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# ENVIRONMENTAL IMPACT STATEMENT – METRO NORTH

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## ALBERT COLLEGE PARK TO MATER STOP

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AREA MN106 (PART 3 – CHAPTERS 13 TO 18)  
VOLUME 2 – BOOK 6 OF 7

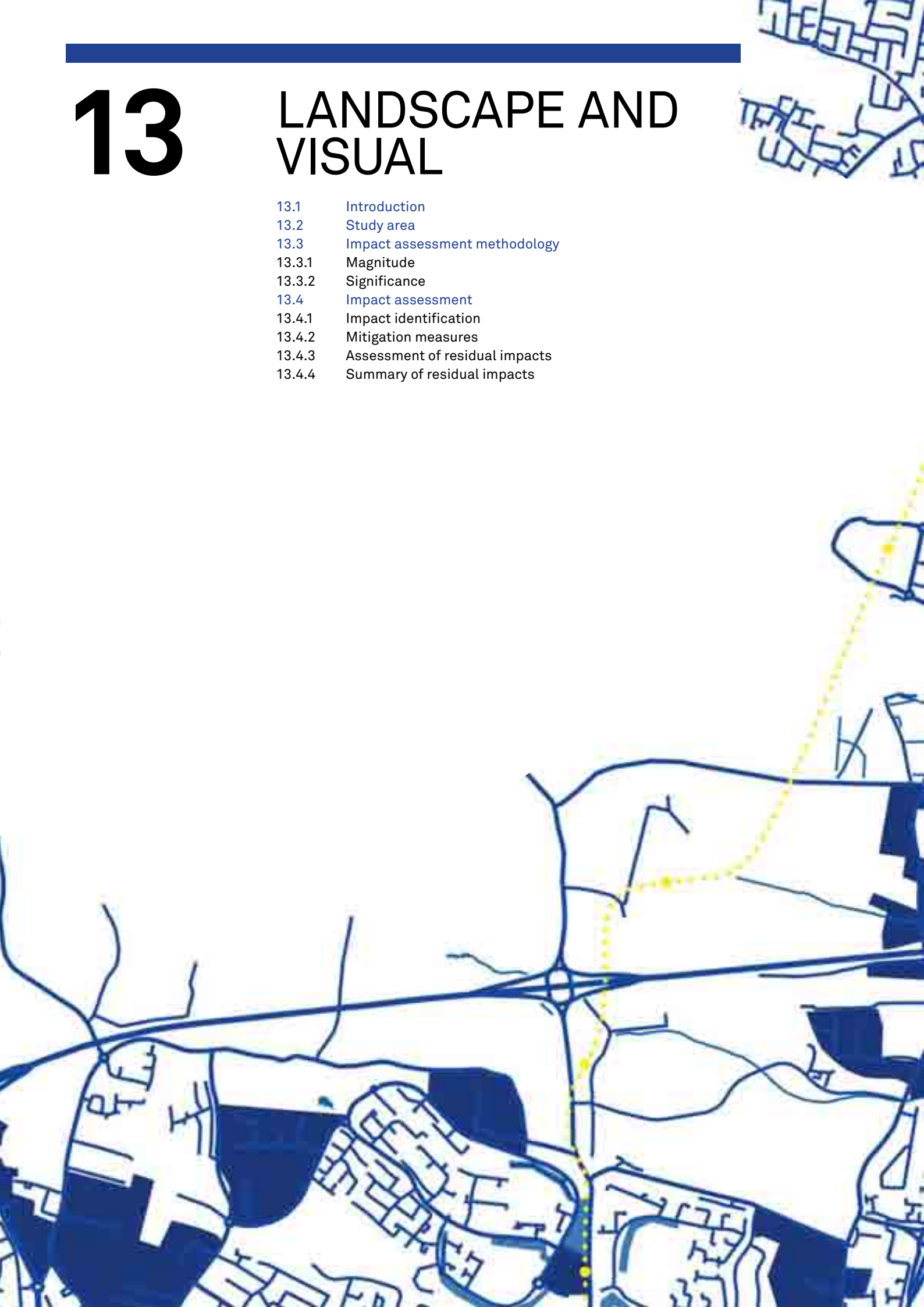
Drumcondra

Mater

# 13

# LANDSCAPE AND VISUAL

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This chapter of the EIS evaluates the potential for landscape and visual impacts arising from the construction and operation of the proposed scheme in Area MN106.

### 13.1 INTRODUCTION

This chapter of the EIS evaluates the potential for landscape and visual impacts arising from the construction and operation of the proposed scheme in Area MN106.

### 13.2 STUDY AREA

The study area corresponds to the potential zone of visual influence of the proposed scheme. The study area is illustrated on the maps (Baseline Landscape and Visual) included in Volume 3, Book 1 of 2.

The dimensions of the study area vary in width depending on the local landscape. In built-up areas, the study area typically extends to the edges of the buildings on either side of the centre line of the proposed scheme. The dimensions of the study area are generally wider in locations where the proposed alignment runs through open space or farmland where longer distance views are possible.

### 13.3 IMPACT ASSESSMENT METHODOLOGY

The source and type of all potential impacts is described in Section 13.4.1.

Mitigation measures to be put in place are defined in Section 13.4.2. Mitigation measures are defined for any adverse impacts that are deemed to be of Medium or greater significance prior to mitigation. The extent to which mitigation is needed increases as the significance of the impact increases.

The residual impacts on landscape and visual amenity are assessed based on the assumption that all mitigation planting will be established successfully and good growth and development will have taken place over a 15 year period from implementation of the planting. The planting is therefore assumed to be effective in providing visual screening of the proposed scheme which will be most effective during the summer months and hence the impact of the proposed scheme is expected to be significantly reduced.

Residual impacts that persist after mitigation measures have been put in place are evaluated in terms of magnitude and significance as described in this section. A summary of all residual impacts is provided in Section 13.4.4.

### 13.3.1 Magnitude

The magnitude of change effecting landscape or visual receptors depends on the nature, scale and duration of the particular change that is envisaged, the location in which it is proposed, and the overall effect on a particular view. This may be very small if the proposed scheme is at some distance. In a landscape, the magnitude of change will depend on the loss or change in any important feature or change in the backdrop to, or outlook from, a landscape. The angle of view, duration of view, distance from the proposed scheme, degree of contrast with the existing view and the extent of visibility all influence the magnitude of the change in view.

The criteria used to assess the different levels of magnitude of change associated with impacts on landscape are shown in Table 13.1. The criteria used to assess the different levels of magnitude of change associated with impacts on visual amenity are shown in Table 13.2.

### 13.3.2 Significance

Significance is determined by considering the sensitivity (functional value) of the landscape or visual receptor and the magnitude of change expected as a result of the proposed scheme. Each case is assessed on its own merits as significance is not absolute and factors unique to each circumstance need to be considered. However, the general principles underpinning the evaluation of significance are set out in Table 13.3 and this table provides a guide to the application of professional judgement and experience in each individual case.

**Table 13.1 Criteria for assessment of magnitude of change on landscape**

Criteria	Magnitude of change
- A clearly evident and frequent or continuous change in key landscape characteristics or components affecting an extensive area.	very high
- A clearly evident change either over a restricted area or infrequently perceived or a moderate change in key landscape characteristics or components, frequent or continuous and over a wide area.	high
- A moderate change either over a restricted area or infrequently perceived or a small change in key landscape characteristics or components over a wide area.	medium
- A barely or rarely perceptible change in key landscape characteristics or components.	low
- Imperceptible change.	very low

**Table 13.2 Criteria for assessment of magnitude of change in visual amenity**

Criteria	Magnitude of change
- Major changes in view such as at close distances, affecting a substantial part of the view, continuously visible for a long duration, or obstructing a substantial part or important elements of view.	very high
- Clearly perceptible changes in views such as at intermediate distances; resulting in either a distinct new element in a significant part of the view; or a more wide ranging, less concentrated change across a wider area.	high
- Moderate changes in views, such as at long distances, or visible for a short duration, perhaps at an oblique angle, or which blends to an extent with the existing view.	medium
- Change which is barely visible, such as at very long distances, or visible for a very short duration, perhaps at an oblique angle, or which blends with the existing view.	low
- Imperceptible change.	very low

Table 13.3 Criteria for assessment of impact significance

		Magnitude of change				
		very low	low	medium	high	very high
Sensitivity of landscape / viewpoint (Functional value)	low	Not significant	Low significance	Low significance	Medium significance	Medium or High significance
	medium	Not significant	Low significance	Medium significance	High significance	High or Very high significance
	high	Not significant	Low significance	Medium or High significance	High or Very high significance	Very high significance

## 13.4 IMPACT ASSESSMENT

### 13.4.1 Impact identification

Sources of impact on landscape and visual amenity include the following;

- All above ground structures including track sections, LMVs, elevated structures, bridge crossings, roads and road realignments, buildings, earthworks, Park & Ride facilities, the depot, stops and associated furniture;
- Lighting.

These sources of impact will result in the following impact types:

#### Direct Impacts

- Loss of landscape elements, including permanent land loss, vegetation losses, severance of watercourses, loss of built elements (which are part of the existing landscape or townscape fabric);
- Changes in physical topography as a result of the introduction of earthworks embankments or cuttings;
- Physical changes arising from the introduction of new structures into the receiving landscape or townscape.

#### Indirect Impacts

- Change to the character of a local landscape arising as a result of the visibility of the proposed scheme.

Landscape and visual impacts may be:

- Positive: a change, which improves the quality of the environment (for example, improving landscape diversity; removal of existing an existing negatively aspect etc.);
- Neutral: a change, which does not affect the quality of the environment;
- Negative: a change, which reduces the quality of the environment (for example, impact on broadleaved woodland; obstructing an existing view; etc).

### 13.4.2 Mitigation measures

#### 13.4.2.1 Construction phase

The following mitigation measures will be applied throughout the construction phase to minimise landscape and visual impacts:

- Fencing will be erected around all temporary work sites;
- Materials and machinery will be stored tidily during the works;
- Portable machinery will be stored behind fencing in compounds when not in use;
- Roads providing access to site compounds and work areas will be maintained free of excessive dust and mud as far as is reasonably practical;
- Lighting of compounds and work sites will be restricted to agreed working hours and that which is necessary for security;
- Temporary fencing, barriers, traffic management and signage will be removed when no longer required;
- All existing trees to be retained will be protected prior to the commencement of construction in accordance with BS 5837 (or an equivalent standard);
- On completion of construction, all remaining spoil and construction material will be removed;
- Work sites and other land occupied temporarily will be reinstated.

The assessment of residual construction impacts assumes that the mitigation measures described in this section are implemented.

### 13.4.2.2 Operational phase

In assessing the impact of the proposed scheme on the landscape and visual environment, account was taken of various measures that will be taken to mitigate potential adverse effects. The landscape mitigation measures are described in this section and illustrated in the Landscape Insertion Plans (see pages 182 to 243).

The mitigation measures that will apply to the proposed scheme overall include the following;

- ecologically sensitive integration of the proposed scheme into the receiving environment. The proposed landscape treatments will complement the surrounding ecological network and will counter the potential barrier and fragmentation effect of the proposed scheme as well as compensate for the loss of habitat;

- consideration of the landscape character and context of the proposed scheme in the preparation of the landscape design which will also consider the road user. The proposed scheme will aim to retain and reinforce regional identity where possible;
- use of landscape planting treatments that require minimal long term maintenance and whose species content match or enhance the character of the surrounding area;
- a range of different habitats will be created to enhance local biodiversity including grasslands, scrub, woodland planting and hedgerows.

Additional landscape mitigation measures that will be implemented repeatedly in particular locations along this area of the alignment are listed in Table 13.4.

**Table 13.4 Mitigation measures specific to Area MN106**

Landscape Mitigation measures	Description and purpose	Area in which mitigation will be put in place (Additional detail regarding mitigation measures is provided in the Landscape Insertion Plans (see pages 182 to 243))
GLM 1	As much existing vegetation as possible will be retained within and adjacent to the proposed scheme. Vegetation to be retained will be protected in accordance with BS5837. Where any woodland is removed for essential safety reasons the potential effects of wind-throw will be assessed and appropriate measures included in the design to mitigate any effects.	LLCA13 LLCA14
GLM 2	Planting to be introduced to compensate for vegetation loss and contribute or reinstate local landscape character.	LLCA13 LLCA14
SLM13a	Replace lost DCU avenue trees with substantial semi mature trees of same species.	
SLM13b	Replace trees lost at entrance to park, along path and along Ballymun Road boundary.	
SLM13c	Replace small group of trees on central path.	
SLM13d	Replace area of woodland lost at southern end of park.	
SLM13e	Ensure existing avenue trees along Griffith Avenue are protected and provide tree screening around Griffith Avenue Stop.	
SLM14a	Create level play area and grassed open space at St. Patrick's Boys National School.	
SLM14b	Additional planting to screen views of new ventilation building from St. Patrick's Boys National School playground and main road.	

### 13.4.3 Assessment of residual impacts

#### 13.4.3.1 Project scenario: construction phase

##### **LLCA 13: Albert College Park and Griffith Avenue Parkland**

Three construction compounds are proposed for location within this LLCA. Compounds 12A and 12b, the Albert College Tunnel Portal are located adjacent to each other within Albert College Park. Compound 12A is located at the northern end of the park within an area of grassed open space and will be present for 2 years. It will contain offices and welfare facilities and will provide service facilities for the TBM. Compound 12B is located south of 12a in a large grassed open space and will be present for 5 years. The northern compound will be handed back on completion of the cut and cover works.

The landscape sensitivity of this area has been judged as high. There are sensitive residential visual receptors located along Ballymun Road with views into the park. People using the park are also sensitive receptors. Use of the park will be severely restricted during the works. The magnitude of change due to construction works is very high therefore the significance of construction impact on landscape and visual receptors is High but of a temporary nature.

It will be very important to restrict the extent of the compounds so as not to cause a long term effect on the existing trees on the boundaries of the compounds. This is particularly the case for the central line of trees east of Construction Compound 12A.

Compound 13, the Griffith Stop compound, is located at the southern end of this LLCA. It will be present for 4 years and will contain offices, welfare facilities and storage and batching facilities.

Views of this compound will be available to residential receptors along Griffith Avenue and to motorists travelling along the road. Views will be mitigated by the presence of the existing street avenue trees. Views will also be available from the Elmhurst Convalescent Home to the north of Compound 13 and from rear of Walnut Rise.

Similar to Compound 12A, it will be important not to remove adjacent trees unnecessarily particularly those not directly affected by the actual stop location. This relates to the group of trees west of the compound and adjacent to Griffith Avenue.

It is judged that the landscape and visual impacts from construction, relevant to Compound 13, should be no worse than the operational impacts if the restriction noted in the preceding paragraph is adhered to.

There are no construction impacts arising from the remainder of the alignment due to the bored tunnel method of construction.

##### **LLCA 14: Griffith Avenue Residential Area**

Construction Compound 14, St. Patrick's-ventilation shaft, is located within this character area within the grounds of St. Patrick's Boys National School. The compound will contain offices and welfare facilities and provide some storage facility and will be present for two years.

The landscape sensitivity of this area has been judged as Low and there are few sensitive visual receptors, all of which are very local such as users of the school and residents along Millbourne Avenue. Users of the sports fields to the north will also see the compound.

Existing trees to the west of the compound should be retained and protected as they provide screening to adjacent properties.

In view of the local nature of the construction impacts it is judged that their effect on receptors is Low.

There are no construction impacts arising from the remainder of the alignment due to the bored tunnel method of construction.

##### **LLCA 15: Tolka River and Environs**

There are no construction impacts arising from the alignment due to the bored tunnel method of construction. In addition, there are no compounds proposed within this LLCA.

##### **LLCA 16: Drumcondra Road Lower Area**

Compound 15, Drumcondra, is located within this LLCA and is confined to the area of the proposed stop. It will be present for four years and will contain offices and welfare facilities.

The landscape sensitivity of this overall area has been judged as high. However, the location for the compound is within an existing yard and the quality of the space is not as high. It is suggested therefore that the sensitivity of the compound area is Medium.

Views into the compound are very local and are mainly from adjacent residential properties.

It is judged that the impact arising from the construction compound will be Low on landscape/townscape receptors and Medium on local visual receptors.

There are no construction impacts arising from the remainder of the alignment due to the bored tunnel method of construction.

##### **LLCA 17: Royal Canal**

There are no construction impacts arising from the alignment due to the bored tunnel method of construction. In addition, there are no compounds proposed within this LLCA.



**LLCA 18: Dorset Character Area**

Compound 16, Mater, is located within this LLCA and is confined to the area of the proposed stop. It will be present for four years.

The sensitivity of this area has been assessed as Medium but the quality is described as Very low. Views into the compound are local and mainly from adjacent properties and users of the car park.

Approximately 10 mature trees will be lost in order to construct the stop. These trees are significant as there are so few in the immediate area. In addition, they provide screening of the existing car park.

In view of the above, it is suggested that the impact arising from the construction compound and the construction of the stop will be Medium on both landscape and visual receptors.

There are no construction impacts arising from the remainder of the alignment due to the bored tunnel method of construction.

**13.4.3.2 Project scenario: operational phase**

The impacts on both landscape and visual amenity on these LLCAs are discussed in the following sections. The impacts on landscape are described in terms of the direct effects (direct physical changes) that are predicted to occur and indirect effects (effects on landscape character arising from the visibility of the proposed scheme).

The visual impact assessment is undertaken from specific viewpoint locations within the visual envelope of the proposed scheme within each LLCA.

**LLCA 13: Albert College Park and Griffith Avenue Parkland****Landscape Impacts (Direct impacts)**

The alignment crosses the Albert College Park and Griffith Avenue Parklands underground from the northern entrance at Ballymun Road to Griffith Avenue, approximately opposite Griffith Lawns. At the northern end within Albert College Park, the cut and cover method of construction requires the removal of a considerable informal line of trees close to the park's boundary with Ballymun Road. These trees (approximately 30 in number) are a significant landscape feature, visible when entering and traversing the park. They are also a prominent landscape feature along Ballymun Road forming a green consistent linear marker for the park.

The alignment continues below the park requiring the further removal of a group of small trees aligning a public path which crosses the park from east to west. These are not particularly significant trees.

At the point where the method of construction changes from cut and cover to a bored tunnel, approximately 11 trees will require removal. These trees align an informal path which traverses the southern end of Albert College Park.

The Griffith Avenue Stop is located at the extreme southern end of the character area and will result in the loss of a large number of mature trees. (approximately 15 number). These trees are a significant group and form part of the southern boundary of the area. Their removal will be obvious from the north and from Griffith Avenue. In their place will be the new stop facilities with its associated mitigation planting.

Griffith Avenue is lined with an avenue of pollarded trees which are a distinctive feature of the road. It is not the intention to remove any of these avenue trees as a direct consequence of the works. There is the requirement to locate a road access between the trees and this will require careful location and detailing to avoid damage. The retention of the avenue trees will assist in mitigating the loss of boundary trees along the roadside.

The landscape sensitivity of this area has been judged as High.

**Table 13.5 Direct impacts on LLCA 13**

**Loss of landscape elements and features**

- Loss of approximately 50 to 60 mature trees at boundaries of Albert College Park.

**Changes to local topography as a result of earthworks structures**

- None.

**Changes arising from the Introduction of proposed structures**

Introduction of Griffith Avenue Stop into parkland.

**Landscape Impacts (Indirect effects)**

There are no indirect effects due to the underground location of the alignment.

**Visual Impacts**

Two viewpoints are located within LLCA 13 (13a and 13b). A description of the visual impacts that occur at these viewpoint locations is provided in Table 13.12. For each viewpoint, the visual baseline is presented as a brief description of the main components in the existing view. The mitigation measures to be employed at these locations are shown in detail in the Landscape Insertion Plans (see pages 182 to 243). The evaluation of impacts described in Table 13.12 takes into consideration the effects of these mitigation measures.

The underground location of the alignment through this character area is an embedded mitigation which reduces the visual impacts of the proposed scheme particularly from within the park.

The loss of boundary trees at Ballymun Road will be visible from residential properties on the other side of the carriageway. Users of the park and particularly those using the entrance to the University will observe these losses. However their loss does not open up views of existing unattractive features, rather there is a greater view into the park. Drivers travelling along Ballymun Road will also be aware of the large vegetation loss at the entrance and boundary of the park.

At Griffith Avenue, residents facing in the direction of the park will be impacted by the removal of the existing mature trees and the introduction of a new, modern glass structure forming the Griffith Avenue Stop. Similarly, drivers will be aware of these changes whilst travelling in either direction along the Avenue.

It is predicted that there will be adverse visual impacts associated with the infrastructure during years 1 to 15 as the planting will be in an immature state. Visual impacts at Viewpoint 13a are considered to be of Low significance. Visual impacts at Viewpoint 13b are considered to be of High significance.

#### **LLCA 14: Griffith Avenue Residential Area**

##### **Direct impacts**

The alignment is entirely underground throughout this character area and is within a bored tunnel. This method of construction does not disturb anything at ground level. As a consequence there are no direct landscape impacts arising from the actual alignment.

Off Millbourne Avenue near its junction with Ferguson Road, there is a requirement for the location of a ventilation building within the alignment. This is located within the grounds of St. Patrick's Boys National School and will require the removal of several mature trees and the redesign and relocation of play areas and open space.

In addition a new access road to the ventilation building will be constructed which will require the removal of several trees and shrubs and a section of existing wall.

A new large ventilation building will be positioned close to the existing school building. However this is a dense urban area and a new building at this location will not fundamentally change the landscape/townscape character.

**Table 13.6 Direct impacts on LLCA 14**

##### **Loss of landscape elements and features**

- Loss of several large trees within school grounds. Loss of play area and open space. Opening up of section of existing boundary wall.

##### **Changes to local topography as a result of earthworks structures**

- Construction of long section of retaining wall and formation of level open space and new play area.

##### **Changes arising from the Introduction of proposed structures**

- Introduction of a new ventilation building with new access road.

##### **Landscape Impacts (Indirect effects)**

Due to the loss of playground and open space within the school grounds, there will be an indirect effect in other areas. To the north of the school, a new retaining wall will be built to provide a level area of grass and a new play area for the school. This is in compensation for the loss of these elements elsewhere.

##### **Visual Impacts**

One viewpoint is located within LLCA 14 (14b). A description of the visual impacts that occur at this viewpoint location is provided in Table 13.12. For each viewpoint, the visual baseline is presented as a brief description of the main components in the existing view. The mitigation measures to be employed at these locations are shown in detail in the Landscape Insertion Plans (see pages 182 to 243). The evaluation of impacts described in Table 13.12 takes into consideration the effects of these mitigation measures.

The main view within this space will be from the school building and within the existing grassed area and playground.

It is predicted that there will be adverse visual impacts associated with the infrastructure during years 1 to 15 as the planting will be in an immature state. Visual impacts at Viewpoint 14b are considered to be of High significance. In order to aid the reader, a photomontage of Viewpoint 14b (St. Patrick's Boys National School) has been prepared and is included on page 244.

#### **LLCA 15: Tolka River and Environs**

##### **Direct impacts**

There are no direct impacts on this landscape character area as the entire alignment is underground and the method of construction is tunnelling.

**Table 13.7 Direct impacts on LLCA 15****Loss of landscape elements and features**

- None.

**Changes to local topography as a result of earthworks structures**

- None.

**Changes arising from the Introduction of proposed structures**

- None.

**Landscape impacts (Indirect effects)**

There are no indirect effects on this local landscape character area as the entire alignment is underground and the method of construction is tunnelling.

**Visual impacts**

There are no visual impacts on sensitive receptors as the entire alignment is underground and the method of construction is tunnelling.

**LLCA 16: Drumcondra Road Lower Area****Direct impacts**

The alignment is entirely underground throughout this character area and is within a bored tunnel. This method of construction does not disturb anything at ground level. As a consequence, there are no direct landscape impacts arising from the actual alignment.

At the Drumcondra Stop, the structure will be built adjacent to existing buildings of mixed ages and style. At each adjacent road an element or elevation of the new stop will be visible and will impart a slight change to the character of each street elevation. The majority of the mass of the new stop structure is concealed from view.

The landscape sensitivity for the whole area has been judged as High. However this High classification is not appropriate for this particular location due to the setting which includes the elevated Maynooth line where a Medium classification is deemed more suitable.

**Table 13.8 Direct impacts on LLCA 16****Loss of landscape elements and features**

- None.

**Changes to local topography as a result of earthworks structures**

- None.

**Changes arising from the Introduction of proposed structures**

- Changes to street elevations, building massing.

**Landscape impacts (Indirect effects)**

None

**Visual impacts**

One viewpoint is located within LLCA 16 (16a). A description of the visual impacts that occur at this viewpoint location is provided in Table 13.12. For each viewpoint, the visual baseline is presented as a brief description of the main components in the existing view. The mitigation measures to be employed at these locations are shown in detail in the Landscape Insertion Plans (see pages 182 to 243). The evaluation of impacts described in Table 13.12 takes into consideration the effects of these mitigation measures.

The view from the corner of St. Alphonsus' Road Lower and St. Joseph's Avenue will be relatively unchanged. There will be a close view of the Escape Core Building in lieu of the existing bleak walls.

Properties aligning St. Joseph's Avenue, St. Alphonsus' Road and Avenue and Drumcondra Road Lower will have views of various parts of the new stop. In some cases these views will be from upper floor windows. It is predicted that there will be adverse visual impacts associated with the infrastructure during years 1 to 15 as the planting will be in an immature state. Visual impacts at Viewpoint 16a are considered to be of Low significance.

**LLCA 17: Royal Canal****Direct impacts**

There are no direct impacts on this landscape character area as the entire alignment is underground.

**Table 13.9 Direct impacts on LLCA 17****Loss of landscape elements and features**

- None.

**Changes to local topography as a result of earthworks structures**

- None.

**Changes arising from the Introduction of proposed structures**

- None.

**Landscape impacts (Indirect effects)**

There are no indirect effects on this local landscape character area as the entire alignment is underground and the method of construction is tunnelling.

**Visual impacts**

There are no visual impacts on sensitive receptors as the entire alignment is underground and the method of construction is tunnelling.

**LLCA 18: Dorset Character Area****Direct impacts**

The alignment is entirely underground throughout this character area and in addition is within a bored tunnel. As a consequence there are no direct landscape impacts arising from the actual alignment.

At the Mater Stop, five existing properties will be demolished to accommodate the Stop, entrances, ventilation and escape buildings. Three of these buildings are part of a long terrace of buildings of regular and repetitive form. They will be replaced by new structures constructed of modern materials. The fact that it is the end buildings which are being removed means that the integrity of the existing elevation is not compromised which would be the case if middle sections were proposed for removal.

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**Table 13.10 Direct impacts on LLCA 18**

**Loss of landscape elements and features**

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- Loss of end properties from contiguous residential terrace.
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**Changes to local topography as a result of earthworks structures**

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- None.
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**Changes arising from the Introduction of proposed structures**

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- New modern entrance blocks and infrastructure placed into existing streetscape.

**Landscape impacts (Indirect effects)**

There are no indirect effects on this local landscape character area as the entire alignment is underground and the method of construction is tunnelling.

**Visual impacts**

Visual impact is very local and mainly affects existing properties which align the surrounding roads. This mainly concerns Leo Street and North Circular Road where the removal of the existing buildings and the replacement by new structures will be visible. Due to the high sensitivity of these receptors and the medium magnitude of change, the significance of this visual impact is Medium.

### 13.4.4 Summary of residual impacts

A summary of all residual impacts is provided in Table 13.11 and Table 13.12.

Table 13.11 Summary of residual impacts on landscape

LLCA ID	Sources of Impact	Amount	Impact Description	Mitigation measures	Sensitivity of LLCA (Functional Value)	Magnitude (post mitigation)	Significance (Post mitigation)
LLCA 13	Cut and Cover section of alignment.	Total length of cut and cover approx. 350m	Loss of large areas of vegetation.	GLM 1 GLM 2	high	high	High
	Griffith Avenue Stop	Area of Griffith Avenue Parklands lost to stop approximately 5270m <sup>2</sup>	Change in character of park and rural character due to introduction of stop.	SLM13a SLM 13b SLM 13c SLM 13d SLM13e			
LLCA 14	Location of ventilation building at St. Patrick's College and construction of a new access road.	Area of building and access road approximately 1200m <sup>2</sup>	Loss of vegetation Loss of play area and open space. Loss of section of boundary stone wall.	GLM 1 SLM 14a SLM 14b	low	low	Low
LLCA 15	None	Not applicable	Not applicable	Not applicable	low	Not applicable	Not Significant
LLCA 16	Drumcondra Stop	Not applicable	New buildings and structures on street elevation.	Embedded in design of buildings.	high generally but medium in this particular location	medium	Medium
LLCA 17	None	Not applicable	Not applicable	Not applicable	low	very low	Not significant
LLCA 18	Location of Mater Stop	Removal of five existing buildings and a number of mature trees.	Loss of character from removal of buildings. Loss of mature trees in area with few trees.	Design of new structures to provide appropriate ends to existing terraces.	medium	medium	Medium

Table 13.12 Summary of residual impacts on visual amenity at selected viewpoint locations

Viewer Type: H: Residents of dwellings/houses; R: Recreational users; T: Commuters/pedestrians; W: Workers.

View point ID	Location and viewer type	Components of the existing view	Mitigation measures are shown in the Landscape Insertion Plans, see pages 182 to 243	Description of the proposed view (with landscape mitigation measures).	Sensitivity of viewpoint (Functional Value)	Magnitude (post mitigation)	Significance (Post mitigation)
13a	Walnut Rise (H)	Boundary wall and streetscape in foreground. Mature trees in the far distance. Tilled field.	Planting adjacent to stop to integrate facility into the landscape.	Same as before with elements of stop possibly visible in distance but seen through new tree planting.	high	low	Low
13b	Rear of Elmhurst convalescent home	Large open space (used for tillage). Mature trees in the background. Housing in far distance. Copper dome of Corpus Christi church.	Planting adjacent to stop to integrate facility into the landscape.	Stop visible in view at close distance. Line of trees provide some screening but majority of structure visible.	high	high	High
14b	St. Patricks Boys National School (H) (T)	Hard surfaced open space. Scattered trees. Grassed embankment associated with sports pitch. Grassed open space and boundary wall. Dwellings beyond boundary wall.  (Please refer to page 244 for the photomontage of this location.)	Protection of existing planting. New screen planting and creation of new level play area and grassed area.	New ventilation building and surfaced service road. Tree planting to side elevation.  (Please refer to page 244 for the photomontage of this location.)	medium	very high	High
16a	Corner of St. Alphonsus Road Lower and St. Joseph's Avenue (H) (T)	Streetscape. Boundary wall and rear entrance to St. Vincent's Centre for the Deaf.	Sympathetic design of structure.	The escape Core building will be visible as a new structure in lieu of bleak wall elevation.	high	low	Low

# Landscape Baseline Plans Albert College Park



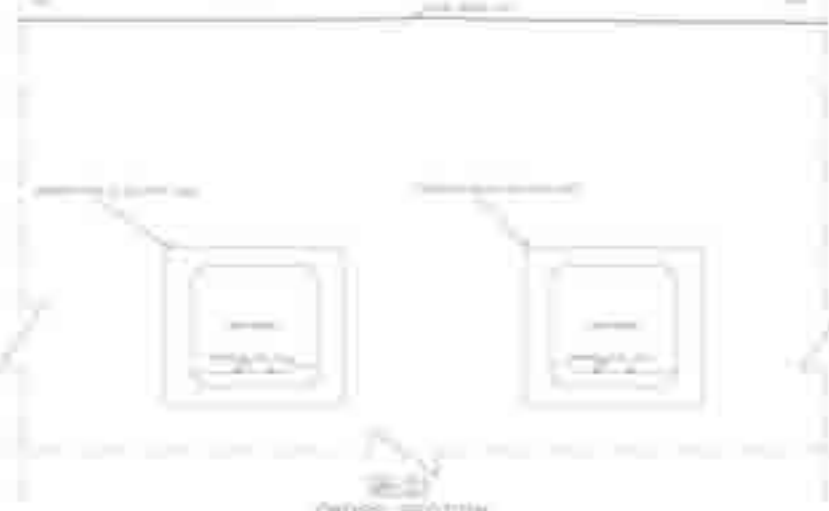


Proposed Metro Park Agreement

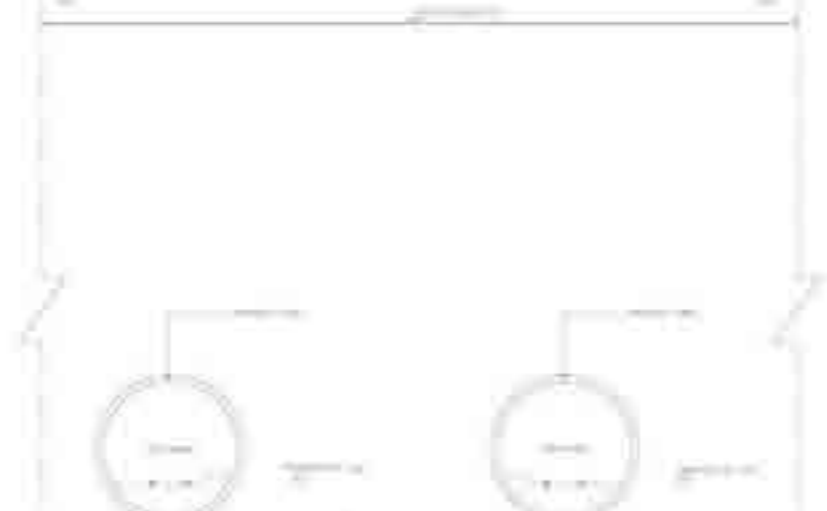
<b>RAILWAY WORKS</b>			
BASELINE LANDSCAPE			
4431-1000000000			
DATE:	DATE:	DATE:	DATE:
BY:	BY:	BY:	BY:
APP:	APP:	APP:	APP:
REV:	REV:	REV:	REV:



# Landscape Insertion Plans Albert College Park



CROSS SECTION



PLAN VIEW



**DRAWING LEGEND**

[Symbol]	[Description]
[Symbol]	[Description]
[Symbol]	[Description]
[Symbol]	[Description]
[Symbol]	[Description]



**RPA**

**METRO**

**RAILWAY WORKS**  
LINE MN - ALIGNMENT DETAIL  
SHEET NO. 105





# Landscape Baseline Plans Albert College Park to Bantry Road



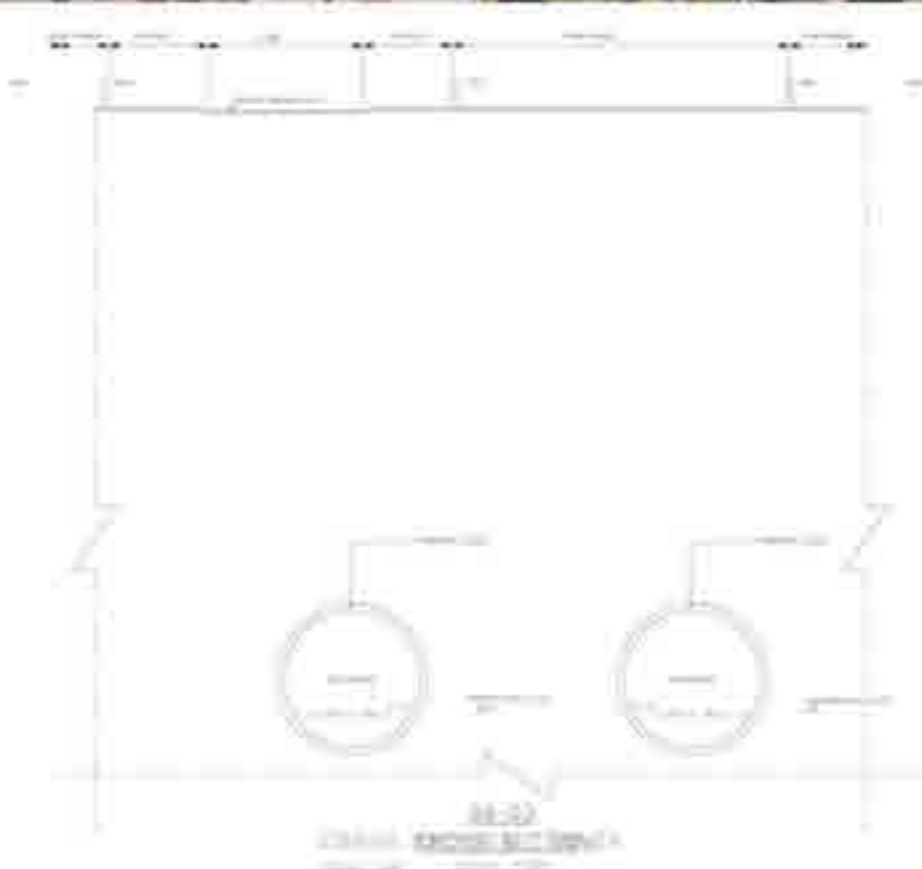
Proposed Metro North Alignment

<b>RAILWAY WORKS</b>			
BASELINE LANDSCAPE			
SCALE: 1:1000 (Horizontal) & 1:1000 (Vertical)			
DATE:	ISSUED:	BY:	APPROVED:

Landscape Insertion Plans  
Albert College Park to Bantry Road



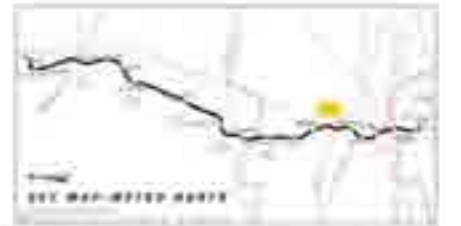
LOCATION PLAN  
 1:10000  
 10/10/2018



PLAN 10000

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**RPA** **METRO**

**RAILWAY WORKS**  
 LINE 100 - ALIGNMENT DETAILS  
 HAMPTON PARK TO HUNTRY ROAD

100 100 100 100 100 100 100 100 100 100







# Landscape Baseline Plans Bantry Road to Hardiman Road



Proposed Metro Park Alignment

<b>RAILWAY WORKS</b>			
BASELINE LANDSCAPE			
4021 - Sandy Hill & Hartigan Road			
DATE:	ISSUED:	BY:	SCALE:

Landscape Insertion Plans  
Bantry Road to Hardiman Road



Figure 100

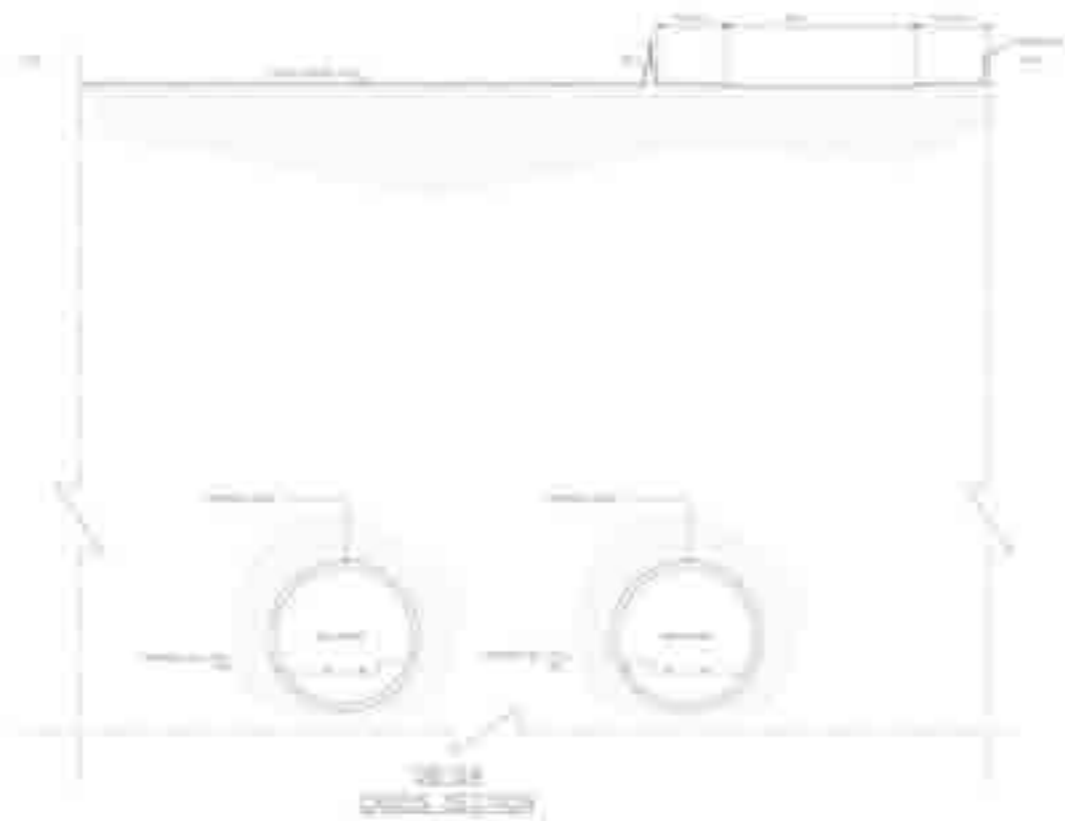


Table with multiple rows and columns, likely containing project details, dates, and contact information. The text is too small to read accurately.



**RAILWAY WORKS**  
LINE NO - ALIGNMENT DETAILS  
BANTY ROAD TO HESSMAN ROAD









# Landscape Baseline Plans Hardiman Road to Millbourne Avenue



Proposed Metro North Alignment



**METRO**

**RAILWAY WORKS**  
 BASELINE LANDSCAPE

4/2011 - 4/2011

DATE	DESCRIPTION	BY	CHECKED

Landscape Insertion Plans  
Hardiman Road  
to Millbourne Avenue

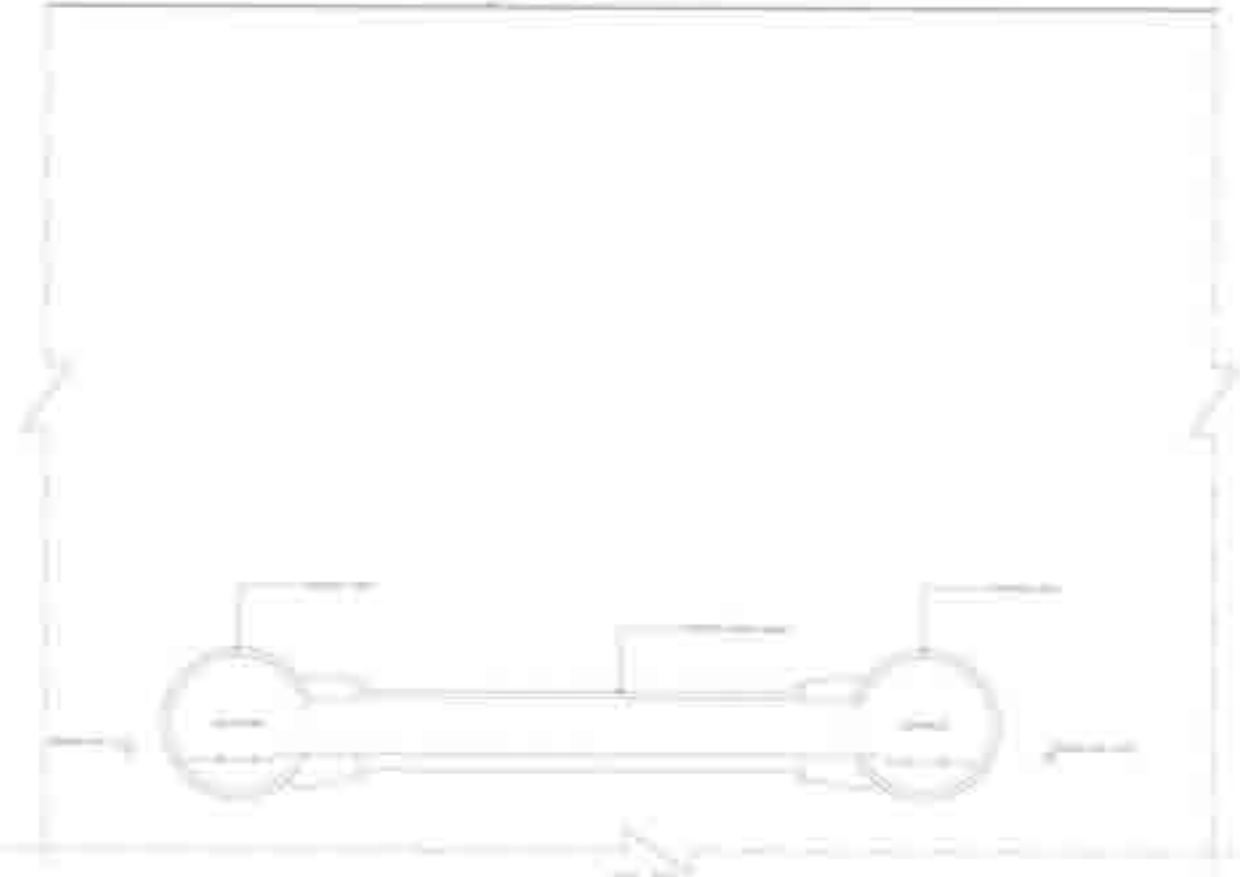


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**RPA** **METRO**

**RAILWAY WORKS**  
LINE NO - ALIGNMENT DETAILS  
HARRISMAN ROAD TO HILLSBORNE AVENUE







# Landscape Baseline Plans Millbourne Avenue to Dargle Road



Proposed Metro Park Agreement

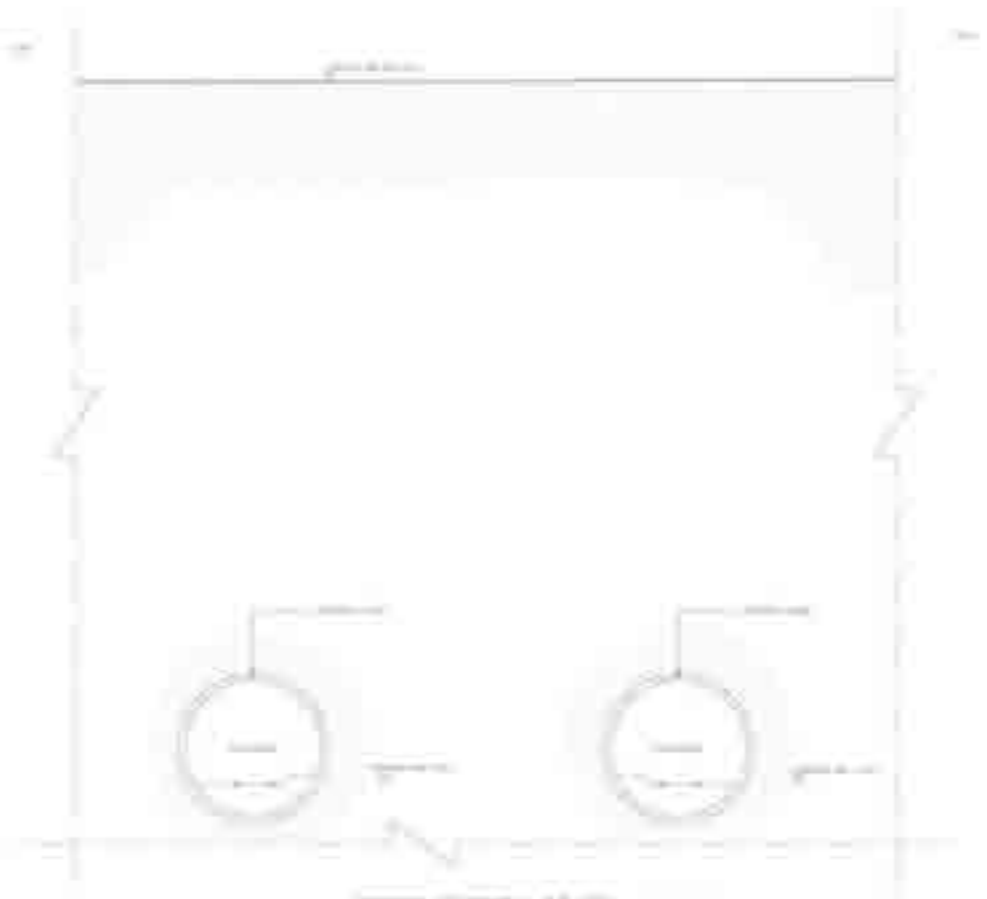
 																	
<b>RAILWAY WORKS</b> BASELINE LANDSCAPE <small>4001 - Millbrook Road, St. George's Park</small>																	
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Landscape Insertion Plans  
Millbourne Avenue  
to Dargle Road



23.26



CROSS SECTION 23.26

	Overhead Power Line
	Track
	Grade
	Structure
	Right-of-Way

	Proposed Track
	Proposed Right-of-Way
	Proposed Station
	Proposed Platform
	Proposed Building



**RPA** **METRO**

**RAILWAY WORKS**  
 LINE NO. - ALIGNMENT DETAILS  
 WILCOX AVENUE TO HARRIS ROAD

DATE:	DATE:
BY:	BY:

PROJECT NO. 100-100000	DATE 10/2008
PROJECT NAME 15th St - 31st St	DATE 10/2008
PROJECT LOCATION 15th St - 31st St	DATE 10/2008
PROJECT DESCRIPTION 15th St - 31st St	DATE 10/2008
PROJECT OWNER 15th St - 31st St	DATE 10/2008
PROJECT ENGINEER 15th St - 31st St	DATE 10/2008
PROJECT ARCHITECT 15th St - 31st St	DATE 10/2008
PROJECT CONTRACTOR 15th St - 31st St	DATE 10/2008





# Landscape Baseline Plans Dargle Road to St. Anne's Road North



Proposed Metro Track Alignment

RPA METRO

**RAILWAY WORKS**  
BASELINE LANDSCAPE

Scale: 1:5000

DATE:	15/05/2018
PROJECT:	RAILWAY WORKS
DRAWN BY:	...
CHECKED BY:	...
APPROVED BY:	...

Landscape Insertion Plans  
Dargle Road to  
St. Anne's Road North



LOCATION PLAN  
 2017.10.05



ALL DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED



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**RPA** **METRO**

**RAILWAY WORKS**  
 LINE NO. ALIGNMENT DETAIL  
 PARALLEL ROAD - ST ANNE'S ROAD NORTH

106

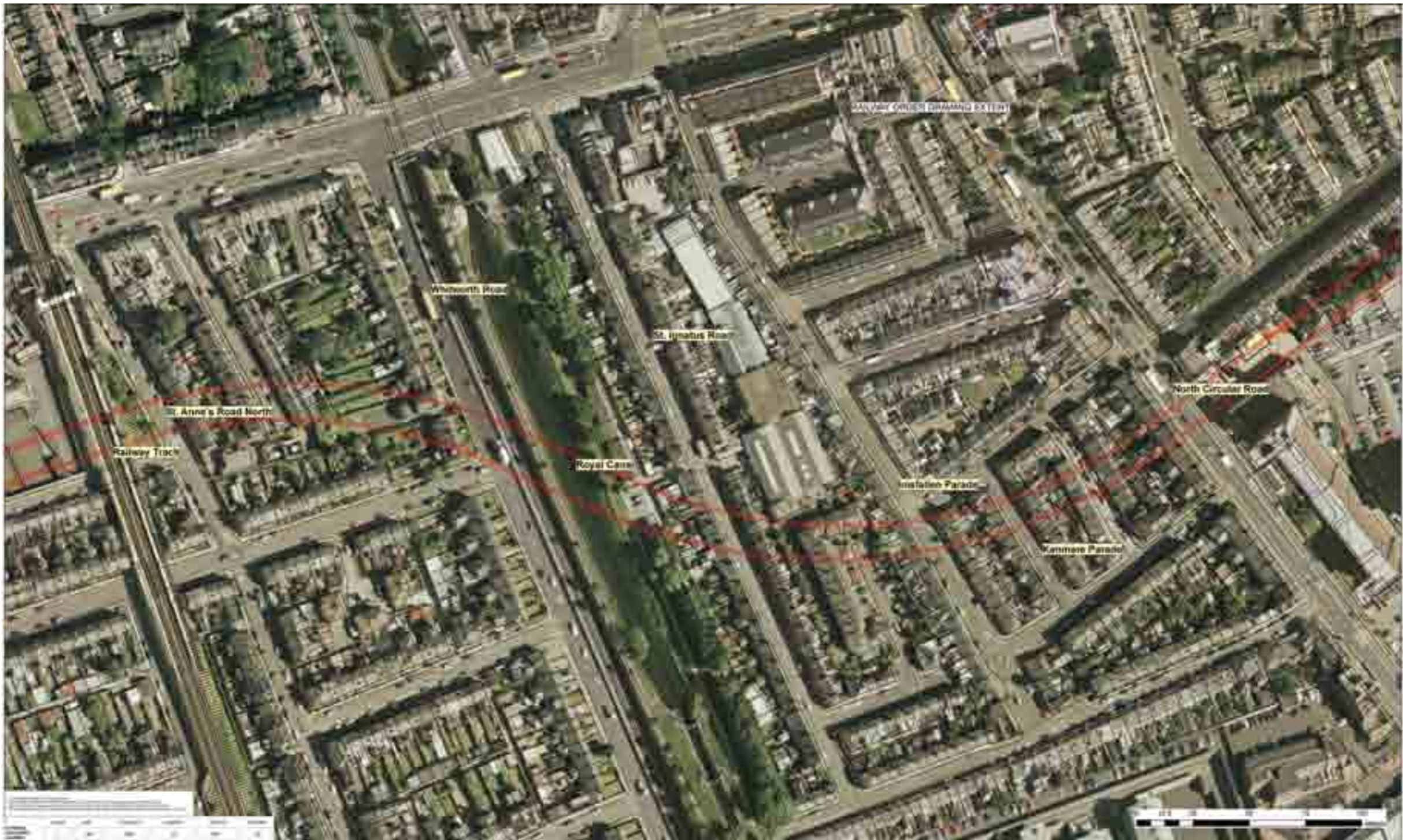
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 PROJECT NO.: [Number]  
 SHEET NO.: [Number]







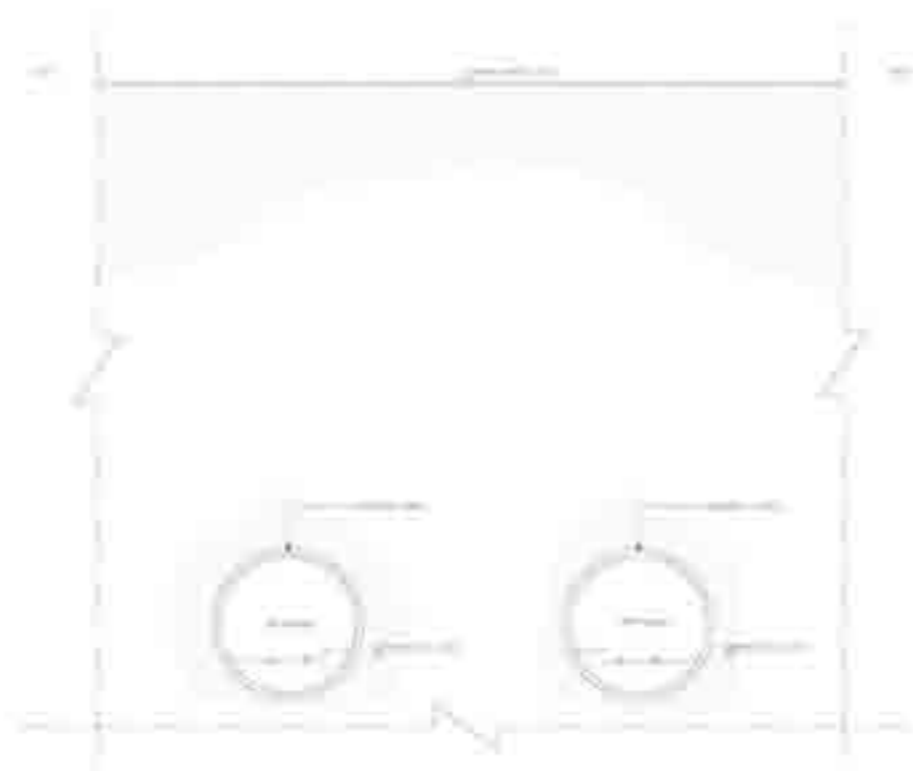
# Landscape Baseline Plans St. Anne's Road North to Kenmare Parade



Proposed Metro Route Agreement

 																	
<b>RAILWAY WORKS</b> BASELINE LANDSCAPE <small>RAILWAY WORKS - 2018/19 Annual Report</small>																	
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Landscape Insertion Plans  
St. Anne's Road North to  
Kenmare Parade



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PROJECT: [Illegible]  
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DATE: [Illegible]



<p><b>RAILWAY WORKS</b></p> <p>LINE NO. - ALIGNMENT DETAILS</p> <p>ST: HWY 20 RD. NORTH TO SENNARS PARKWAY</p>	<p>SEE MAP NORTH</p>
<p><b>RPA</b></p>	<p><b>METRO</b></p>
<p><b>RAILWAY WORKS</b></p> <p>LINE NO. - ALIGNMENT DETAILS</p> <p>ST: HWY 20 RD. NORTH TO SENNARS PARKWAY</p>	
<p>100</p>	







# Landscape Baseline Plans Kenmare Parade to St. Joseph's Parade



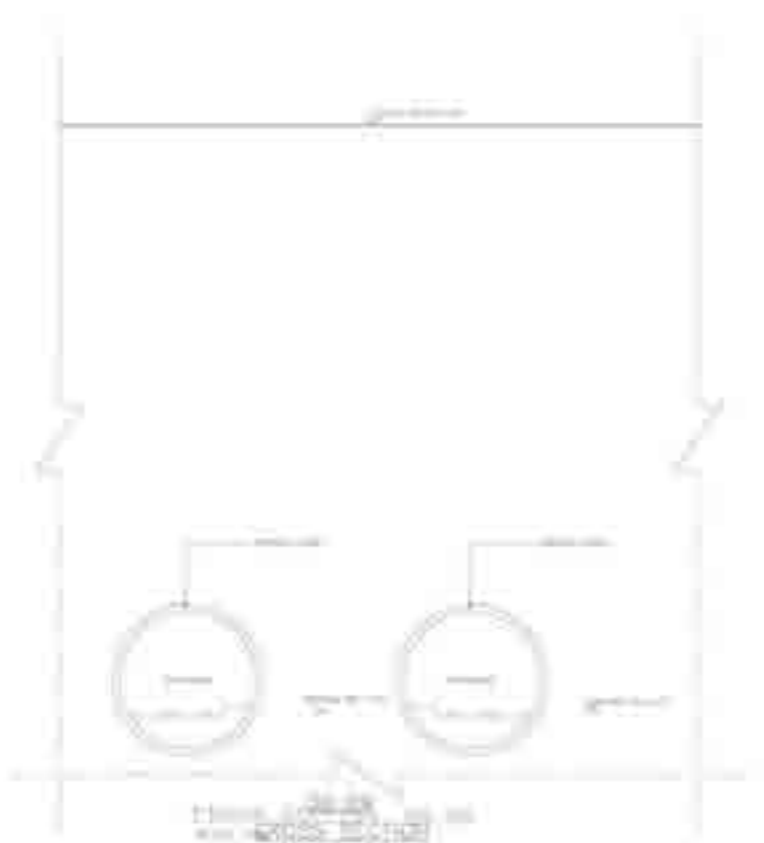
Proposed Metro North Agreement

 																	
<b>RAILWAY WORKS</b> BASELINE LANDSCAPE <small>2023-24 - Waterloo Parkside to Joseph's Road</small>																	
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Landscape Insertion Plans  
Kenmare Parade to  
St. Joseph's Parade



20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.



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**RPA** **METRO**

**RAILWAY WORKS**  
 LINE M1 - ALIGNMENT DETAILS  
 KENMARE PARADE TO ST. JOSEPH'S PARADE

RAILWAY WORKS  
 LINE M1 - ALIGNMENT DETAILS  
 KENMARE PARADE TO ST. JOSEPH'S PARADE

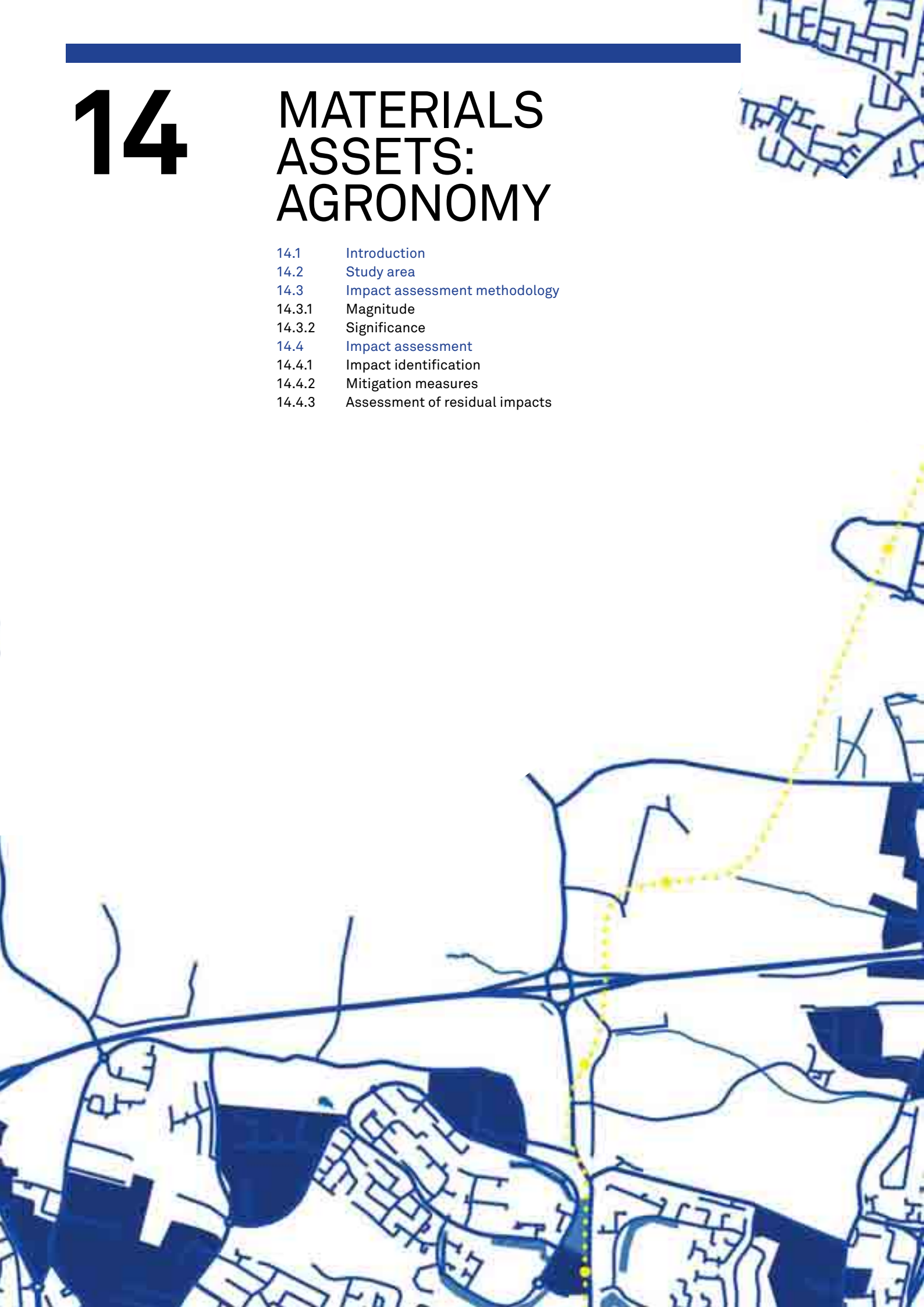


MN106 Viewpoint 14b

# 14

## MATERIALS ASSETS: AGRONOMY

- 14.1 Introduction
- 14.2 Study area
- 14.3 Impact assessment methodology
  - 14.3.1 Magnitude
  - 14.3.2 Significance
- 14.4 Impact assessment
  - 14.4.1 Impact identification
  - 14.4.2 Mitigation measures
  - 14.4.3 Assessment of residual impacts





This chapter of the EIS evaluates the potential for impacts on agronomy due to the construction and operation of the proposed scheme in Area MN106.

#### 14.1 INTRODUCTION

This chapter of the EIS evaluates the potential for impacts on agronomy due to the construction and operation of the proposed in Area MN106.

#### 14.2 STUDY AREA

The study area for this assessment is set out in Table 14.1.

Table 14.1 Study area

| Criteria  | Area of Agricultural Land Directly Affected |
|---|---|
| Farms directly affected by the proposed scheme are illustrated on maps (Baseline Agronomy) included in Volume 3, Book 1 of 2. | 20ha  |

#### 14.3 IMPACT ASSESSMENT METHODOLOGY

The source and type of all potential impacts is described in Section 14.4.1. Mitigation measures to be put in place are defined in Section 14.4.2. Mitigation measures are defined for any adverse impacts that are deemed to be of Medium or greater significance prior to mitigation. The extent to which mitigation is needed increases as the significance of the impact increases. The residual impact of each impact is then evaluated in Section 14.4.3 in terms of magnitude and significance.

##### 14.3.1 Magnitude

The magnitude of the impact takes into account the type and range of impact that will occur as well as the duration over which the impact will occur. The criteria for assessment of impact magnitude are set out in Table 14.2.



Table 14.2 Criteria for assessment of impact magnitude

| Criteria   | Impact magnitude |
|--|------------------|
| <ul style="list-style-type: none"> <li>- A large proportion of the land lost</li> <li>- A large proportion of the land severed</li> <li>- Permanent loss of farm buildings or water sources</li> <li>- Impact would cause a change in farming enterprise</li> </ul>  | very high        |
| <ul style="list-style-type: none"> <li>- A large proportion of the land lost</li> <li>- A medium proportion of land severed</li> <li>- Farm buildings or water sources may be affected but can be replaced</li> <li>- Impact would not cause a change in farming enterprise but would require high degree of operational changes</li> </ul>              | high             |
| <ul style="list-style-type: none"> <li>- A medium proportion of the land lost</li> <li>- A small proportion of land severed or no severance</li> <li>- Farm buildings or water sources may be affected but can be replaced</li> <li>- Impact would not cause a change in farming enterprise but would require significant operational changes</li> </ul> | medium           |
| <ul style="list-style-type: none"> <li>- A small proportion of the land lost</li> <li>- A small proportion of land severed or no severance</li> <li>- Farm buildings or water sources may be affected but can be replaced</li> <li>- Impact would cause a minor change in the day to day operation of farms</li> </ul>                                   | low              |
| <ul style="list-style-type: none"> <li>- A small proportion of the land lost</li> <li>- A small proportion of land severed or no severance</li> <li>- No impact on operation of farms</li> </ul>   | very low         |

### 14.3.2 Significance

The significance of the impact is defined by evaluating the magnitude of the impact in light of the functional value of the target of the impact. The targets of the impact in this assessment are the individual farms directly affected by the proposed scheme. Therefore an impact which affects a farm with a low functional value will not be as significant as a similar impact which affects a farm with a high functional value.

## 14.4 IMPACT ASSESSMENT

### 14.4.1 Impact identification

The elements of the proposed scheme that will act as sources of impact on agronomy include the following:

All permanent above ground built structures associated with the proposed scheme, earthworks, cuttings and embankments, the stop, access ways and tunnel portals.

The main potential types of impacts to agricultural enterprises during the construction and operational phases are:

### Land-take

Any reduction in land area can potentially reduce the viability and productivity of farms within the study area. The level to which land-take affects the viability of an individual farm is not solely dependent on the amount of land removed, but is also dependent on factors such as quality of the land taken, total area of the holding, type of enterprise and whether the land-take results in severance or permanent reduction and damage of land access, farm structures or water sources. Land will be required during the construction phase for construction compounds.

### Severance

Increasing the segmentation of a farm can potentially increase the long-term fixed and variable costs associated with running the farm and therefore can potentially reduce the viability of farms.

**Disturbance: traffic, noise, air, other**

The day-to-day operation of farms in the study area will be disrupted due to increased levels of construction traffic in the local road network and possible traffic diversions. Changes in the traffic regime can also be expected to occur during the operational phase. Water and electricity supplies may also be temporarily disrupted. Increased levels of noise and dust may occur as result of construction traffic and excavation works. Sudden noise sources which may be associated with construction may cause farm animals to take flight and possibly harm themselves or other farm animals. Land drainage systems may be blocked on a temporary basis.

**14.4.2 Mitigation measures****Land-take**

- Minimise the land-take requirements so that only lands required for the proposed scheme are taken.
- Mitigation works will not be carried on lands outside the areas encompassed by the Compulsory Purchase Order (CPO). However land owners who lose wells as a result of the proposed scheme will drill replacement wells in their own land if a satisfactory replacement is not available. Land owners may also have to build additional farm facilities (e.g. cattle retaining and testing pens) on their own land if land is severed.
- Land owners will be paid for the land taken, which will allow them to replace the lost land if they wish to do so.
- Land taken on a temporary basis during the construction phase will be reinstated and returned to the relevant land owners.

**Severance**

- All severed land parcels will be accessible either via the local road network or via accommodation access roads provided as part of the proposed scheme
- Where existing water and electricity supplies to fields or farm yards are severed, the supply will be reinstated by provision of ducting where possible. Alternatively, where ducting is not feasible an alternative water source or electricity supply will be made available. If an alternative water source is not available, the farmer will drill a well on his own land.
- Land owners may have to build additional farm facilities (e.g. cattle retaining and testing pens) on their severed land.

**Disturbance: traffic, noise, air, other**

- The contractor will liaise with land owners prior to the finalisation of the design of the proposed scheme. Any issues predicted to occur as a result of disturbance caused during the construction works will be addressed during as part of ongoing consultation with the land owners.

- A key contact will be appointed by the contractor during the construction phase to facilitate communications between affected landowners and the contractor. Good communication with farmers will facilitate the re organisation of farm enterprises by farmers at critical times. Liaison between the contractor and farmers during the works will also minimise difficulties caused by the restriction of access to severed land parcels.
- Boundary fencing will be erected to delineate the site boundary and prevent disturbance to adjacent land.
- The land owner will be provided with access to all severed land during the construction of the proposed scheme where this is possible. Where this access is temporarily disrupted the land owner will be notified in advance. If the land owner can not access his severed land because of works being carried out for the proposed scheme, temporary gates across fenced areas will be provided.
- Disrupted electricity and water supplies shall be restored within 12 hours or else alternative supplies shall be provided by way of generators or water tankers. The contractor shall minimize impacts on water quality. This shall be done by way of a programme of mitigation measures for surface water sources as described in the Surface Water chapters of this EIS (Volume 2, Chapter 11).
- The contractor will employ measures to prevent the spread of dust and mud onto adjoining lands. These measures are set out in the Air and Climatic Factors chapters of this EIS (Volume 2, Chapter 12). Typically, the impact of dust on agricultural grazing livestock is not significant. However, if exceptional cases occur, livestock will be moved from the affected area at the expense of the contractor.
- If soil disturbance occurs, the contractor shall ensure that all top soil is reinstated to facilitate successful crop establishment. Reinstatement shall ensure that the land is level, adequately drained and shall not contain stones or gravel or other materials imported onto the site for the construction of the proposed scheme. The agronomy assessment assumes that it will take some years for this land to reach its production potential. It is also assumed that this production potential will be permanently lower than its original state due to compaction and disturbance of soil.
- The drainage design of the proposed scheme will intersect any existing field drains and carry the drainage water to a suitable outfall.

### 14.4.3 Assessment of residual impacts

#### 14.4.3.1 Project scenario: construction phase

There are 20ha of agricultural land in Area MN106 directly affected by the proposed scheme – 100% of this land has a high functional value for the purposes of impact assessment. Because this 20 hectare land parcel is surrounded by the city there will be no indirect impacts on other farms. Agricultural lands within Area MN106 account for 5.7% of the total agricultural area directly affected by the proposed scheme.

Table 14.3 Summary details of individual farm in the study area.

|  |                    |   |
|--|--------------------|---|
| Farm id (Refer to Baseline Agronomy maps included in Volume 3, Book 1 of 2 for location of land parcels)                                 |                    | 9   |
| Area (ha) of affected farm   |                    | 20  |
| Type of Farm Enterprise  |                    | 20ha of cereals and potatoes.                                     |
| Land type and quality  | Soil Association   | No 38   |
|  | Land quality       | Good quality  |
| % of total Agricultural lands along Metro North  |                    | 5.7%  |
| Land taken (ha)  | Permanent/residual | 0.6   |
|  | Temporary          | 2.2   |
| % land taken   | Permanent/residual | 3%  |
|  | Temporary          | 11%   |
| Severance  |                    | No  |
| % land severed (of the area remaining)   | Permanent/residual | 0%  |
|  | Temporary          | 0%  |
| Nature of impact (before mitigation)<br>(Refer to Baseline Agronomy maps included in Volume 3, Book 1 of 2 for location of land parcels) |                    | Medium construction phase and Low residual impact from land loss. |
| Magnitude of impacts   | Permanent/residual | low   |
|  | Temporary          | medium  |
| Functionality  |                    | 4 – High  |
| Significance of impacts  | Permanent/residual | Low   |
|  | Temporary          | Medium  |
| Recommended mitigating measures (see notes 1 - 4 below)  |                    | As per 1 - 4 below.   |

#### Recommended mitigation measures;

1. Restore affected access points to lands remaining after construction is completed;
2. Restore water and power supplies to lands remaining after construction is completed;
3. Fence off all construction areas;
4. The land within the construction compounds will be re instated according to guidelines within the construction contract.

**Land-take**

Approximately 2.9ha of agricultural land will be required for the construction of the proposed scheme during the construction phase. 1.74ha will be required for construction compounds and will be returned to the land owners when construction is completed. The area of land in the study area will be reduced by 8.7% during construction.

The potential magnitude of impact on agriculture due to land loss during the construction phase would be medium if mitigation was not put in place and the functionality of the study area is high therefore this impact would be considered to be of Medium significance. The mitigation measures to be put in place are set out in Section 14.4.2. When these mitigation measures are taken into consideration, the magnitude of construction phase impact is medium and is considered to be of Medium significance. This impact cannot be completely mitigated.

**Severance**

There will be no severance of land. Water and power services may be severed but because of the commitment to maintain these supplies the impact is not significant.

**Disturbance: traffic, noise, lighting, air, other**

During the construction phase there will be temporary disruption to the day to day operation of farms due to construction traffic and possible temporary disruption of access and water and power supplies to parts of the farm. Noise sources in this area during construction include the construction works, construction traffic and construction compounds. The predominant enterprise in the area is arable (100% of the agricultural area). These enterprises are less sensitive to disturbance due to lighting, dust, construction traffic, interrupted water supplies and interrupted farm access. Before mitigation, the potential magnitude of the disturbance impact is considered to be low and the study area is of high functional value. The significance of the construction phase disturbance impact is therefore considered to be Low (before mitigation). Mitigation measures to be put in place with respect to noise are described in Section 14.4.2. When these measures are taken into account, the magnitude of the disturbance impact is considered to be low and the significance of the construction phase impact is therefore considered to be Low.

**14.4.3.2 Project scenario: operational phase****Land-take**

Approximately 1.13ha of agricultural land will be required for the operation of the proposed scheme – 5.7% permanent reduction. The potential magnitude of impact on agriculture due to land loss during the operational phase would be low if mitigation was not put in place and the functionality of the study area is high therefore this impact would be considered to be of Low significance. The mitigation measures to be put in place are set out in Section 14.4.2. When these mitigation measures are taken into consideration, the magnitude of residual impact is low and is considered to be of Low significance. This impact cannot be completely mitigated.

**Severance**

No impact from severance will occur in this area.

**Disturbance: traffic, noise, lighting, air other**

Noise and light sources in this area during operation will emanate from the Griffith Avenue Stop.

Arable cropping enterprises are not sensitive to continuous noise sources and traffic/dust/lighting does not lead to a reduction in crop growth. Mitigation measures to be put in place with respect to noise are set out in Section 14.4.2. When these measures are taken into account, the magnitude of these impacts is considered to be Very low. The residual impact is therefore considered to be not significant.

There may be some increases in traffic along local road networks adjoining the stop but in general traffic volumes along the proposed scheme will reduce and the residual impact on agriculture from changes in traffic volumes is assessed to be not significant.

**Disturbance of drainage**

The potential magnitude of impact on agriculture due to disruption of drainage would be very low if mitigation was not put in place (because there is no severance and railway line is under ground) and the functionality of the study area is high therefore this impact would be considered to be not significant.

**Impacts on water sources and water quality**

Water is a necessary resource for agriculture in the study area as a potable supply for irrigation, spraying and for washing equipment and produce. Assuming alternative water sources will be maintained and provided the magnitude of impact on water sources from the operation of the proposed scheme is assessed to be not significant.



# 15

## MATERIAL ASSETS: ARCHAEOLOGY, ARCHITECTURAL HERITAGE AND CULTURAL HERITAGE

- 15.1 Introduction
- 15.2 Study area
- 15.3 Impact assessment methodology
- 15.3.1 Magnitude
- 15.3.2 Significance
- 15.4 Impact assessment
- 15.4.1 Impact identification
- 15.4.2 Assessment of potential impacts prior to mitigation
- 15.4.3 Mitigation measures
- 15.4.4 Assessment of residual impacts



This chapter describes the potential impacts on archaeology, architectural heritage and cultural heritage, which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN106.

## 15.1 INTRODUCTION

This chapter describes the potential impacts on archaeology, architectural heritage and cultural heritage which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN106. Cultural heritage comprises archaeology and architectural heritage and also includes environmental aspects that are dealt with in other chapters of the EIS including Human Beings: Landuse, Landscape and Visual and Soils and Geology (Volume 2, Chapters 2, 9 and 13 respectively).

Archaeology and architectural heritage all refer to traces of human activity in the physical environment inherited from past generations, maintained in the present and preserved for the benefit of future generations. Elements of archaeology and architectural heritage are not restricted by size and as such individual finds, buildings, or whole sites can be considered important to cultural heritage.

Preservation of archaeology and architectural heritage is deemed important as heritage that survives from the past is often unique and irreplaceable, important to the study of human history, and can serve an important component in a country's tourist industry.

The Environment Impact Assessment Directive of the European Union (EU) requires that potential impacts on archaeology, architectural heritage and cultural heritage are examined. As such this chapter of the EIS examines the impact that the proposed scheme may have on archaeology and architectural heritage. Impacts on other aspects of cultural heritage are examined in the other chapters of the EIS described previously.

The proposed mitigation measures for archaeological impacts have been further developed and detailed in an Archaeology Strategy document for the proposed scheme. This provides a base from which to plan the execution of the works. The overall approach to archaeological mitigation as detailed in the Archaeological Strategy has been agreed with Department of Environment, Heritage and Local Government (DoEHLG) and Dublin City Council (DCC). This strategy document is live and will continue to evolve with the project through the detailed design and construction phase of the project.

## 15.2 STUDY AREA

The study area for this assessment is set out in Table 15.1.



Table 15.1 Study area

| Criteria   | Width of corridor<br>(on either side of<br>the alignment)   |
|--|---|
| Designated features of archaeological and architectural heritage | 250m in areas of undeveloped Greenfield<br>100m in developed areas  |
| Areas of archaeological potential                                | 50m around proposed tunnelled sections  |
| Properties of architectural merit                                | Properties that are to be impacted upon by the proposed alignment and which occur within the study area detailed above. |
| Townland boundaries  | Townland boundaries intersected by the proposed alignment occurring within the study area detailed above                |

## 15.3 IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology in this chapter is set out in a number of steps:

- Impact identification;
- Assessment of potential impacts pre-mitigation;
- Derivation of mitigation measures;
- Assessment of residual impacts.

The source and type of all potential impacts is described in Section 15.4.1. The impact that would occur if mitigation were not put in place is evaluated in Section 15.4.2 in terms of magnitude and significance. Mitigation measures to be put in place are defined in Section 15.4.3. Mitigation measures are defined for any adverse impacts that are deemed to be of Medium or greater significance prior to mitigation. The extent to which mitigation is needed increases as the significance of the impact increases. The residual impact of each impact is then evaluated in Section 15.4.4 in terms of magnitude and significance.

### 15.3.1 Magnitude

The criteria used to assess the different impacts associated with this scheme are shown in Table 15.2.

**Table 15.2 Criteria for assessment of impact magnitude**

| Criteria  | Impact magnitude |
|---|------------------|
| <ul style="list-style-type: none"> <li>- Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeological site is completely and irreversibly destroyed by a proposed development.</li> <li>- An impact that obliterates the architectural heritage of a structure or feature of national or international importance. These effects arise where an architectural structure or feature is completely and irreversibly destroyed by the proposed development. Mitigation is unlikely to remove adverse affects.</li> </ul>   | very high        |
| <ul style="list-style-type: none"> <li>- An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about the archaeological feature/site.</li> <li>- An impact that, by its magnitude, duration or intensity alters the character and/or setting of the architectural heritage. These effects arise where an aspect or aspects of the architectural heritage is/are permanently impacted upon leading to a loss of character and integrity in the architectural structure or feature. Appropriate mitigation is likely to reduce the impact.</li> <li>- A beneficial effect that permanently enhances or restores the character and/or setting of the architectural heritage in a clearly noticeable manner.</li> </ul>   | high             |
| <ul style="list-style-type: none"> <li>- A Medium direct impact arises where a change to the site is proposed which though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.</li> <li>- An impact that results in a change to the architectural heritage which, although noticeable, is not such that alters the integrity of the heritage. The change is likely to be consistent with existing and emerging trends. Impacts are probably reversible and may be of relatively short duration. Appropriate mitigation is very likely to reduce the impact.</li> <li>- A beneficial effect that results in partial or temporary enhancement of the character and/or setting of the architectural heritage and which is noticeable and consistent with existing and emerging trends.</li> </ul> | medium           |
| <ul style="list-style-type: none"> <li>- An impact which causes changes in the character of the environment which are not High or Very high and do not directly impact or affect an archaeological feature or monument.</li> <li>- An impact that causes some minor change in the character of architectural heritage of local or regional importance without affecting its integrity or sensitivities. Although noticeable, the effects do not directly impact on the architectural structure or feature. Impacts are reversible and of relatively short duration.</li> <li>- A beneficial effect that causes some minor or temporary enhancement of the character of architectural heritage of local or regional importance which, although positive, is unlikely to be readily noticeable.</li> </ul>  | low              |
| <ul style="list-style-type: none"> <li>- An impact on the archaeological heritage capable of measurement but without noticeable consequences.</li> <li>- An impact on architectural heritage of local importance that is capable of measurement but without noticeable consequences</li> <li>- A beneficial effect on architectural heritage of local importance that is capable of measurement but without noticeable consequences.</li> </ul>   | very low         |

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### 15.3.2 Significance

The significance of impacts is assessed in consideration of the magnitude of the impact and the importance and sensitivity (functional value) of the baseline environment. Functional Value is set out in the baseline Archaeology, Architectural and Cultural Heritage chapter of this EIS (Volume 1, Chapter 23).

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## 15.4 IMPACT ASSESSMENT

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### 15.4.1 Impact identification

The potential for impacts on archaeology and architectural heritage has been assessed in consideration of the Environmental Protection Agency (EPA) Guidelines on the preparation and content of EISs (EPA, 2002 & 2003) and the National Roads Authority (NRA) Guidelines for the assessment of Archaeological Heritage Impacts of National Road Schemes (NRA, 2005).

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#### 15.4.1.1 Archaeology

Direct impacts on the archaeological heritage can be defined as follows:

- A change that will detract from or permanently remove an archaeological monument or site from the landscape;

Indirect impacts on the archaeological heritage can be defined as follows:

- A change that does not affect the archaeological heritage;
- A change that improves or enhances the setting of an archaeological monument.

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#### 15.4.1.2 Architecture

Direct impacts on the architectural heritage can be defined as follows:

- Total loss of structure or grounds - demolition of buildings or features or removal of demesne land;
- Partial loss of structure or grounds - part removal of buildings or feature or part removal of demesne land;
- Severance - interruption of linked features such as gardens, outbuildings or lodges;
- Reunification of structures – removal of severance caused by existing development;

Indirect impacts on the architectural heritage can be defined as follows:

- Visual Intrusion - development encroaching on established views of buildings, structures or landscapes, the disruption or destruction of designed vistas, light intrusion (dealt elsewhere);
- Degradation of setting - changes in the original landscape, townscape or garden setting of a building or structure;
- Degradation of amenity - loss of amenity, especially where an historic house is open to the public;
- Enhancement of setting – changes in the original landscape, townscape or garden setting of a building or structure;
- Enhancement of amenity – improvement of amenity, especially where the historic house is open to the public.

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### 15.4.2 Assessment of potential impacts prior to mitigation

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#### 15.4.2.1 Project scenario: construction phase

The principle source of impacts on features of archaeological, architectural and cultural heritage is ground disturbance. Ground disturbance (Direct effects) can occur at the construction compounds, during site clearance, utilities removal, sub-surface site investigation, demolition, site excavation and ground preparation. Heritage constraint features that may potentially be impacted upon by ground disturbance during the construction phase of the project are set out in Table 15.3.

**Table 15.3 Assessment of impacts (direct effects) associated with ground disturbance during construction**

| Impact Ref # | Affected Area/ Feature   | Impact assessment prior to mitigation   |
|--------------|--|---|
| MN106_C01    | HC# 391-395 (Nos. 12, 14, 16, 18 & 20 St Alphonsus Road).<br><br>Structures of Architectural Merit | <ul style="list-style-type: none"> <li>- The construction of the Drumcondra Stop box will directly impact on these houses of architectural merit. This impact will result in the partial loss of the structures.</li> <li>- The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.</li> </ul>  |
| MN106_C02    | HC#396-400 (Nos. 2-6 St Alphonsus Avenue).<br><br>Structures of Architectural Merit                | <ul style="list-style-type: none"> <li>- The construction of the Drumcondra Stop box will directly impact on these houses of architectural merit. This impact will result in the total loss of the structures.</li> <li>- The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.</li> </ul>  |
| MN106_C03    | HC# 419 (40 Drumcondra Road Lower).<br><br>Structures of Architectural Merit                       | <ul style="list-style-type: none"> <li>- The construction of the Drumcondra Stop box will directly impact on the buildings of St. Vincent's Centre for the Deaf. These buildings are of architectural merit. This impact will result in the total loss of the structures.</li> <li>- The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.</li> </ul> |
| MN106_C04    | HC#405-406 (Nos. 398 & 400 North Circular Road).<br><br>Structures of Architectural Merit          | <ul style="list-style-type: none"> <li>- The construction of the Mater Stop box will directly impact on these houses of architectural merit. This impact will result in the total loss of the structures.</li> <li>- The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.</li> </ul>   |
| MN106_C05    | HC#401-404 & 420 (Nos. 24-26 Leo Street).<br><br>Structures of Architectural Merit                 | <ul style="list-style-type: none"> <li>- The construction of the Mater Stop box will directly impact on these houses of architectural merit. This impact will result in the total loss of the structures.</li> <li>- The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.</li> </ul>   |
| MN106_C06    | HC#35 (Mater Hospital).<br><br>Site of archaeological potential                                    | <ul style="list-style-type: none"> <li>- The construction of the Mater Stop box will impact on any surviving archaeological deposits.</li> <li>- The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.</li> </ul>   |

Vibration impacts (Direct effects) may affect the integrity of a structure, particularly an historic structure. The operation of TBMs on or directly beneath structures may lead to damage should the vibrations become too severe. In addition it will be necessary to use Drill & Blast techniques for cross-passages. It is unlikely that archaeological layers would be impacted in the same way as historic structures as detailed in the Vibration chapters of this EIS (Volume 2, Chapter 5). Heritage constraint features that may be subject to vibration impacts are set out in Table 15.4.

Impacts may also occur as a secondary effect of other environmental change (Direct effects). For example, a reduction in ground water levels, may affect the preservation of surrounding archaeological layers, or create unstable foundations for historic structures where organic (wood) materials may have been used, as detailed in the Groundwater chapter of this EIS (Volume 2, Chapter 10).. Mitigation measures will insure that there will be no significant reduction in local groundwater levels at DCU, Griffith Avenue, Drumcondra and Mater Stop boxes. Heritage constraint features that may be subject to these types of secondary environmental impacts are set out in Table 15.5 below:

**Table 15.4 Assessment of potential vibration impacts (Direct effects) during construction**

| Impact Ref # | Affected Area/ Feature   | Impact assessment prior to mitigation  |
|--------------|--|--|
| MN106_C07    | HC# 388 (Gate Lodge for Elmhurst nursing home, Hamstead Avenue).<br><br>Structure of Architectural Merit | - This building of architectural merit lies directly above the bored tunnels.<br><br>- The magnitude of this impact is low and the impact affects an area of high functional value so the impact is considered to be of Low significance.  |
| MN106_C08    | HC# 389 (Converted outbuildings, Elmhurst House).<br><br>Structures of Architectural Merit               | - These buildings of architectural merit lie directly above the bored tunnels.<br><br>- The magnitude of this impact is low and the impact affects an area of high functional value so the impact is considered to be of Low significance.   |
| MN106_C09    | HC#27 (Hollybank House - former Drumcondra Town Hall)<br><br>Protected Structure                         | - This building (protected structure) lies within the vicinity of a cross passage which will be excavated using the Drill & Blast technique<br><br>- The magnitude of this impact is high and the impact affects an area of very high functional value so the impact is considered to be of High significance.   |
| MN106_C10    | HC#28 (Glenarm House).<br><br>Protected Structure  | - This building (protected structure) lies within the vicinity of a cross passage which will be excavated using the Drill & Blast technique<br><br>- The magnitude of this impact is high and the impact affects an area of very high functional value so the impact is considered to be of High significance.   |
| MN106_C11    | HC#29 (St Alphonsus Monastery).<br><br>Protected Structures  | - This building (protected structure) lies directly above the bored tunnels and lies within the vicinity of a cross passage which will be excavated using the Drill & Blast technique<br><br>- The magnitude of this impact is high and the impact affects an area of very high functional value so the impact is considered to be of High significance. |

**Table 15.5 Assessment of potential secondary environmental impacts (Direct effects) during construction**

| Impact Ref # | Affected Area/<br>Feature        | Impact assessment prior to mitigation  |
|--------------|----------------------------------|--|
| MN106_C13    | HC#35 (Mater Hospital).          | - Any reduction in the surrounding water levels during and after the construction of the Mater Hospital Stop box will impact on any surviving archaeological deposits. |
|              | Site of archaeological potential | - The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.            |

**Table 15.6 Assessment of potential unknown impacts (Direct effects) during construction**

| Impact Ref # | Affected Area/<br>Feature  | Impact assessment prior to mitigation  |
|--------------|--|--|
| MN106_C14    | Griffith Avenue Stop<br>Ventilation building at St. Patrick's College. | - The magnitude and significance of impacts in this area cannot be assessed based on existing information because these areas are green undeveloped areas. |

Impacts may also occur in areas of undeveloped land through which the alignment passes and where the study has not identified any archaeological remains. Areas in which these impacts may occur are set out in Table 15.6.

**15.4.2.2 Project scenario: operational phase**

It is not anticipated there will be any impacts at operational phase. However impacts through vibration (Direct effects) may affect the integrity of a structure, particularly an historic structure. The operation of LMVs on or directly beneath structures may lead to significant damage to historic buildings should the vibrations become too severe. It is unlikely that archaeological layers would be impacted in the same way as detailed in the Vibration chapters of this EIS (Volume 2, Chapter 5).

Protected structures and structures of architectural merit located directly above the proposed tunnel sections and which may therefore be impacted upon are set out in Table 15.7.

Table 15.7 Assessment of potential unknown impacts (Direct effects) during construction

| Impact Ref # | Affected Area/ Feature   | Impact assessment prior to mitigation  |
|--------------|--|--|
| MN106_001    | HC# 388 (Gate Lodge for Elmhurst nursing home, Hamstead Avenue).<br><br>Structure of Architectural Merit | - The building lies directly above the bored tunnels.<br>- The magnitude of this impact is very low and the impact affects an area of high functional value so the impact is considered to be of Very low significance.        |
| MN106_002    | HC# 389 (Converted outbuildings, Elmhurst House)<br><br>Structure of Architectural Merit                 | - The building lies directly above the bored tunnels.<br>- The magnitude of this impact is very low and the impact affects an area of high functional value so the impact is considered to be of Very low significance.        |
| MN106_003    | HC#29 (St Alphonsus Monastery)<br><br>Protected Structure  | - These buildings lie directly above the bored tunnels.<br>- The magnitude of this impact is very low and the impact affects an area of very high functional value so the impact is considered to be of Very low significance. |

### 15.4.3 Mitigation measures

The mitigation measures that are to be put in place are detailed in this section.

#### 15.4.3.1 Mitigation of potential construction impacts

Table 15.8 Mitigation of potential impacts associated with ground disturbance (Direct effects) as set out in Table 15.3

| Impact Ref # | Affected Area/ Feature   | Mitigation measures   |
|--------------|--|---|
| MN106_C01    | HC# 391-395 (Nos. 12, 14, 16, 18 & 20 St Alphonsus Road).<br><br>Structures of Architectural Merit | - A drawn measured architectural survey & a photographic survey of the structures will take place prior to ground disturbance, to be lodged with the Irish Architectural Archive.<br><br>- When this mitigation measure is taken into consideration, the magnitude of the impact remains at high. |
| MN106_C02    | HC#396-400 (Nos. 2-6 St Alphonsus Avenue).<br><br>Structures of Architectural Merit                | - A drawn measured architectural survey & a photographic survey of the structures will take place prior to ground disturbance, to be lodged with the Irish Architectural Archive.<br><br>- When this mitigation measure is taken into consideration, the magnitude of the impact remains at high. |
| MN106_C03    | HC#419 (40 Drumcondra - Road Lower).<br><br>Structures of Architectural Merit                      | - A drawn measured architectural survey & a photographic survey of the structures will take place prior to ground disturbance, to be lodged with the Irish Architectural Archive.<br><br>- When this mitigation measure is taken into consideration, the magnitude of the impact remains at high. |
| MN106_C04    | HC#405-406 (Nos. 398 & 400 North Circular Road).<br><br>Structures of Architectural Merit          | - A drawn measured architectural survey & a photographic survey of the structures will take place prior to demolition, to be lodged with the Irish Architectural Archive.<br><br>- When this mitigation measure is taken into consideration, the magnitude of the impact remains at high.         |
| MN106_C05    | HC#401-404 & 420 (Nos. 24-26 Leo Street).<br><br>Structures of Architectural Merit                 | - A drawn measured architectural survey & a photographic survey of the structures will take place prior to demolition, to be lodged with the Irish Architectural Archive.<br><br>- When this mitigation measure is taken into consideration, the magnitude of the impact remains at high.         |
| MN106_C06    | HC#35 (Mater Hospital).<br><br>Site of archaeological potential                                    | - Archaeological assessment after site clearance followed by excavation should any deposits be shown to be present.<br><br>- When this mitigation measure is taken into consideration, the magnitude of the impact decreases to very low.   |

For detail regarding mitigation measures to be put in place with respect to vibration impacts (Direct effects) during construction please refer to the Vibration chapters of this EIS (Volume 2, Chapter 5). A system of monitoring will be put in place for all structures, buildings and monuments specified in Table 15.4. When all of the specified mitigation measures are put in place, the magnitude of the impact for TBM vibration is considered to be very low, but Drill & Blast is high.

For detail regarding mitigation measures to be put in place with respect to secondary environmental impacts (Direct effects) during construction, please refer to the Groundwater chapters of this EIS (Volume 2, Chapter 10).



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**Table 15.9 Mitigation of potential secondary environmental impacts (direct effects) during construction**

| Impact Ref # | Affected Area/ Feature                                      | Mitigation measures  |
|--------------|---|--|
| MN106_C13    | HC#35 (Mater Hospital).<br>Site of archaeological potential | <ul style="list-style-type: none"> <li>- Mitigation will ensure the existing natural water levels are maintained.</li> <li>- When this mitigation measure is taken into consideration, the magnitude of the impact decreases to very low.</li> </ul> |

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**Table 15.10 Mitigation of potential unknown impacts (direct effects) during construction**

| Impact Ref # | Affected Area/ Feature                              | Mitigation measures  |
|--------------|---|--|
| MN106_C14    | Greenfield land in the area of Griffith Avenue Stop | <ul style="list-style-type: none"> <li>- This area of undeveloped green field land requires standard archaeological assessment including geophysical survey, test excavation and excavation should any archaeological deposits be shown to survive.</li> <li>- When this mitigation measure is taken into consideration, the magnitude of the impact decreases to very low.</li> </ul> |

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#### **15.4.3.2 Mitigation of potential operational impacts**

For detail regarding mitigation measures to be put in place with respect to vibration impacts (Direct effects) during operation please refer to the Vibration chapters of this EIS (Volume 2, Chapter 5). A system of monitoring will be put in place for all structures, buildings and monuments specified in Table 15.4. When all of the specified mitigation measures are put in place, the magnitude of the impact is considered to be very low.

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#### **15.4.4 Assessment of residual impacts**

A summary of the residual impacts associated with the proposed scheme is provided in Table 15.11.

Table 15.11 Summary assessment of residual impacts

| Impact Ref #        | Affected Area/ Feature   | Impact Type          | Magnitude of impact taking into account mitigation | Functional value of area affected | Significance of impact taking into account mitigation |
|---------------------|--|----------------------|--|-----------------------------------|---|
| <b>Construction</b> |  |                      |  |                                   |   |
| MN106_C01           | HC# 391-395 (Nos. 12, 14, 16, 18 & 20 St Alphonsus Road).<br><br>Structures of Architectural Merit       | Ground disturbance   | high   | high                              | High  |
| MN106_C02           | HC#396-400 (Nos. 2-6 St Alphonsus Avenue).<br><br>Structures of Architectural Merit                      | Ground disturbance   | high   | high                              | High  |
| MN106_C03           | HC#419 (40 Drumcondra Road Lower).<br><br>Structures of Architectural Merit                              | Ground disturbance   | high   | high                              | High  |
| MN106_C04           | HC#405-406 (Nos. 398 & 400 North Circular Road).<br><br>Structures of Architectural Merit                | Ground disturbance   | high   | high                              | High  |
| MN106_C05           | HC#401-404 & 420 (Nos. 1, 2, 24-26 Leo Street).<br><br>Structures of Architectural Merit                 | Ground disturbance   | high   | high                              | High  |
| MN106_C06           | HC#35 (Mater Hospital).<br><br>Site of archaeological potential  | Ground disturbance   | very low   | high                              | Very Low  |
| MN106_C07           | HC# 388 (Gate Lodge for Elmhurst nursing home, Hamstead Avenue).<br><br>Structure of Architectural Merit | Vibration<br><br>TBM | low  | high                              | Low   |
| MN106_C08           | HC# 389 (Converted outbuildings, Elmhurst House).<br><br>Structures of Architectural Merit               | Vibration<br><br>TBM | low  | high                              | Low   |
| MN106_C14           | Griffith Avenue Stop Tunnel Vent at James Joyce Court.   | Potential Unknown    | very low   | medium                            | Very low  |

| Impact Ref #     | Affected Area/ Feature  | Impact Type                     | Magnitude of impact taking into account mitigation | Functional value of area affected | Significance of impact taking into account mitigation |
|------------------|---|---------------------------------|--|-----------------------------------|---|
| MN106_C09        | HC#27 (Hollybank House - former Drumcondra Town Hall)<br>Protected Structure                          | Vibration<br>TBM, Drill & Blast | high   | very high                         | High  |
| MN106_C10        | HC#28 (Glenarm House).<br>Protected Structure   | Vibration<br>TBM, Drill & Blast | high   | very high                         | High  |
| MN106_C11        | HC#29 (St Alphonsus Monastery).<br>Protected Structures   | Vibration<br>TBM, Drill & Blast | high   | very high                         | High  |
| MN106_C12        | HC#405-406 (Nos. 398 & 400 North Circular Road).<br>Structures of Architectural Merit                 | Vibration<br>TBM, Drill & Blast | high   | high                              | High  |
| MN106_C13        | HC#35 (Mater Hospital).<br>Site of archaeological potential   | Secondary Env. Impacts          | very low   | high                              | Very low  |
| <b>Operation</b> |   |                                 |  |                                   |   |
| MN106_001        | HC# 388 (Gate Lodge for Elmhurst nursing home, Hampstead Avenue).<br>Structure of Architectural Merit | Vibration<br>LMVs               | very low   | high                              | Very low  |
| MN106_002        | HC# 389 (Converted outbuildings, Elmhurst House)<br>Structure of Architectural Merit                  | Vibration<br>LMVs               | very low   | high                              | Very low  |
| MN106_003        | HC#29 (St Alphonsus Monastery)<br>Protected Structures  | Vibration<br>LMVs               | very low   | very high                         | Very low  |

# 16

## MATERIAL ASSETS: NON AGRICULTURAL PROPERTY

- 16.1 Introduction
- 16.2 Study area
- 16.3 Impact assessment methodology
  - 16.3.1 Magnitude
  - 16.3.2 Significance
- 16.4 Impact assessment
  - 16.4.1 Impact identification
  - 16.4.2 Mitigation measures
  - 16.4.3 Assessment of residual impacts



This chapter of the EIS evaluates potential impacts on non agricultural property arising from the construction and operation of the proposed scheme in Area MN106.

## 16.1 INTRODUCTION

This chapter of the EIS evaluates potential impacts on non agricultural property arising from the construction and operation of the proposed scheme in Area MN106. Impacts on agricultural properties are assessed in the the Agronomy chapters of this EIS (Volume 2, Chapter 22).

## 16.2 STUDY AREA

All of the properties to be impacted upon as part of the proposed scheme are located within 50m of the alignment. The study area is therefore limited to 50m either side of the proposed alignment.

## 16.3 IMPACT ASSESSMENT METHODOLOGY

The source and type of all potential impacts is described in Section 16.4.1. Mitigation measures to be put in place are defined in Section 16.4.2 The residual effect of each impact is then evaluated in Section 16.4.3 in terms of magnitude and significance.

### 16.3.1 Magnitude

The criteria used to assess the impacts associated with this scheme are shown in Table 16.1.

Table 16.1 Criteria for assessment of impact magnitude

| Criteria   | Impact magnitude |
|--|------------------|
| Any impact on non agricultural property where the use of the property cannot continue  | very high        |
| Not applicable   | high             |
| Any impact on non agricultural property where the use of the property can continue (in some cases, after temporary disruption) | medium           |
| Not applicable   | low              |
| Not applicable   | very low         |

### 16.3.2 Significance

The significance of all impacts is assessed in consideration of the magnitude of the impact and the functional value of the property upon which the impact has an effect. Impacts are evaluated in terms of five classes of significance: Very high, High, Medium, Low or Very low.

## 16.4 IMPACT ASSESSMENT

### 16.4.1 Impact identification

Impacts on non agricultural property occur due to land-take associated with the proposed scheme.

Three types of impact are assessed in this chapter:

- Non agricultural properties to be demolished (in whole or in part);
- Non agricultural properties to be acquired on a temporary basis;
- Non agricultural properties to be acquired on a permanent basis.

All temporary and permanent land-take on private property is shown on the property drawings that accompany the Railway Order application. Potential impacts on property due to ground settlement are addressed in the Soil and Geology chapter of this EIS (Volume 2, Chapter 17).

In some cases, acquisition of properties is undertaken to reduce the potential for negative impacts on residents during construction. In this context, the acquisition of properties is considered to be a mitigation measure (as well as an impact) and is assessed as such in other appropriate EIS chapters e.g. Noise, Vibration and Archaeology, Architectural Heritage and Cultural Heritage (Volume 2, Chapters 4, 5 and 15 respectively).

### 16.4.2 Mitigation measures

In cases where properties are to be demolished, alternative pedestrian crossing facilities will be provided prior to demolition taking place such that no significant disruption of individuals will occur. The magnitude of the residual impact is therefore assumed to reduce to low.

RPA are committed to having a Property Protection Scheme in place prior to construction works commencing. In cases where parts of properties are occupied, access to the remaining unoccupied parts will be maintained where it is possible and safe to do so. Protection such as hoarding will be used to ensure that the boundary of any construction sites are maintained and damage does not occur outside of this boundary. Where damage cannot be avoided, it will be repaired. Reinstatement of any natural boundaries will be carried out upon completion of the construction phase.

Mitigation measures to reduce any potential impacts on property due to vibration, ground settlement, dust or changes in visual amenity are addressed in the Vibration, Soil and Geology, Air and Climatic Factors and Landscape and Visual chapters of this EIS (Volume 2, Chapters 5, 9, 12 and 13 respectively).

In addition to the above mitigation measures, in a number of cases, where demolition of properties is to occur, RPA has offered compensation. Where appropriate, compensation is payable to owners of property that is acquired land in accordance with the general compulsory purchase code. Appropriate compensation will also be payable to owners of property that is subject to temporary acquisition. Compensation will be provided through the CPO process. In light of the above mitigation measures and in all cases where compensation is agreed, the magnitude of the impact is assumed to reduce to medium.

No mitigation measures are required with respect to the operational phase of the proposed scheme.

### 16.4.3 Assessment of residual impacts

#### 16.4.3.1 Project scenario: construction phase

A number of non agricultural properties are to be acquired in this area. These properties are shown in Table 16.2.

Table 16.2 Non agricultural properties to be impacted upon during the construction phase

| Property  | Functional value | Impact  | Mitigation measure | Residual impact magnitude | Residual impact significance |
|---|------------------|---|--------------------|---------------------------|------------------------------|
| Various properties situated above bored tunnel alignment as listed in the Railway Order | very high        | Permanent land-take of substratum for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| DCU lands at Griffith Avenue Stop   | very high        | Permanent/Temporary land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| Part of grounds of St. Patrick's College, Drumcondra                                    | very high        | Permanent/Temporary land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 12 Alphonsus Road Drumcondra, Dublin 9  | very high        | Permanent/Temporary land take rear garden for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 14 Alphonsus Road Drumcondra, Dublin 9  | very high        | Permanent/Temporary land-take rear garden for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 16 Alphonsus Road Drumcondra, Dublin 9  | very high        | Permanent/Temporary land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 18 Alphonsus Road Drumcondra, Dublin 9  | very high        | Permanent/Temporary land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 20 Alphonsus Road Drumcondra, Dublin 9  | very high        | Permanent/Temporary land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| Dunbeg, Saint Alphonsus Avenue, Drumcondra, Dublin 9                                    | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 2 Saint Alphonsus Avenue, Drumcondra, Dublin 9  | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 3 Saint Alphonsus Avenue, Drumcondra, Dublin 9  | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 4 Saint Alphonsus Avenue, Drumcondra, Dublin 9  | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 5 Saint Alphonsus Avenue, Drumcondra, Dublin 9  | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 6 Saint Alphonsus Avenue, Drumcondra, Dublin 9  | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| Access road to Quinn's public house, Drumcondra, Dublin 9                               | very high        | Permanent land-take for the proposed scheme(land at road level may be returned to land owner after construction by agreement) | Compensation       | medium                    | Medium significance          |



| Property  | Functional value | Impact  | Mitigation measure | Residual impact magnitude | Residual impact significance |
|---|------------------|---|--------------------|---------------------------|------------------------------|
| Saint Vincent's Centre For The Deaf<br>Drumcondra Road Lower,<br>Drumcondra, Dublin 9             | very high        | Permanent land-take for Metro Line/Stop   | Compensation       | medium                    | Medium significance          |
| Access road to rear of commercial premises at 32 – 38 Lower Drumcondra Road, Drumcondra, Dublin 9 | very high        | Permanent/Temporary/Wayleave land-take for the proposed scheme (land at road level may be returned to land owner after construction by agreement) | Compensation       | medium                    | Medium significance          |
| Iarnród Éireann railway, Drumcondra, Dublin 9   | very high        | Permanent land-take of substratum for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 398 North Circular Road, Dublin 7   | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 400 North Circular Road, Dublin 7   | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| Part of grounds of Mater Misericordiae Hospital,  | very high        | Permanent/Temporary land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 24 Leo Street, Phibsborough, Dublin 7   | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 25 Leo Street, Phibsborough, Dublin 7   | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |
| 26 Leo Street, Phibsborough, Dublin 7   | very high        | Permanent land-take for the proposed scheme   | Compensation       | medium                    | Medium significance          |

#### 16.4.3.2 Project scenario: operational phase

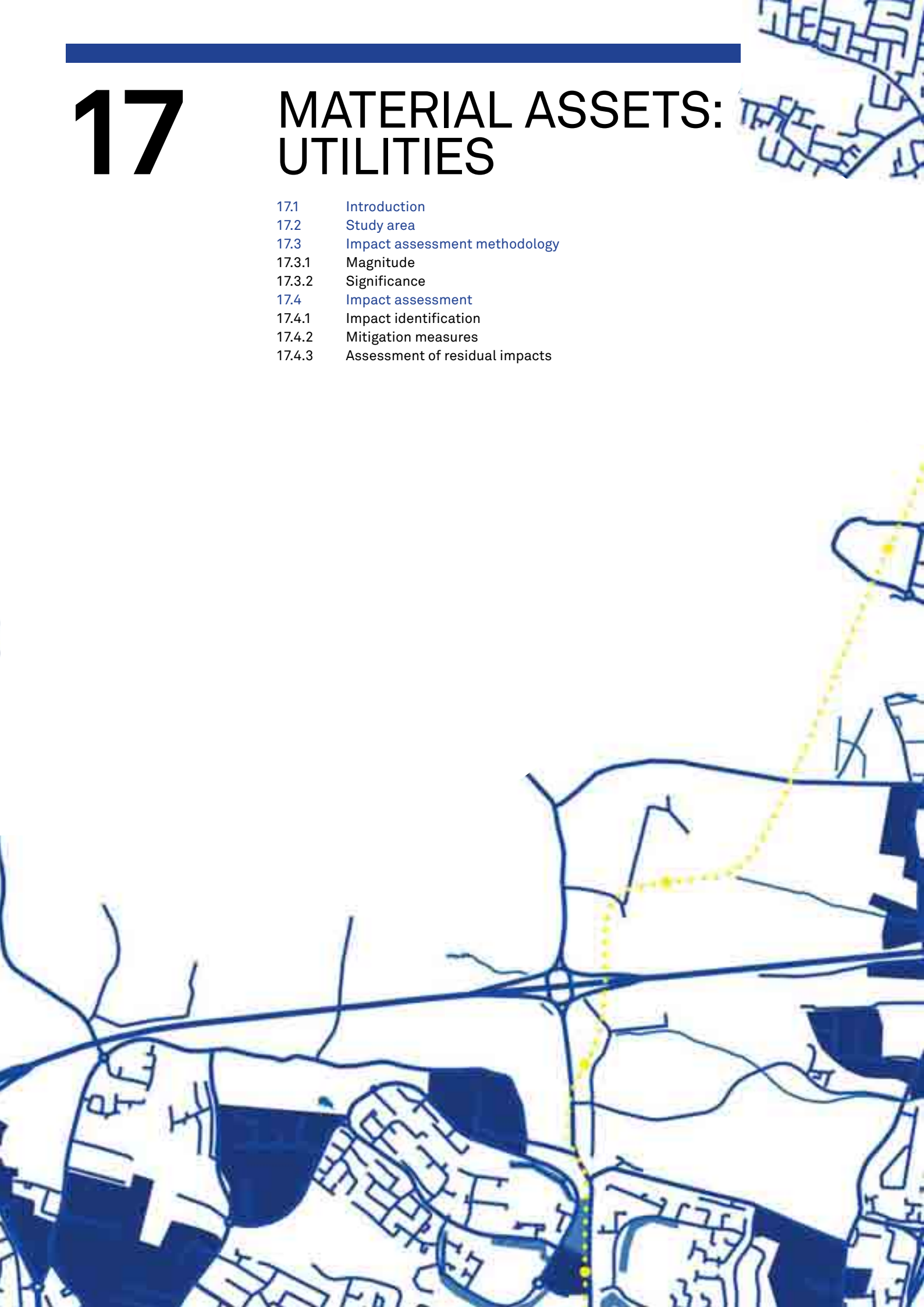
Existing and planned future properties within this area will benefit from their location and close proximity to a new permanent public transport and upgraded road system. Experience of the effects of the Luas Red and Green lines on house prices along these lines would indicate the residential property values and land values generally in the study area should also increase due to a positive 'Luas effect'. A property market analysis report from the estate agent Douglas Newman Good (DNG, 2005), indicated a Luas effect on house prices in the Tallaght area, and stated that 'an analysis of property price increases along the two Luas lines to Tallaght and Sandyford confirms that those properties within a five minute walk of a Luas station have seen higher increases in value than other comparable properties with no immediate access to the tram system'. More specifically, the report states that in Dublin 24, properties close to a Luas stop

increased on average by 54% between January 2002 and January 2005 whilst the average increase was 37% in areas not within easy walking distance of a stop, a differential of 17%. The impact on property values in proximity to the proposed scheme is therefore likely to be positive. In general, operation of the proposed scheme is therefore assumed to have a positive impact on property by increasing the attractiveness of areas and strengthening the overall property market in the vicinity of the proposed scheme.

# 17

## MATERIAL ASSETS: UTILITIES

- 17.1 Introduction
- 17.2 Study area
- 17.3 Impact assessment methodology
  - 17.3.1 Magnitude
  - 17.3.2 Significance
- 17.4 Impact assessment
  - 17.4.1 Impact identification
  - 17.4.2 Mitigation measures
  - 17.4.3 Assessment of residual impacts





This chapter of the EIS evaluates the potential impacts on utilities, which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN106.

### 17.1 INTRODUCTION

This chapter of the EIS evaluates the potential impacts on utilities, which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN106.

This chapter specifically refers to impacts on over and underground utility infrastructure such as water, gas, electricity, sewers, surface water drainage and telecommunications. It includes an evaluation of the impacts associated with protection, diversion and relocation of utility services equipment and plant in the vicinity of surface running tracks, stops, tunnels, ventilation shafts and other areas associated with the proposed scheme. Any impacts due to electromagnetic interference are addressed in the Radiation and Stray Current chapter of this EIS (Volume 2, Chapter 6). Indirect impacts that may occur due to the activities and potential disruption caused during utilities diversions are addressed in other chapters of the EIS. Examples include the Socio-economics and Traffic chapters of this EIS (Volume 2, Chapters 3 and 7 respectively).

### 17.2 STUDY AREA

The study area for this chapter is approximately 84m either side of the centre line of the track alignment.

### 17.3 IMPACT ASSESSMENT METHODOLOGY

Due to the extensive footprint and geographical extent of the proposed scheme and its associated structures, impacts on utility services are unavoidable. Early recognition of the type and level of impact makes it possible to provide suitable mitigation measures to minimise service disruption. The source and type of all potential impacts are described in Section 17.4.1.

Mitigation measures to be put in place are defined in Section 17.4.2. Mitigation measures are defined for any adverse impacts deemed to be of Medium or greater significance. The extent to which mitigation is needed increases as the significance of the impact increases. The residual impact is then evaluated in Section 17.4.3 in terms of magnitude and significance.

#### 17.3.1 Magnitude

The criteria used to assess the different impacts associated with the proposed scheme are shown in Table 17.1.

Table 17.1 Criteria for assessment of impact magnitude

| Criteria  | Impact magnitude |
|---|------------------|
| <ul style="list-style-type: none"> <li>- Long-term disruption of service e.g. for more than one week;</li> <li>- Relevant stakeholders are notified at short notice or not at all prior to disruption taking place;</li> <li>- The level of service provided by the original utilities infrastructure is not reinstated.</li> </ul> | very high        |
| <ul style="list-style-type: none"> <li>- Long-term disruption of service e.g. for a week;</li> <li>- Relevant stakeholders are notified at short notice prior to disruption taking place;</li> <li>- The level of service provided by the original utilities infrastructure is reinstated.</li> </ul>                               | high             |
| <ul style="list-style-type: none"> <li>- Medium-term disruption of service e.g. for up to two days;</li> <li>- Relevant stakeholders are notified prior to disruption taking place;</li> <li>- The level of service provided by the original utilities infrastructure is reinstated or improved.</li> </ul>                         | medium           |
| <ul style="list-style-type: none"> <li>- Short-term disruption of service e.g. for several hours;</li> <li>- Relevant stakeholders are notified prior to disruption taking place;</li> <li>- The level of service provided by the original utilities infrastructure is reinstated or improved.</li> </ul>                           | low              |
| <ul style="list-style-type: none"> <li>- No disruption of the existing level of service.</li> </ul>   | very low         |

### 17.3.2 Significance

The significance of impact is assessed in consideration of the magnitude of the impact and the functional value of the utility service upon which the impact has an effect.

## 17.4 IMPACT ASSESSMENT

### 17.4.1 Impact identification

Activities related to construction and installation of the following components of the proposed scheme may have impacts on utility services:

- Stops, tracks, depot, Park & Ride, substations, ventilation shafts, landscaping bunds, ancillary roads and access ways, cut and cover tunnel sections, tunnels and tunnel portals;
- Earthworks, such as cuttings and embankments;
- Construction compounds.

Two types of impacts are recognised to occur: temporary and permanent.

#### 17.4.1.1 Temporary Impacts

Temporary impacts are typically associated with the construction phase of the proposed scheme. These impacts are short-term in nature and are required to facilitate construction. Direct impacts occur where utilities are located in whole or in part within the footprint of the proposed scheme.

### 17.4.1.2 Permanent Impacts

Permanent impacts are long-term impacts which are expected to persist over the lifetime of the proposed scheme.

### 17.4.2 Mitigation measures

Utilities infrastructure ensures reliable provision of power (electricity/gas), water and other amenity services in accordance with service level agreements. RPA recognises the importance of ensuring that disruption to any utility service is minimised and where necessary, depending on the service level agreement, alternative measures are to be taken to ensure continuity of the service whilst diverted.

The importance of continuity of service to consumers within Area MN106 is recognised. Utility services within the study area have been identified; extensive consultations have taken place with stakeholders including Statutory Undertakers, Local Authorities and other relevant parties. Reviews of relevant existing service networks and civil infrastructure have been carried out to identify potential impacts on existing service networks.

A schedule of proposed utility diversions has been prepared which identifies infrastructure requiring diversion and includes information on the type and size of each utility. This schedule also identifies the necessary mitigation measures required by the utility company and the contractor to facilitate the implementation of works. A summary of this schedule specific to MN106 is provided in Table 17.2.

Utility drawings have been prepared by digitally transferring data from the existing drawings of Statutory Undertakers into computer aided drawing (CAD) format. Because of potential inaccuracies and errors in these records, the information is supplemented by an extensive survey of the proposed scheme using invasive and non-invasive methods of underground service mapping in order to verify the positions of buried apparatus.

To ensure that the operation of the proposed scheme is not affected by future utility maintenance or diversion activities, utility services will generally be diverted away from the track. All utilities that cross the track or the proposed scheme infrastructure will be protected or lowered, relocated or diverted as necessary and spare capacity may be provided for future maintenance or expansion.

All works will be carried out in ongoing consultation with the relevant Statutory Undertakers and Local Authority representatives and will be in compliance with their requirements (including health and safety) and relevant codes of practice. Agreement will be reached prior to any works taking place and relevant design documentations prepared. The works will be coordinated and programmed in consultation with the relevant undertaker to minimise impact. The contractor will be responsible for design and co-ordination of utility diversionary works.

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## 17.4.3 Assessment of residual impacts

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### 17.4.3.1 Construction phase

The utility works in area MN106 include, but are not limited to the diversion of water mains of varying diameters and materials, gas mains (local distribution) of varying diameters and materials, drainage pipes (surface water, sewage, and combined systems) of various diameters, alteration of manholes, duct systems for telecommunications providers, street lighting, traffic lighting and signals, cable TV operators and ESB (local distribution and high voltage), including miscellaneous chambers as detailed in Table 17.2. The works also include any alterations to service connections to individual properties necessitated by the diversion of the associated main utility services.

During the construction phase, if mitigation measures were not put in place the impacts on utility services would be of high magnitude. All utility services are considered to be of very high functional value and therefore if mitigation were not put in place, the significance of the impacts would be High to Very high. However, if the mitigation measures described in Section 17.4.2 are put in place, the magnitude of the impact decreases to very low and therefore is not considered to be significant.

Table 17.2 Impacts and mitigation measures

| Utility Type        | Description/<br>Pipe Size          | Approximate<br>length that<br>may be<br>impacted<br>upon (m) | Likely mitigation<br>measures  | Potential duration<br>of disrupted service<br>(Magnitude of<br>residual impact) | Significance of<br>residual impact |
|---------------------|------------------------------------|--|--|---|------------------------------------|
| Gas<br>Transmission | 400mm, 40 bar HP Steel             | 83   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 500mm, 40 bar HP CI                | 245  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
| Public Lighting     | LV Supply                          | 50   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | Unknown                            | 75   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
| ESB<br>Transmission | 38 KV Double Circuit               | 165  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 220 KV                             | 104  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | High Pressure Oil Filled<br>220 KV | 88   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
| ESB<br>Distribution | 2 x MV & 1 LV                      | 90   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 1 x LV                             | 52   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |

| Utility Type        | Description/<br>Pipe Size | Approximate<br>length that<br>may be<br>impacted<br>upon (m) | Likely mitigation<br>measures  | Potential duration<br>of disrupted service<br>(Magnitude of<br>residual impact) | Significance of<br>residual impact |
|---------------------|---------------------------|--|--|---|------------------------------------|
|                     | 1 x MV OH Cable           | 110  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 1 x MV Cable              | 102  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
| Gas<br>Distribution | 8" CI 25 mbar             | 90   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 90mm PE 25 mbar           | 76   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 125 PE (6in) 25 mbar      |  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 125 PE                    | 52   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 180 PE 4 bar              | 180  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 180 PE 25 mbar            | 8.6  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|                     | 90 PE (4in) 25 mbar       | 182  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |



| Utility Type | Description/<br>Pipe Size | Approximate<br>length that<br>may be<br>impacted<br>upon (m) | Likely mitigation<br>measures  | Potential duration<br>of disrupted service<br>(Magnitude of<br>residual impact) | Significance of<br>residual impact |
|--------------|---------------------------|--|--|---|------------------------------------|
|              | 300mm DI 25 mbar          | 71   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
| DCC Water    | 4" CI                     | 56   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|              | 6" CI                     | 101  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|              | 12" CI                    | 103  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|              | 18" CI                    | 61   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|              | Watermain                 | 7  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|              | 125mm MDPE Watermain      | 78   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
| Eircom       | 2x100 PP                  | 141  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Lowr                               |
|              | 6x100 PP                  | 81   | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |
|              | 9x100 PP                  | 118  | Decommission/<br>Divert/ Protect<br><br>Permit to dig system<br>and liaison with<br>service provider | Temporary/<br>Short term<br><br>(low)   | Low                                |

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### **17.4.3.2 Operational phase**

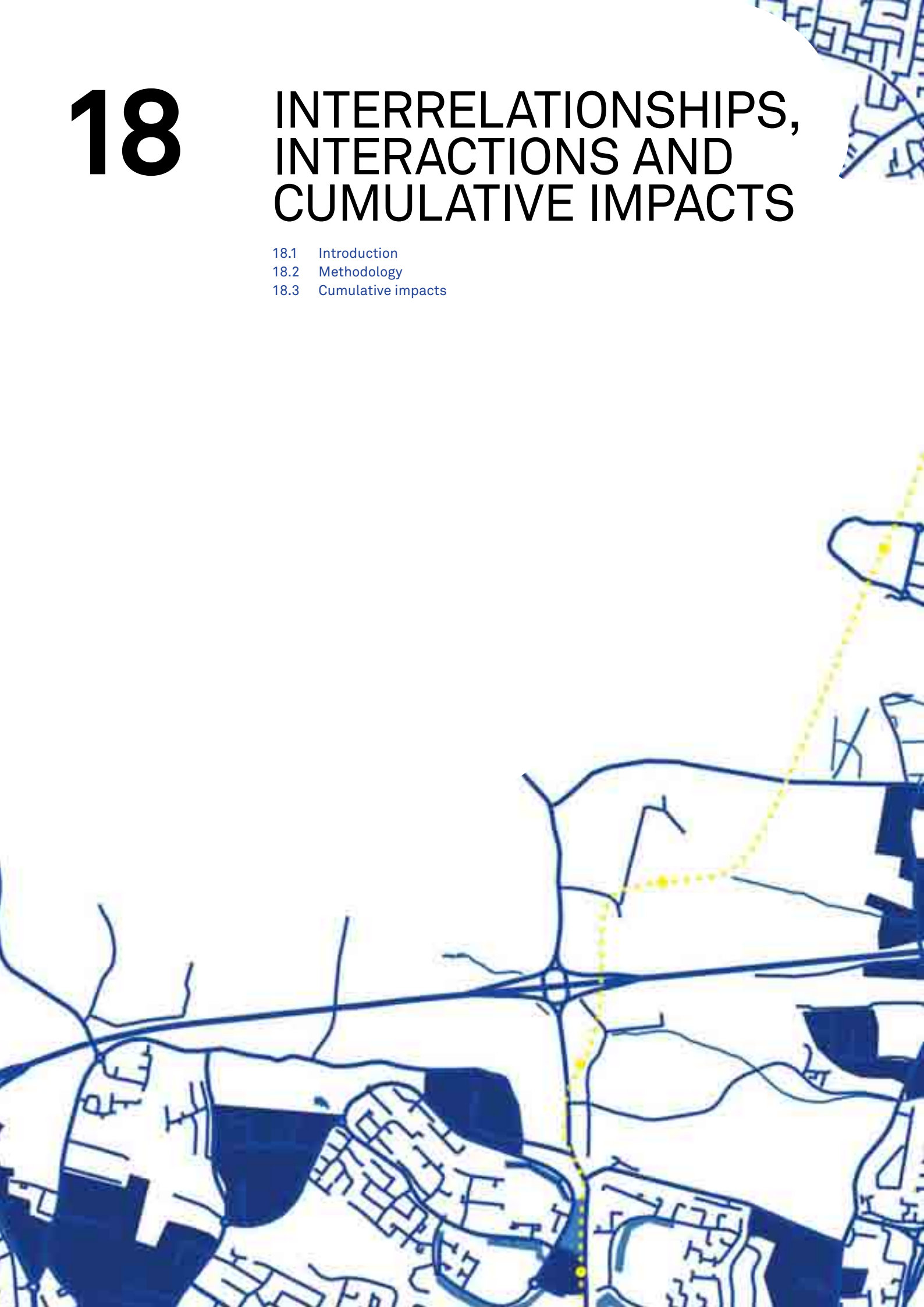
Provided that the mitigation measures specified in Section 17.4.2 are implemented, the operation of the proposed scheme will not impact on utility services.



# 18

## INTERRELATIONSHIPS, INTERACTIONS AND CUMULATIVE IMPACTS

- 18.1 Introduction
- 18.2 Methodology
- 18.3 Cumulative impacts





Section 39(2)(b) of the Railway Infrastructure Act, 2001 specifies that an environmental impact statement must contain a description of the inter-relationship between the likely significant impacts on the aspects of the environment listed in Section 39.

## 18.1 INTRODUCTION

Section 39(2)(b) of the Railway Infrastructure Act, 2001 specifies that an environmental impact statement must contain a description of the inter-relationship between the likely significant impacts on the aspects of the environment listed in Section 39.

The purpose of this chapter is to illustrate the key inter-relationships that exist between the various affected environmental topics. Cumulative impacts due to the proposed scheme are considered. Cumulative or combined impacts due to the combination of the proposed scheme and other projects in the same area are also examined. This includes cumulative impacts (impacts which accumulate over space or time to generate a larger overall impact), cross-media impacts and other impact interactions.

European guidelines state why this is an important process:

'An impact which directly affects one environmental medium may also have an indirect impact on other media (sometimes referred to as cross media impacts). This indirect effect can sometimes be more significant than the direct effect.' (E.C. 1999)

For example, in some cases, changes in noise or vibration levels may have a profound effect on human beings. Whilst the additional noise may not constitute a significant increase when using simple assessment methods, vulnerable groups of individuals may be indirectly affected.

'Visual intrusion may also have an indirect impact on the amenity value of sites of historical interest. Again, in the absence of the analysis of indirect impacts, visual intrusion may not be considered as significant. However, the indirect impacts may be considered as being substantial' (E.C. 1999).

## 18.2 METHODOLOGY

Impact interactions and inter-relationships have been considered throughout the EIA process and in the preparation of the individual impact chapters (Volume 2) so that it can take into account the broader picture of how the proposed scheme may affect the various environmental media.

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, 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 the EIS. The matrix that has been developed is presented as Figure 18.1.

|  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
|--|--------------|-----------------------|-------------------------------|---------------------|---|-----------------------|--------------------------|-------------|---------------|------------------|----------------------|-----------------|---------------------------|--|---------------------------|--|
| Human Health   | Human Health | Human Beings: Landuse | Human Beings: Socio-Economics | Human Beings: Noise | Human Beings: Radiation and Stray Current | Human Beings: Traffic | Air and Climatic Factors | Groundwater | Surface Water | Soil and Geology | Landscape and Visual | Flora and Fauna | Material Assets: Agronomy | Material Assets: Archaeology, Architectural Heritage and Cultural Heritage | Material Assets: Utilites | Material Assets: Non Agricultural Property |
|  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Human Beings: Landuse  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Human Beings: Socio-Economics  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Human Beings: Noise  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Human Beings: Radiation and Stray Current                                  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Human Beings: Traffic  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Air and Climatic Factors   |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Groundwater  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Surface Water  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Soil and Geology   |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Landscape and Visual   |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Flora and Fauna  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Material Assets: Agronomy  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Material Assets: Archaeology, Architectural Heritage and Cultural Heritage |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Material Assets: Utilites  |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |
| Material Assets: Non Agricultural Property                                 |              |                       |                               |                     |   |                       |                          |             |               |                  |                      |                 |                           |  |                           |  |

Figure 18.1  
Impacts Interaction and Interrelationship Matrix

The consideration of impact interactions and potential cumulative impacts has been addressed during the preparation of the EIA in each of the individual impact chapters. A very diverse range of interactions has been considered as part of this EIA including, but not limited to the examples described in Table 18.1.

**Table 18.1 Key Impact interactions and interrelationships**

| Interaction   | Description   |
|---|---|
| Human Health, Air & Climatic Factors and Traffic  | <p>Impacts on air quality may occur due to emissions of dust from construction compounds. Impacts on air quality may also occur due to changes in traffic levels and thus exhaust emissions. In some cases, particularly during the construction phase, both impacts occur at the same location. The potential for interactions was therefore considered, particularly when defining the relevant mitigation measures and carrying out the assessment of potential impacts on human health.</p> <p>The potential for traffic emissions to have an indirect impact on climate (in terms of climate change) has also been considered.</p> |
| Human Health, Noise and Traffic   | <p>Noise impacts may occur due to construction or operation activities. Noise impacts may also occur due to changes in traffic levels. In some cases, particularly during the construction phase, both impacts occur at the same location. The potential for interactions was therefore considered, particularly when defining the relevant mitigation measures and carrying out the assessment of potential impacts on human health.</p>   |
| Vibration and Archaeology, Architectural Heritage and Cultural Heritage                     | <p>The potential for vibration impacts on features of architectural, archaeological or cultural importance has been considered and appropriate measures have been defined.</p>  |
| Groundwater, Soil and Geology and Surface Water   | <p>There are direct and physical links between surface water, groundwater, soils and geology. The impacts of the scheme are therefore considered in the chapters that support all three environmental topics in recognition of the fact that impacts to one component of this complex system may have knock-on, indirect effects on other components.</p>   |
| Landscape and Visual and Flora and Fauna  | <p>Mitigation measures for landscape impacts and ecological impacts were considered when defining the Landscape Insertion Plans (Volume 2, Chapter 13) in order to ensure that interactions between impacts were considered in an appropriate manner. In many cases, the mitigation measures that have been defined serve the dual purpose of mitigating both landscape and ecological impacts.</p>   |
| Landuse and Socio-economics   | <p>Impacts on commercial landuses 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.</p>   |
| Traffic and Socio-economics   | <p>Traffic impacts and mitigation measures have the potential to impact on socio-economic activity. The potential for indirect impacts of this nature has been considered when defining appropriate mitigation measures.</p>  |
| Landuse, Landscape and Visual and Archaeology, Architectural Heritage and Cultural Heritage | <p>Cultural heritage comprises elements of the landscape which are important to individuals. Landscape elements which are important to individuals may include man-made buildings, traditional landuse, natural environmental features or features of archaeological or architectural importance. Impacts on all of these aspects of cultural heritage are considered in the relevant chapters of this EIS.</p>   |
| Water, Soil and Geology and Flora and Fauna   | <p>Direct physical links exist between these topics and potential impacts on surface water or soils were therefore also considered in the Flora and Fauna chapters of this EIS (Volume 2, Chapter 8).</p>   |



| Interaction                                     | Description   |
|---|---|
| Landuse, Non Agricultural Property and Agronomy | Land-take can have an impact on landuse, property and agricultural lands. Changes in landuse affecting Agronomy and Non Agricultural Property have been assessed as part of the EIA and are described in Volume 2, Chapters 14 and 16 respectively. |
| Soil and Geology and Human Health               | The key issue here is radon emissions. The potential for radon emissions from disturbed/excavated soil and geology to have an impact on human health has been considered and appropriate mitigation measures have been established.                 |

### 18.3 CUMULATIVE IMPACTS

Cumulative impacts occur when the addition of single impacts from a number of individual schemes results in compounding effects. Cumulatively, these impacts may be significant if they occur close together in terms of location and time.

The scheme will inevitably cause a degree of disruption during the construction phase, as with most major transport infrastructure projects. Next to disruption the construction equipment and hoardings are likely to be very visible. Drivers and public transport users may also experience delays during temporary road diversions. The combination of these construction effects is likely to heighten any overall sense of disruption felt by those living and working close to the route of the scheme.

During the construction phase of the scheme, several other projects are likely to take place within the study area. A review of planning applications has been undertaken (as described in the Baseline Landuse chapter of this EIS (Volume 1, Chapter 10)) to identify such developments. Examples include, but are not limited to:

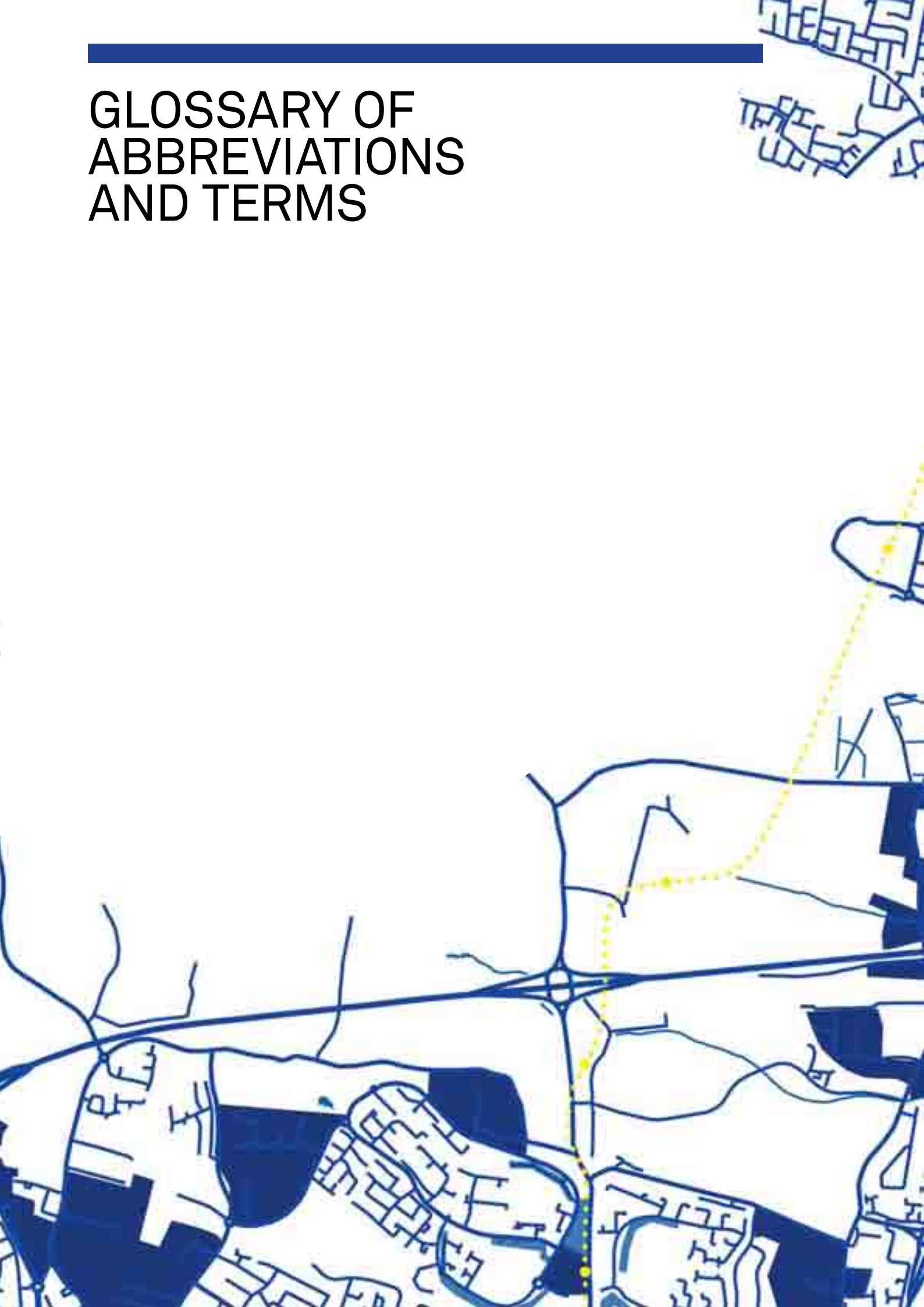
- the Irish Rail Interconnector project;
- the development of Dublin Airport;
- the Luas BX Line;
- the Marlborough Bridge across the River Liffey;
- the extension of Mater Hospital.

The development of schemes such as those listed above has the potential to cause cumulative impacts. In some cases, the timeframe within which the other developments will occur is not yet clearly defined. However, consultation has been undertaken with proponents of these other projects to ensure that the potential for cumulative impacts is considered and appropriate mitigation measures are put in place where relevant. Considerations in this regard were undertaken in relation to the Landuse, Socio-economics, Noise, Traffic and Air and Climatic Factors of this EIS (Volume 2, Chapters 2, 3, 4, 7 and 12 respectively). The means by which cumulative impacts are assessed is clearly defined, where relevant, in all chapters of the EIS.

Given the urban location of the proposed scheme, cumulative impacts arising due to other major construction projects are inevitable. Impacts of this nature have been assessed where possible and must be considered by the planning authority in exercising their development control function for future developments in the local area.

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# GLOSSARY OF ABBREVIATIONS AND TERMS



## 1 GLOSSARY OF ABBREVIATIONS

| Acronym         | Definition  |
|-----------------|---|
| AADT            | Annual Average Daily Traffic (total annual traffic flow divided by 365)   |
| AAP             | Area Action Plan  |
| AD              | Anno Domini (Medieval Latin: 'in the year of our lord') a designation used to number years in the Julian and Gregorian calendars.   |
| AEC             | Areas of Ecological Constraint  |
| ALSAA           | Aer Lingus Sports and Athletics Association   |
| AP              | Aerial Photograph   |
| At-grade        | At public carriageway level (as opposed to tunnel or elevated).   |
| BAP             | Biodiversity Action Plan  |
| BOD             | Biological Oxygen Demand  |
| BRE             | Building Research Establishment   |
| BRL             | Ballymun Regeneration Ltd.  |
| CBA             | Cost Benefit Analysis   |
| CCVM            | City Centre Vissim (Micro-simulation) Models  |
| CIRIA           | Construction Industry Research and Information Association  |
| CLR             | Contaminated Land Report  |
| CRDS            | Cultural Resource Development Services Ltd.   |
| cSAC            | Candidate Special Area of Conservation  |
| CO              | Carbon Monoxide   |
| CO <sub>2</sub> | Carbon Dioxide  |
| CPO             | Compulsory Purchase Order   |
| CRT             | Cathode Ray Tube  |
| CSO             | Central Statistics Office   |
| DART            | Dublin Area Rapid Transit   |
| dB (Decibel)    | The basic unit for sound measurement. Decibels are measured on a linear scale which defines a logarithmic amplitude scale, thereby compressing a wide range of amplitude values into a small set of numbers |
| dB(A)           | A frequency weighting applied to sound measurements which approximates to the frequency response of the human ear   |
| DC              | Direct current  |
| DCC             | Dublin City Council   |
| DCU             | Dublin City University  |
| DEIS            | Delivering Equality of Opportunity in Schools   |
| DIT             | Dublin Institute of Technology  |
| DMRB            | Design Manual for Roads and Bridges, UK   |
| DoE             | Department of Environment (in the UK)   |
| DoEHLG          | Department of Environment, Heritage and Local Government (in Ireland)   |
| DoT             | Department of Transport   |
| DTI             | Dublin Transportation Initiative  |
| DTO             | Dublin Transportation Office  |
| DTOTM           | Dublin Transportation Office Traffic Model  |
| DTS             | (Environmental) Desktop Study   |

| Acronym           | Definition   |
|-------------------|--|
| EA                | Environmental Agency (UK)  |
| ED                | Electoral Division   |
| EIA               | Environmental Impact Assessment  |
| EIS               | Environmental Impact Statement   |
| EM                | Electromagnetic  |
| EMC               | Electromagnetic Compatibility  |
| EMI               | Electromagnetic Interference   |
| EPA               | Environmental Protection Agency  |
| ERFB              | Eastern Regional Fisheries Board   |
| ERSA              | European Regional Science Association  |
| ESB               | Electricity Supply Board   |
| EU                | European Union   |
| FAQ               | Frequently Asked Questions   |
| FCC               | Fingal County Council  |
| FTE               | Full-time employment   |
| GAA               | Gaelic Athletic Association  |
| GAC               | Generic Assessment Criteria  |
| GDA               | Greater Dublin Area  |
| GPO               | General Post Office  |
| GQRA              | Generic Quantitative Risk Assessment   |
| GRP               | Glass Reinforced Plastic   |
| GSI               | Geological Survey Ireland  |
| HAP               | Habitat Action Plan  |
| HC#               | Heritage Constraint Number   |
| HGV               | Heavy Goods Vehicle  |
| IEEM              | Institute of Ecology and Environmental Management  |
| IEMA              | Institute of Environmental Management and Assessment   |
| InfraCo           | Infrastructure Company appointed to design, construct and operate the proposed scheme  |
| IPPC              | Integrated Pollution Prevention and Control  |
| IR                | Irish Rail   |
| kph               | Kilometres per hour  |
| $L_{Aeq}$         | The equivalent continuous noise level. The notional steady dB(A) level that would produce the same A-weighted sound energy level as the actual, time varying sound, over a stated period |
| $L_{A10}/L_{A90}$ | The noise levels in dB(A) that are equalled or exceeded for the 10%/90% of the sample time   |
| $L_{Amax}$        | Maximum peak noise level   |
| LAP               | Local Area Plan  |
| LGV               | Light Goods Vehicle  |
| LI                | Landscape Institute  |
| LLCA              | Local Landscape Character Areas  |

| Acronym           | Definition   |
|-------------------|--|
| LMV               | Light Metro Vehicle  |
| LRT               | Light Rail Transit   |
| Luas              | Dublin's Light Rail Transit system   |
| LV                | Low Voltage  |
| MGI               | Main Ground Investigation  |
| Mitigation        | Measures designed to avoid, reduce or remedy adverse impacts   |
| MID               | Mobility Impaired/ Disabled  |
| MNEC              | Metro North Economic Corridor  |
| MNTM              | Metro North Traffic Model  |
| MRP               | Molybdate-Reactive Phosphate   |
| NAQIA             | National Air Quality Information Archive UK  |
| NCCS              | National Climate Change Strategy   |
| NCT               | National Car Test  |
| NDP               | National Development Plan  |
| NHA               | Natural Heritage Area  |
| NIAH              | National Inventory of Architectural Heritage   |
| NMI               | National Museum of Ireland   |
| NML               | Noise Monitoring Location  |
| NMS               | National Monuments Services  |
| NO <sub>2</sub>   | Nitrogen Dioxide   |
| NO <sub>x</sub>   | Nitrous Oxides   |
| NPWS              | National Parks and Wildlife Service  |
| NRA               | National Roads Authority   |
| NSS               | National Spatial Strategy for Ireland  |
| OCS               | Overhead Catenary System   |
| OPW               | Office of Public Works   |
| OS                | Ordnance Survey  |
| OSI               | Ordnance Survey of Ireland   |
| PAH               | Polycyclic aromatic hydrocarbon  |
| PCU               | Passenger Car Units  |
| P&R               | Park & Ride  |
| PE                | Polyethylene   |
| PM <sub>10</sub>  | Particulate Matter with diameter of a less than 10 microns   |
| PM <sub>2.5</sub> | Particulate Matter with diameter of a less than 2.5 microns  |
| pNHA              | Proposed Natural Heritage Area   |
| ppb               | Parts per billion  |
| PPG               | Pollution Prevention Guidelines  |
| ppm               | Parts per million  |
| PPP               | Public Private Partnership   |
| pteg              | Passenger Transport Executive Group  |
| Public Utilities  | Water supply, drainage, gas, electricity, telecommunications systems as controlled operated and maintained by statutory bodies such as local authorities, Bord Gais etc. |
| QBC               | Quality Bus Corridor   |

| Acronym           | Definition  |
|-------------------|---|
| RAPID             | Revitalising Areas by Planning, Investment and Development                                  |
| RMP               | Record of Monuments and Places  |
| RPA               | Railway Procurement Agency.   |
| RPG               | Regional Planning Guidelines  |
| RPGDA             | Regional Planning Guidance for the Greater Dublin Area                                      |
| RPS               | Record of Protected Structures  |
| SAC               | Special Area of Conservation  |
| SGVs              | Soil Guideline Values   |
| SMR               | Sites and Monuments Record (of the Department of Arts, Heritage, Gaeltacht and the Islands) |
| SO <sub>2</sub>   | Sulphur Dioxide   |
| SPA               | Special Protected Areas   |
| SSG               | St. Stephen's Green   |
| Spp.              | Species   |
| SUDS              | Sustainable Urban Drainage System   |
| SVM               | Swords Vissim Models  |
| TAG               | Transport Analysis Guidance   |
| TBM               | Tunnel Boring Machine   |
| TCD               | Trinity College Dublin  |
| TD                | Teachta Dála (Member of Parliament)   |
| TPH               | Total Petroleum Hydrocarbons  |
| UCD               | University College Dublin   |
| µg/m <sup>3</sup> | Micrograms per cubic metre  |
| UHI               | Urban Heat Island   |
| UK                | United Kingdom  |
| VOC               | Volatile Organic Compound   |
| WWTP              | Waste water treatment plant   |

## 2 GLOSSARY OF TERMS

| Term                           | Definition   |
|--------------------------------|--|
| Agronomy                       | The science of agriculture (soil management, land cultivation, and crop production).   |
| Alignment                      | The position of the proposed schemes tracks relative to the surrounding topography.  |
| Alignment design detail        | Information pertaining to the various positions along the alignment.   |
| Alternative route option       | Route options which were considered other than the route decided upon.   |
| Alternatives                   | The EIA Regulations giving effect to the 1985 and 1997 EIA Directives require an outline of the main alternatives studies by the road authority and an indication of the main reasons for its choice, taking into account the environmental effects. Alternatives typically relate to alternative routes, alternative designs and alternative processes (NRA).   |
| An Bord Pleanála               | An Bord Pleanála was established in 1977 under the Local Government (Planning and Development) Act, 1976 and is responsible for the determination of appeals and certain other matters under the Planning and Development Acts, 2000 to 2006, and with appeals under the Building Control Act, 1990, the Local Government (Water Pollution) Acts, 1977 and 1990 and the Air Pollution Act, 1987.   |
| Aquifer                        | A water-bearing layer of soil, sand, gravel, or rock that yields water.  |
| Archaeological Assessment      | An archaeological assessment is the investigation of known, suspected or previously unidentified monuments, sites or areas of archaeological potential in order to assess the impact which the proposed development may have on them. Each assessment should contain a description of the archaeology known to survive in the development area and of the types of archaeological features, not yet identified, which could possibly exist in that location. These should be evaluated in terms of the impact of the proposed works on known or predicted archaeology. Assessments may indicate that archaeological test excavation is required. The assessment procedure also proposes a strategy designed to deal with the possible adverse effects of the development works on archaeology. |
| Archaeological Excavation      | Archaeological excavation is the systematic recording and removal of layers of soil, deposits, structures and artefacts by a qualified archaeologist. As excavation is destructive by its nature it must be carried out with meticulous care so that all information, whether its relevance is immediately obvious or not, will remain available after the site has completely disappeared. This is why it is termed preservation by record. Post-excavation analysis e.g. radio carbon dating, conservation of archaeological finds, the proper storage of archaeological objects and publication of the results of the excavation are all integral parts of the process.   |
| Archaeological Monitoring      | Archaeological monitoring involves an archaeologist being present in the course of the carrying out of development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works.   |
| Archaeological site            | This encompasses all upstanding and buried archaeological monuments, deposits, and features which pre-date the year 1700AD. All monuments which are listed in the Sites and Monuments Record of the Department of Arts, Heritage, Gaeltacht and the Islands (formerly OPW). All sites described and mapped by the SMR has the full protection of National Monuments legislation (1937-1995).   |
| Archaeological Test Excavation | Archaeological test excavation is excavation of confined strips or areas of a site in order to establish the presence or absence of archaeology and to determine its nature and extent.  |
| At-grade section               | A section of the proposed scheme at ground level (as opposed to tunnel or elevated).   |

| Term  | Definition   |
|---|--|
| Baseline environment                          | Environmental conditions that currently exist and against which any future changes can be assessed.  |
| Baseline studies                              | Work done to determine and describe the baseline environmental conditions against which any future changes can be measured or predicted and assessed.  |
| Bored tunnel                                  | Tunnel constructed using the tunnel boring machine.  |
| British and Irish Archaeological Bibliography | An online database containing datasets covering publications from AD 1695 to the present day on archaeology and the historic environment, historic buildings, maritime and industrial archaeology, environmental history, and the conservation of material culture - with a geographical focus on Britain and Ireland. |
| Brownfield                                    | In town planning, Brownfield land is an area of land previously used or built upon or land that is or was occupied by a permanent structure, which has become vacant, underused or derelict and has the potential for development.   |
| Building / Structure of Architectural Merit   | A building or Structure which has no legal protection that is, in the opinion of the authors of the EIS, to be of architectural merit and therefore included in the study. N.B. Please see criteria for their inclusion in the archaeological chapters of this EIS.  |
| Census of Ireland                             | A census of the population of the whole of Ireland, occurring every four years between 1821 and 2006.  |
| Central median                                | Parcel of land between two carriageways.   |
| Civil Survey letters                          | A detailed survey of landuse and land ownership in Ireland undertaken by the English Government in 1641.   |
| Conservation Area                             | An area where the architectural design and scale of these areas is of sufficient importance to require special care in dealing with development proposals and works by the private and public sector alike.  |
| Construction compounds                        | Site where construction equipment is to be stored and construction operation is to be managed from.  |
| Construction phase                            | The period of time over which the scheme will be constructed.  |
| Contamination                                 | The act of contaminating or polluting; including (either intentionally or accidentally) unwanted substances or factors.  |
| Culvert                                       | A channel or conduit for passing water under a road or embankment.   |
| Cumulative effects                            | The effect on the environment which results from the incremental impact of an action when added to other past, present or reasonably foreseeable actions regardless of what agency or person undertakes such actions.  |
| Cumulative impacts                            | Impacts that occur as a result of the addition of the incremental impact of an action to other past, present or reasonably foreseeable actions.  |
| Cut and cover techniques                      | The method of constructing tunnels.  |
| Cut and cover tunnel                          | A tunnel that is excavated from the 'top down' (i.e. from the surface) and then covered over to reinstated the surface.  |
| Demography                                    | The study of the size, growth, and age and geographical distribution of human populations, and births, deaths, marriages, and migrations.  |
| Dewatering                                    | The removal of water.  |
| Direct effects                                | The effects that will occur as a direct result of the project.   |
| Do-minimum scenario                           | The scenario that would exist in the future if the project were not to go ahead.   |
| Dublin Transportation Office (DTO)            | Statutory agency which provides transport and landuse advice to organisations operating in the Greater Dublin Area.  |



| Term                                  | Definition  |
|---------------------------------------|---|
| Eastern Regional Fishing Board (ERFB) | The statutory body responsible for maintaining and improving environmental quality and developing and protecting the fisheries resource in the eastern region of Ireland.   |
| Ecosystem                             | A community of different plant and animal species interacting with one another and with their non-living environment.   |
| EIA regulations                       | Collective name for the various statutory instruments through which the EC Council Directive on Environmental Assessment (Directive 85/337/EC as amended by Directive 97/11/EC) was implemented in Ireland.   |
| Electoral Divisions (EDs)             | The smallest administrative area for which population statistics are published.   |
| Elevated section                      | A section of the scheme that is raised off the surface i.e. viaduct.  |
| Environmental Impact Assessment (EIA) | <p>The systematic, reproducible and interdisciplinary identification, prediction and evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives.</p> <p>The process of examining the environmental effects of the proposed scheme development – from consideration of environmental aspects at design stage through to preparation of an Environmental Impact Statement, evaluation of the EIS by the competent authority and the subsequent decision as to whether the development should be permitted to proceed, also encompassing public response to that decision.</p> |
| Environmental Impact Statement (EIS)  | A statement of the effects, if any, which proposed development, if carried out, would have on the environment. This document presents the findings of the EIA to the decision-makers and the public.  |
| Environmental Protection Agency (EPA) | Ireland's statutory body for the balanced and sustainable protection and management of the environment.   |
| EPA Q-value                           | An Environmental Protection Agency classification concerning the biological status of a watercourse.  |
| European Union (EU)                   | The economic and political union established in 1993 after the ratification of the Maastricht Treaty by members of the European Community, which forms its core.  |
| Fáilte Ireland                        | Established under the National Tourism Development Authority Act, 2003, it provides strategic and practical support to develop and sustain Ireland as a high - quality and competitive tourist destination.   |
| Fauna                                 | All of the living animals.  |
| Flora                                 | All of the plants.  |
| Functional Value                      | A term used to express the combined consideration of importance, sensitivity and existing adverse effects.  |
| Geological Survey Ireland (GSI)       | Founded in 1845 it is responsible for providing geological advice and information, and for the acquisition of data for this purpose.  |
| Geotechnical investigation            | Investigations performed by geotechnical engineers or engineering geologists to obtain information on the physical properties of soil and rock around a site to design earthworks tunnels, underground structures and foundations for the proposed scheme and for repair of distress to earthworks and structures caused by subsurface conditions.  |
| Greater Dublin Area                   | The Greater Dublin Area comprises the Dublin and Mid-East Regions. The constituent counties are: Dublin County Borough and the Counties of Dun Laoghaire-Rathdown, Fingal, and South Dublin (Dublin Region) together with the counties of Kildare, Meath and Wicklow (Mid-East Region).   |
| Greenbelt                             | A policy or landuse designation used in landuse planning to retain areas of largely undeveloped, wild, or agricultural land surrounding or neighbouring urban areas.  |

| Term                      | Definition  |
|---------------------------|---|
| Greenfield                | Clean, undeveloped land.  |
| Greenhouse gases          | Components of the atmosphere that contribute to the greenhouse effect. Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, and ozone. The majority of greenhouse gases come mostly from natural sources but are also contributed to by human activity. |
| Groundborne noise         | Sound that passes through the ground and is audible at the surface.   |
| Groundwater               | Groundwater is the water beneath the surface that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs. Groundwater is the water that is pumped by wells and flows out through springs.               |
| Groundwater flow          | Movement of water beneath the ground surface facilitated by the types of subsurface materials, faulting and bedding, the slope and hydrological characteristics of the materials and the amount and location of water.  |
| Habitat                   | The physical and living environment in which an organism or community of organisms live.  |
| Hayes's Indices           | A catalogue of all the articles, poems and reviews (apart from short notices) in the periodicals published in Ireland, which contain material likely to be of value for research whatever the intellectual or cultural activity.  |
| Hydrocarbon pollution     | The contamination of an environment with substances consisting only of carbon and hydrogen atoms.   |
| Hydrological impacts      | The effect on the water systems, river, lakes, groundwater, etc.  |
| Impacted receptors        | Those who are likely to experience a change in their environment as a result of the scheme.   |
| Indirect effects          | Effects that occur due to the project indirectly.   |
| Indirect impact           | Impacts on the environment which are not a direct result of the project, often produced away from the project or as a result of a complex pathway.  |
| In-stream impacts         | Impacts which occur within a watercourse.   |
| Irish Rail Interconnector | A connection with a proposed 5.2 km underground line, connecting the Docklands and Hueston Station.   |
| Landuse                   | The use or activities which occur within particular areas   |
| Launch sites              | The locations from which the tunnel boring machines are to be launched.   |
| Light rail                | Rail transport systems used to convey light or rapid speeds.  |
| Linear scheme             | A scheme that is linear in spatial design.  |
| Long-term effects         | Effects that will persist long into the future.   |
| Luas                      | Dublin's light rail transport system.   |
| M50                       | A C-shaped orbital motorway transport route around Dublin.  |
| Magnitude of Impacts      | Takes into account the quality, type and range of impact that will occur as well as the duration over which the impact will occur.  |
| Medium-term effects       | Effects that will persist for some time into the future, but will not be permanent.   |
| Mining techniques         | The methods used to extract soil from the ground.   |
| Mitigation                | The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.  |
| Mitigation measures       | Measures taken to avoid, reduce and, if possible, remedy significant adverse effects.   |

| Term                                   | Definition  |
|--|---|
| Modal share                            | The proportion of population that uses each mode of transport for their routine journeys.   |
| Modal shift                            | The decision by people to discontinue using one particular mode of transport and to move to another for their routine journeys.   |
| Monitoring                             | The repetitive and continues observation measurement and evaluation of environmental data to follow changes over a period of time, also used to assess the efficiency of control measures. Monitoring is the regular observation and recording of activities taking place in a project or programme. It is a process of routinely gathering information on all aspects of the project.  |
| National Heritage Area (NHA)           | An area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.  |
| National Monument                      | Section 2 of the National Monuments 1930 Act provides that 'national monument' 'means a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic, or archaeological interest attaching thereto....., and the said expression shall be construed as including, in addition to the monument itself, the site of the monument and the means of access thereto and also such portion of land adjoining such site as may be required to fence, cover in, or otherwise preserve from injury the monument or to preserve the amenities thereof'. |
| National Roads Authority (NRA)         | Ireland's statutory body for securing the provision of a safe and efficient network of national roads.  |
| Negative effect                        | A result of the project that has made the situation worse than before.  |
| Negative impact                        | A change that reduces the quality of the environment.   |
| Non-statutory bodies                   | Organisations not established at the behest of Government.  |
| Non-technical summary                  | Information for the non-specialist reader to enable them to understand the main environmental impacts of the proposal without reference to the main environmental impact statement.   |
| NO <sub>x</sub>                        | Nitrogen Oxides.  |
| Open Space                             | Includes all areas of public realm, parks and squares, as well as incidental areas of open spaces peripheral to development and open space specific to residential development.   |
| Operational phase                      | The period of time over which the proposed scheme will be in operation.   |
| Overhead cantenary system (OCS)        | The system through which power is supplied to Metro.  |
| Park & Ride sites                      | Facilities at public transport stops that allow commuters to leave their personal vehicles in a car park and transfer to a bus, rail system (rapid transit, light rail or commuter rail) or carpool for the rest of their trip.   |
| Permanent effects                      | Effects that are non-reversible and will persist indefinitely.  |
| pH Index                               | A measure of the acidity or alkalinity of a solution. The pH scale commonly in use ranges from 0 to 14.   |
| Phase 1 Habitat Survey                 | Standard ecological field survey methodology to identify, record and map the key habitats and species, in line with the Heritage Council's 2000 Guidelines. Recognised methodology used for collating information on the habitat structure of a particular site.  |
| Positive impact                        | A result of the project that has made the situation better than before.   |
| Proposed National Heritage Area (pNHA) | An area that is potentially considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.  |
| Proposed scheme                        | The Metro North development proposals subject to the Railway Order.   |

| Term   | Definition   |
|--|--|
| Public realm   | The space between and within buildings that are publicly accessible, including streets, squares, forecourts, parks and open spaces.  |
| Public Utilities   | Water supply, drainage, gas, electricity, telecommunications systems as controlled operated and maintained by statutory bodies such as local authorities, Bord Gais etc.   |
| R132   | A relatively new regional road that passes through Balbriggan and Swords and terminates at a junction with the N1 in Whitehall.  |
| Railway infrastructure   | Any land, buildings, structures, equipment, systems, vehicles, services or other thing used in connection with, or necessary or incidental to, the movement of passengers or freight by railway.   |
| Railway Order  | The authorisation given by An Bord Pleanála for a railway project to commence construction.  |
| Railway Procurement Agency (RPA)                                   | The independent statutory body responsible for securing the provision of, or provide, such light railway and metro infrastructure as may be determined from time to time by the Minister for Transport.                                  |
| RAPID (Revitalising Areas by Planning, Investment and Development) | An initiative that is led by the Department of Community, Rural and Gaeltacht Affairs to focus investment into the most concentrated areas of disadvantage in the country.   |
| Receiving environment  | The extent of the existing environment within which the project is to be developed and any area that may be impacted upon as a result of the project.  |
| Receptor   | Any element in the environment which is subject to impacts.  |
| Records of Monuments and Places (RMP)                              | A database of all archaeological monuments in the state compiled by the Archaeological Survey of Ireland.  |
| Register of Historic Monuments (RHM)                               | The name, location and a brief description of all the historic monuments and archaeological areas in State compiled by the National Monuments Service of the Department of the Environment, Heritage and Local Government.               |
| Residual impact  | The degree of environmental change that will occur after the proposed mitigation measures have taken effect.   |
| Retained cut   | A cutting that is excavated but is not covered over after, generally the sections of the alignment where the proposed scheme descends to and rises e.g. from underground tunnels.  |
| Risk   | The likelihood of a specific effect occurring within a specified period or in specified circumstances.   |
| Route option   | Prior to decision on the route of the proposed scheme there were various route options that were considered.   |
| Royal Historical Society Bibliography                              | An authoritative guide to what has been written about British and Irish history from the Roman period to the present day. The Bibliography is hosted by the Institute of Historical Research, which is part of the University of London. |
| Severance  | The separation/reduction in separation of population from facilities and services they use within their communities.   |
| Scope  | The spatial and temporal extent which the environmental impact assessment is to be evaluated over.   |
| Scoping  | The process of identifying the issues to be addressed by an EIA. It is a method of ensuring that an EIA focuses on the important issues and avoids those that are considered to be less significant.                                     |
| Scoping stage  | The stage of the EIA at which the scope is decided upon.   |
| Secondary effects  | The potential effects of additional changes that are likely to occur later in time or at a different place as a result of the implementation of a particular action.   |

| Term                               | Definition   |
|------------------------------------|--|
| Sensitive receptors                | Those who are likely to experience a change in their environment as a result of the construction of Metro due to their own nature.   |
| Short-term effects                 | Effects that are only short lasting.   |
| Significant impact                 | An impact which, by its character, magnitude, duration of intensity alters a sensitive aspect of the environment   |
| Sites and Monuments Record (SMR)   | Lists with accompanying maps and files of all certain or possible archaeological sites and monuments mainly dating to before 1700AD for all counties.  |
| Soundscape                         | Any acoustic environment, whether it springs from natural urban or rural sources.  |
| Source Protection Zones (SPZs)     | The Environment Protection Agency identifies Source Protection Zones to protect groundwater (especially public water supply) from developments that may damage its quality.                  |
| Special Area of Conservation (SAC) | Sites included in Annex I and II of the EC Habitats Directive (92/43/EEC) due to them being considered to be of European interest following criteria given in the directive.                 |
| Special Protection Area (SPA)      | Sites designated under the European Union directive on the Conservation of Wild Birds (79/409/CEE) to protect important bird species.  |
| Species migration                  | The movement of species between habitats.  |
| Spoil                              | The earth excavated during tunnelling and other construction works.  |
| Stakeholders                       | Those who may be potentially affected by a proposal (e.g. local people, the proponent, Government agencies, NGOs, donors and others).  |
| Statutory bodies                   | Organisations established at the behest of Government.   |
| Stenotopic species                 | Species tolerant of only a narrow range of environmental factors.  |
| Stop                               | Points at which passengers will be able to embark and disembark the proposed scheme.   |
| Stop access points                 | The points via which the stops can be accessed.  |
| Study Area                         | This study area encompasses all areas that may potentially be impacted upon by the proposed scheme.  |
| Swords QBC                         | Bus service linking Swords with Dublin airport and Dublin city.  |
| Temporary effects                  | Effects that will last for only a certain amount of time.  |
| Temporary impact                   | Impacts that will last for only a certain amount of time.  |
| Townscape                          | The urban landscape.   |
| Track gauge                        | The distance between the two rails.  |
| Traffic assessment                 | Consists of the collection of data, traffic census and the analysis of this data in order to make traffic flow predictions.  |
| Traffic flow                       | The number of vehicles travelling along a particular route in a particular direction over a period of time.  |
| Traffic impact model               | A model, constructed from data that enables the determination of transportation demands of development proposals and provides for reduction of adverse impacts on the transportation system. |
| Transport 21                       | The capital investment framework through which the transport system in Ireland will be developed, over the period 2006 to 2015.  |
| Tunnel Boring Machine (TBM)        | The machine used to excavate earth and create the underground tunnels through which the proposed scheme will run.  |
| Tunnel sections                    | Various lengths of the tunnel.   |
| Twin tunnels                       | Two tunnels constructed side by side, but not connected other than by occasional cross-over passages.  |

| Term                    | Definition  |
|-------------------------|---|
| Urban Heat Island (UHI) | A microclimatic effect that is experienced in urban areas.                              |
| Utilities               | Services provided such as water, gas, electricity and telecommunications.               |
| Ventilation shaft       | A construction which facilitates the movement of air in and out of the tunnel sections. |
| Verge                   | A small parcel of land of incidental use.   |
| Vertical alignment      | The positioning of the proposed scheme tracks relative to the ground surface.           |
| Visual amenity          | The value of views to a receptor in a particular area                                   |
| Visual receptors        | Those who are likely to experience a change in view.                                    |
| Wildlife Corridors      | A strip of habitat connecting wildlife populations separated by human activities.       |

