



Dublin Light Rail Environmental Impact Statement

Line B1

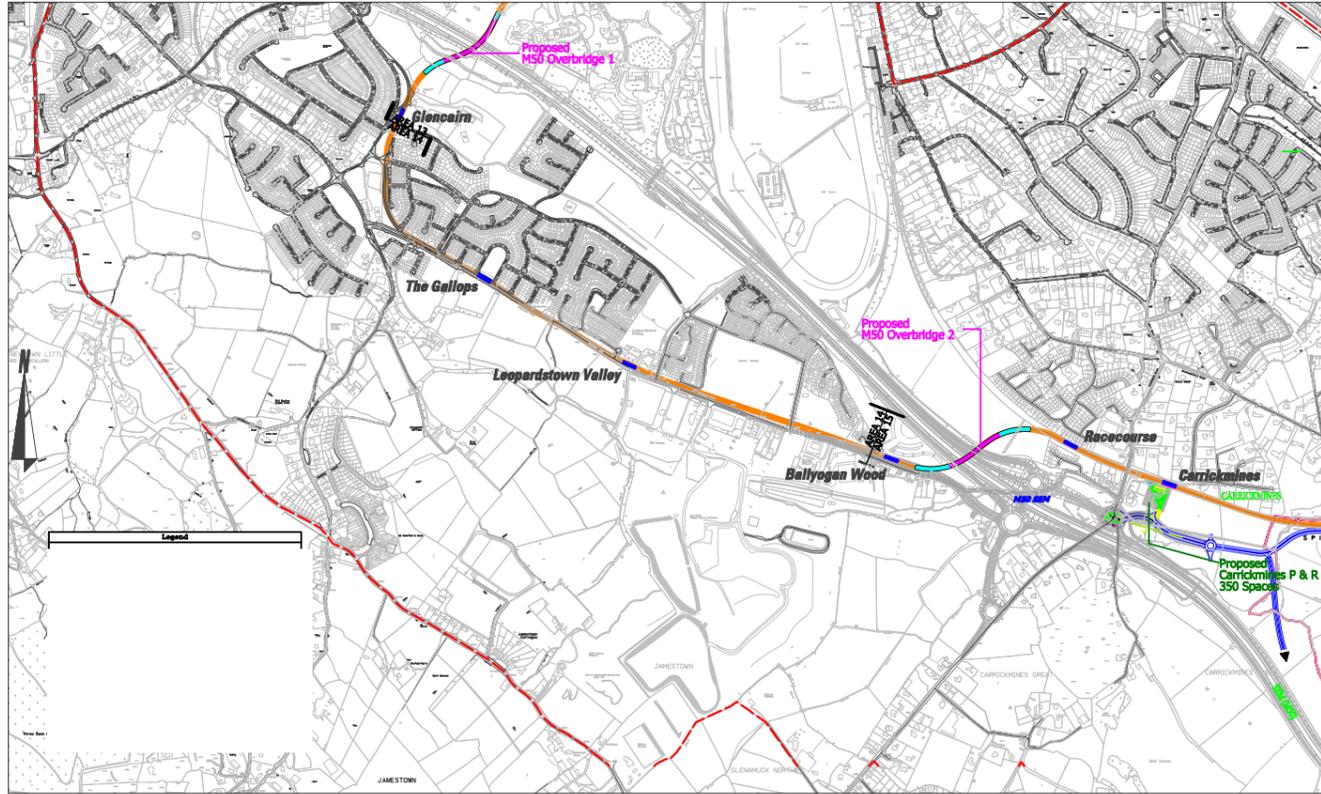
Sandyford Industrial Estate to
Cherrywood

Volume 2

Area

14

Murphystown Road to
Ballyogan Wood



area **14**

Glencairn Stop to Ballyogan Wood

ENVIRONMENTAL IMPACT STATEMENT

The Environmental Impact Statement is being published in three separate Volumes as follows:

Volume 1 Chapters 1, 2, 3, 4, 5, 6, and 8

Volume 2 Chapter 7 (Environmental Impact- Areas 13 to 15)

Volume 3 Chapter 9 (EIS Non-Technical Summary)

This Environmental Impact Statement (EIS) relating to Line B1 of the Dublin Luas Light Rail Transit (LRT) Project is set out in nine Chapters, titled as follows:

Chapter 1 Introduction

Chapter 2 Public Consultation

Chapter 3 Consideration of Alternatives Luas Line B1

Chapter 4 Description of the Proposed Luas Line B1

Chapter 5 Aspects of the environment considered

Chapter 6 Interactions

Chapter 7 Environmental Impact -Areas 13 to 15 inclusive

Chapter 8 Difficulties encountered in compiling this EIS

Chapter 9 Non-Technical Summary

The preparation of an Environmental Impact Statement requires the co-ordination and synthesis of associated yet diverse elements of the overall assessment. To facilitate this process, a schematic structure is used in order to provide a coherent documentation of the various aspects of the environment considered. An outline of the Grouped Format structure of the Environmental Impact Statement is detailed below.

1 Receiving Environment (Baseline Situation)

A description of the specific environment into which the proposal will fit, taking account of other developments likely to occur. The particular aspects of the environment are discussed in terms of their context, character, significance and sensitivity.

2 The Characteristics of the Proposal

A projection of the specific "load" on the particular aspects of the environment which the proposal would be likely to generate. This is set out at the commencement of each of the three individual areas in Volume 2.

3 The Potential Impact of the Proposal

- a) The potential impact of the proposal also comprises a general description of the possible types of impacts which proposals of this kind would be likely to produce.
- b) This includes a consideration of the "Do-Nothing" impact. The "Do-Nothing" impact describes the environment as it would be in the future if no development of any kind is carried out.

4 Remedial or Reductive Measures

A description of any specific remedial or reductive measures considered necessary and practicable resulting from the assessment of potential impacts described at (3a) above.

5 The Predicted Impact of the Proposal

- a) An assessment of the specific direct and indirect impact of the proposal arrived at by adding to the receiving environment (as in (1) above), the loading of the proposal (as in (2) above) and the remedial or reductive measures (as in (4) above).
- b) Also considered is a "Worst Case" scenario, arising where a development, or its mitigation measures substantially fail.

6 Monitoring

A description of any monitoring of effects on the environment which might be necessary in both the construction and operational phases, covering the monitoring methods, and the agencies responsible for their implementation.

7 Reinstatement

Where required, a description of the reinstatement measures and agencies responsible for their implementation.

ENVIRONMENTAL IMPACT STATEMENT STUDY TEAM

The Environmental Impact Statement was prepared on behalf of the Railway Procurement Agency (RPA) by a study team led by RPS McHugh Planning and Environment, who were responsible for the overall study management and co-ordination as well as for Land Use Planning and Development, Demography and Employment, Property, Local History and Interactions. The other members of the study team are as follows:

Flora and Fauna

Eleanor Mayes, Ecological Consultant,

Vehicular and pedestrian traffic and Safety

Railway Procurement Agency (RPA)

Soil and water

T.J. O'Connor & Associates, Consulting Engineers,

Public utilities

Railway Procurement Agency (RPA)

Electromagnetic aspects

Mott McDonald, Consulting Engineers,

AIR (NOISE AND VIBRATION)

Eanna O'Kelly and Associates, Consultant Acoustic Engineers,

Climate (air quality)

Envirocon Ltd., Environmental Consultants,

Lighting

J.V. Tierney & co., Consulting Engineers,

The landscape, buildings of artistic, historical and architectural merit

Mitchell and Associates, Landscape Architects,
J.M. McConville, Consultant Arborists,
Arc Digital Photographic Ltd.

Archaeology

Margaret Gowen & co. Ltd.,
Archaeological project management,

The public consultation process

Railway Procurement Agency (RPA)

Graphic design and photomontages

Arc Digital Photographic Ltd.
Railway Procurement Agency (RPA)

AVAILABILITY OF THE EIS

Copies of this Environmental Impact Statement including the Non-Technical Summary may be purchased by any member of the public during normal office hours at the following locations:

Railway Procurement Agency (RPA), Parkgate Street,
Dublin 8
Dublin Transportation Office, Hainault House, Floor 3,
69-71 St. Stephen's Green, Dublin 2.

The EIS may be purchased as a complete document for a sum of €50.00 (Volumes 1, 2 & 3).

Alternatively, reports on each of the three individual Areas of the Line B1 alignment discussed in Chapter 7 (Volume 2) of the EIS dealing with particular areas and topics may be purchased individually for a sum of €10.00 each.

Copies of Volume 1 may be purchased for €30.00 each.

Copies of the Non-Technical Summary (Volume 3) of this EIS may be purchased at any of the above locations for a sum of €3.00 each.

A CD version of the whole EIS (Vol 1; Vol 2 Area 13, 14 and 15 and NTS) for €5.00.

This EIS is also available to download through the RPA website at www.rpa.ie

Contents

| | | | | | |
|---|-----------|--|-----------|---|-----------|
| Characteristics of the Proposal Area 14 | 5 | | | | |
| Luas Line B1: The Proposed Development | 5 | | | | |
| Glencairn Stop (Murphystown Road) to Ballyogan Wood | 5 | | | | |
| Glencairn Stop to Ballyogan Road (Murphystown Parallel Access Road) | 6 | | | | |
| Ballyogan Road (Murphystown Parallel Access Road to the Gallops Stop) | 7 | | | | |
| The Gallops Stop to Leopardstown Valley Stop | 10 | | | | |
| Leopardstown Valley Stop to Ballyogan Wood | 12 | | | | |
|  | | | | | |
| 7.14.1 Human Beings | 14 | | | | |
| 7.14.1.1 Introduction | 14 | | | | |
| 7.14.1.2 Demography & Employment | 14 | | | | |
| 7.14.1.3 Land Use Planning and Development | 15 | | | | |
| 7.14.1.4 Vehicular and Pedestrian Traffic and Safety | 17 | | | | |
| 7.14.1.5 Community Severance | 19 | | | | |
|  | | | | | |
| 7.14.2 Flora and Fauna | 21 | | | | |
| 7.14.2.1 Introduction | 21 | | | | |
| 7.14.2.2 Flora | 21 | | | | |
| 7.14.2.3 Fauna | 22 | | | | |
|  | | | | | |
| 7.14.3 Soil | 23 | | | | |
|  | | | | | |
| 7.14.4 Water | 24 | | | | |
| | |  | | | |
| | | 7.14.5 Air | 25 | | |
| | | 7.14.5.2 Introduction | 25 | | |
| | | 7.14.5.3 Noise | 25 | | |
| | | 7.14.5.4 Vibration | 25 | | |
| | | 7.14.5.5 Lighting | 26 | | |
| | | 7.14.5.6 Electromagnetic Aspects | 27 | | |
| | |  | | | |
| | | 7.14.6 Climate | 28 | | |
| | | 7.14.6.1 Introduction | 28 | | |
| | | 7.14.6.2 Air Quality | 28 | | |
| | |  | | | |
| | | 7.14.7 Landscape and Visual Impact | 30 | | |
| | | 7.14.7.1 Introduction | 30 | | |
| | | 7.14.7.2 Landscape | 30 | | |
| | | 7.14.7.3 Trees | 33 | | |
| | | 7.14.7.4 The Built Environment and Visual Impact | 34 | | |
| | |  | | | |
| | | 7.14.8 Material Assets | 36 | | |
| | | 7.14.8.1 Introduction | 36 | | |
| | | 7.14.8.2 Public Utilities | 36 | | |
| | | 7.14.8.3 Property | 36 | | |
| | |  | | | |
| | | 7.14.9 Cultural Heritage | 38 | | |
| | | 7.14.9.1 Introduction | 38 | | |
| | | 7.14.9.2 Local History | 38 | | |
| | | 7.14.9.3 Architectural Heritage | 38 | | |
| | | 7.14.9.4 Archaeology | 38 | | |
| | | | |  | |
| | | 7.14.10 Area 14 Construction Scenario | | | 42 |
| | | 7.14.11 Direct and Indirect Effects Resulting from Use of Natural Resources | | | 43 |
| | | 7.14.12 Direct and Indirect Effects Resulting from Emission of Pollutants, Creation of Nuisances and Elimination of Waste | | | 43 |
| | | 7.14.13 Forecasting Methods used for 7.14.10 and 7.14.11 | | | 43 |
| | | 7.14.14 Interactions | | | 43 |
| | | | | Appendix 14A List of Plant Species in Area 14 | 44 |
| | | | | Appendix 14B List of Tree Species in Area 14 | 45 |
| | | | | Appendix 14C Specialist maps | 48 |

Glencairn stop (Murphystown Road) to Ballyogan Wood



Photomontage of Luas Line B1 at Leopardstown Valley Stop

Luas Line B1 THE PROPOSED DEVELOPMENT

Luas Line B1 comprises the construction, installation and operation of a twin tracked light rail transit system between Sandyford Industrial Estate and Cherrywood including the provision of track, cable supports, overhead power lines, stops, sub-stations and trams, as well as associated works. This route comprises an extension of the existing Green Line linking St. Stephen's Green in Dublin City Centre to Sandyford Industrial Estate, which commenced operation in June 2004. Luas Line B1, which is the subject of the Railway Order application which this EIS accompanies, runs for a distance of approximately 7.6km from the Sandyford Stop, adjacent to the Luas Sandyford Depot at the north-eastern corner of the Sandyford Industrial Estate, to the planned District Centre at Cherrywood via the Central Park scheme, Ballyogan Road, Carrickmines and Laughanstown, terminating at the Cherrywood Science and Technology Park. This alignment includes two bridge crossings of the reservation of the South Eastern Motorway (SEM); one spans from the lands of Central Park and links over the Leopardstown Valley to Murphystown Road; the other spans from a point north of Ballyogan Road to a point south of the alignment of the former Harcourt Street rail line, west of Glenamuck Road in Carrickmines. It also includes an elevated crossing of the Brewery Road/Leopardstown Road Roundabout and the Wyattville Link Road, an underpass at Glenamuck Road Bridge and the planned Cherrywood Spine Road.

Luas Line B1 runs predominantly off-street, or along a dedicated reservation. It will provide residents, workers and visitors within its catchment area with a fast and efficient public transportation service.

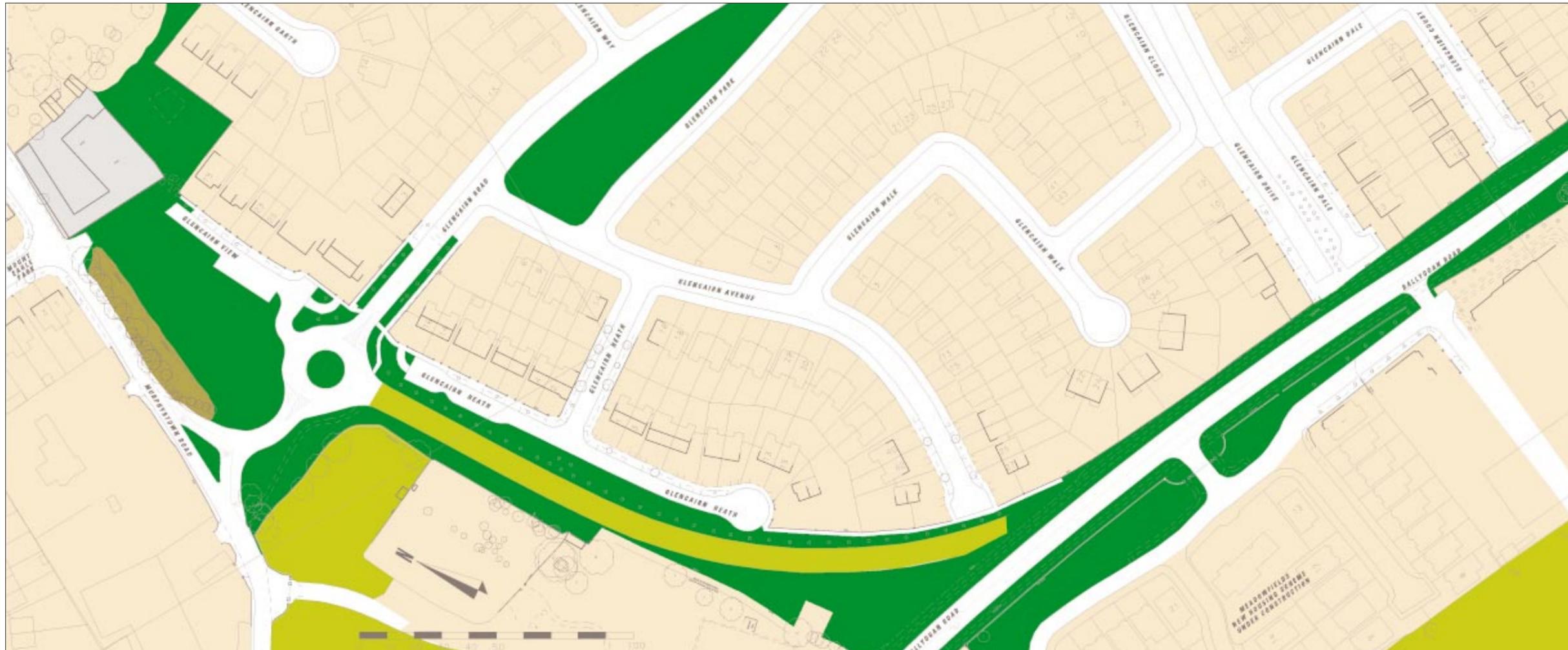
For ease of local identification and interest, the Luas Line B1 alignment has been divided into three Areas. This document deals with **Area 14**, running from a point immediately to the south of the planned Glencairn stop on Murphystown Road to the eastern end of Ballyogan Road in the vicinity of the Ballyogan Wood residential scheme. The aim of this document is to highlight the specific environmental impact arising for the area from the construction and operation of the proposed Luas Line B1, and the remedial measures that will be employed to reduce or remedy any likely significant adverse impacts.

Area 14 Glencairn Stop to Ballyogan Road (Murphystown Parallel Access Road)



This section of Luas Line B1 will run at-grade from the planned Glencairn stop, and will follow the eastern side of the planned alignment of the Murphystown Parallel Access Road. This planned road, which is a Local Roads Objective of the Dun Laoghaire-Rathdown County Development Plan 2004-2010, is intended to constitute a significant upgrading of the existing narrow Murphystown Road, linking Ballyogan Road to the SEM Sandyford Intersection.

Luas Line B1 will follow the reservation of the planned Murphystown Parallel Access Road into "The Gallops" residential estate. It will cross the existing roundabout at the western entrance to the estate at-grade, and will run southwards, along the eastern side of the planned road alignment in the vicinity of that portion of the estate known as Glencairn Heath. Luas Line B1 will then follow the south-eastward curve of the planned new road, before linking to the northern side of Ballyogan Road.



Area 14 Ballyogan Road (Murphystown Parallel Access Road) to The Gallops Stop



Luas Line B1 will run eastwards at-grade parallel to the northern side of the Ballyogan Road. This road serves a number of housing estates along its length, as well as an existing neighbourhood centre at Leopardstown Valley.

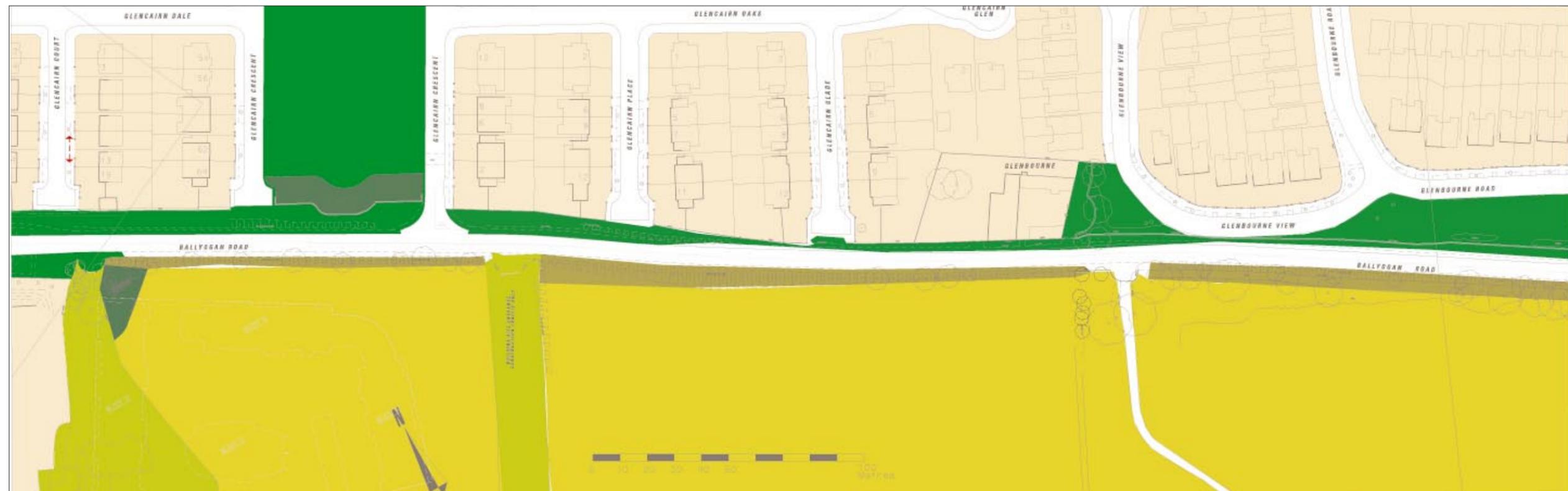
The construction of Luas Line B1 along Ballyogan Road will require the significant upgrading, widening and realignment of this road. The upgrading of Ballyogan Road is a Six Year Local Roads Objective of the Statutory Development Plan. The design of the Ballyogan Road realignment will be in accordance with the Council's requirements and will include provision of a cycle track, footpath, and grass verge on both sides of the carriageway.

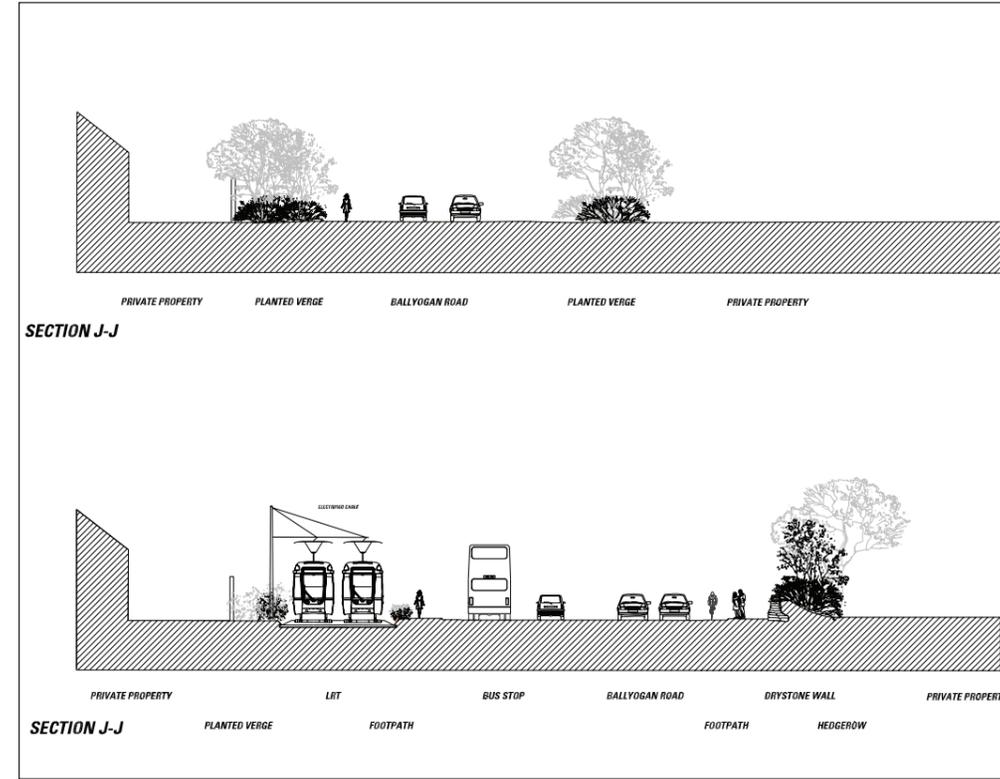
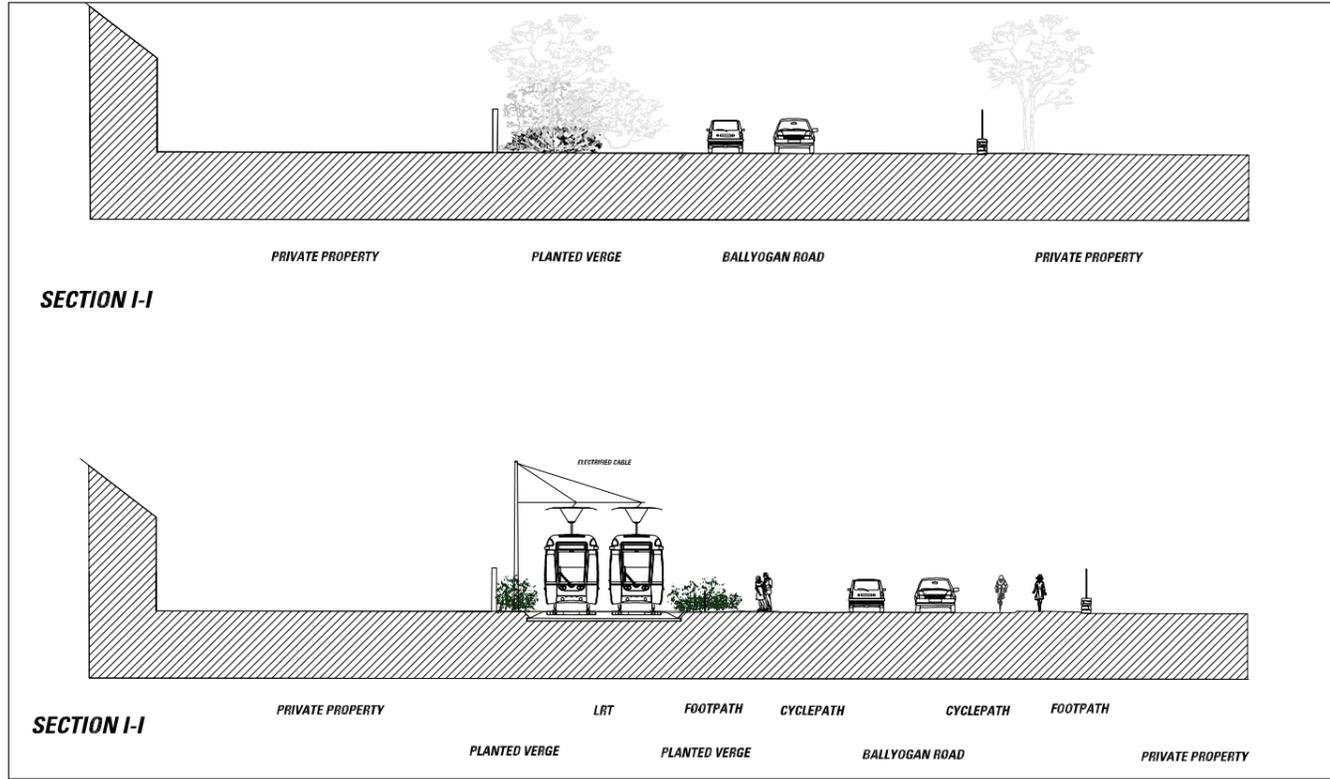
Localised widening will be undertaken at junctions in order to provide for turning lanes. This will require the acquisition of extensive strips of property on both sides of the existing Ballyogan Road. It will also require the removal of the existing mature trees and hedgerow on both sides of the carriageway.

Luas Line B1 along the Ballyogan Road will also provide a central link within the designated area of the Stepside Action Plan 2000, as adopted by Dun Laoghaire-Rathdown County Council in June 2000. Furthermore, the design of the roadway has been undertaken such as to connect with the planned Murphystown Parallel Access Road, which is also an objective of the Council. When complete, the roadway will form a seamless link between the SEM Carrickmines Interchange to the east and the SEM Sandyford Interchange to the west.

Luas Line B1 runs immediately adjacent to the southern boundary of "The Gallops" residential estate and north of *Kilgobbin Wood* residential scheme on the southern side of Ballyogan Road. The Gallops stop is to be provided at the southern entrance to the estate, immediately adjacent to a large area of public open space in the vicinity of Glencairn Crescent. The western "leg" of Glencairn Crescent which currently comprises a cul-de-sac, will be opened by means of a gate to provide pedestrian access only to The Gallops stop.

This will prevent the creation of informal desire line paths from the western side of Glencairn Crescent to the existing area of public amenity open space.





Area 14 The Gallops Stop to Leopardstown Valley Stop



The alignment runs eastwards from the Gallops stop and continues along the northern side of the Ballyogan Road. This requires an at-grade crossing of the existing southern entrance to *The Gallops* estate, immediately to the east of the stop.

The Luas Line B1 alignment curves slightly to the south of "Glenbourne", an existing period dwelling on the northern side of Ballyogan Road. The construction of Luas Line B1 will require the extinguishing of the existing vehicular entrance to this property from Ballyogan Road. A new entrance will be provided within the *Leopardstown Valley* (*Glenbourne*) residential development.

The alignment then enters a grassed reservation along the southern edge of this residential development, and crosses at-grade the main entrance road serving the scheme.

A stop will be located immediately to the south of the Leopardstown Valley Neighbourhood Centre. This Centre is designated and zoned under the Dun Laoghaire Rathdown County Development Plan 2004-2010 to be developed as a major District Centre serving the area. A public bus interchange will also be created within this area.





Existing Area of Leopardstown Valley



Photomontage of Luas Line B1 Leopardstown Valley Stop



Area 14 Leopardstown Valley Stop to Ballyogan Wood



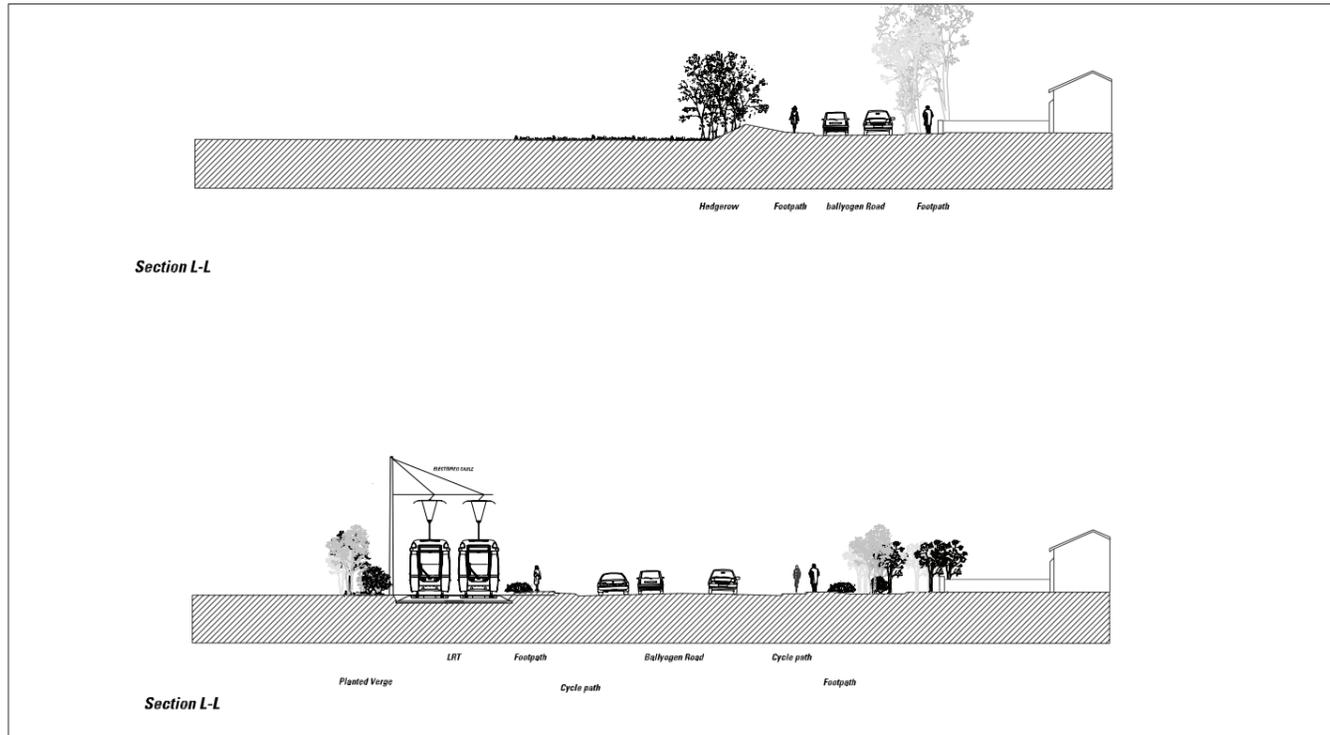
The Luas Line B1 alignment continues at-grade on the existing grassed reservation, parallel to the northern side of Ballyogan Road. This requires at-grade crossings of Ballyogan Avenue, which provides access at two locations from Ballyogan Road to the Drinaghmore and Ballyogan residential estates. The Luas Line B1 alignment also runs immediately to the south of the existing public playing fields to the east of the Drinaghmore Estate.

A substation serving the scheme is planned to be located to the east of the Drinaghmore residential estate, to the north-west corner of the playing fields adjacent to the alignment. A temporary construction compound and assembly site will be located east of Ballyogan Avenue.

Luas Line B1 will serve existing and planned new development in this area, including the Ballyogan Business Park, the An Post Ballyogan Sorting Office and a significant area of lands zoned for employment use on the southern side of Ballyogan Road. The ESB Carrickmines Station, County Council Ballyogan Landfill site and recycling centre are also located on the southern side of Ballyogan Road.

Area 14 terminates to the west of the entrance road serving the Ballyogan Wood public housing scheme.







7.14.1.1 INTRODUCTION

Human beings constitute a primary element of the 'environment' and any potential impact on human beings by Luas Line B1 must therefore be carefully assessed. The principal concern is that human beings should experience no significant unacceptable diminution in aspects of 'quality of life' as a consequence of the construction and operation of the proposed development. This assessment of 'Human Beings' considers demography and employment, land use planning and development, vehicular and pedestrian traffic and safety, and community severance.

7.14.1.2 DEMOGRAPHY & EMPLOYMENT

The key demographic and employment characteristics of Area 14 which are examined include: - the size and changing size of the population, number and size of households, employment and social profile, work and school travel patterns, and car ownership rates.

The Electoral Division (ED) is the smallest administrative area for which population statistics are published by the Central Statistics Office. There are three EDs within the catchment of Area 14 (Glencullen, Foxrock-Carrickmines and Cabinteely-Loughlinstown).

The majority of this assessment is based on the 2002 Census of Population data, which is the most recent source of official data available on an Electoral Division (ED) basis.

7.14.1.2.1 Receiving Environment

Demography

In 2002 the resident population of the EDs incorporation Area 14 was 17,826 persons. This represents a 21.3% increase in the overall population of the area since 1996 and an increase of 56% since 1991. In comparison the overall Line B1 catchment has increased by 11.7% since 1996 and by 31.8% since 1991. It can be seen that the population of Area 14 has increased by a relatively large amount since 1991 and is an indication of the level of development that has taken place in the area.

Table 7.14.1.2.1: Population Area 14, Luas Line B1 and DTO Area, 1991- 02

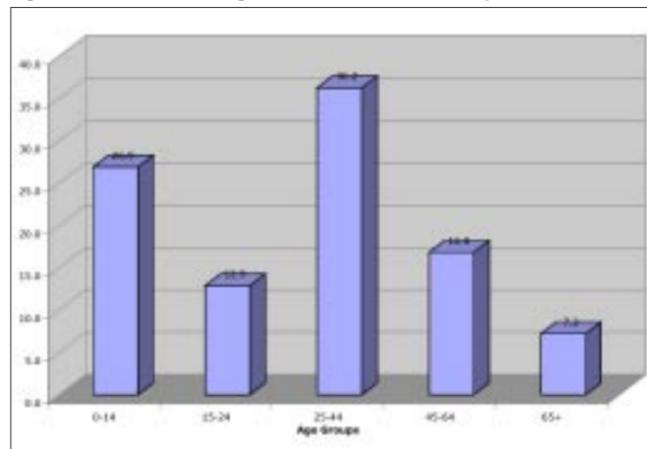
| | Area 14 | Total Line B1 | DTO Area |
|------|---------|---------------|-----------|
| 1991 | 11,427 | 24,557 | 1,350,595 |
| 1996 | 14,690 | 28,981 | 1,405,671 |
| 2002 | 17,826 | 32,367 | 1,535,446 |

SOURCE: Census of Population 1991,1996, 2002

Age Profile

In 2002 65.9% of the Area 14 population were aged between 15 and 64 years of age i.e. the working age groups. This is slightly lower than the working age population of the overall Luas area, which is 67.6% of the population. In addition, in 2002 8.6% of the population of Area 14 were students over the age of 15 compared with 9.6% within the overall catchment area of the Luas Line B1.

Fig. 7.14.1.2.1 Area 14 Age Profile as % of Total Population 2002



Households

In 2002 there were a total of 5,599 households in the three EDs incorporating Area 14. This represents an increase of 22.4% over the six-year period since 1996. In 2002 the average household size in these EDs was 3.1 persons. This is the same as the average household size for the overall Luas catchment area. Of this, 14.9% comprised single private households. In addition, 93% of households within the three EDs resided in conventional houses. This is the same as the figure of 93% within the Luas Line B1 Area. Lower density suburban dwellings are the predominant form of house type in the area.

Table 7.14.1.2.2.: Household Statistics, Area 14 and Line B1 2002

| | Area 14 | Total line B1 |
|--------------------------------------|---------|---------------|
| Total number of households | 5,599 | 10,284 |
| Average household size (persons) | 3.1 | 3.1 |
| Percentage single private households | 15.2% | 16.2% |
| Percentage apts/ flats / bedsits | 5.8% | 5.2% |

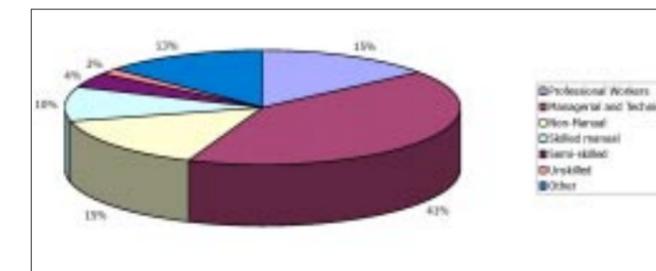
Employment

In 2002, a total of 7,790 persons residing in the EDs incorporating Area 14 were recorded as being at work. The number of people unemployed was 336, which gave an unemployment rate of 4.1%. This rate varied within Area 14, with Glencullen having the highest unemployment rate at 4.7% and Foxrock-Carrickmines having the lowest at 3.2%. An examination of the occupational structure of those 'at work' in Area 14 shows that 22.3% of the total were classed as professional, technical and health workers, while 5.4% were classed as manufacturing workers.

Social Deprivation

Social class can be an indicator of the socio-economic character of an area. In 2002, 56% of the resident population in the EDs incorporating Area 14 were categorised as being of Social Classes 1 or 2 i.e. the highest social classes, generally representing professional and managerial occupations. 6% were classed as being of social class 5 or 6, comprising semi-skilled and unskilled manual labour, including low-level service occupations. This illustrates that a very low level of social deprivation exists in Area 14.

Fig. 7.14.1.2.2: Area 14 Social Class



Travel Mode and Car Ownership

In 2002, 68.6% of the population in the three EDs of Area 14 over 5 years of age travel to work/school/college by car (be they drivers or passengers). This compares to a figure of 63% for the overall Luas catchment area. In contrast, 16.7 % travel to work/school/college by public transport as opposed to 18.3% in the Luas Area as a whole. In the overall DTO area, 19.7% travel to work/school/college by public transport.

In 2002, the rate of car ownership was 167 cars per 100 permanent households. This compares to a figure of 146 cars per 100 permanent households in 1991. The rate of car ownership in the overall Luas Area in 2002 was 159 cars per 100 households. This has risen from the 1991 rate of 132 cars per 100 permanent households

Table 7.14.1.2.3: Car Ownership Rates, 1991 and 2002

| | 1991 | 2002 |
|--------------|------|------|
| Area 14 | 146 | 167 |
| Luas Line B1 | 132 | 159 |

7.14.1.2.2 Potential Impact of the Proposal

Construction Phase

Demography

No potential impact on demography is expected to occur during construction of the proposed development. Whilst the resident, working and visiting populations of Area 14 may experience temporary general disturbance and inconvenience due to construction works associated with



the alignment, and with the planned associated re-alignment of Ballyogan Road, these will not affect demography, but rather are related to issues such as traffic and community severance, which are addressed elsewhere in this EIS. No potential impact on the structure of households and household size is anticipated in Area 14 during construction of Luas Line B1.

Employment

Construction of Luas Line B1 and the upgrading of Ballyogan Road will create considerable employment opportunities. These opportunities will be open to suitable members of the labour force from the Area 14

population (as with all suitable members of the labour force throughout the Dublin Region and beyond). Associated and indirect employment could also be created during the construction phase, for example in local retail services, building suppliers etc.

Travel Mode and Car Ownership

Car ownership amongst the resident population will not alter significantly as a result of the construction of the Luas Line B1 alignment, and associated road works on Ballyogan Road. The potential impact on traffic is dealt with at section 7.14.1.4 of this Environmental Impact Statement.

Operational Phase

Demography

The existing and future Area 14 resident and working populations will benefit from the introduction of a permanent efficient public transport service through this area, and the upgrading of existing road infrastructure. No significant impact on population structure as a direct consequence of Luas Line B1 is anticipated.

Employment

It is likely there will be enhanced employment opportunities in the Stepside area, which will be facilitated by the operation of Luas Line B1 in the area, as well as by an improved local distributor and National road network.

Travel Mode and Car Ownership

Travel mode will be potentially impacted upon with a shift away from private cars to public transport use by the working and visitor populations. There is currently a poor level of public transport serving this area. However, car ownership amongst the resident population is not anticipated to alter significantly as a result of the operation of Luas Line B1.

“Do Nothing” Scenario

Under a “do-nothing” scenario, no likely and significant impact will accrue to the overall number, age profile or average household size of the resident, working and visitor populations.

7.14.1.2.3 Remedial or Reductive Measures

Construction Phase

Appropriate information and management procedures will be introduced before and during the construction phase for the resident, working and visitor populations. This will include traffic management and access measures. A Construction Team representative will be available during the construction phase for consultation with local residents and businesses.

Operational Phase

No remedial or reductive measures are necessary in terms of the demography of the Area 14 population during the operation of Luas Line B1.

7.14.1.2.4 Predicted Impact of the Proposal

Demography

No likely and significant impacts on demography in terms of population and household size or structure are predicted.

Employment

Consolidation and growth of the working population is likely given the increased accessibility of this central area, both by the introduction of Luas Line B1, and by the associated upgrading of the Ballyogan Road which will provide a direct link to the SEM. Overall, a beneficial impact is predicted.

Travel Mode and Car Ownership

The predicted impact on travel mode will be some shift away from private cars to public transport use by the working and visitor populations. However, car ownership will not alter significantly with the operation of Luas Line B1 alignment.

7.14.1.2.5 Monitoring

Appropriate information review and update will be carried out during the construction of Luas Line B1 - through Area 14.

7.14.1.2.6 Reinstatement

No reinstatement is required in respect of demography and employment .

7.14.1.3 LAND USE PLANNING AND DEVELOPMENT

7.14.1.3.1 Receiving Environment

Land Use Structure

The proposed Area 14 Luas Line B1 alignment runs through lands zoned primarily for residential, employment and recreational/open space use under the Dun Laoghaire Rathdown County Development Plan 2004-2010.

The majority of lands immediately adjacent to the northern side of the proposed Luas Line B1 on Ballyogan Road contain established residential estate-type development, including *The Gallops* (Glencairn), *Leopardstown Valley* (Glenbourne), *Drinaghmore*, *Ballyogan*, and *Ballyogan Wood*. There are two residential schemes on the southern side of Ballyogan Road, at its western end, *Meadowfield* and *Kilgobbin Wood*. A small local centre serves the Leopardstown Valley scheme. This is planned to be significantly extended to comprise a major Neighbourhood Centre of the area. In July 2004 Viscount Securities received a grant of Permission under planning Reg. Ref. D03A/0584 for a 20,604 sq.m. mixed use development on a 3.84 hectare site at the rear of Leopardstown Valley shopping Centre. Areas of public open space exist within these

residential areas. The Council owned playing fields are located along the route of the proposed alignment, immediately to the east of the *Drinaghmore* estate on the northern side of Ballyogan Road.

The land use structure on the southern side of Ballyogan Road currently comprises primarily undeveloped lands, although these are planned to accommodate significant new residential and employment-related development within the wider Stepside area in accordance with the Stepside Area Action Plan and the Dun Laoghaire Rathdown County Development Plan 2004-2010.

Other uses on the southern side of the carriageway includes the ESB Carrickmines Station, the Council Landfill site and recycling centre, the Ballyogan Business Park, An Post Sorting Office, as well as a small number of residential properties. In addition, a significant amount of undeveloped land to the east of the landfill site are zoned Objective E – “*To provide for Industrial and Employment uses*”;

Statutory Development Plan Context

Dun Laoghaire Rathdown County Development Plan 2004-2010

The Dun-Laoghaire Rathdown County Development Plan 2004-2010 forms the statutory development plan for the area. The Development Plan states that its central emphasis is ‘to plan for and co-ordinate appropriate sustainable development in Dun Laoghaire-Rathdown based on high quality residential, working and recreational environments and sustainable transportation patterns.

The lands in the vicinity of the Area 14 section of the Luas Line B1 alignment are subject to five main land use zoning objectives as listed below:

- ‘*To protect and/or improve residential amenity*’ (A)
- ‘*To provide for economic development and employment*’ (E)
- ‘*To preserve and provide for open space and recreational amenities*’ (F)
- ‘*To protect and improve high amenity areas.*’ (G)
- ‘*To protect, provide for and/or improve neighbourhood centre facilities.*’ (NC)



Public Services are permitted in principle in Zones A, E and NC, and are considered 'open for consideration' in Zone F.

Area 14 of the Luas Line B1 alignment passes through the Stepside area for which the 2004-2010 Development Plan contains a number of specific objectives that include the following: -

- To provide for a proposed Luas stop at Leopardstown Valley.
- To provide for a proposed Luas stop at Ballyogan Wood.
- To provide for the development of a neighbourhood centre.

The Plan also contains a '6-year Local Roads Objective' for the upgrading of Ballyogan Road and the Murphystown Road. In addition, the Plan contains 'cycle route objective' to run along Ballyogan Road.

Stepaside Action Plan

The Stepside Action Plan, 2000 was prepared on foot of the 1998 Statutory Plan which zoned this area A1, "to provide for new residential communities in accordance with approved Action Area Plan". The Plan anticipates that the area will be developed over a ten year period. In this regard, development is planned primarily to constitute residential use, in order to support a planned population base of some 20,000 persons. However, a modest element of mixed-use activity is also encouraged. The Dun Laoghaire Rathdown County Development Plan 2004-2010 notes that significant development, primarily residential, has commenced within this area. It is estimated that in September 2004 c. 1,500 residential units were under construction and/or completed with some 4,000 additional houses and apartments planned for completion by 2012.

The Action Plan confirms that "...the provision of an improved public transport infrastructure is fundamental if the sustainability objectives of the Plan are to be met". The Action Plan recognises the logic of routing a Luas extension from Sandyford Industrial Estate through the proposed Stepside Action Plan Area. The route shown in the Action Plan, primarily running along the existing alignment of Ballyogan Road, will bring all parts of the Stepside Plan Area within 1 kilometre of a fixed-

line public transport corridor. This will facilitate a greater density of residential development.

The 2000 Action Plan acknowledges the role of Public Private Partnership (PPP) initiatives in realising an extension of Luas Line B from Sandyford to Cherrywood/Rathmichael.

Relevant Planning Application Decisions

A number of relevant applications for permission in the immediate vicinity of the Luas Line B1 alignment have been determined by the Planning Authority. These are set out below.

Ballyogan Road, Northern Side

A significant amount of development has been permitted in The Gallops residential scheme since its original construction. Primarily this involves minor extension works to existing residences. However, under Ref: D00A/0777, Park Developments Ltd. was granted permission for development of 51 dwellings, with associated car parking on a site of 1.8 hectares fronting onto Glencairn Drive, to the north of the estate.

Under planning Reg. Ref. D04A/1099 Viscount Securities Limited received a Grant of Permission for development comprising 267 no. dwellings and 400 no. car parking spaces on lands bounded by Glencairn Drive and Leopardstown Racecourse car park.

Under the current County Development Plan Leopardstown Valley Shopping Centre is a designated Neighbourhood Centre to serve the wider area. In July 2004 Viscount Securities Limited received a Grant of Permission under planning Reg. Ref. D03A/0584 for a 20,604 sq.m mixed use development on a 3.84 hectare site at the rear of Leopardstown Valley Shopping Centre. The development comprises offices, retail, library, health centre, community centre, childcare facility, recreational facility as well as a central pedestrian route to the link to the future Luas stop on the Ballyogan Road. An additional 431 no. surface car spaces was also proposed.

Ballyogan Road, Southern Side

Deane Homes Ltd. was granted permission in May 2001 under Reg. Ref. D00A/1256, for development comprising 178 no. dwellings, in a mix of houses and apartments on lands with

temporary access from the Ballyogan Road through the lands of the dwelling Meadowfields. This now comprises the Meadowfields residential scheme located immediately east of the junction of Ballyogan Road and Kilgobbin Road.

Under Reg. Ref. D99A/991, Willow Ltd. was granted permission for development comprising warehouse and office development of 5,311 sq. m. on Ballyogan Road, Sandyford. This now comprises the Ballyogan Business Park Development, immediately to the east of the Council Landfill Site.

In June 2003, Kelland Homes was granted permission, under Reg. Ref. D03A/0411, for residential development consisting of 228 no. two and three bed apartments in 5 no. four and five storey blocks on a site south of Ballyogan Road and east of Kilgobbin Wood residential development. No development has occurred to date at this site.

Castlethorn Construction was granted permission in June 2002, under reg. Ref. D01A/0498, for mixed use development consisting of 509 no. dwellings, in a mix of detached houses, courtyard townhouses, duplexes and apartments, ranging from 1 storey to 6 storey blocks; and a mixed use and local village centre comprising retail units, business/services units, apartments, restaurant, medical centre, dentists practice, physiotherapist practice, newsagent, pharmacy, an aparthotel, supermarket, leisure centre, crèche and associated car parking in 4 blocks ranging in height from 4 storey to 8 storey all on a site approx. 19.6 hectares at Newtown Little, north of Kilgobbin Lane, Stepside, Co. Dublin. This development is substantially complete.

7.14.1.3.2 Potential Impact of the Proposal

Construction Phase

That section of the Luas Line B1 alignment which is adjacent to existing public roads has the potential to temporarily cause significant localised disruption and inconvenience to traffic flow during the construction phase. In particular, the Ballyogan Road is being significantly re-aligned to the south in order to facilitate the provision of the proposed Luas Line B1. This could consequently affect adjoining land uses, by reason of interference with access and delivery traffic, or by reason of noise and other disturbance. Without proper remedial

measures this would constitute a potentially adverse impact on the uses of the area.

Operational Phase

The proposed development of Luas Line B1 through this area, and the associated upgrading and re-alignment of Ballyogan Road, complies with the strategy of the Dun Laoghaire-Rathdown County Development Plan 2004-2010, the Stepside Action Plan 2000, and the DTO Strategy 2000-2016, all of which support the construction of a light rail network between Sandyford and Cherrywood, ultimately linking to the City Centre.

The Luas Line B1 alignment in Area 14 will serve the area of the Stepside Action Plan, which is being developed to accommodate significant new residential and employment-related development, thus providing a fast and efficient public transport system in this area.

'Do-Nothing' Scenario

If Luas Line B1 did not proceed, the Development Plan policy and DTO Strategy to provide a light rail network between Sandyford Industrial Estate and Cherrywood would not be fulfilled. The strategy of the Stepside Action Plan is based upon the provision of a Light Rail Transit alignment into this area as an alternative to the use of the private car.

7.14.1.3.3 Remedial or Reductive Measures

Construction Phase

Remedial or reductive measures include the provision of appropriate access to existing land uses along the route during construction. To reduce interference to a minimum, ongoing consultation and liaison with occupiers and owners of adjoining lands will be undertaken.

Operational Phase

Traffic management measures will be put in place to facilitate the operation of Luas Line B1, particularly where existing road alignments are required to alter as a consequence. These management measures will be subject to the approval of Dun Laoghaire-Rathdown County Council, as Roads Authority, following consultation with the relevant Statutory agencies.



7.14.1.3.4 Predicted Impact of the Proposal

Construction Phase

The works associated with the construction of the Luas Line B1 alignment and the upgrading of Ballyogan Road will have a significant short-term and temporary impact on land uses in the area. They are deemed to be acceptable in the interest of the common good and of the proper planning and development of the area.

Operational Phase

The proposed Luas Line B1 will comply with the policies and objectives of the Dun Laoghaire-Rathdown County Development Plan 2004-2010, the Stepside Action Plan 2000, and the DTO Strategy 2000-2016.

7.14.1.3.5 Monitoring

During the construction phase there will be ongoing monitoring of the impact/disturbance to existing land use and activities. Public consultation and ongoing local liaison procedures will be put in place in the area to deal with any queries affecting land uses in the area.

7.14.1.3.6 Reinstatement

Reinstatement of pavement and street surfaces as far as is practicable will be carried out as part of the construction phase.

7.14.1.4 VEHICULAR AND PEDESTRIAN TRAFFIC AND SAFETY

7.14.1.4.1 Receiving Environment

The current road network within Area 14 is undergoing a major transformation associated with the construction of the South Eastern Motorway (SEM). Principally within Area 14, this will entail, at its western extremity, the construction of a link between Ballyogan Road and the Leopardstown Road via a road bridge over the SEM and at its eastern end, reconstruction and widening of the Ballyogan Road approach to the Carrickmines Interchange of the SEM.

The existing environment within Area 14 is characterised by

residential developments between the SEM corridor and Ballyogan Road. Along the southern side of Ballyogan Road, the development of zoned lands has commenced at its western end and this development is set to increase in line with the Council's objectives as contained in the Stepside Area Action Plan 2000.

Ballyogan Road is the subject of a confirmed CPO (1987) for the widening and upgrading of this route from Kilgobbin Road to Glenamuck Road. The Council has since acquired some amount of the lands referenced under this CPO. A section of the widening has been completed at the western end of Ballyogan Road and included junction improvements at Kilgobbin Road.

There are currently no signalised junctions along Ballyogan Road. Access traffic at the road junctions serving the existing residential estates operate under priority control.

Traffic Flows

Current road traffic volumes throughout the morning peak hour (0800–0900 hrs) are as set out below in Table 7.14.1.4.1.

Table 7.14.1.4.1: Current AM Peak Road Traffic Volumes Area 14

| Road | Location (pcu) | Two-Way Volume AM Peak Hour |
|-------------------------|-------------------------|-----------------------------|
| Murphystown Road | South of Glencairn Road | 1013 |
| Glencairn Road | Murphystown Road | 495 |
| Ballyogan Road | Glencairn Crescent | 705 |
| Glencairn Crescent | Ballyogan Road | 142 |
| Glenbourne Road | Ballyogan Road | 241 |
| Ballyogan Avenue (West) | Ballyogan Road | 140 |
| Ballyogan Avenue (East) | Ballyogan Road | 122 |

A number of observations may be made in respect of traffic movements within Area 14 during the morning peak hour survey period, as set out below.

- Exit volumes out of the residential estates of The Gallops, Leopardstown Valley and Ballyogan Estate on to the Ballyogan Road total 426 pcu's with 54% (228) of this volume travelling westbound on Ballyogan Road.

Glenbourne Road (Leopardstown Valley) has the highest volume of exit traffic on to Ballyogan Road with 144 pcu's during the morning peak.

- A total of 453 pcu's exit from Glencairn Road (The Gallops) onto the Murphystown Road with close to a 50:50 split in terms of directional movement thereafter on Murphystown Road.

Pedestrian Movements

There are no controlled pedestrian crossing facilities along the proposed route of Luas Line B1 within Area 14.

Existing pedestrian movements in the area over the course of the day (0700-1900 hrs) were recorded as being very light and as shown on the attached Table 7.14.1.4.2.

Table 7.14.1.4.2: Daily Pedestrian Movements Area 14

| Location | Pedestrian Numbers |
|---|--------------------|
| Murphystown Road /Glencairn Road | 27 |
| Ballyogan Road /Glencairn Crescent | 68 |
| Ballyogan Road /Glenbourne | 71 |
| Ballyogan Road /Ballyogan Avenue (West) | 61 |
| Ballyogan Road /Ballyogan Avenue (East) | 22 |

At Murphystown Road/Glencairn Road, 19 out of a total of 27 pedestrians accounted for the movement out of Glencairn Road and across Murphystown Road.

Cycle Facilities

At the western end of Ballyogan Road, there is short section of cycle track on both sides of the road between Meadowfields and Kilgobbin Road which was implemented as part of the road upgrade undertaken in this area by Dun Dun Laoghaire Rathdown County Council. No other cycle facilities exist within Area 14.

Existing daily cyclist numbers are as shown on Table 7.14.1.4.3.

Table 7.14.1.4.3: Daily Cyclist Numbers Area 14

| Location | Cyclist Numbers |
|---|-----------------|
| Murphystown Road /Glencairn Road | 109 |
| Ballyogan Road /Glencairn Crescent | 17 |
| Ballyogan Road /Glenbourne | 15 |
| Ballyogan Road /Ballyogan Avenue (West) | 23 |
| Ballyogan Road /Ballyogan Avenue (East) | 22 |

Accident History

The Dublin Transportation Office provided accident data for the five year period from 1998 to 2002 for Ballyogan and Murphystown Roads. There were pedestrian injuries sustained in two of the accidents on Ballyogan Road.

Table 7.14.1.4.4: Accident Data for the Period 1998- 2002 Area 14

| Location | Minor Injury | Serious injury | Total | Motorcyclists Involved | Pedestrian Involved |
|------------------|--------------|----------------|-------|------------------------|---------------------|
| Ballyogan Road | 5 | | 5 | 1 | 2 |
| Murphystown Road | 5 | 1 | 6 | 1 | 1 |

An analysis of the accident data available for Ballyogan Road and Murphystown Road indicates:

- Ballyogan Road: 2 accidents were recorded in 1998 and 1 accident recorded each in 1999, 2001, and 2002.
- Murphystown Road: 4 accidents were recorded in 1998 with 1 a year in 2001 and 2002.

7.14.1.4.2 Potential Impact of the Proposal

Construction Phase

The Luas Line B1 alignment through Area 14 will necessitate the upgrading and realignment of Ballyogan Road between Meadowfields estate at the western end of



Ballyogan Road and the approach to the proposed SEM Carrickmines Interchange. The proposed upgrade will fulfil a long held Development Plan objective of Dun Laoghaire Rathdown County Council to realise the upgrading of an important distributor link on the Council's road network. This is a positive impact of the overall proposed development. The design of the Ballyogan Road realignment will be in accordance with the Council's requirements and will entail footpaths and cycleway on both sides.

The design of Ballyogan Road will be compatible with the Council's planned Murphystown Parallel Access Road. When complete, the overall route will form a seamless link between the SEM Carrickmines Interchange to the east and the SEM Sandyford Interchange to the west, including a link via an overbridge to Leopardstown Road. Overall, the proposal constitutes a positive impact on traffic movement in this area.

Construction would be accomplished in two phases – the realignment and widening of Ballyogan Road including diversion of utility apparatus away from the influence of the trackbed, and the construction of the trackbed itself together with the control systems for its operation. The overall construction scenario for Area 14 is detailed at Section 7.14.10 of this EIS.

Within Area 14, the effect of construction activity on vehicular and pedestrian traffic will be managed to provide for the continued movement of people and goods. In the absence of a well defined programme of construction activity having due regard to traffic circulation patterns and pedestrian movements, the construction activity would have the potential to create significant delays to commuting traffic as well as to compromise pedestrian amenity and safety. A co-ordinated approach to the management of these issues involving all of the statutory authorities will therefore be necessary.

Operational Phase

Traffic Flows

The projected traffic flows on the road network within Area 14 are illustrated in Table 7.14.1.4.5 below.

Table 7.14.1.4..5: Projected Traffic Volumes 2016 Area 14

| Road | Two-Way AM | Two-Way PM | Change |
|--|-------------------------|---------------------------|---------|
| | Traffic | Traffic | Traffic |
| | Volume (pcu) No-Luas | Volume (pcu) With-Luas | |
| Ballyogan Road at Glencairn Crescent | 1038 | 1099 | +6% |
| Ballyogan Road at Glenbourne Road | 631 | 602 | -5% |
| Ballyogan Road at Ballyogan Ave (west) | 819 | 860 | +5% |
| Ballyogan Road at Ballyogan Ave (east) | 512 | 556 | +9% |
| Ballyogan Road at Ballyogan Wood | 967 | 950 | -2% |

This table highlights the likely traffic flows in the forecast year 2016, when compared with the network in 2016 without Luas Line B1.

A minor increase in traffic flow along Ballyogan Road is evident as a consequence of the introduction of Luas Line B1. However the availability of Luas means that strategic or longer distance traffic that would have used routes such as the N11 and SEM can now make use of Luas. This in turn frees up what were previously congested routes for localised demand which results in some minor increases in traffic volumes along routes such as the Ballyogan Road.

The most significant impact on vehicular traffic under the operational stage of Luas Line B1 could be at locations where it traverses road crossings. In the absence of a strategy for defining priority and positive control of movements, road traffic would be presented with a situation that compromises the safety of all road users. A simple realignment of Ballyogan Road maintaining current widths would not allow for the degree of traffic control necessary under the operation of Luas Line B1.

Pedestrian Safety

Current provision for pedestrians within Area 14 is broadly commensurate with the surrounding built environment.

The provision of a widened Ballyogan Road as part of the

Luas proposals offers opportunities to provide footways on both sides along its entire length. This is a significant positive benefit to pedestrians in the area. At Murphystown Road, the Council proposes to implement the Murphystown Parallel Access Road, which entails significant improvements in pedestrian facilities.

At locations where pedestrian routes cross the Luas Line B1 alignment, the potential arises for conflict with pedestrian movements unless safeguards are put in place to provide for their protection. This would include ample footpath width in addition to clearly defined pedestrian routings across the alignment. The installation of controlled pedestrian phases across traffic routes such as Murphystown Road and Ballyogan Road would significantly enhance the environment for pedestrians.

Cyclists

With the exception of a short section of the western end of Ballyogan Road up to its junction with Kilgobbin Road, there are no cycle facilities currently within Area 14. Clearly defined cycle tracks as part of a widened Ballyogan Road accompanying the advent of Luas Line B1 would minimise the risk of potential conflict between the various forms of transport, and would provide for greater cyclist safety and amenity value. This is a significant positive impact.

'Do-Nothing' Scenario

Under a 'Do-Nothing' Scenario, the current limited bus services would remain the only viable alternative to the private car. This would be further exacerbated as development continues apace in this area.

7.14.1.4.3 Remedial or Reductive Measures

Construction Phase

Traffic management measures will be implemented in agreement with the Road Authority to ensure a co-ordinated response to the construction activity. Temporary footpaths adjacent to the construction activity will be constructed to appropriate standards and provision made for access for the mobility impaired.

Private access arrangements to premises abutting the Luas

Line B1 alignment or Ballyogan Road will be maintained during works.

On a wider scale, the phasing of works associated with other construction activities in the area will determine the sequencing of Luas Line B1 construction activities. A co-ordinated traffic management plan will be agreed with the local authority and An Garda Síochána in this respect.

The alternative access routes available off either Murphystown Road or Ballyogan Road into the Gallops, Leopardstown Valley and Ballyogan Estate provide available options while construction across access roads is being undertaken.

Information outlining construction activities will be disseminated to local residences and businesses in advance of start-up such that prior arrangements regarding access and delivery and associated diversionary routings may be made available. Local liaison committees will be established to assist in this exercise.

Operational Phase

All road crossings of the Luas Line B1 alignment at major accesses will be undertaken through signal control. The widening and realignment of Ballyogan Road will ensure sufficient width to accommodate signalised junction arrangements. The design of the Murphystown Parallel Access Road equally entails signal installation at the Glencairn Road junction. This will provide for clear and positive control of all tram and road vehicle movements.

New road signage advising of tram crossing points and track alignment will be installed along the adjacent roadways and at all junction locations. These measures will provide for the safety of all road users.

At private access locations, adequate sight distances will ensure good intervisibility between trams and road vehicles.

Existing access arrangements on Ballyogan Road have been incorporated into the new road design. The planned realignment of Ballyogan Road will also include the



implementation of cycle tracks on both sides.

Pedestrian crossings will be provided along Ballyogan Road at signalised junction locations, thereby adding to the existing pedestrian provision along this route. Bus stops will be provided on both sides of the upgraded route adjacent to Luas stop locations.

7.14.1.4.4 Predicted Impact of the Proposal

Construction Phase

Predicted impacts on both vehicular and pedestrian traffic flows and safety will be slight, principally arising out of the road crossings and the widening and realignment of Ballyogan Road. Some short term temporary disruption will be experienced largely in the form of diversions and lane restrictions. Effective traffic management arrangements agreed in advance with the local authority will assist in mitigating the potential effects. Construction at road junctions and the potential for disruption will be mitigated by the availability of alternative access arrangements to the Gallops, Leopardstown Valley and Ballyogan Estates of Ballyogan Road.

Operational Phase

Luas Line B1 will interact with road traffic at a number of road crossing locations along the proposed new Ballyogan Road between The Gallops and Ballyogan Wood housing developments. At all of these locations, signalised junctions will be implemented. Significant benefits will accrue through the provision of a safer road infrastructure complete with pedestrian crossing facilities at all road junctions and cycle tracks and footpaths along the complete length of Ballyogan Road.

There will be significant benefits arising out of the presence of a high quality public transport system as represented by Luas Line B1 through this area. There will be no permanent diversions of traffic involved and the construction of the new Ballyogan Road will provide for a safer environment for all road users.

The cycling environment will benefit as a result of the implementation of Luas Line B1 in Area 14, through the

provision of parking facilities at stop locations, and the construction of cycle tracks on both sides along the length of the re-aligned Ballyogan Road.

The provision of bus stops adjacent to stop locations will provide for interchange between the two modes and presents opportunities for feeder services from areas currently outside of the direct catchment.

7.14.1.4.5 Monitoring

A local liaison committee will be established to assist in the implementation of Luas Line B1. In addition, Dun Laoghaire Rathdown County Council as road authority, will continue to monitor road traffic subsequent to the introduction of Luas Line B1 and will implement appropriate alterations to traffic movements in the light of changing circumstances as they may deem to be necessary from time to time

7.14.1.4.6 Reinstatement

It is intended that Luas Line B1 should continue to operate indefinitely.

7.14.1.5 COMMUNITY SEVERANCE

7.14.1.5.1 Receiving Environment

Principal Activities and Nodes

Pedestrian movement is significant in the vicinity of the existing residential estates off Ballyogan Road. Pedestrian movements are generally accommodated along pavements in the vicinity of Ballyogan Road and the existing residential developments. The pedestrian environment is currently poor along Murphystown Road.

Traffic Flow

Ballyogan Road comprises a major distributor link in this suburban area. Traffic flow is busiest during peak hours in the morning and evening. In addition, the route is used as a link road from the South County Dublin area, both to Dublin City Centre as well as to West Dublin and beyond. (Refer also to section 7.14.1.4 – *Traffic* of this EIS).

7.14.1.5.2 Potential Impact of the Proposal

Construction Phase

Pedestrian Flow

Pedestrian flow movements in Area 14 may experience a temporary significant localised impact caused by construction activities. Construction will also be associated with the completion of the Murphystown Parallel Access Road and the re-alignment of the Ballyogan Road.

Traffic Flow

The construction phase, including the planned re-alignment works to Ballyogan Road will require some significant degree of traffic diversion in this area. Diversion of traffic would potentially impact, not only upon vehicles, which are diverted from the actual alignment, but also upon those who are travelling on those roads onto which diverted traffic is routed. The planned construction works may require some diversion/re-routing of bus services. However, there is currently a low frequency of service in this area. This is addressed in more detail in Section 7.14.1.4 – *Traffic* of this EIS.

Operational Phase

Pedestrian Flow

In general, no significant severance impact on pedestrian flow is anticipated in the vicinity of Luas Line B1. From a point immediately east of the existing dwelling 'Glenbourne', the alignment runs on a reservation, such that, with the exception of existing entrance roads to the various housing estates, there will be no impact in terms of pedestrian flow. The planned Murphystown Parallel Access Road and upgraded Ballyogan Road re-alignment include new footpaths, which will ensure unrestricted pedestrian flow with the operation of Luas Line B1 in this area.

Traffic Flow

Access and delivery movements in most of this section of Luas Line B1 are unlikely to be significantly impacted upon. The upgraded alignment of Ballyogan Road, combined with the planned construction of the Murphystown Parallel Access Road and the SEM, will constitute a significant

positive impact on traffic flow.

'Do-Nothing' Scenario

Under a 'Do-Nothing Scenario', through traffic caused by people commuting both to the Sandyford Industrial Estate and other employment areas including Dublin City Centre, would continue to produce severance conditions at certain locations. Moreover, as a consequence of the extremely limited public transport (bus) service along this section of the route, there is currently no realistic alternative to the private car for commuters residing or working in this area.

7.14.1.5.3 Remedial or Reductive Measures

Construction Phase

Pedestrian Flow

Temporary pedestrian crossings and other facilities will be provided where appropriate and necessary. This will serve to mitigate any potential severance impact and result in only a short-term modest inconvenience caused by diversions around construction work sites.

Traffic Flow

The planned road improvements on the Murphystown Parallel Access Road and Ballyogan Road will comprise remedial measures in themselves. It is intended that traffic management measures put in place during the construction phase will be the permanent designed traffic management measures for this area during the operation of Luas Line B1. Agreed management measures for bus routing with Dublin Bus will mitigate any impact to passengers in terms of access to bus services.

Operational Phase

Pedestrian Flow

As the operation of Luas Line B1 will in general reduce severance for pedestrians, particularly in terms of access between residences and places of work, no remedial or reductive measures are required.

Traffic Flow

Remedial or reductive measures include the introduction of



appropriate traffic management measures by Dun Laoghaire-Rathdown County Council following consultation with the relevant statutory agencies.

7.14.1.5.4 Predicted Impact of the Proposal

Construction Phase

Pedestrian Flow

The construction phase will not result in any significant predicted severance impact on pedestrians. Any short-term inconvenience is not considered to be a significant impact that would result in community severance.

Traffic Flow

During the construction phase, there will be significant short-term disruption to traffic flow along the alignment, particularly on Ballyogan Road, which is to be re-aligned to facilitate the planned Luas Line B1. However, the introduction of appropriate management measures, the retention of access, and the temporary nature of the construction works, will mean that there will be a moderate overall predicted impact in terms of community severance.

Operational Phase

Pedestrian

A significant positive impact will occur to pedestrian flow along Luas Line B1, due to the completion of planned road improvements in this area, including new footpaths. The provision of the new public transport facility in the area will serve to facilitate non-vehicular movement in this area

Traffic Flow

Given the remedial and reductive measures proposed, a significant beneficial impact is predicted, as an efficient public transport alternative will be provided in an area currently experiencing a serious deficiency in such service. The planned road improvement works will benefit access, delivery and through traffic movements.

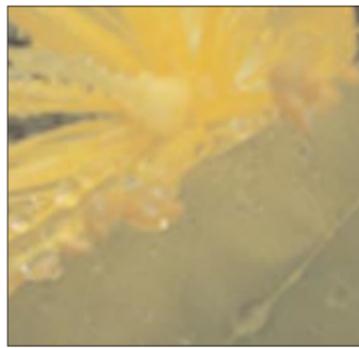
7.14.1.5.5 Monitoring

A Construction Team representative will be available in this area during the construction phase, for consultation and co-ordination with residents and local businesses on an ongoing basis.

7.14.1.5.6 Reinstatement

No reinstatement measures are required in respect of community severance.

Flora and Fauna



7.14.2.1 INTRODUCTION

Area 14 of the Proposed Luas Line B1 extends from Murphystown Road along Ballyogan Road to Ballyogan Wood. The alignment is bounded by existing residential development to the north, with some open verge areas. Ballyogan Road lies immediately adjoining the alignment to the south and will be realigned and upgraded as part of this Railway Order Application. Such works also form a local roads objective of the Statutory Development Plan.

7.14.2.2 FLORA

7.14.2.2.1 Receiving Environment

Habitats on and adjoining the alignment of Luas Line B1 Area 14 are as follows:

- Houses/buildings and gardens
- Spoil and bare ground
- Amenity grassland GA2
- Neutral grassland GS1
- Treelines WL2
- Hedgerow WL1
- Landscape planting (ornamental/non-native shrub) WS3.

No rare or protected plant species occur on or adjoining the alignment (Curtis and McGough, 1988). A plant species list is given in Appendix 1. A separate assessment of trees on and near the alignment is presented elsewhere in this EIS.

Houses/buildings and gardens

Private gardens adjoining the alignment were not surveyed.

Spoil and bare ground

Bare ground on the alignment mainly comprises the existing unvegetated surfaces of roads and paved areas. A small area of partially vegetated disturbed ground lies on the alignment to the rear of Glencairn. This is vegetated with typical colonising species of disturbed ground: nettle, red valerian, yellow clover, white clover, red clover, knapweed, Yorkshire fog and ryegrass.

Amenity grassland

Amenity grassland occurs in narrow strips along the alignment. It is dominated by ryegrass, with daisy, white clover and ribwort plantain, with other common weed species of lawns occurring frequently.

Neutral grassland

A small area of species poor neutral grassland occurs on the alignment on the reserved area between Glencairn Heath and Ballyogan Road. Clustered dock is a conspicuous component of the flora, which is otherwise grass dominated. Extensive areas of neutral grassland lie to the south of Ballyogan Road. There is a further area of species poor neutral grassland to the east of Ballyogan Avenue, where a temporary construction compound will be located. This field area is dominated by cock's-foot grass, and creeping thistle and winter heliotrope are invading it.

Treelines

A significant treeline runs along much of the southern side of Ballyogan Road. This is dominated by mature beech and ash at the western end, with ash dominating towards the eastern end. Wych elm occurs frequently as semi-mature cover. Sycamore occurs occasionally. The shrub layer is dominated by hawthorn and bramble, with occasional privet, blackthorn, elder and dog rose.

Hedgerow

A relict agricultural hedgerow runs along c. 55% of the northern side of Ballyogan Road. This is dominated by hawthorn and ash, with wych elm, sycamore, blackthorn, bramble, and occasional privet, elder and dog rose.

The remaining boundaries on the northern side of Ballyogan Road are unvegetated walls.

Landscape planting

Tree species used in landscape planting, and present as saplings and semi-mature trees are lime and hornbeam. At Glenbourne Road, alder, ash and hawthorn are planted as screening of Ballyogan Road. Landscape planting at the sports ground off Ballyogan Road/Ballyogan Avenue includes alder, birch, *Acer* cultivars, guelder rose, dogwood

and laurel.

At Ballyogan Wood, sapling trees planted in amenity grassland are whitebeam, rowan, cherry, hawthorn, lime and *Acer* (maple) cultivars.

7.14.2.2.2 Characteristics of the Proposal

The proposal involves the construction of the light rail alignment at grade throughout area 14, along the northern side of Ballyogan Road. It also involves the realignment and upgrading of Ballyogan Road, which will result in the loss of mature trees along this boundary.

7.14.2.2.3 Potential Impact of the Proposal

Construction phase.

Locally significant habitats impacted by the proposed development are the treelines and hedgerows along Ballyogan Road. Hedgerows along the northern side of the road will be removed and the alignment inserted. Treelines on the southern side of the road will be removed under planned road realignment and improvement works by the RPA. The combined proposals will remove almost all tree and shrub cover from Ballyogan Road, with locally significant impacts.

Amenity grassland, and a small area of neutral grassland will also be impacted; these impacts are assessed as imperceptible with regard to flora, as common herbaceous species are affected, and their general distribution is widespread and abundant.

Operational phase.

No additional impacts on flora are envisaged during the operational phase.

'Do Nothing' Scenario

In a 'Do Nothing' Scenario, the upgrading of Ballyogan Road will result in the loss of treeline flora along the southern side of the road.

7.14.2.2.4 Remedial or Reductive Measures

Construction Phase.

The main mitigation measures for flora in area 14 are replacement planting of hedgerow and treeline where space permits. Where public open space is sufficiently wide between existing housing and the alignment along the northern side of Ballyogan Road, landscape planting including native tree and shrub species will be provided.

The land take for road widening along the southern side of Ballyogan Road is sufficient for the inclusion of a grass verge and treeline replacement planting. Suitable tree species for use include oak, ash, elm, holly and wild cherry. Shrub species suitable for inclusion are hawthorn, blackthorn and guelder rose.

Potential post-planning route deviations would be subject to the same mitigation measures as the existing proposed alignment.

Operational phase.

Some replacement of damaged trees or shrubs may be required in the operational phase.

7.14.2.2.5 Predicted Impact of the Proposal

Residual impacts on flora arising through the loss of treeline and hedgerows are assessed as locally significant in the short term. Lateral route deviation could result in additional loss of existing landscape planting of trees and shrubs. Replacement planting will reduce these impacts to moderate in the medium term and slight in the long term.

Impacts on amenity grassland and neutral grassland remain imperceptible with regard to flora.

7.14.2.2.6 Monitoring

No monitoring is required.

7.14.2.2.7 Reinstatement

No additional reinstatement is required.



7.14.2.2.8 Potential Route Deviation

Lateral route deviation in area 14 of Luas Line B1 could have potential to impact on existing landscape planting of trees and shrubs which lie close to the existing proposed alignment, resulting in additional impacts on tree and shrub cover along Ballyogan Road. Longitudinal or vertical deviations from the existing proposed alignment are unlikely to result in any additional impacts on flora.

7.14.2.3 FAUNA

7.14.2.3.1 Receiving Environment

Fauna in Area 14 is typical of suburban fringe habitats liable to disturbance. The bird fauna is dominated by common species: rook, jackdaw, magpie, blackbird, song thrush, robin, wren, chaffinch, greenfinch, and the common tit species.

No badger setts occur in the immediate vicinity of the alignment. Foxes are likely to make some use of the area, as are hedgehogs, rodents and pygmy shrew. A bat survey has not been carried out on this section of the alignment at this stage but would be required prior to any felling at this location.

7.14.2.3.2 Characteristics of the Proposal

The proposal involves the construction of the light rail alignment at grade throughout Area 14, along the northern side of Ballyogan Road, and the realignment and upgrading of Ballyogan Road.

7.14.2.3.3 Potential Impact of the Proposal

Construction phase

Locally significant habitats impacted by the proposed development are the treelines and hedgerows along Ballyogan Road. Hedgerows along the northern side of the road will be removed as the alignment is constructed. Treelines on the southern side of the road will be removed when road widening takes place. The overall works

proposed will remove almost all tree and shrub cover from Ballyogan Road, with locally significant impacts on bird populations arising from habitat loss. There may be a potential for bat roosts and feeding habitat to be impacted by the removal of the treeline on the southern side of Ballyogan Road, arising from road widening. No additional severance impacts to fauna will arise.

Operational phase

No additional impacts on fauna are anticipated during the operational phase arising from light rail traffic, as the route runs beside an existing roadway.

'Do Nothing' Scenario

In a 'Do Nothing' scenario, road widening will result in the loss of treeline habitats for fauna along the southern side of Ballyogan Road.

7.14.2.3.4 Remedial or Reductive Measures

Construction phase

The main mitigation measures for fauna in Luas B1 Area 14 are replacement planting of hedgerow and treeline habitats where space permits. Where public open space is sufficiently wide between existing housing and the alignment along the northern side of Ballyogan Road, landscape planting including native tree and shrub species will be provided.

The land take for road widening along the southern side of Ballyogan Road is sufficient for the inclusion of a grass verge and treeline replacement planting. Suitable species for use include oak, ash, elm, holly and wild cherry. Shrub species suitable for inclusion are hawthorn, blackthorn and guelder rose. It is recommended that a bat survey of the treeline to the south of Ballyogan Road is carried out before any tree felling or construction work on the road improvement measures commence, so that appropriate mitigation measures can be put in place if necessary.

Treeline and hedgerow vegetation, and any landscape planting which may be affected by lateral route deviation, will be cleared between the months of September and February inclusive, in order to minimise impacts on breeding birds.

Construction phase

No additional remedial measures for fauna are required during the operational phase.

7.14.2.3.5 Predicted Impact of the Proposal

Residual impacts on birds and mammals are assessed as significant in the immediate area of Ballyogan Road in the short term, reducing to moderate in the medium term and slight in the long term, as replacement tree and hedgerow cover matures.

7.14.2.3.6 Monitoring

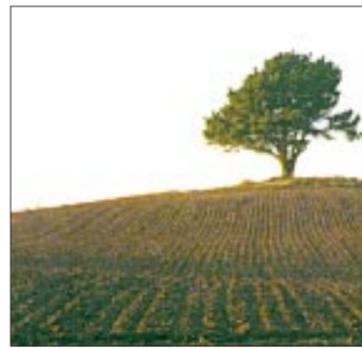
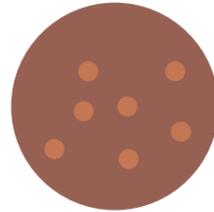
No monitoring is required.

7.14.2.3.7 Reinstatement

No additional reinstatement is required.

7.14.2.3.8 Potential Route Deviation

Lateral route deviation in area 14 of Luas Line B1 could have potential to impact on existing landscape planting of trees and shrubs which lie close to the existing proposed alignment, resulting in additional impacts on tree and shrub cover along Ballyogan Road and consequent additional loss of habitat for fauna. Longitudinal or vertical deviations from the existing proposed alignment are unlikely to result in any additional impacts on fauna.



7.14.3.1 INTRODUCTION

This section addresses impacts arising out of the construction and operation of Luas Line B1 on soil, based on available information in Area 14. It includes an evaluation of potential for contamination arising from previous land uses. Soil dispersed as dust during construction is addressed in Section 7.14.6- *Air Quality* of this EIS.

7.14.3.2 RECEIVING ENVIRONMENT

From Murphystown Road to Ballyogan Wood the soil profile generally comprises pavement materials and a thin made-ground layer over glacial till over a weathered granite profile. These are relatively impermeable soils.

The route of Luas Line B1 in Area 14 runs largely on or next to existing roads adjacent to housing developments. The roads have been present since before 1816 but much of the housing stock is recent. The longevity of the roads means that, apart from pavement and formation materials there are unlikely to be significant depths of made-ground along the route.

Dun Laoghaire-Rathdown County Council's landfill site lies to the south of Ballyogan Road, with the main entrance located immediately to the west of the existing Ballyogan Business Park. Records of the extent of land-filling indicate that the landfill material does not extend under the route of the Luas or under the associated Ballyogan Road southern re-alignment works. A recent recycling facility is located adjacent to this landfill site, along Ballyogan Road and the Carrickmines Electricity Station is also located to the south of the Ballyogan Road.

No other potential contaminative uses have been identified on the proposed route in Area 14. However, local contamination in near surface soils should not be completely discounted.

7.14.3.3 POTENTIAL IMPACT OF THE PROPOSAL

Construction Phase

Ground disturbance will principally be limited to a normal maximum construction depth of 800-1200mm. Other ground disturbance will include excavations for the Luas substations and associated services at Murphystown Road and Ballyogan Wood and from operations within the construction compound adjacent to the sports ground. Impacts can arise from the disturbance, handling and transport of contaminative substances including made-ground, subsoil and construction wastes during the construction process.

Whilst a landfill site and electricity station lie close to the route, no potentially contaminative uses have been identified that will have caused contamination to be present in the soil directly on the line of the route. However, caution should be adopted when carrying out work in the vicinity of the landfill and a general possibility for contamination to be present locally in made-ground should be catered for.

In addition the potential for the spillage of construction wastes exists. However the boulder clay/granite soil structure provides a relatively impermeable barrier against leakage into the surrounding environment.

Operational Phase

In respect of the Luas B1 there will be no operational impacts other than the possible release of minor quantities of dust from the tram braking system and spillage of small quantities of oil from the electrical substations. This is not considered to be likely or significant.

'Do-Nothing' Scenario

Under a 'Do-Nothing' scenario, no likely and significant implications arise in respect of soil.

7.14.3.4 REMEDIAL OR REDUCTIVE MEASURES

Construction Phase

In order to protect construction workers and to allow waste management of excavated materials, intrusive ground investigations will be carried out prior to excavation near the entrance to the landfill site and electricity station, to confirm whether any contaminated landfill materials are present in the area where disturbance of the ground is planned. During the construction process, the contractor will be required to commit to exercise due care and attention in the handling and disposal of any potentially contaminated material in accordance with the Waste Management Acts 1996-2003 and subsequent legislation.

Operational Phase

No remedial or reductive measures are considered necessary.

7.14.3.5 PREDICTED IMPACT OF THE PROPOSAL

Construction Phase

Neutral impacts are predicted from the construction process if the remedial and reductive measures are adhered to.

Operational Phase

Neutral impacts are predicted from the operation of Luas Line B1.

7.14.3.6 MONITORING

Requirements to monitor for possible emissions to soil during the construction process will be laid down in the contract documents.

7.14.3.7 REINSTATEMENT

There are no requirements for reinstatement in respect of soil.

Water



7.14.4.1 INTRODUCTION

This section addresses impacts arising out of the construction and operation of the Luas Line B1 on the aquatic environment in Area 14. It does not include issues of surface water and foul drainage, which are addressed in Section 7.14.8.2 - *Public Utilities* of this EIS.

7.14.4.2. RECEIVING ENVIRONMENT

From Murphystown Road to Ballyogan Wood the Luas Line B1 runs largely along existing roads and adjacent to residential developments. Much of the route is already paved. The underlying soils are generally impermeable comprising made-ground layer over glacial till over granite. Surface water runs to ground or to the local drainage networks. Surfaces are predominantly gardens or other open spaces including paved areas. The Ballyogan Road forms an approximate boundary between catchments for the Racecourse Stream and the Ballyogan Stream.

The route does not cross any watercourses and there are no known abstractions in the area.

7.14.4.3 POTENTIAL IMPACT OF THE PROPOSAL

Construction Phase

Ground disturbance will principally be limited to the upgrading and widening of the Ballyogan Road, track formation and excavations for the Luas substations and associated services. A separate proposal of the Planning Authority is for the construction of the Murphystown Parallel Access Route, immediately adjacent to the Luas alignment. No evidence for any material potentially harmful to the aquatic environment has been identified on the proposed route, and no sensitive ground water resources exist in the area. There is a potential for construction spillages and dust to reach the local drainage network that lead to the streams.

Operational Phase

The track pavement varies from a relatively permeable ballasted track to a less permeable embedded track. All surface water will be collected and run off via a positive drainage network. Where the track runs on or adjacent to existing roads discharges of surface water from the Luas Line B1 will be to the existing or upgraded highway drainage system. Where the alignment runs across open land a new drainage system will be built. Since the trams are powered by electricity, the potential for contaminating leakages or spillages is minimal. Consequently no potential adverse impacts arise in this instance.

'Do-Nothing' Scenario

Under a 'Do-Nothing' scenario, no implications arise in respect of water.

7.14.4.4 REMEDIAL OR REDUCTIVE MEASURES

Construction Phase

Careful design and control of the method of working during the construction will do much to alleviate any potential adverse effects in respect of water. The contractor will be required to implement control procedures in order to maintain safe working practices and the protection of the Environment.

Operational Phase

As there are no likely and significant adverse impacts arising in respect of water during the operational phase of the Luas Line B1, no remedial or reductive measures are necessary.

7.14.4.5 PREDICTED IMPACT OF THE PROPOSAL

Construction Phase

Provided the remedial or reductive measures outlined above are adhered to, no likely or significant impact to water is predicted during the construction process. Any adverse impact on water should be slight.

Operational Phase

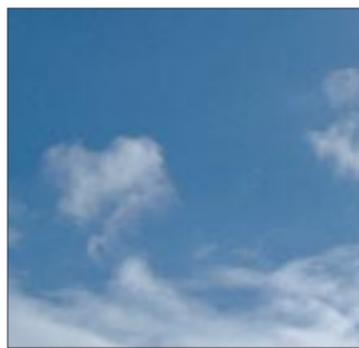
No likely or significant impact to water is predicted during the operation of Luas Line B1. Overall a neutral impact is predicted.

7.14.4.6 MONITORING

Requirements to monitor for possible emissions to water during the construction process will be laid down in the contract documents.

7.14.4.7 REINSTATEMENT

No reinstatement measures are required relating to water.



7.14.5.1 INTRODUCTION

This section of the Environmental Impact Statement considers the impact of the construction of the Luas Line B1 alignment in Area 14 on the Noise, Vibration, Lighting and Electromagnetic environments.

7.14.5.2 NOISE

7.14.5.2.1 Receiving Environment

The proposed route from Murphystown Road to Ballyogan Wood is on street with existing moderate traffic flow. The noise environment along the route is dominated by road traffic.

The existing noise environment was measured at three representative locations along the proposed route.

Four samples of fifteen minutes duration were taken at each location. Where practical the microphone was located one metre from the facades, otherwise in close proximity to the facades. The samples were analysed to yield the equivalent continuous noise level L_{Aeq} and the percentile levels L_{A10} , and L_{A90} , the noise levels in dBA equalled or exceeded for 10% and 90% of the sample time. The maximum noise level at L_{AMAX} was also measured for each sample. The measurements were carried out over two days, on the 13th and 14th January 2005, between the hours of 08.00am and 20.00pm. The instrumentation consisted of a Bruel and Kjaer Precision Integrating Sound Level Meter Type 2236. This was calibrated using a Bruel and Kjaer Calibrator Type 4230.

The results are summarised in table 7.14.5.2.1

Table 7.14.5.2.1: Summary of Noise Monitoring Results Taken at 1 metre from Facades of Building*

| LOCATION | L_{Aeq} | L_{A10} | L_{A90} | L_{AMAX} |
|---------------------|-----------|-----------|-----------|------------|
| 27 Glencairn Avenue | 55 | 58 | 50 | 64 |
| 18 Glenbourne View | 59 | 61 | 44 | 70 |
| 1 Ballyogan Wood | 51 | 55 | 42 | 62 |

* Mean value of four 15-minute samples.

7.14.5.2.2 Potential Impact of the Proposal

The noise from the passage of trams has the potential to cause disturbance to the occupiers of premises along the route.

7.14.5.2.3 Remedial or Reductive Measures

Construction Phase

All construction equipment will be required to comply with the EC Directives relating to noise emission from construction plant and equipment. These include compressors, welding generators; hand held concrete breakers and picks, excavators, dozers, loaders and excavator loaders.

Operational Phase

To reduce the risk of additional noise from trams going around curves, anti-wear and anti-squeal measures will be applied to the rails.

The existing trams running along the Green Line have incorporated noise control measures in their design, as will any additional trams running along Luas Line B1.

7.14.5.2.4 Predicted Impact of the Proposal

Construction Phase

Comparatively high noise levels will temporarily arise during the construction phase, particularly from the use of pneumatic jackhammers and/or hydraulic rock breakers used for road breaking in the diversion of services and the preparation for laying of the track bed. Within 10 metres of this type of activity the noise levels are likely to be of the order of L_{Aeq} of 88dBA. Other types of construction noise are likely to be of the order of L_{Aeq} 75dB at a distance of 10 metres. This will be temporary and intermittent in nature and will be similar to that occurring in the laying and maintaining of public utility services. Its impact will be moderate to significant.

Operational Phase

The noise level expected from the operation of the Luas one metre outside the facades of the noise monitoring locations are shown in Table 7.14.5.2.2

Table 7.14.5.2.2: Predicted Noise Levels 1m outside facade due to Operation of Luas

| LOCATION | Distance from L_{Amax} Track to Reception (Metres) | Means By Pass Speed (Km/hr) | L_{Aeq} | L_{Amax} |
|---------------------|--|-----------------------------|-----------|------------|
| 27 Glencairn Avenue | 20 | 45 | 57 | 89 |
| 18 Glenbourne View | 35 | 35 | 55 | 84 |
| 1 Ballyogan Wood | 20 | 15 | 50 | 73 |

It should be noted that the methodology set out in "Calculation of Railway Noise 1995", is valid for distances from 10 metres to 300 metres from the rail head to the nearest receptor point, which is taken as 1 metre outside the nearest effected window.

The projected noise levels, and their exceedance or otherwise over the existing ambient noise levels are shown in table 7.14.5.2.3:

Table 7.14.5.2.3: Projected Noise Levels due to operation of the LRT and existing ambient levels

| LOCATION | Projected LRT Noise | Expected Traffic Noise | Existing Traffic Noise* | Resultant | Exceedance Over dBA |
|---------------------|---------------------|------------------------|-------------------------|-----------|---------------------|
| 27 Glencairn Avenue | 57 | 55 | 55 | 59 | +2 |
| 18 Glenbourne View | 55 | 59 | 60 | 60 | +1 |
| 1 Ballyogan Wood | 50 | 51 | 51 | 54 | +3 |

At location A, B and C there will be an increase of 1dBA to 3 dBA over the existing ambient noise levels. The impact will be slight.

7.14.5.2.5 Monitoring

Construction Phase

The noise levels due to construction will be monitored at selected noise sensitive locations.

Operational Phase

Noise levels will be monitored at selected locations to check for compliance with predicted levels.

7.14.5.2.6 Potential Route Deviation

It is considered that the potential route deviation as set out in the Railway Order application will not have any material effect in terms of noise.

7.14.5.3 VIBRATION

7.14.5.3.1 Receiving Environment

A comparatively low level of vibration is generated by the passage of road vehicles along the existing roadways. This is due to all these vehicles having pneumatic tyres. Consequently vibration levels transmitted to the residences along the route is comparatively low.

7.14.5.3.2 Characteristics of the Proposal

During the construction phase vibrations will arise from machinery and plant involved, and during operational phase vibrations will arise from the dynamic interaction of the wheels of the rail cars on the rails themselves.



7.14.5.3.3 Potential Impact of the Proposal

Construction Phase

During the construction phase the proposed development has the potential to create an adverse impact on the adjoining residences due to vibration caused by the mechanical tools and equipment used during this process.

Operational Phase

During the operational phase the Luas has the potential due to the running of the tram's on the trackbed to create vibratory effects, which could have an adverse impact on properties adjoining the Luas.

7.14.5.3.4 Remedial or Reductive Measures

Construction Phase

Remedial measures to be considered are the control of working hours and by agreement with the local authority. A balance has to be achieved between hours which are too restrictive and which might further prolong the impact. During construction the best practical means will be utilised to minimise vibration transmitted to sensitive areas and buildings. A criterion for vibration will be set at a level of 5mm/sec when measured near the foundation of any building. For listed and vulnerable buildings the criterion will be 3mm/sec. This follows the German standard DIN 4150. This level is very conservative and is used to protect against the onset of superficial damage in listed buildings or ancient monuments.

Operational Phase

To reduce vibration transmitted from the interaction of wheels on tracks to the ground and through to sensitive areas, vibration isolation techniques will be incorporated into the track and track-bed design. To take account of possible amplification of vibration, which may occur between the foundations and upper floors, an amplification factor of 3 will be allowed for in the design.

7.14.5.3.5 Predicted Impact of the Proposal

Construction Phase

Vibrations will arise and may be perceptible inside

residential areas during the breaking out of the roadway with the use of pneumatically operated hammers or hydraulic rock breakers. Vibration levels of 1 to 2 mm/sec are clearly perceptible. Levels up to 3mm/sec do not pose any risk of structural or cosmetic damage to the most sensitive of buildings such as ancient monuments, etc.

Operational Phase

The level of vibration will meet the criterion for residential properties both by day and night set out in Annex A, Table 2 of International Standard 2631-2 "*Evaluation of human exposure to whole-body vibration Part 2: Continuous and shock induced vibration in buildings (1 to 80Hz)*." The impact will be negligible. This naturally concerns the human response to vibration. This criterion for human response is much more stringent than that for slight cosmetic damage to buildings therefore the possibility of slight cosmetic damage to any buildings will be negligible.

7.14.5.3.6 Monitoring

Construction Phase

Vibration levels will be monitored at sensitive buildings where the vibration level may temporarily exceed the criteria set.

Operational Phase

During commissioning of the system, which is likely to last for up to six months, vibration levels will be monitored at selected locations to check for compliance with the design criterion.

7.14.5.4 LIGHTING

7.14.5.4.1 Receiving Environment

Public lighting, as outlined later, is provided along part of the route.

7.14.5.4.2 Characteristics of the Proposal

During the construction period the construction site may be lit at night-time for safety and security reasons. The stops

and crossings associated with the operation of the Luas will require appropriate levels of lighting for reasons of safety also.

The Luas system will operate from overhead lines fed at 750 Volt D.C.. Sparking and flashing from these overhead lines will occur in an unpredictable pattern as the collector on the light rail vehicles make contact with them. This will not occur on a regular basis or frequency.

7.14.5.4.3 Potential Impact of the Proposal

Construction Phase

As the construction site will be lit at night-time during the construction period, this is likely to give rise to some impacts on established residences where these adjoin the Luas Line B1 alignment.

Operational Phase

The stations and crossings associated with Luas Line B1 will require appropriate levels of artificial lighting for reasons of safety. This will introduce a new additional lighting source.

A proposal of this kind can be expected to have a neutral impact on existing natural lighting.

'Do-Nothing' Impact

Were the proposed development not to take place the 'do-nothing' impact the current levels of both natural and artificial lighting would remain unchanged.

7.14.5.4.4 Remedial or Reductive Measures

Construction Phase

The night-time lighting of the construction site will be facilitated through the use of low angle lighting with a minimum of 25 Lux which concentrates the light beams downwards thereby minimising the impact of night-time light disturbance to local residences.

During the construction phase of this proposal the night-time lighting associated with the construction site could exceed the maximum acceptable limits for such lighting and

cause sleep disturbance to residents in adjoining properties.

Operational Phase

The operation phase will involve the following factors:-

- Provide lighting at stations and level crossings.
- Proposed lighting at stations, car parks cycle ways shall be to a level recommended by C.I.B.S.E. in the interest of public safety.

During the operation of the Luas mitigation measures concerning public lighting will be built into the lighting actually provided. These lights will be in accordance with B.S. 5489 which sets out the requirements for such lighting.

As the proposal is not expected to have any significant adverse impacts on artificial lighting no remedial or reductive measures are necessary.

7.14.5.4.5 Predicted Impact of Proposal

Construction Phase

The night-time lighting of the construction site will have a temporary impact, though it is not considered to be significant. Proposed night-time lighting at the construction site shall be to a level of not less than 25 Lux in the interest of public safety.

Operational Phase

The proposal will not have any significant adverse impact on the natural lighting along this route section.

It is anticipated that, as in other similar systems, residents along the route section will quickly become accustomed to infrequent sparking and flashing of the contact between the tram collector and the overhead lines and that its limited intrusion will not cause an impact of any significance.

Cycleways will be provided along this section and will necessitate the provision of public lighting. This will have the effect of enhancing security for the residents whose property abuts the Luas tracks.



Ballyogan Road

Public lighting is provided along Ballyogan Road by means of a variety of systems. Towards the west end of the road, the lighting system comprises 12m. high columns, located 50m apart and using high pressure sodium lamps and giving an average illumination of 10 lux. Towards the eastern end of the road, public lighting is provided from 8m high columns, with high pressure sodium lamps, giving an average illumination of 7 lux. The majority of the lighting columns are provided to the north side of the carriage way. It would appear that the installation of the new Light Rail system will interfere with the present public lighting and a new public lighting system will have to be provided, which will probably be located on the south side of Ballyogan Road.

7.14.5.4.6 Monitoring

Construction Phase

Throughout the construction phase there will be an on-going consultation process between RPA and local residents and businesses. The night-time lighting shall be monitored to ensure that it does not exceed the acceptable limit of 25 Lux for such lighting, thereby negating the possibility of a 'worst case' scenario.

Operational Phase

No monitoring of Lighting will be required during the operation phase of this proposal.

7.14.5.4.7 Reinstatement

The proposed development will involve alterations to part of the existing lighting system along the route section. The lighting system including the new elements of same, will be restored to the current standard by Dun Laoghaire Rathdown County Council, or by the contractor, whichever is considered the most appropriate.

7.14.5.4.8 Potential Route Deviation

Where the route may vary, deviate from the proposal laterally, consideration may be required with regard to impact on the existing public lighting system along part of the route.

7.14.5.5 ELECTROMAGNETIC ASPECTS

7.14.5.5.1 Receiving Environment

The preliminary survey has found that on Ballyogan Road there are ground embedded ESB HV 110 kV cables that may be exposed to stray currents. The cables run along the track route for almost 160 metres from a point to the west of the Ballyogan Wood residential development. Other than this it is unlikely that there is further sensitive equipment along this section, Area 14 of the overall Luas Line B1. There are ESB overhead lines crossing the line B1 at Ballyogan Road near Leopardstown Valley stop. The electrical and statutory clearances required, at this crossing, including the security of the installation will be reviewed and any changes necessary will be agreed with the ESB.

7.14.5.5.2 Potential Impact of the Proposal

Construction Phase

No potentially adverse electromagnetic effects arising during the construction phase have been identified at this stage of the project.

Operational Phase

The trams take their power supply from 750v DC overhead cables supported by headspans or cantilevers attached to poles. Further parallel Traction Power supplies cables will run in ducts below ground at the edge of the trackbed. In addition there will be a Luas substation along this section of the route, located to the east of the Drinaghmore residential estate, adjacent to the playing fields to the north of Ballyogan Road and the Luas Line B1.

In respect of the track alignment, there may be potential electro-magnetic impacts arising from the distribution of current to the trams. Experience with new and developing trams through out the E.U. suggests that adverse effects can be "designed out" prior to the selection of the vehicle. The contract will require the contractor to carry out rigorous analysis, testing and monitoring or the tramway equipment with regard to EMC. The Contractors will be required to comply with the relevant European and International

Standards and Directives.

'Do-Nothing' Scenario

Under a 'Do-Nothing' scenario no likely and significant implications arise in respect of electromagnetic aspects.

7.14.5.5.3 Remedial or Reductive Measures

Construction Phase

The Luas Line B1 alignment will be constructed to meet the requirements of the EU Directive on Electromagnetic Compatibility (89/336/EEC) and the emerging 'best engineering standards' from the European Committee for Electrotechnical Standardisation (CENELEC). Thus, further remedial and reductive measures are not expected to be called for. All components of the Luas Line B1 alignment will be designed for compliance with the current European Standard, EN 50121 (Electromagnetic compatibility for railways). The contractor shall ensure that sufficient procedures are in place to ensure compliance with the above legislation and standards.

Testing for electromagnetic interference will be undertaken during the testing and commissioning phase to confirm that the system is performing to the manufacturer's specifications.

With reference to stray current, suitable spacing and design measures will be provided. Where this cannot be achieved, appropriate remedial actions will be agreed to conform with the specification.

For telecommunication facilities, field measurements will be undertaken during the testing and commissioning stages to check that measures adopted are sufficient. Further remedial and reductive measures should not be required.

Operational Phase

If any adverse impacts are identified, then intensive consultation with owners/occupiers of sensitive premises or equipment will be undertaken to eliminate the adverse effects.

7.14.5.5.4 Predicted Impact of the Proposal

Construction Phase

No residual electromagnetic impacts are predicted during the construction phase.

Operational Phase

If the remedial and reductive measures outlined above are adhered to no likely or significant residual electromagnetic impacts are predicted from the operation of the Luas Line B1.

7.14.5.5.5 Monitoring

Requirements to monitor for possible electromagnetic emissions during the commissioning process will be laid down in the Contract documents.

7.14.5.5.6 Reinstatement

No reinstatement measures are required during either the construction or operational phases of the Luas Line B1.

7.14.5.5.7 Potential Route Deviation

It is not considered that any of the potential deviations of the route alignment stated within the Railway Order Application shall pose any additional significant electromagnetic impact



7.14.6.1 INTRODUCTION

This section of the Environmental Impact Statement addresses the issue of Air Quality in terms of the impact of the construction and operation of the Luas Line B1 on existing air quality levels.

7.14.6.2 AIR QUALITY

7.14.6.2.1 Receiving Environment

The air quality in this section of the Luas Line B1 largely reflects the combined impact of atmospheric emissions from traffic and domestic emissions along Ballyogan Road. The air quality in the area is rated as satisfactory. Levels of air pollution in the zone have fallen dramatically since the end of the 1980's. This is due to the major change in fuel usage patterns within the domestic sector following the ban on the sale of bituminous coal throughout Dublin since 1990, (Marketing, Sale and Distribution Regulations 1990-1993). Solid fuel has been largely replaced by natural gas throughout extensive parts of these suburbs. New housing developments in the surrounding area use natural gas as the primary fuel for heating. These measures have resulted in the dramatic downward trend in levels of sulphur dioxide and smoke observed across the south Dublin suburbs over the past decade.

The principal source of atmospheric emissions is from traffic, with a background contribution due to emissions from housing and miscellaneous sources. Immediately adjacent to the Ballyogan Road elevated levels of nitrogen oxides, hydrocarbons, carbon monoxide and particulates may be measured. These are a major component of motor vehicle exhausts. Emissions from new residential developments to the north and south of Ballyogan Road will be heated with natural gas and so emissions from these schemes will be low.

Ambient levels of sulphur dioxide would be well below the National Air Quality Standards (NAQS) contained in the Air Quality Standards Regulations 2002 (SI No 271 of 2002) within Area 14. These Regulations give air quality limit

values for hourly and daily sulphur dioxide levels. In the case of daily concentrations the limit to be met is $125 \mu\text{g}/\text{m}^3$, expressed as a 99.2 percentile (3rd highest daily value of the year). Monitoring results obtained from the site operated by Dun-Laoghaire Rathdown County Council at Mount Annville (4.5 km to NW) for the period 1997/98-1999/00 (this site closed in 2000) give maximum daily concentrations $44 \mu\text{g}/\text{m}^3$ for sulphur dioxide. The annual average levels during this period were 13-18 $\mu\text{g}/\text{m}^3$ for sulphur dioxide. This monitoring site is located in a more built-up part of the suburbs than is found in the Ballyogan area and so lower levels of these pollutants could be expected in the Area 14 portion of the Luas Line B1.

Nitrogen dioxide levels, which are primarily due to motor vehicle exhaust emissions are well below the current NAQS limit value (SI No 244 of 1987) of $200 \mu\text{g}/\text{m}^3$ (expressed as a 98 percentile, or 175th highest hourly level recorded over the year) in the area. Hourly levels of nitrogen dioxide alongside Ballyogan Road would be generally less than $50 \mu\text{g}/\text{m}^3$ beyond about 50m from the roadway, with annual average levels less than $30 \mu\text{g}/\text{m}^3$. These concentrations are also less than the future hourly and annual limit values, specified in the 2002 Regulations, which are to be met by January 2010. Within the Glencairn housing development, ambient concentrations would be lower, with typical annual average NO_2 concentrations of less than $20 \mu\text{g}/\text{m}^3$.

Annual levels of benzene would be below $1 \mu\text{g}/\text{m}^3$ near the proposed Luas Line B1 within Area 14. The future annual limit value of $5 \mu\text{g}/\text{m}^3$, which is specified in the 2002 Regulations, comes into effect in 2010. With further reductions in the benzene content of petrol, the levels will continue to decline over the next few years. The 2002 Regulations specify a limit value for an 8-hour exposure of $10 \text{mg}/\text{m}^3$ for carbon monoxide. Vehicle exhausts are the main source of these air pollutants, with high levels commonly experienced in areas of traffic congestion and poor air movement such as within inner city streets. The speed of vehicles, dispersion of emissions along the local roads would be sufficient to prevent high levels of carbon monoxide being experienced. Results for 2003 from the continuous ambient monitoring station operated by Dublin City Council at Coleraine Street in the inner city give a

maximum level of $5 \text{mg}/\text{m}^3$ (Dublin City Council, Air Quality Monitoring and Noise Control Unit, Annual Report 2003-04). Given the much lower traffic volumes in the Ballyogan area, compared to those in the inner Dublin area, ambient levels will be substantially less than this value and well below the NAQS value.

Levels of particulates referred to as PM_{10} (particulate material with a mean aerodynamic diameter of less than $10 \mu\text{m}$) in the area would be generally below the NAQS specified in the 2002 Regulations. The annual limit value is $40 \mu\text{g}/\text{m}^3$ with a daily limit value of $50 \mu\text{g}/\text{m}^3$ (no more than 35 exceedances per year). The primary sources of PM_{10} along the Luas Line B1 through Area 14 would be from traffic travelling along the Ballyogan Road and from the house-building and ongoing construction programmes taking place along the southern side of Ballyogan Road. Near the construction site boundaries and increase in PM_{10} concentrations would be expected. However, within the Ballyogan and Glencairn housing developments, ambient PM_{10} concentrations decrease rapidly and would be in the order of 20-25 $\mu\text{g}/\text{m}^3$.

7.14.6.2.2 Potential Impact of the Proposal

Construction Phase

This phase of the development has a potential to generate dust emission and gaseous emissions from the construction of the track bed and the 3 stops in Area 14. Dust emissions will occur from the activities including movement of existing utilities, laying of track, construction of the station-stops and sub-stations along this portion of the Luas Line B1. Movement of vehicles to and from the construction compounds and assembly areas also has the potential to generate dust and PM_{10} emissions from temporary haul roads. Emissions from construction plant equipment as well as from vehicles delivering building materials to the construction compounds along this section can also result in short-term elevated concentrations of air pollutants in the immediate vicinity of the construction activities.

Operational Phase

This section of the Luas Line B1 through Area 14 will not

result in any significant change in current traffic flows as it follows a route along the existing road-side verge along Ballyogan Road. Therefore, there will be no adverse impact on existing traffic flows and hence ambient air quality adjacent to the Luas Line B1 route.

7.14.6.2.3 Remedial or Reductive Measures

Construction Phase

Dust suppression measures, in accordance with effective site management, will be implemented to control dust emissions caused by resuspension of material on roads and from construction areas during dry windy weather conditions. This may include the use of a mobile water spray on the road surface near to the construction compound and any temporary haulage routes along public roads. Any spillages or drag-out of silt and mud on the road surface from construction traffic should be promptly removed to prevent a possible local dust nuisance in the immediate locality.

Burning of construction waste material will be prohibited, with material recycled and re-used either on or off site where practicable.

Diesel engines of trucks and other plant machinery should be regularly maintained so that they do not emit excessive black smoke likely to cause a local nuisance at nearby private properties.

Operational Phase

No remedial measures are required in respect of air quality.

7.14.6.2.4 Predicted Impact of the Proposal

Construction Phase

It is planned that the construction of the track-bed will be undertaken in sections. Materials to construct the track-bed will be stored along with plant machinery in the designated temporary construction compounds at Murphystown Road and Ballyogan Road. Management procedures for these construction compounds will be implemented to ensure that dust emissions from movement of trucks delivering materials and handling of track bed materials is undertaken



so that dust and PM₁₀ emissions are minimised.

There may be a short-term impact on air quality in terms of dust emissions in the vicinity of the construction areas as the track-bed is laid. However, with the proposed dust control measures (Sect 7.14.6.2.3) the impact on air quality in terms of dust deposition rates and PM₁₀ will be slight to moderate. Notwithstanding the fact that the track-bed will be constructed in sections it is envisaged that the impact will be significant although temporary in nature.

Operational Phase

Atmospheric emissions from a motor vehicle are dependent on the type of vehicle, age and speed along the section of a roadway. Exhaust-pipe emission rates for cars and commercial vehicles have declined significantly over the past decade with stricter controls on the quantity of pollutants permitted from petrol and diesel engines. Additional reductions were introduced in 2000 with the implementation of EU Council Directive 98/69/EC relating to measures to be taken against air pollution by emissions from motor vehicles. This E.U. Directive sets stringent limits on the emissions of nitrogen oxides, hydrocarbons (benzene), carbon monoxide and suspended particulates from post 2000 vehicles. As the age of the motor fleet changes with older models on the roads being replaced by newer vehicles, there will be an overall reduction in emissions per vehicle.

Estimates of traffic flows on the road network within Area 14 of the Luas Line B1 are provided in the traffic impact analysis (Section 7.14.1.4) for the 2016 'With' and 'No Luas' scenarios. A minor change of less than 10% in traffic flows along parts of the Ballyogan Road is predicted with the operation of the Luas. This will result in a minor or slight reduction in exhaust-pipe emissions from vehicles traveling along Ballyogan Road.

The planned Luas Line B1 runs along undeveloped ground near Glencairn or the existing roadside verge for most of the track along Ballyogan Road and so the impact on air quality from the operation of the Luas is predicted to be neutral at the nearest housing.

7.14.6.2.5 Monitoring

No air quality monitoring is proposed during the construction or operational phases in respect of the Luas Line B1.

7.14.6.2.6 Reinstatement

Not applicable in relation to air quality

Landscape & Visual Impact



7.14.7.1 INTRODUCTION

This section sets out to describe the visual environment of the area, to assess the Impacts of the LRT insertion on the existing suburban townscape and landscape including the existing trees in the area it also assesses the visual impact of the development. It sets out measures to eliminate, ameliorate and mitigate these impacts.

7.14.7.2 LANDSCAPE

7.14.7.2.1 Receiving Environment

The Area 14 route of the Luas Line B1 commences immediately south of the Murphystown Glencairn stop, and runs through the western boundary area of the Gallops (Glencairn) residential estate. These dwellings predominantly consist of two-storey semi-detached houses with a half-brick finish, and serviced by a 5.5m access road. The alignment crosses a reservation of open space on the north-western edge of the estate, which is enclosed, from the Murphystown Road by a tall screen of Cypress, Pine, Larch, Ash, Horse Chestnut, and an under storey of Brambles (see also Section 7.14.7.3 Trees of this EIS).

The alignment runs across a grassed entrance roundabout servicing the Gallops estate and continues parallel to the curving alignment of the planned Murphystown Parallel Access road, which links to Ballyogan Road. The route is screened from the main road, and from a cluster of enclosed properties to the northwest by a stone wall, vertical metal palisade fencing and tall trees. On the northern side, the route is separated from the existing estate dwellings by a wide grass margin planted with a row of lime trees (3m) and an access road. The route curves around the south perimeter of the Gallops Estate and proceeds on a south-easterly alignment along the northern side of the Ballyogan Road. The estate is separated from Ballyogan Road by a concrete post and rail fence.

Two-storey half-bricked detached residences have been constructed at Meadowfields on the southern side of Ballyogan Road at its western end. The scheme known as

Kilgobbin Wood, also recently constructed, is enclosed by a black vertical rail fence on a low-stone wall, to a height of 1.8m fronting the road. There is a line of mature trees and hedgerows- Lawson Cypress, Beech and Sycamore, Pine and Hawthorn to the rear of this development and running in parallel to it. The eastern perimeter of Meadowfields has a line of mature Lawson Cypress on a north / south axis. Beyond that row, there is an open field containing galvanised sheds in the southern part of the field and backed by a line of mature Sycamore and Pine trees. The field is in rough grass and is currently used for storing concrete drainage pipes. It is enclosed by a low concrete post and rail fence. Adjoining the field to the east is a large two-storey house, Elmfield House, set back some 30m. from the road, and contained by mature trees, 15-20m in height, including Ash and Scots Pine.

The carriageway of Ballyogan Road, from the Kilgobbin Road junction to Elmwood House, has a cycleway, a footpath and grass margin on both sides. The footpath is confined to the north side along the remainder of Ballyogan Road.

The southern side of the route, between Elmfield House and the ESB Carrickmines, is defined by a low bank, a tall hedgerow, and trees. Vegetation consists predominantly of a mix of Hawthorn, Lime, Holly, Sycamore and Ash with an under-storey of Brambles, Ivy, and Symphoricarpos. Beyond the hedgerow, there are small fields used for grazing and enclosed by hedgerows with mature trees in rows and in groups. From road level, the vegetation pattern restricts the views to the Dublin Mountains.

The northern side of the route consists of a pattern of remnant vegetation-Ash, Sycamore, Lime and Hawthorn-growing to 6m. There are sections where the vegetation has been replaced by walls and fences enclosing housing areas.

Glencairn Crescent, an estate situated opposite Elmfield house is bounded by such a remnant, by a low wall, and by ornamental shrub planting- mostly Viburnum species. The vegetation screens the estate from the road. This section of The Gallops estate consists of two storey half bricked semi-

detached houses formed around an oval grassed open space. There is further remnant vegetation leading up a private house, Glenbourne, on the northern side of Ballyogan Road. The house is contained within a 3.5m stone wall.

The Leopardstown Valley (Glenbourne) residential development is located immediately east of the existing dwellings of Glenbourne. It is separated from the road by a low stone wall surmounted by an ornamental metal fence. Beyond the fence, there is a grass margin with groups of Alder at 10m. centres that partly delimits views into the estate. The houses are red-bricked, two storey and semi-detached. The same boundary treatment also defines the Leopardstown Valley Neighbourhood Centre, at the eastern end of the residential estate. The Neighbourhood Centre is a single storey red-bricked complex, with strongly expressed eaves, fronted by a service road, car parking and an area of grassed open space up to the boundary wall.

East of the Neighbourhood Centre, the Drinaghmore housing development consists of two storey semi-detached houses. Adjoining the estate is a large grassed recreational area comprising public sports playing fields. It is enclosed by a low bank, supporting Ash, Lime and Hawthorn, 4-5m. in height. Opposite the playing fields on the southern side of the road is the ESB Carrickmines Station. Two high voltage lines converge on the station on a south to north axis and running approximately parallel. One of the lines proceeds across the road onto the perimeter of the public playing fields and continues in a north westerly direction towards Leopardstown Race course.

The entrance to the Ballyogan Council landfill site is on the southern side of Ballyogan Road. This landfill site is now closed to the public and remediation is taking place on the landfill area itself. Adjoining the former landfill site to the east is Ballyogan Business Park. Six mature trees have been preserved along the front of the structures-Ash and Sycamore. The complex consists of three-storey structures finished with blue-and-beige coloured panels.

East of the Business Park, there is a group of residences comprising single storey cottages enclosed by hedges, and two commercial works. A 'Craftstone' activity is located in a

single storey red brick building bound by a block wall and a hedge. A 'Marbleworks' is located in a single storey cottage with a concrete block shed to the rear roofed with grey asbestos sheeting.

To the east of these cottages is an open field, roughly grazed and enclosed by a grass bank with Lime and Thorn trees 4 – 5 metres in height. The An Post Sorting Office- a single storey structure is set back from the road in this vicinity, with decorative shrub planting in the grounds, and enclosed to the front with low concrete post and chain link fencing. Its western boundary consists of 1.8m high vertical metal fencing.

East of the sorting office is the recently constructed Ballyogan recycling centre, consisting of a recycling area with a security office and the containers for the various products to be recycled to be deposited in. To the south of this area is the Bailing Centre building and Administration Offices which are faced with proprietary profiled metal sheeting. To the east of the recycling centre there is a terrace of single storey cottages enclosed by stub walls and hedges (Griselinia and Lonicera).

Overall, the landscape on the southern side of Ballyogan Road, east of the ESB Carrickmines Station is dominated by the topography of the former waste disposal site – exposed fill rising steeply to a rough plateau considerably elevated above the original ground level. Beyond the landfill site, the land continues to rise towards the Dublin Mountains.

The entrance to the Ballyogan residential development is located opposite An Post Sorting Office. It consists of a 6m carriageway with grass margins and a row of standard Lime trees. The perimeter of the estate is a rough grass bank with a scrubby hedge of Ivy, Thorn and Ash. The hedge is intermittent with frequent gaps. To the rear there is uncultivated grassland.

The Ballyogan Wood development comprises two storey semi-detached houses with a white rendered finish. They are set back from the main road by a service road and grassed open space bounded by a low concrete post and



chain link fence. The eastern boundary is a 1.8m-rendered white wall with a concrete coping. A recently constructed residential development, Ballyogon Vale, is located to the south of Ballyogon Wood. These are two-storey buildings with yellow bricked facades with rendered gables, slate roof finish and standing seam zinc canopies over door ways. The houses are separated from the Ballyogon Road by a serviced access road and green open space with a low stone wall approximately 1.2 metres high along the Ballyogon Road.

The entrance to this estate is also the entrance to Ballyogon Wood, the two developments forming one residential area.

7.14.7.2.2 Potential Impact of the Proposal

Construction Phase

The Luas Line B1 through Area 14 runs entirely at grade, parallel to the existing and planned upgraded road network serving this area. From Glencairn (The Gallops) estate to the eastern point of Area 14, the trackbed alignment crosses the access roads to a number of housing estates on the Ballyogon Road. Access arrangements will be required for the following:

- The Gallops- The main service access to the estate at an existing roundabout and off the Murphystown Road
- Glencairn Crescent Includes a Luas stop platform fronting the estates existing crescent of open space.
- Glenbourne and Leopardstown Valley Shopping Neighbourhood Centre with a Luas stop platform located in front of the shopping centre, and a bus pull-in interchange facility located on the Ballyogon Road.
- Drinaghmore immediately east of the Shopping Centre
- Ballyogon Housing Estate
- Ballyogon Wood and Ballyogon Vale housing estates.

Ballyogon Road carries a moderate traffic load, and a moderate level of pedestrian activity with movement between the housing estates and the shopping centre. The installation of the Luas Line B1 alignment, including the Luas stop platforms will be accompanied by major road widening works and re-alignment works to the Ballyogon Road.

A visual impact is inevitable during construction. The construction of the track bed with its rails, kerbs, edges and paved surfaces could have a moderately negative impact on segments of the route alignment. Negative impacts could occur at the road crossing unless surfacing materials are carefully chosen.

Construction will be preceded by preliminary works, including as follows:

- Segregation of the contractor's compounds and site assembly areas, to the west of the alignment and to the north of Murphystown Road, in the vicinity of Glencairn, immediately west of the public playing fields on the northern side of Balyogon Road, and extending to the western boundary of the Ballyogon Wood residential development.
- Segregation of the general alignment and securing of entrances as appropriate, removal of scrub vegetation and temporary spoil heaps as necessary.
- Modification of kerbs and carriageways to provide temporary road diversions, and final alignments where appropriate.
- Excavation of trenches and laying of service mains and diversions. They will be augmented by storage areas located to the east of the public playing fields to the north of the Ballyogon Road, and similarly fenced and secured.

The provision of Overhead Line Equipment (OHLE), with its power lines supports and masts, could have severe negative impact on the suburban townscape. This could be particularly so at all road crossings where the OHLE crosses the line of vision of road/footpath users.

The construction phase will involve considerable movement of machinery and goods, and enclosure of temporary works. Site activities will include excavation, demolition, clearance, materials storage, concreting pouring, and fabrication, erection and fixing sequences.

Access to the construction and the associated compound and assembly area will be primarily provided from the public road network of the area. In this latter regard the

construction of Luas Line B1 is likely to occur immediately subsequent to the necessary upgrading of Ballyogon Road.

Accessible parts of the alignment will also be fenced and secured to a height of 1.2m while the trackbed is being excavated, formed and laid, and at other times when work which could be dangerous to the public is in progress.

Where necessary, to ensure continuous public access to properties, temporary road, paths and footbridges will be provided. Construction will be planned to minimise disruption and dust from compounds and assembly areas, and particularly along the track bed. Damage to property, to grassland, planting and carriageways will be minimised. Where damage cannot be avoided, it will be repaired.

The main construction work will include:

- Excavation, widening, formation and surfacing of the track bed, track construction and the construction of parallel service ducts.
- Construction of Luas stops at The Gallops, Leopardstown Valley and Ballyogon Wood
- Construction of sub-station to east of the Drinaghmore residential estate, adjacent to the playing fields to the north of Ballyogon Road, and the Luas Line B1 alignment.
- Installation of electrical equipment, support masts and OHLE.
- Construction of footpath connections, grading, top soiling, grassing and planting of landscaped areas.

There is potential for locally significant negative impact along Ballyogon Road where installation will necessitate the upgrading and realignment of the carriageway and the consequent demolition of the entire length of hedgerows and trees. This is addressed in more detail at Section 7.14.7.3. Trees of this EIS.

The removal of the existing trees and hedgerows along the

southern side of the Ballyogon Road will constitute a significant negative impact along the eastern part of the road, as it will expose to view an extensive area of landfill. Moderately negative impacts could occur along Ballyogon Road where upgraded road alignment passes the frontages of the residential areas and shopping centre, and the margins are of sufficient width to facilitate screening. However Ballyogon Road continues to carry large volumes of traffic, and consequently will suffer with further environmental deterioration (see also Section 7.14.1.4 traffic of this EIS).

There is also significant potential for a positive visual impact along the Ballyogon Road. The interface between the suburban developments and semi-urban landscape has fragmentary, unkempt and difficult to maintain edges. The widening of the carriageway and road edges provides an opportunity to comprehensively address the landscape design of the roadway in the context of its edge setting.

Operational Phase

In operation the Luas Line B1 will most likely provide positive impacts by:

- Enlivening the suburban setting by the trams travelling through well-designed reservations, notably where it adjoins built-up areas.
- The long-term impact of improved transport in raising perception of environmental quality.

Do Nothing Impact

If the Luas Line B1 system is not inserted, the existing backlands corridor will remain as a semi-derelict and visually poor landscape. The upgrading of the Ballyogon Road is six-year road objective in the 2005-2011 Dun Laoghaire-Rathdown County Development Plan and is likely to alter the existing landscape of this road.

7.14.7.2.3 Remedial or Reductive Measures

Primary amelioration of the line will be achieved through the co-ordination of the design of the Luas Line B1 with the adjoining carriageways, boundaries and paths, and through



Careful design of raised embankments, bridges and stops. The visual integration of the OHLE with the landscape will be achieved by careful choice of the support systems, by the careful integration of masts with the vertical elements of the streetscape, and by their co-ordination with street furniture.

The construction of the Luas Line B1 will tend to dominate the entire run along this section.

Mitigation will be achieved by:

- Inserting the trackbed at grade in the existing grass margin.
- Selecting the visually appropriate method of support for the OHLE system –where possible one line of lateral poles with cantilevered arms.
- Planting trees and shrubs along the alignment of the northern side of Ballyogan Road and particularly along the frontages of Glencairn Crescent, Glenbourne, Drinaghmore and Ballyogan and Leopardstown Neighbourhood Centre and Ballyogan Wood / Ballyogan Vale Housing estates. In addition new planting will be provided along the realignment carriageway of Ballyogan Road.
- Trimming the remnant hedges on the northern side of the Luas Line B1 and weeding out extraneous material (weed plants).
- Planting new trees locally to absorb the alignment into its surroundings.

The Ballyogan Road re-alignment will have a significant landscape impact as the existing boundary vegetation provides a strong screen. The screen is very important at the central portion of Ballyogan Road where it runs parallel to the landfill site. A high level of mitigation, primarily comprising new landscape planting will be required along the boundary of the re-aligned road.

7.14.7.2.4 Predicted Impact of the Proposal

Construction phase

The temporary and intermittent construction impacts-temporary enclosure of the compounds and assembly areas, creation of temporary carriageways, diversion of traffic, construction operations, moving vehicles, dust and vibration- fall into a number of categories:

- The diversion of traffic during the major upgrading and realignment works on Ballyogan Road.
- The segregation with fencing of the various elements of the Luas Line B1 while the main construction work – the building and surfacing of the trackbed- is carried out.
- The diversion of traffic onto temporary carriageways while the road crossings are excavated and constructed. In addition, the diversion of traffic during the major upgrading and realignment works on Ballyogan Road.
- The intermittent work involved in equipping the line and erecting the OHLE.
- The final grading, finishing and landscaping of the work area, the compounds and assembly areas, following completion of construction.

These works are all temporary, some are intermittent, and dust and dirt will be strongly controlled. They are all impacts that are normal in the urban scene. In the context of this project these are not regarded as being significant in terms of impact on the landscape and townscape..

Following amelioration and mitigation, the Luas Line B1, and associated realigned Ballyogan Road will have a moderate, positive impact on the corridor in general, through the consistent treatment of the overall alignment, accompanied by the design and treatment of the grass verges with new planting.

Following amelioration and mitigation, the OHLE and the supports will have a moderate, negative visual landscape in Area 14. The impact from the housing areas will be slight given the capacity for tree planting on the northern side of the Luas Line B1. New planting on the southern side of the

realigned Ballyogan Road will ensure a moderate-to-slight predicted impact on landscape.

Operational Phase

The overlooking from trams into the properties abutting the line will not constitute a significant visual impact for the majority of adjoining properties. The increase in the use of the Luas Line B1 as a safe and environmentally attractive movement corridor will have a positive impact on the area. Overall the provision of the Luas Line B1, from Sandyford Industrial Estate to Cherrywood via Ballyogan, Carrickmines, and Laughanstown will have a continuing positive effect on the development of these areas and will underpin their gradual environmental improvement. The upgrading of the Ballyogan Road as an improved route corridor will also have a positive impact on the area.

The visual impact of the OHLE and its supports, and the residual overlooking from trams into adjoining properties will reduce as the landscaping matures.

Overall, the Luas Line B1 will have a significant and positive visual impact on the landscape and townscape of the area. The residual negative impact of the OHLE and its supports will be greatly outweighed by the positive impacts of the other parts of the system and by the anticipated long term benefits that will accrue to the visual environment. Overall moderate positive visual impact will result from the operation of the Luas Line B1.

7.14.7.2.5 Monitoring

During the construction phase it will be necessary to monitor the method statements of contractors to ensure that the work conforms to good engineering and landscape conservation practice. The control of dust and dirt, and the protection of existing trees and shrubs, will be important throughout the period of the works, particularly at points of access to the line.

During the operation phase of the Luas the landscape elements, including grassing, trees and shrub planting, will require planned maintenance and replacement, to ensure their health and long term growth.

7.14.7.2.6 Reinstatement

During the construction phase all disturbed fencing, garden walls, and flanking soft areas along the Luas Line B1 and along Ballyogan Road will be reinstated to provide a consistent landscaped edge to the corridor.

7.14.7.2.7 Potential Route Deviation

The proposed possible route deviation will not, in most cases, significantly alter the assessment of visual impacts outlined above, due to the large scale and open nature of the landscape compartments it passes.



7.14.7.3 TREES

7.14.7.3.1 Receiving Environment

From the roundabout at the entrance to The Gallops (Glencairn) housing estate there is a line of young trees planted in the verge beside the reservation for the planned Murphystown Parallel Access Road. These consist of thirty-four maple and five birch, all in good condition.

Southern side of Ballyogan Road

Inside the boundary of the property *Elmfield House* there is an area of mature woodland with a mixed, mature under-story in good condition, comprising elder, hawthorn, holly, laburnum, hazel and laurel. There are ten mature trees consisting of Scots pine, fir and ash, one over-mature ash with two early mature poplar and ash. There are also two dead trees (holly & fir). Most trees are in fair to good condition, with a few in poor condition.

Beside the road outside the boundary of *Elmfield House* there is an old, unmanaged agricultural field boundary interspersed with mature hedgerow trees. Some of the mature trees have died and fallen through disease. There are three sycamore in fair condition, five ash in poor condition and one birch in fair condition.

Between Elmfield House and opposite *Glenbourne House* there is an agricultural field boundary hedge that has been managed in the past. It is tall, with early mature and mature trees, ten of which are very good quality and the rest are of fair quality. The species composition is hawthorn, blackthorn, holly, ash, sycamore, elm and beech.

From the field boundary opposite Glenbourne House to the next field boundary opposite Glenbourne road, just before the entrance to Leopardstown Valley there is a hedge running along the side of the road, interspersed with early mature and mature ash and fifteen more mature trees. The hedge is in good condition and consists of hawthorn, elm and holly. The mature trees consist of elm, beech, lime, sycamore, Scots pine, horse chestnut and oak, in varying degrees of health from good, through fair to poor. At the end

of this hedge there is an old field boundary with early mature to mature, overgrown, unmanaged willow in fair to poor condition.

Continuing on the roadside from the willow hedge on to Carrickmines 220kv station there is a roadside hedge with mature trees and scrub. The hedge consists of fair quality hawthorn, elm, willow and holly with numerous early mature to mature ash and sycamore. The mature trees comprise three beech and a Scot's pine, all in fair to poor condition. There is also one yew within the hedge.

At Carrickmines 220kv station there is an area of ornamental planting which acts as a screen. This planting is in fair condition and combines mature ornamental shrubs with young and early mature trees. Species include Cherry laurel, griselinia, holly, cypress, buddleia, crab apple, lonicera, beech, hawthorn, ash, cherry, birch, maple, field maple, rowan, elm, willow and sycamore.

At Ballyogan Business park there was previously an agricultural hedge along the roadside. The new development has removed the under-story leaving a few isolated mature trees on a bank, and a number of these have sustained damage as a result of this development, particularly to their roots. On the eastern boundary there are a few isolated hawthorn and early mature sycamore. If the bank beside these trees is removed their viability will be significantly compromised. Two of the mature retained trees are sycamore in fair condition and there are a further two early mature ash in poor condition.

Between Ballyogan Business Park and the property no. 83 Ballyogan Road there is a series of six private residences. In the front garden of No. 83 is a mature cypress hedge in fair condition. No. 84 has no vegetation. The property 'Daisy Cottage' has a managed Escallonia and Philadelphus hedge in good condition. The Marble works and No. 134 have no vegetation and 'Craftstone fireplaces' has a young cypress in good condition behind a boundary wall.

Between property no. 83 Ballyogan Road and the An Post Delivery Office the mature hawthorn hedge has been removed and replaced with a fence.

At the An Post Delivery Office there is an ornamental

planting scheme within the property. This planting consists of young maple and rowan in good to fair condition and young Malus in good condition.

Between the An Post Delivery Office and the eastern boundary of the property 'Rockview' the semi-managed agricultural boundary hedge has been removed. ,

Between the properties 'Rockview' and 'Haven Cottage' there are six private residences outside each of which is a hedge. The boundary of 'Rockview' is a mature, well-managed Lonicera garden hedge in good condition. At No. 95 there is a mature, low-managed Escallonia garden hedge in good condition, with a Lonicera hedge before the gate. No. 94 has a mature, tall-managed Lonicera and cypress hedge in good condition. Before the property entrance is a low-cut Griselinia hedge in good condition. At 'Kingston Lodge' there is a mature, tall-managed cypress hedge in good condition.

Outside 'Heigue Cottage' is a mature, well-managed privet hedge in good condition, set a little back from the footpath. In the roadside verge in front of this hedge are four young beech trees in good condition. Outside 'Haven Cottage' is a mature, low, well managed garden hedge consisting of ivy, Lonicera nitida and privet, all of which are in good condition.

Northern side of Ballyogan Road

Between Glencairn Court and Glencairn Crescent beside the footpath there is a managed hedge that has been clipped to allow for pedestrian access. The hedge comprises mature holly, hawthorn and elder, all of which are in fair condition, and is interspersed with young, early mature and mature hedgerow trees. The trees are all in fair condition and consist of predominantly ash with young sycamore and early mature elm. This hedge acts as a significant screen to the new houses.

At Glencairn Crescent there is a newly planted ornamental shrubbery comprising young cherry laurel, dogwood, lime and willow, all of which are in good condition.

Between Glencairn Crescent and 'the dwelling Glenbourne House' there is a tall hedge on the roadside that is managed beside the footpath. It has dense ivy growth and is made up of predominantly elm regeneration, multiple stemmed

sycamore, mature hawthorn and young beech, all in fair condition. There are two gaps along the hedge.

After Glenbourne on the roadside there are two early mature ash trees in fair condition. From Glenbourne to Leopardstown Valley estate, behind the boundary wall, there are a number of small spinneys of young alder and a few willow in good condition.

Between the entrance to Leopardstown Valley and The Gallops Public House there is a new planting scheme beside the existing car park. Eight young lime trees and three young maples have been planted in small groups and these are in good condition.

From The Gallops Public House to the entrance to Drinaghmore Estate there is a small section of a remnant, tall hedge which comprises mature hawthorn, elm and ash and is in fair condition. From the entrance to Drinaghmore estate to just before the playing fields there is a tall, managed roadside hedge growing beside a ditch. This hedge consists of mature hawthorn with early mature ash, sycamore and elm, all of which are in good condition. Works being carried out on the north side of this hedge may have damaged the roots of some of these trees. There is a gap in this hedge outside the last house before the playing fields

East of the Drinaghmore Estate, alongside the sports ground, and extending as far as a point opposite the property at no. 84 Ballyogan road is a semi-managed former agricultural field boundary hedge made up of mature hawthorn, elder and blackthorn, all in fair condition. It is situated on a ditch and is interspersed with predominantly early mature ash with a few early mature sycamore and young elm, all in fair condition. To the north of this hedge there is a mature, well-managed hawthorn hedge in good condition.

At the entrance road to Ballyogan Estate there is a relatively new planting scheme of standard street trees. On the north west side of the entrance road there are young alder, field maple and cherry and on the north east side there are young field maple. The trees are in good condition.

From a point approximately 26.0 metres east of the entrance to Ballyogan Estate to Ballyogan Wood there is a sparse,



gappy, isolated mature hawthorn hedge in poor condition, interspersed with hedgerow trees. These trees consist of five early mature to mature ash trees in fair condition and young elm regeneration in fair condition.

At Ballyogan Wood public open space there is a new ornamental planting scheme. From the east of the site to the entrance there are two young beech, four young birch, two young cherry and one young hawthorn and they are all in fair condition. From the entrance to the west of the site there are three young whitebeam, one young cherry and four young rowan and they are all in fair condition. Some have been vandalised.

7.14.7.3.2 Potential Impact of the Proposal

The associated re-alignment of Ballyogan Road, will result in the removal of a stand of mature trees at the entrance to Elmfield house. This will have a significant impact. From Elmfield house to the entrance to the Council Landfill site, the proposals will result in the removal of the existing agricultural hedge and associated trees to accommodate the road re-alignment. The removal of the hedge will have a slight to moderate local impact, while the removal of mature trees will have a locally significant impact.

The insertion of the Luas Line B1 alignment on the northern side of Ballyogan Road will result in the removal of eight sections of remnant hedges, with associated trees. This will have a slight to moderate impact. The alignment will also result in the removal of two areas of recent planting, an area between the existing dwelling Glenbourne and the entrance to Leopardstown Valley Neighbourhood Centre, and an area either side of the entrance to Ballyogan Estate. The removal of these recent planting will have a slight impact.

The insertion of Luas stops along this section will result in the removal of some young, recently planted trees; their removal will have a slight impact.

7.14.7.3.3 Remedial or Reductive Measures

Appropriate remedial measures include the relocation of young trees from the Luas Line B1 alignment, and the area encompassing the realigned Ballyogan Road improvement works, prior to construction, and carry out a programme of new planting.

7.14.7.3.4 Predicted Impact of the Proposal

The Luas Line B1 alignment and the Ballyogan Road re-alignment will have a locally significant impact on mature trees. The removal of roadside hedges along Ballyogan Road will have a slight to moderate impact. The removal of recently planted trees will have a slight impact.

7.14.7.3.5 Monitoring

Any trees to be retained should be protected from construction damage by suitable fencing in accordance with the current best practices. For the protection of trees on construction sites (BS 5837 Trees in Relation to Construction; Protection of Trees on Development Sites Part 1 & 2, Arboricultural Association; The National Joint Utilities Group 10, Guidelines for Planning, Installation & Maintenance of Utility Services in Proximity to Trees) All excavations near trees should also be in accordance with the current best practices. Monitoring of fences and the effects on construction will be required for the duration of the construction phase.

7.14.7.3.6 Reinstatement

A comprehension scheme of new planting should be carried, using suitable species alongside the re-aligned road. Trees planted close to the overhead cables should be selected so as to be compatible with the operations of the system. Typically trees should have an upright growth habit and should not have large leaves.

7.14.7.3.7 Potential Route Deviation

Lateral route deviation has the potential to further impact to a lesser or greater degree on existing mature trees adjoining the alignment along Ballyogan Road.

7.14.7.4 THE BUILT ENVIRONMENT AND VISUAL IMPACT

7.14.7.4.1 Receiving Environment

It is proposed by Dun Laoghaire-Rathdown County Council to construct a new Murphystown Road, to be built parallel to the existing Murphystown Road, but east and north of it, bringing it around the west end of the large housing estate known as the Gallops, running through what is now open ground in front of Glencairn Heath, to join Ballyogan Road. A section of this road has been constructed, but not completed or opened. To the west of this new road alignment is part of the Leopardstown Heights housing estate and a number of large private properties. The character of the Gallops and Leopardstown Heights is that of relatively new housing estates, with the typical mixture of semi-detached and detached houses, each house with its own front and back garden, these gardens bounded by low walls at the front. The older and formerly rural properties have large grounds with well established planting, including numerous large trees.

At present Ballyogan Road forms the edge of urban development. On its northern side lie housing estates: the Gallops, Drinaghmore and the Ballyogan estate. From Glencairn Avenue east as far as Glenbourne View, nine estate roads run generally north south at right angles to Ballyogan Road. Eastwards from there the housing estate roads are generally parallel to Ballyogan Road, and divided from it by narrow green spaces. There is a small local shopping centre, Leopardstown Valley at the east end of Glenbourne Road. On the southern side of Ballyogan Road there is one new housing estate called Kilgobbin Wood. Though other new development is under construction, to date the southern side remains largely rural, with many large trees in lands along the southern edge of the road, particularly at the western end. Towards the eastern end there is an ESB sub-station, a small group of industrial units, a sorting office, some rural cottages and small stone works. South off the road is a large tip head. Murphystown Road, and most of Ballyogan Road fall within the Stepside Action Plan, published by Dun Laoghaire-

Rathdown County Council in July 2000, and covering an area from the new Motorway to the Enniskerry Road. The Stepside Action Plan confirms the intention to construct the new Murphystown Road, and to upgrade Ballyogan Road. It also proposes the construction of between 800 and 1000 houses along the south side of Ballyogan Road, from the new junction with Murphystown Road to Leopardstown Valley. This housing is to be separated from Ballyogan Road itself by a green strip. On the north side of Ballyogan Road, the Ballyogan Wood estate has recently been extended eastwards.

7.14.7.4.2 Potential Impact of the Proposal

Construction Phase

Along the Luas Line B1, institutions and institutional lands as well as new and established housing areas are potentially sensitive to change and to new development. However, given the very extensive new development planned or approved near the alignment, sensitivity to the development of the Luas itself would be secondary to sensitivity to these larger developments. Residents along Murphystown and Ballyogan Roads are also likely to be sensitive to impacts arising from the construction of the Luas Line B1 alignment. These impacts are likely to be regarded as significant and negative by the residents of houses facing or immediately adjoining the line. Other residents or users of the area are likely to regard the construction of the Luas Line B1 alignment as moderate and neutral in character. The construction of the Luas Line B1 alignment along the alignment of the planned Murphystown Parallel Access Road and along the upgraded and realigned Ballyogan Road is likely to result in significant impacts on the character of the area. The impacts of the construction of the new roads has the potential to be far greater than the construction of the Luas Line B1 alignment. The removal of mature trees on the southern side of Ballyogan Road has the potential to result in significant negative impacts on the character of the area.

Operational Phase

There is the potential for moderate to significant impacts to arise from the existence of the Luas Line B1. These impacts may be regarded as negative by the residents of houses



facing or immediately adjoining the line. Other residents or users of the area are likely to regard the presence of the Luas Line B1 as positive in character. Generally, the existence of Luas stops has the potential to be regarded as making a positive contribution to the character of the area. This will be particularly so at Leopardstown Valley. The existence of the new Murphystown Road and the new and widened Ballyogan Road is likely to result in significant impacts on the character of the area, made greater by the loss of mature trees on the south side of Ballyogan Road. The impacts of the existence of the new roads is likely to reduce over time, as planned new developments are built, and landscaping matures.

7.14.7.4.3 Remedial and Reductive Measures

Construction Phase

No remedial or reductive measures are proposed. Remedial measures in respect of landscaping and planting, or other screening measures are set out elsewhere in this EIS.

Operational Phase

No remedial or reductive measures are proposed specifically in respect of the built environment and visual impact.

7.14.7.4.4 Predicted Impact of the Proposal

Construction Phase

There will be moderate to significant impacts arising from the construction of the Luas Line B1 alignment on residents along Murphystown and Ballyogan Roads. These impacts will be greatest in extent and most negative for the residents of houses facing or immediately adjoining the line. The construction of the Luas Line B1 alignment along the planned Murphystown Parallel Access Road and along the upgraded and realigned Ballyogan Road will bring about moderate changes in the character of the area, and so result in moderate impacts. The impacts of the construction of the new roads will be far greater than the construction of the Luas Line B1 alignment itself. The removal of mature trees on the south side of Ballyogan Road will result in significant negative impacts on the character of the area.

Operational Phase

The existence of the Luas Line B1 will initially have significant negative impacts on the residents of houses facing or immediately adjoining the line. Impacts on other residents or users of the area will be neutral or positive in character. The existence of Luas stops will make a positive contribution to the character of the area, and result in positive impacts. The existence of the new Murphystown Road and the new and widened Ballyogan Road will result in significant impacts on the character of the area, reducing over time.

7.14.7.4.5 Monitoring

No monitoring of the impacts of the existence of the Luas Line B1 alignment on the character of the built environment is proposed.

7.14.7.4.6 Reinstatement

Not applicable in respect of the Built Environment and Visual Impact.

Material Assets



7.14.8.1 INTRODUCTION

This section addresses the impact of the proposed development on Material Assets. It includes an evaluation of the diversion and/or relocation of Statutory undertakers equipment and all pipes and cables laid under the wayleave for Luas Line B1 alignment. It is a key objective of this project that there should be no interruption to the operation of Luas Line B1, for repairs or alterations to public utilities. The issue of Property is also assessed under the main heading of Material Assets.

7.14.8.2 PUBLIC UTILITIES

7.14.8.2.1 Receiving Environment

The various utilities set out below are known to exist within the vicinity of the B1 alignment in Area 14. The extent of services throughout the receiving area, which has been determined from records, will require extensive surveying and mapping at a later date to determine the final diversionary requirements.

Water

There is minor interaction with existing watermains. There are two local supplies at the entrance to the Ballyogan residential scheme, comprising 6" and 12" mains which will need diverting and/or lowering.

Gas

There are a number of local 180mm and 63mm distribution services which will be crossed at Murphystown Road and Ballyogan Road. These services will have to be diverted and or lowered in the vicinity of the Luas Line B1 alignment.

Drainage

There are a number of surface water drains in the vicinity of Area 14, ranging from 225mm to 300mm in diameter which may require diverting or side entry manhole construction.

ESB

Local low voltage supplies will need diverting/lowering. Ballyogan Road currently contains a 38kV overhead line,

two 110kV lines and a 220kV line from the ESB Carrickmines station running laterally and transversely. One of the 110kV supplies has been re-routed due to the construction of the SEM. The remaining lines will need precise locating and depth identification prior to construction so as to determine their interaction with Luas Line B1.

Telecommunications

The local Eircom network along Ballyogan Road may need to be diverted.

7.14.8.2.2 Potential Impact of the Proposal

Construction Phase

Service ducts under Line B1 may be provided if required for example to support redevelopment. Manholes will be reconstructed to provide access to sewers located outside the alignment. Impacts can arise from the disturbance of the existing roadway such as delays to traffic and access limitations to residential and commercial property. It should be noted that other than the cumulative effect of diverting all services out of the B1 alignment, the works are no different to those carried out on a day to day basis by the statutory undertakers.

Many services in Area 14 are outside the Luas B1 alignment. However attention must be paid to the as-laid position of the high voltage ESB supplies to the Carrickmines ESB station during design and construction.

It is not anticipated that there will be any significant effects since the size of the services is such as to require exceptional plant or equipment. If work is necessary on the major ESB network considerable pre-planning and lead time will be necessary to achieve the required diversion. While trenching is undertaken there will be short periods when access to individual premises may be limited.

Operational Phase

In respect of Public Utilities there will be no operational impacts during the operation of Luas Line B1

'Do-Nothing' Scenario

Under a 'Do-Nothing' scenario there are no implications in respect of public utilities other than to note that ongoing maintenance and repair work would continue to be done.

7.14.8.2.3 Remedial or Reductive Measures

Construction Phase

In respect of the construction of the Luas B1 alignment, no specific remedial or reductive measures are required during the construction process.

Operational Phase

No remedial or reductive measures are required in the operational phase of Luas Line B1.

7.14.8.2.4 Predicted Impact of the Proposal

Construction Phase

Overall, a neutral impact is predicted.

Operational Phase

Overall, a neutral impact is predicted.

7.14.8.2.5 Monitoring

Any requirements to monitor for possible effects during the construction process will be laid down in the contract documents.

7.14.8.2.6 Reinstatement

Upon completion of the diversionary works, public utilities, will be restored and full services access will be provided outside the Luas B1 alignment.

7.14.8.3 PROPERTY

7.14.8.3.1 Receiving Environment

Properties within the Area 14 section of the Luas Line B1 and to the south of the SEM reservation, primarily comprise suburban residential dwellings. A number of non-residential properties are located on the southern side of

the Ballyogan Road, including the Council Landfill site and recycling centre, the Ballyogan Business Park, and An Post Sorting Office. On the northern side of Ballyogan Road, the existing Leopardstown Valley Local Centre, to be upgraded to Neighbourhood Centre under the current Plan, serves the adjoining residential areas.

7.14.8.3.2 Potential Impact of the Proposal

Construction Phase

Acquisition of strips of land will be necessary to insert the Luas Line B1 alignment into Area 14. Property acquisition is shown on Map 3. The planned southern re-alignment of Ballyogan Road will require more extensive strips of land to the south of Ballyogan Road. Overall, however, the potential impact on existing property by the loss of these strips is not anticipated to be significant.

Construction works could give rise to adverse effects by restricting or impeding access to properties within the various residential developments on the northern side of Ballyogan Road, and also including access to the planned Leopardstown Valley Neighbourhood Centre, the An Post Ballyogan Sorting Office, the ESB Carrickmines Station, and the Council Landfill Site and recycling centre. Ballyogan Avenue, serving the properties of the Ballyogan Estate, also leads to the rear (southern) entrance of the Leopardstown Race Course. However, this access is to be extinguished in order to facilitate the construction of the SEM.

In particular, the construction of the Luas Line B1 alignment will require the closure of the existing vehicular access onto Ballyogan Road from the dwelling Glenbourne. Pedestrian access onto Ballyogan Road from the dwelling will be retained.

Operational Phase

Overall, the operation of the Luas Line B1 in Area 14 will link the existing and planned future expanded residential and commercial properties of Stepside to Sandyford, Cherrywood, Rathmichael and Dublin City Centre. The upgrading of Ballyogan Road will improve road access infrastructure in this area. These planned transportation



improvements will effect a significant positive impact on property in the area by increasing the attractiveness of this area, and thereby strengthening the property market in the vicinity. While the property market in this area is strong at present, such demand could potentially increase due to the construction of the Luas Line B1.

‘Do Nothing’ Scenario

Under the ‘Do-Nothing’ scenario, the property market in this section of Line B1 would remain strong due to the high demand for residential properties in the Ballyogan and Stepside areas, particularly due to the planned construction of the SEM.

7.14.8.3.3 Remedial or Reductive Measures

Construction Phase

Where applicable, compensation will be payable to the owners of acquired property, in accordance with the general Compulsory Purchase Code.

Landscaping, noise abatement or other remedial measures will be put in place to protect the amenities of the existing residential properties in closest proximity to the Luas Line B1 and revised Ballyogan Road alignments. Such measures are set out elsewhere in this EIS.

During the construction phase access to properties along the alignment will be maintained.

A new private vehicular access serving the dwelling *Glenbourne* will be created linking to Glenbourne Road, at the outer edge of the Leopardstown Valley residential development.

Operational Phase

No remedial or reductive measures are required in respect of property or property values.

7.14.8.3.4 Predicted Impact of the Proposal

Construction Phase

Overall, where acquisition of property is required to accommodate the Luas Line B1 alignment and the planned re-alignment of Ballyogan Road, the remedial measures set out above will ensure that the impact of the proposed development on property will not be significant.

Operational Phase

Existing properties along the Area 14 section of the Luas Line B1 will benefit from their location in close proximity to a new permanent public transport and upgraded road system. This will effect an overall significant positive impact on property in the area.

7.14.8.3.5 Monitoring

A Construction Team representative will be available during construction for consultation and liaison with members of the public.

7.14.8.3.6 Reinstatement

Reinstatement of property boundaries affected by acquisition of land will be carried out during the construction phase.

7.14.8.3.7 Potential Route Deviation

The purpose of the powers of deviation is to facilitate on-site construction and to further mitigate rather than contribute to an increased impact on any given aspect of the environment considered. It is not envisaged that any increased impact on property will result from the potential employment of these powers.

Cultural Heritage



7.14.9.1 INTRODUCTION

This section of the EIS considers the impact of the development on Cultural Heritage in Area 14 which is examined in terms of local history, buildings of artistic, historic and architectural merit and archaeology.

7.14.9.2 LOCAL HISTORY

7.14.9.2.1 Receiving Environment

Ballyogan

The Harold family first owned the lands of Kilgobbin after the Anglo-Norman invasion. The family occupied a great tract of land around the Dublin Mountains and gave its name to Harold's Cross (Ball 1905). At the same time, the adjacent land, known as 'Balyofryn,' was given to All Saint's Priory by Claricia, the wife of a descendant of the Mac Gillamochoilmog family (O'Brien, unpublished MA thesis), which may have been part of the modern townland of Ballyogan.

On the dissolution of the religious houses by Henry VIII, the lands of 'Balyofryn' came into the possession of the Corporation of Dublin. In the reign of Elizabeth I, Jacques Wingfield, the tenant of Stillorgan, held the lands and was covenanted to build a castle to protect them (Ball 1905). However, there are no ruins or sites of castles in the townland known today as Ballyogan.

Stepaside

During the nineteenth century, Kilgobbin village fell into decline and Stepaside became the new centre of activity in the area. Stepaside lay on the busy road from Dundrum to Enniskerry, and during this period it acquired a new police station and a forge, while its inn became a well known hostelry. The name Stepaside originated during the eighteenth century and may be a corruption of 'Steepaside'. It has also been suggested that Stepaside took its name from that of the inn, as it was a favourite halting place for coaches on their way to Enniskerry and County Wicklow.

Many of the nineteenth century Ordnance Survey maps show that the lower slopes of Three Rock Mountain were covered in small quarries. There were quarries at Barnacullia and others above Stepaside, but many have since been filled in. The granite quarries at Barnacullia provided much employment in the area and one of their principal customers was Dublin Corporation, who contracted them to supply paving stone for the city. Ticknock, the principal quarrying area had belonged at one time to the Fitzwilliam estate.

Alderman Fredrick Darley, whose family had a long tradition of stonecutting and building in Dublin, acquired the lease of a piece of land at Newton Little, just above Kilgobbin. Here, in about 1815, he built a small house called Fernhill. The house was sold during the 1930s to the Walker family who have established a magnificent garden, which is now open to the public.

Jamestown House

Built in the late eighteenth century, Jamestown House is situated between Kilternan and Stepaside, just north of the road leading back towards Dundrum. It is unfortunately now a ruined shell, but was once an attractive house. It is late Georgian or Regency in style and some ten years ago contained the remains of a handsome, sandstone doorcase with carved rosettes, a fanlight and some internal plasterwork which featured reeded mouldings. Robin Goodbody, in his study of the Killgobbin area 'On the Borders of the Pale', says that Jamestown House was built by Edward Rourke, a Dublin pinmaker, some time after 1780. The lands of Jamestown were eventually acquired by the former Dublin County Council, who laid out a very attractive public golf course there. To the east of the house, in a clump of trees, there is an ancient cross and the site of an old well, which are all that remain of an early medieval church.

7.14.9.2.2 Potential Impact of the Proposal

No likely or significant potential impacts on local history during the construction or operational phase are anticipated.

'Do-Nothing' Scenario

Under a 'Do-Nothing' scenario, no implications arise in respect of local history.

7.14.9.2.3 Remedial or Reductive Measures

No remedial or reductive measures are necessary during the construction or operational phases of the Luas Line B1.

7.14.9.2.4 Predicted Impact of the Proposal

No likely and significant impacts on local history are predicted during the construction or operational phases of the Luas Line B1.

7.14.9.2.5 Monitoring

No monitoring measures are necessary in respect of local history.

7.14.9.2.6 Reinstatement

No reinstatement measures are required.

7.14.9.3 ARCHITECTURAL HERITAGE

7.14.9.3.1 Receiving Environment

There are no protected structures near the Luas Line B1 in Area 14. Lisieux Hall (Park Cottage) is separated from the alignment by the alignment of the planned Murphystown Parallel Access Road, and is likely to suffer only imperceptible impacts from the construction or existence of the Luas Line B1.

7.14.9.3.2 Potential Impact of the Proposal

Construction Phase

There may be an imperceptible impact on *Lisieux Hall*

Operational Phase

There may be an imperceptible impact on *Lisieux Hall*

'Do Nothing' Scenario

Under a 'Do-Nothing' scenario, no issues arise in respect of architectural heritage.

7.14.9.3.3 Remedial and Reductive Measures

Construction Phase

No remedial or reductive measures are proposed in respect of architectural heritage.

Operational Phase

No remedial or reductive measures are proposed in respect of architectural heritage.

7.14.9.3.4 Predicted Impact of the Proposal

Construction Phase

There will, at most, be an imperceptible impact on *Lisieux Hall*

Operational Phase

There will, at most, be an imperceptible impact on *Lisieux Hall*

7.14.9.3.5 Monitoring

No monitoring of the impacts of the existence of the Luas Line B1 on architectural heritage is proposed

7.14.9.3.6 Reinstatement

Not applicable in respect of architectural heritage in Area 14.

7.13.9.4.7 Potential Route Deviation

It is understood that the potential to vary the alignment, if invoked, will be in order to avoid and/or minimise impact in terms of the built and architectural heritage along the route and therefore should not result in an increased impact.

7.14.9.4 ARCHAEOLOGY

7.14.9.4.1 Receiving Environment

The following archaeological appraisal of Area 14



(Glencairn to Ballyogan Wood stop) is based on a field inspection and a desk study drawn from several published sources; the Record of Monuments and Places (RMP) of Dúchas, the Heritage Service; and the topographical files of the National Museum of Ireland (information on stray finds).

The main purpose of this section of the EIS is to assess the importance of the receiving archaeological environment and the impact of the proposed route on this environment. Ameliorative measures are also proposed to safeguard any monuments, features or finds of antiquity.

Archaeological sites are broadly classified for the purposes of impact assessment in such a way that their importance in the archaeological record is suggested. A zone of archaeological potential (ZAP) is the area around the extant remains where related archaeological features are likely to occur. The numbers used to identify the sites are those of the RMP; all sites listed in the RMP are given protection under national monuments legislation.

Archaeological sites that occur within approximately 100m of the Luas route corridor are described below, sites which are relevant to the general archaeological landscape of the area are also mentioned in the text (please see figure 1).

The Luas route corridor runs through the townlands of Murphystown, Kilgobbin, Ballyogan, Jamestown and Carrickmines Little. The nearest recorded monument is located in Jamestown townland. This possible enclosure site (DU 026:001) was tested in 1997 and nothing of archaeological significance was encountered. The site is now built on. Recent infrastructural and industrial developments in the townlands of Ballyogan and Jamestown have revealed further information in relation to the pale ditch and also produced further sites which had no visible archaeological remains, suggesting an even greater density of archaeological activity than the standing monuments alone would indicate.

Archaeological Background

The area through which Luas Line B1 travels has a rich and varied archaeological heritage dating back to earliest times.

Mesolithic (9000–5000 BC)

Current archaeological evidence suggests that south county Dublin was first inhabited at the end of the Mesolithic period. Excavations on Dalkey Island have revealed deposits dating to this period that include shell middens, animal bones and razor-sharp flint tools called Bann flakes. Radiocarbon results on this site show an early date of 3340 BC. A small number of Bann flakes have also been recovered in Dún Laoghaire, Rathfarnham and Loughlinstown, indicating early settlement along rivers, streams and the coast (Corlett 1999).

Neolithic (4000–2400 BC)

The evidence for settlement of the area during the Neolithic period occurs in the form of megalithic tombs and a distribution of datable stray artefacts. In south county Dublin, settlement appears to have been located at the foot of the Dublin/Wicklow Mountains, and there is a striking east–west band of surviving tombs in this area. Of the relatively few finds dating to the Neolithic in the area, two objects from Kingston, near Ballyogan, are described in the NMI files as simply ‘stone artefacts’ (NMI refs. 1935:398, 399). They may be polished stone axes, indicating early activity in the area, dating from at least the Neolithic.

Bronze Age (2000–500 BC)

A number of cist burials (DU026:015) dating to the Bronze Age were discovered early this century in a sand pit at Jamestown, south of the Luas alignment. A bronze palstave was found in Glenamuck townland, indicating Bronze Age activity in the area.

Recent Excavations: During works associated with the South-Eastern Motorway two possible fulachta fiadh were excavated in Ballyogan townland by Thaddeus Breen and Gary Conboy under licence numbers 02E0481 and 02E1276 (Breen 2004, Conboy 2004). One of which was found close to a stream, close to the proposed M50 Overbridge Two.

Early historical (Christian) period (AD 400–1200)

A number of sites in the area date to the early historical period. The ruined church of Kilgobbin, situated on a small hill, is a building erected just less than 300 years ago. However, it occupies the site of a church (DU026:004) that

stood at Kilgobbin at the time of the Anglo-Norman invasion. The church is said to owe its foundation to St Gobban, whose festival falls on April 1. His name appears in the *Martyrology of Tallaght* as well as the *Martyrology of Donegal*. Near it stands a fine typical example of a plain high cross and the site of a holy well. The cross base (DU026:018) at Carrickmines Great is probably of early Christian or early medieval date also.

Medieval period (AD 1200–1600)

The medieval period is represented in this area by a wide range of monuments; south Dublin's status as the frontier of the Pale is mirrored by the tower houses in the locality such as those at Carrickmines (DU026:005), Kilgobbin (DU025:017/01) and Murphystown (DU023:025). A fragment of gable wall now located on a central island within the newly constructed interchange for the SEM (formerly located in a farmyard adjacent to the Glenamuck Road) is all that remains of a strongly fortified castle which was erected at Carrickmines (DU026:005). The Pale boundary (DU026:0115) partially surrounded Dublin during the medieval period and was a defensive structure built by the English settlers to alleviate the constant raiding of their lands by native Irish tribes such as the O'Tooles and the O'Byrnes. An act of Parliament of 1488-89 required the landowners of the time to construct a defensive boundary along the borders of the Pale.

Recent Excavations: Sections of the pale ditch have been excavated in recent times on the southern side of the Ballyogan road in Jamestown townland (licence numbers: 98E0119, 99E0456, 01E0413, 02E0535).

Unclassified

The site of a possible enclosure (DU026:001) is located on Ballyogan Road, straddling the townlands of Ballyogan and Jamestown. It was marked as a c.22m diameter tree ring (landscape feature) on the first edition (1843) OS six-inch map. This site has been built upon in recent times, and no remains of the feature survive.

Recent Excavations: In 1997, testing was undertaken by Martin Reid (licence no. 97E467) in two locations in Ballyogan. The first was a cropmark site at the west end of

the line of the pale ditch (SMR DU026:001) in the area of Ballyogan dump. This site was identified as a possible feature from an aerial photograph. Test trenching revealed that it was part of the 20th century dump and not of archaeological significance (Reid 1998, 24). Testing on the southern side of the Ballyogan road in the area of SMR sites DU026:001 and DU026:115 was also carried out in 2001 by John O'Connor under licence number 01E0413, which revealed further sections of the pale ditch.

RMP No. DU026:001
NGR: 2071/22436
Townland: Jamestown
Type: Enclosure site (poss)
Description: Marked as a tree ring on the 1st (1843) O.S. six-inch map (diameter c.22m). This site is now built on.

Historic Background

Historical background of the townlands along proposed Area 14 Luas Line B1.

Kilgobbin

The village of Kilgobbin grew up around the church and the castle (DU026:004) built by the Walsh family in the fifteenth century. The Pale boundary, which was established by the Anglo-Normans in the thirteenth century, ran past the village; part of the boundary is still preserved to the east of the castle. Ball and Hamilton (1895) mention a watchtower and guardhouse built into the wall of a house called Moreen in the village.

In the sixteenth century, the village consisted of a cluster of small cabins around Kilgobbin Castle. Rocque's map of Dublin, dated to 1756, shows the castle surrounded by several substantial houses. Houses in the area include Kilgobbin Castle House, a late eighteenth-century villa; Kilgobbin House, a late Georgian farm house; and Clay Farm, an early nineteenth-century farm house lived in by the Richardsons, whose family mausoleum is in Kilgobbin graveyard. The village was largely deserted during the nineteenth century, when Stepside developed and expanded (Pearson 1998, 317–9).



Ballyogan

In John Rocque's 1756 map of County Dublin, a section of the Pale boundary is shown as a deep ditch and river flowing from Carrickmines towards Kilgobbin Castle, with a small path/trail running alongside it. It runs almost parallel to Ballyogan Road and to a small river that runs eastwards towards Carrickmines. The western end disappears under the Ballyogan tiphead and may well have been longer before the opening of this dump. It would appear from subsequent historical maps that this path preceded Ballyogan Road, which is depicted on Taylor's 1816 map as the 'New Road.'

7.14.9.4.2 Potential Impact of the Proposal

The construction of the Luas track involves the excavation of a trench 6–7m wide and 0.8–1.2m deep. A working width of 10m-15m will be observed by the contractor along the route of the Luas. As with each of the Luas alignment sections, and in all areas where ground disturbance is proposed, there exists the potential for disturbing previously unrecorded archaeological soils, features or deposits. As this area has been greatly disturbed due to recent development it is not anticipated that significant archaeological deposits will be encountered during construction.

The construction of the Luas sub-stations will involve clearance and excavation, which may have an impact on any sub-surface archaeological deposits that may survive. The area of interest of RMP site DU026:001 extends onto Ballyogan Road; this site has been built upon in recent times, and no above ground remains survive. Therefore the impact of the proposed development on the archaeological resource is considered slight to minimal.

The proposed Luas Line B1 will run along the northern side of the Ballyogan Road. Much of this northern side has not yet been subject to development, therefore there is moderate potential that previously unknown archaeological remains may be encountered. Therefore it is recommended that this section is monitored (see figure 3 for details).

7.14.9.4.3 Remedial or Reductive Measures

An Archaeological watching brief is necessary at the location of the Luas sub-station and along the part of the alignment that has been previously undisturbed on the northern side of the Ballyogan road (see monitoring section for details). This will ensure the recognition of any surviving archaeological features requiring excavation and recording.

7.14.9.4.4 Predicted Impact of the Proposal

There are no standing archaeological monuments within Area 14 that will be altered by the proposed alignment, nor is there likely to be a high sub-surface archaeological presence. However, there is a limited possibility that previously unrecorded subsurface archaeological deposits are preserved in situ on the northern side of the Ballyogan road, on which the construction could have a negative impact.

7.14.9.4.5 Monitoring

Monitoring should be carried out at the location of the Luas sub-station and along the part of the alignment that has been previously undisturbed on the northern side of the Ballyogan road. See figure 3 for location.

Please note that all recommendations are subject to approval by the National Monuments Section, Department of Environment, Heritage and Local Government and the National Museum of Ireland.

7.14.9.4.6 Reinstatement

In an archaeological context, no reinstatement measures are necessary.

7.14.9.4.7 Potential Route Deviation

The present line of the Luas between Glencairn stop and Ballyogan Wood is largely located on previously disturbed ground. Apart from the area of RMP site DU026:001, no archaeological monitoring is recommended. Should the line of the proposed Luas line move into previously undisturbed ground, further archaeological monitoring will be required.

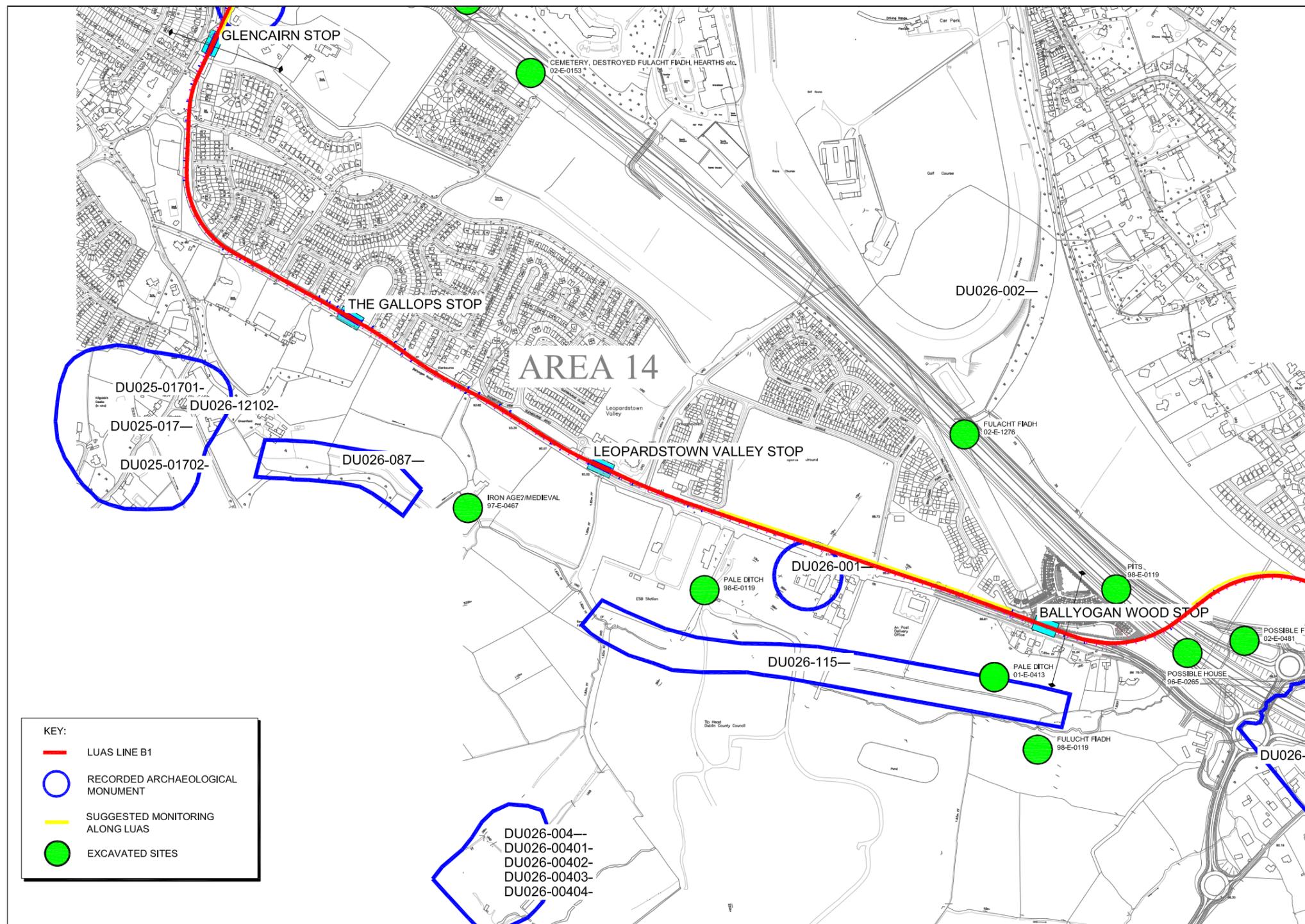


Figure 1: Showing RMP Sites and locations of recent excavations along Luas route in Area14.

Area 14 Construction Scenario



7.14.10.1 URBAN FUNCTION

Area 14 runs from the proposed Glencairn Stop, within the property of Clonlea House and follows the eastern side of the planned alignment of the Murphystown Parallel Access Road, at the western edge of The Gallops residential estate. It swings onto the northern side of Ballyogan Road and traverses in an easterly direction. In the vicinity of the Leopardstown Valley Neighbourhood Centre, Luas Line B1 enters a grassed reservation, and follows this to the eastern end of the alignment in the vicinity of the existing Ballyogan Wood residential scheme. The construction of the Luas Line B1 alignment will require a major upgrading and partial realignment of Ballyogan Road. There will be two stops provided along Area 14. The first, The Gallops stop, will be located in the vicinity of The Gallops suburban residential scheme. Leopardstown Valley stop is to be provided within the area of the Leopardstown Valley Neighbourhood Centre, which is planned to be upgraded, to serve the wider Stepaside area.

A construction and storage compound and assembly area will be located immediately to the east of the existing playing fields, on the northern side of Ballyogan Road, and extending to the western edge of the Ballyogan Wood residential development. A substation serving the scheme will also be constructed at this location, to the southwest of the playing fields, adjoining the B1 alignment.

7.14.10.2 ORGANISATION OF THE WORK

The provision of the Luas Line B1 alignment along Ballyogan Road requires the prior upgrading and partial realignment of this public carriageway. This will require some amount of temporary changes to the existing local traffic system, including diversions as considered necessary to improve safety and to aid efficient operation of Luas trams. The overall construction sites for the re-alignment works, and associated utilities diversion will be planned in considerable detail.

Luas Line B1 runs for a considerable portion of this route upon an existing grassed reservation. In addition, the

construction of Luas Line B1 will occur subsequent to the re-alignment of the public road, such that the B1 alignment should not restrict road space.

The construction works for Luas Line B1, and the associated re-alignment and improvement of Ballyogan Road will be effectively planned and organised in order to minimise disturbance to the traffic using this route, which serves primarily as a local distributor route. Finishing and resurfacing works within the roadway will be undertaken as soon as possible in order to return the carriageway area to full and permanent vehicular circulation at the earliest possible opportunity.

Until a contractor has been formally appointed to undertake the construction of Luas Line B1, no precise programme can be established. For the purposes of this EIS the following assumptions can reasonably be made based on the required end date for completion of the works and the commissioning of the system, and on the basis of experience gained on similar projects elsewhere.

- Work will start simultaneously at a number of locations.
- Duration - approximately 38 months
- A period for testing and commissioning the system is included.
- Trams will be supplied during the construction period.

7.14.10.3 SITE ACCESS

The site may be accessed primarily from the following areas:-

- from Murphystown Road, and from the area of the planned construction compound and assembly area on the northern side of this road, via the property of *Clonlea House* and the existing alignment of the northern portion of the Murphystown Parallel Access Road.
- Access will be provided along the full length of Ballyogan Road, serving both the Luas construction and the associated upgrading works to Ballyogan Road.

The stocks of materials being stored and passing through these access points may be relatively large and will have to be managed with considerable care.

7.14.10.4 CONTRACTORS' COMPOUND AND ASSEMBLY AREA

A contractors compound and assembly area will be created to the east of the public playing fields on the northern side of Ballyogan Road and extending to the western boundary of the Ballyogan Wood residential scheme. This compound will be approximately 10,000m² in area. Access to the Luas Line B1 alignment will be taken from the public carriageway of Murphystown Road, and from Ballyogan Road, via the northern portion of the Murphystown Parallel Access Road. Following completion of Luas Line B1 and associated works including structures in this area, the residual area will be landscaped and incorporated into the existing townscape.

7.14.10.5 WASTE MANAGEMENT

A Waste Management Plan will be prepared on behalf of the Railway Procurement Agency by the appointed contractor prior to the commencement of development. It will be implemented by the appointed contractor on site. This will involve identification of all likely waste materials prior to construction work commencing and a review and selection of the most appropriate means of waste disposal in accordance with best practice and the provisions of the Waste Management Acts.

All excavated inert material will be reused, where possible, to create embankments and bunding elsewhere along the alignment. Any remaining material will be reused and/or disposed of by licensed operator/carrier within the Dublin area, the location to be determined at the time of development.

7.14.10.6 SPECIAL MATTERS

Critical Roads

Following the re-alignment works to Ballyogan Road, Luas Line B1 will run entirely off-street, but will cross a number of vehicular entrances to residential estates adjacent to the alignment. In this regard, provision will be made to maintain vehicular and pedestrian movement in this area during construction to the greatest extent possible.

The provision of Luas Line B1 requires extensive construction works to occur to Ballyogan Road. This road is currently a main link to the Sandyford Industrial Estate, Dublin City Centre and other destinations. These road works will be carried out in advance of the construction of Luas Line B1 on Ballyogan Road, in order to ensure that the widened carriageway is available for traffic during track works. Provision will be made to maintain vehicular and pedestrian movement in this area during construction to the greatest extent possible.

Local Residents

The area of Ballyogan Road includes a large number of residents, primarily in a number of residential estates, but also comprising a number of single dwellings, particularly on the southern side of the carriageway. The proposed re-alignment of Ballyogan Road will require the incorporation of a strip of land on its southern side, comprising the boundary lands of a number of properties. Overall, the construction works associated with Luas Line B1 and Ballyogan Road will not in any way extinguish formal access to residences in the vicinity of the alignment, with the exception of the existing vehicular access to *Glenbourne*, which is to be extinguished. However, such access could be restricted, and will require the implementation of detailed site management procedures during construction.



7.14.11 DIRECT AND INDIRECT EFFECTS RESULTING FROM USE OF NATURAL RESOURCES

Area 14 of the Luas Line B1 alignment will run from the area of the termination of Area 13 at Murphystown Road, and will follow the alignment of the planned Murphystown Parallel Access Road, and Ballyogan Road, which is to be re-aligned to the south to accommodate the proposed route. The likely significant direct and indirect effects on the environment of the proposed development which may result from the use of natural resources, in this case the natural resources being the land encompassed within the subject site, have been comprehensively assessed in this Environmental Impact Statement in keeping with Paragraph 3 (e) (i) of S.I. No. 349 of 1989 as amended. It is expected that the building materials required for the construction of the Luas will be sourced from Ireland and elsewhere within the E.U.

7.14.12 DIRECT AND INDIRECT EFFECTS RESULTING FROM EMISSION OF POLLUTANTS, CREATION OF NUISANCES AND ELIMINATION OF WASTE

Details of emissions arising from the development were outlined in the relevant sections of this Chapter, which dealt with the aspects of the environment considered in relation to Area 14. There will be no significant direct or indirect effects arising from emissions. Waste Management is addressed under Section 7.14.10.5.

7.14.13 FORECASTING METHODS USED FOR 7.14.10 AND 7.14.11

The methods employed to forecast the effects on the various aspects of the environment are standard techniques used in the particular professional disciplines. The general procedure employed was to address the receiving environment in a dynamic fashion, to add to that a projection of the "loading" placed on aspects of the environment by the development in it, mitigated by appropriate measures and thereby arrive at a net or predicted impact. The methodology employed by each of the specialist consultants is outlined in the relevant sections of Chapter 5 of the Environmental Impact Statement.

7.14.14 INTERACTIONS

Human Beings/The Landscape/Visual Issues

Luas Line B1, together with its overhead lines and ancillary structures will be observed by pedestrians and residents as they become accustomed to the new environment. Whilst the construction phase will initially have an adverse effect on the visual and residential amenities of the area, this will be outweighed by the long term positive visual impacts resulting from environmental improvements associated with Luas Line B1, and the maturing of remedial landscaping provision.

Flora/The Landscape/Human Beings

The removal of existing foliage during construction of Luas Line B1 and the upgraded Ballyogan Road alignments will interact with the landscape environment. However, in particular along the planned alignments of the Murphystown Parallel Access Road and Ballyogan Road, this will occur in any case with the upgrading of these routes, which are specific local objectives of the Statutory Development Plan. However, the introduction of new planting where appropriate will help to establish a new landscape and flora.

Material Assets/Human Beings

The operation of Luas Line B1 parallel to the alignment of the planned Murphystown Parallel Access Road and Ballyogan Road will provide a new permanent public transport service for this residential area, which is planned to accommodate a significant new resident population. Luas Line B1 will provide an efficient public transport alternative to the private car, and will link the area to the existing or planned employment areas of Sandyford, Cherrywood and Dublin City Centre. This will lead to a significant positive interaction between Material Assets and Human Beings, and will also achieve planning policy and objectives for Area 14 relating to public transport.

Material Assets/Flora/Fauna

The main interaction between Flora and Fauna is that the loss of vegetation necessary for the proposal will result in a loss of cover and habitat for insects, birds and mammals, and disturbance along the route, which will reduce its use

Appendix 14A

List of Plant Species in Area 14

as a corridor for animal movement. This will particularly occur along Ballyogan Road. However, it should be noted that the re-alignment of this route has previously been confirmed by the Planning Authority and is an objective of the Statutory Development Plan. New landscape planting is a significant element of the overall Luas Line B1 proposal.

Human Beings/Material Assets/Landscape/Air

Luas Line B1 will run along a landscaped corridor, which is segregated from the existing road infrastructure. This will ensure a minimum of conflict with existing and planned future vehicular or pedestrian traffic movement in the area. In addition, the provision of a viable public transportation option will facilitate a reduction in traffic flow in the area, thereby contributing to reduced vehicles exhaust emissions.

| Common name | Scientific name |
|--------------------------------|-----------------------|
| Grasses | |
| Cock's-foot | Dactylis glomerata |
| Ryegrass | Lolium perenne |
| Yorkshire fog | Holcus lanatus |
| Herbaceous dicotyledons | |
| Clustered dock | Rumex conglomeratus |
| Creeping thistle | Cirsium arvense |
| Daisy | Bellis perennis |
| Knapweed | Centaurea nigra |
| Nettle | Urtica dioica |
| Red clover | Trifolium pratense |
| Red valerian | Centranthus ruber |
| Ribwort plantain | Plantago lanceolata |
| White clover | Trifolium repens |
| Winter heliotrope | Petasites fragrans |
| Yellow clover | Trifolium dubium |
| Trees and shrubs | |
| Alder | Alnus spp. |
| Ash | Fraxinus excelsior |
| Beech | Fagus sylvatica |
| Birch | Betula spp. |
| Blackthorn | Prunus spinosa |
| Bramble | Rubus fruticosus agg. |
| Dog rose | Rosa canina |
| Dogwood | Cornus spp. |
| Elder | Sambucus nigra |
| Guelder rose | Viburnum opulus |
| Hawthorn | Crataegus monogyna |
| Laurel | Prunus laurocerasus |
| Privet | Ligustrum vulgare |
| Sycamore | Acer pseudoplatanus |
| Wych elm | Ulmus glabra |

Appendix 14B

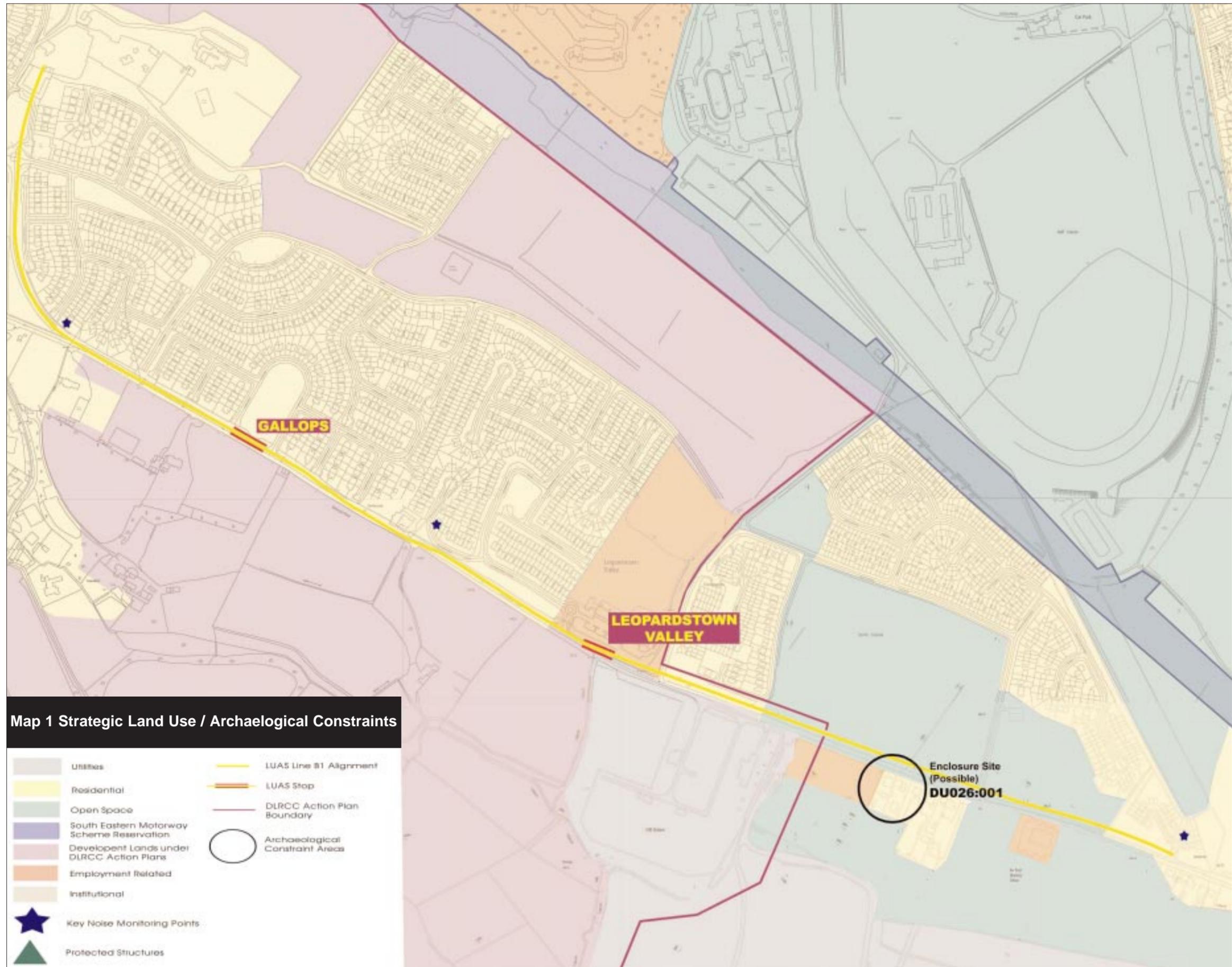
List of Tree Species in Area 14

| Location | Ref. No. | Species | Age | Condition | Ref. Code | Comments | |
|--|---------------------------------|-----------------------------|--------------------------------|-----------|---|---|---|
| From roundabout at Glencairn | Area 007 | 11 Maple | Y | Good | A | A group of young trees planted in the verge, they appear sound | |
| | | 5 Birch | Y | Good | A | | |
| | | 23 Maple | Y | Good | A | | |
| South of Ballyogan Road | | | | | | | |
| Elmfield House area 008 | 190 | Poplar | EM | Fair | B | A tall, drawn-up suppressed tree with a suspected infection of bacterial canker. | |
| | 191 | Ash | EM | Fair/Poor | B/C | A twin-stemmed tree with a distorted crown and dense ivy cover. | |
| | 192 | Scots Pine | M | Fair | B | This tree's upper crown is leaning towards road, it appears stable. | |
| | 193 | Fir | M | Good | B | This tree has some suppressed dead wood. | |
| | 194 | Holly | M | Poor | C | A dead tree. | |
| | 195 | Fir | M | Poor | C | A dead tree. | |
| | 196 | Scots Pine | M | Good | B | This tree has dense ivy and isolated major dead wood. | |
| | 197 | Fir | M | Good | B | This tree has some suppressed dead wood. | |
| | 198 | Scots Pine | M | Fair | B | A very large tree with co-dominant stems and an included union. It has a one-sided crown which leans slightly on to the road. It has isolated major dead wood. | |
| | 199 | Ash | M | Fair | B | This tree has three main stems, one of which is truncated and has heavy ivy growth. It has scattered minor dead wood. | |
| | 200 | Fir | M | Fair | B | This tree has a slightly sparse crown and tip die-back. | |
| | 201 | Fir | M | Fair | B | This tree has a slightly sparse crown and tip die-back. | |
| | 202 | Fir | M | Poor | C | This tree is suppressed by trees 200 and 201 and has minor die-back. | |
| | 203 | Scots Pine | M | Fair | B | This tree has a leaning stem and dense ivy growth. | |
| | 204 | Ash | OM | Poor | C | This tree leans slightly over the road. It has basal decay. | |
| | | Under-story | | M | Fair | B | Mixed mature under-story comprising elder, hawthorn, holly, laburnum, hazel and laurel. |
| | Roadside outside Elmfield House | Hedge | Hawthorn, Elm, Laburnum, Holly | M | Poor | B/C | An old, unmanaged agricultural field boundary, interspersed with mature hedgerow trees, numbered as follows. Some of the mature ash trees have died and fallen through disease. |
| | | 711 | Birch | M | Fair | B | A large mature tree leaning over the road with heavy ivy growth. |
| | | 207 | Ash | M | Poor | C | This tree has significant crown die-back with scattered major dead wood. It is infected with the decay fungus Inonotus hispidus. |
| | | 208 | Ash | M | Poor | C | This tree has a wide decurrent crown with significant die-back. It has an extensive infection of Inonotus hispidus and has dense ivy growth. |
| 209 | | Ash | M | Poor | C | This tree has previously shed its upper crown. It has major dead wood and is infected with Inonotus hispidus. | |
| 210 | | Ash | M | Fair/Poor | B/C | This tree has a decurrent crown with extensive crown die-back and dead wood overhanging the road. It has dense ivy growth. | |
| 211 | | Ash | M | Fair/Poor | B/C | This tree has a decurrent crown with some die-back and dead wood overhanging the road. It has dense ivy growth. | |
| 212 | | Sycamore | M | Fair | B | This tree has a one-sided crown, being suppressed by an adjacent tree, which has been felled. It has minor dead wood and dense ivy cover | |
| 214 | | Sycamore | M | Fair | B | It has a slightly one-sided crown, having been suppressed by an adjacent tree that was felled. It has minor dead wood and dense ivy cover. | |
| 215 | | Sycamore | M | Fair | B | A squat specimen with heavy laterals extending into the field and dense ivy cover. It is the last tree on the Elmfield house boundary. | |
| Between Elmfield House and opposite Glenbourne House | Hedge 008 | Hawthorn, Blackthorn, Holly | M | Good | B | An agricultural field boundary hedge which has been managed in the past. It is tall with early mature and mature trees, 10 of which are very good quality and the rest are of fair quality. | |
| | | Ash, Sycamore, Elm | EM | Good | B | | |
| | | | Beech | Y | Good | B | From field boundary opposite Glenbourne House to next field boundary opposite Glenbourne Road, just before entrance to Leopardstown valley. Section 009 |
| | 338 | Ash | EM | Fair | B | Tree No. 338 is growing on the road side and a line of 6 further hedgerow trees are growing away from the road. They have moderate ivy growth. The following four trees are in a group just off the road to the east of tree 338. | |
| | 117 | Elm | M | Fair | B/C | A single tree with heavy ivy growth. | |
| | 146 | Beech | M | Fair | B | This tree has scattered minor dead wood in crown and has suffered damage to its roots by cattle poaching the ground around the base. | |
| | 147 | Lime | M | Poor | C | This tree has some crown die-back, epicormic growth and has suffered root damage from cattle poaching the ground around the base. | |
| | 148 | Sycamore | M | Good | A/B | It has crown die-back, minor scattered dead wood and has suffered root damage from cattle poaching the ground around its base. | |
| | | Hedgerow | Hawthorn, Elm, Holly | M | Good | B | This hedge runs along the road side and has young, early mature and mature ash, with the following trees interspersed along its length. |
| | 118 | Beech | M | Good | A | This has a well formed crown with minor scattered dead wood but no obvious defects. Has had tree surgery carried out on the branches which overhang the road. | |
| 119 | Beech | M | Fair | B | It has heavy ivy growth but no obvious defects. | | |

List of Tree Species in Area 14

| Location | Ref. No. | Species | Age | Condition | Ref. Code | Comments |
|--|-----------------------|---|------|-----------|-----------|---|
| | 120 | Beech | M | Fair | B | It has isolated major dead wood and dense ivy growth. It has had tree surgery carried out on the branches which overhang the road. |
| | 327 | Sycamore | M | Fair | B | This tree has very dense ivy growth. The dense ivy cover prevents a detailed assessment |
| | 121 | Beech | M | Poor | C | This tree has a large cavity at its base and an infection with the decay fungus Ganoderma sp. It has light ivy growth. |
| | | Scots Pine | M | Good | A | This tree has moderate ivy growth. It has no obvious defects. |
| | | Scots Pine | M | Fair | B | Leaning towards the road. It has had surgery in the past. |
| | | Horse Chestnut | M | Good | A | This tree has minor scattered dead wood and minor storm damage. Growing behind a waterlogged ditch. |
| | | Oak | M | Fair | B | This tree has scattered major dead wood. It has been pruned on the road side. Growing behind a waterlogged ditch. |
| | 329 | Sycamore | M | Poor | C | This tree has major crown die-back and heavy ivy growth. Growing behind a waterlogged ditch. |
| | | Oak | M | Fair | B | This tree has major crown die-back and some storm damage. It has been pruned on the road side. |
| End of Section 009 | Hedge | Willow | EM/M | Fair/Poor | B/C | An old field boundary on the south side of the road. Is overgrown and unmanaged. |
| From end of section 009 to Carrickmines 220kv station | Hedge 010 | Ash, Hawthorn, Elm, Willow, Holly, blackthorn | M | Fair | B | A roadside hedge with mature trees and scrub. Also contains one yew. |
| | | Beech (No. 714) | M | Fair | B | Two beech trees with scattered minor dead wood. |
| | | Beech | M | Poor | C | A tree in major decline. |
| | | Sycamore | EM/M | Fair | B | Numerous within hedge. |
| | | Ash | EM/M | Fair | B | Numerous within hedge. |
| | | Scots Pine | M | Fair/Poor | B/C | Has been topped and is leaning. It is growing opposite the entrance to Leopardstown Valley. |
| Carrickmines 220kv station | Planting 011 | Cherry laurel, Griselinia, Hawthorn, Holly, | M | Fair | B | An area of ornamental planting which is acting as a screen to Carrickmines 220kv station. |
| | | Ash, Cherry, Birch, Maple, Field Maple | EM | Fair | B | |
| | | Ash, Rowan, Sycamore, Elm, Willow | Y | Fair | B | |
| Ballyogan Business Park Section 012 | | | | | | Previously an agricultural boundary. The new development has removed the under-storey leaving a few isolated mature trees on a bank. On the eastern boundary there are a few isolated hawthorn and early mature sycamore. If the bank beside these trees is removed their viability will be significantly |
| | 715 | Sycamore | M | Fair | B | This tree has a decurrent crown with truncated branches and has possibly been pollarded in the past. It carries isolated major dead wood. One large limb overhangs the road. |
| | 716 | Sycamore | M | Fair | B | Possibly a previous pollard. Carries isolated minor and major dead wood and recent development works has probably damaged its roots. |
| | 718 | Ash | EM | Poor | B/C | A poorly shaped trees, it has scattered deadwood. |
| | 721 | Ash | EM | Poor | B/C | A poorly shaped trees, it has scattered deadwood. |
| 83 Ballyogan Road to Ballyogan Business Park Section 013 | 83 Ballyogan Road | Cypress | M | Fair | B | Garden Hedge. |
| | Daisy Cottage | Escalonia, Philadelphus | M | Good | A | Managed garden hedge. |
| | Craftstone Fireplaces | Cypress | Y | Good | A | Garden hedge behind wall. |

| Location | Ref. No. | Species | Age | Condition | Ref. Code | Comments |
|---|-----------------------|---|----------|-----------|-----------|--|
| An Post Delivery Office | Planting 014 | Maple | Y | Good/Fair | A/B | An ornamental planting scheme within the An Post property. |
| | | Rowan | Y | Good/Fair | A/B | |
| | | Malus | Y | Good | A | |
| Ballycoolan Road. From Haven Cottage to Rock View Area 015 | Haven Cottage | Ivy, Lonicera nitida, Privet | M | Good | A/B | Low, well managed garden hedge. |
| | Heigue Cottage | Privet | M | Good | A/B | A well managed hedge in good condition set a little back from the footpath. In the verge in front of this hedge are 4 young beech trees in good condition. |
| | Kingston Lodge | Cypress | M | Good | A/B | A tall managed hedge. |
| | 94 Ballyogen Road | Lonicera, Cypress | M | Good | A | A tall managed hedge. After the property entrance there is a low cut Griselinia hedge in good condition. |
| | 95 Ballyogen Road | Escalonia | M | Good | A | A low managed garden hedge. After the gate there is a low Lonicera hedge. |
| | Rock View | Lonicera | M | Good | A | A well managed garden hedge. |
| | | | | | | |
| North of Ballyogen Road | | | | | | |
| Between Glencairn Court and Crescent | 016 Hedge | Holly, Hawthorn, Elder | M | Fair | B | A managed hedge with scattered trees, beside the footpath the hedge has been cut back for pedestrian access. Is a significant screen to the new houses. The ash trees have dense ivy cover. |
| | | Ash | Y,EM & M | Fair | B | |
| | | Sycamore | Y | Fair | B | |
| | | Elm | EM | Fair | B | |
| Glencairn Crescent shrub area | 017 | ShrubberyCherry laurel, Dogwood, Lime, Willow | Y | Good | A | A newly planted shrubbery. |
| | | | | | | |
| Glencairn Crescent to Glenbourne House | 018 Hedge | Elm & sycamore, with beech and hawthorn | Y-EM | Fair | B | A tall hedge on the roadside that is managed on the footpath. It has dense ivy growth and is made up of predominantly elm regeneration with multiple stemmed Sycamore with hawthorn and beech . There are two gaps along the hedge. |
| After Glenbourne House on road side | 712 | Ash | EM | Fair | B | A multiple stemmed tree with included unions. It has minor dead wood scattered throughout its crown. It has possibly sustained root damage through the construction of the adjacent pavement. |
| | 713 | Ash | EM | Fair | B | A single stemmed tree with minor dead wood throughout its crown. |
| From Glenbourne House to Leopardstown Valley | 113 | Alder and Willow | Y | Good | A | Inside the wall are a number of small spinneys of young alder and a few willow in good condition. |
| From Leopardstown Valley entrance to The Gallops Pub | Planting 019 | Lime (8) Maple (3) | Y | Good | A | A new planting scheme beside the car park. They are in good condition and free from defects. |
| From the Gallops pub to the entrance to Drinaghmore | Hedge 020 | Hawthorn, Elm, Ash | M | Fair | B | A small section of a remnant, tall hedge. |
| From entrance of Drinaghmore to just before sports ground | Hedge 021 | Hawthorn with Ash, Sycamore, Elm | EM | Good | B | A tall, managed roadside hedge growing beside a ditch, comprising mature hawthorn with some early mature trees, Works being carried out on north side of hedge may have damaged the roots. There is a gap in this hedge outside the last house before the football pitch. |
| East of Drinaghmore Estate, alongside sports ground to opposite 84 Ballyogan Road | Hedge 022 | Hawthorn, Elder, Blackthorn | M | Fair | B | |
| | | Hawthorn, Elder, Blackthorn | M | Fair | B | A semi-managed former agricultural field boundary on a ditch interspersed with predominantly early mature ash and a few sycamore. Some of the ash trees display symptoms of ash canker. To the north of this hedge is a mature hawthorn hedge, well managed and in good condition. |
| | | Ash | EM-M | Fair | B | |
| | | Elm | Y | Fair | B | Dutch Elm disease has killed numerous elm within the hedge. |
| | | Ash | M | Fair | B | This tree has isolated minor dead wood, some of which is over the road. |
| Entrance Road to Ballyogan Estate. Area 023 | NW side of road | Dogwood, Alder, Field Maple, Cherry | Y | Good | A | A relatively new planting of standard street trees. |
| 26m east of entrance to Ballyogan Estate to Ballyogan Wood | Hedge 024 | Hawthorn,Blackthorn | M | Poor | B/C | A sparse,gabby,isolated mature hawthorn hedge interspersed with hedgerow tree as follows. |
| | | Ash | EM-M | Fair | B | 5 hedgerow trees which have been poorly pruned around existing overhead cables. They have major scattered dead wood and dense ivy growth. |
| | | Elm | Y | Fair | B | |
| Ballyogan Wood public open space | From east to entrance | Beech (2) Birch (4) | B | Fair | | A new ornamental planting scheme. A number of the trees have been damaged |
| Cherry (2), | Y | Fair | B | Fair | | |
| | From entrance to west | Cherry (1) Whitebeam (3), Rowan (4) | Y | Fair | B | |

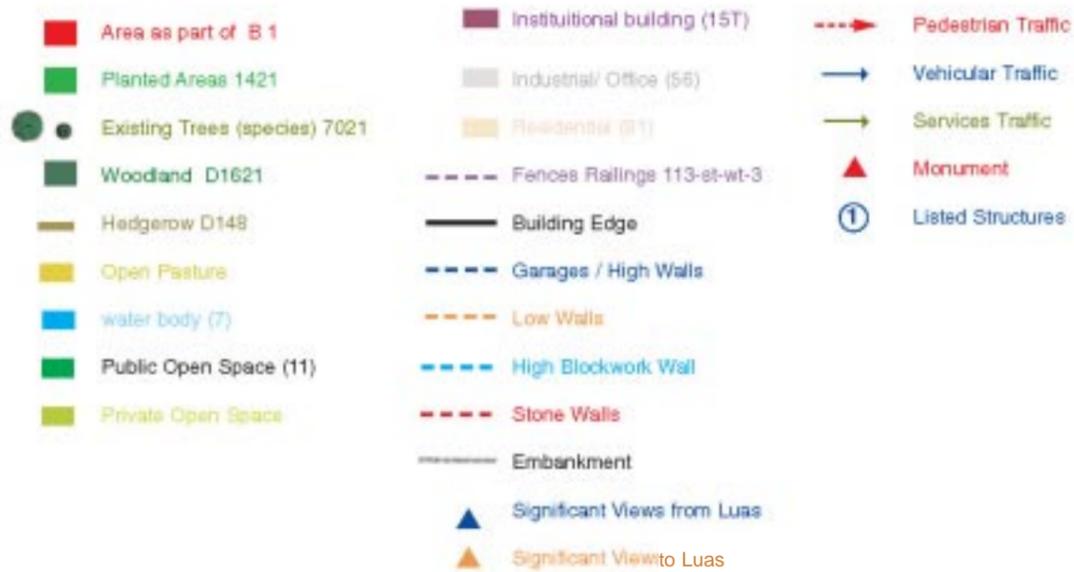






| Map 3 Property Acquisition | |
|--|-------------------------|
|  | Property to be acquired |
|  | Luas Line B1 Alignment |
|  | Luas Stop |
| Note | |
| For precise information on property acquisition see property drawings attached to Railway Order Application. Map identifies significant and permanent acquisition only. | |

urban analysis
Ballyogan Road (Murphystown Parallel Access Road) to the Gallops Stop



urban analysis
The Gallops Stop to Leopardstown Valley Stop



urban analysis
Leopardstown Valley Stop to Ballyogan Wood

