

DART+ West

OPTION SELECTION REPORT

VOLUME 1: PREFERRED OPTION REPORT

July 2021



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Executive Summary

This document is Volume 1 of four volumes of the Option Selection Report (OSR) for the DART+ West project prepared in advance of the second stage of non-statutory public consultation. Volume 1 of the OSR presents the following:

- Introductory description of the DART+ Programme and the DART+ West project
- High level description of the public consultation process and the outcome of non-statutory public consultation no.1
- Description of the Options Selection Report and the options selection process
- Description of the Preferred Option for the DART+ West project.

The DART+ Programme is a transformative programme of projects that aims to modernise and improve existing rail services in the Greater Dublin Area (GDA). It will provide a sustainable, electrified, reliable and more frequent rail service, improving capacity on rail corridors serving Dublin.

The first project of the DART+ Programme to be delivered will be DART+ West. The DART+ West project is seeking to significantly increase rail capacity on the Maynooth & M3 Parkway lines. This can be achieved by changing to electrified, high-capacity DART trains and increasing the frequency of trains.



Increase passenger capacity from 5,000 to 13,200 passengers per hour per direction on the Maynooth Line



Figure 1-1 provides a schematic layout of the proposed DART+ West. The principal project components are as follows:

- Re-signalling, electrification and Telecommunications (SET)
- Overhead line equipment (OHLE)
- Structural alterations and new structures
- Linear railway permanent way works
- Level crossing replacement works
- Station alterations and a new station
- New depot and associated access
- Substations and technical buildings
- Construction and permanent compounds.

The electrification of the rail line will predominantly follow the existing railway corridor. Interventions outside of Iarnród Éireann lands will be required at a number of locations for some of the scheme elements such as:

- Roadworks and structures associated with level crossings removals
- Track realignment at Jackson's Bridge and associated roadworks
- The proposed depot including trackwork and roadworks
- The proposed Spencer Dock Station
- The construction of substations (to facilitate the provision of power to the line)
- The use of land for temporary construction / storage compounds and all ancillary works required for the project.

It is intended that this document will be published as part of the second stage of non-statutory public consultation. It is proposed that all supporting information will be made available with it.

On completion of the non-statutory public consultation, the public submissions received following the consultation period will be considered in further development of the design of the preferred option for publication as part of the statutory process for planning.

Preferred Option Report

1. Introduction to the DART+ Programme

The current DART network is 50 km long, extending from Malahide/ Howth to Greystones. The DART+ Programme will increase the length of the DART network to 150 km of railway corridor through the electrification and upgrade of existing lines transforming commuter rail travel in the Greater Dublin Area (GDA).

The DART+ Programme also includes the purchase of new train fleet. The DART+ Programme will deliver frequent, modern, electrified services from Dublin City Centre (Connolly & Spencer Dock) to:

- Maynooth, M3 Parkway
- Hazelhatch & Celbridge
- Drogheda
- Greystones.

The DART+ Programme is a key transportation improvement to form a high quality and integrated public transport system. It will have benefits for the residents of the Greater Dublin Area and also those living in the other regions. It will assist in providing a sustainable transport system and a societal benefit for current and future generations.

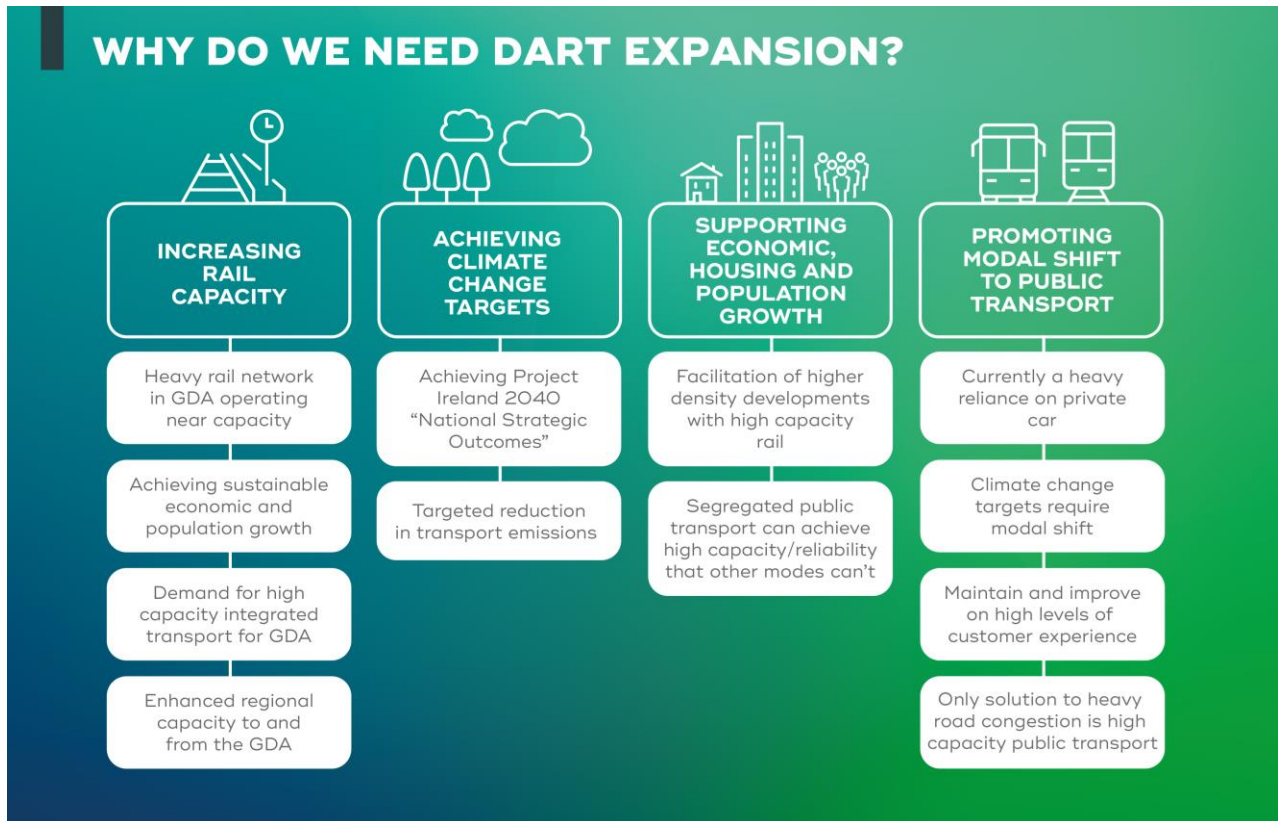
The DART+ Programme will seek to maximise use of the existing railway corridors and implement a modernisation programme to achieve the capacity increase necessary to meet current and future demands.

1.1. DART+ Programme Objectives

The DART+ Programme's primary objective is to support urban compact growth and contribute to reducing transport congestion and emissions in the Dublin region by enhancing the heavy rail network between Dublin City Centre and the areas of Drogheda, Maynooth, Dunboyne, Celbridge and Greystones, providing a sustainable, safe, efficient, integrated, and accessible public transport service along these corridors.

Sub-objectives of the DART+ Programme include the following:

- Cater for existing heavy rail travel demand and support long-term patronage growth along established rail corridors in the Greater Dublin Area through the provision of a higher frequency, higher capacity, electrified heavy rail service which supports sustainable economic development and population growth
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved inter-rail and inter-modal connectivity and integration with other public transport services
- Enable further urban compact growth along existing rail corridors, unlock regeneration opportunities and more effective use of land in the Greater Dublin Area, for present and future generations, through the provision of a higher capacity heavy rail network
- Deliver an efficient, sustainable, low carbon and climate resilient heavy rail network, which contributes to a reduction in congestion on the road network in the Greater Dublin Area and which supports the advancement of Ireland's transition to a low emissions transport system and delivery of Ireland's emission reduction targets
- Provide a higher standard of customer experience including provision of clean, safe, modern vehicles and a reliable and punctual service with regulated and integrated fares.



1.2. DART+ West Overview

The first project of the DART+ Programme to be delivered will be DART+ West.

The DART+ West project is seeking to significantly increase rail capacity on the Maynooth & M3 Parkway lines. This can be achieved by changing to electrified, high-capacity DART trains and increasing the frequency of trains. The DART+ West project will increase passenger capacity from approximately 5,000 to 13,200 passenger per hour, by utilising new DART trains and lengthening existing diesel trains, operating at increased service frequency (i.e. 6 existing to 12 proposed trains per hour). The capacity projections have been amended since public consultation no.1, based on more detailed railway operating modelling.

Delivery of this project will support existing communities along the railway and support future sustainable development. It will serve all existing stations along the railway corridor between Maynooth Station and M3 Parkway Station to Connolly Station and a proposed Spencer Dock Station using electrical power with lower carbon footprint than associated with the existing diesel trains. The frequency and quality of service will provide a viable transport alternative to communities along the route and help encourage people to migrate from private car use. This will assist Ireland in reducing greenhouse gas emissions from transport and help combat climate change.

The electrification of the rail line will predominantly follow the existing railway corridor. Interventions outside of Iarnród Éireann lands will be required at a number of locations for some of the scheme elements such as:

- Level crossing replacements
- Proposed depot, including rail and road realignment
- Proposed new Spencer Dock Station
- Construction of substations (to facilitate the provision of power to the line)

- Use of land for temporary construction/storage compounds and all ancillary works required for the project.

Figure 1-1 overleaf provides a schematic layout of the proposed DART+ West.

Benefits of DART+ West



Increase peak passenger capacity from 5,000 to 13,200 passengers per hour per direction and increase train frequency between Maynooth and M3 Parkway and Dublin City Centre – facilitating fast, frequent, and reliable transport to the surrounding communities.



Enhance public transport opportunities for work, education, or leisure purposes.



Facilitate the development and future growth of existing and new communities that will greatly benefit from the connectivity that DART+ West project will deliver.



Alleviate road congestion, particularly at the level crossings.



Build a sustainable and connected city region, supporting the transition to a low carbon and climate resilient society.



Facilitate people to make sustainable travel choices by encouraging a move away from private cars to a reliable, efficient and safe public transport network.



Improve multimodal transport connectivity through interchange with the Luas at Broombridge and proposed Spencer Dock Station and with the proposed Metrolink at Glasnevin/Phibsborough.



Improve journey time reliability.

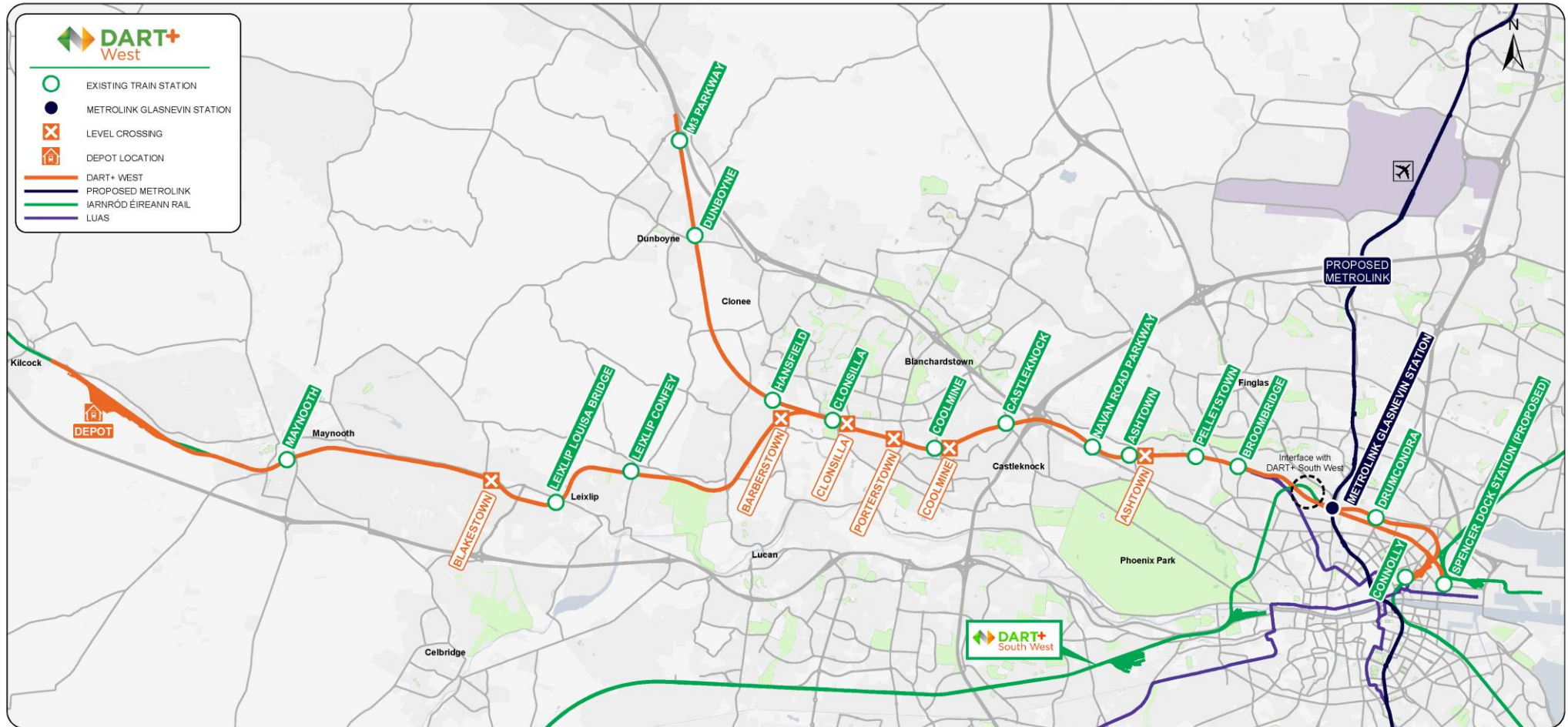


Figure 1-1 Schematic of DART+ West

2. Purpose of the Report

2.1. DART+ West Public Consultation Process

Stakeholder engagement and consultation during the design process is a key element to the delivery of major infrastructure projects such as the DART+ West project. The purpose of the consultations is to engage the public in the scheme's delivery process, inform the public of the statutory process and likely timescales, seek the public's cooperation and understanding of the project and to capture local knowledge to inform the design, Environmental Impact Assessment (EIA) and railway order (RO) process.

Public participation is welcomed and encouraged throughout the design development process. For DART+ West, it is planned that there will be three main project consultation stages which provide the opportunity to learn about the design development and provide feedback which will inform the next stage as appropriate. The main public participation stages in the project development are illustrated below:

- Non-Statutory Public Consultation No. 1 emerging preferred option (August 2020).
- Non-Statutory Public Consultation No. 2 preferred option (Current stage).
- Statutory Consultation Period as part of the Railway Order application process.

2.2. Status of the Design Presented in this Report

2.2.1. Public Consultation No. 1 – Emerging Preferred Option

Non-Statutory public consultation no. 1 commenced on 26th August 2020 and was concluded on 21st October 2020.

All submissions received either via post, telephone communication, online form feedback or email were analysed. The issues, comments and suggestions were logged and considered by the design teams as appropriate. A summary of key issues or concerns raised during public consultation no. 1 are described in the Public Consultation no. 1 Findings Report, Annex 6.1 to the OSR (Volume 4).

The purpose of public consultation no.1 was to inform the public of the developing design at the emerging preferred option stage for the DART+ West project and to request their views. All submissions received as part of the first round of consultations have fed into the design process and the selection of the preferred option. The project team has analysed the submissions and considered all relevant information in re-evaluation and further development of design options leading to the selection of the preferred option.

As part of this analysis the following items or options were identified as requiring further examination and have been considered in the options assessment process:

- General: Consider the methods of advertisement of the consultation event to the public to maximise the reach of the notification.
- Ashtown: Consider CCTV provision to address the security and safety concerns at the proposed underbridge.
- Ashtown: Consider an alternative solution for the set down area at Ashtown Train Station at Martin Savage Park (further design development of the emerging preferred option).
- Ashtown and Coolmine: Consider universal access options at Coolmine and Ashtown Stations as part of the DART+ West project due to the closure of the level crossings which were previously used for access (In-station accessibility MCA – Volume 2, Chapter 9).
- Coolmine: Consider an option that does not provide any new road traffic bridge but does provide for all non-motorised users.

- Coolmine: Further investigate the possibility of improving the signalling at the level crossing to avoid the requirement for the closure of the level crossing.
- Coolmine: Consider an option along the alignment of the existing Coolmine Road that incorporates a drop lock and the removal and reconstruction of the protected Kirkpatrick canal bridge.

2.2.2. Principal Changes to Preferred Option Following Public Consultation No.1

Having completed public consultation no.1, contributions from the public led to a number of design changes which are evident in the preferred option to be presented as part of public consultation no.2. The principal changes include the following:

- At Ashtown, in addition to the proposed road bridge, a pedestrian bridge with lifts is proposed to be constructed at the station for mobility impaired persons. The bridge and lifts will be accessible to the public, not just to station passengers.
- At Ashtown, the existing Ashtown Road south of the railway is to be reconfigured as a high amenity urban space.
- At Coolmine, the proposed road bridge at St Mochta's Green and Riverwood Court is no longer preferred. Instead, a pedestrian / cycle bridge is proposed at the location of the level crossing suitable for all non-motorised users and the local road network will be upgraded to accommodate road traffic diverted away from the level crossing.
- At Coolmine, it is proposed to construct a pedestrian bridge with lifts in the station to accommodate mobility impaired users.
- To the west of Maynooth, in the environs of Jackson's Bridge, it is proposed to construct a new section of railway parallel to and south of the existing railway at Jackson's Bridge, leaving the heritage bridge unaffected by the project. The proposal will sever vehicular access over Jackson's Bridge and it is proposed to divert motorised vehicles west to a proposed new crossing of the railway and the canal at the location of the depot. It is proposed that pedestrians and cycles will continue to use Jackson's Bridge and access for them will be facilitated under the railway along the approximate alignment of the existing local road.

2.2.3. Public Consultation No. 2 – The Preferred Option

A period of public and stakeholder consultation and engagement will be undertaken on the preferred option (presented in this report). As part of the consultation process the public will be invited to make submissions and observations on the preferred option which will be considered by the design team. Thereafter, submissions will be reviewed, and the design of the preferred option will be advanced in preparation for statutory processes. Initial designs will be further refined and developed taking on board any new feedback received during the consultation process.

The design development of the preferred option will inform the preparation of the Environmental Impact Assessment (EIA) and an Appropriate Assessment (AA). This process will culminate with the publication of an Environmental Impact Assessment Report (EIAR) and an Appropriate Assessment Screening Report (and Natura Impact Statement if screened in) that will be submitted as part of documentation required for the railway order approvals process.

2.2.4. Statutory Consultations

As part of the statutory processes for the project a railway order application will be submitted to An Bord Pleanála. At the time of the submission of the railway order application, an advertisement will be placed in at least one national newspaper to notify the public of the railway order application. There will be a period of 6 weeks for submissions to be made to An Bord Pleanála. The Board may decide to hold an Oral Hearing.

2.2.5. Purpose of the Option Selection Report

At the time of launch of public consultation no.1 in August 2020 a Preliminary Option Selection Report was published which identified an “emerging preferred option”. This report presented the early project design work undertaken at that stage of design development. This document was preliminary and has been superseded by the Option Selection Report (OSR). This Option Selection Report reflects consideration of the feedback received at public consultation no.1, information received from surveys and investigations, further design development and re-evaluation of the design options.

The OSR is presented in four Volumes, listed below:

- **OSR – Volume 1: Preferred Option Report** (this document) - presents a summary of the preferred option consequent on the options assessment process and a description of the public consultation process
- **OSR – Volume 2: Technical Report** - contains the technical detail, supporting information, assessments and recommendations identifying the preferred option for the project
- **OSR – Volume 3: Drawings** - contains the drawings of the options considered, key environmental constraints and the drawings of the preferred option
- **OSR – Volume 4: Annexes** - contain information additional to the OSR Technical Report, and some previous studies used in identification of the preferred option.

The principal project components are set out in Volume 2 of this report and are as follows:

- Re-signalling, electrification and telecommunications (SET)
- Overhead line equipment (OHLE)
- Structural alterations and new structures
- Linear permanent way works
- Level crossing replacement works
- Station alterations and a new station
- New depot and access
- Substations and technical buildings
- Construction phase and permanent compounds.

The project can be characterised as one which provides for enhancement of existing railway infrastructure over the 40 km length of the scheme with the installation of electrical and signalling technology. A number of discrete elements of the scheme extend beyond the boundary of the existing railway such as the proposed depot, the level crossing roadworks and the proposed station at Spencer Dock. Alternatives in respect of many of the longitudinal works vary little from an environmental perspective and consequently the options assessment for the likes of signalling systems, for example, is largely a technical matter rather than an issue of environmental impact.

While presenting a description of the preferred option, the OSR has been drafted with a focus on those elements for which alternative options manifest, options which are markedly different from one another, and which have varied impact on the local environment. Examples of such include options for level crossing removals, options for capacity enhancement in the Docklands area, and options for the location of buildings and compounds.

The OSR identifies the key constraints relevant to the various components of the project within the respective study areas, to develop feasible options for each aspect and documents the Multi-Criteria Analysis (MCA) process of the options leading to the selection of the preferred option for the DART+ West project.

This volume of the report has been divided into sections describing the preferred option for the project in an east to west direction, as follows:

1. City Centre Enhancements (Connolly Station, and the proposed new Spencer Dock Station)
2. City Centre to Phibsborough / Glasnevin
3. Phibsborough / Glasnevin to Clonsilla Station
4. Clonsilla Station to M3 Parkway
5. Clonsilla Station to Maynooth depot.

It summarises the outcome of the options selection process for the principal elements of the project. Given the largely online nature of much of the project, some elements have greater impact beyond the core railway corridor than others and require more extensive options assessment such as the infrastructure proposals necessary to replace level crossings. The end-to-end Preferred Route is illustrated in the Layout Figures included in **Annex 1.0** to this document and will assist the reader in understanding the final preferred option for the project.

This OSR Preferred Option Report provides a statement of the preferred option, the selection of which is addressed in detail in the chapters of Volume 2 of the Options Selection Report.

2.2.6. Options Assessment Process

This report presents the outcome of the optioneering process, which has followed a structured and systematic approach to determine the preferred option for the project in an objective manner. The process followed is a Multi-Criteria Analysis (MCA) technique, as recommended by the Common Appraisal Framework (CAF) Guidelines for Transport Projects and Programmes, published by the Department of Transport (2020).

The MCA process provides a coherent mechanism for choosing between options on a comparative basis. Each option is characterised under six principal categories as defined within the CAF and compared on a qualitative basis. The principles of the process apply to all options assessment for the project. The mechanism allows for an objective approach to be taken to selection of the most suitable option to be advanced for the project. A summary of the MCA process is presented in **Chapter 4 of Volume 2** of the OSR, as has the application of the comparative assessment methodology when appraised against the Project Objectives. Aspects of the process which are particular to individual elements of the project are detailed in each individual Chapter of Volume 2, and should be referred to when reviewing the respective options assessment results. In a number of cases this detailed methodology has been appended to the OSR in an attempt to present a more concise document for public consumption.

3. General Works Required End-to-End

3.1. Introduction

Chapters 3 to 7 of this document set out a description of the preferred option for the DART+ West project from end-to-end progressing in sections from east to west. Given that much of the general linear works manifest along the full extent of the scheme, these elements are described first in Chapter 3 to avoid the need for repetition. In addition, elements of the scheme which, although arising at discrete locations throughout the scheme, are proposed to be provided with common treatment are described in Chapter 3.

A significant characteristic of the proposed DART+ West project is that much of the associated works can be implemented on the existing railway infrastructure and within CIE property. Where it is necessary to carry out works outside the operational railway and in third party lands the locations are discrete and localised.

Table 3-1 provides a list of Schematic Layout Sheets included in **Annex 1.0** together with an indication of the locations addressed by each sheet.

Table 3-1 Proposed Temporary Construction Compound Locations

Schematic Layout Sheet Number	Locations Included
Sheet 1 of 39	Docklands to Connolly
Sheet 2 of 39	Newcomen to Croke Park
Sheet 3 of 39	Drumcondra to Glasnevin
Sheet 4 of 39	Glasnevin to Cabra
Sheet 5 of 39	Cabra to Broombridge
Sheet 6 of 39	Broombridge to Pelletstown
Sheet 7 of 39	Pelletstown to Ashtown
Sheet 8 of 39	Ashtown to Navan Road Parkway
Sheet 9 of 39	Navan Road Parkway to M50
Sheet 10 of 39	M50 to Castleknock
Sheet 11 of 39	Castleknock to Coolmine
Sheet 12 of 39	Coolmine Station
Sheet 13 of 39	Porterstown
Sheet 14 of 39	Clonsilla Station
Sheet 15 of 39	Barberstown/Hansfield
Sheet 16 of 39	Hilltown (R149)
Sheet 17 of 39	Hilltown (L2222 Stirling Road)
Sheet 18 of 39	Dunboyne (South)
Sheet 19 of 39	Dunboyne Station
Sheet 20 of 39	Dunboyne (North)
Sheet 21 of 39	M3 Parkway Station
Sheet 22 of 39	Clonsilla to Barberstown
Sheet 23 of 39	Barberstown/Westmanstown
Sheet 24 of 39	Westmanstown (Collins Bridge)
Sheet 25 of 39	Westmanstown to Leixlip
Sheet 26 of 39	Leixlip Confey Station

Schematic Layout Sheet Number	Locations Included
Sheet 27 of 39	Leixlip Confey Station to Louisa Bridge Station
Sheet 28 of 39	Louisa Bridge Station
Sheet 29 of 39	Leixlip East (R449)
Sheet 30 of 39	Blakestown
Sheet 31 of 39	Blakestown to Pikes Bridge
Sheet 32 of 39	Rail Park (Maynooth East)
Sheet 33 of 39	Maynooth East
Sheet 34 of 39	Maynooth Station
Sheet 35 of 39	Maynooth West
Sheet 36 of 39	Maynooth West (DART+ West Maynooth depot/Jacksons Bridge)
Sheet 37 of 39	DART+ West Maynooth depot and L5041
Sheet 38 of 39	DART+ West Maynooth depot
Sheet 39 of 39	DART+ West Maynooth depot West

3.2. General Linear Works

A number of elements of the works will be common to all sections of the project. In order to avoid repetition the following is a summary of these general linear works elements required along the full length of the project to enable the electrification of the line and the upgrade of the existing network:

- Overhead Line Equipment (OHLE) will be required to provide electrical power to the network's new electrified train fleet. This will be similar in style to that currently used on the DART network
- Signalling upgrades and additional signalling furniture will be required to the upgraded infrastructure to allow the delivery of the proposed train service specification. Signalling infrastructure will include the associated low voltage power supply and tele-communications
- Ancillary equipment cabins associated with electrical, signalling and telecommunications infrastructure
- Improvements to boundary walls and fencing to ensure public safety is maintained after the electrification of the line. This will require increasing the height of walls at some locations to provide the necessary protection and physical segregation between public areas and the railway corridor
- Alterations to railway tracks, including minor realignment and track lowering will be required at locations to ensure sufficient space for the overhead electrical lines
- Utility diversions are required to accommodate new and upgraded infrastructure. Vegetation management and other ancillary works are also anticipated along the length of the project.

For more detail refer to **OSR Volume 2: Chapters 5 and 7**.

3.2.1. Overhead Electrification Equipment

The new DART trains will be electrically powered using 1500 V direct current from overhead wires and associated support wires. The appearance of the proposed infrastructure will be similar to that used on the existing DART as shown in **Figure 3-1**. There are typically four longitudinal wires for each track. In order to carry the wires, structural steel supports are necessary. A typical steel mast support has been selected and is illustrated in **Figure 3-2**. Masts will typically rise to between 6.0 m and 8.5 m above rail level. It is anticipated they will be located at spacings of between 40 m and 50 m along the railway.



Figure 3-1 Sample DART OHLE Equipment

In particular instances where space is constrained variants on the steel supports are envisaged which are of a similar type. The different support configurations are illustrated by location on the Layout Figures appended to this document. Drawings located in Volume 3 of the OSR indicate the layout of the OHLE elements and their supporting structures (cantilevers, portals, etc.) in greater detail.

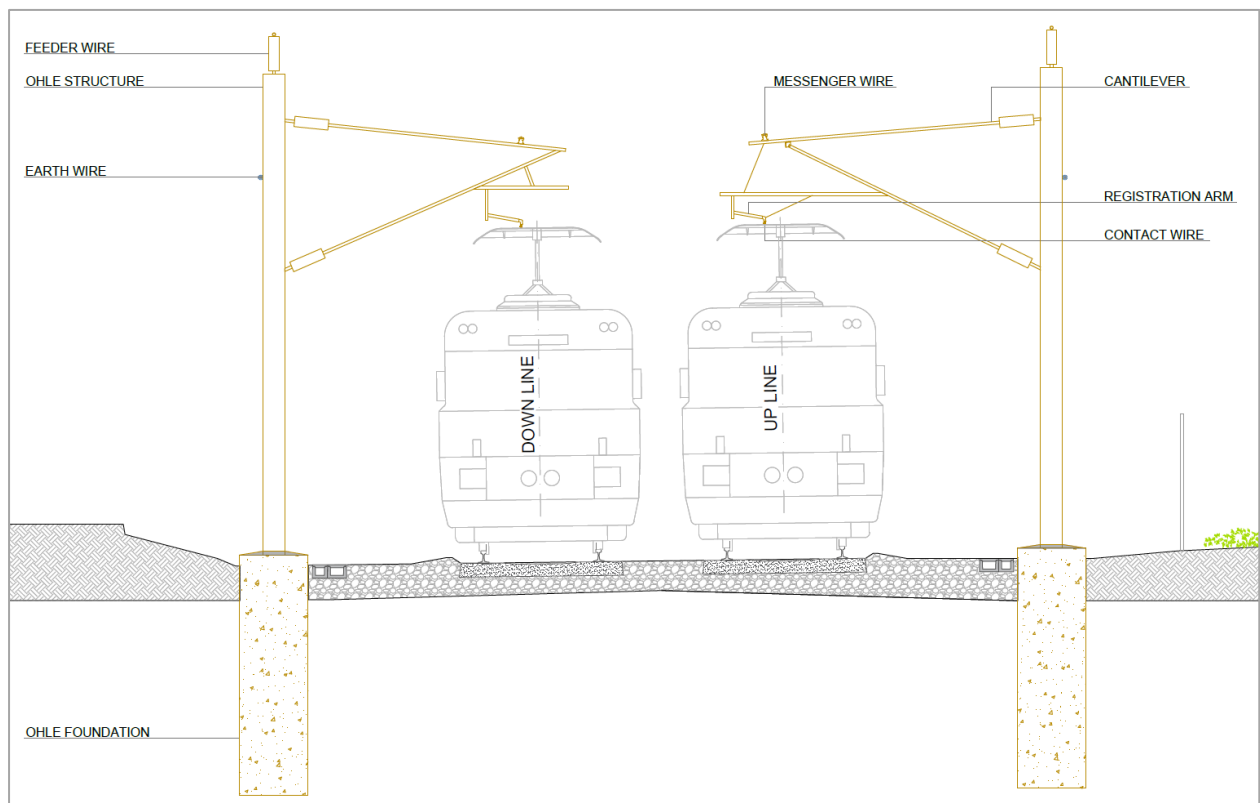


Figure 3-2 Single Track Cantilever layout

3.2.2. Signalling

The existing railway incorporates signalling infrastructure along its length in the form of underground cables, track level sensors and switches, and visible signals on posts or gantries which communicate instruction to the train drivers along the route. As part of the DART+ West project it is intended to replace the existing signalling system with modern technology which will serve the more frequent train service. The proposed

signalling system will incorporate similar components to those already in use. Sample posts and gantries and signal boxes are shown in Figure 3-3. **Chapter 5 of Volume 2** of the OSR shows the typical signal forms and location cases, and there is an assessment of where it is envisioned that some structures (gantries, cantilevers) will be required to support areas with higher signal density.



Figure 3-3 Sample DART+ West Signalling Infrastructure

Portal gantries will only be used in stations or in areas with more than two tracks such as in Connolly Station and in the Docklands area.

Telecommunications for a rail project are critical to ensure all train movements are managed and regulated in a safe manner. This is an absolute project requirement to ensure the safety to all passengers using rail services and governed by strict legislation, guidelines and standards. The telecommunications provide a link between the remote signalman, the lineside signal / communications infrastructure and the train driver. The telecommunications infrastructure includes underground cabling, lineside telecom location cases similar to the sample shown in **Figure 3-3** and localised building infrastructure. The telecommunications system also controls station infrastructure, such as cameras, telephones, loudspeakers, public information displays for trains, etc. The details of the telecommunications buildings are described as part of the proposed linear works.

3.2.3. Electrical Substations

Electrical power will be supplied to the DART+ West project at electrical substation buildings located at intervals along the line. A total of twelve electrical substations are necessary along the DART+ West route corridor. Electrical power from the ESB network will be supplied to the DART+ West substations and it will be converted to 1,500 V direct current to power the overhead line electrical system. Electrical sub-station buildings are approximately 5.0 m high x 30 m long x 10 m wide. The substations will be located within a secure compound, behind palisade fencing for security purposes. Where practicable, the DART+ West project has sought to locate the sub-stations within CIÉ owned lands. They will have appearance similar to that shown in the image in Figure 3-4. For further detail, refer to **Chapter 5 of Volume 2** of the OSR, and for the location of individual the substations see the Layout Figures included in **Annex 1.0** of this volume in addition to the sectional description of the preferred option provided below.



Figure 3-4 Sample Electrical Substation

3.2.4. Ancillary Equipment Cabins

There are a number of equipment cabins which are required to support the signalling, electrical and telecommunication infrastructure. These will be located within existing Iarnród Éireann land where possible and will be typically in stations where similar cabins are currently evident.

The various cabins required along the works are:

- Signalling Equipment Rooms (SER)
- Principal Supply Points (PSP)
- Telecommunication Equipment Rooms (TER).



Figure 3-5 Sample Cabins

The cabins are typically fenced off as they need to be secure. A sample set of cabins is shown in **Figure 3-5**. The sites of equipment cabins are indicated on the Layout Figures contained in **Annex 1.0**. For further details, refer to **Chapter 5 of Volume 2 of the OSR**.

3.3. Permanent Way Requirements

3.3.1. Trackwork Alterations

It is proposed to alter the existing track alignment where necessary to ensure there is sufficient space to fit the electrical infrastructure under bridges along the route and, in some instances, to improve the track alignment in accordance with current standards. The alterations typically include lowering sections of the railway marginally and altering the associated drainage and utilities equivalently. The alterations apply to lengths of up to 1 km. They are shown in plan on the Layout Figures contained in **Annex 1.0**. Detailed consideration of trackwork alterations is provided in **Chapter 7 of OSR Volume 2**.

3.3.2. Interventions at Bridges to Obtain Necessary Height

Sufficient height at bridges is a critical project requirement for DART+ West, as there needs to be sufficient space between the roof of trains and the underside of the bridge to accommodate the new overhead electrification system. There are a number of locations where space is insufficient and interventions are necessary. Alternative design solutions have been selected including the following:

1. Provision of specialist electrical solutions

2. Lowering of the rail track with measures to protect against flooding and to ensure rail stability
3. Modification of an existing bridge
4. Replacement of access over an existing bridge with equivalent access over a proposed new bridge with appropriate architectural consideration
5. Realignment of the rail corridor to avoid a bridge; or
6. A combination of the above.

There are a number of locations along the scheme where structural interventions are required. These are:

- Modification of an existing flat deck bridge by raising the existing bridge deck by between 200 mm and 320 mm. This solution is proposed at Old Navan Road Bridge, and Louisa Bridge;
- Modification of an existing arch bridge with replacement precast arch to a higher profile and altering the spandrel and parapet walls. This applies at Broombridge, Castleknock railway bridge and Leixlip Confey Station railway bridge.

The above text deals with bridge modifications and bridge reconstructions but does not address the new rail alignment adjacent to Jackson's Bridge. Where replacement access or track realignment is proposed, it is addressed in the sectional description of the preferred option presented in **Chapters 4 to 7** below. Detailed consideration of interventions at bridges is provided in **Chapter 6 of OSR Volume 2**.

3.3.3. Level Crossing Removals

There are a number of existing level crossings along the route. These are located at (east to west) Ashtown, Coolmine, Porterstown, Clonsilla, Barberstown and Blakestown. The level crossings constrain railway capacity due to the need to share the interface with cars, pedestrians and cyclists. In order to achieve the project objectives for rail passenger service increases it is not viable to retain the level crossings in their current form or with enhancements. The permanent removal of the level crossings is necessary to achieve the increased train frequency.

The removal of the level crossings will improve train efficiencies, will enhance safety, and will remove the delays caused by the road / rail interface. Their closure will also remove the periodic blockages on the road system, which are currently very pronounced, especially in the morning and evening peak commuter periods (for example Coolmine level crossing is closed for approximately 40 minutes between 08.00-09.00 each weekday).

On removal of the level crossings, the boundary of the railway will be secured with palisade fencing 2.4 m high and with gates which will allow Iarnród Éireann maintenance access to the railway.

Where existing usage patterns of the level crossings exhibit significant activity, alternative equivalent access is proposed in the form of bridges and roadworks. Infrastructural proposals in respect of each of the level crossing locations is included in the sectional descriptions of the preferred option; See **Chapters 4 to 7**. Detailed consideration of options in respect of the level crossing removals is provided in **Chapter 8 of OSR Volume 2**.

3.3.4. Ancillary Works

With the installation of electrified lines, interventions will be necessary at structures along the length of the scheme to provide protection from accidental or deliberate interference. Boundary walls along the railway will need to be raised to remove the risk of the public coming into contact with the electrification equipment, for example along the Royal Canal at Whitworth Road. Parapet walls on bridges crossing the railway will have to be raised in height to a minimum of 1.8 m above adjacent pavement level.

3.3.5. Utilities Diversion

Existing utilities such as watermains, electricity cables, telecommunications cables and gas mains, both underground and above ground will require temporary and permanent diversion to accommodate the scheme. This will typically involve the relocation of the existing services along diverted routes to make space for the new infrastructure.

3.3.6. Compounds

A number of temporary construction compounds and permanent maintenance compounds are required along the length of the project. These are discussed in detail in **Chapter 11 of OSR Volume 2**.

Temporary Construction Compounds

Temporary construction compounds are generally located adjacent to the site of individual elements of infrastructure that are being constructed, for example at the depot or where major bridge or station works are required. It is envisaged that these compounds will only be in place during the construction phase of the project. Their locations are summarised in **Table 3-2** below and are shown on the Layout Figures in **Annex 1.0**.

Table 3-2 Proposed Temporary Construction Compound Locations

Function	Locations
Multi-disciplinary	Docklands, Castleknock, Blakestown, Millfarm, Depot, Dunboyne, M3 Parkway
Stations	Connolly, Ashtown, Coolmine
SET	Cabra Road, Reilly's bridge and Reilly's bridge complementary, Navan Road Parkway, Barberstown,
Permanent Way	Connolly, Glasnevin, Clonsilla, OBG13 Collins bridge, OBG18 Pike bridge and OBCN286 Barnhill bridge
Structures	OBG5 Broombridge, OBG9 Old Navan Road bridge, OBG14 Bridge adjacent to Leixlip Confey Station, OBG16 Louisa bridge; New UBG22A, UBG22B and UBG22C; and New OBG23A
Level crossing	Ashtown, Coolmine, Porterstown, Clonsilla, Barberstown
Substation	Glasnevin, Ashtown, Coolmine, Leixlip Confey, Maynooth, Hansfield

Operational Phase Maintenance Facilities

In addition to the existing maintenance compounds along the route, new operational phase maintenance facilities have been identified to support the project. An additional facility is proposed at the Navan Road Parkway Station. The Navan Road Parkway Station maintenance facility will be located immediately south of the railway and to the west of the station. The maintenance facility will include a two-storey building with a floor plan of approximately 7.5 m high x 42.5 m long x 9.8 m wide (subject to further design development) and will include provision for staff parking. The maintenance facility will be located within a secure compound accessed via the existing station access roadway.

The extension of the proposed DART+ West line to the proposed Spencer Dock station requires the demolition of several existing industrial railway buildings including an existing maintenance facility which is currently located immediately east of the existing Docklands Station. It is proposed that the existing maintenance facility will be moved further east to a site within the Docklands area adjacent to East Wall Road. The area between the existing Docklands station and the extension of the railway alignment into the proposed Spencer Dock station is to be utilised as a construction compound during the construction phase and permanent compound during the operational phase. The proposed extension of the railway will sever

the access to this area. To provide permanent access a new access ramp will be provided from Sheriff Street Upper to serve both the construction and operational phases.

4. City Centre Enhancements

4.1. General Description

The primary aim of the DART+ West project is to facilitate the increase in train frequencies and to increase passenger capacity along the Maynooth and M3 Parkway lines to the City Centre. The increased train frequency associated with DART+ West, coupled with the existing railway traffic from other lines, cannot be accommodated solely within Connolly Station. Therefore, additional city centre capacity is required. The DART+ West project has considered a number of options for providing this additional city centre capacity. The preferred options at these locations that have emerged from the studies undertaken are identified below. Refer to **Annex 1.0: Layout Figures Sheet 1**.

4.2. Spencer Dock Station

The preferred option to provide additional capacity in the city centre is the construction of a proposed station at Spencer Dock. This new station will represent a significant enhancement to the Dublin Docklands area, securing interchange with Luas, and local bus services and being embedded in the heart of the Dublin Docklands Area. The proposed station configuration provides good integration with the surrounding buildings by aligning the platforms of the station to the North Lotts planning scheme gridlines. Due to space constraints, it is necessary that the station be lowered below the existing ground level in the vicinity of the existing Spencer Dock Luas stop by approximately 7.0 m. At the north end of the station the track alignment is lowered by approximately 3.5 m below adjacent ground level. In passing under Sheriff Street, it will be necessary to reconstruct two spans of the Sheriff Street Upper Bridge. The proposed terminal station will have four platforms with lifts, stairs and escalators linking passengers to the surface streetscape. The proposed station is discussed further in **Chapter 9 of Volume 2** of the OSR. A plan on the proposed station is shown in Figure 4-1.

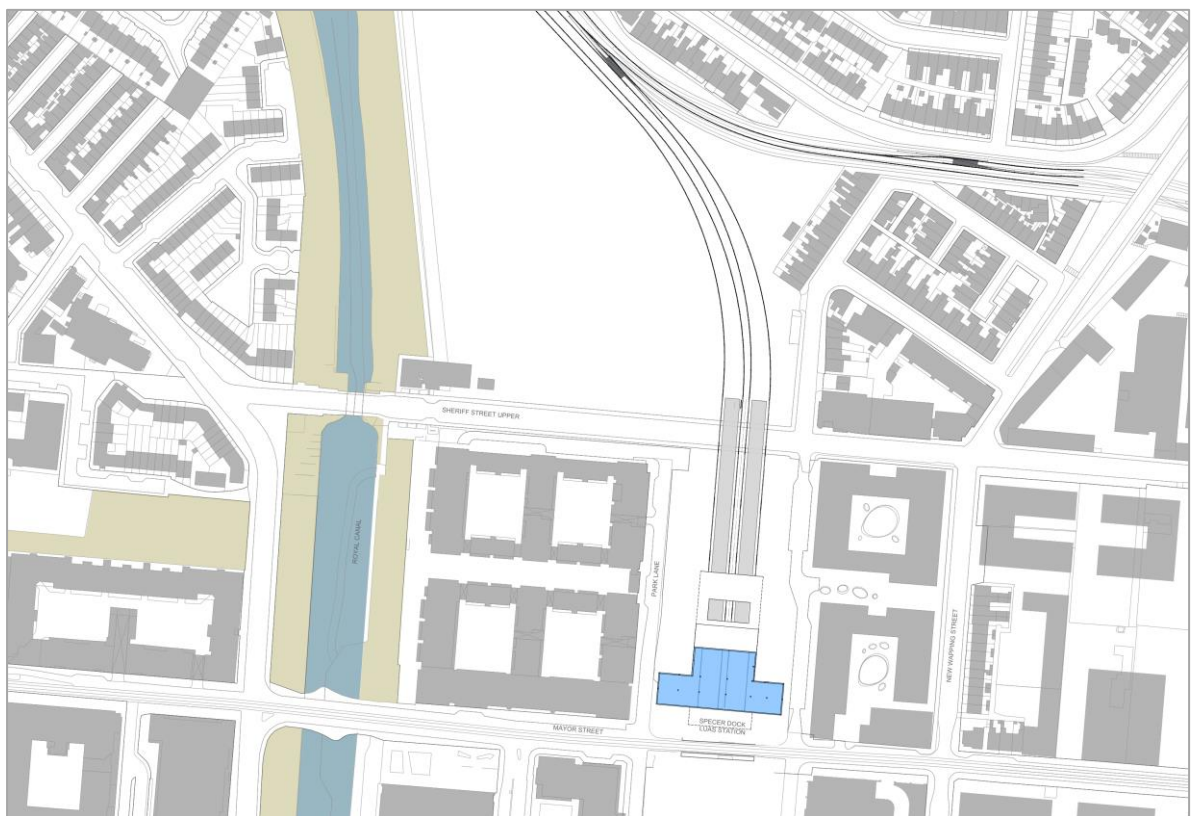


Figure 4-1 Spencer Dock (Docklands) Station preferred option: General layout

The new Spencer Dock Station will not preclude building development above the station in the future. Any future development is not associated with the DART+ West project and will need to consider the requirements of both the station and the land use policy when taken forward.

Figure 4-2 and **Figure 4-3** show graphic representations of the proposed station.

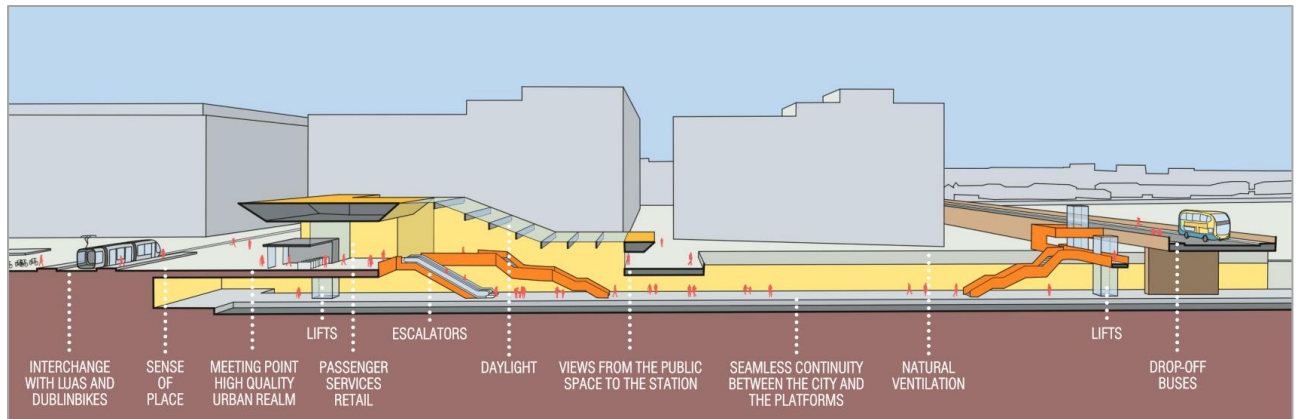


Figure 4-2 Graphic illustrating the Section and the Primary Elements of Spencer Dock Station



Figure 4-3 View of Proposed Entrance to Spencer Dock Station

4.3. Connolly Station

Two principal issues arise at Connolly Station in respect of the project. It will be necessary to provide additional access and egress capacity to the Loop Line bridge platforms (platforms 5, 6 and 7) to accommodate the increased passenger numbers which will be served by the project. In addition, it will be necessary to enhance the junction infrastructure immediately north of the station so it can accommodate the increased number of trains passing through.

4.3.1. Proposed Preston Street Entrance

In respect of passenger access and egress enhancements, the preferred option is to provide a new Connolly Station entrance from Amiens Street via Preston Street and through the existing undercroft arches beneath the station. This option requires refurbishment of an area of the existing undercroft vaults and the platforms themselves. Access from the undercroft to platform level will be by means of escalator, stair and lift centred on the existing island platforms.

An artistic impression of the proposed entrance is provided in Figure 4-4.

The platform level layout is shown in **Figure 4-5** with the proposed staircases, escalators and lifts outlined in plan. The escalators will be located below the existing canopies and consequently will have weatherproofed access to platform level. It is proposed that the staircases and lift will be enclosed within architectural glass canopies to provide protection from the weather.



Figure 4-4 Proposed Preston Street Entrance

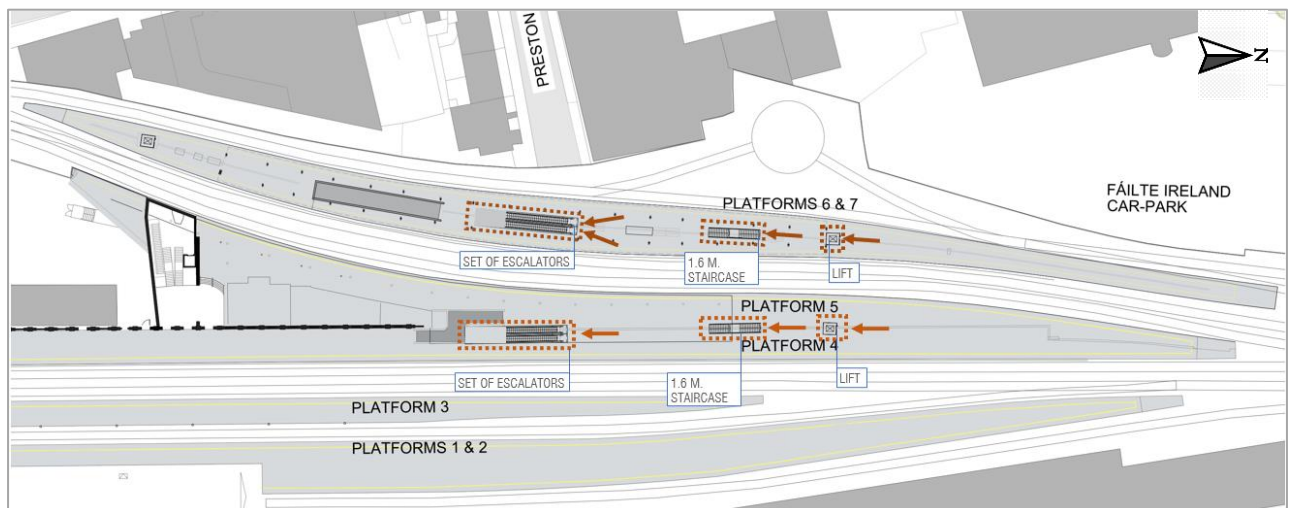


Figure 4-5 Connolly Station preferred option: Platform level

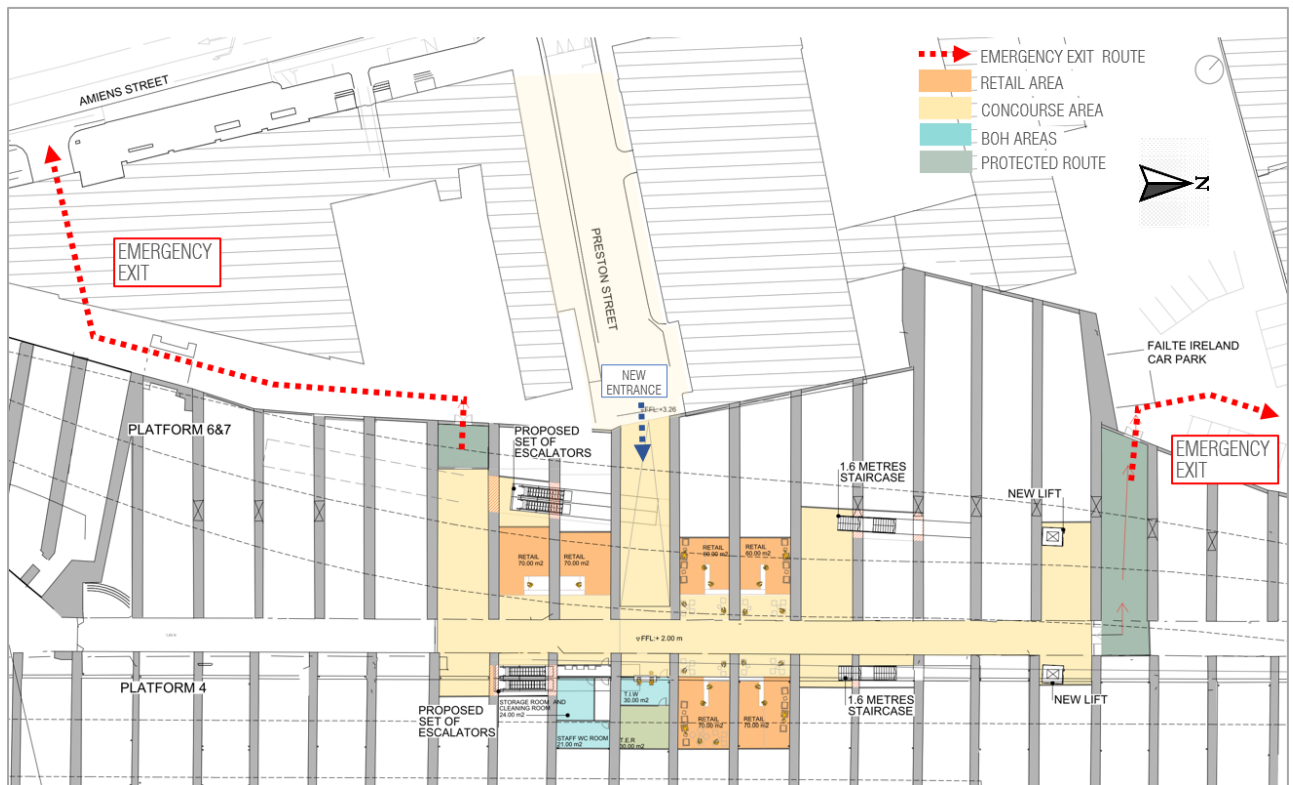


Figure 4-6 Connolly Station preferred option: Street Level

The incorporation of emergency exits has been accounted for in the development of the preferred option, and these are illustrated in the street level layout shown in **Figure 4-6**. Refer to **Chapter 9 of OSR Volume 2** for detailed consideration of interventions at Connolly Station.

The southernmost emergency egress is proposed to lead onto Amiens Street. The northernmost emergency egress is proposed to be through the existing Failte Ireland car park to Saville Place. The proposed Preston Street entrance will provide good intermodal connection with bus lines at Amiens Street.

4.3.2. Proposed Trackwork at Connolly Station

To facilitate the proposed increase in train frequency at Connolly Station it is proposed as part of the DART+ West project to modify the trackwork on the northern approach to the Station with additional crossovers and adjustments to track alignment. The modifications will also facilitate enhancement of operational flexibility at the Station.

Figure 4-7 shows the existing layout of tracks north of the station.

All alterations proposed as part of the project will be at the same level as existing track and will be constructed wholly within the boundary of the existing railway.



Figure 4-7 Existing Trackwork North of Connolly Station

Consequently, no land acquisition is envisaged for these works. Refer to **Chapter 7 of OSR Volume 2** for detailed consideration of permanent way interventions at the junction north of Connolly Station.

4.3.3. Docklands Substation

The preferred option for the location of the Docklands Substation is to the north of Sheriff Street and within the Iarnród Éireann North Wall Yard railway compound. Access to Docklands Substation will be provided from the existing entrance on Abercorn Road. The proposed location is within the existing CIÉ boundaries, therefore no additional land acquisition is envisaged. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Docklands substation.

4.3.4. City Centre to Phibsborough / Glasnevin

It is proposed that both of the existing railway lines between Connolly Station and Phibsborough / Glasnevin and between the proposed Spencer Dock Station and Phibsborough / Glasnevin will be electrified with the installation of overhead electrical equipment, associated infrastructural enhancements, re-signalling, telecommunications, electrical substations and ancillary works. Refer to **Annex 1.0: Layout Figures Sheets 1 to 3**.

There are a number of existing structures in this section where the space beneath the bridge is insufficient to allow the installation of a standard OHLE solution. At these locations, track lowering, installation of a reduced height OHLE solutions or a combination of both is proposed to meet the needs of the scheme. This work will have no significant effect on the existing bridges and the works will be undertaken entirely within the existing rail corridor. The bridges in question are listed below:

- Three overbridges on the Maynooth Line (MGWR) north of Connolly Station
- Ossory Road Bridge
- Two overbridges located on the Phoenix Park Line (GWSR) north of Connolly Station
- Newcomen Bridge
- Clarke's Bridge
- Clonliffe Bridge
- Binn's Bridge
- Cross Guns (Westmorland Bridge)
- Cross Guns (on Prospect Road)
- Maintenance bridge at Glasnevin.

5. Phibsborough / Glasnevin to Clonsilla Junction

5.1. General Description

Between Phibsborough / Glasnevin and Clonsilla Station the Maynooth line runs alongside the Royal Canal. The line then passes through Broombridge Station, where it interfaces with the Luas Green line. Travelling in a westerly direction along this section are the following stations: Pelletstown Station which is currently under construction, Ashtown Station, Navan Road Parkway Station, Castleknock Station, Coolmine Station and Clonsilla Station. Refer to **Annex 1.0: Layout Figures Sheets 4 to 14**.

The existing level crossings in this section of the project which have been identified for closure are Ashtown, Coolmine, Porterstown and Clonsilla.

Along this section, OHLE is typically single-track cantilever portals at stations and with a sections of twin track cantilever when the line is adjacent to the canal.

There are two existing structures within this section where existing clearance beneath the bridge is insufficient to allow the installation of a standard OHLE solution. At these locations, track lowering, installation of a reduced height OHLE solution or a combination of both shall be employed to allow a suitable solution to be achieved. This work will have no significant effect on the existing bridges and the works will be undertaken entirely within the existing rail corridor. The bridges in question are:

- M50 Roundabout / Navan Road bridge
- M50 Roundabout bridge.

A new station is proposed at Phibsborough / Glasnevin as part of the MetroLink project. This station will be delivered as part of the MetroLink Railway Order.

5.2. Glasnevin Substation

The preferred option locates the Glasnevin substation on the western extremity of the grounds of St. Vincent's School to the north of the railway, and adjacent to Clareville Court. The proposed substation will be located in the corner of the field. The full dimensions of the pitch will be retained on completion. Access for construction is likely to be off the Finglas Road, through Claremont Lawns and Clareville Court. Controls will be placed on the Contractor during construction to minimise any potential impact on the residents of Claremont Lawns and Clareville Court and on the school due to construction traffic. The proposed location is not within the existing IÉ railway boundaries therefore land acquisition will be required. Consideration of options in respect of Glasnevin substation are included in **Chapter 5 of OSR Volume 2**.

5.3. Broombridge

The existing bridge (Broome Bridge) carrying Broombridge Road requires an intervention to provide sufficient clearance for the overhead electrification equipment. The railway arch is located next to the Royal Canal arch with the two-arch limestone canal bridge dated to c.1790 and railway bridge c.1845. See **Figure 5-1**. Refer to **Chapter 6 of OSR Volume 2** for detailed consideration of interventions at Broome Bridge.

Broome Bridge is a protected structure and is included in the record of protected structures for Dublin city. While the entry in the record of protected structures implies that only the canal bridge is protected, the National Inventory of Architectural Heritage (NIAH), Reg No. 50060126 has included the railway and canal bridges and they have been assigned a National significance for their architectural, historical, social and technical interest.

The clearance at Broome Bridge railway bridge is extremely low. It is not possible to deploy a reduced OHLE system or a track lowering solution due to potential flooding issues and existing station infrastructure at

Broombridge Station. Therefore, the preferred option is for a careful and sensitive reconstruction of the existing railway bridge to obtain the required clearance.



Figure 5-1 Broome Bridge

Given the architectural and scientific heritage value of Broome Bridge, the protect team has carefully considered the design intention at this location to ensure any impact from the DART+ West works on the adjacent Royal Canal arch bridge is mitigated.

It is proposed to systematically deconstruct the arch and walls of the existing bridge and reconstruct it with a higher clearance using a pre-cast arch units. The existing Broome Bridge stone will be reused in the spandrel walls and parapets of the reconstructed bridge. The road surface will be re-established using lightweight concrete to the new elevation to curtail the additional structural loads on the abutments. The objective is to maintain an arched configuration adjacent to the existing canal arch whilst allowing the DART+ West project to proceed. The design will be informed by consultations with Dublin City Council and the Architectural Advisory Unit of the Department of Culture, Heritage and the Gaeltacht.

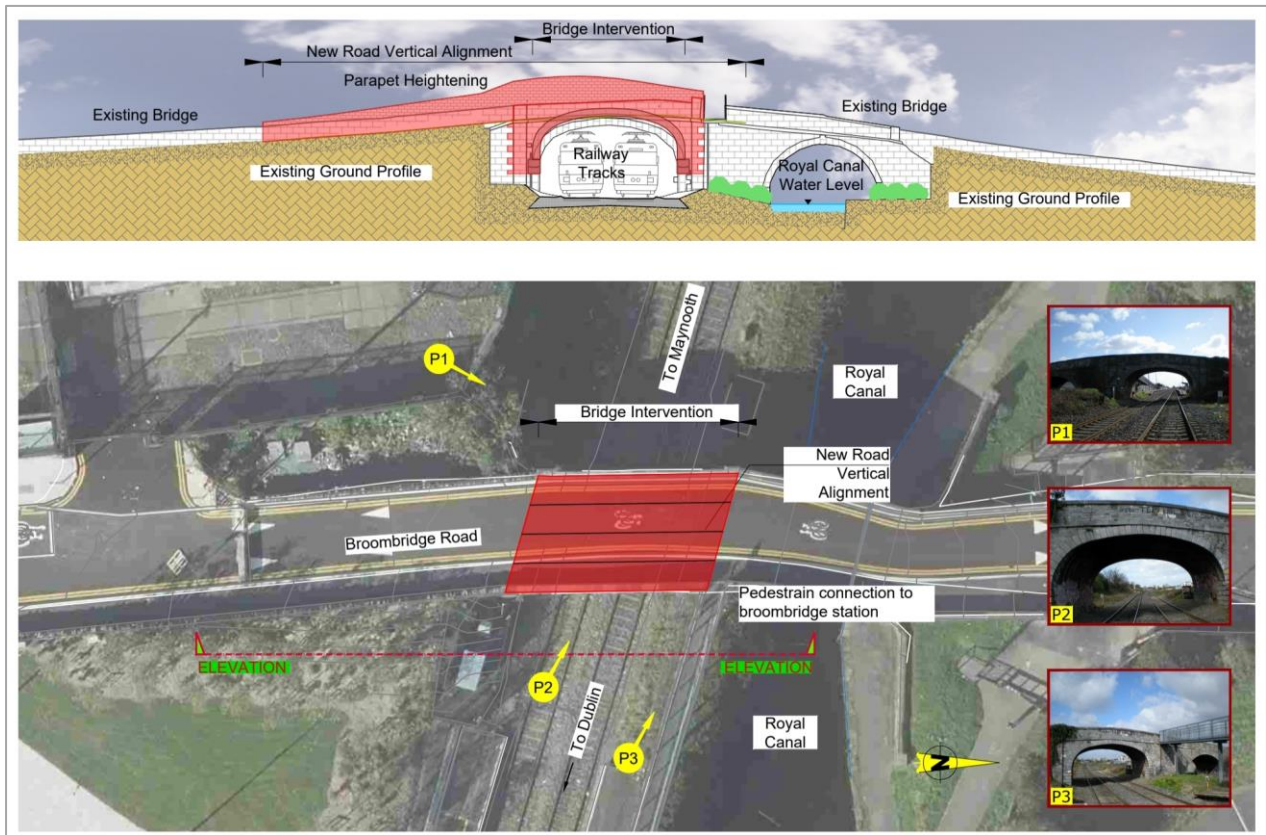


Figure 5-2 Deck Reconstruction of Broombridge

5.4. Ashtown

5.4.1. Level Crossing Removal

The preferred option at this location entails re-routing Ashtown Road along its original alignment (pre-Royal Canal) on Mill Lane and passing under both the railway and the Royal Canal. The option can accommodate a 6.5 m carriageway with 1.8 m footpaths on both sides and 2.5 m two-way cycle track on the eastern side. It is proposed to curtail the footpath along the west of the alignment fronting the listed Ashton House curtilage to a 0.5 m wide paved verge and provide a pedestrian crossing at this location to minimise the impact on the heritage property. Cyclists and pedestrians will be connected from the underpass to Ashtown Road via a new dedicated shared 3.0 m facility on the south side and a shared 3.0 m ramp on the north side connecting to Ashtown Road. An at-grade turning head and drop-off are proposed each side of the railway.

The preferred option extends approximately 150 m north of the canal and 300 m south of the railway. The proposed road alignment drops to an approximate level of 37.5 m OD under the railway. On both sides of the railway a separate 3.0 m wide link is proposed to provide enhanced access for non-motorised users between the sides of the railway.

It is feasible to pass under the canal at the proposed location of the bridge, as it is upstream of the double lock on the canal and the canal is at the same approximate level as the adjacent railway. This option requires land acquisition and modifications to existing accesses. **Figure 5-3** provides an artistic impression of the proposed works at Ashtown. Refer to **Chapter 8 of OSR Volume 2** for detailed consideration of Ashtown Level Crossing.



Figure 5-3 Aerial View of level crossing replacement at Ashtown

5.4.2. Ashtown Station Accessibility Enhancements

The proposed closure of the level crossings has resulted in the requirement to assess in-station accessibility for persons with impaired mobility. At Ashtown, this assessment identified that additional infrastructure was required to comply with the relevant mobility standards.

The preferred option for Ashtown Station includes a new pedestrian bridge replacing the existing footbridge which will be removed. The new footbridge will provide staircases and lifts to ensure accessibility between platforms. It will also be available to the public providing north south connection across the railway. It will be located at the entrance of the station, close to the western end of the platforms.

Figure 5-4 illustrates the location and general layout of the proposed pedestrian bridge.

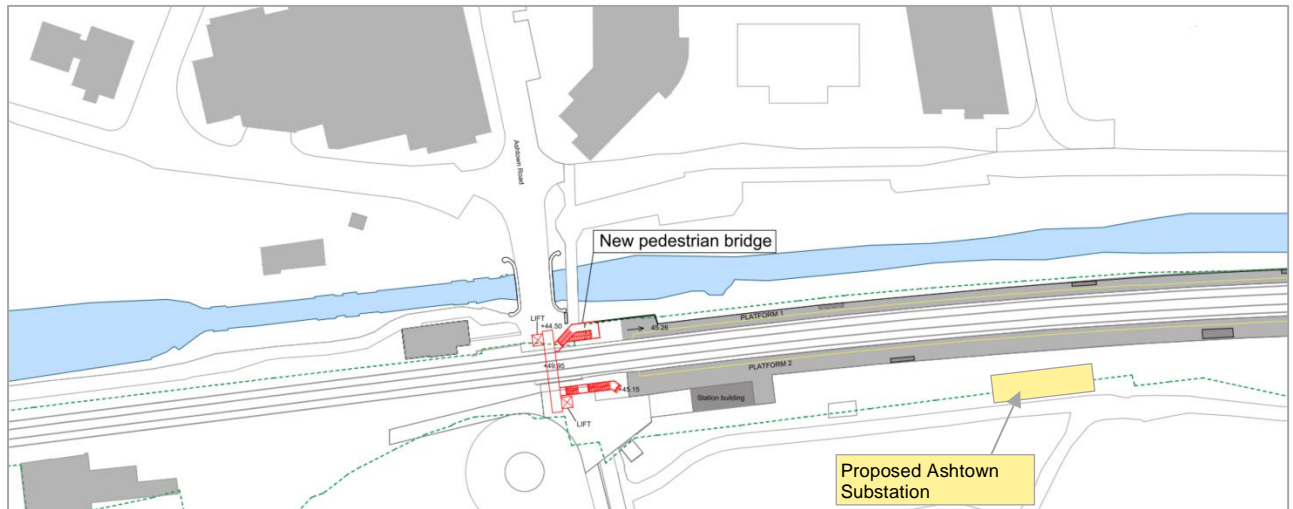


Figure 5-4 Ashtown Station pedestrian bridge layout

5.4.3. Ashtown Substation

The preferred option for the Ashtown substation provides for placement of the substation to the south of the railway and to the east of Ashtown Station. The proposed location is substantially within the existing Iarnród Éireann railway boundary, thereby minimising additional land take. Vehicular and pedestrian access can be established via a connection to Ashtown Road. The location falls on an existing ESB utility network, therefore a network diversion is required. Connection to the water supply network can be established at Martin Savage Park, and a connection to the gravity foul and storm water networks can be established with the existing networks just west of the substation. The location of the proposed substation is indicated on **Figure 5-4**. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Ashtown substation.

5.5. Navan Road Parkway Operational Phase Maintenance Facility

The preferred option is located on private lands south of the rail line and west of the station parking; see **Figure 5-5**. The proposal is to establish an operational phase maintenance facility and to use it to support construction activity while the works progress on site. In this regard, the facility will have an access point to the tracks, allowing access for rail mounted vehicles. The maintenance facility will include a two-storey building approximately 7.5 m high x 42.5 m long x 9.8 m wide subject to further design development. The facility will be located within a secure compound accessed via the station roadway and will include provision for staff parking.

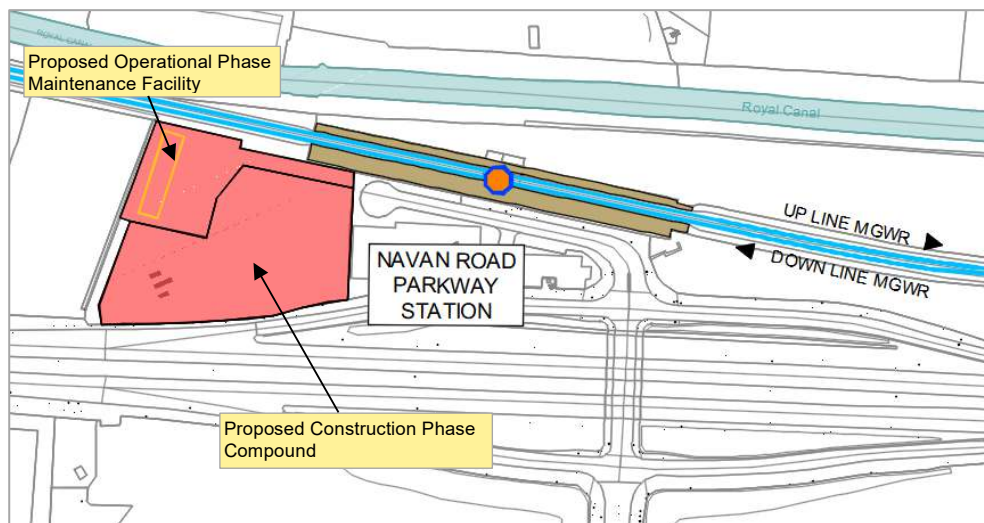


Figure 5-5 Proposed Operational Maintenance Facility

5.6. Old Navan Road Bridge

The existing bridge carrying Old Navan Road requires an intervention to provide sufficient clearance for the OHLE. A photograph of the existing bridge is provided in **Figure 5-6**.



Figure 5-6 Old Navan Road Bridge

The preferred option is to raise the existing bridge deck to obtain the necessary space under the bridge. It is proposed the bridge deck will be raised by approximately 290 mm. The approaches along the Old Navan Road will be adjusted to accommodate this; see **Figure 5-7**. Old Navan Road is a cul-de-sac with no alternative vehicular access. Access for all residents will be accommodated at all stages of construction. Old Navan Road was divided by the M50 motorway. Currently, there is a bridge crossing, accessible only for pedestrians and cyclists, that connects both communities across the motorway. Access will be maintained during construction for pedestrians and cyclists except during the deck lift. Refer to **Chapter 6 of OSR Volume 2** for detailed consideration of interventions at Old Navan Road Bridge.

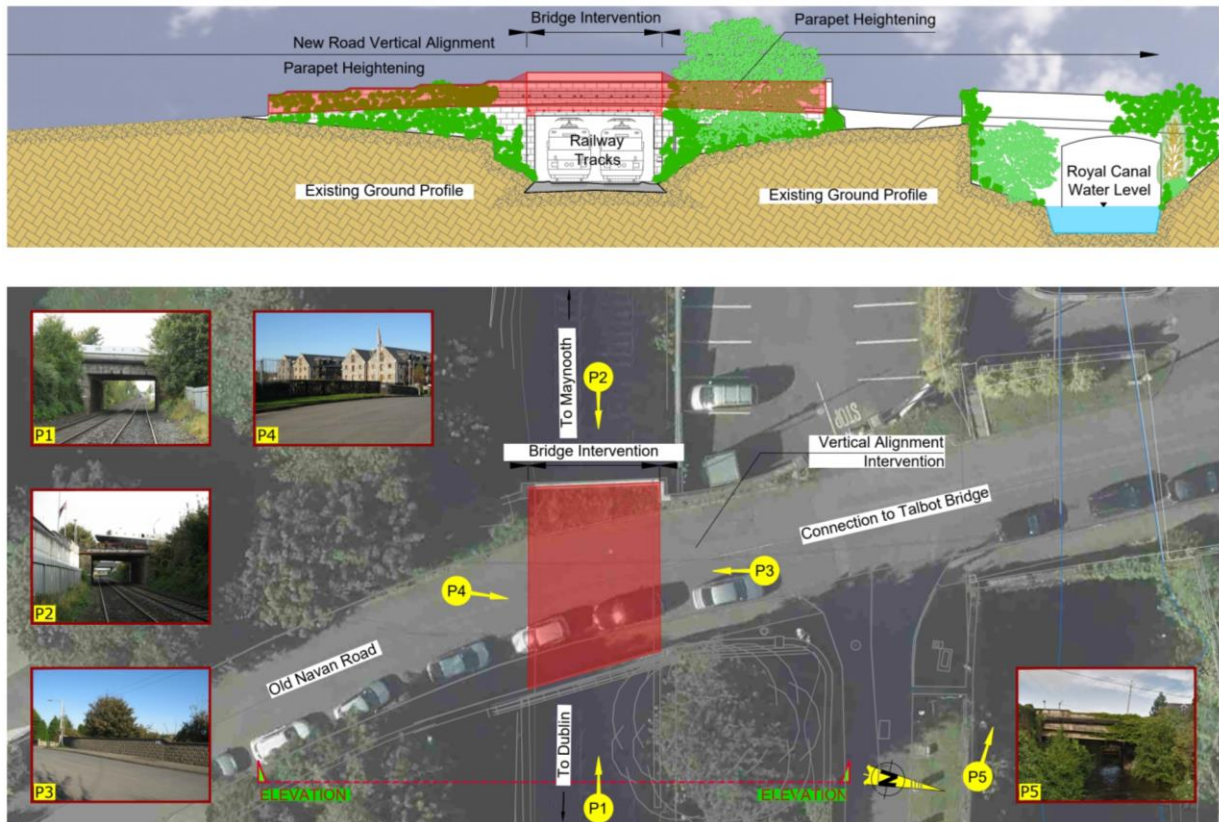


Figure 5-7 Old Navan Road Bridge Deck Lift

5.7. Castleknock Road

5.7.1. Castleknock Road Bridge Deck Reconstruction

The existing bridge carrying Castleknock Road requires an intervention to provide sufficient clearance for the OHLE. The Granard Canal Bridge is a protected structure registered at the National Inventory of Architectural Heritage (NIAH), Reg No. 11354002 assigned a Regional significance for its architectural and technical interest; see **Figure 5-8**. The adjacent railway bridge is not included in the record of protected structures or in the NIAH but is very close to the canal bridge.



Figure 5-8 Castleknock Road bridge

The clearance beneath the existing bridge is low and it is not possible to deploy a reduced OHLE system or a track lowering solution, due to potential flooding issues. Consequently, the preferred option for securing space under the bridge is to reconstruct the arch of the bridge at a higher level. It is proposed to systematically deconstruct the existing arch, spandrel walls and parapets and reconstruct using pre-cast arched units for the bridge deck and the original masonry for the walls and parapets; See **Figure 5-9**. Where additional masonry is needed it will be sourced to match the existing stone. Infill to the arched units will be in lightweight concrete. The road alignment on the approaches to the bridge will need to be raised to accommodate the modified bridge profile. The design will be informed by consultations with Fingal County

Council and the Architectural Advisory Unit of the Department of Culture, Heritage and the Gaeltacht. Refer to **Chapter 6 of OSR Volume 2** for detailed consideration of interventions at Castleknock Road Bridge.

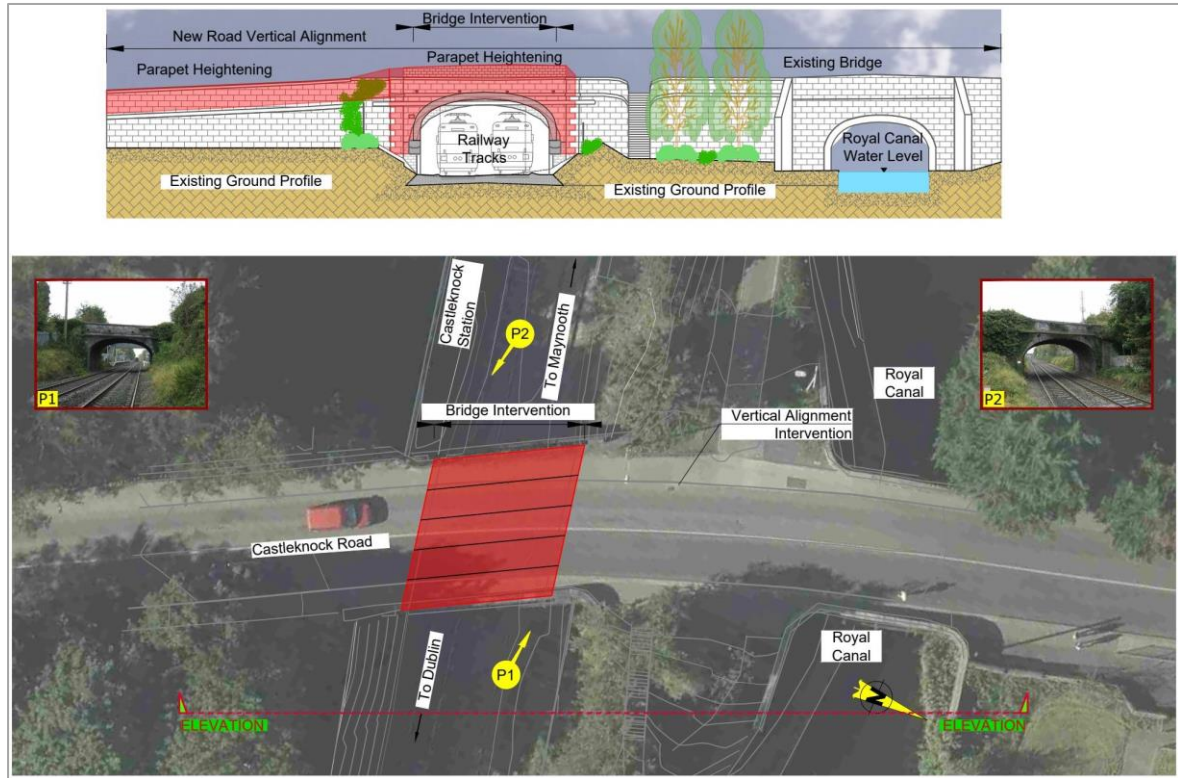


Figure 5-9 Deck reconstruction of Castleknock Road bridge

5.7.2. Castleknock Substation

The preferred option is the siting of the substation at the south of the railway, in parkland west of the existing Castleknock Road (R806). The proposed location is not within the existing CIÉ property boundaries, therefore land acquisition will be required. It will be necessary to create an access to the proposed substation from the existing Castleknock Road. Refer to **Figure 5-10** for the location of the proposed substations. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Castleknock substation.

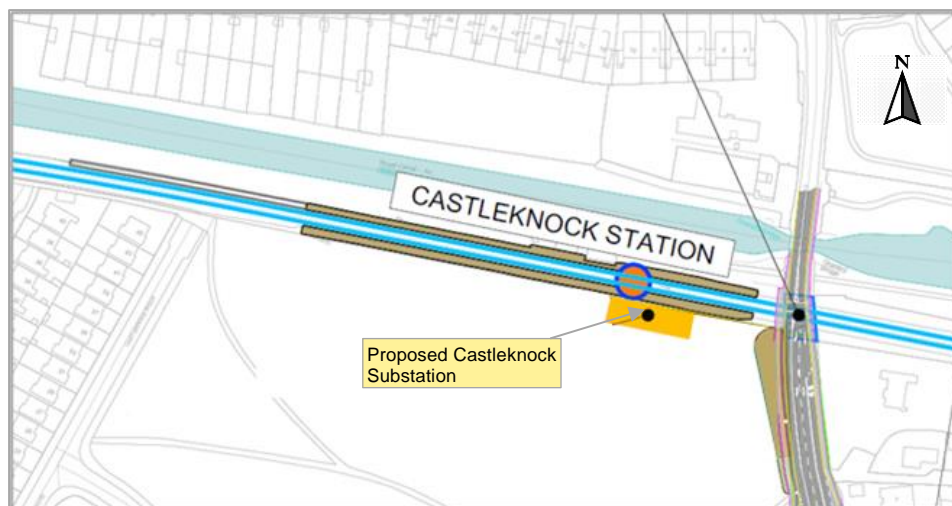


Figure 5-10 Proposed Castleknock Substation Location

5.8. Coolmine

5.8.1. Level Crossing Removal

Feedback from the public and stakeholders following public consultation no.1 resulted in a re-appraisal of the possible options for the replacement of the Coolmine level crossing. These new alternative proposals have been assessed along with the original options, and this has led to the identification of a preferred option which differs from that identified as the emerging preferred option.

The preferred option for the replacement of the Coolmine level crossing now involves the construction of a new cycle/foot bridge over the railway and canal on Coolmine Road. The provision of the new bridge will facilitate the closure of the level crossing but will require diversion of traffic to alternative crossings of the railway. Improvements are proposed to the surrounding road network as part of this option.

The pedestrian / cycle bridge associated with the preferred option is illustrated in **Figure 5-11** and a general layout illustrating the extend of road improvements is shown in **Figure 5-12**. Refer to **Chapter 8 of OSR Volume 2** for detailed consideration of Coolmine Level Crossing.



Figure 5-11 Aerial View of Footbridge at Coolmine

This option proposes that traffic will primarily divert to the existing bridge crossings at Dr. Troy Bridge (Diswellstown Road viaduct) and Castleknock Bridge. In order to facilitate the additional capacity on the existing road network, the option includes the upgrade to junctions along the local road network. The proposed upgrades are:

- Diswellstown Road Junction
- Diswellstown Road / Coolmine Road Junction
- Park Lodge / Castleknock Road Junction
- Porterstown Road / Diswellstown Road Junction.

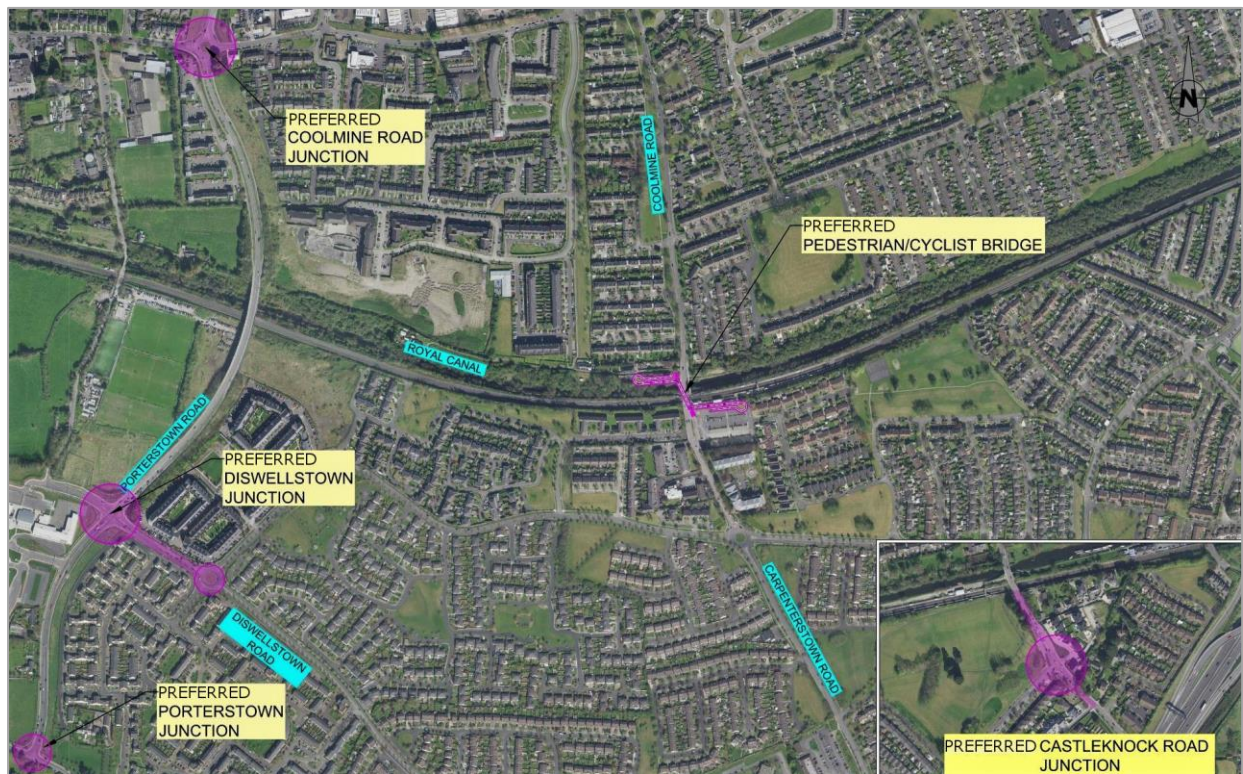


Figure 5-12 Preferred option for Level Crossing Replacement at Coolmine

5.8.2. Coolmine Station Accessibility Enhancements

The proposed closure of the level crossings has resulted in the requirement to assess in-station accessibility for persons with impaired mobility. At Coolmine, this assessment identified that additional infrastructure was required to comply with the relevant mobility standards.

The northern entrance to Coolmine Station (to Platform 1) is very constrained. The width of the access will need to be widened up to 1.6 m. Minor land acquisition will be required at this location. See **Figure 5-13**.

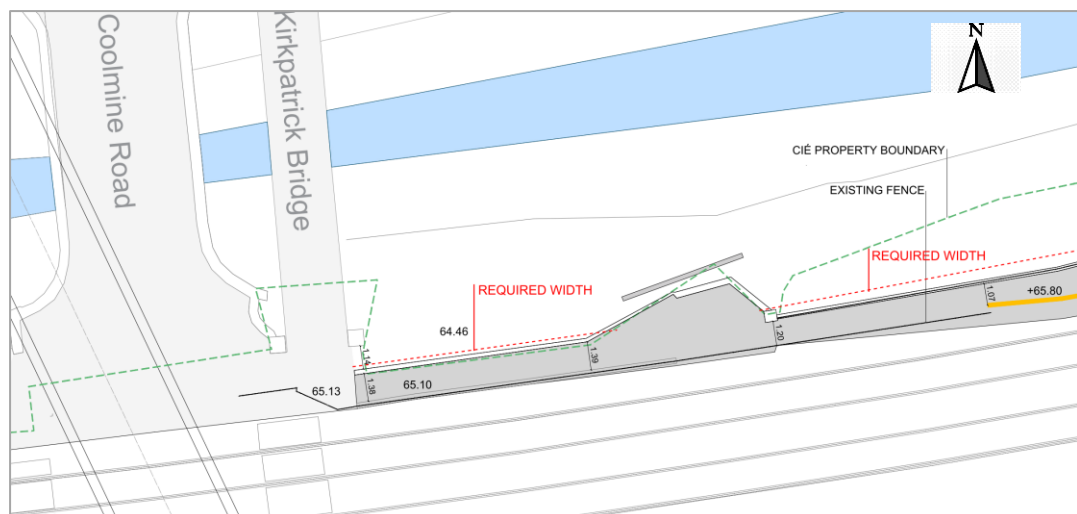


Figure 5-13 Coolmine Station Access to Platform 1

The proposal also requires a solution that connects both platforms. Currently, there is a pedestrian bridge between platforms, but it is not suitable for persons with reduced mobility. Solutions have been considered to solve the accessible connection between platforms.

The preferred option consists of a new pedestrian bridge, with staircases and lifts, to replace the existing footbridge. The pedestrian bridge will be located 25 m west of the existing station footbridge, to facilitate the passenger flows as it is closer to the station entrance. See **Figure 5-14**.

This solution allows for maintenance of the current footbridge during the construction of the new bridge, thus keeping the current passenger operation of the station.

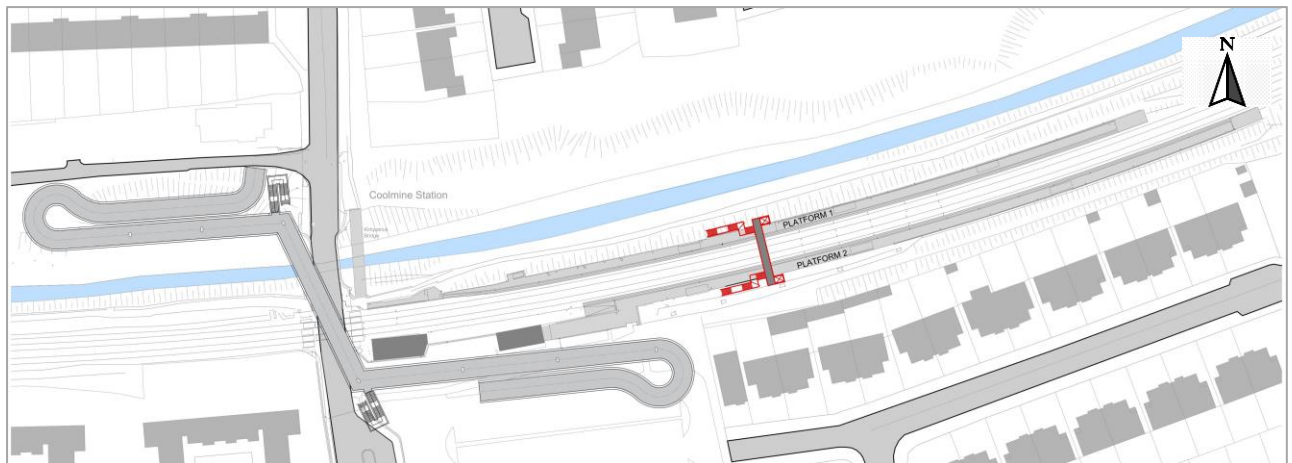


Figure 5-14 Coolmine Station Footbridge

5.8.3. Coolmine Substation

The preferred option is the placing of the substation on a partially grassed area next to Maple Green residential area, 400 m east of Coolmine Station. A direct access can be provided through the local road network, connecting the substation to Maple Green. The terrain at this location is flat, therefore the substation would be at existing ground level. The location of the proposed substation is shown on **Figure 5-15**. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Coolmine substation.

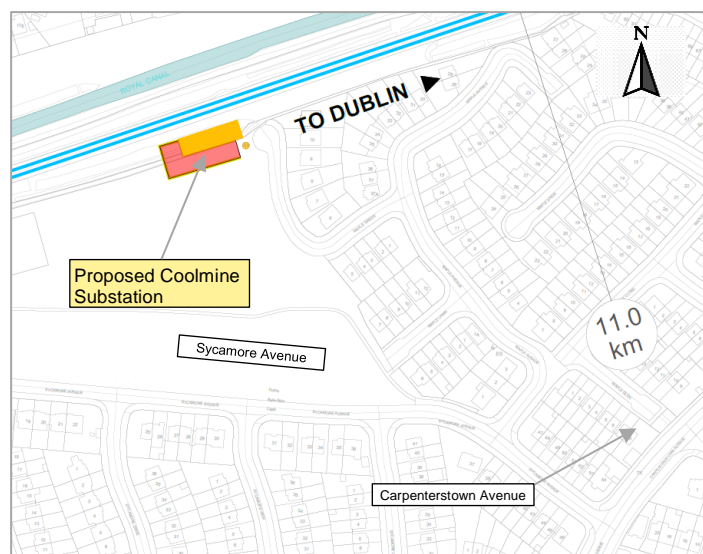


Figure 5-15 Coolmine Substation Location

5.9. Porterstown

5.9.1. Level Crossing Removal

The preferred option at Porterstown involves the construction of a new cycle/foot bridge over the railway and canal. The provision of the new bridge will facilitate the closure of the level crossing but would require diversion of vehicular traffic to adjacent bridge crossings of the railway. No specific improvements to the surrounding highway network are proposed by DART+ West, however there are a number of road improvements proposed by Fingal County Council in the area (Kellystown Road and Barnhill to Ongar Distributor Road).

It is proposed that the new pedestrian and cycle footbridge is 5 m in width between handrails. The bridge provides a connection between Porterstown Road either side of the crossing. The arrangement of the bridge utilises nested ramps to the north and south of the rail where it crosses in order to minimise the footprint. An artistic impression of the proposed bridge is illustrated in **Figure 5-16**. Refer to **Chapter 8 of OSR Volume 2** for detailed consideration of Porterstown Level Crossing.



Figure 5-16 Aerial View of Level Crossing Replacement at Porterstown

5.10. Clonsilla

5.10.1. Level Crossing Removal

The preferred option at this location involves the closure of the level crossing and the construction of a new 5 m wide cycle and pedestrian bridge over the railway and canal. The provision of the new bridge will facilitate the closure of the level crossing but would require diversion of traffic to surrounding crossings of the railway. A new road bridge will be provided to the west of the existing Barberstown level crossing which will maintain vehicular connectivity north-south over the railway. No improvements to the surrounding highway network are proposed as part of the DART+ West project. A number of road improvement are proposed by Fingal County Council in the area (Kellystown Road and Barnhill to Ongar Distributor Road).

The new pedestrian and cycle footbridge is proposed to be 5 m wide between handrails. The bridge provides a connection between Clonsilla Road either side of the crossing. The arrangement of the bridge utilises nested ramps to the north and south of the existing station. An artistic impression of the proposed bridge is illustrated in **Figure 5-17**. Refer to **Chapter 8 of OSR Volume 2** for detailed consideration of Clonsilla Level Crossing. The design of the northern ramp is to be agreed with Fingal County Council to be consistent with the Royal Canal Urban Greenway cyclist headroom requirements.



Figure 5-17 Aerial View of Level Crossing Replacement at Clonsilla

6. Clonsilla Junction to M3 Parkway

6.1. General Description

West of Clonsilla Station the line splits, with a line continuing out towards Maynooth (mainline) and a line to M3 Parkway (Pace line/branch line). The Pace line, which spurs northwards, passes through Hansfield Station and Dunboyne Station before terminating at M3 Parkway Station which lies to the north of Dunboyne and west of Junction 5 off the M3 Motorway. Refer to **Annex 1.0: Layout Figures Sheets 15 to 21**.

The line will be provided with electrification over the entire section through the installation of overhead electrical equipment, associated upgrades of signals and communications, and the provision of electrical substations as required.

Along this section, the OHLE proposals are typically single-track cantilever and portals at the stations.

There are three existing structures within this section where existing clearance beneath the bridge is insufficient to allow the installation of a standard OHLE solution. At these locations, track lowering, installation of a reduced height OHLE solution or a combination of both shall be employed to allow a suitable solution to be achieved. This work will have no significant effect on the existing bridges and the works will be undertaken entirely within the existing rail corridor. The bridges are:

- Barnhill Bridge
- Stirling Road Bridge
- Dunboyne Bridge.

6.2. Hansfield Substation

The preferred option is to place the substation south of the railway, near and east of Hansfield Station. The terrain at this location is almost flat, therefore no major earthworks are envisaged. The location of the building has no clashes with existing utilities networks. The proposed substation and the road needed for access, will be inside CIÉ property and will connect to Barberstown Lane North. See **Figure 6-1**. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Hansfield substation.

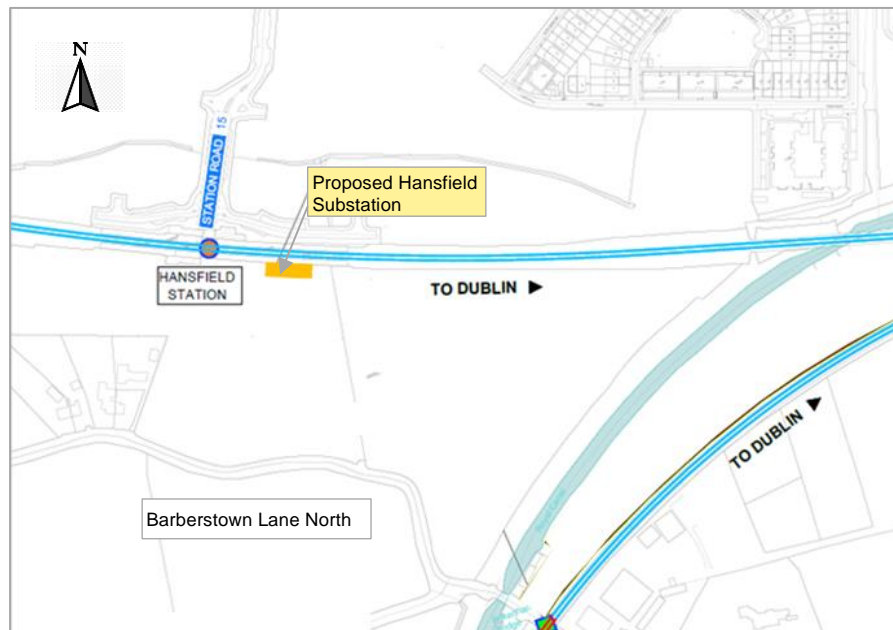


Figure 6-1 Hansfield Substation Proposed Location

6.3. Dunboyne Substation

The preferred option is the placement of the substation to the north of the railway, and west of Dunboyne Station. The terrain at this location is flat, so no major earthworks are envisaged. There are no clashes with existing utilities networks. Access to the proposed substation would be through the existing station car park with curtailed modifications envisaged except the relocation of the existing taxi stop. There is space for two parking spaces next to the location of the proposed substation. See **Figure 6-2**. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Dunboyne substation.

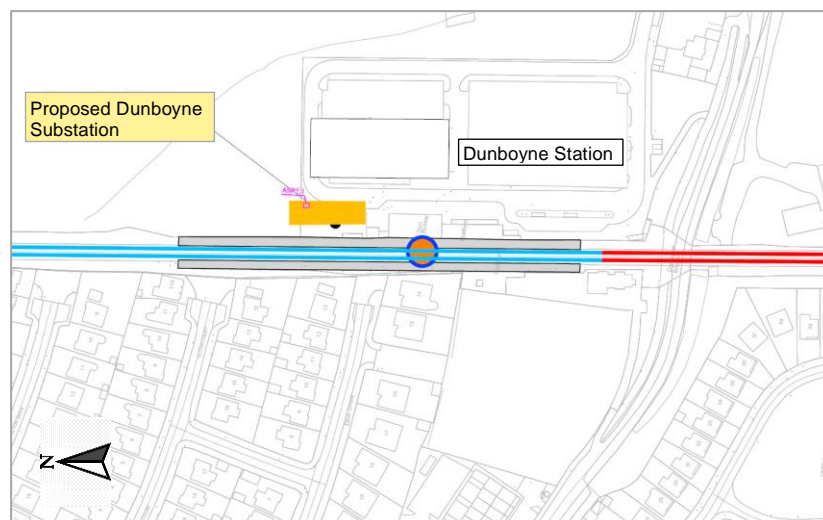


Figure 6-2 Dunboyne Substation Proposed Location

6.4. M3 Parkway Substation

The preferred option is to place the substation to the west of the railway, near the M3 Parkway Station buildings. Major works would not be required to accommodate road access from the R157, however the existing bicycle parking will need to be relocated. The proposed road access would be along the existing

circulatory access way in the station and parking area, but a connection would be needed to secure parking spaces for the substation. The only clash in this area is with a bike locker which could be relocated. The existing bus stop will be retained under this proposal. Refer to **Figure 6-3**. There is no clash with existing utility networks. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at M3 Parkway substation.

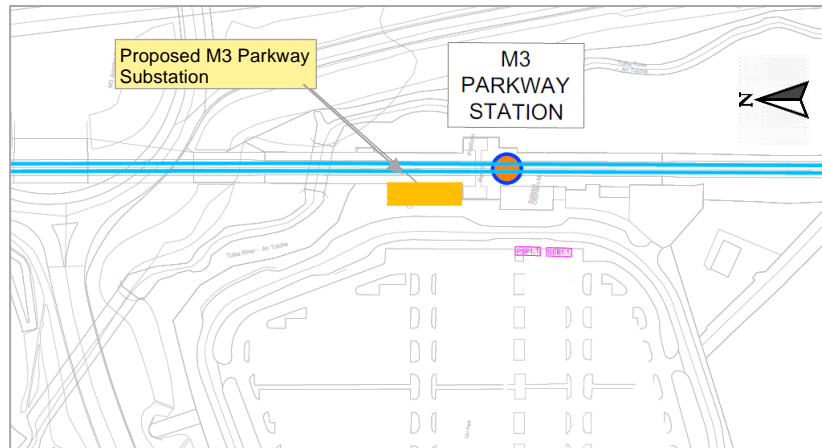


Figure 6-3 M3 Parkway Substation Proposed Location

7. Clonsilla Junction to Maynooth Depot

7.1. General Description

As mentioned, west of Clonsilla Station, the railway diverges, with the mainline continuing westwards to Maynooth & Sligo, and a branch line (Pace line) continuing northwards towards Dunboyne & M3 Parkway. This section describes the scheme that continues along the mainline from west of Clonsilla Station through to the new proposed maintenance and stabling depot located west of Maynooth. The Maynooth Line and M3 Parkway branch line will be electrified as part of this project. Refer to **Annex 1.0: Layout Figures Sheets 22 to 39**.

Between Clonsilla Station and the proposed depot the existing rail line continues parallel and to the north of the Royal Canal, passing through Leixlip Confey Station, Leixlip (Louisa Bridge) Station, and Maynooth Station.

In this section of the scheme there are two existing level crossings which have been identified for closure at Barberstown and Blakestown.

OHLE supports are typically single-track cantilever. At stations, portals are proposed and twin track cantilever supports are proposed where the line is adjacent to the canal.

There are two existing structures within this section where existing clearance beneath the bridge is insufficient to allow the installation of a standard OHLE solution. At these locations, track lowering, installation of a reduced height OHLE solution or a combination of both shall be employed to allow a suitable solution to be achieved. This work will have no significant effect on the existing bridges and the works will be undertaken entirely within the existing rail corridor. The bridges in question are:

- Collins Bridge
- Pike Bridge.

7.2. Barberstown

7.2.1. Level Crossing Removal

The preferred option at this location involves the construction of a new bridge above the railway and canal located 250 m to the west of the existing crossing. The road will ramp up to the bridge from 140 m on the north side and 220 m on the south side of the proposed bridge. The provision of the new bridge will facilitate the closure of the level crossing.

The option would take the form of a bridge spanning over the railway and the canal with tie-in to the existing road network south of the railway and tie-in to the re-configured road network north of the railway consequent on the implementation of the proposed Barnhill to Ongar scheme due to be procured shortly by Fingal County Council.

The proposed scheme will accommodate pedestrian and cycle facilities consistent with plans for enhancement of such amenities in the local area. Refer to **Figure 7-1** for the proposed layout of the roadworks and bridge at Barberstown. Refer to **Chapter 8 of OSR Volume 2** for detailed consideration of Barberstown Level Crossing.

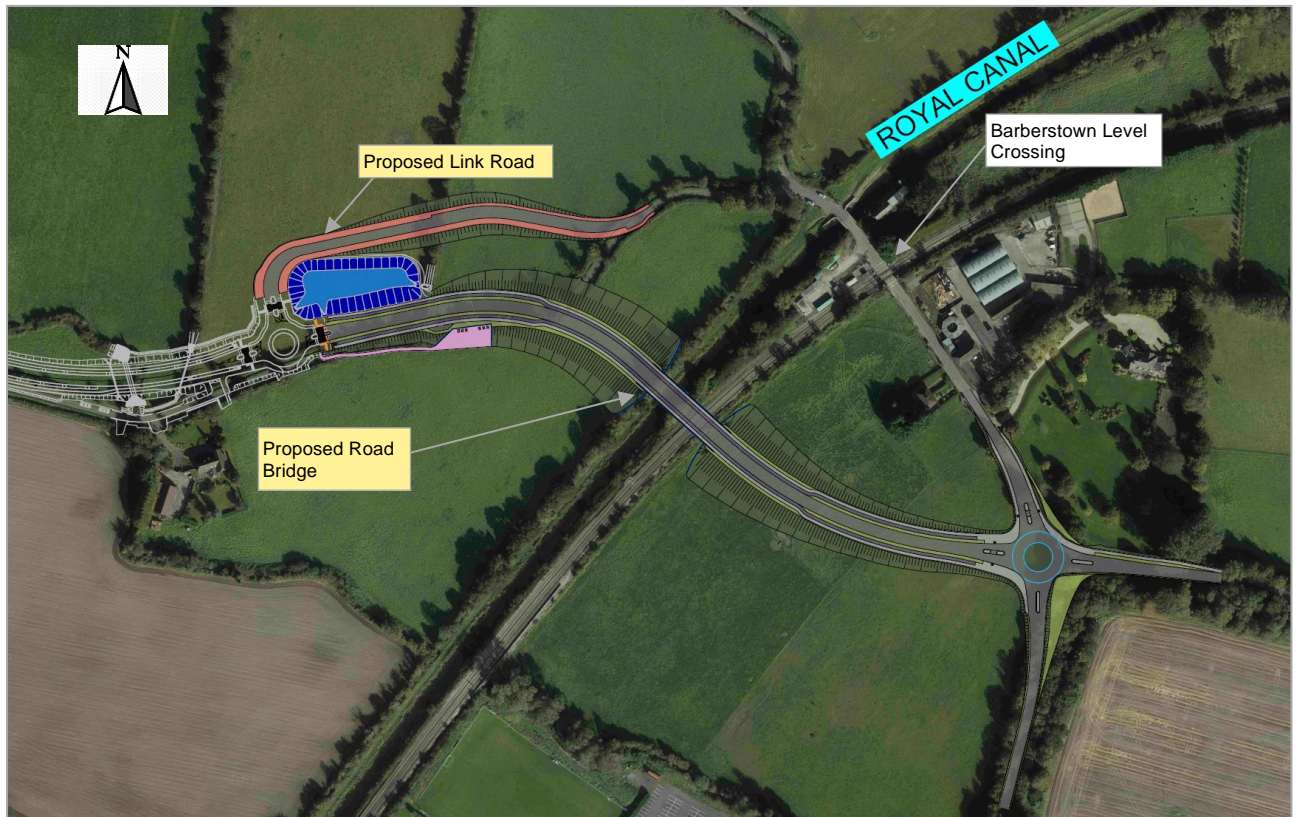


Figure 7-1 Preferred option for Level Crossing Replacement at Barberstown

7.3. Railway bridge adjacent to Leixlip Confey Station

7.3.1. Deck Reconstruction

The railway bridge adjacent to Leixlip Confey Station which carries the R149 requires an intervention to provide sufficient clearance for the OHLE.

This bridge has a one way shuttle system in place under traffic signal control. It has an overall width of 7.6 m, and there is access to the Royal Canal towpath located north of the bridge.

The clearance beneath the existing bridge is low and it is not possible to deploy a reduced OHLE system or a track lowering solution, due to potential flooding issues. Therefore, the preferred option is for a careful and sensitive reconstruction of the existing railway bridge to obtain the required clearance.

To achieve a sufficient vertical clearance for the catenary equipment under the bridge, a precast arch deck solution is proposed, requiring the bridge deck to be raised by at least 150 mm.

It is proposed to systematically deconstruct the existing bridge and reconstruct with a higher clearance using pre-cast arch units. The road surface will be re-established using lightweight concrete to the new elevation to reduce the additional structural loads. The objective is to maintain a railway arch adjacent to the existing canal arch whilst allowing the DART+ West project to proceed. The works proposals in respect of the railway bridge adjacent to Leixlip Confey Station are illustrated in **Figure 7-2**. Refer to **Chapter 6 of OSR Volume 2** for detailed consideration of interventions at the railway bridge adjacent to Leixlip Confey Station.

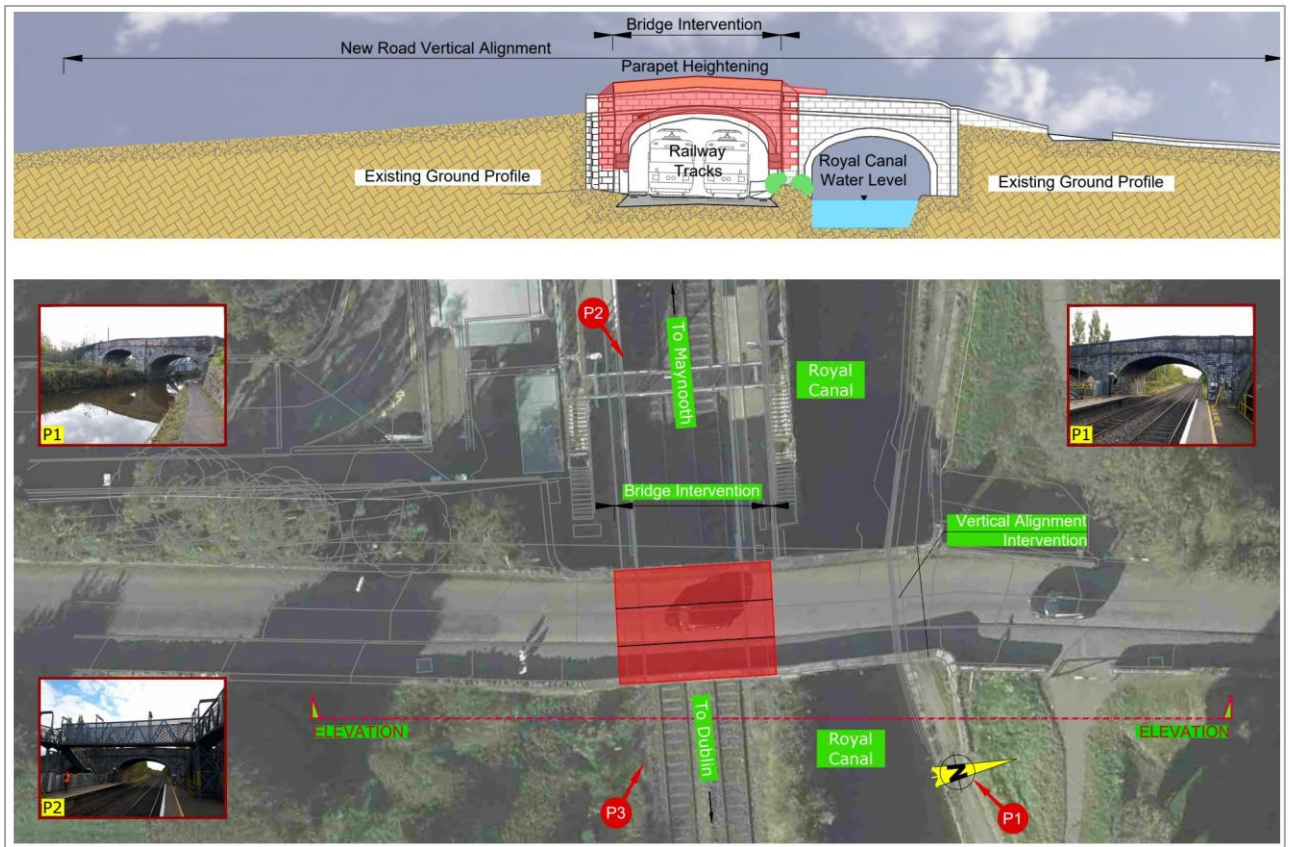


Figure 7-2 Railway Bridge Adjacent to Leixlip Confey Station Bridge Deck Reconstruction

7.3.2. Leixlip Confey Substation

The preferred option is to place the proposed substation to the south of the railway, west of the existing Leixlip Confey Station. The proposed location is within the existing Iarnród Éireann railway boundaries, thereby minimising land take. A section of the existing car park will be required for undertaking works to accommodate road access from the R149. Refer to **Figure 7-3** for the proposed location of the substation. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Leixlip Confey substation.

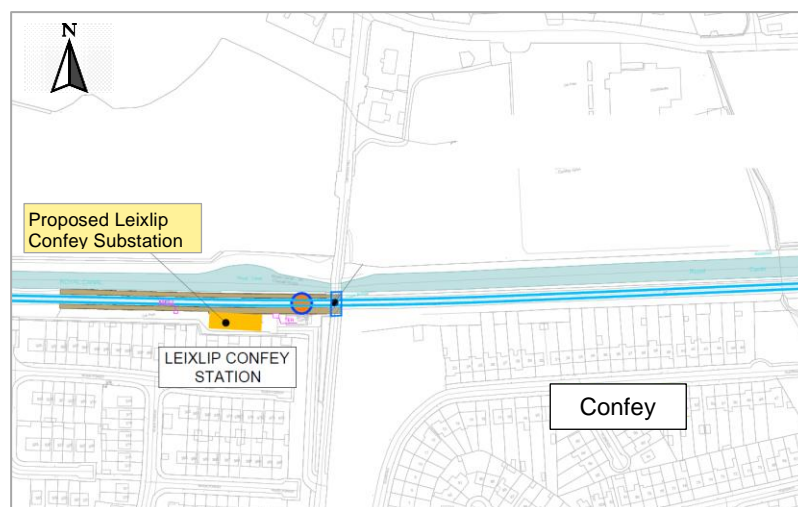


Figure 7-3 Leixlip Confey Substation Location

7.4. Louisa Bridge

7.4.1. Deck Lift

Louisa Bridge carries the R149, and is adjacent to the Leixlip (Louisa Bridge) Station. This bridge requires an intervention to provide sufficient clearance for the OHLE.

This bridge is a flat deck bridge, located in Leixlip, at Leixlip Louisa Bridge Station exit towards Maynooth.



Figure 7-4 Louisa Bridge

The preferred option at Louisa Bridge is to replace the existing bridge deck with one which is more slender to obtain the required clearances for electrification. This is a two-lane bridge with 14 m width. There is a train station access and pedestrian parking access close to this bridge, which means that any road closures have a significant impact on the mobility, and limit visibility and cause sight obstruction for the adjacent property owners or residents. The required deck lift for this bridge is approximately 140 mm to obtain sufficient clearance for the OHLE system and prevent a significant modification of the road alignment and the adjacent protected canal bridge. The works proposals in respect of Louisa Bridge are illustrated in **Figure 7-5**. Refer to **Chapter 6 of OSR Volume 2** for detailed consideration of interventions at Louisa Bridge.

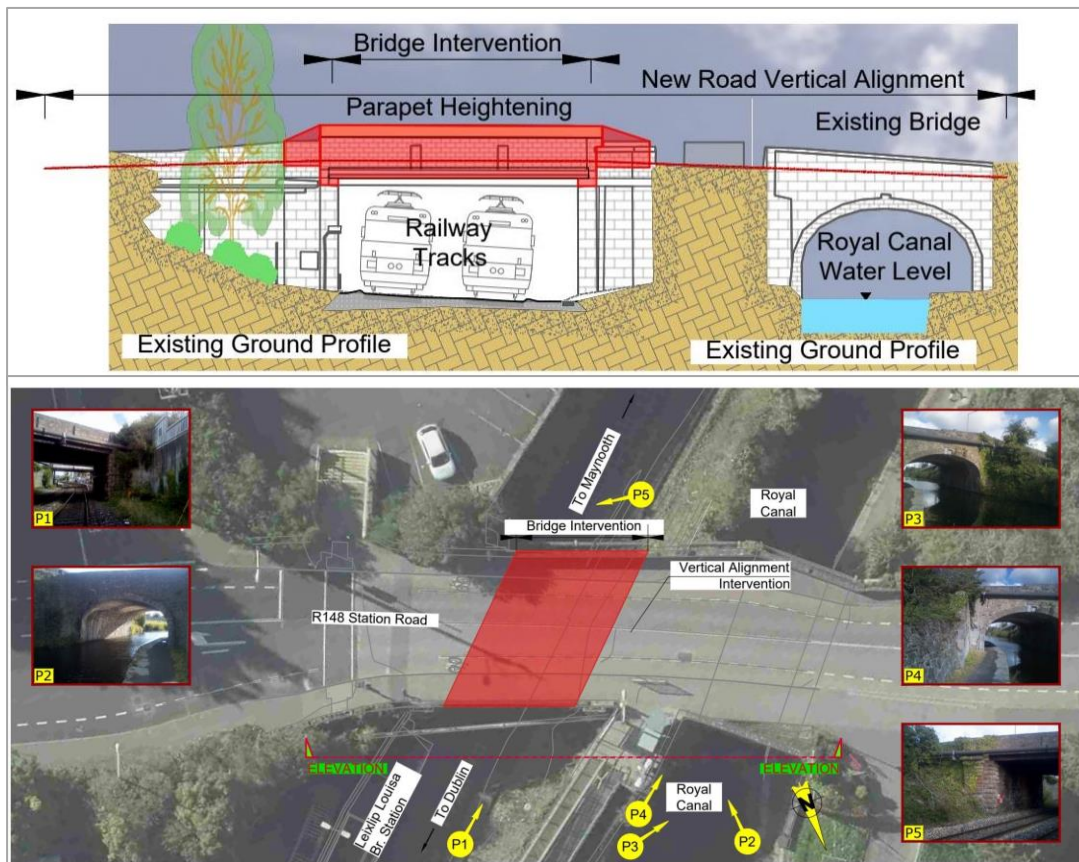


Figure 7-5 Louisa Bridge Deck Lift

7.5. Blakestown

7.5.1. Level Crossing Removal

The preferred option for this location, described in Chapter 8 of Volume 2 of the OSR as the “Do Minimum” option, is the closure of the level crossing with no alternative access provided. For this scenario, all traffic would be diverted to alternative routes around the crossing location. Refer to **Chapter 8 of OSR Volume 2** for detailed consideration of Blakestown Level Crossing.

7.5.2. Blakestown Substation

The preferred option for the Blakestown substation is to locate the substation to the south of the railway, west of the existing Blakestown level crossing. The proposed location is not within existing Iarnród Éireann railway boundaries, therefore it will be necessary to acquire additional lands. It will be necessary to create an access off the existing road. Access to the location would be along the existing local road network, which links to the R148 and the Celbridge Interchange. Along with the substation access road, parking spaces will have to be provided. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Blakestown substation.

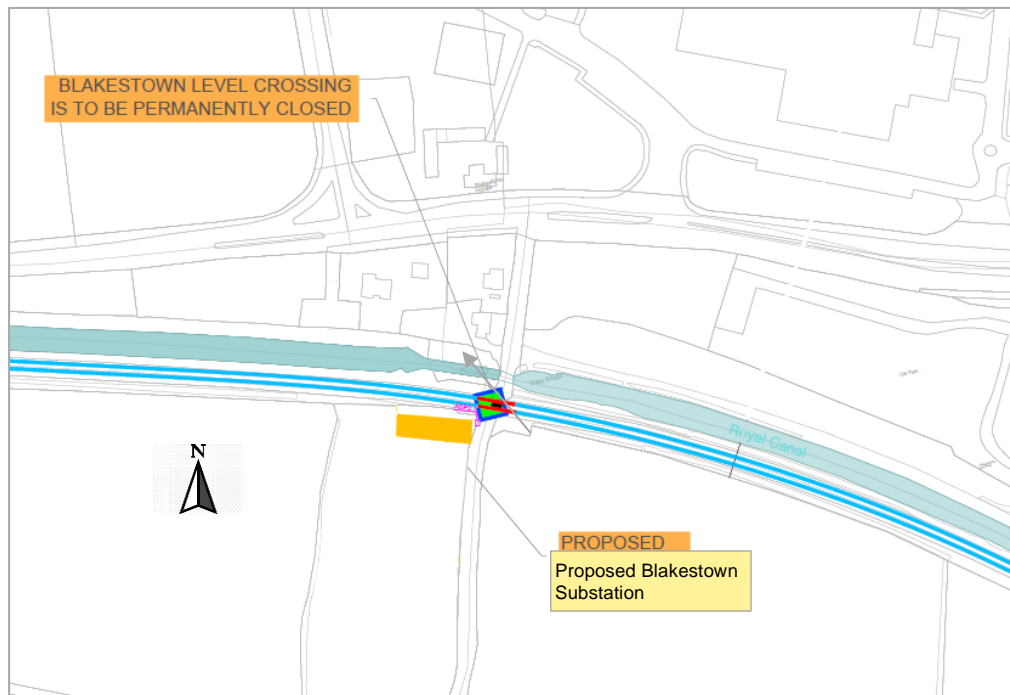


Figure 7-6 Proposed Blakestown Substation

7.6. Maynooth West

7.6.1. Maynooth Substation

The preferred option is to place the proposed substation to the south of the railway adjacent to the R406. The proposed location is largely within the existing CIÉ property boundaries. The access road to the station will need to be modified at the substation location, as will the footpath. This option will result in the loss of five parking bays from the station car park. Refer to **Figure 7-7** for the location of the proposed substation. Refer to **Chapter 5 of OSR Volume 2** for detailed consideration of interventions at Maynooth substation.

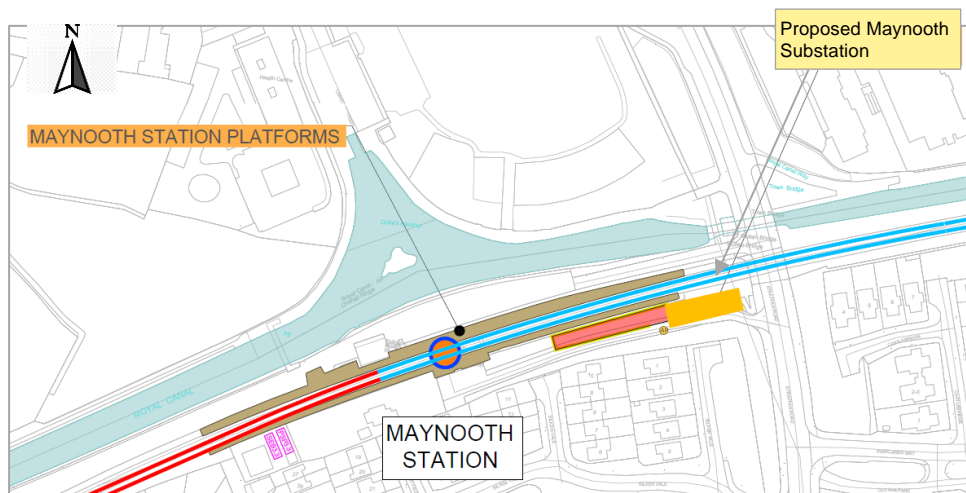


Figure 7-7 Proposed Maynooth Substation

7.6.2. Double Track from Maynooth to the Connection to the Depot

The railway is currently a single track line west of Maynooth. It is proposed to upgrade it to a twin-track configuration between Maynooth and the proposed depot. The new track will generally run parallel to and south of the existing track.

West of Maynooth the twin track configuration will divert onto a new railway embankment, running parallel to the existing railway on the approach to the proposed depot. This is due to pre-existing flooding issues on the site and due to the heritage value of the existing Jackson's Bridge, (RIAH Registration No.11900505) west of Maynooth.

The proposed works will include trackwork, electrification, signalling and telecommunications works, platform modifications in Maynooth Station, embankment construction, drainage works with attenuation and compensatory storage within the floodplain of the Lyreen River and tributary. The works will also include electrification of the existing siding south of the railway in Maynooth.

As the space between the Royal Canal and the existing track is narrow along sections of the line, a length of retaining wall is required so the embankment does not encroach into the canal.

The new alignment lies within an area subject to flooding as illustrated in **Figure 7-9**. The installation of the new tracks must be at a sufficiently high level to be above the predicted flood levels. The new tracks will pass beneath an existing 220 kV ESB line, and the resulting clearance beneath the existing lines is insufficient therefore the ESB line will require raising so that sufficient clearance is achieved.



Figure 7-8 Jackson's Bridge

New alignment within the floodplain has potential to increase flood risk, however the provision of compensatory storage and flood conveyance culverts through the new alignment embankment will mitigate any increase in flood risk. Estimated additional compensatory storage volumes required for this option are in the region 10,000 m³.



Figure 7-9 Flooding at Jackson's Bridge (February 2021)

7.6.3. Diversion of the Existing L5041

Due to the new proposed railway alignment to the south of Jackson's Bridge, described in Section 7.6.2 above, it is necessary to realign the existing L5041 local road and a section of the R148. South of Jackson's bridge the L5041 will be realigned to the west. The realignment will continue west towards the proposed DART+ West depot for approximately 900 m. The L5041 will then turn north via a new roundabout and cross the eastern end of the proposed depot, existing railway and Royal Canal via a new proposed overbridge. The western arm of the new roundabout will provide access to the DART+ West depot.

On the northern side of the railway and Royal Canal the realigned L5041 will meet the realigned R148 at a new roundabout. Approximately 800 m of the R148 is required to be realigned to provide adequate vertical gradients to allow the new overbridge to connect with the R148.

Access for pedestrians and cyclists will be maintained under the proposed realigned section of railway to Jackson's Bridge.

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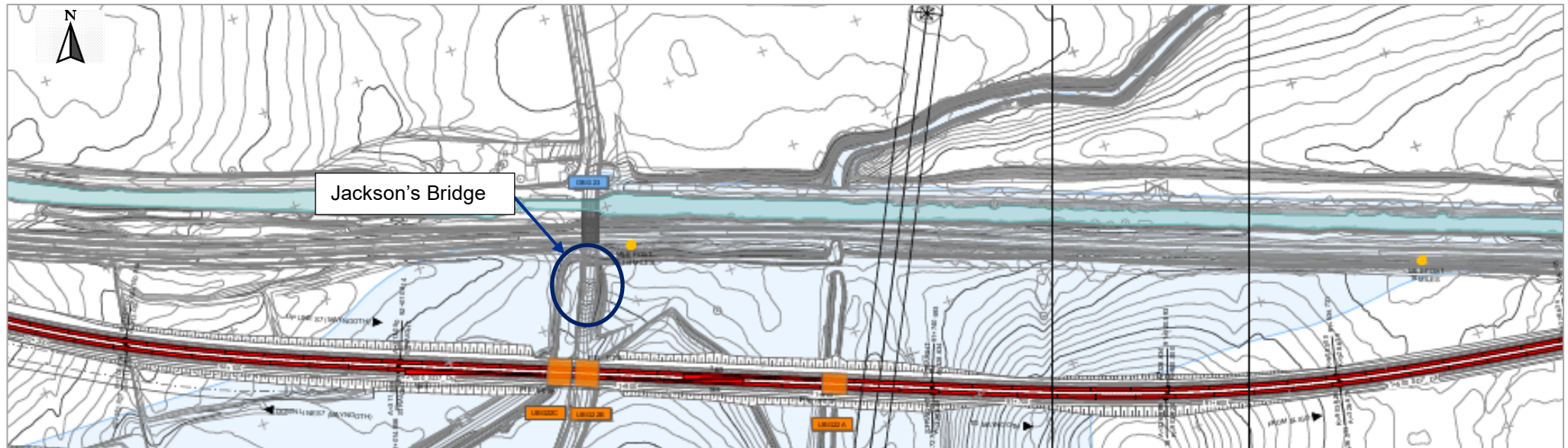


Figure 7-10 Alignment of Diverted Track to the South of Jackson's Bridge

7.7. Depot

7.7.1. General Description

The preferred option for the depot near Maynooth includes stabling with two-ended tracks and a main building adjacent in the central area resulting a length along the main line of around 2.58 km.

The configuration of the depot is a through type, with several two-ended tracks in the maintenance shed. All movements are enabled using shunting tracks when necessary. The access to the workshop and the stabling yard are direct from the main line. However, since the stabling yard is parallel to the maintenance shed, shunting movements will be necessary between both facilities.

The following facilities are located at the eastern side of the site:

- Automatic vehicle inspection (AVI)
- Automatic washing plant (AWP)
- Permanent way compound
- Service Slab building
- Main access and security building
- Substation.

The main building and stabling are located in the central area of the depot site. A shunting track is proposed on the western side to provide connection between the tracks for the stabling area and the workshop. The proposed layout is illustrated in **Figure 7-11**.

The main building will be the largest and most complex facility within the Maynooth depot. Administrative, operational and maintenance tasks will be carried out there. Also, the Depot Control Centre (DCC) will be located within the main building, from where the movement, control and security of vehicles within the depot will be managed.

Staff will be able to access the depot by car, walking or by cycling from the road access. The staff flows inside the depot are by road and footpaths interconnecting all the facilities: service slab, AWP and AVI, with the maintenance shed and the stabling yard.

Part of the site of the depot is subject to occasional flooding events. The proposed design incorporates areas of compensatory storage to ensure the proposed depot does not cause additional flooding in the area.

The depot is discussed in more detail in **Chapter 10 of Volume 2** of the OSR.

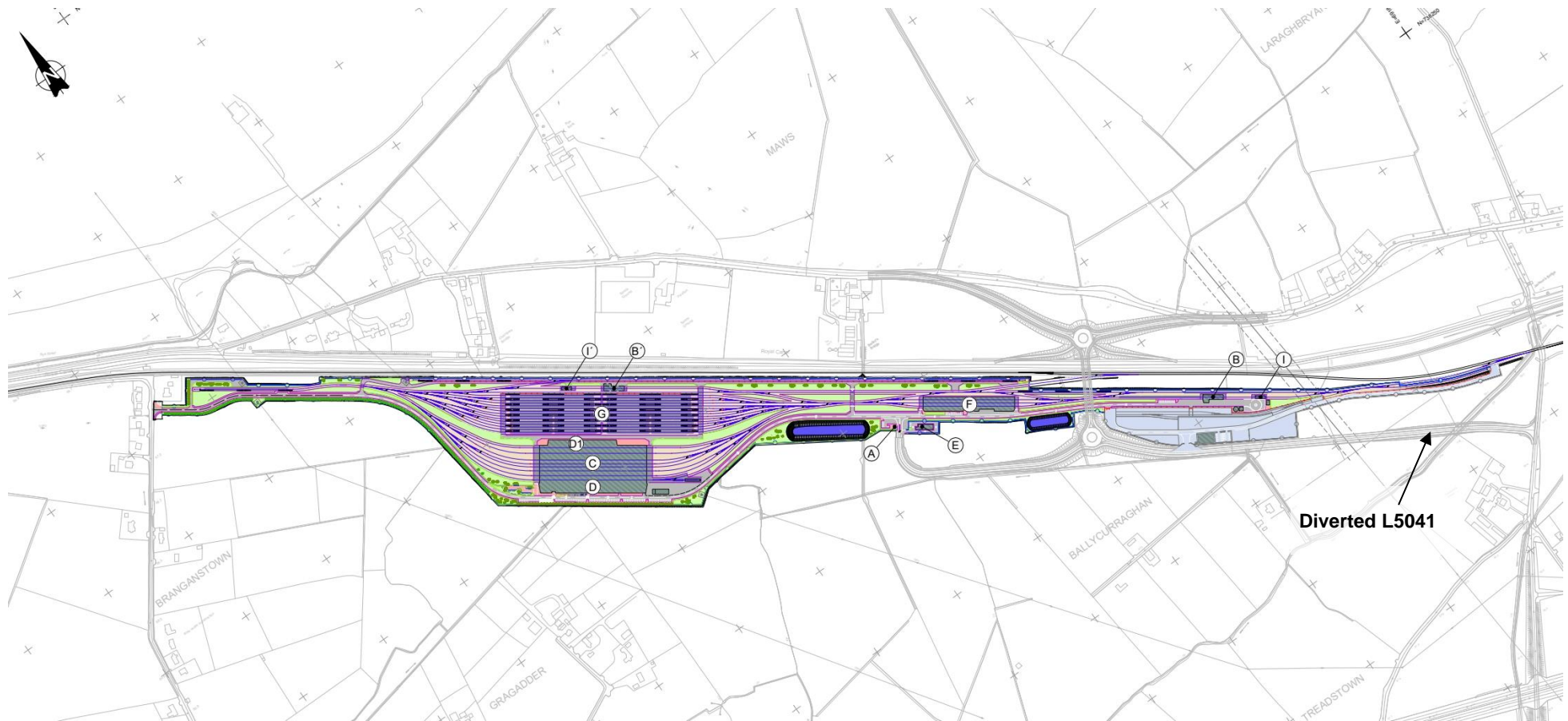


Figure 7-11 Depot preferred option

7.7.2. Depot Access

The preferred option for access to the new depot site is for a road access to the R148 via the realigned L5041 connecting depot traffic to Maynooth and Kilcock interchanges.

The new bridge will provide vehicular access to the R148 across the new depot site, railway and Royal Canal and provide access to the R148 for the realigned L5041 described in Section 7.6.3. The existing farm road providing access from the R148 to the land south of the railway will be closed, and access to the local road network south of the railway will be via this new access road.

The new bridge (referred to as OBG23A) which will provide access to the depot is indicated in plan in **Figure 7-12**.

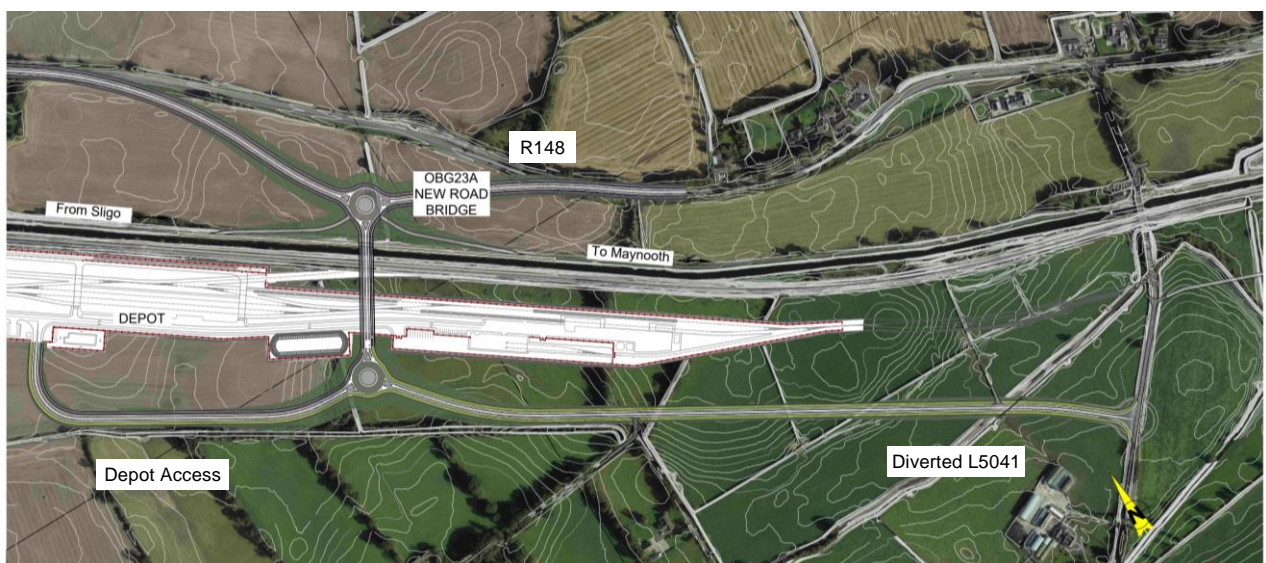


Figure 7-12 Plan of Depot Access Area

The internal road layout of the new depot site has been designed to provide heavy goods vehicle access throughout the site and to all facilities for servicing and maintenance. Access for special vehicles required to transport rolling stock has been considered in the design of the road layout.

8. Conclusion

The DART+ West is the first project in the DART+ Programme and proposes to deliver sustainable threefold enhancement in passenger capacity through electrification, re-signalling and associated infrastructural works along approximately 40 km of existing corridor from Maynooth & M3 Parkway Stations to the City Centre.

The preferred option for the DART+ West project is presented in this document, OSR Volume 1, with summary details of the public consultation process. OSR Volume 2 presents the detail of the option selection process which lead to the choice of the preferred option.

It is intended that this document will be published as part of the second stage of non-statutory public consultation. It is proposed that all supporting information will be made available with it.

On completion of the non-statutory public consultation, the public submissions received following the consultation period will be considered in further development of the design of the preferred option for publication as part of the statutory process for planning.

Annex 1.0 – Layout Figures