Chapter 05
Construction

Contents

5. Construction

5.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the construction activities associated with the Ballymun / Finglas to City Centre Core Bus Corridor Scheme, hereafter referred to as the Proposed Scheme.

The design of the Proposed Scheme has been developed to a stage where all potential environmental impacts can be identified, and a fully informed environmental impact assessment can be carried out.

The National Transport Authority (NTA) (the Employer for the construction works) shall set out the Employer's Requirements in the Construction Contract including all applicable mitigation measures identified in this EIAR, as well as additional measures required pursuant to conditions attached to any decision to grant approval. Procurement of the contractor will involve the determination that the appointed contractor is competent to carry out the works, including the effective implementation of the mitigation measures. The appointed contractor will be required to plan and construct the Proposed Scheme construction works in accordance with the Employer's Requirements, and the NTA will employ an Employer's Representative team with appropriate competence to administer and monitor the Construction Contract for compliance with the Employer's Requirements.

In order to allow an assessment of the Construction Phase impacts associated with the Proposed Scheme, this Chapter describes the construction phasing and programme as well as the construction activities necessary to undertake the works, including information on the Construction Compounds, construction plant and equipment.

This Chapter includes the following information:

- An overview of how the Proposed Scheme has been divided into sections is presented in Section 5.2;
- An overview of the construction activities proposed at each section along the Proposed Scheme (i.e., a description of what is proposed to be constructed) is presented in Section 5.3;
- A programme for the Proposed Scheme (i.e., when the sections will be constructed) is presented in Section 5.4;
- A general description of the construction methodology to be carried out at each section (i.e., how the Proposed Scheme will be built) is presented in Section 5.5;
- Information on the plant and equipment (i.e., what machinery will be used to construct the Proposed Scheme) is presented in Section 5.6;
- Information on the Construction Compounds is presented in Section 5.7;
- The temporary traffic management measures, including the staging measures to be carried out (i.e., how the vehicles, cyclists and pedestrians will be impacted and safely catered for, during the works) are presented in Section 5.8; and
- Infrastructure projects and developments which are expected to interface with the construction of the Proposed Scheme are referenced in Section 5.9.

Details of mitigation measures proposed to address potential impacts arising from construction activities are described in Chapter 6 to Chapter 21 as appropriate and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

A Construction Environmental Management Plan (CEMP) has also been prepared and is included as Appendix A5.1 in Volume 4 of this EIAR. The CEMP will be updated by the NTA prior to the commencement of the Construction Phase, so as to include any additional measures required pursuant to conditions attached to any decision to grant approval. The CEMP has regard to the guidance contained in the Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA) Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007), and the handbook published by Construction Industry Research and Information Association (CIRIA) in the United Kingdom, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

All of the measures set out in the CEMP appended to this EIAR will be implemented in full.

5.2 Construction Phasing

The Proposed Scheme has been divided into seven primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 17 sub-sections, according to the types of construction works required. The sections / sub-sections are:

- **Section 1:** Ballymun Road from St. Margaret's Road to Griffith Avenue;
- **Section 2:** St. Mobhi Road and Botanic Road from Griffith Avenue to Hart's Corner:
  - **Section 2a:** Griffith Avenue to Botanic Road;
  - **Section 2b:** Griffith Avenue;
  - **Section 2c:** Ballymun Road, Glasnevin Hill, Botanic Road; and
  - **Section 2d:** Botanic Road to Prospect Way.
- **Section 3:** Prospect Road, Phibsborough Road from Hart's Corner to Western Way:
  - **Section 3a:** Prospect Way to Lindsay Road;
  - **Section 3b:** Lindsay Road to Royal Canal;
  - **Section 3c:** Royal Canal to Western Way; and
  - **Section 3d:** Royal Canal Bank Cycleway.
- **Section 4:** Constitution Hill and Church Street to Arran Quay:
  - **Section 4a:** Western Way to Coleraine Street;
  - **Section 4b:** Coleraine Street to Arran Quay; and
  - **Section 4c:** Markets Cycleway.
- **Section 5:** Finglas Road from St. Margaret's Road to Wellmount Road;
- **Section 6:** Finglas Road from Wellmount Road to Ballyboggan Road; and
- **Section 7:** Finglas Road from Ballyboggan Road to Hart's Corner:
  - **Section 7a:** Ballyboggan Road to Claremont Lawns;
  - **Section 7b:** Claremont Lawns to St. Vincent's School; and
  - **Section 7c:** St. Vincent's School to Hart's Corner.

The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR. The construction activities to be carried out at each section / sub-section are described in Section 5.3.

5.3 Overview of Construction Works

The construction activities to be undertaken, and the anticipated duration of the works, in each section / sub-section are described in Section 5.3.1 to Section 5.3.7.3. The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR. This Section should be read in conjunction with the drawings listed in Table 5.1. These drawings are contained in Volume 3 of this EIAR.

Table 5.1: List of Relevant Drawings

Drawing Series Number	Description
BCIDD-ROT-SPW_ZZ-0304_XX_00-DR-CR-9001	Site Location Plan
BCIDD-ROT-GEO_GA-0304_XX_00-DR-CR-9001	General Arrangement
BCIDD-ROT-GEO_HV-0304_ML_00-DR-CR-9001	Mainline Plan and Profile
BCIDD-ROT-GEO_CS-0304_XX_00-DR-CR-9001	Typical Cross Sections
BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001	Landscaping General Arrangement
BCIDD-ROT-PAV_PV-0304_XX_00-DR-CR-9001	Pavement Treatment Plans
BCIDD-ROT-SPW_BW-0304_XX_00-DR-CR-9001	Fencing and Boundary Treatment
BCIDD-ROT-TSM_GA-0304_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDD-ROT-LHT_RL-0304_XX_00-DR-EO-9001	Street Lighting
BCIDD-ROT-TSM_SJ-0304_XX_00-DR-TR-9001	Junction System Design
BCIDD-ROT-STR_ZZ-0304_XX_00-DR-SS-9001	Structures
BCIDD-ROT-DNG_RD-0304_XX_00-DR-CD-9001	Proposed Surface Water Drainage Works
BCIDD-ROT-UTL_UD-0304_XX_00-DR-CU-9001	IW Foul Sewer Asset Alterations
BCIDD-ROT-UTL_UE-0304_XX_00-DR-CU-9001	ESB Asset Alterations
BCIDD-ROT-UTL_UG-0304_XX_00-DR-CU-9001	GNI Asset Alterations
BCIDD-ROT-UTL_UW-0304_XX_00-DR-CU-9001	IW Water Asset Alterations
BCIDD-ROT-UTL_UL-0304_XX_00-DR-CU-9001	Telecommunications Asset Alterations
BCIDD-ROT-UTL_UC-0304_XX_00-DR-CU-9001	Combined Existing Utility Records

For further details on the design specifications, with regards to matters such as parking and loading bay widths, signalised junctions, priority junctions, roundabouts, bus stops, accessibility, traffic signals, lighting, utilities, drainage, pavement, and landscape design, please refer to the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors, contained in Appendix A4.1 in Volume 4 of this EIAR.

5.3.1 Section 1: Ballymun Road from St. Margaret's Road to Griffith Avenue

Section 1 encompasses a length of approximately 2,930m (metres) along R108 Ballymun Road between St. Margaret's Road and R102 Griffith Avenue, including a short section of R108 St. Mobhi Road on the eastern side of the traffic gyratory junction at R102 Griffith Avenue. The construction activities at Section 1 will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. On-street parking laybys will be installed along Ballymun Main Street. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stops (including shelters and information displays etc.)) and landscaping works. Fencing will be realigned along Ballymun Main Street, between Santry Cross and Balbutcher Lane, to facilitate a bus stop relocation. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed along the central median, and along the verges. The expected construction duration will be approximately six months.

5.3.2 Section 2: St. Mobhi Road and Botanic Road from Griffith Avenue to Hart's Corner

5.3.2.1 Section 2a: Griffith Avenue to Botanic Road

Section 2a encompasses a length of approximately 940m along R108 St. Mobhi Road, between R102 Griffith Avenue and R108 Botanic Road, including a section approximately 200m in length along the northern side of the River Tolka, parallel to the River Tolka and St. Mobhi Drive, between R108 St. Mobhi Road and Glasnevin Hill. The construction activities at Section 2a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A fence will be realigned, and gates will be relocated at Scoil Chaitríona. The gates at Scoil Mobhi will be relocated. A major retaining wall at Home Farm Football Club (Structure Reference: 05) will be demolished and reconstructed. The major retaining wall will be approximately 148m in length and a maximum of 4m in retained

height. A gate will also be relocated as part of these works. Further information on the retaining wall construction methodology is provided in Section 5.5.4.1.5. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed along this section, particularly at Scoil Chaitríona, Home Farm Football Club, and Na Fianna GAA Club. The expected construction duration will be approximately nine months.

5.3.2.2 Section 2b: Griffith Avenue

Section 2b encompasses a length of approximately 200m along Griffith Avenue, between St. Mobhi Road and Ballymun Road. The construction activities at Section 2b will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Trees and vegetation will be removed along Griffith Avenue. The expected construction duration will be approximately three months.

5.3.2.3 Section 2c: Ballymun Road, Glasnevin Hill, Botanic Road

Section 2c encompasses a length of approximately 1,100m along Ballymun Road, Glasnevin Hill, and Botanic Road between R102 Griffith Avenue and R108 St. Mobhi Road, including St. Mobhi Drive. The construction activities at Section 2c will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. A section of the Tolka Valley Cycleway will be constructed parallel to St. Mobhi Drive, and the River Tolka, across open green space. Urban realm works will be carried out in Glasnevin Village. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A fence and a wall will be realigned at Daneswell Place. Some minor utility diversions and / or protections will be required. Vegetation will be removed at the entrance to Bon Secours Hospital. The expected construction duration will be approximately six months.

5.3.2.4 Section 2d: Botanic Road to Prospect Way

Section 2d encompasses a length of approximately 375m along R108 Botanic Road, between Fairfield Road and Prospect Way. The construction activities at Section 2d will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Trees will be removed along R108 Botanic Road, at Daneswell Place. The expected construction duration will be approximately two months.

5.3.3 Section 3: Prospect Road, Phibsborough Road from Hart's Corner to Western Way

5.3.3.1 Section 3a: Prospect Way to Lindsay Road

Section 3a encompasses a length of approximately 150m along R108 Botanic Road, between Prospect Way and Lindsay Road. The construction activities at Section 3a will comprise pavement reconstruction, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. A two-way cycle track will be constructed along the eastern side of the road. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed at the junction of R108 Botanic Road and R135 Finglas Road. The expected construction duration will be approximately two months.

5.3.3.2 Section 3b: Lindsay Road to Royal Canal

Section 3b encompasses a length of approximately 200m along R108 Prospect Road, between Lindsay Road and the Royal Canal. The construction activities at Section 3b will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. A two-way cycle track will be constructed along the eastern side of the road. New pedestrian / cycle bridges over the railway at Lindsay Grove (Structure Reference: 01) and Whitworth Road (Structure Reference: 02) will be constructed next to the existing railway bridges to facilitate the addition of the cycle track. Further information on the methodology is provided in Section 5.5.4.1.1 and Section 5.5.4.1.2. Construction activities will also consist of additional signage, new road markings,

new and amended traffic signal infrastructure, new street furniture and landscaping works. Vegetation will be removed along the Royal Canal. The expected construction duration will be approximately nine months.

5.3.3.3 Section 3c: Royal Canal to Western Way

Section 3c encompasses a length of approximately 1,100m along R108 Phibsborough Road, between the Royal Canal and R135 Western Way. The construction activities at Section 3c will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. An existing wall at Phibsborough Shopping Centre will be realigned. Cellars at Doyle's Corner will not be impacted. Some minor utility diversions and / or protections will be required. Trees will be removed along R108 Phibsborough Road. The expected construction duration will be approximately three months.

5.3.3.4 Section 3d: Royal Canal Bank Cycleway

Section 3d encompasses a length of approximately 1,250m along the Royal Canal Bank, between Whitworth Road and R135 Western Way. The construction activities at Section 3d will comprise resurfacing of the footpaths, and cycle tracks, and new kerbs. A new pedestrian / cycle bridge over the Royal Canal (Structure Reference: 03), will be constructed to facilitate cyclists accessing the Royal Canal Bank Cycleway. Further information on the construction methodology is provided in Section 5.5.4.1.3. A new Royal Canal Bank Underpass under R101 North Circular Road (Structure Reference: 04) will be constructed to facilitate pedestrians and cyclists accessing the Royal Canal Bank Cycleway. Further information on the construction methodology is provided in Section 5.5.4.1.4. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Trees and vegetation will be removed along the Royal Canal, either side of R101 North Circular Road, and along R135 Western Way. The expected construction duration will be approximately 12 months.

5.3.4 Section 4: Constitution Hill and Church Street to Arran Quay

5.3.4.1 Section 4a: Western Way to Coleraine Street

Section 4a encompasses a length of approximately 300m along R108 Constitution Hill, between R135 Western Way and Coleraine Street. The construction activities at Section 4a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. A two-way cycle track will be constructed along the eastern side of the road. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed at R108 Constitution Hill, particularly at the Dublin Bus Phibsborough Depot. The expected construction duration will be approximately six months.

5.3.4.2 Section 4b: Coleraine Street to Arran Quay

Section 4b encompasses a length of approximately 670m along R132 Church Street, between Coleraine Street and R148 Arran Quay. The construction activities at Section 4b will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed at the area between R132 Church Street, Coleraine Street and Linenhall Terrace. The expected construction duration will be approximately three months.

5.3.4.3 Section 4d: Markets Cycleway

Section 4d encompasses a length of approximately 770m along the Markets Cycleway, between Coleraine Street and R148 Ormond Quay. The construction activities at Section 4d will comprise new road markings, new street furniture and landscaping works. The expected construction duration will be approximately two months.

5.3.5 Section 5: Finglas Road from St. Margaret's Road to Wellmount Road

Section 5 encompasses a length of approximately 750m along R135 Finglas Road, between R104 St. Margaret's Road and Wellmount Road. The construction activities at Section 5 will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and some lengths of cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A footpath will be constructed through Mellowes Park. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed along R135 Finglas Road, particularly at the R104 St. Margaret's Road Roundabout, at the Finglas Bypass slip roads, and between Church Street and Wellmount Road. The expected construction duration at the Finglas Bypass will be approximately one week, and the Mellowes Park footpath will be approximately five weeks. The expected construction duration for localised works (for new toucan crossings at R104 St. Margaret's Road, and for a cycle track link to Mellowes Road) will be approximately 12 weeks.

5.3.6 Section 6: Finglas Road from Wellmount Road to Ballyboggan Road

Section 6 encompasses a length of approximately 1,700m along R135 Finglas Road, between Wellmount Road and Ballyboggan Road. The construction activities at Section 6 will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Trees and vegetation will be removed along R135 Finglas Road, along the verges, and the central median. The expected construction duration will be approximately six months.

5.3.7 Section 7: Finglas Road from Ballyboggan Road to Hart's Corner

5.3.7.1 Section 7a: Ballyboggan Road to Claremont Lawns

Section 7a encompasses a length of approximately 1,100m along R135 Finglas Road, between Ballyboggan Road and Claremont Lawns. The construction activities at Section 7a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A wall along R135 Finglas Road, at the junction of Slaney Road, will be realigned. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed along R135 Finglas Road, along the verges, and the central median. The expected construction duration will be approximately six months.

5.3.7.2 Section 7b: Claremont Lawns to St. Vincent's School

Section 7b encompasses a length of approximately 380m along R135 Finglas Road, between Claremont Lawns and St. Vincent's School. The construction activities along R135 Finglas Road at Section 7b will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. At the public park area at Claremont Lawns, extensive works will be carried out for the construction of a new car park opposite Glasnevin Cemetery. A fence will be realigned, and a gate will be relocated along R135 Finglas Road, opposite Glasnevin Cemetery. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed along R135 Finglas Road, particularly opposite Glasnevin Cemetery. The expected construction duration will be approximately six months.

5.3.7.3 Section 7c: St. Vincent's School to Hart's Corner

Section 7c encompasses a length of approximately 300m along R135 Finglas Road, between St Vincent's School and Lindsay Road, approximately 140m along Prospect Way, between R135 Finglas Road and R108 Botanic Road. The construction activities at Section 7c will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A fence will be realigned, and gates will be relocated at St. Vincent's School. A fence will be realigned,

and gates will also be relocated at 34 to 42, Finglas Road. Some minor utility diversions and / or protections will be required. Trees and vegetation will be removed along R135 Finglas Road, particularly at St. Vincent's School. The expected construction duration will be approximately six months.

5.4 Construction Programme

A programme for the Proposed Scheme is provided in Table 5.2. The total Construction Phase duration for the overall Proposed Scheme is estimated at approximately 24 months. However, construction activities in individual sections will have shorter durations, as outlined in Section 5.3. The programme identifies the approximate duration of works at each section. The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR.

Table 5.2: Proposed Scheme Construction Programme

Section Ref.	Approximate Construction Duration	Approximate Length (m)	Year 1				Year 2			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Section 1	6 months	2,930								
Section 2a	9 months	940								
Section 2b	3 months	200								
Section 2c	6 months	1,100								
Section 2d	2 months	375								
Section 3a	2 months	150								
Section 3b	9 months	200								
Section 3c	3 months	1,100								
Section 3d	12 months	1,250								
Section 4a	6 months	300								
Section 4b	3 months	670								
Section 4c	2 months	770								
Section 5	1 week / 5 weeks / 12 weeks	750								
Section 6	6 months	1,700								
Section 7a	6 months	1,100								
Section 7b	6 months	380								
Section 7c	6 months	300								

In order to achieve the overall programme duration, it will for the most part, be necessary to work on more than one section / sub-section at any one time. The programme has been prepared with a view to providing as much separation as practicable between sections under construction at any given time. This has been done in order to minimise traffic disruption and facilitate the ease of movement of sustainable modes, bus services and goods along the Proposed Scheme.

5.5 Construction Methodology

This Section provides an outline of how each element of the Proposed Scheme infrastructure will be constructed. It should be read in conjunction with the phasing set out in Section 5.3 and Section 5.4, and also with the traffic management stages set out in Section 5.8.

5.5.1 Pre-Construction

The NTA will prepare the Construction Contract documents, which will include all applicable mitigation measures identified in this EIAR, as well as any additional measures required in any conditions attached to any decision by An Bord Pleanála, should they grant approval.

The preparations will also include the need for additional investigative survey works (such as ground investigation and slit trenching to confirm the location of existing utilities) to supplement the information in the Construction Contract documents. Any such additional investigative survey works that could be deemed to be construction activities will follow the requirements of the CEMP, where necessary.

The NTA will also serve notices on impacted landowners in accordance with the requirements of the Compulsory Purchase Order (CPO) process to ensure necessary lands are available for the construction works.

5.5.2 Preparatory and Site Clearance Works

Additional preparations will be required prior to commencing the road and street upgrade works, to confirm the construction methodology, such as additional investigative survey works (such as confirmatory invasive species surveys, ground investigation and slit trenching to confirm the location of existing utilities).

There will be elements of preparatory works, including establishing the Construction Compounds, the installation of fencing and signage, vegetation clearance and treatment of non-native invasive species, demolition works (e.g., such as boundary walls), etc. required in preparation for the main construction activities.

5.5.2.1 Land Acquisition and Boundary Treatment

Condition surveys of properties adjacent to the Proposed Scheme that the works have the potential to affect will be undertaken prior to works commencing. Liaison with impacted landowners will be carried out in advance of the commencement of boundary works to properties.

Boundary works will be commenced where both permanent and temporary land acquisition is required to ensure that sufficient space is available to construct the Proposed Scheme. Boundary treatments will be carried out on a section-by-section basis (with sections / sub-sections defined in Section 5.2), and in line with the traffic management stages set out in Section 5.8.3.

This will be a mixture of boundary walls / fencing along industrial / commercial land, railings along parks and temporary boundaries, as required. Any land temporarily acquired from a landowner will only be utilised for the purposes of undertaking boundary works or accommodation works related to the land in question.

Any lands acquired temporarily to facilitate construction work will be returned to landowners on completion of the works. Existing boundary walls or fencing being relocated will be constructed to match the existing conditions, unless otherwise agreed. The removal of trees, vegetation, lawns, paving etc. will be minimised in so far as practicable.

5.5.2.2 Fencing

Fencing will be erected on a section-by-section basis (with sections / sub-sections defined in Section 5.2), and in line with the traffic management stages set out in Section 5.8.3.

5.5.2.3 Construction Traffic Management Measures and Signage

Prior to commencing the construction works described below within a sub-section of the Proposed Scheme, temporary traffic management measures will be installed. The temporary traffic management measures, including measures for pedestrians, cyclists, public transport users, general traffic, proposed lane closures, road closures and diversions are discussed in detail in Section 5.8. Temporary traffic management signage will be put in place in accordance with the requirements of the Department of Transport's Traffic Signs Manual, Chapter 8, Temporary Traffic Measures and Signs for Roadworks (hereafter referred to as the Traffic Signs Manual) (Department of Transport, Tourism and Sport 2019). Further information is also provided in the Construction Traffic Management Plan (CTMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.5.2.4 Tree Protection

Trees to be retained within and adjoining the works areas will be suitably protected as necessary, as per the British Standards Institution (BSI) British Standard (BS) 5837:2012 Trees in Relation to Design, Demolition and Construction ((BSI 2012). Trees identified for removal will be removed in accordance with BS 3998:2010 Tree Work. Recommendations (BSI 2010). The location of trees to be retained, and trees to be removed is shown on the Landscaping General Arrangement Drawings (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001).

A suitably qualified arborist will be appointed by the contractor to monitor tree protection, and tree removal related activities. The design has been developed to ensure removal of trees has been minimised in so far as practicable. Where necessary, protective fencing will be erected, and mitigation measures will be put in place, prior to construction works commencing in the immediate vicinity.

Works required within the root protection area of trees to be retained will follow the arboricultural methodology included in Appendix A17.1 Arboricultural Impact Assessment in Volume 4 of this EIAR. Further information on mitigation measures with regards to the removal, and protection of trees is provided in Chapter 12 (Biodiversity) and further information on the assessment of tree removal with regards to landscape and visual impact is provided in Chapter 17 (Landscape (Townscape) & Visual) of this EIAR.

5.5.2.5 Vegetation Clearance and Treatment of Non-Native Invasive Species

Vegetation (e.g., hedgerows, scrub, grassland) clearance and treatment of non-native invasive species (e.g., Japanese knotweed, Himalayan balsam, Giant hogweed) will be undertaken within the Proposed Scheme boundary, where necessary.

A suitably qualified specialist will be appointed by the contractor to monitor vegetation clearance, and treatment of non-native invasive species. Prior to construction, confirmatory invasive species surveys will be undertaken by the specialist to re-confirm the presence and / or extent of species within the footprint of the Proposed Scheme. Further information with regards to pre-construction ecological surveys and restrictions are provided in Chapter 12 (Biodiversity) of this EIAR. Vegetation identified for removal will be removed in accordance with BS 3998:2010 Tree Work. Recommendations (BSI 2010) and best arboricultural practices as detailed and monitored by the specialist. The Invasive Species Management Plan (ISMP) for the control of invasive plant species on the site of the Proposed Scheme is included in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.5.2.6 Archaeological Investigations

The NTA will procure the services of a suitably qualified archaeologist as part of its Employer's Representative team administering and monitoring the works. In addition, a suitably qualified archaeologist will be appointed by the contractor to monitor archaeological and cultural heritage matters during construction, to acquire any licenses / consents required to conduct the work, and to supervise and direct the archaeological measures associated with the Proposed Scheme in accordance with the Employer's Requirements. In the event of archaeological features or material being uncovered during the Construction Phase, all machine work will cease in the immediate area to allow the archaeologist time to inspect and record any such material. Further information on archaeological management is included in Section 15.5 in Chapter 15 (Archaeological & Cultural Heritage) of this EIAR.

5.5.2.7 Ground Investigations

Prior to construction, localised confirmatory ground investigations will be undertaken to verify the results of the assessments undertaken and reported in this EIAR.

Information on the specific ground investigations conducted along the Proposed Scheme have been outlined in Chapter 14 (Land, Soils, Geology & Hydrogeology) of this EIAR.

5.5.2.8 Construction Compounds

As part of preparatory works, the Construction Compounds will be set up which will include installation of the necessary facilities including the site office, welfare facilities, etc. Controlled access to the Construction Compounds will be implemented, fencing will be erected, and lighting will be installed. The Construction Compounds will be secured with Closed-Circuit Television (CCTV), to ensure safe storage of all material, plant and equipment. Temporary fencing will be erected, and site security will be employed. Further information on the Construction Compounds is included in Section 5.7.

5.5.2.9 Lighting

The majority of the Proposed Scheme is already artificially lit. However temporary lighting will be required at times along the Proposed Scheme at certain locations during the Construction Phase, as necessary. Where it is necessary to disconnect public lighting during the construction works or to undertake works outside of daylight hours where existing lighting is low, appropriate temporary lighting will be provided. Temporary lighting will also be installed at the Construction Compounds for the duration of the Construction Phase.

The standard of temporary lighting installed during the Construction Phase will meet the standard of the existing carriageway and will be appropriate to the speed and volume of traffic during construction. Temporary construction lighting will generally be provided by tower mounted floodlights, which will be cowled and angled downwards to minimise spillage of light from the site.

New permanent lighting and upgrades to the existing lighting infrastructure are also proposed as part of the Proposed Scheme's lighting strategy, the details of which are addressed in Section 4.6 in Chapter 4 (Proposed Scheme Description) of this EIAR.

5.5.2.10 Demolition

In some locations along the Proposed Scheme, items, such as walls, gates, fencing, lighting poles, bus stops, etc. will need to be removed or demolished. The impacts of materials arising from the Proposed Scheme demolitions are assessed in Chapter 18 (Waste & Resources) of this EIAR. Measures for managing demolition materials are included in the Construction and Demolition Resource Waste Management Plan (CDRWMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.5.3 Road and Street Upgrades

5.5.3.1 General

The Proposed Scheme will be constructed in a manner which will minimise, as much as practicable, any disturbance to residents, businesses and road users. Road and street upgrade works will be completed in a staged manner, as described in Section 5.8.3, whereby traffic of all modes will be managed to ensure construction can continue while ensuring the safety of all road users, and personnel, and maintaining flow of all modes of traffic wherever practicable.

5.5.3.2 Parking and Access

When roads and streets are being upgraded, there will be some temporary disruption / alterations to on-street and off-street parking provision, and access to premises in certain locations along the Proposed Scheme. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses

affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with residents and business owners prior to construction starting in the area. The duration of the works will vary from property to property, but access and egress will be maintained at all times. The location of temporary land acquisition, proposed gates, and the relocation of existing gates are shown in the Fencing and Boundary Treatment Drawings (BCIDD-ROT-SPW_BW-0304_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

5.5.3.3 Earthworks

Topsoil and subsoil will be excavated as part of the Proposed Scheme, for foundations, bus stop shelters, signs, public lights, traffic signal poles, tree pits etc. This topsoil and subsoil may be temporarily stored at the Construction Compounds for reuse where practicable, in line with the principles of circular economy. The Proposed Scheme will aim to minimise the amount of materials brought onto the Proposed Scheme in so far as practicable. The acceptability of earthworks material for reuse will be determined, by testing and analysis, to determine if materials meet the specific engineering standards for their proposed end-use.

All earthworks will be managed having regard to the Guidelines for the Management of Waste from National Road Construction Projects (TII 2017), and Number 10 of 1996 – Waste Management Act, 1996, as amended (hereafter referred to as the Waste Management Act). The management of materials is discussed in Chapter 18 (Waste & Resources) of this EIAR. The overall estimated quantities of demolition, excavation, and reuse materials for the Proposed Scheme are outlined respectively in Table 18.8, Table 18.9, and Table 18.13 in Chapter 18 (Waste & Resources) of this EIAR. The overall estimated quantities of imported materials for the Proposed Scheme are outlined in Table 19.10 in Chapter 19 (Material Assets) of this EIAR.

5.5.3.4 Cellars

Excavations within the City Centre will be minimal, thereby reducing the risk of interference with existing cellars along the Proposed Scheme. At certain locations, cellars extend outwards from buildings into adjoining footpaths or streets. Cellars have been identified at Section 3c, at Doyle's Corner. Building condition surveys will be completed immediately prior to any works. However, it is not anticipated that the proposed works will impact directly on any cellars.

In the unlikely event that works are required to a cellar, works would comprise of lowering the cellar roof, blocking up and backfilling a portion of the cellar or blocking up and backfilling the entire extent of the cellar. Such cellar works would generally commence with the excavation of the footpath. A concrete block wall would then be constructed within the cellar at the location of what is to be the new external wall of the cellar, before infilling.

5.5.3.5 Drainage

Adjustment or upgrade works will be required to service chambers and manholes, gullies, etc. Access manholes located in the footways will be lowered or raised to match the proposed carriageway levels, where the carriageway will be widened into the existing footways.

Specific controls and mitigation measures will be put in place to manage runoff and minimise pollution to receiving water bodies during the Construction Phase of the Proposed Scheme. Further information with regards to drainage, and drainage design is included in Chapter 4 (Proposed Scheme Description), Chapter 13 (Water), Chapter 19 (Material Assets) and the Surface Water Management Plan (SWMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.5.3.6 Utility Works

Realignment, upgrade or replacement of utilities and services will be required in conjunction with, or to accommodate the Proposed Scheme. Any such works to utilities and services will be along or immediately adjacent to the Proposed Scheme. A list of utility and service works along the Proposed Scheme is provided in Chapter 19 (Material Assets) of this EIAR.

Utilities and services, including overhead and underground, comprise amongst others:

- Watermains;
- Storm water and foul sewers;
- Fuel pipelines;
- Electricity ducts and cabling;
- Gas mains;
- Telecommunications and TV ducting and cabling; and
- Traffic signalling ducting and cabling.

The existing overhead utilities and services will be located and recorded prior to the commencement of works. Any relocation of existing overhead lines will be coordinated to ensure interruption to the existing network is minimised.

Proposed utility works are based on available records, and preliminary site investigations. Prior to excavation works being commenced, localised confirmatory surveys will be undertaken by the appointed contractor to verify the results of the pre-construction assessments undertaken and reported in this EIAR.

Areas to be excavated for utility trenches will first be traced for live services using established scanning techniques. Where necessary, trenches excavated for utility diversions will be supported to ensure that the sides of the excavation are secure. Each of the different utilities will be re-laid at a location, depth and spacing in agreement with the appropriate standards, and the trench then backfilled.

5.5.3.7 Pavement and Carriageway Works

This Section describes the pavement and carriageway works to be completed along the Proposed Scheme, including construction, or alterations to the carriageway, kerbs, parking and loading bays, footpaths, cycle tracks (cycle paths, cycle tracks, cycle lanes), bus stops (island, shared landing area, inline, layby) etc. The following options outline the pavement construction / reconstruction scenarios required along the Proposed Scheme:

- Where the existing road surfacing is showing signs of deterioration, the existing pavement will be replaced (i.e., road pavement and surfacing will be removed and replaced to similar levels as existing);
- Where the quality of the existing road pavement is poor or where the existing road will be widened, full depth road foundation and pavement reconstruction will be carried out; and
- In some instances, road overlay (i.e., the addition of new pavement / road surfacing material), with no excavation, will be provided.

The proposed pavement treatment along the Proposed Scheme is provided in the Pavement Treatment Plans (BCIDD-ROT-PAV_PV-0304_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

Existing asphalt / bituminous layers will be removed using road planers, with planings being recycled where possible, as is common practice. Following this, existing lower courses of road make-up or ground will be excavated in layers using mechanical excavators in order to segregate materials for reuse, recycling or disposal, as appropriate, with materials being transported using lorries. The new or rehabilitated pavement will then be constructed from formation level, in coordination with the installation of street furniture assets. Plant used in construction of the new road make-up will be excavators, rollers, dumpers, and lorries. Road markings and reflective road studs will also be installed.

The choice of materials will include unbound or hydraulically bound granular materials for the foundation, hydraulically bound materials, hot or cold bituminous mixtures for base and binder layers and natural stone or concrete paving units, bituminous mixtures or concrete materials for the surface. Specialist products such as high friction surfacing treatments will also be applied to the surface of the pavement where appropriate.

5.5.3.8 Traffic Signal Junctions

During the works, the existing traffic signals will remain in operation, supplemented as necessary by temporary traffic signals, until such time as the new signals become operational.

The existing signalised junctions along the Proposed Scheme will be upgraded to provide bus priority, enhanced pedestrian crossings and segregated cycling facilities. In general, traffic signals will be replaced, and additional dedicated signals will be provided for buses, cyclists and pedestrians. Underground works will be required to provide additional ducts for traffic signal electrical and telecommunication cables, as described in Section 5.5.3.6, with associated chambers and control boxes above ground. Additional traffic monitoring equipment will be provided, including CCTV cameras and other detectors.

5.5.3.9 Ancillary Road Furnishings

The appointed contractor will install street furniture such as rubbish bins, signage, seats, lighting, benches, planters, bollards, cycle racks and bus stops (including shelters and information displays etc.).

5.5.3.10 Landscaping

Where vegetation, grassed areas and hedgerows are disturbed during the works, these will be reinstated, and replaced, where practicable. New trees will be planted in suitable tree pits, where necessary, at various locations as shown in the Landscaping General Arrangement Drawings (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

5.5.4 Structural Works

5.5.4.1 Principal Structures

The principal structural works which form part of the Proposed Scheme are summarised in Table 5.3. Further details are provided in Section 5.5.4.1.1 to Section 5.5.4.1.5. Further information on the structures along the Proposed Scheme is provided in the Bridges and Major Retaining Structures Drawings (BCIDD-ROT-STR_ZZ-0304_XX_00-DR-SS-9001) in Volume 3 of this EIAR.

Table 5.3: Principal Structures

Structure Name	Structure Reference	Section Reference
Pedestrian / Cycle Bridge over Railway at Lindsay Grove	01	Section 3b
Pedestrian / Cycle Bridge over Railway at Whitworth Road	02	Section 3b
Pedestrian / Cycle Bridge over the Royal Canal	03	Section 3d
Royal Canal Bank Underpass under North Circular Road	04	Section 3d
Retaining Wall at St. Mobhi Road, Home Farm Football Club	05	Section 2a

5.5.4.1.1 Pedestrian / Cycle Bridge over Railway at Lindsay Grove (Structure Reference: 01)

A pedestrian / cycle bridge will be constructed, over the railway line at R108 Prospect Road, near Lindsay Grove. The bridge will be a single span, fully integral portal bridge, adjacent to the existing bridge over the railway line. The proposed bridge will be immediately adjacent to the existing railway over-bridge OBO11, but without structural connection between them. The proposed bridge will be independent to the existing bridge, separated by a traffic durable longitudinal expansion joint. The joint will accommodate differential movement between the proposed and existing bridges.

The proposed bridge will be approximately 17.5m in length, with clearance of approximately 4.90m. A typical section of the bridge will consist of eight precast prestressed concrete beams, and a cast in-situ reinforced concrete slab. The bridge will be supported on piled foundations, and the foundations will consist of three reinforced concrete piles of 0.5m diameter per abutment; a reinforced concrete pile cap at the top of the piles, to transfer the loads from the deck to the piles; and a ballast wall to retain the ground. The length of the piles has been estimated to be 10.0m. The precast beams will be lifted in place in close proximity, such that formwork will not be required for slab construction. The integral connection between the deck and the substructure will be made

at the pile cap during construction. The barrier of the proposed bridge will be a concrete parapet with a restrained height of 1.85m.

Access to the works area will be provided from the wide footpath area in front of The Bernard Shaw pub, separated from the adjoining public footpath along the road edge. To construct the bridge, screen protection will be provided to prevent materials falling onto the railway track. The areas in front of The Bernard Shaw pub and Prospect Medical Centre adjoining the bridge will be cordoned off to provide working space for the bridge works. Prefabricated structural elements will be delivered to the works location. Bored concrete piles will be installed, with a pile driver, behind the existing railway retaining walls adjacent to Prospect Medical Centre and The Bernard Shaw pub, on the north and south side of the railway track, respectively. The abutments will be excavated and constructed behind the existing walls, and the parapet walls will be demolished. Precast concrete beams will be lifted into place using a mobile crane on either side of the bridge and reinforced to complete the deck. Road closures for a short period on R108 Phibsborough Road are likely to be required during delivery of the bridge beams (and also for short periods during piling operations). It is envisaged that the beams will be lifted over the railway tracks over several nights. The appointed contractor will liaise with Iarnród Éireann and obtain all necessary consents from them in advance of the works commencing. Finally, the pavement and parapets will be finished.

5.5.4.1.2 Pedestrian / Cycle Bridge over Railway at Whitworth Road (Structure Reference: 02)

A pedestrian / cycle bridge will be constructed, over the railway line at R108 Prospect Road, near Whitworth Road, to facilitate carriageway widening. The bridge will be a single span, fully integral portal bridge, adjacent to the existing bridge over the railway line. The proposed bridge will be immediately adjacent to the existing railway overbridge OBD222. The proposed bridge will be independent to the existing bridge, separated by a gap.

The proposed bridge will be approximately 13.3m in length between bearings centre line, with the piled foundations behind the existing walls, with vertical clearance of approximately 5m. A typical section of the bridge will consist of 14 precast prestressed concrete beams, and a cast in-situ reinforced concrete slab. The bridge will be supported on piled foundations, and the foundations will consist of four reinforced concrete piles of 0.5m diameter per abutment; a reinforced concrete pile cap at the top of the piles, to transfer the loads from the deck to the piles; and a ballast wall to retain the ground. The precast beams will be lifted in place in close proximity, such that formwork will not be required for slab construction. The integral connection between the deck and the substructure will be made at the pile cap during construction. The barrier of the proposed bridge will be a concrete parapet with a restrained height of 1.85m.

Access to the works area will be provided from the northern bank of the Royal Canal. To construct the bridge, screen protection will be provided to prevent materials falling onto the railway track. Prefabricated structural elements will be delivered to the works location. Bored concrete piles will be installed, with a pile driver, behind the existing railway retaining walls. The abutments will be excavated and constructed behind the existing walls, and the parapet walls will be demolished. Precast concrete beams will be lifted into place using a mobile crane on either side of the bridge and reinforced to complete the deck. Road closures for a short period are likely to be required on R108 Phibsborough Road and / or Whitworth Road during delivery of the bridge beams (and also for short periods during piling operations). It is envisaged that the beams will be lifted over the railway tracks over several nights. The appointed contractor will liaise with Iarnród Éireann and obtain all necessary consents from them in advance of the works commencing. The crane will be located on the Royal Canal Bank to the south of the bridge, and the existing Royal Canal Way walkway will be closed during construction with a diversion onto the southern bank. Finally, the pavement and parapets will be finished.

5.5.4.1.3 Pedestrian / Cycle Bridge over the Royal Canal (Structure Reference: 03)

A pedestrian / cycle bridge will be constructed, to facilitate the continuation of the Royal Canal Bank Cycleway, over the Royal Canal, whilst maintaining canal navigation. The bridge will be an arch bridge with an overall length of 17m, spanning the Royal Canal. The bridge will have a vertical clearance of 3.5m over the canal water level and a horizontal navigation clearance of 10m. The overall width of the arch bridge will be 6.0m. The total width of the bridge deck will be 5.15m, including the railings, and will provide a clearance width of 4.0m for the cycle lane.

The bridge superstructure consists of two arches, located outside of the deck, with cables supporting the deck. The arches and the deck will be constructed from steel. The arch sections consist of Circular Hollow Sections and the deck surface will be constructed in perforated steel sheets, to provide water-permeable surfaces.

The bridge will be supported on piled foundations; consisting of four reinforced concrete encased piles of 0.5m diameter per abutment, a reinforced concrete pile cap at the top of the piles and a reinforced concrete abutment wall. The piles will be approximately 6.0m. The precast concrete U-shape ramp retaining walls will be placed in shallow foundations that will not require temporary sheet piles for excavations. The precast concrete ramp walls will be clad in masonry.

In consultation with Waterways Ireland, the appointed contractor will temporarily lower the canal water level over a length of 300m between locks to approximately 0.5m depth (estimated duration two months), to enable the excavation of the foundation strips along the canal banks and the completion of the foundation works along the canal banks. Thereafter, and to avoid any further unnecessary disturbance of sedimentation or changes to the hydrological regime, sandbags will be used to create a dry working area in the canal. Canal water within this area will be pumped clear via a silt-buster tank, or similar, and back to the canal.

The ground surface will be prepared, with minor excavations to achieve the piling level. Prefabricated structural elements will be delivered to the works location. Bored pile drilling will be completed. Steel pile casings will be pushed down as the augur bores the hole. Steel cases will be adopted to prevent leakage of concrete in the canal. As the auger withdraws, concrete will be pumped into the hole and finally reinforcement cages pushed into the concrete. The drilling / piling activity will be completed over a period of two weeks, with one to two piles per day. Closures of R108 Phibsborough Road for short periods are likely to be required during delivery of pile casing and reinforcement.

In order to construct the ramps, the ground surface will be prepared, and minor excavations will be completed to achieve the foundation level. The precast concrete ramp trough sections will be installed by crane, with masonry wall finish pre-installed. The ramps will be filled with crushed stone, and finally the pavement and parapets will be completed.

The bridge deck will be completed last. The steel deck will be preassembled off site in different segments, including the arch, ribs, and deck. The segments will be transported to site, and the segments will be erected and assembled by crane, from both sides of the canal, to reduce the required distance for each one and reduce the size of cranes required on both banks. A closure of a short duration (less than three days) of the Royal Canal Bank (Eglinton Terrace), south of the bridge location, will be required for the erection of the arches, ribs, and deck. The hangers will be positioned and tensioned, and finally the parapets and lighting will be put in place.

5.5.4.1.4 Royal Canal Bank Underpass under North Circular Road (Structure Reference: 04)

A pedestrian / cyclist underpass will be constructed, under R101 North Circular Road, to facilitate unimpeded passage for cyclists and pedestrians along the Royal Canal Bank Cycleway. The underpass will provide a wide passage, and a continuous link for the linear park between the Royal Canal Bank and Phibsboro Library.

The underpass structure will be a single span, fully integral portal under-bridge, approximately 16.7m in length, and 19.2m in width. The underpass will have a clearance span of 14.15m, and a vertical clearance of 3.0m. The bridge deck will be a solid slab construction with precast prestressed concrete beams, and a cast in-situ reinforced concrete slab. The substructure will comprise of embedded foundations, formed by bored in-situ reinforced concrete piles and in-situ reinforced concrete pile caps, where the precast beams will be supported. The integral connection is to be made at the pile cap to provide the fully integral portal structure. The substructure is also to be the retaining structure.

Contiguous reinforced concrete piled walls are proposed at both ends of the underpass, to retain the existing ground, and provide temporary support for the construction excavation in the area. The proposed bridge abutment walls will be covered by a concrete lining that incorporates architectural finishes.

The form of design of the underpass lends itself to top-down construction, which is a less disruptive form of construction in this congested area. The following activities will be undertaken in sequence:

- Underground services will first be diverted temporarily to the side of the bridge works area, which will include several watermains, gas mains and electric power cables as noted in Chapter 19 (Material Assets) of this EIAR;
- The sub-structure and deck construction works will be completed in two halves, with traffic management first being installed to reduce the R101 North Circular Road to one lane in each direction, on one half of the road, whilst the first half of the underpass is constructed. Once the first half has been completed, traffic will be moved onto the completed half, whilst the second half is constructed. Each of these traffic management phases is anticipated to last four months;
- Piled foundations will be installed, and ground beams / pile caps constructed for the sub-structures in the first half of the bridge. Prior to excavation of the ground beams / pile caps, the existing road will be temporarily retained to maximise the extent of ground beam / pile caps that can be installed;
- The pavement in the works area of R101 North Circular Road will be excavated to a depth of approximately 1.5m;
- Prefabricated structural elements will be delivered to the works location on R101 North Circular Road, where a mobile crane will be positioned to lift the elements into place. Precast concrete beams will be installed, and reinforced in-situ concrete poured to complete the deck;
- Underground services will be repositioned to their final location;
- Road pavement and concrete footpaths will be installed in the works areas;
- North-south access from the Royal Canal Bank to the R101 North Circular Road will be maintained and carefully controlled with some localised diversions (for an estimated period of four months), during construction of the northern half of the structure (stage 1 of the construction traffic management measures, as detailed in Section 5.8.3.3.4.2);
- The completed half of the underpass will be opened, and traffic on the R101 North Circular Road will be diverted to the recently completed half of the underpass;
- The same methodology will be completed in the new works area to complete the second half of the structure. Similar traffic restrictions for a period of four months will also be required to construct the second half of the bridge; and
- Final finishes to road surface in the middle of the road, where the two halves meet, will be required, with traffic diverted to the outer two lanes.

Once the structure and road finishes are completed, four lanes of traffic over the structure will be restored. The approach ramps, and the area underneath the new underpass structure will be excavated to the required levels from underneath. The concrete faces to the abutments, and wingwalls of the underpass in front of the support piles will be constructed. The access ramp to the south-eastern side, up to R101 North Circular Road will be completed, and landscaping and finishes will be carried out.

5.5.4.1.5 Retaining Wall at St. Mobhi Road, Home Farm Football Club (Structure Reference: 05)

Retaining walls with a retained height greater than 1.5m are classed as principal structures. There is one principal retaining wall along the Proposed Scheme, as detailed in Table 5.4.

Table 5.4: Retaining Walls Along the Proposed Scheme

Structure Reference	Structure Type	Details	Chainage (m)	Length (m)	Max Retained Height (m)	Structure Reference
05	Reinforced Concrete Retaining Wall	Replacement of an existing concrete retaining wall in a new position.	A3530 to A3698	150.0	2.5	Section 2a

The existing retaining wall along R108 St. Mobhi Road, at Home Farm Football Club, which currently supports the road embankment, will be demolished, and a new retaining wall (Structure Reference: 05) will be constructed to facilitate carriageway widening on R108 St. Mobhi Road. This wall will support the road embankment on R108 St. Mobhi Road, which borders Home Farm Football Club.

The cantilevered retaining wall will be constructed of reinforced concrete, with railings and clad as required, with suitable materials depending on the local environs. The site of the retaining wall will be isolated using fencing, as

appropriate, to the location. The retained area behind the existing retaining wall will be excavated and the retaining wall will be demolished with a hydraulic breaker mounted to an excavator. The existing ground will then be stripped to formation level. Existing services will be diverted as required to enable wall construction. A side slope will be battered back to enable construction. Blinding will be installed at formation level. Formwork and reinforcing steel for the wall will be fixed in place. Then concrete will be poured in sections and formwork removed after initial curing of concrete. After a sufficient curing period, the area behind the wall will be backfilled. The boundary railing will be installed, and the replacement trees will be planted behind the new railing.

5.5.5 Construction Site Decommissioning

On completion of construction, all construction facilities and equipment such as plant, materials, temporary signage, and laydown areas, Construction Compounds, etc. will be removed. The areas which were occupied by the Construction Compounds will be reinstated (refer to the Landscaping General Arrangement Drawings (BCIDD-ROT-ENV_LA-0304_XX_00-DR-LL-9001) in Volume 3 of this EIAR).

5.6 Construction Plant and Equipment

In order to assess a reasonable worst-case Construction Phase impact scenario, with regards to air quality and noise and vibration, an estimate of construction plant and equipment that will be necessary to construct the Proposed Scheme has been prepared. The estimated peak daily numbers of principal items of plant and equipment working within a section is indicated in Table 5.5. It should be noted that these are peak daily numbers.

The appointed contractor will select and utilise plant and equipment in a manner that ensures Construction Noise Thresholds, as defined in Chapter 9 (Noise & Vibration) of this EIAR, are not exceeded. Refer to Chapter 7 (Air Quality) and Chapter 9 (Noise & Vibration) of this EIAR for the Construction Phase air quality and noise and vibration assessments, and associated mitigation measures.

Table 5.5: Estimated Peak Daily Plant and Equipment Numbers

Plant / Equipment	Section																
Type	1	2a	2b	2c	2d	3a	3b	3c	3d	4a	4b	4c	5	6	7a	7b	7c
Lorry	2	4	1	1	1	1	1	2	3	1	4	1	1	2	2	2	2
Backhoe Mounted Hydraulic Breaker	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
8t (tonne) Excavator	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
16t (Rubber Wheeled) Excavator	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
6t Dumper	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1
Road Planer	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1
Road Sweeper	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1
Asphalt Paver	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1
Asphalt Roller	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1
3t Roller	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1
Concrete Trucks	1	1	1	1	1	1	3	1	3	1	1	0	0	1	1	1	1
Crane	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	0
Pile Driver	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0

5.7 Construction Compounds

In order to construct the Proposed Scheme, the appointed contractor will require Construction Compounds from which they can manage the delivery of the Proposed Scheme.

5.7.1 Construction Compound Locations

The location of the Construction Compounds in relation to the Proposed Scheme are shown in Figure 5.1 in Volume 3 of this EIAR. The Construction Compound locations have been selected due to the amount of available space, their relative locations near to the majority of the Proposed Scheme major works and access to the National and Regional Road network. Refer to Chapter 6 (Traffic & Transport) of this EIAR for an assessment of the construction traffic.

Construction Compound B1 will be located on the north-eastern corner of Santry Cross, with access / egress from R104 Santry Avenue, as shown in Image 5.1. The area of Construction Compound B1 is approximately 520m^2 (metres squared).

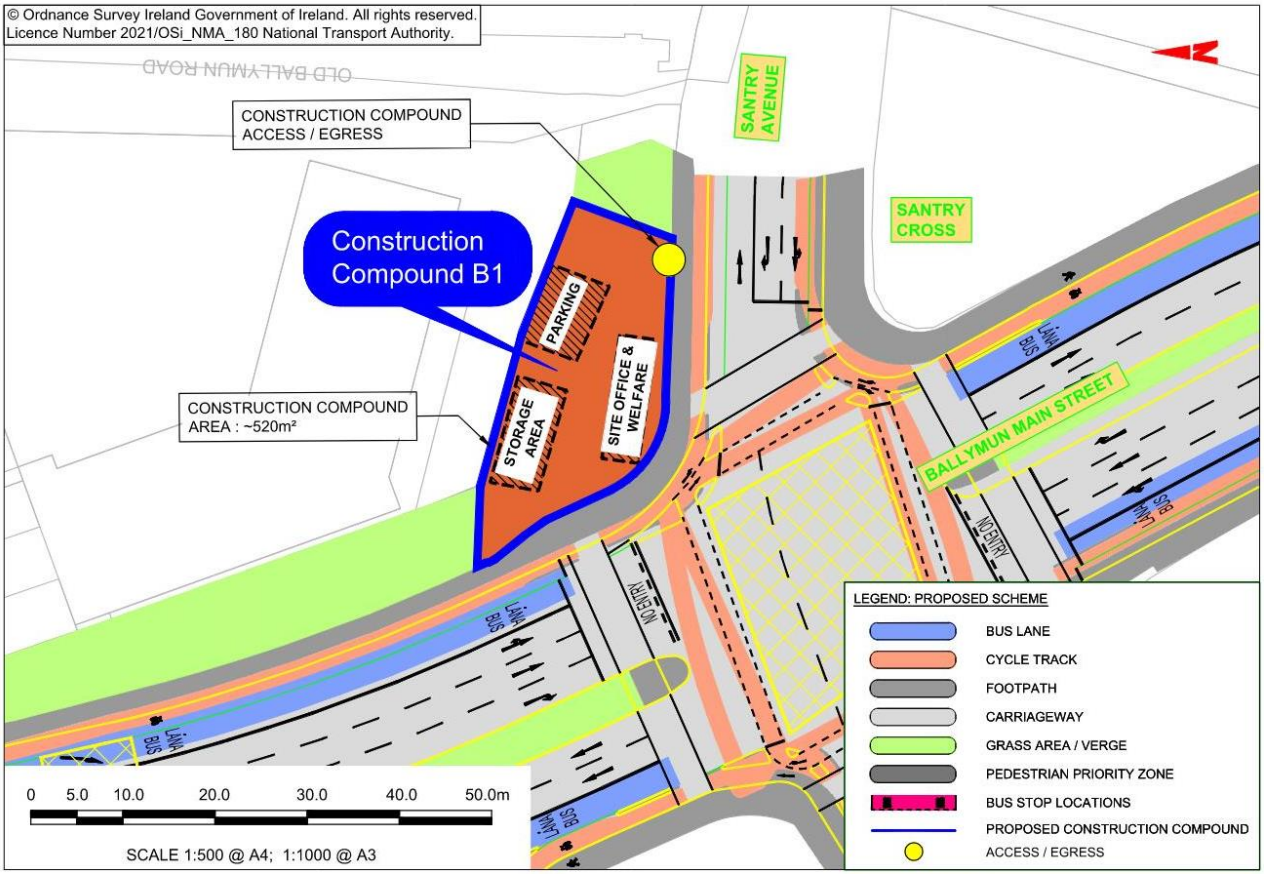

Image 5.1: Location and Extent of Construction Compound B1

Construction Compound B2 will be located along St. Mobhi Drive, on the road and the southern footpath, with access / egress from St. Mobhi Drive, as shown in Image 5.2. The area of Construction Compound B2 is approximately 100m^2.

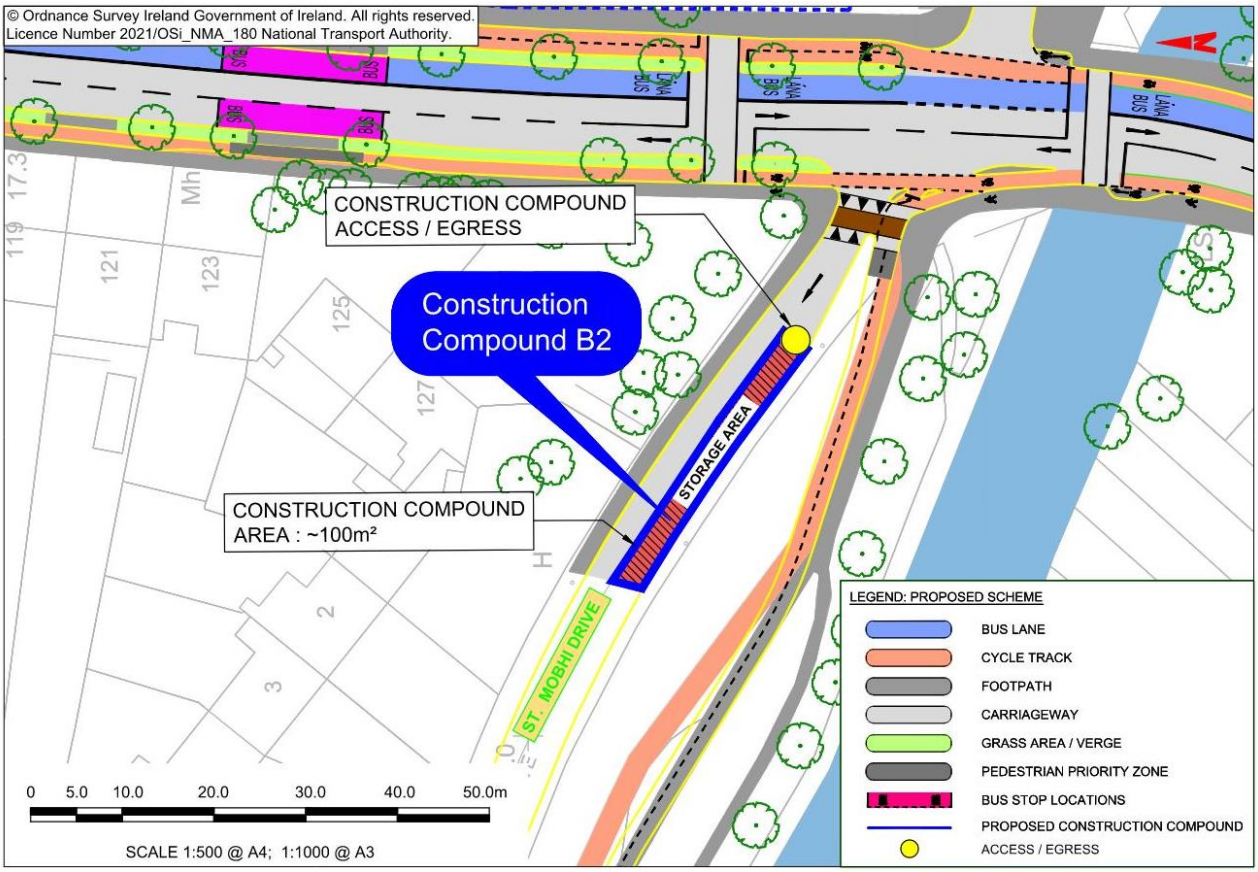

Image 5.2: Location and Extent of Construction Compound B2

Construction Compound B3 will be located at the Constitution Hill, Catherine Lane North Junction, with access / egress from Catherine Lane North, as shown in Image 5.3. The area of Construction Compound B3 is approximately 480m^2.

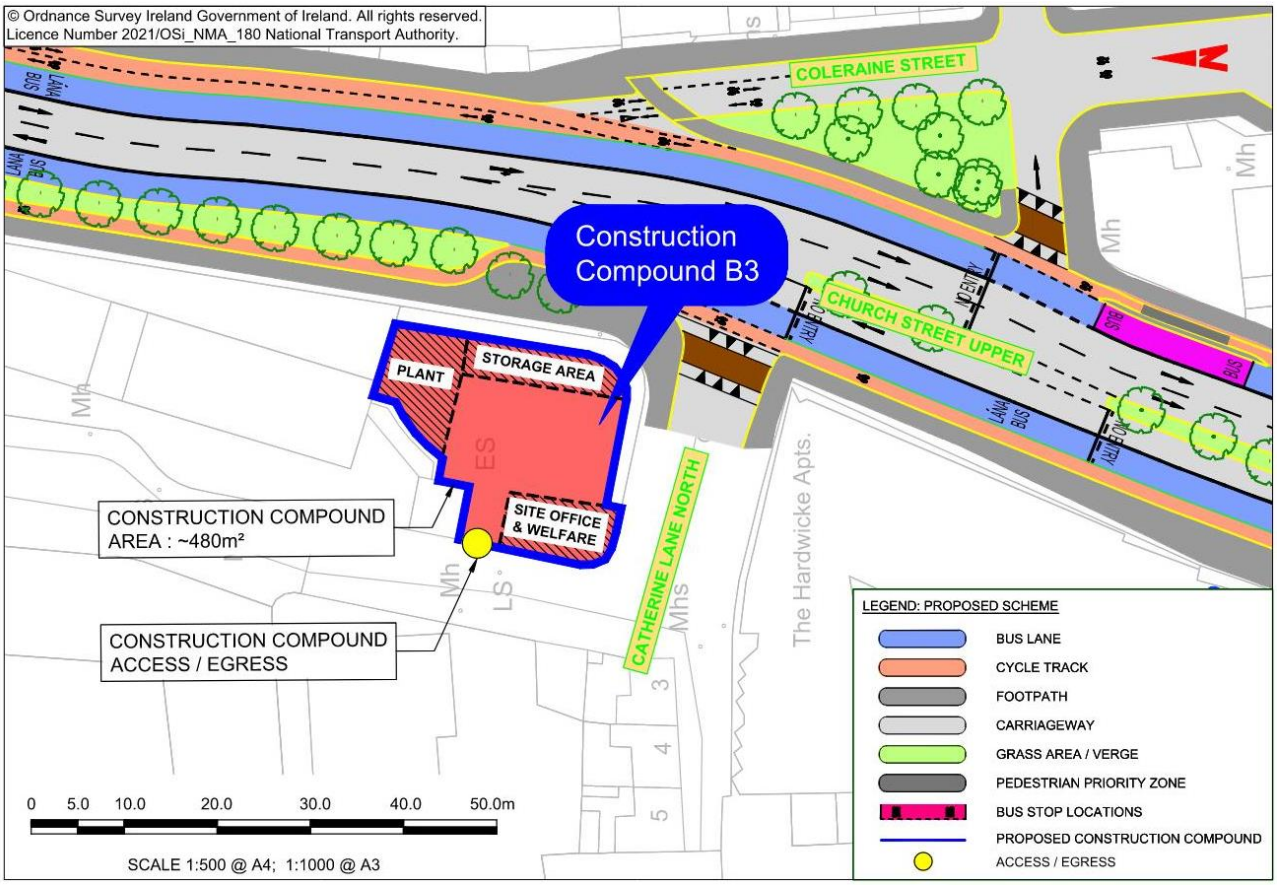

Image 5.3: Location and Extent of Construction Compound B3

Construction Compound F1 will be located on the western side of R135 Finglas Road at Mellowes Park, in the vicinity of the R104 St. Margaret's Road Roundabout, with access / egress from Casement Road, as shown in Image 5.4. The area of Construction Compound F1 is approximately 820m^2.

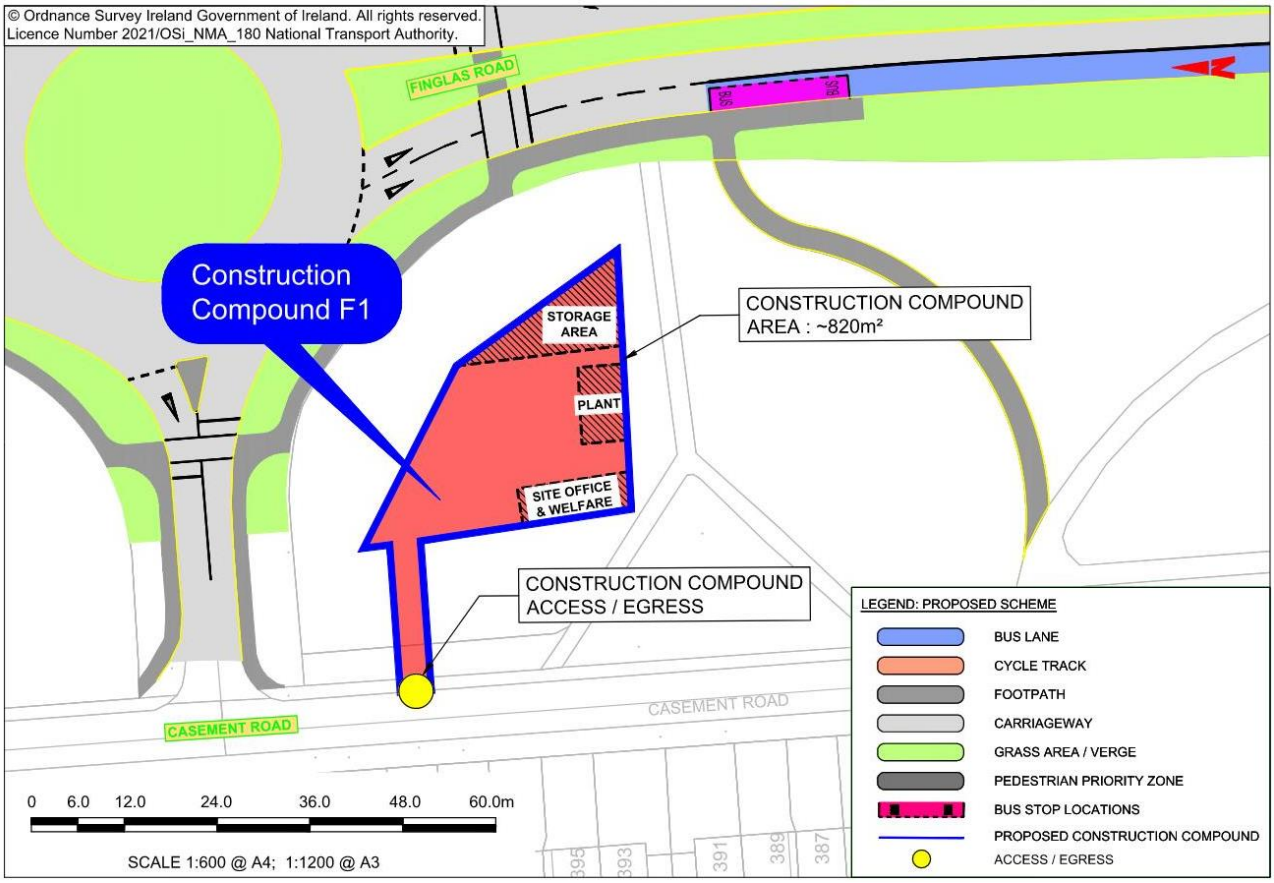

Image 5.4: Location and Extent of Construction Compound F1

Construction Compound F2 will be located at the junction of Finglas Place on R135 Finglas Road, with access / egress from Finglas Place, as shown in Image 5.5. The area of Construction Compound F2 is approximately 360m^2.

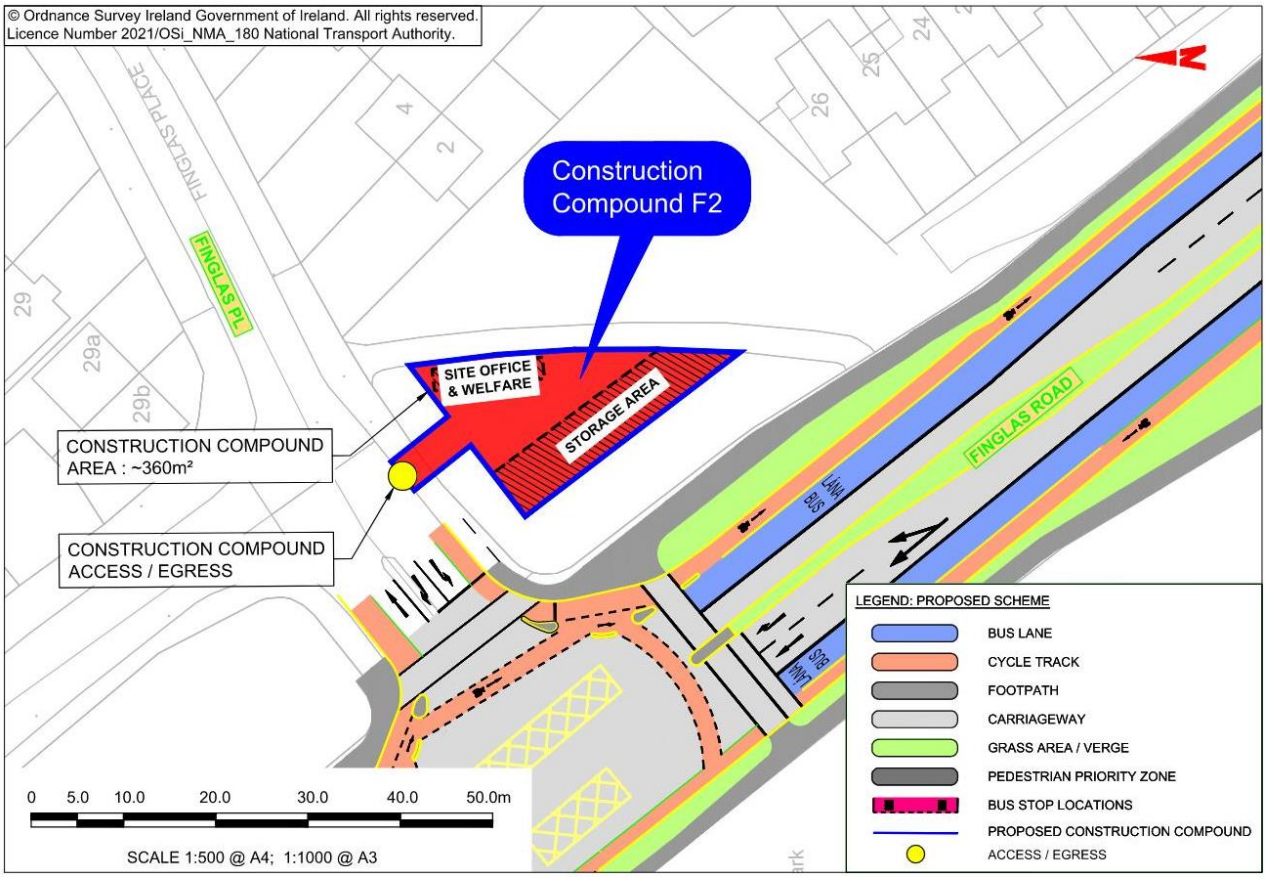

Image 5.5: Location and Extent of Construction Compound F2

Construction Compound F3 will be located at Claremont Lawns, opposite Glasnevin Cemetery, with access / egress from Claremont Lawns, as shown in Image 5.6. The area of Construction Compound F3 is approximately 1,920m^2.

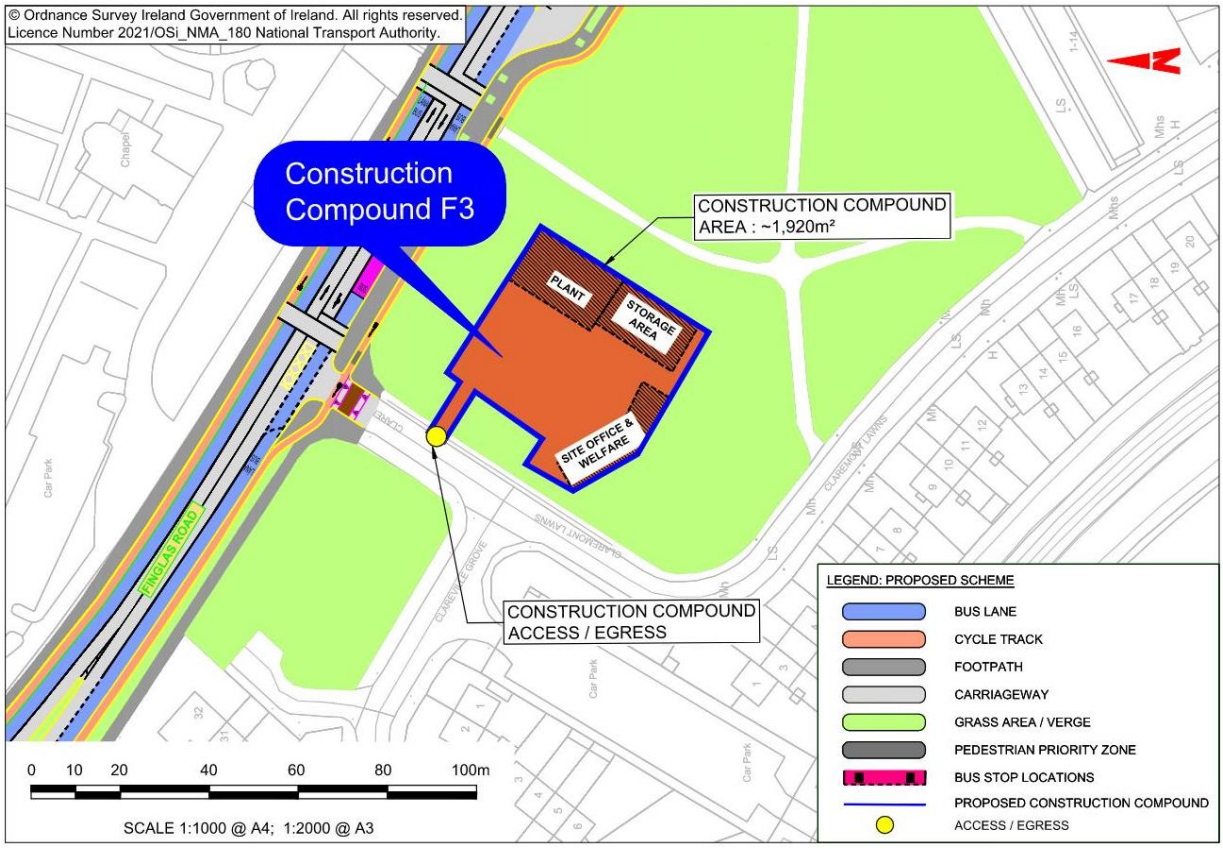

Image 5.6: Location and Extent of Construction Compound F3

5.7.2 Construction Compound Activities

As shown in Image 5.1 to Image 5.6, the Construction Compounds will contain a site office and welfare facilities for NTA personnel and contractor personnel. Limited car parking will be allowed at the Construction Compounds, in line with the principles of the Construction Stage Mobility Management Plan (CSMMP), as described in Appendix A5.1 CEMP in Volume 4 of this EIAR, which will be prepared by the appointed contractor. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the Construction Compounds for reuse, as necessary. Items of plant and equipment, described in Section 5.6, will also be stored within the Construction Compounds.

All necessary authorisations, under the Waste Management Act, as amended, will be obtained prior to undertaking temporary storage. Certain materials will be reused where practicable, primarily excavated material. Further information on the reuse of material within the Proposed Scheme is included in Chapter 18 (Waste & Resources) of this EIAR. Further information on the air quality and noise and vibration assessments, and associated mitigation measures at the Construction Compounds is included in Chapter 7 (Air Quality) and Chapter 9 (Noise & Vibration) of this EIAR.

5.7.3 Construction Compound Services

The Construction Compounds will be fenced off, lit (during working hours) and secured with CCTV, as described in Section 5.5.2.8. Temporary lighting, including security lighting will be required at the Construction Compounds, as described in Section 5.5.2.9. Access to the Construction Compounds will be restricted to site personnel and authorised visitors only.

The Construction Compounds will be engineered with appropriate services. Water, wastewater, power, and communications connections will be organised by the appointed contractor. At work areas along the Proposed Scheme, where permanent provisions (for the duration of the construction programme) are not practicable, appropriate temporary provisions will be made, including the use of generators if required. Temporary welfare facilities will need to be used, for example, portable toilets in the vicinity of works. Wastewater from temporary welfare facilities will be collected and disposed of to a suitably licenced facility.

Appropriate environmental management measures will be implemented at the Construction Compounds, for example, to minimise the risk of fuel spillage, and to ensure that the Construction Compounds and the approaches to it are appropriately maintained. Further information on the air quality, noise and vibration and water related mitigation measures that will be implemented is included in Chapter 7 (Air Quality), Chapter 9 (Noise & Vibration) and Chapter 13 (Water) of this EIAR.

Following completion of the construction works, the Construction Compound areas will be cleared and reinstated to match pre-existing conditions.

5.8 Construction Traffic Management

A CTMP has been prepared to facilitate the assessment of the potential impacts on traffic and transport along the Proposed Scheme. The CTMP includes details of the temporary traffic management measures that will be implemented during the construction of the Proposed Scheme.

The staging of construction and associated temporary traffic management measures has considered the receiving environment when developing the schedule of works.

The CTMP has given due consideration to facilitate the maximum practicable movement of people during the Construction Phase through implementing the following hierarchy of transport mode users:

- Pedestrians;
- Cyclists;
- Public Transport; and
- General Traffic.

Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

The construction traffic management measures have been developed in accordance with the Traffic Signs Manual (Department of Transport, Tourism and Sport 2019). Construction traffic management measures are summarised in Section 5.8.1 to Section 5.8.3, with further details (such as routing of construction vehicles, timings of material deliveries, etc.) included in the CTMP in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.8.1 Pedestrian and Cyclist Provisions

The measures set out in Section 8.2.8 of the Traffic Signs Manual (Department of Transport, Tourism and Sport 2019) will be implemented, wherever practicable, to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users) and cyclists. Therefore, where footpaths or cycle facilities are affected by construction, a safe route will be provided past the works area, and where practicable, provisions for matching existing facilities for pedestrians and cyclists will be made.

5.8.2 Public Transport Provisions

Existing public transport routes will be maintained throughout the duration of the Construction Phase of the Proposed Scheme (notwithstanding the potential for occasional road closures / diversions as discussed in Section 5.8.4). Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes will be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Scheme. Some existing bus stop locations will need

to be temporarily relocated to accommodate the works. In such cases, bus stops will be safely accessible to all users and all temporary impacts on bus services will be determined in consultation with the NTA and the service providers.

5.8.3 General Traffic Provisions

The roads and streets along the Proposed Scheme will remain open to general traffic, wherever practicable, during the Construction Phase. However, lane closures, road closures and diversions will be necessary to facilitate construction.

Two-way traffic will generally be maintained along the Proposed Scheme, however in circumstances where there is not sufficient road width to allow two-way traffic (e.g., reduced lane width), single lane traffic controlled by a stop / go system of temporary traffic lights will be implemented with priority provided to traffic travelling towards the City Centre during the morning, and this will be reversed during the afternoon, where appropriate. Lane closures and route diversions will supplement this system if traffic volumes are heavy. Short delays may occur outside of the AM and PM peaks, for example, as a result of vehicles accessing the works.

For most of the Proposed Scheme, the existing carriageway width is sufficient to maintain full width two-way traffic throughout the works. However, where the carriageway width is restricted, at various sections throughout the Proposed Scheme, the construction works will be split into traffic management stages as described in Section 5.8.3.1 to Section 5.8.3.7.

5.8.3.1 Section 1: Ballymun Road from St. Margaret's Road to Griffith Avenue

The works at Section 1 will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the outer verges, traffic reduced to two lanes in each direction, and realigned in narrow lanes to the central reservation, as shown in Image 5.7;
- Stage 2 – Construction works on the central reservation, traffic reduced to two lanes in each direction, and realigned in narrow lanes to the outer verges, as shown in Image 5.8; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

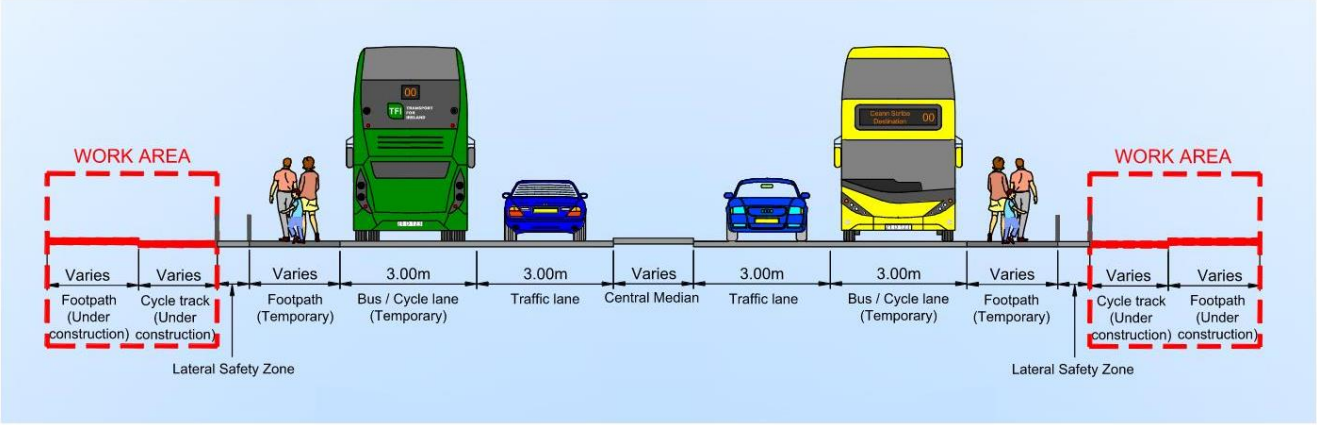

Image 5.7: Traffic Management Cross Section, Section 1 – Stage 1

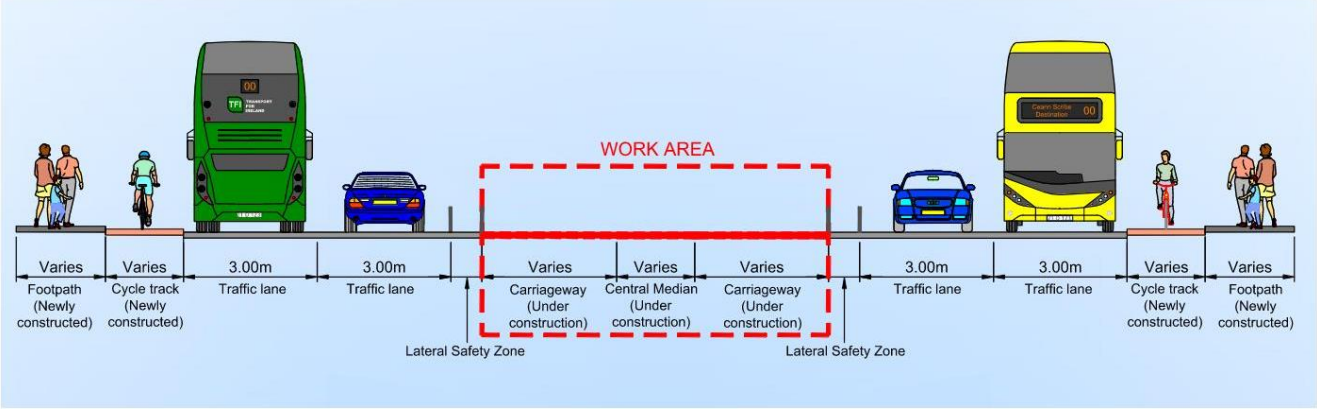

Image 5.8: Traffic Management Cross Section, Section 1 – Stage 2

5.8.3.2 Section 2: St. Mobhi Road and Botanic Road from Griffith Avenue to Hart's Corner

5.8.3.2.1 Section 2a: Griffith Avenue to Botanic Road

The works at Section 2a will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the northbound verge, traffic reduced to a single lane in each direction and realigned in narrow lanes to the east, as shown in Image 5.9;
- Stage 2 – Construction works on the southbound verge, traffic reduced to a single lane in each direction and realigned in narrow lanes to the west, as shown in Image 5.10; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

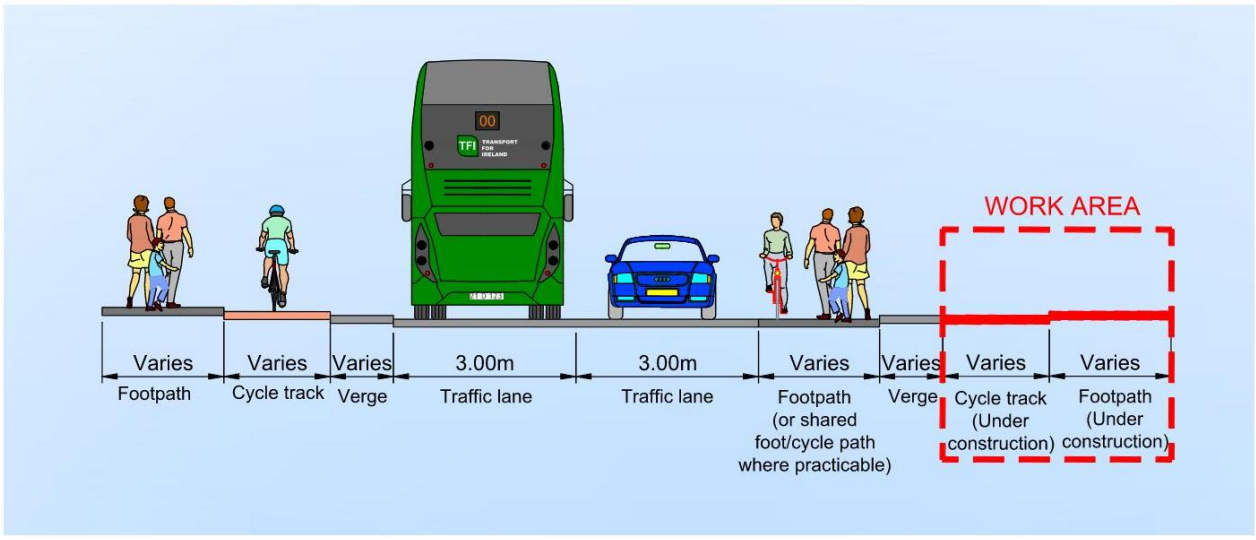

Image 5.9: Traffic Management Cross Section, Section 2a – Stage 1

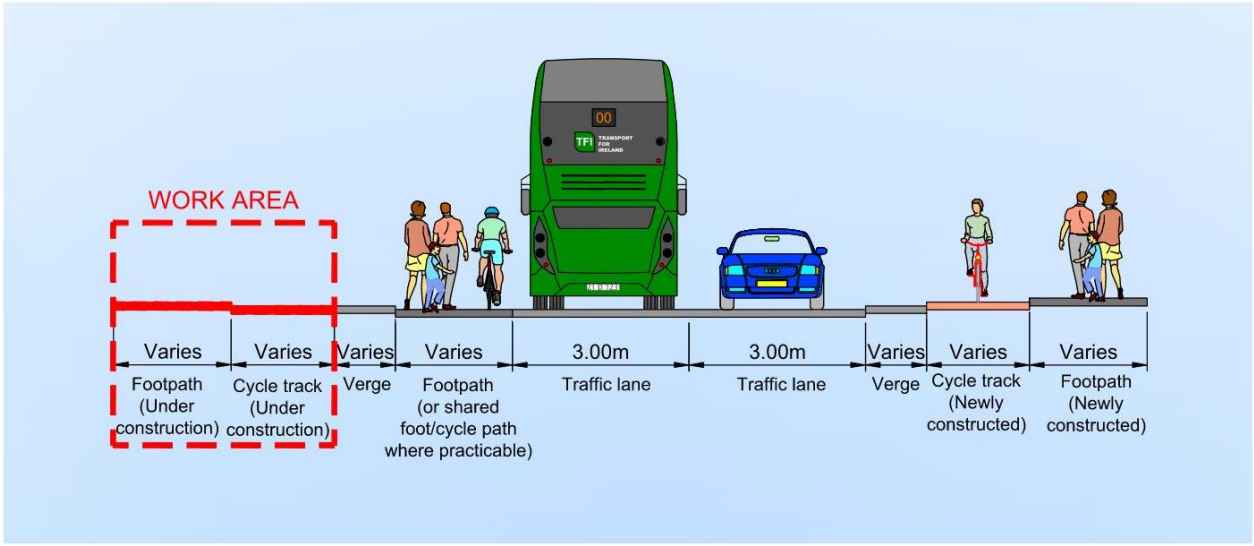

Image 5.10: Traffic Management Cross Section, Section 2a – Stage 2

5.8.3.2.2 Section 2b: Griffith Avenue

The works at Section 2b will be undertaken mainly along the footpaths and verges. R102 Griffith Avenue is sufficiently wide to facilitate localised temporary diversions of the footpaths.

5.8.3.2.3 Section 2c: Ballymun Road, Glasnevin Hill, Botanic Road

The works at Section 2c will be undertaken along the carriageway, and along the verges. Limited localised traffic management measures will be implemented to facilitate the works. Traffic lanes will be realigned in narrow lanes, temporarily, with traffic potentially reduced to single lane shuttle working, out-of-hours.

5.8.3.2.4 Section 2d: Botanic Road to Prospect Way

The works at Section 2d will be undertaken along the verges. Limited localised traffic management measures will be implemented to facilitate the works. Traffic will potentially be reduced to single lane shuttle working, out-of-hours.

5.8.3.3 Section 3: Prospect Road, Phibsborough Road from Hart's Corner to Western Way

5.8.3.3.1 Section 3a: Prospect Way to Lindsay Road

The works at Section 3a will be undertaken in two traffic management stages:

- Stage 1 – Construction works on the eastern side, traffic reduced to a single lane, with the bus lane moved westwards into the middle lane so that the left lane can be converted to a two-way cycle track, as shown in Image 5.11; and
- Stage 2 – Finishing works undertaken out-of-hours, traffic reduced to single lane.

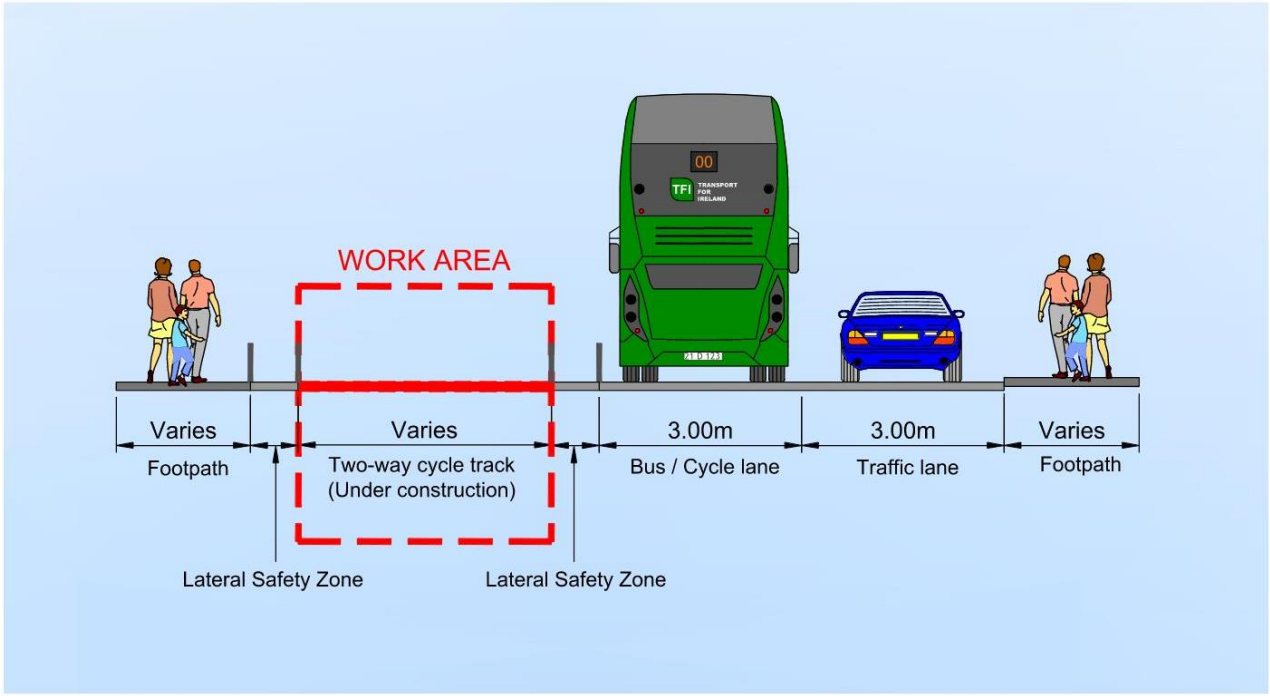

Image 5.11: Traffic Management Cross Section, Section 3a – Stage 1

5.8.3.3.2 Section 3b: Lindsay Road to Royal Canal

The works at Section 3b will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the southbound side, traffic reduced to a single lane in each direction and realigned in narrow lanes to the west, as shown in Image 5.12;
- Stage 2 – Construction works on the northbound side, traffic reduced to a single lane in each direction and realigned in narrow lanes to the east, as shown in Image 5.13; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

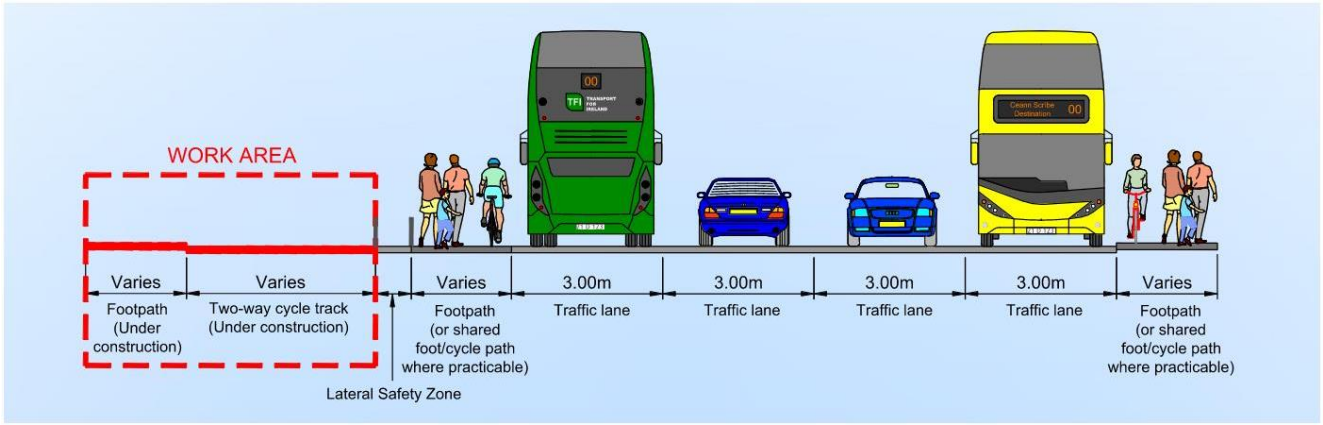

Image 5.12: Traffic Management Cross Section, Section 3b – Stage 1

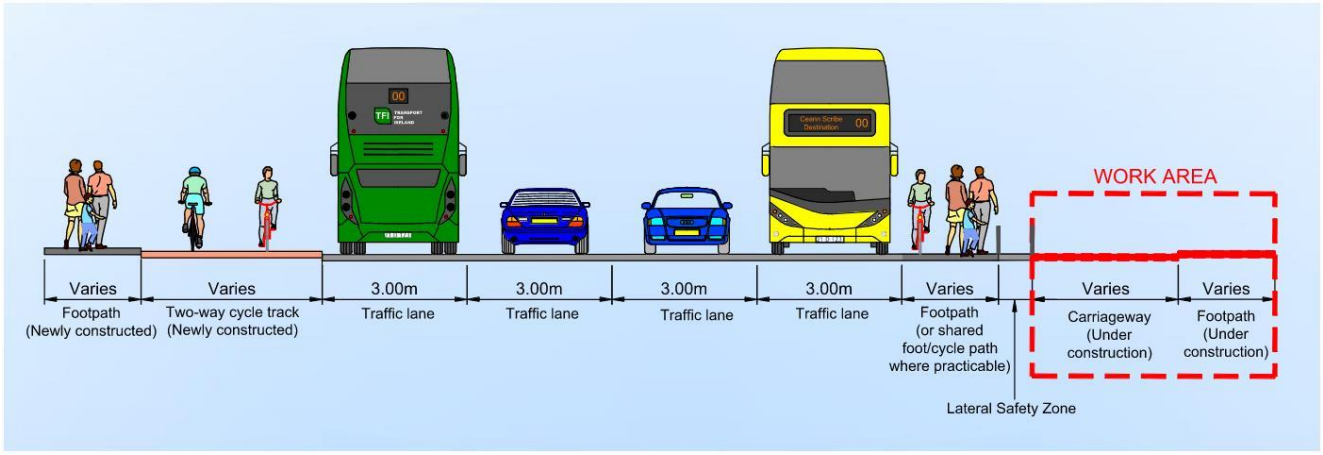

Image 5.13: Traffic Management Cross Section, Section 3b – Stage 2

5.8.3.3.2.1 Pedestrian / Cycle Bridge over Railway at Lindsay Grove (Structure Reference: 01)

Construction of the pedestrian / cycle bridge over the railway at Lindsay Grove (Structure Reference: 01) will take place on the eastern side of R108 Prospect Road. Pedestrian access will be provided to the adjoining Bernard Shaw pub and Prospect Medical Clinic along carefully controlled routes from the adjoining public footpath along the road edge.

Closures of a lane on R108 Phibsborough Road is likely to be required for short periods during delivery of the bridge beams and also for short periods during piling operations.

5.8.3.3.2.2 Pedestrian / Cycle Bridge over Railway at Whitworth Road (Structure Reference: 02)

Construction of the pedestrian / cycle bridge over the railway at Whitworth Road (Structure Reference: 02) will take place on the eastern side of R108 Prospect Road. Access will be provided from the northern bank of the Royal Canal.

The Royal Canal Way walkway along the northern bank will be closed during the works. Pedestrians will be diverted along the southern bank at Binn's Bridge on Drumcondra Road. Once the new bridge areas are complete, the two-way cycle track will be constructed across the wide footpath areas.

Closures of a lane on R108 Phibsborough Road and / or Whitworth Road are likely to be required for short periods during delivery of the bridge beams and also for short periods during piling operations.

5.8.3.3.3 Section 3c: Royal Canal to Western Way

Localised bus lane closures will be implemented at Section 3c. Users of the bus lane will utilise the outer lane along with other general traffic.

5.8.3.3.4 Section 3d: Royal Canal Bank Cycleway

5.8.3.3.4.1 Pedestrian / Cycle Bridge over the Royal Canal (Structure Reference: 03)

For the majority of the works at the pedestrian / cycle bridge over the Royal Canal (Structure Reference: 03), a crane will be located on the Royal Canal Way footpath on the north bank of the canal, thus closing the footpath to pedestrians for the duration of these works. Pedestrians will be diverted to the south bank (along Royal Canal Bank). A closure for a short period (up to two days) of the Royal Canal Bank will be required when a second crane is required to lift the bridge into position, from the north and south sides of the canal simultaneously.

5.8.3.3.4.2 Royal Canal Bank Underpass under North Circular Road (Structure Reference: 04)

The works at the Royal Canal Bank Underpass under R101 North Circular Road (Structure Reference: 04) will be undertaken in three traffic management stages:

- Stage 1 – Structural works on the northern side of R101 North Circular Road over the underpass, traffic reduced to two lanes in each direction, and realigned in narrow lanes to the south, as shown in Image 5.14;
- Stage 2 – Structural works on the southern side of R101 North Circular Road over the underpass, traffic reduced to two lanes in each direction, and realigned in narrow lanes to the north, as shown in Image 5.15; and
- Stage 3 – Finishing works will be undertaken out-of-hours, when the underpass has been completed. Traffic will be reduced to a single lane of traffic in each direction and realigned to the outer lanes.

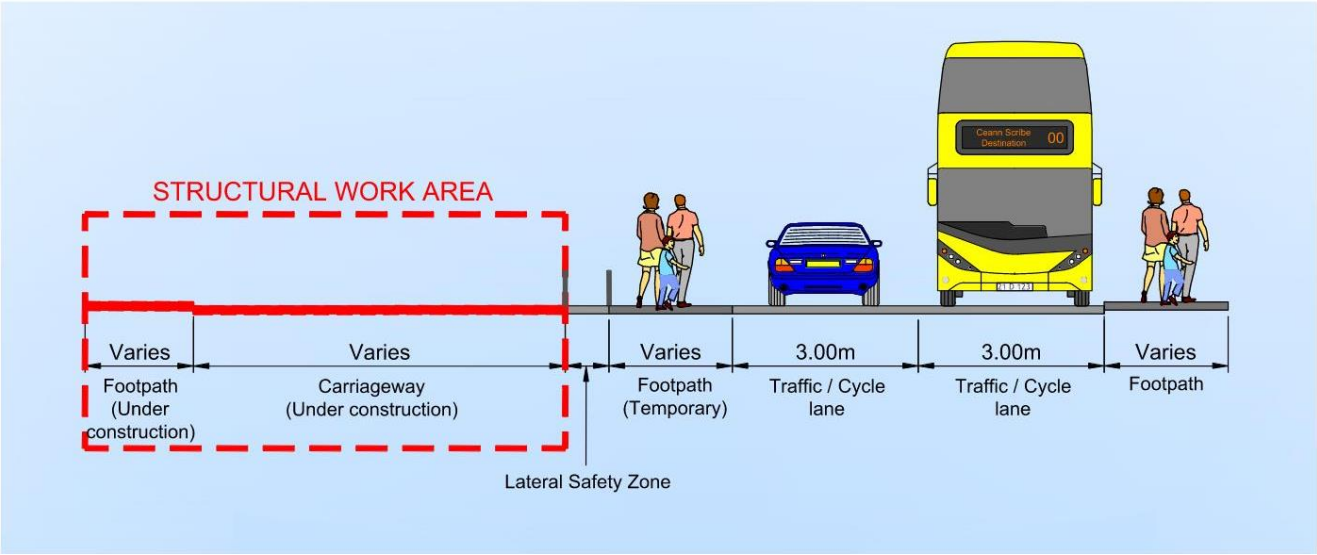

Image 5.14: Traffic Management Cross Section, Section 3d, Royal Canal Bank Underpass – Stage 1

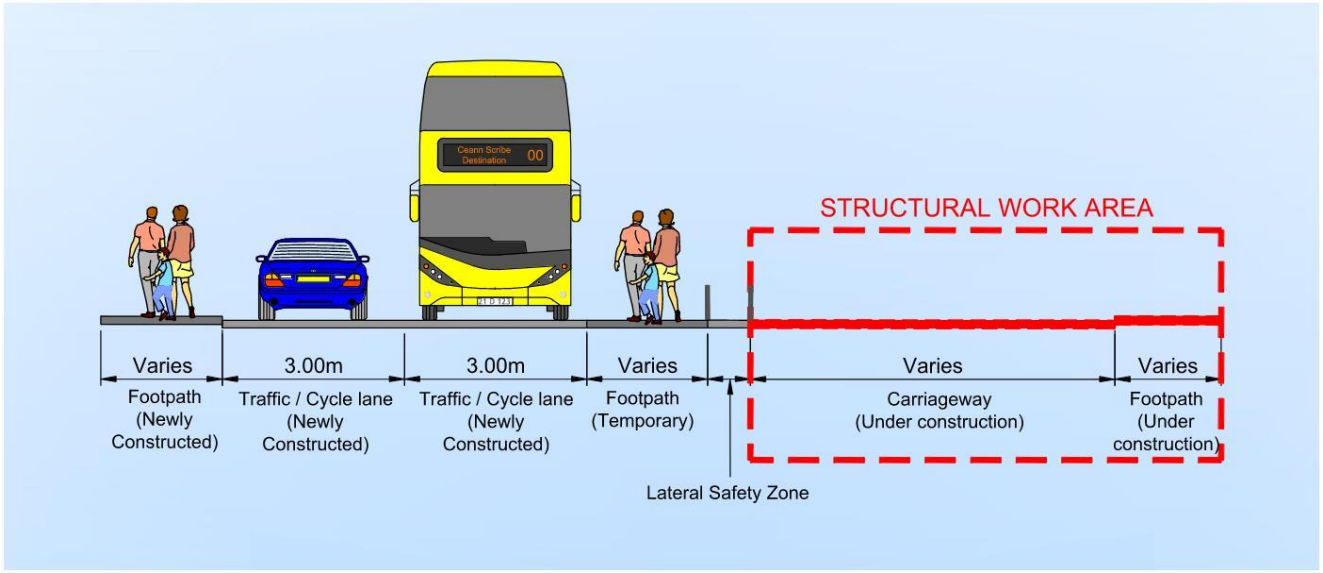

Image 5.15: Traffic Management Cross Section, Section 3d, Royal Canal Bank Underpass – Stage 2

5.8.3.4 Section 4: Constitution Hill and Church Street to Arran Quay

5.8.3.4.1 Section 4a: Western Way to Coleraine Street

The works at Section 4a will be undertaken in two traffic management stages:

- Stage 1 – Construction works on the southbound verge, traffic reduced to a single lane in each direction, and realigned in narrow lanes to the west, as shown in Image 5.16; and
- Stage 2 – Construction works on the northbound verge, traffic reduced to a single lane in each direction, and realigned in narrow lanes to the east, as shown in Image 5.17.

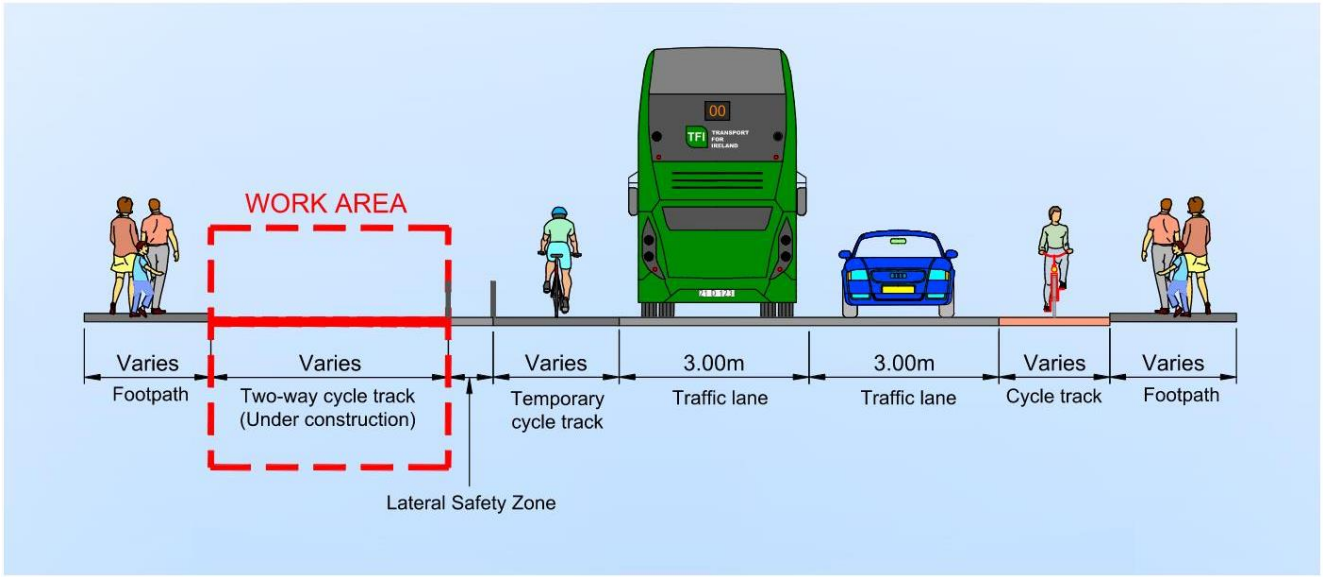

Image 5.16: Traffic Management Cross Section, Section 4a – Stage 1

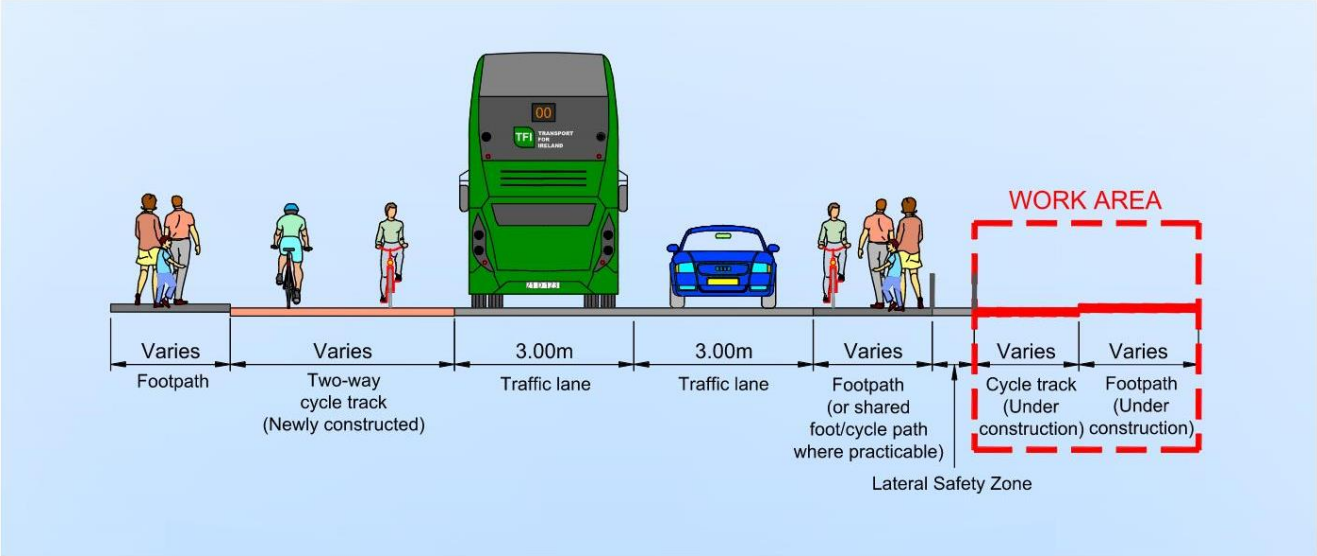

Image 5.17: Traffic Management Cross Section, Section 4a – Stage 2

5.8.3.4.2 Section 4b: Coleraine Street to Arran Quay

The works at Section 4b will be undertaken mainly along the carriageway. Localised bus lane closures will be implemented. Users of the bus lane will utilise the outer lane along with other general traffic.

5.8.3.4.3 Section 4c: Markets Cycleway

No construction traffic management measures are proposed at Section 4c.

5.8.3.5 Section 5: Finglas Road from St. Margaret's Road to Wellmount Road

The works at Section 5 will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the outer verges, traffic reduced to one lane in each direction, and realigned in narrow lanes either side of the central median, as shown in Image 5.18;
- Stage 2 – Construction works on the outer verges, traffic reinstated to two lanes in each direction, as shown in Image 5.19; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

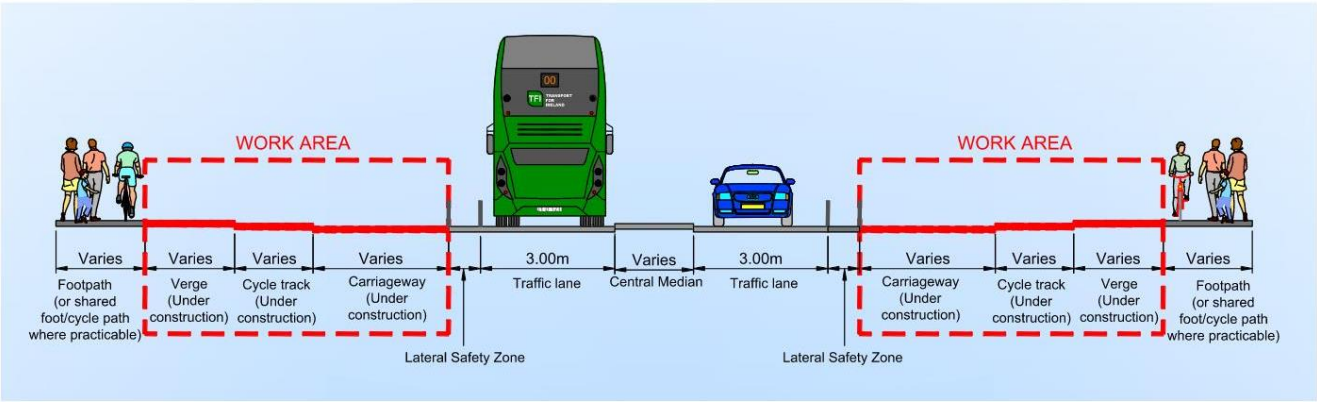

Image 5.18: Traffic Management Cross Section, Section 5, Section 6 and Section 7a – Stage 1

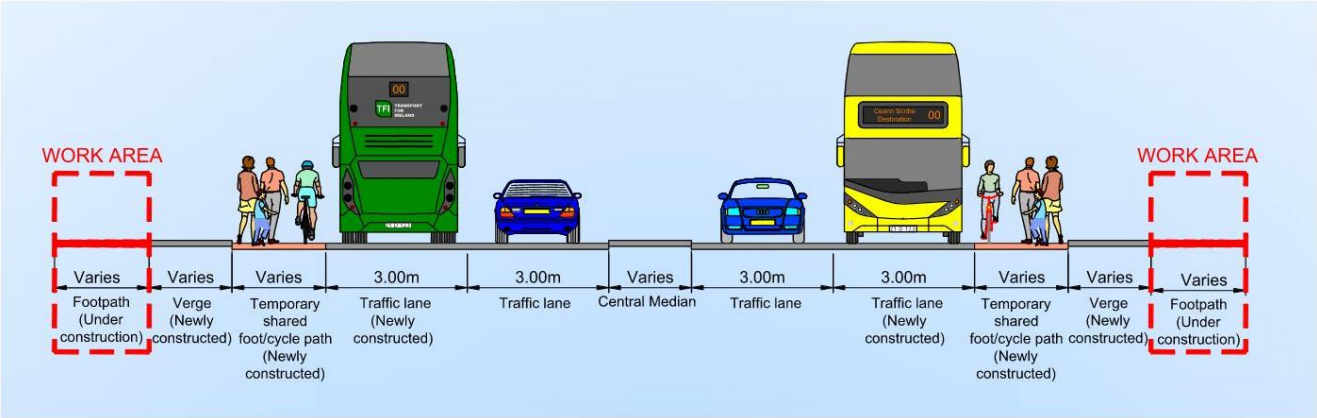

Image 5.19: Traffic Management Cross Section, Section 5, Section 6 and Section 7a – Stage 2

5.8.3.6 Section 6: Finglas Road from Wellmount Road to Ballyboggan Road

The works at Section 6 will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the outer verges, traffic reduced to one lane in each direction, and realigned in narrow lanes either side of the central median, as shown in Image 5.18;
- Stage 2 – Construction works on the outer verges, traffic reinstated to two lanes in each direction, as shown in Image 5.19; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

Between the junctions of Old Finglas Road and Ballyboggan Road it is proposed to lengthen the right turn lanes in the median over a length of 130m. These works will take place in a preliminary stage before the other works. Users of the bus lane will utilise the outer lane along with other general traffic.

Works at the Clearwater Shopping Centre Junction will occur first in the north-east corner, then the south-east, the south-west and the north-west.

5.8.3.7 Section 7: Finglas Road from Ballyboggan Road to Hart's Corner

5.8.3.7.1 Section 7a: Ballyboggan Road to Claremont Lawns

The works at Section 7a will be undertaken in three traffic management stages:

- Stage 1 – Construction works on the outer verges, traffic reduced to one lane in each direction, and realigned in narrow lanes to either side of the central median, as shown in Image 5.18;
- Stage 2 – Construction works on the outer verges, traffic reinstated to two lanes in each direction, as shown in Image 5.19; and
- Stage 3 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

5.8.3.7.2 Section 7b: Claremont Lawns to St. Vincent's School

The works at Section 7b will be undertaken in four traffic management stages:

- Stage 1 – Construction works on the southern verge (including at the car park opposite Glasnevin Cemetery), traffic reduced to a single lane in each direction and realigned in narrow lanes to the north, as shown in Image 5.20. Works will commence at the car park;
- Stage 2 – Construction works on the central verge, traffic reduced to a single lane in each direction and realigned in narrow lanes to the south, as shown in Image 5.21;
- Stage 3 – Construction works on the northern verge, traffic reduced to a single lane in each direction and realigned in narrow lanes to the south, as shown in Image 5.22; and
- Stage 4 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

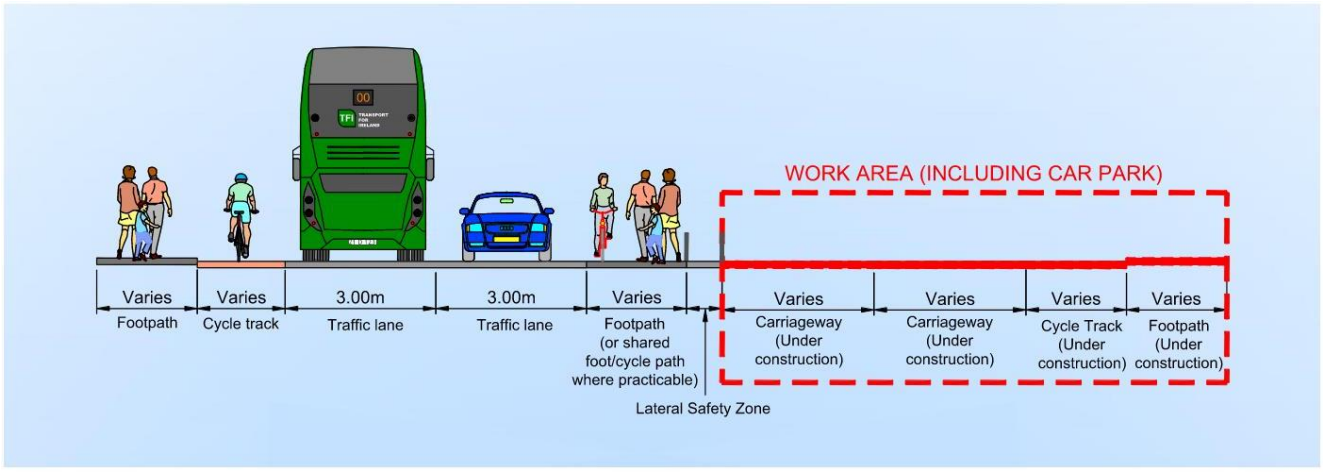

Image 5.20: Traffic Management Cross Section, Section 7b – Stage 1

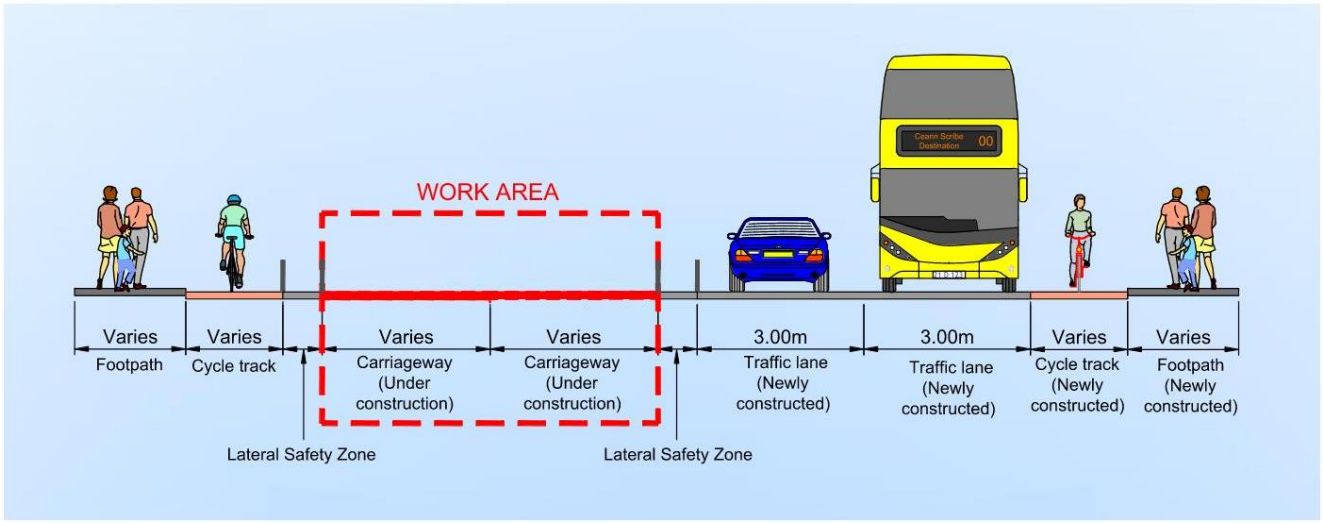

Image 5.21: Traffic Management Cross Section, Section 7b – Stage 2

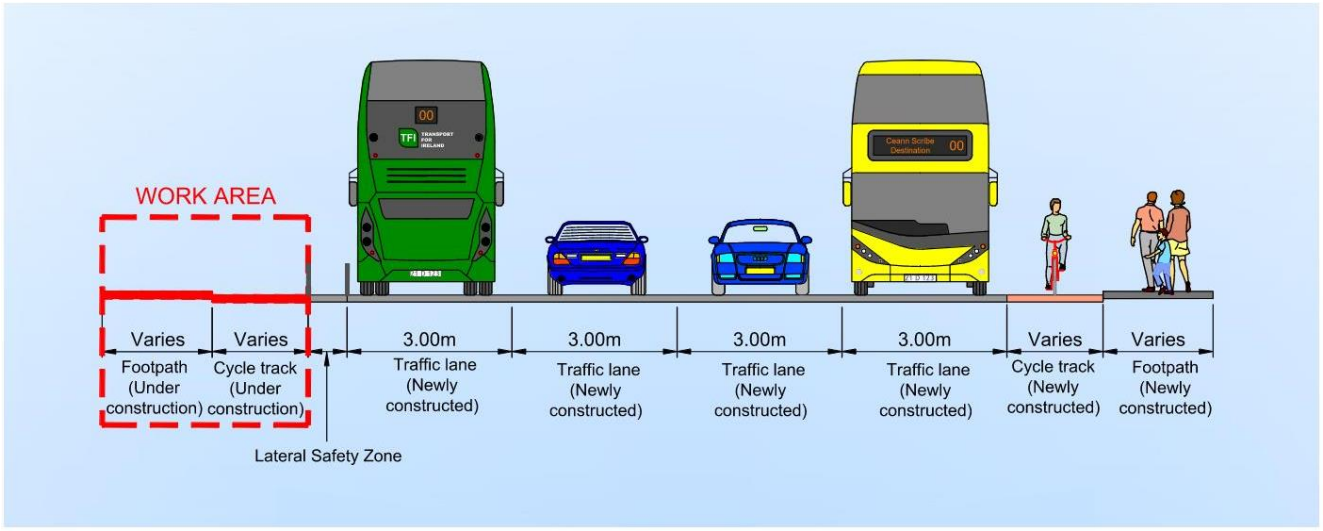

Image 5.22: Traffic Management Cross Section, Section 7b – Stage 3

5.8.3.7.3 Section 7c: St. Vincent's School to Hart's Corner

The works at Section 7c will be undertaken in four traffic management stages:

- Stage 1 – Construction works on the southern side, traffic reduced to a single lane in each direction and realigned in narrow lanes to the north, as shown in Image 5.23;
- Stage 2 – Construction works in the central area of the road, traffic reduced to a single lane in each direction and realigned in narrow lanes to the verges, as shown in Image 5.24;
- Stage 3 – Construction works on the northern side, traffic reduced to a single lane in each direction and realigned in narrow lanes to the south, as shown in Image 5.25; and
- Stage 4 – Finishing works undertaken out-of-hours, traffic reduced to single lane shuttle working.

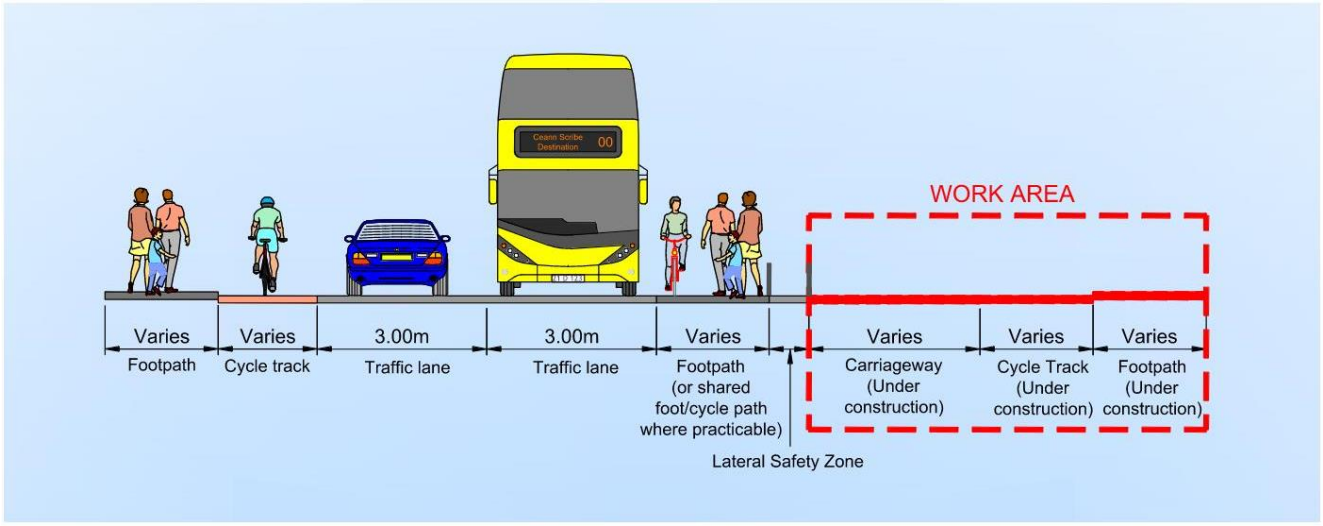

Image 5.23: Traffic Management Cross Section, Section 7c – Stage 1

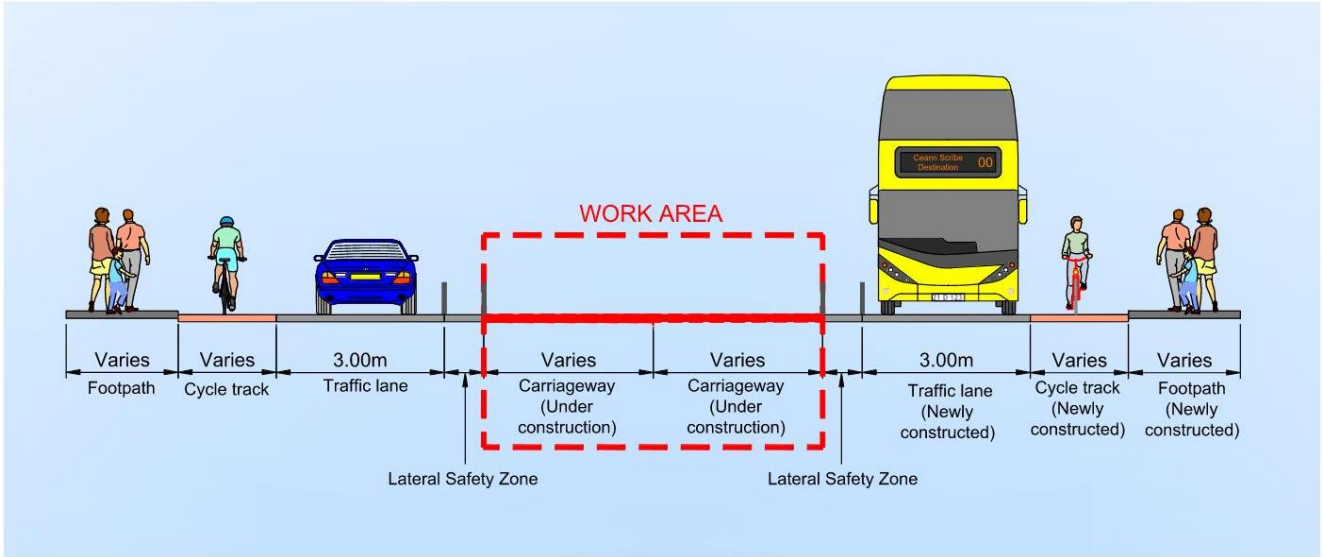

Image 5.24: Traffic Management Cross Section, Section 7c – Stage 2

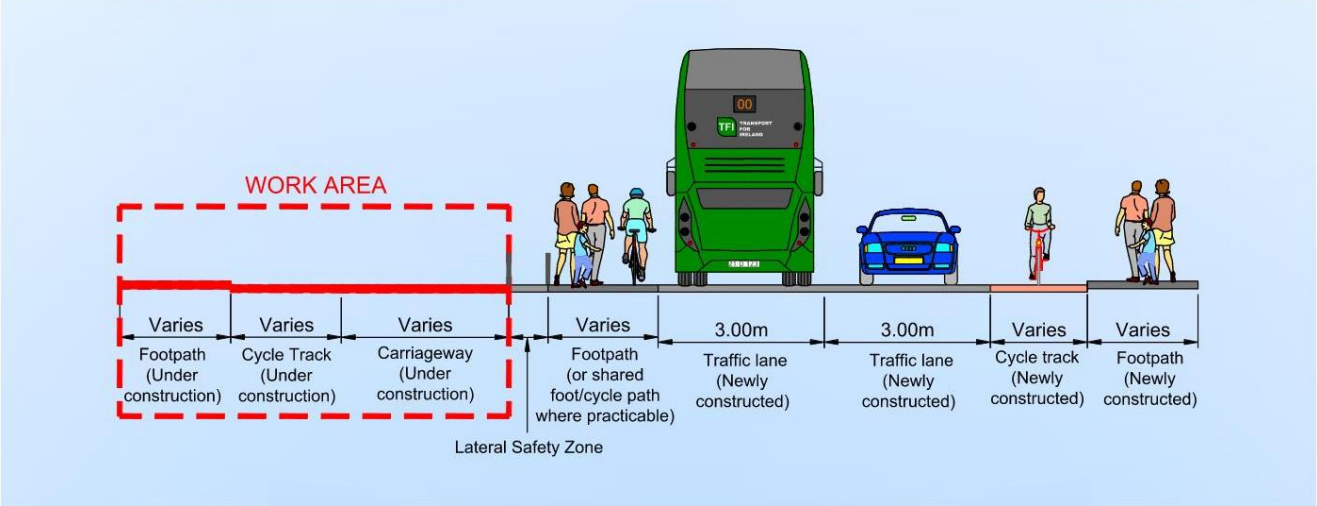

Image 5.25: Traffic Management Cross Section, Section 7c – Stage 3

Southbound / City Centre bound bus lanes will be temporarily closed between Towerview Cottages and Prospect Way, and an upstream temporary traffic signal will be installed to hold traffic back before the end of the bus lane and thereby minimise delays for buses. The footpath south of Prospect Way will be reduced to 1.5m in width, to facilitate works along Prospect Way

5.8.4 Road Closures and Diversions

Some very limited short duration road closures and diversions will be required for bridge beam instalment works at Phibsborough during the Construction Phase of the Proposed Scheme. However, these measures will be minimised, wherever possible. Where necessary, road closures and diversions will take into consideration the impact on road users, residents, businesses etc. Road closures and diversions will be carried out with regard to the Traffic Signs Manual (Department of Transport, Tourism and Sport 2019). All road closures and diversions will be determined by the NTA, in consultation with the local authority and An Garda Síochána, as necessary. As mentioned previously, access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

5.9 Interface with Other Projects

The likely timelines of the Proposed Scheme construction works have considered the potential for simultaneous construction of, and cumulative impacts with other infrastructure projects and developments which are proposed along, or in the vicinity of the Proposed Scheme. The likely significant cumulative impacts caused by the Proposed Scheme in combination with other existing or planned projects were identified and assessed in Chapter 21 (Cumulative Impacts & Environmental Interactions) of this EIAR.

Interface liaison will take place on a case-by-case basis through the NTA, as will be set out in the Construction Contract, to ensure that there is coordination between projects, that construction access locations remain unobstructed by the Proposed Scheme works and that any additional construction traffic mitigation measures required to deal with cumulative impacts are managed appropriately.

5.10 Construction Environmental Management

5.10.1 Construction Environmental Management Plan

As stated in Section 5.1, a CEMP has been prepared for the Proposed Scheme and is included as Appendix A5.1 in Volume 4 of this EIAR. The CEMP will be updated by the NTA prior to finalising the Construction Contract documents for tender, so as to include any additional measures required pursuant to conditions attached to An Bord Pleanála's decision. It will be a condition of the Employer's Requirements that the successful appointed contractor, immediately following appointment, must detail in the CEMP the manner in which it is intended to effectively implement all of the applicable mitigation measures identified in this EIAR. The CEMP has regard to the guidance contained in the Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan (TII 2007), and the handbook published by CIRIA in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

Details of mitigation measures proposed to address potential impacts arising from construction activities are described in Chapter 6 to Chapter 21, as appropriate, and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

A number of sub-plans have also been prepared as part of the CEMP and these are summarised in the following sections. For the avoidance of doubt, all of the measures set out in the CEMP and the sub-plans appended to this EIAR will be implemented in full by the appointed contractor to the satisfaction of the NTA.

5.10.1.1 Construction Traffic Management Plan

The CTMP has been prepared to demonstrate the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled. It will be a condition of the Employer's Requirements that the successful appointed contractor, immediately following appointment, must detail in the CTMP the manner in which it is intended to effectively implement all of the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála, should they grant approval. Further details on the assessment of construction traffic, and traffic related mitigation measures are provided in Chapter 6 (Traffic & Transport) of this EIAR.

5.10.1.2 Invasive Species Management Plan

The Invasive Species Management Plan (ISMP) has been prepared which provides the strategy to be adopted in order to manage and prevent the spread of non-native invasive plant species. Non-native invasive plant species were identified in close proximity to the Proposed Scheme during ecological surveys. It will be a condition of the Employer's Requirements that the successful appointed contractor, immediately following appointment, must detail in the ISMP how it is intended to complete the works in accordance with the Employer's Requirements, and will be subject to the NTA's approval. Further details on the assessment of non-native invasive species, and associated mitigation measures are provided in Chapter 12 (Biodiversity) of this EIAR.

5.10.1.3 Surface Water Management Plan

The SWMP has been prepared which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition of the Employer's Requirements that the successful appointed contractor, immediately following appointment, must detail in the SWMP how it is intended to effectively implement all of the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.

5.10.1.4 Construction and Demolition Resource and Waste Management Plan

The CDRWMP has been prepared which provides the strategy that will be adopted in order to ensure that optimum levels of reduction, reuse and recycling are achieved. It will be a condition of the Employer's Requirements that the successful appointed contractor, immediately following appointment, must detail in the CDRWMP the manner in which it is intended to effectively implement all of the applicable mitigation measures identified in this EIAR and

any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval. Further details on waste management are provided in Chapter 18 (Waste & Resources) of this EIAR.

5.10.1.5 Environmental Incident Response Plan

The Environmental Incident Response Plan (EIRP) has been prepared to ensure that in the unlikely event of an incident (environmental, or non-environmental), response efforts are prompt, efficient, and suitable for the particular circumstances. The EIRP details the procedures to be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g., concrete), non-compliance incident with any permit or licence, or other such risks that could lead to a pollution incident, including flood risks. It will be a condition of the Employer's Requirements that the successful appointed contractor, immediately following appointment, must detail in the EIRP, the manner in which it is intended to effectively implement all of the applicable mitigation measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.

5.10.2 Mitigation Measures

Mitigation and monitoring measures have been identified as environmental commitments and overarching requirements which shall avoid, reduce or offset potential impacts which could arise throughout the Construction Phase of the Proposed Scheme. These mitigation and monitoring measures which are relevant to the Construction Phase of the Proposed Scheme are detailed in Chapter 6 to Chapter 21, and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) and in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.10.3 Construction Working Hours

It is generally envisaged that construction working hours will be between 07:00hrs and 23:00hrs on weekdays, and between 08:00hrs and 16:30hrs on Saturdays. Night-time and Sunday working will be required to facilitate street works that cannot be undertaken during day time / evening conditions. The planning of such works will take consideration of sensitive receptors, in particular any nearby residential areas.

5.10.4 Personnel Numbers

Throughout the Construction Phase, there will be some variation in the numbers of personnel working on-site. It is anticipated there will be 70 to 80 personnel directly employed across the Proposed Scheme, rising to 100 personnel at peak construction.

5.10.5 Construction Health and Safety

The requirements of Number 10 of 2005 – Safety, Health and Welfare at Work Act 2005, S.I. No. 291/2013 Safety, Health and Welfare at Work (Construction) Regulations, 2013 (hereafter referred to as the Regulations) and other relevant Irish and European Union safety legislation will be complied with at all times. As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to the completion of the Construction Phase. This Health and Safety Plan will be reviewed as the Proposed Scheme progresses. The contents of the Health and Safety Plan will follow the requirements of the Regulations. In accordance with the Regulations, a 'Project Supervisor Design Process' has been appointed and 'Project Supervisor Construction Stage' will be appointed, as appropriate.

5.11 Monitoring Measures

All monitoring measures relating to the Construction Phase of the Proposed Scheme have been set out in various chapters of the EIAR and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

5.12 References

BSI (2010). BS 3998:2010 Tree work – Recommendations

BSI (2012). BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations

Department of Transport (2019). Traffic Signs Manual. Chapter 8 Temporary Traffic Measures and Signs for Roadworks

TII (2011). TII Specification for Road Works Series 100

TII (2017). Guidelines for the Management of Waste from National Road Construction Projects

Directives and Legislation

Number 10 of 1996 - Waste Management Act, 1996, as amended