



**Chapter 05**  
Construction

## Contents

<b>5.</b>	<b>Construction .....</b>	<b>1</b>
5.1	Introduction .....	1
5.2	Construction Phasing .....	2
5.3	Overview of Construction Works .....	2
5.3.1	Section 1: Lower Kimmage Road from Kimmage Cross Roads to Junction with Harold's Cross Road .....	3
5.3.2	Section 2: Harold's Cross Road from Harold's Cross Park to Grand Canal .....	4
5.3.3	Section 3: Clanbrassil Street Upper and Lower, and New Street from the Grand Canal to the Patrick Street Junction.....	4
5.4	Construction Programme.....	5
5.5	Construction Methodology.....	6
5.5.1	Pre-Construction.....	6
5.5.2	Preparatory and Site Clearance Works.....	6
5.5.3	Road and Street Upgrades.....	9
5.5.4	Structural Works .....	11
5.5.5	Construction Site Decommissioning.....	16
5.6	Construction Plant and Equipment.....	16
5.7	Construction Compounds .....	17
5.7.1	Construction Compound Locations .....	17
5.7.2	Construction Compound Activities .....	20
5.7.3	Construction Compound Services .....	20
5.8	Construction Traffic Management .....	21
5.8.1	Pedestrian and Cyclist Provisions .....	21
5.8.2	Public Transport Provisions.....	21
5.8.3	General Traffic Provisions .....	22
5.8.4	Road Closures and Diversions.....	28
5.9	Interface with Other Projects .....	28
5.10	Construction Environmental Management .....	28
5.10.1	Construction Environmental Management Plan.....	28
5.10.2	Mitigation Measures .....	29
5.10.3	Construction Working Hours .....	30
5.10.4	Personnel Numbers.....	30
5.10.5	Construction Health and Safety.....	30
5.11	Monitoring Measures.....	30
5.12	References .....	31

## 5. Construction

### 5.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the construction activities associated with the Kimmage 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 indicative 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 three primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into six sub-sections, according to the types of construction works required. The sections / sub-sections are:

- **Section 1:** Lower Kimmage Road from Kimmage Cross Roads to Junction with Harold's Cross Road:
  - **Section 1a:** Kimmage Cross Roads to Ravensdale Park;
  - **Section 1b:** Lower Kimmage Road - Ravensdale Park / Sundrive Road / Harold's Cross Road; and
  - **Section 1c:** Kenilworth Park / Harold's Cross Road Junction.
- **Section 2:** Harold's Cross Road from Harold's Cross Park to Grand Canal;
- **Section 3:** Clanbrassil Street Upper and Lower, and New Street from the Grand Canal to the Patrick Street Junction:
  - **Section 3a:** Grand Canal Bridge / Clanbrassil Street Upper;
  - **Section 3b:** Clanbrassil Street Upper / Clanbrassil Street Lower; and
  - **Section 3c:** Clanbrassil Street Lower / New Street South.

The location of each section / sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR. The typical construction works 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 5.3.3.3. 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-0011_XX_00-DR-CR-9001	Site Location Plan
BCIDD-ROT-GEO_GA-0011_XX_00-DR-DR-9001	General Arrangement
BCIDD-ROT-GEO_HV-0011_ML_00-DR-CR-9001	Mainline Plan and Profile
BCIDD-ROT-ENV_LA-0011_ML_00-DR-LL-9001	Landscaping Drawings
BCIDD-ROT-PAV_PV-0011_XX_00-DR-CR-9001	Pavement Treatment Drawing
BCIDD-ROT-SPW_BW-0011_XX_00-DR-CR-0007	Fencing and Boundary Treatment Drawings
BCIDD-ROT-TSM_GA-0000_XX_00-DR-CR-9001	Traffic Signs and Markings Drawings
BCIDD-ROT-LHT_RL-011_XX_00-DR-EO-9001	Public Lighting
BCIDD-ROT-TSM_SJ-0011_XX_00-DR-TR-9001	Junction System Design Drawings
BCIDD-ROT-STR_ZZ-0011_XX_00-DR-SS-9001	Structures
BCIDD-ROT-DNG_ZZ-0011_XX_00-DR-CD-0001	Proposed Surface Water Drainage Works
BCIDD-ROT-UTL_UD-0011_XX_00-DR-CU-9001	IW Foul Asset Alterations
BCIDD-ROT-UTL_UW-0011_XX_00-DR-CU-9001	IW Water Asset Alterations
BCIDD-ROT-UTL_UE-0011_XX_00-DR-CU-9001	ESB Asset Alterations
BCIDD-ROT-UTL_UG-0011_XX_00-DR-CU-9001	GNI Asset Alterations
BCIDD-ROT-UTL_UL-0011_XX_00-DR-CU-9001	Telecom Asset Alterations
BCIDD-ROT-UTL_UC-0011_XX_00-DR-CU-9001	Combined Utilities Drawing

For further details on the design specifications, with regards to matters such as parking and loading bay widths, signalised junctions, priority junctions, 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: Lower Kimmage Road from Kimmage Cross Roads to Junction with Harold's Cross Road**

#### **5.3.1.1 Section 1a: Kimmage Cross Roads to Ravensdale Park**

Section 1a will encompass a length of 260m (metres) along Kimmage Road Lower, between Kimmage Cross Roads and Ravensdale Park. This section also includes the Kimmage Cross Roads, including the Kimmage Road West, Terenure Road West and Fortfield Road approaches to the junction. The construction activities at Section 1a will comprise pavement repair and reconstruction where necessary, narrowing and resurfacing of the roads, widening of footpaths, and the provision of new cycle tracks, with kerb separation from the roadway. Construction activities will also consist of additional traffic signage, new road markings, new and amended traffic signal infrastructure, new street furniture (rubbish bins, seats, benches, planters, bollards, cycle racks, bus stops (including shelters and information displays etc.)) and landscaping works. Some minor utility diversions and / or protections will be required.

The expected construction duration will be six months.

#### **5.3.1.2 Section 1b: Lower Kimmage Road - Ravensdale Park / Sundrive Cross / Harold's Cross Park**

Section 1b will encompass a length of approximately 1,970m along Kimmage Road Lower, between Ravensdale Park and Harold's Cross Park, including the Sundrive Road / Larkfield Avenue Junction, and limited works at offline locations along Poddle Park, Derravaragh Road, Mount Argus Way, Mount Argus Close, and Mount Argus View. Section 1b will also encompass an offline length of approximately 240m along Derravaragh Road between Corrib Road and Mount Tallant Avenue. The construction activities in Section 1b will comprise limited localised works primarily for urban realm improvements and junction modifications.

A Quiet Streets Cycle Route shared with local traffic is proposed along Poddle Park, continuing to Blarney Park and onto Sundrive Road. A parallel pedestrian and cycle route approximately 320m in length is proposed from Sundrive Road through Mount Argus Way and Mount Argus View, before re-joining Kimmage Road Lower. On this pedestrian and cycle route at Mount Argus, a new boardwalk structure (Structure Reference: 02) will be provided beside the River Poddle just to the north of the small car park at Sundrive Road. Further information on the construction methodology is provided in Section 5.5.4.1.

On the eastern side of the corridor, there is another parallel Quiet Streets Cycle Route shared with local traffic along Derravaragh Road and Larkfield Grove. Minor works along this route are required to install a new road closure with a cycle gate at the junction of Derravaragh Road and Aideen Drive, and to open gaps for cyclists through the existing road closures at the junctions at Corrib Road and at Mount Tallant Avenue.

At Sundrive Cross, on Kimmage Road Lower and on Sundrive Road, urban realm improvements will be introduced, including dedicated parking bays, high quality footpath paving and the introduction of landscaping.

Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture (rubbish bins, seats, benches, planters, bollards, cycle racks, bus stops (including shelters and information displays etc.)) and landscaping works. Some minor utility diversions and / or protections will be required.

The expected construction duration will be approximately six months.

#### **5.3.1.3 Section 1c: Kenilworth Park / Harold's Cross Road Junction**

Section 1c will be located 0.5km to the east of the Proposed Scheme corridor and encompasses the Kenilworth Park / Harold's Cross Road Junction, including the Rathgar Avenue and Kenilworth Square North approach roads.

The construction activities at Section 1c will comprise additional signage, new road markings, and new and amended traffic signal infrastructure.

The expected construction duration will be approximately three months.

### **5.3.2 Section 2: Harold's Cross Road from Harold's Cross Park to Grand Canal**

Section 2 will encompass a length of approximately 390m between Harold's Cross Park and the Grand Canal, including the Grove Road / Parnell Road Junction with Harold's Cross Road. The construction activities at Section 2 will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, cycle tracks, and new kerbs. Harold's Cross Road will be widened and will result in encroachment into various areas of private land. New boundary treatments will be provided at these locations. A new car park will also be provided in the grounds of Our Lady's Hospice. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. Major utility diversions and / or protections will be required.

The expected construction duration will be up to 15 months.

### **5.3.3 Section 3: Clanbrassil Street Upper and Lower, and New Street from the Grand Canal to the Patrick Street Junction**

#### **5.3.3.1 Section 3a: Grand Canal Bridge / Clanbrassil Street Upper**

Section 3a will encompass a length of approximately 80m over the Robert Emmet Bridge, at the Grand Canal and along Clanbrassil Street Upper, as well as 50m along Windsor Terrace on the north bank of the canal. The construction activities at Section 3a will comprise pavement reconstruction, widening, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. New offline cycle / pedestrian bridges will be constructed on each side of the existing Robert Emmet Bridge (Structure References: 01A and 01B). On the north eastern side of the eastern footbridge, an ancillary ramp structure will be provided extending eastwards along the southern side of Windsor Terrace to provide a suitable gradient for pedestrians to descend to the footpath along the northern bank of the Grand Canal (Structure Reference: 04). To the north of the bridge, the road will be widened, and the existing retaining wall on the western side of Clanbrassil Street Upper will be demolished and replaced with a new retaining wall (Structure Reference: 03). Further information on the construction methodology is provided in Section 5.5.4.1. The existing single-storey residential property at Gordon's Fuels, to the west of the existing retaining wall, will be demolished to accommodate a realigned and combined access to the Gordon's Fuels property, Mullen Scrap and for access by Waterways Ireland to the Grand Canal. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. Some trees will be removed at the corner of Parnell Road and Clanbrassil Street Upper. However, new trees will be planted upon completion of the construction works. Some minor utility diversions and / or protections will be required.

The expected construction duration will be 18 months.

#### **5.3.3.2 Section 3b: Clanbrassil Street Upper / Clanbrassil Street Lower**

Section 3b will encompass a length of approximately 380m along Clanbrassil Street Upper and Lower, including the South Circular Road Junction with Clanbrassil Street Lower at Leonard's Corner, to St. Patrick's Court. The construction activities at Section 3b will comprise pavement repair, 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 road lighting, new street furniture (rubbish bins, seats, benches, planters, bollards, cycle racks, bus stops (including shelters and information displays etc.)) and landscaping works. Some minor utility diversions and / or protections will be required.

The expected construction duration will be six months.

### 5.3.3.3 Section 3c: Clanbrassil Street Lower / New Street South

Section 3c will encompass a length of approximately 630m along Clanbrassil Street Upper and New Street South. The construction activities at Section 3b 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 road lighting, new street furniture (rubbish bins, seats, benches, planters, bollards, cycle racks, bus stops (including shelters and information displays etc.)) and landscaping works. Some trees will be removed from the existing central reserve on Clanbrassil Street Upper. However, new trees will be planted upon completion of the construction works. Some minor utility diversions and / or protections will be required.

The expected construction duration will be six months.

## 5.4 Construction Programme

An indicative 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 18 months. However, construction activities in individual sections will have shorter durations as outlined in Section 5.3. The programme identifies the estimated 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 No.	Estimated Construction Duration	Approximate Length (m)	Year 1				Year 2	
			Q1	Q2	Q3	Q4	Q1	Q2
Section 1a	6 months	260						
Section 1b	6 months (incl. 2 months concurrently at Derravaragh Road)	1,970 + 240						
Section 1c	3 months	Junction						
Section 2	15 months	390						
Section 3a	18 months	80						
Section 3b	6 months	380						
Section 3c	6 months	630						

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 temporary 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 replacement boundary walls / railings, fencing 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 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.

### **5.5.2.3 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-0011\_ML\_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.

### **5.5.2.4 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, the NTA will ensure that a 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 Proposed Scheme is included in Appendix A5.1 CEMP in Volume 4 of this EIAR.

### **5.5.2.5 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.

### **5.5.2.6 Ground Investigations**

Prior to construction, localised confirmatory ground investigation will be undertaken where necessary, by the appointed contractor.

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

### **5.5.2.7 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) where necessary, to ensure safe storage of all material, plant and equipment. Further information on the Construction Compounds is included in Section 5.7.

### **5.5.2.8 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.

### **5.5.2.9 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 Demolition Resource Waste Management Plan (CDRWMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

#### **5.5.2.9.1 Demolition of Bungalow at Clanbrassil Street Upper**

As part of the Proposed Scheme, the existing single story residential property to the north of the Grand Canal, and adjacent to the Gordon's Fuels / Waterways Ireland lands, will need to be demolished.

Prior to the commencement of demolition of the property, the appointed contractor will undertake an asbestos survey. Should asbestos containing materials be found, it will be disposed of by a specialist asbestos contractor in accordance with the appropriate legislation.

There will be no requirement for a bat survey prior to demolition, as there is no attic in the property.

Before the commencement of demolition works, all existing services will be identified, located, and turned off, in liaison with the local service providers. This includes Electricity Supply Board (ESB), water, gas, and telecommunications. Temporary disruption to services may arise during the course of the work but these existing services will be re-instated.

Any materials remaining in or around the house (e.g., furniture, kitchen appliances etc.) will be segregated and removed off site to an appropriately licenced facility.

Demolition of the property will commence from the roof structure working downwards. The appointed contractor will require the use of excavators and / or other suitable equipment for the demolition works. The remaining concrete and masonry structures will then be demolished and temporarily stockpiled in an appropriate location within the Proposed Scheme boundary. All material will be removed off site to an appropriately licenced facility.

Safe access to the adjacent commercial properties will be maintained throughout the demolition activities, unless otherwise agreed with the individual landowners.

### **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 5.8.4, 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-0011\_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 a 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, imported and recycled fill for the Proposed Scheme are outlined respectively in Table 18.8, Table 18.9, Table 18.9 and Table 18.10 in Chapter 18 (Waste & Resources) 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 Leonard'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**

In certain places 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;
- 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.

There is a high voltage (220kV (kilovolt)) oil-filled underground electricity cable located in the vicinity of the existing Robert Emmet Bridge. The cable is currently installed on the north bank of the Grand Canal, close to the canal's edge. It then crosses the Grand Canal on the Robert Emmet Bridge before turning to the west along the south bank of the Grand Canal. There is a risk that oil would reach the Grand Canal, should the cable be damaged during the construction works. A ground investigation, where construction works are to take place near to the ESB oil-filled cable, will be carried out prior to construction commencing and the appropriate mitigation measures identified in Section 13.5 of Chapter 13 (Water), will be deployed as required.

### **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-0011\_XX\_00-M2-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-0011\_ML\_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-0011\_XX\_00-DR-SS-9001) in Volume 3 of this EIAR.

**Table 5.3: Principal Structures**

Structure Name	Structure Reference	Section Reference
Stone Boat Boardwalk at Mount Argus Way	02	Section 1b
New Structures at Robert Emmet Bridge including.		Section 3a
- Cycle / pedestrian bridge west of Robert Emmet Bridge;	01A	
- Pedestrian bridge east of Robert Emmet Bridge;	01B	
- Retaining wall on northern approach to Robert Emmet Bridge on western side of Clanbrassil Street Upper; and	03	
- Ramp on eastern approach to Robert Emmet Bridge.	04	

#### 5.5.4.1.1 Stone Boat Boardwalk at Mount Argus Way (Structure Reference: 02)

The proposed Stone Boat Boardwalk will provide a footway / cycleway link between the rear of the car park on Sundrive Road to Mount Argus Way. The boardwalk will be approximately 40m long and 4m wide and will be constructed at a varying level of approximately 3m above the level of the river channel bed. The finished surface level of the bridge will match the level of the existing car park and the road surface at Mount Argus Square. A section of the existing boundary wall to the rear of the car park will be demolished to allow connectivity onto the proposed boardwalk.

The proposed structure will be supported on continuous flight auger (CFA) bored piles that will be installed into the River Poddle riverbank. The length of the piles has been estimated to be approximately 10m, with an approximate diameter of 500mm.

Each pile will support a transverse primary steel beam, which will in turn be connected by a row of four secondary steel beams positioned in a longitudinal direction along the length of the structure. The steel beams will support the steel deck which will be finished in perforated metal with a slip resistant finish. A steel post and wire railing will be provided along the edge of the boardwalk, closest to the River Poddle.

The underside of the boardwalk structure will have a vertical clearance of approximately 0.6m to the top of the Stone Boat feature in the river channel adjoining to the east. The positioning of the CFA piles finished level of the boardwalk will not affect the operation of the existing box culvert that extends beneath the car park adjacent to Sundrive Road.

Access to the works area will be provided mainly from the car park at Sundrive Road, with a secondary access from the existing road at Mount Argus Way. Protective measures will be provided to prevent materials falling into the River Poddle and prefabricated elements of the proposed boardwalk will be delivered to the works location from the southern end. CFA piles will be installed using a piling rig from the car park at the Mount Argus Square apartments where a part of the car park will be acquired temporarily for this purpose.

The ground surface will be prepared, with minor excavations to achieve the piling level. Bored pile drilling will be completed. Steel pile casings will be pushed down as the auger bores the hole. Steel cases will be adopted to prevent leakage of concrete into the river. 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 approximately two weeks, with one to two piles installed per day.

The steel beam sections will be lifted into place by a mobile crane and connected to the piles. It is expected that the crane will be positioned within the car park on Sundrive Road, with a second smaller crane located in the car park at Mount Argus Square to assist in stabilising the lifting process. Once the steel beams have been connected, the metal deck will be lifted into place and fastened before the railing is installed. Reinstatement of adjacent areas will then be completed.

#### 5.5.4.1.2 Cycle / Pedestrian Bridge to the West of the Robert Emmet Bridge (Structure Reference: 01A)

A new footbridge is proposed on the western side that will carry pedestrians and two lanes of cycle traffic that will be displaced from Robert Emmet Bridge as a result of the provision of bus lanes on the main carriageway. The footbridge will be approximately 24m long spanning the Grand Canal, and 6m wide including glass panels to

provide edge protection and will provide a 5m clearance width for the footway and cycleway. The clearance of the bridge over the Grand Canal water level will be approximately 3.2m, similar to the existing Robert Emmet Bridge. A section of the existing parapet wall adjacent to Parnell Road will be removed to allow access onto the new footbridge.

The proposed structure will be independently supported by reinforced concrete abutments and two intermediate steel piers. Longitudinal and transverse steel beams will support the deck surface that will be constructed in perforated steel sheets, to provide water-permeable surfaces.

Each of the abutments and intermediate piers will be supported on pairs of CFA piles, up to 13m long and 500mm in diameter. 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 auger bores the hole. Steel cases will be installed 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 approximately two weeks, with one to two piles installed per day.

Reinforced concrete pile caps will be constructed at the top of the piles which will support the reinforced concrete abutments and steel piers. The abutment on the northern side of the bridge will be constructed and the steel piers delivered to site, lifted by crane and fastened in place.

The bridge deck will be completed last. The steel deck will be transported to site and lifted into place by crane, from the northern side of the canal.

Glass panel edge protection will be provided on each side of the bridge structure and surface finishes applied to the bridge deck. Reinstatement of adjacent areas will then be completed.

#### 5.5.4.1.3 Pedestrian Bridge to East of Robert Emmet Bridge (Structure Reference: 01B)

A new footbridge is proposed on the eastern side, that will carry pedestrians displaced from Robert Emmet Bridge as a result of the provision of bus lanes on the main carriageway. The footbridge will be approximately 25m long spanning the Grand Canal. The bridge will be 3.5m wide, including glass panels to provide edge protection, and will provide a 2.5m clearance width for the footway. The clearance of the bridge over the Grand Canal water level will be approximately 3.2m, similar to the existing Robert Emmet Bridge. A section of the existing retaining wall adjacent to Grove Road and Windsor Terrace will be removed to allow construction of the new bridge.

The proposed structure will be independently supported by concrete piled abutments and two intermediate steel piers. Longitudinal and transverse steel beams will support the deck surface that will be constructed in perforated steel sheets, to provide water-permeable surfaces.

Each of the abutments and intermediate piers will be supported on pairs of CFA piles, up to 13m long and 500mm in diameter. 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 auger 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 installed per day.

Reinforced concrete pile caps will be constructed at the top of the piles which will support the abutments and intermediate steel piers. The abutments on both the northern and southern sides of the bridge will be constructed, and the steel piers delivered to site, lifted by crane and fastened in place.

The bridge deck will be completed last. The steel deck will be transported to site and lifted into place by crane, from the northern side of the canal.

Glass panel edge protection will be provided on each side of the bridge structure and surface finishes applied to the bridge deck. Reinstatement of adjacent areas will then be completed.

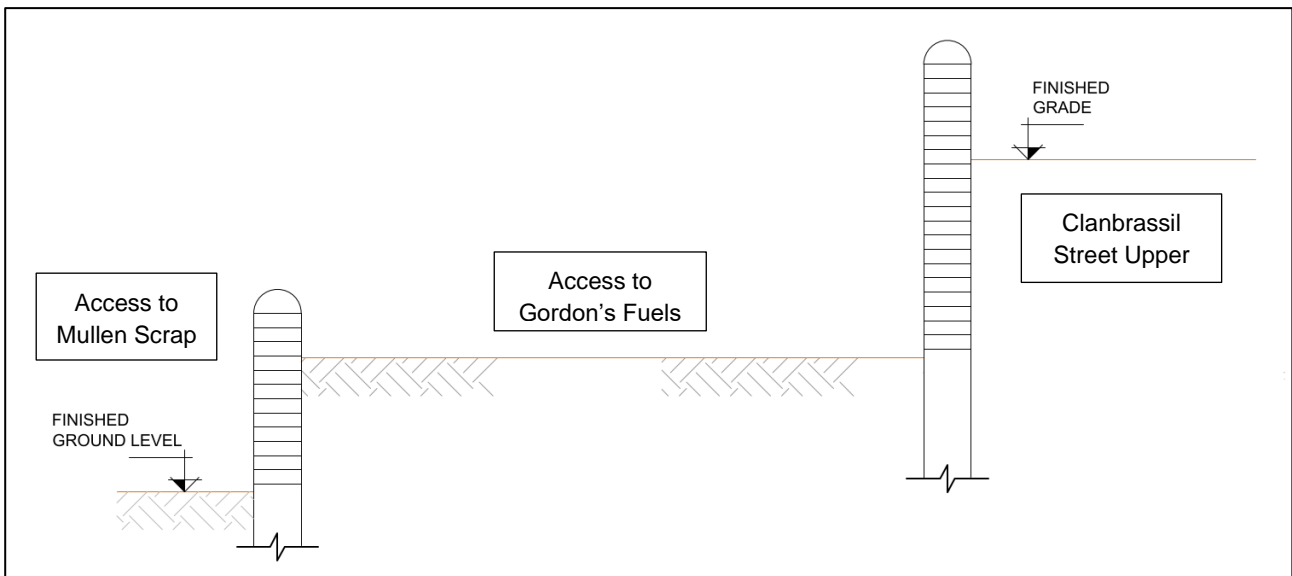
5.5.4.1.4 Retaining Wall on Northern Approach to Robert Emmet Bridge (Structure Reference: 03)

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: Proposed Retaining Walls**

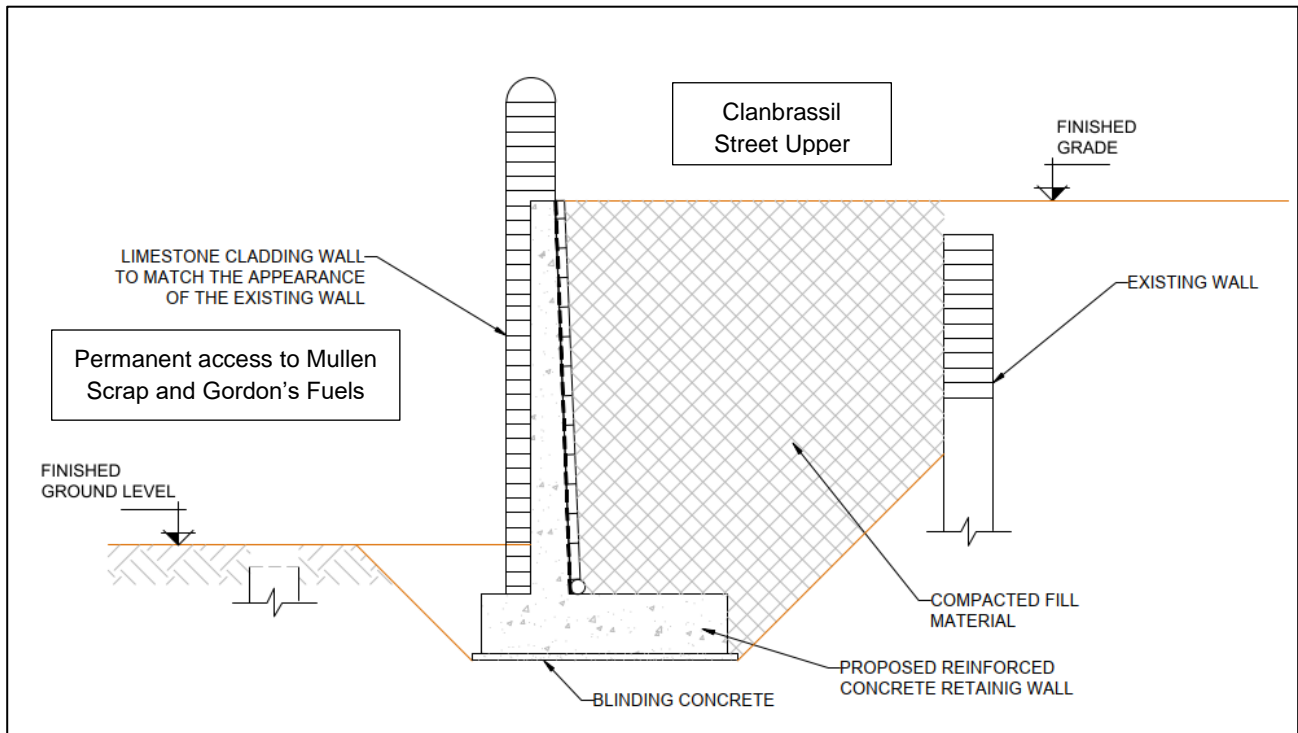
Structure Reference	Structure Type	Details	Chainage (m)	Length (m)	Max Retained Height (m)	Section Reference
03	Reinforced Concrete Retaining Wall	Replacement of an existing concrete retaining wall in a new position.	A2703 to A2763	60	3.5	Section 3a

On the western side of the street there are two existing masonry retaining walls located to the north of Robert Emmet Bridge on Clanbrassil Street Upper, where there are two laneways for access to Gordon’s Fuels at an upper level, and to Mullen Scrap at a lower level. These access lanes will be combined to facilitate the widening of Clanbrassil Street Upper. The lower wall will be demolished, and the upper wall buried behind new fill material to accommodate the widening of the road. A new combined retaining wall will be provided that is approximately 60m in length with a maximum retained height of approximately 3.5m, plus parapet above. Cross sections showing the existing and proposed layout of the retaining walls and access arrangements at this location, are shown in Image 5.1 and Image 5.2.



**Image 5.1: Cross Section Through Existing Accesses and Retaining Walls at Gordon's Fuels and Mullen Scrap**





**Image 5.2: Cross Section Through Proposed Access and Retaining Wall at Gordon's Fuels and Mullen Scrap**

Following the demolition of the existing property, described in Section 5.5.2.9.1, the existing lower retaining wall will be partially demolished down to the level of the lower access road serving Mullen Scrap. The ground in the vicinity of the demolished property will then be regraded to provide vehicular access between the lower access road and the Gordon's Fuels site. Once access arrangements have been amended to both the Gordon's Fuels and Mullen Scrap sites, construction of the north abutment for the cycle / pedestrian bridge to the west of the Robert Emmet Bridge, will commence. Refer to Section 5.8.3.3.1.1 for details.

The proposed new retaining wall (Structure Reference: 03) will be constructed in reinforced concrete and clad as required with masonry to match the appearance of the existing wall. The ground between the existing lower and upper retaining walls will be stripped to formation level. Existing services will be diverted as required to enable the wall construction. Blinding will be installed at formation level, then formwork and reinforcing steel for the wall will be fixed in place. Concrete will then be poured in sections and formwork removed after initial curing of the concrete. After a sufficient curing period, the area behind the retaining wall will be backfilled. The existing parapet wall will be removed, and the limestone masonry materials and coping will be retained for reuse from the upper retaining wall. Refer to Section 16.5 of Chapter 16 (Architectural Heritage) for more details. The top section of the existing upper retaining wall will be partially demolished, and the remaining lower section buried behind new structural fill in the gap between the existing and new retaining walls.

Once the new retaining wall has been constructed, the lower access road will be widened to allow combined access to both Gordon's Fuels and to Mullen Scrap. As noted previously, the lower access road will be connected into Gordon's Fuels across the footprint of the demolished house, with the ground regraded for a new ramp up to the higher Gordon's Fuels yard level.

During the works, the access to Gordon's Fuels will be diverted to the adjoining lower laneway beside Mullen Scrap as the existing access cannot remain in operation. This will require initial works to demolish the dwelling at Gordon's Fuels and reprofiling of the ground levels to link from the lower laneway up into the site. A loading area for Mullen Scrap will be temporarily relocated a short distance north along the lower access road, so as to provide clear access to the Gordon's Fuels site until the works are completed.

The replacement access road to Gordon's Fuels and Mullen Scrap will be reconstructed and widened to ensure suitable access / egress to Clanbrassil Street Upper is restored at the current location. Reinstatement of adjacent areas will then be completed, including pavement, footway and cycleway surfacing construction activities.

#### 5.5.4.1.5 Ramp on Eastern Approach to Robert Emmet Bridge (Structure Reference: 04)

The proposed ramp structure will carry pedestrians from Windsor Terrace to the new footbridge on the east side of Robert Emmet Bridge.

The existing narrow ramp at the edge of the road will be widened to form a cantilever section over the existing retaining wall to accommodate a 2m wide footpath. The section of ramp will also be lengthened to approximately 20m to provide a suitable gradient and to fit with the levels of the proposed eastern footbridge over the canal.

Protective measures will be provided to prevent materials falling into the Grand Canal and prefabricated elements of the proposed structure will be delivered to the works location. The ground surface will be prepared, with minor excavations to allow construction of the foundations for the extended section of the ramp. The extended section of the ramp will be formed as a reinforced earth structure. The existing retaining wall will be increased in height to suit the levels of the new ramp. The proposed cantilevered section of the ramp will be constructed in reinforced concrete on top of the extended section of retaining wall. Once complete, edge restraint in the form of pedestrian railings, will be installed on both sides of the ramp. Reinstatement of adjacent areas will then be completed.

### 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 area which was occupied by the Construction Compounds will be reinstated (refer to the Landscaping General Arrangement Drawings (BCIDD-ROT-GEO\_GA-0011\_XX\_00-DR-DR-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 Type	Section						
	1a	1b	1c	2	3a	3b	3c
Lorry	2	3	1	4	2	2	2
Backhoe Mounted Hydraulic Breaker	1	1	1	2	1	1	1
8t (tonne) Excavator	1	1	0	1	0	0	0
13t (Rubber Wheeled) Excavator	0	0	0	1	1	0	0
16t (Rubber Wheeled) Excavator	0	0	0	2	0	0	0
6t Dumper	1	1	1	1	1	1	1
Road Planer	1	0	0	1	1	1	1
Road Sweeper	1	1	0	1	1	1	1
Asphalt Paver	1	1	1	1	1	1	1
Asphalt Roller	1	1	1	1	1	1	1
3t Roller	1	0	0	1	1	1	1
Crane	0	2	0	0	1	0	0
CFA Piling Rig	0	1	0	0	1	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 K1 will be located in the public car park, located between Sundrive Road and Mount Argus Way, as shown in Image 5.3. The area of the Construction Compound is approximately 370m<sup>2</sup> (metres squared).

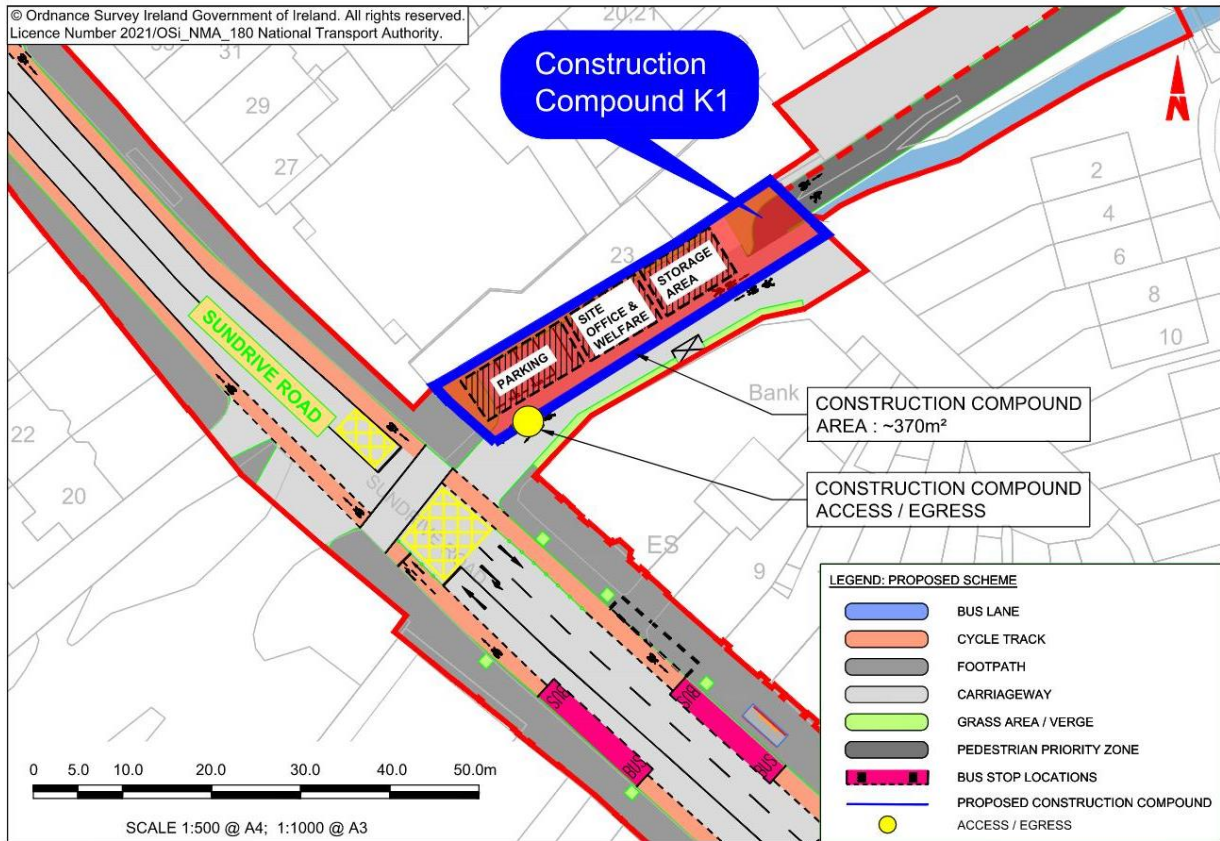


Image 5.3: Location and Extent of the Construction Compound K1

Construction Compound K2 will be located on Harold's Cross Road, in the grounds of Our Lady's Hospice, as shown in Image 5.4. The area of the Construction compound is approximately 680m<sup>2</sup>.

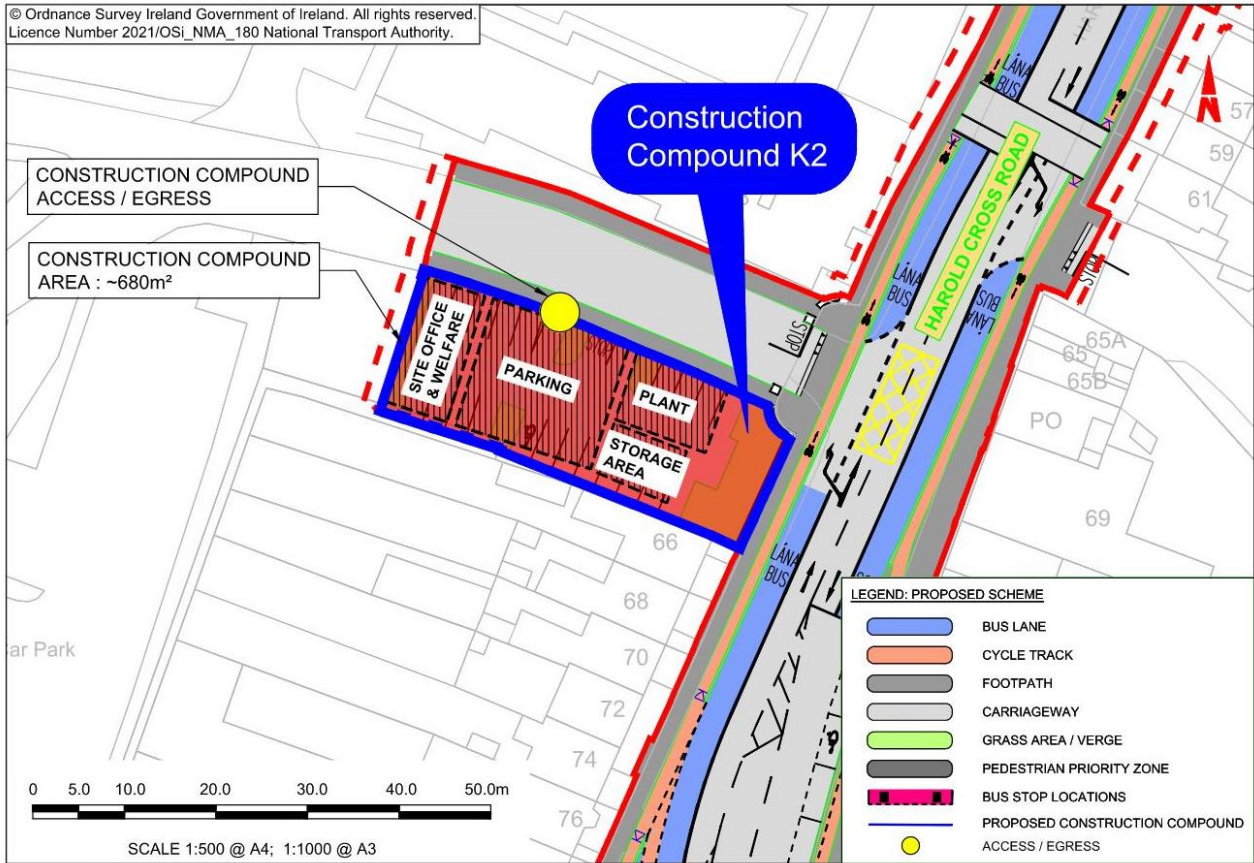


Image 5.4: Location and Extent of the Construction Compound K2

Construction Compound K3 will be located to the west of Clanbrassil Street Lower at St. Patrick's Court, as shown in Image 5.5. The total area of the Construction Compound is approximately 170m<sup>2</sup>.

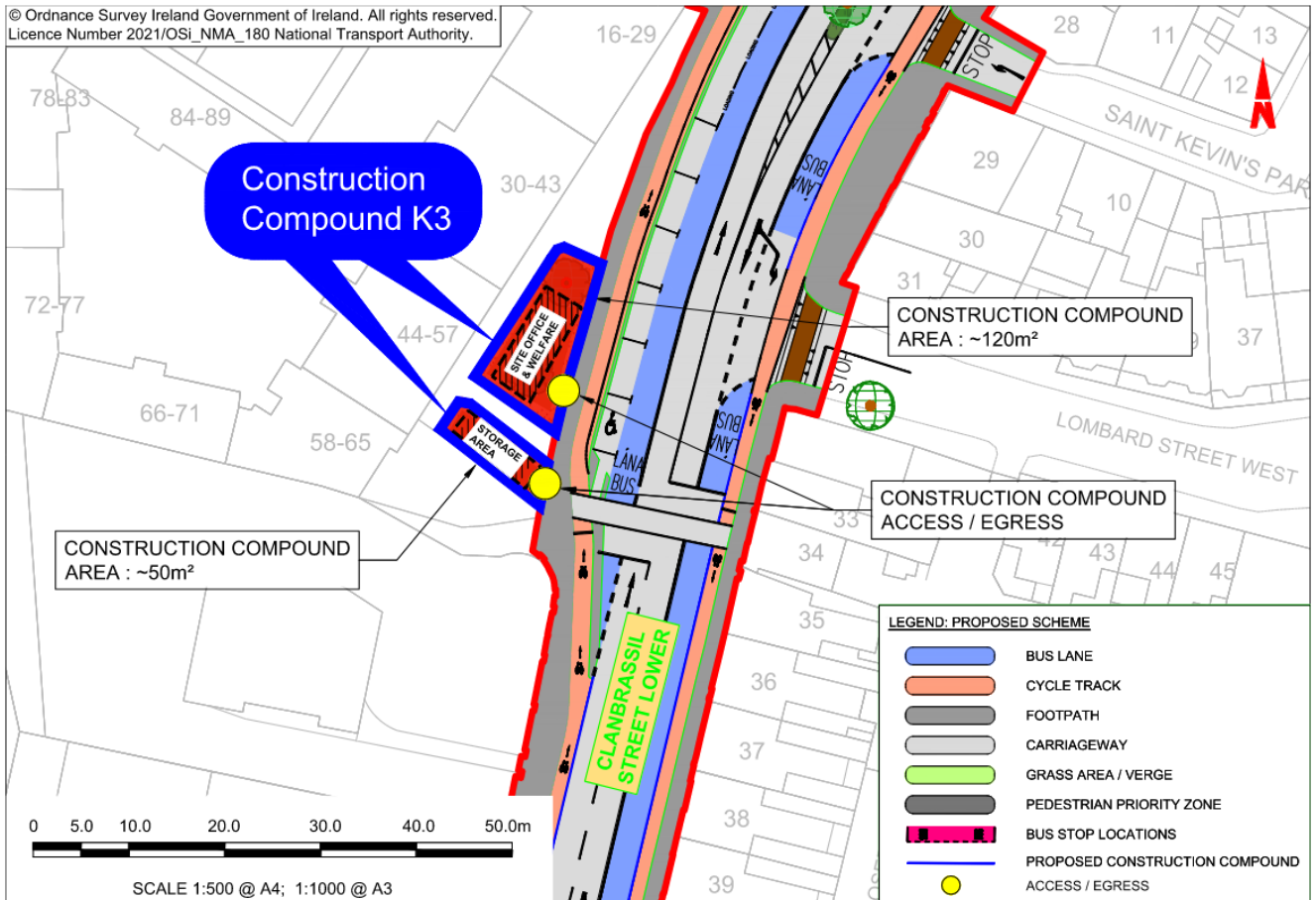


Image 5.5: Location and Extent of the Construction Compound K3

## 5.7.2 Construction Compound Activities

As shown in Image 5.3 to Image 5.5, 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. Excavated materials such as topsoil, subsoil, concrete, rock etc., will not be stored at the Construction Compounds for reuse, as the compounds are too small. All excavated materials will be immediately loaded into lorries for removal from the site of the excavation. Items of plant and equipment, described in Section 5.6, will be stored within the Construction Compounds when not in use.

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 Compound 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 5.5.2.7. Temporary lighting, including security lighting will be required at the Construction Compounds,

as described in Section 5.5.2.8. 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 5.8.3 to Section 5.8.4, 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 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 5.8.3.3.

#### **5.8.3.1 Section 1: Lower Kimmage Road from Kimmage Cross Roads to Junction with Harold's Cross Road**

##### **5.8.3.1.1 Section 1a: Kimmage Cross Roads to Ravensdale Park**

The works at Section 1a will take place at the Kimmage Cross Roads and along Kimmage Road Lower to Ravensdale Park.

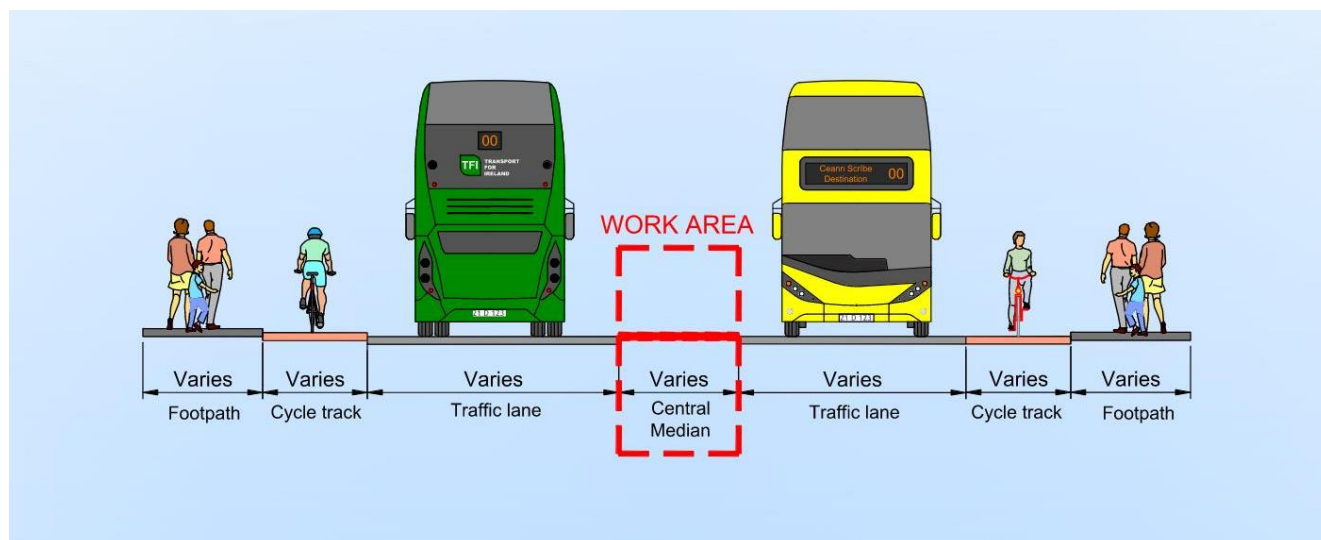
At Kimmage Cross Roads, traffic will be realigned into narrow lanes to facilitate the construction works in the footway and verge areas. All approach traffic lanes at the junction will remain operational, apart from the permanent closure of the left-slip lanes at three junction corners. Finishing works will be undertaken out-of-hours, with traffic potentially reduced to single lane shuttle working.

Construction activities along Kimmage Road Lower will be undertaken along the carriageway, footways 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.

##### **5.8.3.1.2 Section 1b: Lower Kimmage Road - Ravensdale Park / Sundrive / Harold's Cross**

The works at Section 1b will be undertaken along the carriageway, footways and along the verges. Limited localised traffic management measures will be implemented to facilitate the works. Traffic lanes will be realigned and narrowed, temporarily, to facilitate the works to the traffic islands in the centre of the road, as shown in Image 5.6. Finishing works will be undertaken out-of-hours, with traffic potentially reduced to single lane shuttle working.





**Image 5.6: Traffic Management Cross Section, Section 1b**

The works at the Sundrive Road / Kimmage Road Lower Junction will entail road narrowing for the provision of some on-street parking, and reconstruction of the footpaths as part of the urban realm improvements for Kimmage Village. Localised improvement works will take place at the junctions with Mount Argus View and Mount Argus Church on Kimmage Road Lower. Minor adjustments will be made to the road layout in the vicinity of the Harold's Cross Park. Traffic lanes will be realigned in narrow lanes, temporarily, to facilitate the works to the traffic islands and new kerb lines. Finishing works will be undertaken out-of-hours, with traffic potentially reduced to single lane shuttle working.

The works on Derravaragh Road to introduce the Quiet Streets Cycle Route will be undertaken along the edge of carriageway, footways and verge areas. Traffic lanes will be realigned locally in narrow lanes, temporarily, to facilitate the works adjacent to the new kerb lines and footway areas.

#### 5.8.3.1.2.1 Stone Boat Boardwalk (Structure Reference: 02) and Link through Mount Argus Square

Construction of the boardwalk structure between Sundrive Road and Mount Argus Way (Structure Reference: 02) will take place from the car parks adjacent to Sundrive Road and at Mount Argus Square. During the works, the car park adjacent to Sundrive Road is to be used as a Construction Compound (K1). See Section 5.7.1 for more details. A crane needed during the construction of the works will be positioned in the adjacent Construction Compound K1 and on Mount Argus Way. A piling rig will be located on Mount Argus Way during the installation of the CFA piles. Access to the private properties along Mount Argus Square will be maintained at all times.

#### 5.8.3.1.3 Section 1c: Kenilworth Park / Harold's Cross Road Junction

The works at Section 1c will be undertaken on the existing road and at the footways where traffic signals will be adjusted. Limited localised traffic management measures will be implemented to facilitate the works. Traffic lanes will be realigned in narrow lanes, temporarily, to facilitate the works. Finishing works will be undertaken out-of-hours.

#### 5.8.3.2 Section 2: Harold's Cross Road from Harold's Cross Park to Grand Canal

The works at Section 2 will also be undertaken along the carriageway, footways and along the verges. The temporary closure of bus lanes will be required, with temporary bus priority signals at the junctions at Harold's Cross Park and at the Grand Canal.

The works will be undertaken in traffic management stages as follows:

- Stage 1 – Encroachment into the properties to be acquired for road widening, to establish the new permanent road boundaries;

- Stage 2 – Construction works on the southbound footway and verge, traffic realigned in narrow lanes to the west. One southbound traffic lane will be temporarily closed and the footway/cycleway realigned to facilitate the construction works, as shown in Image 5.7;
- Stage 3 – Construction works on the southbound carriageway, traffic reduced to single lane shuttle working, and realigned in narrow lanes to the west, as shown in Image 5.8;
- Stage 4 – Construction works on the northbound carriageway, traffic reduced to single lane shuttle working, and realigned in narrow lanes to the east, as shown in Image 5.9; and
- Stage 5 – Construction works on the northbound footway and verge, traffic realigned in narrow lanes to the east. One northbound traffic lane will be temporarily closed and the footway / cycleway realigned to facilitate the construction works, as shown in Image 5.10.

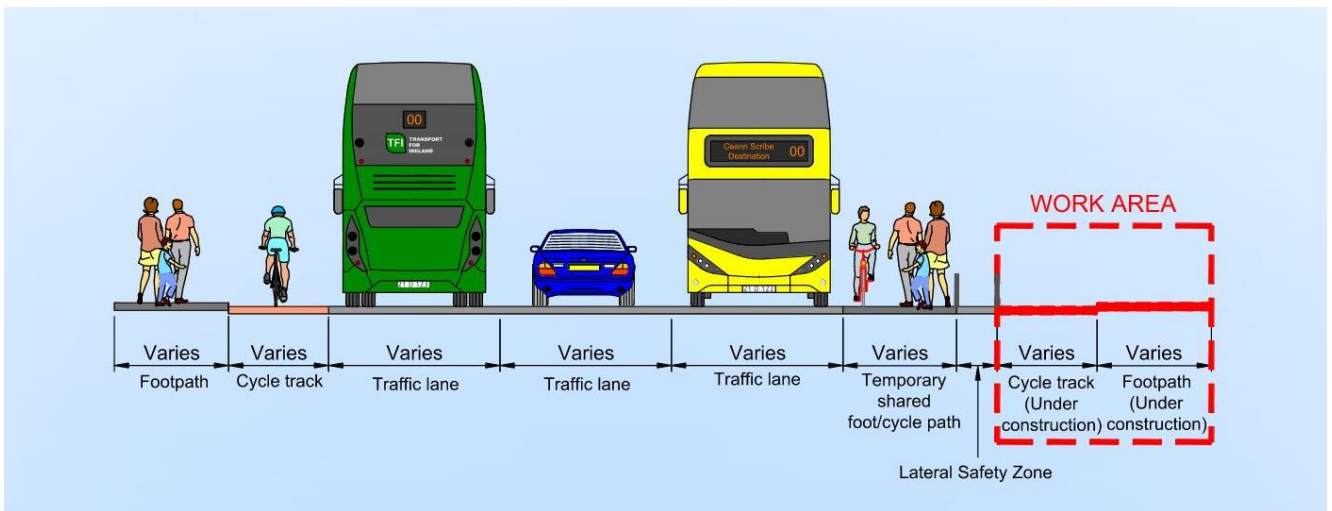


Image 5.7: Traffic Management Cross Section, Section 2 - Stages 1 & 2

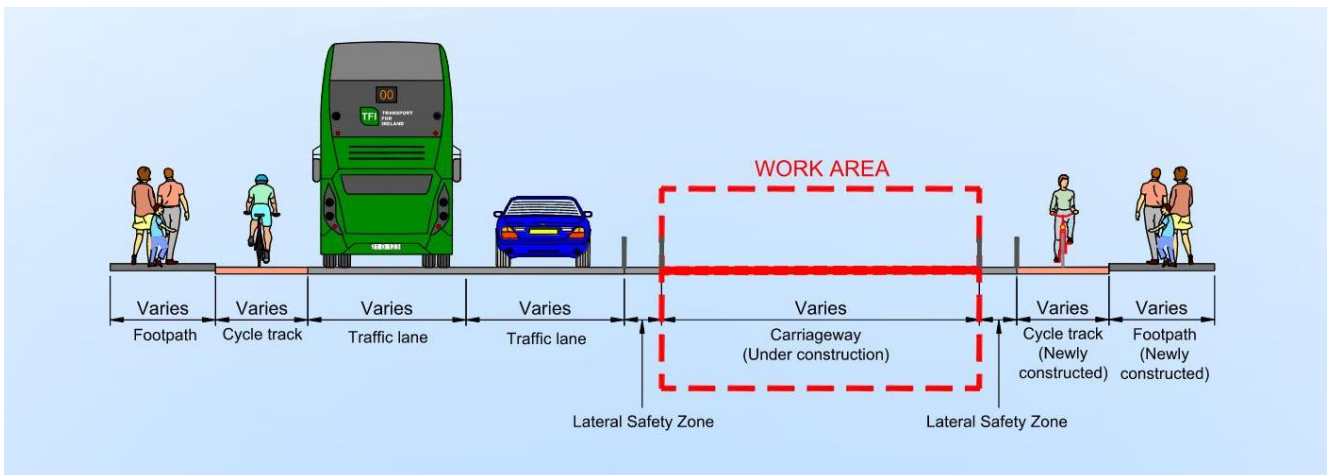
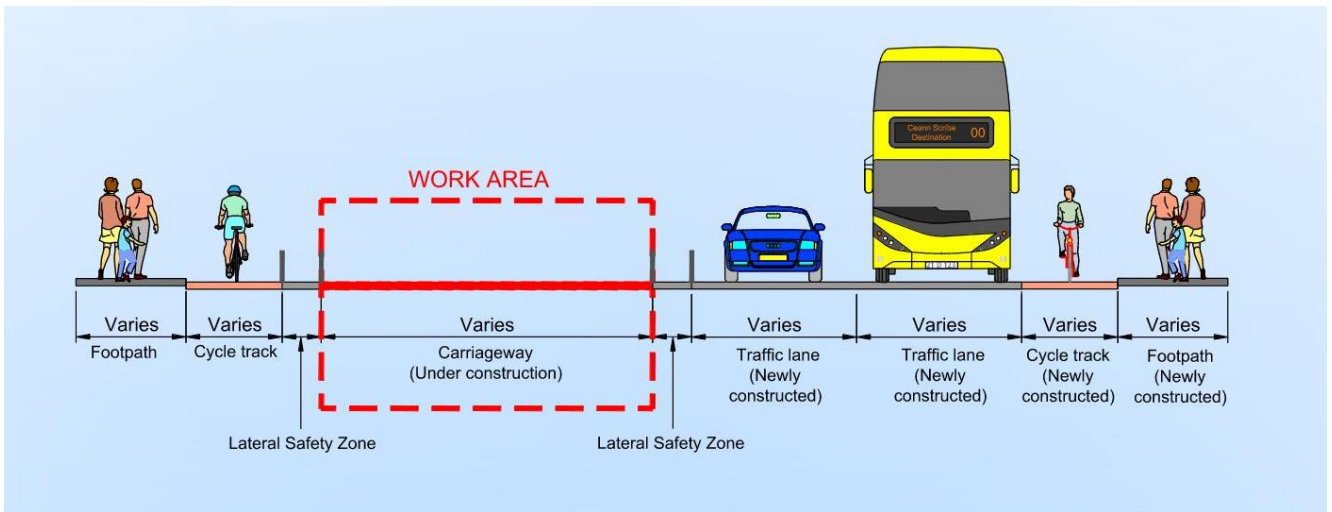
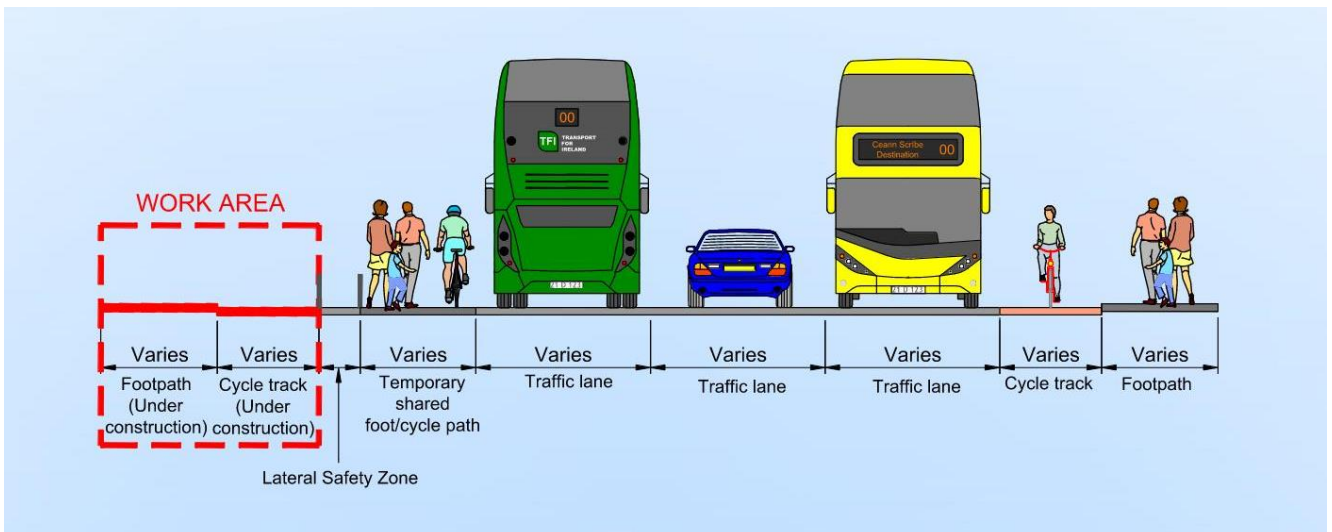


Image 5.8: Traffic Management Cross Section, Section 2 - Stage 3



**Image 5.9: Traffic Management Cross Section, Section 2 - Stage 4**



**Image 5.10: Traffic Management Cross Section, Section 2 - Stage 5**

### 5.8.3.3 Section 3: Clanbrassil Street Upper and Lower, and New Street from the Grand Canal to the Patrick Street Junction

#### 5.8.3.3.1 Section 3a: Grand Canal Bridge / Clanbrassil Street Upper

The works at Section 3a will also be undertaken along the carriageways and footways of Clanbrassil Street Upper, including access lanes on the western side, Parnell Road and Grove Road and at Windsor Terrace, and in the adjoining properties to be acquired. The temporary closure of bus lanes will be required, with temporary bus priority signals on approaches to junctions, coordinated with the restrictions in Section 2 as described earlier. New structures and a retaining wall will be constructed in the vicinity of the Robert Emmet Bridge and along the western side of Clanbrassil Street Upper. Refer to section 5.5.4.1 for more details.

At the Parnell Road / Harold's Cross Road / Grove Road Junction, traffic will be realigned into narrow lanes to facilitate the construction works in the footway and verge areas. All approach traffic lanes at the junction will remain operational. Finishing works will be undertaken out-of-hours, with traffic potentially reduced to single lane shuttle working for short periods of time.

#### 5.8.3.3.1.1 Cycle / Pedestrian Bridge to the West of the Robert Emmet Bridge (Structure Reference: 01A)

During the works at the proposed western pedestrian / cycle bridge over the Grand Canal (Structure Reference: 01A), a crane and piling rig will be located within the yard at Gordon's Fuels on the north side of the canal. A piling rig will be located at this location during the installation of the piles. The piling rig will move to the verge area on the south side of the canal adjacent to Parnell Road when the southern abutment is being constructed, requiring traffic on Parnell Road to be realigned into narrow lanes to facilitate the construction works.

The Grand Canal towpath on the southern side of the canal will be closed during the construction works. However, pedestrians will be temporarily diverted onto Parnell Road and Grove Road.

#### 5.8.3.3.1.2 Pedestrian Bridge to the East of the Robert Emmet Bridge (Structure Reference: 01B)

During the works at the proposed eastern pedestrian bridge over the Grand Canal (Structure Reference: 01B), a crane and piling rig will be required to complete the works. The piling rig will be located on Windsor Terrace during the installation of the piles for the northern abutment. The piling rig will move to the verge area on the south side of the canal adjacent to Grove Road when the southern abutment is being constructed, requiring traffic on Grove Road to be realigned into narrow lanes to facilitate the construction works. A one-night closure of Windsor Terrace will be required to lift the bridge into position from a crane located on the northern side of the canal. Alternative access will be made available from the east during the temporary road closure.

The Grand Canal towpath on the southern side of the canal will be closed during the construction works. However, pedestrians will be temporarily diverted onto Parnell Road and Grove Road.

#### 5.8.3.3.1.3 Retaining Wall on Northern Approach to Robert Emmet Bridge (Structure Reference: 03)

During the construction of the new retaining wall, the existing access lane to Gordon's Fuels (No.32A Clanbrassil Street Upper) will be permanently diverted westwards and amalgamated with the lower access lane for Mullen Scrap (No.31 Clanbrassil Street Upper), where a second smaller existing masonry retaining wall will be demolished to enable widening of the access road for combined use to the two adjoining properties. Construction plant will be primarily located on the lower side of the retaining wall, minimising disruption to traffic on Clanbrassil Street Upper. When required, traffic on Clanbrassil Street Upper will be realigned into narrow lanes to the east, to facilitate the works. A hydraulic breaker and excavator will be located on the access road to Gordon's Fuels. Access for construction of the new retaining wall will be provided via the access road to the Gordon's Fuels site. Temporary access will be provided to the two businesses (Gordon's Fuels and Mullen Scrap) during the works.

#### 5.8.3.3.1.4 Ramp on Eastern Approach to Robert Emmet Bridge at Windsor Terrace (Structure Reference: 04)

Access for construction of the ramp structure will be provided from Windsor Terrace. Construction plant will be located on Windsor Terrace adjacent to the proposed ramp structure. Traffic operation on Windsor Terrace will be closed during the works and the existing car parking bays temporarily removed. Alternative access will be made available from the east during the temporary road closure. Pedestrian access will be temporarily diverted to the northern footpath.

#### 5.8.3.3.2 Section 3b: Clanbrassil Street Upper / Clanbrassil Street Lower

The works at Section 3b will be undertaken along the carriageway and footways on Clanbrassil Street Upper and Lower as far north as St. Patrick's Court, where the street widens to a dual carriageway. Limited localised traffic management measures will be implemented to facilitate the works. Traffic lanes will be realigned in narrow lanes, temporarily, to facilitate the works to the kerb lines. There will be some limited localised repairs to the road pavement where necessary, and the road surface will be planed off and replaced across the full carriageway width. At the South Circular Road / Clanbrassil Street Upper Junction, traffic will be realigned into narrow lanes to facilitate the construction works. Traffic lanes at the junction will be modified to suit the proposed permanent layout which will entail narrowing of the South Circular Road approaches. Finishing works will be undertaken out-of-hours.

The works will be undertaken in two traffic management stages:

- Stage 1 – Construction works on the northbound edge of carriageway and footway, traffic realigned in narrow lanes to the east. Traffic will temporarily operate under one lane in each direction and the footway / cycleway will be realigned to facilitate the construction works, as shown in Image 5.11; and
- Stage 2 – Construction works on the southbound edge of carriageway and footway, traffic realigned in narrow lanes to the west. Traffic will temporarily operate under one lane in each direction and the footway / cycleway will be realigned to facilitate the construction works as shown in Image 5.12.

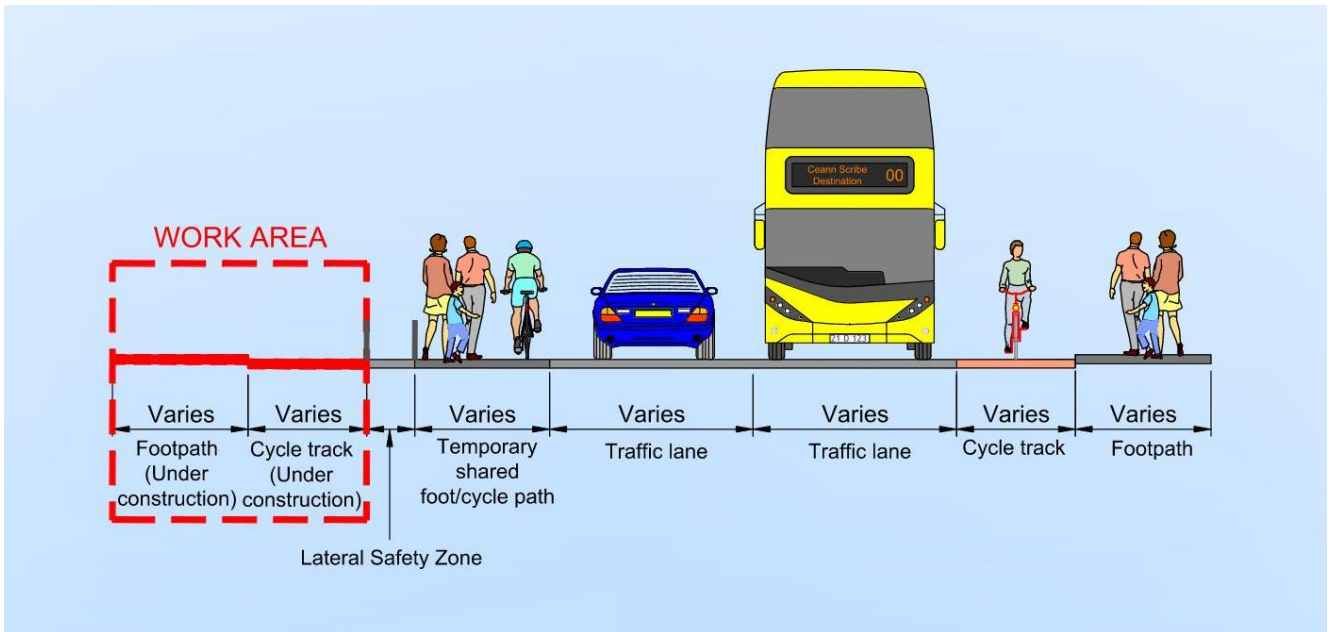


Image 5.11: Traffic Management Cross Section, Section 3b Clanbrassil Street Upper / Lower - Stage 1

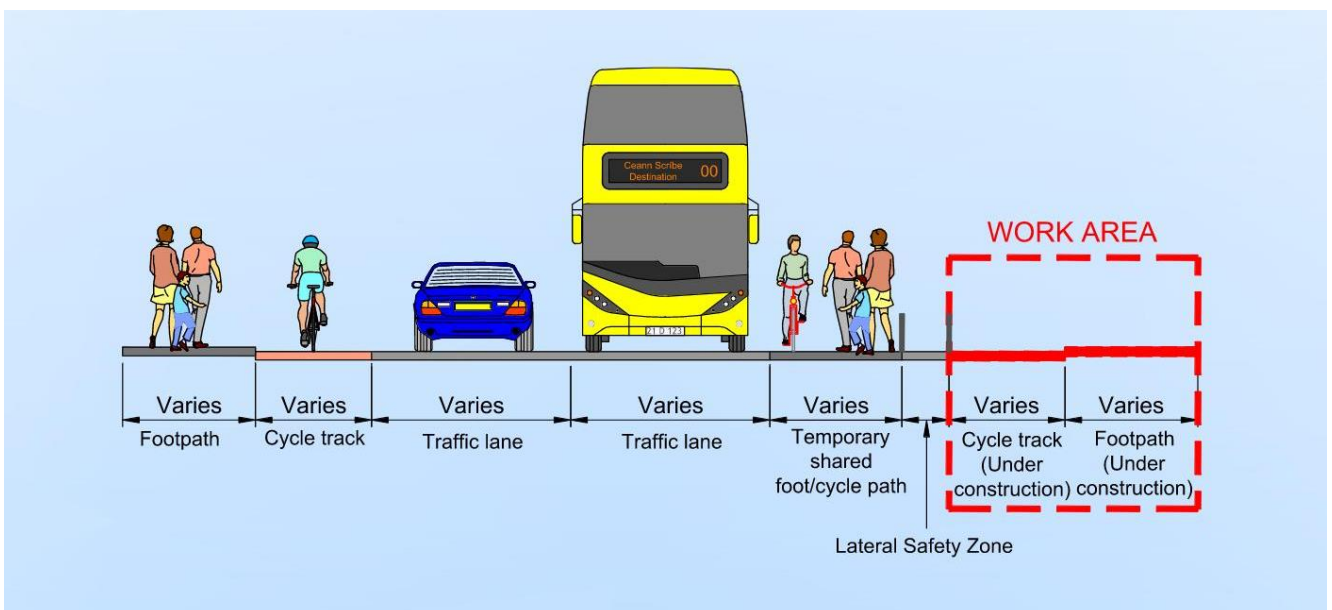


Image 5.12: Traffic Management Cross Section, Section 3b Clanbrassil Street Upper / Lower - Stage 2

#### 5.8.3.3.3 Section 3c: Clanbrassil Street Lower / New Street South

The works at Section 3c will be undertaken along the carriageway and footways on Clanbrassil Street Lower and New Street South. There will be some limited localised repairs to the road pavement where necessary, and the road surface will be planed off and replaced across the full carriageway width. Limited localised traffic management measures will be implemented to facilitate the works. Traffic lanes will be realigned in narrow lanes, temporarily, to facilitate the works to the kerb lines and traffic islands. The temporary closure of bus lanes will also be required.

### 5.8.4 Road Closures and Diversions

Road closures and diversions will need to be carried out 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 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 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 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 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 20 to 30 personnel directly employed across the Proposed Scheme, rising to 50 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 (as amended) (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 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

CIRIA (2015). Environmental Good Practice on Site Guide, 4th Edition

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

TII (2007). Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan

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

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