Chapter 05
Construction

Contents

5. Construction

5.1 Introduction

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

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

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

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

This Chapter includes the following information:

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

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

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

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

5.2 Construction Phasing

The Proposed Scheme has been divided into five primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 10 sub-sections, according to the types of construction works required. The sections/sub-sections are:

- **Section 1:** Pinnock Hill Junction to Airside Junction.
- **Section 2:** Airside Junction to Northwood Avenue:
  - **Section 2a:** Airside Junction to Airport Roundabout;
  - **Section 2b:** Airport Roundabout to Old Airport Road; and
  - **Section 2c:** Old Airport Road to Northwood Avenue.
- **Section 3:** Northwood Avenue to Shantalla Road:
  - **Section 3a**: Northwood Avenue to Omni Park Shopping Centre; and
  - **Section 3b**: Omni Park Shopping Centre to Shantalla Road.
- **Section 4:** Shantalla Road to Botanic Avenue:
  - **Section 4a**: Shantalla Road to Griffith Avenue; and
  - **Section 4b**: Griffith Avenue to Botanic Avenue.
- **Section 5:** Botanic Avenue to Granby Row:
  - **Section 5a**: Botanic Avenue to North Fredrick Street;
  - **Section 5b**: North Fredrick Street to Granby Row; and
  - **Section 5c**: Parnell Square including North Frederick Street.

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

5.3 Overview of Construction Works

The construction activities to be undertaken, and the anticipated duration of the works, in each section/sub-section are described in Section 5.3.1 to Section 5.3.5. 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
BCIDB-JAC-SPW_ZZ-0002_XX_00-DR-CR-9001	Site Location Plan
BCIDB-JAC-GEO_GA-0002_XX_00-DR-CR-9001	General Arrangement
BCIDB-JAC-GEO_HV-0002_ML_00-DR-CR-9001	Mainline Plan and Profile
BCIDB-JAC-GEO_CS-0002_XX_00-DR-CR-9001	Typical Cross Sections
BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001	Landscaping General Arrangement
BCIDB-JAC-PAV_PV-0002_XX_00-DR-CR-9001	Pavement Treatment Plans
BCIDB-JAC-SPW_BW-0002_XX_00-DR-CR-9001	Fencing and Boundary Treatment
BCIDB-JAC-TSM_GA-0002_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDB-JAC-LHT_RL-0002_XX_00-DR-EO-9001	Street Lighting
BCIDB-JAC-TSM_SJ-0002_XX_00-DR-TR-9001	Junction System Design
BCIDB-JAC-DNG_RD-0002_XX_00-DR-CD-9001	Proposed Surface Water Drainage Works
BCIDB-JAC-UTL_UD-0002_XX_00-DR-CU-9001	IW Foul Sewer Asset Alterations
BCIDB-JAC-UTL_UE-0002_XX_00-DR-CU-9001	ESB Asset Alterations
BCIDB-JAC-UTL_UG-0002_XX_00-DR-CU-9001	GNI Asset Alterations
BCIDB-JAC-UTL_UW-0002_XX_00-DR-CU-9001	IW Water Asset Alterations
BCIDB-JAC-UTL_UX-0002_XX_00-DR-CU-9001	Telecommunications Asset Alterations
BCIDB-JAC-UTL_UC-0002_XX_00-DR-CU-9001	Combined Existing Utility Records
BCIDB-JAC-STR_GA-0002_XX_00-DR-SS-9001	Structures General Arrangement
BCIDB-JAC-STR_GA-0002_BR_00-DR-CB-9001	Frank Flood Bridge General Arrangement

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

5.3.1 Section 1: Pinnock Hill Junction to Airside Junction

Section 1 encompasses a length of approximately 780m (metres) along Swords Road, between Pinnock Hill Junction and Airside Junction. The construction activities at Section 1 will comprise conversion of the Pinnock Hill roundabout to a signalised junction, pavement reconstruction and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture (rubbish bins, seats, lighting, benches, planters, bollards, cycle racks, bus stop (including shelters and information displays etc.)) and landscaping works. A heritage monument will be relocated at the Pinnock Hill Junction. Fencing will be constructed south of the Pinnock Hill Junction, and gates will be relocated at the entrance to O'Scanaill Veterinary Hospital. Various utility diversions and/or protections will be required; including electricity overhead lines and underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration will be approximately 12 months.

5.3.2 Section 2: Airside Junction to Northwood Avenue

5.3.2.1 Section 2a: Airside Junction to Airport Roundabout

Section 2a encompasses a length of approximately 1,920m along Swords Road, between Airside Junction and (Dublin) Airport Roundabout. The construction activities at Section 2a will comprise conversion of the Cloghran roundabout to a signalised junction, pavement reconstruction and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A principal retaining wall (RW022) will be constructed north of the Cloghran Junction, approximately 50m in length and maximum 2m in retained height. A minor retaining wall (RW026) will be constructed opposite Metro Point Business Park, approximately 30m in length. A minor retaining wall (RW027) will be constructed along Swords Road, south of Cloghran Junction, approximately 85m in length. Boundary walls will be constructed, and gates will be relocated along Swords Road, north and south of the Airside Junction. Fencing will also be constructed along Swords Road, between Kettles Lane and Stockhole Road, south of Cloghran Junction, and along Castlemoate House. The Construction Compound (SW1) will be located at the Cloghran Junction. Utility (telecommunications infrastructure) diversions and/or protections will be required. The expected construction duration will be approximately 18 months.

5.3.2.2 Section 2b: Airport Roundabout to Old Airport Road

Section 2b encompasses a length of approximately 1,380m along Swords Road, between (Dublin) Airport Roundabout and Old Airport Road. The construction activities at Section 2b will comprise minor pavement reconstruction, minor widening of the Airport Roundabout circulatory carriageway, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Utility diversions and/or protections will be required; including electricity underground cables and telecommunications infrastructure. The expected construction duration will be approximately 6 months.

5.3.2.3 Section 2c: Old Airport Road to Northwood Avenue

Section 2c encompasses a length of approximately 1,620m along Swords Road, between Old Airport Road and Northwood Avenue. The construction activities at Section 2c will comprise pavement reconstruction, widening, resurfacing of the roads, and construction of new footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A principal retaining wall (RW010) will be constructed along Swords Road, north of Northwood Avenue, approximately 70m in length and maximum 2m in retained height. A minor retaining wall (RW008) will be constructed at Greatgas Express, approximately 40m in length. A minor retaining wall (RW009) will be constructed at Royal College of Surgeons Sports Ground, approximately 50m in length. Boundary walls, and fencing will be constructed along Swords Road, and multiple gates will be relocated. The entrance to Collinstown Cross Industrial Estate will be relocated. The Construction Compound (SW2) will be located at Old Airport Road, Swords Road Junction. Various utility diversions and/or protections will be required; including electricity overhead lines and underground cables, gas mains and telecommunications infrastructure. The expected construction duration will be approximately 18 months.

5.3.3 Section 3: Northwood Avenue to Shantalla Road

5.3.3.1 Section 3a: Northwood Avenue to Omni Park Shopping Centre

Section 3a encompasses a length of approximately 1,280m along Swords Road, between Northwood Avenue and Omni Park Shopping Centre. The construction activities at Section 3a will comprise pavement reconstruction, widening, resurfacing of the roads, and construction of new footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A minor retaining wall (RW028) will be constructed along Santry Park, approximately 60m in length. A minor retaining wall (RW014) will be constructed at Santry AIB, approximately 35m in length. A minor retaining wall (RW015) will be constructed at Magenta Hall, approximately 30m in length. Boundary walls, and fencing will be constructed along Swords Road, and multiple gates will be relocated. The Construction Compound (SW1) will be located on Coolock Lane. Various utility

diversions and/or protections will be required; including electricity overhead lines and underground cables, water distribution, and telecommunications infrastructure. The expected construction duration will be approximately 18 months.

5.3.3.2 Section 3b: Omni Park Shopping Centre to Shantalla Road

Section 3b encompasses a length of approximately 620m along Swords Road, between Omni Park Shopping Centre and Shantalla Road. The construction activities at Section 3b will comprise pavement reconstruction, widening, resurfacing of the roads, and construction of new footpaths, and new kerbs. A new cycle track will be constructed along Lorcan Road, Lorcan Drive and Shanrath Road with Quiet Street Treatment (road markings and signage) implemented these roads. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Principal retaining walls (RW016, RW017, RW018), approximately 180m, 25m and 70m in respective length and maximum 1.5m in retained height will be constructed at properties on both sides of Swords Road through Santry Village. Boundary walls and gates will also be relocated throughout Santry Village, and driveways will be reconstructed. Various utility diversions and/or protections will be required, including electricity overhead lines and underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration will be approximately 12 months.

5.3.4 Section 4: Shantalla Road to Botanic Avenue

5.3.4.1 Section 4a: Shantalla Road to Griffith Avenue

Section 4a encompasses a length of approximately 1,470m along Swords Road, between Shantalla Road and Griffith Avenue. The construction activities at Section 4a will comprise pavement reconstruction, widening, resurfacing of the roads, and construction of new footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A principal retaining wall (RW029), will be constructed along Swords Road, at Highfield Hospital, approximately 80m in length and maximum 2m in retained height. A minor retaining wall (RW019) will be constructed at the Church of the Holy Child carpark, north of Collins Avenue Junction, approximately 140m in length. A minor retaining wall (RW020) approximately 150m in length will be constructed at opposite Iveragh Road. A minor retaining wall (RW021) will be constructed at Plunket College, approximately 35m in length. Boundary walls, and fencing will be constructed along Swords Road, and multiple gates will be relocated. The Construction Compound (SW4) will be located at Collins Avenue Junction. Various utility diversions and/or protections will be required; including electricity overhead lines and underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration will be approximately 18 months.

5.3.4.2 Section 4b: Griffith Avenue to Botanic Avenue

Section 4b encompasses a length of approximately 980m along Drumcondra Road Upper and Drumcondra Road Lower, between Griffith Avenue and Botanic Avenue. The construction activities at Section 4b will comprise minor pavement reconstruction and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. A new pedestrian and cycle bridge will be constructed to the west of the existing Frank Flood Bridge (Structure Reference: BR01). Further information on the pedestrian/cycle bridge at Frank Flood Bridge construction methodology is provided in Section 5.5.4.1.1. The Construction Compound (SW5) will be located at Frank Flood Bridge. Various utility diversions and/or protections will be required; including electricity underground cables, water distribution, gas mains and telecommunications infrastructure, particularly at the Frank Flood Bridge (BR01). The expected construction duration will be approximately 18 months.

5.3.5 Section 5: Botanic Avenue to Granby Row

5.3.5.1 Section 5a: Botanic Avenue to North Fredrick Street

Section 5a encompasses a length of approximately 1,450m along Drumcondra Road Upper, Drumcondra Road Lower, Dorset Street Lower and Dorset Street Upper, between Botanic Avenue and North Frederick Street. The construction activities at Section 5a will comprise minor pavement reconstruction, modifications to the central reserve, and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The expected construction duration will be approximately 12 months.

5.3.5.2 Section 5b: North Fredrick Street to Granby Row

Section 5b encompasses a length of approximately 250m along Dorset Street Upper, between North Frederick Street and Granby Row. The construction activities at Section 5b will comprise minor pavement reconstruction and resurfacing of the footpaths, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, and new street furniture. The expected construction duration will be approximately 3 months.

5.3.5.3 Section 5c: Parnell Square including North Frederick Street

Section 5c encompasses a length of approximately 700m along North Frederick Street and Parnell Square East, and along Granby Row and Parnell Square West, between Dorset Steet Upper and Parnell Street. The construction activities at Section 5c will comprise minor pavement reconstruction and resurfacing of the roads, footpaths, and cycle tracks, and new kerbs. Construction activities will also consist of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. The expected construction duration will be approximately 6 months.

5.4 Construction Programme

A programme for the Proposed Scheme is provided in Table 5.2. The total Construction Phase duration for the overall Proposed Scheme is estimated at approximately 36 months. However, construction activities in individual sections will have shorter durations as outlined in Section 5.3. The programme identifies the approximate duration of works at each section. The location of each section/sub-section along the Proposed Scheme is shown in Figure 5.1 in Volume 3 of this EIAR.

Table 5.2: Proposed Scheme Construction Programme

Section Ref.	Approximate Construction Duration	Approximate Length (m)	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Section 1	12 months	780												
Section 2a	18 months	1,920												
Section 2b	6 months	1,380												
Section 2c	18 months	1,620												
Section 3a	18 months	1,280												
Section 3b	12 months	620												
Section 4a	18 months	1,470												
Section 4b	18 months	980												
Section 5a	12 months	1,450												
Section 5b	3 months	250												
Section 5c	6 months	700												

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

5.5 Construction Methodology

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

5.5.1 Pre-Construction

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

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

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

5.5.2 Preparatory and Site Clearance Works

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

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

5.5.2.1 Land Acquisition and Boundary Treatment

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

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

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

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

5.5.2.2 Fencing

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

5.5.2.3 Construction Traffic Management Measures and Signage

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

5.5.2.4 Tree Protection

Trees to be retained within and adjoining the works areas will be suitably protected as necessary as per the British Standards Institution (BSI) British Standard (BS) 5837:2012 Trees in Relation to Design, Demolition, and Construction (BSI 2012). Trees identified for removal will be removed in accordance with BS 3998:2010 Tree Work. Recommendations (BSI 2010). The location of trees to be retained, and trees to be removed is shown on the Landscaping General Arrangement Drawings (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001).

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

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

5.5.2.5 Vegetation Clearance and Treatment of Non-Native Invasive Species

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

A suitably qualified specialist will be appointed by the contractor to monitor vegetation clearance, and treatment of non-native invasive species. Prior to construction, the NTA will ensure that 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.

5.5.2.6 Archaeological Investigations

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

5.5.2.7 Ground Investigations

Prior to construction, localised confirmatory ground 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.

5.5.2.8 Construction Compounds

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

5.5.2.9 Lighting

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

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

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

5.5.2.10 Demolition

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

The following structures will be demolished as part of the Proposed Scheme works:

- Collinstown Cross part demolition of commercial premises; and
- Two semi-detached cottages at the Royal College of Surgeons Sports Ground.

Demolition will be carried out in a controlled manner, and under supervision. Demolition works areas will be appropriately hoarded and signposted. Appropriate mitigation measures will be used to minimise the generation of dust and noise from the demolitions – refer to Chapter 7 (Air Quality) and Chapter 9 (Noise & Vibration) of this EIAR.

5.5.3 Road and Street Upgrades

5.5.3.1 General

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

5.5.3.2 Parking and Access

When roads and streets are being upgraded, there will be some temporary disruption/alterations to on-street and off-street parking provision, and access to premises in certain locations along the Proposed Scheme. Local arrangements will be made on a case-by-case basis to maintain continued access to homes and businesses affected by the works, at all times, where practicable. Details regarding temporary access provisions will be discussed with residents and business owners prior to construction starting in the area. The duration of the works will vary from property to property, but access and egress will be maintained at all times. The location of temporary land acquisition, proposed gates, and the relocation of existing gates are shown in the Fencing and Boundary Treatment Drawings (BCIDB-JAC-SPW_BW-0002_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

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

5.5.3.3 Earthworks

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

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

5.5.3.4 Cellars

Excavations within the City Centre will be minimal, thereby reducing the risk of interference with existing cellars along the Proposed Scheme. At certain locations, cellars extend outwards from buildings into adjoining footpaths or streets. Cellars, coal holes and light wells have been identified at Section 5a and Section 5b. Building condition surveys will be completed immediately prior to any works. Four cellars are proposed to be infilled with foamed concrete during the Works.

5.5.3.5 Drainage

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

Specific controls and mitigation measures will be put in place to manage runoff and minimise pollution to receiving water bodies during the Construction Phase of the Proposed Scheme. Further information with regards to drainage, and drainage design is included in Chapter 4 (Proposed Scheme Description), Chapter 13 (Water),

Chapter 19 (Material Assets) and the Surface Water Management Plan (SWMP) in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.5.3.6 Utility Works

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

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

- Watermains;
- Stormwater 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.

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 (BCIDB-JAC-PAV_PV-0002_XX_00-DR-CR-9001) in Volume 3 of this EIAR.

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

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

5.5.3.8 Traffic Signal Junctions

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

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

5.5.3.9 Ancillary Road Furnishings

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

5.5.3.10 Landscaping

Where vegetation, grassed areas and hedgerows are disturbed during the works, these will be reinstated, and replaced, where practicable. New trees will be planted, in suitable tree pits, where necessary, at various locations as shown in the Landscaping General Arrangement Drawings (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

5.5.4 Structural Works

5.5.4.1 Principal Structures

The principal structures 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 5.5.4.1.2. Further information on the retaining wall structures along the Proposed Scheme is provided in in the Structures General Arrangement Drawings (BCIDB-JAC-STR_GA-0002_XX_00-DR-SS-9001) in Volume 3 of this EIAR.

Table 5.3: Principal Structures

Structure Name	Structure Reference	Section Reference
Pedestrian/Cycle Bridge at Frank Flood Bridge	BR01	Section 4b
Retaining Walls	RW010	Section 2c
	RW016	Section 3b
	RW017	Section 3b
	RW018	Section 3b
	RW022	Section 2a
	RW029	Section 4a

5.5.4.1.1 Pedestrian/Cycle Bridge at Frank Flood Bridge (Structure Reference: BR01)

Frank Flood Bridge (formerly known as Drumcondra Bridge) is an existing bridge structure over the River Tolka in Drumcondra. In order to facilitate the Proposed Scheme cross-section over the River Tolka at this location, an additional independent parallel pedestrian/cycle bridge will be constructed to the west of the existing Frank Flood Bridge.

The existing bridge is a three-span masonry arch bridge, constructed in circa 1813, with a total length of 19.48m and a width of 19.43m. The existing bridge will be retained and strengthened to facilitate additional loading. The existing bridge will carry an additional northbound bus lane, adjacent to the western parapet, and northbound pedestrians and cyclists will be diverted to the proposed pedestrian/cycle bridge. In order to carry the additional weight, the spandrel wall will be strengthened. Mitigation measures will be introduced to reduce the risk of collision with the substandard western parapet.

The proposed pedestrian/cycle bridge will be a two-span steel bridge, with an intermediate support located on the southern bank of the river channel. The bridge pier will be set back from the existing river wall, and the bridge will be located 3m upstream of the existing bridge. The bridge will comprise a central varying depth box girder with a tie down arrangement at the north of the structure. The length of the main (north) span is approximately 38m with a south span of approximately 12m, the total span being approximately 50m. A 4m back span will be provided at the north of abutment to accommodate the moment restraint at this location. The distance between the deck soffit and the ground will vary, however a minimum clearance of 1.5m will be provided at the abutments.

A temporary platform/pontoon will be erected within the river channel to facilitate construction. The platform/pontoon will be located immediately upstream of the existing bridge. To ensure no increased in flood risk, the following mitigation measures will be put in place:

- In-stream works will be undertaken only between 1 July to the 30 September when flows are expected to be at their lowest. This restriction also aligns with ecological restrictions on the works due to Salmon and Kingfisher habitats;
- The platform will be designed so that it can be removed from the channel at short notice in the event of flood warning. The platform would be in place for a maximum of twelve weeks assuming no requirement for it to taken down, removed and re-erected; and
- The existing gauging station at Drumcondra (ref 9019) will be continually monitored for changes in river level. A rate of rise analysis of the gauging station will be completed at detailed design to determine a trigger level when the existing platform needs to be removed due to the risk of flooding.

The parkland beneath the proposed bridge span on the south bank will be lowered to provide additional floodplain storage and increase the effective channel section flow area immediately upstream of the existing bridge.

The proposed bridge will be constructed mainly from the areas north and south of the River Tolka and also from the temporary platform/pontoon. This will limit the need for road closures. Road closures will be required for the delivery of bridge sections (along the west side of the existing bridge). The main river span lift will be conducted under full closure of the bridge, at night or during the weekend. A lane closure on the west side of the existing bridge, and approaches, will be required during utility diversions and works to the west parapet.

The following construction methodology will be carried out in order the strengthen the spandrel wall of the existing bridge, construct the proposed bridge, and tie the new bridge into the existing landscape:

- **Stage 1:**
  - The existing wall at the south end of Our Lady's Park will be demolished;
  - The south bank and north bank will be regraded to finished ground level to facilitate piling rig access, and installation of rock armour. Stone pitching (beach cobbles set into concrete bedding) will be implemented in the area below the bridge deck, on the southern bank. The northern bank will be regraded, and rock armour scour protection will be implemented;
  - The piles to the north abutment and pier (two) will be installed, and the north abutment and pier will be constructed (piles are anticipated to be bored/ Continuous Flight Auger);
  - The north abutment will be backfilled; and
  - The crane mat will be prepared south of the pier location adjacent to the Construction Compound SW5.
- **Stage 2:**
  - The crane position will be established south of the pier;
  - The central beam river span will be delivered to the existing bridge (under full night-time or weekend closure of the existing bridge);
  - The prefabricated beam lengths will be welded into place; and

- The central beam will be lifted into position and secured with temporary supports located at the bridge pier and north abutment.

- **Stage 3:**
  - An access solution (temporary platform/pontoon) will be implemented below the river span;
  - Sections of the river span deck will be delivered to the existing bridge (under northbound lane closures);
  - The sections will be lifted into place working from north to south; and
  - The bolted splice connections will be completed on transverse members and welded connections will be completed on longitudinal members.
- **Stage 4:**
  - The crane will be demobilised, and the access solution (temporary platform/pontoon) will be removed;
  - The south abutment piles (two) will be installed, and the south abutment will be constructed;
  - The crane will be established south of the south abutment;
  - The central beam back span will be lifted into place and temporarily supported;
  - Sections of back span will be delivered to the existing bridge (under northbound lane closures); and
  - The sections will be lifted into position and spliced on transverse members and welded connections will be completed on longitudinal members.
- **Stage 5:**
  - The crane will be demolished, and landscape activities will be commenced in Our Lady's Park, in order to integrate with the proposed bridge;
  - The west footway and single northbound traffic lane will be closed on the existing bridge;
  - Utilities will be diverted from the western footway to the new bridge;
  - For the Horizontal Directional Drilling (HDD) under the Tolka_060 to install three ducts for the diversion of services:
  - A drilling Slurry Management Plan will be developed and implemented by the appointed contractor and all additives proposed will be biodegradable, chemically inert and non-hazardous to aquatic life;
  - A slurry recirculation unit will be utilised, and careful monitoring and management of such a unit can determine if any loss of slurry volume is experiences during the works; and
  - The Slurry Management Plan will include an Incident Response Plan to be implemented in the event of a loss of drilling fluids.
  - The west parapet will be fully encapsulated with scaffold, supported by the existing bridge (no impact on the bridge elevation. Works within the river are restricted to be undertaken only between 1 July to the 30th September);
  - Masonry works to allow raising of the west parapet will be undertaken; and
  - The footbridge, and approaches will be surfaced.

For the diversion of ESB oil filled cables:

- The section of existing oil filled cables along the length of the proposed HDD duct installation will be cut at each end, capped and left as redundant cables in situ by ESB following commissioning of the replacement cables (in consultation with the Appointed Contractor). New electrical cables will be installed in the new ducts beneath the river between two joint bays and transition joints used to join the oil filled cables to the new electrical cables. A new standalone oil line will be installed in the duct with the new electrical cables to allow the oil to continue to perform its function in cooling the remaining existing oil filled cables at either side of the new river crossing. The ducting installed by HDD will be continuous welded HDPE which provides protection to the water body should any leak arise.

- For the existing cables either side of the water body, a ground investigation, where construction works are to take place near to the ESB oil-filled cables will be carried out prior to construction commencing. Following this appropriate mitigation measures will be confirmed and deployed, which could for example result in the removal of all contaminated material from site as outlined in Chapter 14 (Land & Soils). Any hazardous material to be removed from site will be removed in accordance with measures outlined in Chapter 18 (Waste & Resources).

- **Stage 6:**
  - The west kerb line will be realigned;
  - Strengthening solution will be undertaken with sequential lane closures across the structure. (epoxy-based waterproofing and anti-slip surfacing system will be applied to the bridge deck); and
  - Surfacing and removal of diverted utilities works will be caried out to the west of the structure, to coincide with the parapet works.

5.5.4.1.2 Retaining Walls

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

Table 5.4: (Principal) Retaining Walls along the Proposed Scheme

Structure Reference	Structure Type	Details	Chainage (m)	Length (m)	Max Retained Height (m)	Section Reference
RW010	Precast Concrete Retaining Wall	RW010 is located on the west side of R132 Swords Road. Supports car dealership.	A5550 to A5620	70	2.5	Section 2c
RW016	In-situ Concrete Gravity Wall	RW016 is located on the west side of the R132 Swords Road. It is proposed to set back the residential wall and provide off-street residential parking at this location.	A7220 to A7290	70	1.5	Section 3b
RW017	In-situ Concrete Gravity Wall	RW017 is located on the east side of the R132 Swords Road. The proposed widening at this location encroaches into the front gardens of several residential properties.	A7255 to A7280	25	1.5	Section 3b
RW018	In-situ Concrete Gravity Wall	RW018 is located on the east side of the R132 Swords Road. The proposed widening at this location impacts the front gardens of a row of properties.	A7315 to A7385	70	1.5	Section 3b
RW022	Precast Concrete Retaining Wall	RW022 is located on the west side of R132 Dublin Road north of Cloghran roundabout. The proposed widening at this location encroaches on an existing cutting which supports agricultural land.	A1940 to A1990	50	2.0	Section 2a
RW029	Precast Concrete Retaining Wall	RW029 is located on the east side of the N1 encroaching into fencing that forms the boundary to Highfield Hospital. Directly behind the wall is an access road for the hospital located approximately 2m to 3m above the highway level.	A8560 to A8640	80	2.0	Section 4a

Retaining walls are typically installed to cater for level differences between the road and adjoining lands. The existing retaining walls will be demolished and replaced by new walls. The retained area behind the existing retaining walls will be dug out first and the wall will then be demolished with a hydraulic breaker mounted to an excavator.

Retaining walls will generally be constructed of reinforced concrete, with railing and cladding as required, with suitable materials depending on the local environs. Retaining walls will generally be constructed by first isolating the site of the retaining wall using fencing, as appropriate, to the location. The existing ground will then be stripped to formation level. Existing services will be diverted as required to enable wall construction. A side slope will be battered back to enable construction. Blinding will be installed at formation level. Formwork and reinforcing steel for the wall will be fixed in place. Then concrete will be poured in sections and formwork removed after initial curing of concrete. After a sufficient curing period the area behind the wall will be backfilled.

5.5.4.2 Minor Structural Works

5.5.4.2.1 Retaining Walls

Retaining walls with a retained height less than 1.5m are classed as minor retaining walls. There are 10 minor retaining walls along the Proposed Scheme, as detailed in Table 5.5. Retaining walls are typically installed to cater for level differences between the road and adjoining lands. Retaining walls will be constructed as described in Section 5.5.4.1.2.

Table 5.5: (Minor) Retaining Walls along the Proposed Scheme

Structure Reference	Chainage (m)	Length (m)	Max Retained Height (m)	Section Reference
RW026	A1620 to A1650	30	1.25	Section 2a
RW027	A2040 to A2125	85	1.3	Section 2a
RW008	A4380 to A4420	40	0.75	Section 2c
RW009	A4500 to A4550	50	1	Section 2c
RW028	A6410 to A6470	60	1	Section 3a
RW014	A6730 to A6765	35	1.2	Section 3a
RW015	A6770 to A6800	30	1.4	Section 3a
RW019	A8080 to A8220	140	1	Section 4a
RW020	A8410 to A8560	150	1.2	Section 4a
RW021	A8710 to A8745	35	1.4	Section 4a

Further information is provided in the Drawing BCIDB-JAC-STR_GA-0002_XX-00_DR-SS-9001 in Volume 3 of this EIAR.

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 (BCIDB-JAC-ENV_LA-0002_XX_00-DR-LL-9001) in Volume 3 of this EIAR.

5.6 Construction Plant and Equipment

In order to assess a reasonable worst-case Construction Phase impact scenario, with regards to air quality and noise and vibration, an estimate of construction plant and equipment that will be necessary to construct the Proposed Scheme has been prepared. The estimated peak daily numbers of principal items of plant and equipment working within a section is indicated in Table 5.6. 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 5.6: Estimated Peak Daily Plant and Equipment Numbers

Plant/Equipment	Section										
Type	**1**	**2a**	**2b**	**2c**	**3a**	**3b**	**4a**	**4b**	**5a**	**5b**	**5c**
Lorry	8	8	2	8	8	8	6	8	1	1	2
Backhoe Mounted Hydraulic Breaker	4	4	2	4	4	4	4	4	1	1	2
8t (tonne) Excavator	2	2	2	2	2	2	3	2	1	1	1
13t (Rubber Wheeled) Excavator	4	4	2	4	4	2	4	4	1	2	2
16t (Rubber Wheeled) Excavator	1	1	1	1	1	1	1	1	1	1	1
6t Dumper	3	3	3	3	3	3	4	3	3	2	2
Road Planer	1	1	1	1	1	1	1	1	1	1	1
Road Sweeper	1	1	1	1	1	1	1	1	1	1	1
Asphalt Paver	2	2	1	2	2	2	2	2	2	2	2
Asphalt Roller	2	2	2	2	2	2	2	2	1	2	2
3t Roller	2	2	2	2	2	2	2	2	2	2	2
Mini Digger	4	1	4	4	4	4	4	1	1	1	1
Vibratory Roller	4	1	4	4	4	4	4	1	1	1	1
Crane	-	-	-	-	-	-	-	1	-	-	-
CFA Piling Rig	-	-	-	-	-	-	-	1	-	-	-

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.

The Construction Compound SW1 will be located north-east of the Cloghran Junction, with access/egress from Swords Road, as shown in Image 5.1. The area of Construction Compound SW1 is approximately 2,990m^2 (metres squared).

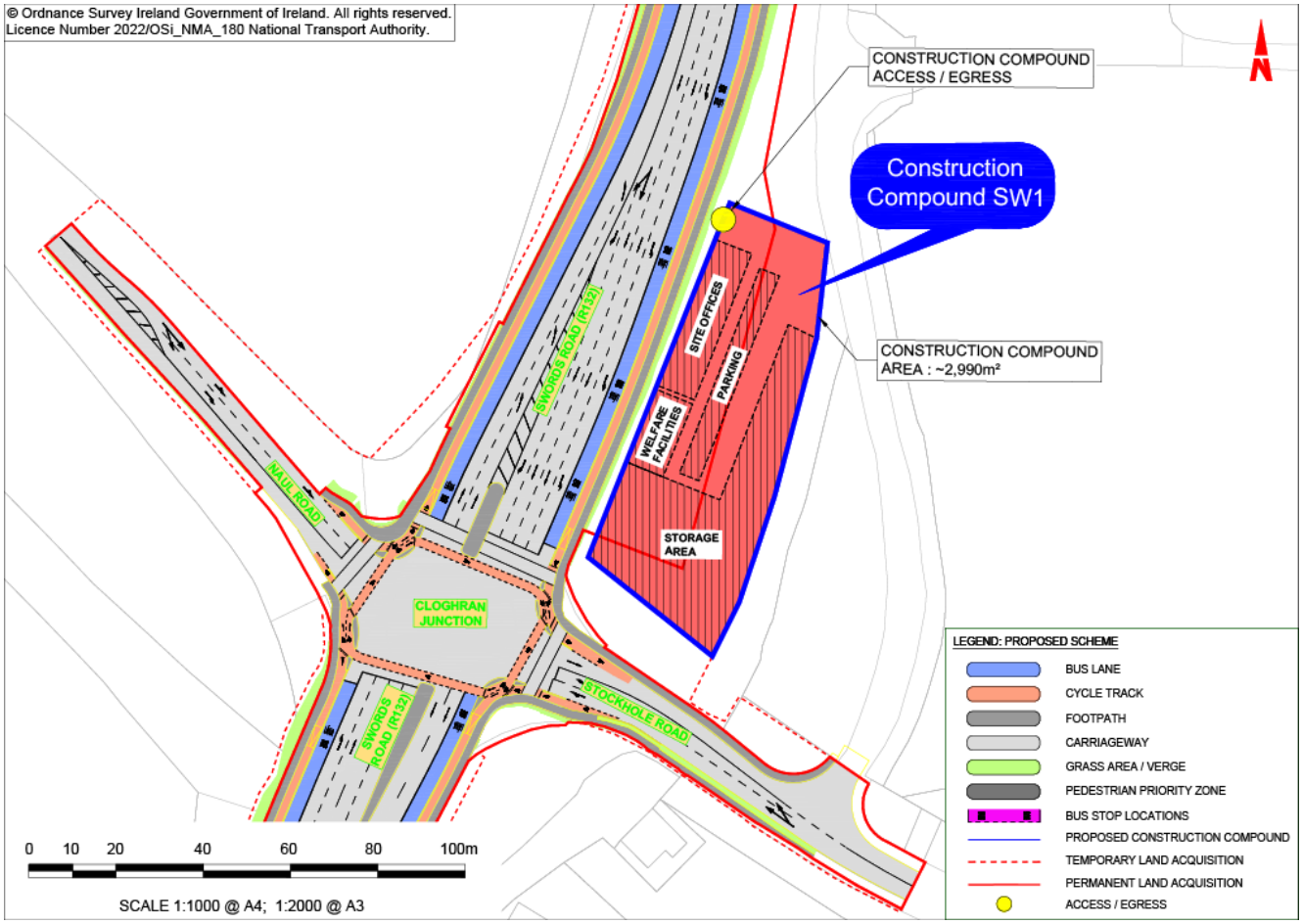

Image 5.1: Location and Extent of Construction Compound SW1

Construction Compound SW2 will be located south-west of Collinstown Cross, with access/egress from Old Airport Road, as shown in Image 5.2. The area of Construction Compound SW2 is approximately 1,940m^2.

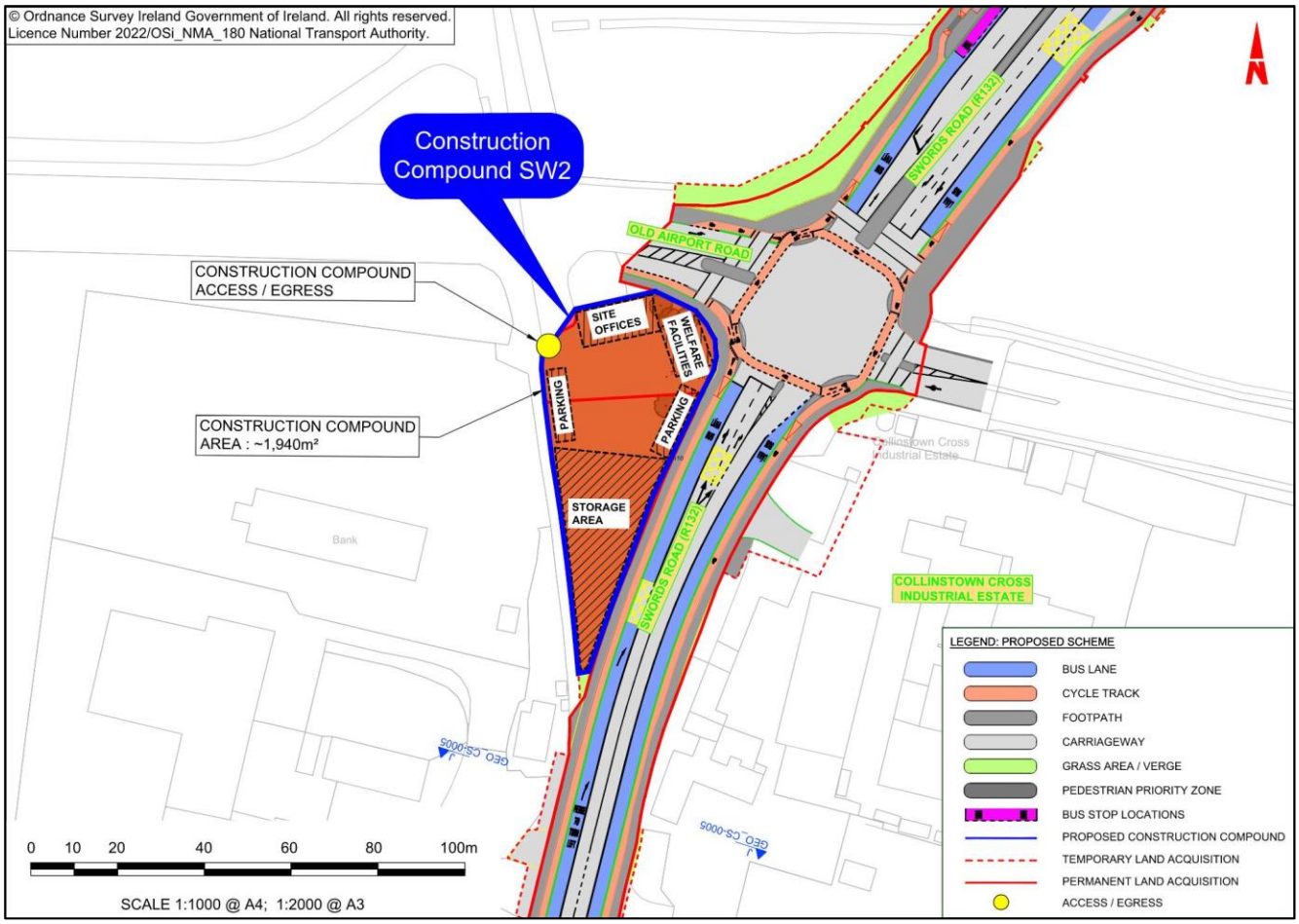

Image 5.2: Location and Extent of Construction Compound SW2

Construction Compound SW3 will be located north of Coolock Lane, with access/egress from Coolock Lane, as shown in Image 5.3. The area of Construction Compound SW3 is approximately 780m^2.

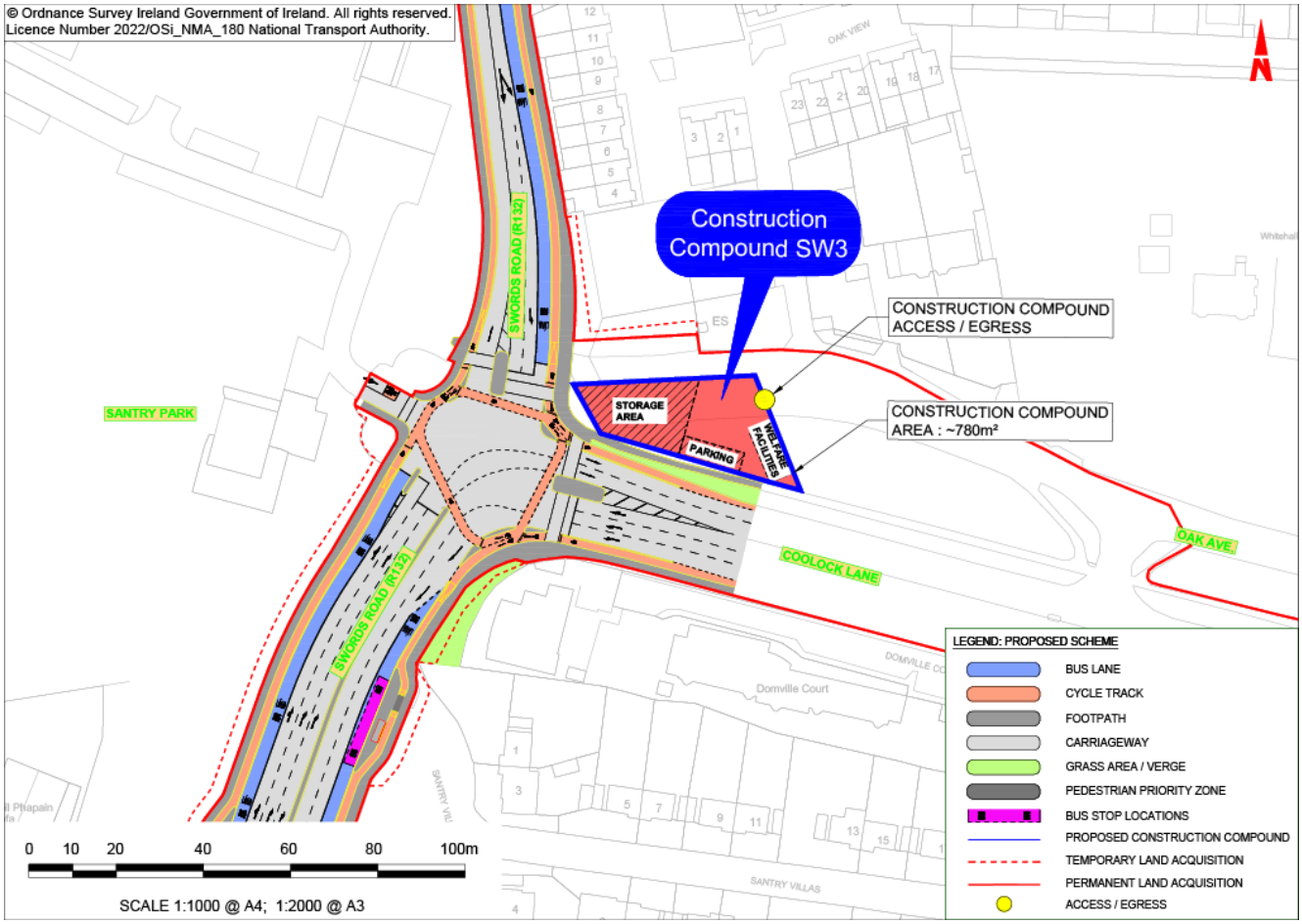

Image 5.3: Location and Extent of Construction Compound SW3

Construction Compound SW4 will be located at Collins Avenue Junction, with access/egress from Swords Road, as shown in Image 5.4. The area of Construction Compound SW4 is approximately 3,190m^2.

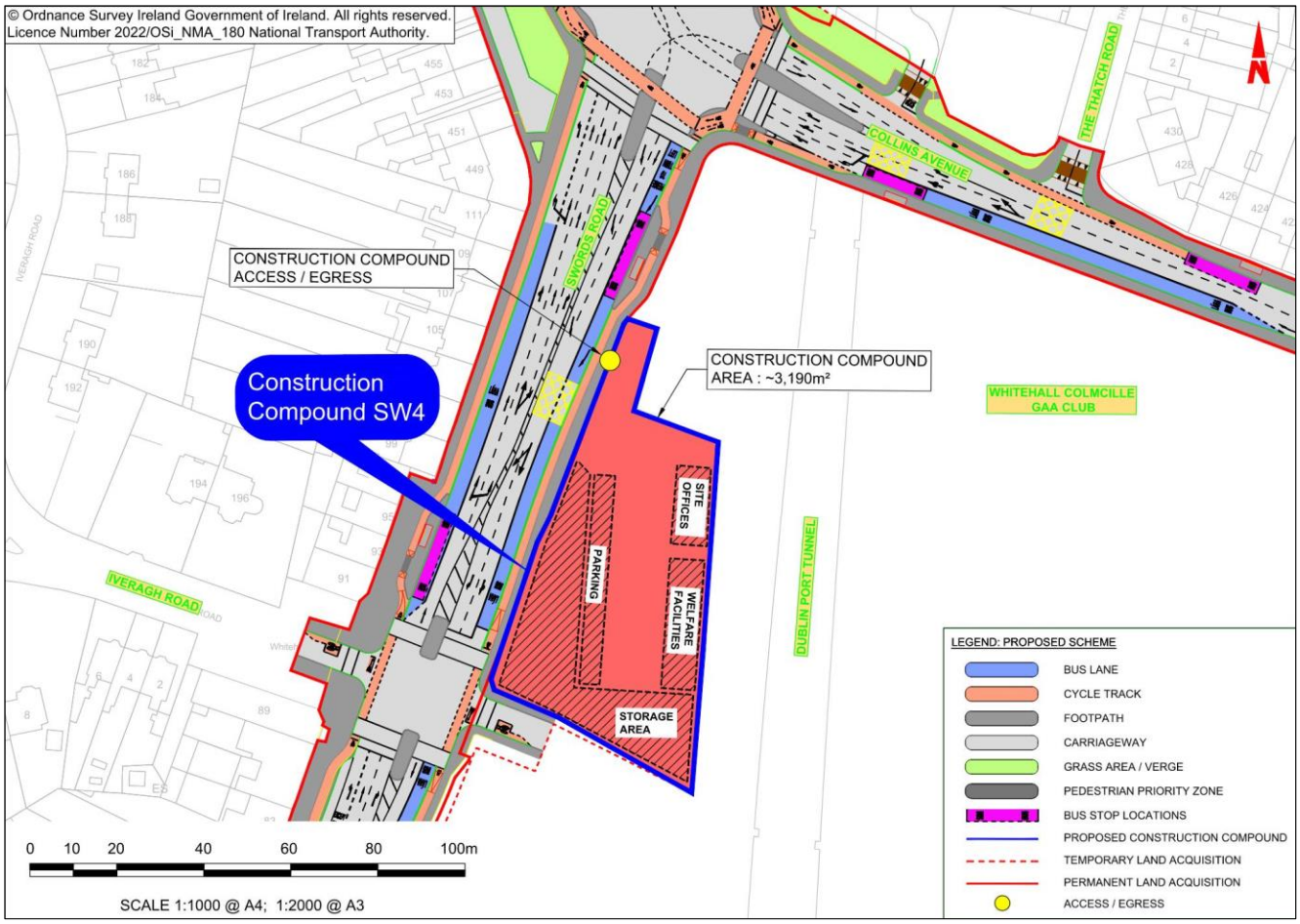

Image 5.4: Location and Extent of Construction Compound SW4

Construction Compound SW5 will be located at Frank Flood Bridge, between the River Tolka and Botanic Avenue, with access/egress from Botanic Avenue, as shown in Image 5.5. The area of Construction Compound SW5 is approximately 780m^2.

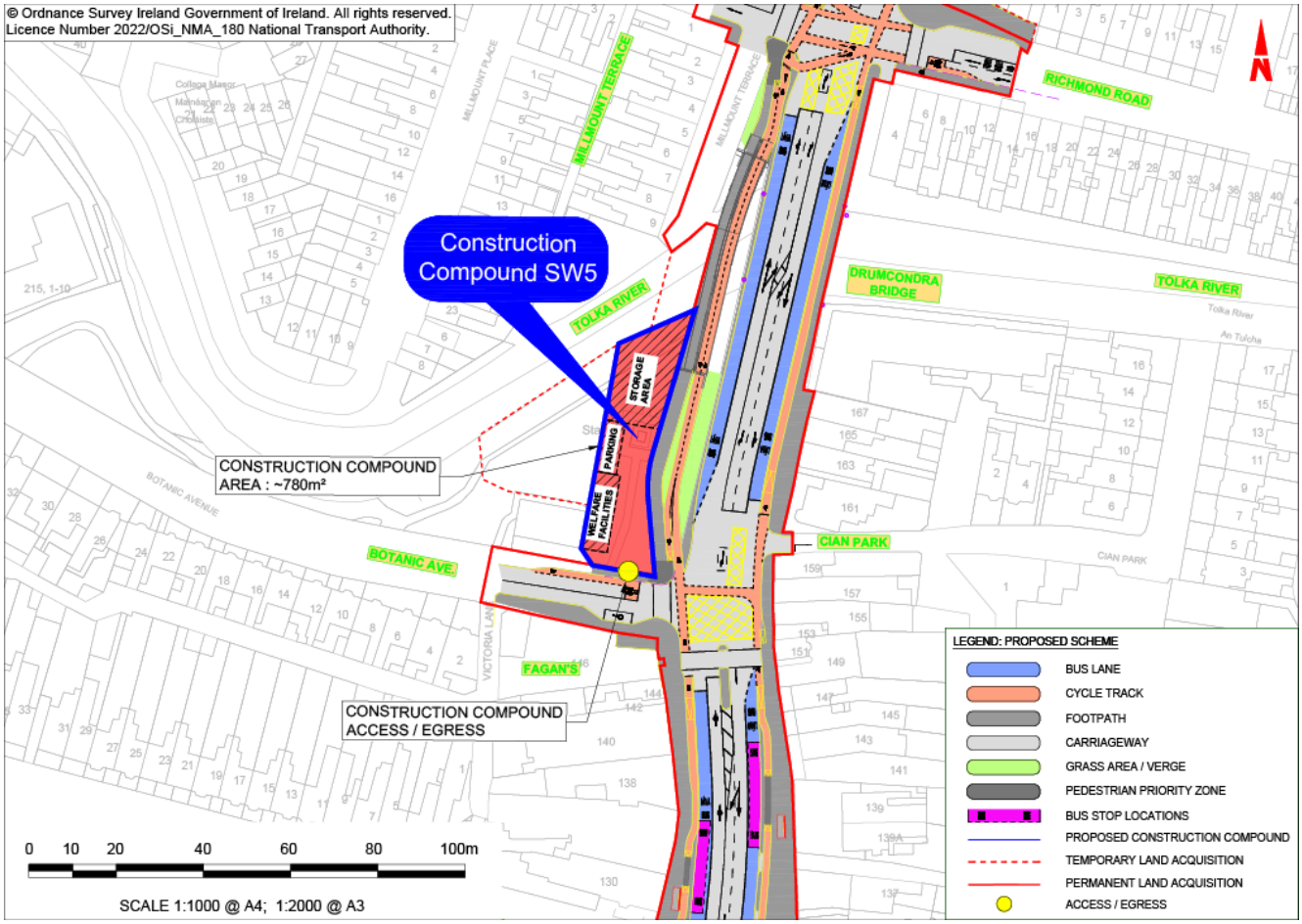

Image 5.5: Location and Extent of Construction Compound SW5

5.7.2 Construction Compound Activities

As shown in Image 5.1 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. Materials such as topsoil, subsoil, concrete, rock etc., will be stored at the Construction Compounds for reuse, as necessary. Items of plant and equipment, described in Section 5.6 will also be stored within the Construction Compounds.

All necessary authorisations, under the Waste Management Act, as amended, will be obtained prior to undertaking temporary storage. Certain materials will be reused where practicable, primarily excavated material. Further information on the reuse of material within the Proposed Scheme is included in Chapter 18 (Waste & Resources) of this EIAR. Further information on the air quality and noise and vibration assessments, and associated mitigation measures at the Construction 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 5.5.2.8. Temporary lighting, including security lighting will be required at the Construction Compounds, as described in Section 5.5.2.9. Access to the Construction Compounds will be restricted to site personnel and authorised visitors only.

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

The 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 Chapter 8 of the Traffic Signs Manual (Department of Transport, Tourism and Sport 2019). Construction traffic management measures are summarised in Section 5.8.1 to Section 5.8.3, with further details (such as routing of construction vehicles, timings of material deliveries, etc.) included in the CTMP in Appendix A5.1 CEMP in Volume 4 of this EIAR.

5.8.1 Pedestrian and Cyclist Provisions

The measures set out in Section 8.2.8 of the Traffic Signs Manual (Department of Transport, Tourism and Sport 2019) will be implemented, wherever practicable, to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users) and cyclists. Therefore, where footpaths or cycle facilities are affected by construction, a safe route will be provided past the works area, and where practicable, provisions for matching existing facilities for pedestrians and cyclists will be made. Where this is not practicable, pedestrians will be directed to use the footpath the opposite side of the road, crossing at controlled crossing points.

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 5.8.3). 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. This will be done in discussion with the NTA, and service providers. In such cases, temporary 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.

Any Operational Phase modifications to general traffic will be implemented at the start of the Construction Phase e.g. the redirection of cyclists through Lorcan Road and Shanrath Road as a Quiet Street, Signal Controlled Bus Priority between Northwood Avenue and Coolock Lane.

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. All road closures and diversions will be determined by the NTA, in consultation with the local authority and An Garda Síochána, as necessary. Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

The anticipated lane closures, road closures, and diversions that may be required during the Construction Phase of the Proposed Scheme, includes those identified in Table 5.7.

Table 5.7: Road Closures, Lane Closures and Diversions

Section Ref.	Road Closures	Lane Closures			Diversions
		Temporary Lane Closures (peak periods)	Temporary Lane Closures (off peak periods)	Short Sections of Stop/Go System	
Section 1	No	Yes (Footway, Cycle Track and General Traffic (Each Direction, Staged))	Yes (when converting the roundabout at Pinnock Hill to a signalised junctions)	Yes	No
Section 2a	No	Yes (Footway, Cycle Track and General Traffic (Each Direction, Staged))	Yes (when converting the Cloghran roundabout to a signalised junction)	Yes	No
Section 2b	No	Yes (Footway, Cycle Track, Public Transport)	No	Yes	No
Section 2c	No	Yes (Footway, Cycle Track, Public Transport (Each Direction, Staged))	No	Yes	No
Section 3a	No	Yes (Footway, Cycle Track, Public Transport (Each Direction, Staged))	No	Yes	No
Section 3b	No	Yes (Footway, Cycle Track, Public Transport (Westbound))	No	Yes	No
Section 4a	No	Yes (Footway (Each Direction, Staged))	No	Yes	No
Section 4b	Yes*	Yes (Footway and Public Transport (Each Direction, Staged))	Yes*	Yes	No
Section 5a	No	Yes (Footway and Public Transport (Each Direction, Staged))	No	Yes	No
Section 5b	No	Yes (Footway (Each Direction, Staged))	No	Yes	No
Section 5c	No	Yes (Footway, Cycle Track (Each Direction, Staged))	No	Yes	No

*An overnight or weekend full road closure and temporary lane closures will be required while the main deck span for the proposed pedestrian and cycle bridge at the Frank Flood bridge in Drumcondra is delivered to site and erected.

The existing carriageway layout will be maintained along the Proposed Scheme to facilitate existing traffic flows, where practicable, however at active construction works areas, the carriageway layout will be modified to provide sufficient space for construction works to be undertaken. The active construction works areas will be dictated by the construction programme in Section 5.4.

In the first instance, where the carriageway width is constrained, the lane widths will be reduced to a minimum of 3.0m. In circumstances where lane width reductions are not sufficient to facilitate the existing layout, the carriageway will be reduced by one lane of traffic in one direction, or one lane of traffic in each direction. Over the majority of the Proposed Scheme, the existing carriageway layout consists of two lanes of traffic in each direction. Along these sections, when construction works areas are active, the carriageway will be reduced to one lane of traffic in each direction. The traffic will be split into three traffic management stages (Stage A to Stage C) as described in Section 5.8.3.1 to Section 5.8.3.3.

Where there is one lane of traffic in each direction, single lane traffic will be controlled by a stop/go system of temporary traffic lights with priority provided to traffic travelling towards the City Centre during the morning peak period and reversed during the afternoon peak period. Where necessary, the appointed contractor will implement lane closures and/or traffic diversions to supplement the stop/go system. The traffic management measures may give rise to some traffic delays outside of the morning peak period and afternoon peak period; however it is anticipated that these would be of a short duration.

5.8.3.1 Stage A

To carry out Stage A works safely, traffic management will be implemented as shown in Image 5.6, by means of narrowing the existing lanes carrying public transport and general traffic to 3.0m. A lateral safety zone will be implemented between the carriageway and the works area, with an appropriate safe distance as per Table 8.2.2.2 of the Traffic Signs Manual.

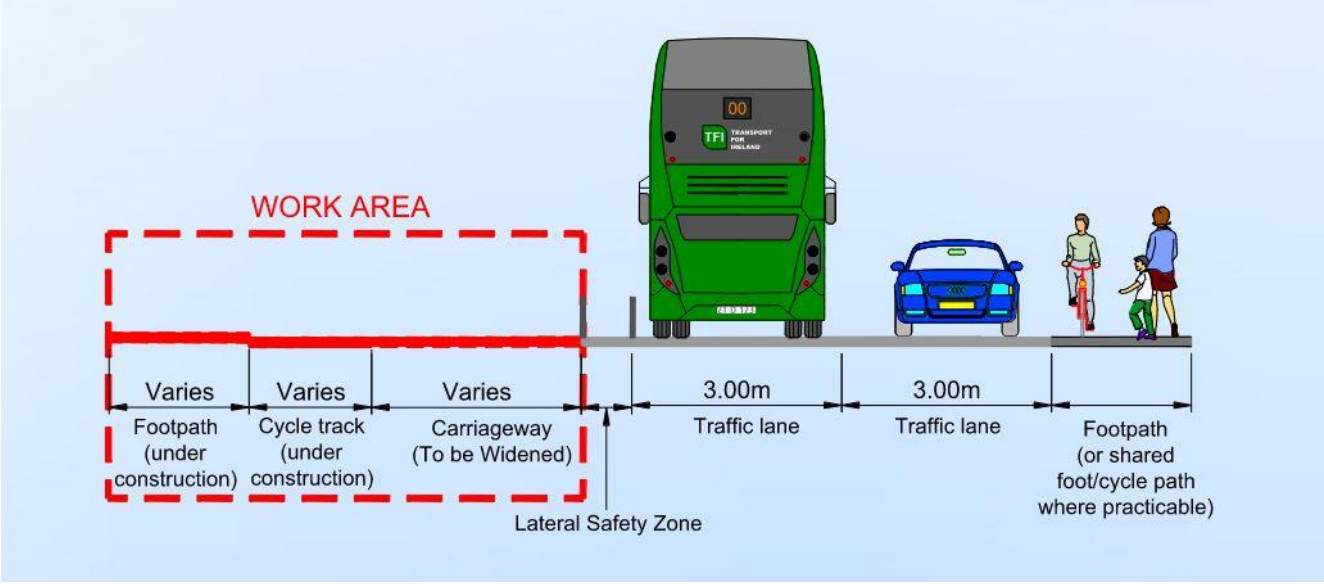

Image 5.6: Work Area – Stage A

5.8.3.2 Stage B

Stage B commences following the completion of Stage A. Public transport, general traffic, pedestrians and cyclists will be transferred to the opposite side of the carriageway to facilitate Stage B works. This stage will include the same methodology as outlined in Stage A, however carried out on the opposite side of the carriageway, as shown in Image 5.7.

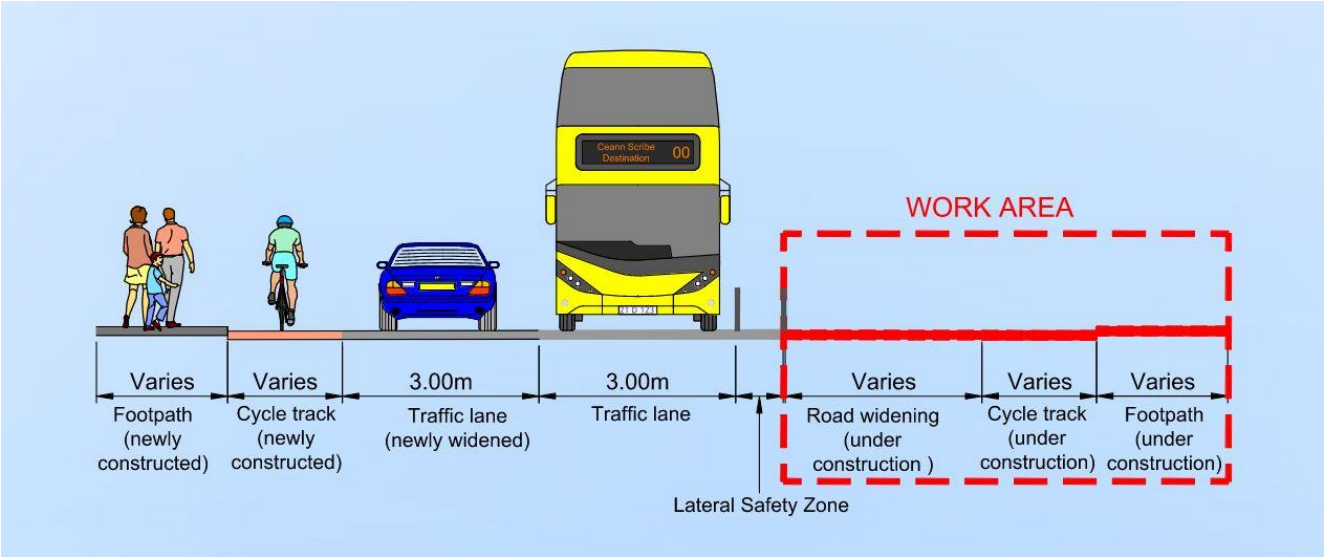

Image 5.7: Work Area – Stage B

5.8.3.3 Stage C

Once Stage B is complete, Stage C will entail completion of the proposed final road surfacing. To maintain traffic movement at this stage, lane closures, road closures, or diversions will be implemented, as appropriate.

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 the 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 the applicable 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 Construction and Demolition Resource and Waste Management Plan (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) 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 daytime/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 250 to 270 personnel directly employed across the Proposed Scheme, rising to 300 personnel at peak construction.

5.10.5 Construction Health and Safety

The requirements of the Safety, Health and Welfare at Work Act, 2005, and the Safety, Health and Welfare at Work (Construction) Regulations, 2013 to 2021 (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 Safety and Health 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 Safety and Health 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 References

ADCO (2021). UAIA BusConnects Dublin – BusConnects Project Proposed Boardwalks Custom House Quay and North Wall Quay, River Liffey

BSI (2010). BS 3998:2010 Tree Work. Recommendations.

BSI (2012). 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 (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