

**Chapter 05**  
Construction

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## 5. Construction

### 5.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the construction activities associated with the Tallaght / Clondalkin 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 provides 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) 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 six primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 46 sub-sections, according to the types of construction works required. The sections / sub-sections are:

- **Section 1:** Tallaght to Ballymount:
  - **Section 1a:** Old Blessington Road / Belgard Square South Junction;
  - **Section 1b:** Tallaght Bus Interchange;
  - **Section 1c:** Old Blessington Road;
  - **Section 1d:** Belgard Square West;
  - **Section 1e:** Belgard Square West / Belgard Square North Junction;
  - **Section 1f:** Belgard Square North;
  - **Section 1g:** Belgard Square North / Belgard Square East Junction;
  - **Section 1h:** Belgard Square East;
  - **Section 1i:** Belgard Square East / Blessington Road Junction;
  - **Section 1j:** Blessington Road;
  - **Section 1k:** Belgard Road / Blessington Road Junction;
  - **Section 1l:** Blessington Road – St. Maelruain’s Church to Courthouse Square Apartments;
  - **Section 1m:** Main Road;
  - **Section 1n:** Old Greenhills Road;
  - **Section 1o:** Greenhills Road, Tallaght; and
  - **Section 1p:** Bus Route, Parkview.
- **Section 2:** Ballymount to Crumlin:
  - **Section 2a:** Greenhills Road, Ballymount;
  - **Section 2b:** Ballymount Avenue;
  - **Section 2c:** Calmount Road / Ballymount Avenue Junction;
  - **Section 2d:** Calmount Road;
  - **Section 2e:** Greenhills Road and Calmount Avenue;
  - **Section 2f:** Greenhills Road, Greenhills;
  - **Section 2g:** Walkinstown Roundabout (including tie-ins at Ballymount Road Lower and St. Peter’s Road);
  - **Section 2h:** St. Peter’s Road to Greenhills Road;
  - **Section 2i:** Cromwellsfort Road; and
  - **Section 2j:** Walkinstown Avenue.
- **Section 3:** Crumlin to Grand Canal:
  - **Section 3a:** Walkinstown Road;
  - **Section 3b:** Drimnagh Road;
  - **Section 3c:** Bunting Road / St Mary’s Road;
  - **Section 3d:** Drimnagh Road / Crumlin Road / Kildare Road / St. Mary’s Road Junction;
  - **Section 3e:** Crumlin Road;
  - **Section 3f:** Kildare Road;
  - **Section 3g:** Sundrive Road Junction; and
  - **Section 3h:** Clogher Road.
- **Section 4:** Grand Canal to Christchurch:
  - **Section 4a:** Dolphins’ Barn Street, Cork Street, and St. Luke’s Avenue;
  - **Section 4b:** Dean Street;

- **Section 4c:** Patrick Street / Kevin Street Upper / New Street South / Dean Street Junction;
- **Section 4d:** Patrick Street and Nicholas Street; and
- **Section 4e:** Christchurch Cathedral / Nicholas Street Junction.
- **Section 5:** New Nangor Road between Woodford Walk / New Nangor Road junction to Long Mile Road / Naas Road / New Nangor Road junction:
  - **Section 5a:** New Nangor Road; and
  - **Section 5b:** Naas Road / Long Mile Road junction.
- **Section 6:** Long Mile Road / Naas Road / New Nangor Road junction to Drimnagh:
  - **Section 6a:** Naas Road;
  - **Section 6b:** Naas Road / Walkinstown Avenue Junction;
  - **Section 6c:** Walkinstown Avenue;
  - **Section 6d:** Walkinstown Avenue / Long Mile Road Junction; and
  - **Section 6e:** Long Mile Road.

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 5.3.6. 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
BCIDA-ACM-SPW_ZZ-0809_XX_00-DR-CR-9001	Site Location Map and Site Location Plan
BCIDA-ACM-GEO_HV-0809_ML_00-DR-CR-9001	Mainline Plan and Profile
BCIDA-ACM-GEO_GA-0809_XX_00-DR-CR-9001	General Arrangement
BCIDA-ACM-GEO_CS-0809_XX_0100-DR-CR-9001	Typical Cross Sections
BCIDA-ACM-ENV_LA-0809_XX_00-DR-LL-9001	Landscaping General Arrangement
BCIDA-ACM-PAV_PV-0809_XX_00-DR-CR-9001	Pavement Treatment Plans
BCIDA-ACM-SPW_BW-0809_XX_00-DR-CR-9001	Fencing and Boundary Treatment
BCIDA-ACM-TSM_GA-0809_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDA-ACM-LHT_RL-0809_XX_00-DR-EO-9001	Street Lighting
BCIDA-ACM-TSM_SJ-0809_XX_00-DR-TR-9001	Junction Systems Design
BCIDA-ACM-DNG_RD-0809_XX_00-DR-CD-9001	Proposed Surface Water Drainage Works
BCIDA-ACM-UTL_UD-0809_XX_00-DR-CU-9001	IW Foul Sewer Asset Alterations
BCIDA-ACM-UTL_UE-0809_XX_00-DR-CU-9001	ESB Asset Alterations
BCIDA-ACM-UTL_UTUL-0809_XX_00-DR-CU-9001	Telecommunications Asset Alterations
BCIDA-ACM-UTL_UG-0809_XX_00-DR-CU-9001	GNI Asset Alterations
BCIDA-ACM-UTL_UW-0809_XX_00-DR-CU-9001	IW Water Asset Alterations
BCIDA-ACM-UTL_UC-0809_XX_00-DR-CU-9001	Combined Existing Utilities Records
BCIDA-ACM-STR_GA-0809_RWXX_0100-DR-CB-9001	Bridges and Major Retaining Structures
BCIDA-ACM-BLD_AR-0809_IN_00-DR-AA-9001	Bus Interchange

For further details on the 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: Tallaght to Ballymount**

#### **5.3.1.1 Section 1a: Old Blessington Road / Belgard Square South Junction**

Section 1a encompasses the Old Blessington Road / Cookstown Way junction and Belgard Square South / Belgard Square West roundabout. The construction activities at Section 1a will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation 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 along Belgard Square West. However, new trees will be planted as part of the landscaping works. Construction Compound TC1 will be located at the green area at the western end of Old Blessington Road, adjacent to the junction with the N81 Tallaght bypass. The Construction Compound is expected to be utilized for Sections 1a to 1i. The expected construction duration for Section 1a will be approximately one month.

#### **5.3.1.2 Section 1b: Tallaght Bus Interchange**

Section 1b encompasses a section of Belgard Square West where the new Tallaght Bus Interchange will be constructed. The construction activities at Section 1b will comprise pavement reconstruction and resurfacing of the roads and footways on Belgard Square West. New kerbs will also be provided following the realignment of the existing kerb lines. New bus interchange structures (including a low height retaining wall adjacent to the existing shopping centre car park), new pavement construction and the installation new kerbs will be required for the bus interchange. Construction activities will also consist of the installation of additional signage, new road markings, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees will be removed along Belgard Square West. However, new trees will be planted as part of the landscaping works. Various utility diversions and / or protections will be required; including water distribution and telecommunications infrastructure. The expected construction duration will be approximately four months.

#### **5.3.1.3 Section 1c: Old Blessington Road**

Section 1c encompasses a length of approximately 60m (metres) along Old Blessington Road. The construction activities at Section 1c will comprise pavement reconstruction and resurfacing of the roads and footways. New kerbs will also be provided following the realignment of the existing kerb lines. New pavement and footway construction will be required in the vicinity of the new Tallaght Bus Interchange. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new street furniture and landscaping works. Some trees will be removed. However, new trees will be planted as part of the landscaping works. Utility (telecommunications infrastructure) diversions and / or protections will be required. The expected construction duration will be approximately one month.

#### **5.3.1.4 Section 1d: Belgard Square West**

Section 1d encompasses a length of approximately 170m along Belgard Square West between Old Blessington Road and the Belgard Square West / Belgard Square North Junction. The construction activities at Section 1c will comprise localised pavement and footway reconstruction. New kerbs will also be provided following the removal of the existing on-street loading bay currently located on the east side of Belgard Square West. Construction activities will also consist of the installation of additional signage and new road markings. The expected construction duration will be approximately one month.

#### **5.3.1.5 Section 1e: Belgard Square West / Belgard Square North Junction**

Section 1e encompasses the Belgard Square West / Belgard Square North junction. The construction activities at Section 1e will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. Some trees and vegetation will be removed from the verge areas along Belgard Square North and from the centre of the existing roundabout. However, new trees

will be planted as part of the landscaping works. The existing canopy structure over the carriageway at the entrance to the Tallaght Hospital will be retained. Various utility diversions and / or protections will be required; including electricity underground cables, water distribution and gas mains infrastructure. The expected construction duration will be approximately three months.

#### **5.3.1.6 Section 1f: Belgard Square North**

Section 1f encompasses a length of approximately 320m along Belgard Square North. The construction activities at Section 1f will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. A section of the existing boundary wall along the northern side of the Belgard Square North will be reconstructed to accommodate the widening of the carriageway to facilitate the addition of the bus lane. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees will be removed from the verge areas along Belgard Square North. However, new trees will be planted as part of the landscaping works. Various utility diversions and / or protections will be required; including electricity underground cables, water distribution and telecommunications infrastructure. The expected construction duration will be approximately 10 weeks.

#### **5.3.1.7 Section 1g: Belgard Square North / Belgard Square East Junction**

Section 1g encompasses the Belgard Square East / Belgard Square North junction. The construction activities at Section 1g will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation 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 from the verge areas along Belgard Square North and from the centre of the existing roundabout. However, new trees will be planted as part of the landscaping works. The expected construction duration will be approximately three months.

#### **5.3.1.8 Section 1h: Belgard Square East**

Section 1h encompasses a length of approximately 150m along Belgard Square East. The construction activities at Section 1h will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. The expected construction duration will be approximately one month.

#### **5.3.1.9 Section 1i: Belgard Square East / Blessington Road Junction**

Section 1i encompasses the Belgard Square East / Blessington Road junction. The construction activities at Section 1i will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, and landscaping works. The expected construction duration will be approximately two weeks.

#### **5.3.1.10 Section 1j: Blessington Road**

Section 1j encompasses a length of approximately 70m along Blessington Road between its junction with Belgard Square East and the junction with Belgard Road. The construction activities at Section 1j will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. Construction activities will also consist of the installation of additional signage, new road markings and landscaping works. The expected construction duration will be approximately one month.

#### **5.3.1.11 Section 1k: Belgard Road / Blessington Road Junction**

Section 1k encompasses the Belgard Road / Blessington Road junction. The construction activities at Section 1k will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will

also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, and landscaping works. The expected construction duration will be approximately two months.

#### **5.3.1.12 Section 1l: Blessington Road – St. Maelruain’s Church to Courthouse Square Apartments**

Section 1l encompasses a length of approximately 450m along Blessington Road, between the Belgard Road junction and the Courthouse Square Apartments. The construction activities at Section 1l will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. Construction activities will also consist of the installation of additional signage, new bus shelters and new road markings. The expected construction duration will be approximately one month.

#### **5.3.1.13 Section 1m: Main Road**

Section 1m encompasses a length of approximately 300m along Main Road. The construction activities at Section 1m will comprise the resurfacing of the roads, cycle track and footways. Construction activities will also consist of the installation of additional signage and new road markings. The expected construction duration will be approximately one month.

#### **5.3.1.14 Section 1n: Old Greenhills Road**

Section 1n encompasses a length of approximately 200m along Old Greenhill Road, between the Main Road and Bancroft Park junctions. The construction activities at Section 1n will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new bus stops, new road lighting and landscaping works. Some trees will be removed from the verge areas along Greenhills Road. However, new trees will be planted as part of the landscaping works. The expected construction duration will be approximately six weeks.

#### **5.3.1.15 Section 1o: Greenhills Road, Tallaght**

Section 1o encompasses a length of approximately 1750m along Greenhills Road, from Bancroft Park to the M50 bridge. The construction activities at Section 1o will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Sections of the existing boundary walls / fences and hedgerows along the western and eastern sides of the Greenhills Road will be realigned and reconstructed along with retaining walls on the western side of Greenhills Road due to the proposed widening of the carriageway. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. Some trees and vegetation will be removed from various locations throughout Section 1o. However, new trees will be planted as part of the landscaping works. A new Sustainable Drainage System (SuDS) will be constructed in the area of land to the east of the Greenhills Road between the Mayberry Road junction and Castletymon Road. Construction Compound TC2 will be located at a green area on the east side of the R819 Greenhills Road, immediately south of the junction with Bancroft Park. The Construction Compound is expected to be used for Sections 1j to 1o. Various utility diversions and / or protections will be required; including electricity underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration for Section 1o will be approximately five months.

#### **5.3.1.16 Section 1p: Bus Route, Parkview**

Section 1p encompasses a length of approximately 620m at the greenfield site, between Treepark Road and Parkview. This will consist of a new two-way bus route constructed parallel to Birchview Avenue and Treepark Road. The construction activities at Section 1p will comprise new pavement, footway and cycleway construction. New kerbs will also be provided. Construction activities will also consist of the installation of additional signage, new road markings, new traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Construction Compounds TC3 and TC4 will be located in the green space between Greenhills Road and Birchview Avenue / Treepark Road, which will ultimately form part of the permanent works. Various utility diversions and / or protections will be required; including water

distribution and telecommunications infrastructure. The expected construction duration will be approximately four months.

### **5.3.2 Section 2: Ballymount to Crumlin**

#### **5.3.2.1 Section 2a: Greenhills Road, Ballymount**

Section 2a encompasses a length of approximately 450m along Greenhills Road, from the M50 bridge to Tymon Park opposite Lugnaquilla Avenue. The construction activities at Section 2a will comprise pavement reconstruction and resurfacing of the roads, footways and cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. New pedestrian and cycle bridges will be constructed parallel to the existing Greenhills Road bridge, crossing the M50. (Structure Reference: ST01). Further information on the construction methodology is provided in Section 5.5.4.1.1. A section of the existing boundary wall / fencing along the eastern side of the Greenhills Road will be realigned and reconstructed due to the proposed widening of the carriageway. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed from various locations throughout Section 2a. However, new trees will be planted as part of the landscaping works. Construction Compound TC4 will be located at a green space along Greenhills Road, to the north of Tymon Lane. Construction Compound TC5 will be located at a green space along Greenhills Road, outside Tallaght Truck Dismantlers north-east of the M50 Motorway. Construction Compounds TC5 and TC6 will be located at the green spaces on the east side of the Greenhills Road, either side of, and adjacent to, the M50. The Construction Compounds will be utilized for the construction of the new pedestrian and cycle bridges. Various utility diversions and / or protections will be required; including electricity underground cables, water distribution and telecommunications infrastructure. The expected construction duration will be approximately two months.

#### **5.3.2.2 Section 2b: Ballymount Avenue**

Section 2b encompasses a length of approximately 450m along Ballymount Avenue. The Greenhills Road will be reprioritised and will connect to Ballymount Avenue across existing vacant land. A new priority junction will also be constructed to maintain connectivity to the northern section of Greenhills Road. The construction activities at Section 2b will comprise new road pavement, pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. A section of the existing boundary fence along the western side of Ballymount Avenue on approach to the junction at Calmount Road will be reconstructed due to the proposed widening of the carriageway and the eastern side of Ballymount Avenue at the Ballymount Recycling Centre to accommodate the Ballymount Avenue link to Greenhills Road. Construction activities will also consist of the installation of additional signage, new road markings, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed from the vacant land where the new road will be constructed, and along the western side of Ballymount Avenue. However, new trees will be planted as part of the landscaping works. Construction Compound TC7 will be located in the vacant land between Greenhills Road and Ballymount Avenue, which will ultimately form part of the permanent works. The Construction Compound is expected to be utilized for Sections 2b to 2j. Various utility diversions and / or protections will be required; including electricity underground cables, water distribution and telecommunications infrastructure. The expected construction duration for Section 2b will be approximately four months.

#### **5.3.2.3 Section 2c: Calmount Road / Ballymount Avenue Junction**

Section 2c encompasses the Calmount Road / Ballymount Avenue junction where the existing roundabout will be upgraded to a traffic signalised junction. The construction activities at Section 2c will comprise pavement reconstruction and resurfacing of the roads, footways and new cycle tracks. New kerbs will also be provided following the realignment of the existing kerb lines. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. Some trees and vegetation will be removed from the verge areas. However, new trees will be planted as part of the landscaping works. Utility (telecommunications infrastructure)

diversions and / or protections will be required. The expected construction duration will be approximately two months.

#### **5.3.2.4 Section 2d: Calmount Road**

Section 2d encompasses a length of approximately 800m along Calmount Road between the Calmount Road / Ballymount Avenue Junction, and the Greenhills Road where a new link and junction will be constructed, including a new access road to Ballymount Court Business Centre. The construction activities at Section 2d will comprise new road pavement, cycle tracks and footways / ramp, pavement reconstruction, resurfacing of the roads and footways, and new kerbs. A new retaining wall structure will be constructed along the northern side of Calmount Road, adjacent to the new junction (Structure Reference: RW01). There will also be new retaining walls either side of the new access road to Ballymount Court Business Centre. Further information on the construction methodology is provided in Section 5.5.4.2.1. Sections of the existing boundary fencing / hedgerows along the northern side of Calmount Road and at Calmount Road / Calmount Avenue junction will be realigned and reconstructed due to the proposed alignment of the Calmount Road extension and junction modifications. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed from the verge areas either side of Calmount Road. However, new trees will be planted as part of the landscaping works. Various utility diversions and / or protections will be required; including electricity overhead lines and underground cables, water distribution, gas mains and telecommunications infrastructure. Works in the vicinity of the existing 1200mm dia. watermain near the Calmount Road extension, will require additional consideration during the proposed works to confirm the location of this asset and the necessary protection measures. The expected construction duration will be approximately six months.

#### **5.3.2.5 Section 2e: Greenhills Road and Calmount Avenue**

Section 2e encompasses a length of approximately 120m along Calmount Avenue, refresh of existing road marking along Greenhills Road and new footway / ramp and cycle track / footway at eastern Calmount Avenue / Greenhills Road tie-in. Calmount Avenue will be extended and will connect into the existing Greenhills Road, with a new roundabout constructed at this location. The construction activities at Section 2e will comprise of new pavement construction, new and reconstruction of footways, ramp / steps structure, resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new road lighting, new street furniture and landscaping works. Some trees and vegetation will be removed from the verge areas where the new road and junction will be constructed. However, new trees will be planted as part of the landscaping works. A section of the existing boundary wall along the western side of the Greenhills Road will be realigned and reconstructed as per existing due to the realignment of the Greenhills Road and construction of the new roundabout. The expected construction duration will be approximately four months.

#### **5.3.2.6 Section 2f: Greenhills Road, Greenhills**

Section 2f encompasses a length of approximately 400m along Greenhills Road, between the new Calmount Road junction and the Walkinstown Roundabout. The construction activities at Section 2f will comprise pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. A new retaining wall structure will be constructed along the northern side of Calmount Road, adjacent to the new junction at Calmount Road / Greenhills Road (Structure Reference: RW01). Further information on the construction methodology is provided in Section 5.5.4.2.1. A second new retaining wall structure will also be constructed along the south-eastern side of Greenhills Road (Structure Reference: RW02). Further information on the construction methodology is provided in Section 5.5.4.2.2. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed from the verge areas and adjacent to the new Calmount Road / Greenhills Road. 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 10 months.

### **5.3.2.7 Section 2g: Walkinstown Roundabout (including tie-ins at Ballymount Road Lower and St. Peter's Road)**

Section 2g encompasses the Walkinstown Roundabout (including tie-ins at Ballymount Road Lower and St. Peter's Road). The construction activities at Section 2g will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. Various utility diversions and / or protections will be required; including electricity overhead lines and telecommunications infrastructure. The expected construction duration will be approximately three months.

### **5.3.2.8 Section 2h: St. Peter's Road to Greenhills Road**

Section 2h encompasses a length of approximately 60m along the link road between St. Peter's Road and Greenhills Road. The construction activities at Section 2h will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new road lighting, and landscaping works. The existing Electric Vehicle (EV) charging stations on Greenhills Road will also be relocated within this section. The expected construction duration will be approximately two weeks.

### **5.3.2.9 Section 2i: Cromwellsfort Road**

Section 2i encompasses a length of approximately 50m along the Cromwellsfort Road. The construction activities at Section 2i will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting and landscaping works. The expected construction duration will be approximately two weeks.

### **5.3.2.10 Section 2j: Walkinstown Avenue**

Section 2j encompasses a length of approximately 50m along Walkinstown Avenue. The construction activities at Section 2j will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting and landscaping works. The expected construction duration will be approximately two weeks.

## **5.3.3 Section 3: Crumlin to Grand Canal**

### **5.3.3.1 Section 3a: Walkinstown Road**

Section 3a encompasses a length of approximately 800m along the Walkinstown Road between the Walkinstown Roundabout and the junction with Drimnagh Road. The construction activities at Section 3a will comprise new road pavement for carriageway widening, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Walkinstown Road will be widened resulting in encroachment into private lands on both the west and east of the carriageway. New boundary treatments will be provided at these locations. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed. However, new trees will be planted as part of the landscaping works. 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 six months.

### **5.3.3.2 Section 3b: Drimnagh Road**

Section 3b encompasses a length of approximately 850m along Long Mile Road and Drimnagh Road. The construction activities at Section 3b will comprise cycle track construction, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. A new retaining wall structure will be

constructed along the northern side of Long Mile Road, to the north of the Long Mile Road / Walkinstown Road junction (Structure Reference: RW03). Further information on the construction methodology is provided in Section 5.5.4.2.3. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed. However, new trees will be planted as part of the landscaping works. The expected construction duration will be approximately three months.

#### **5.3.3.3 Section 3c: Bunting Road / St Mary's Road**

Section 3c encompasses a length of approximately 1300m along Bunting Road and St Mary's Road. The construction activities at Section 3c will comprise cycle track construction, pavement reconstruction, traffic calming and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of bus stop (including shelter and information display etc.), new road lighting, additional signage, and new road markings. Construction Compound TC8 will be located at Bunting Park along Bunting Road and will be used for Sections 3c and 3d only. The expected construction duration for Section 3c will be approximately three months.

#### **5.3.3.4 Section 3d: Drimnagh Road / Crumlin Road / Kildare Road / St. Mary's Road Junction**

Section 3d encompasses the Drimnagh Road / Crumlin Road / Kildare Road / St. Mary's Road junction. The construction activities at Section 3d will comprise cycle track construction, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. Some trees and vegetation will be removed. However, new trees will be planted as part of the landscaping works. The expected construction duration will be approximately three months.

#### **5.3.3.5 Section 3e: Crumlin Road**

Section 3e encompasses a length of approximately 1650m along Crumlin Road between the Cooley Road / Crumlin Road junction and the Grand Canal. The construction activities at Section 3e will comprise road pavement construction for areas of carriageway widening, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Sections of the existing property boundaries along the northern and southern sides of the Crumlin Road will be realigned and reconstructed due to the proposed widening of the carriageway. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stop (including shelter and information display etc.) and landscaping works. Some trees and vegetation will be removed. However, new trees will be planted as part of the landscaping works. Construction Compound TC9 will be located at the green space on the north side of Crumlin Road at the junction with Rafter's Road. Construction Compound TC10 will be located adjacent to the green space on the south side of Crumlin Road at the junction with Rutland Avenue. These Construction Compounds are expected to be utilized for Sections 3e to 3h and Section 4a. 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 for Section 3e will be approximately five months.

#### **5.3.3.6 Section 3f: Kildare Road**

Section 3f encompasses a length of approximately 1,350m along the Kildare Road and Clogher Road between the Drimnagh Road / Crumlin Road / Kildare Road / St. Mary's Road Junction and the Sundrive Road junction. The construction activities at Section 3f will comprise cycle track construction, traffic calming, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.)

and landscaping works. Some trees and vegetation will be removed. However, new trees will be planted as part of the landscaping works. The expected construction duration will be approximately four months.

#### **5.3.3.7 Section 3g: Sundrive Road Junction**

Section 3g encompasses the Sundrive Road junction on the Clogher Road. The construction activities at Section 3g will comprise pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, and new and amended traffic signal infrastructure. The expected construction duration will be approximately one month.

#### **5.3.3.8 Section 3h: Clogher Road**

Section 3h encompasses a length of approximately 1050m along Clogher Road between the Sundrive Road junction and the Grand Canal. The construction activities at Section 3h will comprise traffic calming, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, bus stops (including shelters and information displays etc.) and landscaping works. The expected construction duration will be approximately three months.

### **5.3.4 Section 4: Grand Canal to Christchurch**

#### **5.3.4.1 Section 4a: Dolphin's Barn Street, Cork Street and St. Luke's Avenue**

Section 4a encompasses a length of approximately 1,550m along Dolphin's Barn Street, Cork Street, and St. Luke's Avenue. The construction activities at Section 4a will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed. However, new trees will be planted as part of the landscaping works. Within this section, the scheme considers the planned Dolphin's Barn Public Realm Improvement Works at the South Circular Road junction, including a raised table at this junction. It is noted that the Dolphin's Barn Public Realm Improvement Works are being delivered by Dublin City Council. The expected construction duration will be approximately five months.

#### **5.3.4.2 Section 4b: Dean Street**

Section 4b encompasses a length of approximately 150m along Dean Street between Saint Luke's Avenue and Patrick Street. The construction activities at Section 4b will comprise cycle track construction, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting and new street furniture. Construction Compound TC11 will be located at Dean Street / Patrick Street. The expected construction duration will be approximately 10 weeks.

#### **5.3.4.3 Section 4c: Patrick Street / Kevin Street Upper / New Street South / Dean Street Junction**

Section 4c encompasses the Patrick Street / Kevin Street Upper / New Street South / Dean Street junction. The construction activities at Section 4c will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. The expected construction duration will be approximately two months.

#### **5.3.4.4 Section 4d: Patrick Street and Nicholas Street**

Section 4d encompasses a length of approximately 350m along Patrick Street and Nicholas Street. The construction activities at Section 4c will comprise cycle track construction, pavement reconstruction, and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the

installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. The expected construction duration will be approximately four months.

#### **5.3.4.5 Section 4e: Christchurch Cathedral / Nicholas Street Junction**

Section 4e encompasses the Christchurch Cathedral / Nicholas Street junction. The construction activities at Section 4e will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. The expected construction duration will be approximately two months.

### **5.3.5 Section 5: New Nangor Road between Woodford Walk / New Nangor Road junction to Long Mile Road / Naas Road / New Nangor Road junction**

#### **5.3.5.1 Section 5a: New Nangor Road**

Section 5a encompasses a length of approximately 2,100m along New Nangor Road, between Woodford Walk and the Long Mile Road (R110) / Naas Road (R810) / New Nangor Road (R134) junction. The construction activities at Section 5a will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. The existing roundabout at the Riverview Business Park will be upgraded to a traffic signalised junction. The Cammock / Camac River culvert will be extended at the Oak Road / New Nangor Road junction. These works will be carried out in consultation with the Camac River Flood Alleviation Scheme and South Dublin County Council. The proposed cycle track along the north side of the New Nangor Road will be connected to the Grand Canal Greenway on both sides of the M50 over bridge. Sections of the existing property boundaries along the northern and southern sides of New Nangor Road will be realigned and reconstructed due to the proposed widening of the carriageway. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees and vegetation will be removed from the northern verge areas adjacent to the M50 overbridge and on the southern verge adjacent to the New Nangor Road / Oak Road / Park West Avenue junction. However, new trees will be planted as part of the landscaping works. Construction Compound TC12 will be located at the vacant land between New Nangor Road and Killeen Road and is expected to be utilized for Sections 5 and 6. Various utility diversions and / or protections will be required; including electricity underground cables, water distribution, gas mains and telecommunications infrastructure. The expected construction duration for Section 5a will be approximately three months.

#### **5.3.5.2 Section 5b: Naas Road / Long Mile Road Junction**

Section 5b encompasses the existing Naas Road / Long Mile Road traffic signalised roundabout junction. The construction activities at Section 5b will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. A new pedestrian and cycle bridge will be constructed at this location, providing pedestrian and cycle connectivity between the New Nangor Road, Naas Road and Long Mile Road. (Structure Reference: ST02). The structure will be made up of a central single span and four connected arterial structures that span each corner of the roundabout junction. Access ramps and stairs will be provided at the end supports of each of the four arterial structures. Further information on the construction methodology is provided in Section 5.5.4.1.2. A new retaining wall structure will be constructed along the northern side of New Nangor Road, to the rear of the ramp structure associated with the new pedestrian and cycle overbridge (Structure Reference: RW04). Further information on the construction methodology is provided in Section 5.5.4.2.4. Another new retaining wall will be constructed along the northern side of Naas Road, to the rear of the ramp structure associated with the new pedestrian and cycle overbridge (Structure Reference: RW05). Further information on the construction methodology is provided in Section 5.5.4.2.5. A low height retaining wall will be constructed to the rear of the ramp structure associated with the new pedestrian and cycle overbridge between the Long Mile Road and Naas Road. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure and new road lighting. Some trees will be removed from the verge areas to facilitate construction of the bridge ramps and stairs. Construction Compound TC13 will be located along the Long Mile Road, south of the New Nangor Road / Naas Road / Long Mile Road junction and is expected to be

used primarily for the construction of the new pedestrian and cycle bridges. Various utility diversions and / or protections will be required; including gas mains and telecommunications infrastructure. The expected construction duration will be approximately nine months.

### **5.3.6 Section 6: Long Mile Road / Naas Road / New Nangor Road junction to Drimnagh**

#### **5.3.6.1 Section 6a: Naas Road**

Section 6a encompasses a length of approximately 600m along the Naas Road between the Long Mile Road / Naas Road / New Nangor Road junction and the Naas Road / Walkinstown Avenue Junction. The construction activities at Section 6a will comprise of localised pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees will be removed from verge areas. However, new trees will be planted as part of the landscaping works. Various utility diversions and / or protections will be required; including electricity overhead lines and telecommunications infrastructure. The expected construction duration will be approximately one month.

#### **5.3.6.2 Section 6b: Naas Road / Walkinstown Avenue Junction**

Section 6b encompasses the Naas Road / Walkinstown Avenue junction. The construction activities at Section 6b will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees will be removed from the southern verge area along Naas Road, however new trees will be planted as part of the landscaping works. A new low height retaining wall will be constructed to the rear of the southern verge area on Naas Road where the road will be widened to accommodate a new bus lay-by. Various utility diversions and / or protections will be required; including water distribution and telecommunications infrastructure. The expected construction duration will be approximately two months.

#### **5.3.6.3 Section 6c: Walkinstown Avenue**

Section 6c encompasses a length of approximately 350m along Walkinstown Avenue between the Naas Road / Walkinstown Avenue Junction and the Walkinstown Avenue / Long Mile Road Junction. The construction activities at Section 6c will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. A new boundary wall and fence will be constructed on the eastern side of Walkinstown Avenue. Construction activities will also consist of the installation of additional signage, new road markings, new road lighting, new street furniture, bus stop (including shelter and information display etc.) and landscaping works. Various utility diversions and / or protections will be required; including water distribution, gas mains and telecommunications infrastructure. The expected construction duration will be approximately one month.

#### **5.3.6.4 Section 6d: Walkinstown Avenue / Long Mile Road Junction**

Section 6d encompasses the Walkinstown Avenue / Long Mile Road junction. The construction activities at Section 6d will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage, new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture and landscaping works. The expected construction duration will be approximately six weeks.

#### **5.3.6.5 Section 6e: Long Mile Road**

Section 6e encompasses a length of approximately 750m along the Long Mile Road between the Walkinstown Avenue / Long Mile Road Junction and a point to the west of the Walkinstown Road / Drimnagh Road. The construction activities at Section 6e will comprise pavement reconstruction and resurfacing of the roads, footways, and cycle tracks, and new kerbs. Construction activities will also consist of the installation of additional signage,

new road markings, new and amended traffic signal infrastructure, new road lighting, new street furniture, bus stops (including shelters and information displays etc.) and landscaping works. Some trees will be removed from the central median along the Long Mile Road. However, these will be replaced as part of the landscaping works. The expected construction duration will be approximately three 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 36 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				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Section 1a	1 month	Junction												
Section 1b	4 months	Interchange												
Section 1c	1 month	60 + Junction												
Section 1d	1 month	170												
Section 1e	3 months	Junction												
Section 1f	2.5 months	320												
Section 1g	3 months	Junction												
Section 1h	1 month	150												
Section 1i	0.5 months	Junction												
Section 1j	1 month	70												
Section 1k	2 months	Junction												
Section 1l	1 month	450												
Section 1m	1 month	300												
Section 1n	1.5 month	200												
Section 1o	5 months	1,750												
Section 1p	4 months	620												
Section 2a	2 months	450												
Section 2b	4 months	450												
Section 2c	2 months	Junction												
Section 2d	6 months	800												
Section 2e	4 months	120 + Junction												
Section 2f	10 months	400												
Section 2g	3 months	Junction												
Section 2h	0.5 months	60												
Section 2i	0.5 months	50												
Section 2j	0.5 months	50												
Section 3a	6 months	800												
Section 3b	3 months	850												
Section 3c	3 months	1,300												
Section 3d	3 months	Junction												
Section 3e	5 months	1,650												
Section 3f	4 months	1,350												
Section 3g	1 month	Junction												
Section 3h	3 months	1,050												
Section 4a	5 months	1,550												
Section 4b	2.5 months	150												
Section 4c	2 months	Junction												
Section 4d	4 months	350												

Section No.	Estimated Construction Duration	Approximate Length (m)	Year 1				Year 2				Year 3			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Section 4e	2 months	Junction												
Section 5a	3 months	2,100												
Section 5b	9 months	Junction												
Section 6a	1 month	600												
Section 6b	2 months	Junction												
Section 6c	1 month	350												
Section 6d	1.5 months	Junction												
Section 6e	3 months	750												

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 (Department of Transport, Tourism and Sport 2019), hereafter referred to as the Traffic Signs Manual. 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 (BCIDA-ACM-ENV\_LA-0809\_XX\_00-DR-LL-9001).

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

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

#### **5.5.2.5 Vegetation Clearance and Treatment of Non-Native Invasive Species**

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

A suitably qualified specialist will be appointed by the contractor to monitor vegetation clearance, and treatment of non-native invasive species. Prior to construction, confirmatory invasive species surveys will be undertaken by the specialist to re-confirm the presence and / or extent of species within the footprint of the Proposed Scheme. Further information with regards to pre-construction ecological surveys and restrictions are provided in Chapter 12 (Biodiversity) of this EIAR. Vegetation identified for removal will be removed in accordance with BS 3998:2010

Tree Work. Recommendations (BSI 2010) and best arboricultural practices, as detailed and monitored by the specialist. The Invasive Species Management Plan (ISMP) for the control of invasive plant species on the site of the Proposed Scheme is included in Appendix A5.1 CEMP in Volume 4 of this EIAR.

#### **5.5.2.6 Archaeological Investigations**

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

#### **5.5.2.7 Ground Investigations**

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

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

#### **5.5.2.8 Construction Compounds**

As part of preparatory works, the Construction Compounds will be set up which will include installation of the necessary facilities including the site office, welfare facilities, etc. Controlled access to the Construction Compounds will be implemented, fencing will be erected, and lighting will be installed. The Construction Compounds will be secured with Closed-Circuit Television (CCTV) to ensure safe storage of all material, plant and equipment. 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. Demolition of structures will be carried out in a controlled manner, under supervision. All plant and equipment will be maintained in good working order and inspected in accordance with manufacturers recommended intervals. Demolition works areas will be appropriately hoarded and signposted. Best practice industry standard working methods will be used to minimise the generation of dust, noise and other environmental effects resulting from the demolitions as described in Chapter 7 (Air Quality) and Chapter 9 (Noise & Vibration) of this EIAR.

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.

### **5.5.3 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 (BCIDA-ACM-SPW\_BW-0809\_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, 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 footways or streets. Building condition surveys will be completed immediately prior to any works. However, it is not anticipated that 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 footway. 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.

The proposed extension of Calmount Road coincides with the route of an existing Irish Water 1200mm diameter ductile iron watermain, laid at a depth of approximately 2.5m in the vicinity of Calmount Road and approximately 7.0m where it crosses below Greenhills Road. It is considered that the construction works associated with the Proposed Scheme will have minimal effect on this 1200mm diameter watermain. Ground investigation where construction works are to take place near this watermain will be carried out prior to construction commencing to confirm the depth and location of the watermain, and the appropriate mitigation measures 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, footways, 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 (BCIDA-ACM-PAV\_PV-0809\_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 (BCIDA-ACM-ENV\_LA-0809\_XX\_00-DR-LL-9001) in Volume 3 of this EIAR.

### **5.5.4 Structural Works**

#### **5.5.4.1 Principal Structures**

The principal structural works which form part of the Proposed Scheme are summarised in Table 5.3. Further details are provided in Section 5.5.4.1.1 to Section 5.5.4.2.5. Further information on the structures along the Proposed Scheme is provided in the Bridges and Major Retaining Structures Drawings (BCIDA-ACM-STR\_GA-0809\_XX\_00-DR-CB-9001) in Volume 3 of this EIAR.

**Table 5.3: Principal Structures**

Structure Name	Structure Reference	Section Reference
Greenhills Road Pedestrian and Cycle Bridges	ST-01	Section 2a
Naas Road Pedestrian and Cycle Bridge	ST-02	Section 5b
Retaining Walls	RW-01	Section 2d & 2f
	RW-02	Section 2f
	RW-03	Section 3b
	RW-04	Section 5b
	RW-05	Section 5b

#### 5.5.4.1.1 Greenhills Road Pedestrian and Cycle Bridge (Structure Reference: ST-01)

The Greenhills Road Pedestrian and Cycle Bridge will be formed of two new pedestrian / cycle bridges located adjacent to the existing Greenhills Bridge spanning the M50. The new bridges will provide dedicated facilities for pedestrians and cyclists travelling in both directions along Greenhills Road. Traffic and bus lanes will be accommodated on the existing Greenhills Road Bridge.

The new bridges will take the form of a Warren Truss type structure that comprises steel sections joined longitudinally by angled cross members, which forms triangular shapes along its length. The Warren Truss bridge will be designed with a full through-construction where the structure is built up around the deck. The bridge will span approximately 48.55m over the M50 carriageway. The width of the new pedestrian/cycle bridges will be 4.65m wide, providing a 2.65m segregated cycle track and 2m pedestrian footway. A minimum internal vertical clearance of 2.7m will be provided along the length of the bridges. A minimum vertical clearance of 5.7m will be provided between the M50 carriageway and the underside of the bridge. The steel deck will be finished with an anti-skid surfacing.

Both new bridges will be supported on two reinforced concrete full height abutments constructed in-situ within the embankments on either side of the M50 carriageway. The abutments will be supported by rotary bored piled foundations. The south abutment will be set back 2.60m from the edge of the M50 northbound carriageway with the face of the north abutment set back 4.20m from the edge of the southbound carriageway. A safety barrier will be incorporated between the face of abutments and the edge of both the north and southbound carriageway. No central supports will be required within the M50 central median for either bridge.

Access to the works area will be primarily from the Greenhills Road and adjacent verge areas. Access will also be required from the M50 westbound diverge lane for the south abutment, and the M50 eastbound merge lane for the north abutment.

The ground surface will be prepared, with minor excavations to achieve the piling level for the north and south abutments. The piles will be installed before the pile caps and abutments are constructed. The drilling / piling activity will be completed over a period of approximately two weeks, with one to two piles installed per day. Once the pile caps have been constructed, reinforcing steel will be fixed in place for the abutments. Formwork will be installed next and then concrete poured. Once the concrete has cured, bearings will be installed to support the bridge deck. The Warren Truss bridges will be assembled and lifted into place by mobile cranes. Parapet edge restraint will be provided on the approaches to both bridge structures once the footway and cycle tracks have been connected to the new bridges. Reinstatement of adjacent areas will then be completed.

The Warren Truss deck structures will be delivered to site and assembled within the temporary land take areas, in advance of them being lifted into place. The M50 will need to close temporarily in both directions, during the lifting operation, which will require two mobile cranes positioned on the M50 carriageway. The NTA and the appointed contractor will liaise with Transport Infrastructure Ireland (TII) in advance of the works taking place. It is expected that each bridge structure will be lifted into place over one night. During the temporary nighttime road closure, traffic will be diverted at Junctions 10 and 11 via the N81, R113 and R838. For more information, refer to the details in Table 5.8.

#### 5.5.4.1.2 Naas Road Pedestrian and Cycle Bridge (Structure Reference: 02)

The Naas Road Pedestrian and Cycle bridge will carry pedestrians and cyclists between the New Nangor Road, Naas Road, and the Long Mile Road. The bridge structure will have five separate spans consisting of a fully through Warren Truss structure. The bridge is formed of a 55.5m long central span over the Naas Road and the Luas Red Line, and four arterial spans (ranging from approximately 42m to 46m) spanning the outer corners of the junction. The width of the new pedestrian/cycle bridges on the arterial spans will be 4.65m wide, providing a 2.65m segregated cycle track and 2m pedestrian footway. The width of the central span will be 5.65m wide, providing a 3.15m segregated cycle track and 2.5m pedestrian footway. A minimum internal vertical clearance of 2.7m will be provided along the length of the bridges. A minimum vertical clearance of 5.7m will be provided between the carriageway below and the underside of the bridge. The steel deck will be finished with an anti-skid surfacing.

The central span of the bridge has been designed as single span over the main carriageways of the Naas Road and the Luas Red Line. The arterial bridge spans crossing the other approach roads, have also been designed as single spans to each corner of the junction. The central bridge span will be supported on two braced steel central supports, located on the central island of the junction. The ends of the four arterial bridge spans will also be supported on the central supports and on new braced steel end supports. The braced steel supports will be constructed on reinforced concrete rotary bored piled foundations. Painted steel ramp structures and stairs will be provided at each corner of the bridge to facilitate pedestrian and cyclist access over the bridges. The ramp structures will vary in length from approximately 119m to 150m.

Access to the works area will be primarily from the verge areas on New Nangor Road, Naas Road, the Long Mile Road and the central island of the roundabout junction. The ground surface will be prepared, and ground excavated to facilitate the construction of the foundations. The concrete foundations will be poured and allowed to cure. The braced steel supports will be prefabricated off site, before being delivered to site and lifted into place by mobile cranes. The braced steel supports will be erected first before the Warren Truss structures are assembled and lifted into place. The ramps and stairs will then be installed. Reinstatement of adjacent areas will then be completed.

Two new retaining walls adjacent to the southbound carriageway on the New Nangor Road (Structure Reference: RW04) and adjacent to the eastbound carriageway on Naas Road (Structure Reference: RW05) will be constructed in advance of the ramps and stairs being installed for the Naas Road Pedestrian and Cycle Bridge (Structure Reference: 02). Refer to Section 5.5.4.2.4 and Section 5.5.4.2.5 for more details.

The prefabricated sections of the bridges including the Warren Truss deck structures, will be delivered to site and assembled within the temporary land take area to the south of the bridge, in advance of them being lifted into place. Various sections of the road carriageway at the junction and the approach roads, will need to be closed during lifting operations and will be dependent on the section of the bridge that is being constructed at that time. Two mobile cranes will be required to lift sections of the bridge into place and will be positioned within the closed sections of carriageway. It is expected that each bridge structure will be lifted into place over one night during temporary nighttime road closures. During these temporary road closures, traffic will be diverted via alternative routes. For more information, refer to the details in Table 5.8.

#### 5.5.4.2 Retaining Walls

Retaining walls with a retained height greater than 1.5m are classed as principal structures. There are five 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)	Structure Section
RW01	Reinforced Earth Retaining Wall	Calmount Road	A5340 – A5570	229	7.6	2d
RW02	Reinforced Earth Retaining Wall	Calmount Road	A5495 – A5645	152	3.3	2d & 2f

Structure Reference	Structure Type	Details	Chainage (m)	Length (m)	Max Retained Height (m)	Structure Section
RW03	Reinforced Concrete Retaining Wall	Long Mile Road	F4710 – A6765	64	1.5	3b
RW04	Reinforced Concrete Retaining Wall	Naas Road	F1955 – F2215	277	4.5	5b
RW05	Reinforced Concrete Retaining Wall	Naas Road	F2200	113	1.5	5b

Retaining walls will generally be constructed of either reinforced concrete or reinforced earth, with railings and clad 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 of the remainder of the retaining wall. The following sections explain the construction methodology for each wall in more detail.

#### 5.5.4.2.1 Reinforced Earth Retaining Wall at Calmount Road (Structure Reference: RW01)

A new retaining wall is required along the eastbound carriageway of the proposed alignment connecting the existing Calmount Road with the Greenhills Road. The retaining wall will retain the earthworks embankment required as part of this proposed alignment. The wall will be approximately 229m in length with a maximum retained height of approximately 7.6m.

The retaining wall will consist of a reinforced soil structure with precast concrete facing panels. The ground surface will be prepared, and ground excavated to facilitate the placement of the fill material. The fill material will be placed and compacted in layers with reinforcing straps attached to precast concrete facing panels. Once the required height has been reached, a reinforced concrete slab and coping unit will be constructed. Reinstatement of adjacent areas will then be completed, including road pavement, footway and cycleway surfacing construction activities. A parapet to restrain errant vehicles will be installed along the top of the retaining wall and connected to the coping unit.

Access to the works area will be primarily from the verge areas along Calmount Road / Greenhills Road. Materials will be delivered to site and fill material placed from lorries using an excavator. The precast concrete facing panels will be lifted into place using a mobile crane. Temporary land take will be required from the adjacent properties to facilitate construction.

#### 5.5.4.2.2 Reinforced Earth Retaining Wall at Calmount Road (Structure Reference: RW02)

A new retaining wall is required along the westbound carriageway of the proposed alignment connecting the existing Calmount Road with Greenhills Road. The retaining walls will retain the earthworks embankment required as part of this proposed alignment. The wall will be approximately 152m in length with a maximum retained height of approximately 3.3m.

The retaining wall will consist of a reinforced soil structure with precast concrete facing panels. The ground surface will be prepared, and ground excavated to facilitate the placement of the fill material. The fill material will be placed and compacted in layers with reinforcing straps attached to precast concrete facing panels. Once the required height has been reached, a reinforced concrete slab and coping unit will be constructed. Reinstatement of adjacent areas will then be completed, including road pavement, footway and cycleway surfacing construction activities. A parapet to restrain errant vehicles will be installed along the top of the retaining wall and connected to the coping unit.

Access to the works area will be primarily from the verge areas along Greenhills Road. Materials will be delivered to site and fill material placed from lorries using an excavator. The precast concrete facing panels will be lifted into place using a mobile crane. Temporary land take will be required from the adjacent properties to facilitate construction.

#### 5.5.4.2.3 Reinforced Concrete Retaining Wall at Long Mile Road (Structure Reference: RW03)

A new retaining wall is required along the eastbound carriageway on Long Mille Road at the junction with Walkinstown Road. The wall will be approximately 64m in length with a maximum retained height of approximately 1.5m. This retaining wall will replace the existing retaining wall adjacent to the end of Slievebloom Park.

As part of the upgrade of the Long Mile Road carriageway, footways and cycle track, the existing retaining wall adjacent to Slievebloom Park will be demolished and a new wall reconstructed in its place, temporary retention of existing pavement / footways at Slievebloom Park may be required during demolition. Once the existing retaining wall has been demolished, the ground will be stripped to formation level and existing services will be diverted as required to enable the wall construction. The proposed new retaining wall will be constructed in reinforced concrete. 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 has taken place. After a sufficient curing period, the area behind the retaining wall will be backfilled before the coping stone and a boundary fence is fitted to the top of the wall. New steps and a ramped section will be constructed to provide access between Long Mile Road and Slievebloom Park. Reinstatement of adjacent areas will then be completed, including pavement, footway and cycleway surfacing construction activities.

Access to the works area will be primarily from the verge areas along Long Mile Road and from Slievebloom Park.

#### 5.5.4.2.4 Reinforced Concrete Retaining Wall at Naas Road (Structure Reference: RW04)

A new retaining wall is required along the southbound carriageway on the New Nangor Road at the junction with Naas Road. The wall is required to retain widened fill material to accommodate the approach stairs and ramp to the Naas Road Pedestrian and Cycle Bridge (Structure Reference: ST-02). The wall will be approximately 277m in length with a maximum retained height of approximately 4.5m. This retaining wall will replace the existing retaining wall currently located along the north side of New Nangor Road.

Once the existing retaining wall has been demolished, the ground will be stripped to formation level and existing services will be diverted as required to enable the wall construction. The proposed new retaining wall will be constructed in reinforced concrete. 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 has taken place. After a sufficient curing period, the area behind the retaining wall will be backfilled before the coping stone and a boundary fence is fitted to the top of the wall. Reinstatement of adjacent areas will then be completed, including pavement, footway and cycleway surfacing construction activities.

Access to the works area will be primarily from the verge areas along New Nangor Road. Temporary land take will be required from the adjacent property to facilitate construction.

Once the new wall has been constructed, construction of the ramps and stairs required for the Naas Road Pedestrian and Cycle Bridge (Structure Reference: ST-02) at this location, can commence.

#### 5.5.4.2.5 Reinforced Concrete Retaining Wall at Naas Road (Structure Reference: RW05)

A new retaining wall is required along the eastbound carriageway on the Naas Road at the junction with New Nangor Road. The wall is required to retain widened fill material to accommodate the approach stairs and ramp to the Naas Road Pedestrian and Cycle Bridge (Structure Reference: ST-02). The wall will be approximately 113m in length with a maximum retained height of approximately 1.5m. This retaining wall will partially replace the existing retaining wall currently located along the north side of Naas Road.

Once the existing retaining wall has been demolished, the ground will be stripped to formation level and existing services will be diverted as required to enable the wall construction. The proposed new retaining wall will be constructed in reinforced concrete. 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 has taken place. After a sufficient curing period, the area behind the retaining wall will be backfilled before the coping stone and a boundary fence is fitted to the top of the wall. Masonry cladding similar to that on the existing wall, will be added to the new wall. Reinstatement of adjacent areas will then be completed, including pavement, footway and cycleway surfacing construction activities.

Access to the works area will be primarily from the verge areas along Naas Road. Temporary land take will be required from the adjacent property to facilitate construction.

Once the new wall has been constructed, construction of the ramps and stairs required for the Naas Road Pedestrian and Cycle Bridge (Structure Reference: ST-02) at this location, can commence.

### 5.5.4.3 Miscellaneous Structural Works

The miscellaneous structural works which form part of the Proposed Scheme are summarised in Table 5.5.

**Table 5.5: Miscellaneous Structures**

Structure Name	Structure Reference	Section Reference
Tallaght Bus Interchange	Bus Interchange	1b
Greenhills Road / Airton Road junction outbound Advertising Sign	N/a	1o
Greenhills Road, Kilnamanagh Tymon Primary Care Centre Retaining Wall and Access Ramp	N/a	1o

#### 5.5.4.3.1 Tallaght Bus Interchange

The proposed Bus Interchange at Belgard Square West / The Square Shopping Centre Tallaght will provide four new covered waiting areas located centrally, serving four bus stops either side of the waiting area. Curved sedum green roof structures above the waiting areas are linked with lower horizontal canopies for continuous shelter throughout the waiting area platform. The canopy roof structure will be supported with inclined painted steel circular columns up to glulam beams. The column base connections consist of concrete plinths which will also provide additional seating. The proposed interchange is located between the Luas Red Line Tallaght Stop to the north, and The Square Tallaght Shopping Centre to the east.

The Bus Interchange works will be undertaken in the following sequence:

- Provide traffic management for alternative access to The Square Shopping Centre car park;
- Site Clearance and Excavation;
- Utility Diversions / Protection;
- Drainage and Service Ducting;
- Construct low height retaining wall at interface with The Square Shopping Centre car park;
- Structural works – prepare and pour the structure foundations and plinths. Once completed, the structural steelwork, glass, glulam beams and sedum / green roof will be installed;
- Kerbs and Paved Area works;
- Street Furniture; and
- Finishing works – pulling of cabling, and installation and commissioning of the mechanical and electrical infrastructure.

All works will be completed during working hours with the exception of the final surfacing works which will be completed out-of-hours.

#### 5.5.4.3.2 Greenhills Road / Airton Road junction outbound Advertising Sign

An existing advertising sign, currently located adjacent to the Greenhills Road / Airton Road junction will be relocated to facilitate the provision of the Proposed Scheme. The advertising sign will be relocated as close as practicable to its current location by the appointed contractor.

#### 5.5.4.3.3 Greenhills Road, Kilnamanagh Tymon Primary Care Centre Retaining Wall and Access Ramp

An existing low height retaining wall and ramp which provides access from the footway on Greenhills Road to the Kilnamanagh Tymon Primary Care Centre will be demolished and reconstructed to facilitate the provision of the Proposed Scheme.

### **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 (BCIDA-ACM-ENV\_LA-0809\_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 and Table 5.7. 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 (Section 1 and Section 2)**

Plant / Equipment	Section																									
	1a	1b	1c	1d	1e	1f	1g	1h	1i	1j	1k	1l	1m	1n	1o	1p	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j
Lorry (including concrete trucks)	2	3	2	2	2	3	2	2	2	2	2	2	2	2	6	6	4	4	2	6	4	4	2	1	1	1
Backhoe Mounted Hydraulic Breaker	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	1	3	2	2	2	1	1	1
8t (tonne) Excavator	1	1	1	0	1	1	1	0	0	0	1	0	0	0	2	2	1	1	1	2	0	2	2	1	0	0
16t (Rubber Wheeled) Excavator	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	4	2	2	1	4	2	2	0	0	1	1
6t Dumper	2	2	2	1	2	2	2	1	1	1	2	1	1	1	3	4	2	2	2	4	2	2	2	1	1	1
Road Planer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0	1	1	1	1	1	1	1	1	1	1
Road Sweeper	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1
Asphalt Paver	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1
Asphalt Roller	2	2	2	1	2	2	2	1	1	1	2	1	1	1	2	4	1	2	2	2	2	2	2	1	1	1
3t Roller	1	1	1	1	1	2	1	1	1	1	1	1	1	1	3	2	1	2	1	2	2	2	2	1	1	1
Mobile Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0
Piling Rig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Tracked Crusher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

**Table 5.7: Estimated Peak Daily Plant and Equipment Numbers (Section 3, Section 4, Section 5 and Section 6)**

Plant / Equipment	Section																			
	3a	3b	3c	3d	3e	3f	3g	3h	4a	4b	4c	4d	4e	5a	5b	6a	6b	6c	6d	6e
Lorry (including concrete trucks)	4	4	3	2	6	3	1	3	8	1	2	2	2	8	4	4	2	3	2	3
Backhoe Mounted Hydraulic Breaker	2	2	2	1	3	2	1	2	4	1	1	2	1	4	4	2	1	2	1	2
8t (tonne) Excavator	2	2	1	1	2	1	0	1	3	0	1	1	1	3	2	2	1	1	1	2
16t (Rubber Wheeled) Excavator	2	2	2	1	4	2	1	2	6	1	1	2	1	6	2	2	1	2	1	2
6t Dumper	2	2	2	2	4	2	1	2	6	1	2	2	2	6	4	4	2	2	2	2
Road Planer	1	1	1	1	2	1	1	1	3	1	1	1	1	3	1	2	1	1	1	2
Road Sweeper	1	1	1	1	2	1	1	1	3	1	1	1	1	3	1	2	1	1	1	2
Asphalt Paver	1	1	1	1	2	1	1	1	3	1	1	1	1	3	1	2	1	1	1	2
Asphalt Roller	2	2	2	2	4	2	1	2	6	1	2	2	2	6	2	4	2	2	2	4
3t Roller	2	2	2	1	4	2	1	2	6	1	1	2	1	6	2	4	1	1	1	2
Mobile Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Piling Rig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Tracked Crusher	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0

## 5.7 Construction Compounds

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

### 5.7.1 Construction Compound Locations

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

Construction Compound TC1 will be located at the green area at the western end of Old Blessington Road, adjacent to the junction with the N81 Tallaght bypass, as shown in Image 5.1. The area of Construction Compound TC1 is approximately 940m<sup>2</sup>.

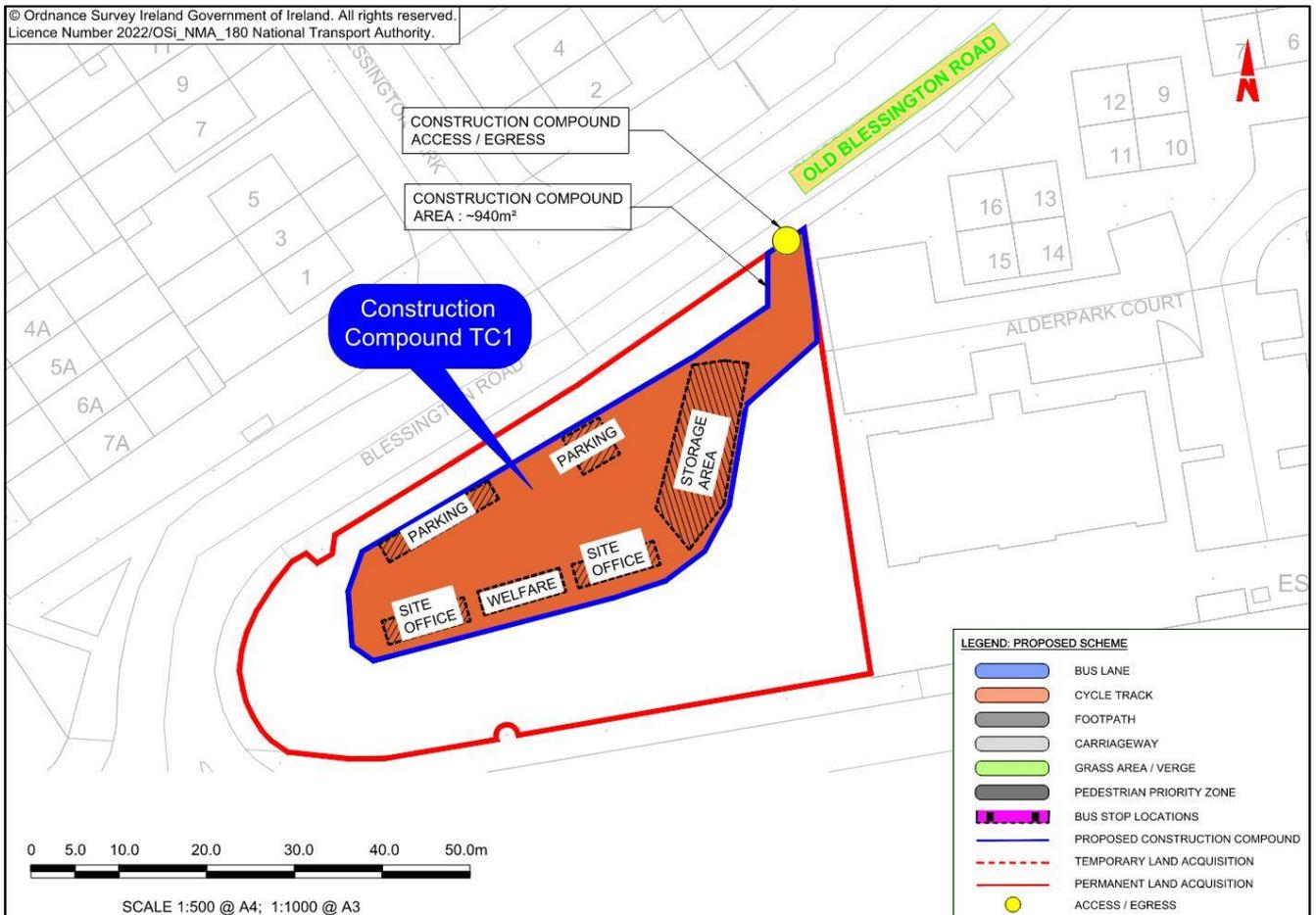


Image 5.1: Location and Extent of Construction Compound TC1

Construction Compound TC2 will be located at a green area on the east side of the R819 Greenhills Road, immediately south of the junction with Bancroft Park, as shown in Image 5.2. The area of Construction Compound TC2 is approximately 1,480m<sup>2</sup>.

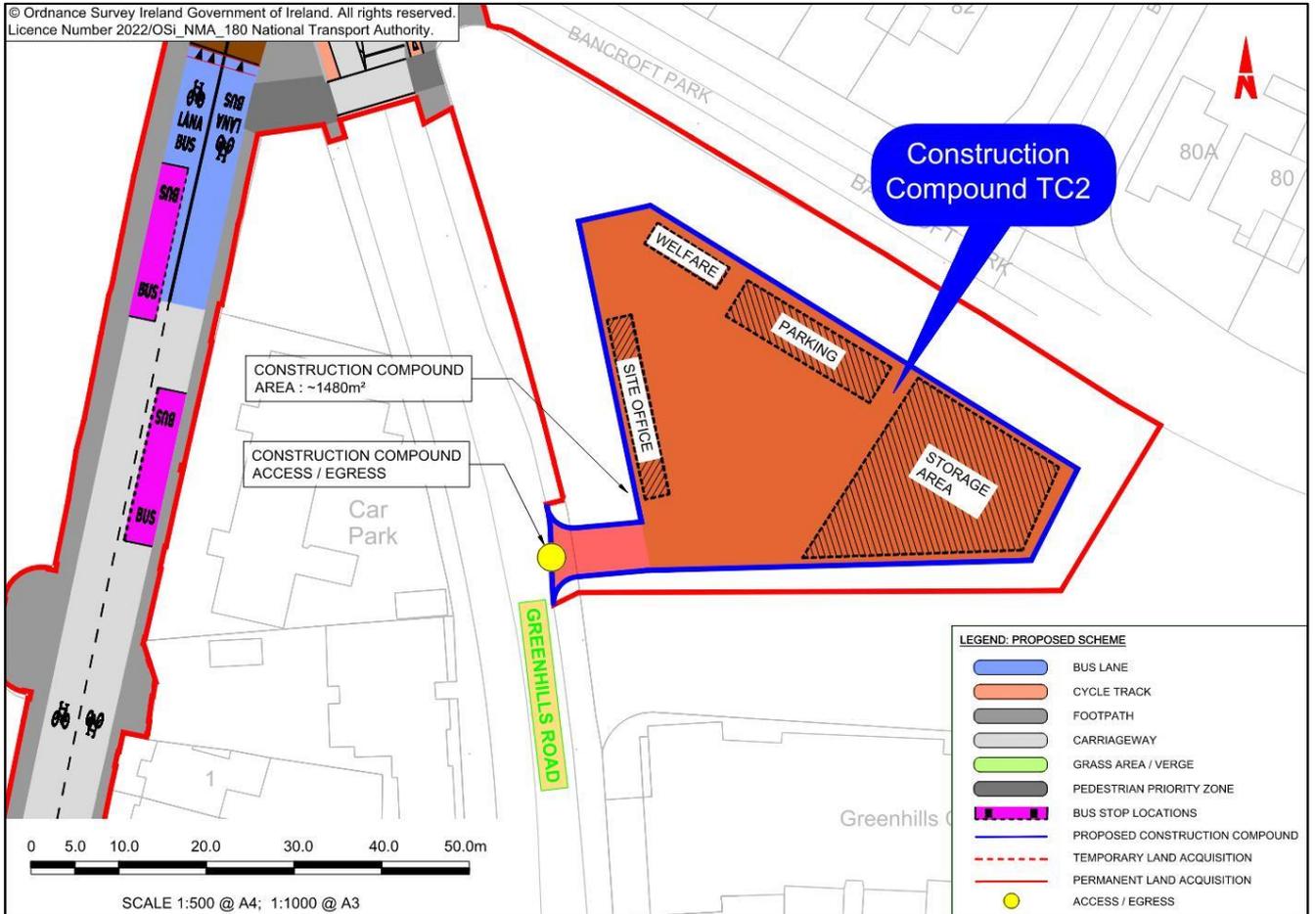
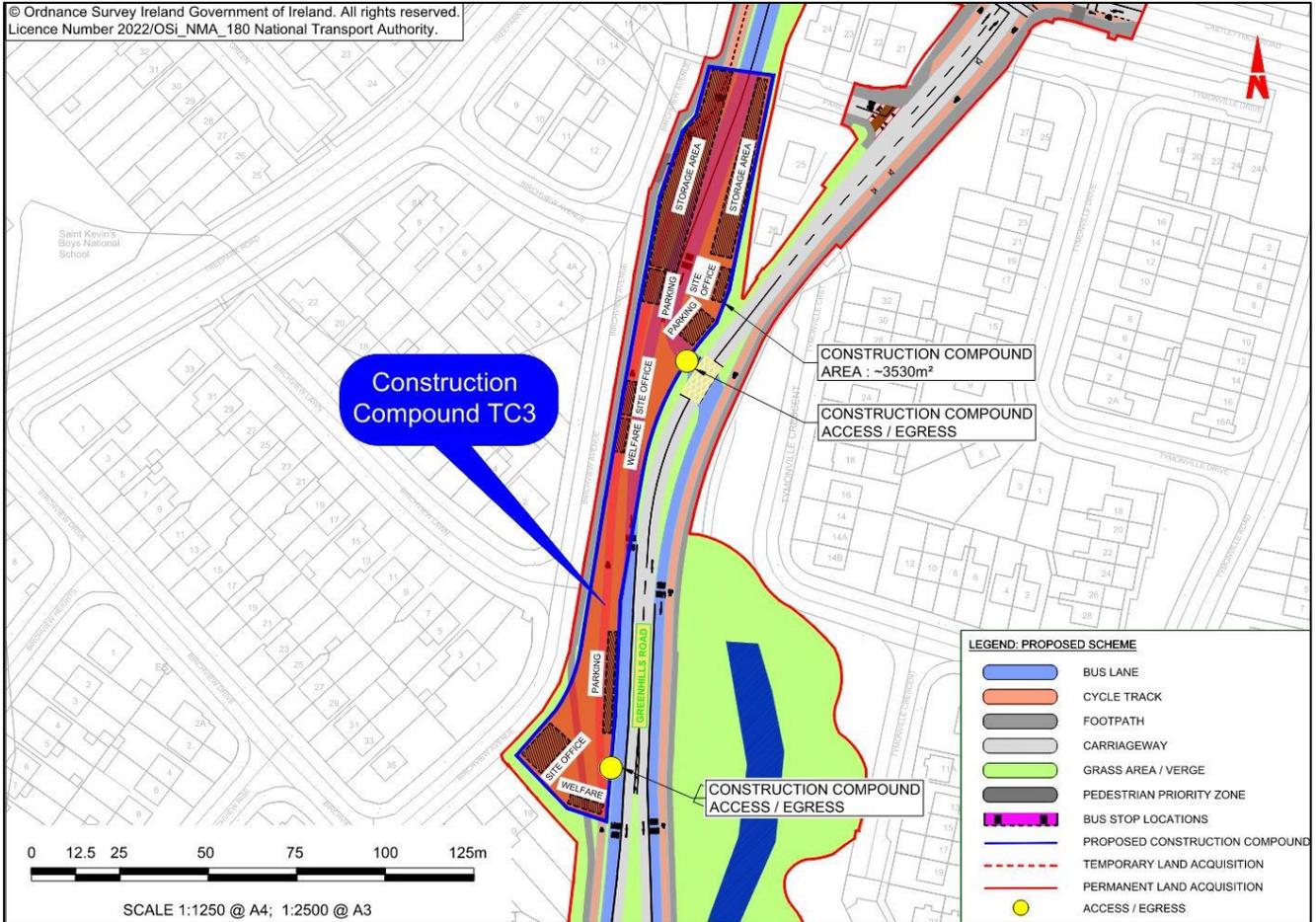


Image 5.2: Location and Extent of Construction Compound TC2

Construction Compound TC3 will be located in the green space between Greenhills Road and Birchview Avenue, which will ultimately form part of the permanent works, as shown in Image 5.3. The area of Construction Compound TC3 is approximately 3,530m<sup>2</sup>.



**Image 5.3: Location and Extent of Construction Compounds TC3**

Construction Compound TC4 will be located in the green space between Greenhills Road / Treepark Road, which will ultimately form part of the permanent works, as shown in Image 5.4. The area of Construction Compound TC4 is approximately 920m<sup>2</sup>.

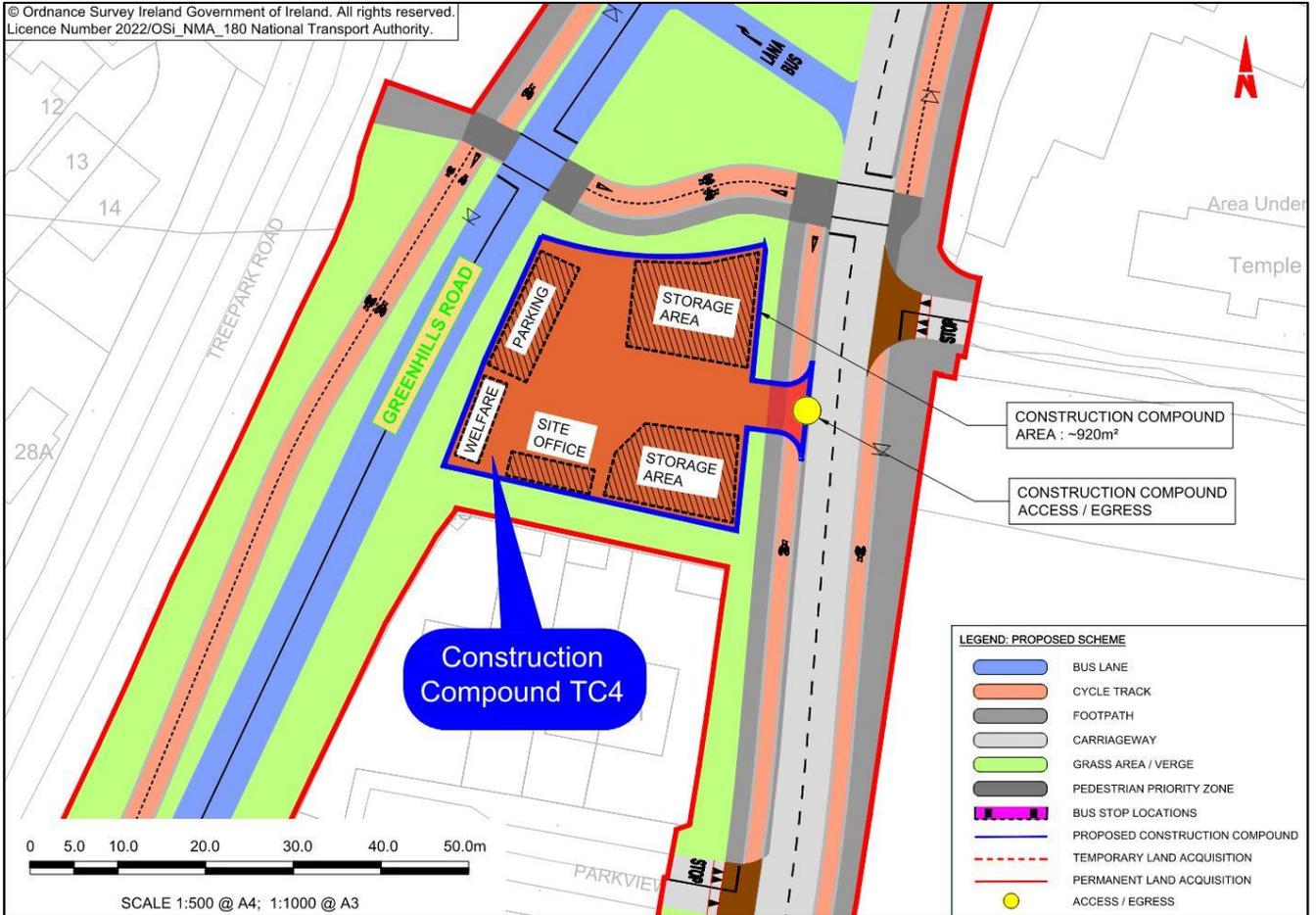


Image 5.4: Location and Extent of Construction Compounds TC4

Construction Compound TC5 will be located at a green space along Greenhills Road, to the north of Tymon Lane, as shown in Image 5.5. The area of Construction Compound TC5 is approximately 1,290m<sup>2</sup>.

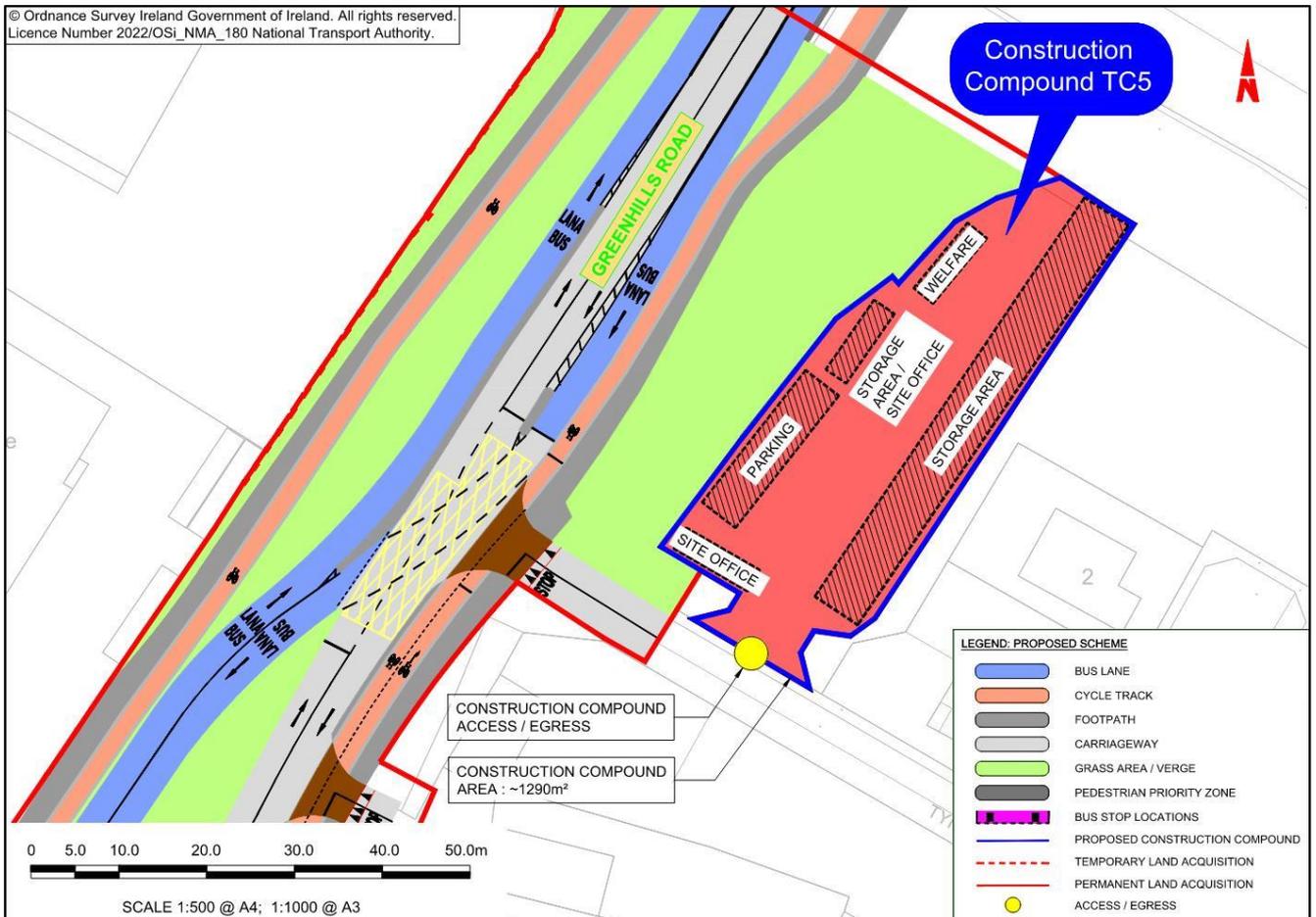


Image 5.5: Location and Extent of Construction Compound TC5

Construction Compound TC6 will be located at a green space along Greenhills Road, outside Tallaght Truck Dismantlers north-east of the M50 Motorway, as shown in Image 5.6. The area of Construction Compound TC6 is approximately 370m<sup>2</sup>.

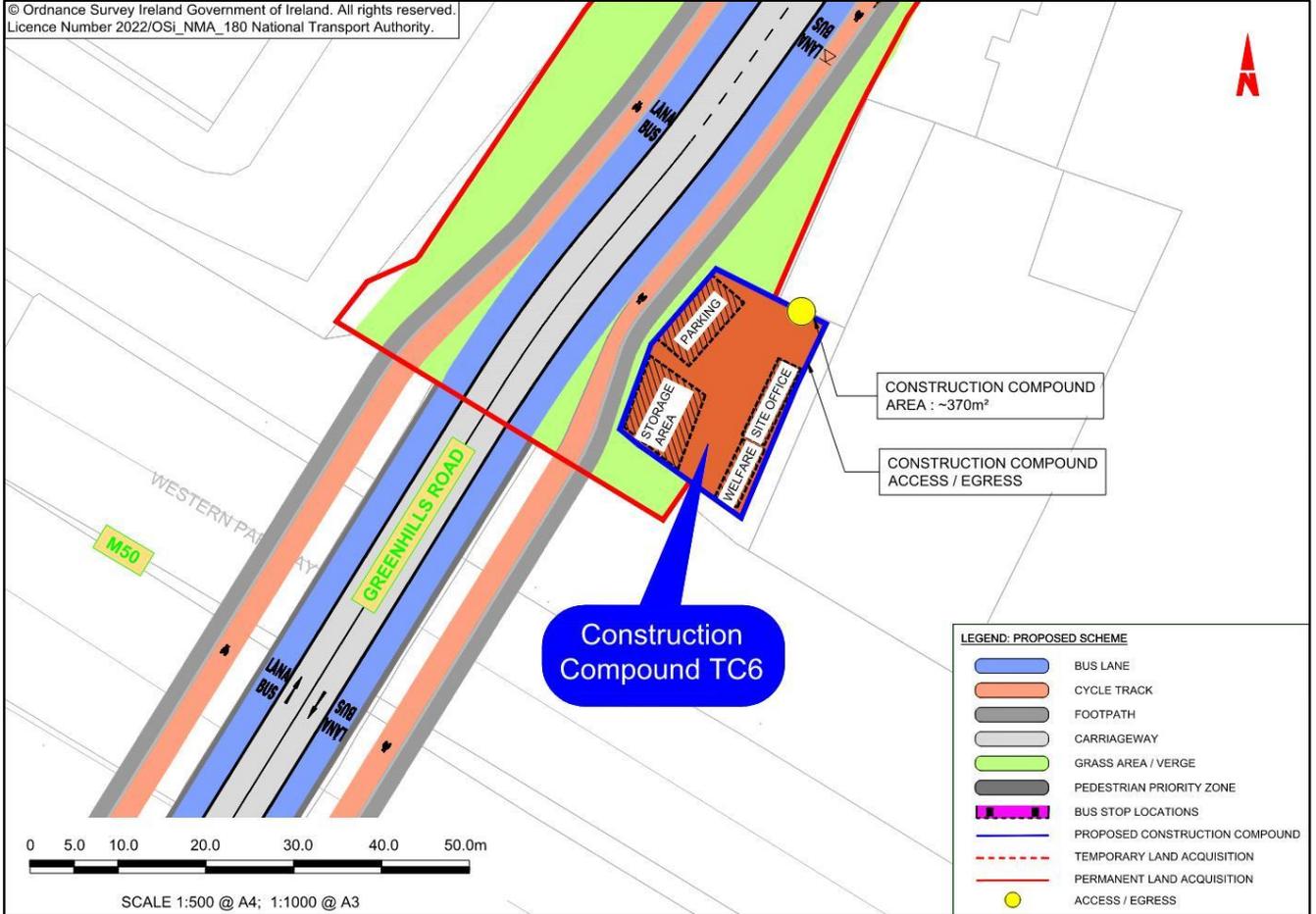
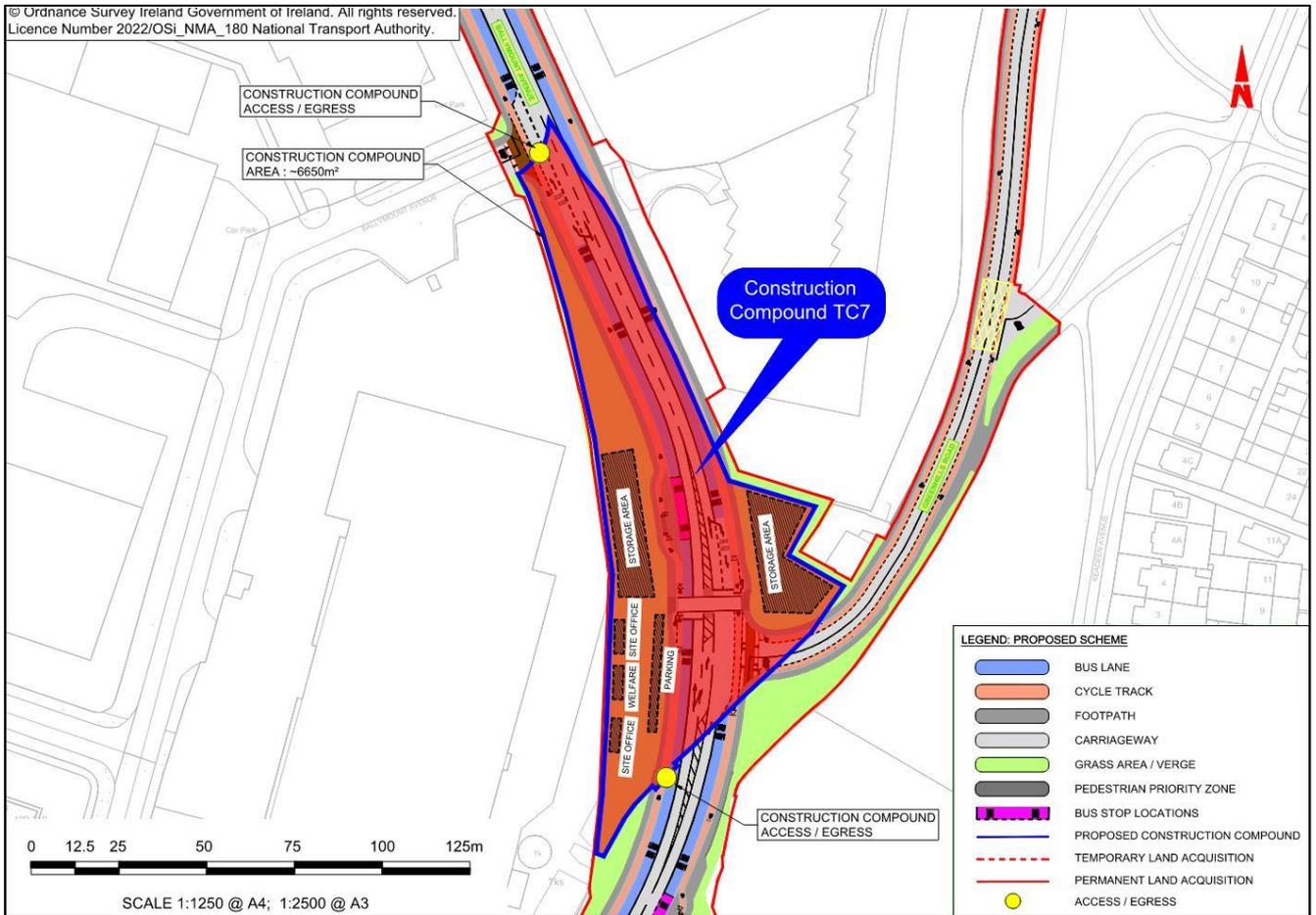


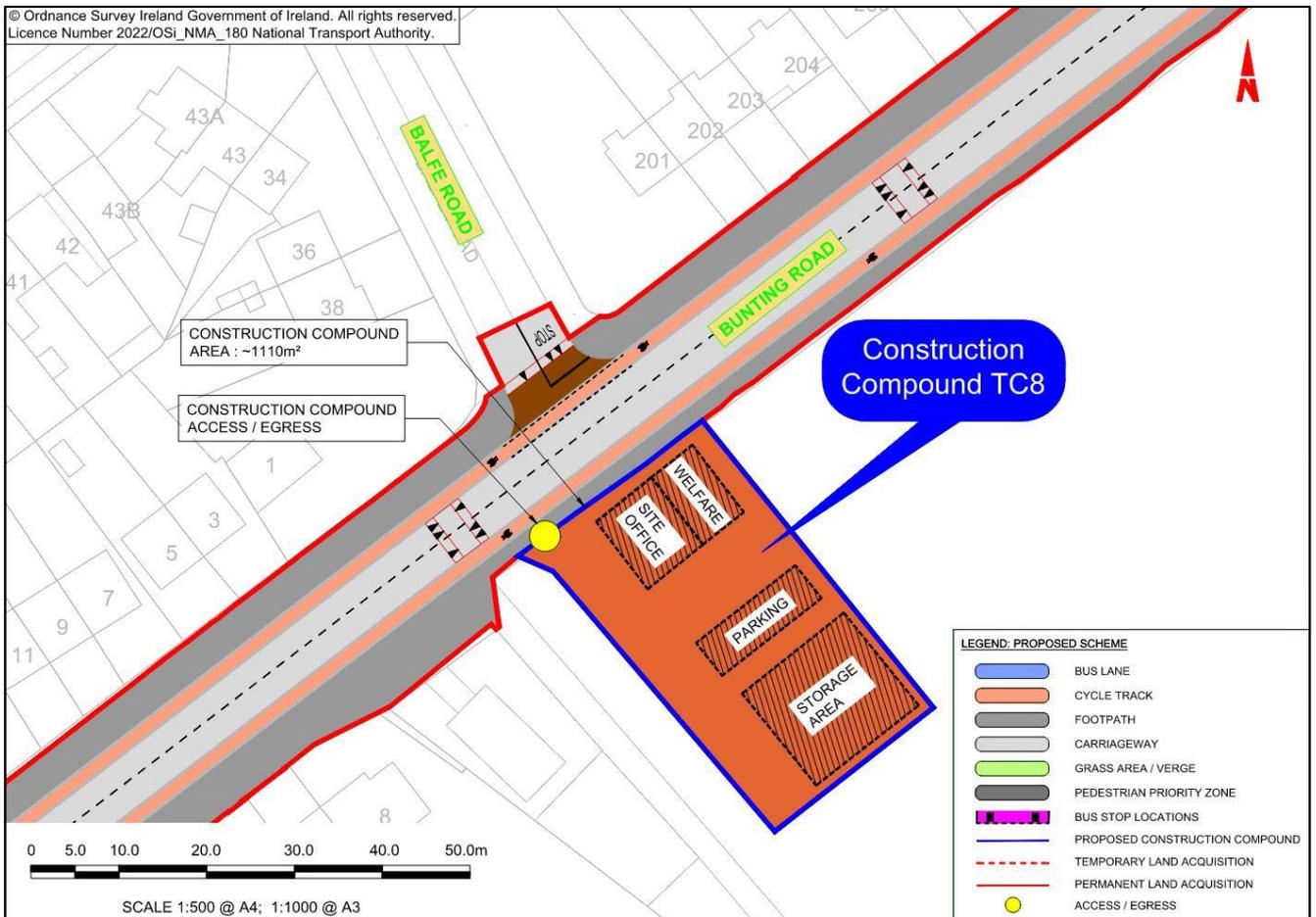
Image 5.6: Location and Extent of Construction Compound TC6

Construction Compound TC7 will be located in the vacant land between Greenhills Road and Ballymount Avenue, which will ultimately form part of the permanent works, as shown in Image 5.7. The area of Construction Compound TC7 is approximately 6,650m<sup>2</sup>.



**Image 5.7: Location and Extent of Construction Compound TC7**

Construction Compound TC8 will be located at Bunting Park along Bunting Road, as shown in Image 5.8. The area of Construction Compound TC8 is approximately 1,100m<sup>2</sup>.



**Image 5.8: Location and Extent of Construction Compound TC8**

Construction Compound TC9 will be located at the green space on the north side of Crumlin Road at the junction with Rafter's Road, as shown in Image 5.9. The area of Construction Compound TC9 is approximately 860m<sup>2</sup>.

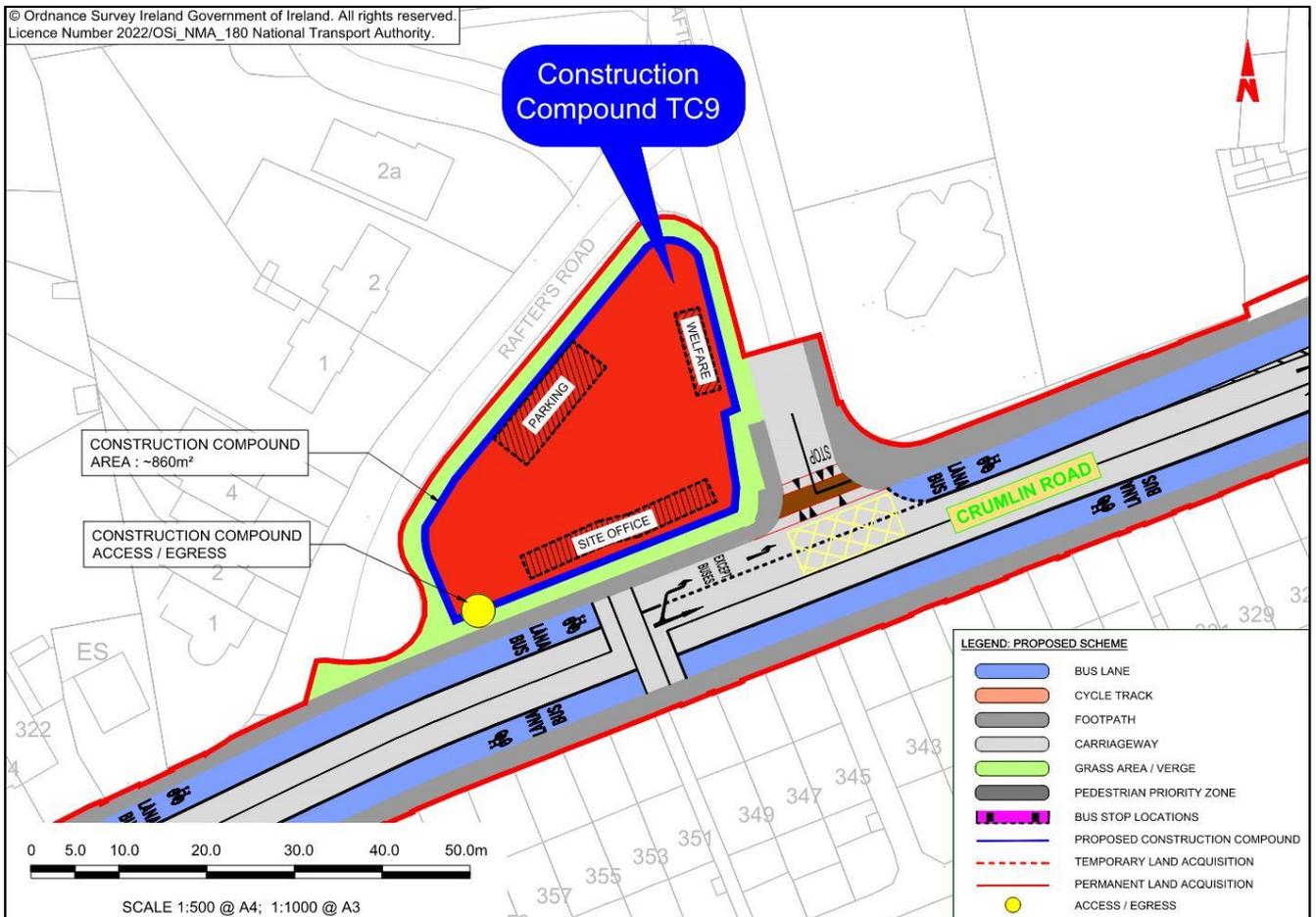
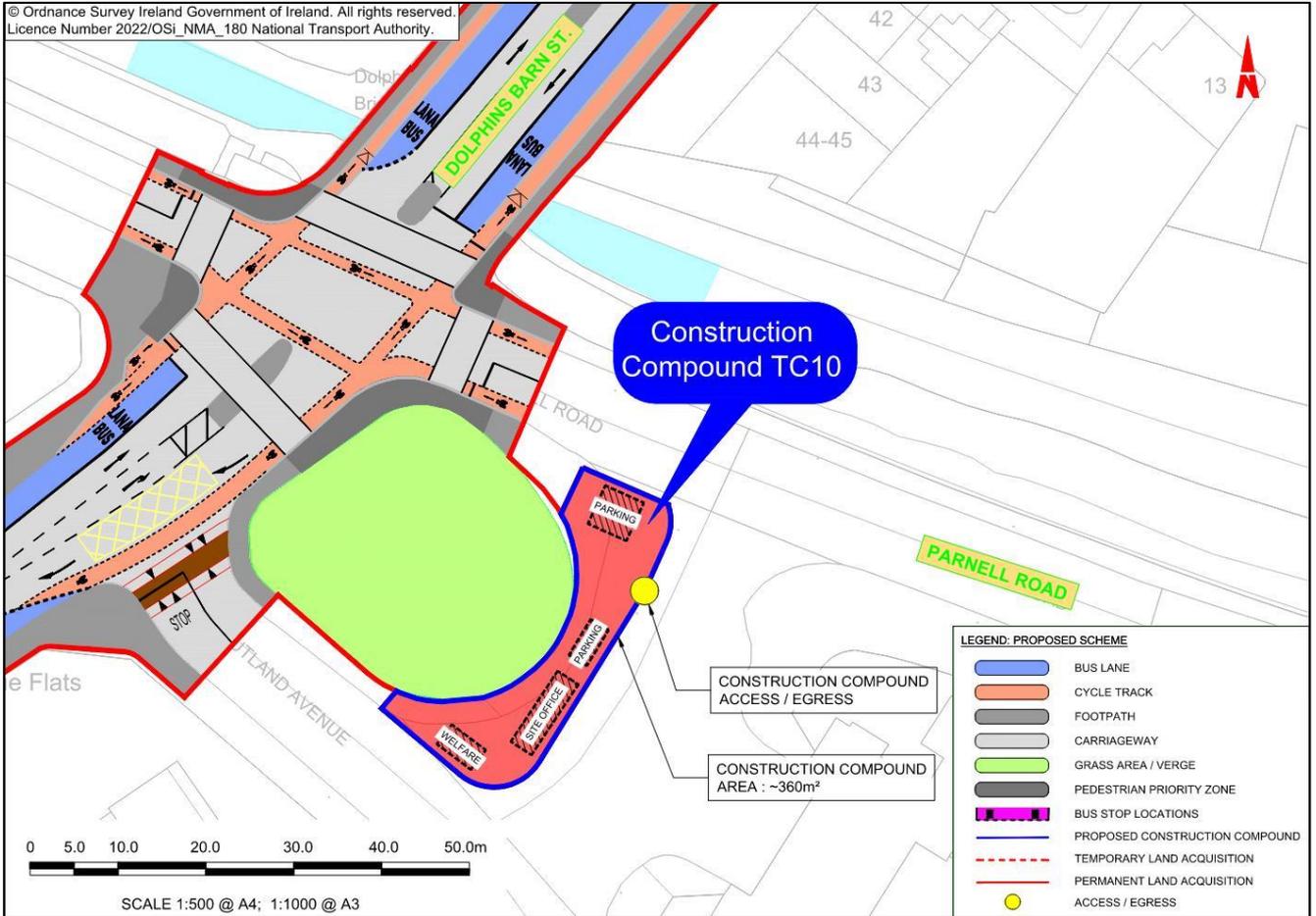


Image 5.9: Location and Extent of Construction Compound TC9

Construction Compound TC10 will be located adjacent to the green space on the south side of Crumlin Road at the junction with Rutland Avenue, as shown in Image 5.10. The area of Construction Compound TC10 is approximately 360m<sup>2</sup>.



**Image 5.10: Location and Extent of Construction Compound TC10**

Construction Compound TC11 will be located at Dean Street / Patrick Street, as shown in Image 5.11. The area of Construction Compound TC11 is approximately 130m<sup>2</sup>.

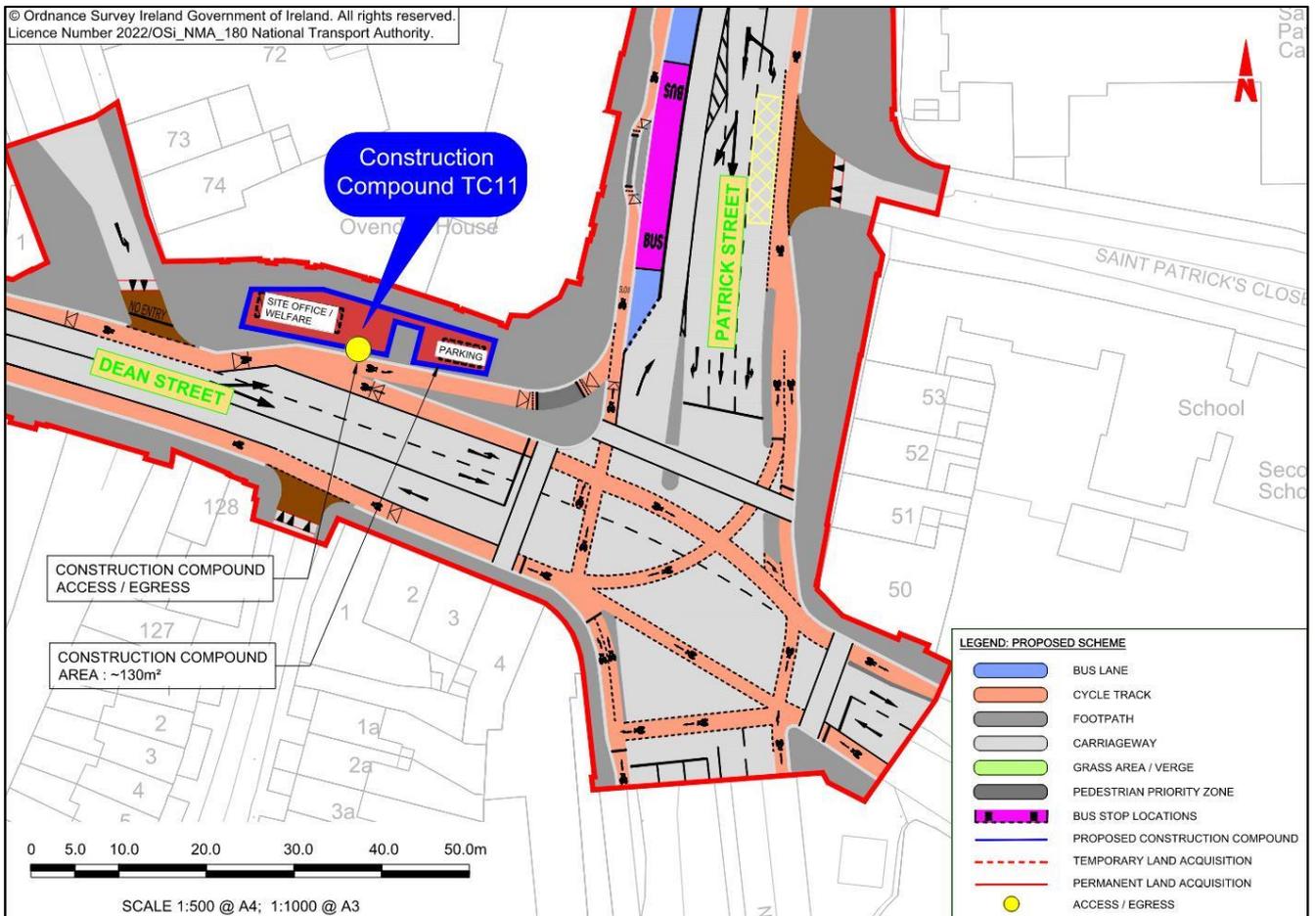
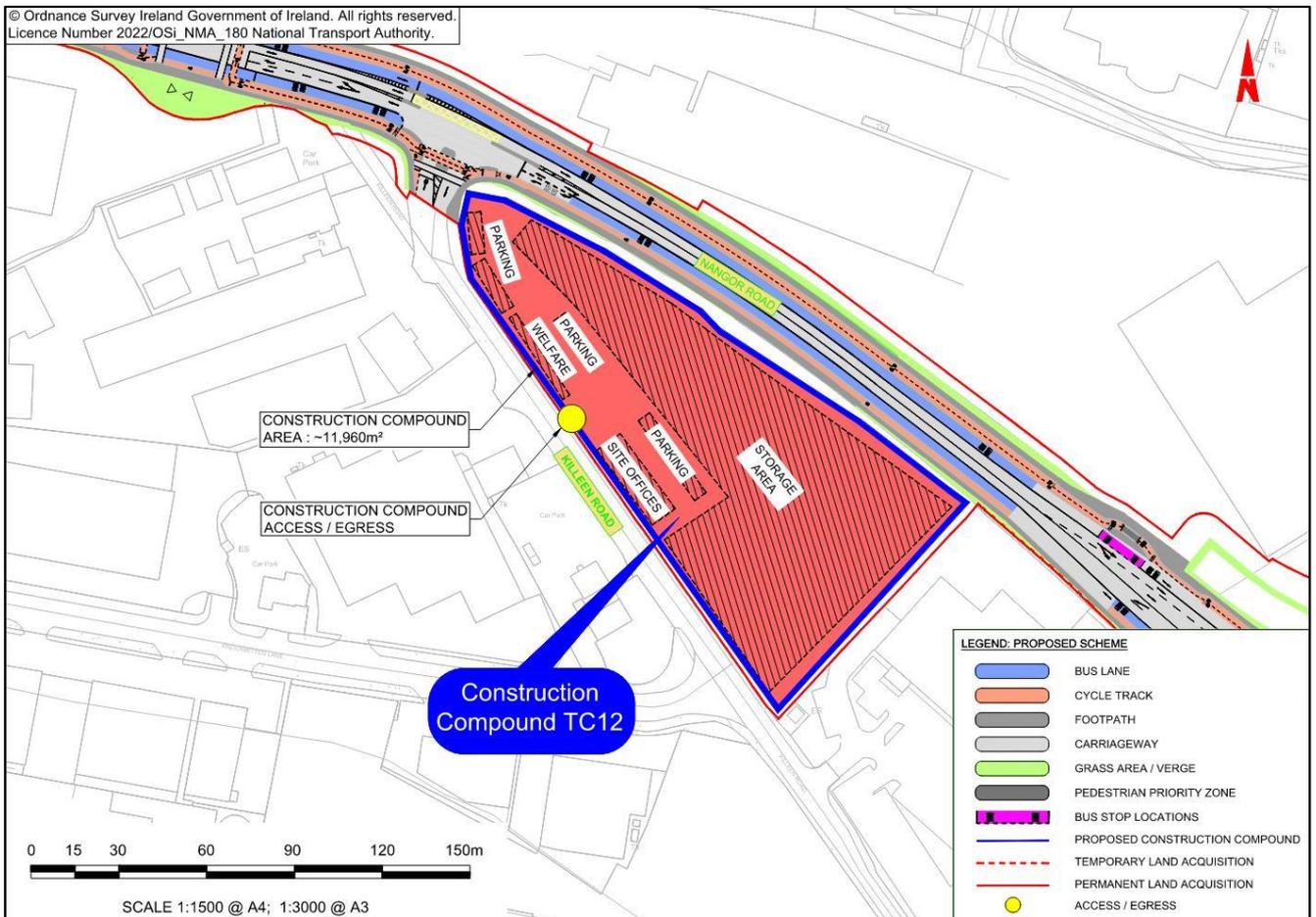


Image 5.11: Location and Extent of Construction Compound TC11

Construction Compound TC12 will be located at the green area between New Nangor Road and Killeen Road, as shown in Image 5.12. The area of Construction Compound TC12 is approximately 11,960m<sup>2</sup>.



**Image 5.12: Location and Extent of Construction Compound TC12**

Construction Compound TC13 will be located along the Long Mile Road, south of the New Nangor Road / Naas Road / Long Mile Road junction, as shown in Image 5.13. The area of Construction Compound TC13 is approximately 3,080m<sup>2</sup>.

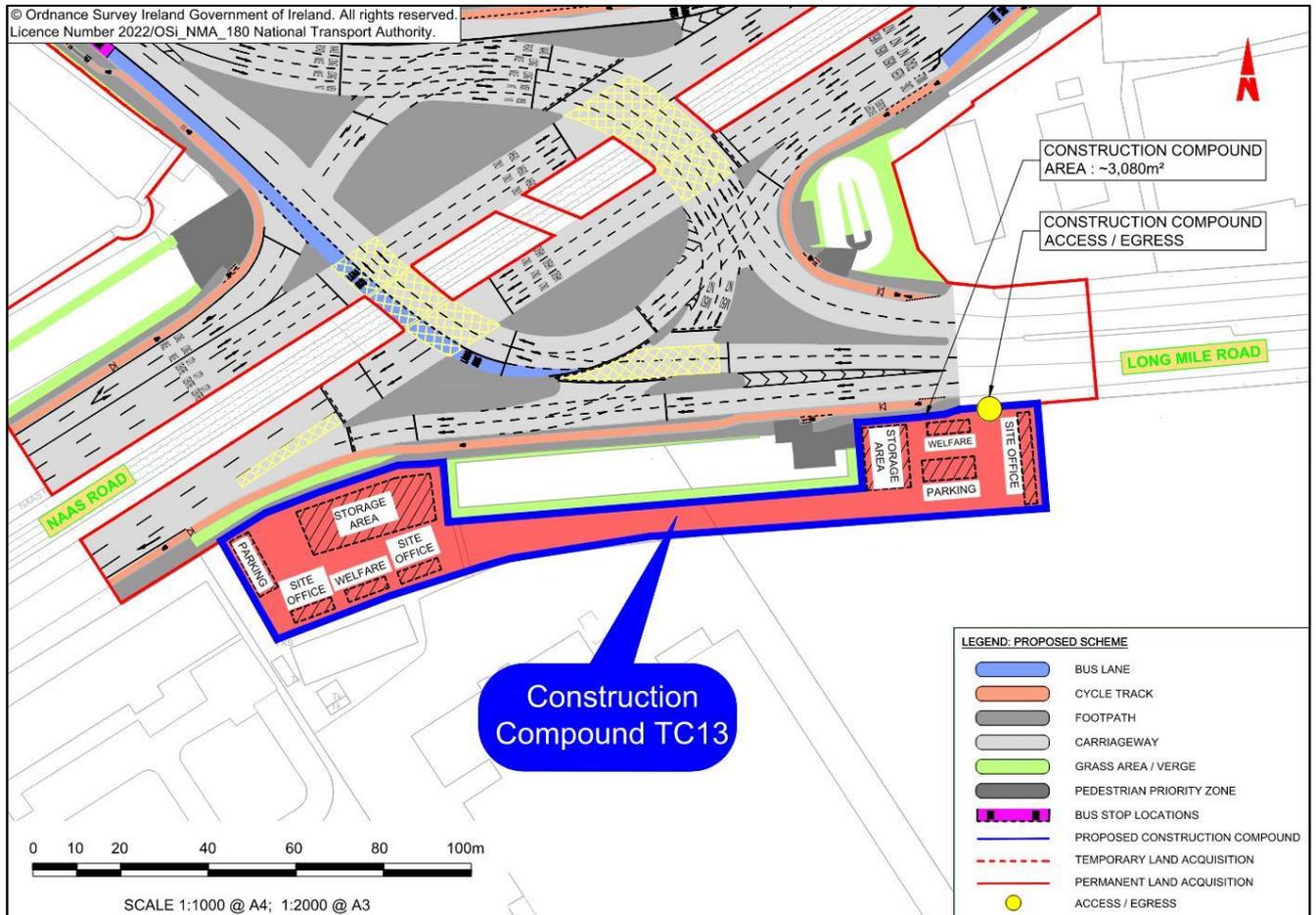


Image 5.13: Location and Extent of Construction Compound TC13

## 5.7.2 Construction Compound Activities

As shown in Image 5.1 to Image 5.13 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.

Certain materials will be re-used where practicable, primarily, site-sourced concrete and excavated material. Any crushing of materials will be undertaken by a mobile crusher that will be located in the Construction Compounds as outlined in Table 5.6 and Table 5.7. Due to the limited volume of this material generated as part of the works, it is anticipated that crushing will only be undertaken intermittently for short periods of time.

All necessary authorisations under the Waste Management Act, as amended, will be obtained prior to undertaking crushing and 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 licenced facility.

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

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

## **5.8 Construction Traffic Management**

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

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

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

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

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

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

### **5.8.1 Pedestrian and Cyclist Provisions**

The measures set out in Section 8.2.8 of the Traffic Signs Manual (Department of Transport, Tourism and Sport 2019) will be implemented, wherever practicable, to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users) and cyclists. Therefore, where footways 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). 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.

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, include those identified in Table 5.8.

**Table 5.8: Lane Closures / Modifications, Road Closures and Diversions**

Section Ref.	Lane Closures / Modifications				Diversions
	Minimum One Lane of Traffic in Each Direction	Temporary Lane Closures	Temporary Road Closures (Night-time)	Short Sections of Stop / Go System	
Section 1a	No	Yes (footway, cycle track and general traffic (each direction, staged)).	Yes (when converting the roundabout at Belgard Square West / South to a signalised junction)	Yes	Yes (traffic diverted via Cookstown Way and Belgard Square West)
Section 1b	No	Yes (footway and general traffic (each direction, staged)). The existing access to Tallaght Shopping Centre eastern surface car park from Old Blessington Road, will be closed, however service vehicles will still have access. The existing alternative access points will be used. Access to the Luas Tram stop and the Square Shopping Centre Service Yard and western car park will be retained.	No	Yes	Yes (traffic diverted via Cookstown Way and Belgard Square West during the upgrade of the roundabout at Belgard Square West / South)
Section 1c	No	Yes (footway and general traffic (each direction, staged)).	No	Yes	Yes (traffic diverted via Belgard Square South to access Shopping Centre Car Park)
Section 1d	No	Yes (general traffic (each direction, staged)). The Belgard Square / Blessington Road junction will be closed, with no through road for vehicular access. Local access will be provided. The existing footways will remain open to facilitate pedestrian access around the hard closure.	Yes	Yes	Yes (traffic diverted via Belgard Square North and Cookstown Way)
Section 1e	Yes	Yes (footway, cycle track and general traffic (each direction, staged)). Priority access to the Tallaght University Hospital will be retained throughout closures, from all arms of the roundabout.	Yes (to complete final pavement surfacing works. Priority access to the Tallaght University Hospital will be retained throughout closures)	Yes	Yes (traffic diverted via Cookstown Way, Belgard Square South & Belgard Square East to access Belgard Square North. Traffic diverted via Cookstown Way and Old Blessington Road to Access Belgard Square East (the existing left-turn restrictions at the Old Blessington Road / Belgard Square West junction may need to be temporarily altered in agreement with the NTA and Dublin City Council)
Section 1f	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	Yes	Yes	No
Section 1g	No	Yes (footway, cycle track and general traffic (each direction, staged)). Access to the Tallaght University Hospital will be retained throughout closures.	Yes (to complete final pavement surfacing works. Priority access to the Tallaght University Hospital will be retained throughout closures)	Yes	Yes (traffic diverted via Belgard Road and Blessington Road)
Section 1h	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	Yes (when converting the roundabout at Belgard Square	Yes	No (note: Upon completion of the road, general traffic will have access only from Blessington Road. Access from Belgard

Section Ref.	Lane Closures / Modifications				Diversions
	Minimum One Lane of Traffic in Each Direction	Temporary Lane Closures	Temporary Road Closures (Night-time)	Short Sections of Stop / Go System	
			North / Belgard Square East to a signalised junction)		Square North will not be permitted. The through road will be used for buses only. Traffic will be diverted via the R113.)
Section 1i	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	No	Yes	No
Section 1j	Yes	Yes (footway and general traffic (each direction, staged)).	No	Yes	No
Section 1k	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	No	Yes	No
Section 1l	Yes (except at existing bus gate)	Yes (footway, cycle track, general traffic and public transport (each direction, staged)).	Yes	Yes	No
Section 1m	Yes	Yes (footway and general traffic (each direction, staged)).	No	Yes	No
Section 1n	Yes	Yes (footway and general traffic (each direction, staged)).	No	Yes	No
Section 1o	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	No	Yes	No
Section 1p	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	Yes (to complete final pavement surfacing works)	Yes	Yes (traffic diverted via new Calmount Road extension / R838 / R113 Belgard Road / Mayberry Road, if the Calmount Road extension works in Section 2d are completed when these works are under construction, or via Ballymount Avenue / Calmount Road R838 / R113 Belgard Road / Mayberry Road if the Calmount Road extension works in Section 2d have not been completed)
Section 2a	Yes	Yes (footway and general traffic (each direction, staged)). Sections of the M50 on-slip and off-slip at the Greenhills Road overbridge, will be closed to allow construction of the abutments for the new pedestrian and cycle overbridge (Structure Reference: ST-01)	Yes Road closures will be required on the M50 to facilitate the placement of the pedestrian and cycle bridges (Structure Reference: ST-01). It is expected that each bridge	Yes	Yes (M50 traffic diverted at Junctions 10 and 11 via N81 – R113 – R838 (5.7km) between 22:00pm and 06:00am)

Section Ref.	Lane Closures / Modifications				Diversions
	Minimum One Lane of Traffic in Each Direction	Temporary Lane Closures	Temporary Road Closures (Night-time)	Short Sections of Stop / Go System	
			structure will be lifted in one night.		
Section 2b	Yes	Yes (footway and general traffic (each direction, staged)).	No	Yes	No
Section 2c	Yes	Yes (footway and general traffic (each direction, staged)).	Yes (to complete final pavement surfacing works)	Yes	Yes (traffic diverted via Ballymount Road Lower / Ballymount Road Upper / Ballymount Avenue, and via Greenhills Road / Calmount Avenue (Section 2e) or via the Calmount Road extension works (Section 2d) to access Calmount Road.
Section 2d	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	Yes (road closures will be required on the Greenhills Road to complete construction of the tie-ins to the new junction)	Yes	Yes (traffic diverted via Ballymount Road Lower and Ballymount Avenue)
Section 2e	Yes	Yes (footway, cycle track and general traffic (each direction, staged))	Yes (road closures will be required on the Greenhills Road to complete construction of the tie-ins to the new junction)	Yes	Yes (traffic diverted via Ballymount Road Lower and Ballymount Avenue)
Section 2f	Yes	Yes (footway, cycle track and general traffic (each direction, staged)).	No	Yes	No
Section 2g	Yes	Yes (footway, cycle track and general traffic (staged)). Access for residents and businesses will be maintained throughout construction.	No	Yes	No
Section 2h	No	Yes (footway and general traffic). Access for residents and businesses will be maintained throughout construction.	Yes	N/a	Yes (traffic diverted via Walkinstown Roundabout)
Section 2i	Yes	Yes (footway and general traffic (each direction, staged)).	No	Yes	No
Section 2j	Yes	Yes (footway and general traffic (each direction, staged)).	No	Yes	No
Section 3a	Yes	Yes (footway and general traffic (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	Yes	No

Section Ref.	Lane Closures / Modifications				Diversions
	Minimum One Lane of Traffic in Each Direction	Temporary Lane Closures	Temporary Road Closures (Night-time)	Short Sections of Stop / Go System	
Section 3b	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	No	No
Section 3c	Yes	Yes (footway and general traffic (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	Yes	No
Section 3d	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	No	No
Section 3e	Yes	Yes (general traffic (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	Yes	No
Section 3f	Yes	Yes (footway and general traffic (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	Yes	No
Section 3g	Yes	Yes (footway and general traffic (each direction, staged)).	No	Yes	No
Section 3h	Yes	Yes (footway and general traffic (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	Yes	No
Section 4a	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)). Access for residents and businesses will be maintained throughout construction.	No	No	No
Section 4b	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)). Access for businesses will be maintained throughout construction.	No	Yes	No
Section 4c	Yes	Yes (footway, cycle track and general traffic (each direction, staged)). Access for businesses will be maintained throughout construction.	No	No	No
Section 4d	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)). Access for businesses will be maintained throughout construction.	No	No	No
Section 4e	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)).	No	No	No

Section Ref.	Lane Closures / Modifications				Diversions
	Minimum One Lane of Traffic in Each Direction	Temporary Lane Closures	Temporary Road Closures (Night-time)	Short Sections of Stop / Go System	
Section 5a	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)). The pedestrian crossing at Woodford Walk junction will be temporarily closed, and pedestrians redirected onto the northern footway until construction of the southern footway is complete. Temporary speed limits will be implemented on New Nangor Road, and temporary traffic lights will be implemented at all junctions.	No	No	No
Section 5b	Yes	Yes (footway, cycle track and general traffic (each direction, staged)). Lane closures will be required during construction of the bridge supports, ramps and stairs to redirect traffic away from the works areas. Footways to the west and north of the junction will be widened initially to allow cyclist and pedestrian access throughout construction.	Yes Road closures will be required to lift and install the five bridge sections (Structure Reference: ST-02). The operation of the Luas Red Line will be maintained at all times, with works which may affect Luas operation restricted to times outside of peak hours during night-time and weekend possessions.	No	Yes. For New Nangor Road temporary closure, traffic will be diverted via Killeen Road – Kylemore Park North – Kylemore Road. For the Naas Road and Long Mile Road temporary road closures, traffic will be diverted via the M50 between Junctions 9 and 10 – Calmount Road – Ballymount Avenue – Ballymount Road Lower – Walkinstown Avenue.
Section 6a	No The Naas Road / John F Kennedy Drive / Old Naas Road junction will be closed during construction. Pedestrian access will be maintained.	Yes (footway, cycle track and general traffic (each direction, staged)).	No The operation of the Luas Red Line will be maintained at all times, with works which may affect Luas operation restricted to times outside of peak hours during night-time and weekend possessions.	No	Yes (Access and egress to John F Kennedy Drive will be diverted via Kylemore Road and Old Naas Road)
Section 6b	Yes	Yes (footway, general traffic and public transport (each direction, staged)). Traffic movements through the Naas Road / Kylemore Road / Walkinstown Avenue junction will be maintained at all times. A temporary pedestrian crossing will provide access to the Kylemore Luas stop during construction while the footway alongside the left turn slip road is closed.	No The operation of the Luas Red Line will be maintained at all times, with works which may affect Luas operation restricted to times outside of peak hours during night-time and weekend possessions.	No	No
Section 6c	Yes	Yes (footway and general traffic (each direction, staged)). Pedestrian movements will be redirected to the east footway on Walkinstown Avenue until construction on the west footway are complete.	No	No	No

Section Ref.	Lane Closures / Modifications				Diversions
	Minimum One Lane of Traffic in Each Direction	Temporary Lane Closures	Temporary Road Closures (Night-time)	Short Sections of Stop / Go System	
Section 6d	Yes	Yes (footway, cycle track, general traffic and public transport (each direction, staged)).	No	No	No
Section 6e	Yes	<p>Yes (footway, cycle track, general traffic and public transport (each direction, staged)).</p> <p>The existing bus service will be maintained during peak hours, during school drop off and pick up times. A temporary speed limit will be implemented during construction.</p> <p>Phased closure of the existing footways on one side of the road may be required between pedestrian crossings to facilitate construction. Where space allows a temporary path will be provided to facilitate pedestrians, alternatively they will be allowed to cross over to the opposite side of the carriageway at a controlled crossing.</p>	No	No	No

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 this will be reversed during the afternoon, where appropriate. 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 5.14, 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.

In a few locations, there may not be sufficient road width to allow reduced lane widths, minimum exclusion zones and barrier / cones arrangement. In these sections, single lane traffic will be permitted during the day in the light traffic direction; outbound during the morning, inbound during the afternoon, and also in the middle of the day if traffic is low. Night-time works will be carried out, with single lane closures and route diversions put in place if required. A stop-go system may also be utilised, if necessary, for short periods. Local arrangements will be made to allow continued access to homes and business affected by the works during this phase. See Image 5.14 for an indicative cross section during Phase A works.

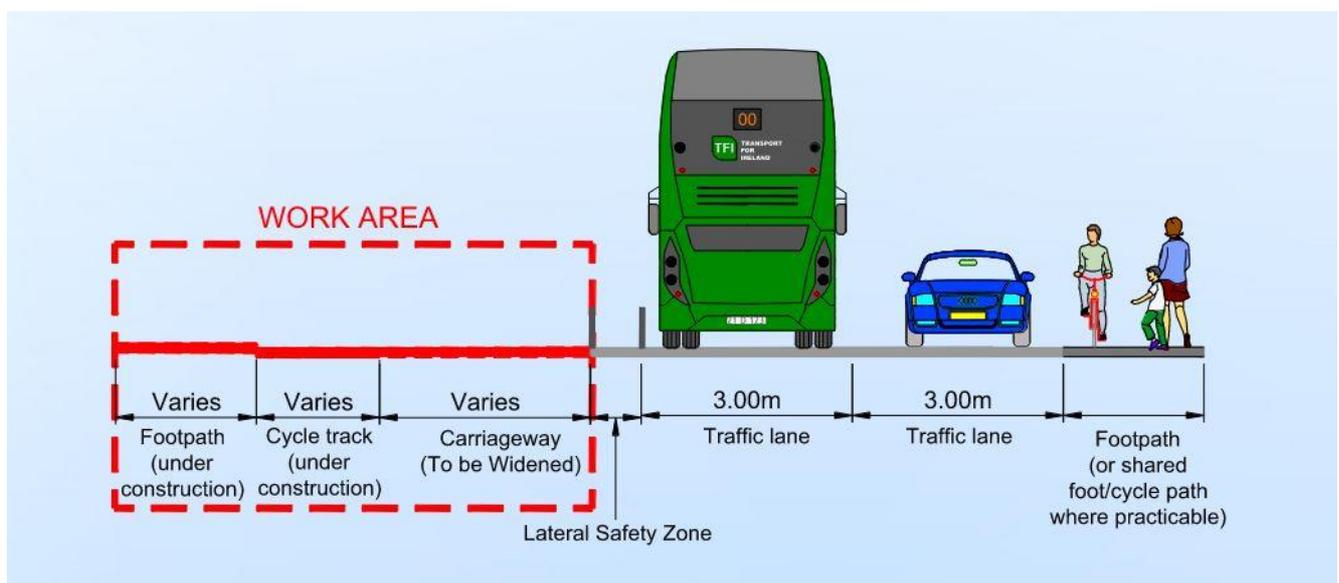


Image 5.14: Work Area - Stage A

### 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, it will be carried out on the opposite side of the carriageway, as shown in Image 5.15.

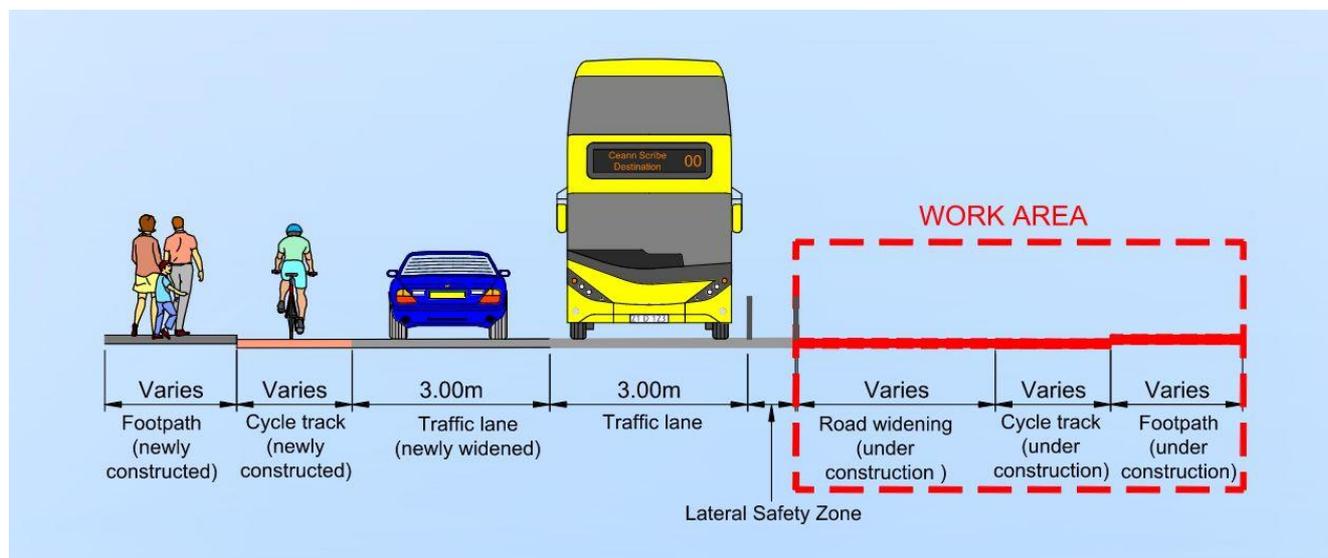


Image 5.15: Work Area - Stage B

### 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.

The major infrastructure projects and major developments which could interface with the Proposed Scheme are:

- The Tallaght Bus Interchange Mobility Hub Pocket Park Scheme;
- Dolphins Barn Public Realm Improvement Plan;
- Liffey Valley to City Centre Core Bus Corridor Scheme; and
- Kimmage to City Centre Core Bus Corridor Scheme.

South Dublin County Council intend to construct a public realm pocket park on the Old Blessington Road between the proposed Tallaght Bus Interchange and the Square Shopping Centre car park. The Proposed Scheme will interface with this pocket park and will maintain pedestrian access at this location.

The Dublin City Council public realm improvements proposed at Dolphins Barn will interface with the Proposed Scheme at the Dolphins Barn / South Circular Road junction.

The Liffey Valley to City Centre Core Bus Corridor Scheme will be developed to the north of the Proposed Scheme and will interface with the Proposed Scheme at Nicholas Street / Christchurch Place / High Street junction. The

Kimmage to City Centre Core Bus Corridor Scheme will be developed to the south of the Proposed Scheme and will interface with the Proposed Scheme at New Street South / Dean Street / Patrick Street / Kevin Street Upper junction.

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 Number 10 of 2005 - Safety, Health and Welfare at Work Act 2005, S.I. No. 291/2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013 (hereafter referred to as the Regulations) and other relevant Irish and European Union safety legislation will be complied with at all times. As required by the Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to the completion of the Construction Phase. This 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 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