



Chapter 04

Description of the Proposed Development

Contents

4.	Description of the Proposed Development	1
4.1	Introduction	1
4.2	Site Description	1
4.3	Neighbouring Land Uses	3
4.4	Main Features of the Proposed Development	13
4.5	Services and Utilities	21
4.6	Security Fencing	21
4.7	Landscaping Strategy	21
4.8	Safety during Operation	22
4.9	Decommissioning	23
4.10	References	24

Tables

Table 4.1: List of relevant drawings	1
--------------------------------------	---

Images

Image 4.1: Site location. Not to scale. Source: OpenStreetMap. Not to scale.	2
Image 4.2: Site layout map. Not to scale. Extract from site layout plan drawing – refer to Drawing No. LIPB-ARUP-ZZ-XX-DR-CB-0003 in Volume 3 of this EIAR.	2
Image 4.3: Neighbouring land uses. Not to scale.	4
Image 4.4: Approximate site image locations (Image 4.5 to Image 4.17, below)	4
Image 4.5: Little Island station car park - looking west	5
Image 4.6: Little Island train station approach - looking west	5
Image 4.7: Entrance to car park adjacent to north amenity park	6
Image 4.8: Northern amenity park area - looking east	7
Image 4.9: Northern amenity park area - looking west	7
Image 4.10: Irish Rail tracks – looking west from Little Island station	8
Image 4.11: N25 dual carriageway – looking west from junction 2 overbridge	9
Image 4.12: Southern wooded area – looking east from Radisson Blu Hotel car park	10
Image 4.13: Southern wooded area, illustrating dense vegetation and mesh link fence	10
Image 4.14: Radisson Blu Hotel car park – looking east along proposed alignment	11
Image 4.15: Tree and vegetation screening on west side of Radisson Blu Hotel car park	11
Image 4.16: East gate business park car park at tie in, looking east	12
Image 4.17: Tie in to LISTI scheme, looking south	12
Image 4.18: Example of steel network arch pedestrian and cycle bridge with concrete deck	14
Image 4.19: Example of segmental precast reinforced concrete porta frame structure over rail	14
Image 4.21: Indicative cross section for reinforced concrete structural forms for elevated ramp structure	15

Image 4.22: Example of reinforced concrete elevated ramp structure with monopiles / columns (as proposed for the northern approach ramp)	16
Image 4.23: Precast prestressed concrete bridge beams for approach ramp elevated structure (as proposed for the southern approach ramp)	16
Image 4.24: Vegetated green wall retaining solution, prior to vegetation growth	16
Image 4.25: Vegetated green wall retaining solution, following vegetation growth	17
Image 4.26: Parapet type with vertical post and rail and steel mesh infill	17
Image 4.27: Parapet type with vertical parapet infill	18
Image 4.28: Example of under bridge screening on new pedestrian and cycle bridge in Odense, Denmark with 1.2m high parapets with vertical bar infill	19
Image 4.29: Example of safety lighting on Mary Elmes footbridge, Cork City	20
Image 4.30: Vegetated green wall retaining solution, prior to vegetation growth	22
Image 4.31: Vegetated green wall retaining solution, following vegetation growth	22

4. Description of the Proposed Development

4.1 Introduction

This chapter provides a description of the site of the Proposed Development, neighbouring land uses and activities, and includes an overview of the main features of the Proposed Development. The Proposed Development will enhance sustainable transport and active transport between Little Island train station, the Dunkettle to Carrigtwohill pedestrian and cycle route and surrounds and the Eastgate Business Park and Little Island surrounding area.

Construction aspects associated with the Proposed Development are described separately in **Chapter 5, Construction Strategy**.

The description of the Proposed Development is supported by a series of drawings (listed in **Table 4.1**), which are contained in **Volume 3** of this EIAR, and these should be read in conjunction with this chapter.

Table 4.1: List of relevant drawings

Drawing Reference Number	Description
LIPB-ARUP-ZZ-XX-DR-CB-0003	Proposed Site Layout
LIPB-ARUP-ZZ-XX-DR-CB-0004	Bridge Elevation and Sections – Sheet 1
LIPB-ARUP-ZZ-XX-DR-CB-0005	Bridge Elevation and Sections – Sheet 2
LIPB-BSM-ZZ-XX-DR-L-0001	Landscape Masterplan
LIPB-BSM-ZZ-XX-DR-L-0002	Landscape Sections

4.2 Site Description

The site of the Proposed Development is located in Little Island, Co. Cork, approximately 10km to the east of Cork City. The Proposed Development is a pedestrian and cyclist bridge that will function as an active travel link for pedestrian and cyclists to travel from the Little Island Train station and the Dunkettle to Carrigtwohill pedestrian and cycle route and surrounds to the Eastgate Business Park and further surrounds of Little Island.

Refer to **Image 4.1** for a site location map.

An extract of the site layout for the Proposed Development is presented in **Image 4.2**.

4.3 Neighbouring Land Uses

The site of the Proposed Development is bounded by the L3004 Glounthaune Road to the north and the Eastgate Business Park to the south. The Proposed Development will cross the following areas from north to south:

- Northern amenity park area;
- Cork City to Midleton / Cobh Irish Rail line;
- N25 national road dual carriageway;
- Wooded area, south of the N25; and
- Radisson Blu Hotel and Eastgate Business Park car parks.

Refer to **Image 4.3** for a map illustrating the neighbouring land uses.

The Proposed Development will connect with the following elements of active and public transport infrastructure:

- Little Island train station;
- Dunkettle to Carrigtwohill pedestrian and cycle route;
- New bus stops on the L3004 Glounthaune Road;
- Improved pedestrian footpath and cycle path infrastructure within Little Island. These are being developed as part of the Little Island Sustainable Transport Interventions (LISTI) project being delivered by Cork County Council (CCC);
- Bus stops within the Eastgate Business Park; and
- Pedestrian and cycle access to the Radisson Blu Hotel.

Refer to **Image 4.4** for a graphic illustrating the approximate locations of the images following in this section.

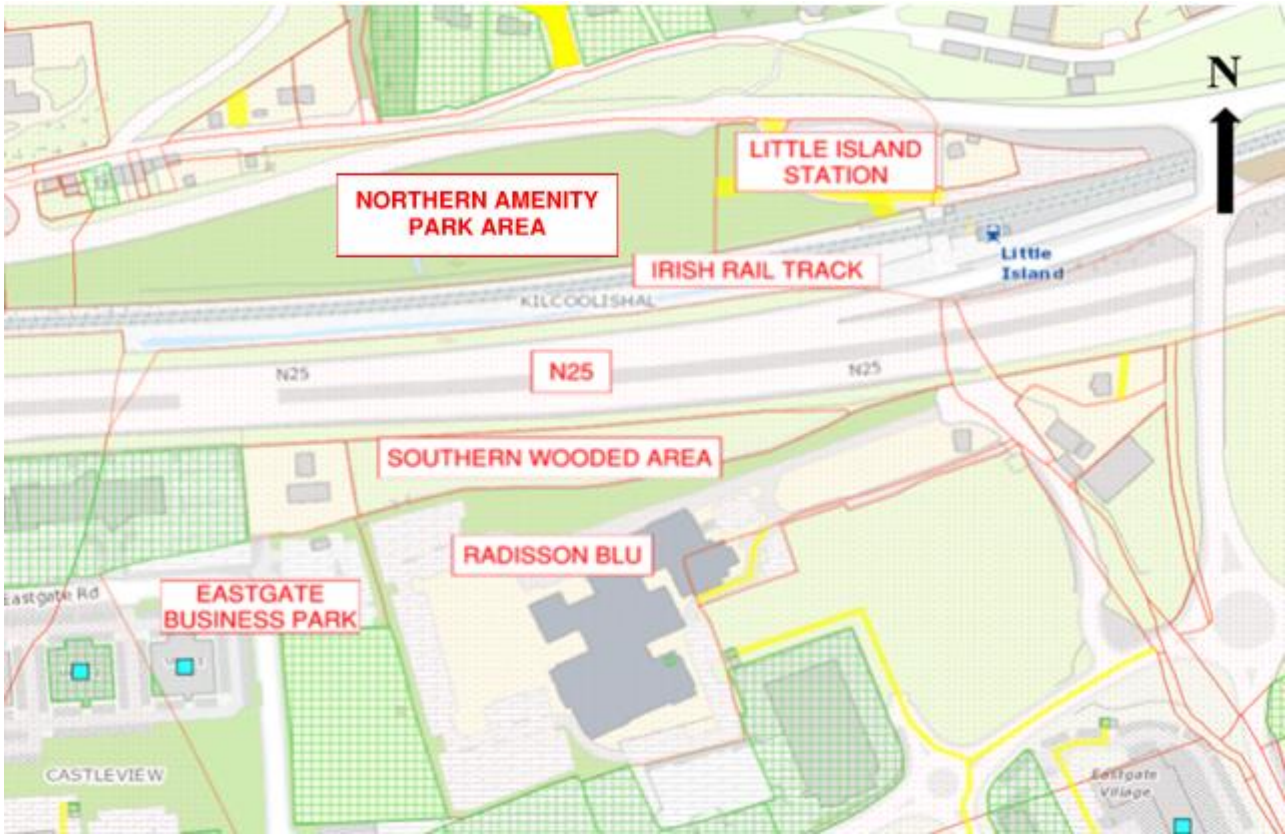


Image 4.3: Neighbouring land uses. Not to scale.



Image 4.4: Approximate site image locations (Image 4.5 to Image 4.17, below)

4.3.1 Little Island train station area

The Little Island train station area is located to the northeast of the Proposed Development site. Irish Rail lands encompass the Irish Rail train station, access road, car park and a car park currently being used as a recycling depot. Refer to **Image 4.5**, **Image 4.6** and **Image 4.7**. Works in this area include the end sections of the northern ramp embankment and link footway / cycleways to connect to the Little Island train station and the Dunkettle to Carrigtwohill pedestrian and cycle route.



Image 4.5: Little Island station car park - looking west



Image 4.6: Little Island train station approach - looking west



Image 4.7: Entrance to car park adjacent to north amenity park

4.3.2 Northern amenity park area

The northern amenity park area, located at the north of the Proposed Development site, between the L3004 Glounthaune Road and the Irish Rail tracks, is a parkland amenity area bounded by trees that mostly comprises grassed areas. Refer to **Image 4.8** and **Image 4.9**. Works proposed in this area include the ramped embankment, elevated ramped structure, link footpaths and landscaping.



Image 4.8: Northern amenity park area - looking east



Image 4.9: Northern amenity park area - looking west

4.3.3 Irish Rail track area

Image 4.10 illustrates the twin track Irish Rail tracks to the west of Little Island train station. The track area is approximately 5.5m wide. However, the Irish Rail land surrounding the tracks extends to the northern amenity park area to the north and the boundary with the N25 highway to the south. The overall width of Irish Rail land is approximately 35m. At the location of the proposed crossing over the rail line there is an existing signal which will be spanned over.



Image 4.10: Irish Rail tracks – looking west from Little Island station

4.3.4 N25 dual carriageway

The N25 dual carriageway running from the Dunkettle junction to Little Island N25 junction 2 at the location of the Proposed Development is illustrated in **Image 4.11**. The proposed crossing location is at the end of the eastbound off ramp, as illustrated on the right of **Image 4.11**. The width of the N25 construction boundary is approximately 50m at the location of the proposed crossing.



Image 4.11: N25 dual carriageway – looking west from junction 2 overbridge

4.3.5 Southern wooded area

Image 4.12 illustrates the entry location of the proposed southern elevated ramp section into the southern wooded area from the Radisson Blu Hotel car park. **Image 4.13** illustrates the dense vegetation and the mesh link fence delineating the boundary between the Radisson Blu Hotel land and other private lands.



Image 4.12: Southern wooded area – looking east from Radisson Blu Hotel car park



Image 4.13: Southern wooded area, illustrating dense vegetation and mesh link fence

4.3.6 Radisson Blu Hotel car park

Image 4.14 illustrates the Radisson Blu Hotel car park. The image is taken looking east from the northwest corner of the car park. Immediately behind the fence to the north of the car park (to the left of **Image 4.14**) is a steep drop off in level into the wooded area behind, with a slope of approximately 1 in 1. To the west side of this car park, there is a line of trees and vegetation which is proposed to be maintained, with the exception of some trees to be cleared on the footway / cycleway alignment.



Image 4.14: Radisson Blu Hotel car park – looking east along proposed alignment



Image 4.15: Tree and vegetation screening on west side of Radisson Blu Hotel car park

4.3.7 Eastgate Business Park car park

The final southern section of the crossing is proposed to travel through the Eastgate Business Park car park, illustrated in **Image 4.16**, and tie in to the proposed Little Island Sustainable Transport Interventions (LISTI) scheme at the location illustrated in **Image 4.17**. At this location, the footway / cycleway will connect to the wider active travel and public transport infrastructure within Little Island. There is a level difference of approximately 1m between the Eastgate Business Park car park and the Radisson Blu Hotel car park.



Image 4.16: East gate business park car park at tie in, looking east



Image 4.17: Tie in to LISTI scheme, looking south

4.4 Main Features of the Proposed Development

4.4.1 Overview

The Proposed Development will consist of a new pedestrian and cyclist bridge that encompasses a segregated footway and cycleway that will be 5m wide (3m two-way cycleway and 2m footway), connecting the Little Island train station and the Dunkettle to Carrigtwohill pedestrian and cycle route with the Radisson Blu Hotel, Eastgate Business Park and the wider surrounds of Little Island. The main elements that will be crossed by the Proposed Development are outlined in Section 4.3. The proposed crossing will be approximately 460m long and will consist of a combination of different structural forms as follows:

- Northern approach ramp: combination of earthen embankment and elevated ramp structure;
- Irish Rail span: concrete portal frame structures;
- N25 span: steel network arch structure; and
- South approach ramp: combination of elevated ramp structure, at grade sections and earthen embankment.

Refer also to the planning drawings in **Volume 3** of this EIAR for further information.

It should be noted that where more than one potential design option has been identified in the sections below, the reasonable worst-case option from an environmental perspective has been assessed throughout this EIAR.

4.4.2 Main bridge spans

The proposed main bridge spans (crossing the N25 and Irish Rail line) consist of a single span steel network arch structure over the N25 and a 2-span precast segmental portal frame structure over the Irish Rail track and adjacent land to the south. The spans of these structures will be approximately 49m (N25) and 2x15m (Irish Rail line). **Image 4.18** and **Image 4.19** are included for illustrative purposes and show examples of similar types of structural forms to those proposed in Little Island.

Foundations for the N25 structure will be set back from the highway on both sides and are expected to be of reinforced concrete piled construction. Foundations for the portal frame structures are proposed to be within the Irish Rail land as illustrated in **Image 4.3**. Foundations for the portal frame structure are yet to be defined but may be shallow foundations or reinforced concrete piled foundations. However, for the purpose of the EIAR and to ensure that a reasonable worst-case has been assessed, it is assumed that reinforced concrete piled foundations will be used.

The N25 span is required to provide a clearance envelope of a minimum of 5.7m to the underside of the structure from the carriageway. The Irish Rail spans are required to provide a clearance height of a minimum of 5.3m to the underside of the structure from the top of the rail level. The elevation of the N25 span, Irish Rail span and the start of approach ramps is illustrated in Drawing No. LIPB-ARUP-ZZ-XX-DR-CB-0004 and Drawing No. LIPB-ARUP-ZZ-XX-DR-CB-0005 in **Volume 3** of this EIAR.



Image 4.18: Example of steel network arch pedestrian and cycle bridge with concrete deck



Image 4.19: Example of segmental precast reinforced concrete porta frame structure over rail

4.4.3 Ramped approaches

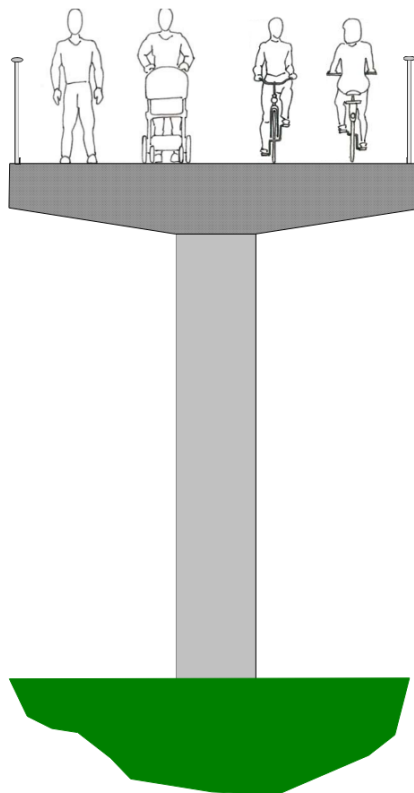
Due to the need for adequate clearance over the N25 and the Irish rail track, as well as the required gradient for approach ramps, the ramp structures for this crossing will be sizeable in scale. A maximum ramp gradient of 1 in 22 is proposed. Ramped approaches will be approximately 160m long to the north and 120m long to the south (made up of two separate ramped sections). In addition to the ramp sections, lengths of at grade walkways / cycleways are proposed to tie in to end points of the crossing at the Little Island train station and the Eastgate Business Park.

The ramp structures will consist of a combination of elevated structures, embankments, landscaping and at grade sections. The southern ramp section between the Radisson Blu Hotel car park and the N25 bridge tie in will be an elevated structure due to the fall off in level to the north and east of the Radisson Blu Hotel car park. An earthen embankment is also proposed on the west side tie into the Radisson Blu Hotel car park due to the level difference. For details of proposed makeup of approach ramps, refer to Drawing No. LIPB-ARUP-ZZ-XX-DR-CB-0004 and Drawing No. LIPB-ARUP-ZZ-XX-DR-CB-0005 in **Volume 3** of this EIAR.

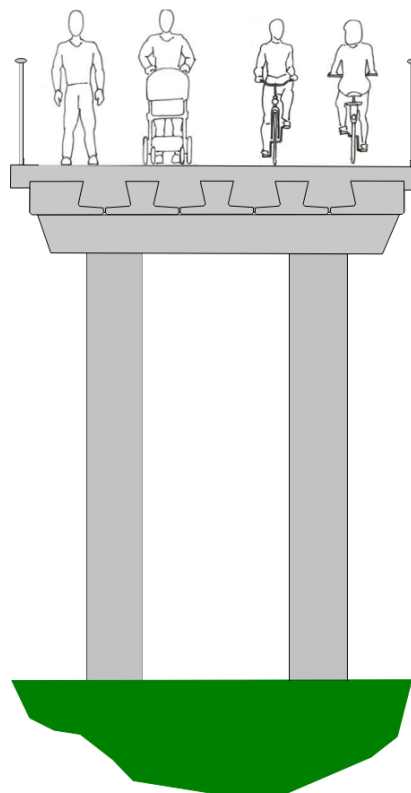
Both elevated ramp structures will use reinforced concrete spans. For the north elevated ramp, a bespoke concrete structure with single piers is proposed. For the southern elevated ramp structure, a precast prestressed bridge beam bridge design with two column piers and crossheads is proposed.

Precast bridge beams such as MY bridge beams are available in single beams with spans of 15-25m, leading to flexibility in design and construction. Once placed on the southern ramp structure, works on the in-situ deck section will be possible from the deck.

Refer to **Image 4.20** for indicative cross sections of both structural forms. **Image 4.21** shows an example of reinforced concrete elevated ramp structure with monopiles / columns (as proposed for the northern approach ramp). **Image 4.22** shows examples of precast prestressed concrete bridge beams for approach ramp elevated structure (as proposed for the southern approach ramp).



**PRECAST CONCRETE
DECK AND CONCRETE
MONO PILES**



**PRECAST CONCRETE DECK AND
DOUBLE CONCRETE PIERS WITH
CROSSHEAD**

Image 4.20: Indicative cross section for reinforced concrete structural forms for elevated ramp structure



Image 4.21: Example of reinforced concrete elevated ramp structure with monopiles / columns (as proposed for the northern approach ramp)



Image 4.22: Precast prestressed concrete bridge beams for approach ramp elevated structure (as proposed for the southern approach ramp)

Ramp embankments are proposed to consist of steepened slope reinforced earth embankment with a green vegetated finish. Refer to **Image 4.23** and **Image 4.24** for examples of similar forms of embankment. Some sections of embankment will have a slackened slope to allow for softening and to provide informal amenity areas within the northern amenity park area.



Image 4.23: Vegetated green wall retaining solution, prior to vegetation growth



Image 4.24: Vegetated green wall retaining solution, following vegetation growth

4.4.4 Parapets

Different parapet types may be utilised for the N25 span and approach ramps and steps. However, any parapet type chosen will meet the requirements of the appropriate design standards. 1.4m high parapets will be required. The parapet type to be used will be confirmed post planning in consultation with CCC, Transport Infrastructure Ireland (TII) and Irish Rail. Two types of steel parapets under consideration are post and rail with steel wire mesh infill (example shown in **Image 4.25**) and vertical post infill at closely spaced centres (example shown **Image 4.26**). The visual impact of both of these parapets is very similar with only infill differing and, as such, they are taken to have similar levels of environmental impact for assessment.



Image 4.25: Parapet type with vertical post and rail and steel mesh infill



Image 4.26: Parapet type with vertical parapet infill

For the span over the Irish Rail track, it is proposed to use the same parapet height (1.4m) and type that will be used elsewhere on the crossing. Using a consistent and open parapet across the structure with adequate levels of lighting will greatly improve the aesthetic experience for the user and help to make the bridge a safe and inviting crossing option. This will in turn encourage greater use and an increased modal shift to sustainable active travel modes.

It is acknowledged that Irish Rail overbridges typically require 1.8m high parapets with the bottom 1.2m having solid infill and the top 0.6m having mesh infill. To mitigate against the reduced height of parapet and ‘open’ type infill, it is proposed that an ancillary solid inclined underbridge protection screen will be used to shield users from the rail and potential future overhead electrical lines. A kicker plate will also be provided along the base of the parapet to prevent debris being kicked off the bridge.

The design approach of this underbridge screening shield is in keeping with international best practice and has been used recently on similar pedestrian and cyclist bridges in the Netherlands and Denmark. Refer to **Image 4.27** for an example of a recently completed bridge in Odense, Denmark, showing the under-bridge screens.



Image 4.27: Example of under bridge screening on new pedestrian and cycle bridge in Odense, Denmark with 1.2m high parapets with vertical bar infill

4.4.5 Foundations

Foundations for all structures, except for the embankments, are proposed to be bored reinforced concrete piles. Piling methods such as Continuous Flight Auger Piles are proposed.

4.4.6 Substructure

The substructures proposed for each structure type are as follows:

- North elevated ramp: pilecaps and single reinforced concrete column / pile piers;
- Irish Rail span: integral portal frames with reinforced concrete substructures on reinforced concrete piled foundations or on shallow spread foundations;
- N25 span: reinforced concrete abutments supported on reinforced concrete piled foundations; and
- South elevated ramp: two pile / column reinforced piers with reinforced concrete crossheads supported on reinforced concrete piled foundations.

4.4.7 Superstructure

The superstructures proposed for each structure type are as follows:

- North elevated ramp: reinforced concrete beam / slab construction. Potential for pre-stressing or post tensioning of structure subject to detailed design. In situ or precast solutions are possible and subject to detailed design;
- Irish Rail span: segmental precast concrete portal frame system with in-situ concrete deck and build up;
- N25 span: steel network arch structure with reinforced concrete or stiffened steel plate deck, subject to detailed design;
- South elevated ramp: precast, pre-stressed concrete beam construction with in-situ reinforced concrete infill. MY bridge beams or similar.

4.4.8 Materials

The primary construction materials to be used for the structure will be:

- In situ reinforced concrete piles, pilecaps, substructures and superstructures;
- Precast concrete superstructure elements;
- Reinforced earth embankments with vegetated green finish;
- Structural steel for network arch structure. This will be painted steel or weathering steel, which will be confirmed at detailed design stage with consideration of the chloride content of the local environment; and
- Painted steel or stainless-steel parapets.

4.4.9 Deck surfacing

Bridge deck surfacing will typically comprise an approved combined anti slip and bridge deck waterproofing system. This is typical for a steel bridge deck. Concrete components may use the same system or alternatively, asphalt surfacing.

The two-way cycleway will be visually segregated from the footway.

4.4.10 Drainage

Subsurface drainage will be implemented in accordance with DN-STR-03012 (TII, 2016). It is proposed that bridge run off will tie into existing drainage networks in the area.

4.4.11 Lighting

Lighting of the proposed structure and embankments will be integrated into the parapets. Lighting will be directional, anti-glare and functional to avoid light spill off the structure, while maintaining a safe feel for users. Lighting will be designed to be inspected and maintained from the structure's deck and will not interfere with the adjacent woodland or stream areas. For approach footways / cycleways off the structures and embankments where no parapets are required, lighting will be provided from lighting poles where existing lighting sources are not adequate.

Refer to **Image 4.28** for an example of lighting typology to be used.

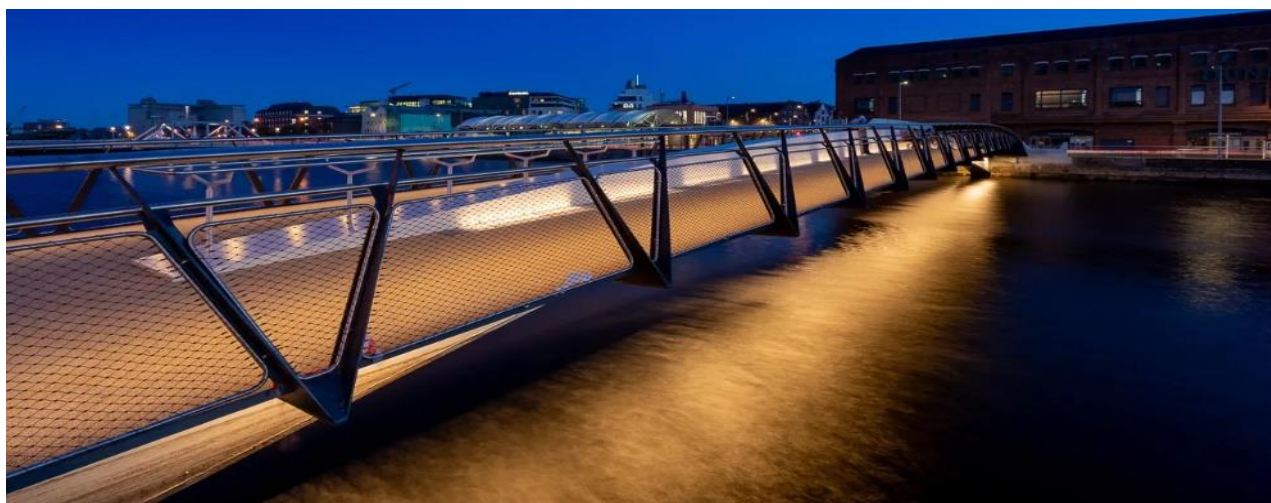


Image 4.28: Example of safety lighting on Mary Elmes footbridge, Cork City

4.4.12 Bridge furniture

Bollards will be provided at bridge entry and exit points to prevent vehicles entering onto the structure. Cycle racks are proposed to be provided at the northeast landing point to the structure. New benches are proposed in the northern amenity park area. Refer to Drawing No. LIPB-BSM-ZZ-XX-DR-L-0001 in **Volume 3** of this EIAR for further details.

4.5 Services and Utilities

The following utility connections are required for the Proposed Development:

- Surface water drainage; and
- Electricity.

There is an existing electrical mini pillar at the southern end of the crossing which is anticipated to provide an electrical connection for the bridge lighting and CCTV, if required.

Surface water drainage on the bridge will be carried at surface level along the structure, with minimum gradients for drainage provided. Collection points at landings, abutments and pier locations, as required, will carry surface water to existing drainage networks.

4.6 Security Fencing

Mesh link fencing in the southern wooded area will be removed during the Construction Phase and replaced following the completion of the construction works within the works area.

Timber fencing along the north of the northern amenity park area will be removed during the Construction Phase. Sections of timber fencing at the proposed footpath connection will not be replaced as per the landscaping design. However, other sections will be replaced.

4.7 Landscaping Strategy

The landscaping strategy is described in more detail in **Chapter 8, *Landscape and Visual***, while the landscape plan and landscape sections are presented in Drawing No. LIPB-BSM-ZZ-XX-DR-L-0001 and Drawing No. LIPB-BSM-ZZ-XX-DR-L-0002, respectively, in **Volume 3** of this EIAR.

Embankments and landscaping will be used on both the northern and southern ramp approaches.

On the southern side of the crossing, the ramp will tie into the car park directly north of the Radisson Blu Hotel. A section of embankment / retaining wall will be required between this car park and the lower Eastgate Business Park car park to the west to tie into the wider LISTI works in Eastgate Business Park.

A green, segmental, reinforced soil retaining structure such as that illustrated in **Image 4.29** and **Image 4.30** is proposed at this location as an environmentally sensitive solution and to minimise land take from the car parks. The same structural form will be used for the embankment forming part of the northern ramp approach. Side slopes on these embankments will be up to 70 degrees. However, sections of these embankments will be provided with less steep slopes to help the embankments soften into the surrounding landscape. Refer to Drawing No. LIPB-ARUP-ZZ-XX-DR-CB-0004 and Drawing No. LIPB-ARUP-ZZ-XX-DR-CB-0005 in **Volume 3** of this EIAR for further information.

The removal of trees and vegetation will be required as part of the site clearance process to facilitate the construction works. The northern amenity park area and sections of the site which have been cleared will be provided with compensatory planting to mitigate against the environmental and biodiversity loss from this clearance. Refer to **Chapter 8, *Landscape and Visual***, Drawing No. LIPB-BSM-ZZ-XX-DR-L-0001 and Drawing No. LIPB-BSM-ZZ-XX-DR-L-0002 in **Volume 3** of this EIAR for further information.



Image 4.29: Vegetated green wall retaining solution, prior to vegetation growth



Image 4.30: Vegetated green wall retaining solution, following vegetation growth

4.8 Safety during Operation

A key objective of the design is to promote use and to help ensure that the crossing feels safe to use and avoids anti-social behaviour, where possible, by design. The following have been incorporated into the design:

- Adequate lighting to ensure feeling of safety for users (refer to Section 4.4.11);
- High aesthetic design to encourage footfall;
- Adequate bins to prevent littering;
- Avoidance of concealed areas, in particular in the northern amenity park area to prevent anti-social behaviour;
- High quality vandal proof parapets;
- Open parapet design to avoid bridge feeling ‘locked in’;
- Kicker plates on the N25 span to avoid falling debris onto the road below; and
- Anti-graffiti paint to allow ease of cleaning and maintenance.

Adequate edge protection will be provided to TII, Irish Rail and Euronorm standards to provide user protection.

4.9 Decommissioning

The design life of the proposed new pedestrian and cyclist bridge is 120 years. During the potential future decommissioning works, it is proposed that the bridge will be removed in a reverse fashion to the proposed construction sequence. Refer to **Chapter 5**, *Construction Strategy* for details on the construction sequence.

The main bridge span and approach spans will be decommissioned by cutting the concrete decking and steel spans into a number of large sections. This will be done either *in situ* or at ground level, with the decking and spans being lifted out by a mobile crane and moveable gantry.

4.10 References

Transport Infrastructure Ireland (TII) (2016). DN-STR-03012 - Design for Durability.