ARUP

South Dublin County Council

Grand Canal to Lucan Urban Greenway

Part 8 Planning

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1. Introduction

The Grand Canal to Lucan Urban Greenway is a joint project between South Dublin City Council (SDCC) and the National Transport Authority (NTA). Arup was appointed in Q4 2021 as a multi-disciplined technical consultant to progress the Grand Canal to Lucan Urban Greenway. The scheme aims to provide a link between the Grand Canal and Lucan Village, providing improved pedestrian and cycle facilities throughout and enhancing links to residential, educational, leisure and commercial areas. Refer to Figure 1.1.

Figure 1.1 Proposed Route

2. Objectives & Policies

2.1 Project Objectives

The purpose of the proposed scheme, as set out by SDCC and the NTA, is to provide a link from Grand Canal to Lucan Village enhancing the pedestrian and cycle facilities from Grand Canal, through Griffeen Valley Park and into Lucan Village. Along with the improvements to pedestrian and cycle facilities, adjustments will be made to existing junctions along the main route and secondary links as part of these improvements. Ultimately when the route is delivered it will help to improve safety, including a reduction in vehicle speeds, and is envisaged that it will contribute towards an increased number of trips in the area by pedestrians and cyclists. The proposed works will tie-into the existing site limits, private and commercial accesses, and junctions along the route.

The scheme objectives are as follows:

- Encourage modal shift to cycle as a safe and convenient means of making local trips (work, school/college, recreational trips, etc) and to create a network of high-quality cycling facilities;
- Develop secondary links in the vicinity of the main scheme that will look to increase the usability of the main route through increasing access and destination options;
- Ensure the delivery of a high-quality cycle route that provides high quality linkage between residential areas and key trip attractors (e.g. schools/colleges, sports clubs, shopping centres) as well as other planned and existing cycle and walking routes;
- Provide a route from Grand Canal bridge at Grange Castle to Lucan Village via the Clonburris Lands, Griffeen Valley Park, Lucan Newlands Road (referred to as Esker Road, Esker Lawns and Esker Hill in the FOSR), and Brookvale public space (referred to as Esker Hill Park in the FOSR) connecting to a boardwalk adjacent to Lucan Road;
- Upgrade junctions where facilities for pedestrians and cyclists are limited or non-existent;
- Significantly improve safety for pedestrians and cyclists in accordance with the NTA Cycle Manual and DMURS.

2.2 Project Related Policies

2.2.1 South Dublin County Development Plan 2016-2022

The aim of South Dublin County Development Plan is to develop sustainable and successful communities across the county through the redevelopment of the established built-up areas and the promotion of compact mixed-use urban villages. The Plan aims to increase the model share for walking and cycling for local trips to work, schools, retail, and leisure. The Plan also aims to enhance safety for all modes of transport in the county.

The proposed the Grand Canal to Lucan Urban Greenway is in accordance with the policies outlined in the South Dublin County Development Plan 2016-2022, in particular those related to; improving connectivity for pedestrians and cyclists within existing communities in order to maximise access to local shops, schools, public transport services and other amenities; Creating a comprehensive and legible County-wide network of cycling and walking routes that link communities to key destinations, amenities and leisure activities, and; to ensure that all streets and street networks are designed to prioritise walking and cycling movements within a safe and comfortable environment for a wide range of ages, abilities and journey types.

2.2.2 National Transport Authority Greater Dublin Area Cycle Network Plan

In 2013, the NTA published the Greater Dublin Area Cycle Network Plan, consisting of the Urban Network, Inter-Urban Network and Green Route Network for each of the seven Local Authority areas comprising the Greater Dublin Area. The plan sets out to create an integrated, comprehensive high quality cycling network, one that is safe, coherent, direct attractive and comfortable.

The Grand Canal to Lucan Urban Greenway forms part of the National Transport Authority Greater Dublin Area Cycle Network Plan and is route 01 in the Cycle South Dublin Programme.

3. Option Identification and Proposed Route

Barry Transportation were previously appointed by South Dublin County Council (SDCC) to develop the 'Feasibility and Option Selection Report for the Canal Loop Urban Greenway'(FOSR). This report detailed the background of the scheme, the route selection process, assessed a variety of options and recommended an Emerging Preferred Route (EPR) for the scheme. Arup were appointed by SDCC in October 2021. Arup prepared an addendum (Addendum – Section 2A Review: Post Non-Statutory Public Consultation) to the FOSR to detail the work done in assessing the feasibility of an alternative route and to detail the new Preferred Route Option (PRO) following the non-statutory public consultation held in March 2021.

Refer to the FOSR and the Section 2A Addendum for options considered as part of the FOSR process, the criteria used to assess the identified route options and the revised Preferred Route Option. The original Emerging Preferred Route and the revised Preferred Route Option are detailed in Figure 3.1 below.

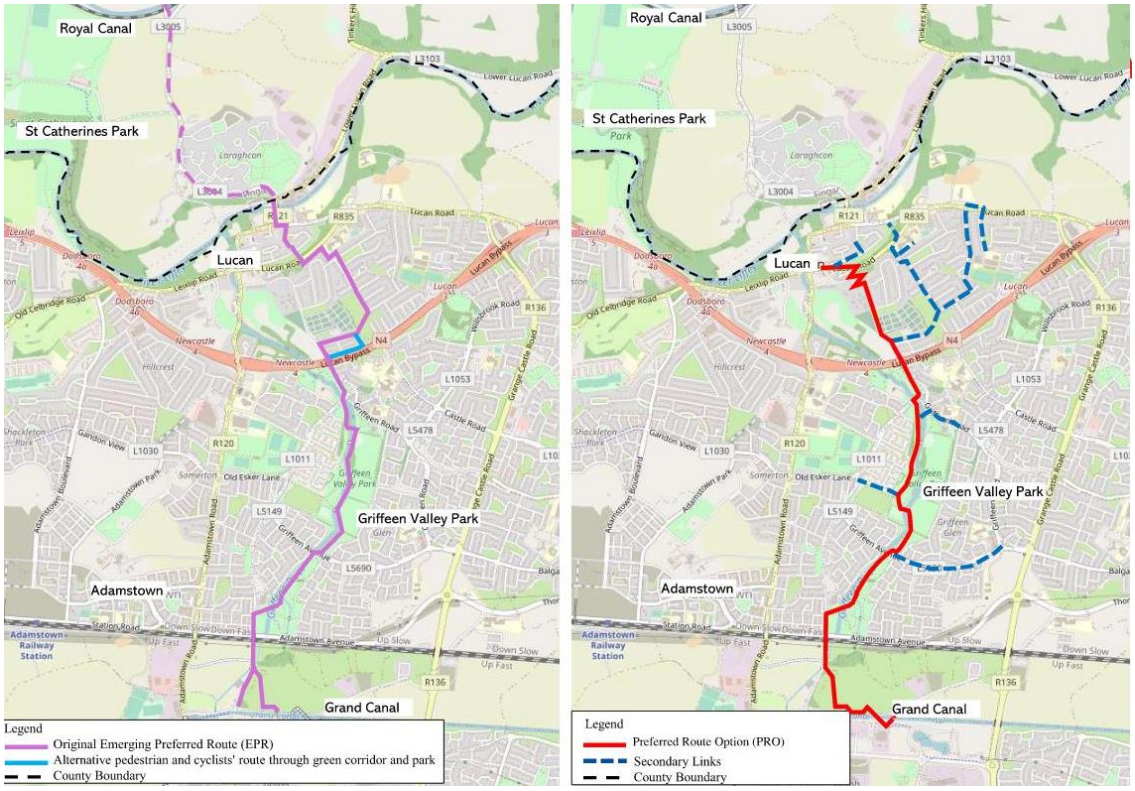


Figure 3.1: Original Emerging Preferred Route and Preferred Route Option

4. Environmental Considerations

JBA Consulting Engineers and Scientists Ltd. (hereafter JBA) were commissioned by SDCC to prepare an Environmental Impact Assessment (EIA) Screening Report, Appropriate Assessment (AA) Screening Report and Ecological Impact Assessment Report for the proposed Grand Canal to Lucan Urban Greenway.

A brief summary of their findings is outlined below.

4.1 Environmental Impact Assessment Screening

The Environmental Impact Assessment (EIA) Screening Report prepared by JBA Consultants determined that the proposed development does not exceed the thresholds that trigger the mandatory requirement for EIA and subsequently the proposed development is deemed to be a sub-threshold development. To determine whether the development may fall under the category of Sub-threshold development, with the potential to give rise to significant environmental effects, a screening exercise was undertaken.

This EIA Screening assessment found that the proposed development is not likely to result in significant negative environmental effects. It is therefore recommended to South Dublin County Council that the proposed development would not be likely to have significant effects on the environment by virtue of its characteristics, location, size or potential impacts and does not require an Environmental Impact Assessment Report to be undertaken.

4.2 Screening for Appropriate Assessment

An AA Screening Report completed by JBA for the proposed development determined that no likely significant impacts are expected as a result of the proposed development. This is due to the small size of the development and the distance and lack of pathways to Natura 2000 sites.

4.3 Ecological Impact Assessment

An Ecological Impact Assessment completed by JBA for the proposed development has outlined mitigation measures to be put in place for the construction phase which will mitigate potential impacts to surface water and ecology. With these mitigation measures in place, no significant impacts will result from the proposed development. A Construction and Environmental Management Plan will be prepared by the appointed contractor, incorporating these mitigation measures.

5. The Proposed Route

The primary route of the scheme from Grand Canal to Lucan Village via Griffeen Valley Park has a total length of 4.2km, of which approximately 3.54km is through parks or other green areas. The majority of the route runs along existing footpaths. As part of design development, a number of secondary links have been identified along existing roads and footpaths to better connect the primary route into the surrounding areas. The secondary links will comprise of small interventions such as the removal of kissing gates, installation of way finding signage, junction tightening, road markings and safe school treatments to improve permeability and access onto the primary route. The combined length of the proposed secondary links which connect to local amenities, primarily schools is approximately 4.29km. The proposed alignment is shown in Figure 5.1 below.

Figure 5.1: Proposed Primary Route and Secondary Links

The varying characteristics of the proposed primary route resulted in the implementation of different active travel provision types that best suit the surrounding area. Existing infrastructure has been utilised as much as practical. There are four locations where existing bridge located within Griffeen Valley park are to be replaced to provide a 4m wide shared surface connection. Additional landscaping and public realm improvements are proposed throughout to enhance the scheme.

The Greenway will be defined by distinct wayfinding markers which will be used to highlight local trip attractors and provide a tool to assist with navigating through the Greenway. Existing wayfinding sign locations will be utilised as much as possible and new signage locations will also be introduced at strategic locations along the route. Wayfinding will be further enhanced by improvements to the public realm and landscaping. It is proposed to replace 'Kissing gates' throughout the extent of the Greenway with cycle friendly alternatives to achieve free-flowing cycling conditions throughout the Greenway.

5.1 Route Sections

The Grand Canal to Lucan Urban Greenway comprises mainly of parkland or low-speed residential roads. The varying characteristics of the proposed primary route resulted in the implementation of different cycling provision types that best suit the surrounding area. In order to best describe the proposed interventions, the route has been subdivided into each eight sections. The works proposed for each subsection are described in the summary below. Figure 5.2 illustrates the approximate location and extent of each section.

Figure 5.2: Proposed Route Sections and Secondary Links

Section 1 – Grange Castle Business Park to Griffeen Valley Park

Starting at the Grange Castle Business Park the Greenway will begin at the Grand Canal Greenway and cross the existing pedestrian bridge into the Clonburris SDZ parklands. The route will utilise the existing pavement in the parklands with minor engineering and landscaping improvements. The parklands currently consist of two parallel paved footways. Each path consists of a width ranging between 2.5 and 3m. Line markings and signage will be used to allocate one of the pavements into a dedicated two-way cycle track. The second path will be maintained for pedestrian use only.

The remainder of this section consists of Hayden's Lane and the existing railway bridge. Due to the low traffic volume and speed of Hayden's Lane it is proposed to retain it as a shared street. No major works are proposed at the existing railway bridge except for minor improvements to improve visibility and safety for users.

It should be noted that the section between Grand Canal and railway bridge will be further developed under the Clonburris Strategic Development Zone (SDZ), SDCC Planning Reference SDZ20A/0021.

Existing public lighting will provide appropriate lighting for this section of the greenway.

Section 2 – Hayden's Lane to Griffeen Avenue

This section of the proposed route, between Hayden's Lane and Griffeen Avenue, is proposed to be upgraded to a 4m wide shared surface. Along most of this section of Griffeen Valley Park, the existing pavement are sufficiently wide to accommodate the proposed shared surface without any major engineering improvements. Surface markings will be used on the shared surface to indicate the shared intent of the path. There are two bridges at this section of the park crossing the local stream, both bridges have an approximate width of 2m. It is proposed to replace these with 4m wide replacement bridges.

Wayfinding signs will be provided at strategic locations that will inform users of the route extents and of local trip attractors. Secondary links off the main route to local schools, sport clubs and leisure centres will be upgraded. 'Kissing gates' at entrances to the park along this section will be replaced with bollards.

Existing public lighting will provide appropriate lighting for this section of the greenway.

Section 3 – Griffeen Avenue

Griffeen Avenue splits Griffeen Valley Park into two sections and forms an important link between the southern and northern section of the park. It is proposed enhance the public areas on either side of the road to create a safe and welcoming environment.

These improvements include opening the boundary wall of the park; providing a park plaza with a resting area and landscaping interventions; converting the existing signalised crossing to a zebra crossing; narrowing of the road to 6m; and raising the road throughout the extent of the park. Construction materials and will be carefully selected in the detail design stage to create a sense of place.

In the existing condition there are three crossings, two uncontrolled crossing points on the eastern and western side of this section and a signalised toucan crossing at the centre. It is proposed to remove the eastern uncontrolled crossing and retain and upgrade the crossing on the western end. To achieve cyclists and pedestrian priority through the road, it is proposed to replace the toucan crossing with a belisha beacon zebra crossing. The existing walking and cycling infrastructure along Griffeen Avenue will be upgraded and connected into Griffeen Avenue proposals.

Existing Public Lighting will provide appropriate lighting on Griffeen Avenue.

Figure 5.3: Griffeen Avenue

Section 4 – Griffeen Avenue to Esker Bridge

The northern section will consist of 4-meter-wide shared surface. The existing pavement along this section ranges between 2 and 2.6 meters, to achieve the desirable pavement widths, existing pavements will need to be widened into the adjacent verge. The widening is designed to minimise impact on tree route systems. New pavement will also be constructed to provide connections through desire lines in the park. The proposed route will cross three existing prefabricated bridges, with widths ranging from 1.5 to 2 meters. The bridges are proposed to be removed and replaced with bridges wide enough to facilitate both pedestrians and cyclists. There are several secondary links to schools, sport clubs and leisure centres proposed along this section.

Wayfinding will be provided by means of signs, landscaping interventions and public realm improvements throughout the extent of this section.

Currently, there is no public lighting provided in the northern section of the park. Lighting will to be provided where necessary through the northern section of the park. Where lighting is to be provided within the vicinity of trees, bat sensitive lighting will be provided.

Figure 5.4: Bridge in Griffeen Valley Park

Section 5 – Esker Bridge to Lucan Newlands Road

This section of the proposed route, between Esker Bridge and Lucan Newlands Road, crosses several environments of varied function. It is the intended to retain the original character and built fabric of the bridge due to its architectural and technical importance. It is proposed to reduce the width of the carriageway at the bridge to 6 meters, provide a new footpath on the northern section and widen the existing footpath on the southern section to a minimum width of 2 meters. Significant consideration was given to the crossing type, because of the constraint nature at this location, it was decided that a 10m wide raised belisha beacon crossing is the most suitable alternative. Part of this proposal is to relocate the westbound bus stop 4611 approximately 20m West.

North of Esker bridge it is proposed to upgrade the existing path to a 4m wide shared surface, the existing pavement is approximately 2m wide, therefore, widening will be required. Some realignment of the path will be required at the approach to Esker Lane to provide for smooth cycling conditions.

No improvements are proposed to the N4 crossing bridge. North of the bridge the existing path is located adjacent to a residential boundary wall. To protect the privacy of residents, it is proposed to remove the existing path and provide a 4m wide shared surface away from the boundary wall.

Public Lighting will be provided in the parklands north of Esker Bridge as there are no provisions in the existing conditions. Where lighting is proposed within the vicinity of trees, bat sensitive lighting will be provided.

Section 6 – Lucan Newlands Road to Esker Lawns

This section consists of Lucan Newlands Road, between Cherbury Park Road and Esker Lawn. It is proposed to upgrade this section to a shared street and provide a series of speed mitigation measures.

Design Manual for Urban Roads and Streets (DMURS) suggests only providing shared streets in low traffic and speed conditions. The low traffic condition is satisfied by the residential nature of the road. To achieve a reduction in driving speeds along Lucan Newlands Road a combination of engineering and landscaping interventions are proposed, these include the following: reduction of carriageway width to 6m; provision of chicanes; planting adjacent to the road; and reduction of corner radii and raised entry treatments on side roads connecting into Lucan Newlands Road. A combination of road markings and signs are proposed to indicate to drivers the shared nature of this street.

The walking facilities on Lucan Newlands Road are of poor quality and there are no provisions for cyclists. Along most of this section the footpath widths are substandard and the large corner radii of side roads result in long crossing lengths. Narrower carriageway and reduced corner radii and raised entry treatment on side roads allows for the provision of consistent and footpaths widths of minimum 2m along the majority of the section.

At the approach to Brookvale the vertical and horizontal road alignment results in poor visibility of the Brookvale entrance for drivers approaching from the east and west. To improve safety for vulnerable road users at this location it is proposed to provide a signal-controlled shuttle system adjacent to the entrance. The shuttle system consists of a 3.5m one-way road where traffic flow is controlled using signals. The space created by the narrowing will be used to widen the existing footpath and create a shared space for pedestrians and cyclists. A signalised toucan crossing will be provided along with dropped kerbs for cyclists to enter and exit the shared space.

Figure 5.5: Lucan Newlands Road

Section 7 – Brookvale

Brookvale forms an important link along the proposed route as it is the connecting link between Lucan Newlands Road and Lucan Village. Brookvale consists of thick vegetation and a steep gradient, with an approximate level difference of 10m.

It is proposed to provide a gently sloped route through Brookvale that takes the form of a 3m shared space with gradients of less than 5% or 1:20 and landings every 10m or 500mm rise and resting places at each turn. Stairs are provided through the centre of route to link up the level landings and provide an alternative route for pedestrians. A landscaping and public realm design have been conducted for this location. Figure 5.6 details the landscaping interventions and park design that integrates this section of the route into the surrounding area.

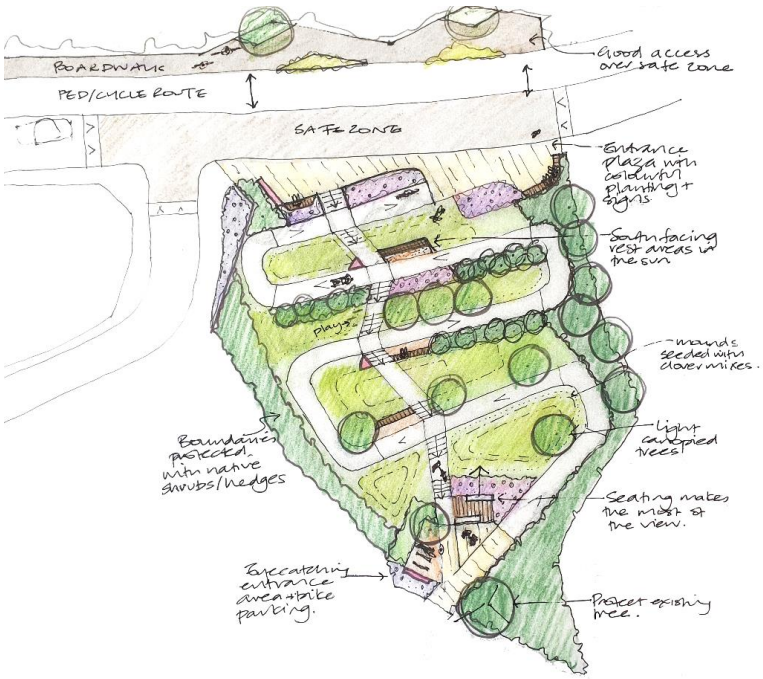


Figure 5.6: Brookvale Conceptual Design

Section 8 – Lucan Road and Sarsfield Park Boardwalk

It is proposed to provide a raised table and toucan Crossing on Lucan Road to provide a link from the base of Brookvale to the boardwalk adjacent to Lucan Road. The boardwalk will serve as a connection to Lucan Village through Sarsfield Park Lane and allow for the shared pedestrian and cycling facility to avoid the constraint area along Lucan Road. A conceptual design for the boardwalk is shown in Figure 5.7 and Figure 5.8. The boardwalk is intended to function as a shared surface and will incorporate existing trees to minimise tree felling. Additional tree planting is proposed to reinforce the treeline to the North of the existing treeline.

Figure 5.7: Brookvale and Boardwalk Conceptual Design

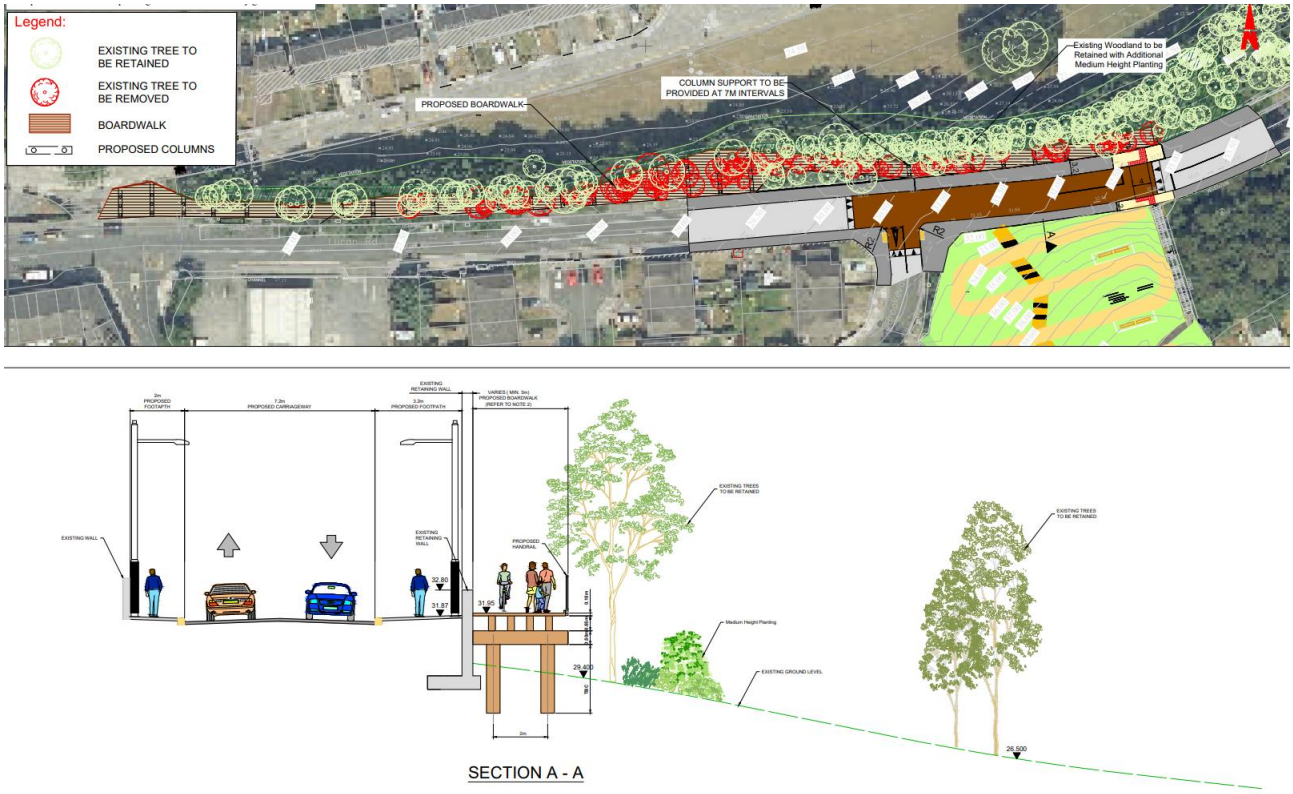


Figure 5.8: Proposed Boardwalk Structural Layout and Cross Section

5.2 Secondary Links

As part of design development, several secondary links have been identified to better connect the proposed route option into the surrounding areas. Some of the secondary links will comprise of small interventions such as the removal of kissing gates, installation of way finding signage, junction tightening, road markings and safe school treatments to improve permeability and access onto the primary route.

These secondary links will increase the usability of the main route and regional connectivity through increasing access and destination options while also providing high quality linkage between residential areas and key trip attractors with a particular focus on connecting schools, colleges, sport clubs, leisure centres as well as other planned and existing cycle and walking routes.

The proposed alignment and inclusions of these routes have been considered in consultation with the destinations (schools or amenity). The proposed alignments are shown in Figure 5.9 below.

Figure 5.9: Proposed Route and Secondary Links

5.2.1 Lucan Road and Lucan Heights

Arup have consulted with the National Transport Authority (NTA), SDCC and the representatives from St. Josephs College. The outcome of this consultation was to improve the infrastructure outside St. Joseph's. Emphasis was given to improving footpath widths, pedestrian crossing and retention of bus layby and school set down space. As part of these improvements, it is proposed to reconfigure the layout of the set-down space by changing the angled parking to parallel and changing the direction of the one-way traffic flow. It is proposed to remove the bus set-down area on Lucan Road and replacing it with a bus layby for school buses and an inline bus stop arrangement for public buses. The existing footpath will be widened to 3m on the northern section of Lucan Road and 2.5m on the section adjacent to the set-down area. The existing island is proposed to be widened to a maximum of 14m and a minimum of 1.5m. In order to accommodate the widening of existing footpath Lucan Road will be locally narrowed to a minimum width of 6m.

On Lucan Heights safe school treatment will be provided in accordance with Safe Routes to School Design Guide.

Refer to Figure 5.10 and see general arrangement drawing 284399-ARUP-ZZ-XX-DR-C-0012 and landscape drawing 284399-ARUP-ZZ-XX-DR-L-0000-REVA V2-L08 for the proposals at Lucan Road and St. Joseph's College.

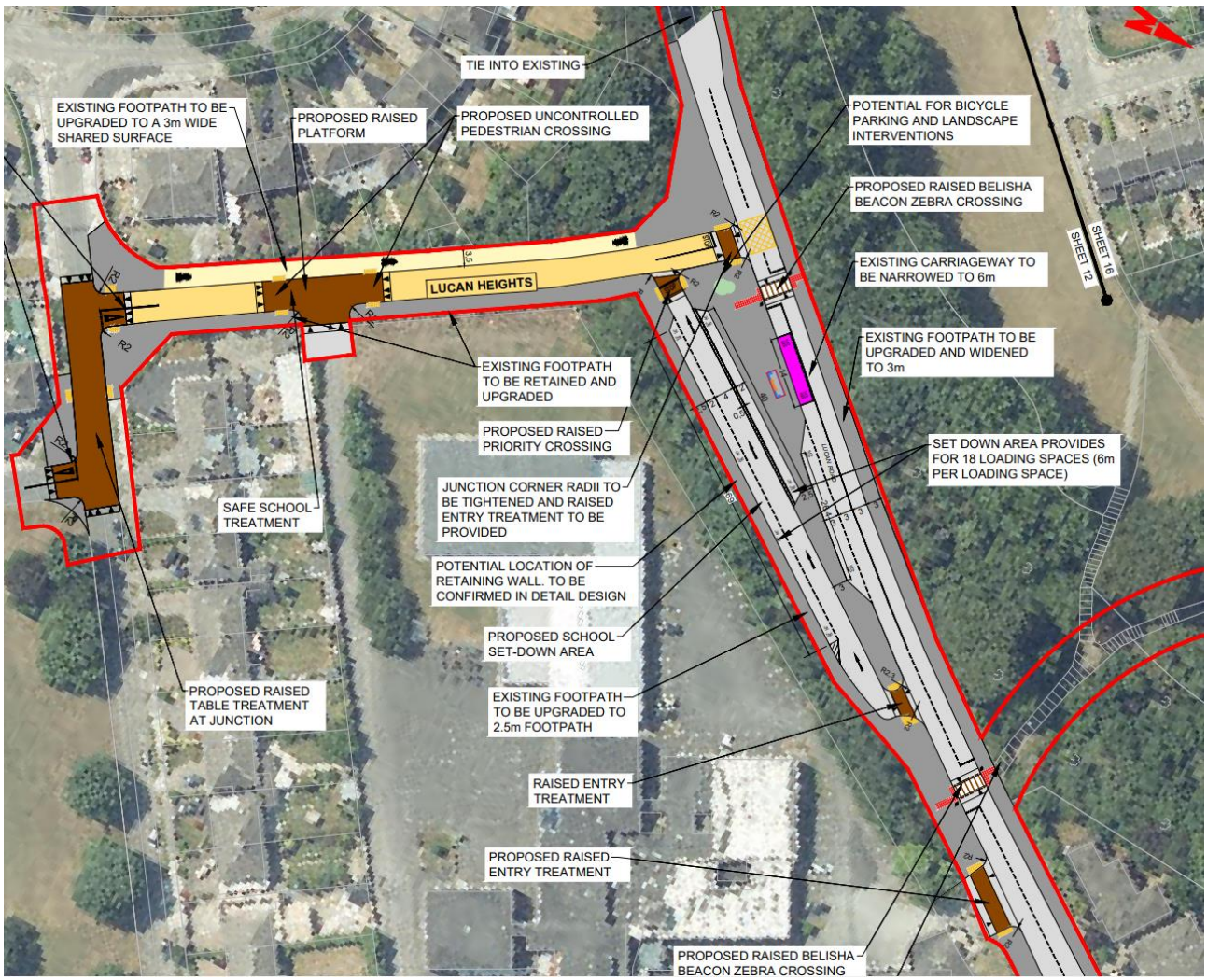


Figure 5.10: Proposed General Arrangement Outside St. Joseph's College

6. Preliminary Design

6.1 Design Standards

Grand Canal to Lucan Urban Greenway has been designed in accordance with requirements and principles outlined in the following standards and guidelines:

- Design Manual for Urban Roads and Streets (DMURS);
- The National Cycle Manual (NCM);
- Safe Routes to Schools Guide (SRTSG);
- The Traffic Signs Manual (TSM);
- Guidance on the use of Tactile Paving;

- TII Publications, and
- Building for Everyone: A universal Design Approach and other guidance's.

6.2 Link Design

The varying characteristics of the proposed route of the Grand Canal to Lucan Urban Greenway resulted in the implementation of several cycling provision types that best suit the surrounding area. Clonburris Parklands, between Grand Canal and the railway bridge crossing, will be developed under the Clonbrurris SDZ developments at a later stage. It is proposed to utilise the existing infrastructure and convert one of the existing pavements into a two-way cycle track for cyclists. The aim for Griffeen Valley Park is to provide an attractive pleasant experience for leisure cyclists while providing a direct and efficient access to local amenities. To achieve this, it is proposed to upgrade an existing path in the park to a 4m wide shared surface. North of N4 bridge crossing, along Lucan Newlands Road, the route enters a low traffic volume residential area. It is proposed to convert Lucan Newlands Road to a shared street. A combination of engineering and landscaping interventions, detailed in Section 5, will be used to reduce driving speeds at this section to provide safe cycling conditions.

Each of the link types are outlined in more detail in the following sections.

6.2.1 Two-way Cycle Track

Section 1.5.2 of the National Cycle Manual (NCM) outlined three basic elements that determine the width of a cycle lane or track, A, B and C below.

- The space to the left of the cyclist
- The space required to support the cycling regime (two-abreast, single file, overtaking etc.)
- The space to the right of the cyclist

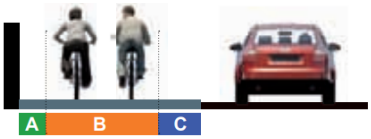
There may also be additional width required depending on topography, traffic, locality etc. The table below provides a simplified means of determining the actual width required for cycle lanes and tracks. Standard wobble room is already built into the values in the table. Where a cycle lane exceeds 3.0m in width, there may be some confusion with traffic lanes and a cycle track may be a better solution.

The proposed 2.5m wide two-way cycle track in Clonburris Parklands satisfies the requirements outlined in table. The cycling regime of the cycle track in Clonburris is a combination of:

Inside Edge A: No option given for vegetation. Will assume 0.25m as for Section C

Cycling Regime B: Basic Two-Way, 1.75m

Outside Edge: Vegetation, 0.25m



A Inside Edge		B Cycling Regime		C Outside Edge		D Additional Features	
Kerb	0.25m	Single File	0.75m	30kph, 3.0m wide lane	0.50m	Uphill	0.25m
						Sharp bends	0.25m
Channel Gully	0.25m	Single File + Overtaking, Partially using next lane	1.25m	50kph, 3.0m wide lane	0.75m	Cyclist stacking, Stopping and starting	0.50m
Wall, Fence or Crash Barrier	0.65m	Basic Two-Way	1.75m	Raised kerb, dropped Kerb or physical barrier	0.50m	Around primary schools, Interchanges, or for larger tourist bikes	0.25m
Poles or Bollards	0.50m	Single File + Overtaking, Partially using next lane	2.00m	Kerb to vegetation etc. (ie. cycleway)	0.25m	Taxi ranks, loading, line of parked cars	1.00m (min 0.8m)
		2 Abreast + overtaking (tracks and cycleways)	2.50m			Turning pocket cyclists	0.50m

Table 6.1: Width Calculator (As per NCM 1.5.2)

6.2.2 Shared Surface

Table 4.1 in DN-GEO-03047 Rural Cycleway Design (Offline) outlined the cross-sectional width requirements for shared surfaces. The standard requires a desirable minimum width of 3m is provided in low volume conditions and 5m in high volume conditions. As part of the design process, it is important to define whether the cycleway will attract low or high volumes of pedestrian/cyclist traffic to give the designer the choice to make an informed decision on cross section dimensions and whether or not segregation of cyclists and pedestrians is necessary. Low volume facilities are those considered to attract less than 1500 users a day and high-volume facilities are those expected to attract greater than 1500 users a day.

The shared surface proposed in Griffeen Valley Park is 4m wide, existing alternative paths provided in the park can also be utilised by pedestrians.

Figure 6.1: Example of a Shared Surface

6.2.3 Shared Street

DMURS and National Cycle Manual (NCM) state that shared streets should only be provided under certain traffic volume and speed conditions, as detailed in Figure 6.2.

The traffic surveys that are described in more detail in section 5.9 concluded that the 85th percentile speed along Lucan Newlands Road is around 50km/h and the traffic volume is approximately 1000 AADT. These conditions satisfy the requirements set out in the NCM for the provision of a shared street. However, it is proposed to further reduce the driving speed along this section by reducing the carriageway width to 6m, installing chicanes and providing landscaping along Lucan Newlands Road.

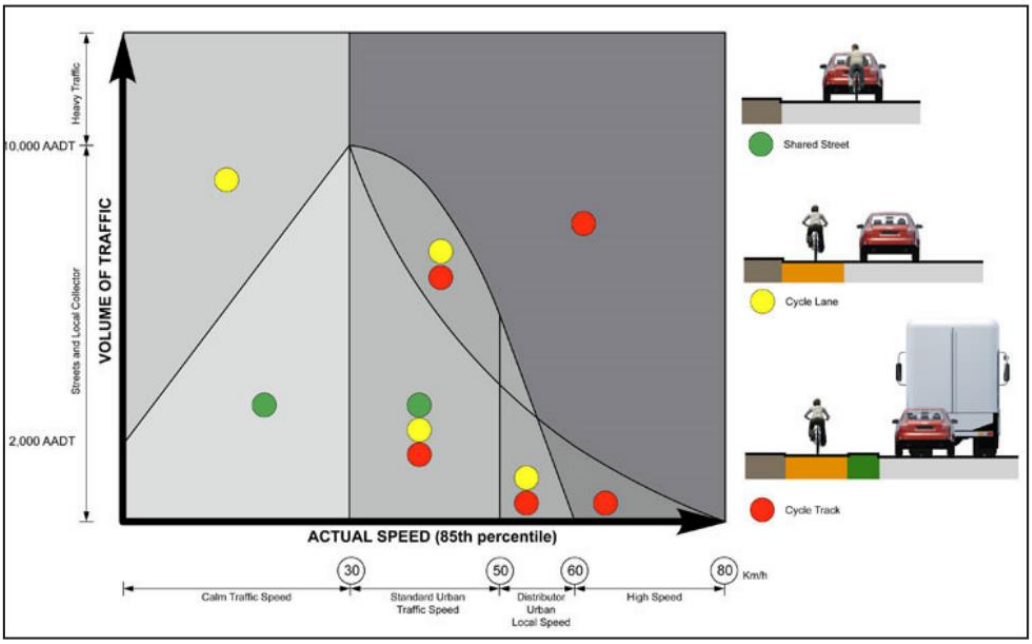


Figure 6.2: Appropriate use of integrated or segregated cycle facilities according to the volume and speed of traffic

6.3 Junction Design

To enhance safety at junctions, it is proposed to "narrow" a number of junctions by reducing kerb-line radii as a means of managing vehicular speeds and reduce crossing distance for active travel users. Raised entry treatment on the adjoining roads and tactile paving at crossings will also be provided.

Figure 6.3 details locations of junction upgrades.

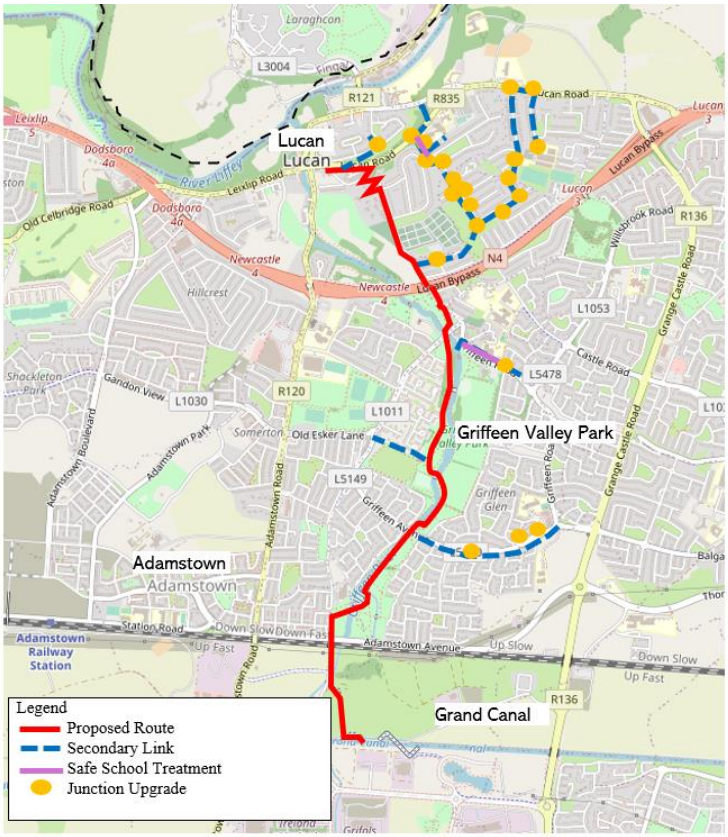


Figure 6.3: Proposed Locations for Junction Improvements

Figure 6.4 below illustrates the principle of reduced kerb-line corner radii from DMURS which reduces cyclist exposure to turning vehicles, narrows pedestrian crossing widths (and times) and overall contributes to slower vehicle speeds.

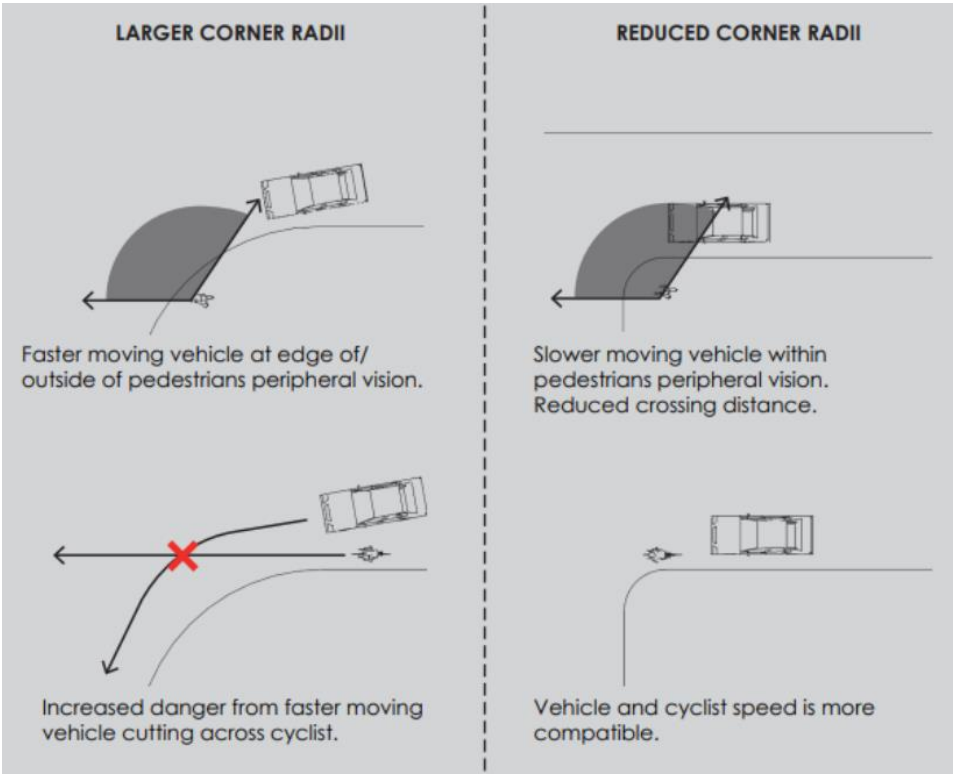


Figure 6.4: Impact of Tighter Corner Radii

Figure 6.5 below illustrates the principle of raised table crossing from DMURS.

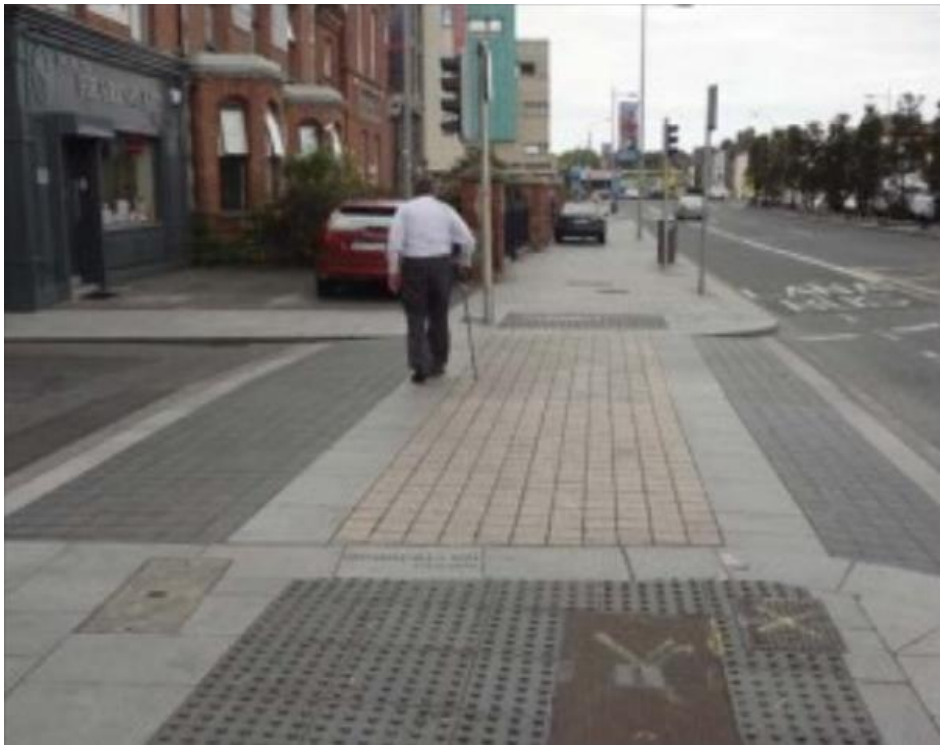


Figure 6.5: Raised Table Crossing

6.4 Proposed Pedestrian Crossings

Three types of crossings have been utilised along the proposed route: controlled toucan crossing, belisha beacon zebra crossing and priority crossing. Tactile paving will be provided at every crossing to advise/warn visually impaired pedestrians.

Additional detail on each of the crossing types is provided in the sections below. It should be noted that an assessment was carried out at each crossing location to determine the appropriate crossing type.

6.4.1 Controlled Toucan Crossing

Controlled toucan crossings have been designed in accordance with TII CC-SCD-05135, National Cycling Manual (NCM) and the Traffic Signs Manual (TSM) and are proposed at three locations along the Greenway – Lucan Newlands Road, Lucan Road and Esker Manor. At the proposed location on Lucan Newlands Road and Lucan Road there are currently no formal crossing facilities. At Esker Manor it is proposed to upgrade the existing crossing to a 4m wide toucan crossing.

Figure 6.6: Controlled Toucan Crossing (as per NCM 4.7.2)

6.4.2 Belisha Beacon Zebra Crossing

Belisha beacon zebra crossings have been designed in accordance with TII CC-SCD-05125, NCM and TSM and are proposed at several locations along the Greenway and secondary. Zebra crossings are preferred over controlled crossings in areas where formal crossings are desirable, however a fully signalised crossing is not needed. It is also proposed to provide raised platforms along with the zebra crossing. This is done to further increase pedestrian priority and ensure drivers slow down at the approach to the crossing. A schedule of locations where belisha beacon zebra crossings are proposed is outlined in Table 6.2.

Table 6.2: Belisha Beacon Zebra Crossing Register

Location	Raised platform proposed (Yes / No)	Existing Condition
Griffeen Avenue – At approach to Roundabout with Griffeen Road	Yes	Standard Priority Crossing
Griffeen Avenue	Yes	Toucan Crossing
Esker Bridge	Yes	No formal crossing provided
Lucan Road – Junction with Lucan Heights	Yes	No formal crossing provided
Lucan Road – West of entrance to St. Joseph's School	Yes	No formal crossing provided
Chapel Hill – At entrance to Sarsfield Park	Yes	No formal crossing provided

Figure 6.7: Example of Belisha Beacon Zebra Crossing

6.4.3 Uncontrolled Crossing

Uncontrolled crossings have been designed in accordance with TII CC-SCD-05123 and proposed in low traffic volume and speed environments such as residential roads. It is proposed to use uncontrolled crossings at locations where side road corner radii are tightened and raised entry treatment proposed along with several other location with existing pedestrian crossing demand.

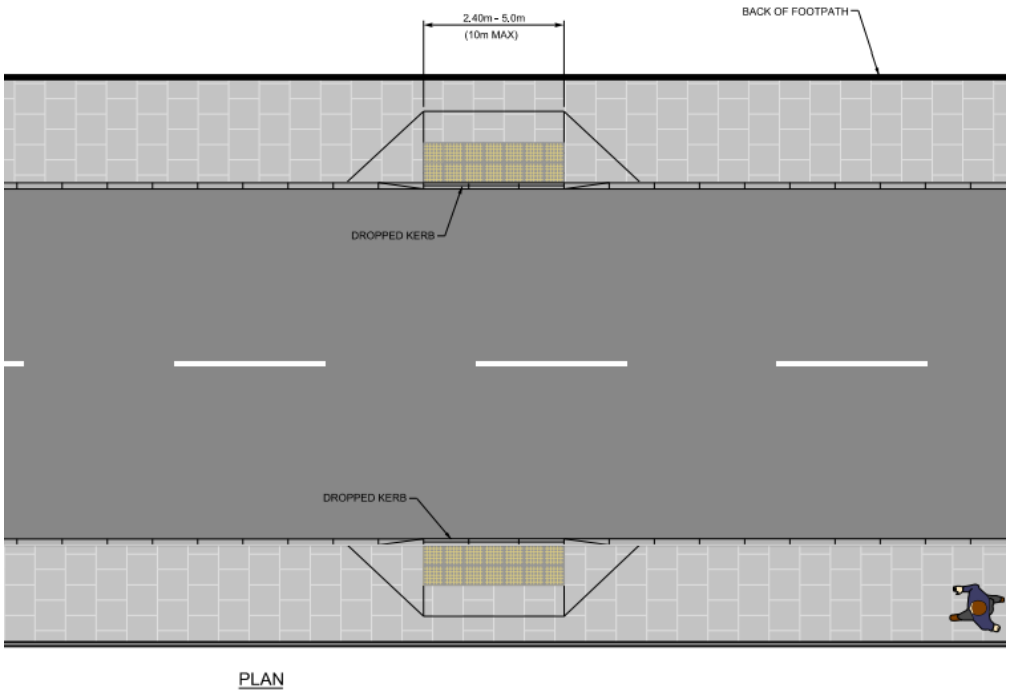


Figure 6.8: Uncontrolled Pedestrian Crossing (TII SCD CC-SCD-05123)

6.5 Stage 1 Road Safety Audit

A Stage 1 Road Safety Audit was carried out during August and September 2022. The Stage 1 Road Safety Audit was carried out in accordance with the requirements of GE-STY-01024 - Road Safety Audit (December 2017), contained on the Transport Infrastructure Ireland (TII) Publications website. The scheme has been examined and the report compiled in respect of the consideration of those matters that have an adverse effect on road safety and considers the perspective of all road users. The accepted recommendations will be incorporated into the scheme during the detailed design phase.

6.6 Existing Services

At the outset of the project, utility providers were contacted to establish existing utility infrastructure including plant and ducting that is located within the route corridor. Further surveys will be carried out to inform the Detailed Design Phase. Any service diversions or protection works will be determined at that Phase. Given the nature of the scheme, which is contained within the existing boundary extents, service diversions are expected to be minimal and proposed junction upgrades will be expected to retain and protected services in situ as part of the proposals. This will ensure a shorter timeframe for construction and minimise disruption to traffic movements.

6.7 Public Lighting

Existing lighting will be retained as part of the proposed scheme and new lighting is proposed in areas where there is currently no lighting provision. See General Arrangement drawings 284399-ARUP-ZZ-XX-DR-C-0000 to 0021_P03 for locations of proposed lighting. As detailed in the Ecological Impact Assessment, any new lighting will be designed to minimise impact on bat species using the site and shall be cognisant of the recommendations outlined in Section 7.2 of the report. The proposed Public Lighting system will be approved by SDCC Public Lighting Department prior to construction and installation.

6.8 Surface Water Drainage

As part of the proposed scheme it is proposed to utilise and retain the existing surface water system, as much as possible, and use it as a connection point for all relocated gullies.

It is also envisaged that existing chamber cover and frames will be removed and reinstalled at new finished levels.

The existing surface water system will be surveyed to determine if its current conditions is appropriate to accommodate the designed runoff rates. It is expected that the existing surface water pipe network is sufficient to cater for the generated runoff, however, it is likely that remedial works, such as cleaning of the networks and repairs will be required. As the scheme is deemed as an upgrade to existing pedestrian and cyclist infrastructure on the road, it is noted that it will not have an increase on the existing designed runoff rates. Additional SuDs will be designed to utilise and connect into the existing surface water network.

6.9 Foul Water

Irish Water existing service records show that there is an existing gravity foul water drainage system within Lower Griffeen Valley Park, Griffeen Avenue, Esker Lane, Lucan Newlands Road, Beech Park, Roselawn, Lucan Road, Sarsfield Park and Chapel Hill. The existing records do not show any existing foul water drainage system within Clonburris Parklands and Cherbury Park Road. Refer to Figure 6.9 below for an extract from Irish water's service record drawings made available to Arup. The proposed scheme will not impact the existing foul water drainage system. However, it is envisaged that existing chamber cover and frames will be removed and reinstalled at new finished levels. A survey of the existing foul water drainage system is proposed to be carried out at detail design stage to determine if service diversion works will be required. In the event where a service diversion is required the works will be carried out cognizant that the existing foul water drainage system shall not be negatively impacted.

Figure 6.9: Irish Water's Existing Foul Water Service Record Drawing

6.10 Water Main

Irish Water existing service records show that there are several ductile iron pipes of different diameter within Griffeen Avenue, Esker Lane, Esker Manor, Lucan Newlands Road, Cherbury Park Road, Beech Park, Roselawn, Lucan Road, Sarsfield Park and Chapel Hill. The existing records do not show any existing watermain within Lower Griffeen Valley Park and Clonburris Parklands. Refer to Figure 6.10 below for an extract from Irish Water's service records drawings made available to Arup. The proposed scheme will not impact the existing water main system. However, it is envisaged that existing chamber cover and frames will be removed and reinstalled at new finished levels. A survey of the existing water main system is proposed to be carried out at detail design stage to determine if service diversion works will be required. In the event where a service diversion is required the works will be carried out cognizant that the existing watermain system shall not be negatively impacted.

Figure 6.10: Irish Water's Existing Water Main Service Record Drawing

6.11 Telecommunications

From Arup's contact with telecoms companies, it was confirmed that Eir, Enet, Zayo and Virgin Media all have existing telecoms ducting located at different sections along the proposed route. Existing telecoms ducting will be protected in place during construction and existing chamber cover and frames will be removed and reinstalled at new finished levels.

6.12 Gas

Gas Network Ireland (GNI) record drawings show there are existing low and medium gas mains in the vicinity of the proposed route. All GNI requirements and technical recommendations will be adhered to during construction of the proposed route and existing gas mains will be protected in place during construction and existing chamber cover and frames will be removed and reinstalled at new finished levels.

6.13 Power

ESB record drawings show there are existing high, medium and low voltage underground and overhead lines in the vicinity of the proposed route. All ESB requirements and technical recommendations will be adhered to during construction of the proposed route and existing ESB infrastructure will be protected in place during construction and existing chamber cover and frames will be removed and reinstalled at new finished levels.

6.14 Land Take

The scheme proposed has been designed to have minimal impact on the surrounding environment and to avoid the requirement for land take where possible. There is no land take proposed as part of the scheme.

The lands known as Brookvale open space (referred to as Esker Hill Park in the Feasibility and Option Selection Report), detailed in Figure 6.11, are not currently under SDCC control and could become within the control of SDCC through a taken-in-charge process. Previously, the Brookvale housing estate's planning application included public open space which was to be taken-in-charge. During the taken-in-charge process, the roads were taken in charge and the open space portion was not concluded, due to the land not being up to SDCC Parks standard and the process was halted. On this basis, SDCC has contacted the owners, William Neville & Sons, who are willing to re-engage with the taken-in-charge process and have no objection to the Grand Canal to Lucan Urban Greenway's Part VIII. After which, the taken-in-charge process will be progressed in advance of starting works.

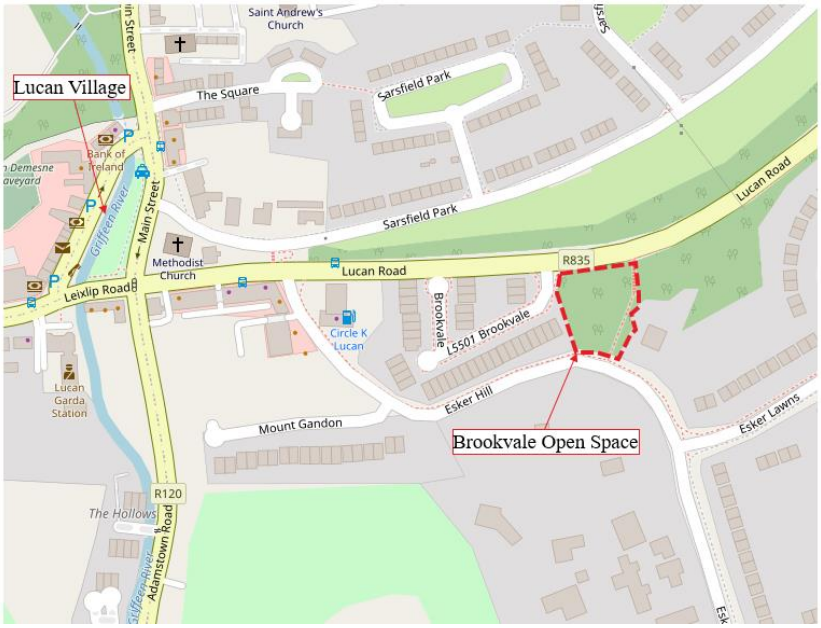


Figure 6.11: Brookvale Open Space (Referred to as Esker Hill Park in the FOSR)

6.15 Parking

Given the nature of the scheme, traversing mainly through existing public parkland, there is little impact on the existing parking facilities along the proposed route.

Upgrades to the set-down area on Lucan Road, outside St Joseph's College, will result in the reconfiguration of the existing set-down area.

There are currently 17 set-down spaces (Between 8:30-9:30 and 13:00-16:00) and 4 parallel parking spaces adjacent to St Joseph's College on Lucan Road. The proposed reconfigured set down area will provide 18 set-down spaces . The 4 existing parallel parking spaces on Lucan Road will be removed and replaced with a new toucan crossing to provide a safe crossing point for students accessing Sarsfield Park. It is noted that additional parking is being provided by the expansion of St Joseph's College Lucan, which is currently under construction.

6.16 Transport Infrastructure

It is proposed to relocate bus stop number 4611, at Esker Bridge, approximately 20m West to facilitate the proposed raised zebra crossing. All other bus stops along the Greenway have been retained. Improvements to the existing bus stop arrangement on Lucan Road, outside St. Joseph's school, are proposed as part of the scheme.

6.17 Traffic Impact Assessment

In general, there will be limited impacts on the existing vehicular traffic on the surrounding road network, however given the nature of the proposals (e.g. reduction in carriageway width, reduction in junction radii and an increase in pedestrian crossings) there will be a slowing of traffic speeds compared to existing, and therefore some increase in journey time will occur. The improvements to pedestrian and cycling infrastructure will encourage a modal shift away from the private vehicle, which should have a corresponding effect on reducing traffic volumes locally.

7. Landscape and Urban Realm

7.1 Overview of Landscaping and Urban Realm

The landscape and urban realm proposal provides a series of interventions along the proposed route which connects the Grand Canal to Lucan Village via the Clonburris Lands, Griffeen Valley Park, Lucan Newlands Road and Brookvale public space connecting to a boardwalk adjacent to Lucan Road, as outlined above in Figure 1.1 (Proposed Route). The overarching landscape proposal looks to create a safe and efficient route for cyclists and pedestrians with a strong sense of identity at important entrances and nodes. This is achieved through a combination of public realm and landscape design interventions which will improve the sense of space, increase potential uses while providing a sense of ownership for existing nearby residential developments.

This new cycle route provides critical cycling infrastructure through Griffeen Valley Park to Lucan Village. New and enhanced public park spaces and public realm improvements at park gateways add placemaking values to Lucan. Swathes of wildflowers and ornamental planting along new and existing tree lines create green buffer strips along the route.

Further landscape treatments include the creation of mounds, seating areas and clusters of trees to enhance views and create focal points. Wayfinding tools are proposed throughout the scheme to help the users in motion navigate the route and enhance the overall experience of the space.

The interventions proposed include subtle changes to landscape management regimes to encourage biodiversity. Site biodiversity will be improved using native and non-invasive adaptive planting, including measures to protect and enhance pollinators as set out in the All-Ireland National Pollinator Plan 2021-2025, through the provision of pollinator friendly planting, wildflower meadows and shade tolerant planting under new and existing trees. The proposed planting scheme will attract wildlife while also creating an attractive space for the users. It will give them an opportunity to enjoy views and resting areas along the route.

Further notable interventions including temporary and permanent land art pieces, a tree top boardwalk, wayfinding proposals (as part of an overall wayfinding strategy), resting areas, new bridges, and plazas. See Landscape Design Drawings and the Artist Impressions for further details on the Outline Landscape Proposals.

7.2 Arboricultural Assessment

An Arboricultural Assessment Report was prepared based on a detailed tree survey along the proposed route and following the requirements of BS5837:2012 *Trees in relation to design demolition and construction – Recommendations.*

The report documents the nature, quality, and condition of existing trees along and adjacent to the route and identifies the likely direct and indirect impact of the proposed development on such trees. It then makes recommendations as to trees that should and/or will need to be removed and identifies trees in relative proximity to the proposed works and construction wayleaves that should be protected during construction, with suitable mitigation measures, as appropriate.

The tree loss to facilitate the construction of the scheme is not considered significant. 91% of the individually surveyed trees will be retained and the number of new trees to be established as part of the landscape design proposal far exceeds the number of trees being lost. See the Arboricultural Report and Drawings for further details.

8. Structures

8.1 Summary of Principal Structures

There are four locations where principal structures are required along the Greenway and are identified as follows;

- River Griffeen Crossing No.1
- River Griffeen Crossing No.2
- River Griffeen Crossing No.3
- River Griffeen Crossing No.4

The following image details how the proposed bridge replacements will look. Each prefabricated bridge will provide a 4m wide shared pedestrian and cycle connection over the river. Further details of which are described in the next sections.

Figure 8.1: Proposed Bridge Design Precedent – 4m wide Shared Pedestrian and Cycle Connection

Figure 8.2: Proposed Bridge Design Precedent - Steel Through-Truss Arrangement Supported on Concrete Abutments

Figure 8.3: Proposed Bridge Design Precedent - Steel Through-Truss Arrangement Supported on Concrete Abutments

8.1.1 River Griffeen Crossing No. 1

A new shared pedestrian and cyclist path is proposed to cross the River Griffeen at the southern section of Griffeen Valley Park, adjacent to Hayden's Lane. The existing 2.1m wide 18m single span bridge is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 18m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigations.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting it in place will minimise any interference with the watercourse. There is sufficient space on the West side of the existing bridge to construct the working platform in a safe location that will not impact the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The superstructure will be lifted out in one go and then dismantled at a suitable location on site before being removed off site. Lifting it out in one manoeuvre will minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

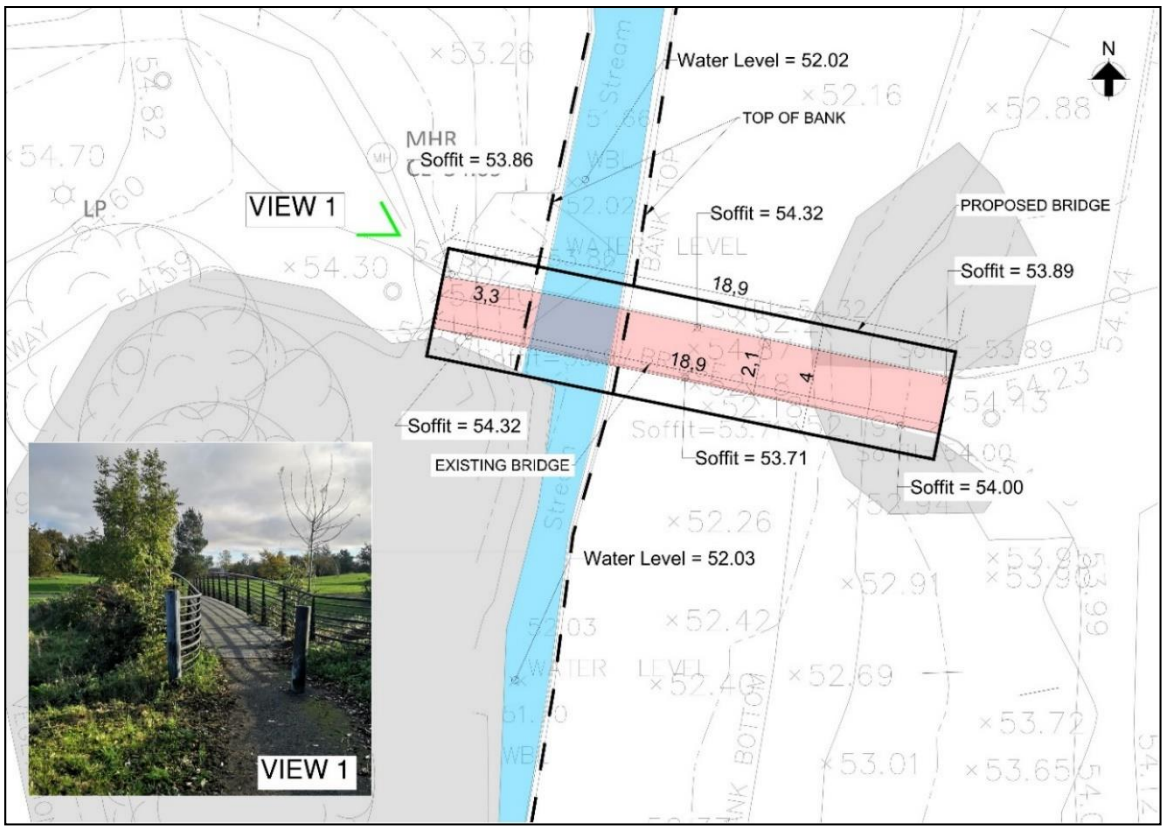


Figure 8.4 Plan View of Existing and Proposed River Griffeen Crossing No.1

8.1.2 River Griffeen Crossing No. 2

A new shared pedestrian and cyclist track is proposed to cross the River Griffeen at the southern section of Griffeen Valley Park, adjacent to Hayden's Park Dale. The existing 2.1m wide with a span of 14.4m is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 14.4m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigation.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting the deck in place will minimise any interference with the watercourse. There is sufficient space on the East side of the existing bridge to construct the working platform in a safe location that will not impact the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The superstructure will be lifted out in one go and then dismantled at a suitable location on site before being removed off site. Lifting it out in one manoeuvre will minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

Figure 8.5: Plan View of Existing and Proposed River Griffeen Crossing No.2

8.1.3 River Griffeen Crossing No. 3

A new shared pedestrian and cyclist path is proposed to cross the River Griffeen at the northern section of Griffeen Valley Park, adjacent to the Dog Run Park. The existing 2.2m wide 22.4m span bridge is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 23.2m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. Soffit levels of the proposals will match that of the existing bridge where possible. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigation.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting the deck in place will minimise any interference with the watercourse. There is sufficient space on either side of the existing bridge to construct the working platform in a safe location that will not impact the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The superstructure will be lifted out in one go and then dismantled at a suitable location on site before being removed off site. Lifting it out in one manoeuvre will minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

Figure 8.6: Plan View of Existing and Proposed River Griffeen Crossing No.3

8.1.4 River Griffeen Crossing No. 4

A new shared pedestrian and cyclist path is proposed to cross the River Griffeen at the northern section of Griffeen Valley Park, adjacent to Esker Manor. The existing 1.4m wide bridge spanning approximately 10.8m is proposed to be replaced with a wider prefabricated bridge to provide for a 4m wide crossing over the river.

The proposal consists of 4m wide 13.8m single span bridge, comprising a steel through-truss arrangement supported on concrete abutments. This configuration minimises the structural depth below deck level, ensuring the superstructure is clear of the design flood level at this location. Soffit levels of the proposals will match that of the existing bridge where possible.

A 1.45m high parapet on the bridge will provide suitable protection for pedestrians and cyclists.

To minimise the environmental impact on the watercourse, where possible it is proposed to retain and modify the existing concrete abutments to carry the additional load of the replacement bridge. A detailed abutment design and bridge replacement methodology will follow the completion of ground investigation.

An offset of approximately 2m from the edge of abutment to Top of Bank (TOB) will provide adequate space to install protective measures to control any accidental discharge or run-off of construction materials down the slope and into the watercourse below.

A temporary working platform will be constructed to support the crane which will be used to both remove the existing bridge deck and lift the replacement deck in place. Lifting the deck in place will minimise any interference with the watercourse. Due to the constrained space, existing trees and vegetation, the weight of the lift could be reduced by erecting the bridge in parts and assembled over the waterway.

This will reduce the size of the crane required and potentially the size of the working platform. The working platform would be constructed on the East side of the existing bridge with mitigation measures put in place to minimise impact to the existing vegetation and the watercourse.

In order to remove the existing bridge the superstructure will be dislodged from the abutments. The bolted connection will be disconnected in the reverse order as to how it was installed. If required, these connections can be locally broken out and the concrete can be repaired if it the support is to be reused. The preferred option for removing the existing bridge would be to lift the superstructure out in one go and then dismantled at a suitable location on site before being removed off site. However, similar to the proposed construction methodology the existing superstructure could be dissembled in parts before being lifted out and removed off site. If it were to be dismantled in parts suitable mitigation measures would be put in place to minimise any interference with the watercourse.

A Construction Environmental Management Plan (CEMP) will be prepared in conjunction with the appointed contractor to agree appropriate additional environmental mitigation measures to ensure the watercourse is protected.

The steel decking will be finished with a combined waterproofing / anti-slip surfacing.

No additional structures are required either end of this bridge, as the shared path approaches at grade.

Figure 8.7: Plan View of Existing and Proposed River Griffeen Crossing No. 4

8.1.5 Sarsfield Park Boardwalk

A new boardwalk serving pedestrians and cyclists is proposed in Sarsfield Park spanning longitudinally adjacent to Lucan Road. The boardwalk will provide a connection to Lucan Village through Sarsfield Park Lane and avoid the constraints along Lucan Road. The proposals consist of an approximately 340m long boardwalk of varying width, with a minimum width of 3m achieved throughout its length and average gradient of 3.5%.

The concept design for the boardwalk was developed by the Landscape Architecture team at Arup with the intention to provide a visually unintrusive design that blends in with the local environment. To minimise the environmental impact of the boardwalk it is intended to incorporate some existing trees into the structure. A conceptual design of the boardwalk is shown in Figure 8.8 and proposed layout and section is detailed in Figure 8.9.

To provide the boardwalk, accommodation works will be required to the existing stone wall on Lucan Road and the access ramp and stairs on the western end, across from Lucan Newlands Road.

Figure 8.8: Proposed Boardwalk Layout

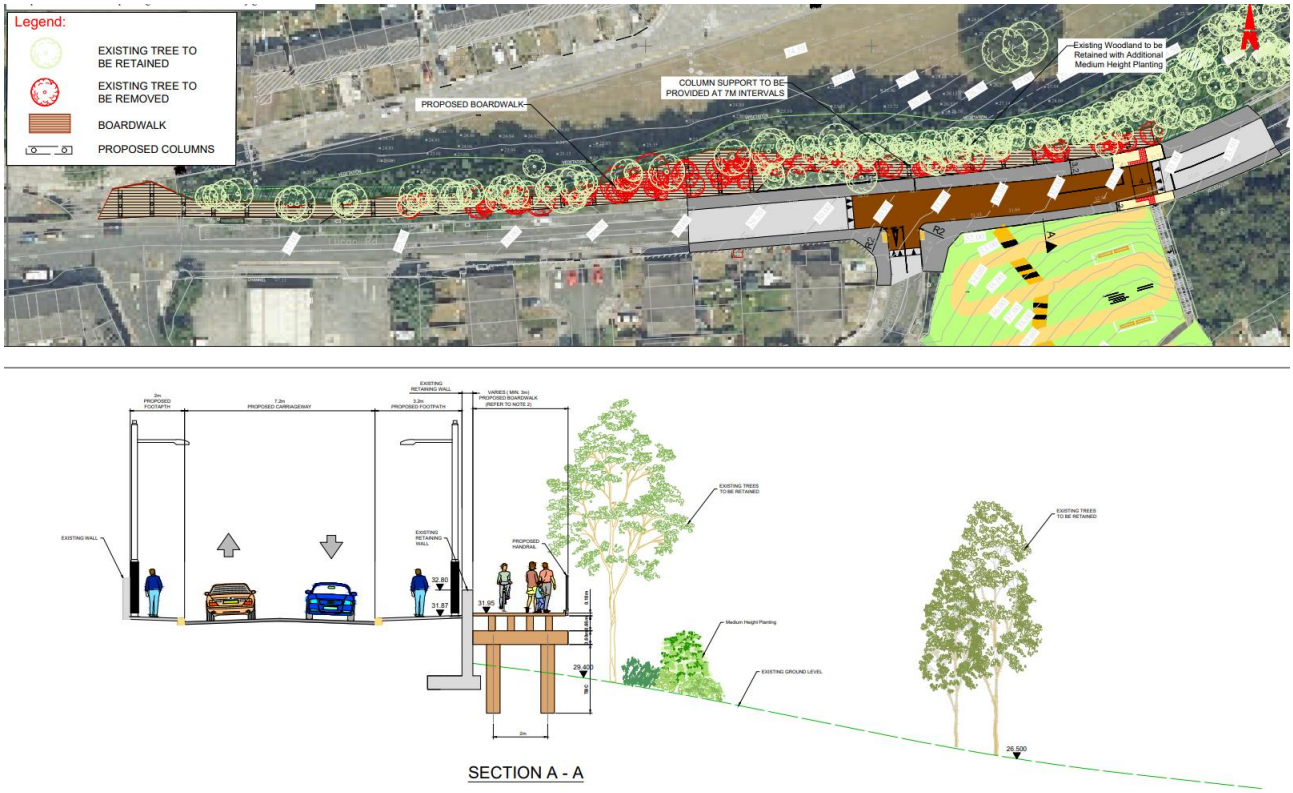


Figure 8.9: Proposed Boardwalk Structural Layout and Cross Section

9. Cost Estimate

The estimated scheme infrastructure cost is anticipated to be in the order of €9.8 to €12.2M. This Cost Estimate includes the 4.2km primary route, 3.9km of secondary links, 29 junction upgrades, 4 bridge replacements, a 690m² boardwalk and landscape interventions throughout the route.

The cost estimate includes the following:

- 10% for preliminaries;
- 5% for Traffic Management;
- 7.5% for inflation;
- 20% contingency; and
- 13.5% VAT on Construction, Traffic Management and Associated Adjustments Costs; and
- 23% VAT on Preparation and Administration Costs and Associated Adjustment Costs.

The total construction cost before these percentages are calculated is €7.3M. A detailed cost estimate is included in Appendix A of this report.

10. Summary

10.1 Pedestrian, Cyclists & Vehicular Traffic

The proposed scheme will deliver a safe, accessible route for pedestrians and cyclists with a minimum of 2m wide footpath, 4m wide shared surface or segregated cycle facilities provided along the route. New and improved crossings will allow pedestrians to cross the road in a safe manner. Facilities for those with visual impairments will be significantly improved, with tactile paving, flush kerbs and raised crossing provided throughout on side roads and development access points.

The provision of high-quality cycling infrastructure will provide an enhanced route for cyclists of all levels linking many residential, educational, and commercial areas. This will offer an attractive option for new and existing cyclists who wish to use the route rather than motorised method of transport. Improved cycling facilities and landscaping and public realm improvements will attract more people to Griffeen Valley Park and its amenities.

In general, there will be limited impacts on the existing vehicular traffic on the surrounding road network, however given the nature of the proposals (e.g. reduction in carriageway width, reduction in junction radii and an increase in pedestrian crossings) there will be a slowing of traffic speeds compared to existing, and therefore some increase in journey time will occur. The improvements to pedestrian and cycling infrastructure will encourage a modal shift away from the private vehicle, which should have a corresponding effect on reducing traffic volumes locally.

10.2 Environmental Impacts

As described in Section 4, it is not expected that the proposed scheme will have a significant impact to the receiving environment.

An arboricultural assessment has been undertaken based on the preliminary design and the expert advice from the arborist was used to amend the design to minimise environmental impacts and to outline any mitigation and protection measures required during the construction stage.

The tree loss to facilitate the construction of the scheme is not considered significant. 91% of the individually surveyed trees will be retained and the number of new trees to be established as part of the landscape design proposal far exceeds the number of trees being lost.

10.3 Conclusions

The Grand Canal to Lucan Urban Greenway will establish a safe and continuous cycling and walking route between the Grand Canal and Lucan Village with new and improved crossings and universal access for all.

The highlights of the Greenway include;

- Vulnerable road users shall be catered for throughout by formalising crossing facilities in the form of raised tables on side roads and minor access roads;
- Six new belisha beacon zebra and three toucan crossings are proposed to replace existing crossings and provide new crossing facilities for pedestrians and cyclists along the route
- A 4m wide shared surface route throughout Griffeen Valley Park
- Four bridges replacements will be provided throughout Griffeen Valley Park which will ensure a consistent level of service throughout the route
- Public realm and landscape improvements throughout the route
- A shared street along Lucan Newlands Road accompanied with speed reduction measures will provide a safer route for both pedestrians and cyclists
- A new gently sloped path in Brookvale will create a cycling and walking link between Lucan Newlands Road and Lucan Road along with public realm and landscape improvements
- A new boardwalk sensitively worked into the existing landscape will provide a link from Lucan Road to Lucan Village

Appendix A

Cost Estimate

Updated Preliminary Cost Estimate Template

NOTE: For Band 3 Projects the activity cost heads presented are the minimum expected for a linear road project and are to be proposed, discussed and agreed in writing with NTA prior to production of the cost estimate.

Project Title:	Grand Canal to Lucan Urban Greenway		
Project / Contract Code:	284399-00	Prepared By (Individual/Organisation):	Arup
Approving Authority:	SDCC	Date Estimate Prepared:	28/7/2022
Sponsoring Agency:	NTA	Base Date of Estimate:	Q3 22

Project Information

Mainline Cross-Section Type:	Shared Surface / Shared Street	Average Link / Side Road Width (m):	N/A
Location:	Lucan, Dublin	Cyclepath Included (Y/N):	Y
Total Mainline Length (m):	4200	Footway Included (Y/N):	Y
Total Mainline Width (m):	N/A	Hardstrip Included (Y/N):	N
Total Link / Side Road Length (m):	3900	Central Reserve Included (Y/N):	N
Potential Start Date:	Q4 2022	Anticipated Duration (Months):	12
Other Relevant Project Information:			

1 Construction Costs

Ref	Description	Total
1.1	Site Clearance	€ 165,000.00
1.2	Fencing	€ 27,500.00
1.3	Road Restraint Systems	€ -
1.4	Drainage & Service Ducts	€ 100,000.00
1.5	Earthworks	€ 460,860.00
1.6	Pavements	€ 4,340.00
1.7	Footways & Kerbing	€ 584,356.00
1.8	Traffic Signs & Road Markings	€ 75,000.00
1.9	Road Lighting	€ 353,000.00
1.10	Structural Concrete (Including Structures Generally)	€ 3,760,000.00
1.11	Accommodation Works	€ -
1.12	Works for Statutory Undertakers	€ 200,000.00
1.13	Landscaping & Ecology	€ 370,000.00
1.14	Other Project Costs	€ 592,000.00

Ref	Description				
1.15	Preliminaries including site compound costs (excluding traffic management) - % applied to base costs	10%	%	€ 6,692,056.00	€ 669,205.60
				Sub-Total A - Construction Costs	**€ 7,361,261.60**

2 Preparation and Administration

Ref	Description	Quantity	Unit	Rate	Total (€)
2.1	Preparation and Administration Costs				€ 553,338.00
2.1.1	Scope & Purpose				€ -
2.1.2	Concept, Development & Option Selection	1		€ 165,904.00	€ 165,904.00
2.1.3	Preliminary Design	1		€ 145,502.00	€ 145,502.00
2.1.4	Statutory Processes	1		€ 52,142.00	€ 52,142.00
2.1.5	Detailed Design & Procurement	1		€ 94,895.00	€ 94,895.00
2.1.6	Construction & Implementation	1		€ 94,895.00	€ 94,895.00
2.1.7	Close Out & Review				€ -
				Sub-Total B - Preparation and Administration Costs	**€ 553,338.00**

3 Traffic Management Related Costs

Ref	Description	Quantity	Unit	Rate	Total (€)
3.1	Traffic Management (TM) Related Costs	5%	%	€ 7,361,261.60	€ 368,063.08
				Sub-Total C - Traffic Management Related Costs	**€ 368,063.08**

4 Land and Property Costs

Ref	Description	Quantity	Unit	Rate	Total (€)
4.1	Properties		Nr		€ -
4.2	Garden Ground		Ha		€ -
4.3	Industrial Development Land		Ha		€ -
4.4	Amenity Land / Open Space		Ha		€ -
4.5	Residential Development Land / Urban		Ha		€ -
4.6	Agricultural Land		Ha		€ -
				Sub-Total D - Land and Property Costs	**€ -**

5 Adjustments

Add Inflation	8%	%	€ 8,282,662.68	€ 621,199.70
Add Project Specific Risk *(Output From QRA - 013_B23_QRA_CMG)*	1	Item		€ -
Add Contingency *(001_B123_CC_CMG)*	20%	%	€ 8,903,862.38	€ 1,780,772.48
			Sub-Total E - Adjustments	**€ 2,401,972.18**

Total Updated Preliminary Cost Estimate Exclusive of VAT				**€ 10,684,634.86**
VAT *on Construction, TM and Associated Adjustments Costs*	13.5%	%	€ 10,131,296.86	**€ 1,367,725.08**
VAT *on Preparation and Administration Costs* and Associated Adjustment Costs	23%	%	€ 553,338.00	**€ 127,267.74**
VAT *on Land and Property* https://www.revenue.ie/en/vat/vat-on-property-and-construction/vat-and-the-supply-of-property/index.aspx	1	Item		€ -
Total Updated Preliminary Cost Estimate Inclusive of VAT				**€ 12,179,627.67**

Mainline Length	4.2 Km	**Rate Per Km (Excluding VAT)**	**€ 2,543,960.68**
		Rate Per Km (Including VAT)	**€ 2,899,911.35**

Source of Cost Data *(Please provide a brief narrative on the source of cost data in the box below)*

Revision	Title	Prepared By	Checked By	Issue Date

NOTE:
Costs are considered to include allowances for overheads and profits.
Costs are reflective of costs at the base date stated above.
VAT is not applicable to all land and property therefore it is not appropriate to apply a uniform percentage. The value associated with VAT on land and property is to be determined on an individual basis and included as a lump sum.