

The Lake Lothing (Lowestoft) Third Crossing Order 201[*]



Lake Lothing
**THIRD
CROSSING**

Document SCC/LLTC/EX/17: Updated Draft Design Guidance Manual

Revision 1

Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure)
Regulations 2009

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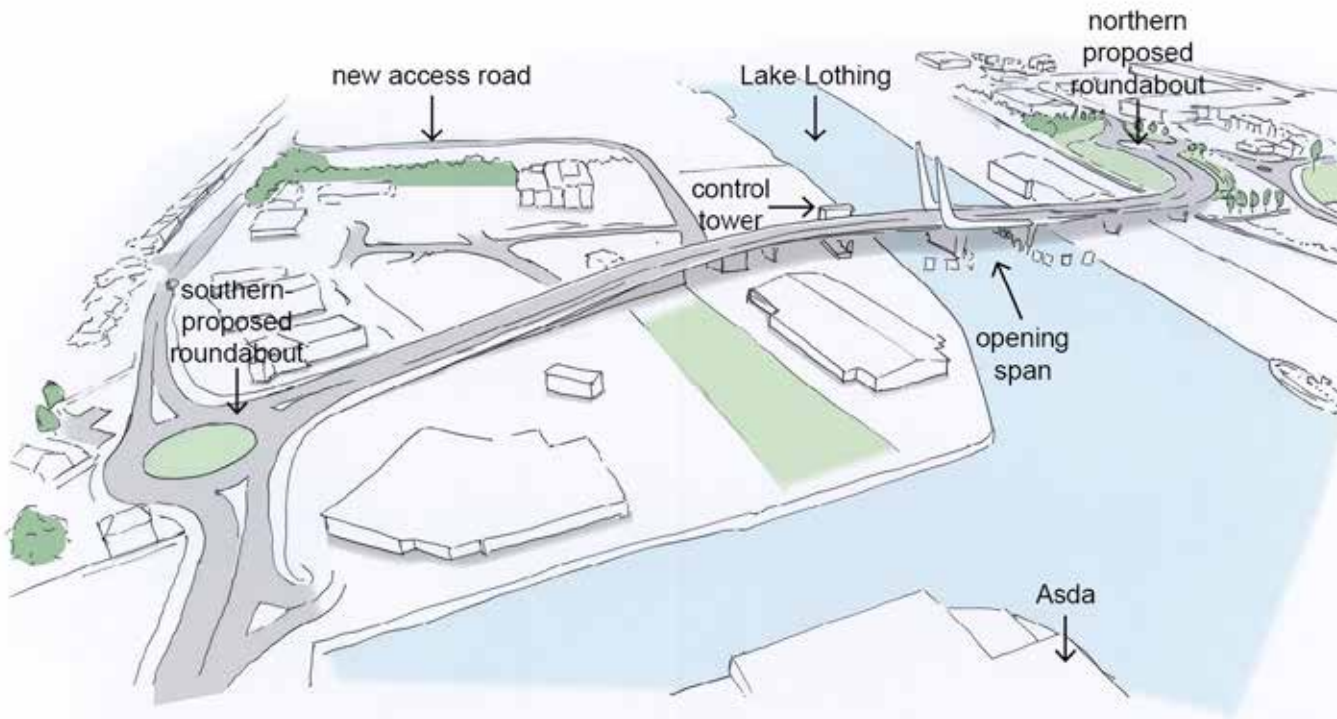


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**THIRD
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The Lake Lothing (Lowestoft) Third Crossing Order 201[*],
Lowestoft Development Consent Order 201[*]

**Document SCC/LLTC/EX/17:
Updated Draft Design Guidance Manual (R1)**

Revision	Status	Prepared by / date:	Checked by / date:	Approved by / date:
R0	DRAFT - FOR DCO SUBMISSION	ZS June 2018	MJ June 2018	JB June 2018
R1	FOR DCO EXAMINATION - DEADLINE 3	ZS January 2019	MJ January 2019	JB January 2019



The draft Development Consent Order includes a requirement that the Scheme is to be designed and implemented in general accordance with the General Arrangement plans and the Design Guidance Manual.

The Design Guidance Manual is being developed by the Applicant in consultation with Waveney District Council and Suffolk County Council. The Applicant's intention is to continue to develop the Design Guidance Manual to reflect those discussions such that a final version will be submitted prior to the close of the Examination.

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Chapter 1

Introduction

- 1.1 Purpose of the Design Guidance Manual
- 1.2 The Vision
- 1.3 The design narrative
- 1.4 Structure of the Design Guidance Manual

1.1 Purpose of the Design Guidance Manual

Development consent is sought for a reference design for the Scheme, with the parameters within which the Scheme may be constructed controlled spatially by the draft Development Consent Order (DCO), in particular Limits of Deviation, and the associated plans.

However, the Applicant, in line with the National Networks National Policy Statement (NNNPS), is also committed to ensuring that an effective design process, and the delivery of good design, is carried through to the detailed design and operation of the Scheme.

The Applicant's approach to embedding good design in the development of the Scheme proposals to the stage of reference design is set out in the Design Report (DR) (document reference 7.5).

The Design Guidance Manual (DGM) provides a vehicle to ensure the Vision and design narrative developed during the pre-application process is carried through to the detailed design stage.

The DGM therefore sets out across a range of topic areas where the design is fixed, by virtue of the requirements of the DCO, associated plans and parameters assessed by the Environment Statement, and where there remains some flexibility to refine the design in accordance with the Vision. In the case of the latter, direction, but not prescription,

is given on how the design narrative should be carried through these elements in to the detailed design.

The draft DCO requires the Scheme to be designed and implemented in general accordance with the Design Guidance Manual.

It should however be noted that there are parallel technical clearance processes to go through, notably Approval in Principle from both Network Rail as Technical Approval Authority for railways and Suffolk County Council as Technical Approval Authority for highways. Additionally, the Applicant will have various obligations associated with the Protective Provisions in the DCO, which are likely to also have a bearing on elements of the detailed design of the Scheme.

1.2 The Vision

As explained in the DR, the Vision for the Scheme is the collective ambition and intent captured by the aim, objectives, design principles, and the design narrative. The Vision has been prepared through collaboration with the Local Planning Authorities (LPAs), Waveney District Council and Suffolk County Council. The Vision defines strategically what the Scheme aims to deliver for Lowestoft, and what the design will bring to the surrounding context as a 'place'.

The aim:

To stimulate regeneration, sustain economic growth, and enhance Lowestoft as a place to live and work in, and to visit.

The objectives:

- To open up opportunities for regeneration and development in Lowestoft.
- To provide the capacity needed to accommodate planned growth.
- To reduce community severance between north and south Lowestoft.
- To reduce congestion and delay on the existing bridges over Lake Lothing.
- To reduce congestion in the town centre and improve accessibility.
- To encourage more people to walk and cycle, and reduce conflict between cycles, pedestrians and other traffic.
- To improve bus journey times and reliability.
- To reduce accidents.

The design principles:

The Lake Lothing Third Crossing will improve connectivity for everyone in Lowestoft; it will be symbolic of Lowestoft rising to meet the aspirations for economic prosperity and embrace the proud maritime history of the town.

- The Scheme shall enhance the identity, culture, character, and nature of Lowestoft and make a positive aesthetic and actual contribution to the conservation and enhancement of Lowestoft's natural, historic and built environment
- The design shall acknowledge its role in place making and promoting regeneration particularly through its relationship to adjacent land
- There shall be a cohesive design narrative bringing together the distinct elements of the Scheme, the primary and secondary structures, including the control tower
- The design shall respond to the external constraints imposed by statutory bodies and internal constraints including capital and maintenance costs
- The Scheme shall result in a positive user experience for all users, be it vehicular, pedestrians, cyclists or less abled individuals, and water borne vessels through its own design and its practical connectivity to the existing network.
- The design shall strive to minimise impacts on amenity and seek sustainability in its use of materials, and inclusion of multi-functional green infrastructure which encourages health and wellbeing.

1.3 The design narrative

Through ongoing engagement with officers from the LPAs during the development of the reference design, a design narrative was established for the Scheme. This provides a theme or approach to design applicable to the Scheme as a whole, key components of the design, and in the detailing. The narrative responds to the local context and emerging industries in the town, providing a concept that provides continuity and innovation to the components of the design.

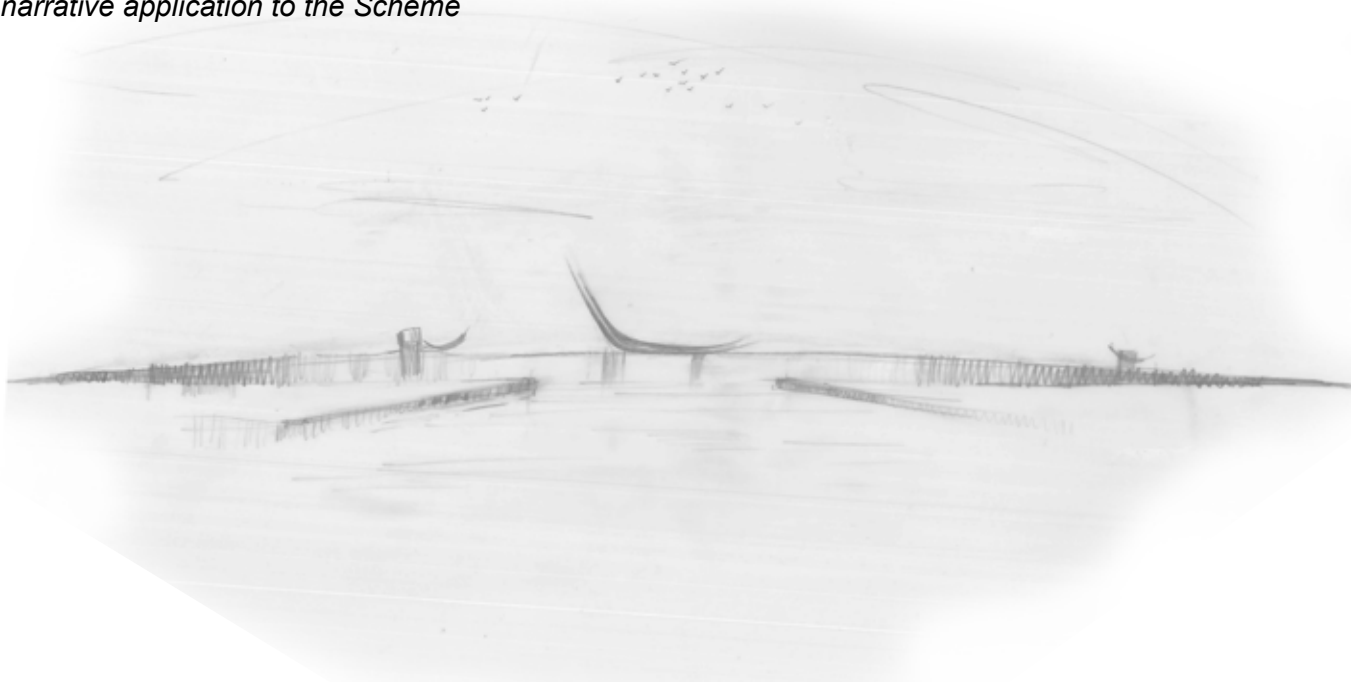
The term 'marine tech' was coined to describe the design narrative for the Scheme. This concept is manifested in the design, particularly of the opening mechanism, through the reflection of invisible forces enabling movement of a contemporary, sleek form - as seen on the wind turbines offshore and the onshore turbine 'Gulliver' at Ness Point.

The design narrative captures the functionality and durability of Lowestoft's working port, with the simplicity and elegance of the innovative technology resting temporarily upon it. It is this harmony of pure functionality and innovation that inspires the design for the Scheme.

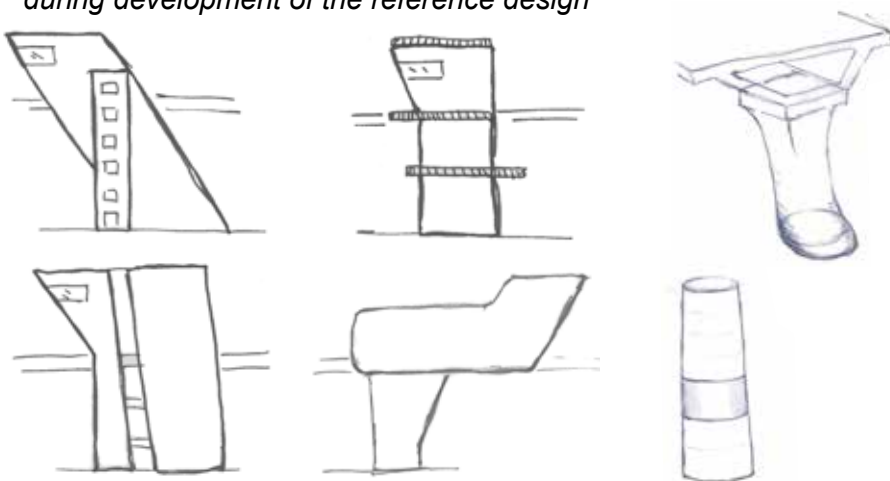


The Port of Lowestoft: Image courtesy of Sembmarine SLP

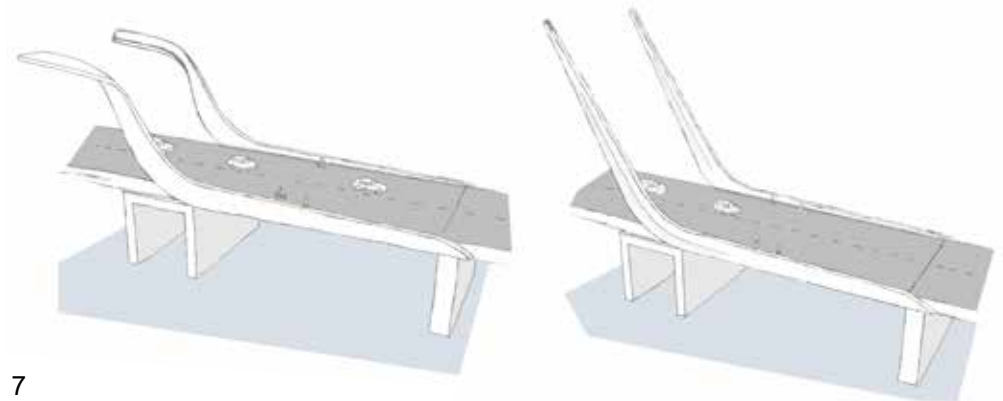
An early sketch of the 'marine tech' narrative application to the Scheme



Variations of the control tower and pier design during development of the reference design

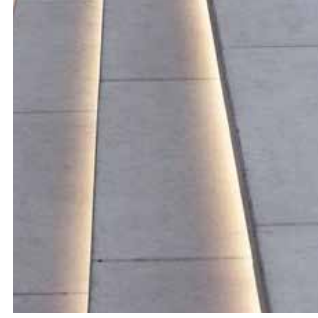
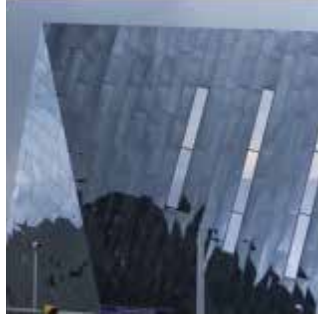


Variations of the mechanism design during development of the reference design



Material Palette

The following images represent a visual summary of the materials, colours and textures contained within the content and aspiration of the DGM.



1.4 Structure of the DGM

The DGM divides the Scheme into the following design topics:

- Highway design
- Structures design
- Landscape and public realm design
- Lighting design
- Signage and wayfinding design
- Other considerations

The Design Guidance Manual provides Design Requirements, Design Parameters and Design Concepts to guide the detailed design of each of these design topics.

These terms are explained in the inset to the right, along with the relevant graphic representation to indicate which applies to the content of the manual.

Whilst these design topics have been addressed separately for the DGM, the Scheme must continue to be considered as a whole, particularly at the interfaces between the components.

DESIGN REQUIREMENT

A principle, design or form to be retained with guidance provided for refinement or enhancement to consider when detailing.

DESIGN PARAMETER

Options or approach defined conceptually with parameters set for an appropriate solution to be derived through design development

• DESIGN CONCEPT

Design or products as illustrated in existing policy and guidance documentation, can also include best practice examples.

Chapter 2

Highway Design

- 2.1 Street typologies
- 2.2 Crossing points
- 2.3 Cycleway design
- 2.4 Traffic management

Introduction

The highway design as shown in the reference design has been through a number of iterations to ensure the most appropriate solution for the Scheme, this is documented in the DR.

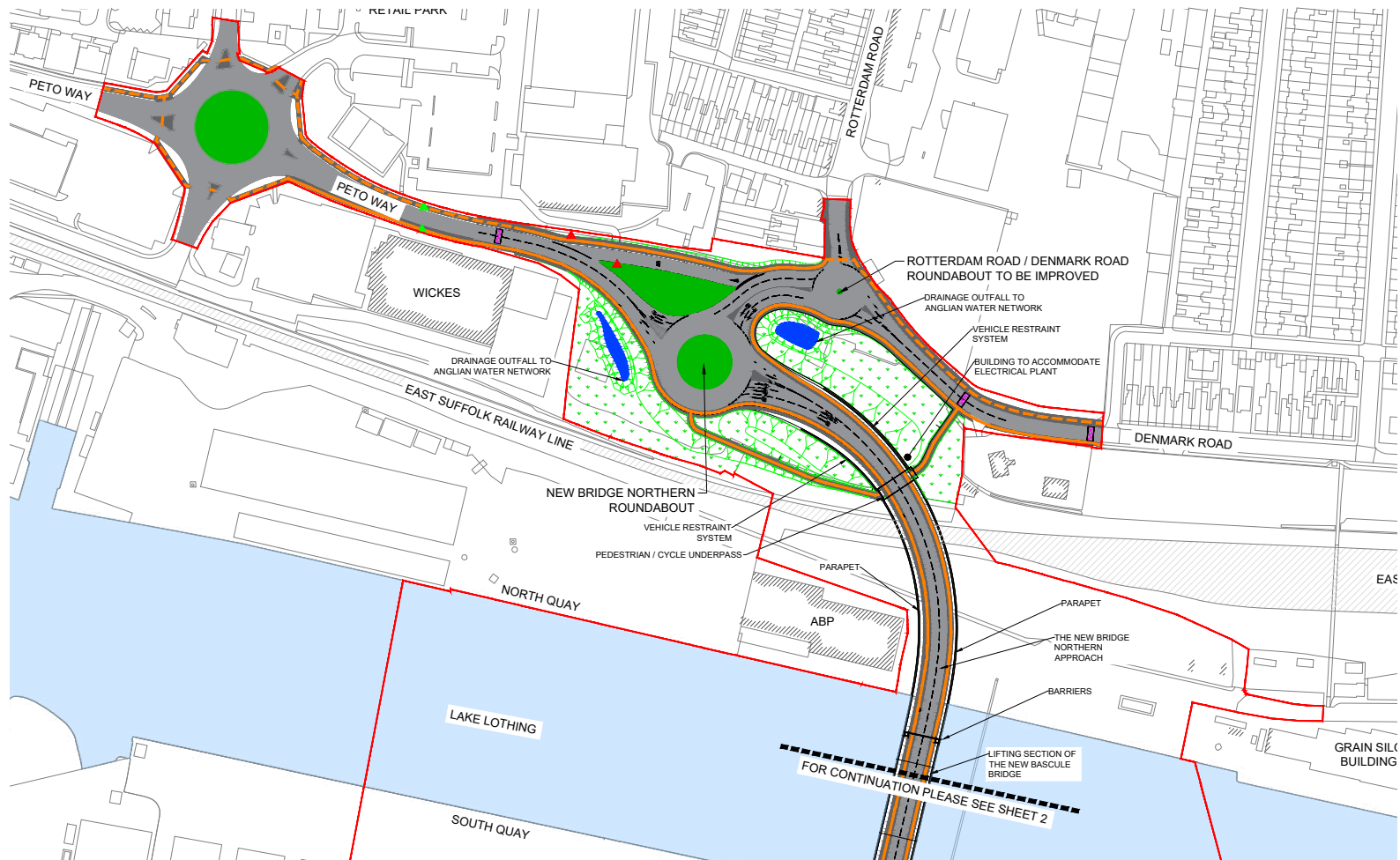
The reference design responds to the constraints of the site, Scheme requirements, and the adjacent landowners/affected parties to minimise impacts as far as is practicable.

The Scheme has been designed to the standards and guidance set out in the Design Manual for Roads and Bridges (DMRB), Manual for Streets, and in accordance with the SCC 'Specification for Estate Roads' 2007 where applicable.

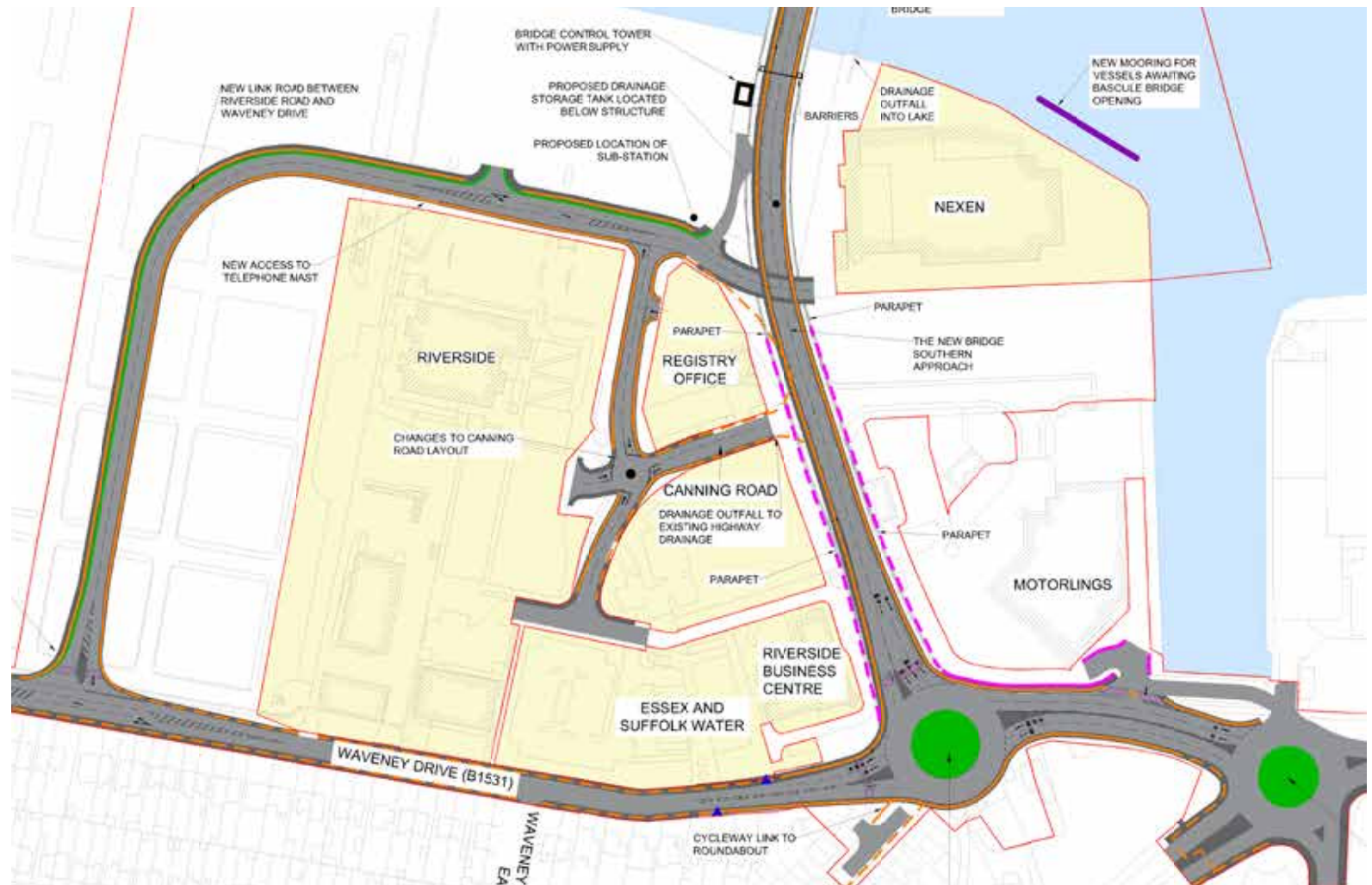
Consideration has also been given to the Scheme's integration with the Strategic Site Proposals set out in the Lake Lothing and Outer Harbour Area Action Plan, and associated with which there is a Supplementary Planning Document (the Sustainable Urban Neighbourhood and Kirkley Waterfront Development Brief (the SUN Brief) which relates to a large development site to the west of Scheme, and through which the New Access Road is located.

Optimise the route and connections to existing networks for all users, including vehicles and NMUs, ensuring safety, comfort, and legibility.

This includes the placement of crossing points to ensure desire lines of NMUs are met so far as is practicable.



Highway General Arrangement
(Sheet 1 of 2)
Northern area of the Scheme



Highway General Arrangement
(Sheet 2 of 2)
Southern area of the Scheme

2.1 Street typologies

Whilst the Scheme is designed in accordance with DMRB, the treatment and spatial arrangement of the Scheme's highways and its connections to the surrounding network may vary to suit the situation and ensure seamless connections.

Street typologies within the Scheme can be broadly defined by the volume of traffic; vehicular and Non-Motorised Users (NMUs), the street geometry, and surrounding context; land uses, character.

Consideration of street typology ensures coherence and appropriateness of the highway design in its setting, and how it will be used. This approach to design can enhance the experience provided for all users whilst ensuring safety and legibility. It can also provide an overarching identity for the Scheme in Lowestoft.

Three street typologies (STs) are applicable to the Scheme, which are:

ST1: Bridge deck and approach

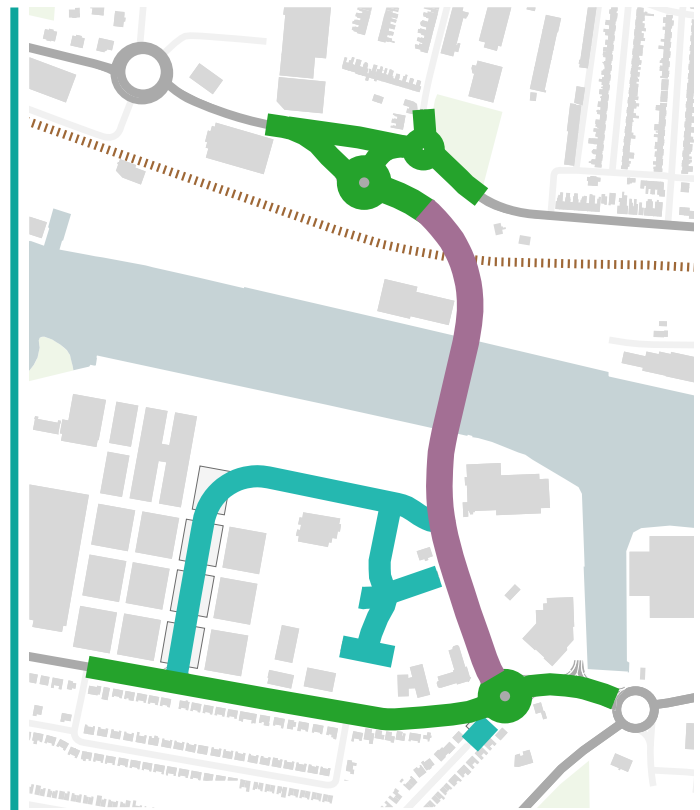
Applicable to the surface upon the third crossing structure between the new roundabouts at the north and south of Lake Lothing, including the opening span.




ST2: Green connection

Applicable to the northern and southern roundabouts of the Scheme and adjacent highway (Peto Way and Waveney Drive) to ensure a seamless, and where possible green, connection to the surrounding network.

ST3: Avenue style

Applicable to the new Access Road, Riverside Business Park, and the northern extent of Durban Road.



-  ST1: Bridge deck and approach
-  ST2: Green connection
-  ST3: Avenue style

Ensure appropriate streetscape design under the areas defined ST1, ST2 and ST3 with seamless connections to existing networks.

ST1: Bridge deck and approach

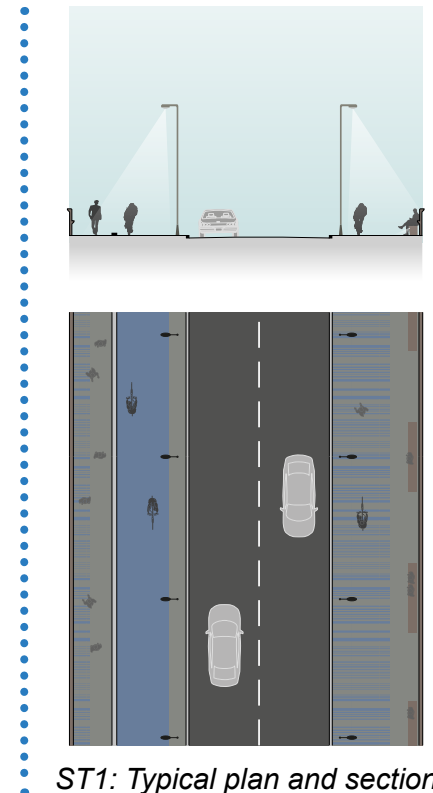
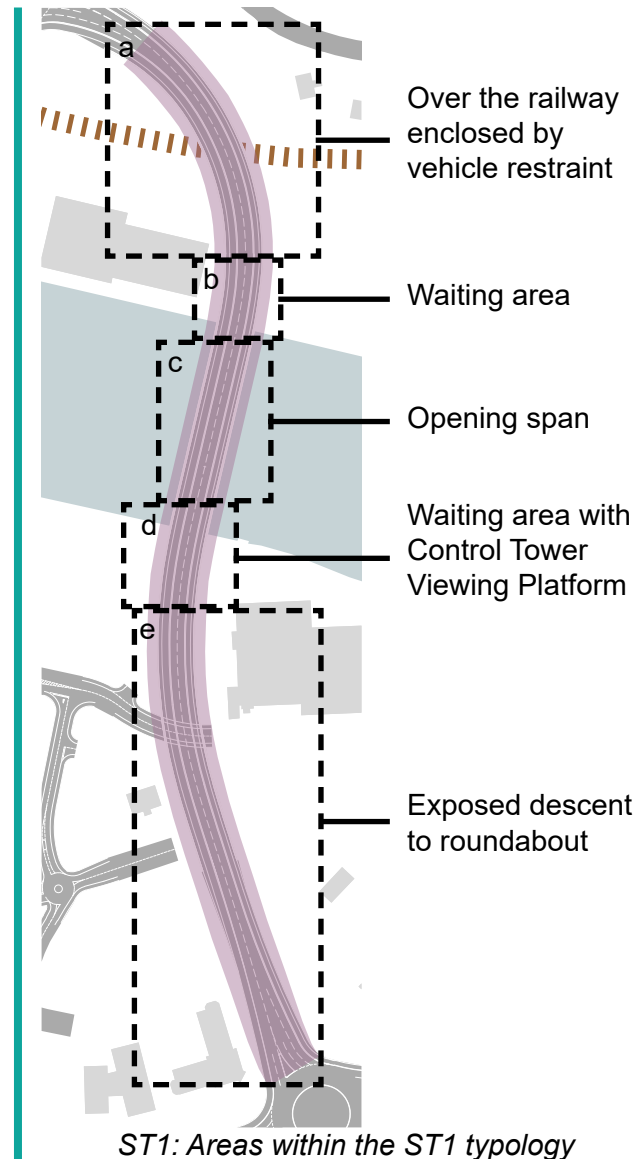
This area of the Scheme offers an opportunity to provide design flair and interest on the new elevated structure.

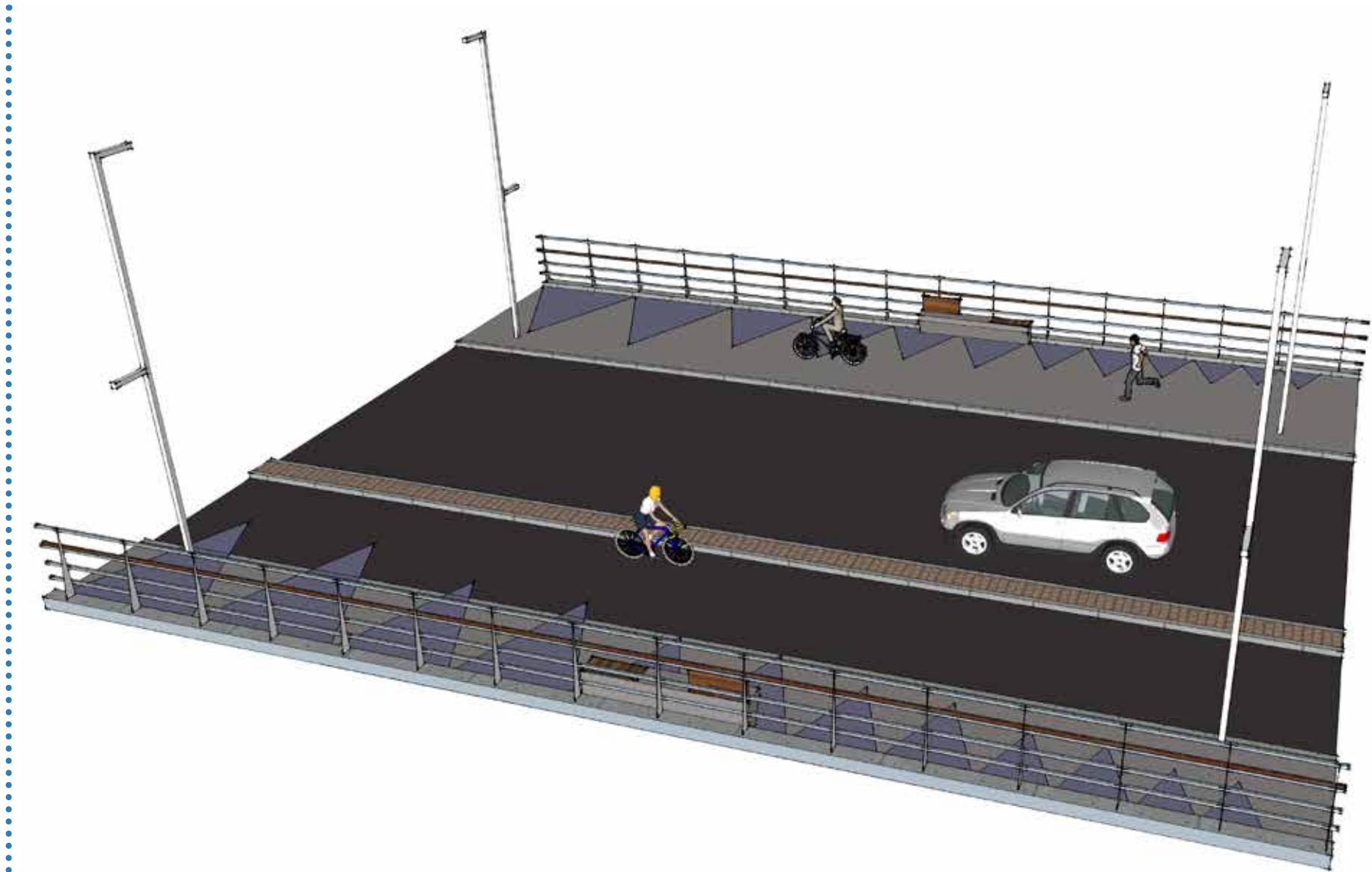
With appropriate widths for pedestrians and cyclists, and varying levels of enclosure and exposure, this can be responded to through the design.

Key areas may suit additional deviation from the standard treatments to create a feature space, such as the 'waiting areas' for NMU's and connection to the viewing platform, which is formed by the undercroft to the control tower (areas b and d on the diagram).

The following sections of the DGM include further guidance on design components and details, but examples of how to treat this street typology include:

- Coloured and/or imprinted surfacing for key areas
- Potential for integrated furniture at waiting areas for short use or perching



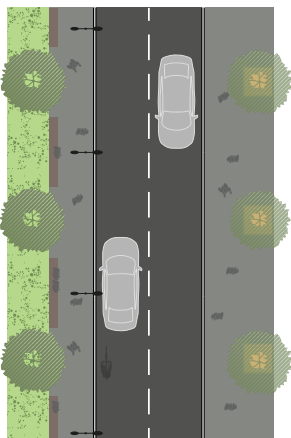


ST1: Illustrative 3D view

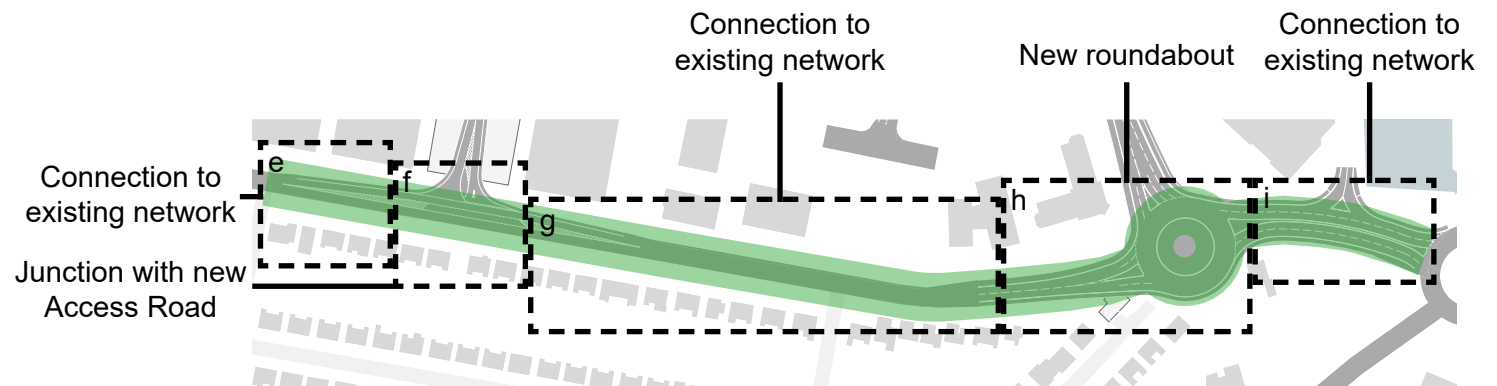
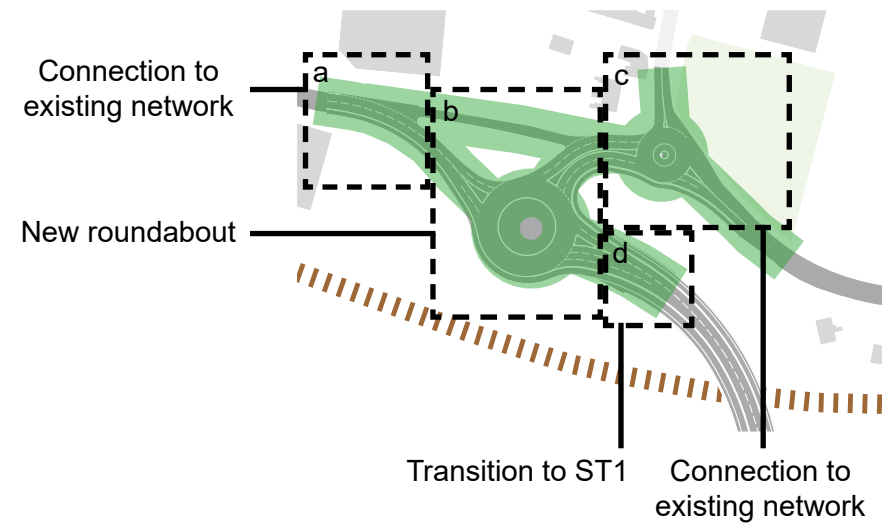
ST2: Green connection

These areas of the Scheme require a seamless transition to the existing conditions. Opportunities to incorporate additional green verge, planting, and/or street trees should be utilised where practicable.

(It is acknowledged that due to current conditions on Waveney Drive and available widths, opportunities for greening may be limited here)



ST2: Typical plan and section





ST2: Illustrative 3D view

ST3: Avenue style

This typology applies to 'minor' roads where pedestrian priority can be enhanced and there is an opportunity for an 'avenue' character street.

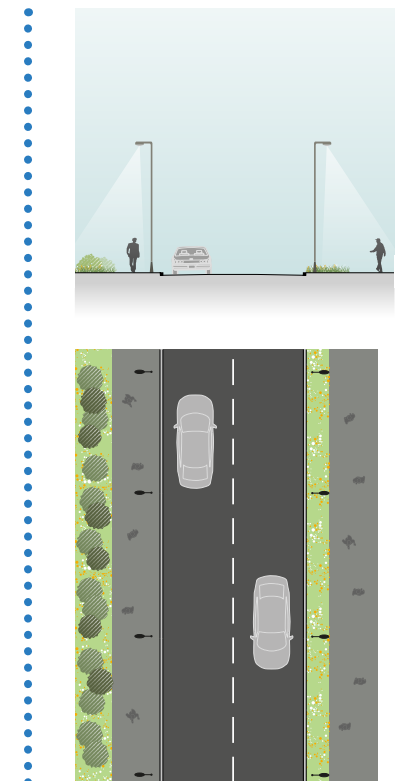
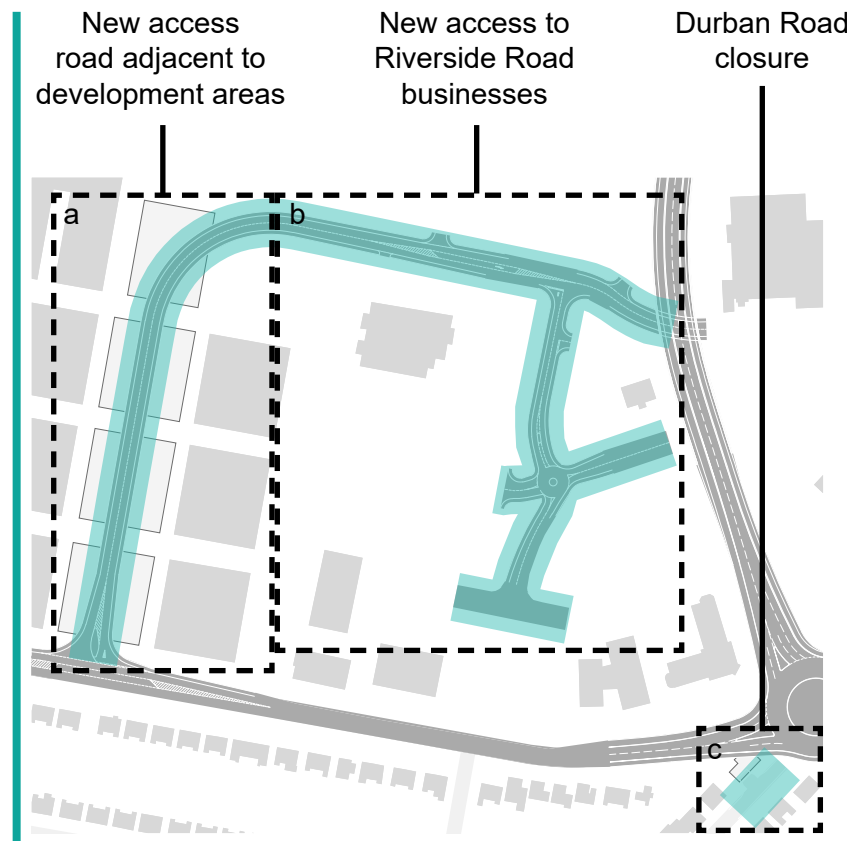
The Avenue style street is described in Section 5.22 of the SUN Brief as:

"This should be a wide single carriage way street with deciduous tree planting alongside. There should be wide pavements of approximately 4m either side of the road which accommodate a segregated cycle lane."

Development should front on to these roads. Traffic speeds will need to be limited to 30mph and appropriate speed controls will need to be implemented."

ST3 takes the description above into account as far as is practicable.

The new Access Road must provide an adaptable design to accommodate adjacent development in the future. Future development in this area could comprise commercial and/or residential, requiring careful consideration as to the most appropriate solution for these land uses.



ST3: Typical plan and section

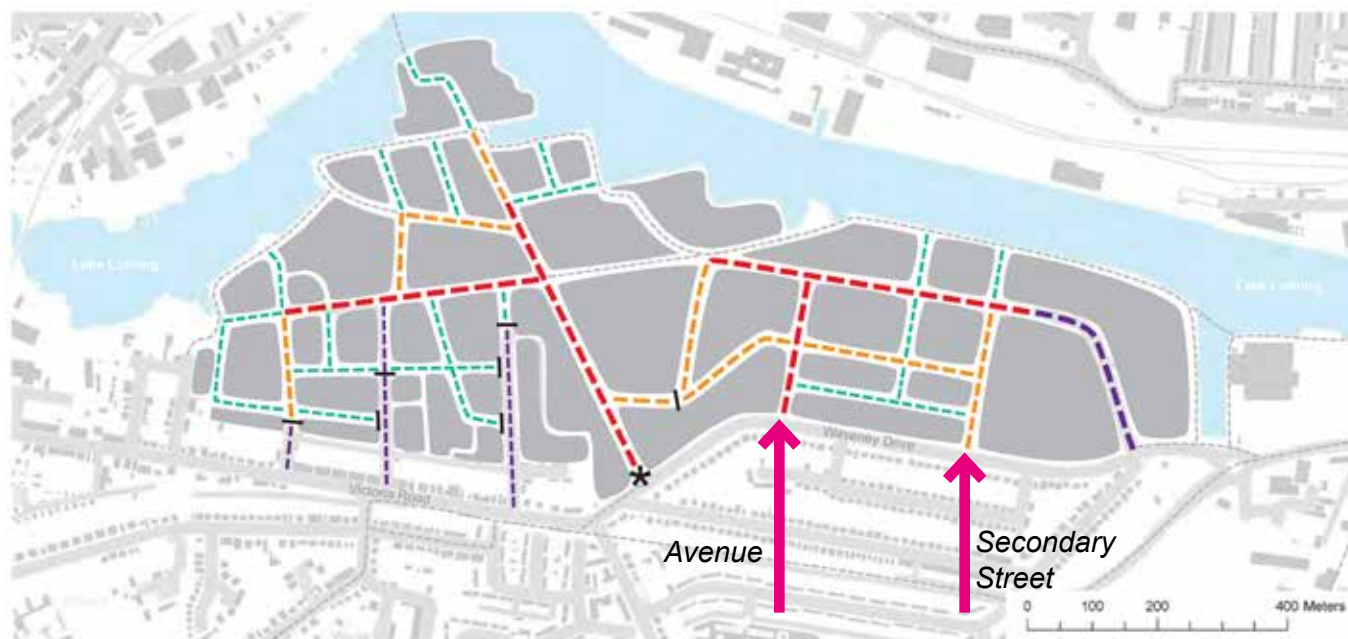


ST3: Illustrative 3D view

Relevant Guidance:

Sustainable Urban Neighbourhood and Kirkley Waterfront Development Brief (Adopted May 2013)
 ('the SUN Brief')
 Section 5: Streets and Transport - Vehicular Network

The detailed design for the new Access Road must consider its appropriateness in accordance with the guidance provided for this area. The description for 'Avenue' and 'Secondary street' are relevant given the location and orientation of the new access road. An assessment of the appropriateness of each



- Avenue ---
- Secondary street ---
- Small street ---
- Existing street ---
- No through route for vehicles ---
- New access point *

Figure 5.3 from SUN Brief - Indicative Vehicular Network

Criteria	Applicable to the new Access Road
Avenue	
Wide single carriageway street	Y
Deciduous tree planting	Y
Wide pavements	Y
4m wide pavements	N
Segregated cycle lane	N
Development front onto road	Y
Limit of 30mph	Y
Speed controls	Y
Secondary Street	
Small through route	Y
Low traffic speed	Y
Traffic calming	Y
Conform to 'Industrial Estate Roads' Guidance	Y

Consideration of the SUN Brief descriptions for 'Avenue' and 'Secondary Street' in their application to the new Access Road

2.2 Crossing points

Crossing points included in the reference design for the Scheme are indicative of location, but do not specify the type of crossing to be implemented.

During consultation with the public and local cycle forums, it was evident that there was a negative perception of signalised crossings in Lowestoft with a general view that there were too many in operation, and poorly sequenced - adding to traffic delays in many cases.

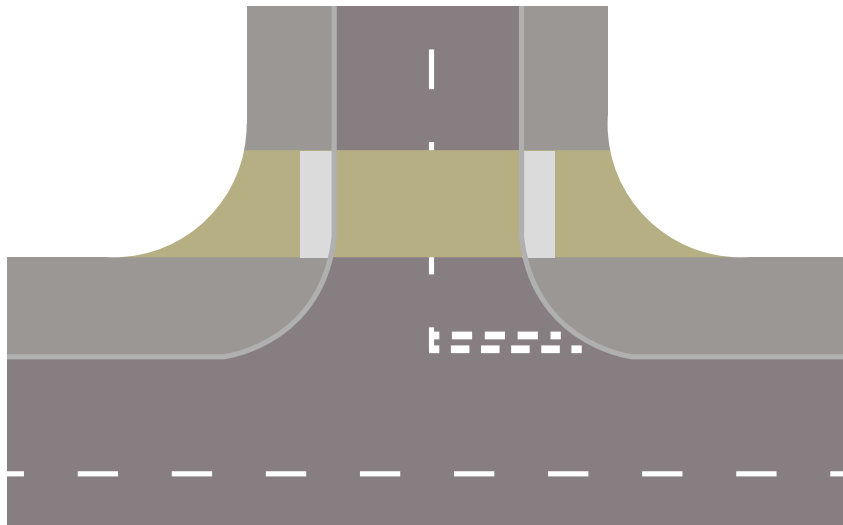
The use of informal crossings at minor side roads and accesses is appropriate, to indicate a location for NMUs to cross safely and conveniently without undue delay to either NMUs or vehicular traffic.

The use of tiger crossings for main routes provides a clear, convenient dual method of crossing for pedestrians and cyclists. Similar to a zebra crossing, the additional width provided for cyclists separately adds to the perception of safety and separation from traffic.

Consideration needs to be given to how these crossings connect cyclists to the relevant lane/route on the network seamlessly while reducing or eliminating the potential for conflict with pedestrians where practicable.



Informal crossing



At locations where informal crossings are appropriate, the use of surface treatment is encouraged to alert all road users to an area of courteous pedestrian priority.

This change in surface can be by means of:

- A change in material (eg. use of setts or other)
- A change in texture (eg. use of imprinted tarmac)
- A change in colour (eg. use of contrasting coloured layer)

The Lowestoft Design Guide suggests the use of Charcon Woburn blocks (in Graphite colouring) for crossings. Other methods may be appropriate for achieving this design parameter.



Example of change in material

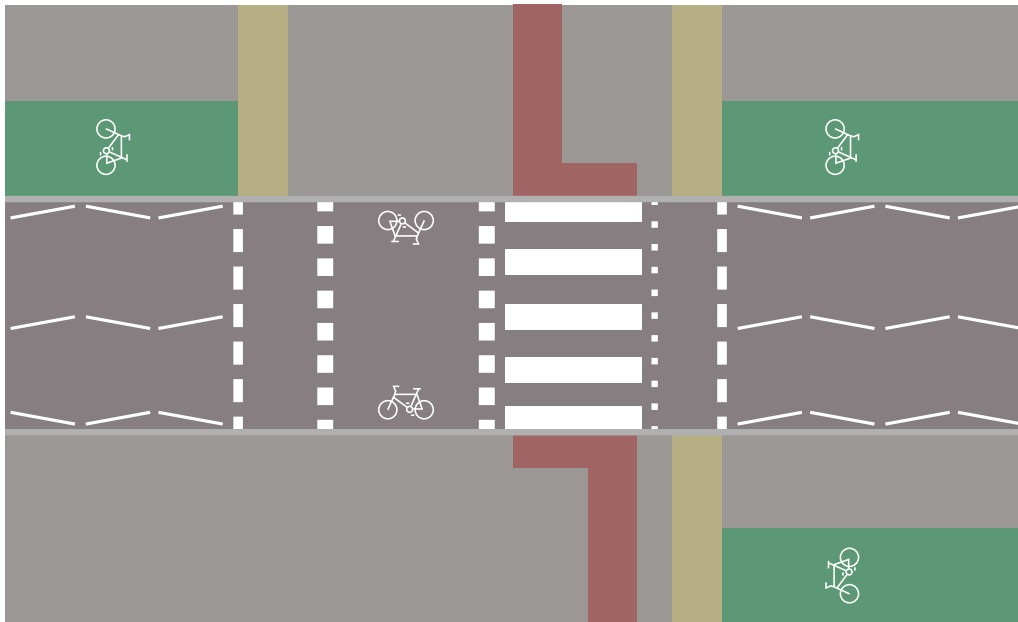


Example of change in surface texture



Example of change in surface colour

Formal crossing



To provide safe, legible, and appropriate crossing types in the locations depicted on the reference design or to ensure all desire lines are met for NMUs. Inclusive design must be exercised to ensure safety and accessibility for all users, without causing undue delay to traffic flows.

This may be achieved by means of a 'Tiger' crossing which extends the standard zebra crossing to allow an additional provision for cyclists. This additional width of the crossing area enhances the perception of safety for all NMUs.

Other methods may be appropriate for achieving this design parameter.



Example of a tiger crossing

2.3 Cycleway design

Effective connections to the existing NMU networks are essential to provide consistency and quality facilities.

The reference design features shared pedestrian and cycle facility on the eastern side of the crossing, and segregated footway cycleway on the western side.

It may be appropriate in detailed design to develop an alternative solution that meets the Design Requirement below

Where a type of cycle facility is to change or end, there will be a suitable transition or options provided for cyclists. The reference design utilises crossing points as the point at which cycle facilities change, to ensure cyclists can use them as a safe decision making point.

The New Access Road, being a minor road, may not require the same facility as provided elsewhere on the Scheme. Here cyclists could be located on road with traffic.



Reference design - Northern approach: Cycle facilities

- Existing Segregated Cycleway
- ⋯ Proposed Segregated Cycleway
- Existing Shared Cycleway
- ⋯ Proposed Shared Cycleway
- Existing on-road cycling
- ⋯ Proposed on-road cycling

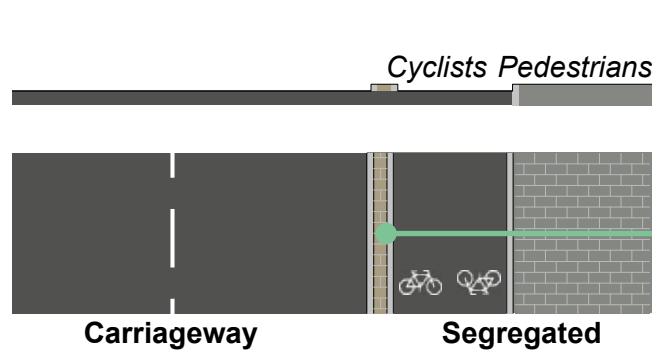


Reference design - Southern approach: Cycle facilities

Segregated cycleway

A physical separation between pedestrians, cyclists and vehicles ensures safety and legibility of spatial allocation.

Locating cyclists at carriageway level can simplify construction and drainage. The use of a physical kerbed buffer ensures separation and increases the perception of safety from the carriageway for two-way cycle movement.



Segregated facility

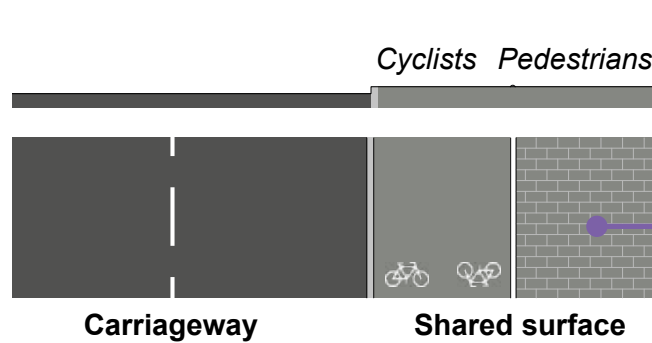


Examples of buffer treatments

Shared cycleway

Shared footway and cycle provision can provide a generous space for slower speed and less confident cyclists.

This may be provided by a continuous surface treatment across the full width, or visual delineation between pedestrians and cyclists by means of markings or variation in surface.



Delineated shared facility



Variations for shared surfaces

To provide safe and appropriate facilities for cyclists on the bridge, with suitable connections to further routes or the road network.

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Example of delineation



Example of a segregated cycleway on a bridge



Example of a poor cycle facility with no footway



Example of segregated footway and cycleway



Example of shared footway / cycleway with delineation

2.4 Traffic management

There is an opportunity for any essential traffic management items including; wigwag lighting, signage, sirens, speakers, and vehicle/pedestrian barriers to be integrated into one piece of furniture. This innovation can minimise clutter on the bridge deck and ensure these vertical elements are not an eyesore.

The form and materials must be in keeping with the design narrative and not distract visually from the superstructure so far as practicable.

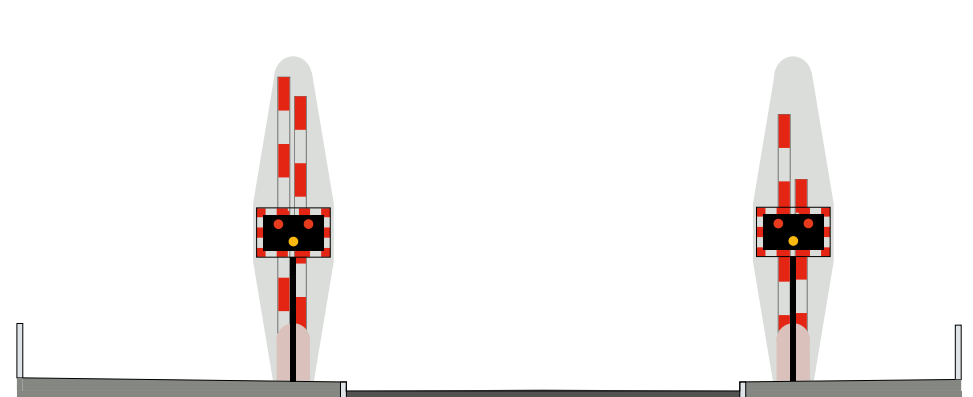
Separating the NMU and vehicular barriers provides a solution with less visual impact, as this vertical element will be shorter in height. It requires the wigwag lighting and barriers to be located either side of the carriageway.

This layout can provide efficiency in operations; the NMU barrier being lowered first reduces the time required to wait for the opening span to be cleared, allowing vehicles to continue movement slightly longer before the vehicular barrier is consequently lowered too.

To provide an appropriate integrated solution to the safe provision of wigwag lighting, vehicle / pedestrian barriers, and associated barrier equipment which responds to the design narrative and seeks to reduce clutter.



Standard wigwag lighting and barriers

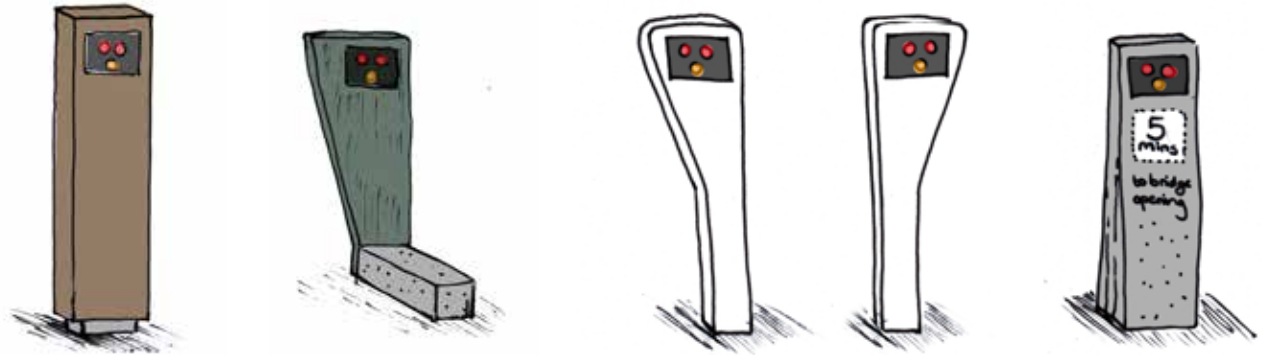


Integrated wigwag lighting and barriers

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Ideally the design for the housing of wigwag lighting, barriers, sirens and associated safety equipment will be combined in integrated units where practicable to minimise street clutter. An example of an integrated unit is illustrated in example 1 below.

In the event that it is not feasible to accommodate such a solution on the bridge deck, the barriers may be treated separately as shown below in example 2.



Sketch concepts of integrated wigwag/barrier furniture shapes



Example of an integrated wigwag and barrier system



Example of wigwag and barrier system on a bridge



Chapter 3

Structures Design

- 3.1 Bridge deck
- 3.2 Pier and abutment design
- 3.3 Opening mechanism
- 3.4 Superstructures
- 3.5 Control Tower
- 3.6 Suicide measures

Introduction

The structural design is the most fundamental part of the Scheme, as it will be visible in Lowestoft's skyline as a piece of architecture, and must function efficiently for over a century.

The Vision, including the design narrative set out in the DR should be considered in both the Scheme design as a whole, and in the details. Consideration should be given to each component of the structure to ensure it reads as one unified entity.

3.1 Bridge deck

The bridge deck must meet all structural and functional requirements currently met by the reference design, and enhance this wherever possible through detailed design.

The solution must consider its construction and ongoing access maintenance requirements over Lake Lothing the operational port, and the East Suffolk Line.

Visually the bridge deck should appear as one entity, a seamless structure which minimises any change in material as far as is practicable.

Ensure a simple and sinuous appearance of all structures comprising the bridge, with seamless connections and interfaces.

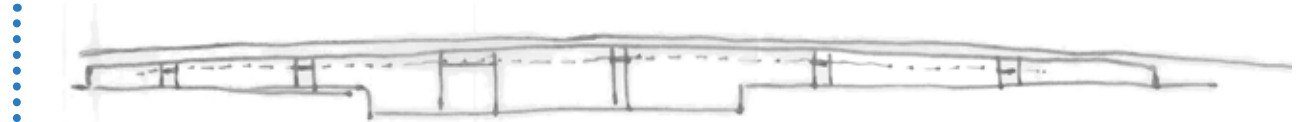
3.2 Pier and abutment design

The pier and abutment/wall designs must provide a suitable solution to ensure unity across the Scheme. This includes abutments and walls at the northern and southern extents of the crossing, land piers of varying heights, and in-water piers supporting the opening span.

In line with the design narrative, the development of the pier design must avoid the use of superfluous material so far as is practicable whilst ensuring its primary functions are safely maintained. The pier and abutment form must reflect their functions in their appearance.

The refinement of this shape will look to visually narrow the pier forms, and where possible provide additional benefits such as maintenance access to the bridge deck.

Depending on the type of bridge deck developed through detailed design, the piers may be connected bearings or integral connections - which should be reflected in the form.



Sketch illustrating the need for unity in pier and abutment design across the Scheme

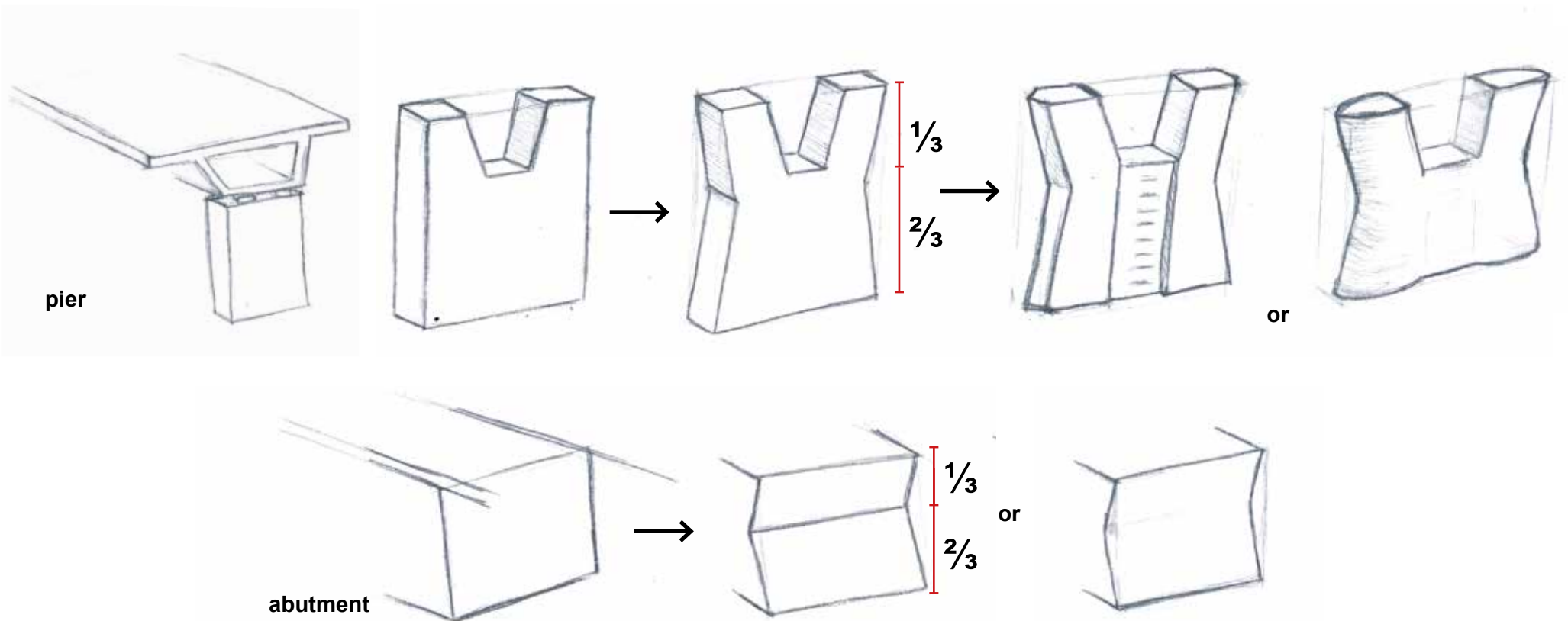


Example of good pier design - Lower Hatea Crossing, New Zealand

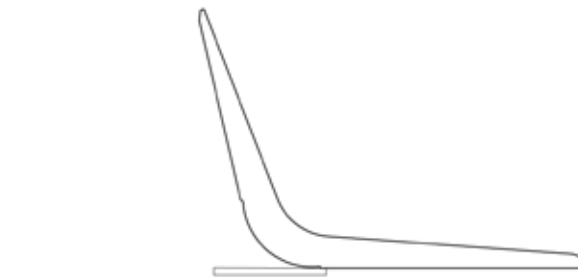
Chapter 3 / Structures Design

The sketches below reflect the reference design featuring predominantly bearing connections between the bridge deck and piers. The removal of pier material between the bearings benefits the maintenance access that would be required for the bearings.

The designs must consider visual interest and appearance from every angle, for they will be viewed from afar, from beneath the bridge deck itself on land and in water.



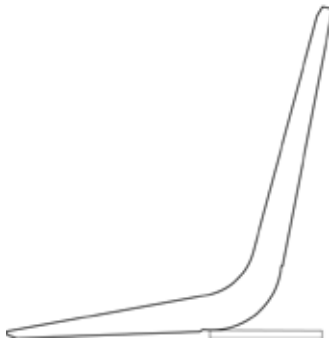
Sketches to demonstrate development of piers and abutments from the reference design



closed position

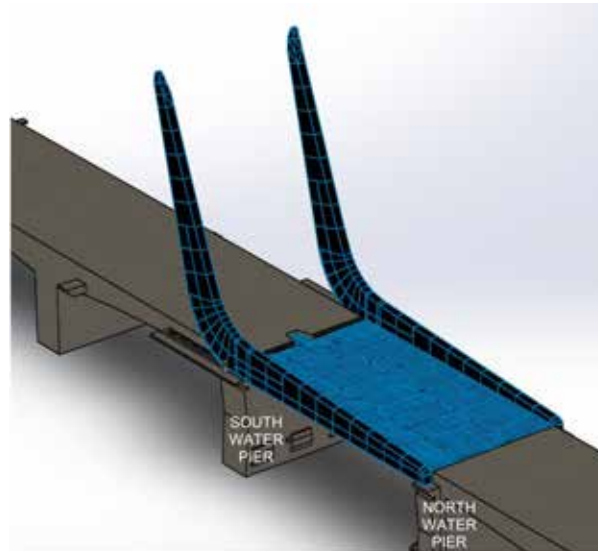


in motion

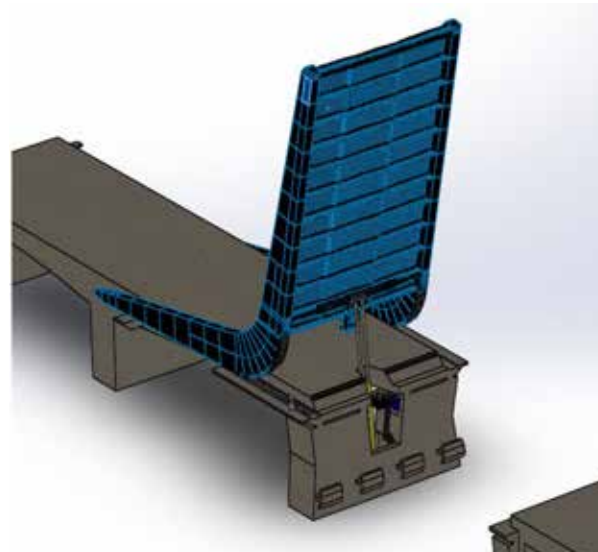


open position

The opening mechanism in various positions



Reference design of opening mechanism



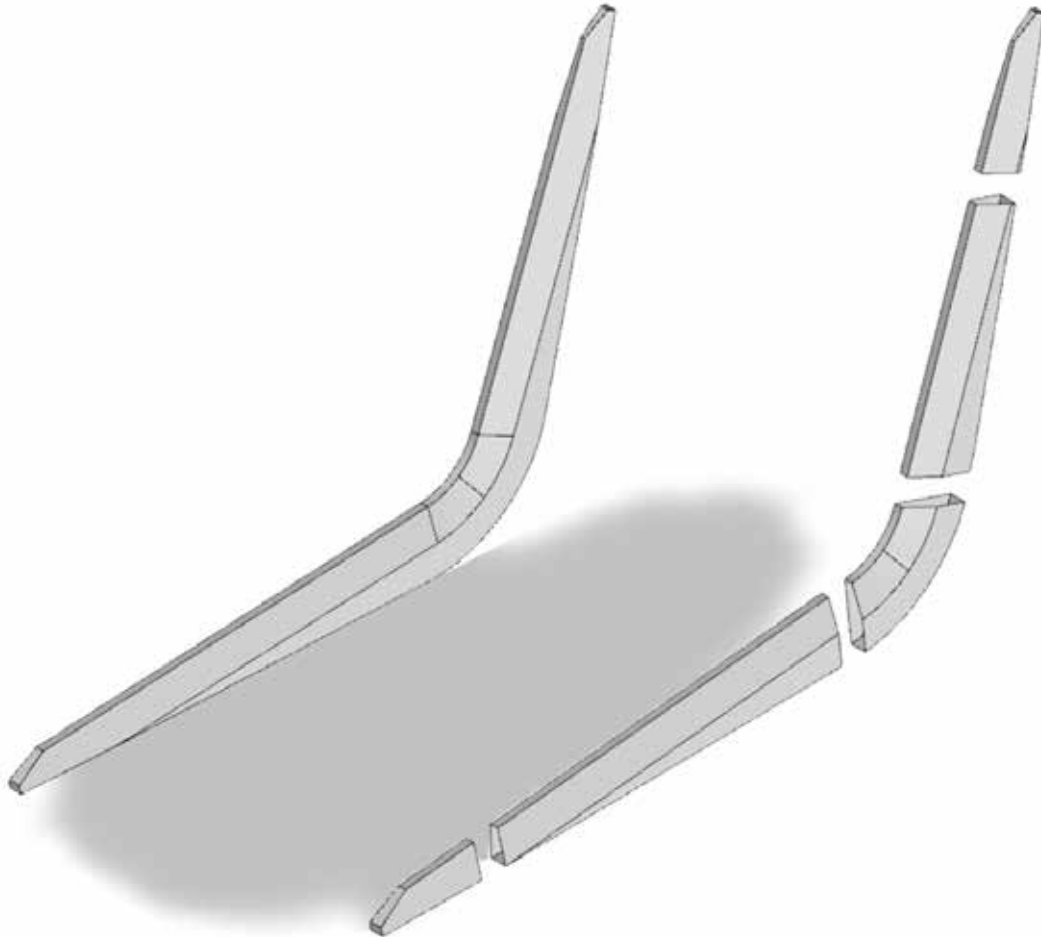
3.3 The Opening Mechanism

The Scheme includes a rolling bascule mechanism with vertical counterweight superstructures to facilitate the opening span of the bridge. This mechanism was developed through an iterative process with structural engineers, moving bridge experts from KGAL Consulting Engineers, and landscape architects, to ensure its optimal functionality and appearance.

The rolling radius of the counterweight arms have been designed in response to a number of constraints and considerations including:

- The need to minimise the size of the pier beneath; the smaller the radius / and therefore rolling track length, the better the loads are transferred to the in water pier rather than extending excessive weight towards the centre of the open span.
- The visual implication of the angle at which the counterweight arms are positioned, an aspiration to 'relax' the angle rather than appearing to feature a right-angle.

The Design Report explains in more detail the design process for the reference design.



3D representation of superstructure design to be refined in detailed design

3.4 Superstructures

The superstructure (moving counterweight arms) design has been tested in its simple structural form, for hydraulic simulation and inclusion in the reference design. The design developed through detailed design must subsequently undergo the necessary testing and checks to ensure its efficiency, and compatibility with the substructure beneath.

The design of the counterweight arms are to be developed in detail design towards a sleek, slimmed form. Subtle alterations to the faces of the superstructure provide opportunities to allow the faces of the superstructure to catch the light in an elegant way.

To ensure the counterweight arms maintain their sleek faceted appearance whilst performing as safely and efficiently as possible structurally.

3.5 Control Tower

The Control Tower (CT) required to operate the opening span of the bridge, is located on the south-western side of the third crossing, offset from the quay edge.

The CT structure should look to maintain the visual appearance of the reference design externally, including the massing and shape, unless an alternative design comes forward that is consistent with the Vision and design narrative.

The detailed design should be developed to have regard to the operational needs of the mechanism and the operator without compromising the quality of the design, its aesthetic appearance and future adaptability.

The design for the CT should consider the use of the space beneath bridge structure to house the plant room to ensure the CT itself can remain as visually slender as possible.

The location of the CT must consider essential access for operators and maintenance, whilst not inhibiting any future development of adjacent land or a 'waterfront pedestrian cycle path' route as shown in the SUN Brief.

Refer to the DR for further information about the development of the reference design for the CT.



To provide a fit-for-purpose control tower and plant room with appropriate workplace facilities.

The CT design must:

- Perform its primary operational function with appropriate visibility, facilities and be safe and secure for bridge operations.*
- Be designed to complement and be visually and be visually secondary to the superstructure as the 'main event'.*
- Be a simple form expressive of function, recalling historic industrial context.*
- Utilise the functional form to offer further benefits to the public and surrounding context. For example, through a public viewing platform and adaptable components for future connectivity to quayside.*
- Enable the structure to be adapted by future developers to provide future public access from quayside to bridge.*
- Robust materials and finishes for long term durability in tough marine and highway environment.*



Examples of the preferred cladding

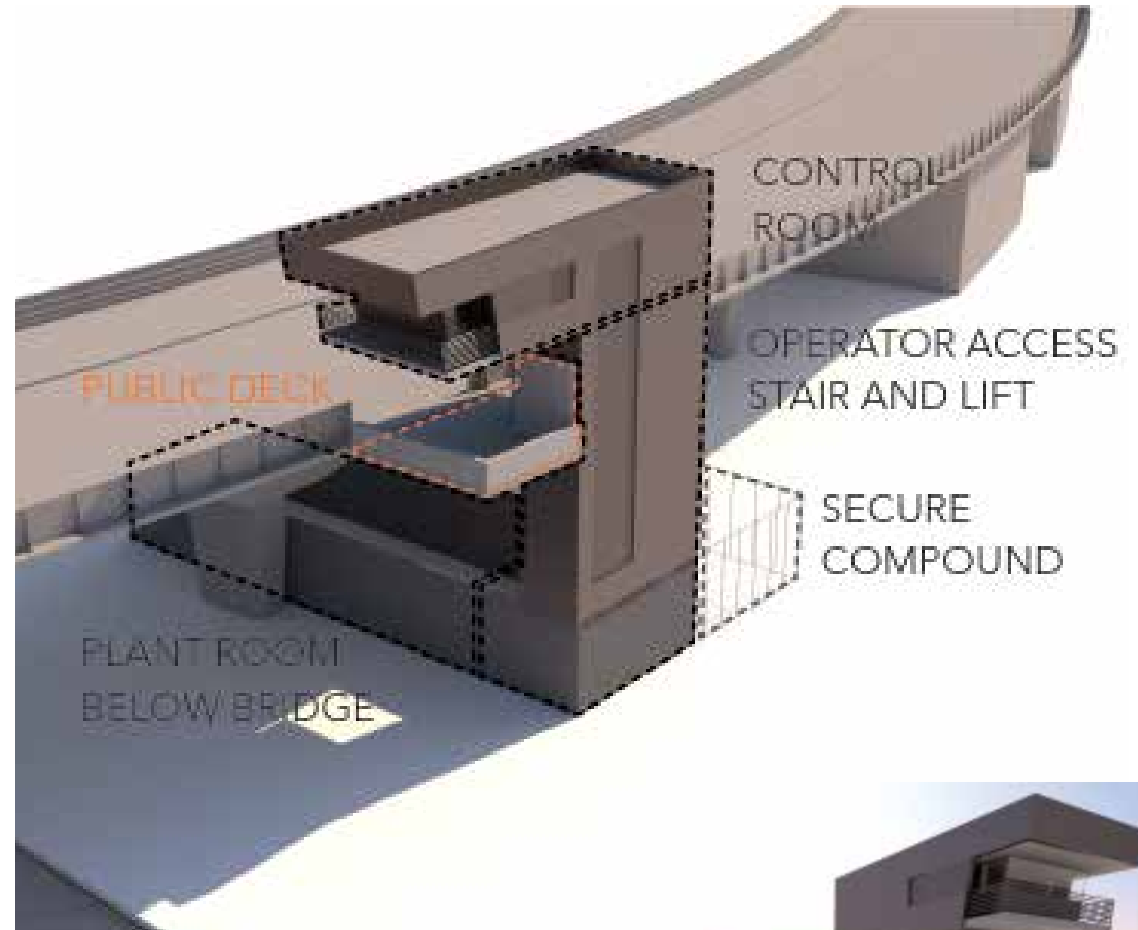


Illustration of how the control tower could look



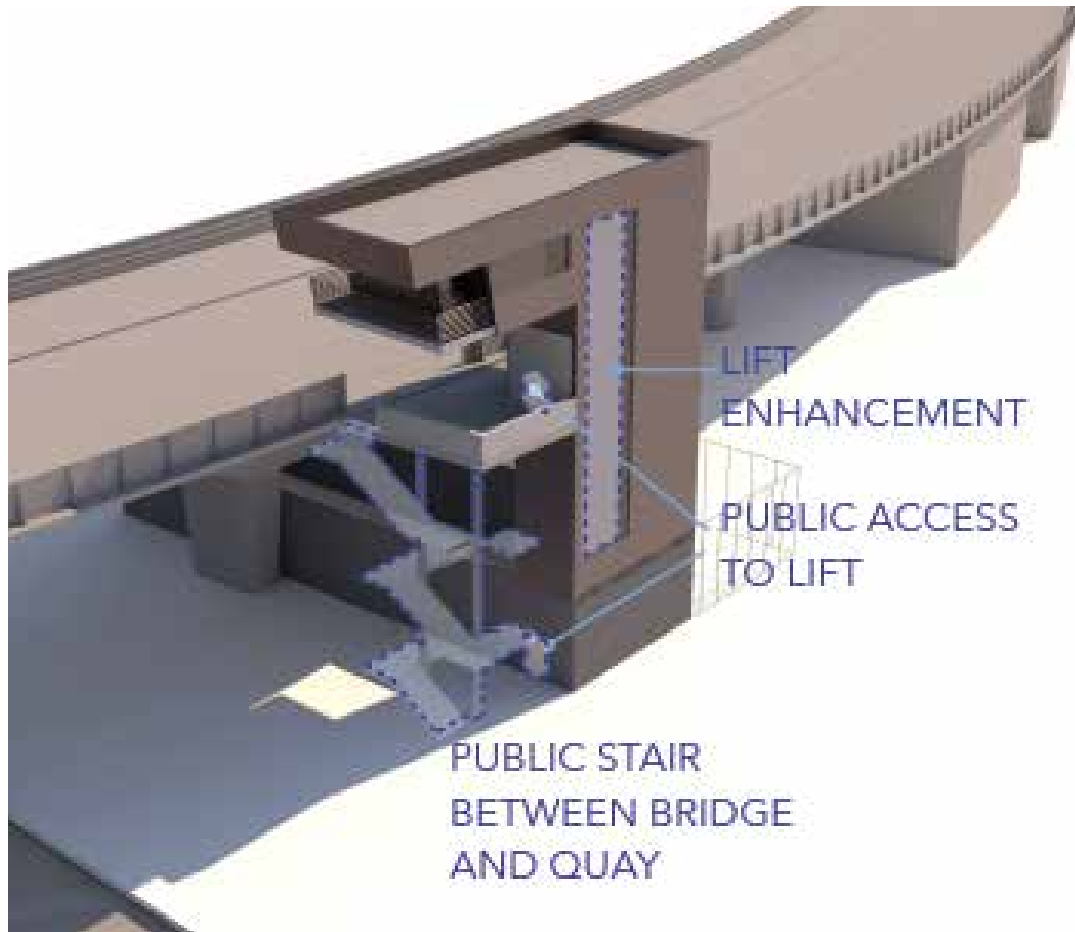


Illustration of how the control tower could be adapted to provide access to future quayside development

3.6 Suicide measures

The proposal for a structure at height and over water requires consideration to the likelihood of suicide and how the structure design may respond to this. This is an important consideration for detailed design to ensure appropriate measures are in place. These may include relevant signage in key locations to inform people of the Samaritans contact details.

Through the nature of the bridge being located in an urban environment with a 24-7 manned Control Tower nearby, there will be natural surveillance and CCTV on site.

Chapter 4

Landscape and Urban Design

4.1 Public realm

Introduction

Landscape and urban design is a key area of the Scheme to contribute to providing 'places' for people, ensure softened connections between the new crossing and the surrounding context.

The layout of the Scheme provides spaces to utilise with planting and public space, particularly on the northern approach.

To optimise the Scheme's offering to Lowestoft as a whole, through a place-making approach that seizes opportunities to provide amenity and bio-diversity benefits.



Extract from Landscape Plan (P01)

4.1 Public realm

Northern approach

As part of the ongoing workshops undertaken with the local planning authorities, the public realm shown in the first submission of the reference design has been subject to further discussion and development.

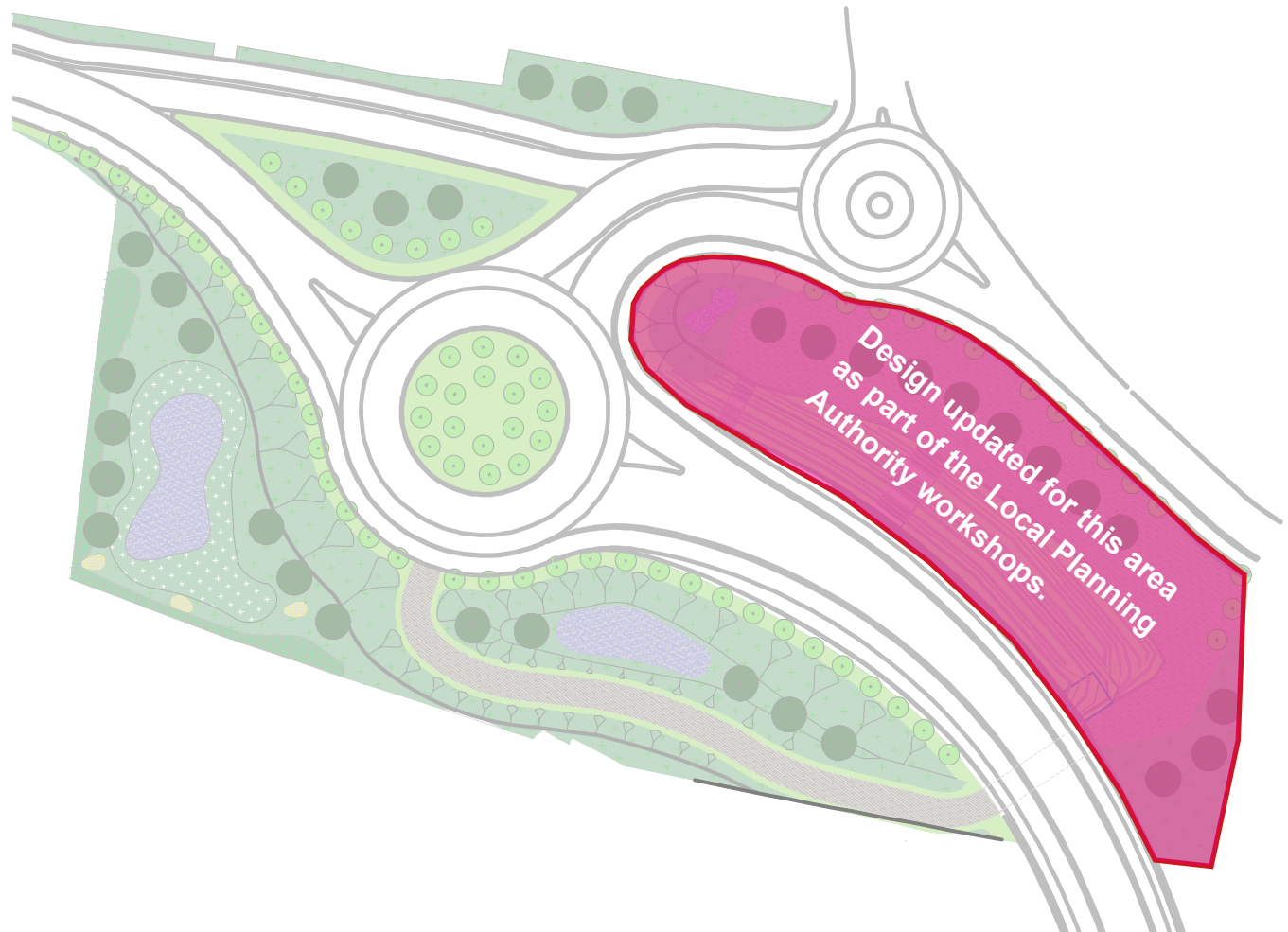
In particular, the Northern Approach which forms a link between industrial, retail, residential and port land uses. It is considered that this area would be better suited as a maximised green / planted space rather than planted on the west and hardscape public realm on the east.

For this reason, the sloped embankment will now feature a mosaic of planting and trees on both sides of the proposed highway as shown.

The opportunity to enhance connections for non-motorised users to the bridge with a route beneath the bridge will be retained.

Through detailed design there is an opportunity to offer bio-diversity benefits in areas which should be maximised where possible.

The materials and products used should be appropriate to the setting, long-lasting, and complement the local improvement occurring in Lowestoft.



Plan indicating area of change as developed through LPA workshops for the DGM

-  Amenity Grass
-  Species rich meadow
-  Habitat planting
-  Wetland planting
-  Native shrub/hedge
-  Heathland style
-  Planted SuDS Pond
-  Feature or native tree
-  Street tree
-  Screening tree
-  Hibernaculum
-  Paved area
-  Bench



- ① Planted embankment**
- ② Route beneath bridge**
- ③ Planted SuDS Pond**

Updated design: Northern Approach

Tree and planting species

Tree species, specification and locations are to be agreed with relevant officers from the local planning authority and/or the organisation to be adopting and maintaining the Scheme.

Planting in the appropriate areas is to be predominantly planting for the biodiversity benefit to invertebrates, reptiles, insects and birds. The presence of slopes and dips for SuDS ponds creates a varied landscape for species rich planting. The SuDS ponds could contain reed beds which aid in the filtration of surface water run-off and slowing its release to the main system.

Wilderness planting is a collective term for swathes of varying colour and texture, with herbaceous planting and ground cover species suited to the conditions ensuring an attractive but low maintenance solution.

The remaining areas shown in green are to be amenity grass and wildflower / meadow style verges providing diversity and interesting areas requiring minimal intervention.



Feature or native tree: for scale and majestic effect - such as Oak



Street tree: smaller scale, minimal leaf litter



Screening tree: to filter views and provide density - such as Field Maple or Red Birch

The development of the area at the Northern Approach to feature predominantly planting, ensures that this area is utilised in the most appropriate way.

The design retains the alternative pedestrian (and cycle) links to the crossing to Denmark Road, offering safe and legible of a generous size. There are also areas for rest where street furniture could be located for temporary occupation.



Additional route provided between the bridge deck and Denmark Road beneath bridge



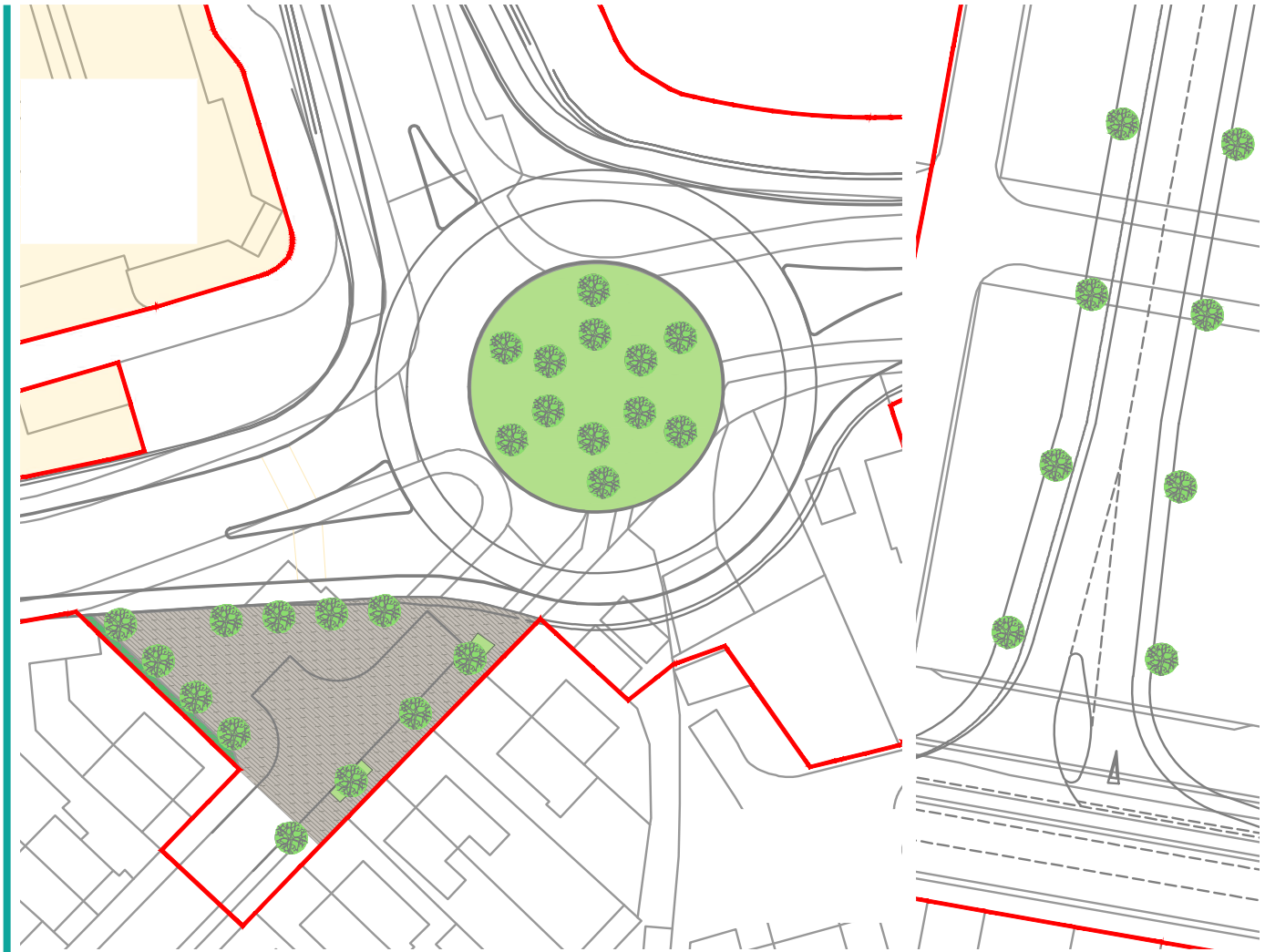
Examples of how the route could look

Southern approach

Opportunities for landscape and public realm are somewhat limited at the Southern Approach of the Scheme which is constrained by adjacent properties and the need to minimise impact on them.

Where possible and appropriate, the Scheme will include sustainable drainage systems (SuDS), planting, and tree planting to soften the appearance of the Scheme and provide surface water management.

The public realm areas will include an appropriate palette of street furniture which reflects the emerging identity of Lowestoft and considers what is used elsewhere in the town.



Extracts from Landscape Plan (P01)

Chapter 5

Lighting Design

- 5.1 Highway lighting
- 5.2 Public realm lighting

Introduction

Lighting enhances the user experience and perception of safety on the highway and in the public realm areas.

The reference design includes highway, public realm, and architectural feature lighting to be developed through detailed design.

The lighting must provide appropriate ambience and visibility for all crossing users, whilst considering minimising impact on approaching vessels in Lake Lothing.

5.1 Highway lighting

The highway lighting must be designed in accordance with all relevant standards, be appropriate to the setting, and consider longevity.

The lighting design must feature appropriate products which complement those preferred elsewhere in the town centre by the Highway Authority.

5.2 Public realm lighting

The public realm lighting must enhance safety for all users, and has the opportunity to enhance architectural features of the bridge structure.

The superstructure arms may be lit to allow them to be a special feature in the town's skyline during hours of darkness.

The aspiration is that the opening mechanism has a 'floating' appearance, not competing visually at night with the substructure below it.

Coloured lighting can offer variation in the bridge appearance for special effect or events, this may be controlled from the Control Tower if appropriate.



Indicative render of how the bridge could be lit at night

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Lake Lothing

**THIRD
CROSSING**