

Title: **STAGE 1 ROAD SAFETY AUDIT**

For;

Boyne Greenway, Drogheda to Mornington

Client: **DBFL Consulting Engineers.**

Date: **January 2022**

Report reference: **1232R01**

VERSION: **FINAL (1-3-2022)**

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CONTENTS SHEET

Contents

| | | |
|------|---|----|
| 1.0 | Introduction | 2 |
| 2.0 | Background | 3 |
| 3.0 | Issues Raised in This Road Safety Audit | 5 |
| 3.1 | Problem..... | 5 |
| 3.2 | Problem..... | 6 |
| 3.3 | Problem..... | 7 |
| 3.4 | Problem..... | 8 |
| 3.5 | Problem..... | 9 |
| 3.6 | Problem..... | 9 |
| 3.7 | Problem..... | 10 |
| 3.8 | Problem..... | 10 |
| 3.9 | Problem..... | 11 |
| 3.10 | Problem..... | 12 |
| 3.11 | Problem..... | 12 |
| 3.12 | Problem..... | 13 |
| 3.13 | Problem..... | 13 |
| 4.0 | Observations | 15 |
| 4.1 | Observation..... | 15 |
| 4.2 | Observation..... | 15 |
| 4.3 | Observation..... | 15 |
| 5.0 | Audit Statement..... | 16 |
| | Appendix A..... | 17 |
| | Appendix B – Problem Location Map. | 19 |
| | Appendix C | 20 |

1.0 Introduction

This report was prepared in response to a request from Mr. Mark Kelly of DBFL Consulting Engineers for a Stage 1 Road Safety Audit of the proposed Boyne Greenway between Drogheda and Mornington.

The Road Safety Audit Team comprised of;

Team Leader: **Norman Bruton**, BE CEng FIEI, Cert Comp RSA.

TII approval number: NB 168446

Team Member: **Mark McKenna**, BEng (Hons) MSc CEng MIEI

TII approval number: MM 3363499

The Road Safety Audit comprised an examination of the information provided and a site visit by the Audit Team on the 3rd December 2018, a subsequent site visit was undertaken by the Team leader in December 2021 to check for any significant changes to the road environment.

The weather at the time of the site visit was dry and the road surface was wet.

This Stage 1 Road Safety Audit has been carried out in accordance with the requirements of TII Publication Number GE-STY-01024, dated December 2017.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety. It has not been examined or verified for compliance with any other standards or criteria.

The problems identified in this report are considered to require action in order to improve the safety of the scheme for road users.

If any of the recommendations within this safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observation are intended to be for information only. Written responses to Observations are not required.

The information supplied is listed in **Appendix A**.

A problem location map is contained in **Appendix B**.

The feedback form to be completed by the Design Team Leader is contained in **Appendix C**.

A Stage 1 Road Safety Audit was carried out on a previous iteration of this design in December 2018 by the same Audit Team (Report Ref 516R01)

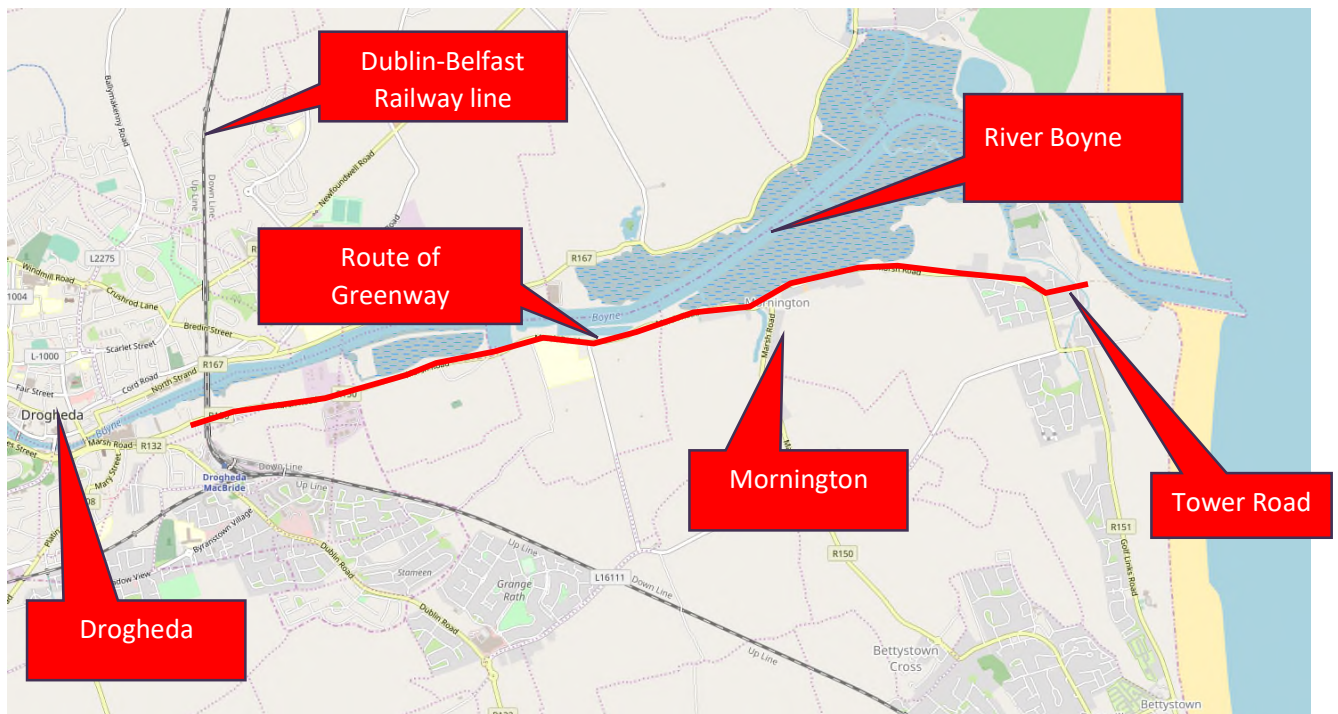
2.0 Background

It is proposed to construct a greenway (shared use pedestrian and cyclist facility) between Drogheda in Co. Louth and Mornington in Co. Meath. The greenway will be adjacent to the public road.

Ancillary works include a bridge at in the Mornington area (Ch 3,715).

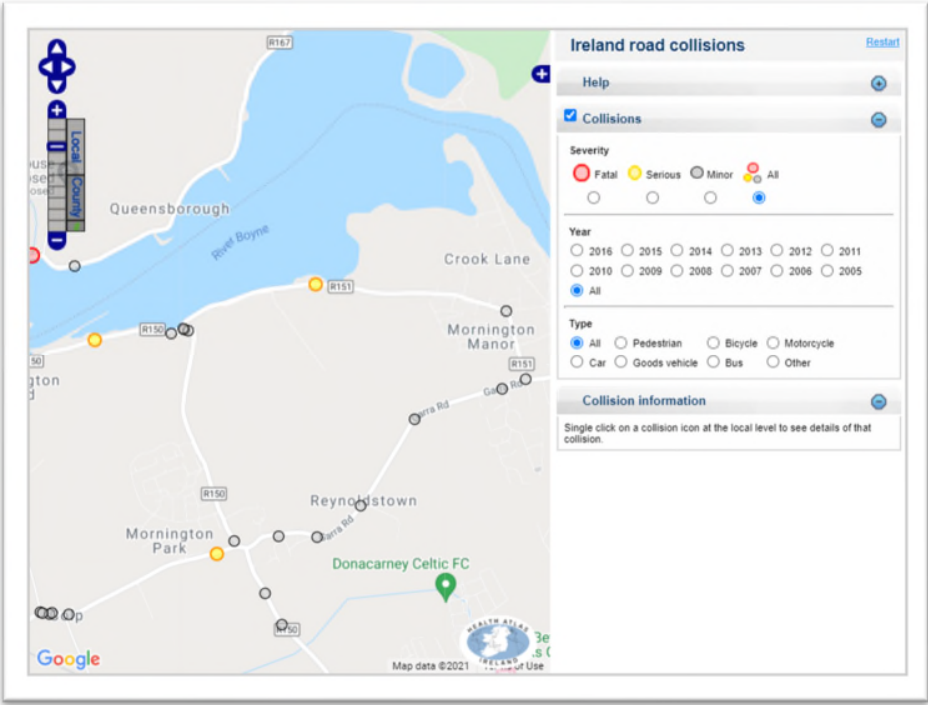
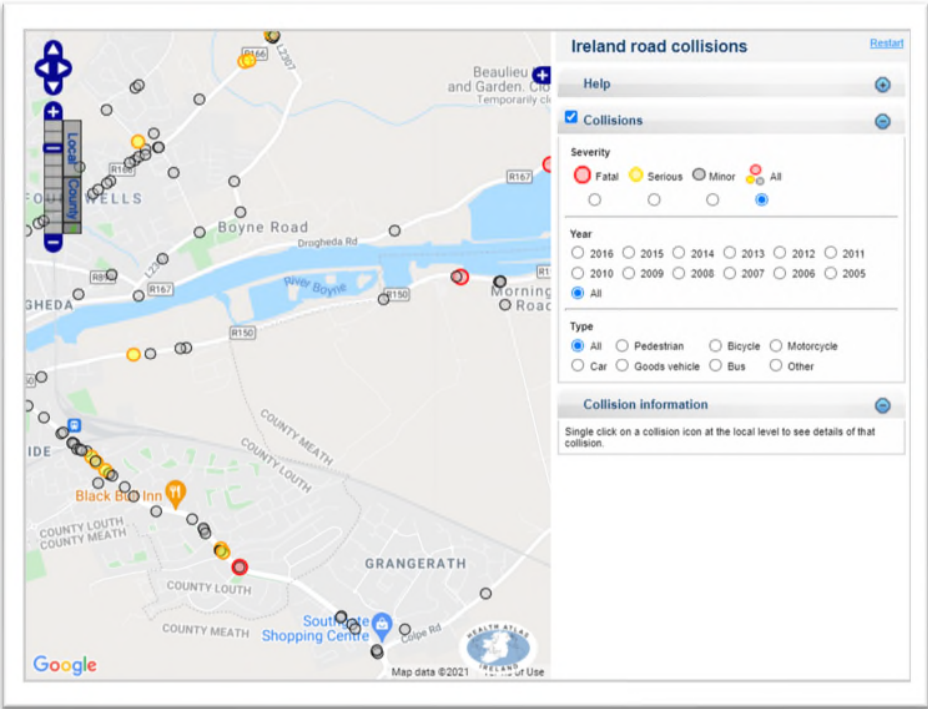
The proposed width of the greenway is 4m. The scheme commences on the R150, Marsh Road just before the Dublin-Belfast Boyne viaduct and finishes at Tower Road which will become a shared space. The total length of the scheme is 5,867m.

The route location is shown in red below.



Scheme Location Plan (Image courtesy of Openstreetmap.org)

The Road Safety Authority's website www.rsa.ie shows the injury collisions between 2005 and 2016. There were a number of collisions along the route of the Greenway including a fatal, single vehicle collision in 2008, adjacent to Drogheda Grammar School. Apart from a potential issue with head-on collisions at the junction of the R150 and R151 there does not appear to be any trends or high frequency of collisions along the route.



3.0 Issues Raised in This Road Safety Audit

3.1 Problem

LOCATION

Throughout the scheme, speed limits.

PROBLEM

There is an 80km/hr speed limit on sections of the R150 and generally a 60km/hr speed limit along other sections with a 50km/hr speed limit adjacent to Drogheda Grammar School and at the start of the greenway at the outskirts of Drogheda town.

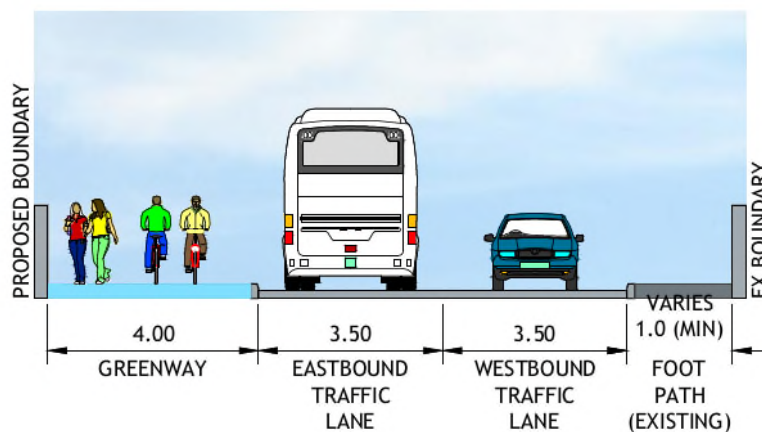
There is a risk that where the proposed greenway is adjacent to the public road that high vehicle speeds will lead to pedestrians and cyclists being sucked into the carriageway by passing vehicles, especially heavy commercial vehicles or buses.

There is also a very low likelihood of a vulnerable road user surviving a collision with an errant vehicle travelling at 80km/hr or even 60km/hr.

The high vehicle speeds would discourage younger users of the greenway particularly school going children.

It is noted that the design contains raised tables at regular intervals such as side road junctions and crossing points. It is unclear if an overall traffic calming strategy has been assessed based on the spacing and effectiveness of these features.

TYPICAL CROSS SECTION TYPE A-1 (CH 0 TO 600)



RECOMMENDATION

It is recommended that this issue be forwarded to the Roads Authority to form part of the next county wide speed limit review. Vehicle speeds should be assessed and additional traffic calming should be provided where excessive speed occurs.

As an interim measure a buffer strip along the kerb edge should be provided to discourage use by pedestrians or cyclists.

A review by the Design Team on the design speeds post the introduction of the proposed traffic calming should be undertaken to see if any additional measures are required.

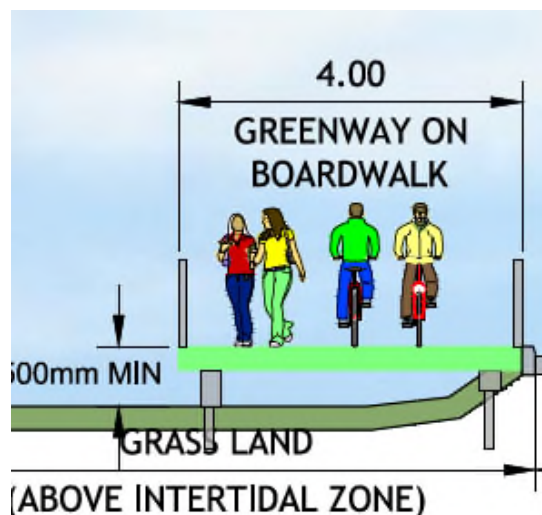
3.2 Problem

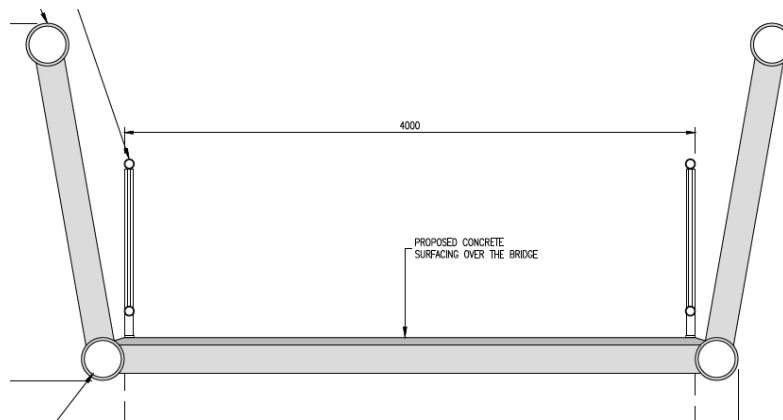
LOCATION

Throughout the scheme, width of the proposed greenway.

PROBLEM

It is proposed that the greenway will be 4.0m wide throughout the scheme. In areas where the greenway goes off-line the 4.0m width includes the pedestrian railings and could also include furniture such as lighting columns and life buoys that would be developed during the detailed design stage. There is a risk that the effective width of the greenway along these off-line sections will be much reduced from the on-line sections and that there would be insufficient width for both two-way cyclists and pedestrians. In addition, cyclists may be travelling at relatively high speeds given the flat nature of the proposed greenway and they may not reduce their speed when they enter the tighter off-line sections. This could lead to collisions between cyclists and pedestrians.





RECOMMENDATION

It is recommended that the effective width of the greenway be kept constant throughout the scheme.

In addition, where there are any particular interesting viewing areas the cross section should be widened locally to allow people stop and rest (provision of benches) but at the same time let others continue their journey.

3.3 Problem

LOCATION

Drawing 170029-2201 Rev P2, Start of Greenway in Drogheda.

PROBLEM

It is unclear if there are proposals for another section of greenway through Drogheda town to connect with this greenway at some time in the future. The existing R150 has no dedicated cycle facilities from the town centre to the proposed scheme. The R150 is a busy regional road and appears to have a relatively high proportion of heavy goods vehicles given the presence of the port and associated industries. There is a risk that users of the greenway coming from the town centre will be exposed to this traffic without dedicated facilities. As the number of greenway users increase then the likelihood of a collision will increase.



RECOMMENDATION

It is recommended that the scheme be extended to include the upgrade of pedestrian and cyclist facilities to the town centre.

It is also recommended that provision be made for parking for those who wish to use the greenway who initially travel there by car.

The nature and scale of these works may depend on possible future phases of greenway construction.

3.4 Problem

LOCATION

General, throughout the scheme adjacent to the Boyne estuary.

PROBLEM

At some locations along the scheme the existing road is close to the banks of the River Boyne. At some locations there is a vertical drop at the edge to the bed of the river/mud plains. There are also some tributary crossings with retaining walls/headwalls along the route. There is a risk that an errant vehicle could enter the river bed and there could be a secondary effect if the tide was high of drowning or of the vehicle not been seen by passing drivers given the height difference.

Where the greenway is located beside the existing road there is a risk that the removal of a bund may lead to an increased risk of an errant vehicle reaching the river/floodplain.

It was observed during the site visit that there is a high kerb along some sections of the existing public road. It is unclear if such a kerb is adequate to provide containment for errant vehicles.



RECOMMENDATION

It is recommended that risk assessments are carried out on the need to provide protection for errant vehicles from entering the river bed at various locations along the scheme. This should include the approach and departure lengths to parapet/retaining walls. Based on the outcome of the risk assessments suitable containment should be provided.

The use of high kerbs should take account of the speed limit and the containment rating (N1, N2 or otherwise) of the kerbs.

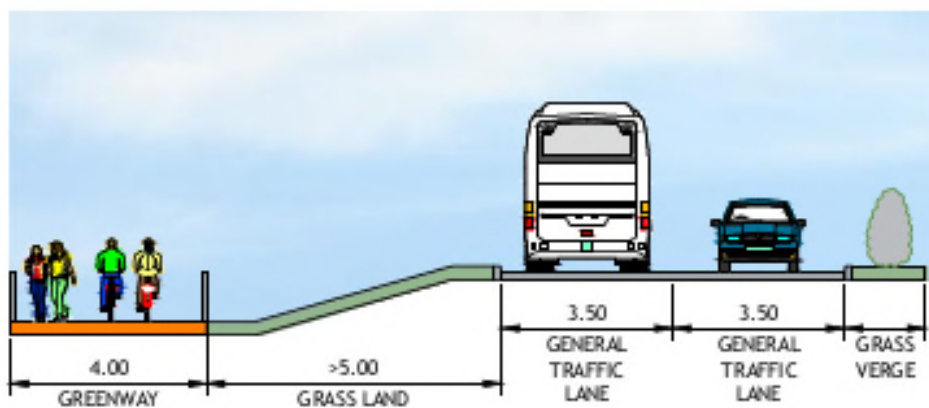
3.5 Problem

LOCATION

General, possibility of flooding.

PROBLEM

It was observed during the site visit that there are warning signs that some areas are prone to flooding. There is a risk that some users of the greenway may not know where to walk/cycle if the area is flooded. This could lead them to enter the carriageway or fall in areas where they cannot see trip hazards due to flooding. It is unclear if allowance has been made for recent extreme rainfall events combined with high tides and the possible implications of climate change.



RECOMMENDATION

It is recommended where possible the levels of the greenway should be above flood levels and that a regime of warning users of potential flooding be devised at detailed design stage.

3.6 Problem

LOCATION

Drawing 170029-2201 Rev P2, Bicycle Parking at Train Station.

PROBLEM

It is anticipated that the number of cyclists travelling to the train station to get the train will increase as a result of the construction of the greenway. Without suitable covered bicycle parking, cyclists may leave their bicycles where they may be an obstruction to pedestrians leading to pedestrian injuries.

RECOMMENDATION

It is recommended that through liaison with Iarnród Éireann that the provision of covered bicycle parking at the train station car park on Marsh Road be provided.

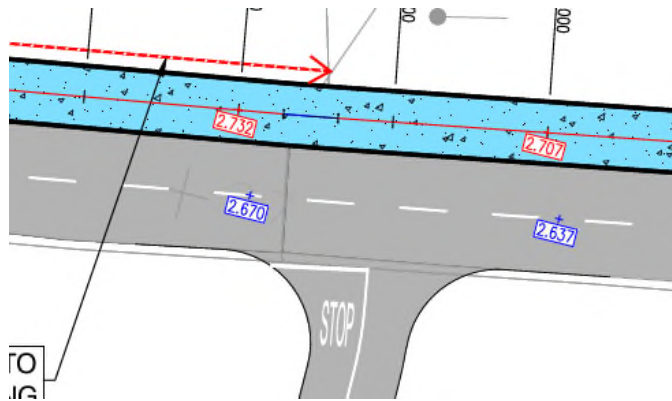
3.7 Problem

LOCATION

Drawing 170029-2205 Rev P2, Sideroad at Chainage 630.

PROBLEM

There is a proposed sideroad at Ch 630 on the opposite side of the R150 to the greenway. No means of accessing the greenway is shown on the drawings. Without an access point, vulnerable road users may have to stay on the carriageway where they would be at greater risk of being struck by passing traffic.



RECOMMENDATION

It is recommended that a suitable crossing/access to the Greenway be provided.

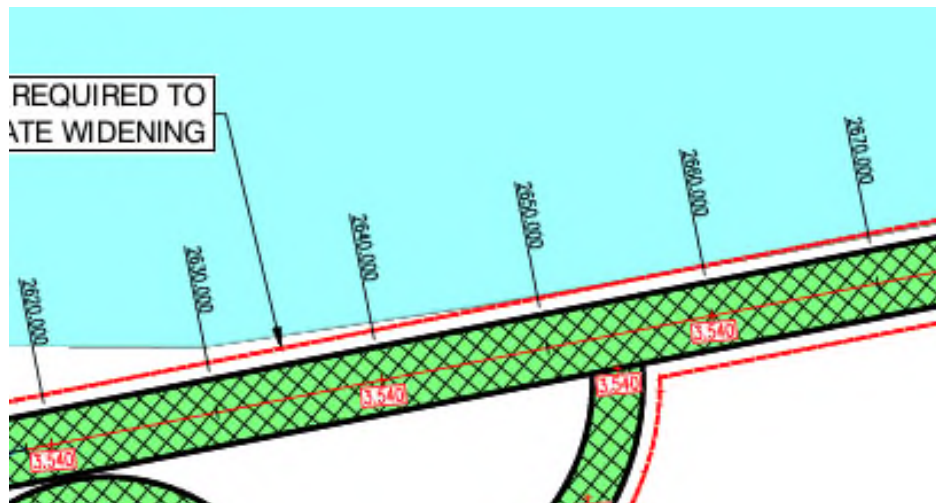
3.8 Problem

LOCATION

Drawing 170029-2218 Rev P5, Access to Marsh Road/Mill Road Junction.

PROBLEM

It is proposed to provide a spur from the boardwalk element of the greenway to the signalised crossing of Marsh Road to the East of the Mill Road junction. The turn into the spur from the main greenway may be difficult for cyclists given its width and the presence of the railings. This could lead to collisions with the railings or collisions with other cyclists or pedestrians.



RECOMMENDATION

It is recommended that the junction with the greenway spur be widened locally to facilitate cyclists turning movements.

3.9 Problem

LOCATION

Drawing 170029-2226 Rev P2, Zebra Crossing on R150 Church Road.

PROBLEM

The proposed zebra crossing at R150 Church Road is very close to the stop line. Drivers waiting to turn onto the R151/R150 will have to wait on the crossing. This may block the path of vulnerable road users.



RECOMMENDATION

It is recommended that the zebra crossing be set back at least one car length or that the entire junction be signalised.

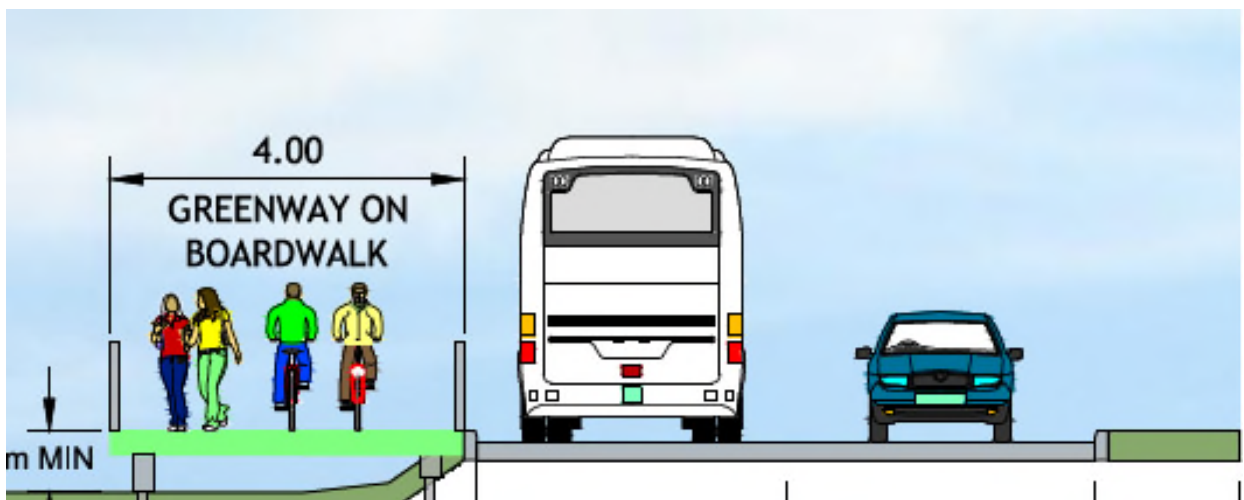
3.10 Problem

LOCATION

Drawing 170029-2227 Rev P2, Typical cross section.

PROBLEM

The typical cross section East of the R150 Church Road junction shows the boardwalk and carriageway separated by a pedestrian railing and a kerb. There is a risk that the railing will be damaged by a large vehicle given how small of an offset it has from the edge of the carriageway. This could also lead to injury to pedestrians or cyclists.



RECOMMENDATION

It is recommended that the railing of the boardwalk be set back further from the edge of carriageway.

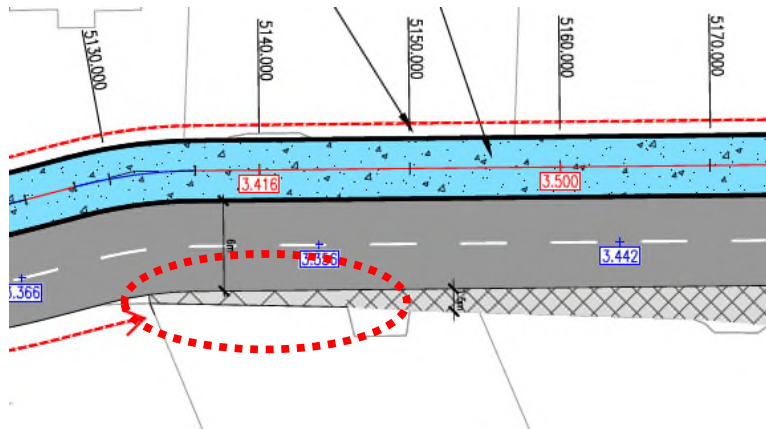
3.11 Problem

LOCATION

Drawing 170029-2235 Rev P3, Footpath on Southern side of R151.

PROBLEM

It is unclear where the footpath will terminate on the southern side of the R151 but it is expected at approximately Ch 5140. There is a risk that pedestrians may continue their journey towards Drogheda on the carriageway if there is no facility for them to cross to the greenway on the opposite side. This would lead to an increased risk of those pedestrians being struck by passing vehicles.



RECOMMENDATION

It is recommended that an uncontrolled crossing point be provided at the terminal of the footpath at a location where suitable inter-visibility is provided between pedestrians and drivers.

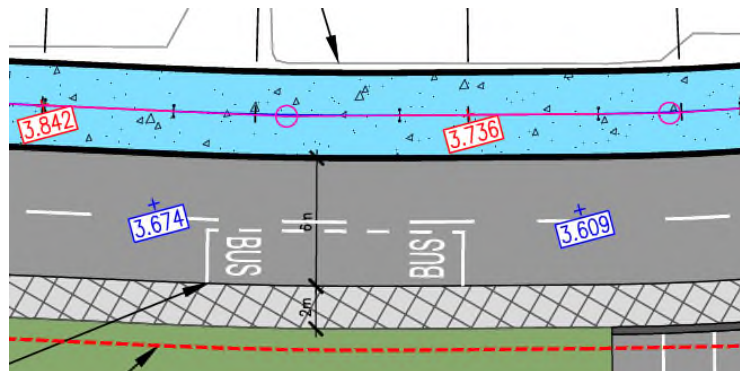
3.12 Problem

LOCATION

Drawing 170029-2237 Rev P4, Bus stop facilities.

PROBLEM

It is unclear if a pedestrian crossing point is to be provided between the greenway and the Drogheda bound bus stop at Ch 5450. Without suitable crossing facilities the bus may not be accessed by all.



RECOMMENDATION

It is recommended that a pedestrian crossing be provided adjacent to bus stop.

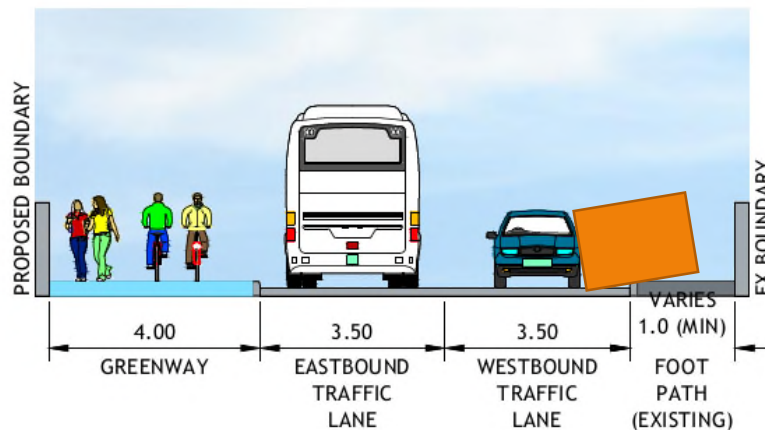
3.13 Problem

LOCATION

Drawing 170029-2202 and Site Observation.

PROBLEM

It was observed during the site visit that on-road parking takes place on the Marsh Road outside the houses adjacent to Weir Hope. There are no on-curtilage parking facilities at some of those houses. It is unclear if the carriageway will be narrowed at this location as a result of the greenway or will remain the same. A lack of parking provision may lead to parking on the footpath resulting in hazards for pedestrians.



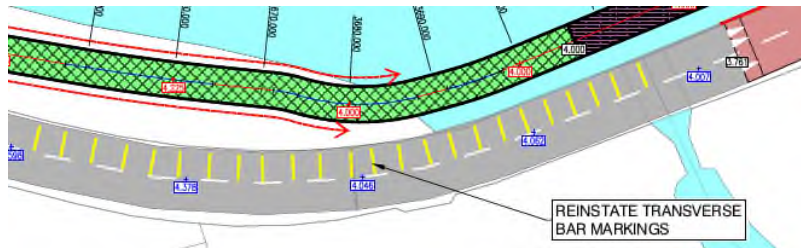
RECOMMENDATION

It is recommended that the scheme design takes account of this parking and that provision be made for it.

4.0 Observations

4.1 Observation

The use of transverse bar markings is currently only permitted on dual carriageway approaches to roundabouts. Alternative forms of traffic calming may be required on approach to the R150/R151 junction.



4.2 Observation

The use of tactile paving at raised tables throughout the scheme is inconsistent. This can be made consistent during the detailed design phase.

4.3 Observation

It is assumed that the greenway will be lit during the hours of darkness and that the crossing points will also be lit.

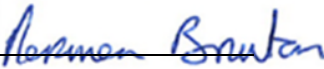
5.0 Audit Statement

We certify that we have examined the information provided and the site on the 3rd December 2018 and again in December 2021. The examination has been carried out with the sole purpose of identifying any features of the design which could be removed or modified in order to improve the safety of the scheme.

The problems identified have been noted in this report together with associated safety improvement suggestions which we would recommend should be studied for implementation. The audit has been carried out by the persons named below who have not been involved in any design work on this scheme as a member of the Design Team.

Norman Bruton

Signed:



(Audit Team Leader)

Dated: 1-3-2022

Mark McKenna

Signed:



(Audit Team Member)

Dated: 1-3-2022

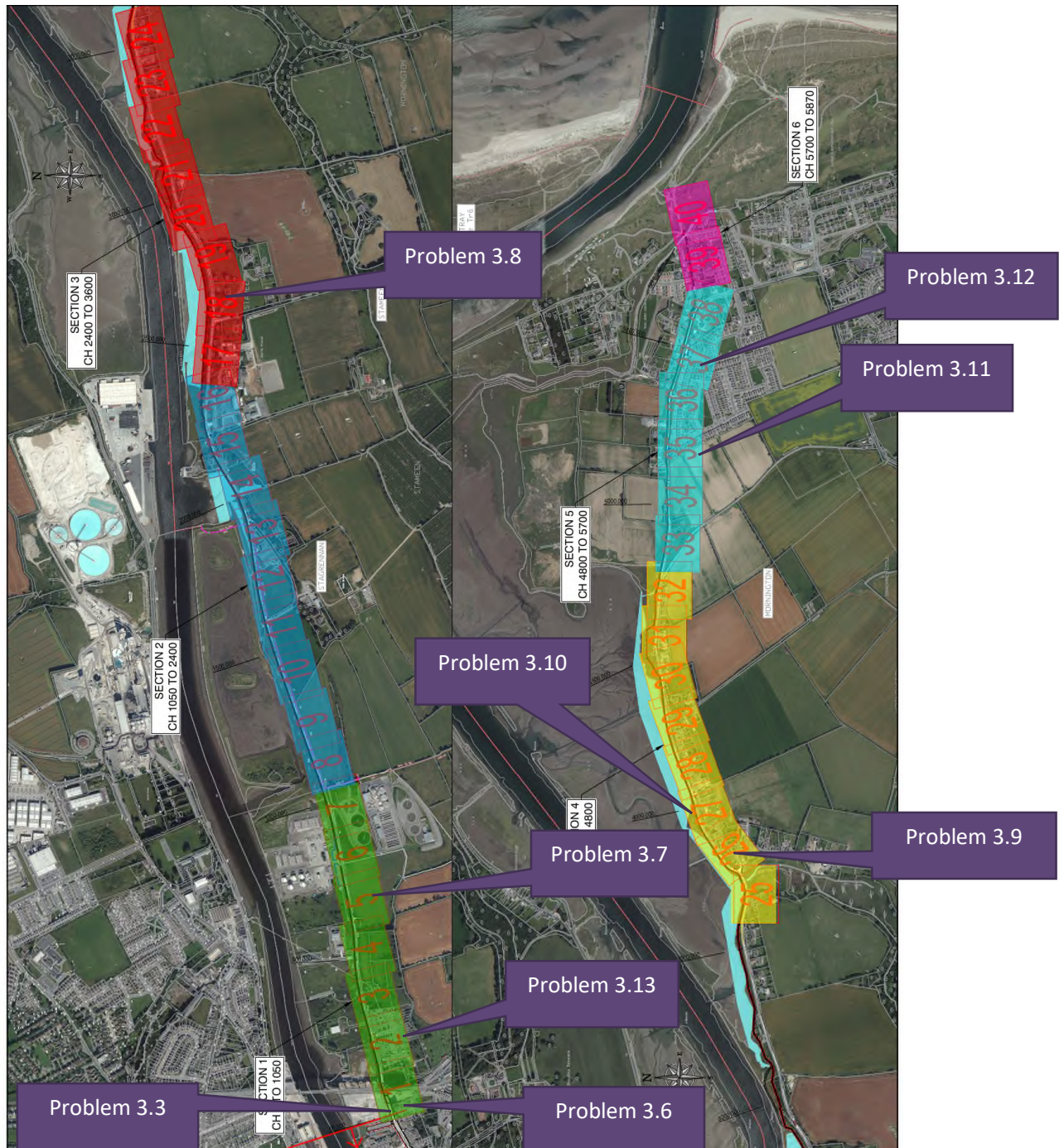
Appendix A

List of Material Supplied for this Stage 1 Road Safety Audit;

Drawing 170029-2200 Proposed Alignment Key Plan
Drawing 170029-2201 Proposed Alignment Sheet 1
Drawing 170029-2202 Proposed Alignment Sheet 2
Drawing 170029-2203 Proposed Alignment Sheet 3
Drawing 170029-2204 Proposed Alignment Sheet 4
Drawing 170029-2205 Proposed Alignment Sheet 5
Drawing 170029-2206 Proposed Alignment Sheet 6
Drawing 170029-2207 Proposed Alignment Sheet 7
Drawing 170029-2208 Proposed Alignment Sheet 8
Drawing 170029-2209 Proposed Alignment Sheet 9
Drawing 170029-2210 Proposed Alignment Sheet 10
Drawing 170029-2211 Proposed Alignment Sheet 11
Drawing 170029-2212 Proposed Alignment Sheet 12
Drawing 170029-2213 Proposed Alignment Sheet 13
Drawing 170029-2214 Proposed Alignment Sheet 14
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Drawing 170029-2219 Proposed Alignment Sheet 19
Drawing 170029-2220 Proposed Alignment Sheet 20
Drawing 170029-2221 Proposed Alignment Sheet 21
Drawing 170029-2222 Proposed Alignment Sheet 22
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Drawing 170029-2236 Proposed Alignment Sheet 36

Drawing 170029-2237 Proposed Alignment Sheet 37
Drawing 170029-2238 Proposed Alignment Sheet 38
Drawing 170029-2239 Proposed Alignment Sheet 39
Drawing 170029-2240 Proposed Alignment Sheet 40
Drawing 170029-2405 - Accomodation Works - Local Access Sheet 6 of 9
Drawing 170029-2406 - Accomodation Works - Local Access Sheet 7 of 9
Drawing 170029-2407 - Accomodation Works - Local Access Sheet 8 of 9
Drawing 170029-2408 - Accomodation Works - Local Access Sheet 9 of 9
Drawing 170029-2400 - Accomodation Works - Local Access Sheet 1 of 9
Drawing 170029-2401 - Accomodation Works - Local Access Sheet 2 of 9
Drawing 170029-2402 - Accomodation Works - Local Access Sheet 3 of 9
Drawing 170029-2403 - Accomodation Works - Local Access Sheet 4 of 9
Drawing 170029-2404 - Accomodation Works - Local Access Sheet 5 of 9
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Drawing 170029-2701
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Appendix B – Problem Location Map.



Appendix C

Feedback Form

SAFETY AUDIT FORM – FEEDBACK ON AUDIT REPORT

Scheme: Boyne Greenway, Drogheda to Mornington.

Stage: 1 Road Safety Audit

Date Audit (Site visit) Completed: 3rd December 2018 & 13-12-2021

| Paragraph No. in Safety Audit Report | Problem accepted (yes/no) | Recommended measure accepted (yes/no) | Alternative measures (describe) | Alternative measures accepted by Auditors (Yes/No) |
|--------------------------------------|---------------------------|---------------------------------------|--|--|
| 3.1 | Yes | Yes | As part of this Boyne Greenway scheme, it is proposed to reduce the speed limit of the R150 and R151 to 50km/hr, this will be forwarded to the Roads Authorities to form part of the next county wide speed limit review. In addition, a number of traffic calming features such as table-top ramps have been provided to reduce vehicle speeds. Upon construction of the scheme, and for intervening period until the implementation of the speed limit reduction as outlined, a Temporary Speed Limit Order will be applied to the R150/R151 along the route of the Greenway, which shall reduce the speed limit to 50km/hr. | Yes |
| 3.2 | Yes | No | The width of the proposed greenway has been calculated using the TII Publication "Rural Cycleway Design, April 2017, ref no. DN-GEO-03047. The 4m width is considered to meet/exceed the minimum desirable width of 3m for low volume routes (i.e. < 1,500 daily users). Lighting columns will not be provided within the greenway. | Yes |
| 3.3 | Yes | No | The upgrade of pedestrian and cycle facilities into Drogheda town is part of a separate phase/section of Boyne Greenway scheme. | Yes |

| Paragraph No. in Safety Audit Report | Problem accepted (yes/no) | Recommended measure accepted (yes/no) | Alternative measures (describe) | Alternative measures accepted by Auditors (Yes/No) |
|--------------------------------------|---------------------------|---------------------------------------|---|--|
| | | | There is a large park and ride car park on the western side of the Boyne Viaduct. This Irish Rail carpark is currently pay & display, greenway users may use the car park complying to the pay & display protocols. | |
| 3.4 | Yes | No | The proposed greenway will create more protection from potential errant vehicle entering the river bed than the existing layout. The scheme proposes a 4m wide boardwalk with kerbs and fencing along this point. The boardwalk will be able to cater for vehicular loads, for emergency access. Therefore, the boardwalk will create an additional 4m clear zone. | Yes |
| 3.5 | Yes | No | <p>The greenway would only be in Flood Zone A when alongside the road, and therefore constrained by existing road infrastructure, raising the greenway significantly (as much as 1.2 metres above road level in places) would be impractical, commercially restrictive, and visually obtrusive.</p> <p>It is the intention of Meath County Council that permanent warning signage (variable message) be put in place notifying both road and greenway users of the flood levels and directing them to an alternative route. The sign information will be switched by way of automatic level monitoring within Drogheda Port</p> | Yes |
| 3.6 | Yes | No | This is on Iarnród Éireann private owned lands. Bicycle parking is currently provided at the rail station. If the scheme is approved, | Yes |

| Paragraph No. in Safety Audit Report | Problem accepted (yes/no) | Recommended measure accepted (yes/no) | Alternative measures (describe) | Alternative measures accepted by Auditors (Yes/No) |
|--|---------------------------------|--|---|--|
| | | | the Employer will raise the matter with Iarnród Éireann and the National Transport Authority with a view to the latter providing additional covered bicycle parking at the Station. | |
| 3.7 | Yes | No | This sideroad is a future private development. When the road/development is further progressed, discussions between the development and the Roads Authority will be undertaken to determine a suitable safe crossing facility. | Yes |
| 3.8 | Yes | Yes | | |
| 3.9 | Yes | No | It is proposed to replace the zebra crossing with an uncontrolled crossing, as there no desire line or footpath on the opposite side of Church Road at present. This crossing may be updated as part of future developments along Church Road. | Yes |
| 3.10 | Yes | No | 450mm buffer will be provided between the carriageway edge and the boardwalk railing. The timber rails will be placed on the boardwalk/greenway side of the posts. | Yes |
| 3.11 | Yes | No | A zebra crossing to the greenway is provided at the Mornington Court access. Providing a pedestrian crossing at the location mentioned will encourage the two residential properties on the southern side of the R151 to cross at a location where vehicle speeds have not | Yes |

| Paragraph No. in Safety Audit Report | Problem accepted (yes/no) | Recommended measure accepted (yes/no) | Alternative measures (describe) | Alternative measures accepted by Auditors (Yes/No) |
|--|---------------------------------|--|--|--|
| | | | been calmed due to proposed traffic calming. | |
| 3.12 | Yes | Yes | | |
| 3.13 | Yes | No | Prior to providing the exiting cycle facilities there were yellow lines (parking restriction) on both sides of the carriage at this location. Residents at this location have existing parking spaces at the rear of their properties. | Yes |

Signed.....*Mark Kelly*
Design Team Leader

Date: 22/02/2022

Signed.....*Herman Bruton*
Audit Team Leader

Date: 24/2/2022

Signed.....*Corinne Ross*
Employer

Date: 01/03/2022