# South Circular Road to Bishops Quay Cycle Scheme

## Site Specific Flood Risk Assessment

**211101-PUNCH-XX-XX-RP-C-007**

**September 2022**

## Document Control

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# 1 Introduction

## 1.1 Background

This report was prepared to accompany a planning application by Limerick City and County Council (LCCC) for a proposed cycle route from Ballykeefe Roundabout on Ballinacurra Road to Bishops Quay via South Circular Road (SCR), Henry Street and Mill Lane.

The proposed route of the scheme will cover a distance of approximately 2.6km connecting the suburbs of Raheen/Dooradoyle within Limerick's city centre as outlined in Figure 1-1 below.

The proposed works will involve alterations to the existing road network which includes both increasing and reducing road width, new cycle track construction, improved footpath provision, new pedestrian crossings, traffic calming measures, shared surfaces, new road markings and all ancillary works necessary for completion of the scheme. Upon completion of the project, there will be improved facilities for both pedestrians and cyclists with an aim to reduce the reliability on private car use in the area.

The project extents are as outlined in Figure 1-1 below. Please refer to the engineering drawings contained within the planning pack for the full extents of the works.

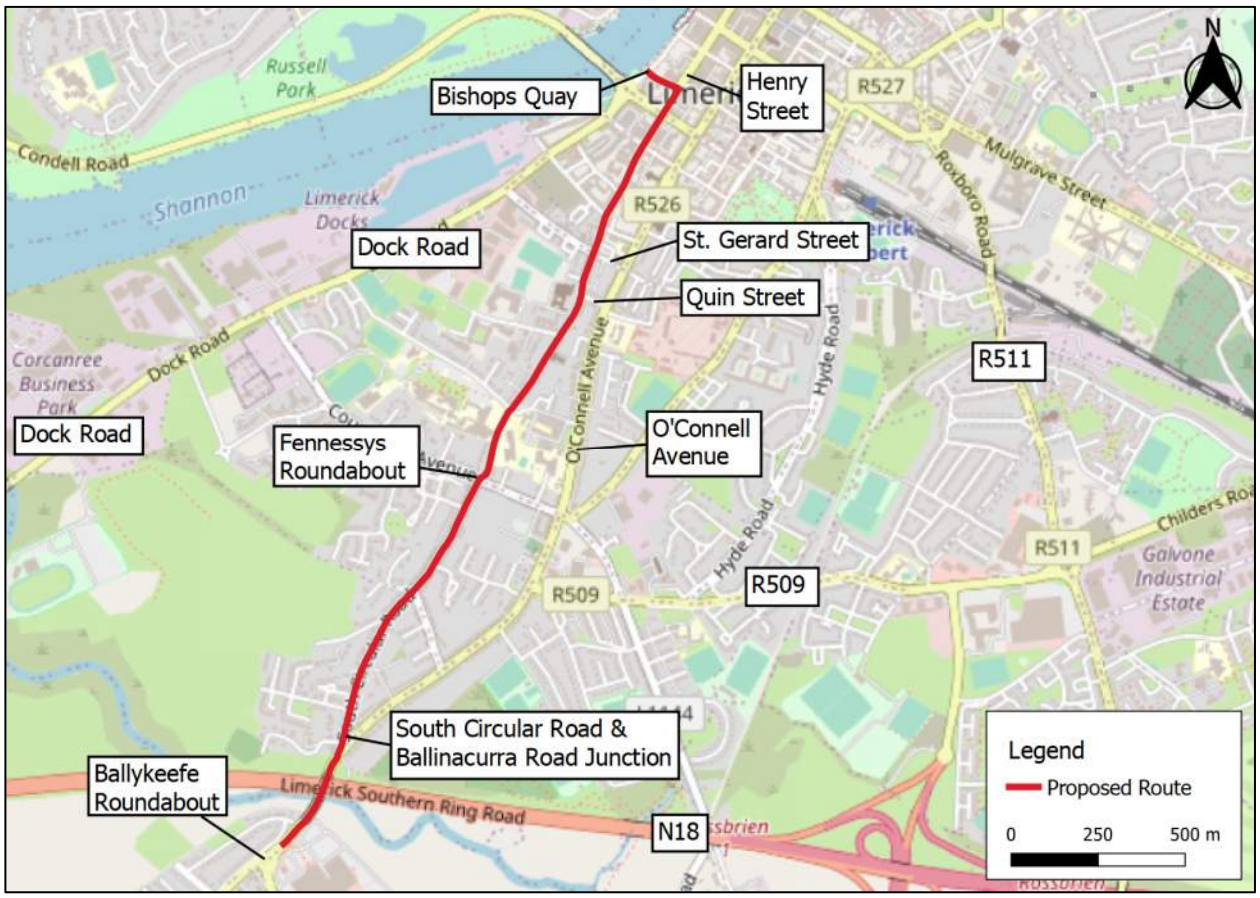


**Figure 1-1: Project Extents (Ref: https://www.openstreetmap.org/copyright )**

# 2 Relevant Guidance

## 2.1 The Planning System and Flood Risk Management Guidelines

In September 2008, "The Planning System and Flood Risk Management" Guidelines were published by the Department of the Environment, Heritage and Local Government in Draft Format. In November 2009, the adopted version of the document was published.

The Flood Risk Management Guidelines give guidance on flood risk and development. The guidelines recommend a precautionary approach when considering flood risk management in the planning system. The core principle of the guidelines is to adopt a flood risk sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding. The guidelines include definitions of Flood Zones A, B and C, as noted in Table 2-1 below. It should be noted that these do not take into account the presence of flood defences, as there remain risks of overtopping and breach of the defences.

**Table 2-1: Flood Zone Designation**

| Flood Zone | Type of Flooding | Annual Exceedance Probability (AEP) |
|---|---|---|
| Flood Zone A | Coastal | Less than a 1:200 (0.5% AEP) year event |
| | Fluvial | Less than a 1:100 (1% AEP) year event |
| Flood Zone B | Coastal | Greater than a 1:200 (0.5% AEP) and less than a 1:1000 (0.1% AEP) year event |
| | Fluvial | Greater than a 1:100 (1% AEP) and less than a 1:1000 (0.1% AEP) year event |
| Flood Zone C | Coastal | Greater than a 1:1000 (0.1% AEP) year event |
| | Fluvial | Greater than a 1:1000 (0.1% AEP) year event |

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for through the use of the **Justification Test**, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.

A three staged approach to undertaking an FRA is recommended:

**Stage 1: Flood Risk Identification** – Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment;

**Stage 2: Initial Flood Risk Assessment** – Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures;

**Stage 3: Detailed Flood Risk Assessment** – Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk of the development, impacts of the flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements for Stage 1.

## 2.2 Limerick City and County Council (LCCC) Development Plan

Policies relating to flood risk within the Limerick City and Council Development Plan 2022-2028 are outlined in Chapter 9. The relevant excerpts are copied below:

> *It is the policy of Limerick City and County Council to:*
>
> - *Flood Risk Assessments. It is an objective of the Council to require a Site-specific Flood Risk Assessment (FRA) for all planning applications in areas at risk of flooding (coastal/tidal, fluvial, pluvial or groundwater), where deemed necessary. The detail of these Site-specific FRAs (or commensurate assessments of flood risk for minor developments) will depend on the level of risk and scale of development. A detailed Site-specific FRA should quantify the risks, the effects of selected mitigation and the management of any residual risks. The assessments shall consider and provide information on the implications of climate change with regard to flood risk in relevant locations.*
> - ***Strategic Flood Risk Assessment**. It is an objective of the Council to have regard to the recommendations set out in the Draft Strategic Flood Risk Assessment prepared to support the Draft Plan.*

A Strategic Flood Risk Assessment was completed for Limerick City and County Council in June 2021, the recommendations of which have been incorporated into the current LCCC Development Plan 2022-2028 which states the following with regards flood risk:

> *It is a policy of the Council to protect Flood Zone A and Flood Zone B from inappropriate development and direct developments/land uses into the appropriate lands, in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 (or any superseding document) and the guidance contained in Development Management Standards. Where a development/land use is proposed that is inappropriate within the Flood Zone, then the development proposal will need to be accompanied by a Development Management Justification Test and site specific Flood Risk Assessment in accordance with the criteria set out under The Planning System and Flood Risk Management Guidelines for Planning Authorities 2009 and Circular PL2/2014 (as updated/ superseded). In Flood Zone C, the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed and should consider the implications of climate change.*

## 2.3 Land Zoning

The proposed cycle scheme will largely be located along existing roadways and as such land use zoning does not apply. Part of the proposed scheme includes the provision of a new 10 space car park which is located on lands subject to 'Existing Residential'. The proposed carpark does not lie within a designated flood zone.

## 2.4 Flood Risk Management Plan

The OPW have published Flood Risk Management Plans detailing the feasible range of flood risk management measures proposed for their respective river basins. The Flood Risk Management Plan for the Shannon Upper and Lower River Basin was published by the OPW in 2018 and is valid for the period 2018-2021. The plan lists current flood management measures in place and potentially viable Flood Relief Works. There are a number of measures proposed in the plan which are applicable for all areas. As well as maintaining existing measures, the Flood Risk Management Plan lists the following proposed Flood Relief Scheme measures for Limerick:

- The proposed King's Island Flood Relief Scheme includes protection to residential and commercial properties. The design standard of protection for the scheme is the 1% AEP fluvial event (1 in 100 year) and 0.5% AEP tidal event (1 in 200 year). The scheme is not expected to impact on the proposed development.
- The proposed Limerick City & Environs Flood Relief Scheme may include structural flood defences, demountable defences, upgrade existing culverts, dredging (deepening and widening), replacement of lock gates, provision of Sluice Gates, new flapped outfall, top-hinged rectangular tide gates, an online storage area, road raising and public Awareness for properties, a Flood Forecasting system for the Lower Shannon and new embankments. The design standard of protection for the scheme is the 1% AEP fluvial event (1 in 100 year) and 0.5% AEP tidal event (1 in 200 year). The scheme is not expected to impact on the proposed development.

# 3 Flood Risk Identification

## 3.1 Existing Hydrological Environment

The proposed cycle route runs from north of Ballykeefe Roundabout on Ballinacurra Road to Bishops Quay in Limerick City. The dominant hydrological features in the vicinity of the route are the River Shannon and it's tributary, Ballinacurra Creek, both of which are tidally influenced in this area. The proposed cycle route crosses over Ballinacurra Creek approximately 250m north-east of the Ballykeefe Roundabout and the route terminates on the banks of the River Shannon. The watercourse locations are shown in Figure 3-1.

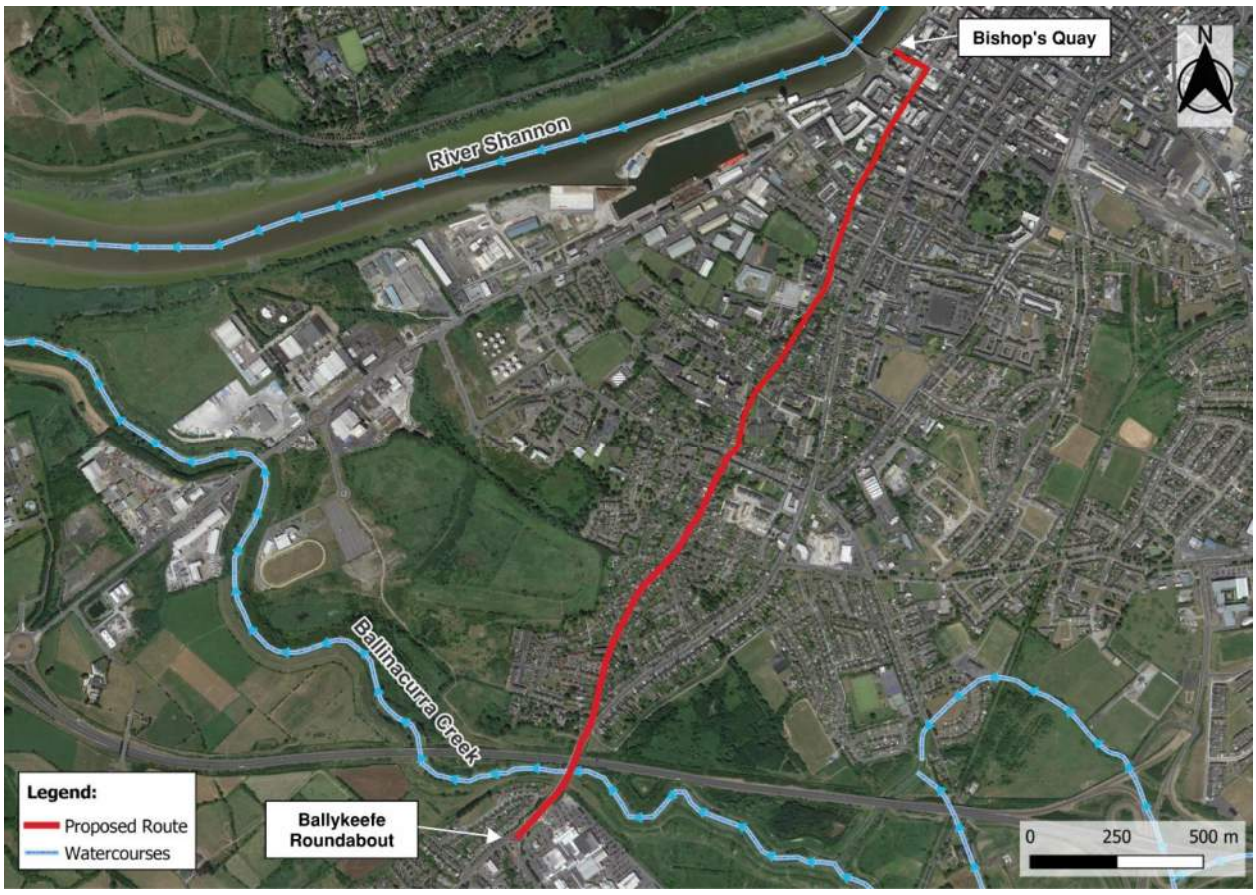


**Figure 3-1: Existing Hydrological Environment**

## 3.2 Groundwater Flooding

From a review of data from the Geological Survey of Ireland, it appears that the proposed cycle route is not at risk of groundwater flooding.

## 3.3 Review of Historic Mapping

A review of the OSI Historical maps[1] was carried out. Due to the length of the proposed cycle route the historic mapping is presented in two Figures. Figure 3-2 depicts the route from Ballinacurra Creek to New Street and Figure 3-3 shows the route from New Street to Bishop's Quay. The route is not identified as "liable to flood" in the available historic OSI maps.

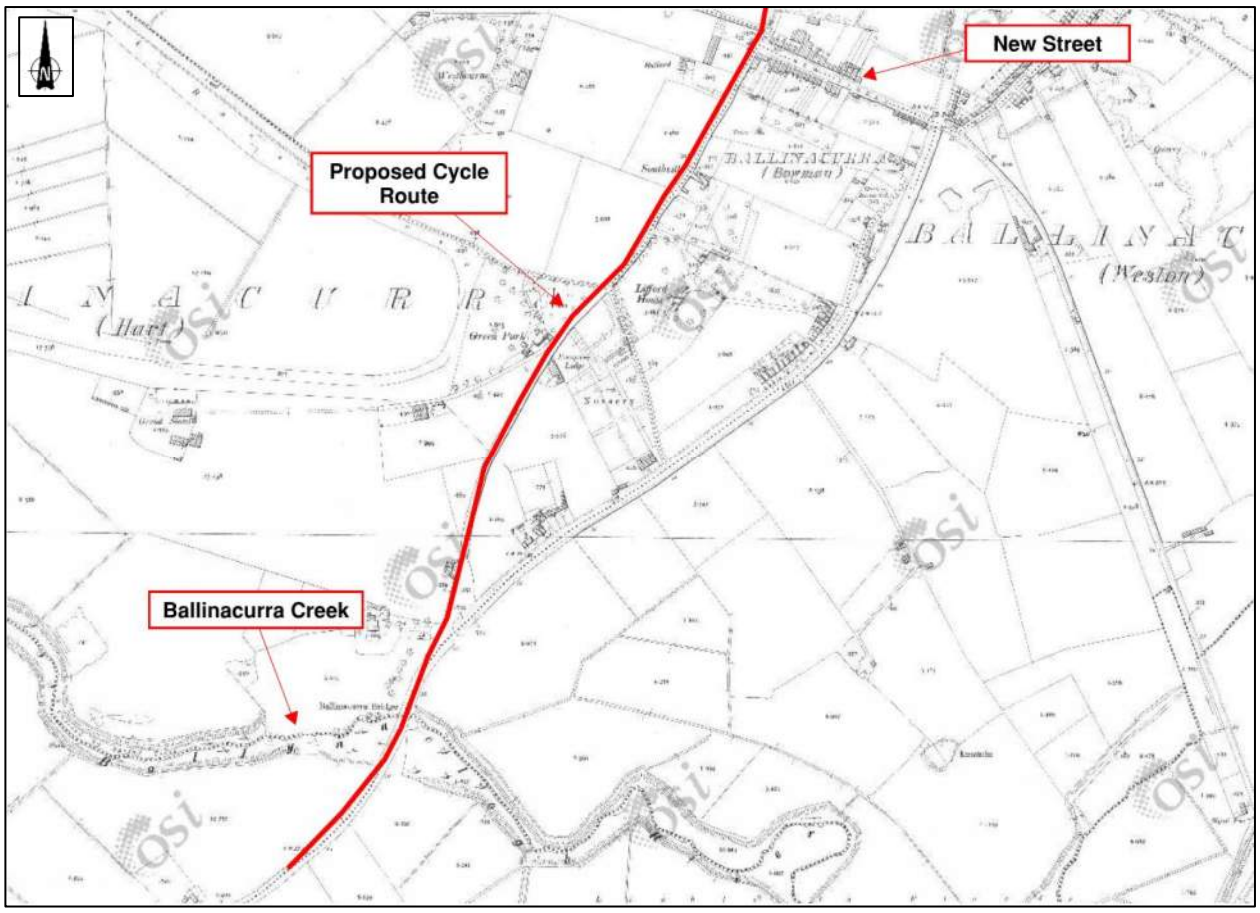


**Figure 3-2: Extract from OSI historical 25-inch map (Ballincurra Creek to New Street)**

[1] Maps available: http://map.geohive.ie/mapviewer.html

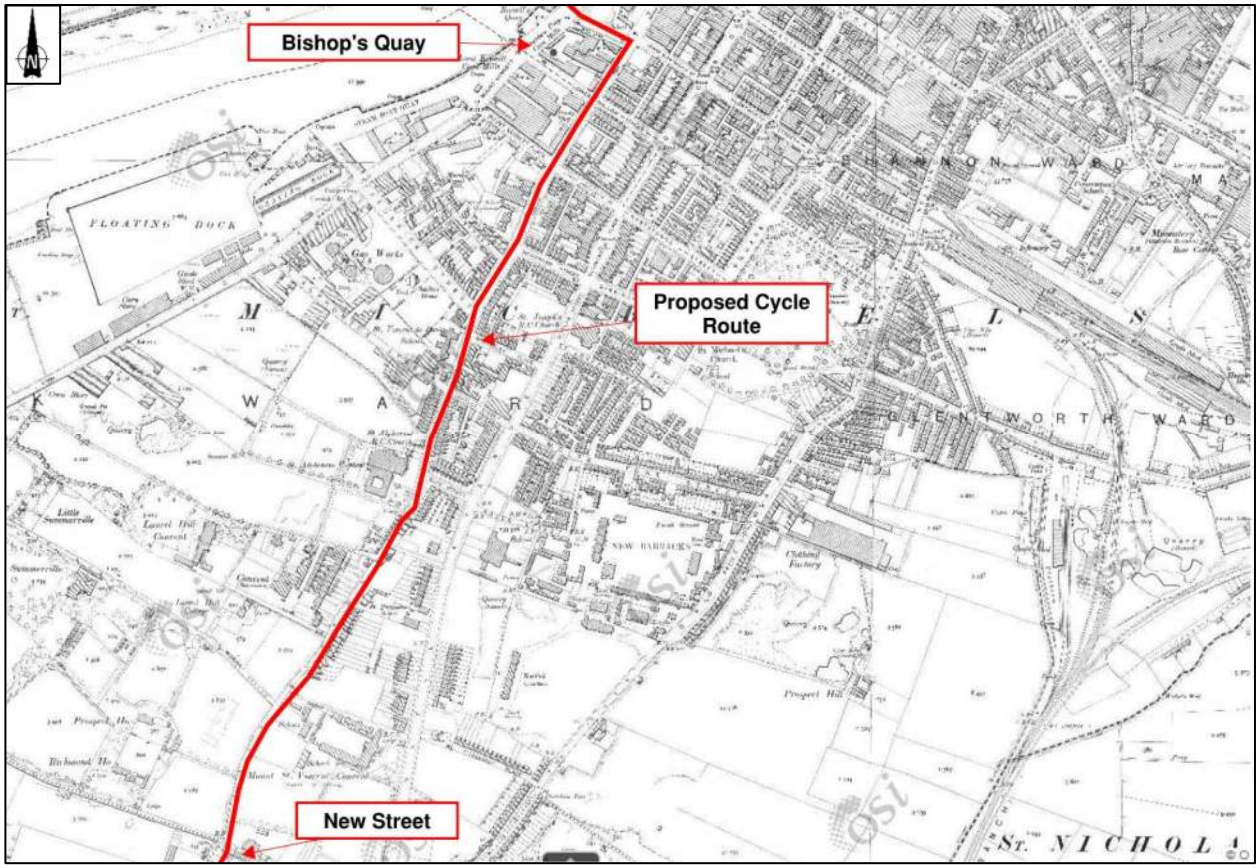


**Figure 3-3: Extract from OSI historical 25-inch map (New Street to Bishop's Quay)**

## 3.4 History of Flooding

The OPW Flood Hazard Mapping Website is a record of historic flood events. This database identifies a historic flood event on Ballincurra Creek at the southern extent of the cycle route in 1999. This flood event was attributed to a combination of persistent rainfall, high tide, low pressure and westerly winds. This same event caused flooding adjacent to Bishop's Quay. The OPW database also identifies recurrent flood events at Ballincurra Creek adjacent to the proposed cycle route. An extract from the Past Flood Event Local Area Summary Report is shown in Figure 3-4.

Please note that this is not a guaranteed record of all flood events.

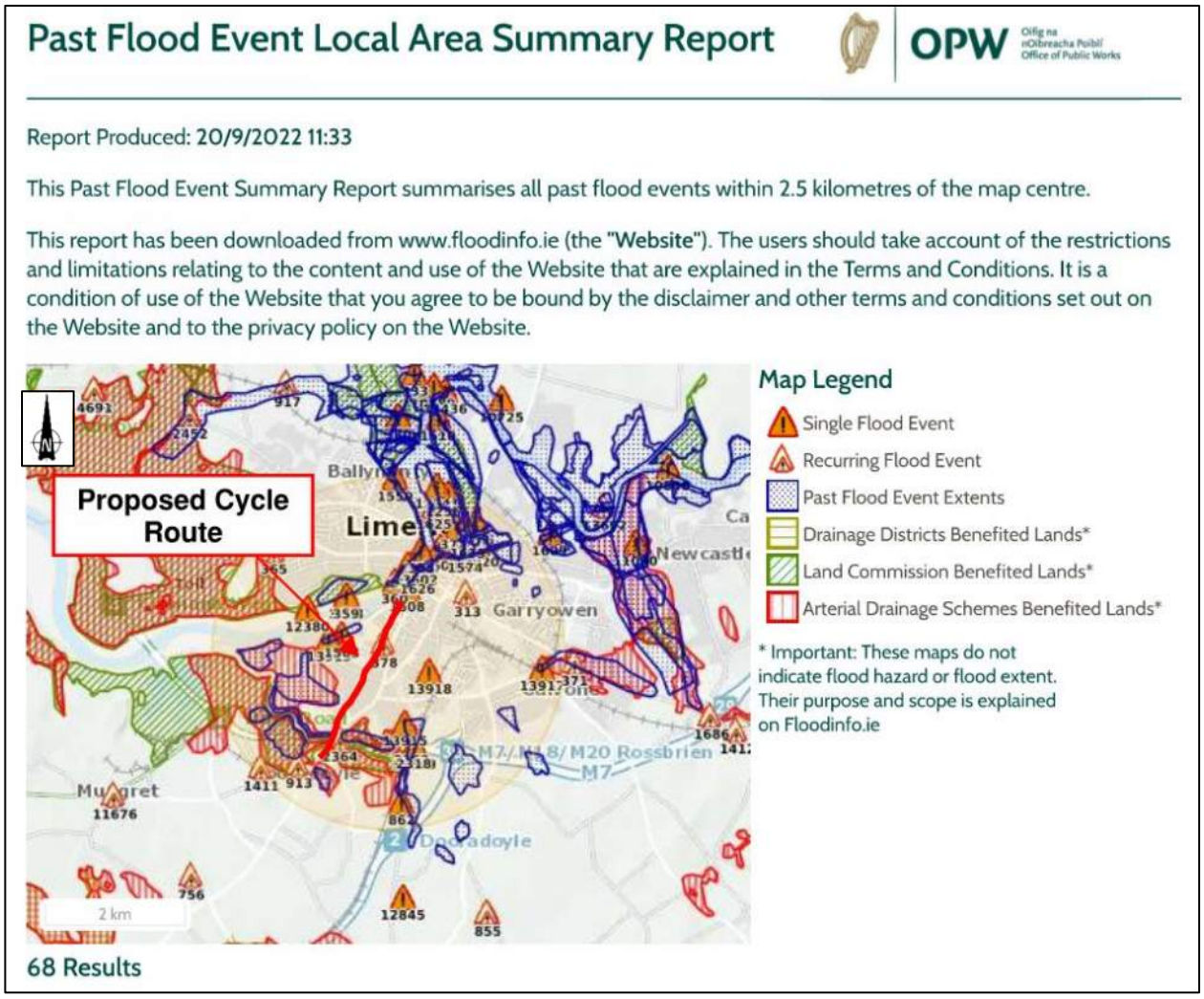


**Figure 3-4: OPW Past Flood Event Report (Ref: OPW Flood Maps)**

## 3.5 LCCC Development Plan Strategic Flood Risk Assessment

A Strategic Flood Risk Assessment (SFRA) was prepared to accompany the LCCC Development Plan 2022-2028. This SFRA includes flood zone mapping for the Limerick City and County area. Figure 3-5 and Figure 3-6 below are extracts from Figure 7.1 and Figure 7.2 of the SFRA document.

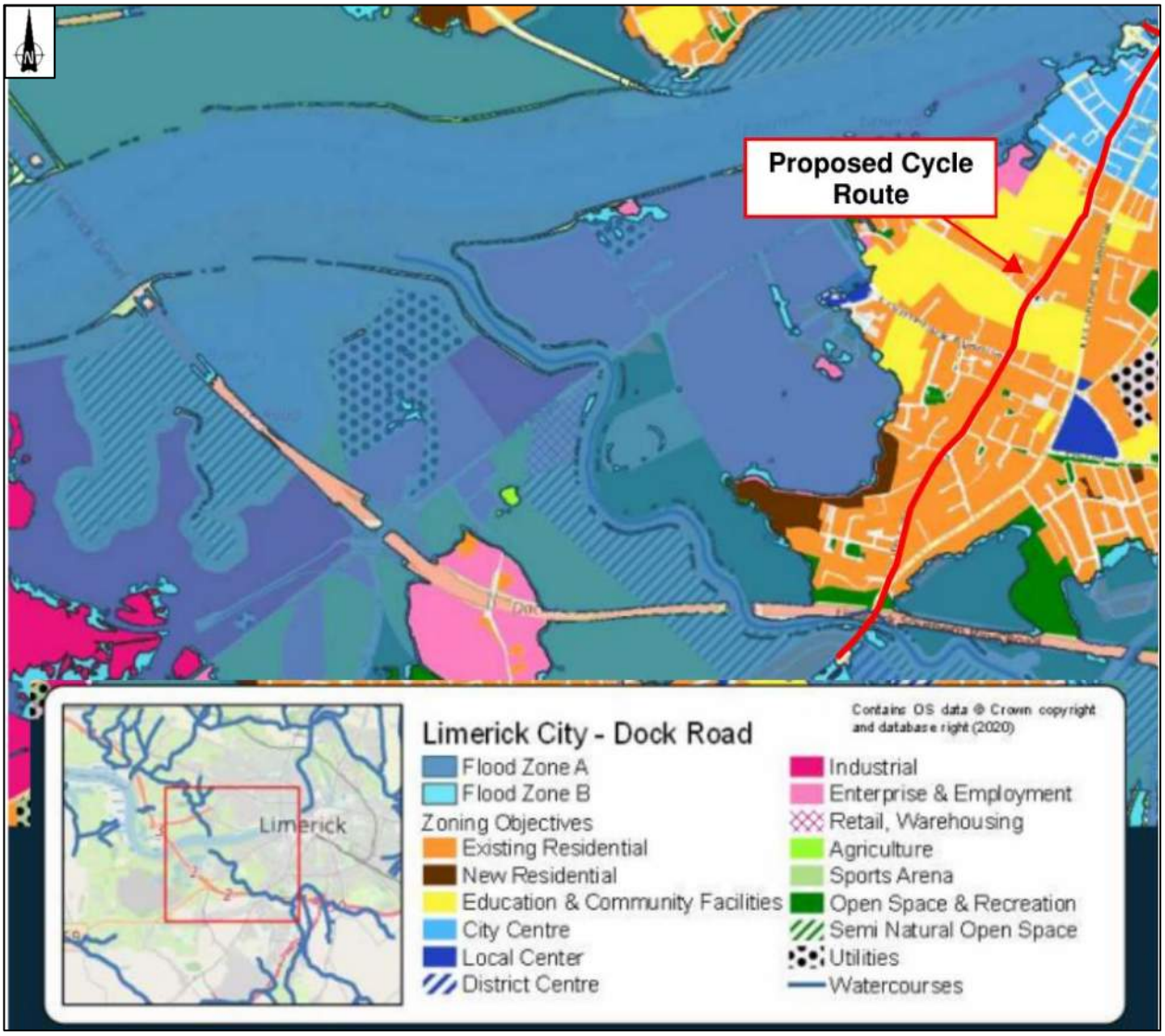


**Figure 3-5: Extract from LCCC Development Plan SFRA Figure 7.1**

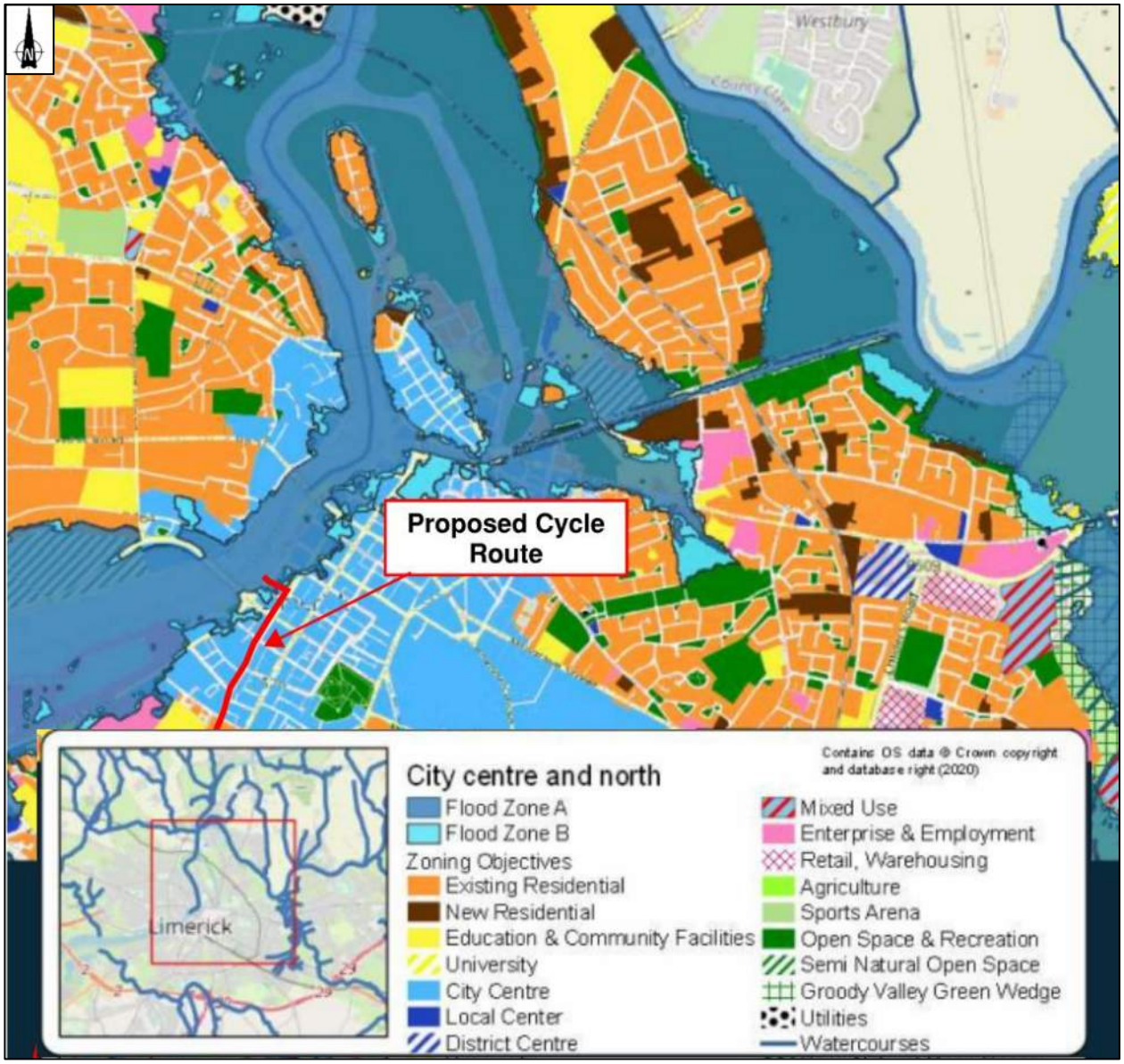


**Figure 3-6: Extract from LCCC Development Plan SFRA Figure 7.2**

It can be seen from Figure 3-5 and Figure 3-6 that the southern extent of the proposed cycle route at Ballinacurra Creek and the northern extent at Bishop's Quay are located in Flood Zone A.

## 3.6 Catchment Flood Risk Assessment and Management Study (CFRAMS) Mapping

The CFRAMS is an OPW led national programme which seeks to identify and map potential existing and future flood hazard in areas at significant risk from flooding. It also aims to identify flood relief measures and prepare Flood Risk Management Plans for these areas.

The site of the proposed development is located in an area which has been assessed as part of the Shannon CFRAM Study (UoM 25/26). The OPW has published detailed flood hazard mapping for this area which is available online for public viewing. This includes flood extent and flood depth mapping for a number of return periods for fluvial and coastal flood events.

Fluvial flooding does not affect the proposed cycle route.

Figure 3-7 below, is an extract from the Shannon CFRAMS coastal flood extent mapping showing areas at risk of flooding at the southern extent of the proposed cycle route. It can be seen in this figure that approximately 250m of the proposed cycle route is located within a defended area which is protected up to a 0.5%AEP coastal flood event. "The Planning System and Flood Risk Management" Guidelines stipulate that flood zones be based on undefended scenarios and therefore this section of the proposed cycle route is located within the 0.5%AEP flood extent or Flood Zone A.

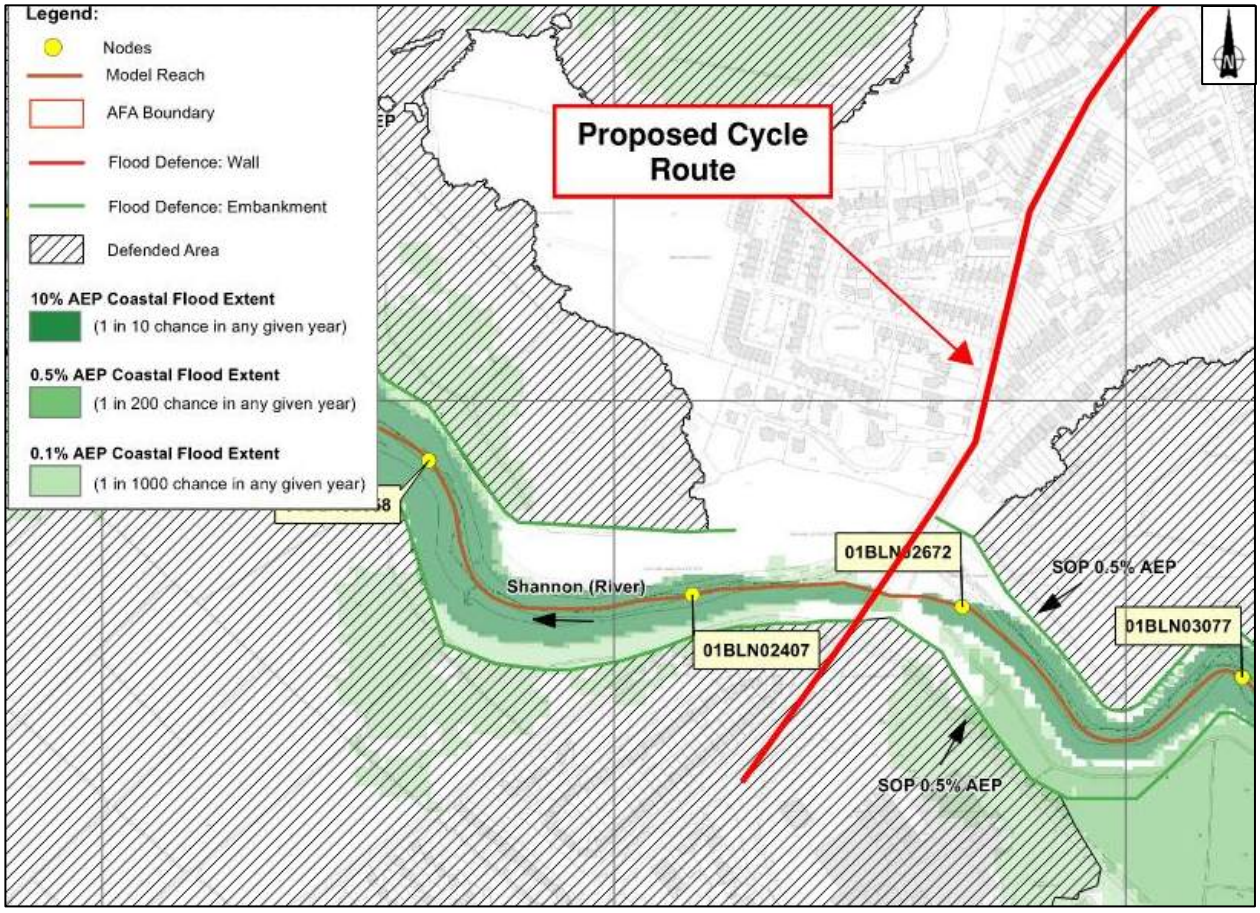


**Figure 3-7: CFRAMS Flood Extent Mapping (Southern Extent)**

Figure 3-8 below, is an extract from the Shannon CFRAMS coastal flood extent mapping showing areas at risk of flooding at the northern extent of the proposed cycle route. It can be seen from this figure that approximately 20m of the proposed cycle route is located within the 0.5%AEP coastal flood extent or Flood Zone A.

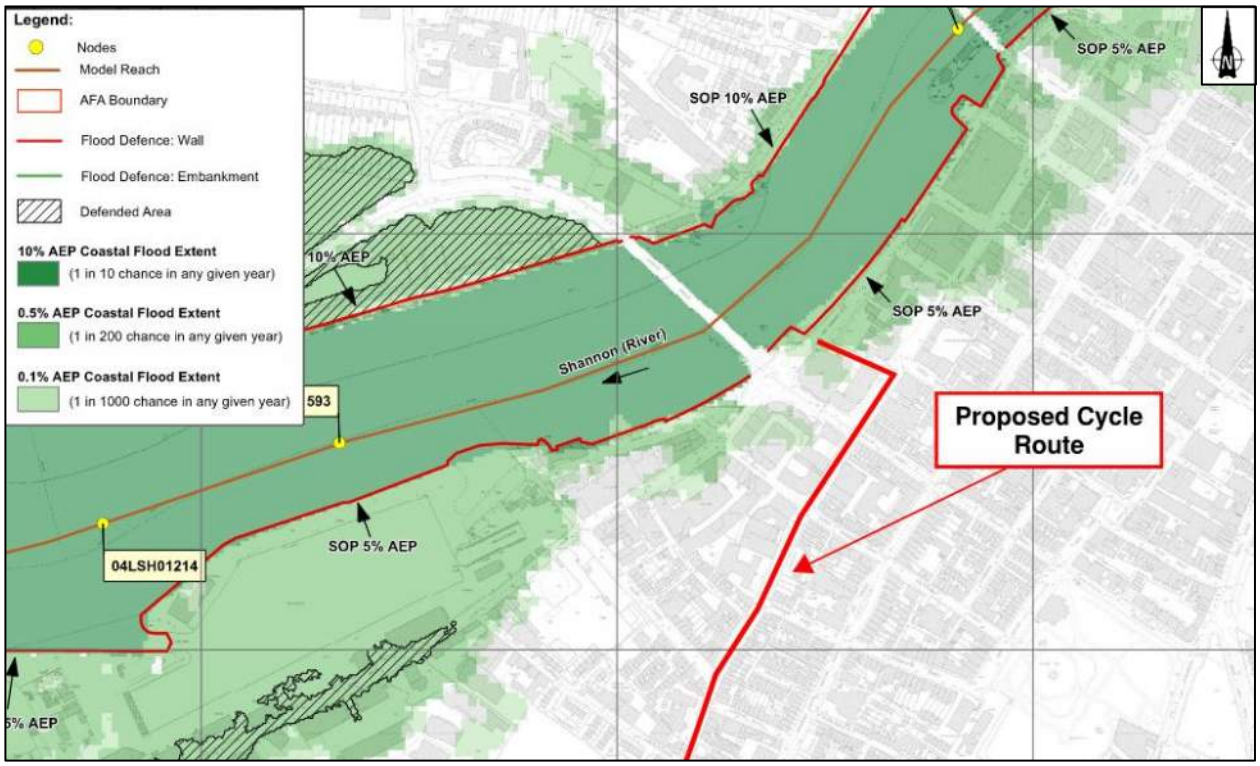


**Figure 3-8: CFRAMS Flood Extent Mapping (Northern Extent)**

## 3.7 Pluvial Flood Risk

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. The existing surface water within the scheme extents will be discharged to the existing storm water network system. LCCC will explore the introduction of SuDS measures during the detailed design stage of the project through the introduction, where feasible, of nature-based SuDS solutions such as tree pits, rain gardens among others. There will be no increase in discharge volumes associated with the scheme.

## 3.8 Estimate of Flood Zone

PUNCH Consulting Engineers have reviewed the available information as outlined in the above sections. We have concluded that the southern and northern extents of the proposed cycle route are located in Flood Zone A and are therefore at risk of flooding.

## 3.9 Vulnerability Classification

Table 3.1 of "The Planning System and Flood Risk Management" Guidelines provides a broad classification of land use and vulnerability class. The proposed cycle route can be classified under "*outdoor sports and recreation*" and as such is considered a Water Compatible Development.

Table 3.2 of "The Planning System and Flood Risk Management" Guidelines provides a matrix of vulnerability versus flood zone and is reproduced here as Table 3-1. With reference to this table, it is concluded that the proposed cycle route is considered appropriate within Flood Zone A.

**Table 3-1: Matrix of Vulnerability versus Flood Zone to indicate Justification Requirement**

| | Flood Zone A | Flood Zone B | Flood Zone C |
|---|---|---|---|
| Highly vulnerable development | Justification Test | Justification Test | Appropriate |
| Less vulnerable development | Justification Test | Appropriate | Appropriate |
| Water-compatible development | Appropriate | Appropriate | Appropriate |

## 3.10 Flood Impact Assessment of the Proposed Scheme

There are a number of potential aspects to consider when assessing if the proposed development will increase the flood risk elsewhere.

i. Loss of flood Storage – Not Applicable
ii. Diversion of flood waters – Not Applicable
iii. Increased runoff from the proposed development – Not Applicable

Coastal flood storage and flow paths in the area will be unaffected due to the proposed cycle scheme. Ground levels will be maintained at the existing ground levels as much as possible. Flow paths in extreme flood events will have the same flow pattern as existing.

The majority of the current site has impermeable surfaces, and the SUDs measures will be introduced as part of the proposed development. The result of this is that the runoff rate from the development will be reduced in the proposed scenario when compared with the current existing scenario.

# 4 Flood Risk Assessment Conclusions

This report was prepared to accompany a planning application by Limerick City and County Council (LCCC) for a proposed cycle route from north of Ballykeefe Roundabout on Ballinacurra Road to Bishops Quay via South Circular Road (SCR), Henry Street and Mill Lane.

The proposed cycle route has been assessed in accordance with the "The Planning System and Flood Risk Management" Guidelines and LCCC's Development Plan 2022-2028.

CFRAMS Flood Extent Maps were consulted to establish the Flood Zone. It was determined that the southern and northern extents of the proposed cycle route are currently located in Flood Zone A for coastal flooding. The proposed cycle route is classified as a Water Compatible Development under "The Planning System and Flood Risk Management" Guidelines and as such is considered appropriate in this location. The proposed development will not increase the flood risk elsewhere.