

LIMERICK CITY AND COUNTY COUNCIL

ST PAULS TO BALLYKEEFFE ROUNDABOUT ACTIVE TRAVEL SCHEME

SITE - SPECIFIC FLOOD RISK ASSESSMENT

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1. INTRODUCTION

1.1 SSFRA Requirement

MRG Consulting Engineers Limited have prepared this Site Specific Flood Risk Assessment Report (SSFRA) to accompany the Part 8 Planning Application by Limerick City & County Council for the upgrade of cycling facilities and cyclist/pedestrian crossing facilities along a length of the R526 St. Nessans Road from Saint Pauls Roundabout to Ballykeeffe Roundabout (SPR to BKR).

Under the Planning System and Flood Risk Management Guidelines for Planning Authorities (DEHLG & OPW) a proposed development must undergo a Flood Risk Assessment to ensure sustainability and effective management of flood risk. The requirement for the preparation of an SSFRA is also referenced in the Limerick Development Plan 2022-2028.

The R526 SPR to BKR Scheme is located in the greater Raheen / Dooradoyle area which is a large residential area to the Southwest of Limerick City with a number of local schools and employers in the area. University Hospital Limerick is located on the R526 south of St. Pauls Roundabout. The Crescent Shopping Centre is situated off the R926 Dooradoyle Road adjacent to Ballykeeffe Roundabout and comprises the largest concentration of retail floor space outside of the City Centre and is adjacent to Limerick City & County Council's County Hall building and library.

Figure 1.1 below highlights the extents of the R526 SPR to BKR Scheme in red.



Figure 1.1 Site Location Map showing Proposed R526 SPR TO BKR Cycle Facility Scheme in red.

2. SITE BACKGROUND

2.1 Site Location

The SPR to BKR Scheme extents comprises the road corridor from the St. Pauls Roundabout junction to the Ballykeeffe Roundabout junction. See Figure 2.1

There are completed cycle track installation works and further planned improvements to cycle facilities in the area of the Scheme on the R526, R926 and Father Russell Road as follows:

- To the north of Ballykeeffe Roundabout there are improvement works to the cycle facilities proposed on Ballinacurra Road, South Circular Road and Henry Street into the City Centre at Bishops Quay with Part 8 Planning Approval granted in 2023.
- To the south of Ballykeeffe Roundabout, on the R926 Dooradoyle Road, opposite the Crescent Shopping Centre there is an inbound section of cycle lane linking to Ballykeeffe Roundabout which extends from a segregated cycle track constructed in 2021. The segregated cycle tracks are then provided on both sides of the road with improvements to existing cycle lanes at junctions with the works completed in 2021 extending to the 2nd signalised junction (playground junction) on the R916 Dooradoyle Road. The provision of the segregated facility was achieved by re-construction of areas of existing footpaths and narrowing of the existing road carriageway.
- To the west of St. Pauls Roundabout, the installation of segregated cycle tracks on a part of Father Russell Road and improvements to junctions received Part 8 Planning Approval granted in 2022. The Father Russell Road cycle scheme will provide a connection from the R510 to the R526 with the approved works currently at Tender Stage.

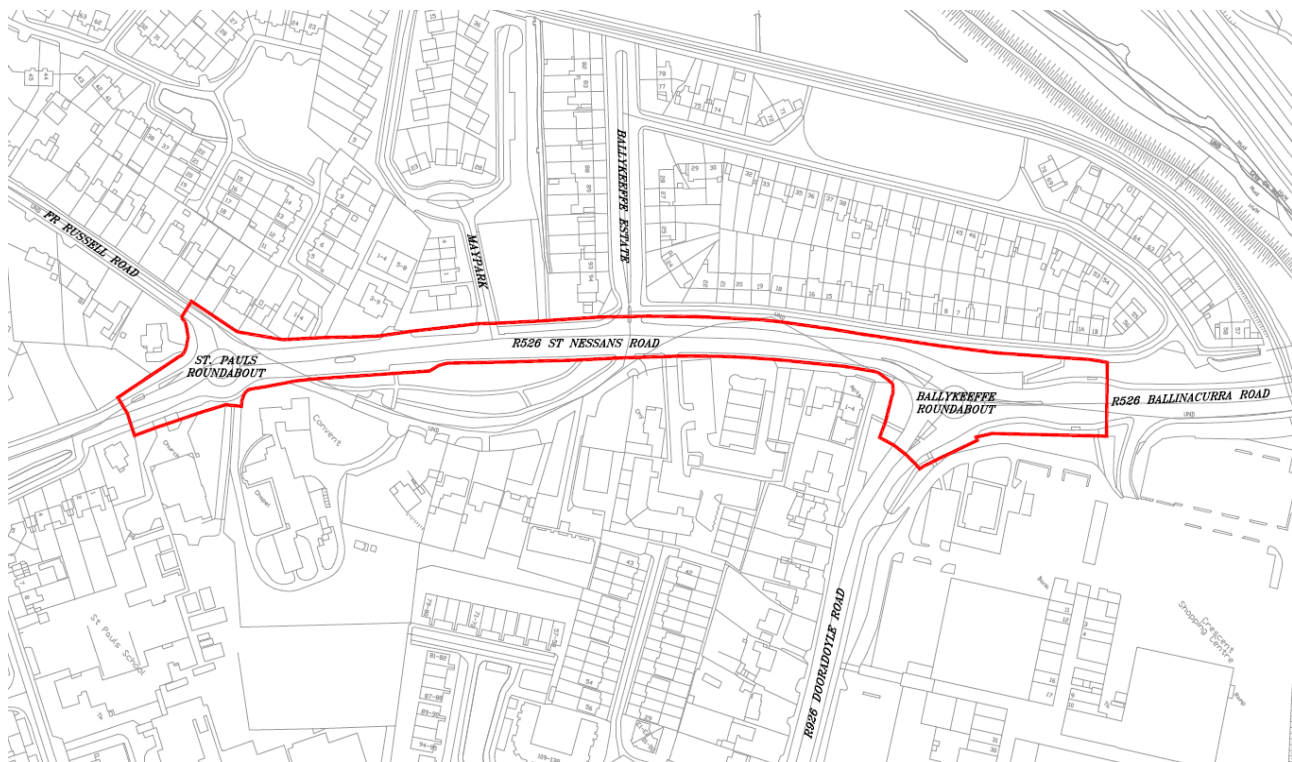


Figure 2.1 R526 Cycle Facilities Extents

2.2 Description of Site and Proposed Development

The primary deliverables for the project are the provision of cycle facilities to the National Cycle Manual incorporating improvements to crossing facilities for pedestrians and cyclists particularly at junctions. It is proposed to provide segregated cycle facilities on both sides of the road where feasible with a minimum clear cycle track width of 1750mm for a one-way facility. The cycle track will be typically separated from the road carriageway by a minimum 250mm wide upstand kerb. A two-way cycle track is proposed in parts of the Scheme to provide for increased connectivity for cyclists. The Scheme will also include modifications to the footpath widths with a minimum footpath width of 1800mm proposed. Other elements to be delivered in conjunction with the above include junction improvements as required, works to bus lanes/stops, pedestrian facilities with associated modification to drainage, line markings and signage etc. The proposed R526 SPR to BRK Scheme can be divided into three distinct sections as follows;

St. Pauls Roundabout

The proposed layout for Saint Pauls Roundabout includes for the provision of segregated cycle tracks with the cycle tracks separate to the footpaths. It is proposed to tighten the outside diameter kerbing to the roundabout to provide a buffer to cyclists and to act as a deterrent to high vehicular speeds. The zebra crossings on both approaches on the R526 would be replaced with signalised crossings which would include for bus detection and bus priority on the approaches to the roundabout. A toucan crossing would be provided on Fr Russell Road with a zebra crossing on the Scoil Phoil Naofa arm of the roundabout where there are single lane approaches to the roundabout and low traffic volumes.

The proposed improvement works to the Saint Pauls Roundabout junction requires land acquisition from Saint Pauls Church and Saint Pauls Nursing Home. The works required to the Church property to provide improved crossing facilities are within a green area to the rear of the existing boundary wall with limited impact on the property. The boundary wall section removed to facilitate the works will be re-constructed at the rear of the upgraded footpath. The works to Saint Pauls Nursing Home would require the permanent closure of an existing access gate which is currently used as a service access only. A section of the Convert boundary wall will be set-back to provide for improved visibility onto the R526 from the Scoil Phoil Naofa access road.

R526 Link Arrangement between Roundabout Junctions

The proposed arrangement for the R526 includes for the provision of a 1.75m clear width one-way segregated cycle track on the south side of the road with a 2.75m clear width two-way cycle track on the north side of the road between St. Pauls Roundabout and the Ballykeeffe Estate junction. The proposed two-way cycle track would link to a shared street arrangement through Ballykeeffe Estate and onto a new two-way cycle track to the north-west of Ballykeeffe Roundabout.

Physical segregation will be provided by a full height kerb between the cyclist and the carriageway. The existing carriageway width will be reduced to facilitate the cycle tracks with a minimum lane width of 3.1m to be maintained.

Ballykeeffe Roundabout

The proposed layout for the Ballykeeffe Roundabout includes for the provision of segregated cycle tracks separate to the footpaths. It is proposed to tighten the outside diameter to the roundabout to provide a buffer to cyclists and to act as a deterrent to high vehicular speeds. The zebra crossings on the north side off the roundabout on the R526 would be replaced with signalised crossings which would include for bus detection and bus priority on the outbound approach to the roundabout. A new stepped pedestrian access route from Ballykeeffe Estate and signalised road crossing is included on the western arm of the roundabout on the R526.

Island bus stop arrangements would be constructed on the inbound and outbound bus stops in line with the guidance included in BusConnects. Two-way cycle tracks will provide a link to the Crescent Shopping Centre and the R926 Dooradoyle Road to the south and to the proposed South Circular Road link to the north. The existing zebra crossings on Dooradoyle Road would be replaced with widened signalised crossings with new segregated cycle tracks on the east and west side.

2.3 Local Hydrology and Existing Drainage

Local drainage channels, flood embankments and areas of benefited lands are available to view on the floodinfo.ie website and the information is extracted below in Figure 2.2. The Benefited lands outlined in black and dotted green are lands that were drained as part of the Drainage District. Drainage Districts were carried out by the Commissioners of Public Works under a number of drainage and navigation acts from 1842 to the 1930s to improve land for agriculture and to mitigate flooding. Embankments were constructed, including along the Shannon and Ballinacurra Creek local to the SPR to BKR Scheme to protect the benefited lands.

The blue lines delineate the drainage channels and watercourses forming part of Arterial Drainage Schemes that the OPW has a statutory duty to maintain. Local to the SPR to BKR Scheme drainage channel C1/1 is shown in blue on the mapping starting in Cois Luachra and draining under the R526, through Ballykeeffe Estate and west towards Bunlicky. This channel drains the area surrounding the SPR to BKR Scheme. The flood embankments alongside Ballinacurra Creek are shown in green and labelled E2, E3, E4 & E5 with the Creek labelled D4.

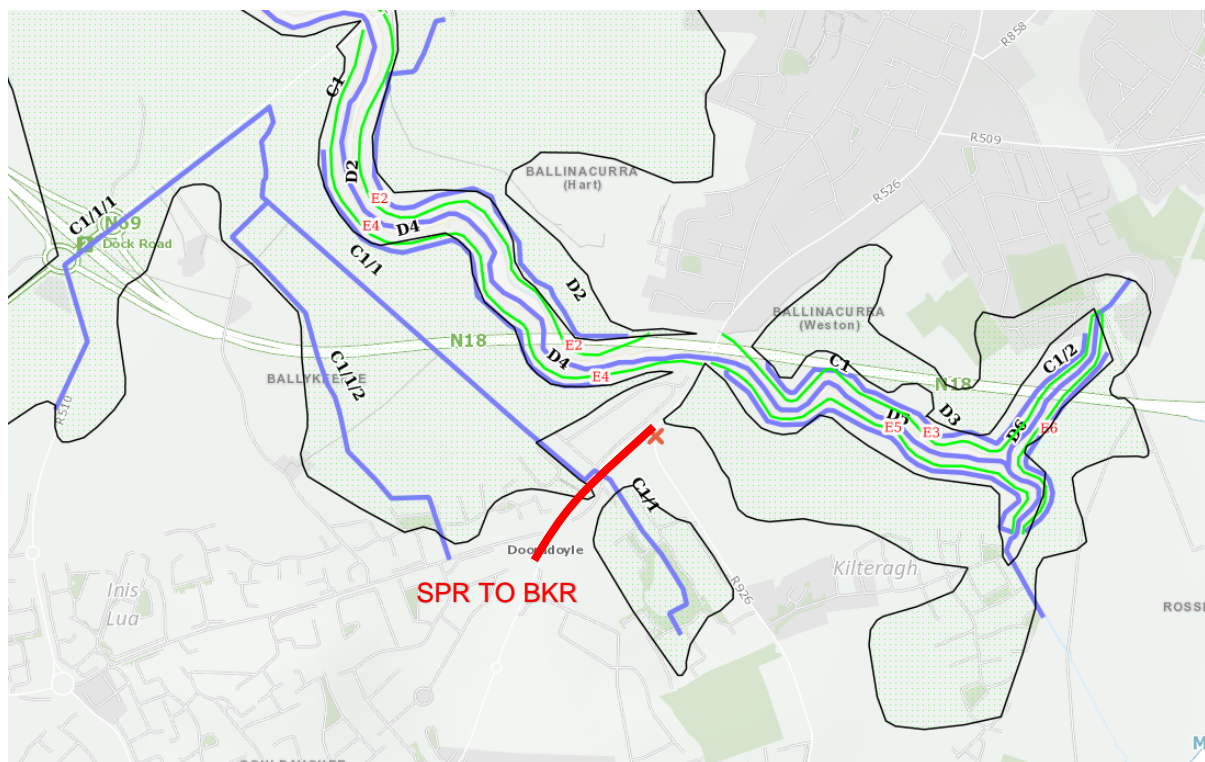


Figure 2.2 OPW Drainage Mapping

The existing surface water runoff from the R526 St. Nessans Road is collected by road gullies and discharges to a separate piped storm water network. There is negligible impact in the overall hard areas associated with the SPR to BKR Scheme. Green verge spaces are to be introduced around both Saint Pauls Roundabout and Ballykeeffe Roundabout with soft areas to be provided in the large splitter islands at Ballykeeffe Roundabout to compensate for cycle track areas to be constructed.

The existing surface water collection system on the roadway is to be retained. Figure 2.3 shows the trunk surface water drains and the discharge location to the existing OPW open channel C1/1. High points on this section of the R526 are located at Saint Pauls Roundabout and Ballykeeffe Roundabout with the road falling from both roundabouts to a low point at the Ballykeeffe Estate junction. The piped surface water drainage collection system collects to this low point (c.3.3mOD) discharging to a culvert which crosses the R526 draining to the OPW open channel C1/1 to the rear of No. 94 Ballykeeffe Estate. The open channel drains through a culvert under the railway line at the rear of the Ballykeeffe Estate to the drainage channel system in the low lying Ballykeeffe area. Outfall from the drainage channel system are controlled by sluices to prevent tidal flows entering the system.

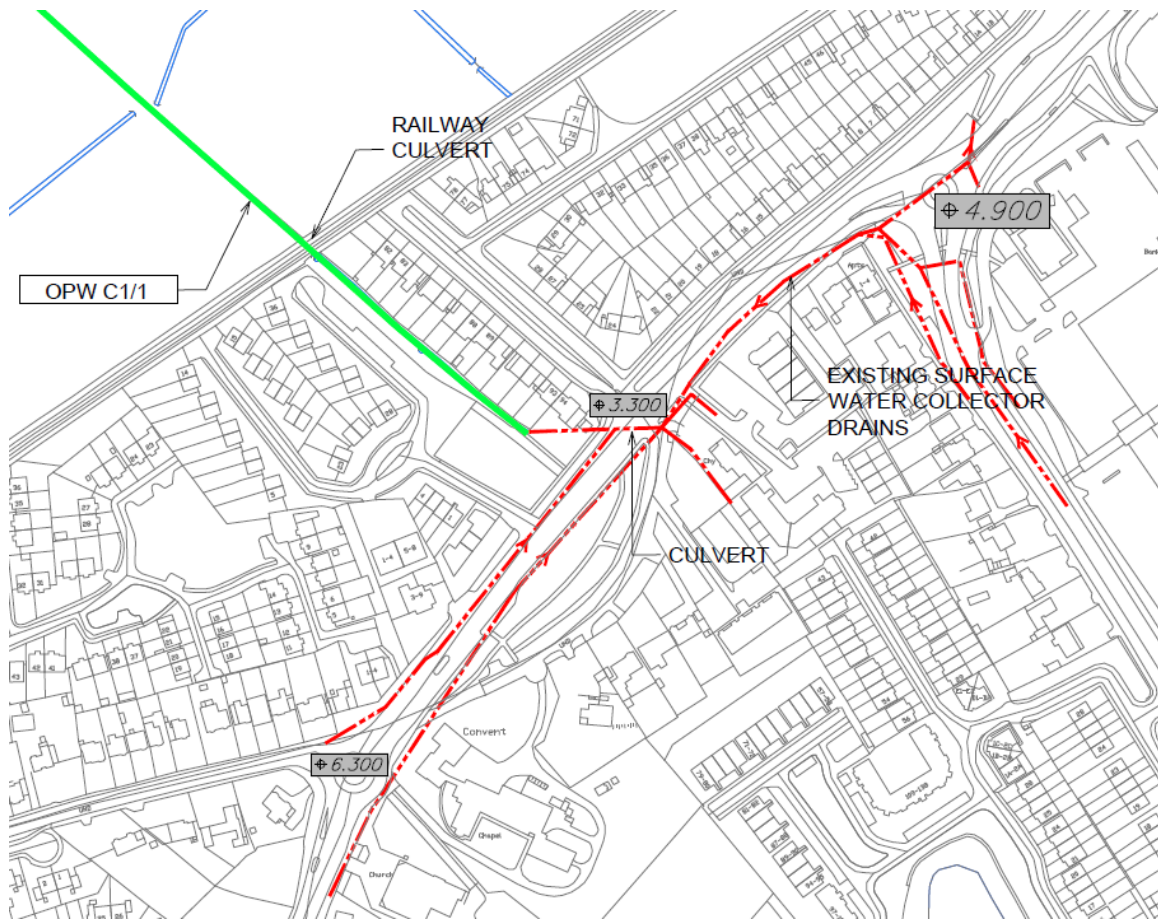


Figure 2.3 Trunk Surface Water System Outline

3. RELEVANT GUIDANCE

3.1 The Planning System and Flood Risk Management

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.

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

Table 2.1: Flood Zone Designation

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.

This Assessment has been carried out in accordance with the recommendations of the guidelines, which include for a three staged approach to carrying out an appraisal of the site, summarised as follows ;

- Stage 1 - Flood Risk Identification - Identification of any flooding or surface water management issues related to the development site that may warrant further investigation.
- Stage 2 – Initial Flood Risk Assessment – Confirms sources of flooding that may affect the development site. The initial FRA will assess the adequacy of existing information and identify what further studies may be needed to fully address the flooding issues. The requirements for a detailed FRA are scoped during Stage 2.
- Stage 3 – Detailed Flood Risk Assessment – Where stages one and two indicate that a development may be subject to a significant flood risk, a detailed flood risk assessment must be carried out. The detailed FRA will normally involve some form of mathematical modelling.

3.2 Limerick Development Plan 2022-2028

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

Policy CAF P5 – Managing 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 subsequent document) and the guidance contained in Development Management Standards and the Strategic Flood Risk Assessment (SFRA). Where a development/land use is proposed that is inappropriate within the Flood Zone, but has passed the Plan Making Justification Test, 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' (and any subsequent updates). This will need to demonstrate inclusion of measures to mitigate flood and climate change risk, including those recommended under Part 3 (Specific Plan Making Justification Tests detailed in the SFRA). 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.

Objective CAF O20 – Flood Risk Assessments

It is an objective of the Council to require a Site-specific Flood Risk Assessment (FRA) for all planning applications in Flood Zones A and B and consider all sources areas at risk of flooding (for example 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. The FRA will be prepared taking into account the requirements laid out in the SFRA, and in particular in the Plan Making Justification Tests as appropriate to the particular development site. 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.

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.

4. FLOOD RISK IDENTIFICATION

4.1 OPW Catchment Flood Risk Assessment and Management Study(CFRAMS)

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.

The Shannon CFRAMS Mapping indicates that Fluvial flooding does not affect the proposed SPR to BKR Scheme.

Figure 4.1 below, is an extract from the Shannon CFRAMS Coastal Flood Extent mapping showing areas at risk of flooding in the vicinity of the SPR to BKR Scheme. The black diagonal hatching indicates the area that is protected from coastal flooding through the flood embankments constructed alongside the Shannon and Ballinacurra Creek.

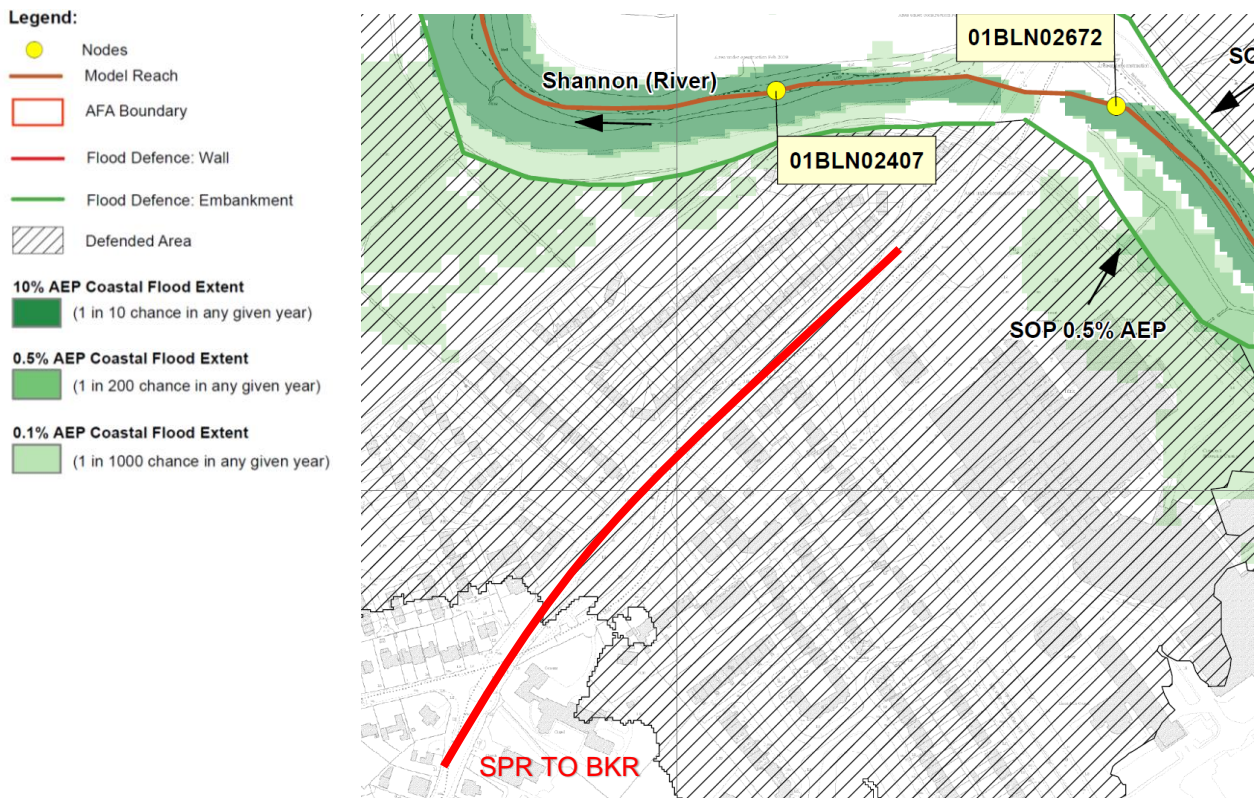


Figure 4.1 Extract from CFRAMS Coastal Flood Extents Mapping

4.2 History of Flooding

The OPW maintain a record of past flooding events which is available to view on floodinfo.ie. An extract from the Past Flood Events record showing the flood location with hazard symbol and flood extents in blue shading is included in Figure 4.2 below. The records shows historic flooding events at Ballinacurra Creek and Russell Court / Maypark north of Saint Pauls Roundabout marked with a hazard symbol. The flood extents in the blue shading is along the low-lying lands adjoining Ballinacurra Creek and the pond area to the south of the R526 within Cois Luachra / Dooradoyle Park. The SPR to BKR Scheme is outside the extents of the record of past flood events.

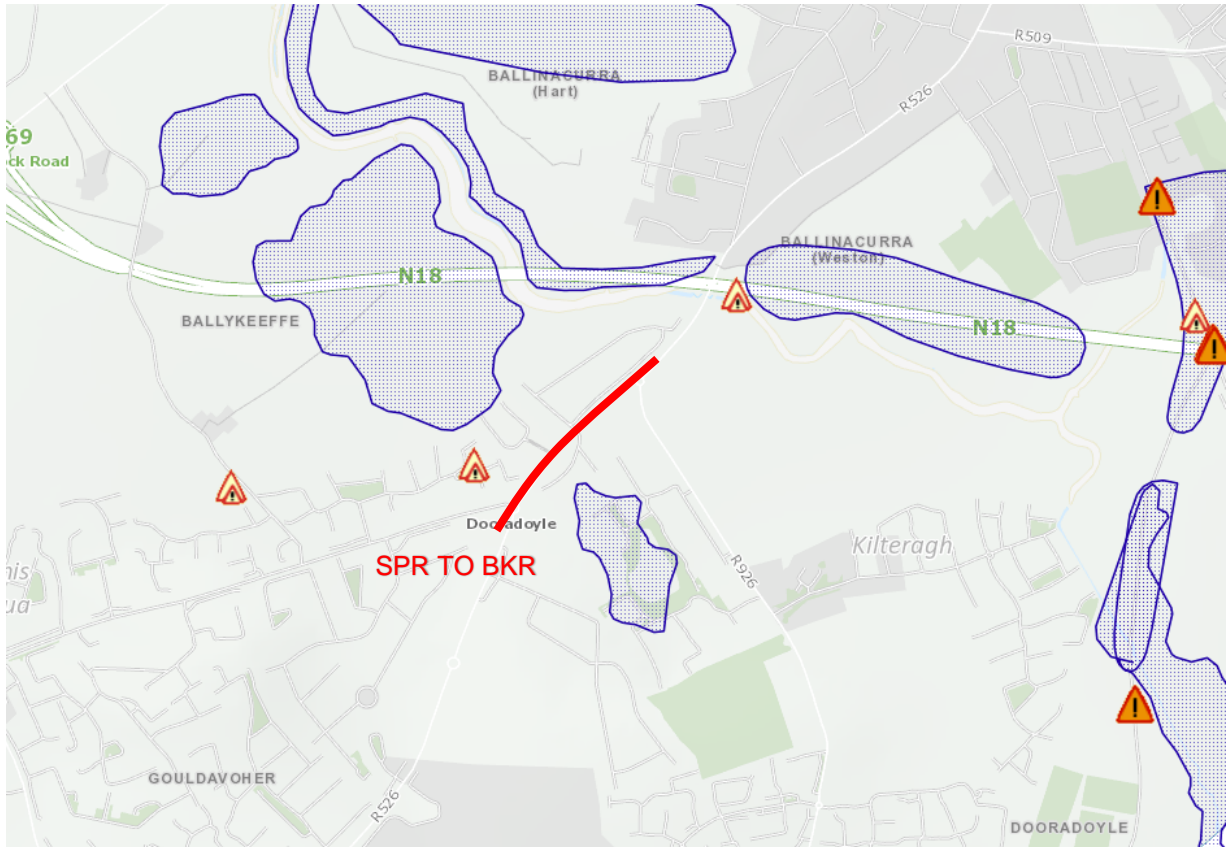


Figure 4.2: Extract from OPW Past Flood Events

4.3 Historic Mapping

A review of the OSI Historical maps was carried out using the OSI Geohive website. Figures 4.3 & 4.4 show an extract from the OSI historical 25-inch map and 6-inch map. The lands surrounding SPR to BKR are not identified as “liable to flood” on the available historic OSI maps with the flood areas located further north and west adjoining Ballinacurra Creek. The OPW drain referenced in Section 2.3 which crosses the R526 appears on both maps. The maps show the historic alignment of the R526 on this section which featured an s-type bend after the St. Pauls junction.

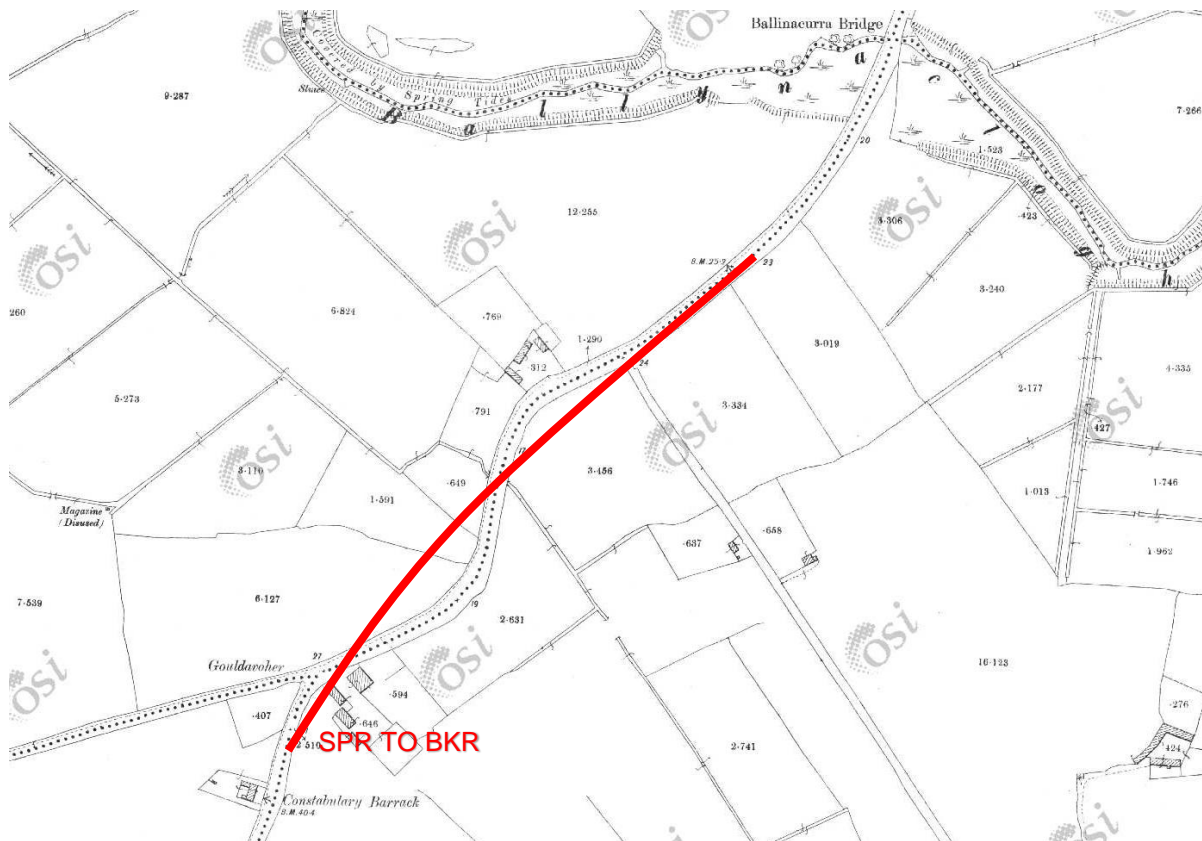


Figure 4.3: Extract from OSI historical 25-inch map

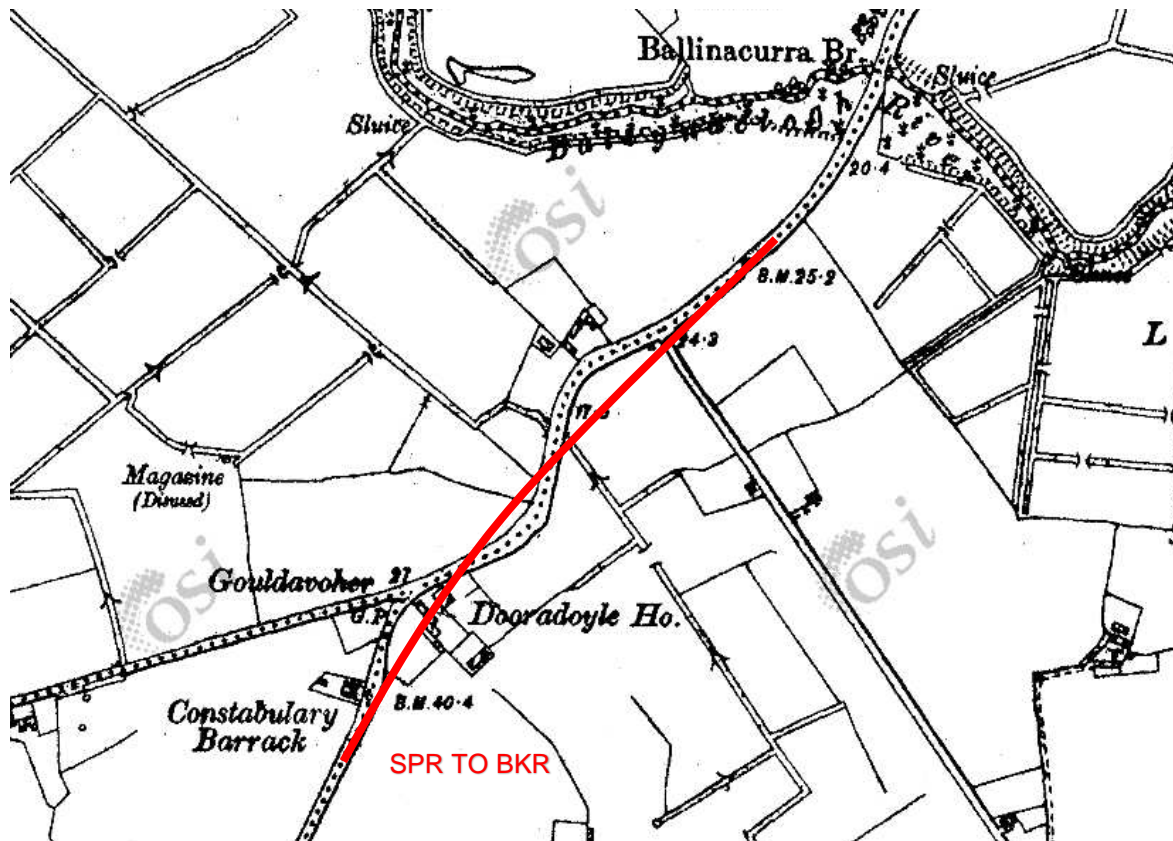


Figure 4.4: Extract from OSI last edition 6-inch map

4.4 LCCC Development Plan Strategic Flood Risk Assessment

A Strategic Flood Risk Assessment (SFRA) was prepared on behalf of Limerick City & County Council to accompany the LCCC Development Plan 2022-2028. The SFRA includes flood zone mapping for the Limerick City and County area. Figure 4.5 below shows an extract of the map relating to the Southern Environs area which includes the local land zoning with the blue shading showing the extents of Flood Zones A and B.

The mapping again reflects the historic flooding adjoining Ballinacurra Creek which is noted in the SFRA as being at risk of flooding from tidally influenced fluvial sources. The flooding would accrue should a breach form in the flood embankments alongside the watercourse. The OPW and LCCC are currently working on the Limerick Flood Relief Scheme which is assessing improvement works to the existing embankment system in Limerick.

The SFRA mapping shows an area of the R526 between St. Pauls Roundabout and Ballykeeffe Roundabout as being within Flood Zone A which overlap with the SPR to BKR Scheme. The flood zones in the SFRA mapping were prepared ignoring the presence of the flood defence embankments which is as per the requirements set out in the Planning System and Flood Risk Management Guidelines for Planning Authorities.



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Southern Environs

- Flood Zone A
- Flood Zone B
- Zoning Objectives
- Existing Residential
- New Residential
- Education & Community Facilities
- City Centre
- Local Center
- District Centre
- Industrial
- High Tech / Manufacturing Campus
- Enterprise & Employment
- Retail, Warehousing
- Agriculture
- Sports Arena
- Open Space & Recreation
- Special Control Area
- Semi Natural Open Space
- pNHA
- Utilities
- Watercourses

Figure 4.5: Extract from LCCC Development Plan 2022-2028 SFRA

4.5 Geological Survey of Ireland Mapping

From a review of data from the Geological Survey of Ireland mapping, it appears that the proposed SPR to BKR Scheme is not at risk of groundwater flooding with no groundwater wells, springs or karst features identified in the area.

5. FLOOD RISK ASSESSMENT

5.1 Coastal Flood Risk

Coastal flooding occurs as the result of sea levels which exceed normal tidal levels and result in waters overflowing onto the land during high tides or storm surges with watercourses unable to drain down due to the high water levels downstream. The OPW CFRAMS mapping extracted in Section 4.1 indicates that the SPR to BKR Scheme is not in the area at risk of coastal flooding due to the protection afforded by the flood embankments constructed alongside the Shannon and Ballinacurra Creek.

5.2 Pluvial Flood Risk

Pluvial flooding occurs when the amount of rainfall exceeds the infiltration capacity of the ground to absorb it or in the case of hard standing urban areas exceeds the capacity of the surface water collection systems. The excess water will flow overland, ponding in natural hollows and low-lying areas or behind obstructions. The flow will eventually enter a piped or natural drainage system.

Any impact from pluvial flooding will be generated by the rainfall that will fall within the site due to capacity issues or blockages in the collection system.

5.3 Fluvial Flood Risk

Fluvial flooding occurs when the capacity of a watercourse or river is exceeded or the channel is blocked or restricted, or the watercourse is surcharged from its confluence with a downstream watercourse and excess waters spill out onto low-lying areas. The OPW CFRAMS mapping indicates that the SPR to BKR Scheme is not at risk of fluvial flooding.

5.4 Groundwater Flooding Risk

Groundwater flooding occurs when the water table rises as a result of prolonged rainfall to meet the ground surface and flows out over it. There is no record of groundwater flooding. The area of the SPR to BKR Scheme is extensively hard standing and groundwater flooding is not considered a risk.

5.5 The Justification Test for Development Management

Table 3.1 of “The Planning System and Flood Risk Management” Guidelines provides a broad classification of land use and vulnerability class. The proposed SPR to BKR Scheme could 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 5.1. With reference to this table, it is concluded that given the nature of the proposed outdoor and recreation use the development of the proposed SPR to BKR Scheme is considered appropriate within Flood Zone A.

	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

Table 5.1: Matrix of Vulnerability versus Flood Zone to indicate Justification Requirement

5.6 Flood Impact Assessment of the Proposed Scheme

There are potential aspects to consider when assessing if the proposed development will increase the flood risk elsewhere, as a result of impact on the following :

- Loss of flood storage area;
- Diversion of flood waters;
- Increased runoff from the proposed works.

The proposed SPR to BKR Scheme does not impact the flood risk in the area. Coastal flood storage and flow paths in the area will be unaffected due to the proposed SPR to BKR scheme. Ground levels will be maintained at the existing ground levels. Flow paths in extreme flood events will not be impacted. In this regard the SPR to BKR Scheme has negligible impact on flood risk.

5.7 Flood Mitigation

The proposed SPR to BKR Scheme is to be constructed within the existing road corridor of the R526 St. Nessans Road. Considering that the SPR to BKR Scheme does not increase existing hard standing areas it is considered that the proposed works do not increase in the flood risk and are water compatible and that the Justification Test does not apply.

However, it is proposed to carry out the mitigation measures listed below to the existing drainage system comprising collection pipework, culverts and a drainage outfall channel to examine the risk of debris build-up in the system as a means of flood risk mitigation to the completed works:

- Review the condition of the existing gullies, manholes and collection pipes on the existing road drainage system;
- Review the condition and accesses to the culvert crossing the R526 at the Ballykeeffe Estate junction;
- Consult with the OPW with regard to the current maintenance of the existing open drainage channel C1/1 within Ballykeeffe Estate and northwards through the drainage channel system and sluiced outfalls;
- Consult with the OPW with regard to the access and maintenance arrangements to the culvert crossing under the railway line at the rear of the Ballykeeffe Estate and other culverted sections of the exiting drainage outfall.

6. CONCLUSIONS

This report was prepared to accompany a planning application by Limerick City and County Council (LCCC) for the proposed St. Pauls Roundabout to Ballykeeffe Roundabout (SPR to BKR) Active Travel Scheme.

The proposed SPR to BKR Scheme has been assessed in accordance with the “The Planning System and Flood Risk Management” Guidelines and the policies and objectives of LCCC’s Development Plan 2022-2028 with regard to flood risk. The following is a summary of the findings of this SSFRA:

- i) The Shannon CFRAMS Mapping indicates that coastal or fluvial flooding does not affect the area of the proposed SPR to BKR Scheme;
- ii) The Shannon CFRAMS Mapping shows that the area of the proposed SPR to BKR is with a ‘defended area’ and is protected from coastal and fluvial flooding through the flood embankments constructed alongside the Shannon and Ballinacurra Creek;
- iii) There is no recorded flood event on the OPW record system that affects the area of the SPR to BKR Scheme;
- iv) The area of the SPR to BKR Scheme is outside of lands indicated as ‘liable to flood’ on the historic OS maps;
- v) The Strategic Flood Risk Assessment (SFRA) prepared on behalf of Limerick City & County Council to accompany the Limerick Development Plan 2022-2028 shows that an area of the SPR to BKR Scheme is within Flood Zone A and indicates that the flooding could accrue should a breach form in the flood embankments alongside the Shannon or Ballinacurra Creek;
- vi) The proposed SPR to BKR Scheme is classified as Water Compatible Development under “The Planning System and Flood Risk Management” Guidelines and as such is considered appropriate in Flood Zone A;
- vii) The SPR to BKR Scheme is to be constructed within the existing road corridor of the R526 with no changes to existing ground levels;
- viii) The proposed development of the SPR to BKR Scheme will not increase the flood risk elsewhere;
- ix) Flood mitigation measures outlined in Section 5.6 should be addressed as part of the proposed works.