

Marshall Yards Development Company Limited

Large-Scale Residential Development at Ballybin Road, Ratoath, Co. Meath

Site Specific Flood Risk Assessment
(Planning Submission)

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1 Introduction

Donnachadh O'Brien & Associates Consulting Engineers Ltd. (DOBA) have been instructed by the Client, Marshall Yards Development Company Limited, to prepare a Site-Specific Flood Risk Assessment (SSFRA) to accompany a planning application submission to Meath County Council (MCC) for the proposed Large-Scale Residential Development (LRD) on lands at Ballybin Road, Ratoath, Co. Meath.

2 Existing Site

The existing site is predominantly a greenfield site in agricultural use with 2 existing detached dwellings and agricultural buildings as illustrated in **Figure 1** below. The site is bound to the west and north by the existing Fox Lodge Woods / Manor residential development, to the east by agricultural lands and also the Ballybin Road and to the south by the R125. The existing private dwellings on the site are served by 2 no. existing vehicular accesses – one off the R125 roundabout to the south of the site and one off the Ballybin Road. The site topography is gently sloping from west to east with existing levels extending from ca. +82.50m along the western boundary to +77.50m along the eastern boundary. The existing site is illustrated on Engineering drawings C-0001, C-0002 & C-0003.



Figure 1 Site Location (Source: Google Maps)

3 Proposed Development Description

The proposed development is at a site with a total area of 5.48 hectares principally located at Main Street/R125 and Ballybin Road, Ratoath, Co. Meath. The total site contains a proposed residential development site with an area of 3.66 hectares (bisected by a proposed realigned Ballybin Road) and a proposed infrastructural development site with an area of 1.82 hectares (principally for road and related works, water services and open space amalgamation). The site is generally bound by: Fox Lodge Woods and Fox Lodge Manor to the west and north; existing agricultural lands and residential development to the north and east; existing Ballybin Road and Moulden Bridge to the east; and Main Street/R125 and Jamestown Road/L1016 to the south. The site also incorporates parts of: the existing Ballybin Road (north and west of Moulden Bridge), Main Street/R125, Jamestown Road/L1016 and green open space in Fox Lodge Manor.

The proposed development principally consists of the demolition of 2 No. dwellings (594 square metres gross floor area combined) and 1 No. agricultural shed (988.7 square metres gross floor area) and the construction of 141 No. residential dwellings with a gross floor area of 12,428 square metres in buildings of 2 No. and 3 No. storeys. The dwellings include 117 No. houses (57 No. 2-bed, 52 No. 3-bed, 7 No. 4-bed and 1 No. 5-bed) and 24 No. maisonette/duplex units (18 No. 1-bed and 6 No. 3-bed).

The development also proposes a reconfiguration of the road layout at the south (Main Street/R125 and Jamestown Road/L1016) and east (Ballybin Road) of the site. Specifically, it is proposed to demolish/remove the existing 5-arm roundabout and to replace same with a new 4-arm signalised junction and reconfigured access to the existing Ratoath Childcare site. The new junction arrangement will facilitate a proposed realignment of the southern section of the existing Ballybin Road (approximately 172 metres) as the northern arm of the new signalised junction and a revised entrance for the existing dwelling to the north-east of the site at Ballybin Road (known as 'Fox Lodge Farm', Eircode A84 KF97). The proposed road infrastructure works also include: road markings, traffic signals, traffic signage, footpaths and cycle infrastructure.

The development also proposes:

- 2 No. new multi-modal accesses onto the proposed realigned Ballybin Road to serve the bisected residential site;
- 2 No. pedestrian accesses onto Main Street/R125 and 1 No. pedestrian access onto the realigned Ballybin Road;
- Relocation of existing eastbound bus stop at Main Street/R125 approximately 130 metres to the west;
- Repurposing of the closed section of Ballybin Road as a pedestrian/cycle greenway;
- Internal roads and footpaths;

- 228 No. car parking spaces;
- Cycle parking spaces;
- Hard and soft landscaping, including public open space, communal amenity space and private amenity space (as rear gardens and terraces/balconies facing multiple directions);
- Demolition of the wall at the north-west corner of the site interfacing with Fox Lodge Manor and the amalgamation of existing public open in the estate and proposed public open space;
- Boundary treatments;
- Public lighting;
- Rooftop PV panels;
- 2 No. ESB sub-stations; and
- All other associated site and development works above and below ground.

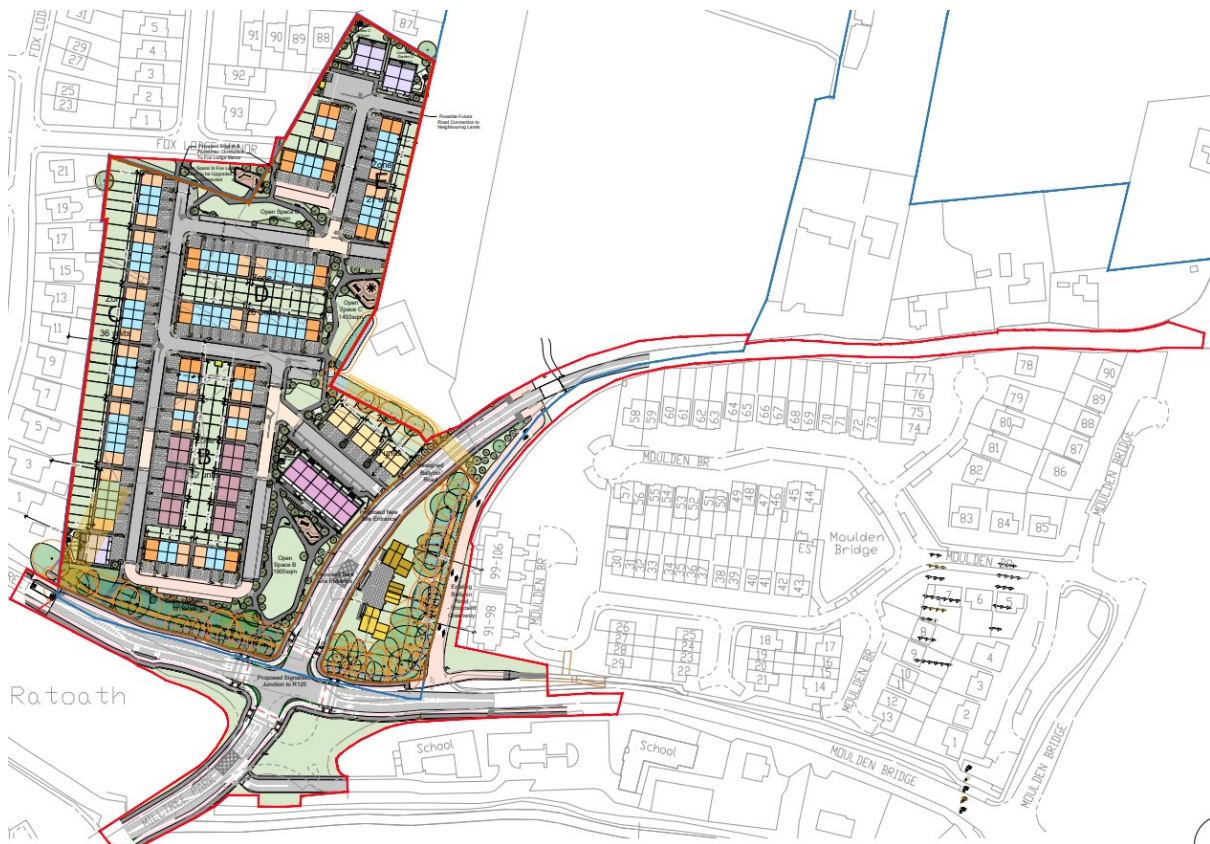


Figure 2 Proposed development (source: JFA)

4 Site Specific Flood Risk Assessment

This SSFRA has been prepared in accordance with the requirements of the following:-

- DoEHLG 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (2009), identifying and assessing the flood risk pertinent to this subject site,
- Meath County Development Plan 2021 – 2027,
- Strategic Flood Risk Assessment of the Meath County Development Plan 2021 – 2027,

The following assessment has been based on the sources of information outlined below: -

- OPW www.floodmaps.ie
- Irish Water and MCC Existing Drainage Records
- Geological Society of Ireland (GSI) Maps

In accordance with Table A1 of the DoEHLG / OPW guidelines, the components to be considered in the identification and assessment of flood risk are as follows: -

- Tidal – flooding from high sea levels
- Fluvial – flooding from water courses
- Pluvial – flooding from rainfall/ surface water
- Ground Water – flooding from springs/ raised ground water
- Human/ mechanical error - flooding due to human or mechanical error.

4.1 Tidal

Tidal flooding occurs when normally dry, low-lying land is flooded by seawater. The extent of tidal flooding is a function of the elevation inland flood waters penetrate, which is controlled by the topography of the coastal land exposed to flooding. This site is approximately 20km from the sea with a lowest ground level of approximately +77.00m. As such, the site is not at risk of tidal flooding.

4.2 Fluvial

Fluvial flooding, as defined by the OPW, occurs when rivers and streams break their banks and water flows out onto the adjacent low-lying areas. Fluvial flooding can arise where the runoff from heavy rain exceeds the natural capacity of the river channel. The nearest formal watercourse to the proposed development site is the Broadmeadow River to the south of the site. The current CFRAM flood maps indicate that the proposed residential portion of the application site is located in Flood Zone C, as illustrated in **Figure 3** below. The water level (0.1% AEP) correlates to a level of +76.18mOD. As the lowest house and road level on site are +79.30mOD and +79.00mOD, the levels on site provide a minimum 2.82m freeboard to the flooding levels indicated on the CFRAM Flood Maps.

The application boundary extends eastwards along the Ballybin Road to facilitate extension of the wastewater gravity network towards the existing wastewater network adjacent to Moulden Bridge. A small portion of the application boundary along the eastern section of the Ballybin Road and along the northern section of Jamestown Road/L1016 (to the south of the application site) is located within Flood Zone A & B. No amendments to the existing road and ground levels are proposed in these areas. In addition, fully sealed manhole covers will be utilized for the wastewater manholes along Ballybin Road in Flood Zone A to reduce the risk of floodwater entering the wastewater network. As such, the extension of the wastewater network along Ballybin Road and the amendments to Jamestown Road/L1016 will not have any impact on the existing flood risk nor will they increase the risk of flooding elsewhere. Similarly to the south, it is proposed to demolish/remove the existing 5-arm roundabout and to replace same with a new 4-arm signalised junction and reconfigured access to the existing Ratoath Childcare site. These works does not propose to alter the existing levels and does not impact existing flooding.

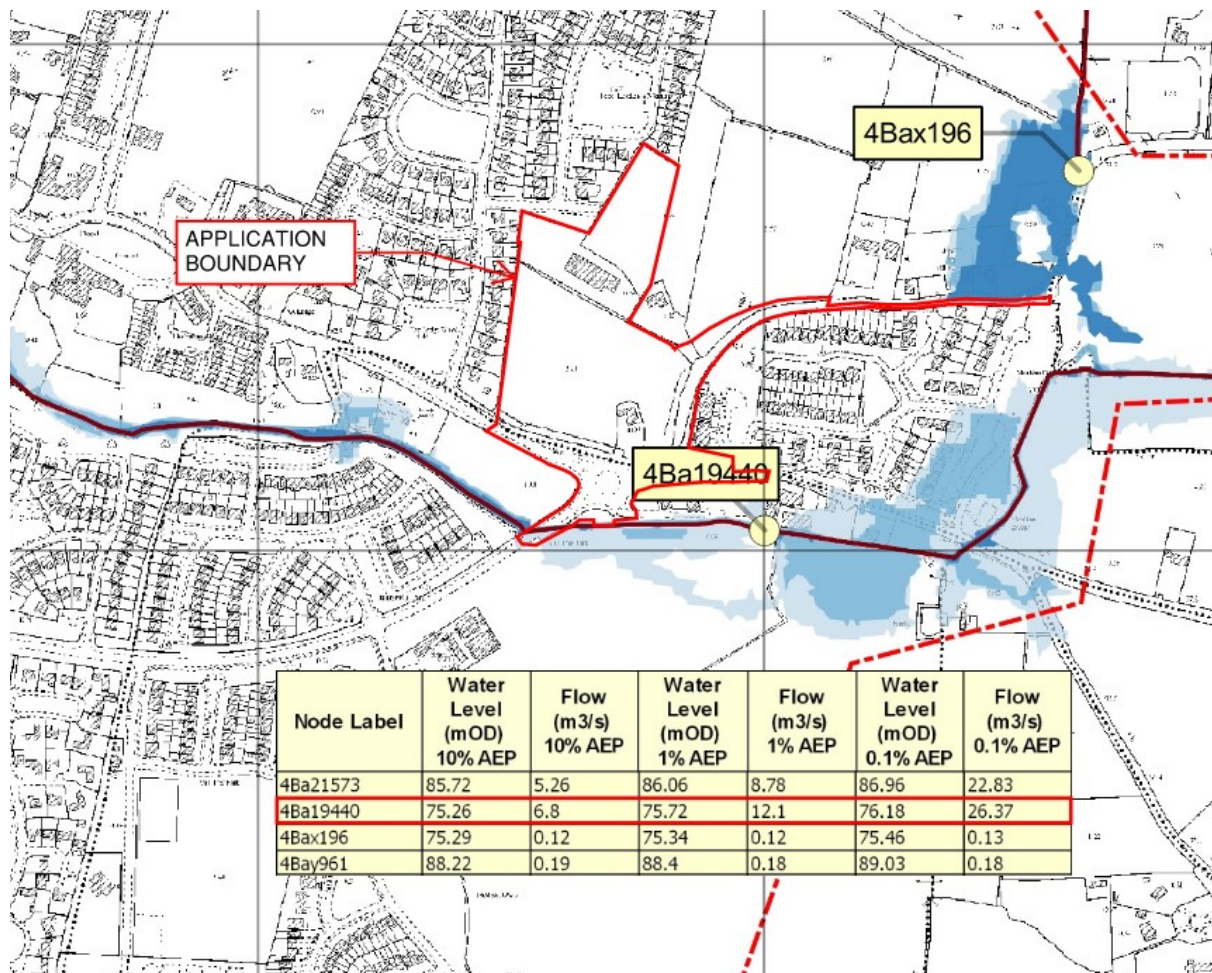


Figure 3 Extract from the OPW Fingal East Meath FRAM Study map e08rat_exfcd_f0_26

4.3 Pluvial

Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall and flood risk from pluvial sources exists in all areas. Provision of adequate storm water drainage systems will minimise the risk from pluvial flooding sources. The increase in total area of roofs and hard-standing (paved areas) on the proposed site will result in increased runoff. The proposed drainage system has been designed in accordance with the requirements of MCC and best practise SUDS to accommodate flows in peak rainfall events and the drainage system has sufficient capacity to accommodate a 1 in 100 Year plus 20% Climate Change event below ground without flooding any of the paved surfaces. **Engineering calculations** included in the **Infrastructure Design Report** submitted with this Application demonstrate that no pluvial "out-of-manhole" flooding occurs for all storms up to and including a 1:100 Year plus 20% Climate Change event. The above measures incorporated into the design will serve to significantly reduce any risk of pluvial flooding arising from the development of the site.

4.4 Groundwater

During periods of prolonged rainfall, the groundwater may seep to above ground level due to the susceptibility of groundwater levels to diurnal, seasonal and climatic variations over an extended period. This could result in ground water seeping to the ground surface. The GSI groundwater flooding data (Groundwater Flooding Data Viewer (arcgis.com)) has not identified the site of the proposed development as being at risk from ground water flooding. Initial boreholes and trial pits records show water struck in boreholes BH02 at 6.7m BEGL, BH03 at 2.2m BEGL and BH05 at 2.8m BEGL. Water was also noted in Trial pits TP07 and TP11 at 2.5m BEGL in both Trial pits. As such, the risk of groundwater flooding is minimal. Ground investigations included as Appendix A of the **Infrastructure Design Report** submitted together with this Application demonstrate that the proposed finished floor levels and road levels are not susceptible to ground water flooding.

4.5 Human/ Mechanical Error

The subject site will be drained by an internal storm water drainage system which discharges to the existing Broadmeadow River as described in **Section 4** of the **Infrastructure Design Report** submitted as part of this Application. The surface water and SuDS design has incorporated the following flood risk management features;

- Each SuDS feature has been provided with an overflow via a surface water inspection chamber which intercepts exceedance flows and directs these into the main surface water network
- High level over flows on all outfalls have been provided to allow for exceedance

- Overland flood routing to dedicated low points on the site. The low points are provided with a perforated manhole lids or double gullies to intercept overland flood flows in the event of exceedance or blockage.
- Lowest level on site provided with a high-level overflow to outfall from the development which is unrestricted

4.6 Sequential Approach and Justification Tests

The sequential approach and Justification tests procedures are outlined in 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' 2009 and is summarised and adopted below. A sequential approach is a key tool in ensuring that development, particularly new development, is first and foremost directed towards land that is at low risk of flooding. The philosophy used in this approach is

1. Avoid – preferably choose lower risk flood zones for new development
2. Substitute – Ensure the type of development proposed is not especially vulnerable to the adverse impact of flooding
3. Justify – Ensure that the development is being considered for strategic reasons
4. Mitigate – Ensure flood risk is reduced to minimal levels
5. Proceed – Only where Justification Test passed and emergency planning measures are in place

Figure 4 below sets out the mechanism for the use of the sequential approach to development in flood areas from the planning perspective.

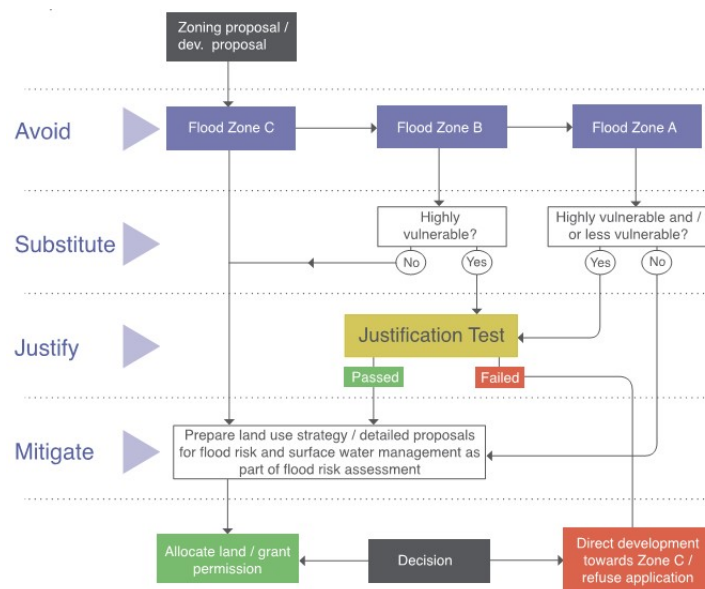


Figure 4 Sequential approach mechanism in the planning process

The sequential approach makes use of flood risk assessment and of prior identification of flood zones for river and coastal flooding and classification of the vulnerability to flooding of different types of development as outlined in the figures below.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	<p>Garda, ambulance and fire stations and command centres required to be operational during flooding;</p> <p>Hospitals;</p> <p>Emergency access and egress points;</p> <p>Schools;</p> <p>Dwelling houses, student halls of residence and hostels;</p> <p>Residential institutions such as residential care homes, children's homes and social services homes;</p> <p>Caravans and mobile home parks;</p> <p>Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and</p> <p>Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.</p>
Less vulnerable development	<p>Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;</p> <p>Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans;</p> <p>Land and buildings used for agriculture and forestry;</p> <p>Waste treatment (except landfill and hazardous waste);</p> <p>Mineral working and processing; and</p> <p>Local transport infrastructure.</p>
Water-compatible development	<p>Flood control infrastructure;</p> <p>Docks, marinas and wharves;</p> <p>Navigation facilities;</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location;</p> <p>Water-based recreation and tourism (excluding sleeping accommodation);</p> <p>Lifeguard and coastguard stations;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</p> <p>Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).</p>
*Uses not listed here should be considered on their own merits	

Figure 5 Classification of Vulnerability of different types of development

Figure 6 below illustrates those types of development which would be appropriate to each flood zone and those which would be required to meet the Justification test.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Figure 6 Vulnerability of Development vs. Flood Zone

As the residential portion of the site is located within Flood Zone C, the development is appropriate and there is no requirement for a justification test. The works to the wastewater outfall infrastructure along Ballybin Road to the east of the site and the works to Jamestown Road/L1016 to the south of the site are located partially within Flood Zone A/B. As such, the Justification Test (in the below Figure) has been applied to these areas as requested by Meath Co. Co.

**Box 5.1 Justification Test for development management
(to be submitted by the applicant)**

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
 - (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;
 - (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;
 - (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
 - (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

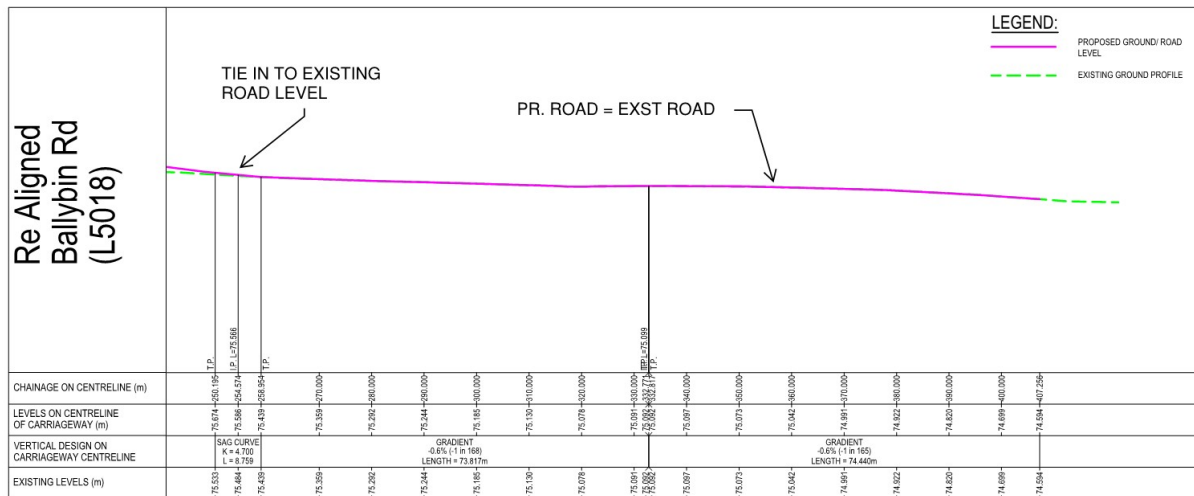
Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan.

Refer to section 5.28 in relation to minor and infill developments.

Figure 7 Justification Test for Development Management

The response to the Justification Test is as follows:

1. Subject Lands, excluding Ballybin Road, are zoned residential,
2. (i) The development will not increase flood risk elsewhere as the proposed road levels (in both of these areas) are to remain as existing,
(ii) As noted above, the road levels will remain as existing and will not increase flood risk. Sealed manhole covers are proposed on the wastewater manholes located along Ballybin Road in Flood Zone A / B to minimise the risk of flood water entering the wastewater network. The below long sections of the subject road located with flood zone A/B indicate that no level changes are proposed.



It is clear from the above responses to the Justification Test that the subject development works within Flood Zone A / B do not increase the risk of flooding. No further mitigation measures are deemed required.

4.7 Summary

As described above, there is no risk to the proposed dwellings from Tidal, Fluvial, Pluvial, Groundwater or Human / Mechanical Error Flooding. The residential portion of the site is located within Flood Zone C. The works along Ballybin Road and Jamestown Road/L1016 in Flood Zones A / B do not impact the existing levels and do not increase the existing flood risk. The works in these areas only relate to constructing offsite sewer connections and reinstatement to existing levels. Sealed manhole covers are also proposed in these areas. As such, no further detailed assessment is deemed necessary and the development is not at risk from flooding and is appropriate.