VERSION 3.00 LRD

15 MARCH 2023

FLOOD RISK ASSESSMENT STAGE1 REPORT

In respect of LANDS AT CORNAMADDY & BALLYKEERAN ATHLONE

On behalf of AKIYDA LIMITED

PREPARED BY: PAT OBRIEN

11THE CRESCENT, LIMERICK

INFO@EOBMS.IE

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1 FLOOD RISK

1.1 INTRODUCTION

Akyida Limited propose a Large Scale Residential Development (LRD) at Cornamaddy and BallykeerAn (townlands), Athlone, Co. Westmeath and as part of the planning application we have prepared this Flood Risk Assessment (stage 1) for the site.



Figure 1 Site Location

The site is zoned for residential development and there are no flood constraints which limit the amount of land available for residential use.

The project description for the proposal is as follows:

A 10 year permission for a Large-scale Residential development on lands at Ballykeeran and Cornamaddy Townlands, Athlone, County Westmeath. The development will consist of the provision of a total of 332no. residential units along with provision of a crèche. Particulars of the development comprise as follows:

(a) Site excavation works to facilitate the proposed development to include excavation and general site preparation works.
(b) The provision of a total of 172no. 2storey residential dwellings which will consisting of 152no. 3 bed units and 20no. 4 bed units.
(c) The provision of a total of 160no. apartments/duplex units consisting of 36no.1 bed units,

99no.2bed units and 25no. 3bed units. The apartment blocks range in height from 2 storey to 4 storey and the duplex blocks range from 2 storey to 3 storey in height.

(d) Provision of a 2 storey creche.

(e) Provision of associated car parking at surface level via a combination of in-curtilage parking for dwellings and via on-street parking for the creche, duplexes and apartment units.

(f) Provision of electric vehicle charge points with associated site infrastructure ducting to provide charge points for residents throughout the site.

(g) Provision of associated bicycle storage facilities at surface level throughout the site and bin storage facilities.

(h) The provision of a new link road via adjacent lands to the west to provide for vehicular, pedestrian and cyclist access.

(i) The provision of internal culverts and associated bridges along with a realignment of a section of an existing drainage channel within the site to facilitate internal access roads along with associated crossing points across the drainage channel (to facilitate pedestrian, cyclist and vehicular crossing points).

(j) The creation of a pedestrian footpath alongside the local road which will connect to the existing footpath aligning the N55 National road;

(k) Provision of associated open space areas, residential communal open space areas to include formal play areas along with all hard and soft landscape works for private gardens and amenity spaces along with public lighting, planting and boundary treatments to include boundary walls, railings & fencing;

(l) Provision of 2no. ESB substations.

(m) Internal site works and attenuation systems.

(n) All ancillary site development/construction works to facilitate foul, water and service networks for connection to the existing foul, water and ESB networks.

An Environmental Impact Assessment (EIAR) and Natura Impact Statement have been prepared and accompany this application.

1.2 BACKGROUND INFORMATION REVIEW

As part of the study data collection phase a number of available sources of information generally as set out in the OPW Guidelines was investigated in order to build an understanding of the potential risk of flooding to the site.

This included:

- A site inspection: The site was noted to be greenfield agricultural lands. The open channel/ditch traversing the site was noted. No evidence of flooding was noted.
- A review of existing ground conditions and the topographical survey (site levels)
- The OPW Flood Risk Maps as per the CFRAM study.
- The OPW record of past flood events. No record of flooding events was found affecting the site or this locality (with the closest flood event being recorded circa 2.5km south).

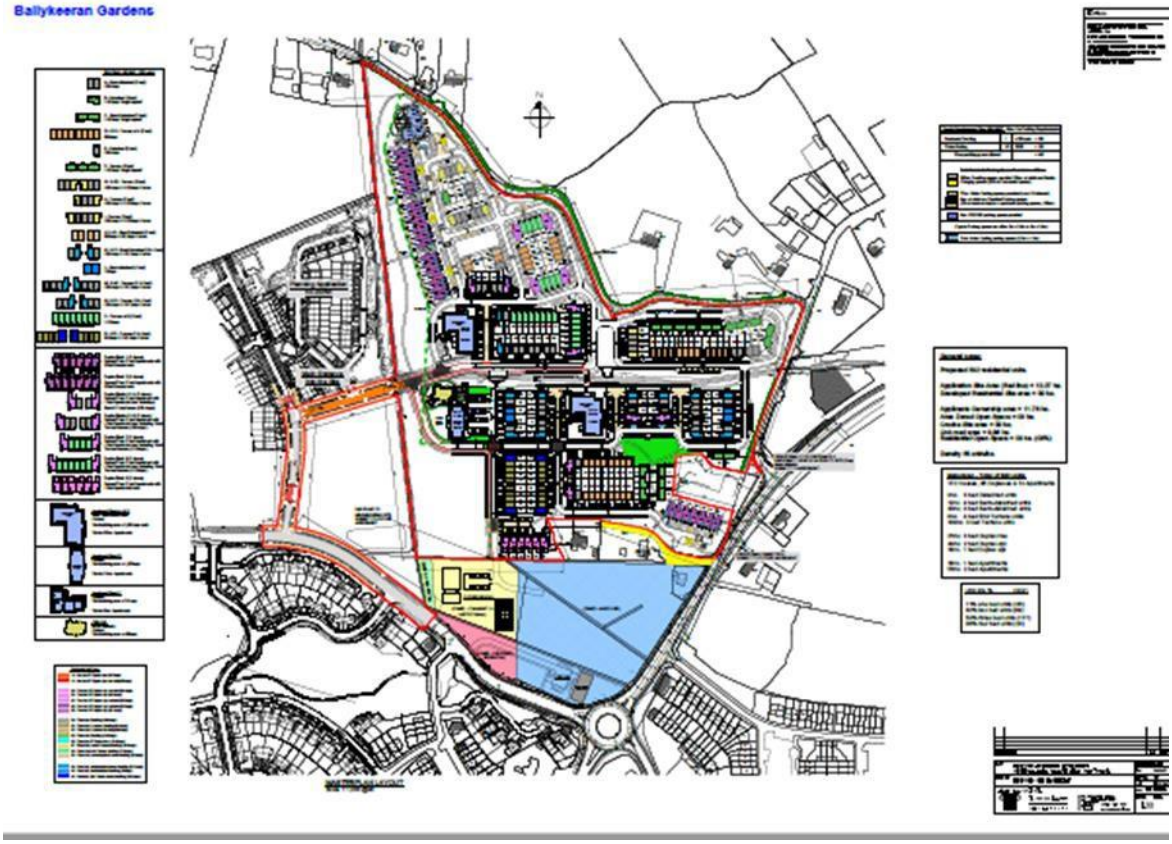


Figure 2 Site Masterplan

2 The Planning System and Flood Risk Management Guidelines

In 2009 the OPW and the then Department of the Environment and Local Government (DEHLG) published Guidelines on flood risk management for planning authorities entitled The Planning System and Flood Risk Management - Guidelines for Planning Authorities. The Guidelines introduce mechanisms for the incorporation of flood risk identification, assessment and management into the planning process. Implementation of the Guidelines is intended to be achieved through actions at the national, regional, local authority and site-specific levels. Planning authorities and An Bord Pleanála are required to have regard to the Guidelines in carrying out their functions under the Planning Acts. The core objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

There are three types or levels of flood zones defined for the purposes of the Flood Guidelines as summarized below.

Zone	Description
Zone A High probability of flooding.	This zone defines areas with the highest risk of flooding from rivers (i.e. more than 1% probability or more than 1 in 100) and the coast (i.e. more than 0.5% probability or more than 1 in 200).
Zone B Moderate probability of flooding.	This zone defines areas with a moderate risk of flooding from rivers (i.e. 0.1% to 1% probability or between 1 in 100 and 1 in 1000) and the coast (i.e. 0.1% to 0.5% probability or between 1 in 200 and 1 in 1000).
Zone C Low probability of flooding.	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1000).

We also highlight the CFRAM study are deemed acceptable by both WMCC and National Policy as being appropriate and reliable to identify flood risk. In this regard we refer to Government policy on climate change under the document 'Flood Risk Management: Climate Change Sectoral Adaptation Plan' as prepared under the National Adaptation Framework (OPW).

As the Planning Authority will note the purpose of this Climate Change Sectoral Adaptation Plan for Flood Risk Management is to:

- outline the potential impacts of climate change on flooding and flood risk management in Ireland
- identify the objectives for an effective and sustainable approach to adaptation as part of flood risk management for the future,
- promote a coordinated approach to adaptation:

(i) within the flood risk management sector and sustainable flood risk management measures in other sectors, and,

(ii) across the policies and actions of other Sectors including Local Authorities, and,

- recommend any further actions required to meet the objectives for adaptation.

Importantly as stated on page 53 of this Government policy document it states the CFRAM programmes give confidence that they are plausible for assessing climate change:

'The MRFS and HEFS provide potential futures that permit flood hazard and risk assessments to be undertaken to identify possible impacts of climate change on flooding, which, in turn, enables an assessment of the vulnerability of different communities and areas around the country to such possible changes. This will inform how flood risk in these communities should be managed now and into the future.'

'The comparability of the two future scenarios adopted for the CFRAM Programme against current international projections gives confidence that they are acceptable as plausible futures for use in assessing potential requirements for adaptation.'

On applying this national policy on climate change/flood risk to the lands it is clear national policy by the OPW and the CFRAM studies are acceptable for determining flood risk in relation to climate change. Further, we note the Climate Change Sectoral Adaptation Plan (CCSAP) specifically refers to how the section 28 guidelines are appropriate in terms of policy and flood risk. For ease of reference we highlight section 3.3 of the CCSAP states: (page 33)

'The Guidelines for the Planning System and Flood Risk Management (DECLG, & OPW, 2009), provide a clear, transparent framework for forward planning and

development management with due consideration of flood risk.

The guidance on zoning for appropriate land use is based on existing risk, but with a recommendation that a precautionary approach be taken to potential future risk including the potential impacts of climate change, stating that “A Precautionary approach should be applied, where necessary, to reflect uncertainties in flooding datasets … and the ability to predict the future climate … “, and that “Development should be designed with careful consideration to possible future changes in flood risk, including the effects of climate change … so that future occupants are not subject to unacceptable risks.’

The potential impacts of climate change are provided for within the Guidelines, and the robust implementation of the Guidelines should reduce the potential impacts of climate change on properties developed in the future, although the application of the precautionary approach may have implications for the development potential in some areas.’ (emphasis added)

In this context we submit the policy tests as set out in the section 28 ‘Guidelines for the Planning System and Flood Risk Management’ are wholly appropriate to determine a proposal against flood risk and climate change scenarios. With no flood risk identified for these lands (as per the OPW CFRAM maps) it can be concluded on a robust evidence basis there is no flood risk affecting the project site.

2.1 FLOOD RISK & ASSESSMENT OF FLOOD MECHANISMS

Having reviewed the flood mapping for the area, the Athlone Town Development Plan and the Westmeath County Development Plan Flood Risk Assessment and Management Plan it is found that the site is location within **Flood Zone C– Low Probability of Flooding**.

As per the Guidelines development in this zone is therefore appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainability considerations.

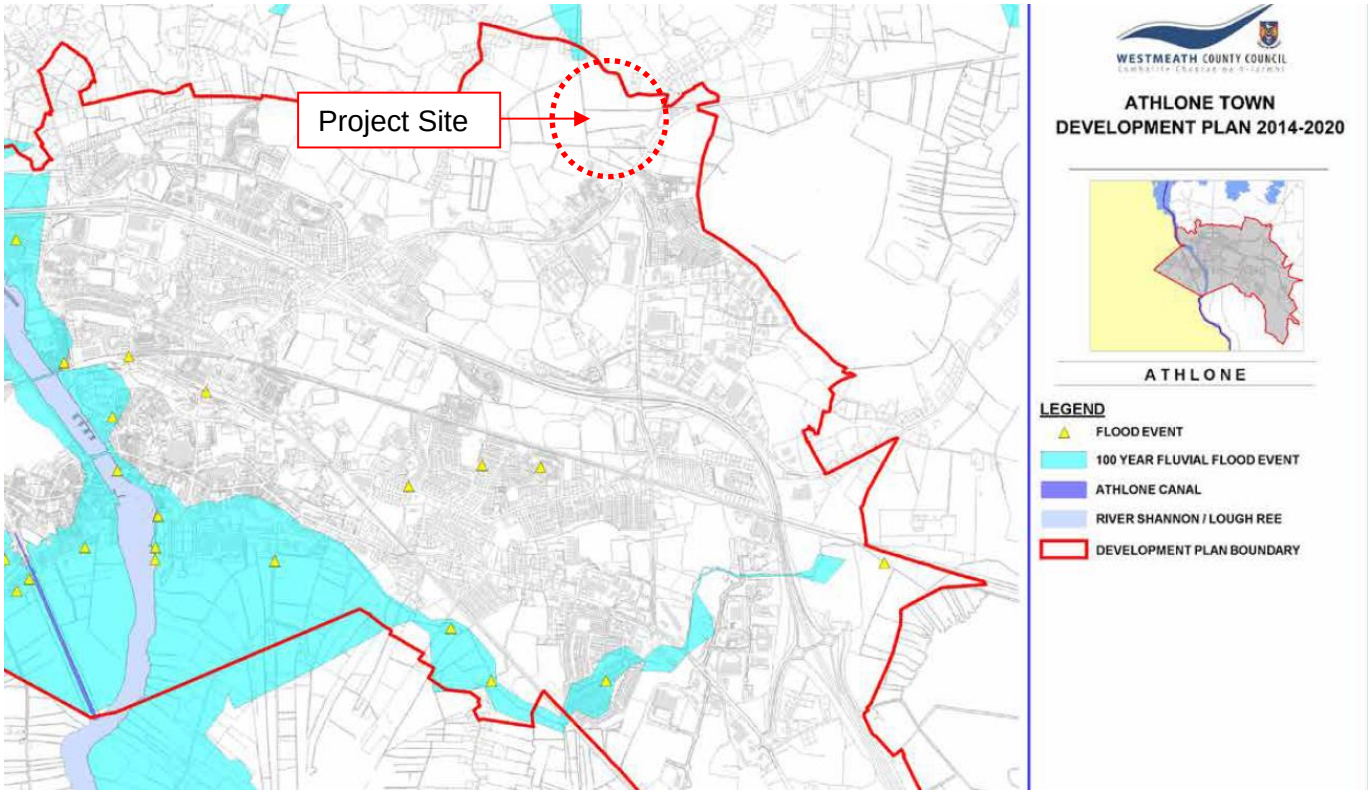


Figure 3 Development Plan Flood Risk Map

Figure 4 below, extracted from CFRAM OPW fluvial flood maps, illustrates the predicted extreme 10% AEP (1 in 10 year), 1% AEP(1 in 100 year) and 0.1% AEP (1 in 1000 year) flood events at the closest node point along the River. This is referenced as Node Label 01GOLO220u.

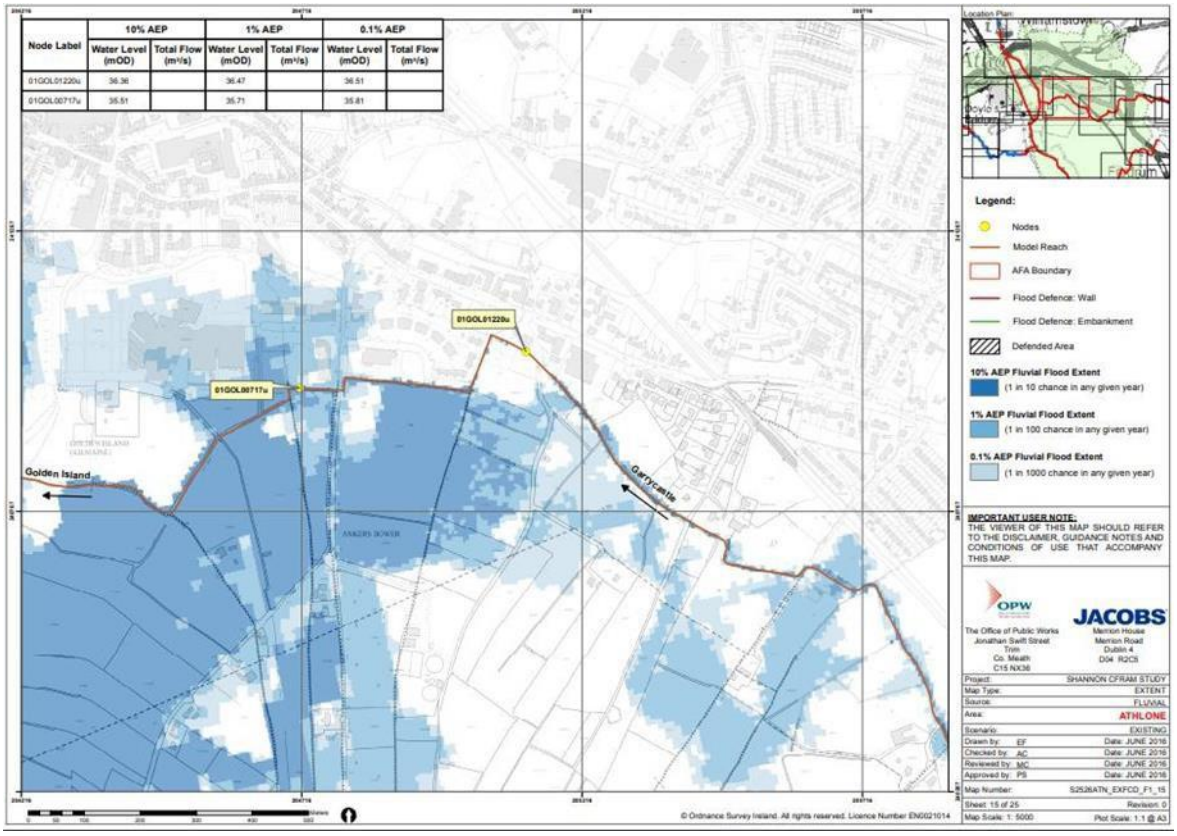


Figure 4 Extract from OPW CFRAM Maps

Details of the predicted fluvial flood volumes levels for this node point are listed in the table below. It should be noted that this node is 2.5Km from the project site and the closest flood zone area to the site as per the CFRAM study.

Node Label	Water Level (mOD) 10% AEP	Water Level (mOD) 1% AEP	Water Level (mOD) 0.1% AEP	Site Design Levels
01GOLO220u	36.36	36.47	36.51	Minimum Finished Floor Level is 40.5mOD Minimum Finished Ground Level is 40.0mOD

Table 1 - Table of CFRAMS Fluvial Maps – Predicted Flood Levels from Nearest Node under the OPW CFRAM study (2.5km away)

2.2 COASTAL FLOODING

The site location is such that it is not affected by coastal flooding and as such this does not affect the project site.

2.3 TIDAL FLOODING

The site location is such that it is not affected by tidal water bodies and as such tidal flooding does not affect the project site, as the site is approximately 40m above sea level.

2.4 PLUVIAL FLOODING

Pluvial flooding typically occurs when extreme rainfall overwhelms drainage systems or soil infiltration capacity, causing excess rainwater to pond above ground at low points in the topography.

To ensure the proposal is not at risk of pluvial flooding ground levels across the site are being raised/re-profiled. This design response addresses the poor permeability of existing soil(s) on-site and the raising the site along with the surface water network being designed to cater for rainfall events up to a 1 in 100-year return period with an allowance for climate change of 20%. Surface water run-off exceeding the allowable outflow rate for the site will be stored in storm-tech underground attenuation tanks as per the SUDS design strategy and this will ensure greenfield run-off rates and no increased flood risk from rainfall or pluvial events affecting third party lands.

For further discussion on the surface water network design we refer to the accompanying engineering report for further surface water design details.

2.5 POTENTIAL FOR THE PROJECT TO CONTRIBUTE TO OFF-SITE FLOODING

By restricting the flow to greenfield runoff rates and the addition of SUDS features within the proposed drainage system the likelihood of the proposed development adversely affecting the existing ditch or contributing to downstream flooding is obviated.

2.6 PROPOSED WATERCOURSE CROSSING & CULVERTS

In order to facilitate the crossing of the existing ditch (watercourses) by the proposed access road a culvert will be required. These design measures also include for culverting a section of the central ditch as requested by the Local Authority during LRD discussions.
In terms of context and drainage catchment it is highlighted these existing drainage ditches serve to drain the immediate lands and are not Section 50 ditches/watercourses.
We have reviewed the catchment of these ditches and also the existing culvert network at the northern extent of the site which crosses under the local road; and which is noted as 900mm diameter pipe.
Therefore the design approach has been to install culverts within the site which are larger than the upstream and downstream 900mm pipes and install 1200mm box culverts into the culvert/ditch crossings proposed. This will ensure the culverts within the site are of a larger design size and increased hydraulic capacity from existing culverts upstream and downstream of the site, thereby ensuring there is no reduced channel flow within the site from the box culverts proposed. This is a robust engineering solution to accommodate existing and future flows along the ditches.

Also to ensure no blockages develop in these ditch crossings/culverts going forward the following criteria will apply to the siting, design and maintenance of the crossings:

New culverts will be fitted with screens to prevent the inflow of debris to remove the risk of blockage. Where new or amended screens are proposed they should be in compliance with the requirements of the Culvert Design & Operation Guide (2010).
The maintenance and management of the site (either by the Management Company or the Local Authority) shall be required to include culvert maintenance which will remove the risk of blockage and maintain the capacity of the culverts. Maintenance measures will include for:
-removal of any items within the ditch that may impede it's flow, including small bushes, excess vegetation etc.
-build up of silt in ditches and at culvert inlets should be removed and disposed of appropriately.
-cyclical (minimum bi-annual) visual inspection of culvert inlets and screens and removal of debris as required, ensuring debris is not deposited in an area likely to fall back into the ditch.

2.7 POST DEVELOPMENT SCENARIO & CULVERTS

The culverts proposed have a hydraulic capacity of 7m3/s vs the existing 900mm culverts under the local roads adjacent to the site of 1.48m3.

The existing ditches within the site have a limited catchment area and channel flows are found to be 1.76 m3/s.

Our analysis finds that the proposed culverts are adequately sized to cater for channel flows in all scenarios and will not increase flood risk elsewhere.

2.8 RESIDUAL RISK

Residual risks are defined as risks that remain after all risk avoidance, substitutions and mitigation measures have been taken. Consideration has also been given regarding flood risk caused by events or greater than the required design standard, as summarized below.

Description of Risk	**Hazard**	**Residual Impact**
Underestimation of fluvial flood level Update of OPW/CFRAM Maps	Inundation of the site for a design event	Fluvial flood levels have been derived from detailed modelling carried out as part of the CFRAM study and are therefore considered fit for purposed. Extreme flood events will not impact the site, given the freeboard in excess of 4m. We again refer to minimum FFLs and FGL's proposed providing circa 4.5m freeboard above fluvial flood levels.
Access and egress routes to and from the site during a 1%/0.1% AEP flood event	Completely dry access/egress not possible during flood event	All areas of the development lie outside flood plain areas and access/egress route to and from the site will always be available.
Stormwater System	Failure of system	In the event of exceedance or blockage of the system the ground levels ensure than any overland flow is directed to the towards the channels and the green areas.

3 CLIMATE CHANGE

`The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG 2009 Technical Appendix A, Section 1.6 recommends that where mathematical models are not available climate change flood extents can be assessed by using the flood Zone B outline as a surrogate for Flood Zone A with allowance for the Possible impacts of climate change.

Therefore, and in accordance with the recommendation above, the predicted 0.1% AEP flood level of 36.51m OD listed in the table above is considered to be representative of the 1% AEP plus the 20% climate change flood level.

3.1 ASSESSING FLOOD RISK IN THE CONTEXT OF CLIMATE CHANGE

The Flood Extents associated with the Node 01GOLO220u, as illustrated on Figure 4, indicate that the proposed development site would not be impacted by a surrogate 1% AEP (1 in 100 year) future scenario climate change fluvial flood event in the River.

We again highlight the lowest finished floor level at the proposed development is 40.50m OD, which is 4.0m above the 1% AEP future change flood Level.

That proposed development site is therefore considered to be adequately protected in consideration of future scenario extreme fluvial flood event in the area.

4 CONCLUSION

The Flood Risk Assessment has concluded that the proposed development is considered to be adequately protected in consideration of future scenario of flood events in the area.

The site of the proposed development is within Zone C, and is appropriate for the Proposed residential development from a flood risk perspective.

The Minimum Finished Floor Level is 40.50m O.D. which is 4.0M above the 1% AEP Event recorded at the closest node under the CFRAM study. Also the minimum Finished Ground level is 40.2mOD, which is over 4.0m.above flood level.

Having reviewed the Athlone Flood Relief Scheme it is noted the majority of the flooding was caused by the river, and the is south of the site approximately 2.5 km away with no potential impact on the proposed site as there are no overland flow paths towards the project site.

We also reviewed past flood events close to the site and note that there was none recorded within 2.5km of the site.

We note from drainage tests carried out to inform SUDS drainage measures there may some local pluvial drainage issues caused by water logging/ponding on the site. To ensure the proposal is not at risk of pluvial flooding ground levels across the site are being raised/re-profiled. This design response addresses the poor permeability of existing soil(s) on-site and the raising the site along with the surface water network being designed to cater for rainfall events up to a 1 in 100-year return period with an allowance for climate change of 20%. Surface water run-off exceeding the allowable outflow rate for the site will be stored in storm-tech underground attenuation tanks as per the SUDS design strategy and this will ensure greenfield run-off rates and no increased flood risk from rainfall or pluvial events affecting third party lands.

Also the water shed analysis under separate cover shows the lines of drainage within the site and how these are addressed by the proposed scheme.
Finally in terms of culverts proposed we have reviewed the existing culvert network at the northern extent of the site which crosses under the local road; and which is noted as 900mm diameter pipe.
Therefore the design approach has been to replicate this existing 900mm pipe into the culvert/ditch crossings proposed, and this is found to be an adequate design size to accommodate flows along the ditches.
As set in section 2.7 of this FRA the existing diches within the site have a limited catchment area and channel flows are found to be 1.48m3/s. To ensure the proposed culverts will are adequaetely sized the culverts proposed have a hydraulic capacity of 7.0 m3/s.
Our analysis finds that the proposed culverts are adequately sized to cater for channel flows in all scenarios and will not increase flood risk elsewhere.

APPENDIX A FLOOD MAPS

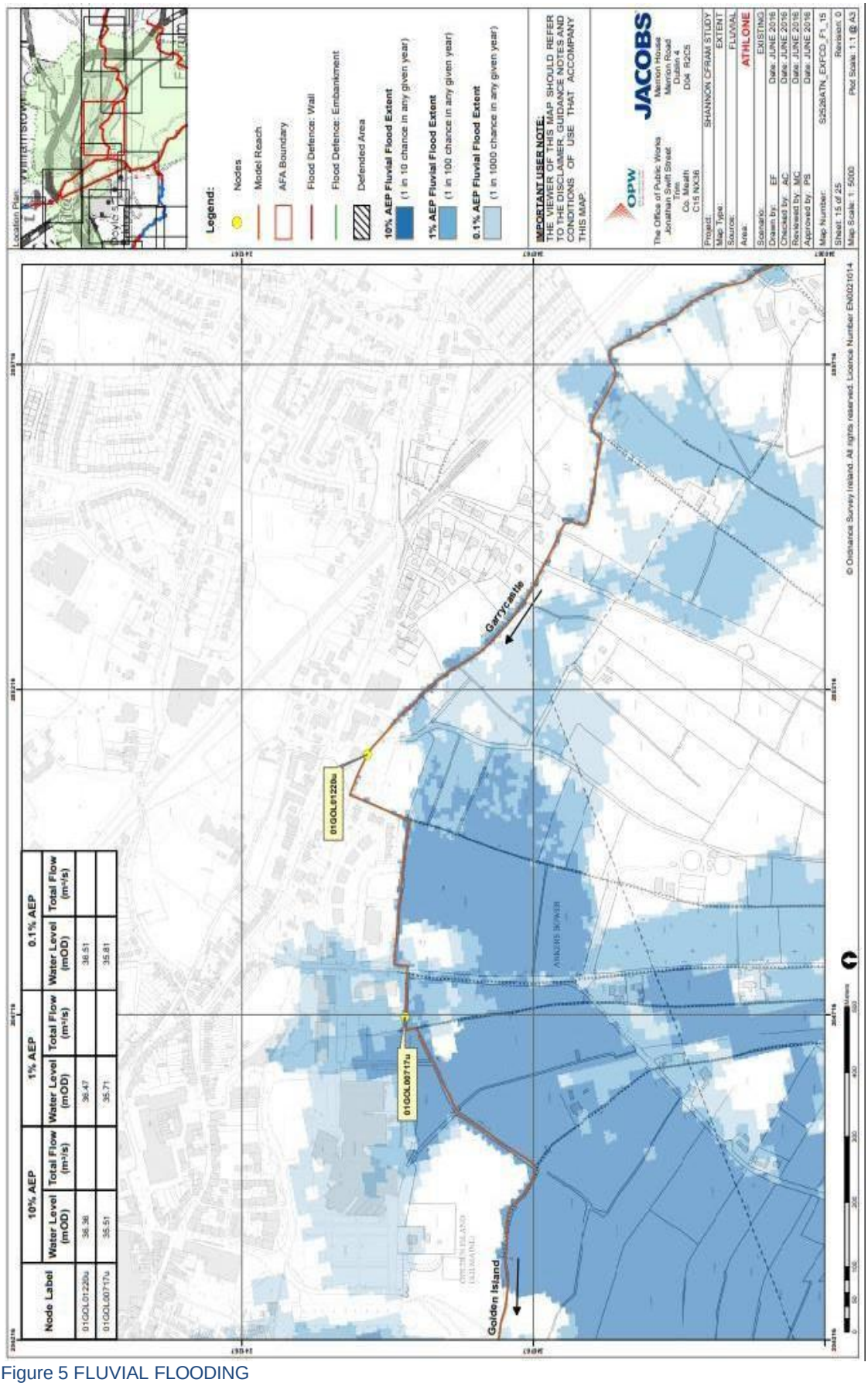


Figure 5 FLUVIAL FLOODING

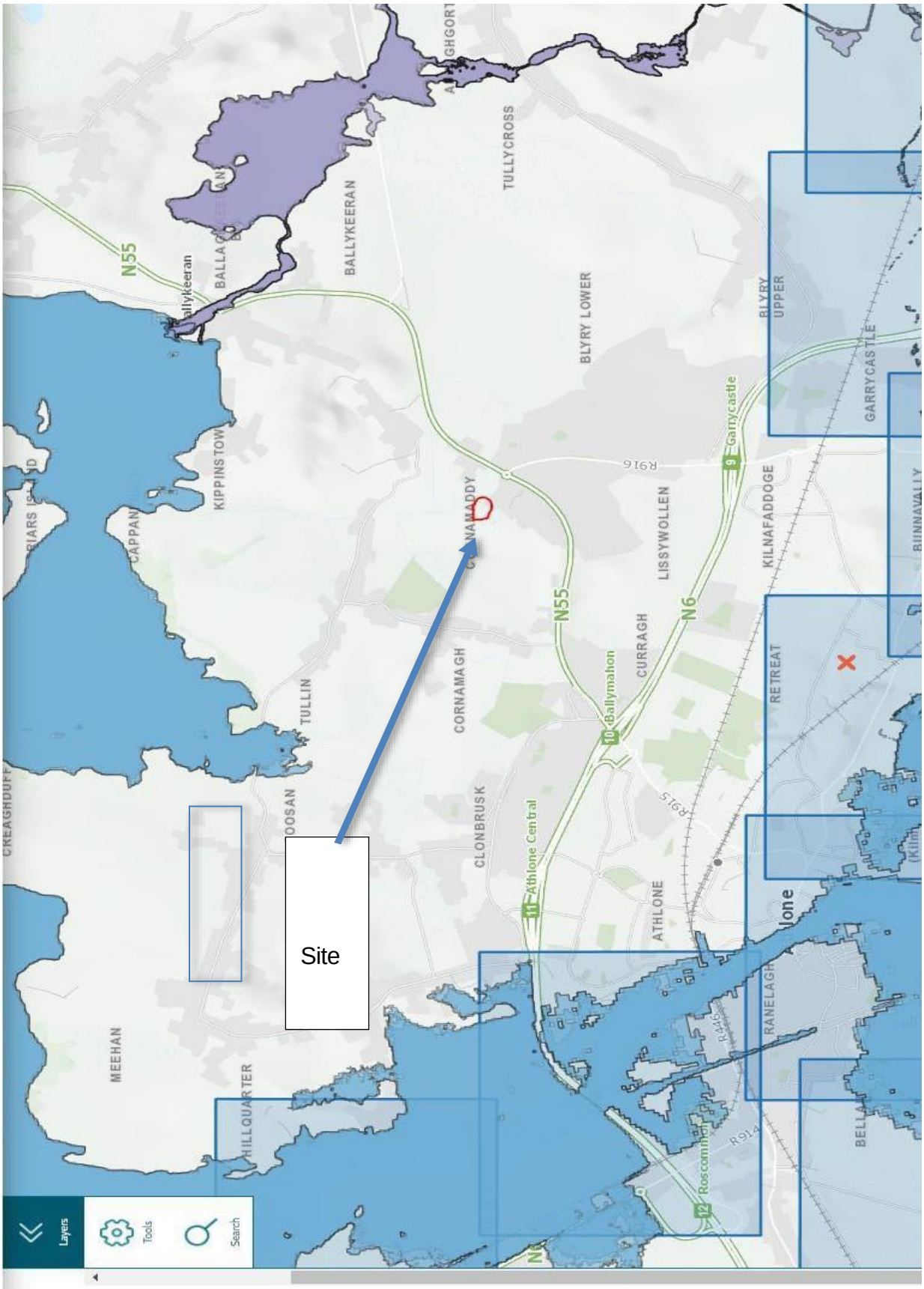


Figure 6 FLOOD EXTENTS ALL POSSIBILITIES

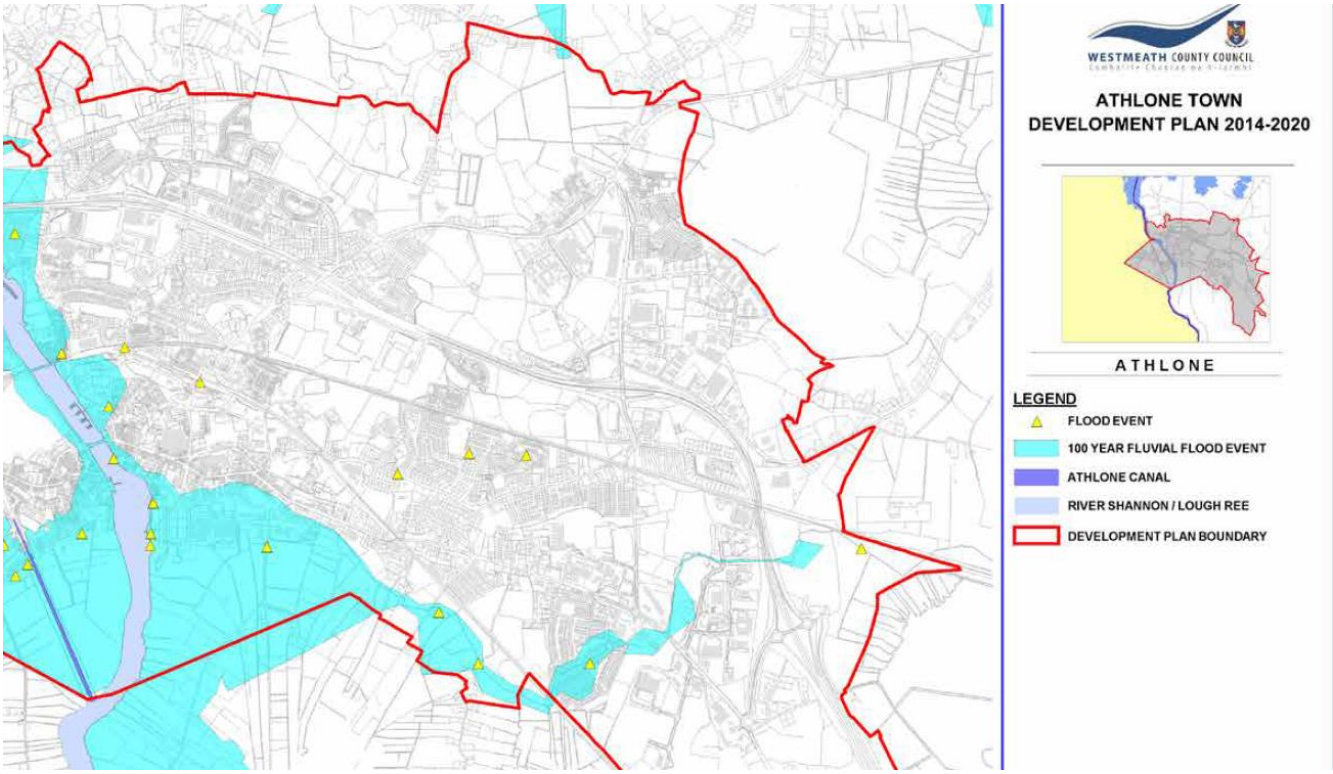


Figure 7 FLOOD EXTENTS ATHLONE TOWN DEVELOPMENT PLAN