

Location: Newcastle West, Co. Limerick		Unique ID: 240392 (from PFRA database)	
Initial OPW Designation	APSR <input checked="" type="checkbox"/>	AFRR <input type="checkbox"/>	IRR <input type="checkbox"/>
Co-ordinates	Easting: 129750	Northing: 133000	
River / Catchment / Sub-catchment	Arra, Daar & Doally River / Deel / Shannon Estuary		
Type of Flooding / Flood Risk (identify all that apply)	Fluvial non-tidal <input checked="" type="checkbox"/> Fluvial tidal <input type="checkbox"/> Coastal <input type="checkbox"/>		

Stage 1: Desktop Review	
1.1 Flood History (include review of Floodmaps.ie)	<p>River Flow Path</p> <p>The Arra River sources at Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA; it merges with the Doally River before flowing through Newcastle West. The River Mash also joins the Arra / Doally on the southwest fringe of the town.</p> <p>Downstream, east of the town and parallel to the R520, the Arra/Dooally River merges with the Daar River, and flows into the River Deel. The River Deel flows north through Rathkeale, Askeaton and then to the Lower River Shannon SAC / River Shannon and River Fergus Estuaries SPA.</p> <p>Flood event records</p> <p>31st July 2008 (River Arra)</p> <p>Extreme rainfall event. Extensive flooding of the town centre.</p> <ul style="list-style-type: none"> Newcastle West Flood Severity and Impact Report: Report on flooding in Newcastle West, Co. Limerick, July 2008 (Report Includes: Flood Extent, Flood Level, Flood Depth, Source, Cause) Video footage of Flood at or near peak at 2.45 am on 01/08/2008. Filmed by member of public. Copy held by OPW FRAM section. (Video Includes: Flood Level, Flood Depth, Source) <p>2005</p> <ul style="list-style-type: none"> Meeting Minutes: River Deel floods R520, east of Newcastle West, every 1-3 years & River Deel floods N21 approx twice per year. <p>Radio interviews:</p> <p>No historic need for drainage improvement works. First known event of this type in living memory of the town.</p> <p>RTE flooding footage and photos from August 2008</p> <p>http://www.rte.ie/news/2008/0801/floods.html</p> <ul style="list-style-type: none"> River Arra burst its banks 1.5 inches rain fell in 12 hour period ~5 feet of water in north and south quays N21 flooded and closed Extreme rainfall event 19:00 – 20:00, 20:30 – 21:00 even heavier Most severe in town's history <p>Limerick Leader Newspaper Published on Thu Aug 07 2008 outlines chronology of events.</p>

1.2 Relevant information on flooding issues from OPW and LA staff	<p>PFRA database comments (<i>in italics</i>):</p> <p>OPW comments</p> <ul style="list-style-type: none">Major flood event in 2008, Scheme under design. Also castlemahon at SE corner of pred area, Severity 2, Houses flooded following Aug. '08 Flood. Also Severity of 2 for Dromin, east of pred area. <p>LA comments</p> <ul style="list-style-type: none">Sewerage plant floods regularly outside Newcastle west castle mahon.All agree it is APSR <p>Meeting / discussion summary comments:</p> <p>OPW comments</p> <ul style="list-style-type: none">Major flooding event in 2008. Considered to be an extremely rare event – a “one off”.A new scheme has since been constructed. This is a mixture of walls and other improvements along the main channel where the main flooding occurred.The works are marked up on the annotated map.Summary of works is:<ul style="list-style-type: none">(1) New flood wall along New Road(2) New works to the wall along North Quay (flap valves, re-pointing, old drainage cut off etc.)(3) Major clearance and heavy maintenance.Survey and modelling of Newcastle West been done.There is a large flood plain downstream of Newcastle West.There are two important gauging stations east of Newcastle West.During the 2008 event, the following was recorded:<ul style="list-style-type: none">River Arra – 600 mm higher than the previous record. This is at the confluence with the Deel.River Deel – 300 mm higher than the previous record. This gauge is at Grange Bridge.No flooding on River Daar in November 2008 – very steep slopesNew flood warning system - alarm bell level and text message <p>LA comments</p> <ul style="list-style-type: none">This area was not discussed.		
1.4 PFRA Data			
1.4.1 PFRA hazard mapping	PFRA mapping available in GIS layer:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
	PFRA mapping included on FRR map:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
1.4.2 Summary of Principal Receptors	Type	FRI score (if available)	
	ESB_HV_Sub_Weighted_F_C	2500	
	WTPLoc2005_Weighted_F_C	25	
	UWWTPLoc_Weighted_F_C	25	
	Monument_LV_Weighted_F_	10.2	
	Total:	4781.2	

1.7 Stage 1 Evaluation	Aspect	Clearly APSR	Uncertain
	Flood History (1.1)	X	
	OPW / LA Information (1.2)	X	
	PFRA Evaluation (1.4)	X	
	Overall Desktop Evaluation (if any above aspect is uncertain then overall designation is uncertain)	X	
1.8 Proposed level of assessment for Stage 2 site visits	Level A Site Visit		
	Level B Site Visit		X

Stage 2: Site Inspection		Level B Assessment	
Date and Time of Inspection		Date: 14/04/11	
		Time: 14:30	
Names of inspection team (including OPW/LA staff if present)		Iain Blackwell	
		Kelly Kasperczyk	
2.3 Local knowledge - on-site comments (OPW, LA and any info volunteered by local residents during visit)	No on site comments		
2.4 Comments on hydraulic constrictions (bridges, etc.) and conveyance routes	<p>There are numerous crossings of the tributaries of the Arra upstream of the town centre.</p> <p>In the town centre, there are two arch bridges, a double box culvert underneath a building, and then an arch bridge further d/s (located just u/s of new flood wall) – all of which could pose restrictions to flow.</p>		
2.6 Defence Assets			
Formal and Informal Flood Defence Assets <i>(include effective and ineffective assets to inform asset survey and potential mitigation measures)</i>	Open Channel Watercourses		
	Man-made river channel <input type="checkbox"/>	Flood relief channel <input type="checkbox"/>	Canal <input type="checkbox"/>
	Mill leat <input type="checkbox"/>	Drainage channels / back drains <input type="checkbox"/>	
	Bridges and Culvert crossings		
	Single Arch bridge <input checked="" type="checkbox"/>	Multi-Arch bridge <input checked="" type="checkbox"/>	
	Single Span bridge <input type="checkbox"/>	Multi-Span bridge <input type="checkbox"/>	
	Box culvert(s) <input checked="" type="checkbox"/>	Pipe culvert(s) <input type="checkbox"/>	Arch Culvert(s) <input type="checkbox"/>
	Culverted Watercourses (culvert length is greater than just a crossing)		
	Box culvert(s) <input checked="" type="checkbox"/>	Pipe culvert(s) <input type="checkbox"/>	Arch Culvert(s) <input type="checkbox"/> Irregular Culvert(s) <input type="checkbox"/>
	Walls and Embankments		
	Embankment(s) <input type="checkbox"/>	Raised wall(s) <input checked="" type="checkbox"/>	Retaining wall(s) <input checked="" type="checkbox"/>
	Control Structures – weirs, gates, dams		
	Fixed crest weir <input type="checkbox"/>	Adjustable weir <input type="checkbox"/>	Dam / Barrage <input type="checkbox"/>
	Sluice gates <input type="checkbox"/>	Lock gates <input type="checkbox"/>	Radial gates <input type="checkbox"/>
Storage			
On-line storage (natural) <input type="checkbox"/>	On-line storage (artificial) <input type="checkbox"/>	Off-line storage <input type="checkbox"/>	
Outfalls			
Flapped outfall(s) into watercourse <input checked="" type="checkbox"/>		Unflapped outfall(s) into watercourse <input type="checkbox"/>	
<i>i.e. from smaller watercourses, drains etc. into river / estuary / sea</i>			
Tidal flap(s) <input type="checkbox"/>	Tidal sluice(s) <input type="checkbox"/>		
<i>i.e. from main watercourse into estuary / sea</i>			
Other			
Pumping Station <input type="checkbox"/>	Erosion Protection <input type="checkbox"/>	Sand Dunes <input type="checkbox"/>	

	<p>Additional notes (if required):</p> <p>Potential informal defences are present on the right bank of the town; however, some stretches have gaps in the walls and these are currently ineffective.</p> <p>New OPW flood wall along New Road. However, this wall does not commence until approx 15m d/s of where the Arra is crossed by St. Mary's Road. This section of the right bank has an open fence.</p>
<p>2.8 Initial Potential Mitigation Measures</p>	
<p>Non-structural measures</p>	<p>Planning and Development control <input type="checkbox"/></p> <p>Sustainable Urban Drainage Systems <input type="checkbox"/></p> <p>Flood forecasting / warning <input checked="" type="checkbox"/></p> <p>Change in Operating Procedures for water level control: <input type="checkbox"/></p> <p>Public awareness campaign <input checked="" type="checkbox"/></p> <p>Individual property protection <input checked="" type="checkbox"/></p> <p>Land use management <input checked="" type="checkbox"/></p>
<p>Structural measures</p>	<p>Strategic development management for floodplain development: <input type="checkbox"/> (integration of measures into strategic development proposals)</p> <p>Storage: On-line <input checked="" type="checkbox"/> Off-line <input checked="" type="checkbox"/></p> <p>Flow diversion: Flood relief channel <input checked="" type="checkbox"/> Flood relief culvert <input type="checkbox"/></p> <p>Increase conveyance: Bridge works <input checked="" type="checkbox"/> Channel works <input checked="" type="checkbox"/> Floodplain <input type="checkbox"/></p> <p>Flood defences: Walls <input checked="" type="checkbox"/> Embankments <input type="checkbox"/></p> <p>Localised works: Defence raising <input type="checkbox"/> In-fill gaps <input type="checkbox"/> Trash screen <input type="checkbox"/></p> <p>Maintenance works: Culvert / channel clearance <input type="checkbox"/> Asset maintenance <input type="checkbox"/></p> <p>Relocation of properties: <input type="checkbox"/></p> <p>Improve existing defences: <input type="checkbox"/> (describe)</p> <p>Other (describe):</p> <p>Some informal defences could be altered to increase effectiveness, e.g:</p> <ul style="list-style-type: none"> Right bank along South Quay – some gaps in wall adjacent to pavement. Left bank on Arra riverside walk – some gaps in walls e.g. garden entrances, could be filled (but may need complete replacement). <p>Improved conveyance through restrictive culverts / bridges include:</p> <ul style="list-style-type: none"> the 3-arch road bridge at South Quay / North Quay (and another obstruction – a RC concrete beam crossing immediately d/s of the bridge) consideration of altering the twin box culvert with the building over it at the east end of North Quay in situ to a single full-span culvert / bridge. <p>Downstream of Newcastle West, Rathkeale and Askeaton are also identified as areas that may be defined as Areas of Potential Significant Risk. Consideration should be given to flood storage measures downstream of Newcastle West that could benefit these downstream locations.</p>

Outcomes	
Recommended Designation	APSR <input checked="" type="checkbox"/> not an APSR <input type="checkbox"/> IRR <input type="checkbox"/>
Summary Comments (if required)	<p>The main area of concern is through the town centre due to the confluence of three watercourses (Arra, Mash and Doally) at the west end of the town. There is not considered to be a significant flood risk from the River Daar which flows along the noertheast edge of the town.</p> <p>The primary cause of the flood risk in Newcastle West appears a combination of factors:</p> <ul style="list-style-type: none"> • an extensive network of streams flowing from the mountains immediately to the west of Newcastle West; • the confluence of three significant watercourses (Arra, Mash and Doally) on the upstream (west) edge of town; • severe hydraulic restrictions within the town, downstream of the confluences of these rivers; <p>The river bed has significant rocky outcrops in the town centre and these act as the hydraulic control, influencing flood risk towards the upstream end of the town.</p> <p>Wider strategic options are possible u/s and d/s of the town which could benefit other downstream communities, particularly Rathkeale (closest d/s APSR).</p>



Photo 1: Box culverts to the NE of the Newcastle West on the River Daar



Photo 2: Road crossing to the west of Newcastle west on the Dooally River



Photo 3: Double Arch Bridge crossing on tributary to the Dooally River west of Newcastle West



Photo 4: Double Arch Bridge crossing in south quay area of Newcastle West



Photo 5: Rocky outcrops in river in Newcastle West centre



Photo 6: Twin box culvert with building above located in the North Quay area



Photo 7: New flood Wall with gap in defence between beginning of wall and Bridge



Photo 8: Two No. 3 Arch bridges on East side of Newcastle West town centre

