

<b>Location: Bruree, Co. Limerick</b>		<b>Unique ID:</b> (from PFRA database)	
<b>Initial OPW Designation</b>	<b>APSR</b> <input type="checkbox"/>	<b>AFRR</b> <input checked="" type="checkbox"/>	<b>IRR</b> <input type="checkbox"/>
<b>Co-ordinates</b>	<b>Easting: 155170</b>	<b>Northing: 130420</b>	
<b>River / Catchment / Sub-catchment</b>	<b>River Maigue</b>		
<b>Type of Flooding / Flood Risk</b> (identify all that apply)	<b>Fluvial non-tidal</b> <input checked="" type="checkbox"/> <b>Fluvial tidal</b> <input type="checkbox"/> <b>Coastal</b> <input type="checkbox"/>		

<b>Stage 1: Desktop Review</b>	
<b>1.1 Flood History (include review of Floodmaps.ie)</b>	<p><b>River Flow Path</b></p> <p>The River Maigue flows roughly N-S to the west of Bruree. There is an extensive network of streams feeding into the River Maigue north and south of Bruree. Within the extent of the town there is one tributary south of the town.</p> <p><b>Flood event records</b></p> <p>There are two flood records (from 1986 -1999) for the same area Howardstown; one singular and one recurring. This flood area is located North of Bruree approx 2km.</p>
<b>1.2 Relevant information on flooding issues from OPW and LA staff</b>	<p><b>PFRA database comments (<i>in italics</i>):</b></p> <p><b>OPW comments</b> <i>Not designated APSR as failed to reach predictive analysis threshold</i></p> <p><b>LA comments</b> <i>(am) OPW Scheme in place. Risk to house upstream of bridge (pm).</i></p> <p><b>Meeting / discussion summary comments:</b></p> <p><b>OPW comments</b></p> <ul style="list-style-type: none"> <li>Not a significant problem. One house possibly at risk of flooding.</li> </ul> <p><b>LA comments (Limerick County Council)</b></p> <ul style="list-style-type: none"> <li>Not aware of any flooding issues in this area, but can check with the area engineer and advise.</li> </ul>

<b>1.4 PFRA Data</b>			
<b>1.4.1 PFRA hazard mapping</b>	<b>PFRA mapping available in GIS layer:</b>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	<b>PFRA mapping included on FRR map:</b>		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<b>1.4.2 Summary of Principal Receptors</b>	<b>Type</b>	<b>FRI score (if available)</b>	
	Receptors not considered as part of the PFRA process.  FRI score not calculated in PFRA.		
<b>1.7 Stage 1 Evaluation</b>	<b>Aspect</b>	<b>Clearly APSR</b>	<b>Uncertain</b>
	<b>Flood History (1.1)</b>		<b>X</b>
	<b>OPW / LA Information (1.2)</b>		<b>X</b>
	<b>PFRA Evaluation (1.4)</b>		<b>X</b>
	<b>Overall Desktop Evaluation</b> (if any above aspect is uncertain then overall designation is uncertain)		<b>X</b>
<b>1.8 Proposed level of assessment for Stage 2 site visits</b>	<b>Level A Site Visit</b>		<b>X</b>
	<b>Level B Site Visit</b>		

<b>Stage 2: Site Inspection</b>		<b>Level A Assessment</b>		
<b>Date and Time of Inspection</b>		<b>Date: 30/03/11</b>		
		<b>Time: 10:30</b>		
<b>Names of inspection team (including OPW/LA staff if present)</b>		<b>Iain Blackwell</b>		
		<b>Kelly Kasperczyk</b>		
<b>2.1 Ground-truthing of Hazard Mapping</b>	<b>Fluvial non-tidal</b> <input checked="" type="checkbox"/> <b>Fluvial tidal</b> <input type="checkbox"/> <b>Coastal</b> <input type="checkbox"/> <b>Not available</b> <input checked="" type="checkbox"/>			
	Flood outlines appear reasonable, reflecting local topography well.			
<b>2.2 Spot check ground-truthing of selected receptor vulnerability</b>	<b>Receptor Type</b>	<b>Location description (if not obvious)</b>	<b>Exists?</b>	<b>Overall Vulnerability / Risk (L / M / H)</b>
<b>(also note any key receptors noted during visit that are not identified by PFRA)</b>	Church and graveyard	Above left bank, upstream of main bridge	Yes	L – on very high ground
	Mill buildings	Downstream of main bridge on right bank.	Yes	M – high above river, but level with mill race
	Bridge		Yes	M
<b>2.3 Local knowledge - on-site comments</b> <b>(OPW, LA and any info volunteered by local residents during visit)</b>	No on-site comments.			
<b>2.4 Comments on hydraulic constrictions (bridges, etc.) and conveyance routes</b>	<p>Seven-arch bridge. Two left arches are blocked with sediment.</p> <p>High ground at left bank (u/s and d/s of bridge).</p> <p>Weir downstream of bridge artificially raises levels. This is the hydraulic control for the river and provides the head for the mill race and mill headrace.</p> <p>River bends u/s of the bridge next to a few residential properties on right bank.</p> <p>No expansive flood plain along this reach.</p>			

2.5 SVRS Assessment Matrix												
<b>Weightings:</b> <b>A - x1 - reasonable expectation of flooding</b> <b>B - x2 - high expectation of flooding or flooding is tidal (any risk)</b> <b>C - x5 - risk to life</b>												
Approx. Number	1 to 4				5 to 20				>20			
Weighting		A	B	C		A	B	C		A	B	C
Property (domestic)	10				100	X			200			
Property (small retail or business)	20				200				400			
Property (large retail or business)	50				500				1000			
Road or Rail Infrastructure	30	X			300				600			
Critical Infrastructure (local) [hospital, school, police/fire/ambulance station, substation, WTW/WWTW, gov bldg, other (specify)]	50				500				1000			
Critical Infrastructure (national importance)	250				1000				2000			
Cultural Heritage Site	20	X			200				400			
Environmental Designated Site	20				200				400			
Hazardous Substances Site	50				500				1000			
<b>Total SVRS</b>									<b>150</b>			
2.6 Defence Assets												
<b>Formal and Informal Flood Defence Assets</b> <i>(include effective and ineffective assets to inform asset survey and potential mitigation measures)</i>	<b>Open Channel Watercourses</b> Man-made river channel <input type="checkbox"/> Flood relief channel <input type="checkbox"/> Canal <input type="checkbox"/> Mill leat <input checked="" type="checkbox"/> Drainage channels / back drains <input type="checkbox"/>											
	<b>Bridges and Culvert crossings</b> Single Arch bridge <input 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 type="checkbox"/> Pipe culvert(s) <input type="checkbox"/> Arch Culvert(s) <input type="checkbox"/>											
	<b>Culverted Watercourses</b> (culvert length is greater than just a crossing) Box culvert(s) <input type="checkbox"/> Pipe culvert(s) <input type="checkbox"/> Arch Culvert(s) <input type="checkbox"/> Irregular Culvert(s) <input type="checkbox"/>											
	<b>Walls and Embankments</b> Embankment(s) <input type="checkbox"/> Raised wall(s) <input checked="" type="checkbox"/> Retaining wall(s) <input type="checkbox"/>											
	<b>Control Structures – weirs, gates, dams</b> Fixed crest weir <input checked="" type="checkbox"/> Adjustable weir <input type="checkbox"/> Dam / Barrage <input type="checkbox"/> Sluice gates <input checked="" type="checkbox"/> Lock gates <input type="checkbox"/> Radial gates <input type="checkbox"/>											
	<b>Storage</b> On-line storage (natural) <input type="checkbox"/> On-line storage (artificial) <input type="checkbox"/> Off-line storage <input type="checkbox"/>											
	<b>Outfalls</b> Flapped outfall(s) into watercourse <input type="checkbox"/> Unflapped outfall(s) into watercourse <input checked="" 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> <b>Other</b> Pumping Station <input type="checkbox"/> Erosion Protection <input type="checkbox"/> Sand Dunes <input type="checkbox"/> <b>Additional notes (if required):</b> Main flood defence asset is the flood wall on the right bank upstream and downstream of the bridge.
<b>2.8 Initial Potential Mitigation Measures</b>	
<b>Non-structural measures</b>	Planning and Development control <input type="checkbox"/> Sustainable Urban Drainage Systems <input type="checkbox"/> Flood forecasting / warning <input checked="" type="checkbox"/> Change in Operating Procedures for water level control: <input type="checkbox"/> Public awareness campaign <input type="checkbox"/> Individual property protection <input checked="" type="checkbox"/> Land use management <input type="checkbox"/>
<b>Structural measures</b>	<b>Strategic development management for floodplain development:</b> <input type="checkbox"/> <i>(integration of measures into strategic development proposals)</i> <b>Storage:</b> On-line <input type="checkbox"/> Off-line <input type="checkbox"/> <b>Flow diversion:</b> Flood relief channel <input checked="" type="checkbox"/> Flood relief culvert <input type="checkbox"/> <b>Increase conveyance:</b> Bridge works <input checked="" type="checkbox"/> Channel works <input type="checkbox"/> Floodplain <input type="checkbox"/> <b>Flood defences:</b> Walls <input type="checkbox"/> Embankments <input type="checkbox"/> <b>Localised works:</b> Defence raising <input checked="" type="checkbox"/> In-fill gaps <input checked="" type="checkbox"/> Trash screen <input type="checkbox"/> <b>Maintenance works:</b> Culvert / channel clearance <input type="checkbox"/> Asset maintenance <input checked="" type="checkbox"/> <b>Relocation of properties:</b> <input type="checkbox"/> <b>Improve existing defences:</b> <input checked="" type="checkbox"/> <b>(describe)</b> Minor improvements may be possible through creating (or repairing) flapped outfalls on right bank downstream of main bridge, and raising flood wall upstream of the bridge on the right bank. <b>Other (describe):</b> The existing weir and mill race could be altered to increase capacity and reduce the upstream water level (as this is the hydraulic control). However, the potential impact on cultural heritage (mill) and river bed ecology would need to be considered.

<b>Outcomes</b>				
<b>PFRA Designation</b>	APSR <input checked="" type="checkbox"/> not an APSR <input type="checkbox"/> IRR <input type="checkbox"/>		FRI Score: N/A	
<b>Site Ground-truthing of PFRA Assessment (hazard mapping and receptors)</b>	<b>High Confidence (good)</b>	<b>Uncertain</b>	<b>Low Confidence (poor)</b>	<b>Not available</b>
	X			
<b>Site Visit Review Score</b>	150			
<b>Recommended Designation</b>	APSR <input type="checkbox"/> not an APSR <input checked="" type="checkbox"/> IRR <input type="checkbox"/>			
<b>Summary Comments (if required)</b>	<p>A total of around 5-8 properties are potentially at risk on the right bank both upstream and downstream of the main bridge. Properties on the upstream side of the bridge are protected by a flood defence wall. In the absence of this wall, the properties may be at risk of flooding, and the main route through the town may become disrupted. With a small number of properties at risk, this is a borderline case.</p> <p>A brief review of historic flows (rather than historic floods, of which there are none) as recorded at the Bruree Gauging Station, shows that the gauging station has 58 years of data. The biggest flows on record are 1989, followed by 1983 and 1998 at around the same value. No flooding was recorded in any of these events.</p> <p>Given the biggest flow on record since 1953 occurred in 1989, it is expected that there would be some knowledge of flooding in Bruree if it took place. Similarly (and more likely) for 1998, a knowledge of any significant flooding would be expected as this is a relatively recent event. This event is likely to be around the 2-3% Annual Exceedance Probability (AEP) event (possibly rarer) although it is noted that a flood frequency analysis of this gauging station site has not been carried out.</p> <p>On the basis of this local gauge (very close to the town), the lack of flood history, lack of support from the LA or OPW, and the relatively small number of properties potentially at risk, it is recommended that this site is not designated as an APSR.</p> <p>The SVRS score of 150 is comparable with other sites that are included as APSRs, however, the recommendation is driven by the on site findings rather than the SVRS.</p>			



**Photo 1:** River Maigue u/s of multi-arch bridge. Properties on the right bank protected by a flood wall.



**Photo 2:** Downstream side of multi-arch bridge. Some low properties on d/s side on right bank.



**Photo 3:** Mill and weir located d/s of the bridge. Most properties on the right bank are elevated above the flood plain.



**Photo 4:** Low lying properties on the right bank immediately d/s of the bridge.



**Photo 5:** River looking d/s to the main bridge. Properties on the left bank have partial protection from the wall on the right bank. Limited flood plain on the left bank with the land rising sharply.



**Photo 6:** U/s view on the approach to Bruree. Left bank (on right on photo) is seen to much lower than the right bank.



