

<b>Location: Tromracastle, Co. Clare</b>		<b>Unique ID: 280483</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: 99750</b>		<b>Northing: 173000</b>
<b>River / Catchment / Sub-catchment</b>	<b>Ballymakea River / Inagh Catchment</b>		
<b>Type of Flooding / Flood Risk</b> (identify all that apply)	<b>Fluvial non-tidal</b> <input type="checkbox"/> <b>Fluvial tidal</b> <input checked="" type="checkbox"/> <b>Coastal</b> <input type="checkbox"/>		

## Stage 1: Desktop Review

<b>1.1 Flood History (include review of Floodmaps.ie)</b>	<p><b>River Flow Path</b></p> <p>The Ballymakea River flows west towards Tromracastle, draining a generally low-lying area several kilometres inland, very rural in nature, flowing through small isolated communities.</p> <p><b>Flood event records</b></p> <p>There are no flood records for the townland of Tromracastle. The nearest flood record is in Cloghauninchy, Quilty, Co. Clare immediately south of Tromracastle. This is a listed single flood record.</p> <p>The Ballymakea River discharges into the sea by way of a culvert through a shingle embankment at Cloghauninchy (just south of Tromracastle near Quilty in Co. Clare. The original culvert, constructed in 1927, was severely damaged in March 1989 due to a combination of high winds and spring tide. Following the destruction of the culvert there was no outlet for the natural river flows resulting in the flooding of a considerable area of land, a stretch of approximately 500m of road and a number of houses to a depth of almost 1m.</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>HA27 or 28? Very rural - Coastal - Need to see Coastal amalgamated area - No Strong LA Opinion - 1 Dated flood - OPW severity = 3 but no comment Tidal extents cover area see report</i></p> <p><b>LA comments</b>  <i>Low Lying Flat Area with many "once-off" housing. Area protected by Sand Dunes, if breached many properties would be at risk of flooding.</i></p> <p><b>Meeting / discussion summary comments:</b></p> <p><b>OPW comments</b></p> <ul style="list-style-type: none"> <li>The flood extents at this location are greater than shown by the PFRA.</li> <li>A 1.8m discharge pipe through the shingle embankment used to get tidally compromised and the area of drains filled up like a lake. A second discharge pipe was constructed to help alleviate this.</li> <li>The dune system at this location is moving inland, reducing its protection. Also, property owners have cut into the dunes to obtain access to the beach.</li> <li>It is thought that Clare CoCo may have plans for further development in this area as a sewage treatment system has been recently installed (may also be just to address WFD issues).</li> <li>ESB or UCC have undertaken a flood study in this area.</li> </ul>

	<b>LA comments</b> <ul style="list-style-type: none"> <li>No existing formal defences</li> <li>Potential Coastal Erosion Risk (Dune Breaching)</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>	
	No principal receptors within the area for flood risk review. The FRI score is from residential and commercial properties.  <b>Total:</b>  (Included in PFRA database as Carricknola)	575	
<b>1.7 Stage 1 Evaluation</b>	<b>Aspect</b>	<b>Clearly APSR</b>	<b>Uncertain</b>
	<b>Flood History (1.1)</b>		X
	<b>OPW / LA Information (1.2)</b>		X
	<b>PFRA Evaluation (1.4)</b>		X
	<b>Overall Desktop Evaluation</b> (if any above aspect is uncertain then overall designation is uncertain)		X
<b>1.8 Proposed level of assessment for Stage 2 site visits</b>	<b>Level A Site Visit</b>	X	
	<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: 08/06/11</b>		
		<b>Time: 10:00</b>		
<b>Names of inspection team (including OPW/LA staff if present)</b>		<b>Iain Blackwell</b>		
		<b>Lewis Maani</b>		
<b>2.1 Ground-truthing of Hazard Mapping</b>	<b>Fluvial non-tidal</b> <input type="checkbox"/> <b>Fluvial tidal</b> <input checked="" type="checkbox"/> <b>Coastal</b> <input checked="" type="checkbox"/> <b>Not available</b> <input checked="" type="checkbox"/>			
	Reasonable outline of fluvial flooding, showing flooded areas on the low lying land behind the dune system and shingle ridge. No properties shown as being flooded.  No coastal flooding hazard mapping available at time of site visit.			
<b>2.2 Spot check ground-truthing of selected receptor vulnerability</b>  <b>(also note any key receptors noted during visit that are not identified by PFRA)</b>	<b>Receptor Type</b>	<b>Location description (if not obvious)</b>	<b>Exists?</b>	<b>Overall Vulnerability / Risk (L / M / H)</b>
	Houses	Located along main road N-S through Tromracastle	Yes	L
	Tromra Castle (remains)		Yes	L
<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>	No significant hydraulic restrictions. There is a single arch bridge towards the downstream end of system (the main road crossing) but the bridge has high capacity.  Channel conveyance is limited in places due to significant vegetation (typically reeds) growing in the channels.  Two large pipe culverts convey the flow through the shingle ridge. These do not have any tidal flaps and do not present any clear hydraulic restriction to the outflow from the river. They also allow tidal inundation.  There are no alternative conveyance routes.			

## 2.5 SVRS Assessment Matrix

### Weightings:

A - x1 - reasonable expectation of flooding

B - x2 - high expectation of flooding  
or flooding is tidal (any risk)

C - x5 - risk to life

Approx. Number	1 to 4				5 to 20				>20			
Weighting		A	B	C		A	B	C		A	B	C
Property (domestic)	10				100				200			
Property (small retail or business)	20				200				400			
Property (large retail or business)	50				500				1000			
Road or Rail Infrastructure	30				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				200				400			
Environmental Designated Site	20				200				400			
Hazardous Substances Site	50				500				1000			
Total SVRS									0			

## 2.6 Defence Assets

### Formal and Informal Flood Defence Assets

(include effective and ineffective assets to inform asset survey and potential mitigation measures)

### Open Channel Watercourses

Man-made river channel ☒ Flood relief channel ☐ Canal ☐  
Mill leat ☐ Drainage channels / back drains ☒

### Bridges and Culvert crossings

Single Arch bridge ☒ Multi-Arch bridge ☐  
Single Span bridge ☐ Multi-Span bridge ☐  
Box culvert(s) ☐ Pipe culvert(s) ☐ Arch Culvert(s) ☐

### Culverted Watercourses (culvert length is greater than just a crossing)

Box culvert(s) ☐ Pipe culvert(s) ☒ Arch Culvert(s) ☐ Irregular Culvert(s) ☐

### Walls and Embankments

Embankment(s) ☒ Raised wall(s) ☐ Retaining wall(s) ☐

### Control Structures – weirs, gates, dams

Fixed crest weir ☐ Adjustable weir ☐ Dam / Barrage ☐  
Sluice gates ☐ Lock gates ☐ Radial gates ☐

### Storage

On-line storage (natural) ☒ On-line storage (artificial) ☐ Off-line storage ☐

	<p><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></p> <p><b>Other</b>          Pumping Station <input type="checkbox"/>      Erosion Protection <input type="checkbox"/>      Sand Dunes <input checked="" type="checkbox"/></p> <p>In addition to the sand dunes, there is a length of shingle ridge towards the south of the area, through which the stream discharges via the two large pipe culverts.</p> <p><b>Additional notes (if required):</b>          The main flood protection is the provision of twin circular piped outfalls to the sea. These go through the shingle ridge and extend 20-30m into the sea. The outfalls are heavily protected with concrete and rock armour.          There are no flaps on the outfalls so tidal inundation into the watercourse is also possible on high tides.          There is very little flow in the drains (several are dry or not flowing) and the network itself provides significant storage for times when the tide is high. The current outfall structures are in good condition.          For this site the only risk of flooding is in the event of a major collapse of both outfall structures, or significant erosion of the sand dunes and breach of the shingle ridge. None of these are likely events hence no properties are identified as being at risk in the SVRS Assessment (see Section 2.5 above).</p>
<b>2.8 Initial Potential Mitigation Measures</b>	
<b>Non-structural measures</b>	<p>Planning and Development control <input checked="" type="checkbox"/>          Sustainable Urban Drainage Systems <input type="checkbox"/>          Flood forecasting / warning <input checked="" type="checkbox"/> (Extreme tides)          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"/></p>
<b>Structural measures</b>	<p><b>Strategic development management for floodplain development:</b> <input type="checkbox"/>  <i>(integration of measures into strategic development proposals)</i></p> <p><b>Storage:</b>      On-line <input checked="" type="checkbox"/>      Off-line <input type="checkbox"/></p> <p><b>Flow diversion:</b> Flood relief channel <input type="checkbox"/>      Flood relief culvert <input type="checkbox"/></p> <p><b>Increase conveyance:</b> Bridge works <input type="checkbox"/>      Channel works <input type="checkbox"/>      Floodplain <input type="checkbox"/></p> <p><b>Flood defences:</b>      Walls <input type="checkbox"/>      Embankments <input type="checkbox"/></p> <p><b>Localised works:</b>      Defence raising <input type="checkbox"/>      In-fill gaps <input type="checkbox"/>      Trash screen <input type="checkbox"/></p> <p><b>Maintenance works:</b> Culvert / channel clearance <input checked="" type="checkbox"/>      Asset maintenance <input checked="" type="checkbox"/></p> <p><b>Relocation of properties:</b> <input type="checkbox"/></p> <p><b>Improve existing defences:</b> <input type="checkbox"/> (describe)</p> <p><b>Other (describe):</b>          Intermittent monitoring of shingle ridge and sand dune levels to identify any changes in profile after major storm events. Intermittent condition inspection of the outfall structures at low tide to check for blockage and deterioration.</p>

<b>Outcomes</b>				
<b>PFRA Designation</b>	<b>APSR</b> <input type="checkbox"/> <b>not an APSR</b> <input checked="" type="checkbox"/> <b>IRR</b> <input type="checkbox"/> <b>FRI Score: 575</b>			
<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>	0			
<b>Recommended Designation</b>	<b>APSR</b> <input type="checkbox"/> <b>not an APSR</b> <input checked="" type="checkbox"/> <b>IRR</b> <input type="checkbox"/>			
<b>Summary Comments (if required)</b>	<p>At Tromracastle there are assets that protect the village, both natural and man-made.</p> <p>The sand dunes and shingle ridge are at the front edge of the land that generally falls away inland. These provide protection from coastal flooding. The scale of these systems means that a breach is extremely unlikely as it would need to be preceded by significant erosion and would need to erode 50m+ of the land behind as well. There is no clear evidence of the dunes eroding at this location.</p> <p>From the fluvial / tidal flooding perspective, the protection is provided by the two large pipe culverts through the shingle ridge. Only if there was a collapse of the culverts would there be a significant fluvial flood risk, and this would be as a result of water not being able to escape rather than an extreme fluvial event. Given the capacity of these culverts and their good condition, it is concluded that the risk of flooding from fluvial sources (including with a tidal influence) is very low.</p> <p>It is concluded that this is not an area at significant risk of flooding, and therefore should not be designated as an APSR.</p>			



**Photo 1:** Properties along the N-S local road in Tromracastle. These are protected by dunes to the west (right of this picture).



**Photo 2:** Dunes protecting Tromracastle. Line of fence posts (in place for many years) show no indication of active erosion at this location.



**Photo 3:** Looking inland towards the properties from the top of the dunes.



**Photo 4:** Watercourse behind the dunes and low lying area providing significant storage. Tromra Castle remains in the background on the horizon.





**Photo 5:** Watercourse immediately upstream of the outfall looking inland. Properties on the left next to road are elevated above the surrounding flood plain.



**Photo 6:** Shingle ridge at the south of Tromracastle through which the outfalls discharge.

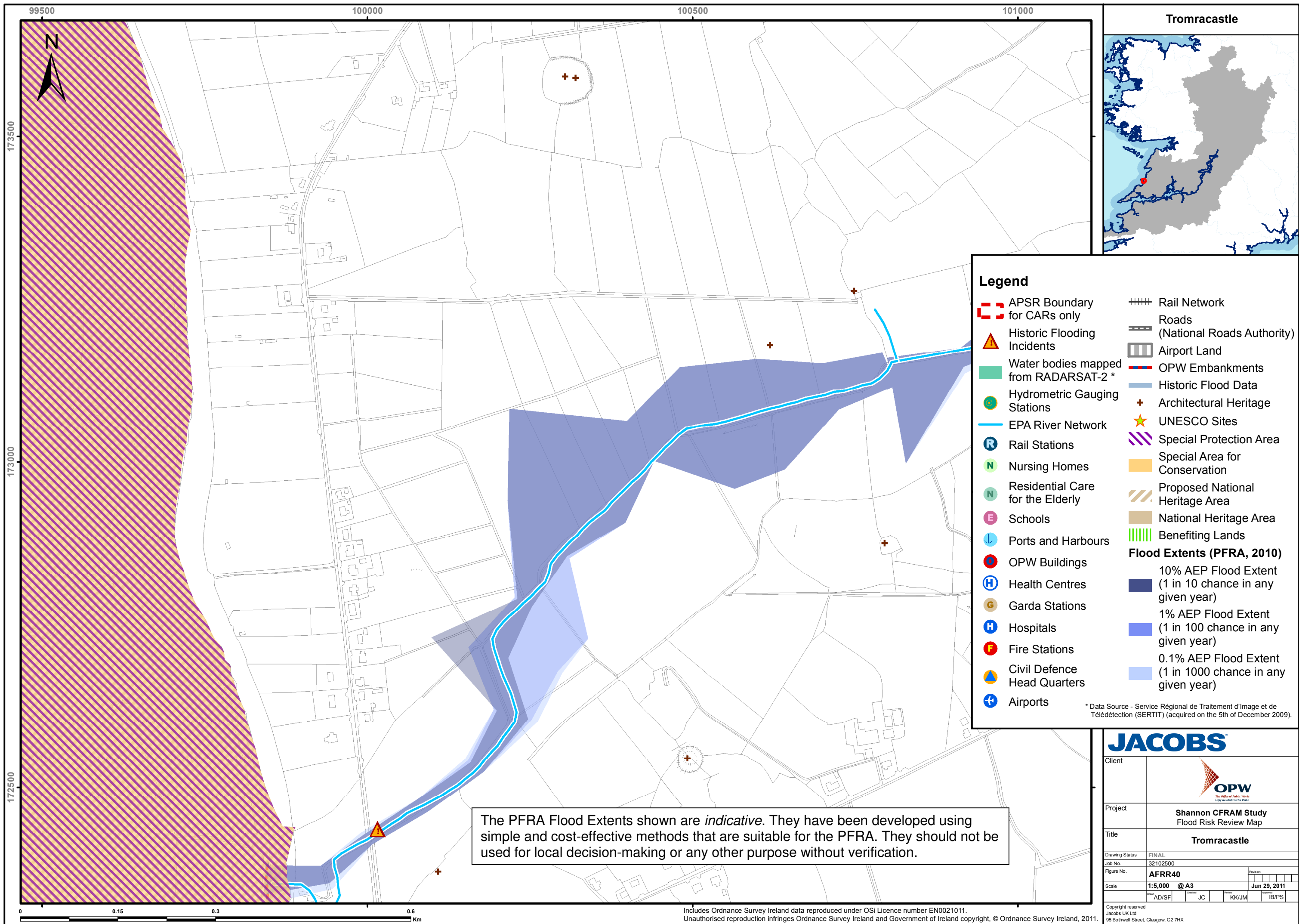


**Photo 7:** Upstream side of the large culvert outfall structures.




**Photo 8:** Downstream side of one of the outfall structures, heavily protected by rock armour.





**JACOBS**

Client			
Project	Shannon CFRAM Study Flood Risk Review Map		
Title	Tromracastle		
Drawing Status	FINAL		
Job No.	32102500		
Figure No.	AFRR40	Revision	
Scale	1:5,000 @ A3	Drawn	Jun 29, 2011
	AD/SF	JC	KK/JM
			IB/PS
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