

Location: Shannon International Airport Radar Station, Co. Clare		Unique ID: 275485 (from PFRA database)	
Initial OPW Designation	APSR <input type="checkbox"/>	AFRR <input type="checkbox"/>	IRR <input checked="" type="checkbox"/>
Co-ordinates	Easting: 137684		Northing: 160636
River / Catchment / Sub-catchment	Shannon Estuary		
Type of Flooding / Flood Risk (identify all that apply)	Fluvial non-tidal <input checked="" type="checkbox"/> Fluvial tidal <input checked="" type="checkbox"/> Coastal <input checked="" type="checkbox"/>		

Stage 1: Desktop Review	
1.1 Flood History (include review of Floodmaps.ie)	<p>River Flow Path</p> <p>At this location the Shannon Estuary is inter-tidal, and therefore can be considered to potentially have both “fluvial tidal” and “coastal” flooding influences. There are also a few minor watercourses in the vicinity that could potentially present a flood risk on the airport site.</p> <p>Shannon International Airport, and the asset (as identified from the co-ordinates) is located on the northern shore of the River Shannon behind tidal embankments, immediately southwest of Shannon Town. The estuary of the River Fergus is located west of the airport, which also has tidal embankments defending the land behind.</p> <p>Flood event records</p> <p>There are two flood records listed for north of Shannon Airport from 2000 & 2005.</p> <p>The mapped flood area corresponds to:</p> <ul style="list-style-type: none"> Ballycally - Surface water ran off land onto road L3169 in January 2005. The runoff was from land to south of road. Water flowed around one no. dwelling house but house was not flooded. This is a rare event. Also, c 2000 the L7174 was flooded due to tidal backup from the estuary. A flap valve has been installed into the estuary since and the problem has not recurred. Flooding at Carrigerry near Shannon. No. of Properties damaged was two.
1.2 Relevant information on flooding issues from OPW and LA staff	<p>PFRA database comments (<i>in italics</i>):</p> <p>OPW comments <i>IRR radar station ; Off the Airfield - Separate IRR.</i></p> <p>LA comments <i>Include as IRR, Critical IRR in low laying area on coast</i> <i>Two additional Shannon Radar Station protected by flood embankments.</i></p> <p>Meeting / discussion summary comments:</p> <p>OPW comments</p> <ul style="list-style-type: none"> No comments <p>LA comments</p> <ul style="list-style-type: none"> There are two transmitters a few kilometres north of Shannon at Ballygirreen that the Irish Aviation Authority control. These are NOT on the airport site.

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"/> Note: Whilst the PFRA mapping is available for the area (for fluvial flooding), there is no coastal mapping.		
1.4.2 Summary of Principal Receptors	Type	Number (approx.)	FRI score (if available)
	Note: Shannon International Airport Radar Station has no score included in the PFRA database under its own entry: "1RAD_Shannon Radar Station". Neither is there any specific score for the radar under Shannon town in the PFRA database. Total		
1.7 Stage 1 Evaluation	Aspect	Clearly IRR	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⁾	
1.8 Proposed level of assessment for Stage 2 site visits	Level A Site Visit		
	Level B Site Visit		X

Note: (1) Although the flood history does not suggest there is a major flooding problem at Shannon Airport (or at the radar station noted to be on the airport site based on the IRR co-ordinates), it is considered to be at potentially high risk given its location (from the co-ordinates) behind the Shannon embankments. A Level B Site Visit assessment is therefore appropriate.

Stage 2: Site Inspection		Level B Assessment	
Date and Time of Inspection		Date: 09/06/11	
		Time: 16:00	
Names of inspection team (including OPW/LA staff if present)		Iain Blackwell	
		Lewis Maani	
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>Flood risk at Shannon Airport is primarily from the Shannon Estuary. However, there are a number of smaller watercourses – including drains – that are within the area, for which there are culvert and bridge crossings. It is also noted that the Fergus Estuary to the west may present a flood risk.</p> <p>Given the flat topography of the land behind the embankments (Shannon and Fergus) any breach of the defences would tend to spread across the land behind the embankments, affecting Shannon Airport. There is no clear conveyance route away from the airport.</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>	<p>Open Channel Watercourses</p> <p>Man-made river channel <input type="checkbox"/> Flood relief channel <input type="checkbox"/> Canal <input type="checkbox"/></p> <p>Mill leat <input type="checkbox"/> Drainage channels / back drains <input checked="" type="checkbox"/></p> <p>Bridges and Culvert crossings</p> <p>Single Arch bridge <input type="checkbox"/> Multi-Arch bridge <input type="checkbox"/></p> <p>Single Span bridge <input type="checkbox"/> Multi-Span bridge <input type="checkbox"/></p> <p>Box culvert(s) <input checked="" type="checkbox"/> Pipe culvert(s) <input checked="" type="checkbox"/> Arch Culvert(s) <input type="checkbox"/></p> <p>Culverted Watercourses (culvert length is greater than just a crossing)</p> <p>Box culvert(s) <input type="checkbox"/> Pipe culvert(s) <input type="checkbox"/> Arch Culvert(s) <input type="checkbox"/> Irregular Culvert(s) <input type="checkbox"/></p> <p>Walls and Embankments</p> <p>Embankment(s) <input checked="" type="checkbox"/> Raised wall(s) <input checked="" type="checkbox"/> Retaining wall(s) <input type="checkbox"/></p> <p>Control Structures – weirs, gates, dams</p> <p>Fixed crest weir <input type="checkbox"/> Adjustable weir <input type="checkbox"/> Dam / Barrage <input type="checkbox"/></p> <p>Sluice gates <input checked="" type="checkbox"/> Lock gates <input type="checkbox"/> Radial gates <input type="checkbox"/></p> <p>Storage</p> <p>On-line storage (natural) <input type="checkbox"/> On-line storage (artificial) <input type="checkbox"/> Off-line storage <input type="checkbox"/></p>		

	<p>Outfalls</p> <p>Flapped outfall(s) into watercourse <input checked="" type="checkbox"/> Unflapped outfall(s) into watercourse <input checked="" type="checkbox"/> <i>i.e. from smaller watercourses, drains etc. into river / estuary / sea</i></p> <p>Tidal flap(s) <input checked="" type="checkbox"/> Tidal sluice(s) <input type="checkbox"/> <i>i.e. from main watercourse into estuary / sea</i></p> <p>Other</p> <p>Pumping Station <input checked="" type="checkbox"/> Erosion Protection <input type="checkbox"/> Sand Dunes <input type="checkbox"/></p> <p>Additional notes (if required):</p> <p>Shannon (including the airport and assets associated with it) is protected on its south side by extensive flood defence embankments of varying heights. These extend for many kilometres to the east and west, along the Shannon Estuary and the Fergus Estuary protecting large areas of low lying land behind them.</p> <p>Integral to the flood defence provided by these embankments is the series of drainage channels and back drains behind the embankments, outfalls (with tidal flaps) from these drainage channels through the embankments, and pumping stations to discharge water through the embankments.</p>
2.8 Initial Potential Mitigation Measures	
Non-structural measures	<p>Planning and Development control <input checked="" 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 checked="" type="checkbox"/></p> <p>Public awareness campaign <input type="checkbox"/></p> <p>Individual property protection <input type="checkbox"/></p> <p>Land use management <input type="checkbox"/></p>
Structural measures	<p>Strategic development management for floodplain development: <input type="checkbox"/> <i>(integration of measures into strategic development proposals)</i></p> <p>Storage: On-line <input type="checkbox"/> Off-line <input type="checkbox"/></p> <p>Flow diversion: Flood relief channel <input type="checkbox"/> Flood relief culvert <input type="checkbox"/></p> <p>Increase conveyance: Bridge works <input type="checkbox"/> Channel works <input type="checkbox"/> Floodplain <input type="checkbox"/></p> <p>Flood defences: Walls <input checked="" type="checkbox"/> Embankments <input checked="" type="checkbox"/></p> <p>Localised works: Defence raising <input checked="" type="checkbox"/> In-fill gaps <input checked="" type="checkbox"/> Trash screen <input type="checkbox"/></p> <p>Maintenance works: Culvert / channel clearance <input checked="" type="checkbox"/> Asset maintenance <input checked="" type="checkbox"/></p> <p>Relocation of properties: <input type="checkbox"/></p> <p>Improve existing defences: <input checked="" type="checkbox"/> (describe)</p> <p>The main embankments protecting Shannon International Airport will form an important part of a flood risk management strategy for the location (including Shannon itself). This is a significant asset already in operation, and therefore provides a basis for improvements where necessary, for example, localised raising (if identified as being necessary).</p> <p>Other (describe):</p>

Outcomes		
Recommended Designation	APSR <input type="checkbox"/>	not an APSR <input type="checkbox"/> IRR <input checked="" type="checkbox"/>
Summary Comments (if required)	<p>Shannon Airport has a major flood risk from tidal flooding in the event of a breach of the Shannon Estuary or Fergus Estuary embankments.</p> <p>The radar station for Shannon Airport is noted to be on the site of the airport based on the co-ordinates given in the Project Brief. However, the description of the asset, and its location are contradicted based on information gathered from different sources as follows:</p> <ul style="list-style-type: none"> • Comments from OPW from the PFRA indicate that the Radar Station is “off the airfield” and is therefore justified as a separate IRR. • Comments from the Local Authority indicate that there are two radio transmitters controlled by the Irish Aviation Authority at Ballygirreen, near Newmarket-on Fergus. This is confirmed from internet searches, but these transmitters are NOT the subject of this flood risk review. • A desk-based search (internet based) suggests that the radar station for Shannon International Airport is located on Woodcock Hill, located approximately 14km ENE of Shannon Airport. If this is the asset of concern, there is no flood risk at this site. <p>Based on the uncertainty identified above, it is assumed that the location of the asset is correct, but that the description may not be clear. It is recommended that the asset is identified as an IRR on the basis of its location behind these embankments, but that the nature and description of the asset is clarified.</p>	



Photo 1: Embankment and back drain outfalls close to Shannon Airport.



Photo 2: Pumping Station located at the end of a major back drain close to Shannon Airport.



Photo 3: Airport car park and other infrastructure (including radar – based on co-ordinates) located behind the Shannon Embankments at a lower level than the estuary inter-tidal zone.



Photo 4: Airport car park showing significant difference in elevation between car park and embankment crest (approximately 2.0m).



Photo 5: Access road along the top of the embankment bordering the Shannon Estuary inter-tidal-zone. The Shannon Estuary inter-tidal zone is seen beyond the crash barrier.



Photo 6: Major Shannon tidal embankment adjacent to the airport road towards the eastern end of the airport.



Photo 7: View from the top of the embankment (above the pumping station in Photo 2) looking west. Airport infrastructure assets located immediately behind the embankment.



Photo 8: Shannon Airport from the air with frontage to the Shannon Estuary. The radar assets are located on this site (based on the asset co-ordinates).

