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| Location: Rahan, Co. Offaly | | Unique ID: 250438 (from PFRA database) | |
| Initial OPW Designation | APSR <input checked="" type="checkbox"/> | AFRR <input type="checkbox"/> | IRR <input type="checkbox"/> |
| Co-ordinates | Easting: 225221 | Northing: 225619 | |
| River / Catchment / Sub-catchment | Clodiagh River / Brosna / Shannon | | |
| 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 | |
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| 1.1 Flood History (include review of Floodmaps.ie) | River Flow Path The Clodiagh River flows through the village of Rahan meandering in a north westerly direction to the river's confluence with the River Brosna. The Grand Canal borders the southern boundary of the village. The Clodiagh River is crossed within the village of Rahan and the Grand Canal is crossed twice, once to the south of Rahan and again to the west. Flood Event Records Two flood records are listed in floodmaps.ie. One dated August 2008. The other event is undated. Both of these events appear to have occurred outside the village of Rahan. |
| 1.2 Relevant information on flooding issues from OPW and LA staff | PFRA database comments (<i>in italics</i>): OPW comments <i>Designated APSR on the basis of predictive analysis and LA comments.</i> <i>Designated APSR on the basis of predictive analysis and LA comments</i> LA comments <i>River flooded 2009 Agree</i> Meeting / discussion summary comments: OPW comments <ul style="list-style-type: none"> Rahan is on the Clodiagh River. There are embankments and flood defence sluices used to drain the land. LA comments <ul style="list-style-type: none"> The river channel has good capacity at Rahan. Rahan has a low risk to flooding, unsure if there was any flooding in 2009. |

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| 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) |
| | Arch_Regional | | 20.1 |
| | Monument_LV | | 122 |
| | Total | | 387 |
| 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 | | X |
| | Level B Site Visit | | |

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| Stage 2: Site Inspection | | Level A Assessment | | |
| Date and Time of Inspection | | Date: 06/05/11 | | |
| | | Time: 12:00 | | |
| Names of inspection team (including OPW/LA staff if present) | | Peter Smyth | | |
| | | James Murray | | |
| | | | | |
| | | | | |
| 2.1 Ground-truthing of Hazard Mapping | Fluvial non-tidal <input checked="" type="checkbox"/> Fluvial tidal <input type="checkbox"/> Coastal <input type="checkbox"/> Not available <input type="checkbox"/> | | | |
| | PFRA hazard mapping seems accurate through Rahan. However, it does not take into account informal embankments on left bank downstream of bridge | | | |
| 2.2 Spot check ground-truthing of selected receptor vulnerability (also note any key receptors noted during visit that are not identified by PFRA) | Receptor Type | Location description (if not obvious) | Exists? | Overall Vulnerability / Risk (L / M / H) |
| | Abbey and church | upstream of town away from left bank | Yes | Low |
| | Private dwellings | On the right bank just upstream of the bridge over the Clodiagh | Yes | Medium |
| 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 | The bridge over the Clodiagh in Rahan seems to have good capacity and would not act as a hydraulic constriction. There are a number of relief culverts on the left bank floodplain associated with the bridge, these have been walled shut. | | | |

2.5 SVRS Assessment Matrix

Weightings:

A - x1 - reasonable expectation of flooding

B - x2 - high expectation of flooding

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 | X | | |
| 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 | X | | | 200 | | | | 400 | | | |
| Environmental Designated Site | 20 | | | | 200 | | | | 400 | | | |
| Hazardous Substances Site | 50 | | | | 500 | | | | 1000 | | | |
| Total SVRS | | | | | | | | | 220 | | | |

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 ☐

Outfalls

Flapped outfall(s) into watercourse ☐ Unflapped outfall(s) into watercourse ☐
i.e. from smaller watercourses, drains etc. into river / estuary / sea
Tidal flap(s) ☐ Tidal sluice(s) ☐
i.e. from main watercourse into estuary / sea

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| | Other Pumping Station <input type="checkbox"/> Erosion Protection <input type="checkbox"/> Sand Dunes <input type="checkbox"/> Additional notes (if required): |
| 2.8 Initial Potential Mitigation Measures | |
| Non-structural measures | Planning and Development control <input checked="" type="checkbox"/> Sustainable Urban Drainage Systems <input type="checkbox"/> Flood forecasting / warning <input type="checkbox"/> Change in Operating Procedures for water level control: <input type="checkbox"/> Public awareness campaign <input checked="" type="checkbox"/> Individual property protection <input type="checkbox"/> Land use management <input type="checkbox"/> |
| Structural measures | Strategic development management for floodplain development: <input type="checkbox"/> <i>(integration of measures into strategic development proposals)</i> Storage: On-line <input type="checkbox"/> Off-line <input type="checkbox"/> Flow diversion: Flood relief channel <input checked="" type="checkbox"/> Flood relief culvert <input type="checkbox"/> Increase conveyance: Bridge works <input type="checkbox"/> Channel works <input type="checkbox"/> Floodplain <input type="checkbox"/> Flood defences: Walls <input checked="" type="checkbox"/> Embankments <input checked="" type="checkbox"/> Localised works: Defence raising <input type="checkbox"/> In-fill gaps <input type="checkbox"/> Trash screen <input type="checkbox"/> Maintenance works: Culvert / channel clearance <input type="checkbox"/> Asset maintenance <input type="checkbox"/> Relocation of properties: <input type="checkbox"/> Improve existing defences: <input type="checkbox"/> (describe) Other (describe): |

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| Outcomes | | | | |
| PFRA Designation | APSR <input checked="" type="checkbox"/> not an APSR <input type="checkbox"/> IRR <input type="checkbox"/> | | FRI Score: 387 | |
| Site Ground-truthing of PFRA Assessment (hazard mapping and receptors) | High Confidence (good) | Uncertain | Low Confidence (poor) | Not available |
| | X | | | |
| Site Visit Review Score | 220 | | | |
| Recommended Designation | APSR <input checked="" type="checkbox"/> not an APSR <input type="checkbox"/> IRR <input type="checkbox"/> | | | |
| Summary Comments (if required) | The main area at risk of flooding is on the right bank, just upstream of the road bridge crossing of the Clodiagh where there are in excess of 20 properties at risk of flooding. There are sufficient receptors at significant risk of flooding to warrant Rahans designation as an APSR. | | | |



Photo1: Upstream face of the Bridge in Rahan over the Clodiagh River.



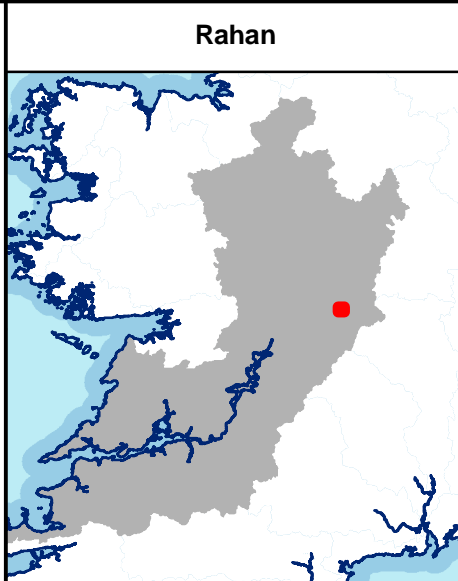
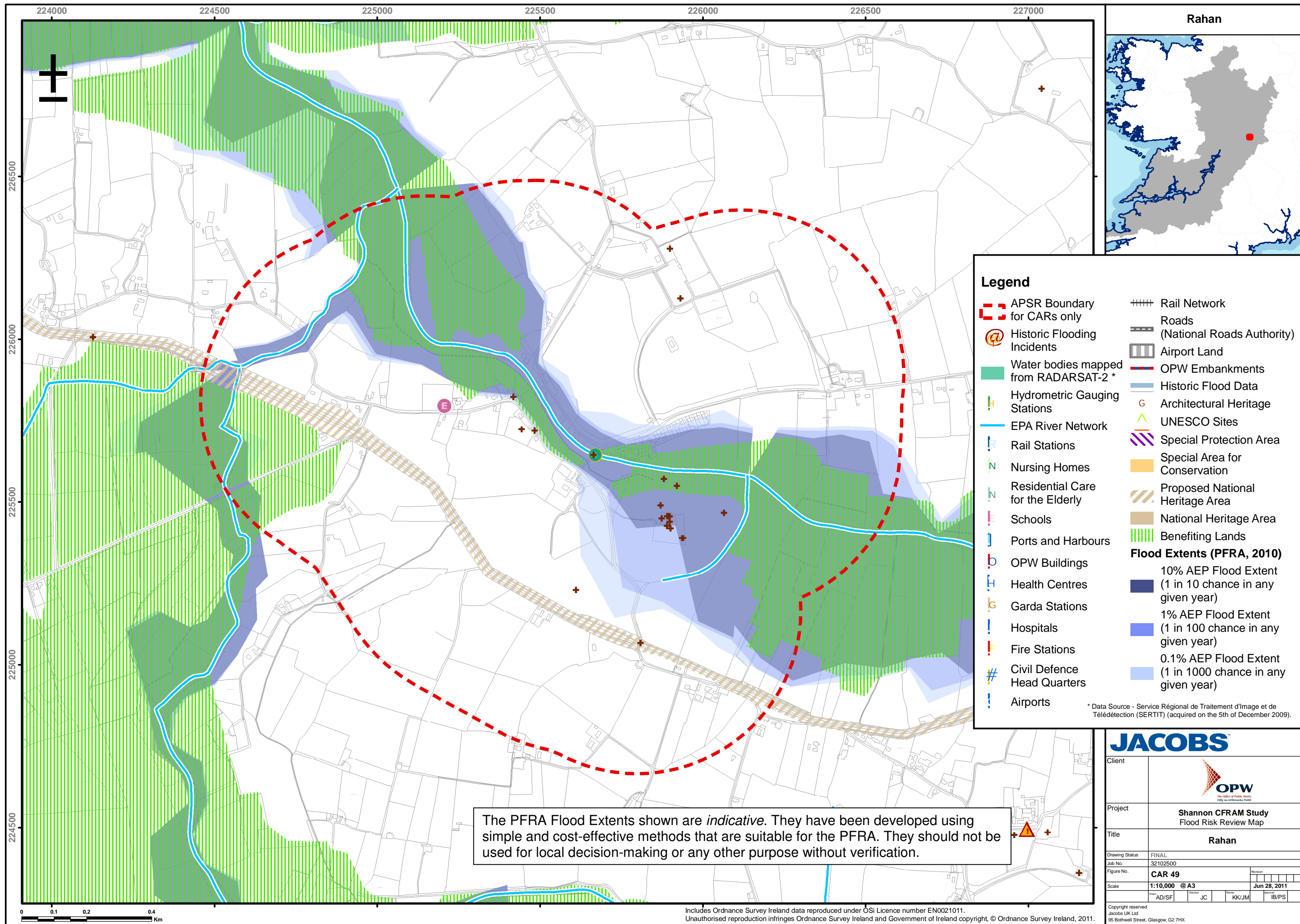
Photo 2: Overflow arches at the Clodiagh River Road Bridge in Rahan, blocked up.



Photo 3: Clodiagh River at Rahan, looking upstream.



Photo 4: Pipe culvert on tributary to the Clodiagh River at Rahan.




Legend

- APSR Boundary for CARs only
- Historic Flooding Incidents
- Water bodies mapped from RADARSAT-2 *
- Hydrometric Gauging Stations
- EPA River Network
- Rail Stations
- Nursing Homes
- Residential Care for the Elderly
- Schools
- Ports and Harbours
- OPW Buildings
- Health Centres
- Garda Stations
- Hospitals
- Fire Stations
- Civil Defence Head Quarters
- Airports
- Rail Network
- Roads (National Roads Authority)
- Airport Land
- OPW Embankments
- Historic Flood Data
- Architectural Heritage
- UNESCO Sites
- Special Protection Area
- Special Area for Conservation
- Proposed National Heritage Area
- National Heritage Area
- Benefiting Lands

Flood Extents (PFRA, 2010)

- 10% AEP Flood Extent (1 in 10 chance in any given year)
- 1% AEP Flood Extent (1 in 100 chance in any given year)
- 0.1% AEP Flood Extent (1 in 1000 chance in any given year)

* Data Source - Service Régional de Traitement d'Image et de Télédétection (SERTIT) (acquired on the 5th of December 2009).

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| JACOBS | |
| Client |  |
| Project | Shannon CFRAM Study Flood Risk Review Map |
| Title | Rahan |
| Drawing Status | FINAL |
| Job No. | 32102500 |
| Figure No. | CAR 49 |
| Scale | 1:10,000 @ A3 |
| Drawn | AD/SF |
| Checked | JC |
| Reviewed | KK/JM |
| Approved | IB/PS |
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