



Shannon Catchment-based Flood Risk Assessment and Management (CFRAM) Study





Flood Risk Review Report











Document control sheet

Client: Office of Public Works
 Project: Shannon CFRAM Study
 Document Title: Flood Risk Review Report

Job No: 32103000

	Originator	Checked by	Reviewed by	Approved by
ORIGINAL	NAME	NAME	NAME	NAME
v0_0	Iain Blackwell	Peter Smyth	Peter Smyth	Mike Hind
DATE	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
30-June-11				
Document Status Draft Flood Risk Review Report				

REVISION	NAME	NAME	NAME	NAME
V0_A	Iain Blackwell	James Murray	James Murray	Mike Hind
DATE	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
18-Nov-11				
Document Status Final Flood Risk Review Report				

REVISION	NAME	NAME	NAME	NAME
V1_0				
DATE	SIGNATURE	SIGNATURE	SIGNATURE	SIGNATURE
28-Mar-12				
Document Status Final Flood Risk Review Report (Legal Disclaimer amended)				

Copyright

Copyright Office of Public Works. All rights reserved.

No part of this report may be copied or reproduced by any means without prior written permission from the Office of Public Works. If you have received this report in error, please destroy all copies in your possession or control and notify the Office of Public Works.

Legal Disclaimer

This report is subject to the limitations and warranties contained in the contract between the commissioning party (Office of Public Works) and Jacobs Engineering Ireland Limited.

Contents

Executive Summary	1
Glossary	4
1 Introduction	5
1.1 Scope	5
1.2 Structure of this Report	6
1.3 Flood Risk Review Sites	6
2 Flood Risk Review Methodology	8
2.1 Context	8
2.2 Overall Approach	8
2.2.1 Desk-based Review	9
2.2.2 Site Visits	9
3 Datasets, Information and Knowledge	12
3.1 Introduction	12
3.2 Datasets and Information Sources	12
3.3 Other Information and Knowledge	14
3.3.1 Stakeholder Meetings	14
3.3.2 Site Visits	15
4 Flood Risk Review Assessment	17
4.1 Introduction	17
4.2 Underlying Principles and Assumptions	17
4.3 Summary of Findings and Outcomes	19
4.3.1 CARs and Community AFRRs	19
4.3.2 IRRs and Receptor AFRRs	26
4.4 Additional Considerations and Findings	27
4.4.1 General Findings	27
4.4.2 Site Specific Issues	28
5 Conclusions and Recommendations	29
5.1 Conclusions	29
5.2 Recommendations	29
Appendix A Extracts from the Project Brief	
Appendix B Finalised List of CAR, AFRR and IRR	
Appendix C Overview Plans of Flood Risk Review Locations	
Appendix D Flood Risk Review Assessments	
Appendix E Potential FRR Locations Identified	

Executive Summary

The Flood Risk Review Report recommends locations in the Shannon RBD that are considered to be Areas of Potential Significant Risk (APSR), also known as Areas for Further Assessment (AFA). The OPW, in consultation with the Local Authorities, will use the findings of this Flood Risk Review Report to confirm the final APSR / AFA list, following which the extent and direction for all future activities on the project will be set.

In total, 108 community locations were considered as part of this Flood Risk Review process. This comprised 57 Communities at Risk (CAR) and 51 Areas for Flood Risk Review (AFRR), as defined in the Project Brief and through subsequent minor additions. A total of eight Individual Risk Receptors (IRRs) plus an additional potential IRR (identified as an AFRR as an addition to the scope) have also been considered. The community locations and the IRRs were identified by the OPW based on a national Preliminary Flood Risk Assessment (PFRA) which included an assessment of historic data; and consultation with Local Authorities.

The Flood Risk Review has included a desk-based assessment of each location taking account of the Preliminary Flood Risk Assessment findings, and a range of readily available datasets. A visit to each community location and selected IRRs has further informed the assessment.

The findings from the PFRA have been reviewed both in terms of the desk-based study and a ground truthing site visit. In general, this verification of receptors and flood hazard extents were found to be good, although some areas of uncertainty at specific locations have been identified.

The desk-based assessment combined with the site visit has been the basis for concluding whether the location should be identified as an APSR or not. This Flood Risk Review process has led to the following conclusions:

- 52 locations identified as CARs are recommended to be designated as APSRs;
- 5 locations identified as CARs are recommended NOT to be designated as APSRs;
- 14 community locations identified as AFRRs are recommended to be designated as APSRs;
- 37 community locations identified as AFRRs are recommended NOT to be designated as APSRs.
- 5 receptors identified as IRRs in the Project Brief are recommended to remain designated as IRRs.
- 3 receptors identified as IRRs in the Project Brief are recommended NOT to be designated as IRRs; one of these receptors was removed early in the process and has not undergone the full Flood Risk review process.
- 1 receptor identified as an AFRR (as a potential IRR) is recommended NOT to be designated as an IRR.

This gives a final total of 66 locations recommended for designation as APSRs, and five receptors recommended for designation as IRRs. These are listed in Tables ES1 and ES2 below.

Table ES1. Recommended Areas of Potential Significant Risk

Name	County	Unit of Management
Abbeydorney	Kerry	23
Abbeyfeale	Limerick	23
Athea	Limerick	23
Banna	Kerry	23
Listowel	Kerry	23
Moneycashen	Kerry	23
Tralee	Kerry	23
Adare	Limerick	24
Askeaton	Limerick	24
Ballylongford	Kerry	24
Charleville	Cork	24
Clarina	Limerick	24
Croom	Limerick	24
Drumcolligher	Limerick	24
Foynes	Limerick	24
Kilmallock	Limerick	24
Milford	Cork	24
Newcastle West	Limerick	24
Rathkeale	Limerick	24
Bunratty	Clare	27
Ennis	Clare	27
Kilkee	Clare	27
Kilrush	Clare	27
Quin	Clare	27
Shannon	Clare	27
Sixmilebridge	Clare	27
Abbeyshrule	Longford	25/26
Ahascragh	Galway	25/26
Athleague	Roscommon	25/26
Athlone	Westmeath / Roscommon	25/26
Ballinasloe	Galway / Roscommon	25/26
Ballyfarnon	Roscommon	25/26
Ballymahon	Longford	25/26
Banagher	Offaly / Galway	25/26
Birr	Offaly	25/26
Borrisokane	Tipperary	25/26
Boyle	Roscommon	25/26
Cappamore	Limerick	25/26
Carrick on Shannon / Cortober	Leitrim / Roscommon	25/26
Castleconnell	Limerick	25/26
Castlerea	Roscommon	25/26
Clara	Offaly	25/26
Clonaslee	Laois	25/26
Cloondara	Longford	25/26
Dromod	Leitrim	25/26
Drumshanbo	Leitrim	25/26
Edgeworthstown	Longford	25/26
Ferbane	Offaly	25/26
Kilbeggan	Westmeath	25/26
Kilcormac	Offaly	25/26
Killaloe / Ballina	Tipperary / Clare	25/26
Leitrim Village	Leitrim	25/26
Limerick City	Limerick / Clare	25/26

Name	County	Unit of Management
Longford	Longford	25/26
Mohill	Leitrim	25/26
Mullingar	Westmeath	25/26
Nenagh	Tipperary	25/26
Newport	Tipperary	25/26
O'Briens Bridge	Limerick/Clare	25/26
Pollagh	Offaly	25/26
Portumna	Galway	25/26
Rahan	Offaly	25/26
Roscommon	Roscommon	25/26
Roscrea	Tipperary	25/26
Shannon Harbour	Offaly	25/26
Springfield	Clare	25/26

Table ES2. Recommended Individual Risk Receptors

Name	County	Unit of Management
Lanesborough Power Station	Longford	25/26
Shannon International Airport Radar Station	Clare	27
Shannon International Airport	Clare	27
Shannonbridge Power Station	Offaly	25/26
Tarbert Power Station	Kerry	24

The recommended APSRs and IRRs listed in Tables ES1 and ES2 are based on those 108 community locations and nine IRR (and potential IRR) locations considered.

During the Flood Risk Review, a number of additional locations were identified by the Local Authorities and the Regional OPW teams as possible sites for Flood Risk Review. A summary of these locations is provided in Appendix E. None of these sites has been taken forward for Flood Risk Review.

Glossary

CAR	Community at Risk	A location considered to have a probable significant flood risk, based on the understanding of the location, prior to the Flood Risk Review.
AFRR	Area for Flood Risk Review	A location considered to have a possible significant flood risk, based on the understanding of the location, prior to the Flood Risk Review. This can be either a “community” location or an individual receptor.
APSR	Area of Potential Significant Risk	An area at potentially significant risk, taking account of both likelihood of flooding and consequence.
AFA	Area of Further Assessment	An area that is considered to be at potentially significant risk, thereby justifying its inclusion for further assessment. Note that the term AFA is a replacement term for APSR.
IRR	Individual Risk Receptors	A receptor that warrants consideration of flood risk in its own right (rather than within an AFA), typically major infrastructure.
UoM	Unit of Management	The division of the study area into major catchments and their associated coastal areas.
RBD	River Basin District	The natural geographical and hydrological units for water management, as defined during the implementation of the Water Framework Directive.
PFRA	Preliminary Flood Risk Assessment	A high level screening exercise that identified areas of potentially significant flood risk from all sources, and summarises the probability and harmful consequences of past (historical) and future (potential) flooding.
CFRAM Study	Catchment-based Flood Risk Assessment and Management Study	The five year study covering the whole River Shannon catchment area which gives a picture of past flooding and areas at risk of future flooding, and sets out a prioritised set of specific measures for reducing and managing flood risk.

1.1 Scope

The specification for the Flood Risk Review is set out in Section 4 of the Stage I Project Brief (June 2010) and Section 2.11 of the Stage II Shannon CFRAM Study Project Brief (October 2010). Relevant extracts are included in Appendix A.

OPW has identified Communities at Risk (CAR), Areas for Flood Risk Review (AFRR) and Individual Risk receptors (IRR) for the Shannon CFRAM Study based on historic data, knowledge of local flood issues, a national Preliminary Flood Risk Assessment (PFRA) undertaken by Mott MacDonald (Report on Preliminary Flood Risk Assessment – The Republic of Ireland – The Definition of Areas of Potentially Significant Risk, Oct 2010) and subsequent consultation with Local Authorities and other key Stakeholders.

This Flood Risk Review builds on this previous work in order to develop a finalised list of Areas of Potential Significant Risk (APSR) which will be studied in detail under the Shannon CFRAM Study. For future activities on this study it should be noted that the term APSR will be replaced by the term Area for Further Assessment (AFA). Within the context of the Flood Risk Review activity, and this report specifically, the term APSR has been maintained throughout for consistency within this task.

Based on the requirements in the Project Briefs (extracts included in Appendix A) the scope of work for the Flood Risk Review must take account of:

- The findings of the PFRA;
- Relevant information from existing datasets;
- Information and knowledge provided by the OPW, Local Authorities and other Stakeholders;
- Findings from site visits to CARs, AFRRs and IRRs.

This information is then used to prepare this Flood Risk Review report which is specifically required to include the following information:

- Methodology for the Flood Risk Review;
- Datasets, information and knowledge used;
- Findings of the risk assessment;
- Outcomes of the review in terms of identifying areas where the risk may potentially be significant.

To this end, the Flood Risk Review has included desk-based reviews and site visits to 108 community locations, comprising 57 CARs and 51 AFRRs, as well as seven IRRs and one potential IRR (noting that one further IRR – Durrow heritage site - was removed following a preliminary review).

The compiled finalised list of these 108 community locations and eight receptors, appraised by this Flood Risk Review process, is included in Appendix B.

1.2 Structure of this Report

This Flood Risk Review report is structured to reflect the specific reporting requirements of the Brief as follows:

- Section 1 Provides an introduction to the Flood Risk Review and sets the context and scope of this activity.
- Section 2 Provides a detailed description of the methodology used in the Flood Risk Review and the list of locations covered in the Review.
- Section 3 Outlines the datasets, information and knowledge used to inform the Flood Risk Review.
- Section 4 Presents the findings of our assessment for each location, and confirms those locations that are recommended to be considered as APSRs and IRRs.

1.3 Flood Risk Review Sites

Table 1 summarises the locations of the 116 CAR, AFRR and IRR locations assessed by this Flood Risk Review process. These locations are marked on the Overview Plans for each Unit of Management, which are included as Appendix C. A complete listing for each location, including its National Grid Reference, County and Unit of Management, is provided in Appendix B. The desk-based assessments and the site visits for all the locations (CARs, IRRs and AFRRs) were undertaken between March and September 2011.

Table 1. Summary CAR, AFRR and IRR Locations Assessed

County	Communities at Risk	Areas for Flood Risk Review	Individual Risk Receptors
Clare	9	7	3
Cork	1	1	
Galway	2	4	
Kerry	5	11	1
Laois	1	0	
Leitrim	3	3	
Limerick	14	9	1 ⁽²⁾
Limerick City	1	0	
Longford	3	3	1
Offaly	6	4	2
Roscommon	4	6	
Tipperary North	5	2	
Tipperary South	0	1	
Westmeath	3	0	
Total⁽¹⁾	57	51	8

Notes: ⁽¹⁾ In certain instances a CAR or AFRR may span County boundaries. In these instances the CAR or AFRR has only been counted once in the table. ⁽²⁾ For clarity, this is Aughinish Island CHP Plant and Sub-station identified as “receptor” AFRR as opposed to a “community” AFRR.

The areal extent of the sites included in the Flood Risk Review is based on the principle of extending 500m beyond the development boundary of the location being considered, with assets and properties within this limit being considered in the Flood Risk Review.

2.1 Context

The activities completed to date under the national Preliminary Flood Risk Assessment (PFRA), undertaken by Mott MacDonald in conjunction with OPW, is assumed to be systematically correct, based on the process applied. Nonetheless, although the PFRA procedure aims to be as objective as possible, it is recognised as a national, desk-based assessment of flood risk, and hence the complexity of the process interacting with national receptor datasets, could introduce potential for mis-assignment of a CAR. Elements of the process where 'over or under estimation' or inappropriate assignment might arise include:

- Hazard mapping;
- Vulnerability classification;
- Assignment of Flood Risk Index (FRI) values;
- Aggregation of risk square areas;
- Spatial sensitivity to grid overlay;

Therefore, on-site ground-truthing to the extent that may be practical and readily achievable, preceded by desk-based review and coupled with pragmatic site appraisal based on evaluation of flood risk by experienced professionals is necessary to inform the PFRA.

The Flood Risk Review process, as undertaken within this study, along with the current public consultation process on the PFRA (scheduled for completion in November 2011) forms part of the PFRA. Both of these activities will ultimately inform the final decisions that are reported to the European Commission with regard to the designation of APSRs.

2.2 Overall Approach

Our approach is based on the proposals set out in our Stage I and Stage II tender responses to meet the requirements of the Project Brief (see Appendix A). This involved a two-stage approach involving a desk-based review followed by site visits.

The overall assessment involved limited spot ground-truthing of elements on which the PFRA assessment has been based coupled, with on-site evaluation (to the extent justified based on the desk-based review) of a number of risk factors.

For each location, a pro-forma has been used to capture the findings from both the desk-based assessment and the site visit.

The pro-forma used for the Flood Risk Review is included in Appendix D1. This includes notes and comments about the information related to the Flood Risk Review undertaken for each location.

Whilst both the desk-based and site visit elements are focused on the specific requirements of the Flood Risk Review, other information (not specifically related to the Flood Risk Review) has also been gathered, where appropriate. This includes, for example, defence asset information and the topographic survey requirements for

future activities on the project. However, this information has intentionally not been presented on the submitted Flood Risk Review pro-formas.

2.2.1 Desk-based Review

Web available imagery, the OPW PFRA datasets, existing risk mapping and data from OPW which is readily available, has all been used for the desk-based review of each location, with the main activities summarised as follows:

- **Flood history** – a review of recorded flooded events based on a review of events recorded in www.floodmaps.ie
- **Relevant information on flooding issues** – a summary of information provided on the site based on discussions and meetings with OPW regional teams and Local Authorities
- **Other relevant data** – a review of readily available information on defence asset data, spatial planning data, and environmentally designated sites.
- **PFRA hazard mapping and receptors** – an analysis of the mapping and principal receptors to identify the main assets / properties giving rise to the PFRA score.
- **Virtual inspection** – use of aerial and street level photography, mapping and images to identify possible flood risk related issues.

These five key aspects of the desk-based review resulted in the identification of locations for which there is no question about their recommended designation as APSRs (or IRRs), and those where this designation is uncertain, leading to two possible levels of detail for the site visits.

In addition to the consideration of flood risk, the information gathered in the desk-based review also informed the safe planning and preparation for the site visits.

2.2.2 Site Visits

CARs and “Community” AFRRs

All 108 community locations were visited. However, the type of visit and information gathered was dependent on whether the desk-based review determined the location to be ‘clearly an APSR’ or an ‘uncertain APSR’. Two types of the site visit were therefore adopted:

- **Level A Site Visits.** This type of visit was undertaken when the desk-based assessment concluded the location’s APSR designation was ‘uncertain’. The visit included on-site ground-truthing of flood hazard mapping from the PFRA (where available) and sample spot checks of key receptors and their vulnerability. It is not practical to check more than a sample of receptors and their PFRA vulnerability and scoring. However, it is considered that on-site ground-truthing of a sample of readily observable receptors is sufficient to indicate the level of confidence in the designations used in the PFRA systematic process, with the focus typically being on those receptors which carry the highest score within the total FRI score under the PFRA.

A separate and independent evaluation of flood risk has been undertaken on site and a Site Visit Review Score (SVRS) evaluated using a scoring matrix based on key risk indicators. The approach is less comprehensive than the PFRA approach and has a fairly coarse numerical scoring system. Nonetheless it provides a valuable, simple on-site assessment method to inform the Flood Risk Review process. It is emphasised that the SVRS has not been used as a replacement for the FRI - it is a convenient measure of the outcome from the site visit evaluation.

The SVRS, in combination with the findings of the desk-based study and the general site observations, are used together as the basis for determining whether or not a location should be recommended for designation as an APSR.

As part of the quality control related to the identification of sites as APSRs, a total of 18 independent site visits and cross-checks have been undertaken by our Project Principal to ensure consistency in evaluation and designation of locations. These visits raised points for discussion regarding specific receptors and level of risk (noting that the FRR visits were at a greater level of detail than these “verification” visits) and confirmed the conclusions drawn from the site visits.

- **Level B Site Visits.** This type of visit was undertaken when the desk-based assessment concluded the location to be ‘clearly an APSR’. Each of the sites designated as “Clearly APSR” in the desk-based review was on the basis of:
 - a clear, consistent flood history;
 - information provided by OPW and Local Authorities demonstrating the potentially significant flood risk;
 - the FRI score under the PFRA, clearly showing significant receptors to be at potentially significant risk;

For these sites, the visit focused on the understanding of local flood issues and general familiarisation with the locations. Given that the APSR designation is clear for these locations, there would be little value in undertaking detailed ground-truthing of receptor risks or determining an SVRS. Examples of Level B site visits are typically some of the larger CARs such as Athlone, Limerick, Shannon, Ennis and Tralee.

IRRs and “Receptor” AFRRs

For the seven receptors identified as IRRs and the single receptor identified as an AFRR, the approach was slightly different, with either a Level A or Level B site visit undertaken, or no site visit undertaken.

- **Level A Site Visits.** These site visits were undertaken using the same approach as for “communities” when the desk-based assessment concluded that the IRR designation was ‘uncertain’. This approach was used for four sites.
- **Level B Site Visits.** These site visits were undertaken using the same approach as for “communities” when the desk-based assessment concluded that the IRR designation was ‘clearly an IRR’, despite there being no extensive flood history. This is because whilst the likelihood may be low (reflected in the absence of any flood history) the impact may be very high. This approach was used for two sites.

- **No Site Visit.** For those locations where the designation is 'clearly an IRR' including a flood history, no site visit was deemed necessary. This approach was used for two sites.

3

Datasets, Information and Knowledge

3.1 Introduction

In undertaking the Flood Risk Review, a wide range of datasets, information, and knowledge held by different Stakeholders has been used to inform both the desk-based studies and the site visits.

3.2 Datasets and Information Sources

The primary data sets and information used in the Flood Risk Review are listed in Table 2. The data sets fall broadly into four main categories:

- **Background Mapping** – OSi mapping plus key flood risk related background mapping such as watercourses and gauging station network.
- **Historic and Predictive Flooding** – details such as specific event data and flood outlines (where available), and hazard mapping from the PFRA.
- **Potential Flood Receptors** – a wide range of data sets providing information on residential and commercial properties, critical infrastructure, environmental and heritage sites.
- **Interactive Map Viewers** – on-line tools to assist with locating critical receptors and site visit planning.

Table 2. Summary of Data Sets and Sources

Data	Format	Description	Source / Owner
Background Mapping			
Blueline River Network	GIS format	2011 version	OPW / Environmental Protection Agency
OSi Background Mapping	GIS format	1000, 2500, 5000 vector maps, 50000 raster maps.	OSi
Hydrometric Gauging Stations	GIS format		OPW
Embankments	GIS format		OPW
Catchment boundary	GIS format		OPW
Historic and Predictive Flooding			
Historic Flood Event Data	GIS format	Some flood extents are available, but most information is linked to a point. This type of information does not define Flood Zones, but is useful as an indicator that flooding may be a significant issue in the vicinity of that point, with further information available from the reports and photographs attached to that flood event	OPW

Data	Format	Description	Source / Owner
Indicative Flood Hazard Areas (PFRA)	GIS format	10% AEP flood extents; 1% AEP flood extents; 0.1% AEP	OPW
Benefiting Land	GIS format	These maps were prepared to identify areas that would benefit from land drainage schemes, and typically indicate low-lying land near rivers and streams that might be expected to be prone to flooding	OPW
Potential Flood Receptors			
Geo-Directory Property Database - Residential and Commercial Properties	GIS format	Key Receptors analysed for the PFRA	OPW / Various
Primary Schools	GIS format		
Post Primary Schools	GIS format		
Third Level	GIS format		
Fire Stations	GIS format		
Garda Stations	GIS format		
Civil Defence	GIS format		
Nursing Homes	GIS format		
Hospitals	GIS format		
Health Centres	GIS format		
Power Utilities	GIS format		
Water Utilities	GIS format		
Telecommunication Utilities	GIS format		
Airports	GIS format		
Architectural Heritage	GIS format		
National Monuments	GIS format		
Special Areas of Conservation	GIS format	Site boundaries of environmental designated locations (updated dataset acquired in 2011).	National Parks and Wildlife Service
Special Protection Areas	GIS format		
Natural Heritage Areas	GIS format	Site Synopsis to identify key features	
Proposed Natural Heritage Areas	GIS format		
Local Area Plans	PDF	Development Maps, local information on flood risk and receptors.	Local Authorities
Interactive Map Viewers			
Google StreetView	Internet	Online mappers used to locate/investigate key interests prior to site visits	Google
OSi			Ordnance Survey Ireland

3.3 Other Information and Knowledge

Other information and knowledge has primarily been obtained through meetings and discussions with various Stakeholders with specific knowledge of the locations and areas under consideration, and from on-site discussions as part of the Flood Risk Review site visits. Typical information gathered includes such things as:

- Local areas of repeated flooding;
- Local bottlenecks and blockage risks;
- Low spots in defences etc.
- Suggested flooding mechanisms and actions taken to reduce flood risk.

3.3.1 Stakeholder Meetings

A key part of the desk-based activity that informed the site visits, were meetings held with representatives of OPW and the various Local Authorities. These meetings provided a wealth of background information including details on:

- History of specific schemes;
- Flooding history and possible causes of historic flooding;
- Identification of possible high risk locations;
- Information on any current schemes under design or construction;
- Local sensitivities – for example areas of recurring incidents.

The main findings from these meetings are included in the notes of the desk-based study for each location.

Table 3 shows a list of meetings that have been held with OPW, Local Authorities, and other Stakeholders. Each of these meetings was attended by one or more members of the Jacobs Flood Risk Review team. Where appropriate, follow up telephone discussions supplemented these meetings.

It is noted from Table 3 that no consultation meetings have been held with Cork County Council, Laois County Council, Tipperary South County Council or Limerick City Council. This is due to the small number of AFRRs and CARs designated in the Project Brief for these County Councils, and in the case of Limerick City Council, the clear designation of Limerick as an APSR.

Table 3. Summary of Stakeholder Meetings to Inform the Flood Risk Review

Organisation	Meeting Location	Meeting Date
Office of Public Works	Mungret, Co. Limerick	23 rd March 2011
Office of Public Works	Mungret, Co. Limerick	9 th May 2011
Office of Public Works	Mullingar, Co. Westmeath	13 th April 2011
Office of Public Works	Headford, Co. Galway	1 st June 2011
Kerry County Council	Listowel, Co. Kerry	4 th May 2011
Kerry County Council	Tralee, Co. Kerry	4 th May 2011
Limerick County Council	Dooradoyle, Co. Limerick	10 th May 2011
Clare County Council	Ennis, Clare	7 th June 2011
Roscommon County Council	Roscommon, Co. Roscommon	11 th May 2011
Leitrim County Council	Carrick on Shannon, Co. Leitrim	19 th May 2011
Galway County Council	Ballinasloe, Co. Galway	24 th May 2011
Longford County Council	Longford, Co. Longford	25 th May 2011
Westmeath County Council	Athlone, Co. Westmeath	31 st May 2011
Offaly County Council	Tullamore, Co. Offaly	7 th June 2011
North Tipperary County Council	Nenagh, Co. Tipperary	10 th June 2011
Electricity Supply Board	Dublin, Co. Dublin	29 th March 2011
Waterways Ireland	Carrick on Shannon, Co. Leitrim	30 th March 2011
Environmental Protection Agency	Dublin	2 nd June 2011
Inland Fisheries Ireland	Athlone, Co. Westmeath	10 th June 2011
Irish Farmers Association	Athlone, Co. Westmeath	20 th April 2011

3.3.2 Site Visits

The focus of the information gathered on the visits to each location has already been discussed under Section 2.2. However, it is noted that the visits also provided an opportunity to gain further local knowledge through discussions with a range of people. This included Local Authority employees, local residents, and owners of local businesses. The information from these discussions, where they occurred, is recorded on the specific Flood Risk Review forms (under Section 2.3 of the Flood Risk Review forms) for each location. The on site activities are summarised as follows, informing both the flood hazard and possible consequences:

- **Ground-truthing of hazard mapping** – consideration of the fluvial flooding extents (from the PFRA), commenting in particular on areas where the PFRA generated outlines do not appear to be realistic.
- **Ground-truthing of selected receptors** – identification of key receptors, to note both their presence and potential vulnerability, as well as identifying new receptors (such as new housing estates).

- **Local knowledge** – comments noted in discussion with OPW or Local Authority staff, and information volunteered by local residents during the visit related to e.g. past events, bottlenecks, flood levels etc.
- **Hydraulic constrictions and conveyance routes** – consideration of likely / possible hydraulic constrictions and blockage risk (based on judgement rather than any capacity calculations) and the consequence of this in relation to out-of-bank flow routes in the event of a flood.
- **Site Visit Review Score** – identification of receptors and possible flood risk to derive the SVRS, taking account of flooding source, blockage, conveyance, threshold level (relative to ground level), number of properties and assets affected etc.
- **Defence Assets** – identification of current formal and informal flood defence assets, including both effective and ineffective “assets” to assist in informing the asset survey requirements as well as potential mitigation measures. It is noted that this activity does not form part of the Project Brief for the Flood Risk Review, but does provide useful information for subsequent tasks.
- **Preliminary consideration of potential mitigation measures** – identification of a range of possible, potential mitigation measures, emphasising that this does not imply that the measures identified are exhaustive, nor are they necessarily viable.

4

Flood Risk Review Assessment**4.1 Introduction**

The preceding sections in this report outline the methodology and information used when undertaking the Flood Risk Review assessment of the 108 CAR and “community” AFRR locations, and the seven IRRs and one “receptor” AFRR.

This section presents the findings of our Flood Risk Review assessment for each location, and identifies those recommended for designation as APSRs and IRRs.

This assessment takes specific account of:

- The PFRA findings to date including the Flood Risk Index (FRI) score, Local Authority and OPW comments made earlier in the PFRA process, and the specific reasons for identifying a location as a CAR or AFRR;
- A review of other available datasets and information;
- Site visits to each location;
- Comments made in discussions with Local Authorities, OPW and other Stakeholders;
- Flood receptors – residential, commercial and environmental;
- Flooding impacts – economic, social, environmental and heritage.

4.2 Underlying Principles and Assumptions

The Flood Risk Review process draws all of this information together to enable a recommendation for each location on whether it should be designated as an APSR (or an IRR) or not.

A number of underlying principles have been applied in the assessment. These are particularly important to consider in the context of those locations – specifically the CARs and “community” AFRRs - which may have a borderline designation. The main assumptions and principles are summarised as follows:

- **Locations where there is a major scheme in place**
The identification of such a scheme recognises that there is an inherent flood risk at the location. Whilst the scheme may currently provide a good level of protection, it is possible that it may need to be considered for improvement and would therefore qualify as being an APSR. An example would be Adare (UoM 24), where there are large embankments along the River Maigue adjacent to the town.
- **Locations where there are minor formal or informal raised flood defence assets**
At these locations, consideration is given to the flood risk under the assumption that the defence could fail in some way. Hence, this is similar in principle to the locations where there is a major scheme in place; the defences may not necessarily fail, but if they did, there is a need to consider what may be at risk of flooding.

- **Locations where there are other minor formal or informal assets that influence flood risk**

Assets and structures that have an influence on flood risk, such as bridges, culverts, trashscreens and flap valves are considered slightly differently from raised embankments and walls. For example, if a culvert is assumed to be blocked and remains unattended, the flood risk will increase to those receptors located on the surrounding land that would be inundated. However, such an assumption would be extreme, and it is conceivable that if this principle was applied consistently across the Shannon RBD (and nationally) there would be many hundreds of additional areas at risk of flooding. For situations such as this, the location would not be considered, by default, to be at significant risk. However, it is noted that such locations may still be designated as APSRs for other reasons.

By contrast, at those locations where there is a **specific risk** of blockage for particular reasons, and there would be **significant flooding impacts**, the location would be identified as being at significant risk; the risk is taken as a combination of the likelihood of occurrence and the impact.

A similar principle is applied for the following:

- Trash screens becoming blocked;
- Flap valves on land drainage networks failing in either the open position or closed position;
- Bridges or culverts collapsing;
- Drainage channels becoming overgrown.

For these typical examples, in instances where simple maintenance would keep the flood risk low, or the asset is in good condition and unlikely to fail structurally (e.g. a bridge or culvert collapsing), the location would not automatically be identified as an area of potentially **significant** risk.

In all of the above instances, at each location, the likelihood of the 'failure' is considered together with the impact on the receptors to assess whether the overall risk is significant.

- **Primary watercourses under consideration**

The focus of the Flood Risk Review has been on watercourses for which there is considered to be a reasonable likelihood of flooding occurring. In general, this has been focused on the EPA 'Blue-line' river network. However, it is noted there are some locations where the 'Blue-line' river network does not pick up watercourses, for example a long culverted section may not be shown. Such a watercourse may give rise to a potentially significant flood risk, and therefore, the location could be included as an APSR, despite there not being a 'Blue-line' watercourse shown. Conversely, there are watercourses indicated that are surface water or land drainage ditches and are **not** considered to pose either (a) a **significant** flood risk, or (b) a **fluvial** flood risk. In several cases, the ditches and channels were completely dry during the site visits, and whilst this does not imply that there is no flood risk, it can be an indication that their purpose is for surface water drainage and that the flood risk associated with them is pluvial, or in some cases, from groundwater. It is emphasised that no sites have been designated as non-APSRs on the basis that a watercourse is either small, or dry – it is based on risk.

- **Limits of extents of the site visits**

The extent of the area considered for the CARs has been defined by applying a 500m buffer around the location's development boundary. For AFRRs, whilst no defined boundary has been developed, the broad principle of looking 500m beyond the location's development boundary has been adopted, to ensure that all potential receptors are appropriately considered within the context of the Flood Risk Review. Fluvial and tidal flood risk from watercourses within the location's boundary, including from watercourses beyond the boundary that may cause significant flood risk, have been considered by the Flood Risk Review process.

4.3 Summary of Findings and Outcomes

4.3.1 CARs and Community AFRRs

A total of 108 locations have been assessed through the Flood Risk Review process. The completed pro-formas for each of the locations are included in Appendix D, grouped together for each Unit of Management as follows:

- Appendix D2 – UoM 23;
- Appendix D3 – UoM 24;
- Appendix D4 – UoM 25 / 26;
- Appendix D5 – UoM 27;
- Appendix D6 – UoM 28.

Tables 4 (UoM 25 / 26) and 5 (UoMs 23, 24, 27 & 28) summarise the full listing of the locations, including the Flood Risk Review's recommendation on whether the location should be designated as an APSR.

The findings from the PFRA, the desk-based study and site visits have all been taken into account to determine a Site Visit Risk Score (SVRS). Consideration of the assessments as a whole indicates that locations with a SVRS of less than around 120 are unlikely to have sufficient, critical receptors at significant risk of flooding to warrant designation as an APSR. However, it is also recognised that at some locations, it is possible that a SVRS above this value may still not warrant designation as an APSR. It is emphasised that it is the summary conclusions, drawn from the information gathered in the desk-based review and from the site visit that determines the recommendation regarding the designation as an APSR. The SVRS is simply used as a check against the conclusion drawn.

Taking this into consideration, the following is a summary of the Flood Risk Review conclusions with respect to the identification of APSRs:

- 52 locations identified as CARs are recommended to be designated as APSRs.
- 5 locations identified as CARs are recommended NOT to be designated as APSRs.
- 14 locations identified as AFRRs are recommended to be designated as APSRs.
- 37 locations identified as AFRRs are recommended NOT to be designated as APSRs.

Within Tables 4 and 5, the following locations are also highlighted:

- Locations highlighted in **pale blue** are those which **were designated** as an AFRR in the Brief, but **are recommended** for designation as an APSR as a result of the Flood Risk Review.
- Those locations highlighted in **pale green** are those which **were designated** as a CAR in the Brief, but **are not recommended** for designation as an APSR as a result of the Flood Risk Review.

Table 4. Summary of Recommended Location Status from the Flood Risk Review – UoM 25 and 26

ID	Name	County	UoM	CAR or AFRR in Brief	Recommendation from Flood Risk Review
AFRR 1	Abbey	Galway	25 / 26	AFRR	Not APSR
CAR 2	Abbeyshrule	Longford	25 / 26	CAR	APSR
AFRR 46	Ahascragh	Galway	25 / 26	AFRR	APSR
AFRR 3	Annacarriga	Clare	25 / 26	AFRR	Not APSR
AFRR 4	Annacotty	Limerick	25 / 26	AFRR	Not APSR
AFRR 6	Athleague	Roscommon	25 / 26	AFRR	APSR
CAR 6	Athlone	Westmeath	25 / 26	CAR	APSR
CAR 7	Ballaghaderreen	Roscommon	25 / 26	CAR	Not APSR
CAR 8	Ballinasloe	Galway	25 / 26	CAR	APSR
AFRR 8	Ballyfarnan	Roscommon	25 / 26	AFRR	APSR
AFRR 45	Ballymahon	Longford	25 / 26	AFRR	APSR
AFRR 10	Banagher	Offaly	25 / 26	AFRR	APSR
CAR 11	Birr	Offaly	25 / 26	CAR	APSR
CAR 12	Borrisokane	Tipperary	25 / 26	CAR	APSR
CAR 13	Boyle	Roscommon	25 / 26	CAR	APSR
AFRR 43	Bridgetown	Clare	25 / 26	AFRR	Not APSR
AFRR 13	Caherconlish	Limerick	25 / 26	AFRR	Not APSR
CAR 15	Cappamore	Limerick	25 / 26	CAR	APSR
CAR 16	Carrick on Shannon / Cortober	Leitrim	25 / 26	CAR	APSR
AFRR 15	Carrigahorrig	Tipperary	25 / 26	AFRR	Not APSR
CAR 18	Castleconnell	Limerick	25 / 26	CAR	APSR
CAR 19	Castlerea	Roscommon	25 / 26	CAR	APSR
CAR 21	Clara	Offaly	25 / 26	CAR	APSR
CAR 23	Clonaslee	Laois	25 / 26	CAR	APSR
AFRR 16	Clonfert	Galway	25 / 26	AFRR	Not APSR
AFRR 47	Cloondara	Longford	25 / 26	AFRR	APSR
CAR 57	Cloonlara	Clare	25 / 26	CAR	Not APSR
AFRR 44	Dromineer	Tipperary	25 / 26	AFRR	Not APSR
AFRR 51	Dromod	Leitrim	25 / 26	AFRR	APSR
CAR 26	Drumshanbo	Leitrim	25 / 26	CAR	APSR
CAR 27	Edgeworthstown	Longford	25 / 26	CAR	APSR

ID	Name	County	UoM	CAR or AFRR in Brief	Recommendation from Flood Risk Review
AFRR 48	Elfeet	Longford	25 / 26	AFRR	Not APSR
AFRR 21	Ferbane	Offaly	25 / 26	AFRR	APSR
AFRR 22	Inish Cealtra	Clare	25 / 26	AFRR	Not APSR
AFRR 23	Jamestown	Leitrim	25 / 26	AFRR	Not APSR
CAR 30	Kilbeggan	Westmeath	25 / 26	CAR	APSR
AFRR 24	Kilconnell	Galway	25 / 26	AFRR	Not APSR
CAR 31	Kilcormac	Offaly	25 / 26	CAR	APSR
CAR 34	Killaloe / Ballina	Tipperary / Clare	25 / 26	CAR	APSR
AFRR 26	Kinnitty	Offaly	25 / 26	AFRR	Not APSR
AFRR 27	Knockvicar	Roscommon	25 / 26	AFRR	Not APSR
AFRR 28	Leitrim Village	Leitrim	25 / 26	AFRR	APSR
CAR 37	Limerick City	Limerick City	25 / 26	CAR	APSR
AFRR 29	Limerick Junction	Tipperary	25 / 26	AFRR	Not APSR
CAR 40	Longford	Longford	25 / 26	CAR	APSR
AFRR 31	Lough Gara	Roscommon	25 / 26	AFRR	Not APSR
CAR 41	Mohill	Leitrim	25 / 26	CAR	APSR
AFRR 35	Moneygall	Offaly	25 / 26	AFRR	Not APSR
CAR 42	Mullingar	Westmeath	25 / 26	CAR	APSR
CAR 43	Nenagh	Tipperary	25 / 26	CAR	APSR
CAR 45	Newport	Tipperary	25 / 26	CAR	APSR
CAR 46	O'Briens Bridge	Limerick/Clare	25 / 26	CAR	APSR
AFRR 36	Oola	Limerick	25 / 26	AFRR	Not APSR
CAR 47	Pollagh	Offaly	25 / 26	CAR	APSR
CAR 48	Portumna	Galway	25 / 26	CAR	APSR
CAR 49	Rahan	Offaly	25 / 26	CAR	APSR
AFRR 38	Roosky	Roscommon	25 / 26	AFRR	Not APSR
CAR 51	Roscommon	Roscommon	25 / 26	CAR	APSR
CAR 52	Roscrea	Tipperary	25 / 26	CAR	APSR
CAR 54	Shannon Harbour	Offaly	25 / 26	CAR	APSR
AFRR 52	Springfield	Clare	25 / 26	AFRR	APSR
AFRR 39	Strokestown	Roscommon	25 / 26	AFRR	Not APSR

Table 5. Summary of Recommended Location Status from the Flood Risk Review – UoM 23, 24, 27 and 28

ID	Name	County	UoM	CAR or AFRR in Brief	Recommendation from Flood Risk Review
CAR 1	Abbeydorney	Kerry	23	CAR	APSR
AFRR 2	Abbeyfeale	Limerick	23	AFRR	APSR
AFRR 5	Ardfert	Kerry	23	AFRR	Not APSR
CAR 5	Athea	Limerick	23	CAR	APSR
AFRR 7	Aughacasma	Kerry	23	AFRR	Not APSR
AFRR 9	Ballyheigue	Kerry	23	AFRR	Not APSR
CAR 10	Banna	Kerry	23	CAR	APSR
AFRR 14	Carhoonaknock	Kerry	23	AFRR	Not APSR
AFRR 18	Derryquay	Kerry	23	AFRR	Not APSR
AFRR 19	Dromroe	Kerry	23	AFRR	Not APSR
AFRR 20	Fenit	Kerry	23	AFRR	Not APSR
AFRR 49	Kilfenora	Kerry	23	AFRR	Not APSR
AFRR 30	Lisselton	Kerry	23	AFRR	Not APSR
CAR 39	Listowel	Kerry	23	CAR	APSR
AFRR 32	Moher	Kerry	23	AFRR	Not APSR
AFRR 34	Moneycashen	Kerry	23	AFRR	APSR
CAR 56	Tralee	Kerry	23	CAR	APSR
CAR 3	Adare	Limerick	24	CAR	APSR
CAR 4	Askeaton	Limerick	24	CAR	APSR
CAR 9	Ballylongford	Kerry	24	CAR	APSR
AFRR 11	Bruff	Limerick	24	AFFR	Not APSR
AFRR 12	Bruree	Limerick	24	AFRR	Not APSR
CAR 20	Charleville	Cork	24	CAR	APSR
CAR 22	Clarina	Limerick	24	CAR	APSR
CAR 24	Croom	Limerick	24	CAR	APSR
CAR 25	Drumcolligher	Limerick	24	CAR	APSR
CAR 29	Foynes	Limerick	24	CAR	APSR
CAR 32	Kildimo New	Limerick	24	CAR	Not APSR
AFRR 25	Killacolla	Limerick	24	AFFR	Not APSR
CAR 35	Kilmallock	Limerick	24	CAR	APSR
AFRR 42	Milford	Cork	24	AFRR	APSR
AFRR 33	Monaster	Limerick	24	AFFR	Not APSR
CAR 44	Newcastle West	Limerick	24	CAR	APSR
AFRR 37	Patrickswell	Limerick	24	AFFR	Not APSR
CAR 50	Rathkeale	Limerick	24	CAR	APSR

ID	Name	County	UoM	CAR or AFRR in Brief	Recommendation from Flood Risk Review
CAR 14	Bunratty	Clare	27	CAR	APSR
AFRR 17	Cranny	Clare	27	AFRR	Not APSR
CAR 28	Ennis	Clare	27	CAR	APSR
CAR 33	Kilkee	Clare	27	CAR	APSR
CAR 36	Kilrush	Clare	27	CAR	APSR
CAR 38	Lissan West	Clare	27	CAR	Not APSR
AFRR 50	Quin	Clare	27	AFRR	APSR
CAR 53	Shannon	Clare	27	CAR	APSR
CAR 55	Sixmilebridge	Clare	27	CAR	APSR
CAR 17	Carrowmore	Clare	28	CAR	Not APSR
AFRR 40	Tromracastle	Clare	28	AFRR	Not APSR

Tables 6 and 7 give further details on the designation of the locations specifically highlighted in Tables 4 and 5 as either **pale blue** or **pale green**.

Table 6. AFRRs Recommended for Designation as APSRs

ID	Name	UoM	Reasons for Designation
South Area – UoM 23, 24, 27 and 28			
AFRR 30	Abbeyfeale	23	Abbeyfeale is at the confluence of two large rivers, the Feale and the Allaghaun. Whilst most of the properties at risk are relatively high, there are several properties and commercial / industrial premises on the right bank of the Allaghaun just upstream of the confluence, which are at potential significant risk.
AFRR 28	Money-cashen	23	Tidal flood risk at the location, with gaps in the current tidal defences (sea wall). Water overtopping the defences is reported to get trapped behind the defences, putting several properties at risk of flooding.
AFRR 42	Milford	24	The watercourse through Milford is relatively steep and fast flowing during high flows. The triple-arch bridge also presents a risk of blockage, leading to outflanking of the bridge and possible flooding. Even without blockage, there are two groups of a few properties that could potentially be vulnerable to flooding, amounting to up to around 5-10 properties in total.
AFRR 50	Quin	27	Quin has a housing estate located on the left bank just downstream of the main three-arch bridge in the town. Whilst the PFRA mapping is considered to over-estimate the flood outline, it is considered that up to around 20 properties may potentially be at risk of flooding.
North Area – UoM 25 / 26			
AFRR 6	Athleague	25/ 26	The desk-based review identified historic evidence of flooding in Athleague of up to 18 properties. The significant risk to these properties requires Athleague to be included as an APSR. This flood risk was confirmed during discussions with Roscommon County Council.
AFRR 8	Ballyfarnon	25/ 26	There is a history of flooding at Ballyfarnon which has required the construction of local improvements works by the OPW. There is a significant number of properties (including a Garda Station and small businesses) potentially at significant risk of flooding. This flood risk was confirmed during discussions with Roscommon County Council.
AFRR 10	Banagher	25/ 26	The site visit to Banagher identified residential properties, a small business, a cultural heritage site and road infrastructure all at significant risk from flooding. This flood risk was confirmed during discussions with Offaly County Council.
AFRR 21	Ferbane	25/ 26	While there is little historic evidence of a flood risk at Ferbane, there is a new School, a nursing home and several residential properties potentially at significant

ID	Name	UoM	Reasons for Designation
			risk of flooding.
AFRR 28	Leitrim Village	25/ 26	There is historic evidence of flooding in Leitrim Village that strongly indicates that there is a significant risk from flooding. This flood risk was confirmed during the site visit where low lying businesses, which have flooded in the past, were identified. Housing estates have also been constructed in the floodplain. This flood risk was confirmed during discussions with Leitrim County Council.
AFRR 45	Ballymahon	25/ 26	The two apartment blocks on the right bank just upstream of the bridge and properties, including a WWTW, on both banks downstream of the bridge are all deemed to have a potentially significant flood risk.
AFRR 46	Ahascragh	25/ 26	Local works completed in 2010 have increased channel capacity which was the cause of flooding at Greene's Hardware Store in 2009. These works have reduced the risk of flooding at the village. However, the embankments around the hardware store are insufficient to fully protect the warehouse units and adjacent properties.
AFRR 47	Cloondara	25/ 26	It is noted that Cloondara did not flood during the November 2009 event. However there is significant flood risk from both the Shannon and Camlin Rivers, in particular to the recent development and WWTW downstream of the main road bridge through the village. This flood risk was confirmed during discussions the Local Authority.
AFRR 51	Dromod	25/ 26	Proven and potential flood risk to properties on the banks of the Shannon and adjacent to the railway line (from the Elsin River). This flood risk was confirmed during discussions with Leitrim County Council.
AFRR 52	Springfield	25/ 26	Significant flood history from the Shannon in recent years. Evidence indicates that the PFRA mapping is underestimating flood risk in the area, with this conclusion supported the Local Authority and OPW.

Table 7. CARs NOT Recommended for Designation as APSRs

ID	Name	UoM	Reasons for Designation
South Area – UoM 23, 24, 27 and 28			
CAR 32	Kildimo New	24	No properties at significant risk in the town although there are a small number of properties at low risk at the eastern end of the town. The rest of the town is located on relatively high ground compared to the surrounding land to the northeast (towards the River Maigue). It should be noted that the community of Faha may be at risk, but this is well outside the APSR boundary for Kildimo New.
CAR 38	Lissan West	27	There are around six residential properties along the road through Lissan West, plus an industrial unit comprising several large buildings just to the north. However, all of these properties and premises are well above the surrounding land, and are not shown to be at risk on the PFRA mapping. The PFRA score was only 247. This suggests that Lissan West was identified as a CAR as a “marginal” case.
CAR 17	Carrowmore	28	The primary reason for Carrowmore being identified as a CAR is the large number of properties (30+) shown as being at risk of flooding in the 10% AEP event. On inspection, these properties are all associated with accommodation for the local golf course and have all been constructed at a level approximately 1.5-2m above the surrounding flood plain. Given the extent of the flood plain in the area it is considered that these properties are not at significant risk of flooding from the nearby minor watercourses.
North Area – UoM 25 / 26			
CAR 7	Ballaghadereen	25/26	There are a number of watercourses flowing through Ballaghadereen, each with different hydrological characteristics. There are several properties potentially at risk of flooding along most of these watercourses, but they are all hydrologically independent. Generally, there are an insufficient number of critical receptors of significant risk of flooding within Ballaghadereen to warrant its designation as an APSR.
CAR 57	Cloonlara	25/26	There is no fluvial flood risk at Cloonlara. The nearest area of significant flood risk is Springfield, situated approximately 1km from Cloonlara. Springfield was extensively flooded in the November 2009 event.

4.3.2 IRRs and Receptor AFRRs

A total of eight receptors have been assessed through the Flood Risk Review process. Seven of these were originally designated as IRRs in the Project Brief, with one further potential IRR added as a “receptor” AFRR subsequently. The completed pro-formas for each of these sites are included in Appendix D7.

The following is a summary of the Flood Risk Review conclusions with respect to the identification of IRRs:

- 5 receptors originally identified as IRRs are recommended to remain designated as IRRs.
- 2 receptors originally identified as IRRs are recommended NOT to be designated as IRRs.
- 1 receptor identified as a receptor AFRR (i.e. a potential IRR) is recommended NOT to be designated as an IRR.

Table 8 summarises the full listing of the locations, including the Flood Risk Review’s recommendation on whether the location should be designated as an IRR.

Table 8. Summary of IRR Recommended Status from the Flood Risk Review

ID	Name	County	UoM	IRR or AFRR in Brief	Recommendation from Flood Risk Review
IRR 1	Tarbert Power Station	Kerry	24	IRR	IRR
IRR 2	Lumcloon Power Station	Offaly	25/26	IRR	Not an IRR
IRR 3	Shannonbridge Power Station	Offaly	25/26	IRR	IRR
IRR 4	Lanesborough Power Station	Longford	25/26	IRR	IRR
IRR 5	Shannon International Airport	Clare	27	IRR	IRR
IRR 6	Radar Station for Shannon Airport	Clare	27	IRR	IRR
IRR 7	Moneypoint Power Station	Clare	27	IRR	Not an IRR
AFRR 41	Aughinish Island CHP plant and sub-station	Limerick	24	AFRR	Not an IRR

Tables 9 gives further details on those locations which are not recommended to be designated as IRRs.

Table 9. Receptor Sites that are NOT Recommended for Designation as IRRs

ID	Name	UoM	Reasons for Designation
IRR 2	Lumcloon Power Station	25/26	Lumcloon Power Station has yet to be built. At present the site is a large fenced area on the left bank of the Silver River. The site itself appears to be at lower flood risk than the right bank. Until the power station is constructed, it is not appropriate to identify it as an IRR.
IRR 7	Moneypoint Power Station	27	The Power Station is located on the frontage of the Shannon Estuary. However the ground level at the lowest part of the site is a few metres above the high spring tide levels. Additionally, the assets are located on higher ground at the site. Overall the flood risk at this site is considered to be low, and is therefore NOT recommended to be designated as an IRR.
AFRR 41	Aughinish Island CHP plant and sub-station	24	The ESB electricity substation at the site is located several metres above high spring tide levels. The CHP plant located towards the centre of the site is at even higher levels. The flood risk at this site is considered to be extremely low, and is therefore NOT recommended to be designated as an IRR.

4.4 Additional Considerations and Findings

During the Flood Risk Review process, a number of wider issues were identified as well as some site specific issues. These are noted for future reference as necessary.

4.4.1 General Findings

- A number of locations and rivers have significant lengths of nearby tidal embankments. This is particularly the case in UoM's 23, 24, and 27; for example, the River Maigue in UoM 24 and the Owengarney River in UoM 27. The issue as to how flood risk to communities located behind these embankments is assessed will need further consideration as it is apparent that every such community has not been identified for Flood Risk Review. Consideration should also be given as to how a group of small, dispersed communities behind tidal embankments should be considered. Both of these issues may be addressed based on flood mapping from the Irish Coastal Protection Strategy Study (ICPSS) combined with the geometric and condition surveys of tidal defences to identify those communities that may be at risk behind such defences. It is therefore possible to add such locations at later stages of the study and these do not need to be identified as APSRs at present.
- Numerous locations were identified by Local Authorities and the Regional OPW teams as potentially at risk of flooding, which were not included within the Flood Risk Review Brief. The sites are listed in Appendix E. These locations have been considered by OPW on the basis of new information provided, along with information provided earlier in the PFRA process, and the FRI score (where applicable) from the PFRA. None of these sites has been taken forward for inclusion within the Flood Risk Review.

4.4.2 Site Specific Issues

Site specific issues were identified at various locations. These are noted here for sites that are not recommended as APSRs. Whilst the flood risk at these locations is not significant (by definition) there are some important considerations related to these sites.

Cranny – There is a local ESB substation in Cranny, County Clare. Whilst there is not a significant risk to the substation, the low risk that there is could be minimised with minor improvements, for example, providing a low bund around water-sensitive equipment.

Ballyheigue – At Ballyheigue, County Kerry, whilst there is not a significant flood risk in the area, there is a wider concern related to the Akeragh drainage system. The fundamental issue for the area to the east and south of Ballyheigue (and overall Akeragh drainage system) is the blockage of the outfall at Black Rock. This is assessed as part of the Banna Flood Risk Review, with Banna recommended as an APSR. Any flood risk measures for managing water levels in the drainage system should include the wider area around Ballyheigue, covering many square kilometres upstream of the Black Rock outfall, extending a few kilometres inland. It is emphasised that these watercourses will not be defined as High priority Watercourses (HPW) or Medium Priority Watercourses (MPW) based on the definition of the APSR boundary for Banna, but will need to be considered as MPWs in their own right.

5**Conclusions and Recommendations****5.1 Conclusions**

The conclusions from the Flood Risk Review are as follows:

- The findings from the PFRA have been reviewed both in terms of the desk-based study and a ground truthing site visit. In general, the verification of receptors and flood hazard extents were found to be good, although some areas of uncertainty have been identified.
- A total of 116 locations have been assessed by the Flood Risk Review. This comprises
 - 108 community locations - 57 CARs and 51 AFRRs
 - 8 receptor locations – 7 IRRs and 1 receptor AFRR.
- The meetings held with regional OPW teams and Local Authorities were an invaluable source of information for ensuring the site visits focused on the appropriate issues within the locations being considered.
- The site visits have provided additional information beyond that required for the Flood Risk Review that will inform subsequent stages of the study. This includes information related to the nature of the watercourses, flood defence assets, topographic survey requirements, hydrology, hydraulic modelling considerations and potential flood risk management options.

5.2 Recommendations

The recommendations for the Flood Risk Review are as follows:

- For the communities considered, a total of 66 locations are recommended for designation as APSRs. This includes the identification of 14 locations that were included as AFRRs. It also excludes five locations that were identified as CARs.
- For the individual receptors considered, a total of five are recommended for designation as IRRs.
- Numerous additional locations were suggested by Local Authorities and Regional OPW teams for possible consideration as additional AFRRs. None of these sites has been taken forward for Flood Risk Review.
- Consideration should be given later in the study to communities located behind tidal flood defence embankments, following completion of the asset condition survey and topographic survey of the assets.

Appendix A Extracts from the Project Brief

Extract from Section 4 of the Stage I Project Brief (June 2010)

4. FLOOD RISK REVIEW

4.1. BACKGROUND

The OPW has undertaken an initial preliminary flood risk assessment, based on available and readily-derivable information, to identify the Communities at Risk, and other locations or Individual Risk Receptors (IRRs) deemed to be at potentially significant risk. This assessment has been based principally upon:

- Information on past flood events
- Knowledge of probable flood risk areas of the staff of the OPW and Local Authorities
- Analysis of available or readily-derivable predictive flood hazard information (such as localised flood extent mapping and coastal extent mapping (both where available) and also broad-scale mapping of areas potentially prone to fluvial flooding based on DTM data and normal-depth calculation) and flood risk receptor data.

The OPW shall provide the outcomes of the initial preliminary flood risk assessment, and relevant supporting datasets, with the tender documentation for the Specific Tender Stage (Stage II).

4.2. RISK REVIEW

The Consultant shall review the initial preliminary flood risk assessment described in Section 4.1 and all information and knowledge gained by the Consultant in undertaking the Project requirements set out in other Sections herein, including but not necessarily limited to site visits, data collection, review of survey outputs, defence asset condition assessment, review of spatial planning documents, discussion or interviews with the staff of the OPW, Local Authorities and other relevant stakeholders who may have relevant information, etc. Based on this review, the Consultant shall assess and identify:

- areas other than those defined as APSRs (based on the Communities at Risk or IRRs defined within the Specific Tender Documentation) where potential significant risks exist or might be considered likely to occur, and,
- areas defined as APSRs (based on the Communities at Risk or IRRs defined within the Specific Tender Documentation) where potential significant risks do not exist or might be considered not likely to occur,

The criteria for the definition of significant risk shall be provided by the OPW.

The Consultant shall, in particular, consider the potential flood risk to environmental receptors (designated or locally important sites and locations of designated species), taking into account the indicative flood hazard (Section 4.1) and the potential adverse consequences of flooding for the site or species (vulnerability). In assessing the vulnerability of an individual site or species, the Consultant should take into account both generic guidance on vulnerability of classifications of sites or species that will be provided by the OPW, and also the local details and context of the site or species.

4.3. RISK REVIEW REPORT

The Consultant shall prepare and submit to the OPW not later than 30/06/2011 a Draft Risk Review Report that shall include:

- a description of the methodology undertaken for the Flood Risk Review, including the datasets, information and knowledge used, and the preliminary risk assessments, and,

- the outcomes of the Review in terms of areas where the risk might be potentially significant, and the areas and Individual Risk Receptors set out above.

The OPW, Steering Group and Progress Group shall review the Draft Flood Risk Review Report and provide comments to the Consultant within two (2) months. The Consultant shall address the comments provided and submit, not later than 30/09/2011, a Final Flood Risk Review Report.

On the basis of the Flood Risk Review, the OPW may decide to designate additional, or de-designate (i.e., remove) Communities at Risk.

For additional Communities at Risk, the Consultant shall undertake the services required for the Locations and Risk, and associated APSRs, HPWs and MPWs as set out herein, for the fixed-sum fees that will be defined in the tender documentation for the Specific Tender Stage (Stage II).

For de-designated Communities at Risk, the Consultant shall undertake no further services set out herein for Communities at Risk, and the associated APSRs, HPWs and MPWs, beyond those delivered by the time of the decision to de-designate such Communities at Risk, for a reduction in the fees payable according to the fixed-sum fee reductions that will be defined in the tender documentation for the Specific Tender Stage (Stage II).

Extract from Section 2.11 of the Stage II Shannon CFRAM Study Project Brief (October 2010)

2.11 Section 4.1 – Flood Risk Review – Background

A report on the initial Preliminary Flood Risk Assessment is provided in digital format. Digital (tabular and GIS) data of the outcomes of the initial PFRA (including areas at risk that do not constitute Communities at Risk or IRRs) is also provided in digital format, in the file named: 2199_Tech_101007_PFRA

As part of the Flood Risk Review (Section 4 of the Generic Specifications), the Consultant shall include all of the Communities at Risk (Table 1) and all of the Areas for Flood Risk Review listed in Table 5. The Consultant shall carry out the services as set out in Section 4 of the Generic Specification, including site visits to inspect all of these Areas and make professional assessments, based on inspection and the use of all available data, of the potential flood risk to the Area. The extent of the Areas for Flood Risk Review is defined in the same manner as the APSRs as set out in Section 1.2.2.3 of the Generic Specification, as amended herein.

Table 1 – Communities at Risk

Name	County	Source of Risk		Appx. Co-ordinates	
		Fluvial	Coastal / Tidal	Easting	Northing
Abbeydorney	Kerry	Yes	No	84750	123250
Abbeysrule	Longford	Yes	No	223250	260250
Adare	Limerick	Yes	Yes	146500	146750
Askeaton	Limerick	Yes	No	134000	150000
Athea	Limerick	Yes	No	112411.9	134873.3
Athlone	Westmeath	Yes	No	205000	240000
Ballaghaderreen	Roscommon	Yes	No	161500	294250
Ballinasloe	Galway	Yes	No	184750	232000
Ballylongford	Kerry	Yes	Yes	99500	144750
Banna	Kerry	Yes	Yes	75750	123000
Birr	Offaly	Yes	No	206007.3	204990.9
Borrisokane	Tipperary	Yes	No	191453.9	193834.8
Boyle	Roscommon	Yes	No	180226.9	302423.4
Bunratty	Clare	No	Yes	145308.1	160869
Cappamore	Limerick	Yes	No	176851.8	151402.7
Carrick-on-Shannon	Leitrim	Yes	No	193796.1	299561.8
Carrowmore	Clare	Yes	No	98741.2	166936
Castleconnell	Limerick	Yes	Yes	166390.9	162679.6
CastleRea	Roscommon	Yes	No	167399	280149.7
Charleville	Cork	Yes	No	152250	122500
Clara	Offaly	Yes	No	225500	232500
Clarina	Limerick	Yes	Yes	150000	154000
Clonaslee	Laois	Yes	No	231896.7	210924.2
Croom	Limerick	Yes	No	151000	141500
Dromcolliher	Limerick	Yes	No	138230.8	121197.3
Drumshanbo	Leitrim	Yes	No	197322.5	310923.8
Edgeworthstown	Longford	Yes	No	225826.1	271930.1
Ennis	Clare	Yes	Yes	134500	177000
Foynes	Limerick	Yes	Yes	125000	151500
Kilbeggan	Westmeath	Yes	No	233250	235500
Kilcormac	Offaly	Yes	No	218372.2	213942.9
Kildimo New	Limerick	Yes	Yes	145250	152750
Kilkee	Clare	Yes	Yes	88730.63	160072.9
Killaloe	Tipperary	Yes	No	170180.8	172822.9
Kilmallock	Limerick	Yes	No	161126	127573
Kilrush	Clare	Yes	Yes	99457.56	155376.4
Limerick City ¹	Clare	Yes	Yes	157858.6	157475.7
Lissan West	Clare	No	Yes	134500	172500
Listowel	Kerry	Yes	No	98500	133000
Longford	Longford	Yes	No	213853.3	274765.6
Mohill	Leitrim	Yes	No	208838.6	296957.6
Mullingar	Westmeath	Yes	No	243907.8	252941.9
Nenagh	Tipperary	Yes	No	186604.3	178781.3
Newcastle West	Limerick	Yes	No	129750	133000
Newport	Tipperary	Yes	No	172620.7	162375.4

O'Brien's Bridge	Limerick Co Co	Yes	No	166319.4	166543.6
Pollagh	Offaly	Yes	No	219358.4	225152.7
Portumna	Galway	Yes	No	185298	204550.9
Rahan	Offaly	Yes	No	225221.3	225619.5
Rathkeale	Limerick	Yes	No	136750	140750
Roscommon	Roscommon	Yes	No	187349.6	264501.5
Roscrea	Tipperary	Yes	No	213500	189500
Shannon	Clare	Yes	Yes	139750	162000
Shannon Harbour	Offaly	Yes	No	203065.6	219015.7
Sixmilebridge	Clare	Yes	No	147400.4	165934.5
Tralee	Kerry	Yes	Yes	82750	114000

NOTE 1: The APSR for the Limerick City Community at Risk shall include all of the developed land within the contiguous urban area of Limerick, and all lands zoned for development in or adjacent to Limerick (as set out in Section 1.2.2.3 of the Generic Tender, and as amended by Section 2.3 herein), including areas that may be outside of the Limerick City Council jurisdictional boundary. While the full extent of the APSR for Limerick City will lie within three Units of Management, it shall be deemed to be within Unit of Management 25-26 for the purposes of the Services and Project.

Table 5 Areas for Flood Risk Review

Name	County	Source of Risk		Easting	Northing
		Fluvial	Coastal / Tidal		
Abbey	Galway	Yes	No	173750	205750
Lough Gara	Roscommon	Yes	No	175000	301000
Abbeyfeale	Limerick	Yes	No	111536	126758
Annacarriga	Clare	Yes	No	168000	177750
Annacotty	Limerick	Yes	Yes	165211	158096
Ardfert	Kerry	Yes	No	78466	120966
Athleague	Roscommon	Yes	No	182847	257437
Aughacasla	Kerry	Yes	No	62750	110500
Ballaghaderreen	Roscommon	Yes	No	161500	294250
Ballyfarnham	Roscommon	Yes	No	186624	313762
Ballyheige	Kerry	Yes	Yes	75500	127250
Banagher	Offaly	Yes	No	200915	215335
Bruff	Limerick	Yes	No	162739	135960
Bruree	Limerick o	Yes	No	155170	130420
Caherconlish	Limerick	Yes	No	167903	149358
Carhoonaknock	Kerry	Yes	No	96500	137750
Tromracatle	Clare	No	Yes	99750	173000
Carrighorrig	Tipperary	Yes	No	190461	201452
Clonfert	Galway	Yes	No	197134	221732
Cranry	Clare	Yes	No	116750	160500
Derryquay	Kerry	Yes	No	76250	111250
Dromroe	Kerry	Yes	No	85000	131000
Fenit	Kerry	No	Yes	73049	115876
Ferbane	Offaly	Yes	No	212380	224010
Inish caltra	Clare	Yes	No	169750	185000
Jamestown	Leitrim	Yes	No	199518	297710
Kilconnell	Galway	Yes	No	173198	231197
Killacolla	Limerick	Yes	No	148250	127250
Kinnitty	Offaly	Yes	No	218670	205191
Knockvicar	Roscommon	Yes	No	187391	305847
Leitrim Village	Leitrim	Yes	No	195700	304639
Limerick Junction	Tipperary	Yes	No	186432	138184
Lisselton	Kerry	Yes	No	92937	138577
Tromracatle	Clare	No	Yes	99750	173000
Listowel	Kerry	Yes	No	98500	133000
Longford	Longford	Yes	No	213853	274766
Moher	Kerry	Yes	No	105250	142250
Monaster	Limerick	Yes	No	155250	141000
Moneycashen	Kerry	No	Yes	85964	137951
Moneygall	Offaly	Yes	No	203073	180993
Oola	Limerick	Yes	No	182392	142006
Patrickswell	Limerick	Yes	No	152500	150000
Roosky	Roscommon	Yes	No	204789	286737
Strokestown	Roscommon	Yes	No	193069	280814

Appendix B Finalised List of CAR, AFRR and IRR

Final List of Communities at Risk (from Technical Note TD 007 17-Mar-11, Table TD007-1: Communities at Risk)

No.	Name	UoM	Local Authority	Coordinates	
				Easting	Northing
CAR 1	Abbeydorney	23	Kerry	84750	123250
CAR 2	Abbeyshrule	25/26	Longford	223250	260250
CAR 3	Adare	24	Limerick	146500	146749.99
CAR 4	Askeaton	24	Limerick	134000	150000
CAR 5	Athea	23	Limerick	112411.9	134873.27
CAR 6	Athlone	25/26	Westmeath	205000	239999.99
CAR 7	Ballaghaderreen	25/26	Roscommon	161500	294249.99
CAR 8	Ballinasloe	25/26	Galway	184750	231999.99
CAR 9	Ballylongford	24	Kerry	99500	144750
CAR 10	Banna	23	Kerry	75750	123000
CAR 11	Birr	25/26	Offaly	206007.29	204990.93
CAR 12	Borrisokane	25/26	Tipperary	191453.88	193834.84
CAR 13	Boyle	25/26	Roscommon	180226.94	302423.39
CAR 14	Bunratty	27	Clare	145308.14	160869.02
CAR 15	Cappamore	25/26	Limerick	176851.82	151402.69
CAR 16	Carrick on Shannon	25/26	Leitrim	193796.13	299561.78
CAR 17	Carrowmore	28	Clare	98750	166750
CAR 18	Castleconnell	25/26	Limerick	166390.86	162679.57
CAR 19	Castlerea	25/26	Roscommon	167399	280149.7
CAR 20	Charleville	24	Cork	152250.01	122499.99
CAR 21	Clara	25/26	Offaly	225500	232500
CAR 22	Clarina	24	Limerick	150000	154000
CAR 23	Clonaslee	25/26	Laois	231896.69	210924.22
CAR 24	Croom	24	Limerick	151000	141500
CAR 25	Dromcolliher	24	Limerick	138230.8	121197.32
CAR 26	Drumshanbo	25/26	Leitrim	197322.49	310923.81
CAR 27	Edgeworthstown	25/26	Longford	225826.08	271930.09
CAR 28	Ennis	27	Clare	134500	177000
CAR 29	Foynes	24	Limerick	125000.01	151500
CAR 30	Kilbeggan	25/26	Westmeath	233250	235500
CAR 31	Kilcormac	25/26	Offaly	218372.24	213942.93
CAR 32	Kildimo New	24	Limerick	145250	152750
CAR 33	Kilkee	27	Clare	88730.63	160072.9
CAR 34	Killaloe	25/26	Tipperary	170180.81	172822.89
CAR 35	Kilmallock	24	Limerick	161126.01	127573.01
CAR 36	Kilrush	27	Clare	99457.56	155376.44
CAR 37	Limerick City	25/26	Limerick City	157858.59	157475.7
CAR 38	Lissan West	27	Clare	134500	172499.99
CAR 39	Listowel	23	Kerry	98500	133000
CAR 40	Longford	25/26	Longford	213853.31	274765.64
CAR 41	Mohill	25/26	Leitrim	208838.56	296957.57
CAR 42	Mullingar	25/26	Westmeath	243907.75	252941.93
CAR 43	Nenagh	25/26	Tipperary	186604.27	178781.31
CAR 44	Newcastle West	24	Limerick	129750	133000

No.	Name	UoM	Local Authority	Coordinates	
				Easting	Northing
CAR 45	Newport	25/26	Tipperary	172620.7	162375.38
CAR 46	O'Briens Bridge	25/26	Limerick	166319.41	166543.63
CAR 47	Pollagh	25/26	Offaly	219358.37	225152.67
CAR 48	Portumna	25/26	Galway	185298.02	204550.87
CAR 49	Rahan	25/26	Offaly	225221.27	225619.45
CAR 50	Rathkeale	24	Limerick	136750	140750
CAR 51	Roscommon	25/26	Roscommon	187349.6	264501.45
CAR 52	Roscrea	25/26	Tipperary	213500	189500
CAR 53	Shannon	27	Clare	139750	161999.99
CAR 54	Shannon Harbour	25/26	Offaly	203065.6	219015.74
CAR 55	Sixmilebridge	27	Clare	147400.38	165934.51
CAR 56	Tralee	23	Kerry	82750	114000
CAR 57	Cloonlara	25/26	Clare	162500	163650

Final List of Areas for Flood Risk Review
(from Technical Note TD 008 31-Mar-11, Table TD008-1: AFRR List)

No.	Name	UoM	Local Authority	Coordinates	
				Easting	Northing
AFRR1	Abbey	25/26	Galway	173750	205750
AFRR2	Abbeyfeale	23	Limerick	111536.3	126758
AFRR3	Annacarriga	25/26	Clare	168000	177750
AFRR4	Annacotty	25/26	Limerick	165211	158095.9
AFRR5	Ardfert	23	Kerry	78465.73	120965.7
AFRR6	Athleague	25/26	Roscommon	182846.6	257436.6
AFRR7	Aughacasla	23	Kerry	62750	110500
AFRR8	Ballyfarnan	25/26	Roscommon	186623.5	313762.4
AFRR9	Ballyheige	23	Kerry	75500	127250
AFRR10	Banagher	25/26	Offaly	200915.1	215334.9
AFRR11	Bruff	24	Limerick	162739.2	135960.1
AFRR12	Bruree	24	Limerick	155169.8	130420.1
AFRR13	Caherconlish	25/26	Limerick	167902.7	149358.4
AFRR14	Carhoonaknock	23	Kerry	96500	137750
AFRR15	Carrighorrig	25/26	Tipperary North	190461.2	201451.6
AFRR16	Clonfert	25/26	Galway	197134.5	221731.9
AFRR17	Cranny	27	Clare	116750	160500
AFRR18	Derryquay	23	Kerry	76250	111250
AFRR19	Dromroe	23	Kerry	85000	131000
AFRR20	Fenit	23	Kerry	73049.27	115876.4
AFRR21	Ferbane	25/26	Offaly	212380	224010
AFRR22	Inish caltra	25/26	Clare	169750	185000
AFRR23	Jamestown	25/26	Leitrim	199518.1	297710.3
AFRR24	Kilconnell	25/26	Galway	173198.5	231196.9
AFRR25	Killacolla	24	Limerick	148250	127250
AFRR26	Kinnitty	25/26	Offaly	218670	205190.7
AFRR27	Knockvicar	25/26	Roscommon	187391.1	305847.5
AFRR28	Leitrim Village	25/26	Leitrim	195700.1	304639.5
AFRR29	Limerick Junction	25/26	Tipperary	186432	138183.5
AFRR30	Lisselton	23	Kerry	92937.26	138576.6
AFRR31	Lough Gara	25/26	Roscommon	175000	301000
AFRR32	Moher	23	Kerry	105250	142250
AFRR33	Monaster	24	Limerick	155250	141000
AFRR34	Moneycashen	23	Kerry	85963.56	137951.3
AFRR35	Moneygall	25/26	Offaly	203073.5	180993
AFRR36	Oola	25/26	Limerick	182392.1	142006.3
AFRR37	Patrickswell	24	Limerick	152500	150000
AFRR38	Roosky	25/26	Roscommon	204788.8	286737.4
AFRR39	Strokestown	25/26	Roscommon	193068.9	280814
AFRR40	Tromracastle	28	Clare	99750	173000

Additional Areas for Flood Risk Review (from email correspondence from OPW, 31-Mar-11)

No.	Name	UoM	Local Authority
AFRR 41	Aughinish Island CHP and substation ⁽¹⁾	24	Limerick
AFRR 42	Milford	24	Cork
AFRR 43	Bridgetown	25 / 26	Clare
AFRR 44	Dromineer	25 / 26	Tipperary
AFRR 45	Ballymahon	25 / 26	Longford
AFRR 46	Ahascragh	25 / 26	Galway
AFRR 47	Cloondara	25 / 26	Longford
AFRR 48	Elfeet	25 / 26	Longford
AFRR 49	Kilfenora	23	Kerry
AFRR 50	Quin	27	Clare
AFRR 51	Dromod	25 / 26	Leitrim

Note: (1) Aughinish Island CHP plant and substation is included as a “receptor” AFRR

Further Additional Area for Flood Risk Review (from written correspondence from OPW, 27-Jun-11)

No.	Name	UoM	Local Authority
AFRR 52	Springfield	25 / 26	Clare

Final List of Individual Risk Receptors ⁽¹⁾

No.	Name	UoM	Local Authority	Coordinates	
				Easting	Northing
IRR 1	Tarbert Power Station	24	Kerry	107750	149250
IRR 2	Lumcloon Power Station	25/26	Offaly	213500	219000
IRR 3	Shannonbridge Power Station	25/26	Offaly	197250	224750
IRR 4	Lanesborough Power Station	25/26	Longford	200500	269250
IRR 5	Shannon International Airport	27	Clare	137674.4	161045
IRR 6	Radar Station for Shannon Airport	27	Clare	137683.6	160636
IRR 7	Moneypoint Power Station	27	Clare	103700	151500

Note: (1) The initial list of IRRs in the Project Brief included Durrow Heritage Site. This was removed early in the FRR process based on a preliminary review. Aughinish Island CHP plant and substation is included as a “receptor” AFRR in the “Additional Areas for Flood Risk Review” table.

Appendix C Overview Plans of Flood Risk Review Locations

Appendix D Flood Risk Review Assessments

Appendix D1 – Blank pro-forma with notes

Appendix D2 – UoM 23

Appendix D3 – UoM 24

Appendix D4 – UoM 25 / 26

Appendix D5 – UoM 27

Appendix D6 – UoM 28

Appendix D7 – Individual Risk Receptors

Appendix E Potential FRR Locations Identified

The following table lists those locations identified by Local Authorities or Regional OPW teams for consideration for Flood Risk Review.

Area identified	County
Area from Bunratty to Shannon	Clare
Area from Clarecastle to Lissan to Ballynacally	Clare
Area from Latoon to Clarecastle	Clare
Area from Limerick to Bunratty	Clare
Area from Shannon to Latoon	Clare
Areas Near Head race at Ardnacrusha	Clare
Areas protected by embankments on the Creegh river at Carrowmore	Clare
Areas protected by embankments on the Owengarney River	Clare
Areas protected by embankments on the Rine River	Clare
Areas protected by embankments on the Shannon and Fergus Estuary	Clare
Ballybeg swallowhole	Clare
Ballyvaughan	Clare
Bellisle	Clare
Clarecastle	Clare
Clareville Water Treatment Intake	Clare
Clareville Water Treatment Plant	Clare
Cloonconneen	Clare
Corrofin	Clare
Doolin	Clare
Gilloogue	Clare
Leamaneh Castle (Kilfenora)	Clare
Liscannor/Lahinch	Clare
Lough Donnell	Clare
Lough Girroga	Clare
Milltown Malbay	Clare
Redgate	Clare
Scarriff/Tuamgraney	Clare
Shannon Banks	Clare
St Flannans College swallowhole	Clare
Toonagh Dysert	Clare
University of Limerick Northern Campus	Clare
Vicinity of the Bolyree river	Clare
Westbury	Clare
Lough Bunny Cross	Clare
Moymore	Clare
Ballinamore Bridge	Galway
Mount Bellew	Galway

Area identified	County
Ballynagar, Lixnaw	Kerry
Feale River Valley	Kerry
Ballysimon Rd	Limerick
Canal Bank	Limerick
Howleys Quay	Limerick
Lucas Drive	Limerick
Montpelier	Limerick
St Mary's Park	Limerick
Suil Na Habhainn / Meadowbrook	Limerick
Annacotty	Limerick
Abbeylara	Longford
Ballinalee	Longford
Newtowncashel	Longford
Saints Island	Longford
Clonmacnoise	Offaly
Tullamore	Offaly
Tarmonbarry	Roscommon
Ballynacarrigy	Westmeath
Moate	Westmeath