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Blaenau Gwent County Borough Council

Strategic Flood Consequence Assessment

Stage 2
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Prepared for

Cyngor Bwrdeistdref Sirol
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Table of Contents

1 Introduction 1

2 Study Area 2

2.1 Context 2

2.2 Overview of Flood Risk 2

2.3 Data Sources 2

3 Methodology 4

3.1 Flood Event Scenarios 4

3.2 Surface Water Flooding 4

3.3 Flood Risk to Third Parties 5

3.4 Limitations of the Stage 2 SFCA 5

4 Candidate Site Assessment 7

4.2 Ebbw Vale North, Ebbw Vale 8

4.3 Waun-y-Pound, Ebbw Vale 11

4.4 Marine Colliery, Ebbw Vale 14

4.5 Cartef Aneurin Bevan, Tredegar 17

4.6 Greenacres, Tredegar 20

4.7 Tredegar Workshops, Tredegar Business Park 23

4.8 North Rising Sun Industrial Estate, Upper Ebbw Fach 26

4.9 Lower Plateau, Six Bells Colliery Site 29

4.10 Roseheyworth Business Park, Lower Ebbw Fach 32

5 Summary 34

5.2 Further Work 34

6 References 37

7 Appendices 38

7.1 Appendix A ..... A

7.2 Appendix B ..... B

7.3 Appendix C C

1 Introduction

1.1.1 This Stage 2 Strategic Flood Consequence Assessment (SFCA) was produced by URS/Scott Wilson for Blaenau Gwent County Borough Council (CBC). This Stage 2 SFCA should be used to inform the Sustainability Appraisal (SA) and Local Development Plan (LDP) process and to ensure proposed development is steered towards the lowest possible flood risk zone, as required by Technical Advice Note 15: Development and Flood Risk (TAN15).

1.1.2 URS/Scott Wilson has completed a Stage 1 SFCA for Blaenau Gwent CBC alongside producing this Stage 2 SFRA. The Stage 1 SFCA determined flood risk within the area at a strategic level. The Stage 1 report then undertook a screening exercise various candidate sites, identified by Blaenau Gwent CBC as part of their emerging LDP for spatial planning purposes.

1.1.3 This Stage 2 SFCA focuses on nine of these candidate sites, which have potentially significant flood risk posed to them (see Appendix A). The Stage 2 SFCA uses existing data collected during the Stage 1 SFCA (e.g. data provided by the Environment Agency, Blaenau Gwent CBC, Dŵr Cymru Welsh Water (DCWW), South Wales Fire and Rescue (SW Fire and Rescue), amongst others, which is augmented by further data provided by the various stakeholders. The Stage 2 study provides further information to gain a better understanding of the risk posed and provides potential mitigation options to manage or mitigate the risk, in order to continue the application of the justification test aspect of TAN15.

1.1.4 The name and location of the nine candidate sites, together with an overview of the study area is provided in Section 2.

2 Study Area

2.1 Context

2.1.1 This Stage 2 SFCA focuses on nine candidate sites. The name and location of each Candidate Site identified for potential development / redevelopment is provided below:

- Ebbw Vale North;
- Waun-y-Pound, Ebbw Vale;
- Marine Colliery, Ebbw Vale;
- Cartef Aneurin Bevan, Tredegar;
- Greenacres, Tredegar;
- Tredegar Business Park;
- North Rising Sun Industrial Estate, Ebbw Fach Upper;
- Lower Plateau, Six Bells Colliery Site, Lower Ebbw Fach; and
- Roseheyworth Business Park.

2.1.2 Appendix B provides an overview map of the candidate sites identified for further investigation at this Stage 2 SFCA level with Appendix C providing maps of the candidate sites showing the flood risks posed to them.

2.1.3 It should be noted that between the completion of the Stage 1 and Stage 2 SFCA report, the Castle Street, Abertillery site has been removed from the LDP process. Hence this site will not be assessed as part of the Stage 2 report despite its inclusion in Table 9 in the Stage 1 report.

2.2 Overview of Flood Risk

2.2.1 The Stage 1 SFCA outlined that the predominant flood risk posed to the Blaenau Gwent CBC area is from fluvial sources. However, the majority of candidate sites have been located away from areas prone to fluvial flooding, where possible. Therefore, the risk posed from other sources, principally from surface water, has become more prominent for many of the sites.

2.2.2 The predominant sources of fluvial flooding within the council area are from the Ebbw River, River Sirhowy and their tributaries. Given the predominant topography of the area, the floodplains associated with these watercourses are relatively limited.

2.3 Data Sources

2.3.1 To inform this Stage 2 SFCA, data collected as part of the Stage 1 SFCA and additional data provided by the Environment Agency have been used to investigate flood risk within the settlements identified in Section 2.1. The sources of available data are as follows:

- Light Detection and Ranging (LiDAR) data – digital elevation data provided by the Environment Agency;

- National Flood and Coastal Defence Database (NFCDD) – details on the location, extent, standard of protection and condition of existing flood defences provided by the Environment Agency;
- Ordnance Survey 10k Map Tiles – Blaenau Gwent CBC;
- Technical Advice Note 15: Development and Flood Risk (2004) – Development Advice Maps (DAMS) flood zone designations and there associated risk;
- Information from other stakeholders (DCWW, South Wales Fire and Rescue and Blaenau Gwent CBC);
- Other reports relevant to flooding (e.g. previous FCAs or culvert inspection reports).

3 Methodology

3.1 Flood Event Scenarios

3.1.1 Where a significant area of a Candidate Site is located within DAM flood zone C or Environment Agency Flood Zones 2 and/or 3, where data allows, flood event scenarios for the predominant flood source at the site have been provided. This would allow Blaenau Gwent CBC to make informed planning decisions with regard to flood risk.

3.1.2 For candidate sites only partially located within DAM flood zone C or Environment Agency Flood Zones 2 and/or 3, or where available data in the vicinity of the site is limited, an assessment of flood risk has been undertaken based on a review of existing flood mapping and ground levels across the site.

3.1.3 Typically, Stage 2 SFCAs would utilise any existing hydraulic modelling data to inform the analysis of flood risks posed to potential candidate sites and present flooding depths and hazards posed to sites. However, in the absence of any modelling data, this analysis cannot be included within the methodology of this SFCA.

3.1.4 The Areas Susceptible to Surface Water Flooding (ASTSWF) maps have been provided as part of the analysis and have been used as part of the evidence base for the site analysis, as explained within the Stage 1 SFCA. Although the ASTSWF maps were shown on a strategic (i.e. council area) scale in the Stage 1 SFCA, due to licensing issues, they cannot be provided on a site specific scale as part of the Stage 2 SFCA.

3.1.5 Additional datasets utilised as part of the Stage 2 site assessments included DCWW data obtained from the DG5 register, which provides evidence of areas known to suffer from surface water flooding. In addition, data provided by SW Fire and Rescue, this data provides evidence of incidents that have required the fire and rescue teams to attend the event. Due to issues relating to sensitivity of data, both of these data sets do not indicate the actual location of previous events or known problems areas. Instead, they provide approximate locations within the vicinity of known problem areas.

3.1.6 Where appropriate, recommendations for a Stage 3 SFCA or site specific Flood Consequence Assessments (FCAs) to undertake further investigation have been made at each candidate site and where necessary mitigation measures are proposed.

3.1.7 As identified by the Stage 1 SFCA, there are no known hydraulic modelling studies currently available within the vicinity of the Candidate Sites. Therefore, this Stage 2 assessment will rely on the generalised mapping augmented by other local data sets, as identified in Section 2.3 above.

3.2 Surface Water Flooding

3.2.1 An assessment of the ASTSWF maps has been included within the screening process for deciding sites to include within this Stage 2 SFCA. However, given the relatively crude and high level nature of these maps there is no specific data available (e.g. flooding depth) to undertake any analysis. In addition, given the potential sensitivity of the data associated with these maps, they cannot be shown in relation to the individual sites via any figures. Therefore, whilst a generic description of the ASTSWF has been provided in relation to the sites, no greater detail can be

provided at this stage. Therefore, the principal reason for including these maps is to identify sites with a potential for inundation with surface water. Such sites can then be cross examined with other data sets collected during the SFCA process, such as Dŵr Cymru Welsh Water and SW Fire and Rescue data, to identify the sites that have evidence of previous surface water issues and therefore could require further examination.

3.2.2 Since the completion of the Stage 1 report, the Environment Agency released Surface Water Flooding Maps. An analysis of these maps indicates there is minimal difference between these maps and the ASTSWF maps, hence would not impact the Stage 2 SFCA assessment.

3.2.3 As part of the Stage 2 assessment, we have liaised with Blaenau Gwent CBC drainage engineers and civil contingency teams to confirm known surface water flooding areas in relation to the proposed development site areas.

3.3 Flood Risk to Third Parties

Surface Water Management

3.3.1 Surface water management arrangements at the proposed developments should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the proposed development, unless specific off-site arrangements are made and result in the same net effect. TAN15 recommends the use of Sustainable Drainage Systems (SuDS) to be incorporated into the development at the design stage. This will ensure that flood risk to third parties is not increased.

3.4 Limitations of the Stage 2 SFCA

3.4.1 This Stage 2 SFCA builds on the information collated and disseminated during the Stage 1 SFCA. The report provides sufficient information to inform decision making on a strategic scale (i.e. to 10 candidate sites). However, this report is not sufficient to undertake a detailed assessment of flood risks due to the following limitations.

3.4.2 No hydraulic modelling has been undertaken. Therefore only currently available data has been used, which is therefore considered to be the best available data. However, where sites are considered to be constrained by flooding and detailed hydraulic models do not exist (or are deemed to be not fit for purpose); they are recommended to be completed as part of a Stage 3 SFCA. Such updates to the hydraulic modelling would allow refinement of Flood Zones (particularly for sites benefitting from flood defences) as well as flood hazard posed.

3.4.3 As explained within the Stage 1 SFCA, it is deemed inappropriate at this strategic scale to undertake detailed analysis of flood risk from unmapped watercourses. Therefore an arbitrary 20m buffer has been applied to each watercourse, within which is it recommended that no development is allocated. Whilst this provides a reasonable starting point in the avoidance of flood risk to proposed development, it is clear that during more detailed study (i.e. as part of a site specific FCA); estimation of flood risks from such watercourses would be required.

3.4.4 Whilst some reference to flooding from storage areas or reservoirs has been made within this SFCA, such analysis (along with additional analysis of flooding from ordinary watercourses) will be undertaken by Blaenau Gwent CBC through their PFRA process. It is recommended that

future updates of the SFCA or development plan FCAs make reference to the PFRA when available.

3.4.5 Any other limitations to the Stage 2 SFCA that relate to individual candidate sites is referred to in the relevant section below, with appropriate recommendations for further work provided.

4 Candidate Site Assessment

4.1.1 The following chapter provides individual focused assessments of each of the 10 candidate sites. In addition to the methodology (Chapter 3), an assessment of each site has been based on:

- Existing defences;
- Standard of defence;
- Ownership and maintenance issues of defences;
- Identification of escape and excavation routes;
- Environment Agency flood warning system coverage;
- Third party impacts.

4.1.2 This chapter aims to identify the flood risks posed to each site in order to inform the LDP decision making process. Therefore, the principle flood risks posed to each site would be identified and potential mitigation measures proposed. For sites that appear to be significantly constrained by flood risks, suggestions for further study through a Stage 3 SFCA would be made.

4.2 Ebbw Vale North, Ebbw Vale

Table 4-1: Ebbw Vale North key information

Candidate Site Number(s):	**B5, B7, B8 and B13**		
Approximate Total Area (ha.):	146		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	99%	0	1%
EA Flood Zone	1	2	3
	99%	0	1%
ASTSWF Zone	Less	Intermediate	More
	15%	5%	1%
Predominant Flood Source:	Fluvial and Surface water		
	Current		**Future**
Standard of Defence*	No defences		No defences
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	DCWW and SWF&R events within 400m of the site. The Waun-y-Pound reservoir to the immediate south of the site, Rhyd-y-blew ponds and associated drainage ditches located on the eastern part of the site.		
Escape/Evacuation	N/A		
Is site covered by Flood Warning/Watch?	N/A		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Majority of site within TAN15 zone A so sequential location of development possible without the need for the Justification Test		
Mitigation Measures	Appropriate surface water management measures		
Stage 3 SFCA Requirement	Not required - Potential further investigation of the ponds and reservoirs on the site as part of a site specific FCA.		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.2.1 The Ebbw Vale North site is to the west of the Ebbw River. Due to the shape of the site, the eastern 'finger' of the site extends to the banks of the river, within the vicinity of Steel Works Road. This area is within the DAM flood zone C2 and Environment Agency Flood Zone 3.

4.2.2 The ASTSWF maps indicate areas at potential risk from surface water flooding that extend across the site in a thin band approximately adjacent to the Bryn-Serth Road. These appear to be associated with the Rhyd-y-blew ponds and the drainage ditches that flow into the ponds.

ASTSWF areas ('More' and 'Intermediate' risk) in the eastern extent of the site are associated with the Ebbw River and land adjacent to this watercourse.

4.2.3 In terms of flood risks posed by the reservoir and ponds on and near the site, due to the predominant topography sloping from west to east across the site, the predominant flow paths from these features would direct water away from the majority of the site.

4.2.4 The Ebbw Vale North site is proposed for large-scale mixed use development (residential, employment, leisure and tourism facilities).

Flood Defence

4.2.5 The NFCDD database provided by the EA indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.2.6 A review of relevant mapping indicates that the extent of DAM zone C as well as the Environment Agency Flood Zone 2 and 3 across the site is minor, hence fluvial flood risk from the Ebbw River is deemed insignificant. Therefore, the more significant flood risk posed to this site is potentially from surface water sources or from the small, unmapped ditches and watercourses that traverse the site. However, given their relatively small size, it is likely that the flood risks from such sources could be adequately managed on site. These small watercourses should be investigated as part of a site specific FCA.

4.2.7 In addition to the on-site ditches, the various ponds and Waun-y-Pound reservoir are a potential flood risk to the proposed site. Flooding from these ponds or the reservoir would potentially occur in the unlikely event of a breach or failure of the impounding structure. However, given the location of the ponds and local topography, the only areas at risk from a breach or failure would be the far eastern extent of the site. Figure A1 indicates the likely flow routes following a failure of the ponds/ reservoir impoundment. Given that the Waun-y-Pound reservoir has a capacity of approximately 83,000m^3, it is classified as a reservoir under the Reservoirs Act, and therefore the Environment Agency hold records of it. The records indicate that it is an impounding reservoir, dammed with earth embankments. The risk category, however, is unknown. Therefore, at this stage, an accurate assessment of the flood risks posed from these sources is not possible or proportionate to the risks posed.

4.2.8 Due to the size of the site, although there are no historical flood records on the site, there are various incidents of historical flooding within the vicinity of the site. Most notably, these are associated with DCWW incidents (approximately seven incidents) and SW Fire and Rescue responses (two incidents). The majority of the DCWW incidents are attributed to 'other sources of flooding' and occurred during a 10% annual probability event (1 in 10 year return period). The SW Fire and Rescue responses occurred in January 2009 and are attributed to unknown sources of flooding. The majority of all incidents are located down slope of the proposed site location.

Climate Change Flood Risk

4.2.9 As recommended within the Stage 1 SFCA, in the absence of detailed hydraulic modelling, the anticipated effects of climate change can be considered by treating the Environment Agency Flood Zone 2, as Flood Zone 3 inclusive of climate change. Figure A2 indicates that the flood extents within the site boundary are similar during both scenarios. Based on this information the anticipated effect on the Ebbw River of climate change is not considered significant at the site.

4.2.10 The impacts of climate change on the small network of ditches and the capacity of the ponds on site should be investigated as part of site specific FCA that would accompany any planning application for the site.

Requirements for Stage 3 SFCA

4.2.11 The vast majority of the site is located within the DAM zone A and Environment Agency Flood Zone 1. In addition, over 80% of the site is not located within an ASTSWF. Therefore, it is deemed appropriate for this site to be progressed through the LDP process without the need for further assessment via a Stage 3 SFCA. However, a site specific FCA would be required as part of any planning application. This should include an assessment or appreciation of the on-site ditches and ponds to ensure these are considered within the Masterplanning process.

4.2.12 In addition, an FCA should ensure the proposed site manages surface water runoff in accordance with TAN15 best practice. This would ensure no additional pressures are placed on downstream areas, which have experienced some flooding in the past (see 4.2.6 above).

Summary

4.2.13 The vast majority of the site is located within DAM zone A and Environment Agency Flood Zone 1. However, the site has been considered in the Stage 2 SFCA on account of a very small area of the site (approximately 1%) located within DAM zone C2 and Environment Agency Flood Zone 2 and 3.

4.2.14 The ASTSWF areas across the site are not significant and are predominantly associated with the existing Ebbw River, on-site ponds and their associated drainage ditches.

4.2.15 The various on-site ponds have the potential to present a flood risk to the far eastern extent of the site in the unlikely event of a breach or failure of the impounding structure.

4.2.16 There are various historical flooding incidents associated with the sewer network within surrounding developed areas. However, the majority of these are located down slope of the site.

4.2.17 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP. However, a site specific FCA would be required, which would be compliant with TAN15.

4.3 Waun-y-Pound, Ebbw Vale

Table 4-2: Waun-y-Pound key information

Candidate Site Number(s):	**B31**		
Approximate Total Area (ha.):	6.3		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	100%	0%	0%
EA Flood Zone	1	2	3
	100%	0%	0%
ASTSWF Zone	Less	Intermediate	More
	22%	25%	18%
Predominant Flood Source:	Surface water		
	Current		**Future**
Standard of Defence*	No defences		No defences
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	Waun-y-Pound reservoir to the northwest of the site.		
Escape/Evacuation	N/A		
Is site covered by Flood Warning/Watch?	N/A		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Entire site within TAN15 zone A so no need for the Justification Test		
Mitigation Measures	Appropriate surface water management measures		
Stage 3 SFCA Requirement	Not required - Potential further investigation of the reservoir as part of a site specific FCA.		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.3.1 As shown by Figure B1, the Waun-y-Pound site is located entirely within the DAM flood zone A and Environment Agency Flood Zone 1. However, it has been selected for consideration as part of the Stage 2 SFCA on account of the ASTSWF located on the site.

4.3.2 The ASTSWF maps indicate areas at potential risk from surface water flooding that extend across the site and are associated with low points of the site. The ASTSWF cover a relatively significant area of the site. However, given the topographic location of the site, these ASTSWF areas appear to have their source at or near the site. Hence, provided the proposed site follows

TAN15 best practice in terms of surface water management, it is likely that appropriate mitigation against such surface water flooding would be provided.

Flood Defence

4.3.3 The NFCDD database provided by the EA indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.3.4 A review of relevant mapping indicates that the entire site is located within DAM zone A and Environment Agency Flood Zone 1, hence fluvial flood risk from Environment Agency defined Main Rivers is deemed negligible. Therefore, the more significant flood risk posed to this site is potentially from surface water sources or from the small, unmapped ditches and watercourses that are located near the site. However, given their relatively small size, it is likely that the flood risks from such sources could be adequately managed on site. In addition, the small watercourse to the north of the site has a controlled source (the outflow from the Waun-y-Pound reservoir) and is located down slope from the site. These small watercourses should be investigated as part of a site specific FCA.

4.3.5 The Waun-y-Pound reservoir is located to the northwest of the site. Flooding from the reservoir would potentially occur in the unlikely event of a breach or failure of the impounding structure. Given that the reservoir has a capacity of approximately 83,000m^3, it is classified as a reservoir under the Reservoirs Act, and therefore the Environment Agency hold records of it. The records indicate that it is an impounding reservoir, dammed with earth embankments. The risk category, however, is unknown. Therefore, at this stage, an accurate assessment of the flood risks posed from these sources is not possible or proportionate to the risks posed. In addition, as shown in Figure B1, given the location of the reservoir and local topography, it is likely that the predominant flow path of water from the reservoir would not result in water inundating the site.

4.3.6 There are no known historical flood events that have affected areas within the vicinity of the site.

Climate Change Flood Risk

4.3.7 Given that the site is located entirely within DAM zone A and Environment Agency Flood Zone 1; the impacts of climate change on fluvial flood risk are unlikely to have a significant impact to the site. In addition, as mentioned above, as the ASTSWF are sourced at or near the site, appropriate surface water management on the site should include an allowance for climate change to mitigate against this potential risk.

4.3.8 The impacts of climate change on the small network of ditches and the capacity of the ponds on site should be investigated as part of site specific FCA that would accompany any planning application for the site.

Requirements for Stage 3 SFCA

4.3.9 The entire site is located within the DAM zone A and Environment Agency Flood Zone 1. Therefore, it is deemed appropriate for this site to be progressed through the LDP process without the need for further assessment via a Stage 3 SFCA. However, a site specific FCA would be required as part of any planning application. This should include an assessment or appreciation of the Waun-y-Pound reservoir and the nearby ditches, as well as the potential for

surface water flooding on the site. It is likely that by applying TAN15 best practice, the potential impacts of surface water flooding would be mitigated.

Summary

4.3.10 The entire the site is located within DAM zone A and Environment Agency Flood Zone 1. Therefore, it would be deemed appropriate for the site to be included within the LDP process.

4.3.11 The ASTSWF areas across the site are predominantly associated with low points on the site and are sourced at or near to the site. Therefore, appropriate on-site surface water management techniques, compliant with TAN15, should provide appropriate mitigation against such surface water flooding.

4.3.12 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP.

4.4 Marine Colliery, Ebbw Vale

Table 4-3: Marine Colliery key information

Candidate Site Number(s):	B34		
Approximate Total Area (ha.):	5.3		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	1.5%	98.5%	0%
EA Flood Zone	1	2	3
	100%	0%	0%
ASTSWF Zone	Less	Intermediate	More
	21.6%	25.1%	18.1%
Predominant Flood Source:	Fluvial and Surface water		
	Current		**Future**
Standard of Defence*	No defences		No defences
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	None		
Escape/Evacuation	N/A		
Is site covered by Flood Warning/Watch?	N/A		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Majority of site located within zone B so all development appropriate, provided site levels are above the 0.1% annual probability flood level		
Mitigation Measures	Appropriate surface water management measures		
Stage 3 SFCA Requirement	Not required		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.4.1 As shown in Figure C1, the vast majority of the Marine Colliery site is located within the DAM zone B and entirely within the Environment Agency Flood Zone 1. However, it has been selected for consideration as part of the Stage 2 SFCA on account of the DAM flood zone B and the ASTSWF located on the site.

4.4.2 The ASTSWF appears to be associated with the Ebbw River but extends across the site in the central and southern extents of the site.

Flood Defence

4.4.3 The NFCDD database provided by the EA indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.4.4 A review of relevant mapping indicates that the vast majority of the site is located within the DAM flood zone B. However, the Environment Agency flood maps indicate that the site is located within Flood Zone 1, suggesting the site is at a level above the 0.1% annual probability flood event and is therefore suitable for all types of development, as per the requirements of TAN15 (in particular Section 9). Examination of relevant contour mapping and LiDAR data suggests the site is raised above the Ebbw River by the natural topography and the location of a bank between the river and the site.

4.4.5 The ASTSWF is associated with the River Ebbw and the base of the valley. Areas of Less, Intermediate and More risk extend across the central and southern parts of the site. However, in the absence of any historical records of flooding (surface water or otherwise) at or near the site, along with the raised topographical nature of the site, the ASTSWF zones across the site could be overly conservative due to the relatively crude methodology used.

4.4.6 Relevant Ordnance Survey mapping (see Figure C1) indicates various small watercourses and springs located to the east (up slope) of the site. These follow the natural topography and flow west into the Ebbw River. The flood risks associated with these small watercourses would be potentially low due to their small size and the fact they are fed by springs, thus providing a relatively consistent flow. In addition, due to their small size, any minor flood risks associated with them could be mitigated by sequential location of development away from these watercourses. This would be investigated during a site specific FCA for the site.

4.4.7 The presence of springs at a higher topographical level could suggest the site is at a lower level than the local water table. Therefore, there is a potential for high groundwater levels within the vicinity of the site. However, there is no evidence to suggest historical incidents of groundwater flooding at the site. In addition, according to the British Geological Survey maps (Sheet 232, Abergavenny), the geology underlying the site varies from that of the higher topographical areas. Assuming the groundwater in the geology underlying the site is in connectivity with river levels in the Ebbw River, it is likely that groundwater levels would remain lower than the site due to the site being located within the Environment Agency Food Zone 1. Given the above, it is likely that the risk of flooding posed by groundwater sources is low. However, this would be investigated as part of a site specific FCA for the site.

4.4.8 There are no known historical flood events that have affected areas within the vicinity of the site.

Climate Change Flood Risk

4.4.9 Given that the majority of site is located within DAM zone B and the entire site located within the Environment Agency Flood Zone 1, the impacts of climate change on fluvial flood risk are unlikely to have a significant impact to the site.

Requirements for Stage 3 SFCA

4.4.10 The majority of the site is located within the DAM zone B with the entire site being within the Environment Agency Flood Zone 1. Therefore, it is deemed appropriate for this site to be

progressed through the LDP process without the need for further assessment via a Stage 3 SFCA. However, a site specific FCA would be required as part of any planning application. This should include an assessment or appreciation of the local small watercourses and the potential for high groundwater levels at the site.

Summary

4.4.11 The majority of the site is located within the DAM zone B with the entire site being within the Environment Agency Flood Zone 1. Therefore, it would be deemed appropriate for the site to be included within the LDP process.

4.4.12 The ASTSWF areas within the vicinity of the site are associated with the Ebbw River and the base of the valley. As there are no records of surface water flooding at the site, it is assumed at this stage that the ASTSWF zones are somewhat conservative.

4.4.13 A site specific FCA would be required to support a planning application for the site to further investigate the potential for surface water flooding and flooding from groundwater sources.

4.4.14 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP.

4.5 Cartef Aneurin Bevan, Tredegar

Table 4-4: C key information

Candidate Site Number(s):	**A25**		
Approximate Total Area (ha.):	0.38		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	100%	0%	0%
EA Flood Zone	1	2	3
	100%	0%	0%
ASTSWF Zone	Less	Intermediate	More
	82%	13%	0%
Predominant Flood Source:	Surface water		
	Current		**Future**
Standard of Defence*	No defences		No defences
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	None		
Escape/Evacuation	N/A		
Is site covered by Flood Warning/Watch?	N/A		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Entire site within DAM zone A so all development is appropriate		
Mitigation Measures	Appropriate surface water management measures		
Stage 3 SFCA Requirement	Not required		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.5.1 As shown by Figure D1, the entire Cartef Aneurin Bevan site is located within the DAM flood zone A and Environment Agency Flood Zone 1. Therefore, all types of development would be appropriate according to TAN15. However, the site has been selected for further study as part of this Stage 2 SFCA on account of it being significantly located within an ASTSWF, albeit only 'Less' and 'Intermediate' risk areas.

Flood Defence

4.5.2 The NFCDD database provided by the EA indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.5.3 A review of relevant mapping indicates that the entire site is located within the DAM flood zone A and Environment Agency Flood Zone 1. Therefore, the risk of flooding from fluvial sources is negligible.

4.5.4 The ASTSWF is sourced from higher topographical areas to the west of the site within the vicinity of Bryn Bach Park Lake. It then follows the natural topography and flows east, through the site and down to the Sirhowy River.

4.5.5 Data collected as part of the Stage 1 SFCA indicates that there are historical records of flooding within the vicinity of the site, data provided by DCWW indicates that two incidents of 'other flooding' have occurred, both during an event of 10% annual probability (1 in 10 year return period). SW Fire and Rescue data indicates that one incident of an unknown source has occurred within the vicinity of the site. This data, coupled with the location of the site within an ASTSWF (albeit mostly 'Less' vulnerable), indicates that there is the potential for some surface water flooding at the site. However, given a lack of a defined source (none of the records provide a defined flood source) for the events and a lack of any additional information (anecdotal or otherwise), it is not possible at this stage to define the nature or scale of these events.

Climate Change Flood Risk

4.5.6 Given that the entire site is located within DAM zone A and the entire site located within the Environment Agency Flood Zone 1, the impacts of climate change on fluvial flood risk are unlikely to have a significant impact to the site. During regulation surface water management as part of the site proposals, climate change should be taken into consideration.

Requirements for Stage 3 SFCA

4.5.7 Given the small site area (approximately 0.4ha) and its location within the DAM zone A and the Environment Agency Flood Zone 1 this site is deemed appropriate for this site to be progressed through the LDP process without the need for further assessment via a Stage 3 SFCA. However, despite the size of the site, it is recommended that some further assessments of flooding consequences are undertaken as part of a planning application for the site. In particular, such an assessment should concentrate on surface water flooding to and from the site in line with the information provided in this Stage 2 assessment.

Summary

4.5.8 The entire 0.4ha site is located within DAM flood zone A, along with the Environment Agency Flood Zone 1 and is therefore the risk posed from fluvial flood sources is negligible.

4.5.9 The majority of the site is located within a 'Less' ASTSWF area, with some of the site located within an 'Intermediate' area. In addition, data provided by DCWW and SW Fire and Rescue indicate historical flood events within the vicinity of the site. However, further inspection of this data does not reveal a definitive flood source, or any additional information, anecdotal or otherwise. Therefore, further inspection of these flood events is not possible or proportionate to the risks posed to the site at this stage.

4.5.10 It is recommended that the site is investigated further during preparation of a planning application. However, the scale and nature of the further work would be relevant to the site proposals.

4.5.11 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP.

4.6 Greenacres, Tredegar

Table 4-5: Greenacres key information

Candidate Site Number(s):	A45		
Approximate Total Area (ha.):	0.5		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	100%	0%	0%
EA Flood Zone	1	2	3
	100%	0%	0%
ASTSWF Zone	Less	Intermediate	More
	12%	24%	22%
Predominant Flood Source:	Surface water		
	Current		**Future**
Standard of Defence*	No defences		No defences
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	None		
Escape/Evacuation	N/A		
Is site covered by Flood Warning/Watch?	N/A		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Entire site within DAM zone A so all development is appropriate		
Mitigation Measures	Appropriate surface water management measures		
Stage 3 SFCA Requirement	Not required		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.6.1 As with the Cartef Aneurin Bevan site, the entire Greenacres site is located within the DAM flood zone A and Environment Agency Flood Zone 1 (see Figure E1). Therefore, all types of development would be appropriate according to TAN15. However, the site has been selected for further study on account of it being significantly located within an ASTSWF, 'Less', 'Intermediate' and 'More' risk areas.

Flood Defence

4.6.2 The NFCDD database provided by the Environment Agency indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.6.3 A review of relevant mapping indicates that the entire site is located within the DAM flood zone A and Environment Agency Flood Zone 1.

4.6.4 Review of relevant mapping identifies a small watercourse (the Nant-y-Bwch) to the west (up slope) of the site. This watercourse is sourced at the Nant-y-Bwch school and flows from west to east, beneath the A4048, before resuming as an open watercourse for approximately 10m before being culverted beneath the Heol Sant Luc road roundabout. It is believed that the Nant-y-Bwch continues to flow east via a culvert adjacent to the site and continues to flow east to join the Sirhowy River to the east of the site, although the exact location of the confluence is unknown at this stage.

4.6.5 The most predominant flood risk posed by the Nant-y-Bwch is from a potential surcharge of the culverts beneath the A4048 and Heol Sant Luc roundabout. Such surcharges could be sourced from a flow event in the watercourse of greater magnitude than the design capacity of the culvert, or a blockage of the culvert caused by debris. The A4048 road is raised above the surrounding ground and would therefore potentially form a barrier against the eastern migration of any surcharged water. In addition, the short (approximately 250m) length of the small watercourse measured from the site to the apparent source would potentially limit the contributing catchment area and therefore unexpectedly high flows through the culvert.

4.6.6 As a result of the above, the flood risks from the Nant-y-Bwch are considered at this stage to be low.

4.6.7 The ASTSWF is sourced from higher topographical areas to the west of the site. It then follows the natural topography and flows east, through the site and down to the Sirhowy River. Review of relevant mapping indicates that the ASTSWF area is attributed to the small watercourse as described above and the low topographical areas of its existing and potentially former (now replaced by a culvert) channel. If this is the case then the potential surface water flood risk posed to the site would be linked with fluvial sources from the small watercourse and potentially reduced by the presence of two culverts upstream of the site.

4.6.8 Data collected as part of the Stage 1 SFCA indicates that there are historical records of flooding within the vicinity of the site, attributed to DCWW and SW Fire and Rescue data. However, these occurrences are all located down slope of the site and at least 200m from the site. In addition, given a lack of a defined source (none of the records provide a defined flood source) for the events and a lack of any additional information (anecdotal or otherwise), it is not possible at this stage to define the nature or scale of these events.

Climate Change Flood Risk

4.6.9 Given that the entire site is located within DAM zone A and the entire site located within the Environment Agency Flood Zone 1, the impacts of climate change on fluvial flood risk are unlikely to have a significant impact to the site. During regulation assessment of site proposals, climate change should be taken into consideration with regard to the culvert capacities upstream of the site and surface water runoff arrangements at the site.

Requirements for Stage 3 SFCA

4.6.10 Given the small site area (approximately 0.5ha) and its location within the DAM zone A and the Environment Agency Flood Zone 1 this site is deemed appropriate for this site to be progressed

through the LDP process without the need for further assessment via a Stage 3 SFCA. However, despite the size of the site, it is recommended that some further assessments of flooding consequences are undertaken as part of a planning application for the site. In particular, such an assessment should concentrate on surface water flooding to and from the site, as well as the potential flood risk posed by the small watercourse in line with the information provided in this Stage 2 assessment.

Summary

4.6.11 The entire 0.5ha site is located within DAM flood zone A, along with the Environment Agency Flood Zone 1. However, a small watercourse, the Nant-y-Bwch, is located upstream of the site. Given the size and length (from source to site) of this watercourse, and the location of culverts upstream of the site, the flood risks from this small watercourse are likely to be low.

4.6.12 A significant portion of the site is located within an ASTSWF area, which appears to be related to the topographical low areas associated with the Nant-y-Bwch. Therefore the flood risks associated would be similarly linked with the fluvial flood risks posed by this watercourse and hence be low.

4.6.13 It is recommended that the site is investigated further during preparation of a planning application, which would include a visual inspection and assessment of the flood risks posed by the Nant-y-Bwch and its associated culverts. However, the scale and nature of the further work would be relevant to the site proposals.

4.6.14 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP.

4.7 Tredegar Workshops, Tredegar Business Park

Table 4-6: Greenacres key information

Candidate Site Number(s):	A14		
Approximate Total Area (ha.):	3.1		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	77%	19%	4%
EA Flood Zone	1	2	3
	96%	1%	3%
ASTSWF Zone	Less	Intermediate	More
	6%	29%	45%
Predominant Flood Source:	Surface water		
	Current		**Future**
Standard of Defence*	No defences		No defences
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	Historical flood event on the River Sirhowy downstream of the site.		
Escape/Evacuation	N/A		
Is site covered by Flood Warning/Watch?	N/A		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Vast majority of site within DAM zone A/B so all development is appropriate, pending extreme flood levels are less than ground level		
Mitigation Measures	Appropriate surface water management measures		
Stage 3 SFCA Requirement	Not required		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.7.1 The majority of the site is located within the DAM flood zone A, with some of the site in zone B and a very small portion of the site in zone C2. In addition, the vast majority of the site is located within the Environment Agency Flood Zone 1, with a very small portion in Flood Zones 2 and 3. The flood zones on the site are attributed to River Sirhowy.

4.7.2 The site has been selected for study within the Stage 2 SFCA on account of the presence of DAM flood zones B and C as well as the Environment Agency defined Flood Zones 2 and 3.

Flood Defence

4.7.3 The NFCDD database provided by the Environment Agency indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.7.4 A review of relevant mapping indicates that the majority of the site (77%, or 2.4ha) is located within Dam flood zone A, with some of the site (19%, or 0.6ha) located in flood zone B. The remaining 4% (0.1ha) is located in flood zone C1, which is confined to a very narrow strip of land along the eastern extent of the site. According to TAN15, all developments are appropriate within DAM flood zone B, provided that the ground levels are higher than the reference 0.1% annual probability flood level for the site. Given that the DAM flood zone C2 and Environment Agency defined Flood Zones 2 and 3 do not extend significantly across the site, it is envisaged that the majority of the site is located at a higher level than the corresponding 0.1% annual probability flood level. Therefore, it is envisaged that development could be sequentially located within Flood Zone 1 and outside of potentially flood prone areas. Corresponding flood levels in relation to ground levels would be confirmed during a site specific FCA.

4.7.5 The ASTSWF maps indicate that there is significant coverage of the site that could be at risk of surface water flooding. These areas appear to be contributed to the lower topographical areas of the valley and River Sirhowy. Despite the presence of the ASTSWF, there are no historical flood events (e.g. SW Fire and Rescue, DCWW or anecdotal evidence) within the vicinity of the site or any further historical evidence to suggest surface water is a particular problem at this site.

4.7.6 Historical records of flooding provided by the Environment Agency during the Stage 1 SFCA process indicates that the River Sirhowy flooded in 1960 downstream of the site. However, there are no levels or additional details provided in relation to this event. In addition, due to a lack of source data, the exact location has been estimated. As a result, no significant conclusions can be drawn from this historical data. However, the Environment Agency typically calibrates their flood zone maps with historical data. Therefore, given that the Flood Zones 3 and 2 do not extend significantly across the site, it can be assumed at this stage that the 1960 flood event had no significant impact on the site.

Climate Change Flood Risk

4.7.7 Given that the majority of the site is located within DAM zone A and within the Environment Agency Flood Zone 1, the impacts of climate change on fluvial flood risk are unlikely to have a significant impact to the site. In line with recommendations provided within the Stage 1 SFCA, in the absence of detailed hydraulic modelling, it can be assumed that the Environment Agency Flood Zone 2 would become the extent of Flood Zone 3, inclusive of the impacts of climate change. Given that Flood Zone 2 does not extend significantly across the site, it is envisaged that the impacts of climate on fluvial flood risk at the site would not be significant.

Requirements for Stage 3 SFCA

4.7.8 Given the majority of the site is located within the DAM zone A and the Environment Agency Flood Zone 1 this site is deemed appropriate for this site to be progressed through the LDP process without the need for further assessment via a Stage 3 SFCA. However, it is recommended that the conclusions made within this Stage 2 SFCA are addressed via a site specific FCA during the planning application phase.

Summary

4.7.9 The majority of the site is located within DAM zone A. Although some of the site is located within DAM zone B, the very limited extent of DAM zone C and Environment Agency Flood Zone 2 or 3 suggests that all development types would be applicable within this site.

4.7.10 Data provided by the Environment Agency suggests the River Sirhowy flooded in 1960. However, a lack of information regarding this flood event limits the conclusions that can be taken (such as flood level, event magnitude and specific location. However, given that the Environment Agency typically calibrate their Flood Zones with historical data, it is unlikely that this flood event caused significant flooding at the proposed site location.

4.7.11 A significant portion of the site is located within an ASTSWF area, which appears to be related to the topographical low areas associated with the River Sirhowy. However, there is a lack of additional data to suggest historical incidents of surface water flooding at the site.

4.7.12 It is recommended that the site is investigated further during preparation of a planning application, which would include confirmation of site levels against potential flood levels at the site, for the present day and taking into account climate change.

4.7.13 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP.

4.8 North Rising Sun Industrial Estate, Upper Ebbw Fach

Table 4-7: North Rising Sun Industrial Estate, Upper Ebbw Fach key information

Candidate Site Number(s):	C19		
Approximate Total Area (ha.):	3.1		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	95%	0%	5%
EA Flood Zone	1	2	3
	95%	1%	4%
ASTSWF Zone	Less	Intermediate	More
	2%	0%	0%
Predominant Flood Source:	Fluvial		
	Current		**Future**
Standard of Defence*	N/A		N/A
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	Historical flood event on the Ebbw Fach, upstream of the site.		
Escape/Evacuation	Potentially through Flood Zone 2/3		
Is site covered by Flood Warning/Watch?	No		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	No – provided development is sequentially located away from flood prone areas		
Mitigation Measures	None (provided mitigation measures pertaining to surface water management are adopted)		
Stage 3 SFCA Requirement	Not required		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.8.1 The majority of the site is located within the DAM flood zone A, a very small portion of the site in zone C2. In addition, the vast majority of the site is located within the Environment Agency Flood Zone 1, with a very small portion in Flood Zones 2 and 3. The flood zones on the site are attributed to Ebbw Fach.

4.8.2 The Ebbw Fach is primarily culverted within the vicinity of the site. However, there is a small open section of this watercourse, immediately upstream of Dale View. The various flood zone maps do not take into account the culverting.

4.8.3 The site has been selected for study within the Stage 2 SFCA on account of the presence of DAM flood zones C as well as the Environment Agency defined Flood Zones 2 and 3.

4.8.4 Due to the vast majority of the site (approximately 95%) that is located within DAM flood zone A and the Environment Agency Flood Zone 1, it is anticipated that any development on the site could be sequentially located within this area. Sequential location of development outside of any flood zones would also preclude the requirement to undertake a Stage 3 SFCA at the site.

Flood Defence

4.8.5 The NFCDD database provided by the Environment Agency indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.8.6 A review of relevant mapping indicates that the majority of the site is located within the Environment Agency Flood Zone 1 and DAM flood zone A. A very small portion of the site, adjacent to the western boundary, is located within DAM zone C2 and the Environment Agency Flood Zones 2 and 3. However, it is anticipated that proposed development at the site could be sequentially located away from the relevant flood zones.

4.8.7 Although the Environment Agency and DAM flood zones do not take into account the extensive culverting of the Ebbw Fach, the Environment Agency have provided historical records of flooding upstream of the site, within the vicinity of the open section of this watercourse. These flood events occurred in December 1979 and were both attributed to fluvial flood sources. The maximum recorded flood level was approximately 306mAOD. Analysis of the LiDAR data provided during the Stage 1 SFCA indicates that the vast majority of the site is at a higher level than 306mAOD.

4.8.8 The Environment Agency Flood Zones follow the line of the A467 road. As explained above, it is likely that these Flood Zones are not a reflection of reality due to the culvert. However, it is possible that evacuation along the A467 may be affected by flooding, hence a FCA for the proposed development should consider access and egress to and from the proposed site.

4.8.9 The ASTSWF maps indicate that the areas of the site potentially at risk from surface water flooding cover a similar extent as the flood zone maps. Therefore, proposed development at the site could be sequentially located away from these areas. Data provided by DCWW indicates that there have been historical records of flooding within the vicinity of the site.

4.8.10 A review of relevant mapping indicates the presence of a small, drain (open watercourse, not enclosed pipe) that traverses the southern and western portion of the site and conveys water from the site into the Ebbw Fach. In the absence of detailed information regarding this drain, no detailed assessment of the flood risks arising from it can be made at this stage. In line with the information provided in the Stage 1 SFCA, it is recommended that until the site is investigated further via a detailed FCA, any proposed development should be set back from this small drain.

Climate Change Flood Risk

4.8.11 Given that the majority of the site is located within DAM zone A and the Environment Agency Flood Zone 1, the impacts of climate change on fluvial flood risk are unlikely to have a significant impact to the site. In line with recommendations provided within the Stage 1 SFCA, in the absence of detailed hydraulic modelling, it can be assumed that the Environment Agency Flood

Zone 2 would become the extent of Flood Zone 3, inclusive of the impacts of climate change. Given that Flood Zone 2 does not extend significantly across the site, it is envisaged that the impacts of climate on fluvial flood risk at the site would not be significant.

Requirements for Stage 3 SFCA

4.8.12 Given the majority of the site is located within the DAM zone A and the Environment Agency Flood Zone 1 this site is deemed appropriate for this site to be progressed through the LDP process without the need for further assessment via a Stage 3 SFCA. However, it is recommended that the conclusions made within this Stage 2 SFCA are addressed via a site specific FCA during the planning application phase.

Summary

4.8.13 The majority of the site is located within DAM zone A. Although some of the site is located within DAM zone C and Environment Agency Flood Zone 2 or 3 it is envisaged that that all development types could be sequentially located outside of any flood zone.

4.8.14 The ASTSWF cover a similar area to that of the flood zones. Hence it is envisaged that any development could be sequentially located outside of the ASTSWF.

4.8.15 It is recommended that the site is investigated further during preparation of a planning application, which would include confirmation of the potential flood risks posed from the small drain located on the site.

4.8.16 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP.

4.9 Lower Plateau, Six Bells Colliery Site

Table 4-8: Lower Plateau, Six Bells Colliery Site key information

Candidate Site Number(s):	D22		
Approximate Total Area (ha.):	2.6		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	4%	10%	86%
EA Flood Zone	1	2	3
	4%	5%	91%
ASTSWF Zone	Less	Intermediate	More
	7%	28%	56%
Predominant Flood Source:	Fluvial		
	Current		**Future**
Standard of Defence*	1 in 100 year		1 in 100 year
Other Considerations	**Comments**		
Defence Type*	Stone and concrete walls		
Defence Ownership and Maintenance*	Local Authority (above bankfull level), Environment Agency (channel)		
Third Party Impacts	Mitigation (e.g. land raising) could have an impact on third parties		
Other flood information	Historical flood event on the Ebbw Fach, upstream of the site. Ebbw Fach is culverted adjacent to the site		
Escape/Evacuation	Potentially along Chapel Road (eastward direction)		
Is site covered by Flood Warning/Watch?	The site is covered by Flood Watch and Flood Warning		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Yes – majority of the site is within DAM flood zone C		
Mitigation Measures	Unknown at present due to lack of detailed hydraulic modelling		
Stage 3 SFCA Requirement	Required to further investigate flooding from the Ebbw Fach		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.9.1 The majority of the site is located within the DAM flood zone C and Environment Agency Flood Zone 3. However, these flood zones do not take into consideration the presence of the culvert.

4.9.2 The Ebbw Fach is primarily culverted adjacent to the site. The culverted section of this watercourse begins upstream (north) of the site and Chapel Road. The culvert ends and watercourse opens out downstream (south) of the site. A structural inspection of the culvert undertaken in 2008 indicates the culvert has a length of 122m and has a width of 5.1m and height of 3.8m. No assessment of the hydraulic capacity of the culvert was made.

4.9.3 The site has been selected for study within the Stage 2 SFCA on account of the presence of DAM flood zones C as well as the Environment Agency defined Flood Zones 2 and 3.

Flood Defence

4.9.4 The NFCDD database provided by the Environment Agency indicates that there are formal defences to the north of the site.

4.9.5 The formal defences consist of stone walls on the right bank (when looking downstream) and concrete walls on the left bank. These defences cease to exist once the watercourse enters the culvert beneath Chapel Road. According to the Environment Agency, the defences have a standard of protection of 1 in 100 years.

Current Flood Risk

4.9.6 A review of relevant mapping indicates that the majority of the site is located within the Environment Agency Flood Zone 3 and DAM flood zone C2. A very small portion of the site, adjacent to the eastern and western boundaries, are located within DAM zone A and the Environment Agency Flood Zone 1. However, it is anticipated that the area of the site within the low risk flood zones would not be sufficient to locate significant development.

4.9.7 TAN15 outlines that highly vulnerable development should not be located within zone C2. However, the Environment Agency and DAM flood zones do not take into account the extensive culverting of the Ebbw Fach at the site. Therefore, the flood zones may not be exactly representative of the actual situation at the site and therefore it is recommended the site is investigated further before precluding development at the site.

4.9.8 The Environment Agency have provided historical records of flooding upstream of the site, within the vicinity of the open section of this watercourse. Both incidents of flooding occurred in December 1979. One incident was attributed to fluvial flooding at the Chapel Road culvert and was exacerbated by a tree stump blocking the entrance to the culvert. The water at this point was measured at approximately 179mAOD. A review of relevant LiDAR data provided as part of the Stage 1 SFCA indicates the level of Chapel Road is approximately 180mAOD with the site being approximately 180mAOD to 190mAOD and therefore slightly higher than the previously recorded flood level. The second incident had no attributed data regarding levels.

4.9.9 The ASTSWF maps indicate that the areas of the site potentially at risk from surface water flooding cover a similar extent as the flood zone maps. Therefore, they cover an extensive area of the site and are believed to be linked to the fluvial Ebbw Fach. Data provided by DCWW and SW Fire and Rescue indicates that there have been historical records of flooding within the vicinity of the site. However, as the surface water areas are linked to the watercourse, it is believed that fluvial flooding presents the greatest risk to the site.

Climate Change Flood Risk

4.9.10 Given that the majority of the site is located within DAM zone C2 and within the Environment Agency Flood Zone 3, the impacts of climate change on fluvial flood risk could have a significant impact to the site. However, in the absence of detailed data (e.g. hydraulic modelling), no detailed assessment of the likely impacts of climate change can be made at this stage.

Requirements for Stage 3 SFCA

4.9.11 The majority of the site is located within the DAM zone C2 and the Environment Agency Flood Zone 3. However, as the flood zones maps do not take into account the presence of the culvert at the site. Therefore, in the absence of detailed information (e.g. hydraulic modelling), a Stage 3 SFCA would be required at this site to further assess the potential impacts of flooding at the site sufficient to undertake the justification test aspect of TAN15.

Summary

4.9.12 The majority of the site is located within DAM zone C2 and Environment Agency Flood Zone 3 attributed to the Ebbw Fach. Therefore, according to TAN15, highly vulnerable development should not be located at the site. However, the flood maps do not take into consideration the culvert that extends adjacent to the site. Therefore, the flood maps may not be representative of the actual flooding situation at the site and it is recommended that it is further investigated via a Stage 3 SFCA.

4.9.13 The ASTSWF cover a similar area to that of the flood zones and therefore linked to the fluvial watercourse. Therefore it is believed that the predominant flood risk posed to the site is from fluvial sources.

4.9.14 The Ebbw Fach has experienced flooding within the vicinity of the site. However, the only level available from the historical event is 179mAOD. The majority of the site is located at approximately 180mAOD.

4.10 Roseheyworth Business Park, Lower Ebbw Fach

Table 4-9: Roseheyworth Business Park key information

Candidate Site Number(s):	D22		
Approximate Total Area (ha.):	2.6		
Area (%) of Site Within Flood Risk Zone			
DAM zone	A	B	C
	66%	34%	0
EA Flood Zone	1	2	3
	100%	0%	0%
ASTSWF Zone	Less	Intermediate	More
	39%	6%	0%
Predominant Flood Source:	Surface water		
	Current		**Future**
Standard of Defence*	N/A		N/A
Other Considerations	**Comments**		
Defence Type*	N/A		
Defence Ownership and Maintenance*	N/A		
Third Party Impacts	None (provided mitigation measures pertaining to surface water management are adopted)		
Other flood information	None		
Escape/Evacuation	N/A		
Is site covered by Flood Warning/Watch?	N/A		
Is TAN15 justification test required, including acceptability of consequences? (TAN15 Section 7 and Appendix 1)	Yes – provided site levels are above the 0.1% annual probability flood level		
Mitigation Measures	Surface water mitigation measures		
Stage 3 SFCA Requirement	Not required		

*Based on information in the National Flood and Coastal Defence Database (NFCDD)

4.10.1 As shown in Figure J1, the majority of the site is located within the DAM flood zone A with some of the site located within DAM zone B. However, the entire site is located within the Environment Agency Flood Zone 1.

4.10.2 The site has been selected for study within the Stage 2 SFCA on account of the presence of DAM flood zone B as well as over 40% of the site being located within an ASTSWF.

Flood Defence

4.10.3 The NFCDD database provided by the Environment Agency indicates that there are no formal defences in the vicinity of the site.

Current Flood Risk

4.10.4 A review of relevant mapping indicates that the majority of the site (66%, or 1.8ha) is located within Dam flood zone A, with the remainder of the site (34%, or 0.9ha) located in flood zone B. According to TAN15, all developments are appropriate within DAM flood zone B, provided that the ground levels are higher than the reference 0.1% annual probability flood level for the site. Given that the nearest DAM flood zone C2 and Environment Agency defined Flood Zones 2 and 3 are located west of the site (associated with the Ebbw Fach), it is envisaged that the majority of the site is located at a higher level than the corresponding 0.1% annual probability flood level. In addition, the entire site is located within the Environment Agency Flood Zone 1 and outside of potentially flood prone areas. Corresponding flood levels in relation to ground levels would be confirmed during a site specific FCA.

4.10.5 The ASTSWF maps indicate that there is some coverage of the site that could be at low or, to a lesser extent, intermediate, risk of surface water flooding. However, there are no historical records of surface water flooding within the vicinity of the site. Therefore it is envisaged that the risk of surface water flooding to the site is relatively low. However, this would be confirmed during site specific FCA or similar undertaken as part of the planning application for the site.

4.10.6 A review of relevant mapping indicates the presence of a small, drain (open watercourse, not enclosed pipe) that flows adjacent to the western portion of the site. In the absence of detailed information regarding this drain, no detailed assessment of the flood risks arising from it can be made at this stage. In line with the information provided in the Stage 1 SFCA, it is recommended that until the site is investigated further via a detailed FCA, any proposed development should be set back from this small drain.

Climate Change Flood Risk

4.10.7 Given that the entire site is located within the Environment Agency Flood Zone 1, it is unlikely that the potential impacts of climate change would be significant at this site.

Requirements for Stage 3 SFCA

4.10.8 The entire site is located within the Environment Agency Flood Zone 1 and there are no historical records of flooding available at the site. Therefore it is recommended that this site can be progressed through the LDP process without the need for a Stage 3 SFCA.

Summary

4.10.9 The majority of the site is located within DAM zone A with the remainder of the site located within DAM zone B. The entire site is located within the Environment Agency Flood Zone 1 and therefore it is believed that all development types would be applicable within this site.

4.10.10 Some of the site is located within an ASTSWF area (less and intermediate risk). However, there is a lack of additional data to suggest historical incidents of surface water flooding at the site.

4.10.11 A small drain is located adjacent to the western extent of the site. In the absence of detailed information relating to this drain, it is recommended that development is set back from this and it is further investigated during a site specific FCA.

4.10.12 As a result of the above, it is not deemed necessary to undertake a Stage 3 SFCA for this site and it would be appropriate for inclusion within the LDP.

5 Summary

5.1.1 This Stage 2 SFCA has focused on 10 candidate sites located within the Blaenau Gwent CBC study area, which have been identified as requiring further investigation in terms of flood risk, namely:

- Ebbw Vale North;
- Waun-y-Pound, Ebbw Vale;
- Marine Colliery, Ebbw Vale;
- Cartef Aneurin Bevan, Tredegar;
- Greenacres, Tredegar;
- Tredegar Business Park;
- North Rising Sun Industrial Estate, Ebbw Fach Upper;
- Lower Plateau, Six Bells Colliery Site, Lower Ebbw Fach; and
- Roseheyworth Business Park

5.1.2 The Stage 2 analysis has been based on data collected during the Stage 1 SFCA and augmented by further datasets and discussions with stakeholders.

5.1.3 Due to a lack of detailed hydraulic modelling at the sites, no detailed analysis of flood depths, levels or flows has been made. For sites that are significantly constrained by flooding, further analysis has been suggested via a Stage 3 SFCA.

5.1.4 As the candidate sites selected by Blaenau Gwent CBC for inclusion within their LDP are predominantly located outside of the DAM flood zones, other sources of flooding (e.g. surface water flooding) have become more prevalent for inclusion within this study. In addition, the predominance of sites located outside of DAM or Environment Agency flood zones means that no analysis has been required of potential flood defence breach or overtopping analysis.

5.1.5 The only site that would required further study during a Stage 3 SFCA is:

- Lower Plateau, Six Bells Colliery Site, Lower Ebbw Fach.

5.2 Further Work

Stage 3 SFCA

5.2.1 Based on the information presented within this Stage 2 SFCA, together with the Stage 1 SFCA the LPA have sufficient information to make informed planning decisions with regards to flood risk at each candidate site. Where further work is necessary to investigate sites identified as being exposed to flood risk it may be necessary to undertake a more detailed Stage 3 SFCA. The scope of the Stage 3 SFCA seeks to further demonstrate that the development is capable of meeting TAN15 requirements for the lifetime of the development. For the most part, the Stage 3 SFCA would include an assessment of residual risk posed to sites in the event of a breach of overtopping event of flood defences.

5.2.2 All sites, if allocated, will require a detailed site specific FCA at the planning application stage to, where necessary, investigate further the flood risk issues identified within this Stage 2 SFCA.

5.2.3 It should be noted that the statements made in this report are based on the best available data at the time of writing and therefore further study prior to allocation may be beneficial to confirm the viability of potential development.

LDP Policy Advice

5.2.4 Liaison with Blaenau Gwent CBC has indicated that they intend on introducing two policies within the LDP that are relevant to flooding. The draft policies are as follows:

Policy SP7 Creating Sustainable High Quality Development

- The Council will seek to address climate change and reduce energy demand to improve the sustainability of the valley communities in Blaenau Gwent through allocating sites for development and considering proposals for development in terms of the extent to which they:
    a) Accord with objectives of sustainability and good design as set out in national planning policy;
    b) Accord with the energy hierarchy as set out in national planning policy;
    c) Promote efficient use of land through giving preference to brownfield land and development at higher densities on sites located close to transport corridors or town centres; and
    d) Avoid locating highly vulnerable development in areas of flood risk as identified in Technical Advice Note (TAN) 15.
- Highly vulnerable development will not be permitted in areas of flood risk identified in TAN 15: Development and Flood Risk as high risk. Where development is required to be located in such locations the Council will assess the flood risk implications of development proposals and prevent development that unacceptably increases risk. Such development would only be allowed where development is justified in that location and information is provided to demonstrate that a proposal satisfies the Flood Consequence Assessment as set out in TAN 15.

Policy DM1 New Development

- Development proposals will be permitted provided: -
    a) Energy efficient design is achieved;
    b) The proposal makes efficient and effective use of resources by employing sustainable building techniques, incorporating energy and water conservation measures, and wherever possible, the use of renewable energy;
    c) Construction waste and pollution is minimised;
    d) Recycled or sustainable products and resources are used in construction, where practicable; and
    e) The proposal reduces surface water run off through minimising an increase in impermeable surfaces and using Sustainable Drainage systems, where practicable.

5.2.5 These policies are deemed to comply with national planning guidance and best practice and hence comply with the conclusions of the SFCA.

6 References

- DEFRA/EA, (2005). Flood Risk Assessment Guidance for New Development - Phase 2. Framework and Guidance for Assessing and Managing Flood Risk for New Development – Full Documentation and Tools. R&D Technical Report FD2320/TR2;
- Environment Agency, (2008). Managing Flood Risk. Eastern Valleys Catchment Flood Management – Final Plan, March 2009
- Welsh Assembly Government. (2004). Technical Advice Note 15: Development and Flood Risk. Assembly Publications;

7 Appendices

- Appendix A
- Appendix B
- Appendix C

7.1 Appendix A

Table 10 taken from Stage 1 SFCA

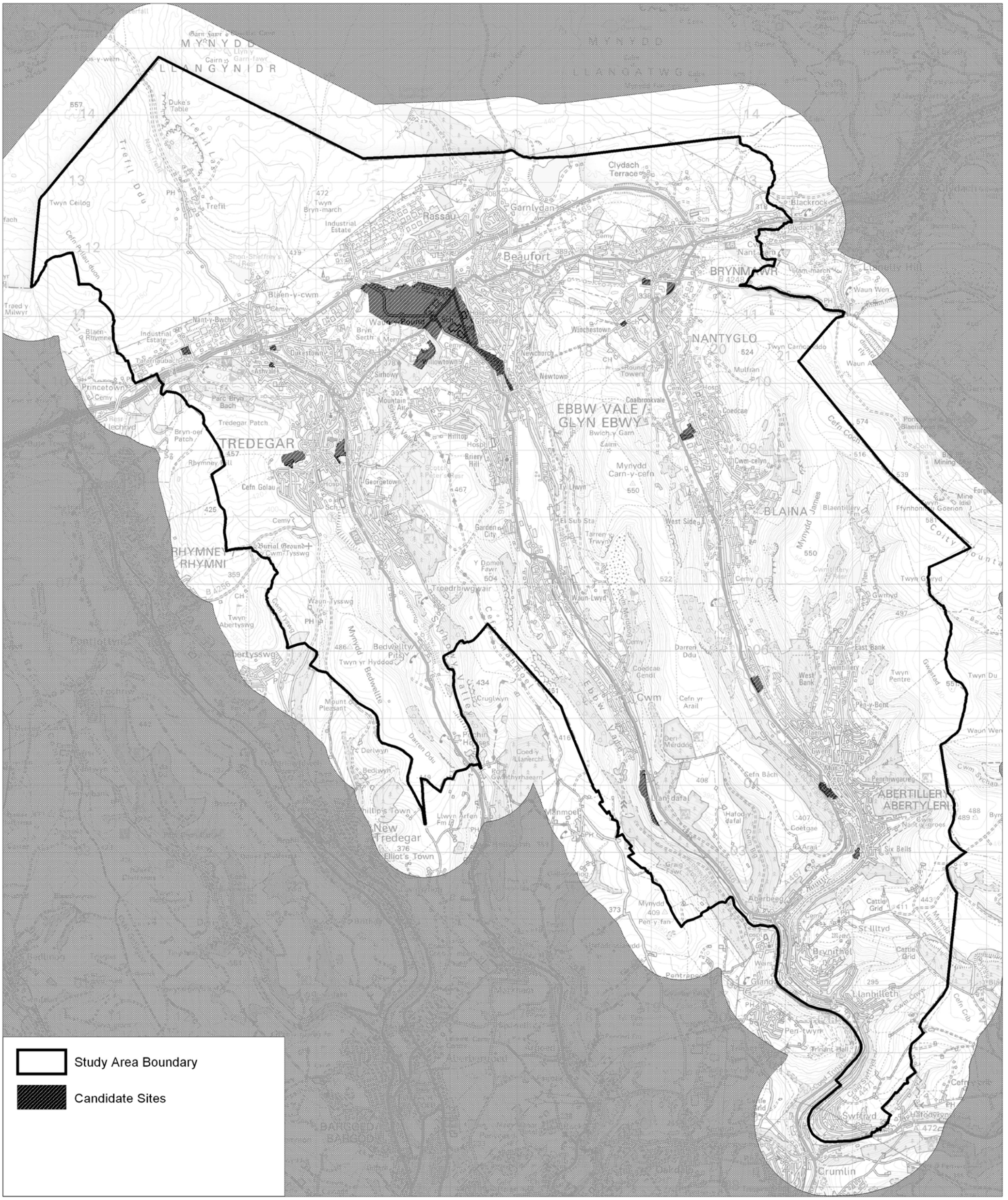
Table 7-1: Screening of candidate sites for inclusion within the Stage 2 SFCA

Town/ Settlement	Description	Candidate Site Reference Number	Approx. Area (ha)	Area within DAM flood zone (% of site)			Area within Environment Agency Flood Zone (% of site)			Area Within ASTSFW (% of site)			Historical Evidence of Flooding	Inclusion in Stage 2 SFCA?
				A	B	C	1	2	3	Less	Inter	More		
Ebbw Vale	Ebbw Vale North	MU1	48.7	99	0	1	99	0	1	15.0	5.0	1.0	DCWW and SWF&R within 400m	Yes
	Waun-y-Pound	B31	6.3	100	0	0	100	0	0	11.0	9.0	2.0	None	Yes
	Marine Colliery	B34	5.29	1.5	98.5	0	1.5	98.5	0	21.6	25.1	18.1	None	Yes
Tredegar	Cartef Aneurin Bevan	A25	0.38	100	0	0	100	0	0	82.0	13.0	0.0	DCWW and SWF&R – within 100m	Yes
	Greenacres	A26	0.5	100	0	0	100	0	0	11.7	24.2	21.9	DCWW within 300m, SWF&R – within 200m	Yes
	Jesmondene Stadium, Cefn Golau	A45	5.26	100	0	0	100	0	0	0.2	0	0	DCWW and SWF&R but down slope of site	No
	Business Resource Centre, Tafarnaubach	A43	1.20	100	0	0	100	0	0	17.5	9.5	0.0	DCWW over 400m from site, across Head of the Valleys Road	No
	Tredegar Business Park	A14	3.05	77.4	19.1	3.5	77.4	19.1	3.5	6.6	28.9	44.7	EA, DCWW and SWF&R within 400m	Yes
Abertilly	Tesco, Castle Street	D31	2.92	26.7	37.1	36.2	26.7	1	36.2	7.9	20.8	28.1	EA and DCWW within 100m	Yes
Upper Ebbw Fach	Land to the North of Winchestown, Nantyglo	C12	0.42	100	0	0	100	0	0	0	0	0	DCWW and SWF&R but 400m away and down slope	No
	NMC Factory and Bus Depot	MU3	2.95	100	0	0	100	0	0	33.0	14.0	0	None	No
	North Rising Sun Industrial Estate	C19	3.12	95.5	0	4.5	95.5	0	4.5	1.5	0	0	EA, DCWW and SWF&R within 300m	Yes

				Area within DAM flood zone (% of site)			Area within Environment Agency Flood Zone (% of site)			Area Within ASTSFW (% of site)				
	Adjacent to Blaen-y-Cwm School	C28	1.42	100	0	0	100	0	0	0	0	0	DCWW and SWF&R but over 400m from site	No
Lower Ebbw Fach	Lower Plateau Six Bells Colliery Site	D11	1.05	4.4	10.4	85.2	4.4	10.4	85.2	7.4	28.0	56.4	EA, DCWW and SWF&R within 300m	Yes
	Roseheyworth Business Park	D22	2.56	65.5	34.5	0	65.5	34.5	0	39.0	5.7	0.0	None	Yes

7.2 Appendix B

Overview Map of Stage 2 SFCA candidate sites



Project: **Blaenau Gwent LDP - SFCA**	Scale: 1:55000 @ A3	Drw:	MJC
		Date:	14/06/10
Title: **Overview of Study Area and Candidate Sites of Potential Strategic Significance**	**Figure 1**		

Scott Wilson
www.scottwilson.com

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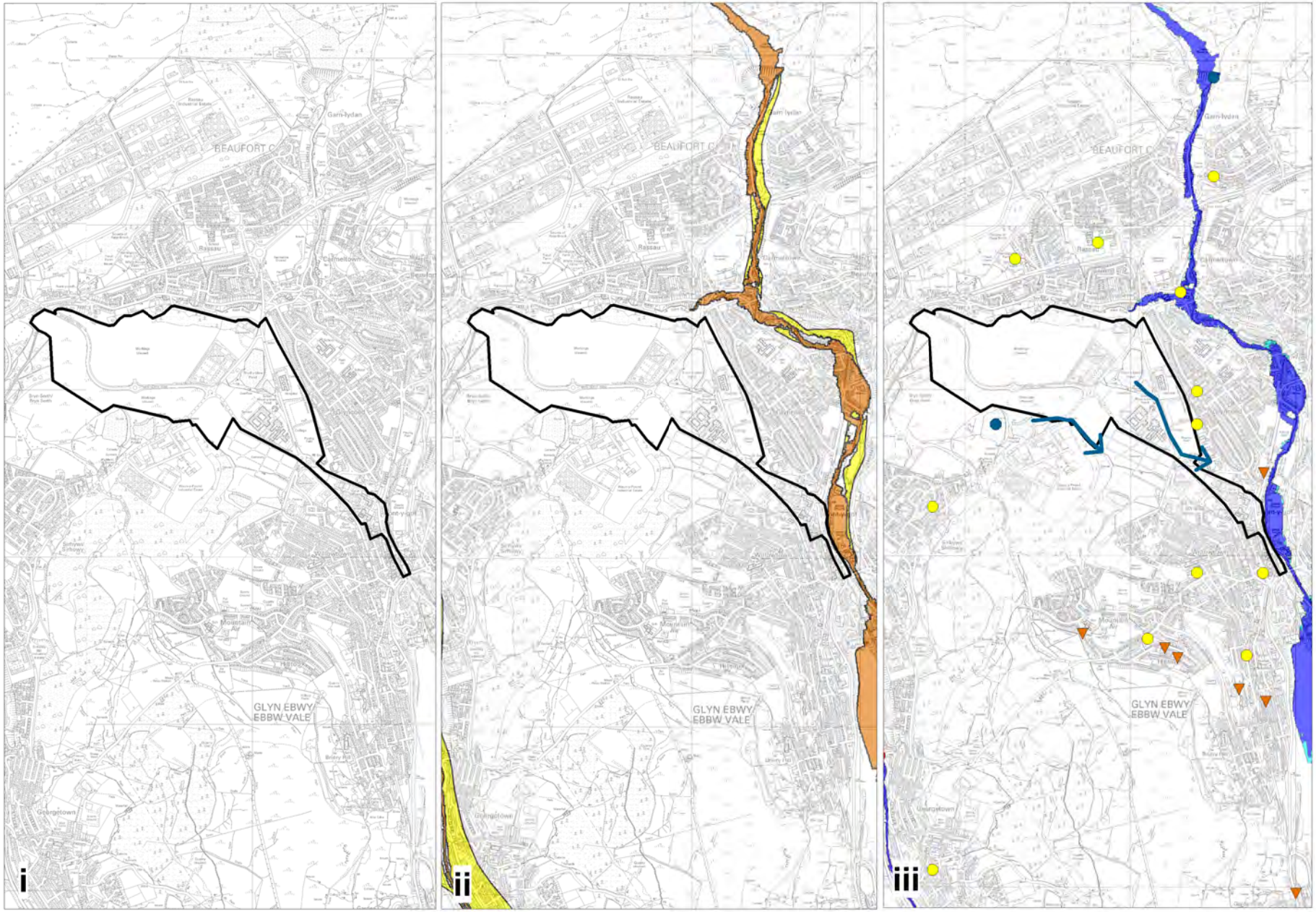
7.3 Appendix C

Candidate Site Figures



Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Ebbw Vale North (MU1) - (i) Location Map**
(ii) WAG DAMs
(iii) EA Flood Zones, Historic & Potential Flood Sources

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Figure A1

Scale at A3: 1:23,000					
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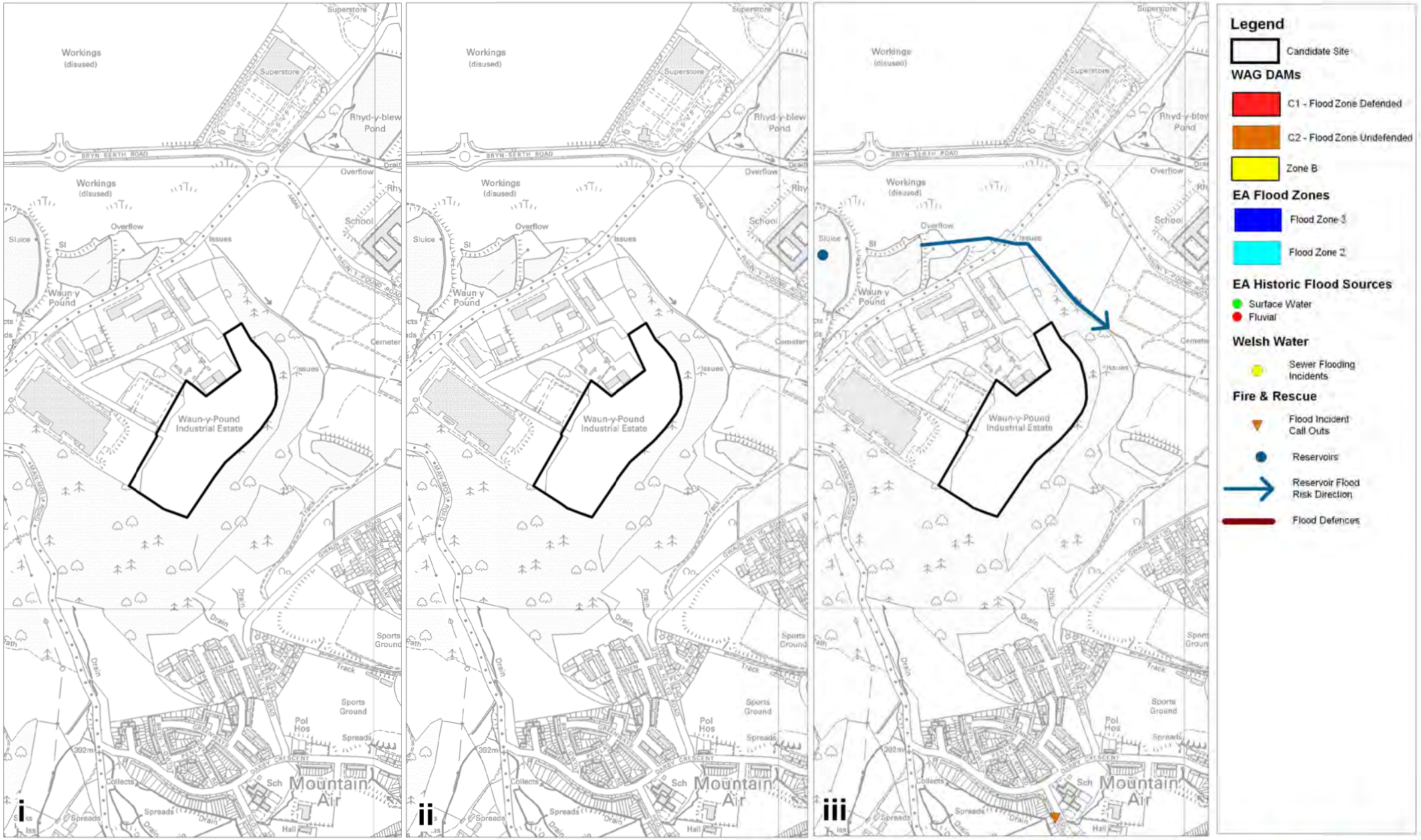

Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Waun-y-Pound (31) - (i) Location Map**
(ii) WAG DAMs
(iii) EA Flood Zones, Historic & Potential Flood Sources

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Figure B1

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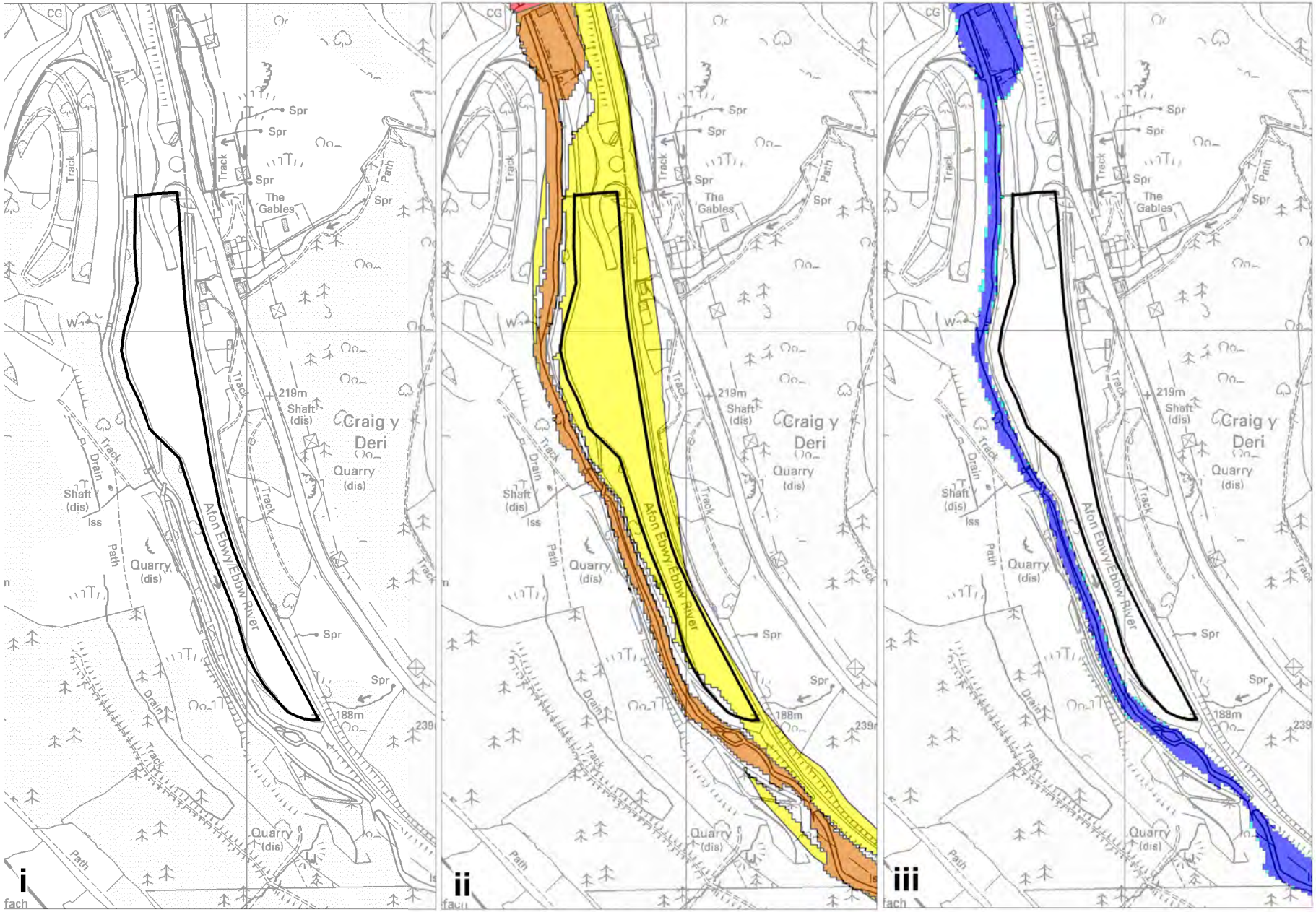

Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Marine Colliery (B34) - (i) Location Map**
(ii) WAG DAMs
(iii) EA Flood Zones, Historic & Potential Flood Sources

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Figure C1

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Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Cartef Aneurin Bevan (A25) - (i) Location Map**
(ii) WAG DAMs
(iii) EA Flood Zones, Historic & Potential Flood Sources

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Figure D1

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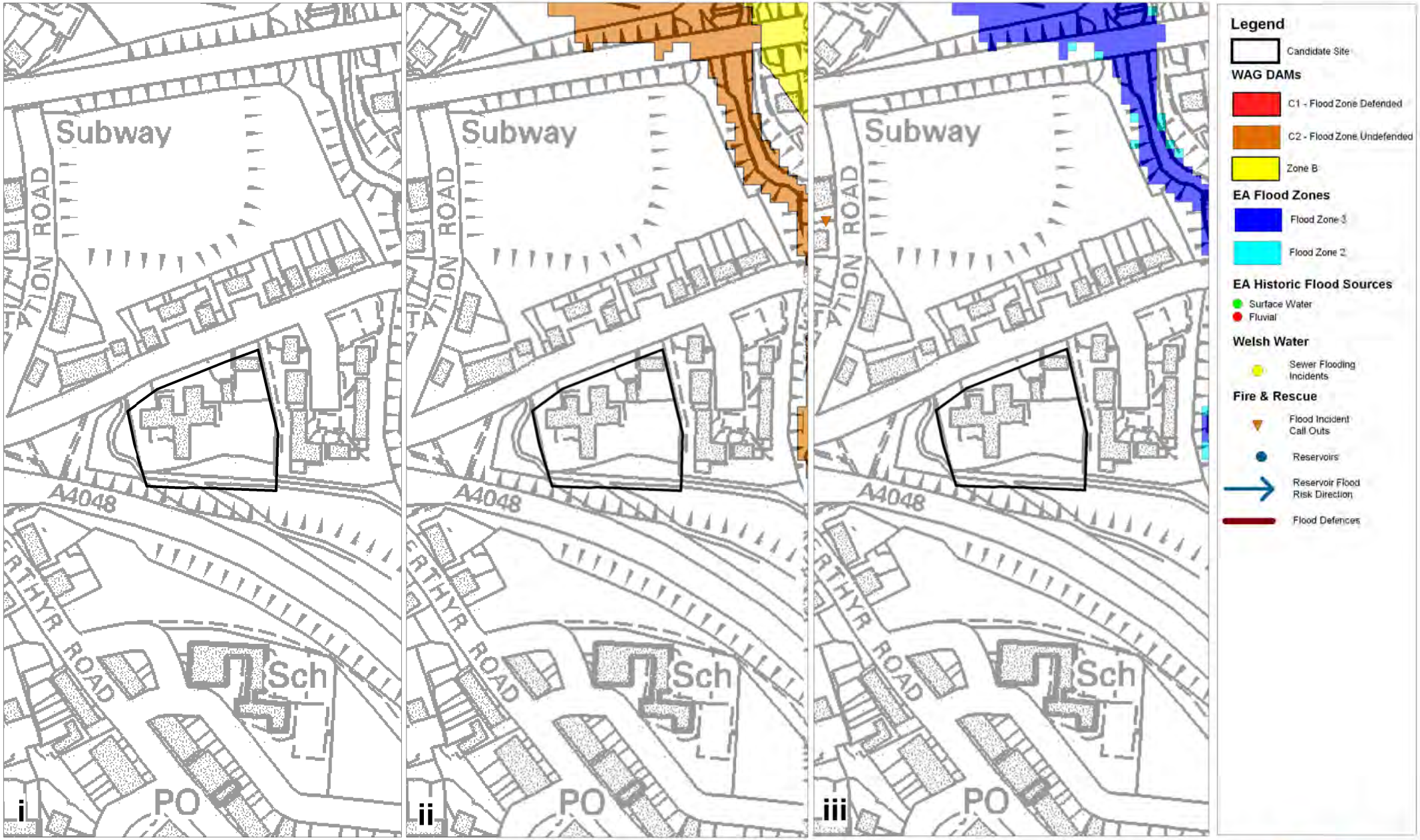

Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Greenacres - (i) Location Map**
(ii) WAG DAMs
(iii) EA Flood Zones, Historic & Potential Flood Sources

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Figure E1

Scale at A3: 1:2,000					
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Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Tredegar Workshops (A14) - (i) Location Map**
(ii) WAG DAMs
(iii) EA Flood Zones, Historic & Potential Flood Sources

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Figure F1

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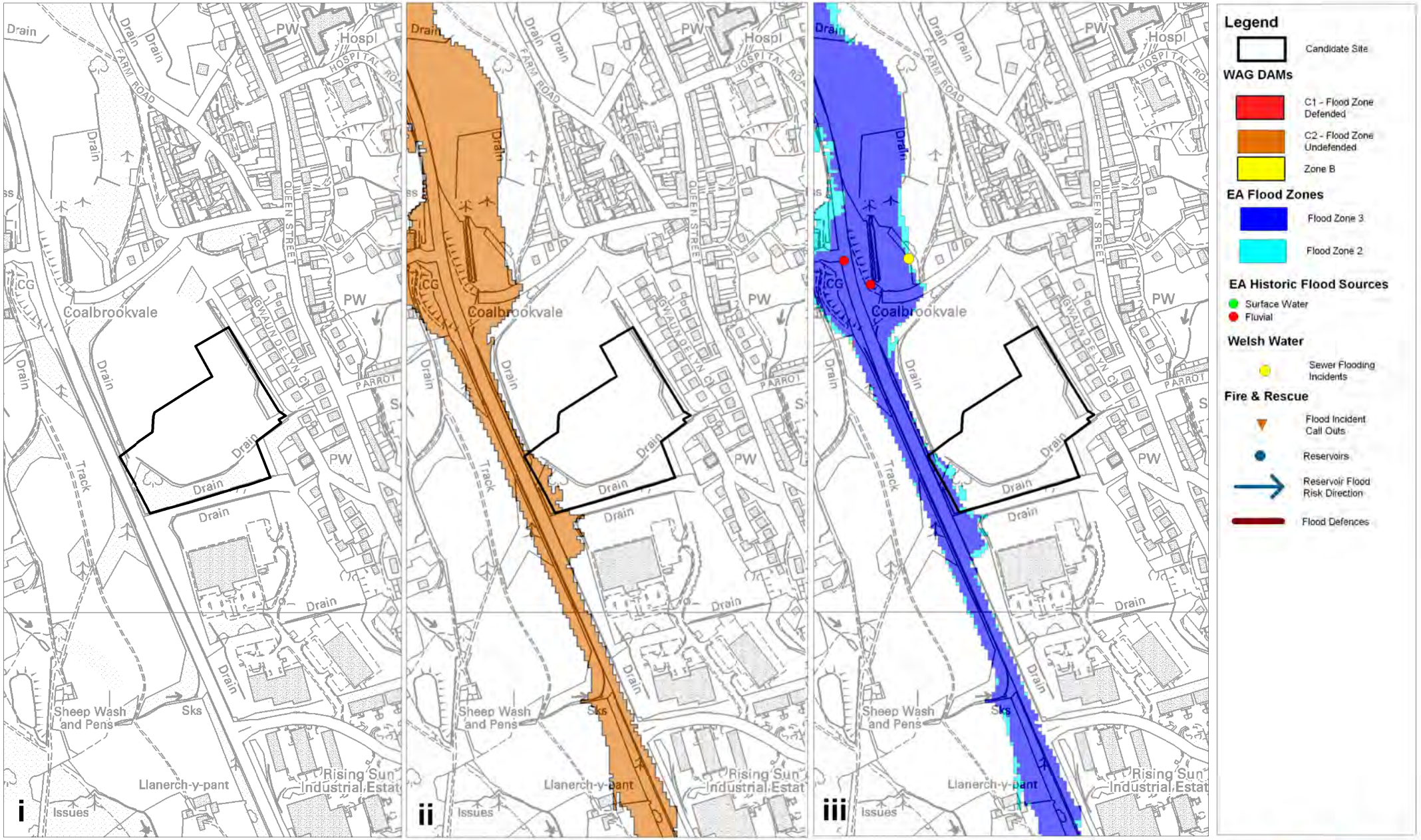

Project: **Blaenau Gwent Stage 2 SFCA**

Title: **North Rising Sun (C19) Industrial Estate - (i) Location Map (ii) WAG DAMs (iii) EA Flood Zones, Historic & Potential Flood Sources**

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Figure G1

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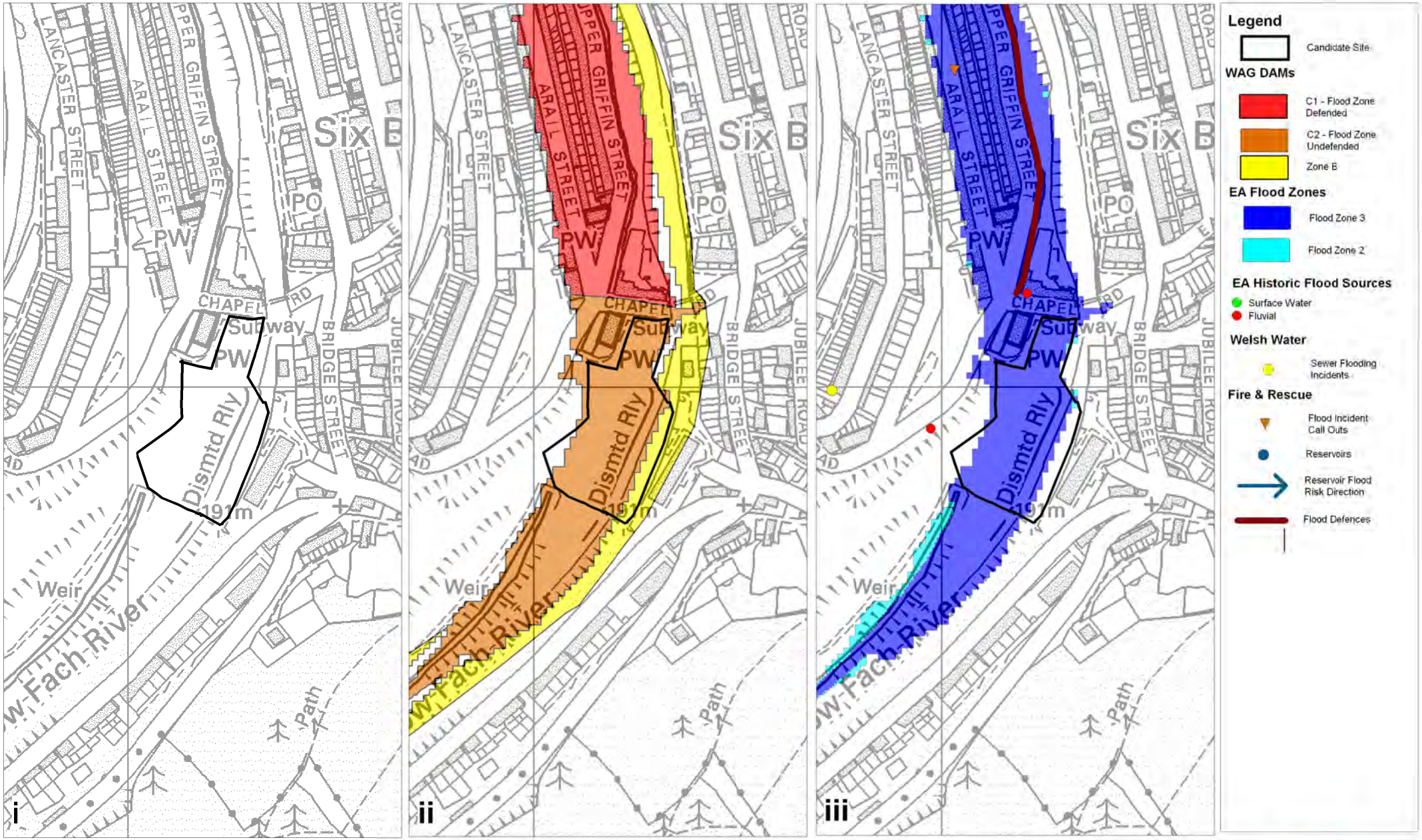

Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Lower Plateau Six (D11) - (i) Location Map**
Bells Colliery Site (ii) WAG DAMs
(iii) EA Flood Zones, Historic & Potential Flood Sources

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Figure H1

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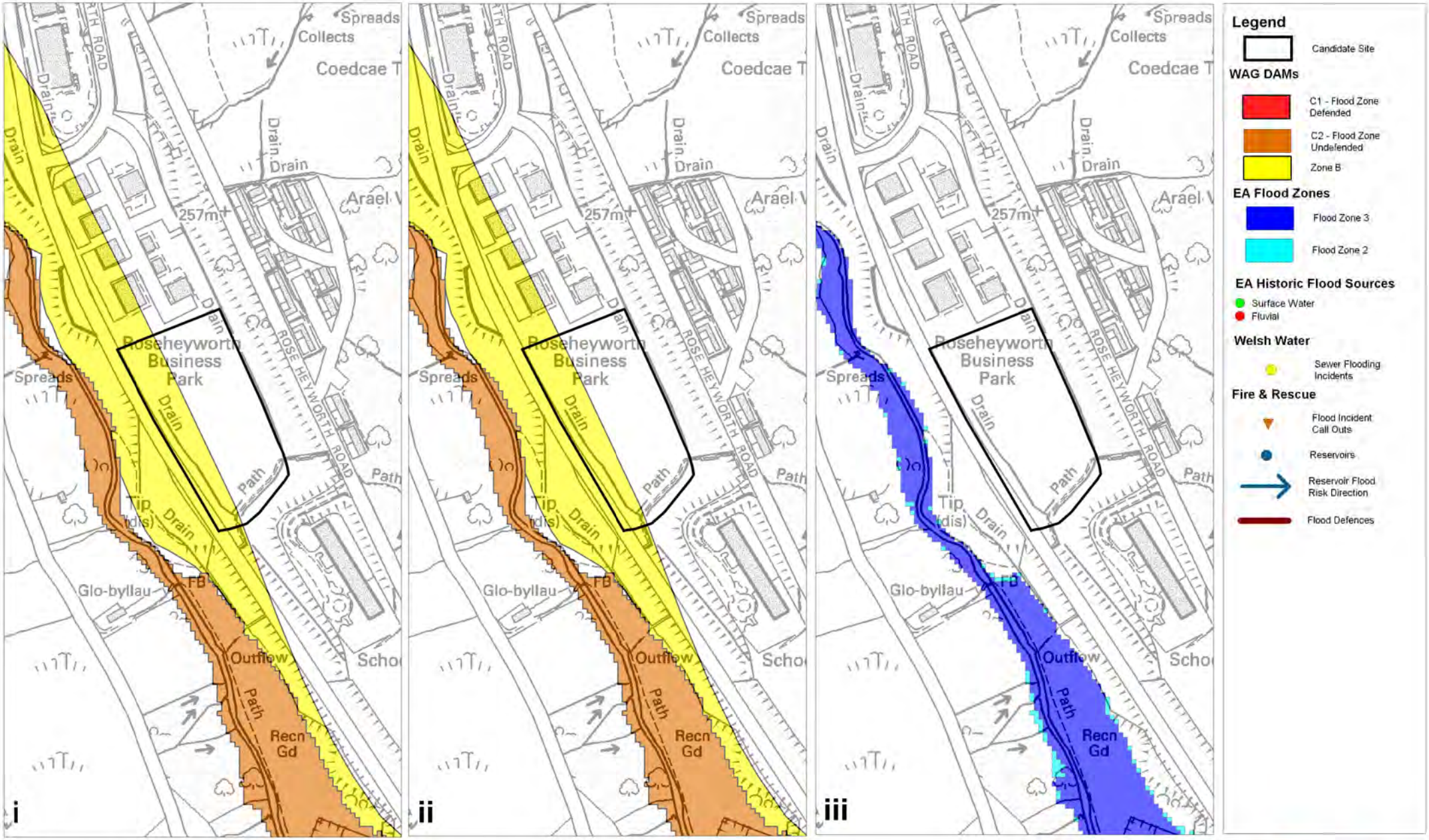

Project: **Blaenau Gwent Stage 2 SFCA**

Title: **Roseheyworth Business Park (D22) - (i) Location Map (ii) WAG DAMs (iii) EA Flood Zones, Historic & Potential Flood Sources**

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Figure I1

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