

County Durham Plan Strategic Flood Risk Assessment - Sequential Test 2019



Altogether better



Flood Risk Sequential Test for the County Durham Plan 2019

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Introduction

This report sets out the Flood Risk Sequential Test for the County Durham Plan. The report forms part of the Strategic Flood Risk Assessment (SFRA) which is being produced by AECOM for Durham County Council (DCC) in partnership with the Environment Agency (EA) and Northumbrian Water (NW).

Sequential Test Methodology

The Council has applied the methodology set out within Section 7 of the Level 1 SFRA, which takes into account the new online national PPG and NPPF Technical Guidance. The results of the SFRA, Sequential Test and (where necessary) Exception Test will be fed into the allocation of sites for the County Durham Plan, the Sustainability Appraisal and Water Management policy.

This report is based on the current evidence base (2018/19) from:

- The Strategic Housing Land Availability Assessment (SHLAA) which identifies sites with potential for housing, identifying any issues affecting the development of sites and estimate when they are likely to come forward which may be affected by issues such as policy constraints or site conditions;
- The Employment Land Review (ELR) which reviews current employment land supply and looks to identify the appropriate type, quality and location of employment land which will be capable of accommodating the economic growth trajectories up to the end of the plan period;
- Jacobs Durham Local Plan Traffic Impacts Report 2018 and
- The Minerals and Waste Technical Paper and from the call for new minerals and waste management sites. The minerals and waste technical paper is the primary evidence document for future minerals and waste planning in County Durham. It contains key evidence relating to mineral resources, mineral working, waste arisings, waste management and provides the basis for the development of new minerals and waste planning policies in the County Durham Plan.

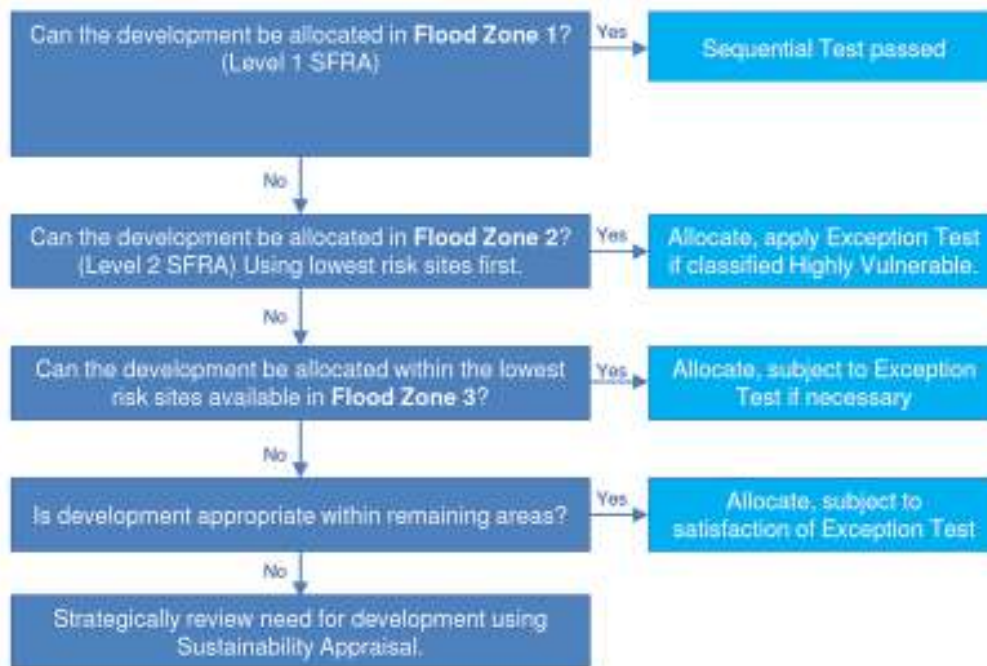
This report will be reviewed at each stage of the Plan making process, where there have been any changes to proposed site allocations.

The Level 1 SFRA has amalgamated the most up to date information from a number of sources and stakeholders. This has been used to create detailed flood risk mapping which has then been overlaid with all of the sites to be assessed from the SHLAA, ELR, relief road, minerals and waste evidence bases.

The Council must demonstrate that, throughout the site allocation process and related Sustainability Appraisal process, a range of possible sites have been considered in conjunction with the flood risk and vulnerability information set out in the SFRA, and that the Sequential Test, and where necessary the Exception Test, has been applied.

The figure below illustrates the approach for applying the Sequential Test ensuring that it is accurately documented and to ensure decision making processes are consistent and transparent.

Figure 1 Application of the Sequential Test for Local Plan Preparation



The Sequential Test requires an understanding of the Flood Zones in the County and the vulnerability classification of proposed forms of development.

Table 1 Provides definitions of fluvial (river and watercourse) Flood Zones

Flood Zone	Fluvial Flood Zone Definition	Probability of Flooding
Flood Zone 1	Land having a less than a 0.1% Annual Exceedance Probability (AEP) (1 in 1,000 chance of flooding in any one year). All land outside Flood Zones 2 and 3.	Low
Flood Zone 2	Land having between a 1% AEP (1 in 100 chance of flooding in any one year) and 0.1% AEP (1 in 1,000 chance of flooding in any one year).	Medium
Flood Zone 3a	Land having a 1% AEP 1 in 100 chance of flooding in any one year) or greater.	High
Flood Zone 3b	Land where water has to flow or be stored in times of flood based on flood modelling of a 5% AEP event (1 in 20 chance of flooding in any one year) or greater, or land purposely designed to be flooded in an extreme flood event (0.1% AEP). Where detailed modelling is not available, it is assumed that the extent of Flood Zone 3b is equal to Flood Zone 3a. For the purposes of this SFRA, land modelled to flood during a 5% AEP (1 in 20 chance of flooding in any one year) has been mapped. Where detailed modelling is not available, it is assumed that the extent of Flood Zone 3b is equal to Flood Zone 3a.	Very High

A summary of the vulnerability classifications, as defined in the NPPF Planning Practice Guidance, is detailed below.

<p>Essential Infrastructure</p> <ul style="list-style-type: none"> • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
<p>Highly Vulnerable</p> <ul style="list-style-type: none"> • Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as ‘Essential Infrastructure’).
<p>More Vulnerable</p> <ul style="list-style-type: none"> • Hospitals • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill* and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
<p>Less Vulnerable</p> <ul style="list-style-type: none"> • Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the ‘More Vulnerable’ class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
<p>Water-Compatible Development</p> <ul style="list-style-type: none"> • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves.

- Navigation facilities.
- Ministry of Defence defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 2 below shows the flood risk vulnerability and flood zone ‘compatibility’ as detailed in the Planning Practice Guidance.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Key:

✓ Development is appropriate

X Development should not be permitted.

This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea.

The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site.

Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

The County Durham Plan

A local plan seeks to guide the future development of a place to improve the lives of its existing and future residents, this includes considering the risk of flooding and the impact of climate change.

The water environment is vital to the well-being of the county. As the Lead Local Flood Authority we work with a number of partners, including the Environment Agency and Northumbrian Water, to ensure development is within environmental limits. This can include issues such as the availability of water to meet demand from housing and industry, the treatment of waste water to acceptable standards, water quality within our watercourses and the capacity of our watercourses to cope with increased volumes of treated waste water, rainfall and/or flood waters both on and off –site.

The NPPF and other Government guidance also sets strict tests to protect people and property from flooding, providing guidance on how to assess, avoid, manage and mitigate flood risk.

Across the county, flood risk is mainly from rivers and watercourses although there are increasing events owing to surface water flooding. The Plan can contribute to reducing flood risk by avoiding development in areas at greater risk of flooding and requiring Sustainable Drainage Systems, where appropriate, when planning and allocating sites for new development. This is particularly important due to the predicted increase in flooding due to climate change.

Sequential Test of the County Durham Plan

This section of the report provides a sequential test of the proposed site allocations within the County Durham Plan. Tables 1 to 4 demonstrate the application of the Sequential Test to the sites identified in the Plan, informed by the database in Appendix A. Where sites are identified as being within a flood zone the table considers whether there are any alternative development sites in lower flood zones and compatibility with flood vulnerability classifications. The tables determine which development sites require more detailed assessments and Exception Testing. These sites will be carried forward into a Level 2 SFRA.

Potential Housing Allocations

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Yes	<p>The following development sites are located wholly within flood zone 1</p> <table border="1"> <thead> <tr> <th>SHLAA Reference</th> <th>Site Name</th> </tr> </thead> <tbody> <tr> <td>1/CO/07, 1/CO/08</td> <td>Laurel Drive</td> </tr> <tr> <td>1/CO/16</td> <td>Rosedale Avenue</td> </tr> <tr> <td>1/CO/42</td> <td>South of Knitsley Lane</td> </tr> <tr> <td>1/CO/89a</td> <td>Blackfyne Community Sports College</td> </tr> <tr> <td>1/CO/89d</td> <td>Muirfield Close</td> </tr> <tr> <td>2/PE/11</td> <td>Former Roseberry School site</td> </tr> <tr> <td>3/BA/21</td> <td>Former Chamberlain Phipps Site</td> </tr> <tr> <td>3/BA/31a</td> <td>East of Bracks Road</td> </tr> <tr> <td>3/CR/02</td> <td>High West Rd</td> </tr> <tr> <td>3/WI/03</td> <td>Land to East of Ash Drive</td> </tr> <tr> <td>3/WO/20</td> <td>Land off Leazes Lane</td> </tr> <tr> <td>4/BE/01</td> <td>Cook Avenue</td> </tr> <tr> <td>4/BE/06</td> <td>Cook Avenue North</td> </tr> <tr> <td>4/DU/101</td> <td>Sniperley Park</td> </tr> <tr> <td>4/DU/104</td> <td>Sherburn Road</td> </tr> <tr> <td>4/DU/118</td> <td>North of Hawthorne House</td> </tr> <tr> <td>4/DU/157</td> <td>Former Gilesgate School</td> </tr> <tr> <td>4/DU/161</td> <td>South of Potterhouse Terrace</td> </tr> <tr> <td>4/DU/93</td> <td>Skid Pan</td> </tr> <tr> <td>5/PE/01a, 5/PE/01b</td> <td>North Blunts</td> </tr> <tr> <td>5/SE/09</td> <td>Seaham Colliery</td> </tr> <tr> <td>5/SE/21</td> <td>Former Seaham School</td> </tr> <tr> <td>7/NA/005</td> <td>Eldon Whinns</td> </tr> <tr> <td>7/NA/186</td> <td>Cobblers Hall</td> </tr> <tr> <td>7/NA/313</td> <td>Copelaw</td> </tr> <tr> <td>7/NA/326</td> <td>Land at Woodham College</td> </tr> <tr> <td>7/SP/097</td> <td>Former Tudhoe Grange Upper School, St Charles Rd</td> </tr> <tr> <td>7/SP/333</td> <td>Former Tudhoe Grange Lower School, Durham Rd</td> </tr> </tbody> </table> <p>Development sites in Flood Zone 1 are considered appropriate and there is no need to proceed with the sequential test</p>	SHLAA Reference	Site Name	1/CO/07, 1/CO/08	Laurel Drive	1/CO/16	Rosedale Avenue	1/CO/42	South of Knitsley Lane	1/CO/89a	Blackfyne Community Sports College	1/CO/89d	Muirfield Close	2/PE/11	Former Roseberry School site	3/BA/21	Former Chamberlain Phipps Site	3/BA/31a	East of Bracks Road	3/CR/02	High West Rd	3/WI/03	Land to East of Ash Drive	3/WO/20	Land off Leazes Lane	4/BE/01	Cook Avenue	4/BE/06	Cook Avenue North	4/DU/101	Sniperley Park	4/DU/104	Sherburn Road	4/DU/118	North of Hawthorne House	4/DU/157	Former Gilesgate School	4/DU/161	South of Potterhouse Terrace	4/DU/93	Skid Pan	5/PE/01a, 5/PE/01b	North Blunts	5/SE/09	Seaham Colliery	5/SE/21	Former Seaham School	7/NA/005	Eldon Whinns	7/NA/186	Cobblers Hall	7/NA/313	Copelaw	7/NA/326	Land at Woodham College	7/SP/097	Former Tudhoe Grange Upper School, St Charles Rd	7/SP/333	Former Tudhoe Grange Lower School, Durham Rd
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Potential Employment Allocations


Table 2 Sequential Test of County Durham Plan Potential Employment Allocation and Safeguarded Sites

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No	<p>The following development sites are within Flood Zone 1, with small margins in Flood Zone 2 Medium Probability of flood risk.</p> <p>Buildings used for shops; financial, professional and other services; restaurants; cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure are classed as Less Vulnerable within the Planning Practice Guidance. As such it is assessed as an appropriate form of development in FZ2 and therefore there is no need to progress with a sequential test. Given that only a small proportion of these sites fall within FZ2 built development can be avoided within the flood risk areas. ¹</p> <table border="1"> <thead> <tr> <th>Site Ref.</th> <th>Site Name</th> <th>Percentage of site in Flood Zone</th> </tr> </thead> <tbody> <tr> <td>EMP52</td> <td>South Church Enterprise Park (Bishop Auckland)</td> <td>4% FZ2 96% FZ1</td> </tr> </tbody> </table>	Site Ref.	Site Name	Percentage of site in Flood Zone	EMP52	South Church Enterprise Park (Bishop Auckland)	4% FZ2 96% FZ1															
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No	<p>The following development sites are located within Flood Zone 3.</p> <table border="1"> <thead> <tr> <th>Site Ref.</th> <th>Site Name</th> <th>Percentage of site in Flood Zone</th> </tr> </thead> <tbody> <tr> <td>EMP5</td> <td>Tursdale (Integra61)</td> <td>9% FZ3a&b 11% FZ2 89% FZ1</td> </tr> <tr> <td>EMP5</td> <td>South of Bowburn Road (Integra61)</td> <td>1% FZ3a&b 1%FZ2 99%FZ1</td> </tr> <tr> <td>EMP48</td> <td>Land at Shaw Bank (Barnard Castle)</td> <td>2% FZ3a&b 2% FZ2 98% FZ1</td> </tr> <tr> <td>EMP56</td> <td>St Helen Auckland Industrial Estate</td> <td>33% FZ3a 51%FZ2 49%FZ1</td> </tr> <tr> <td>EMP132</td> <td>Aycliffe Business Park (South) one plot</td> <td>5% FZ3a&b 7% FZ2 93% FZ1</td> </tr> <tr> <td>EMP135</td> <td>Merchant Park, Newton Aycliffe</td> <td>Less than 1%FZ3a&b and FZ2 99% FZ1</td> </tr> </tbody> </table>	Site Ref.	Site Name	Percentage of site in Flood Zone	EMP5	Tursdale (Integra61)	9% FZ3a&b 11% FZ2 89% FZ1	EMP5	South of Bowburn Road (Integra61)	1% FZ3a&b 1%FZ2 99%FZ1	EMP48	Land at Shaw Bank (Barnard Castle)	2% FZ3a&b 2% FZ2 98% FZ1	EMP56	St Helen Auckland Industrial Estate	33% FZ3a 51%FZ2 49%FZ1	EMP132	Aycliffe Business Park (South) one plot	5% FZ3a&b 7% FZ2 93% FZ1	EMP135	Merchant Park, Newton Aycliffe	Less than 1%FZ3a&b and FZ2 99% FZ1
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EMP135	Merchant Park, Newton Aycliffe	Less than 1%FZ3a&b and FZ2 99% FZ1																				

It should be noted that the protected employment sites have not been assessed as they already benefit from planning permission and any flood risk on site will have been identified and mitigated as part of the approval process.

¹ <http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-2-flood-risk-vulnerability-classification/>

2.	Could the development proposals for the following sites which are partly in flood zone 3 alternatively be located in Flood Zone 1 and/or are the proposed flood risk vulnerability classifications appropriate?
EMP5	<p>Tursdale (Safeguarded²) 9% of the site is within FZ3a&b, 11% in FZ2 and 89% FZ1 The western parcel of land on the map below.</p>  <p>In relative terms the 3a&b flood risk on this site only affects a small proportion of the site, however it does form a large Y shape across the centre of the site which will affect the layout. Development can easily be directed away from FZ3a&b and FZ2 areas. There is no requirement for further investigation at this stage as this is not a proposed allocated site within the Plan but is being safeguarded for B8 beyond the plan period.</p>
EMP5	<p>South of Bowburn Road (Integra61) 1% of the site is within FZ3a&b and 99% FZ1 The eastern parcel of land shown on the map above.</p>

² Safeguarded land is land retained for a specific use beyond the plan period.



In relative terms the flood risk on this site only affects a small proportion of the site and development can easily be directed away from FZ3a&b and FZ2. This site has received outline planning permission for 270 dwellings (class C3), a 70 bed hotel (class C1), a 60 bed residential care home (class C2/C3), a 3.96ha solar farm, change of use of 710m² of agricultural land to residential garden space, 170,859m² of general industrial, storage and distribution (class B2/B8), 1,858m² of restricted goods retail (class A1), 409m² restaurant/café/takeaway (class A3/A5), 613m² public house (class A4), 450m² children's nursery (class D1), 400m² GP surgery (class D1) and 1860m² car showroom (class sui generis). The flood risk issue on this site has been addressed through a comprehensive Flood Risk Assessment as part of the planning application process. No development is proposed within the flood zone, which will be incorporated into a green corridor and SuDS scheme. A road crossing of the Bowburn Beck is currently proposed which may cross flood zone 3b (although the exact location is yet to be confirmed) however the FRA concludes that the crossing can be constructed such that its soffit is above the conjectural flood level (plus 300mm freeboard) and could span the entire flood zone 2/3 envelope.


EMP48 Land at Shaw Bank (Barnard Castle) 2% of the site is within FZ3a&b, 2% in FZ2 with 98% FZ1



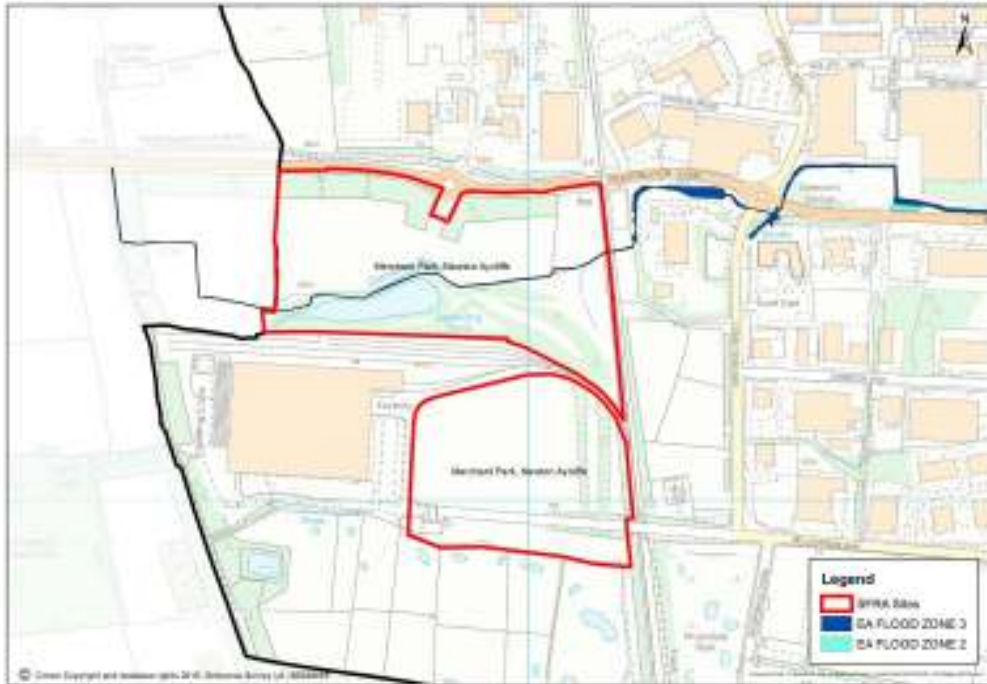
In relative terms the flood risk on this site only affects a very small proportion of the site. Development can easily be directed away from FZ3a&b and FZ2 areas. There is no requirement for further investigation at this stage as any future planning application on this site can easily avoid development in the Flood Zone. There are other employment allocations within the Barnard Castle Area (which is a key area for employment in the west) but there are no other sites of this scale within proximity of this settlement. Whilst it may be possible to find a large enough site elsewhere in Teesdale it would not be sequentially preferable in sustainability terms.

EMP56 St Helen's Auckland Industrial Estate 33% of the site is within FZ3a and 51% within FZ2 with 49% in FZ1.



	<p>Whilst the flood risk on this site covers around half of the site, flood modelling for this area is thought to be at a scale which does not take into account the local ground conditions and topography. As this is a single plot on part of a larger industrial estate and less vulnerable uses (such as general industrial) are classed as appropriate development in FZ 3a and 2, therefore sequentially it would not be logical to relocate the site.</p>
<p>EMP13 2</p>	<p>Aycliffe Business Park (North) 5% of the site is within FZ3a&b, 7% is within FZ2, with 93% FZ1.</p>  <p>In relative terms the flood risk on this site only affects a very small proportion of the site. Development can easily be directed away from FZ3a&b and FZ2 areas. There is no requirement for further investigation at this stage as any future planning application on this site can easily avoid development in the Flood Zone. As this is a single plot on part of a larger operational business park, sequentially it would not be logical to relocate the site.</p>

EMP135 Merchant Park, Newton Aycliffe. Less than 1% of the site is within FZ3a&b and FZ2 with 99% FZ1.



In relative terms the flood risk on this site only affects a small proportion of the site, however it does cut across the centre of the site which will affect the layout. Development can easily be directed away from FZ3a&b and FZ2 areas. The site is part of an existing industrial area with links to the new Hitachi development and so sequentially it would be illogical to try and relocate this potential allocation to a lower risk area. Flooding issues associated with Demon's Beck have already been addressed through the introduction of balancing ponds brought forward as part of the Hitachi development. This indicative layout for future development of this site shows that the units could be located away from the flood zones.



Indicative site plan from <http://merchantpark.co.uk/>

Potential Purpose Built Student Accommodation (PBSA) Allocations

1.	Is the proposed development site in Flood Zone 1 – Low Probability of flood risk?							
Yes	<p>The following development sites are located wholly within flood zone 1</p> <table border="1"> <thead> <tr> <th>Site Name</th> </tr> </thead> <tbody> <tr> <td>Leazes Road</td> </tr> <tr> <td>Howlands (Josephine Butler and Ustinov)</td> </tr> <tr> <td>James Barbour House</td> </tr> <tr> <td>Elvet Hill Car Park</td> </tr> <tr> <td>Mill Hill Lane</td> </tr> <tr> <td>St Mary's College</td> </tr> </tbody> </table> <p>Development sites in Flood Zone 1 are considered appropriate and there is no need to proceed with the sequential test</p>	Site Name	Leazes Road	Howlands (Josephine Butler and Ustinov)	James Barbour House	Elvet Hill Car Park	Mill Hill Lane	St Mary's College
Site Name								
Leazes Road								
Howlands (Josephine Butler and Ustinov)								
James Barbour House								
Elvet Hill Car Park								
Mill Hill Lane								
St Mary's College								
No	There are no sites (or parts of sites) which fall within Flood Zones 3B, 3A or 2.							

Potential Western and Northern Relief Roads

In order to reduce the dominance of car traffic, relieve existing highway network problems, facilitate growth, address air quality and improve the historic environment the council proposes to deliver a number of transport interventions in Durham City. These measures include the construction of a Western Relief Road (WRR) and the safeguarding of two potential routes for a Northern Relief Road (NRR). The WRR requires a bridge to cross the River Browney and the NRR requires a bridge to cross the River Wear. As the route of the NRR has not yet been decided, and the route is merely safeguarded in the County Durham Plan, it is not addressed further in this sequential test. The following assessment has been carried out in relation to the WRR.

1.	Is the proposed development site in Flood Zone 1 – Low Probability of flood risk?
Yes	The majority (98%) of the route of the WRR is within Flood Zone 1.
No	At the point at which the road crosses the River Browney, it requires a bridge which spans flood Zones 2 and 3.
2.	Could the development proposals for the WRR, which are partly in flood zone 2 and 3 alternatively be located in Flood Zone 1 and/or are the proposed flood risk vulnerability classifications appropriate?
No	<p>As the River Browney runs west to east across the county and the route of the proposed WRR runs north/south there is no way to avoid crossing the river at some point (see map below). The proposed route takes into account a number of additional factors including environmental, historic and topographical constraints as well as viability and practicality, therefore sequentially there are no alternative locations which would reduce the need for flood zones 2 and 3 to be crossed by a bridge. At the point the bridge will cross the river it would sit approximately 17m above the river and would span approximately 65 metres of flood zone.</p> <p>As shown in the Table 2 above, an exception test will be required for essential infrastructure in flood zone 3a or 3b. Essential infrastructure in flood zone 2 is</p>

appropriate development. The NPPF makes clear that for the exception test to be passed it should be demonstrated that:

- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
- b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

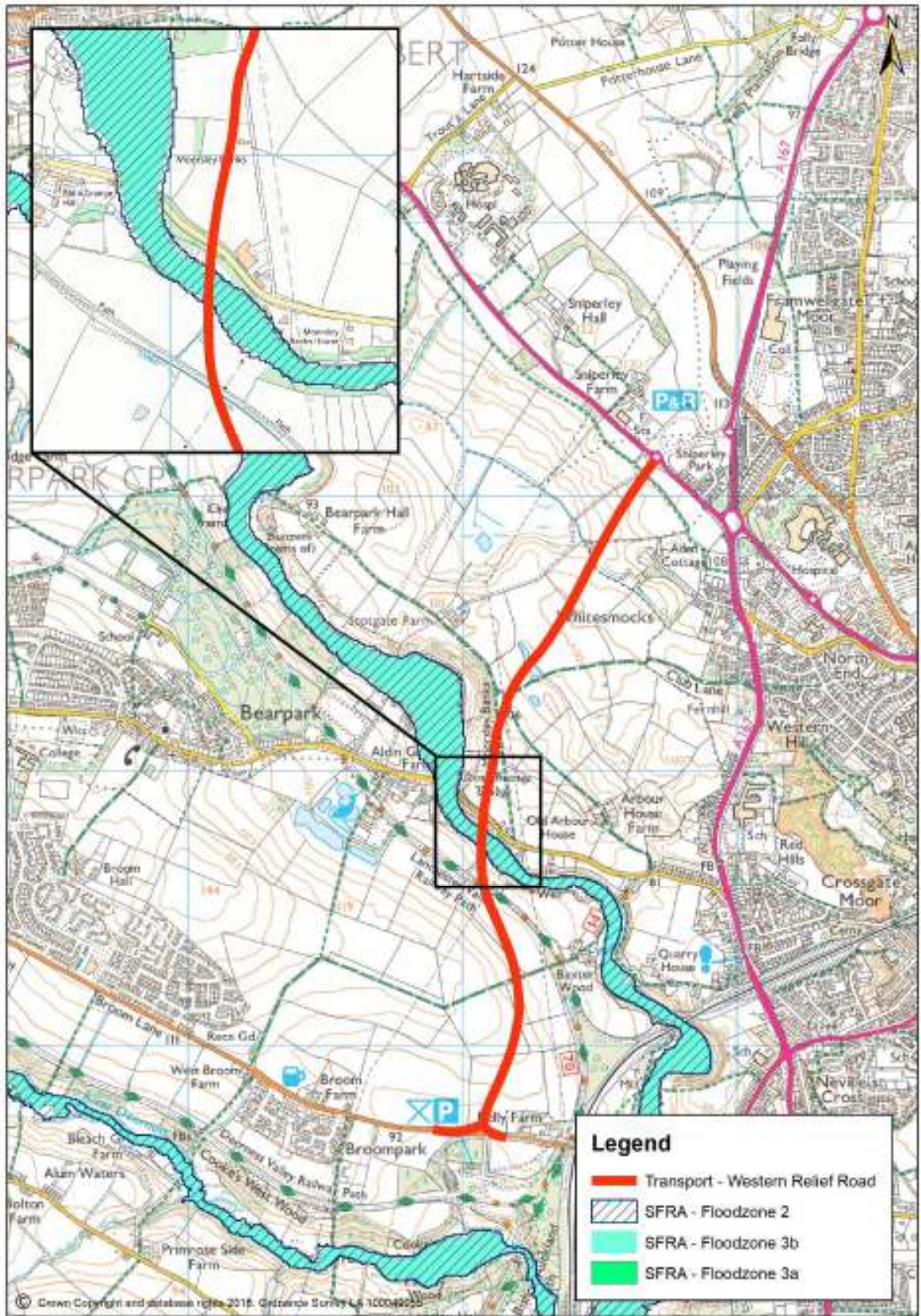
Both elements of the exception test should be satisfied for development to be allocated or permitted.

The details of the road bridge design are still being developed and are not at a stage where the exception test can be applied. A site specific Flood Risk Assessment (FRA) will be carried out as part of any future planning application process and if required, this will include an exception test based on the technical specification of the design. Further work is being carried out in conjunction with the Environment Agency to inform the final design of the bridge i.e. whether the span of the bridge can be supported outside of flood zone 3 (whilst taking into account other constraints in the area) or to demonstrate the construction of and siting of the final structure can be adequately mitigated to ensure the development passes both parts of the exception test. This is not deemed to be a barrier to development.

Wording has also been added to the supporting text of the policy to highlight that “the crossing of the River Browney should not increase the risk of flooding and will need to pass a flood risk exception test if any part of the structure is sited within flood zone 3.”

This is line with paragraph 162 of the NPPF which states that when planning applications come forward on sites allocated in the development plan through the sequential test, applicants need not apply the sequential test again. However, the exception test may need to be reapplied if relevant aspects of the proposal have not been considered when the test was applied at the plan-making stage, or if more recent information about existing or potential flood risk should be taken into account.

The map below shows the route of the proposed WRR together with the flood zones in the area.



Potential Minerals and Waste Allocations

For the purposes of this report all proposed minerals allocations have been screened, there are no proposed waste allocations in the Preferred Options document. Minerals working and processing (except for sand and gravel working) are classed as Less Vulnerable within the Planning Practice Guidance. Less Vulnerable development is appropriate in FZ3a and 2 however should not be permitted in 3b.

1.	Is the proposed development site in Flood Zone 1 – Low Probability of flood risk?	
Yes	The following development sites are located wholly within flood zone 1	
	Site Name	Site Type
	Hulands Quarry (Eastern Extension)	Strategic Mineral Allocation
	Todhills	Strategic Area of Search
	Heights Quarry (Western Extension)	Strategic Mineral Allocation
No	There are no sites (or parts of sites) which fall within Flood Zones 3B, 3A or 2.	

Other sources of flooding

From the initial screening of the housing sites (Appendix A) some of the sites have been identified as having surface water and/or groundwater flood issues. At this stage the extent of these flood issues are not considered to be a barrier to development, however they will need to be addressed as part of the application and development stages, as it will influence the overall design of the site including appropriate Sustainable Drainage Systems which specifically address the sites ground conditions. Groundwater susceptibility areas for example are mapped at a large scale based on the geology of an area. Further investigation of the groundwater levels for these sites will need to be undertaken as part of the application process, as reliance on soakaways may not be practical in these areas. As part of the Plan development process the Council will continue to review the emerging allocation sites in relation to these other sources of flooding, in order to identify any specific issues where further work will be required with the developer.

It should be noted that the Water Management Policy in the Plan will require **all** sites to consider and address flood risk both on-site and off-site. The findings of this document and the more detailed findings of the SFRA work will be used to inform the planning and SuDS application process.

Conclusion

From this assessment it has become apparent that there are no significant flood risk issues associated with the sites identified and therefore a level 2 Strategic Flood Risk Assessment is not required. None of the proposed housing or PBSA allocations fall within flood zone 3 or 2. Some of the housing sites have surface water or groundwater flood issues and this will be identified as part of the planning and SuDS application process where further work will be required with the developer. Some of the employment sites and the WRR have flood zone 3 and 2 issues which will need to be addressed through design but it is not deemed to be a barrier to development and does not require alternative sites to be found. There are no proposed waste allocation sites in the Plan and none of the mineral allocation sites are located in flood zone 3 or 2.

Appendix A - Sequential Test SFRA Site Analysis

See Appendix C of AECOM SFRA Level 1 Report for explanation of Site Assessment Database Attributes

SITE_ID	SITE_TYPE	NAME	FZ3B	% FZ3B	FZ3A	%FZ3A	FZ2	% FZ2	FZ1	% FZ1	Area_RoFSW_30	% RoFSW 30	Area_RoFSW_100	% RoFSW_100	Area_RoFSW_1000	% RoFSW 1000	Sewer_Flooding_20m	ASIGWF_75	ASIGWF_50_75	ASIGWF_25_50	ASIGWF_25
County Hall Re-Development Aykley Heads																					
EMP17	Area - Strategic	Aykley Heads	0	0	0	0	0	0	62435.09404	100	471.897502	1	2086.758638	3	6169.40	9.9 NO		NO	NO	NO	NO
EMP17	Allocation - Strategic	Aykley Heads	0	0	0	0	0	0	15945.6003	100	0	0	0	0	0.00	0.0 NO		NO	NO	NO	NO
EMP17	Allocation - Strategic	Aykley Heads	0	0	0	0	0	0	12024.66138	100	0	0	0	0	0.00	0.0 NO		NO	NO	NO	NO
EMP17	Allocation - Strategic	Aykley Heads	0	0	0	0	0	0	7388.989349	100	0	0	0	0	285.94	3.9 NO		NO	NO	NO	NO
EMP27	Allocation	Peterlee North West Industrial Estate	0	0	0	0	0	0	20144.4846	100	428.275982	2	1435.128888	7	5615.33	27.9 NO		NO	NO	NO	YES
EMP27	Allocation	Peterlee North West Industrial Estate	0	0	0	0	0	0	5914.22625	100	0	0	0	0	0.00	0.0 NO		NO	NO	NO	NO
EMP27	Allocation	Peterlee North West Industrial Estate	0	0	0	0	0	0	59140.72222	100	1815.142836	3	3400.228725	6	7667.20	13.0 NO		NO	YES	NO	NO
EMP29	Allocation	Sea View Industrial Estate (Horden)	0	0	0	0	0	0	12848.55403	100	0	0	6.304092	0	157.33	1.2 NO		NO	NO	YES	NO
EMP32	Allocation	Peterlee South West Industrial Estate	0	0	0	0	0	0	63829.02008	100	300.743887	0	576.047789	1	3273.45	5.1 NO		NO	NO	YES	YES
EMP32	Allocation	Peterlee South West Industrial Estate	0	0	0	0	0	0	18221.82456	100	152.110269	1	220.114507	1	612.04	3.4 NO		NO	NO	YES	NO
EMP36	Allocation	Land at Hawthorn	0	0	0	0	0	0	209423.5818	100	1117.92848	1	1450.552559	1	3411.75	1.6 NO		YES	YES	NO	NO
EMP38	Allocation	Harmire Industrial Park (Barnard Castle)	0	0	0	0	0	0	24424.23081	100	0	0	0	0	0.00	0.0 NO		NO	NO	YES	YES
EMP46	Allocation	Stainton Grove (Barnard Castle)	0	0	0	0	0	0	1959.098165	100	0	0	0	0	0.00	0.0 NO		NO	NO	YES	NO
EMP48	Allocation	Land at Shaw Bank (Barnard Castle)	1188.739136	2	1188.743007	2	1232.357999	2	77976.98568	98	0	0	99.206162	0	908.14	1.1 NO		NO	NO	YES	NO
EMP49	Allocation	Randolph Coke Works (Evenwood)	0	0	0	0	0	0	21692.92516	100	0	0	0	0	0.00	0.0 NO		NO	YES	NO	YES
EMP49	Allocation	Randolph Coke Works (Evenwood)	0	0	0	0	0	0	6511.120593	100	0	0	0	0	0.00	0.0 NO		NO	YES	NO	NO
EMP5	Allocation	South of Bowburn Road (Durham Green)	3103.543	1	3103.547	1	4083.93494	1	585736.8937	99	16028.62625	3	25814.27252	4	54895.44	9.3 NO		NO	NO	NO	YES
EMP5	Safeguarded Site	Integra 61	75917.35936	9	75917.37439	9	91990.5408	11	733515.4261	89	25206.34622	3	44896.50393	5	97736.01	11.8 NO		NO	NO	YES	YES
EMP52	Allocation	South Church Enterprise Park (Bishop Auckland)	0	0	0	0	0	1290.559048	4	30855.20197	96	0	0	0	259.63	0.8 NO		NO	NO	YES	NO
EMP52	Allocation	South Church Enterprise Park (Bishop Auckland)	0	0	0	0	0	0	39967.65563	100	1489.965568	4	2318.889068	6	4039.75	10.1 NO		NO	NO	YES	NO
EMP52	Allocation	South Church Enterprise Park (Bishop Auckland)	0	0	0	0	0	0	6003.878275	100	0	0	0	0	341.76	5.7 NO		NO	YES	NO	NO
EMP53	Allocation	Low Willington Industrial Estate	0	0	0	0	0	0	139567.3993	100	157.001095	0	182.654091	0	13266.81	9.5 NO		YES	NO	NO	NO
ST HELEN AUCKLAND INDUSTRIAL ESTATE																					
EMP56	Allocation	AND EXTENSION	0	0	2997.959971	33	4675.758089	51	4435.765817	49	520.405089	6	1086.161924	12	4444.56	48.8 NO		NO	YES	NO	NO
EMP64	Allocation	Land at Tow Law (Inkerman)	0	0	0	0	0	0	25498.93444	100	0	0	0	0	0.00	0.0 NO		NO	NO	NO	NO
EMP65	Allocation	Dan's Castle Industrial Estate (Tow Law)	0	0	0	0	0	0	2622.25255	100	0	0	0	0	0.00	0.0 NO		NO	NO	NO	NO
EMP89	Allocation	Drum Industrial Estate	0	0	0	0	0	0	44440.81657	100	0	0	0	0	834.98	1.9 NO		NO	YES	NO	NO
EMP92	Allocation	Stella Gill Industrial Estate (Chester-le-Street)	0	0	0	0	0	0	12964.04339	100	0	0	0	0	0.00	0.0 NO		NO	YES	YES	NO
EMP97	Allocation	Westline Industrial Estate (Ouston)	0	0	0	0	0	0	14121.53273	100	0	0	30.9902	0	868.32	6.1 NO		NO	YES	NO	NO
Polygon		Hulands Quarry Extension	0	0	0	0	0	0	226513	100	0	0	0	0	2395.38	1.1 NO		NO	NO	YES	YES
Polygon		Todhills Brickworks	0	0	0	0	0	0	327358	100	37.755125	0	553.576168	0	9705.90	3.0 NO		NO	YES	YES	YES