

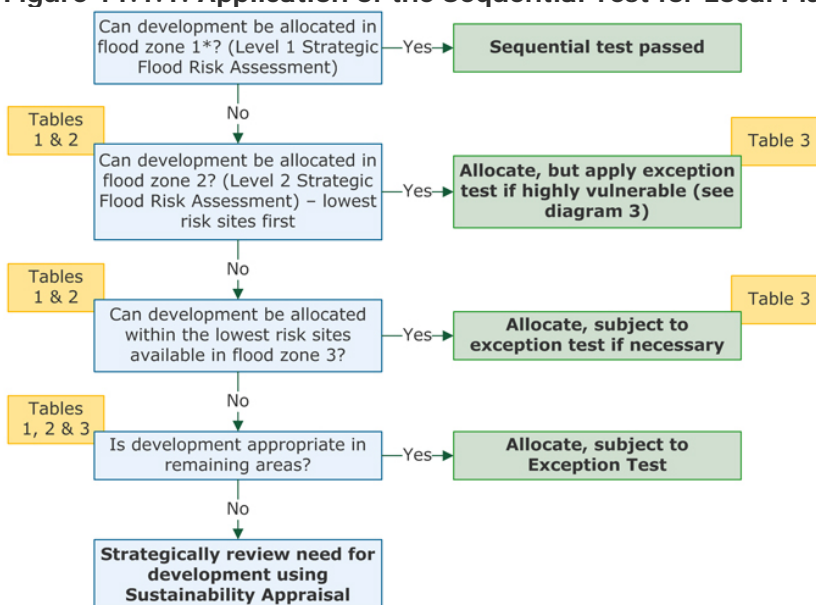
APPENDIX 11.1

NPPF FLOOD RISK SEQUENTIAL AND EXCEPTION TESTING

Sequential and Exceptions Test

- 11.1.1. Paragraph 100 of the NPPF requires Sequential and Exceptions Tests to be carried out to steer new development to areas with the lowest probability of flooding. Where the development is necessary, it should be carried out without increasing the risk of flooding elsewhere. The Planning Practice Guidance issued to complement the NPPF details the procedure to follow in applying a sequential test to the Development.
- 11.1.2. The sequential test is primarily intended for applications where above-ground structures are proposed, or pits created below ground that will obstruct floodwaters or increase the risk of flooding by increasing impermeable surfaces. A buried pipeline will not present any restrictions to floodwaters either forming or flowing away, so the application of the sequential test to the completed project is not necessary.
- 11.1.3. The sequential test is also used to determine the risk to people of being trapped by a flood event and then need rescuing, or the risk of damage to personal belongings that might be flooded.
- 11.1.4. The pipeline construction phase will be the only time when the proposed Development may have some effect upon the flood risk, and personnel are at risk of being trapped in rising flood waters.
- 11.1.5. The sequential test process will be used to demonstrate the slight extent that pipeline construction will have upon the flood risk of the Development.
- 11.1.6. The stages in the Sequential process are shown in figure 11.1.1 below, taken from Figure 2 of the PPG referring to Flood Risk and Coastal Change:-

Figure 11.1.1: Application of the Sequential Test for Local Plan preparation



- Stage 1: Determine the location of the Proposed Development within the flood zones identified by the Environment Agency flood map;
- Stage 2: Select a location that avoids 'Areas at risk of Flooding' (Zone 1) or has the lowest probability of flooding (Level 1 SFRA in Figure 2).
- Stage 3: Determine the Flood Risk Vulnerability classification
- Stage 4: Take into account other sources of flooding and the effects of climate change;
- Stage 5: Determine the risks and apply mitigation to reduce the risk to the minimum possible level.

11.1.7. Figure 12.5 shows the Assessment Site superimposed on a flood map that shows the different zones: –

Zone 1 represented by the areas with no additional shading;

Zone 2 defined by the light blue colouring; and

Zone 3 defined by the dark blue colouring.

These are defined in Table 11.1.1, taken from Table 1 of the PPG, reproduced below:-

Table 11.1.1 Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

11.1.8. The 20m AOD contour appears to have been used by the Environment Agency as the normal limit for Zones 2 and 3 on the flatter ground south of the A170.

Stage 2:

- 11.1.9. The pipeline route was decided prior to this assessment being carried out and takes the chosen alignment for a number of reasons including ecological and land owner consents.
- 11.1.10. The pipeline is within Zone 1 for most of its length and moves into Zone 3 in an area of slightly lower ground near Friar Dike, where the level drops below 20m AOD. The length of pipeline crossing this lower ground is estimated as 300m.
- 11.1.11. Realigning the pipeline to the east to avoid the low area at Friar Dike will cut across another dike that runs to the north along the field boundary and drains into Friar Dike and will also cause additional damage to the tree screen that runs parallel to Friar Dike.
- 11.1.12. The risk presented by flooding to workmen during the pipeline construction can be reduced to negligible levels by timing the construction for dryer times of the year when the ground moisture levels are low and water flows in dikes and the River Derwent are low. Heavy rain can cause flooding, especially when the ground cannot absorb the water, but work would not progress in such weather because of poor ground conditions.
- 11.1.13. A risk assessment and method statement would ensure that in the event of a flood occurring whilst the 300m section of pipeline was being constructed through the Friar Dike area, machinery and personnel were removed from the area until the risk passed.

River Derwent Crossing

- 11.1.14. The pipeline has to cross the River Derwent and its functional flood plain, shown dark blue, before the rising ground reduces the flood risk to that for Zone 2. Zone 2 is confined within the 20m contour on the south side of the River Derwent.
- 11.1.15. Crossing the River Derwent is unavoidable and the least disruptive route has to be found for which land-owner consent can be obtained.
- 11.1.16. Damming the river to create a dry working area is not practicable, so the pipeline will be installed using directional drilling. This will avoid the flood plain by passing underneath it, so this part of the pipeline will have no effect on the flood plain.
- 11.1.17. The risk of the River Derwent flooding will not be either increased or decreased by installation of the pipeline by this method. Once the pipeline has been installed it will not have any effect on the flood plain.
- 11.1.18. Installing the pipeline under the River Derwent using directional drilling avoids the

11.1.19. Functional Flood Plain (Zone 3b) and the risks associated with working in a flood zone.

Stage 3: Flood Risk Vulnerability

11.1.20. Reference to Table 2 of paragraph 035 of the PPG confirms that mineral workings are classified as 'Less Vulnerable'. This is shown below as Table 11.1.2:-

Table 11.1.2: Flood Risk Vulnerability Classification

Less Vulnerable	
•	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.

11.1.21. Reference to Table 3 of paragraph 035 of the PPG, reproduced below as Table 11.1.3, confirms that the Proposed Development is compatible with Zone 3a.

Table 11.1.3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	*•	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	*•	*•	*•

Key: ✓• Development is appropriate.
 *• Development should not be permitted.

Stage 4:

11.1.22. The construction phase of the pipeline is a temporary phase so the effects of climate change can be disregarded.

Stage 5:

11.1.23. A risk assessment has been effectively carried out during the design process by proposing to construct the pipeline under the River Derwent using directional drilling. This removes all the risks associated with working on a functional flood plain, so further mitigation is unnecessary for that pipeline crossing.

11.1.24. The risks associated with constructing the pipeline through the low area near Friar Dike are minimal and can be reduced still further by adopting the following precautions:-

- Program the construction works for the summer and early autumn when water levels can be at their lowest;
- Avoid working in the low area in prolonged wet weather, or during very heavy rainfall.
- If heavy rain does occur vacate the low area, removing machinery if possible.

Conclusion

11.1.25. The Proposed Development is considered to be a 'Less Vulnerable' development and is therefore compatible with placement in Zones 1, 2, and 3a.

11.1.26. The Proposed Development is almost completely within Zone 1 and therefore is not a flood risk, nor does it increase the risk of flooding within that zone.

11.1.27. The functional flood plain is crossed using directional drilling which avoids incompatibility of the development and does not increase the risk of flooding.

11.1.28. The low area near Friar Dike is minimal and the risks associated with working within Zone 3a are very low and can be reduced further by adopting the precautions mentioned above.

11.1.29. An exception test is therefore not necessary and the Development satisfies the requirements of the NPPF.