

# SFRA Level 2 assessment of PRTP13 Railway Station site

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## 1. Introduction

- 1.1. The Princes Risborough draft Town Plan (PRTP) (February 2016) consultation document identified land between Picts Lane and the Princes Risborough railway station as a potential development site (Site Allocation Reference PRTP13 Railway Station Site). The Wycombe District Level 1 Strategic Flood Risk Assessment (SFRA) (2008 and updated 2014) showed this site included areas within fluvial Flood Zones 1, 2 and 3.
- 1.2. Where a Level 1 Assessment shows that allocated land outside flood risk areas cannot appropriately accommodate all the necessary development, it may be necessary to increase the scope of the assessment of a site to a Level 2 Assessment to provide the information necessary for application of the Exception Test (where appropriate).
- 1.3. A Level 2 Strategic Flood Risk Assessment considers the detailed nature of the flood characteristics within a flood zone including flood probability, depth, velocity, rate of onset and duration, alongside the proposed use for the site.
- 1.4. This Level 2 SFRA reviews the flood hazard posed to property and life within the Railway Station site to ensure that the risk of flooding can be realistically mitigated through the design process. In doing so, this Level 2 SFRA provides a tool that will inform the application of the technical aspects of the Exception Test.
- 1.5. For the Exception Test to be passed:
  - it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and
  - a site-specific flood risk assessment must demonstrate that 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.
- 1.6. Both elements of the test have to be passed for development to be allocated or permitted, and to demonstrate that the site can be developed safely and in a sustainable manner.
- 1.7. The draft Princes Risborough Town Plan – Flood Risk Sequential Approach Report (February 2016) demonstrates that the wider sustainability benefits to the community outweigh flood risk and that development of the Railway Station site could avoid the flood risk areas of the site.

## 2. Assessment

- 2.1. The Railway Station site (PRTP13) is a 1.9 ha site accommodating a partially demolished former manufacturing building situated between the northern part of Picts Lane and the Princes Risborough railway station. It has been identified as a site for a mixed use allocation for residential, retail, employment and public open space.



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### 2.2. Description of Flood Risk

Running through the site within a culvert is the Pyrtle Spring, a designated Ordinary Watercourse that emerges from the base of the Chiltern Hills, where the permeable Chalk aquifer meets the impermeable Gault Clay and Lower Greensand of the Vale of Aylesbury. The surface water catchment area drained by the Pyrtle Spring is approximately 4.4 km<sup>2</sup> at the upstream boundary of the allocation site. The groundwater catchment area may be very different to the surface water catchment area and could enlarge or contract seasonally.

Flooding from the Pyrtle Spring may arise from:

- Increased flows in the Pyrtle Spring watercourse (may
- Increased runoff from the surface water catchment
- Blockage or collapse of the culvert

Fluvial flooding and direct surface water runoff are the principal potential sources of flooding. The Pyrtle Spring watercourse is fed from the Chalk aquifer and increased flows from the aquifer could cause groundwater flooding in Princes Risborough. At the Railway Station site, however, this is most likely to be realised as increased baseflow in the watercourse rather than groundwater emerging within the site. Therefore, groundwater flooding is largely covered under fluvial flooding. There is a low risk of flooding from sewers.

#### Fluvial Flood Zones

- 2.3. Environment Agency modelling of the fluvial flood risk indicates that the site is predominantly in fluvial Flood Zone 1 (73%), with 4% of the site in Flood Zone 2, 15.5% in Flood Zone 3a and 7.5% in Flood Zone 3b. It is likely that the flood zones are from national mapping, rather than detailed hydraulic modelling, and may assume that the watercourse is not culverted. Therefore, in this case the flood extents could be considered as more representative of a blocked or collapsed culvert.

### Flood Depth

The Pyrtle Spring runs through the site within a culvert from the south to the north. The Flood Zones (Zones 2 and 3) associated with it are as wide as 80 metres in places. From analysis of the Flood Zones and the digital terrain model, it is estimated that the depth of flooding on the site for the 1% annual probability event will be approximately 0.3 metres

### Flood Velocity

Detailed information on flood velocity is not available for this site. The topography of the site suggests that the velocities will be low and unlikely to be a threat to life. However, a sudden culvert blockage or collapse could temporarily create localised high velocities. A detailed hydraulic model of the Pyrtle Spring watercourse is likely to be required to confirm the nature of the flood risk prior to development of the site.

### Rate of Onset/ Flood Warning

- 2.4. The Pyrtle Spring is an ephemeral watercourse that is likely to respond slowly to changes in groundwater levels within the aquifer. Rates of flooding would be higher where the flooding is caused by a culvert blockage or surface water runoff.
- 2.5. There are currently no formal warning systems in place to raise the alarm in response to anticipated groundwater flooding incidents in Princes Risborough. However, the Environment Agency monitor groundwater levels in Wye, Hughenden and Marlow, and notification is provided via email (on an informal basis) to the Local Authority if raised groundwater levels occur. When raised groundwater levels occur in these areas, they are also likely to be raised in the aquifer areas discharging to Princes Risborough.

### Period of Inundation

- 2.6. The period of inundation associated with flooding at this site is heavily influenced by groundwater recharge within the Chalk aquifer of the Chiltern Hills. It takes prolonged above average winter rainfall to cause groundwater levels to rise sufficiently to cause increased baseflow in the Pyrtle Spring watercourse or groundwater flooding. This type of flooding tends to last for many weeks or months following the extreme long duration rainfall. Flooding arising from surface water runoff is likely to be of short duration.

### Flood Defences

- 2.7. No formal flood defences have been identified on the Pyrtle Spring. The nearby railway embankment may influence local flood flow routes, and this should be investigated further as part of the detailed site based Flood Risk Assessment.

### Flooding from Other (Non Fluvial) Sources

- 2.8. The Environment Agency and the Council do not hold any records of local flooding at this location. Local flooding includes surface water, groundwater, sewers and canals.
- 2.9. The Environment Agency surface water flood map shows an area at risk from surface water coincident with the route of the Pyrtle Spring watercourse. Figure 8 of the Level 1 Update identifies areas at risk from surface water flooding, this shows that 98% of the site is at either no or low risk of surface water flooding, with 1.8% at medium risk and 0.2% at high risk of surface water flooding. There are no records held either by the Environment Agency or the Council of the site flooding from surface water.
- 2.10. Areas of potential groundwater emergence (and therefore a possible susceptibility to groundwater flooding) are indicated in Figure 12 of the SFRA level 1 update. This indicates that there may be some risk from groundwater emergence, but the SFRA Level 1 also states that the Environment Agency's surface water flooding maps best identify the risks of localised flooding.

- 2.11. It is essential that the potential risks associated with groundwater and surface water flooding are carefully considered in a local context as an integral part of the outline design process (i.e. when a detailed Flood Risk Assessment is produced). Up to date information relating to observed localised flooding within the District should be sought from Buckinghamshire County Council. Figure 6 of the SFRA identifies recorded localised flood incidents in the winter of 2013/2014 when there was significant rainfall, it shows that there was no flooding recorded on this site.

### Overview of Flood Risk

- 2.12. A small proportion of the site is situated within Flood Zone 3b, the functional floodplain and is at risk of fluvial flooding in the 5% (1 in 20) design event. Indicative flood depths on the site are expected to be no greater than 300mm. The flood velocity is anticipated to be low through the site although the period of inundation could be relatively long when caused by high groundwater levels in the Chalk aquifer. The risk to life within the site is therefore considered to be low, however, this may need to be confirmed by detailed hydraulic modelling.
- 2.13. The NPPF states that, following application of the Sequential Test, only the 'water-compatible' uses and 'essential infrastructure' (following the Exception Test) should be permitted in Fluvial Flood Zone 3b. As such neither 'less vulnerable' nor 'more vulnerable' or 'highly vulnerable' uses should be developed in this area of the site. However, in applying the principles of the sequential test within the site, there are zones of lower flood risk that may be used for these uses.

## **3. Planning Recommendations**

### Spatial Planning

- 3.1. The sequential test should consider not only the planning 'need' for the future development of the site within the District, but it should also be used to steer vulnerable uses within the site to areas of lowest risk. Therefore, those areas of the site identified as Flood Zone 1 should be developed in preference to those in Flood Zone 2 or Flood Zone 3. Development should be avoided within that proportion of the site that falls within Flood Zone 3b Functional Floodplain and Flood Zone 3a High Probability except for Water Compatible uses.
- 3.2. Throughout the site, development must deliver a measurable reduction in flood risk. Risk reduction measures for consideration should include the incorporation of SuDS to seek a reduction in the rate of runoff from the site.

### Development Control

- 3.3. Proposed development within the site will require a detailed Flood Risk Assessment (FRA) in line with policy DM17 of the adopted Delivery and Site Allocations Plan for Town Centres and Managing Development – DSA (July 2013). It is essential that the adopted design follows the 'sequential approach', steering development towards areas of lowest risk within the site.
- 3.4. The configuration and design of the development within the site should follow the guiding principles set out in paragraphs 5.6 and 5.7 of the Level 1 SFRA (2014). In overview, the following development control recommendations must be incorporated into all development proposals as a minimum:
- a) A measurable reduction in the risk of flooding within the District must be demonstrated as an outcome of the proposed development;

- b) Floor levels must be situated a minimum of 300mm above the 1% (1 in 100) fluvial predicted maximum flood level plus an allowance for climate change;
- c) Basements are not permitted within Flood Zone 3b Functional Floodplain. Sleeping accommodation must not be provided at basement level within Flood Zone 3a. All basements must have an access point that is above the 1% (1 in 100) AEP river flood level, including an allowance for climate change,
- d) Implement Sustainable Drainage System (SuDS) to ensure that the volume and rate of runoff from the site (post development) does not exceed the equivalent greenfield runoff rates. Any SuDS design must take due account of groundwater and geological conditions (refer paragraph 5.6 of the SFRA);
- e) To ensure the safety of residents and employees during a flood, access and egress routes must be designed to meet Environment Agency defined criteria;
- f) Ensure that there is no net loss of floodplain storage as a result of the proposed development. This may be achieved by ensuring (for example) that the existing building footprint is not increased, that overland flow routes are not interrupted by buildings and/or infrastructure, that hydraulically linked compensatory flood storage is provided within the site (or upstream). It must be demonstrated that the proposed development does not result in an increase in maximum flood levels within adjoining properties or elsewhere;
- g) In accordance with policy DM15 of the DSA, a minimum 10m buffer zone must be provided to 'top of bank' within sites immediately adjoining a river corridor. This relates to both open waterways and culverted waterway corridors;
- h) In accordance with DM15 of the DSA and an integral part of the government's "Making Space for Water" agenda, the Environment Agency is actively seeking the re-naturalisation of culverted watercourses as part of any future development. Realistic opportunities to reinstate the natural open waterway within existing culverted reaches of the river(s) should be promoted.

#### 4. Conclusions

This Level 2 SFRA is a high level assessment of the risk of flooding from all sources of the land between Picts Lane and the Princes Risborough Railway Station. This area has been identified as a potential development site (Site Allocation Reference PRTP13 Railway Station Site).

The assessment has shown that the Railway Station Site Allocation:

- Has some areas at greater flood risk than others (Flood Zones 1, 2 and 3).
- Is developable subject to meeting the requirements of the National Planning Policy Framework to ensure flood risk vulnerability and flood zones are compatible.

Any development of the land will be required to comply with National and Local Planning Policy. In particular, it must meet the requirements laid out in the Wycombe District Level 1 Strategic Flood Risk Assessment (2014) and the Wycombe District Delivery and Site Allocations Plan for Town Centres and Managing Development (July 2013) to ensure that the development is not at risk from flooding and does not increase the flood risk elsewhere, both now and in the future.