

Land off Chelford Road, Henbury, Macclesfield

Review of Surface Water Drainage and Flood Risk

Technical Note

Project ref:	4719 – Land off Chelford Road, Henbury, Macclesfield
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Introduction

1. This document has been prepared by Weetwood Services Ltd ('Weetwood') on behalf of Henbury Parish Council and relates to the proposed development of land off Chelford Road, Henbury, Macclesfield.
2. Outline planning permission was granted for the following sites as illustrated in **Figure 1**, with reserved matters applications for appearance, landscaping, layout and scale of development now submitted for each site and currently awaiting determination:
 - Outline 17/4277/M; 135 residential dwellings, approved 22 January 2019
 - Reserved Matters 19/3097/M, June 2019 – 134 residential dwellings
 - Reserved Matters 19/3098/M, July 2019 – 23 residential dwellings
 - Outline 18/0294/M; 31 residential dwellings, approved 27 February 2019
 - Reserved Matters 19/3816/M, August 2019
 - Discharge of Condition 13 19/5799/D, 17 December 2019
 - Outline 17/4034/M; 232 residential dwellings, approved 27 February 2019
 - Reserved Matters 19/5582M, December 2019

It is noted that the number of residential dwellings proposed as part of the reserved matters applications for 17/4277/M equate to a greater total number of dwellings (i.e. 157) than that approved under the outline planning permission for the site.

3. Significant concerns have been raised by Henbury Parish Council with respect to the impact of these developments on surface water drainage and flood risk within the locality, particularly when accounting for the cumulative effect of the proposals.
4. This report has subsequently been prepared in order to provide an assessment of the above taking into account the submitted details currently available on the Cheshire East Council planning portal.

Site Location and Description

5. The sites are located to the north and south of Chelford Road as shown in **Figure 1**.

Waterbodies in the Vicinity of the Site

6. There are no designated main rivers within the area; however, there are a series of land drains located through/adjacent to the sites, which may be defined as 'ordinary

watercourses'. These watercourses flow in both open channel and culvert as illustrated in **Figure 1**.

Site Levels

7. LiDAR data has been used to develop a digital elevation model of the sites and surrounding area as illustrated in **Figure 2**.
8. The topography of each site is summarised below:
 - 17/4277/M; Site levels are in the region of 161.42 – 168.05 metres Above Ordnance Datum (m AOD), generally falling to the north and south/south-east.
 - 18/0294/M; Site levels are in the region of 161.42 – 163.96 m AOD, falling to the north/north-west towards the existing watercourse located along the northern boundary of the site.
 - 17/4034/M; Site levels are in the region of 162.88 – 177.42 m AOD, generally falling towards the western boundary of the site and to the north.

Review of Flood Risk

Flood Zone Designation

9. According to the Flood Map for Planning all three sites are located in Flood Zone 1 and as such are defined by the National Planning Policy Framework as having a less than 1:1,000 annual probability of river flooding.

Fluvial Flood Risk

10. The Flood Map for Planning indicates that the sites are not at risk of flooding from fluvial sources; however, the catchment of the watercourses within the vicinity of the sites is less than 3 km². As such the flood risk from these sources is unlikely to be accurately reflected. In the absence of detailed hydraulic modelling, the Flood Risk from Surface Water map may be utilised as a proxy to assess the risk of flooding from such sources. This is detailed further below.
11. No survey of the existing watercourses within the vicinity of the sites appears to have been undertaken as part of the planning submissions in order to determine the condition and capacity of the open and culverted sections.

Flood Risk from Surface Water

12. The Flood Risk from Surface Water map (**Figure 3**) indicates that there is a risk of flooding to each site, some of which is associated with the existing watercourses within the vicinity.
13. Potential depths and velocities for the low, medium and high risk surface water flooding events are summarised below for each site:
 - 17/4277/M Flood extent is generally confined to an area in the north and south of the site, with the latter associated with the watercourse between the site and 18/0294/M. Flood depths of 300-900 mm expected during the high and medium risk events and in excess of 900 mm during the low risk event. Flood velocities are generally expected to be less than 0.25 m/s with some intermittent areas over 0.25 m/s.
 - 18/0294/M Extent of flooding is limited during the high and medium risk events; however, a significant proportion of the site is at risk during a low risk event as a result of overland flooding from the south-east and the watercourse between the site and 17/4277/M. Flood depths of 300-900 mm

expected during the low risk event, with flood velocities generally expected to be less than 0.25 m/s with some intermittent areas over 0.25 m/s.

17/4034/M Intermittent areas of flooding across the site, which appear to correlate with depressions in the topography; however, there is some flooding along the south-western boundary of the site associated with the watercourse at this location in the high, medium and low risk events. Flood depths and velocities are typically 300-900 mm and less than 0.25 m/s.

14. Appendix C of the Cheshire East Council Strategic Flood Risk Assessment (SFRA, August 2013) indicates that the sites are located within a Critical Drainage Area (CDA), which is defined using the following information:

- Historic data on surface water flooding, where available;
- Government surface water flood maps;
- Topographic data (LiDAR and FEH catchment boundaries);
- Sewer networks; and
- Sewerage drainage area maps

15. The SFRA recommends that these areas should be investigated in detail with a specific focus on the potential impacts of development and identifying appropriate surface water management approaches. Neither 18/0294/M nor 17/4034/M make any reference to the CDA designation.

Flood Risk from Other Sources

16. There are no canals or other impounded waterbodies located within the immediate vicinity of the sites. The Flood Risk from Reservoirs map indicates that the sites are not at risk of flooding from such sources. The sites are therefore not assessed to be at risk of flooding from reservoirs, canals or other artificial sources.

17. According to the British Geological Survey Groundwater Flooding Hazard map (**Figure 4**) the sites are not susceptible to groundwater flooding, with the exception of an area of 17/4034/M in the east which is shown to be at low to moderate risk.

Impact of the Proposed Developments

18. Each outline planning application submission was supported by a Flood Risk Assessment report, including a preliminary surface water drainage strategy. Conditions were subsequently imposed on the outline planning permissions requiring the developments to be undertaken in accordance with the submitted details, albeit subject to detailed design.

19. The flood risk assessments identified limited flood risk to the sites, with no specific mitigation measures subsequently proposed. The only exception is the proposed restriction of development in the north of 17/4277/M within the area of identified surface water flood risk (**Figure 3**). It is not clear whether this has been taken into account on the proposed layout submitted as part of the reserved matters application for this site (19/3097/M) as development appears to encroach within this flood outline.

20. The surface water drainage strategy for each site proposes the restriction of runoff rates to greenfield in order to mimic existing conditions, with attenuation provided on-site to store the 1:100 annual probability rainfall event including a 30% increase in rainfall intensity to allow for climate change.

21. The drainage strategy for 17/4034/M also proposes to discharge runoff from a proportion of the site to a public surface water sewer in Chelford Road to the north and Bromley Road to the east; the former ultimately outfalling to the watercourse to the west (refer to the public

- sewer extract in **Figure 5**). United Utilities appears to have provided confirmation that the sewer network is capable of accommodating the proposed discharge rate.
22. The drainage strategy for 18/0294/M originally proposed to discharge runoff to the watercourse between the site and 17/4277/M; however, it is noted that the discharge of Condition 13 application (19/5799/D) now also proposes to dispose of surface water to the public sewer in Chelford Road.
 23. The approach outlined in paragraph 20-22 would appear acceptable in principle; however, each site is proposing to discharge surface water to a watercourse (whether directly or indirectly via public sewer) that has an existing propensity for flooding both within the vicinity of the site and downstream (including a contribution to flows through Cock Wood, an ancient woodland, which is designated as a Local Wildlife Site).
 24. Furthermore, and as detailed previously, no assessment or consideration appears to have been given to the condition, capacity and riparian ownership implications of the watercourses in order to establish whether these are suitable receptors.
 25. Each watercourse is also culverted for a length, whether this be under a road or through the rear gardens of existing properties. There is therefore a risk of culvert blockage, which has not been considered as part of the flood risk assessments undertaken for any of the sites.
 26. In the absence of such information the developers have not adequately demonstrated how flood risk would be managed now and over the lifetime of the proposed development, ensuring that it does not increase flood risk elsewhere, in accordance with national and local planning policy.
 27. It is also noted that the drainage strategy for 17/4277/M (and its associated reserved matters applications) proposes to dispose of surface water runoff from the developed site to the existing watercourse located to the south. It is proposed to restrict surface water discharge rates to the existing greenfield QBar rate, which has been calculated based upon the total site area (stated as 5.5 ha in the calculations). However, no evidence is provided within the submitted documents to confirm that this is the receptor for surface water from the whole of the existing site in order to justify the proposed discharge rate of 34.52 l/s. **Figure 2** indicates that existing ground levels within a proportion of the site fall to the north away from the watercourse and as such may not currently contribute surface water to this. Whilst it is understood that some flows re-enter the watercourse via the indicative flow paths illustrated in **Figure 3** (some of which are below ground), this is not assessed or quantified in the flood risk assessment. The proposed surface water discharge rate may therefore exceed the existing runoff rate from the site to the watercourse. Furthermore, any works on-site could increase runoff onto the site from the area of land to the north/north-west particularly from the land drain identified in **Figure 3**, which does not appear to have been allowed for in the site design. This is contrary to local and national planning policy and guidance (in particular Policy SE 13; Flood Risk and Water Management of the Cheshire East Local Plan Strategy, adopted July 2017), and would have a detrimental impact on flood risk elsewhere.
 28. It is also acknowledged that the proposed site layout submitted in support of the reserved matters application for 17/4034/M (19/5582M) appears to omit any above ground attenuation. It is not clear how surface water will therefore be attenuated; if below ground any storage tanks could be excessive and costly thereby affecting the viability of the scheme.
 29. The drainage strategy submitted as part of the discharge of Condition 13 application for 18/0294/M (19/5799/D) also includes the provision of underground attenuation, with flows subsequently pumped to the public sewer network, ultimately outfalling to the watercourse

that flows through Cock Wood. Such an approach is not considered to be sustainable and it is not clear whether the consequences (on and off-site) associated with pump failure have been assessed. Furthermore, the requirement for a pumped solution suggests that not all of the site is currently contributing surface water runoff to this watercourse. The proposals could therefore increase flood risk to this source.

30. Events exceeding the design of the surface water drainage network should also be considered with flows resulting from rainfall in excess of the 1:100 annual probability rainfall event including an allowance for climate change being managed on-site. Given the existing flood risk issues within this area this is an important consideration, which does not appear to have been accounted for at any site.
31. The Phase II Geo-Environmental Site Assessment (November 2017) undertaken for 18/0294/M states that the site is predominately underlain by peat and silt deposits. It is subsequently concluded that the *"the only viable foundations solution to be the bulk excavation of the peat and silt deposits with the resulting void backfilled to allow a re-engineered development platform"*. Groundwater was also encountered at a shallow depth at the site (<1.0 metres below ground level).
32. The Phase II Geo-Environmental Site Assessment (June 2017) undertaken for 17/4277/M also identified areas of peat in the south, north and centre of the site, which would again require complete excavation with the resulting void backfilled with geotechnically suitable material to support the foundations of the development.
33. The excavation works required to facilitate the development of both sites to the north of Chelford Road (18/0294/M and 17/4277/M) subsequently has the potential to have a significant impact on the hydrogeology of the sites and surrounding area. Whilst this has not been assessed in detail by Weetwood at this stage, the measures required to address this aspect may well affect the viability of the proposed developments.

Summary and Conclusion

34. In considering the reserved matters applications submitted for the three sites to which this technical note relates due consideration must be given to the following aspects:
 - Confirmation that all development is to be located outside the existing areas of surface water flood risk identified in **Figure 3**, particularly in respect of 17/4277/M and 18/0294/M. Where this is not possible, suitable measures should be incorporated in order to ensure that flood risk is not increased elsewhere as a result of the proposed developments.
 - Evidence required regarding the condition, capacity and riparian ownership of the existing watercourses to which it is proposed to dispose of surface water, both within the vicinity of the sites and downstream in order to establish whether these are suitable receptors.
 - The consequences associated with possible culvert blockage should be assessed.
 - Proposed measures to address any deficiencies identified as part of the above should be agreed with the lead local flood authority, noting that any works off-site would require agreement from the riparian land owner.
 - Justification of the proposed discharge rates is required in order to confirm that these would not increase runoff rates from the sites and thus mimic the existing greenfield regime (whether directly to watercourse or indirectly via public sewer).
 - Confirmation of the proposed method for the attenuation of surface water runoff on-site particularly in respect of 17/4034/M and the associated reserved matters application 19/5582M.

- Evidence required to demonstrate that the drainage strategy proposed as part of the discharge of condition application for 18/0294/M (19/5799/D) is the only viable solution and that more sustainable solutions are not feasible.
 - Event exceedance to be assessed and suitable measures incorporated into the site layouts.
 - Any impact on the CDA identified within the SFRA (August 2013) to be assessed.
 - An assessment of the impact of the removal of peat on hydrogeology to be undertaken.
35. We would expect these to be addressed by the developers (or their appointed consultants) for each site prior to any reserved matters permissions being granted in order to ensure that these can be developed safely, without increasing flood risk elsewhere and in accordance with national and local planning policy.

FIGURES

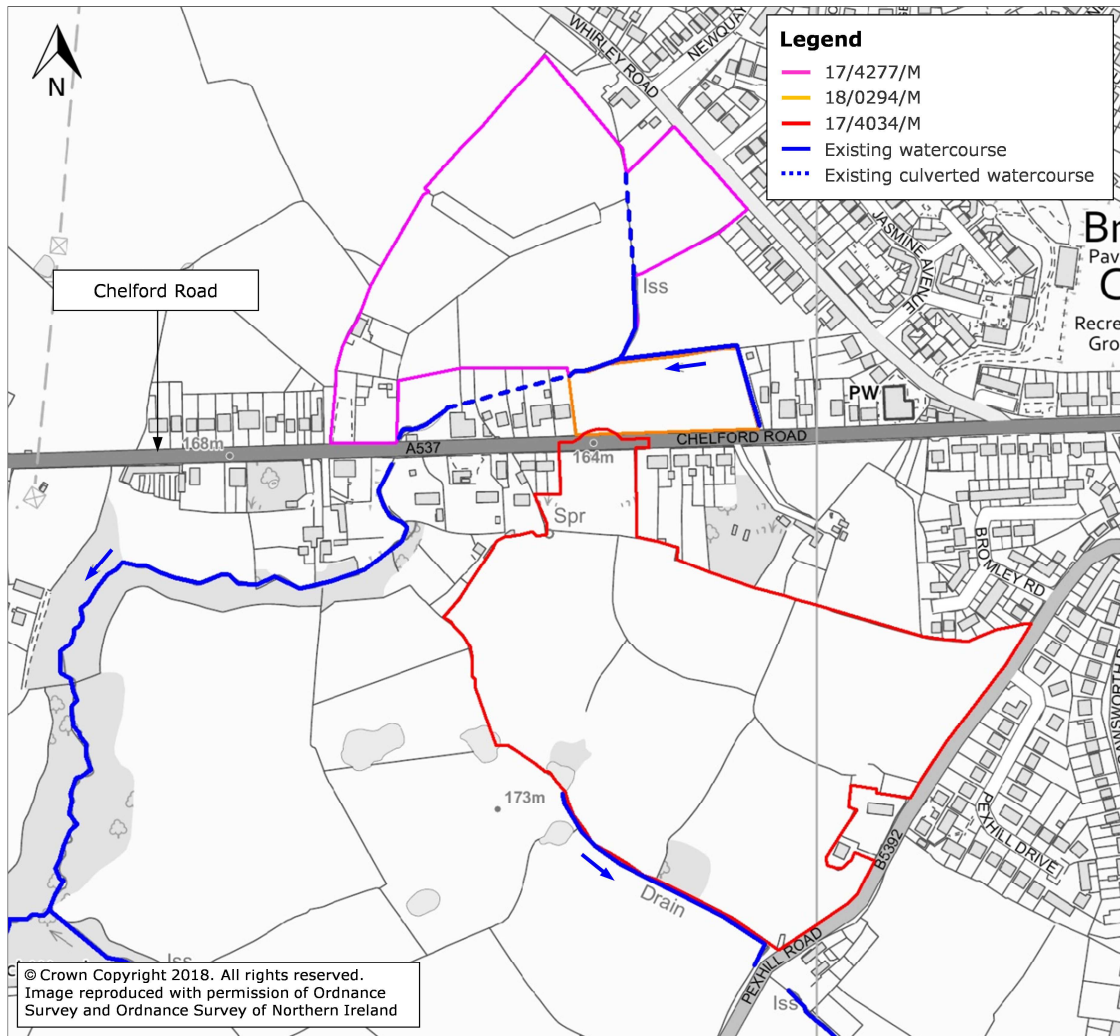


Figure 1: Site Location

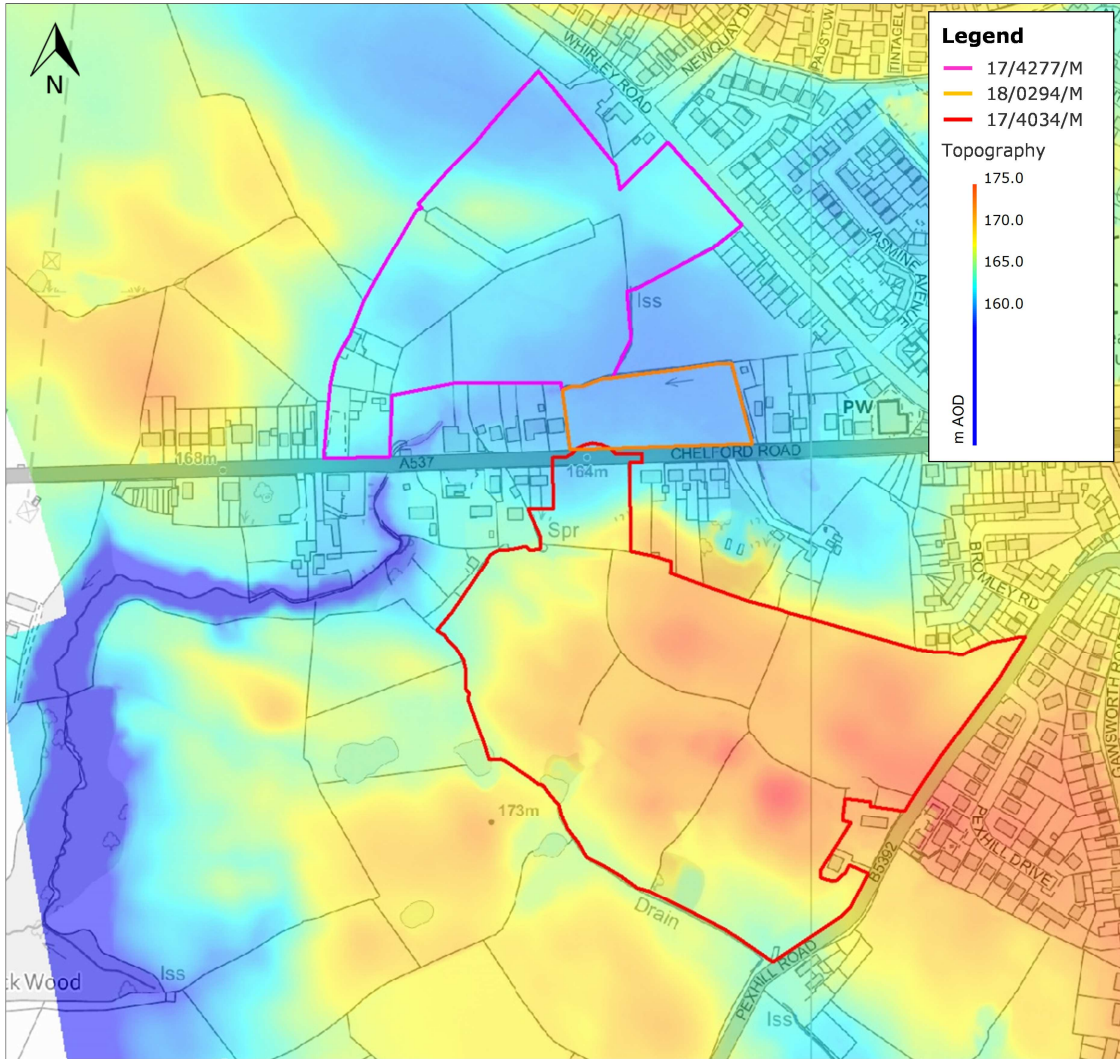


Figure 2: LiDAR

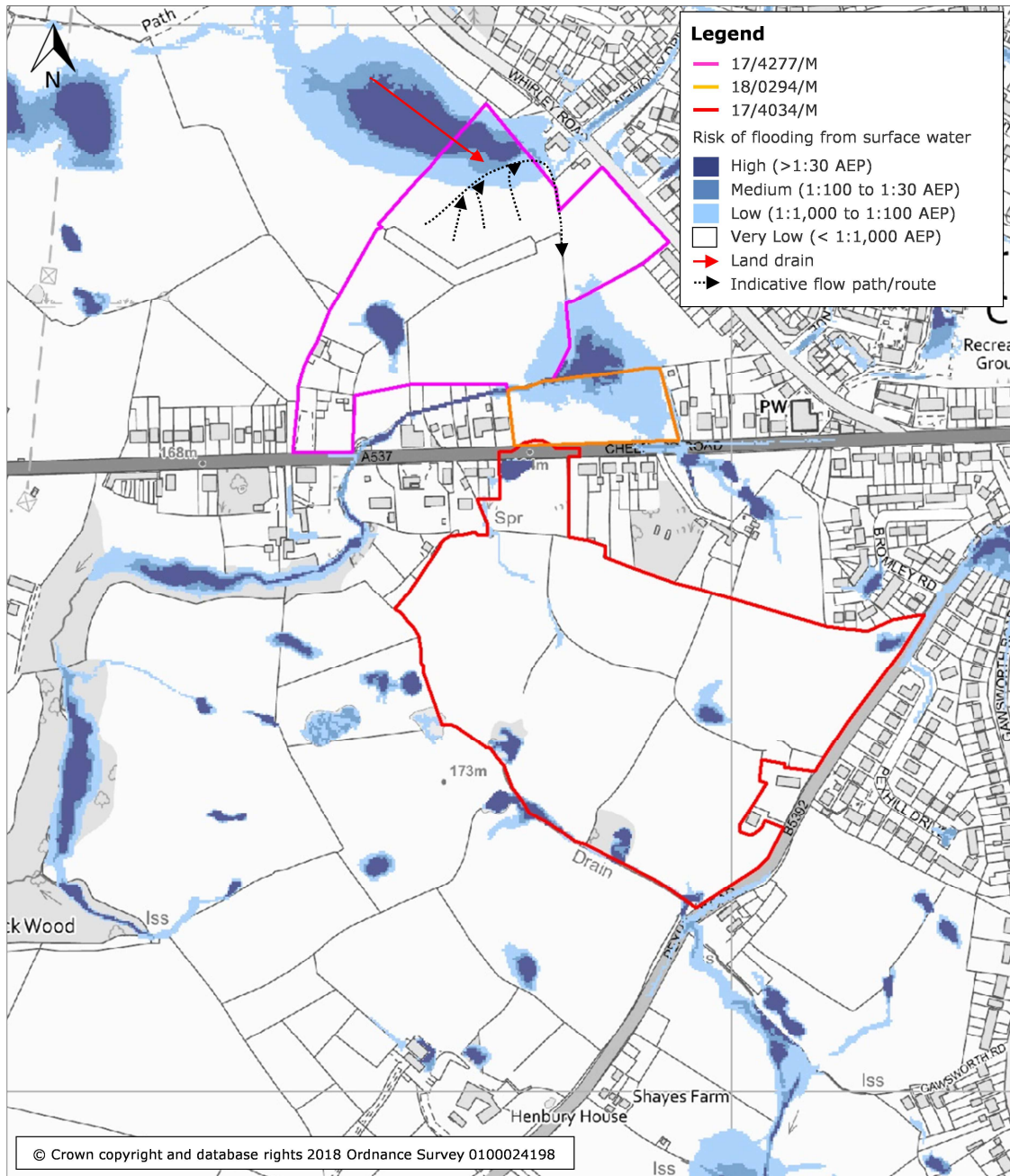


Figure 3: Flood Risk from Surface Water
 (Source: gov.uk website)

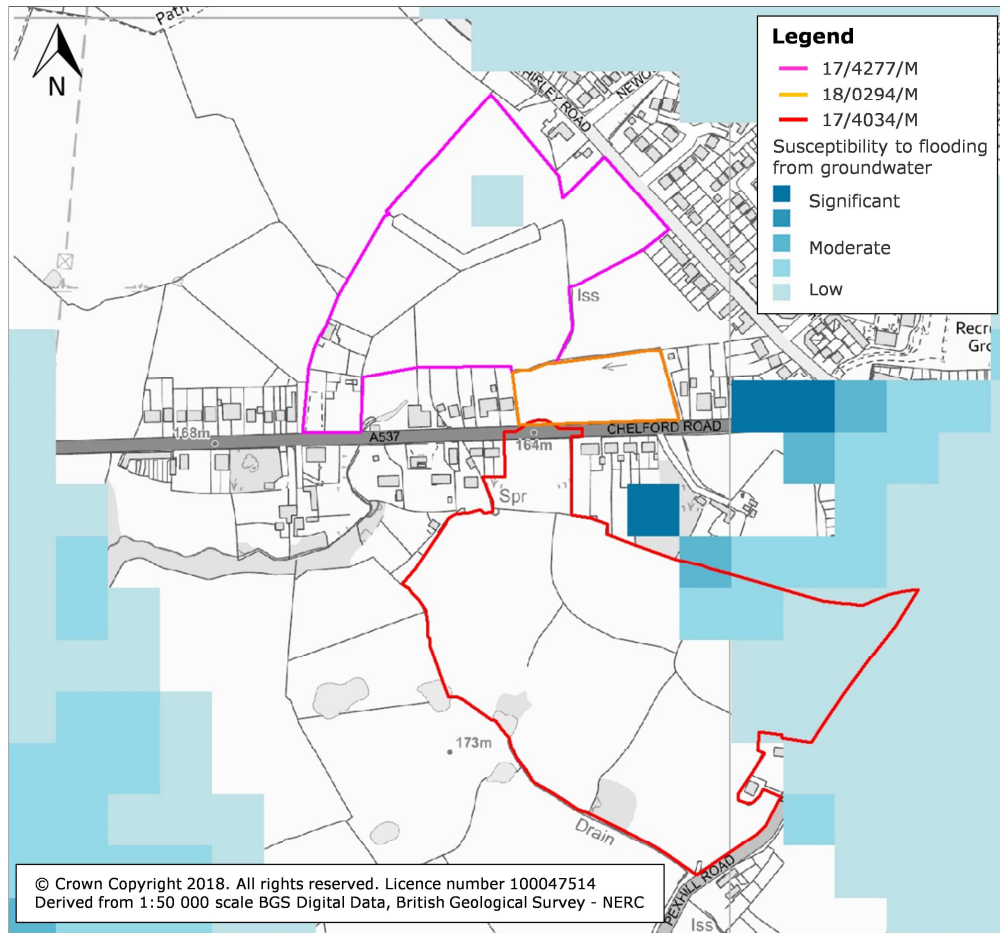


Figure 4: Groundwater Flooding Hazard Map
 (Source: Findmaps)

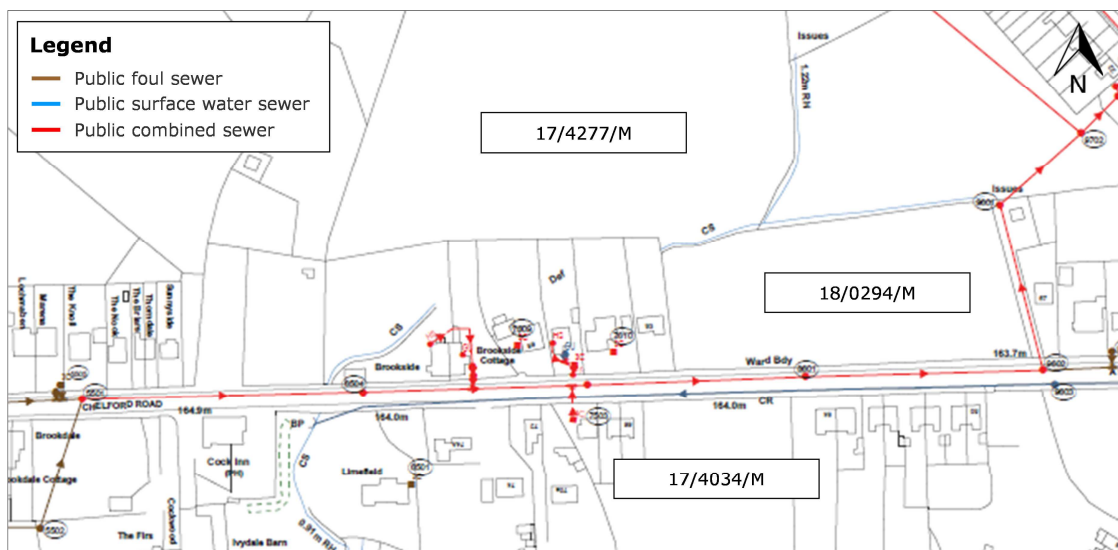


Figure 5: United Utilities Public Sewer Extract

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