

**Peel Park Avenue
Clitheroe**

**Flood risk assessment
for proposed housing**

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1.0 Introduction.

The Peel Park Avenue site is a field area close to the Little Moor area of Clitheroe and on the southeastern side of the town. The site is rough grass at present with a wet/dry ditch on the western side of the site, also the eastern side. New housing is proposed and this report covers flood risks from all sources and new drainage.

2.0 Executive summary

The field area for development is floodzone 1 above any local 1 in 1000 year risk levels. It is currently rough grass and 33 bungalows are proposed. The new hard areas of roads and roofs will generate much more surface water runoff and this will be collected and stored on site to enable the peak outflow rate to be limited to 28.8 l/sec in accord with DEFRA's SC030219 guidance document for new surface water flows from developments. This will improve the current situation of the existing field generating unlimited runoff flows towards Peel Park Avenue in storms and this will reduce and lessen runoff flows and downstream flood risk. A spring is marked on the OS maps as being next to no. 30- this cannot be found on site.

There is an existing surface water drain into Peel Park Avenue surface water sewer from a manhole inside the land belonging to 30 Peel Park Avenue. Applethwaite owns no. 30. This will be the point of outflow for the new development surface water drainage. Foul flows will connect to the existing public foul sewer network in Peel Park Avenue. The site is not at risk from other sources of flood risk as it is higher than the surrounding streams and development to housing will lessen local flood risk because of the on-site storage as required by DEFRA guidelines.

3.0 Existing site, flood risk, history, existing drainage mode.

The existing site is a field area of approx 2 hectares to the south of Peel Park Avenue and next to playing fields. The site has a level range of 97m to 102m AOD with the lowest level in the northwest corner close to Peel Park Avenue. A spring is marked on OS mapping and bases as being next to no. 30 - a site inspection showed this does not now exist. The general ground slope is downhill from 102 at the east side to 97 at the west side. The field is part drained by a ditch which is shown on the site survey but mainly drains onto Peel Park Avenue as the site slopes towards the field entrance. There is another ditch system to the east of the site which flows southwards and then to the south of the site and then southwards again and this joins up with the stream from under the A59 which flows through Higher Standen to join Mearley Brook which flows through Clitheroe. A Roman road is marked along the eastern part of the site.

The site itself is floodzone 1 above any local 1 in 1000 year risk levels and the Environment Agency flood map for planning shows this.

The existing drainage mode of the field is sheet overland flow westwards part to the local western ditch and most out onto Peel Park Avenue. The site is part of an area that drains southwards to eventually flow into the Ribble. A local nearby small catchment has an area of 0.61km² and an annual rainfall depth of 1250mm. DPSBAR the average bedslope is 90.1m /km and BFIHOST is 0.346 indicating on average less absorbent soils. The site itself is part of a similar larger catchment of area of 6.38km².

The small Clitheroe catchment has a response time of approx 2.1 hours. Peak rainfall rates are:

1 in 2.3 year storm (QBAR)- 17 mm/hr

1 in 30 year storm-38 mm/hr

1 in 100 year storm- 53 mm/hr

The local ditch and stream systems are at times unclear from general mapping. The www.gov.uk Jflow/LIDAR surface water mapping whilst approximate (see DEFRA guidance) is of assistance in this case as is a site walkover which has been very useful. The eastern wet/dry ditch starts next to 1 Dyke Nook and flows south- photo 18 shows the eastern stream and its field at a lower level than the site. The Jflow/LIDAR 1 in 1000 year mapping shows the site as not at risk.

4.0 Proposals, new drainage, sustainable drainage.

The proposals are to build 33 bungalows on the site. The new access will be from Peel Park Avenue. The overall site area is approx 2 ha and the developed area will be approx 1.75 ha with the Roman Road area on the eastern side being public open space. Foul drainage will connect to the public foul network and surface water will be stored on site in accord with current DEFRA guidance and discharged at the QBAR greenfield runoff rate of 28.8 l/sec or less to the surface water drain in the garden of no. 30.

An in principle surface water storage volume of 422m³ is shown by the HR Wallingford spreadsheet printout based on 30% climate change central allowance. In view of the site ground conditions being less absorbent (see below) this will be provided in oversize pipes under roads for up to 1 in 30 year volumes and cellular storage under private areas for volumes from 1 in 30 year to 1 in 100 year plus climate change. All house slab levels will be above back of footpath levels.

The BFIHOST catchment average figure of 0.349 indicates less permeable ground for the catchment. The Cranfield Soils mapping shows Soilscape 17- slowly permeable seasonally wet acid loamy and clayey soils. This is confirmed by the Geo-Environmental investigation report of August 2017 by Robert E Fry and Associates of Wigan. 12 trial pits were dug and the site is generally clay with no scope for soakage and sustainable drainage soakaway techniques. Trial pit logs are attached, and percolation tests were not carried out as the impermeable clay conditions applied to all the trial holes and therefore all of the site. However where feasible house driveway runoff will be collected in channel drains at the back of footpath and will then soak into planted beds either side of the back of footpath boundary, and all houses will be provided with water butts.

5.0 Strategic Flood Risk Assessments

The Lead Local Flood Authority is Lancashire CC and the 2014-2017 report 'Lancashire & Blackpool Local Flood Risk Management Strategy' lists surface water management and sustainable drainage as requirements for developments. In general terms the site is not in a 'Critical Drainage Area' -CDA -and there is no requirement to restrict flows further than as required by SC030219 which is the DEFRA guideline document for managing new surface water runoff from developments.

6.0 The effect of DEFRA surface water guidelines in SC030219

The basis of the former SR744 superseded by SC030219 is to restrict new surface water runoff rates from new developments to prevent an increase in flood risk to anyone or anything downstream. The DEFRA guidelines ensure that new surface water runoff is collected inside the site and stored and released at a specified low flow rate so that new developments lessen flood risk.

Greenfield sites which are developed for buildings or houses or new hard drained areas have to follow DEFRA guidelines and store the new surface water runoff and release it at a low 1 in 2.3 year existing greenfield runoff rate (QBAR) to the local sewers watercourses or rivers. The 2 hectare existing area as it stands (rough grass 42% runoff- SPRHOST) will at present produce an approx peak runoff rate during 2.1 hour length small local catchment storms as follows:-

1 in 2.3 year storm - peak rainfall rate 17mm/hr- 39 l/sec
1 in 30 year storm -38mm/hr- 88 l/sec
1 in 100 year storm -53mm/hr- 135 l/sec
1 in 100 year + climate change 20% central rain intensity allowance- 63.6 mm/hr- 162 l/sec

The above calculations are approx to simulate an overhead storm and use the peak rainfall rates from the ReFSR/FEH spreadsheet routine.

When development is complete and all the surface water storage is constructed plus the limiting flow controller on the site surface water outlet is installed the maximum new peak surface water flow rates to the local sewer system from the development area will be as follows

1 in 2.3 year storm 28.8 l/sec
1 in 30 year storm 28.8 l/sec
1 in 100 year storm 28.8 l/sec
1 in 100 year + climate change 28.8 l/sec

This is an improvement on existing present day unlimited greenfield flow rates and will lessen downstream flood risk because the existing field will no longer discharge unlimited flow rates onto Peel Park Avenue and into the gullies and surface water sewer. The limiting runoff rate will be the greenfield runoff rate or less subject to a flow figure to be agreed with United Utilities.

7.0 National Planning Policy Framework and Technical Guidance and EA mapping.

The proposed new housing is classed as 'more vulnerable' in Table 2 and is 'appropriate' in floodzone 1 as per Table 3. There is no need for the exception test, or the sequential test.

Types of flooding that could affect the site are:-

1. River- the site is floodzone 1 above any local 1 in 1000 year risk levels
2. Sea- no tidal influence
3. Land- undrained land slopes towards the eastern site boundary and any runoff will flow into the stream adjacent to the site which is lower than the site.
4. Groundwater- there is a spring shown on the OS maps which a site walkover has shown is not there. The site is generally clay as shown by the site investigation with perched water on top of the clay- see SI report.
5. Sewers* there are no local internet reports of sewer surcharge.
6. Reservoirs canals- none nearby.

Environment Agency mapping is as follows:-

Flood map for Planning- the site is floodzone 1

Risk of flooding from rivers and sea- this shows the effect of any flood defences.

Flood warning- this is not applicable to the site.

Groundwater- the site is not in a groundwater protection zone.

Risk of flooding from reservoirs- this shows reservoir risk- all utility company reservoirs are maintained to a 1 in 10,000 year risk standard under the Reservoirs legislation and this is a very rare and unlikely risk.

Risk of flooding from surface water- this mapping shows surface water flood risk. Pluvial mapping is the subject of a separate EA paper made public in November 2013 and is useful in locating possible ground low points and depressions. We quote- 'the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled'- so whilst the EA mapping shows pathways and confirms the stream paths the mapping generally takes little account of any existing drainage and in practice there is a very low risk. The mapping is based on Jflow software and the EA May 2013 notes -'National Scale Surface Water Flood Mapping Methodology'- state that the method does not take account of existing drainage systems except by subtracting an average rain depth from storm profiles.

Existing land to the east of the site slopes towards it and existing grassland runoff collects in the local ditch/ stream system at the eastern and southern boundaries. Jflow mapping is of use here as it shows no risk or spills onto the site under either 1 in 30 year, 1 in 100 year, or 1 in 1000 year simulated design storms.

8.0 Attachments

This report is a copyright email report and can be transmitted in an email series of attachments or it can be transmitted by dropbox or 'we transfer' with joined up pdf's.

Attachments.(fra02)

Location plans A4

OS plans A3

Site survey A3

Sewer records A3

Cranfield soils data A3

Proposals A3

REFA report extracts and trial pit logs A4

Flood Estimation Handbook CD3 data etc for local catchments A4

HR Wallingford limiting runoff report A4

Environment Agency flood risk mapping A4

Lancashire CC LFRMS extracts

Should you need further data such as survey drawings please email
floodriskengineer@gmail.com

Email files with FRA02

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171207attach1-A4

171207attach2-A4

171207attach3-A3

171207attach4-A3

Fra03 additional attachments

A3

Proposed outfall

Jflow plans 1 in 30yr 1 in 100 yr 1 in 1000 yr

Site photos + index and plan