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Flood Risk Assessment

Preston Road, Longridge

Final - Version 1.0

January 2011

thomas | mackay
environmental solutions 

Leigh House
Varley Street
Pudsey
Leeds
West Yorkshire
LS28 6AN

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Produced by	Simon Jepps BSc MSc
Checked and authorised by	John Jepps BA MSc

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1 INTRODUCTION

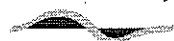
Thomas Mackay Ltd has been instructed to carry out a flood risk assessment (FRA) to accompany a planning application for a proposed residential development off Preston Rd in Longridge, Lancashire. The proposed development is for 60-70 residential units across the site area.

The Environment Agency's Flood Map shows the site to lie entirely within the extent of Flood Zone 1 – that with little or no risk of flooding. However, because the proposals cover an area greater than 1 hectare, PPS25 (Planning Policy Statement 25: Development and Flood Risk) requires a formal flood risk assessment. In line with the Environment Agency Flood Risk Standing Advice v2.0 for the preparation of flood risk assessments, this report will focus on management of site runoff, drainage and other sources of flood risk.

The objectives of this flood risk assessment are:

- Assess the risk of flooding presented to the site.
- Assess the impacts of the proposed development on flooding on site and elsewhere.
- Calculate allowable discharge/runoff and propose recommendations for managing surface water from the new development.
- Provide a flood risk assessment report compliant with PPS25 and its accompanying practice guidance which will provide the basis for consultation on the outline planning application for the proposed development.





2 SITE DESCRIPTION, BACKGROUND AND FLOOD RISK

2.1 SITE DESCRIPTION

The application site is located off Preston Road (B6244) south of the town of Longridge in Lancashire. Access to the site is provided from Preston Road to the east of the site. The site entrance has a NGR of SD 602 360, and covers an area of 2.55 hectares. The location and extent of the site is shown in **Figure 1**.

Figure 1. Site Location and Extent

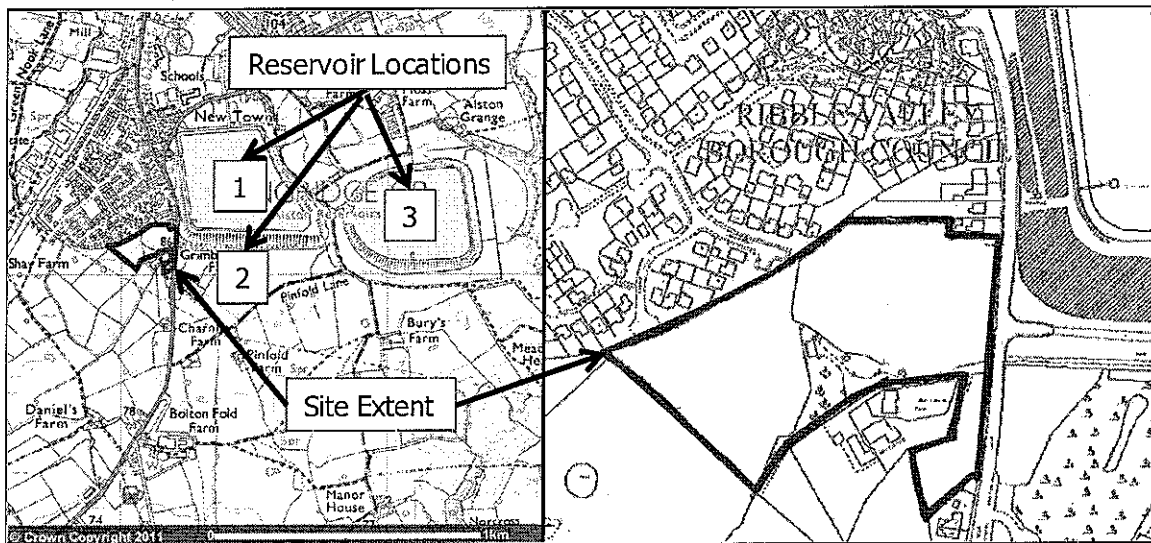


Image produced from Ordnance Survey's Get-a-map service. Image reproduced with permission of Ordnance Survey and Ordnance Survey of Northern Ireland.

The majority of the site area is currently used for grazing by Grimbledeston Farm. The majority of the surface is grassed, with a small area in the centre of the site being covered by mature trees. There is also an open pond in this wooded area, which is to be retained as part of the proposed development. A metalled track currently runs along the southern border of the site to an existing building in the centre of the wooded area.

A topographic survey has been provided for reference when preparing this report. This is provided in **Appendix A**. A review of the topographic survey shows land elevations to be around 83.60mAOD in the southern corner of the site, increasing to over 86.90mAOD along the northern site boundary.

The site is bordered to the west and south by farmland and to the north by a residential development. Two reservoirs are located on the eastern side of the Preston Road. These are the Alston Reservoirs (numbers 1 and 3), owned by United Utilities. A third reservoir (Alston Reservoir Number 2) was previously located along the eastern boundary of Preston Road; this has recently been emptied. The location of these reservoirs is indicated in **Figure 1** (above). Both reservoirs main spillways are located on the eastern boundaries, furthest away from the site.

The remains of an old drainage channel follow the eastern site boundary with Preston Road. It is believed that this used to carry flow from overflow from Alston Reservoir 1 reservoirs to the east of the site, before the residential development to the north of the site truncated this flow route. This channel is no longer active.

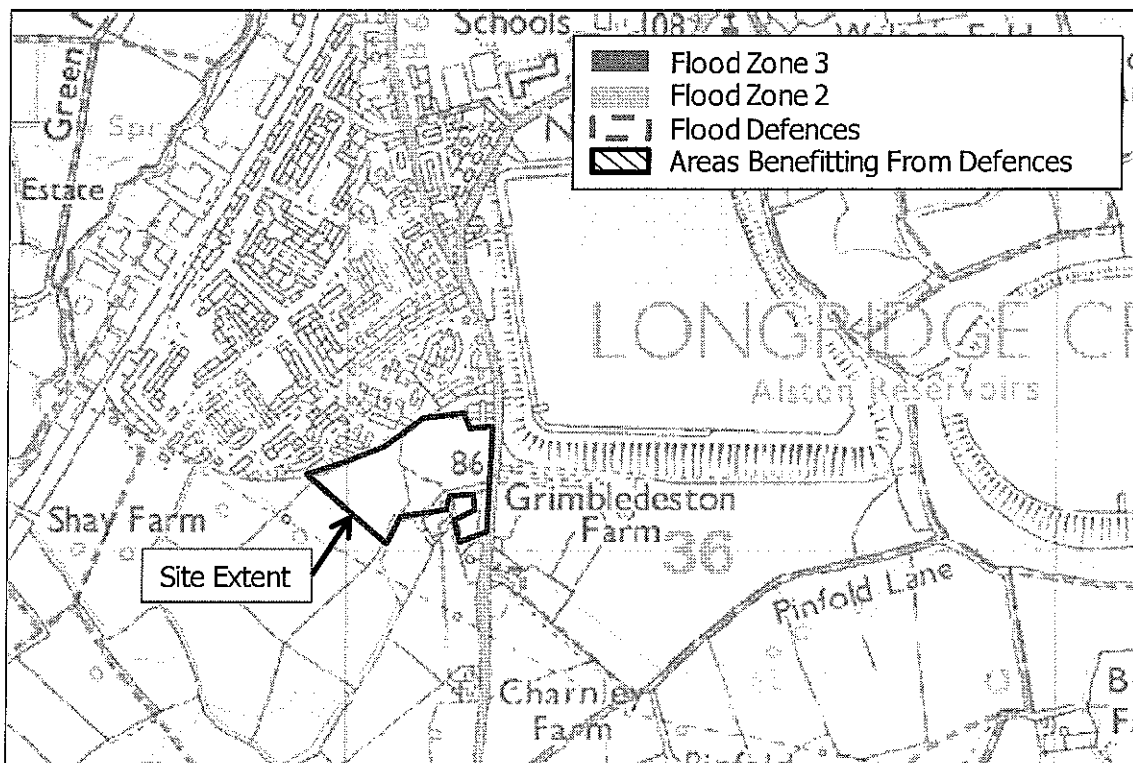
2.2 PROPOSALS

It is proposed to construct 60-70 new residential units on the site. The primary access to the site will remain from Preston Road to the east.

2.3 FLOOD RISK DEFINITION

The Environment Agency's Flood Map was accessed online and is shown in **Figure 2** below. This shows the site to lie within Flood Zone 1 (the area that is not shown to be covered by Flood Zones 2 or 3 in **Figure 3**). Flood Zone 1 is defined by Table D.1 of PPS25 as areas with a low probability of flooding, with less than a 0.1% risk of flooding in any given year. From a flood risk perspective all land uses are appropriate in this flood zone as shown in Table D.1 of PPS25.

Figure 2. Environment Agency Flood Map



The location of new homes within Flood Zone 1 is appropriate and is sequentially preferable to other zones. This means that the PPS25 Sequential and Exceptions Tests are not required to be applied to the proposed development.

2.4 DATA SOURCES

All sources of data referred to during production of this report are detailed below.

2.4.1 Topographic survey

A topographic survey of the site area was undertaken by the Campbell Driver Partnership. This was presented to OS datum and national grid, and is presented in **Appendix A** of this report.

2.4.2 Environment Agency Data Request

The Environment Agency was contacted to investigate any history of flooding at the site. The response from the Environment Agency confirmed that it does not hold any record of any flooding at the site from any sources.

2.4.3 Site Visit

The site and surrounding area was visited on the 13th of January 2011. Relevant information was collected and is referred to where appropriate throughout this report.

2.4.4 Strategic Flood Risk Assessment

During May 2010 a Level 1 SFRA (Strategic Flood Risk Assessment) was produced for Ribble Valley Borough Council. Information presented in the SFRA is referred to where appropriate throughout this report.

2.5 POTENTIAL SOURCES OF FLOODING

2.5.1 Flooding From Rivers

Review of Ordnance Survey mapping and investigation during the study area walkover confirmed that there are no active watercourses in the vicinity of the site. The nearest watercourses are located some 500m to the east south east of the site (brooks shown to flow from north to south to the east of Alston Reservoir 3), forming from moorland areas and draining to the Ribble (to the south). These open watercourses are for the most part set at an elevation lower than the site.

In summary, fluvial flooding is not considered to pose a significant threat to the proposed development.

2.5.2 Flooding From The Sea

There is no significant risk of flooding from the sea at the site as land elevations are in excess of 83mAOD.

2.5.3 Flooding From Groundwater Sources

Groundwater flooding occurs when water levels in the ground rise above surface elevations. It is most likely to occur in low-lying areas underlain by permeable rocks (aquifers).

Soils around the site are slowly permeable and seasonally wet loam and clay soils and do not overlie an aquifer. BGS (British Geological Survey) mapping for the site area shows that the underlying bed rock geology is Pendle Grit; consequently the area is not highlighted in the BGS 'areas susceptible to groundwater flooding' dataset.

There is a significant slope over the site and surrounding area which means that any discharge from groundwater in the vicinity of the site would drain away naturally towards the floodplain of the Ribble (to the south).

In summary, the combination of the topography in the vicinity of the site and soil type / geology means that groundwater flooding is not considered to present a significant risk to the proposed development.

2.5.4 Flooding From The Land

As with groundwater flooding, the natural gradient of the development site towards the south means that there is not likely to be any ponding of surface water should surface water run onto the site. Furthermore the topography of the area upslope from the site means runoff from the developed area of Longridge will not all be directed to the site, and will runoff to the south towards the River Ribble along the shoulder of the valley (upon which the site is located).

Consequently, flooding from surface water runoff is not considered to be a significant risk to the development.

2.5.5 Flooding From Sewers

There are no records of flooding from sewers covering the site area.

In recent years some flooding from sewers has been observed in the northern areas of Longridge. United Utilities has recently invested more than £700,000 upsizing the main sewer network and decreasing the risk of overloading and subsequent flooding from this source. Improvement works focussed on areas to the north of Longridge which had previously suffered from sewer flooding.

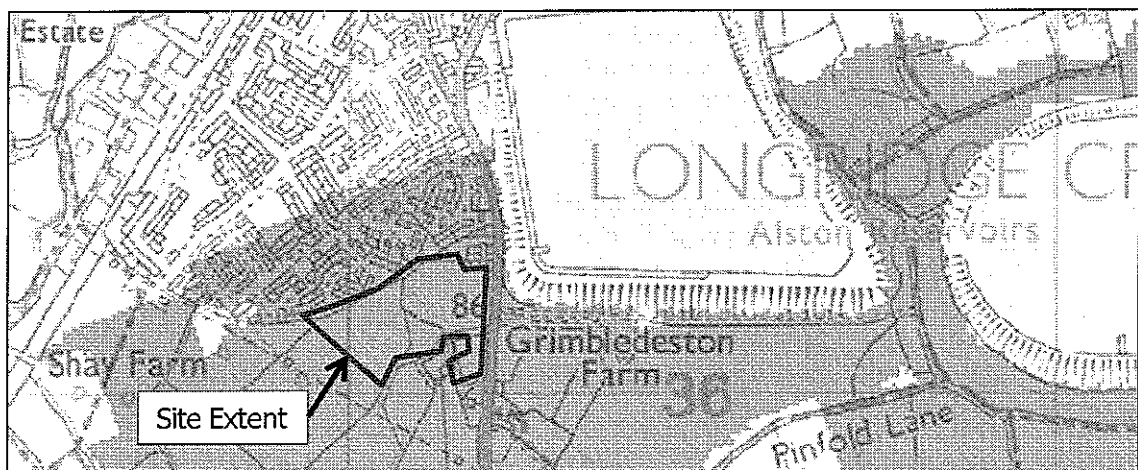
Similarly to other sources of flooding, there is a significant slope over the site and surrounding area which means that any overland flow from sewer flooding upstream of the site would drain away towards the floodplain of the Ribble (to the south), and would not be directed specifically towards the site.

2.5.6 Flooding from Manmade Structures

As discussed earlier in this report, three reservoirs were historically situated to the east of the proposed development site. Of these, the most southerly reservoir has recently been drained and decommissioned leaving only reservoirs 1 and 3 full.

The reservoirs present a risk to the surrounding area should the reservoir embankments fail or be overtopped. Areas at risk are highlighted within the Environment Agency 'Risk of flooding from reservoirs' area maps. This is shown below in **Figure 3**, which shows the site to lie within the modelled area of risk.

Figure 3. EA Risk of flooding from reservoirs map



As stated on the Environment Agency website, reservoirs in the UK have a good safety record with no incidents resulting in the loss of life since 1925. The Environment Agency act as the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be inspected and supervised by reservoir panel engineers. The Environment Agency ensures that reservoirs are regularly inspected and essential safety work is carried out. Given the high standard of maintenance required, flooding from reservoirs is considered very unlikely.

Local authorities have recently been tasked with developing emergency plans for reservoir flooding. However due to the recent nature of this responsibility reservoir flood plans for Longridge are not currently available. Section 4.1 of the Level 1 SFRA for Ribble Valley states that "Under DEFRA guidelines, United Utilities, which own and manage some reservoir facilities in the area, are subject to strict controls on the publication of information relating to such matters and do not consider that potential reservoir related flooding issues would be used as grounds to refuse planning permission."

In summary, whilst the site area is shown to be in an area at risk of flooding from reservoirs, the probability of flooding from this source affecting the site is considered to be very low. Emergency response plans specifically aimed to reduce risk from reservoir flooding are currently being developed for the Longridge area, meaning that the residual risk from this source to the proposed development is anticipated to decrease once these plans are put into effect.



3 SURFACE WATER MANAGEMENT

PPS25 requires that the impact of the new development on site runoff should not increase runoff rates over and above those presented from the pre development situation, and where possible betterment should be provided¹. Although this planning application is at the outline stage, the following sections derive allowable discharge rates for the site in order to ensure compliance with PPS25 and local authority policies.

3.1 PEAK RUNOFF CALCULATIONS

3.1.1 Greenfield Runoff Rates

The majority of the site area is classed as greenfield. An assumption has been made that the small proportion of impermeable surface areas on site (including the access track and the stable building) drain to the surrounding greenfield areas, meaning that the site when considered as a whole acts as greenfield.

The greenfield runoff rate is calculated using the method described in the Institute of Hydrology 124² report. This method derives the peak runoff for the mean annual flood (QBAR) which is then scaled using regional growth curves to determine peak discharges for other return period events. For small catchments, calculations are derived using an area of 50ha and scaled in line with the methodology. The equation used is shown below and the parameters and results are shown in **Table 2** below.

$$\text{QBAR Rural (l/s)} = 1.08 * (\text{Area}/100)^{0.89} * \text{SAAR}^{1.17} * \text{SOIL}^{2.17}$$

Table 1. Parameters and Results for Peak Runoff Calculations (IH124)

Parameter	Description	Current Site Configuration
Area	Area producing runoff (ha)	2.55 ha
SAAR	Standard Annual Average Rainfall (1941-70)	1000mm
SOIL	Derived from winter rainfall acceptance map	0.45 (WRAP class 4)
QBAR	Mean annual peak runoff from site	17.0 l/s
QBAR / Ha	Greenfield runoff rate	6.7 l/s/Ha

Table 1 shows that for the pre development situation, the peak mean annual runoff from the site is estimated to be 17.0 l/s.

3.2 ALLOWABLE DISCHARGE RATES

Calculations have been undertaken in order to ensure that the proposed development will not increase rate of runoff from the site. The peak mean annual runoff from the site is estimated to be 17.0 l/s.

At the detailed planning stage, detailed drainage design should be undertaken to demonstrate that the proposals will not result in this rate of runoff from the site being increased as a result of the proposed development.

¹ Telephone conversation between Paul Sadowski (Environment Agency) and John Jepps (Thomas Mackay Ltd)

² Marshall and Bayliss (1994) Report No 124 Flood Estimation for Small Catchments, Institute of Hydrology

It is recommended that a plan for the management of surface water from the developed site is submitted to the local authority for approval, prior to the detailed planning application being made.



4 CONCLUSIONS

Thomas Mackay Ltd has been instructed to carry out a flood risk assessment (FRA) to accompany a planning application for a proposed development at land off Preston Road in Longridge, Lancashire. The development is to include 60-70 residential units consisting of a mix of house types.

The Environment Agency's Flood Map shows the site to lie in Flood Zone 1 – that with little or no risk of flooding from fluvial or coastal sources. Other sources of flood risk have been considered and the site is found to be at a low risk of flooding from all sources, with the exception of flooding from reservoirs.

The site area is shown to be in an area at risk of flooding from reservoirs, the probability of flooding from this source affecting the site is considered to be very low. Emergency response plans specifically aimed to reduce risk from reservoir flooding are currently being developed for the Longridge area, meaning that the residual risk from this source to the proposed development is anticipated to decrease as these plans are put into effect.

Calculations have been undertaken in order to ensure that the proposed development will not increase rate of runoff from the site. The peak mean annual runoff from the site is estimated to be 17.0 l/s.

At the detailed planning stage, detailed drainage design should be undertaken to demonstrate that the proposals will not result in this rate of runoff from the site being increased as a result of the proposed development. It is recommended that a plan for the management of surface water from the developed site is submitted to the local authority for approval, prior to the detailed planning application being made.

Based on the information presented in this report, from a flood risk perspective the proposed development is considered appropriate at the site.



APPENDIX A TOPOGRAPHICAL SURVEY (DRAWING NO. 10.192)

revisions:



campbell driver partnership
architects designers surveyors

client: grimbledon farm trustees

project: residential development
preston road longbridge

sheet: topographical survey

sheet no:	10.192	of	02
scale:	1:500	at	
date:			
drawn:			
checked:			

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