



Flood Risk Assessment

*Submitted as part of the Outline Planning Application for
Land to the east of Clitheroe Road (Lawsonsteads Farm), Whalley*

COMMERCIAL ESTATES GROUP



LAND EAST OF CLITHEROE ROAD, WHALLEY

FLOOD RISK ASSESSMENT Final Report v1.3

February 2013

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1 INTRODUCTION

Weetwood has been instructed by Commercial Estates Group to undertake a Flood Risk Assessment (FRA) in association with the proposed development of an area of land located to the east of Clitheroe Road, in accordance with the requirements of the National Planning Policy Framework (NPPF) and its supporting Technical Guidance.

Weetwood prepared a FRA for the site in February 2011 to support a planning application¹ for a mixed use development comprising ~300 residential dwellings, a nursing home and primary school. The application was refused in January 2012 on matters not related to flood risk or drainage. The FRA was previously submitted to and accepted by the Environment Agency (EA)².

A planning application³ for a reduced redline boundary was subsequently submitted. This was supported by an updated version (March 2012) of the FRA prepared by Weetwood. The application was approved in November 2012.

1.1 SITE LOCATION

The site is located at Ordnance Survey National Grid Reference SD 737 365, as shown in **Figure 1**. The site is approximately 14.53 hectares (ha) in area.



Figure 1: Site Location

¹ Ref: 3/2011/0111

² EA letter dated 1 April 2011 (EA Ref: CE/2011/104484/01-L02)

³ Ref: 3/2012/0687

1.2 EXISTING AND PROPOSED DEVELOPMENT

The majority of the site is currently greenfield.

Proposals are for the development of 260 residential dwellings and a school with associated access and landscaping (**Appendix A**).

Proposals for residential and educational establishment use are classified as 'more vulnerable development' in Table 2 of the NPPF Technical Guidance.

1.3 SITE LEVELS

A topographic survey of the site has been undertaken by Met Surveys Ltd and is provided in **Appendix B**. This has been utilised to develop a digital elevation model as illustrated in **Figure 2**.

Levels to the west of Watercourse A are shown to slope in a south/south-westerly direction from 59.00 to 54.00 metres Above Ordnance Datum (m AOD). Levels to the east of Watercourse A fall from 85.00m AOD in the north-east to 57.00-58.00m AOD in the south/south-west.

Levels to the south of Watercourse C fall from 58.00m AOD in the north-east to 54.00m AOD in the south-west.

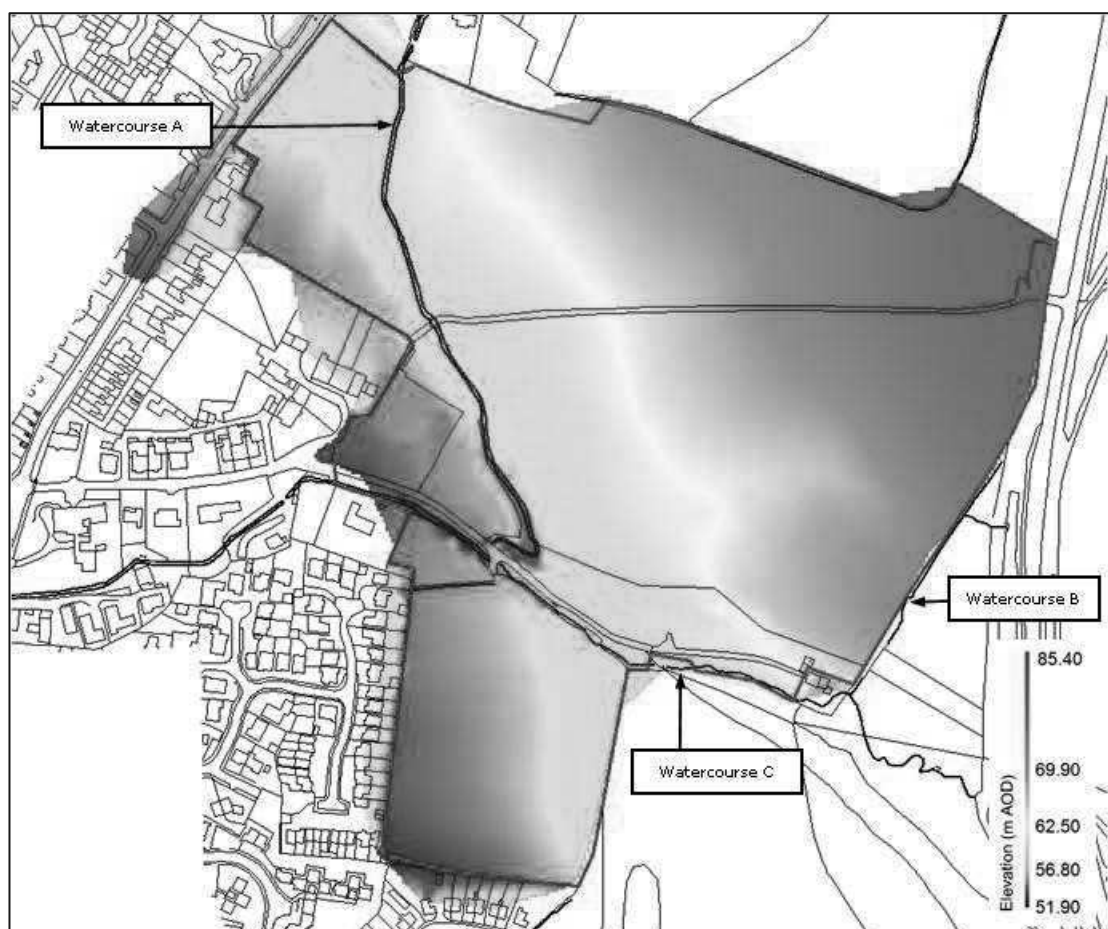


Figure 2: Digital Elevation Model Derived from Topographic Survey

1.4 ACCESS AND EGRESS

Access and egress to the site is currently provided via Clitheroe Road to the west. Levels along this route are in the region of 55.20-59.00m AOD adjacent to the site.

2 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The aim of the NPPF and its supporting Technical Guidance is to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed.

2.1 FLOOD ZONE DESIGNATION

Table 1 of the NPPF provides the definitions for each of the flood zones, which are summarised as follows:

- **Flood Zone 1: Low Probability.** Land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year.
- **Flood Zone 2: Medium Probability.** Land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding or between a 1 in 200 and 1 in 1000 annual probability of flooding from the sea in any year.
- **Flood Zone 3a: High Probability.** Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
- **Flood Zone 3b: The Functional Floodplain.** Land where water has to flow or be stored in times of flood. The identification of the functional floodplain should take account of local circumstance and not be defined solely on rigid probability parameters. However, land which would flood with an annual probability of 1 in 20 or greater in any year should provide a starting point for consideration and discussion.

2.1.1 Environment Agency Flood Map

According to the Environment Agency (EA) Flood Map (**Figure 3**) the site is located in Flood Zone 1.

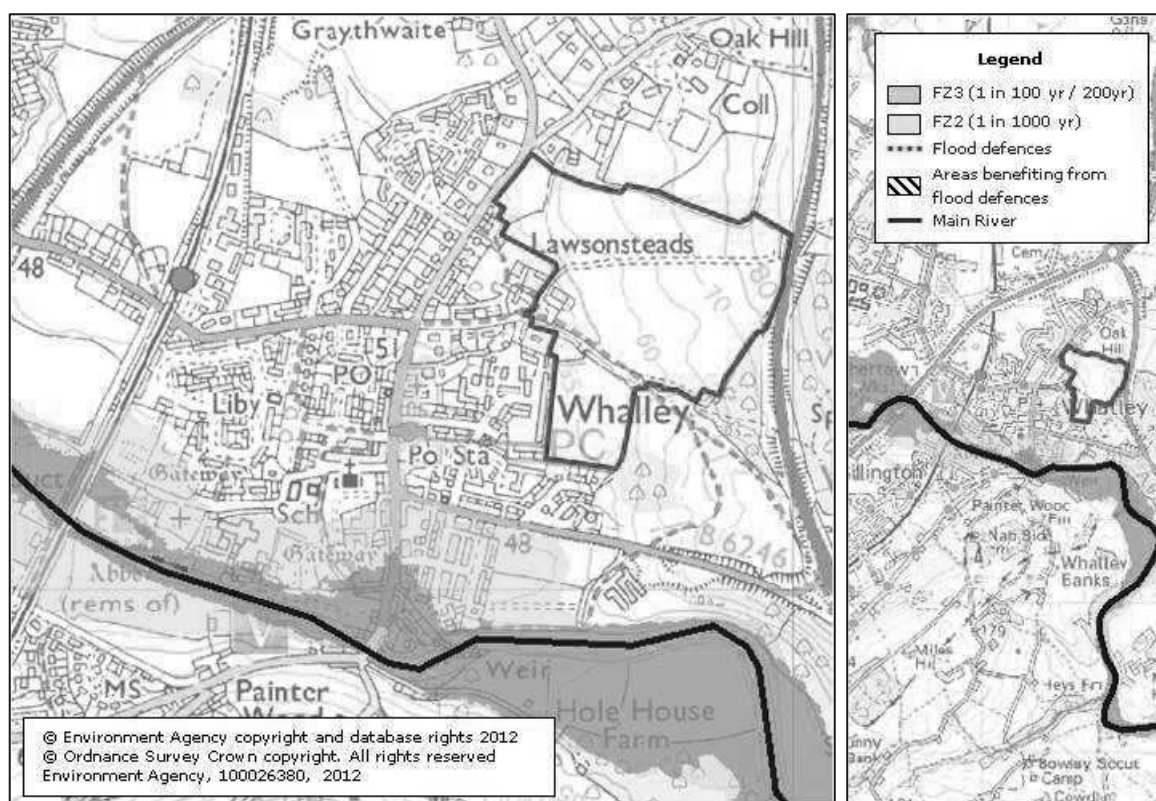


Figure 3: Environment Agency Flood Map

(Source: Environment Agency website)

2.1.2 Strategic Flood Risk Assessment

A Level 1 Strategic Flood Risk Assessment (SFRA) was published by Ribble Valley Borough Council (BC) in May 2010.

Map 1 of the SFRA reaffirms the sites current Flood Zone 1 designation.

2.2 SEQUENTIAL TEST

The aim of the Sequential Test (as outlined in Chapter 10 of the NPPF and paragraphs 3-5 of the Technical Guidance) is to encourage development to be located in areas at the lowest probability of flooding.

The proposed development site is situated within Flood Zone 1 and therefore satisfies the requirements of the Sequential Test.

2.3 DEVELOPMENT AND FLOOD RISK

Table 1 of the NPPF Technical Guidance states that for development proposals on sites in Flood Zone 1 comprising one hectare or above, the vulnerability to flooding from other sources and the effect of the new development on surface water runoff should be incorporated in a FRA.

Other potential sources of flooding are discussed in **Section 3** of this report. The effect of the new development on surface water runoff is addressed in **Section 5**.

3 FLOOD RISK

3.1 HISTORICAL RECORDS OF FLOODING

The EA has provided a flood map illustrating the extent of flooding that was reported in Whalley in June 2012 (**Figure 4**). The EA does not hold any records of flooding at the site itself.

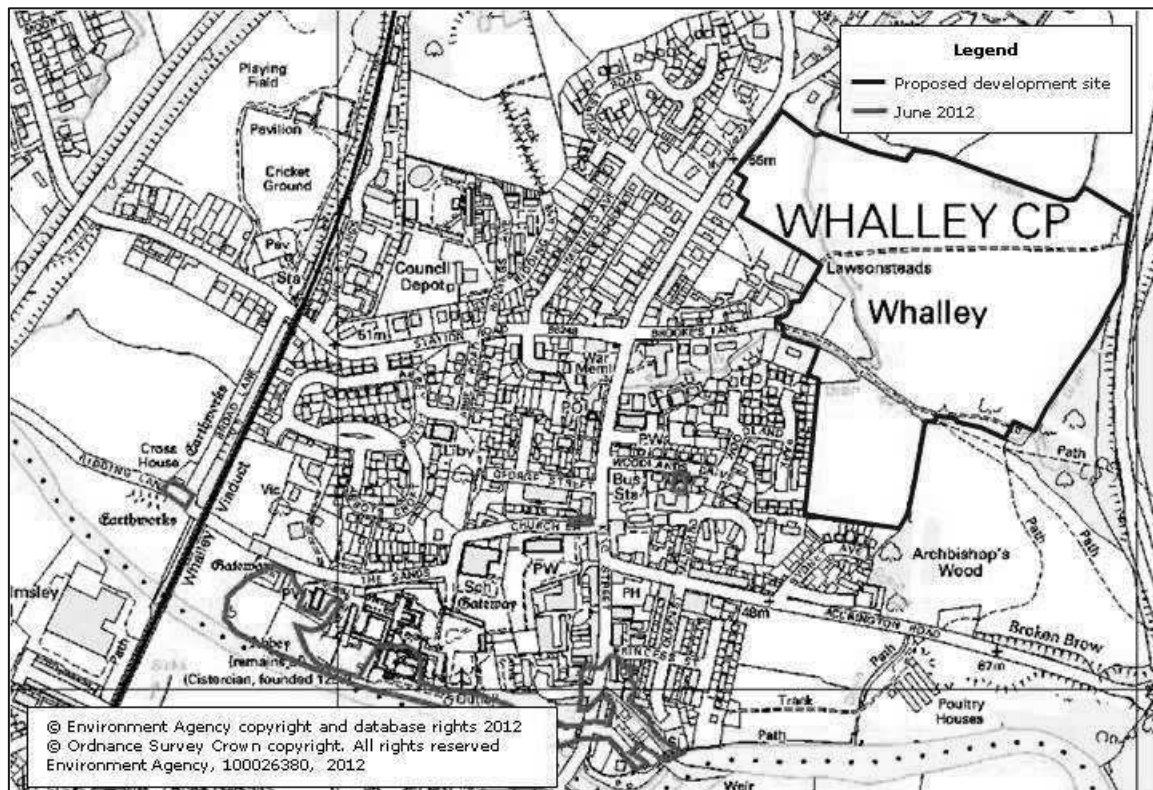


Figure 4: Environment Agency Reported Flooding Map

Approximately 0.20km to the south of the site, Watercourse C (**Figure 5**) is culverted under King Street. Lancashire County Council (CC) has advised⁴ that in the past debris has built up at the trash screen causing the King Street culvert to surcharge, resulting in floodwaters flowing in a southerly direction down King Street. The trash screens are inspected weekly by Lancashire CC, or more frequently if heavy rain is forecast. This does not pose a flood risk to the site.

3.2 FLUVIAL

A number of existing watercourses are located through/adjacent to the site as illustrated in **Figure 5**.

⁴ Telecom C Cornmell (Weetwood) and M Barnes (Lancashire County Council) on 12 October 2010

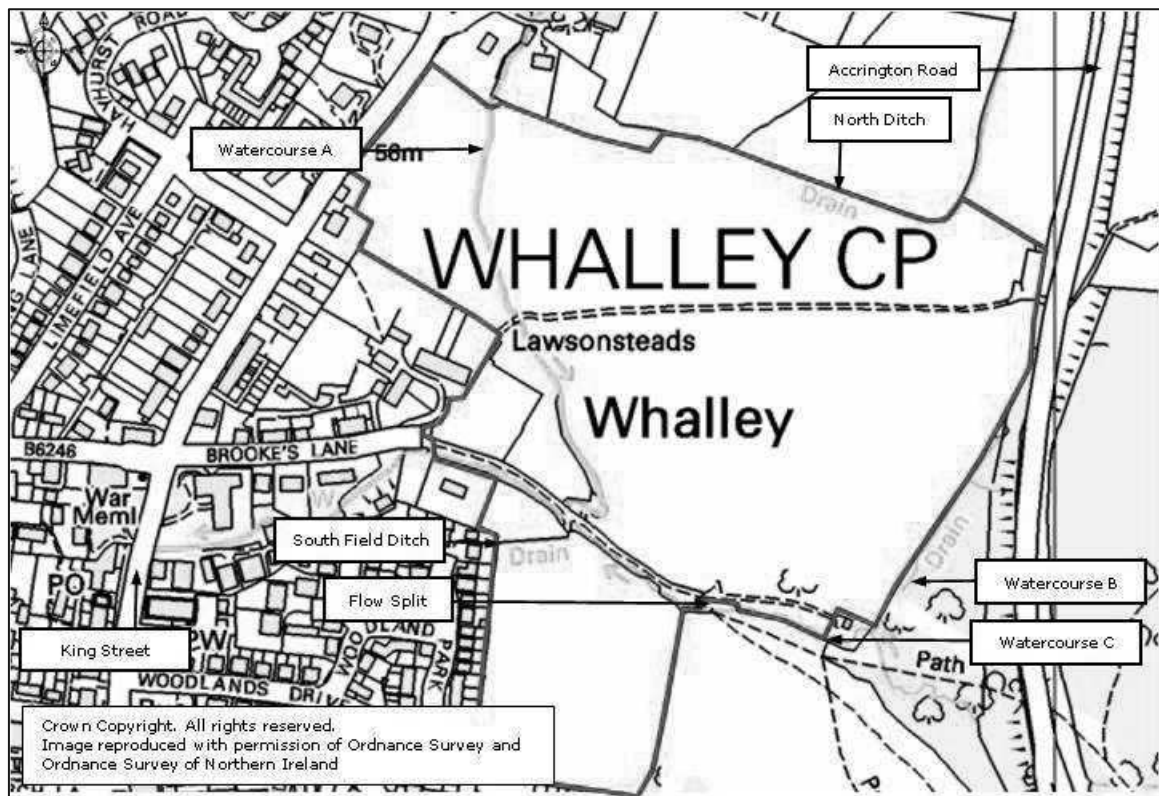


Figure 5: Watercourses

3.2.1 Watercourse A

Watercourse A flows in a south-easterly direction through the site. Ground levels on the right (west) bank generally slope away from the watercourse towards the west. An existing embankment runs along the right bank of Watercourse A. The embankment gives way to a flood defence in the form of a wooden board slotted between concrete blocks at the location of a ford crossing.

The risk to the site from this source will be mitigated through the implementation of the measures proposed in **Section 4** and the surface water drainage strategy in **Section 5**.

3.2.2 Watercourse B

According to the OS map Watercourse B flows under Accrington Road before flowing in a southerly direction adjacent to the eastern boundary of the site.

During a site visit on 17 September 2010, it was observed that the channel bed was several metres below the adjoining land to the west for most of its reach. However the right bank diminished along one section, such that the bed levels were only a short distance below this. In times of high flow, there may be a risk of overtopping of the right bank at this location.

The risk to the site from this source will be mitigated through the implementation of the measures proposed in **Section 4** and the surface water drainage strategy in **Section 5**.

3.2.3 Watercourse C

According to the OS map Watercourse C flows under Accrington Road before receiving inflows from Watercourse B and proceeding in a westerly direction. A flow split structure (see **Figure 5**) diverts most of the flow southwards, where it ultimately discharges to the River Calder according to Lancashire CC⁵. The remaining flow proceeds in open channel in a westerly direction through the site. The open channel is then culverted beneath an access track immediately downstream of which Watercourse A converges with Watercourse C.

The risk to the site from this source will be mitigated through the implementation of the measures proposed in **Section 4** and the surface water drainage strategy in **Section 5**.

3.2.4 Ditches

Two ditches are located within the vicinity of the site; North Ditch to the north-east and South Field Ditch towards the south. Both of these ditches were dry during a site visit on 17 September 2010.

Ensuring no increase in surface water runoff from the site following development (refer to **Section 5**) should address any potential flood risk from these sources.

3.3 RESERVOIRS, CANALS AND OTHER ARTIFICIAL SOURCES

Reservoir or canal flooding may occur as a result of the facility being overwhelmed and/or as a result of dam or bank failure.

There are no Canals located within the immediate vicinity of the site. The EA Risk of Flooding from Reservoirs Map indicates that the site is not at risk of flooding from such sources. The site is therefore not considered to be at risk of flooding from reservoirs, canals or other artificial sources.

3.4 GROUNDWATER

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. It is most common in low-lying areas overlain by permeable soils and permeable geology, or in areas with a naturally high water table.

According to the Soilscape maps produced by the National Soils Research Institute⁶ soil conditions at the site and within the surrounding area are described as '*slowly permeable seasonally wet acid loamy and clayey soils*'. The permeability of the underlying soil conditions and the subsequent propensity for groundwater flooding may therefore be considered low.

Paragraph 4.25 of the SFRA states that '*following consultation with the EA, no evidence of groundwater flooding in the area has been identified*'.

⁵ Telecom C Cornmell (Weetwood) and M Barnes (Lancashire County Council) on 12 October 2010

⁶ Soilscape www.landis.org.uk/soilscape/

Recognising the information contained within the SFRA and the Soilscales maps the propensity for groundwater flooding may be considered low. However, any residual risk of flooding from this source will be mitigated through the implementation of the measures proposed in **Section 4** of this report.

3.5 SURFACE WATER

Surface water flooding comprises pluvial, sewer and highway drains and gullies.

3.5.1 Pluvial

Pluvial flooding results from rainfall-generated overland flow, before the runoff enters any watercourse or sewer, or where the sewerage/drainage systems and watercourses are overwhelmed and therefore unable to accept surface water. Pluvial flooding is usually associated with high intensity rainfall events but may also occur with lower intensity rainfall where the ground is saturated, developed or otherwise has low permeability resulting in overland flow and ponding within depressions in the topography.

As detailed previously, according to the Soilscales maps the underlying ground conditions are described as '*slowly permeable seasonally wet acid loamy and clayey soils*'. There may therefore be the propensity for surface water flooding at the existing site. However, as detailed in **Section 1.3** and illustrated in **Figure 2** site levels are generally shown to fall in a south/south-westerly direction and into the various watercourses/ditches located through/adjacent to the site. As such surface water would not be expected to accumulate to any significant depth at the site itself.

The propensity for pluvial flooding at the site is therefore considered to be low. However, any residual concern regarding flood risk from this source will be addressed through the mitigation measures as detailed in **Section 4** and the surface water drainage strategy in **Section 5**.

3.5.2 Sewer

Sewer flooding can occur when the capacity of the sewer system is overwhelmed by heavy rainfall, becomes blocked or is of inadequate capacity, resulting in flooding of land and/or property. Normal discharge of sewers and drains through outfalls may be impeded by high water levels in receiving waters.

United Utilities (UU) has advised⁷ that they do not hold any records of public sewer flooding of properties in the vicinity of the site as a result of overloaded sewers.

3.5.3 Highway Drains and Gullies

Lancashire CC Highways Department has been consulted to ascertain whether it holds any records of highways flooding at or within the vicinity of the site.

⁷ Email from United Utilities to Weetwood dated 7 September 2010

Lancashire CC advised of the flooding associated with the King Street culvert as detailed in **Section 3.1**. Additionally, flooding of King Street is understood to have occurred in the winter of 2009/2010 as a result of the lack of maintenance of a 450 diameter concrete pipe with a hydrobrake located in Hayhurst Road and Clitheroe Road, designed for storage. Lancashire CC advised that UU now have a maintenance schedule in place. This is not expected to pose a flood risk to the site.

Lancashire CC confirmed that there are no flooding problems associated with the highways drains and gullies in the vicinity of the site.

4 MITIGATION MEASURES

4.1 FLOOD MITIGATION

The flood risk to the site from Watercourse A, Watercourse B and Watercourse C and any residual risk of flooding from groundwater and pluvial sources will be mitigated through the implementation of the measures proposed within the following section of this report.

4.1.1 Ground Levels

It is recommended that ground levels along the eastern boundary of the site are raised in those areas where the bed levels of the adjacent Watercourse B are only a short distance below existing site levels (as detailed in **Section 3.2.2**).

4.1.2 Finished Floor Levels

Finished floor levels of all residential dwellings should be set at a minimum of 0.15m above adjacent ground levels following reprofiling of the site.

This will enable any potential surface water to be conveyed safely across the site without affecting property in accordance with the approach promoted within DEFRA's Making Space for Water.

4.1.3 Watercourse A Embankment

Development of the site should ensure that the integrity of the existing embankment located along the right bank of Watercourse A remains (e.g. no lowering for new access crossings) and is bolstered where necessary. The embankment should be maintained within a public open space area.

4.2 ACCESS AND EGRESS

Access and egress to the site will continue to be provided via Clitheroe Road following development, with a further link also provided onto Accrington Road to the east. These routes are shown to be located within Flood Zone 1 and will therefore provide dry access and egress to the site.

New access roads will be required across Watercourse A and Watercourse C (**Appendix A**). The soffit of any new bridge crossing will be set with an appropriate freeboard above the 1 in 100 year plus climate change flood level. Any new culvert will be designed to ensure that it has sufficient capacity to accommodate flows during a 1 in 100 year plus climate change event.

4.3 ORDINARY WATERCOURSE

Watercourse A, Watercourse B, Watercourse C, North Ditch and South Field Ditch are ordinary watercourses. The Lead Local Flood Authority (Lancashire CC) should be consulted regarding any proposed works or structures in, over or adjacent to these.

5 SURFACE WATER

5.1 REQUIREMENTS FOR SURFACE WATER DRAINAGE

The NPPF and its supporting Technical Guidance requires developers and local authorities to seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of Sustainable Drainage Systems (SuDS).

As a minimum this is seen as a requirement that the peak flow rates of surface water leaving the developed site should be no greater than the rates prior to development. Opportunities to reduce surface water runoff, and the associated flood risk, should also be identified and climate change taken into consideration.

Recognising the above, and the requirements of the EA⁸, Building Regulations Approved Document H and the Code for Sustainable Homes Technical Guide (Category 4), surface water runoff from the proposed site should demonstrate:

- No increase in existing flow rates discharged to watercourse/public sewer
- The use of SuDS as the preferred method of dealing with surface water
- How runoff up to the 1 in 100 year event plus an allowance for climate change will be dealt with without increasing flood risk elsewhere

5.2 SITE AREAS

The existing and proposed impermeable and permeable areas at the site are shown in **Table 1**.

The proposed impermeable areas have been calculated assuming the following percentage impermeable areas in accordance with Urban Drainage (2nd Edition):

- Residential - 50%
- School - 80%

Table 1 indicates that the extent of impermeable area at the site will increase by approximately 5.41 ha following development.

Table 1: Site Areas

	Existing Site	Developed Site
Impermeable area (ha)	0.22	5.63
Permeable area (ha)	14.31	8.90
TOTAL	14.53	14.53

⁸ Preliminary Rainfall Runoff Management for Developments, R&D Technical Report W5-074/A/TR/1 Revision C, 2005

5.3 SURFACE WATER RUNOFF FROM THE EXISTING SITE

The site currently comprises largely undeveloped greenfield land. No formal existing drainage system is therefore expected to be present.

As detailed in **Section 1.3** and illustrated in **Figure 2** site levels are generally shown to fall in a south/south-westerly direction and into the various watercourses/ditches located through/adjacent to the site. The Soilscape maps suggest that the underlying ground conditions have a low to negligible permeability. It is therefore reasonable to assume that surface water from the site currently runs off to the various watercourses/ditches within the vicinity of the site.

5.3.1 Existing Site Runoff Rate

The existing impermeable area at the site comprises only a small proportion (1.5%) of the overall site area. None of the existing impermeable areas are known to have a formal drainage system. Runoff from these areas would therefore be expected to drain into the permeable land surrounding the hardstanding, with disposal via infiltration or runoff to Watercourse A or Watercourse C. The runoff from this area is therefore considered negligible. As such it is proposed, for the purpose of this report, to disregard the contribution of the existing impermeable surfaces and to consider the site as 100% permeable.

The peak runoff rates for the existing site are summarised in **Table 2**.

- Greenfield runoff rates from permeable surfaces have been calculated using the ICP SUDS method within MicroDrainage. Details of the MicroDrainage input parameters and the output results are provided in **Appendix C**.

Table 2: Total Peak Runoff Rate - Existing Site

Return Period	Runoff Rate (l/s)		
	Impermeable areas	Permeable areas	Total
1 in 2 year	0.0	97.4	97.4
1 in 30 year	0.0	165.6	165.6
1 in 100 year	0.0	203.4	203.4

5.4 SURFACE WATER RUNOFF FROM THE DEVELOPED SITE

Table 1 indicates that impermeable areas at the site will increase following development. The following sections describe how surface water runoff from the developed site may be managed in accordance with the requirements of the NPPF and its supporting Technical Guidance.

5.4.1 Surface Water Discharge Rate

The surface water drainage arrangements for any site should be such that the peak flow rates of surface water leaving a developed site are no greater than the rates prior to the proposed development.

It is proposed to limit runoff rates from the proposed impermeable areas to the existing 1 in 2 year greenfield runoff rate (i.e. **6.7 l/s/ha** - as calculated in **Appendix C**). Based upon the anticipated extent of impermeable area post development as provided within **Table 1** this equates to 37.7 l/s. The proposed permeable areas will continue to drain at greenfield runoff rates. This will ensure that runoff rates from the site do not increase following development, and that betterment is provided.

The drainage system for the proposed site will be designed to manage flows in up to the 1 in 100 year event including an allowance for climate change.

The total proposed peak runoff rates from the proposed site are shown in **Table 3**.

Table 3: Total Peak Runoff Rate – Developed Site

Return Period	Runoff Rate (l/s)		
	Impermeable areas	Permeable areas	Total
1 in 2 year	37.7	59.6	97.4
1 in 30 year	37.7	101.5	139.2
1 in 100 year	37.7	124.6	162.3

Comparison of the total peak runoff rates from the existing site (**Table 2**) with those from the developed site (**Table 3**) indicates that development will provide for betterment in terms of reduced surface water flows as encouraged by the NPPF and its supporting Technical Guidance.

5.4.2 Disposal of Surface Water

Building Regulations Approved Document Part H sets out a hierarchy of preferred methods for the disposal of surface water runoff⁹. These are listed below in order of preference:

1. Disposal by infiltration - As detailed previously, according to the Soilscape maps produced by the National Soils Research Institute, soil conditions at the site '*slowly permeable seasonally wet acid loamy and clayey soils*'. It is therefore unlikely that infiltration will be a feasible method for disposal of surface water runoff from the redeveloped site.
2. Disposal to a watercourse - As detailed previously, due to the site topography it is assumed that surface water currently runs off to various watercourses/ditches located through/adjacent to the site. Post development it is therefore proposed to continue to discharge surface water from the proposed impermeable areas to these watercourses/ditches.
3. Disposal to a public sewer - Following development of the site it should not be necessary to discharge surface water runoff into the public sewer system.

⁹ Building Regulations Approved Document H Section 3 page 45

5.4.3 SuDS Options and Storage Calculations

In order to restrict runoff rates from the proposed impermeable areas as set out in **Section 5.4.1**, attenuation storage will be provided. SuDS elements may be used to provide the required storage.

SuDS aim to mimic natural drainage and can achieve multiple objectives such as removing pollutants from urban runoff at source, controlling surface water runoff from developments, and ensuring that flood risk is not increased downstream. Combining water management with green space can provide amenity and biodiversity enhancement. In the absence of infiltration, typical SuDS components may include surface or subsurface storage with flow limiting devices, roadside swales, detention basins and wetlands/retention ponds.

The surface water storage facilities described in the following sections have been modelled using the Detailed Design module of MicroDrainage Source Control.

5.4.3.1 Storage Volume Calculations

For the purposes of assessing storage volume requirements post development the site has been divided into 3 sub catchment areas based upon the existing site topography, the location of the existing watercourses/ditches through the site and the illustrative masterplan as illustrated in **Figure 6**.

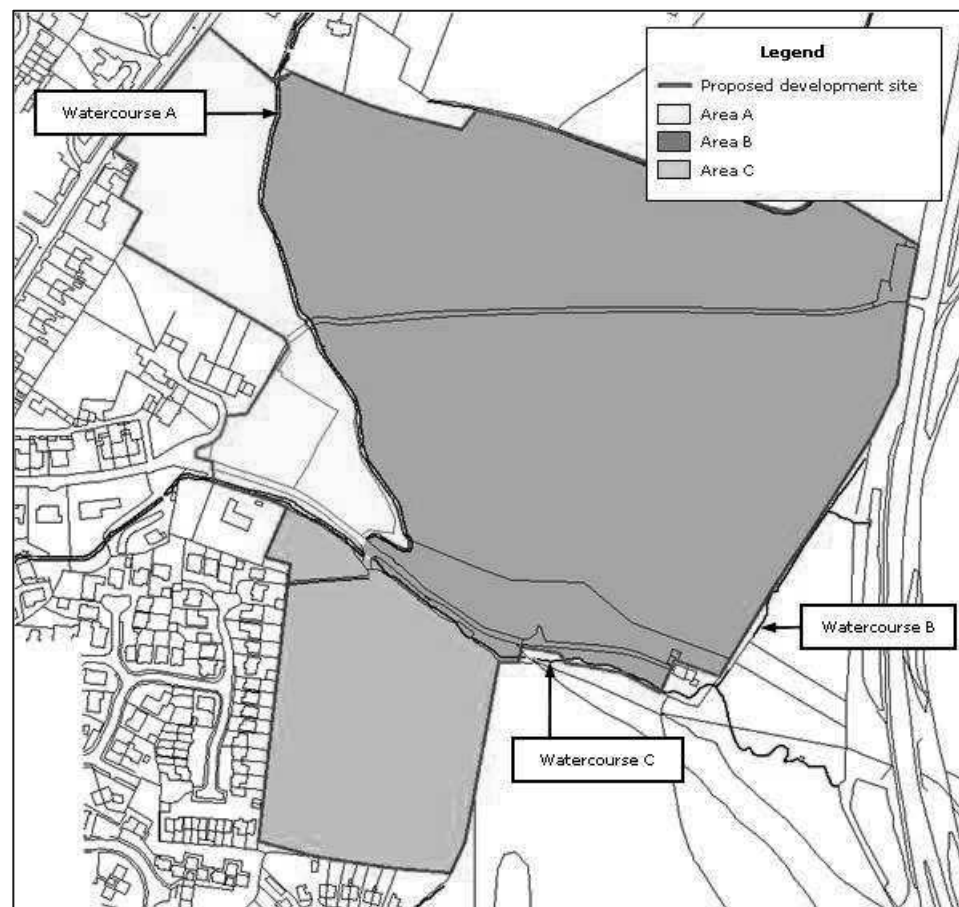


Figure 6: Post Development Surface Water Sub Catchments

The required surface water storage volume for each development area has been sized to store the 1 in 100 year storm event including a 30% increase in rainfall intensity in order to allow for climate change in accordance with Table 5 of the NPPF Technical Guidance.

The parameters used in the storage calculations along with the MicroDrainage Source Control output results are provided in **Appendix D**. This indicates that the following storage volumes would be required:

Area A - 807.4 m³

Area B - 2,467.6 m³

Area C - 723.2 m³

5.4.3.2 Indicative Surface Water Drainage Strategy

Area A generally slopes to the south/south-west away from Watercourse A to the east. As such it is proposed to discharge surface water from Area A to a storage facility in the south, which will ultimately outfall to Watercourse C. It may be difficult to drain the more lower-lying parts of this area to the proposed storage facility. Some site raising may therefore be required within the vicinity of the proposed school.

Area B slopes to the south/south-west. As such it is proposed to drain Area B to a storage facility in the south of this area. This will then subsequently discharge to Watercourse C.

Area C is also shown to slope to the south/southwest, away from Watercourse C. As with Area A it may be difficult to drain the entirety of this area along natural drainage paths. The proposed surface water storage facility will be located in the north-west of Area C. Whilst the eastern and central areas of the site will be able to drain to this area by gravity, some site raising may be required in the west.

An indicative surface water drainage strategy is provided within **Appendix E**. The storage facilities have been sized based upon the illustrative masterplan assuming that surface storage is provided (i.e. surface water is managed on the surface). This is likely to be an overestimate of the surface storage requirements as the storage capacity within the surface water pipe system network (which may be adopted) has been ignored.

5.4.4 Maintenance of SuDS

In the past local planning authorities and water companies have been reluctant to adopt SuDS. With no arrangements in place that require local planning authorities or water companies to adopt SuDS their maintenance has subsequently been the responsibility of the developer.

The Flood and Water Management Act (2010) is currently being implemented through a series of Commencement Orders. Section 32 introduces Schedule 3: Sustainable Drainage. This introduces:

- New standards for the design, construction, operation and maintenance of new rainwater drainage systems
- A new 'approving body' (generally a unitary, county or county borough local authority)
- A requirement for the approving body to approve most types of rainwater drainage systems before any construction work with drainage implications can start, subject to: (i) the system being constructed in line with an approved drainage plan to national standards; (ii) the approving body being satisfied the drainage system has been built and functions in accordance with the drainage plan, and (iii) the system being a sustainable drainage system, as defined by regulations.

However, this provision is awaiting commencement following further work by DEFRA on arrangements for adoption and maintenance of SUDS, including technical guidance. At present it is envisaged that implementation of these arrangements will be sometime in 2014.

In the meantime, other options for maintenance of SUDS include:

- SuDS elements within the curtilage of residential dwellings (e.g. soakaways, permeable paving) will be the responsibility of the owner of the property
- The pipe network, designed to Sewers for Adoption (7th edition) standard, may be adopted by the sewerage undertaker
- Roadside swales may be adopted by the highways authority
- SuDS in public open spaces (e.g. dry detention basin) may be adopted by the local authority
- A management company

5.4.5 Final Drainage Layout

The purpose of this FRA is to demonstrate that a surface water drainage strategy is feasible for the site given the development proposals and the land available. The proposals provide the opportunity for the inclusion of SuDS elements, ensuring that there will be no increase in surface water runoff from the proposed development.

This FRA has demonstrated that, not only can the required storage be accommodated within the site layout, but that various options are feasible and ample land is available, providing flexibility for the final drainage solution. A final decision on the types of storage to be provided will be made at the reserved matters stage.

This FRA provides a holistic approach to surface water drainage in accordance with and satisfying the requirements of the NPPF and its supporting Technical Guidance and as such will enable phased development conditions to be applied in line with this strategy.

6 FOUL DRAINAGE

Weetwood previously developed a foul drainage strategy in support of the original planning application¹⁰ for the site. This was based upon the following proposals:

- 300 residential dwellings
- Nursing home
- Single form entry primary school

The strategy included proposals to connect foul flows from the proposed developable area within the north of Area A (**Figure 6**) to the existing 225mm diameter public sewer running through this part of the site (at manhole 5601 or a new manhole just downstream - **Appendix F**). For Area B and Area C it was proposed to discharge to the public sewer located in Brookes Lane.

Within UUs response to the original planning application dated 20 December 2011¹¹ (**Appendix G**) no objection was raised to the above proposals on capacity grounds. However, UU requested the following condition be imposed as part of any planning permission granted:

Unless otherwise agreed in writing by the local planning authority no part of the development other than:

a) 222 dwelling units; or

b) 161 dwelling units and the proposed nursing home

shall be occupied before the date which is 54 months from the date of the planning permission.

This was recommended in order to allow the sewerage undertaker sufficient time to address capacity issues at the Whalley Wastewater Treatment Works and the capacity of the sewer network serving the development.

A further response was provided by UU in their letter dated 7 September 2012¹² (**Appendix H**) to the planning application¹³ for the reduced redline boundary. This again raised no objection to the development subject to the inclusion of conditions.

As the development proposals are less than those originally proposed it is reasonable to assume that UU would accept foul drainage on the basis of the outcome of the earlier negotiations as outlined above.

¹⁰ Footnote 1

¹¹ UU Ref: DC/11/5196

¹² UU Ref: DC/12/3389

¹³ Footnote 3

7 SUMMARY

There are proposals for the development of an area of land located to the east of Clitheroe Road, Whalley.

According to the EA Flood Map the proposed development site is located outside the 1 in 1000 year flood outline and is therefore defined as being situated within Flood Zone 1 under the NPPF and its supporting Technical Guidance.

The proposed development site, being located in Flood Zone 1, satisfies the requirements of the Sequential Test.

The risk of flooding from reservoirs, canals or other artificial sources, groundwater and surface water is considered to be low.

A number of existing watercourses and ditches are located through/adjacent to the site. These are generally considered to pose a low risk of flooding to the site. However, a number of mitigation measures are proposed to address any residual risk. This includes raising ground levels along the eastern boundary of the site where the bed levels of the adjacent Watercourse B are only a short distance below existing site levels and ensuring that the integrity of the existing embankment located along the right bank of Watercourse A remains and is bolstered where necessary.

Finished floor levels of all residential dwellings should also be set at a minimum of 0.15m above adjacent ground levels following reprofiling of the site.

Access and egress to the site will be provided via Clitheroe Road to the west and Accrington Road to the east following development. These routes are shown to be located within Flood Zone 1 and will therefore provide dry access and egress to the site.

Following development the overall impermeable areas at the site are expected to increase. A scheme for the provision and implementation of a surface water regulation system following the principles set out in this FRA should be submitted to and approved in writing by the local planning authority, prior to the commencement of development. This FRA provides a holistic approach to drainage in accordance with and satisfying the requirements of the NPPF and its supporting Technical Guidance and as such will enable phased development conditions to be applied in line with this strategy.

8 RECOMMENDATIONS

This FRA has demonstrated that the proposed development may be completed without conflicting with the requirements of the NPPF and its supporting Technical Guidance subject to the following:

- The ground levels along the east boundary of the site to be raised in those areas where the bed levels of the adjacent Watercourse B are only a short distance below site levels.
- Finished floor levels to be set at 0.15m above adjacent ground levels
- The integrity of the embankment along the right bank of Watercourse A to be maintained and bolstered where necessary, within a public open space area
- The detailed drainage design, developed in accordance with the principles set down in this FRA, should be submitted to and approved by the local planning authority prior to the commencement of development with a view to allowing phased development of the site to proceed without compromising the holistic approach to dealing with surface water across the whole site.

APPENDIX A: Illustrative Masterplan



Primary School

School drop off

School parking

School drop off

School Playing Fields

Combined footpath/cycle way

Buildings orientated to minimise visual impact from existing houses

Square

Country Lane

Play space

Linear Country Park

Existing footpath network

Archbishop's Wood

Courtyard

Courtyard

Courtyard

Hedgerow planting extended

Amentity Green Space

Combined footpath/cycle way

Schedule

260 houses
Primary School

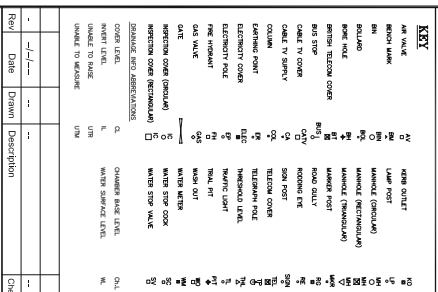
planit intelligent environments		
Commercial Estates Group		
Whalley		
Illustrative Masterplan		
Scale	1:1000@A1	5.02.13
Project	PL1158.M.3.103	



APPENDIX B: Topographic Survey



Datum - OS Level Datum,
Using the OS GPS Network and applying
OSGM02 National Geoid Model to obtain
local area corrections.



Met Surveys Ltd
Southgate House
Pontefract Road
Stourton, Leeds
West Yorkshire
LS10 1SW

T: +44 (0) 113 200 8900
F: +44 (0) 113 200 8901
E: admin@met-surveys.com
W: www.metsurveys.com

Site
LAND EAST OF CLITHEROE ROAD
WHALLEY, LANCASHIRE

Surveyed	CC, WS	Drawn	CC, WS
Chk.	DA	Date	24/08/2010

Rev	Ø
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APPENDIX C: MicroDrainage Outputs for Greenfield Runoff

Weetwood		Page 1																								
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold																										
Date 31/01/2013 09:59 File	Designed By RebeccaEllis Checked By																									
Micro Drainage	Source Control W.12.1																									
<u>ICP SUDS Mean Annual Flood</u> Input <table> <tr> <td>Return Period (years)</td> <td>100</td> <td>Soil</td> <td>0.450</td> </tr> <tr> <td>Area (ha)</td> <td>1.000</td> <td>Urban</td> <td>0.000</td> </tr> <tr> <td>SAAR (mm)</td> <td>1005</td> <td>Region Number</td> <td>Region 10</td> </tr> </table> Results 1/s <table> <tr> <td>QBAR Rural</td> <td>6.7</td> </tr> <tr> <td>QBAR Urban</td> <td>6.7</td> </tr> <tr> <td>Q100 years</td> <td>14.0</td> </tr> <tr> <td>Q1 year</td> <td>5.8</td> </tr> <tr> <td>Q30 years</td> <td>11.4</td> </tr> <tr> <td>Q100 years</td> <td>14.0</td> </tr> </table>			Return Period (years)	100	Soil	0.450	Area (ha)	1.000	Urban	0.000	SAAR (mm)	1005	Region Number	Region 10	QBAR Rural	6.7	QBAR Urban	6.7	Q100 years	14.0	Q1 year	5.8	Q30 years	11.4	Q100 years	14.0
Return Period (years)	100	Soil	0.450																							
Area (ha)	1.000	Urban	0.000																							
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QBAR Urban	6.7																									
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Q1 year	5.8																									
Q30 years	11.4																									
Q100 years	14.0																									
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APPENDIX D: MicroDrainage Storage Volume Calculation

Weetwood			Page 1			
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold		Land East of Clitheroe... Whalley Area A				
Date 31 January 2013 File 1695 130131 A PON...		Designed By Rebecca Ellis Checked By				
Micro Drainage		Source Control W.12.1				
<u>Summary of Results for 100 year Return Period (+30%)</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Summer	0.288	0.288	6.9	232.6	O K
	30 min Summer	0.398	0.398	6.9	320.9	O K
	60 min Summer	0.521	0.521	6.9	420.5	O K
	120 min Summer	0.650	0.650	6.9	524.2	O K
	180 min Summer	0.718	0.718	6.9	579.3	O K
	240 min Summer	0.761	0.761	6.9	614.0	O K
	360 min Summer	0.816	0.816	7.1	658.6	O K
	480 min Summer	0.846	0.846	7.2	682.9	O K
	600 min Summer	0.861	0.861	7.2	695.2	O K
	720 min Summer	0.867	0.867	7.2	700.0	O K
	960 min Summer	0.871	0.871	7.2	702.7	O K
	1440 min Summer	0.862	0.862	7.2	695.4	O K
	2160 min Summer	0.830	0.830	7.1	669.6	O K
	2880 min Summer	0.789	0.789	7.0	636.7	O K
	4320 min Summer	0.706	0.706	6.9	569.5	O K
	5760 min Summer	0.625	0.625	6.9	504.5	O K
	7200 min Summer	0.547	0.547	6.9	441.6	O K
	8640 min Summer	0.472	0.472	6.9	380.8	O K
	10080 min Summer	0.401	0.401	6.9	323.9	O K
	Storm Event		Rain (mm/hr)	Time-Peak (mins)		
	15 min Summer		110.368	22		
	30 min Summer		76.549	37		
	60 min Summer		50.758	66		
	120 min Summer		32.395	126		
	180 min Summer		24.439	186		
	240 min Summer		19.882	244		
	360 min Summer		14.869	364		
	480 min Summer		12.074	482		
	600 min Summer		10.263	600		
	720 min Summer		8.980	702		
	960 min Summer		7.264	810		
	1440 min Summer		5.374	1060		
	2160 min Summer		3.964	1472		
	2880 min Summer		3.188	1880		
	4320 min Summer		2.346	2724		
	5760 min Summer		1.889	3520		
	7200 min Summer		1.597	4320		
	8640 min Summer		1.393	5024		
	10080 min Summer		1.242	5752		
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Weetwood			Page 2			
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold		Land East of Clitheroe... Whalley Area A				
Date 31 January 2013 File 1695 130131 A PON...		Designed By Rebecca Ellis Checked By				
Micro Drainage		Source Control W.12.1				
<u>Summary of Results for 100 year Return Period (+30%)</u>						
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter		0.323	0.323	6.9	261.0	O K
30 min Winter		0.447	0.447	6.9	360.3	O K
60 min Winter		0.586	0.586	6.9	472.6	O K
120 min Winter		0.731	0.731	6.9	590.0	O K
180 min Winter		0.810	0.810	7.0	653.3	O K
240 min Winter		0.860	0.860	7.2	693.7	O K
360 min Winter		0.926	0.926	7.4	747.0	O K
480 min Winter		0.964	0.964	7.6	777.6	O K
600 min Winter		0.985	0.985	7.7	795.2	O K
720 min Winter		0.997	0.997	7.7	804.4	O K
960 min Winter		1.000	1.000	7.7	807.4	O K
1440 min Winter		0.984	0.984	7.7	794.2	O K
2160 min Winter		0.937	0.937	7.5	756.4	O K
2880 min Winter		0.876	0.876	7.3	707.2	O K
4320 min Winter		0.748	0.748	6.9	603.9	O K
5760 min Winter		0.623	0.623	6.9	502.8	O K
7200 min Winter		0.497	0.497	6.9	401.2	O K
8640 min Winter		0.374	0.374	6.9	301.9	O K
10080 min Winter		0.280	0.280	6.9	225.8	O K
Storm Event		Rain (mm/hr)		Time-Peak (mins)		
15 min Winter		110.368		22		
30 min Winter		76.549		37		
60 min Winter		50.758		66		
120 min Winter		32.395		124		
180 min Winter		24.439		182		
240 min Winter		19.882		240		
360 min Winter		14.869		356		
480 min Winter		12.074		470		
600 min Winter		10.263		582		
720 min Winter		8.980		692		
960 min Winter		7.264		900		
1440 min Winter		5.374		1124		
2160 min Winter		3.964		1584		
2880 min Winter		3.188		2048		
4320 min Winter		2.346		2940		
5760 min Winter		1.889		3800		
7200 min Winter		1.597		4608		
8640 min Winter		1.393		5272		
10080 min Winter		1.242		5760		
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Weetwood		Page 3																																
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold	Land East of Clitheroe... Whalley Area A																																	
Date 31 January 2013 File 1695 130131 A PON...	Designed By Rebecca Ellis Checked By																																	
Micro Drainage		Source Control W.12.1																																
<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.300</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.291</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <u>Time / Area Diagram</u> Total Area (ha) 1.150 <table> <thead> <tr> <th>Time (mins)</th> <th>Area (ha)</th> <th>Time (mins)</th> <th>Area (ha)</th> </tr> </thead> <tbody> <tr> <td>0-4</td> <td>0.575</td> <td>4-8</td> <td>0.575</td> </tr> </tbody> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.300	Shortest Storm (mins)	15	Ratio R	0.291	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+30	Time (mins)	Area (ha)	Time (mins)	Area (ha)	0-4	0.575	4-8	0.575
Rainfall Model	FSR	Winter Storms	Yes																															
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Weetwood			Page 1			
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold		Land East of Clitheroe... Whalley Area B				
Date 31 January 2013 File 1695 130131 B PON...		Designed By Rebecca Ellis Checked By				
Micro Drainage		Source Control W.12.1				
Summary of Results for 100 year Return Period (+30%)						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Summer	0.285	0.285	19.4	700.3	O K
	30 min Summer	0.392	0.392	20.8	964.4	O K
	60 min Summer	0.513	0.513	20.8	1263.0	O K
	120 min Summer	0.641	0.641	20.8	1576.6	O K
	180 min Summer	0.709	0.709	20.8	1745.3	O K
	240 min Summer	0.753	0.753	21.0	1853.1	O K
	360 min Summer	0.810	0.810	21.4	1994.4	O K
	480 min Summer	0.843	0.843	21.7	2074.0	O K
	600 min Summer	0.860	0.860	21.8	2117.4	O K
	720 min Summer	0.869	0.869	21.9	2137.9	O K
	960 min Summer	0.877	0.877	21.9	2157.7	O K
	1440 min Summer	0.875	0.875	21.9	2153.5	O K
	2160 min Summer	0.850	0.850	21.7	2092.3	O K
	2880 min Summer	0.813	0.813	21.4	2001.1	O K
	4320 min Summer	0.732	0.732	20.9	1801.6	O K
	5760 min Summer	0.653	0.653	20.8	1606.5	O K
	7200 min Summer	0.578	0.578	20.8	1423.3	O K
	8640 min Summer	0.510	0.510	20.8	1255.3	O K
	10080 min Summer	0.451	0.451	20.8	1110.1	O K
	Storm Event		Rain (mm/hr)		Time-Peak (mins)	
	15 min Summer		110.368		22	
	30 min Summer		76.549		37	
	60 min Summer		50.758		66	
	120 min Summer		32.395		126	
	180 min Summer		24.439		186	
	240 min Summer		19.882		244	
	360 min Summer		14.869		364	
	480 min Summer		12.074		482	
	600 min Summer		10.263		600	
	720 min Summer		8.980		700	
	960 min Summer		7.264		806	
	1440 min Summer		5.374		1056	
	2160 min Summer		3.964		1472	
	2880 min Summer		3.188		1876	
	4320 min Summer		2.346		2688	
	5760 min Summer		1.889		3512	
	7200 min Summer		1.597		4256	
	8640 min Summer		1.393		5008	
	10080 min Summer		1.242		5656	
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Weetwood			Page 2		
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold		Land East of Clitheroe... Whalley Area B			
Date 31 January 2013 File 1695 130131 B PON...		Designed By Rebecca Ellis Checked By			
Micro Drainage		Source Control W.12.1			
Summary of Results for 100 year Return Period (+30%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	0.319	0.319	20.1	785.2	O K
30 min Winter	0.440	0.440	20.8	1082.4	O K
60 min Winter	0.577	0.577	20.8	1419.5	O K
120 min Winter	0.721	0.721	20.9	1774.7	O K
180 min Winter	0.800	0.800	21.3	1967.8	O K
240 min Winter	0.850	0.850	21.7	2092.3	O K
360 min Winter	0.918	0.918	22.3	2259.0	O K
480 min Winter	0.958	0.958	22.6	2357.1	O K
600 min Winter	0.982	0.982	22.9	2415.8	O K
720 min Winter	0.995	0.995	23.0	2448.9	O K
960 min Winter	1.003	1.003	23.1	2467.6	O K
1440 min Winter	0.993	0.993	23.0	2443.3	O K
2160 min Winter	0.953	0.953	22.6	2345.5	O K
2880 min Winter	0.896	0.896	22.1	2205.3	O K
4320 min Winter	0.771	0.771	21.2	1897.6	O K
5760 min Winter	0.648	0.648	20.8	1595.1	O K
7200 min Winter	0.532	0.532	20.8	1310.1	O K
8640 min Winter	0.434	0.434	20.8	1067.7	O K
10080 min Winter	0.361	0.361	20.6	887.9	O K
Storm Event	Rain (mm/hr)		Time-Peak (mins)		
15 min Winter	110.368		22		
30 min Winter	76.549		37		
60 min Winter	50.758		66		
120 min Winter	32.395		124		
180 min Winter	24.439		182		
240 min Winter	19.882		240		
360 min Winter	14.869		356		
480 min Winter	12.074		470		
600 min Winter	10.263		582		
720 min Winter	8.980		692		
960 min Winter	7.264		900		
1440 min Winter	5.374		1124		
2160 min Winter	3.964		1584		
2880 min Winter	3.188		2048		
4320 min Winter	2.346		2904		
5760 min Winter	1.889		3744		
7200 min Winter	1.597		4472		
8640 min Winter	1.393		5184		
10080 min Winter	1.242		5840		
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Weetwood		Page 3																																
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold	Land East of Clitheroe... Whalley Area B																																	
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Rainfall Model	FSR	Winter Storms	Yes																															
Return Period (years)	100	Cv (Summer)	0.750																															
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Weetwood			Page 1			
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold		Land East of Clitheroe... Whalley Area C				
Date 31 January 2013 File 1695 130131 C PON...		Designed By Rebecca Ellis Checked By				
Micro Drainage		Source Control W.12.1				
<u>Summary of Results for 100 year Return Period (+30%)</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Summer	0.289	0.289	6.1	209.1	O K
	30 min Summer	0.399	0.399	6.1	288.2	O K
	60 min Summer	0.522	0.522	6.1	377.4	O K
	120 min Summer	0.650	0.650	6.1	470.0	O K
	180 min Summer	0.718	0.718	6.1	519.5	O K
	240 min Summer	0.761	0.761	6.1	550.5	O K
	360 min Summer	0.816	0.816	6.3	590.3	O K
	480 min Summer	0.846	0.846	6.4	611.7	O K
	600 min Summer	0.861	0.861	6.5	622.7	O K
	720 min Summer	0.867	0.867	6.5	626.9	O K
	960 min Summer	0.870	0.870	6.5	629.3	O K
	1440 min Summer	0.861	0.861	6.5	622.8	O K
	2160 min Summer	0.830	0.830	6.4	600.1	O K
	2880 min Summer	0.790	0.790	6.2	571.2	O K
	4320 min Summer	0.709	0.709	6.1	512.4	O K
	5760 min Summer	0.631	0.631	6.1	455.9	O K
	7200 min Summer	0.555	0.555	6.1	401.6	O K
	8640 min Summer	0.482	0.482	6.1	348.7	O K
	10080 min Summer	0.413	0.413	6.1	298.3	O K
	Storm Event	Rain (mm/hr)		Time-Peak (mins)		
	15 min Summer	110.368		19		
	30 min Summer	76.549		34		
	60 min Summer	50.758		64		
	120 min Summer	32.395		122		
	180 min Summer	24.439		182		
	240 min Summer	19.882		242		
	360 min Summer	14.869		362		
	480 min Summer	12.074		480		
	600 min Summer	10.263		600		
	720 min Summer	8.980		700		
	960 min Summer	7.264		808		
	1440 min Summer	5.374		1056		
	2160 min Summer	3.964		1472		
	2880 min Summer	3.188		1876		
	4320 min Summer	2.346		2724		
	5760 min Summer	1.889		3520		
	7200 min Summer	1.597		4320		
	8640 min Summer	1.393		5096		
	10080 min Summer	1.242		5752		
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Weetwood			Page 2			
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold		Land East of Clitheroe... Whalley Area C				
Date 31 January 2013 File 1695 130131 C PON...		Designed By Rebecca Ellis Checked By				
Micro Drainage		Source Control W.12.1				
Summary of Results for 100 year Return Period (+30%)						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Winter	0.324	0.324	6.1	234.6	O K
	30 min Winter	0.448	0.448	6.1	323.6	O K
	60 min Winter	0.586	0.586	6.1	423.9	O K
	120 min Winter	0.732	0.732	6.1	529.0	O K
	180 min Winter	0.810	0.810	6.3	585.6	O K
	240 min Winter	0.860	0.860	6.5	621.7	O K
	360 min Winter	0.926	0.926	6.7	669.3	O K
	480 min Winter	0.964	0.964	6.8	696.7	O K
	600 min Winter	0.985	0.985	6.9	712.3	O K
	720 min Winter	0.997	0.997	6.9	720.6	O K
	960 min Winter	1.000	1.000	6.9	723.2	O K
	1440 min Winter	0.984	0.984	6.9	711.8	O K
	2160 min Winter	0.939	0.939	6.7	678.6	O K
	2880 min Winter	0.879	0.879	6.5	635.3	O K
	4320 min Winter	0.754	0.754	6.1	545.1	O K
	5760 min Winter	0.633	0.633	6.1	457.8	O K
	7200 min Winter	0.513	0.513	6.1	371.1	O K
	8640 min Winter	0.392	0.392	6.1	283.5	O K
	10080 min Winter	0.290	0.290	6.1	209.5	O K
	Storm Event		Rain (mm/hr)		Time-Peak (mins)	
	15 min Winter		110.368		19	
	30 min Winter		76.549		33	
	60 min Winter		50.758		62	
	120 min Winter		32.395		122	
	180 min Winter		24.439		180	
	240 min Winter		19.882		238	
	360 min Winter		14.869		354	
	480 min Winter		12.074		468	
	600 min Winter		10.263		580	
	720 min Winter		8.980		690	
	960 min Winter		7.264		896	
	1440 min Winter		5.374		1124	
	2160 min Winter		3.964		1580	
	2880 min Winter		3.188		2048	
	4320 min Winter		2.346		2940	
	5760 min Winter		1.889		3800	
	7200 min Winter		1.597		4608	
	8640 min Winter		1.393		5280	
	10080 min Winter		1.242		5856	
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Weetwood		Page 3																												
Suite 1 Park House Broncoed Bus Park Wrexham Rd Mold	Land East of Clitheroe... Whalley Area C																													
Date 31 January 2013 File 1695 130131 C PON...	Designed By Rebecca Ellis Checked By																													
Micro Drainage		Source Control W.12.1																												
<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.300</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.291</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+30</td> </tr> </table> <u>Time / Area Diagram</u> Total Area (ha) 1.030 <table> <thead> <tr> <th>Time (mins)</th> <th>Area (ha)</th> </tr> </thead> <tbody> <tr> <td>0-4</td> <td>1.030</td> </tr> </tbody> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.300	Shortest Storm (mins)	15	Ratio R	0.291	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+30	Time (mins)	Area (ha)	0-4	1.030
Rainfall Model	FSR	Winter Storms	Yes																											
Return Period (years)	100	Cv (Summer)	0.750																											
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M5-60 (mm)	19.300	Shortest Storm (mins)	15																											
Ratio R	0.291	Longest Storm (mins)	10080																											
Summer Storms	Yes	Climate Change %	+30																											
Time (mins)	Area (ha)																													
0-4	1.030																													
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APPENDIX E: Indicative Surface Water Drainage Strategy

Notes:

1. Do not scale from this drawing.

2. Map backdrop reproduced from Ordnance Survey digital map data. Crown Copyright under licence.

KEY:

Site Boundary

Residential

School

Surface Water Storage Facility

Weetwood

Development • Planning • Environment

Park House

Broncoed Business Park

Wrexham Road

Mold

CH7 1HP

T: 01352 700045

E: info@weetwood.net

W: weetwood.net

Client:

Commercial Estates Group

Project Title:

Land East of Clitheroe Road, Whalley

Drawing Title:

Indicative Surface Water Drainage Strategy

Map Orientation:

N

W

E

S

Drawn:

RE

Checked:

AG

Date:

7 February 2013

Drawing No:

1695/SWD Strategy

Rev:

C

The map illustrates the indicative surface water drainage strategy for the Land East of Clitheroe Road, Whalley. It shows the site boundary, residential areas, and three storage facilities (A, B, and C) with their respective catchment areas and volumes.

Storage Facility A:

- Area: 1.5 m (inc 0.5 m freeboard)
- Depth: 1.5 m
- Volume: ~ 807 cu.m
- Discharge rate: ~ 3.7 l/s

Storage Facility B:

- Area: 1.5 m (inc 0.5 m freeboard)
- Depth: 1.5 m
- Volume: ~ 1,233.8 cu.m
- Discharge rate: ~ 1.1 l/s

Storage Facility C:

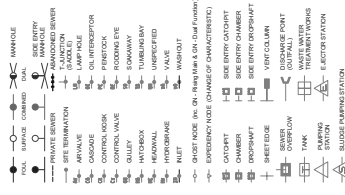
- Area: 1.5 m (inc 0.5 m freeboard)
- Depth: 1.5 m
- Volume: ~ 1,233.8 cu.m
- Discharge rate: ~ 1.1 l/s

APPENDIX F: Public Sewer Records



There are no nodes in SD7436NW.

WASTE WATER SYMBOLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

[illegible]

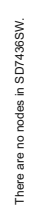
This plan is based upon the Ordnance Survey map with the sanction of the Controller of H.M. Stationary Offices. Unauthorised reproduction infringes copyright. Crown Copyright reserved.

OS Sheet No: SD7436NW
Scale 1:1250 Date: 16-Sep-2010
No Nodes
Sheet 1 of 1



OS Sheet No: SD7436NW
Scale 1:1250 Date: 16-Sep-2010

Printed by: H Kay



NODE TABLE ABBREVIATIONS	
MANHOLE FUNCTION	
F	Flow
T	Transition
U	Unspecified
C	Combined
MANHOLE / NODE TYPE	
M	Manhole
Z	Chout in Rising Man
L	Lampole
Y	Gully
E	Exceptor
H	Headbox
F	Fillet
O	Outlet
V	Combined Sewer
P	Pumping Station
S	Storm
B	Bottom
U	Unspecified
D	Down
M	Manhole
W	Wet
T	Transition Node
G	Chout
	(to allow pipe bends)
SEWER SHAPE	
T	Trenchoidal
A	Axial
E	Elliptical
O	Oval
B	Barrel
R	Rectangular
U	Unspecified
S	Square
SEWER MATERIAL	
C	Cast Iron Cement
BR	Brick
C	Cast Iron
CO	Concrete
CG	Concrete Grey (Thin)
CS	Concrete Segmental (Bolted)
CU	Concrete Segmental (Unbolted)
CC	Concrete Cement
DI	Ductile Iron
GR	Gas Reinforced Concrete
GS	Grass Reinforced Concrete
PS	Plastic Steel Composite
PP	Polypropylene Plastic
RP	Reinforced Plastic Matrix
ST	Steel
CC	Cast Iron (Cast Iron)
PP	Polypropylene
PP	Potch Pipe
RP	Reinforced Concrete
MA	Manhole
U	Unspecified

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OS Sheet No: SD7436SW
Scale 1:1250 Date: 16-Sep-2010
No Nodes
Sheet 1 of 1



OS Sheet No: SD7436SW
Scale 1:1250 Date: 16-Sep-2010

Printed by: H Kay



**United
Utilities**
SEWER RECORDS

OS Sheet No: SD7336SE
Scale 1:1250 Date: 16-Sep-2010
40 Nodes
Sheet 1 of 1

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[illegible]

NODE TABLE ABBREVIATIONS

[illegible]

Note: All flow direction arrows are R||E = colour not significant

Relief Code	Function Type	Item Size	Black	White	Shaded	Grid Layer
1	C	150	42.0	45.0	48.0	150
2	C	150	42.0	45.0	48.0	150
3	C	150	42.0	45.0	48.0	150
4	C	150	42.0	45.0	48.0	150
5	C	150	42.0	45.0	48.0	150
6	C	150	42.0	45.0	48.0	150
7	C	150	42.0	45.0	48.0	150
8	C	150	42.0	45.0	48.0	150
9	C	150	42.0	45.0	48.0	150
10	C	150	42.0	45.0	48.0	150
11	C	150	42.0	45.0	48.0	150
12	C	150	42.0	45.0	48.0	150
13	C	150	42.0	45.0	48.0	150
14	C	150	42.0	45.0	48.0	150
15	C	150	42.0	45.0	48.0	150
16	C	150	42.0	45.0	48.0	150
17	C	150	42.0	45.0	48.0	150
18	C	150	42.0	45.0	48.0	150
19	C	150	42.0	45.0	48.0	150
20	C	150	42.0	45.0	48.0	150
21	C	150	42.0	45.0	48.0	150
22	C	150	42.0	45.0	48.0	150
23	C	150	42.0	45.0	48.0	150
24	C	150	42.0	45.0	48.0	150
25	C	150	42.0	45.0	48.0	150
26	C	150	42.0	45.0	48.0	150
27	C	150	42.0	45.0	48.0	150
28	C	150	42.0	45.0	48.0	150
29	C	150	42.0	45.0	48.0	150
30	C	150	42.0	45.0	48.0	150
31	C	150	42.0	45.0	48.0	150
32	C	150	42.0	45.0	48.0	150
33	C	150	42.0	45.0	48.0	150
34	C	150	42.0	45.0	48.0	150
35	C	150	42.0	45.0	48.0	150
36	C	150	42.0	45.0	48.0	150
37	C	150	42.0	45.0	48.0	150
38	C	150	42.0	45.0	48.0	150
39	C	150	42.0	45.0	48.0	150
40	C	150	42.0	45.0	48.0	150
41	C	150	42.0	45.0	48.0	150
42	C	150	42.0	45.0	48.0	150
43	C	150	42.0	45.0	48.0	150
44	C	150	42.0	45.0	48.0	150
45	C	150	42.0	45.0	48.0	150
46	C	150	42.0	45.0	48.0	150
47	C	150	42.0	45.0	48.0	150
48	C	150	42.0	45.0	48.0	150
49	C	150	42.0	45.0	48.0	150
50	C	150	42.0	45.0	48.0	150
51	C	150	42.0	45.0	48.0	150
52	C	150	42.0	45.0	48.0	150
53	C	150	42.0	45.0	48.0	150
54	C	150	42.0	45.0	48.0	150
55	C	150	42.0	45.0	48.0	150
56	C	150	42.0	45.0	48.0	150
57	C	150	42.0	45.0	48.0	150
58	C	150	42.0	45.0	48.0	150
59	C	150	42.0	45.0	48.0	150
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63	C	150	42.0	45.0	48.0	150
64	C	150	42.0	45.0	48.0	150
65	C	150	42.0	45.0	48.0	150
66	C	150	42.0	45.0	48.0	150
67	C	150	42.0	45.0	48.0	150
68	C	150	42.0	45.0	48.0	150
69	C	150	42.0	45.0	48.0	150
70	C	150	42.0	45.0	48.0	150
71	C	150	42.0	45.0	48.0	150
72	C	150	42.0	45.0	48.0	150
73	C	150	42.0	45.0	48.0	150
74	C	150	42.0	45.0	48.0	150
75	C	150	42.0	45.0	48.0	150
76	C	150	42.0	45.0	48.0	150
77	C	150	42.0	45.0	48.0	150
78	C	150	42.0	45.0	48.0	150
79	C	150	42.0	45.0	48.0	150
80	C	150	42.0	45.0	48.0	150
81	C	150	42.0	45.0	48.0	150
82	C	150	42.0	45.0	48.0	150
83	C	150	42.0	45.0	48.0	150
84	C	150	42.0	45.0	48.0	150
85	C	150	42.0	45.0	48.0	150
86	C	150	42.0	45.0	48.0	150
87	C	150	42.0	45.0	48.0	150
88	C	150	42.0	45.0	48.0	150
89	C	150	42.0	45.0	48.0	150
90	C	150	42.0	45.0	48.0	150
91	C	150	42.0	45.0	48.0	150
92	C	150	42.0	45.0	48.0	150
93	C	150	42.0	45.0	48.0	150
94	C	150	42.0	45.0	48.0	150
95	C	150	42.0	45.0	48.0	150
96	C	150	42.0	45.0	48.0	150
97	C	150	42.0	45.0	48.0	150
98	C	150	42.0	45.0	48.0	150
99	C	150	42.0	45.0	48.0	150
100	C	150	42.0	45.0	48.0	150

APPENDIX G: United Utilities letter dated 20 December 2011

Ribble Valley Borough Council
Council Officers, Church Walk
Clitheroe
BB7 2RA

Direct Line 01925 678308
Planning.Liaison@uuplc.co.uk

Your ref 3/2011/0111
Our ref DC/11/5196
Date 20-DEC-11

Dear Sir/Madam,

Location : Land to east of Clitheroe Road (Lawsonsteads) Whalley
Proposal : Mixed use of development Nursing Home, Primary School, car parking, landscaping

Thank you for your planning consultation of 14/12/11.

This response is based on the details submitted on the planning application form; any changes to the planning application will invalidate this response

On the basis of the information currently available and the currently committed development in the catchment for Whalley Wastewater Treatment Works, UU confirms that it has **no objection** on capacity grounds to the proposed development by Commercial Estates Group subject to the attachment of the following conditions:

1. The site must be drained on a separate system with only foul drainage connecting into the public sewer. No surface water shall be allowed to drain into the public sewer.
2. Unless otherwise agreed in writing by the local planning authority no part of the development other than:
 - a) 222 dwelling units (Use Class C3); or
 - b) 161 dwelling units (Use Class C3) and the proposed nursing home (Use Class C2)

shall be occupied before the date which is 54 months (being four years and six months) from the date of this planning permission

Reason: To allow the sewerage undertaker to address capacity at the Whalley Wastewater Treatment Works and the capacity of the sewer network serving the development and feeding into the Whalley Wastewater Treatment Works.

3. (a) Prior to the commencement of development of each phase, a scheme for foul and surface water drainage for that phase shall be submitted to the local planning authority and agreed in writing; and

(b) Each drainage scheme submitted pursuant to 3(a) above shall ensure that the foul water flows from the development as a whole shall not exceed a rate of 4 litres per second until the date specified in Condition [2] above, unless otherwise agreed in writing with the local planning authority; and

(c) For each phase of the development the foul and surface water drainage scheme shall be implemented in accordance with the approved details unless otherwise agreed in writing with the local planning authority.

Yours Faithfully,

Lorna Church
Asset Protection
United Utilities

APPENDIX H: United Utilities letter dated 7 September 2012



United Utilities Water PLC
Developer Services & Asset Protection
Thirlmere House
Lingley Mere Business Park
Lingley Green Avenue
Great Sankey
Warrington WA5 3LP

Telephone 01925 678308
Planning liaison@uuplc.co.uk

Sarah Westwood
Ribble Valley Borough Council
Council Offices, Church Walk
Clitheroe
BB7 2RA

Your ref: 3/2012/0687
APP/T2350/A/12/2
180417
3/2012/0327
Our ref: DC/12/1628
DC/12/3389
Date: 7 September 2012

Dear Sarah

Location: Land to the east of Clitheroe Road, Whalley, Lancs
Proposal: Mixed use development comprising residential (C3); nursing home (C2); car parking; open space and ancillary landscaping, re-submission of refused application 3/2012/0327P

This response is based on the details submitted as part of the planning application and available on the council's website up to 6 September 2012.

With reference to the above planning application / appeal, I will have no objection to the proposal subject to the attachment of all the below mentioned conditions. Please note there are 5 conditions in total.

United Utilities does have capacity within its wastewater infrastructure to serve this proposal on the basis of planning permissions granted up to Thursday 6 September 2012, however, please note that there are now a number of applications / appeals under consideration in the catchment for the wastewater treatment works by both the planning inspectorate and the local planning authority at the current time. If further planning permissions have been granted since this date or are granted before this application / appeal is determined, the position may change. United Utilities asks the planning inspectorate / local planning authority to inform United Utilities of any planning permissions granted within the catchment for Whalley Wastewater Treatment Works.

In the grant of any planning permission for this development, United Utilities asks the local planning authority / planning inspectorate to attach a condition to any approval which specifies the development shall only be implemented in accordance with the submitted parameter plan and that the proposed nursing home shall not exceed 50 beds in accordance with the submitted planning application form. The suggested condition is:

1 The development hereby approved shall not exceed 55 dwelling units (Use Class C3) in accordance with the submitted Parameter Plan reference PL1158 M.104 and dated 28 March 2012. In accordance with the submitted application forms, the nursing home (Use Class C2) shall not exceed 50 beds

This condition is requested so that there is no ambiguity in the decision notice over what amount of development has been approved.

The submitted flood risk assessment states that the applicant proposes to connect to the foul sewer network at two different locations. The final paragraph on page 15 of the submitted flood risk assessment states:

'As previously proposed the development may connect to the public sewer as follows:

West Area To the existing 225mm diameter public sewer running through this area of the site (at manhole 5601 or a new manhole just downstream).

East Area To the public sewer located in Brookes Lane.'

United Utilities has asked the developer to confirm in writing how the east and west areas are defined by specifying the amount of development to be connected to the two different specified locations. The response, an email dated 9 May from Rebecca Ellis of Weetwood Environmental Engineering, has been received and is enclosed. On the basis of this information, we request the following condition:

2. Prior to the commencement of any phase of development, details of the foul drainage scheme for that phase including any necessary infrastructure shall be submitted to and approved in writing by the local planning authority. No housing shall be occupied for that phase until the approved foul drainage scheme for that phase has been completed in accordance with the approved details. Unless otherwise agreed in writing, the approved foul drainage scheme shall only connect to the foul sewer network at the two connection points identified in the flood risk assessment submitted by Weetwood Environmental Engineering reference 1695/FRA_v1.1 dated 30 March 2012 and the amount of development connecting to each of the two chosen connection points shall be in accordance with the email from Rebecca Ellis of Weetwood Environmental Engineering to Andrew Leyssens of United Utilities dated 9 May 2012 sent at 17.16

United Utilities also requests the attachment of the following conditions to any planning permission granted:

3. Prior to the commencement of development, a strategy outlining the general system of drainage for foul and surface water flows arising from the entire site shall be submitted to the local planning authority and approved in writing. This strategy shall include details of any necessary infrastructure. Thereafter the detailed schemes for foul and surface water drainage for any phase of the development shall be submitted for approval in accordance with the strategy for the entire site approved under this condition.

This condition is requested as there is potential for the development to be brought forward on a phased basis. As a result, it will be necessary to receive an overall strategy for the entire site prior to the commencement of development of any phase so that the subsequent detailed drainage schemes for each phase are capable of forming part of a general system for the entire site in accordance with an overall strategy.

4. Prior to the commencement of any phase of development, details for how foul and surface water shall be drained on separate systems shall be submitted to the local planning authority and

approved in writing for that phase. The development shall be completed, maintained and managed in accordance with the approved details.

This condition is requested to ensure that the site is drained on separate systems for foul and surface water.

5. Prior to the commencement of any phase of the development, details for surface water drainage and means of disposal for that phase, based on sustainable drainage principles and evidence of an assessment of site conditions (inclusive of how the scheme shall be maintained and managed after completion and any necessary infrastructure) shall be submitted to and approved in writing by the local planning authority. For the avoidance of doubt, no surface water shall discharge into the public sewerage system, directly or indirectly, in accordance with the submitted application form and the flood risk assessment submitted by Weetwood Environmental Engineering reference 1695/FRA_v1.1 dated 30 March 2012. The development shall be completed, maintained and managed in accordance with the approved details.

This condition is requested to ensure that surface water is dealt with by the most sustainable means in accordance with national government policy. It also reflects the submitted application form and section 5.4.3 of the submitted flood risk assessment which states:

'Building Regulations Approved Document Part H sets out a hierarchy of preferred methods for the disposal of surface water runoff. These are listed below in order of preference:

1. Disposal by infiltration - According to the Soilscapes and HR Wallingford Procedure maps, the underlying soil conditions have a low to negligible permeability. It is therefore unlikely that infiltration will be a feasible method for disposal of surface water runoff from the redeveloped site.

2. Disposal to a watercourse - As detailed previously, due to the site topography it is assumed that surface water currently runs off to Watercourse A. It is proposed to discharge surface water from the proposed impermeable areas to Watercourse A.

3. Disposal to a public sewer - Following redevelopment of the site it should not be necessary to discharge surface water runoff into the public sewer system.'

We would like to make the developer aware that a public sewer crosses this site and we will not permit building over it. We will require an access strip width of 6 metres, 3 metres either side of the centre line of the sewer which is in accordance with the minimum distances specified in the current issue of "Sewers for Adoption", for maintenance or replacement. Therefore a modification of the site layout, or a diversion of the affected public sewer at the applicant's expense, may be necessary. To establish if a sewer diversion is feasible, the applicant must discuss this at an early stage with Graham Perry, Developer Enquiries Analyst by email, planning.liaison@uuplc.co.uk as a lengthy lead in period may be required if a sewer diversion proves to be acceptable.

Please note, due to the public sewer transfer, not all sewers are currently shown on the statutory sewer records, if a sewer is discovered during construction, please contact the building control body to discuss the matter further.

A separate metered supply to each unit will be required at the applicant's expense and all internal pipework must comply with current water supply (water fittings) regulations 1999.

The provision of a mains water supply could be expensive.

Should this planning application be approved, the applicant should contact our Service Enquiries on 0845 7462200 regarding connection to the water mains/public sewers.

Our water mains will need extending to serve any development on this site. The applicant, who may be required to pay a capital contribution, will need to sign an Agreement under Sections 41, 42 & 43 of the Water Industry Act 1991.

United Utilities offer a fully supported mapping service at a modest cost for our water mains and sewerage assets. This is a service, which is constantly updated by our Property Searches Team (Tel No: 0870 7510101). It is the applicant's responsibility to demonstrate the exact relationship between any assets that may cross the site and any proposed development.

I would be grateful if you can confirm receipt of this letter and ensure a copy is received by the programme officer for the appeal. The letter has been copied to the general email address of the planning inspectorate.

Yours sincerely

Daniel McDermott
Developer Services and Asset Protection, United Utilities

Cc Planning Inspectorate By email only (pcs@pins.gsi.gov.uk)

Enc Email from Rebecca Ellis of Weetwood Environmental Engineering dated 9 May 2012

Sarah Westwood

From: Rebecca Ellis [rebecca.ellis@weetwood.net]
Sent: 09 May 2012 17:16
To: Leyssens, Andrew
Cc: Andrew Grime
Subject: Land East of Clitheroe Road, Whalley (Application 3/2012/0327)

Andrew

I refer to our telephone conversation earlier today. The outline planning application proposals are for up to 55 residential dwellings and a nursing home.

The site is split into two areas; the area to the west of the watercourse situated through this and the area to the east. The nursing home (comprising 50 bed spaces) and 12 residential dwellings will be provided in the west. The remaining 43 dwellings will be provided in the east.

The development may connect to the public sewer as indicated in Section 6 of our FRA (i.e. the west area to the existing 225mm diameter public sewer running through this and the east area to the public sewer located in Brookes Lane).

As I'm sure you are aware the masterplan submitted in support of the outline planning application is illustrative.

I trust that the above is sufficient for your needs, however, please do not hesitate to contact me should you require any further information.

Kind regards

Rebecca Ellis
Senior Project Manager
rebecca.ellis@weetwood.net

Please note change of address and contact details below.

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