



Flood Risk & Flood Consequences Assessment

Proposed Development
On Land at Cheshire Cheese,
Overton Road, Penley, Wrexham.

January 2020

Statement prepared for
Wawne Developments

Report prepared by
Woodsyde Developments Ltd

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Executive Summary

Woodsyde Developments Ltd has been commissioned by Wawne Developments –to undertake a flood risk and flood consequences assessment for an extension to an existing residential property and new and improved access to the property at Cheshire Cheese House, Overton Road Penley, Wrexham. The proposed development will be accessed direct from the A539 Overton Road.

The site is approximately 0.1hectares (0.247 acres) in size. According to the Natural Resources Wales Flood Maps a portion of the land falls within Flood Zones B and C2. However, it is noted that the property extension sits outside of any flood zone.

As part of the site appraisal process it has been necessary to demonstrate that the proposed development can be achieved with an acceptable risk of flooding and without increasing flood risk to third parties. This report describes the methods used and the results of this study. The report takes into account the recommendations of Technical Advice Note 15, Planning Policy Wales and good practices.

This report will demonstrate that there will be no flood risk to the site or any other properties as a result of this development. The site will be re-engineered to provide areas of flood compensation where necessary to enable a sensible site layout. The proposals will include sustainable drainage systems where possible and appropriate.

1.0 Introduction

1.1 Project Brief.

Woodsyde Developments Limited has been commissioned to carry out a Flood Risk and Flood Consequences Assessment for a potential proposed extension to an existing residential property and the creation of a new and safer vehicular access to the property from the A539 Overton Road on behalf of Wawne Developments.

The Report is prepared in full accordance with Technical Advice Note 15 and the Planning Policy Wales. The report is required to identify the 1% (1 in 100 year) and 1% plus allowance for climate change flood extents and levels for the site and ensure that all aspects of development are clear of the 1%+ allowance for climate change floodplain.

The Natural Resources Wales Maps indicate that eastern portion of the land falls within Flood Zone B & C2, in the vicinity of the watercourse. Whereas the western portion where the existing dwelling and proposed dwelling extension sits outside of any flood zone and is not at risk of any flooding.

The proposed building extension is located on higher ground with the banks of the watercourse at a typical level differential of approximately 3.4m between typical water level and the finished floor level of the property which is 37.85m. The riverbank sits at an approximately level of 36.3m-36.45m according to topographical survey, with a depth of water typically 500-650mm deep. The land to the east of the watercourse is fairly uniform and level then falls further to the west before rising up towards the village of Penley.

The highway carriageway has a typical level of 37.25m at the centre of the bridge, where the soffit of the box culvert is at a typical level of 36.61m. The box culvert is approximately 2.4m deep and has a width typically of about 3.6-4.0m. The proposed access will typically follow existing contours on the development side of the river but will be raised to meet the road for the new bellmouth where it will join the A539. The typical level therefore will be in the region of 1.8m above the existing water level. The access will simply be a bridge structure constructed on concrete block foundations with a steel structure above. The cross-sectional area of the watercourse will be unhindered and retained as existing, such that existing flows will be unaltered and there will be little risk of potential flooding. The construction will be timber sleepers bolted to the steel beams.

Given the significant level differences between the property extension and the river flood defences and flood elevation are not considered to be required.

Potential flood risk of a portion of the site will be connected to any potential break out of the riverbank. From the flood maps it appears that there is a risk of flooding from both surface water and the river. This will be restricted mainly to a channel for the high/medium surface water risk and the river. There is potential for lands to the east to flood from lower level surface water risk and the river itself. From reviewing the site, the maximum level of flooding would appear to be around 36.3m which would not cross the highway as this sits at a higher level. Similarly, the property sits at a significantly higher level and will not be at risk as there will be around 1.4m between

finished floor level and the maximum flood level. The bridge deck however will sit at around the same level as the flood levels indicated from the Natural Resources Wales Plans.

The proposed access road will be typically 3m wide and made up of stone. It is suggested that the stone is permeable and that lateral drains are provided under the road at existing ground levels to allow any flood waters to fill the lands adjacent. It is further suggested that the levels between the access, river and A439 are lowered slightly to provide for any flood mitigation by the build up of the road.

1.2 Assessment Procedure

This report has been prepared in accordance with the requirements of Tan 15 and Planning Policy Wales.

An assessment of the flood risk to the proposed development has been considered on the basis of the best information available at the date of this report. The assessment herein is deemed appropriate to the requirements of the Planning Policy Wales, the scale and nature of the development, and the available data. The key elements of this assessment are as follows:

- Desk study scoping exercise;
- Site visit;
- Consultation with relevant authorities;
- Review of site topography and development proposals;
- Identification of data corresponding to appropriate design flood events;
- Consideration of climate change;
- Consideration of flood risks to and from the development;
- Calculation of the impact of the development on surface water run-off, and;
- Recommended attenuation measures.

1.3 Technical Advice Note 15 – Development and Flood Risk and National Planning Policy Framework

- TAN 15 was published in 2005 by the Welsh Assembly Government.
- Tan 15 provides guidance which supplements the policy set out in Planning Policy Wales in relation to development and flooding.
- Tan 15 provides advice on development and flood risk and provides a framework within which risks arising from both river and coastal flooding, and from additional run-off from development in any location, can be assessed.
- Planning Policy Wales provide additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the Planning Policy Wales on development in areas at risk of flooding.
- The guidance retains the key elements of and TAN 15.
- The Natural Resources Wales are a statutory consultee for all planning applications and will give comment and recommendations to the planning authority for any proposed developments affecting a watercourse.
- Planning Policy Wales and TAN15 states that a Strategic Flood Risk Assessment (SFRA) should be carried out by the local planning authority to inform the preparation of Local Development Documents (LDDs), having regard to catchment wide flooding issues which affect the area. The SFRA will provide the information needed to apply the sequential approach.

1.4 Requirements of Tan 15 and Planning Policy Wales

For a FRA proportionate to the risk and appropriate to the scale, nature and location of the development the following will need to be considered;

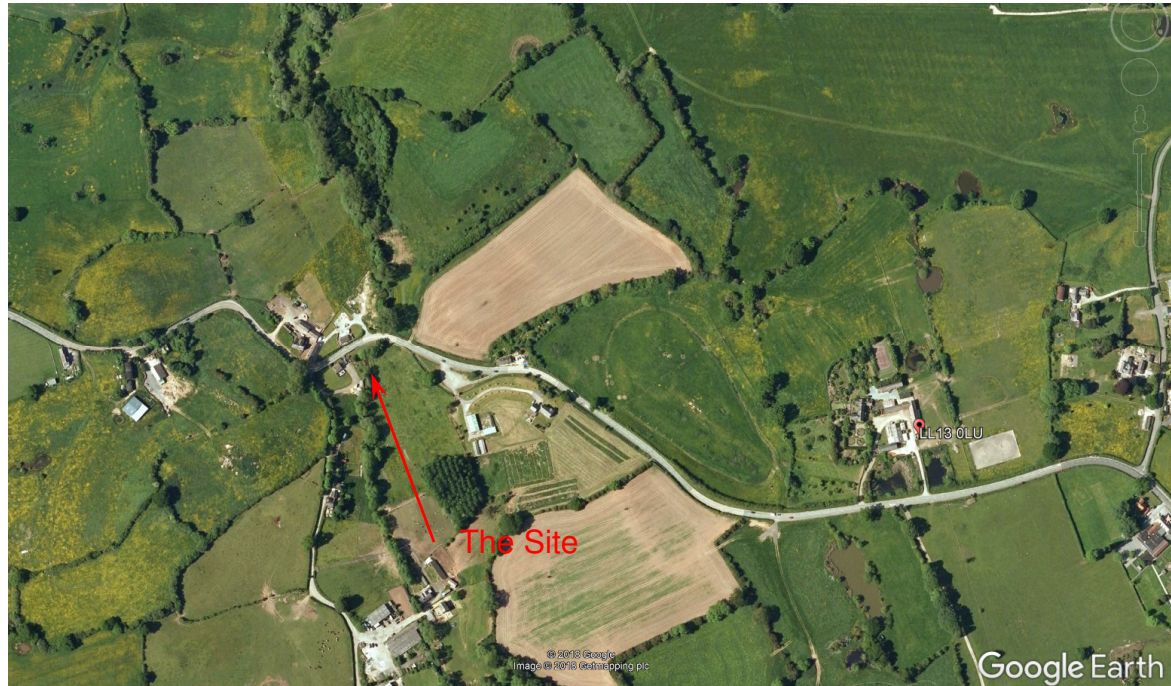
- the risk of flooding arising from the development in addition to the risk of flooding to the development; take the impacts of climate change into account;
- the potential adverse and beneficial effects of flood risk management infrastructure including raised defences, flow channels, flood storage areas and other artificial features together with the consequences of their failure;
- the vulnerability of those that could occupy and use the development, taking account of the Sequential and Exception Tests and the vulnerability classification, including arrangements for safe access;
- quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes; include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular development or land use;
- how the ability of water to soak into the ground may change with development, along with how the proposed layout of the development may affect drainage systems;
- and be supported by appropriate data and information, including historical information on previous events.

2.0 Site Details

2.1 Site Overview

The site is located to the western fringe of the village of Penley, Wrexham (NGR SJ 340351 340168). The A539 county highway abuts the northern boundary of the site.

Figure 2.1 below shows the location of the application site.



OS NGR	SJ 340351, 340168
Local Planning Authority	Powys County Council
Planning Policy Wales Office	Natural Resources Wales
Water Utility Company	Dwr Cymru - Welsh Water

2.2 Site Description

The total site area is approximately 0.01 hectares (0.248 acres), however the proposed development will sit in the western portion and the slightly elevated land. The site has a direct frontage to the A539.

Presently the site for the extension is a part of the amenity space around the existing dwelling and the access is primarily located in Greenfield, being an area of pasture. Tree are dotted along the boundary to the A539 and River. The site of the building is at an approximate level of 37.85m and the land falls down to the watercourse to the east which as a typical water level of 34.45m and runs at approximately 500mm deep. The A539 at the bridge has a level of approximately 37.2m and is therefore out of the potential flood zone.

It is noted that further crossing points have been installed along the watercourse to the south with these being a road bridge at approximately 900m from the site, a ne meter culvert which passes under the highway but is not a bridge structure approximately 2100m from the site and there are two closer bridges with nominal 1200mm diameter pipes at distances of 206m and 279m to the south. It is perhaps the structures that would prevent significant debris flowing down the watercourse towards the site as each structure is smaller than the road bridge adjacent to Cheshire Cheese and would undoubtedly block the system at each individual point and not at the large box culvert adjacent to the proposal.

According to the NRW Flood maps the section where the rivers flows through is at potential risk of flooding from the river and surface water run-off. The dwelling house and location for the proposed extension sits outside of any potential flood risk. The proposed site access will provide significant safety benefit to the owners/occupiers of the dwelling and also the users of the A539 from an increase in junction visibility.

2.3 Surrounding Area

To the western, southern boundaries lie Open pasture lands. Further development is to the south of the property. A farm and residential development to the north beyond the A539 and open land is to the east.

The River is sits at a typical level of approximately 1.5m below the main level of the adjacent field to the east and approximately 3.5m below the dwelling.

It is noted that part of the ground falls to the east with a large fairly level field area thereafter. It is this area which has the higher flood risk along with the channel of the river.

As mentioned above there are at least 4 bridges/culverts along the watercourse to the south which are of significant reduced sizes such that it would be highly unlikely that any debris of sufficient size could indeed pass these and obstruct the bridge structure by the development site.

2.4 Development Proposals

The development proposals will be a two-storey extension to the southern side of the existing dwellings and new access road. The road access will enable a significant improvement over and above the existing arrangements where visibility is restricted by the alignment of the A539. Access will still be direct from the B4362 at a location where maximum junction visibility is available along the frontage. A simple steel and timber bridge will be provided to cross the watercourse and a narrow and slow running section of the river. The bridge deck will be at a similar level of the potential flood level and it is suggested that where a conventional road is constructed culverts are provided such that water can pass from one side to the other under the access. It is noted that the proposed junction bell mouth is outside of any potential flood risk from surface water run-off or indeed the river.

From the Development Advice Maps it would appear that much of the flow of surface

water is contained within the width of the river for up to medium risk with an overflow for the lower flood risks onto the lower land to the east away from the buildings. The access road will be raised above the existing ground levels and provided with lateral pipes to allow any flow of water between the potential flood lands pass between them. It is suggested that the land between the proposed access road, A539 and river is lowered to provide and offset the small amount of flood compensation.

3.0 Scoping Report

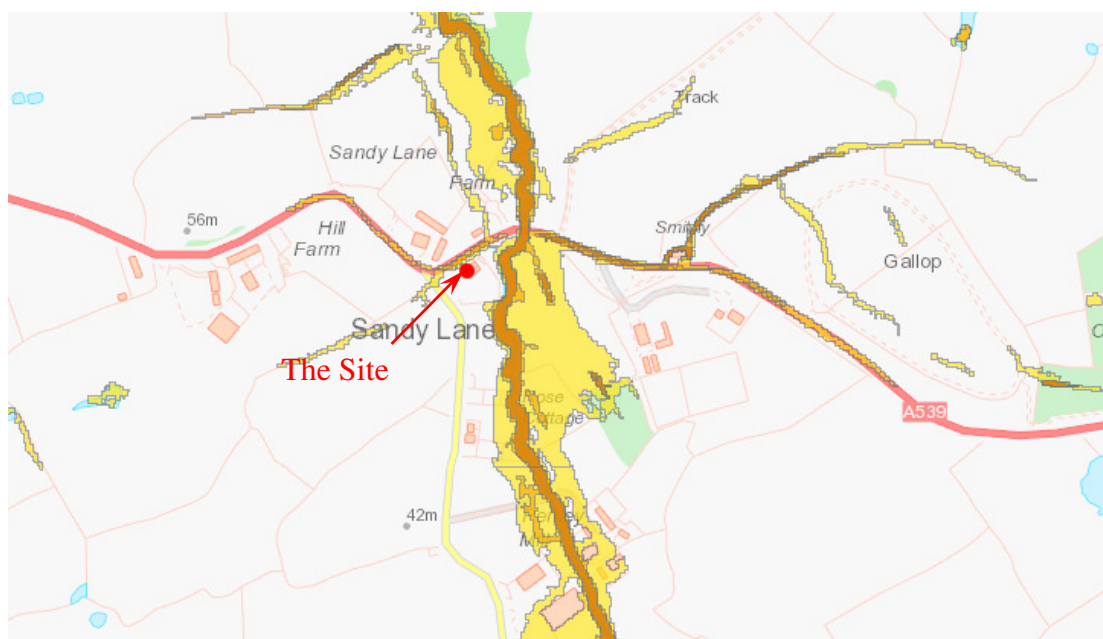
3.1 Indicative Floodplain Map

The Planning Policy Wales and National Resources Wales are responsible for the provision of information pertaining to flood risk from tidal and main watercourses throughout England and Wales. Both bodies provide online information service through its Flood Map data. This data is not intended to provide detailed flood information for individual properties but does provide a useful resource at scoping stage. An extract from the Flood Map is given in Figure 6.2 below

Figure 3.1: Extract from NRW Flood Map – River and Sea (downloaded on 08.03.18)



Figure 3.2: Extract from NRW Flood Map – Surface Water (downloaded on 08.03.18)



3.2 Historical Flooding

Discussion with the landowner have confirmed that there have been no reported incidents of flooding at the location of the application site. However, the Natural Resources Wales Flood Maps indicate that the land maybe at risk of flooding from fluvial and pluvial flooding.

Pluvial flooding would appear to occur from surface water run-off from higher ground and coupled with potential fluvial flooding with the watercourse results in potential flooding in part of the land to the eastern side of the watercourse.

Following slight re-engineering of the land adjacent to the proposed access and the A539 it is considered possible to provide a dry access and flood compensation within the retained land.

3.3 Strategic Flood Risk Assessment

The Wrexham County Borough Council Development Plan advises that development should be well located and preferably on previously developed land. Here it is expected that preference should be given to locating development in Flood Zone A. However, consideration must be given to the risk of alternative sources of flooding (e.g. surface water, sewage, and/or groundwater). Sustainable urban drainage techniques must be employed to ensure no worsening of existing flooding problems elsewhere within the area. This development in the main sits outside the areas of flood risk. Adequate space is available to provide potential flood compensation where the access road would be raised above the existing field levels. The proposals would

ensure that there is no flood risk to the proposed development, access to the existing dwellings and proposed extension or to any lands outside of the development.

3.4 Planning Policy Wales – The Sequential Test

The sequential test should demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.

Tan 15 and Planning Policy Wales suggests that where an SFRA is not available, the sequential test will be based on the Natural Resources Wales Flood Zones. The Natural Resources Wales maps confirm that the site is within Flood Zone A 'low probability'. The actual development and built form of the site will fall within the Flood Risk Vulnerability classification "high vulnerable" (this includes buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hostels). Therefore, based on the Natural Resources Wales flood zone classification of the development, Table 3 indicates that development is appropriate.

Table 3.0: Planning Policy Wales: Flood Risk Vulnerability and Flood Zone 'Compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone A	✓	✓	✓	✓	✓
	Zone B	✓	✓	Exception Test required	✓	✓
	Zone C	Exception Test required	✓	X	Exception Test required	✓
	Zone C2 'Functional Floodplain'	Exception Test required	✓	X	X	X

Key:

✓ Development is appropriate. x Development should not be permitted

3.5 Mechanisms of Flooding

To understand the risk of flooding to a site, it is imperative that potential sources of flooding be clearly defined. The likelihood and severity of flooding depends on the characteristics of the flood sources and the degree to which the site is currently, or can potentially, be protected against flooding from these sources. Table 3.2 reviews the potential risk of flooding at the proposed site from different sources.

Table 3.2 Potential Risk of Flooding to the Proposed Development

Source of Flooding	Potential			Comments
	High	Med	Low	
Fluvial (Rivers)	X		X	A portion of the site for the access is located within Flood Zone B and C2
Tidal/Coastal			X	The site is located far inland and there is no risk of tidal flooding
Pluvial (drainage system)		X		Possibility of Pluvial flooding in an intense rainfall event due to insufficient sewer capacity
Surface Run-off		X		Increased areas of impermeable material
Ponding		X		Proposed drainage must prevent Ponding
Groundwater			X	No apparent Groundwater flood risk. No basements proposed at this site.

4.0 Flood Risk Assessment

4.1 Introduction

Following the scoping exercise, the primary flood risks are identified to be from Fluvial, Pluvial, Surface Run-off, and Ponding. These sources of flooding have been investigated in greater detail, to ascertain whether the risks are acceptable to the nature of the proposed development. Opportunities to mitigate these risks are discussed in Section 5 of this report.

4.2 Fluvial (Rivers)

The area of the site to be considered for development is considered to be located within Flood Zone A (low probability), with a portion of the proposed access road located within Flood Zone B and Flood Zone C2.

The site for the building is not at risk of flood and is significantly higher than the potential food levels.

However, some simple re-engineering of the northern portion of the land to the east of the river and between the access road and A539 could be lowered to provide suitable flood compensation to account for the areas of the access. Flood compensation would be provided with the excavation of swales and/or shallow ponds. Appropriate routing of any flood waters could be provided along the re-engineering of ground levels to minimise any potential flooding, with lateral drains provided to connect the lands either side of the access road.

In assessing the extent of the flood waters to the site, the western most part of the site remains risk free. It is the lower ground to the east that would be liable to flooding from this source. Again, it is not beyond the realms of engineering to provide a suitable area for additional flooding should such an event occur. From review of the site and site topography it is considered that the access will need to be raised to a level of at least 36.25m. Should it be necessary to provide any potential additional flood compensation this could occur to the west of the watercourse and south of the property along the riverbank and also north of the proposed access within the residual land up to the highway carriageway.



Picture 1: indicates the existing culvert, associated banks and A539.



Picture 2: Indicates the depth of bank associated with the watercourse and low-lying water level.

4.3 Pluvial (Drainage Systems)

There is no reported evidence of pluvial flooding at the application site. However, a positive drainage arrangement will need to be provided to the proposed building extension with appropriate attenuation provided for the 1 in 100-year event plus climate change.

The road access will be constructed of permeable material and finish and the run-off will dissipate to ground where possible. There should be no greater run-off created from this source.

The proposed drainage system for the site will utilise Sustainable Drainage Systems (SUDS) where possible. It is not known if the site has sufficient porosity for the use of soakaways and this will be established during the development processes.

Further details of the Drainage Strategy for the site are presented in Section 6.5 of this report.

4.4 Surface Run-off

From inspection the site currently discharges in part to soakaways and part to the watercourse. A positive drainage system will be provided to the proposed extension and a limited discharge to the watercourse.

Subject to appropriate testing the surface water drainage for the proposed development will provide a suitably sized soakaway designed to accommodate the worst event 1 in 100-year storm + 35% for climate change.

Further details of the Drainage Strategy for this site are presented in Section 6 of this report. Appropriate cut-off drains will be provided as necessary to boundaries where appropriate to capture any flows from adjacent land.

4.5 Ponding

Ponding may occur if drainage is not adequately designed after periods of heavy rainfall. The new development will have to implement an adequate drainage system as discussed in Section 5 and 6 of this report.

4.6 Groundwater

There is no apparent flooding threat posed from the ground water level at the location for the dwellings within the site. There are currently no basements to be constructed in the development and therefore no seepage into these structures will occur. Suitable cut-off drainage and/or french drainage will be provided as necessary to ensure there are no issues from this source.

4.7 Residual Risk

It is considered that there will be no residual risk as a result of the proposed development. Adequate land is available within the site to provide a small amount of flood compensation for the area of new access road.

An emergency access can be provided from the site, from the existing access in absolute emergencies but it is considered that the new access can be provided above existing potential flood levels and provide a safe and dry route from the property to the highway network.

It is considered that there will be no residual risks to the property or access, subject to the small amount of flood compensation.

5.0 Recommended Flood Mitigation

5.1 Introduction

This section discusses mitigation options that should be considered in order to reduce the severity of the flood risk and to minimise the potential hazards associated with any residual flood risk.

5.2 Design Levels

The proposed built form of the development lies outside the fluvial and pluvial floodplain. However, as a matter of course; it is recommended that all floor levels are at least 150mm above existing ground levels.

5.3 Site Topography and Flood Routing

Parts of the site are shown to be at risk of flooding and is located within Flood Zone B and C2. However, with selected re-engineering of the site levels adjacent to the access the proposals would be outside of the current flood risk from pluvial and fluvial sources. Currently the site falls away from the built form to the watercourse and this will continue to do so. There will be no flood risk to the building.

Where possible, levels should also fall away from buildings, and areas where water could dam up against structures should be avoided, even if drainage is provided. The site has a good fall from north to south. The proposed location for the dwellings is the approximately 1.4m higher than the riverbank. The ground to the west of the built structure will fall to the south and east to ensure there is no risk to the buildings. It is noted that the top of bank aligns with the extent of the maximum flood level along the western side of the river.

Flood compensation could be provided, and ground levels will be such to accommodate all flood waters in the eastern portion for the road access. This mitigation would appear to conform to the requirements of the Council's SFRA, planning Policy Wales and Tan 15 requirements. Should such mitigation be required then the land between the access road and the A539 could be suitably lowered to accommodate the space lost to the new access road. However, we would recommend that a series of pipes are provided in association with the new access road to allow potential flood waters to pass north to south through this land.

A copy of a site topographical survey is attached in Appendix 2 which indicates the relevant levels to the A539 water levels of the watercourse, bank levels and finished floor levels of the property. It is considered that these details are self-explanatory and assist in reviewing this Flood Consequences Report.

5.4 Sustainable Drainage Systems

It is now commonly a planning requirement to consider utilising sustainable drainage systems (SUDS), if it is appropriate to the specific site conditions. These systems are diverse, but generally aim to provide drainage systems that may facilitate flood and/or pollution control, related to run-off. Such systems are generally 'soft engineering' and as a result can be financially, as well as environmentally, attractive engineering solutions.

The use of soakaways, porosity having been established by site testing will be used to dispose of the surface water run-off, with swales, ponds, water butts and rainwater harvesting being used where appropriate.

5.5 Flood Resistance & Resilience

A basic level of flood resistance and resilience can be achieved by following good building practice and complying with the requirements of the Building regulations 2000 published by the Office of the Deputy Prime Minister (ODPM). The incorporation of flood proofing measures may be considered as part of the design and construction of the development. These could include removable flood barriers across doorways and airbricks or raising the electrical sockets/services if appropriate.

6.0 Drainage Strategy

6.1 Introduction

In order to demonstrate that all forms of flooding have been considered as required by Tan 15 and Planning Policy Wales a drainage strategy is being developed. The aim of including this strategy as part of the flood risk assessment is so that it can easily be seen that the proposed development will not adversely affect the surface water regime in the area and that overall the current situation will be improved.

With minimal earthworks the eastern portion of the site between the new access and the A539 will be flood risk free, with flood routing provided in a deepened swale.

6.2 Existing Surface Water Drainage

I understand that the existing buildings currently drain to soakaways located within the garden space. All other land on the western side of the river partially drains direct to sub-soils or falls naturally along the existing ground levels direct to the river. Surface water from the proposed extension will discharge to an appropriate attenuation system and outfall via a vortex flow control unit at Greenfield rates to river or indeed to a suitably sized soakaway.

It is noted that there are 4 bridges upstream to the south of the A539, which include smaller single culverts to at least two of these where they pass under the highway and two other crossings within private land. It is noted that these culverts would readily block the watercourse before reaching the site and the larger box culvert under the A539.

6.3 Existing Foul Water Drainage

I am advised that a foul water drainage system is to a septic tank arrangement within the vendors lands.

6.4 Proposed Surface Water Drainage

It is proposed attenuation system for the dwelling extension will be designed for a 1 in 100-year event including climate change for the disposal of the surface water. This will outfall to the river which bisects the site. The access road will be permeable, but additional flood compensation will be provided where the land is raised for the access. Suitable lateral drains will be provided to the road construction so that any flood waters can pass between areas. The ground between the A539, access road and river will be reduced in level by approximately 250-300mm as flood compensation.

6.5 Proposed Foul Water Drainage

It is proposed that any new drainage as a result of the extension will connect into the existing foul water drainage arrangements, with these checked for size and capacity for any increase in number of persons in accordance with Flows and Loads 4.

6.6 Maintenance/Adoption.

It is proposed that the new development will connect into the existing foul water drainage system. Surface water will discharge to an attenuation system and discharge at a controlled rate Greenfield rate to the river or into newly constructed soakaway subject to porosity tests.

The drainage will be managed and maintained by the vendor.

6.7 Sustainable Drainage Techniques

It is now commonly a planning requirement to consider utilising sustainable drainage systems (SUDS), if it is appropriate to the specific site conditions. These systems are diverse, but generally aim to provide drainage systems that may facilitate flood and/or pollution control, related to run-off. Such systems are generally 'soft engineering' and as a result can be financially, as well as environmentally, attractive engineering solutions.

Where possible the use of soakaways, swales, water butts and some rainwater harvesting may be used.

7.0 Conclusions & Recommendations

The proposed development has been assessed with regards to flood risk and flood consequences and it is considered that the overall flood risks are minimal, whereby a safe, satisfactory and dry vehicular access can be provided with the introduction of a simple steel and sleeper bridge which will be at a level above the projected flood levels and the addition of flood compensation by the reduction of levels to the land between the A539, access road and river. Lateral pipes will be provided to the road construction to allow any potential flood waters to flow under the access.

As a result of the re-engineering of levels, flood compensation and flood routing, there will be no flood risk to the site or any other properties. Appropriate attenuation will be provided within the development and retained lands with any discharge reduced to maximum Greenfield run-off rates.

The proposals will include a detailed designed storage facility, provided in swales, pond or oversized pipe system for a 1 in 100-year event + 35% climate change and discharge via a flow control vortex. Or to a soakaway system porosity permitting and subject to further site investigation.

The flood risk to the site primarily rests with any potential breach of bank should the watercourse become blocked at the culvert which crosses Overton Road. However as indicated throughout this report a large portion of the overall site is not affected by any flood situation, particularly for the built extension. Moreover, adequate space is available to provide adequate flood compensation for the road area.

In accordance with TAN 15 a dry route will be available to the site and development.

7.1 Review of TAN15 and Planning Policy Wales Objectives

The proposed building extension and proposed access will not be affected by current or future flooding from any source, following some remodelling of finished levels adjacent to the permeable access. With some simple regrading of the existing site levels the road access can be free from flood risk, with compensation areas provided in the north of the access.

Appropriate additional cut-off and land drains will be provided to receive any potential overland flooding.

It is considered that the exception test has been met as all of the development area can and will fall within Flood Zone A, with the land identified within Zone C2/3 being offset with a flood compensation area.

The site falls from west to east, with levels of approximately 37.85m for the finished floor level to the extension. There will be no risks of flooding from the River, with its water level of approximately 34.45m, and the bank levels typically at 36.3-36.45m. The water is typically half a metre deep.

The development will not increase flood risk elsewhere, with the use of soakaways for the disposal of the surface water drainage and attenuation system with restriction of surface water run-off at Greenfield rates.

The measures proposed to deal with the effects and risks are appropriate, for example using swales and ponds to direct any surface water from pluvial or fluvial sources. Provision of compensation areas and utilising other SuDs features such as permeable paving where possible.

It is considered that the exception test has been met as the portion of the site for development is considered to fall within Flood Zone A, with the Zone C2/3 being at lower levels within the retained lands.

The site will benefit from a soakaway system for the surface water. Other origins of flooding have also been assessed and it has been found that there will be no increase in risk of flooding from land, groundwater or sewers as a result of this development.

There are no anticipated negative social, economic or environmental impacts which would result from the development of the site provided mitigation measures outlined in Section 6.4 are adhered to.

Review of Drainage Strategy

The proposed development will ensure that the 1 in 100 year + 35% climate change flows will be attenuated on site.

The surface water drainage will drain to an attenuation system within the site.

Soakaways, swales, ponds, permeable paving, rainwater butts, rainwater harvesting, cut-off drains, and land drainage will be provided where necessary to ensure Sustainable Drainage Techniques.

Any new foul water sewers will be constructed in line with Sewers for Adoption 7th Edition where applicable.

Sustainable Drainage Systems will be utilised as where ground conditions allow, and this will be incorporated at the detailed design stage.

The proposals for flood risk mitigation is compliant with current guidance.

Appendices:

Appendix 1: Drg SA24946/02 – Block Plan by Berrys

Appendix 2: Site Topographical Survey