Taylor Wimpey Yorkshire

Flood Risk Assessment

Kingstone School, Barnsley, West Yorkshire

880431-R1 (0)

APRIL 2014

RSK GENERAL NOTES

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1 INTRODUCTION

RSK Land and Development Engineering Ltd were commissioned by Taylor Wimpey Yorkshire to carry out a Flood Risk Assessment for a proposed residential development on the site of the former Kingstone School, Barnsley, West Yorkshire.

The assessment has been prepared in accordance with National Planning Policy Framework (NPPF) (Ref. 1) and its accompanying Technical Guidance document (TGNPPF) (Ref. 2), the Interim Code of Practice for Sustainable Drainage (Ref. 3) and BS 8533-2011 Assessing and managing flood risk in development Code of practice (Ref. 4), with site-specific advice from the Environment Agency, the Local Planning Authority and the Client.

The NPPF sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. The key definitions are:

- “areas at risk of flooding” means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency;
- “flood risk” means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

For this site, the key aspects that require the assessment are:

- the Environment Agency’s indicative flood map (**Figure 1**) shows the site to lie wholly within Flood Zone 1; and
- the site is over 1ha in size, therefore constitutes the production of a flood risk assessment, in accordance with the NPPF.

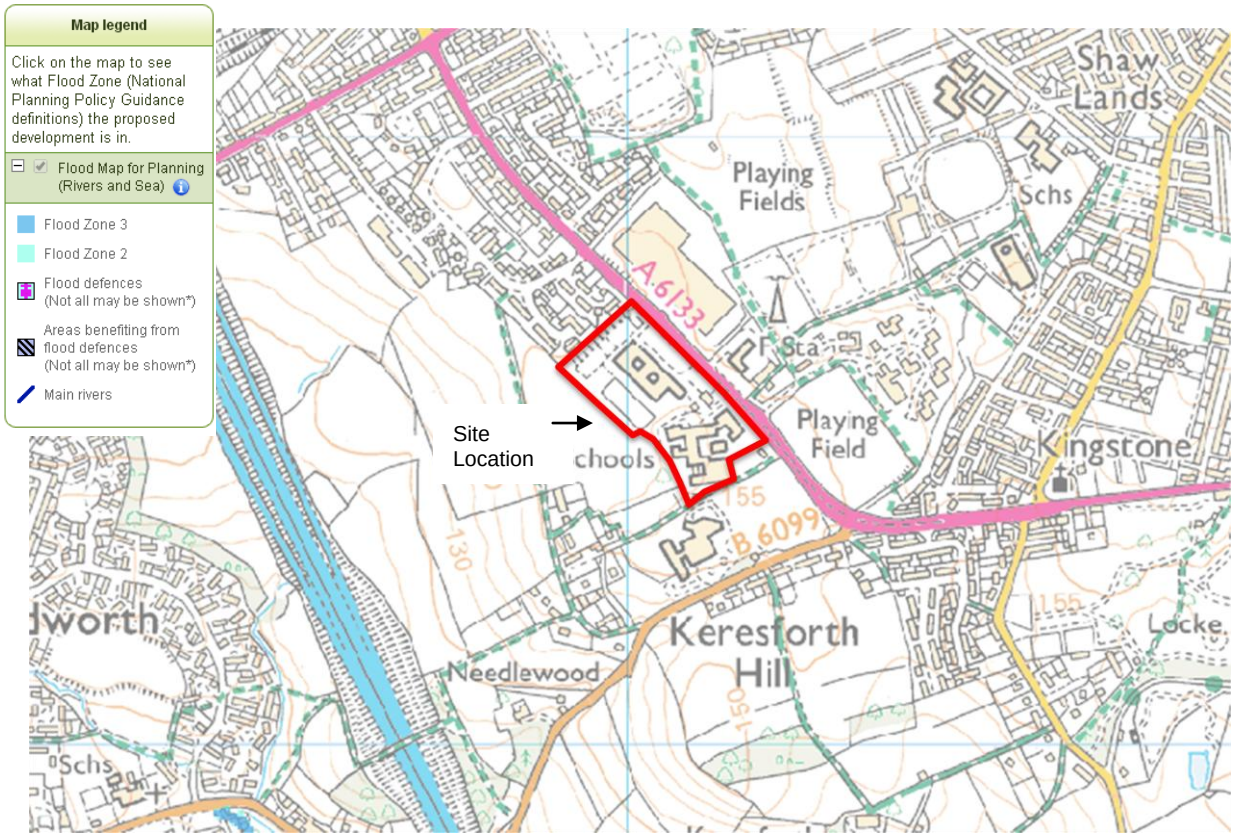

Figure 1- Environment Agency Flood Zone Map (April 2014)

2 CONTEXT AND SCOPE OF WORKS

A key element of project development is to prepare a Flood Risk Assessment to establish the risk associated with site and to propose suitable mitigation, if required to reduce the risk to a more acceptable level.

The scope of work relating to a flood risk assessment is based on the guidance provided in Section 10 of NPPF (Ref. 1) and its accompanying guidance (Ref. 2).

A site-specific Flood Risk Assessment must demonstrate that the site will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. The scope of this assessment therefore comprises of the following elements:

- to obtain information on the hydrology and hydrological regime in and around the site;
- to obtain the views of the Environment Agency including scope, location and impacts;
- to determine the extent of any new flooding provision and the influence on the site;
- to review site surface water drainage based on the proposed layout. To determine the extent of infrastructure required;
- to review architect plans and planning information and other studies to determine the existing site conditions;
- to assess the impact on the site from climate change effects and anticipated increases in rainfall over a 100 year period for residential uses; and
- preparation of a report including calculations and summaries of the source information and elements reviewed.

3 SITE LOCATION AND DESCRIPTION

The site is located off Broadway, Barnsley, West Yorkshire. The site is approximately 10Ha in size, and is the site of the former Kingstone School complex.

The site is located at National Grid reference SE 330 055 and is shown in **Figure 2** below.

Figure 2: Site location map (April 2014)

The site is bounded to the:

- north west by residential properties off Horsewood Close, Broomfield Close and Woodland Drive;
- north east by Broadway, with an industrial facility with playing fields beyond;
- south east by playing fields, with residential properties off Keresforth Hill Road and agricultural land beyond;

- south west by Greenacre School, residential properties off Bramley Carr, Keresforth Mews and Dark Lane, with agricultural lands beyond.

3.1 Proposed development

The proposals for the site are set out for the development of a residential site comprising 163 units. New access and soft landscaping for the development will be included in the proposal.

Proposed allocation plans are shown in **Appendix C**.

3.2 Source protection zone

The entire site is not located within a Source Protection Zone, according to the Environment Agency's latest groundwater designation maps.

3.3 Geology and hydrogeology

According to the British Geological Survey the site and the surrounding area consists bedrock of Pennine Middle Coal Measures Formation – Sandstone and Mudstone.

The soil categorisation (Land Information System's Soilscapes) on the eastern section of the site is defined as 'slowly permeable seasonally wet acid loamy and clayey soils with impeded drainage'. This section is outlined as draining to stream network.

The site is located above a Secondary A bedrock aquifer, based on this reference, the hydrogeology of the site is likely to be characterised by the presence of a semi-confined deep aquifer comprising the Pennine Middle Coal Measures Formation.

A Geo-environmental Assessment was carried out in 2013 by RSK and documented in Report no. 301285 (Ref. 5).

3.4 Surrounding hydrology

The nearest Main River to the site is a tributary of the River Dearne and is located approximately 1.2km to the north east of the site. The nearest Ordinary Watercourse to the site (Dodworth Dyke) is located to the west of the M1 and approximately 700m to the south west of the site. Isolated field drains are located approximately 250m to the west and 270m to the south of the site and flow southwards towards Dodworth Dyke.

4 PLANNING POLICY

4.1 National

Table 4.1: National policy context

Policy/Legislation name	Key Provisions
National Planning Policy Framework	The aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

Table 4.2 National legislation

Policy/Legislation name	Key Provisions
Water Resources Act 1991	*Section 24* - The Environment Agency (EA) is empowered under this Act to maintain and improve the quality of 'controlled' waters *Section 85* - It is an offence to cause or knowingly permit pollution of controlled waters. *Section 88* - Discharge consents are required for discharges to controlled waters.
Flood and Water Management Act 2010	This legislation was formally ratified in April 2010 with the aim is to implementing the findings of the 2007 Pitt Review and co-ordinating control of drainage and flood issues. There are a number of increased responsibilities within the act that affect adoption of Sustainable Drainage Systems (SuDS) features and the role of the EA to expand on the mapping data they provide. The implementation of SuDS features has many beneficial impacts on the treatment of surface water during remediation works.
Water Framework Directive (2000)	The Water Framework Directive (WFD) came in to force in 2000 and requires all inland and coastal waters to reach 'good' chemical and biological status by 2015. Flood risk management is unlikely to have a significant impact on chemical water quality except where maintenance works disturb sediment (such as de-silting) or where pollutants are mobilised from contaminated land by flood waters. The main impact of the WFD on flood risk management, both now and in the future, relates to the ecological quality of water bodies. Channel works, such as straightening and deepening, or flood risk management schemes that modify geomorphological processes can change river morphology. The WFD aims to protect conservation sites identified by the EC Habitats Directive and Birds Directive that have water-related features, by designating them as 'protected sites'.

4.2 Local

Local policies ensures that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and making development safe without increasing flood risk elsewhere and where possible, reducing flood risk.

Table 4.3 Local policy context

Policy/Legislation name	Key Provisions
Barnsley Core Strategy (Adopted 2011) Policy CSP 3- Sustainable Drainage Systems (SuDS)	All development will be expected to use Sustainable Drainage Systems (SuDS). Only in exceptional circumstances, where it can be demonstrated that all types of SuDS are impractical, will other drainage management systems will be permitted. Planning applications must include an assessment to show that SuDS will work and be maintained. Measures should be taken to avoid water contamination and safeguard groundwater supply. Developers will be required to contribute to the maintenance of SuDS
Barnsley Core Strategy (Adopted 2011) Policy CSP 4- Flood Risk	The extent and impact of flooding will be reduced by: • Not permitting new development where it would be at an unacceptable risk of flooding or would give rise to flooding elsewhere; • Requiring developers with proposals in Flood Zones 2 and 3 to provide evidence of the sequential test and exception test where appropriate; • Requiring site-specific Flood Risk Assessments (FRAs) for proposals over 1 hectare in Flood Zone 1 and all proposals in Flood Zones 2 and 3; • Expecting proposals over 1000m2 floor space or 0.4ha in Flood Zone 1 to demonstrate how the proposal will make a positive contribution to reducing or managing flood risk; • Expecting all development proposals on brownfield sites to reduce surface water run-off by at least 30% and development on greenfield sites to maintain or reduce existing run-off rates; • Requiring development proposals to use Sustainable Drainage Systems (SuDS) in accordance with policy CSP3 • Not culverting or building over watercourses and encouraging the removal of existing culverts wherever practicable; and • Using flood resilient design in areas of high flood risk.

5 SOURCE OF FLOOD RISK

In accordance with NPPF (Ref. 1) and advice from the Environment Agency, a prediction of the flood sources and levels is required along with the effects of climate change from the present for the design life of the development (in this case assumed to be 100 years for the residential uses and 60 years for the employment uses). To consider these effects of climate change, NPPF recommends consideration of a 20% increase in peak river flows over this timeframe

The flood risk elements that need to be considered for any site are defined in BS 8533 as the “Forms of Flooding” and are listed as:

- flooding from Rivers (fluvial flood risk);
- flooding from the Sea (tidal flood risk);
- flooding from the Land;
- flooding from Groundwater;
- flooding from Sewers (sewer and drain exceedance, pumping station failure etc); and
- flooding from Reservoirs, Canals and other Artificial Structures.

5.1 Environment Agency maps

The Environment Agency has produced Flood Zone maps for much of England and Wales. The current displayed map is reproduced as **Figure 1** and shows the site to lie wholly within Flood Zone 1, showing the site is not at risk of flooding from fluvial or tidal sources.

5.2 Flooding from rivers (fluvial flood risk)

As noted, according to the Environment Agency flood maps and supported by the Barnsley Metropolitan Borough Council Strategic Flood Risk Assessment (Ref. 6) the flood risk to the site from this source is considered **low**.

5.3 Flooding from the sea (tidal flood risk)

On the coast storm surges and high tides can threaten low lying coastal areas, and can be sometimes large and rapid enough to overtop defence works, causing significantly more damage than river flooding. Tidal flooding is not considered a risk to the site due to the inland location of the development.

5.4 Flooding from the land (overland pluvial flood risk)

If intense rain is unable to soak into the ground or be carried through manmade drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff will occur. Excess surface water flows from the site are believed to drain naturally to the local water features, either by overland flow or through infiltration.

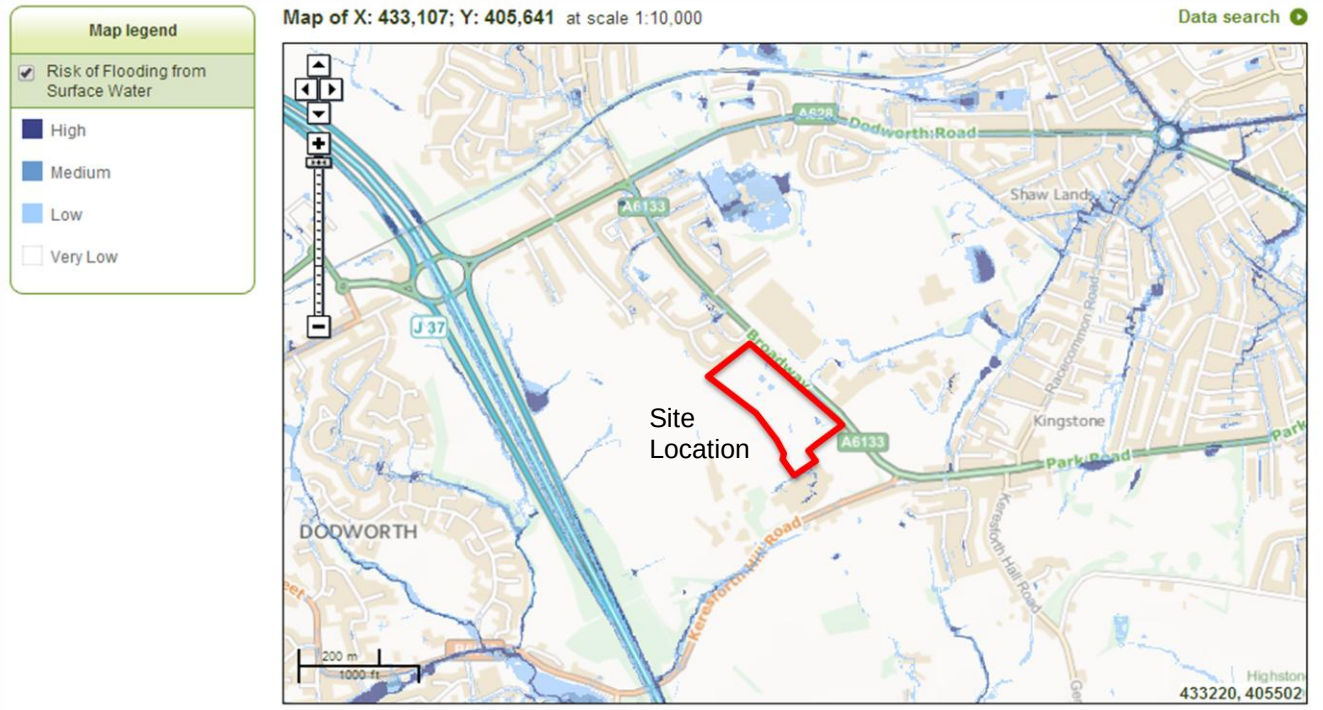

Figure 3- Environment Agency surface water flood map (April 2014)

The Environment Agency's surface water flood map (**Figure 3**) shows that the site is at a very low risk of flooding from pluvial sources. As such the overall risk of pluvial flooding to the site can be considered **very low**.

5.5 Flooding from groundwater

Groundwater flooding tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where

the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

The Barnsley Metropolitan Borough Council Strategic Flood Risk Assessment (Ref. 6) states that the likely candidates for groundwater flooding include the Kingstone area of Barnsley. The site is not thought to be at a flood risk from the re-emergence from the former South Yorkshire mining region following the cessation of minewater pumping.

The Geo-environmental assessment report produced by RSK (Ref. 7) in November 2013 finds groundwater was encountered during the investigation as slow seepages at two locations (TP05 at 1.2m and 3m; TP19 at 1.0m and 2.0m) in the north west of the site. Groundwater was not encountered elsewhere during the investigation. All monitoring wells except two were dry, with standing groundwater encountered within PH6 and PH7 in the north west of the site at depths between 1.80m and 2.61m.

Overall, due to the sporadic nature of groundwater flooding and depth below ground and majority of monitoring wells and trial pits being dry, it can be considered that the risk of groundwater flooding to the site would be considered **low**.

5.6 Flooding from sewers

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its conveyance capacity, the system becomes blocked or it cannot discharge due to a high water level in the receiving watercourse. A sewer flood is often caused by surface water drains discharging into the combined sewer systems; sewer capacity is exceeded in large rainfall events causing the backing up of floodwaters within properties or discharging through manholes. Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption (Ref. 7). One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30 year rainfall event. By definition a 1 in 100 year event would exceed the capacity of the surrounding sewer network as well as any proposed drainage.

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and a consequent potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure.

There are no direct references within the Barnsley MBC SFRA (Ref. 6) or the Barnsley Metropolitan Borough Council Preliminary Flood Risk Assessment (Ref. 8) of sewer flooding affecting the site. Indeed there are no properties on the Yorkshire Water DG5 flooded properties register in the vicinity of the site and the PFRA does not list Kingstone as an area prone to sewer flooding.

To ensure that sewer and surface water flooding is not exacerbated; surface water must be considered within the design of the site. This ensures that any additional surface water and overland flows are managed correctly, to minimise flood risk to the site and the surrounding area. The proposed surface water network on the site should be designed to ensure exceedance of the network has been considered. The existing

Yorkshire Water public sewer network for the surrounding areas is included as **Appendix C**, and shows the location of surface water, foul water and combined sewers essentially adjacent to the site under Broadway and within the residential estate to the north west of the development site.

Due to the existing site drainage, and absence of any historical sewer floods in the vicinity of the site, the flood risk from this source can be considered to be **low**.

5.7 Flooding from reservoirs, canals and other artificial structures

The Environment Agency has recently published flood risk mapping as a result of potential failure of reservoirs and artificial structures.

The Environment Agency's reservoir flood map shows that the site is not in an area that is not at risk of flooding from these sources.

Flood risk from this source is therefore considered **low**.

5.8 Historic flooding

From the Barnsley MBC SFRA (Ref. 6) and PFRA (Ref. 8) there have been no recorded instances of historic flooding affecting the site.

5.9 Flood risk resulting from the development

In theory any development can increase flood risk downstream, if it is not designed properly. This potential is much increased where the site is on greenfield land, as development tends to increase impermeable surfaces, resulting in increased runoff from the site.

In contrast, redevelopment of brownfield sites may offer opportunities to reduce peak runoff, as well as removing connectivity to foul or combined sewerage systems, with consequent benefits for reducing sewer flooding and the potential of pollution from combined sewer overflows. The Barnsley Core Strategy outlines the requirement for a 30% reduction in runoff from brownfield sites.

The proposed development will use the latest best practice guidance to ensure that flood risk is not increased as a result of the development. This will require the provision of a suitable surface water management plan to ensure that the surface water generated from the site does not exceed the pre-development rates; this is investigated further in Section 7 of this report.

5.10 Flood risk summary

From the Environment Agency flood maps, the whole site is located within Flood Zone 1 and as such is at a low risk of flooding from fluvial sources and its inland location means that tidal flooding to the site is not an issue.

Flood risk from other sources (pluvial, groundwater and sewer) to the site is also considered to be low.

6 CLIMATE CHANGE

6.1 Climate change impacts

Within the context of the existing flood risk at the site, and the requirements of the TGNPPF, climate change impacts from different flood sources have been considered alongside the present day scenario as described in Section 5.

As an overview; Climate change can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

In the Humber River Basin District, wetter winters and more rain falling in wet spells may increase river flooding for rivers and tributaries. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers. Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

In accordance with the requirements of the NPPF the latest climate change predictions will be considered within this assessment.

Latest figures for the Humber River Basin District (Ref. 9) show that if emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are:

- winter precipitation increases of around 12% (very likely to be between 2% and 26%);
- precipitation on the wettest day in winter up by around 12% (very unlikely to be more than 24%);
- relative sea levels are very likely to be up between 10cm and 41cm from 1990 levels (not including extra potential rises from polar ice sheet loss); and
- peak river flows in a typical catchment likely to increase between 8% and 14%.

6.2 Increased rainfall intensity

For the surface water runoff assessment, an allowance of a 30% increase in the rainfall intensity values and a 20% increase in peak river flows for the period 2085 to 2115 have been included to account for the impact of climate change in accordance with TGNPPF. This increase will apply towards the end of design lifetime of the residential spaces.

7 SURFACE WATER DRAINAGE STRATEGY

7.1 Pre-development situation

The existing site currently comprises the existing Kingstone School complex and areas of greenfield land. It is believed that the site currently discharges to the Yorkshire Water sewer network beneath Broadway.

7.2 Off-site discharge options

An order of preference exists for drainage receptors. Infiltration drainage should be used where possible. Where this is not possible, or does not provide sufficient capacity, attenuated discharge to watercourses should be sought. Only where neither of these two options is available should discharge to sewers be considered, subject to approvals from the sewerage undertaker.

7.2.1 Infiltration

While the Geo-environmental Assessment (Ref. 6) has been carried out for the site, infiltration test have not been carried out. Further investigation should be carried out to assess whether discharge to the ground, or infiltration, may be a possible drainage solution for this site; however the effectiveness of infiltration is completely dependent on the physical conditions at the site. Potential obstacles include:

Local Variations In Permeability Preventing Infiltration - This testing should be undertaken in line with the guidance contained in BRE 365 (Ref. 10) or CIRIA R156 (Ref. 11) and the results used to firstly check feasibility and secondly to size the necessary infiltration features.

Shallow Groundwater Table - For infiltration drainage devices Building Regulation approved document H2 states that these, “should not be built in ground where the water table reaches the bottom of the device at any time of the year”.

Source Protection Zones - As discussed in Section 3, the site is not located in a source protection zone. If the local ground conditions prove suitable, water could be infiltrated to the ground in a number of different ways (provided suitable treatment options are incorporated into the design), including discharge to infiltration trenches, retention ponds designed to infiltrate water or more laterally extensive systems constructed beneath roadways.

Due to the soil types outlined in Section 3.3 and prevailing geological conditions, it would appear that the use of infiltration as a means of surface water discharge is not a viable option.

7.2.2 Discharge to watercourse

As infiltration is not suitable on the site and does not provide a sufficient discharge rate, discharge to watercourse is the next option to consider. Any discharge off the site should be limited to the pre-development run-off rate for Greenfield sections and

reduced by 30% for brownfield sections with any flows in excess of this being retained on site in a suitably designed attenuation feature. Due to the relative distance to any adequate receiving watercourse and separation due to third party land, connection to watercourse appears unfeasible.

7.2.3 Discharge to sewer

As neither of the above two options are not suitable for the site then connection to sewer has been be sought, and following preliminary consultation with Yorkshire Water, surface water discharge from the site would be limited to 74l/sec with a point of discharge to the surface water sewer beneath Broadway.

7.3 Post-development situation

The site is currently a greenfield / brownfield site and is part in use as former Kingstone School building. The proposed development may increase the impermeable area by an amount to be confirmed. The surface water runoff from the site (post-development) should be limited to the pre-development run-off rate for Greenfield sections and reduced by 30% for brownfield sections with a discharge point to the surface water sewer beneath Broadway the most likely discharge location, following correspondence with Yorkshire Water. Foul water from the site is to be discharged to the Yorkshire Water foul sewer beneath Broadway.

Further details on surface water drainage for the site are provided within the RSK Planning Layout 40-01 for the site.

8 PLANNING CONTEXT

8.1 Application of planning policy

NPPF includes (Section 10) measures specifically dealing with development planning and flood risk using a sequential characterisation of risk based on planning zones and the Environment Agency Flood Map. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

Within NPPF Technical Guidance on flood risk each flood zone has a list of appropriate land uses dependent on vulnerability to flooding.

8.2 Land use vulnerability

From the NPPF Technical Guidance, a "Less Vulnerable" land use could be appropriate to Flood Zone 3a (High Probability of flooding at higher than 1 in 100 annual probability) with the "More Vulnerable" use only permitted if the exception test is passed. For a "More Vulnerable" class, development on this site could be appropriate within Flood Zone 2 (Medium Probability of flooding at less than 1 in 100 but higher than 1 in 1,000 annual probability).

In applying the sequential test, reference is made to the following table (reproduced from Table 3 contained within NPPF).

Table 8.1: Flood risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

The proposed use as a residential development can be classed as 'More Vulnerable' and therefore appropriate in Flood Zone 1.

8.3 Sequential test

The Sequential Test is required to assess flood risk and NPPF Technical Guidance recommends that the test be applied at all stages of the planning process to direct new development to areas with the lowest probability of flooding (Flood Zone 1).

According to NPPF, if there is no reasonably available site in Flood Zone 1, the flood vulnerability of the proposed development (see NPPF Technical Guidance Table 2) can be taken into account in locating development in Flood Zone 2 and then Flood Zone 3. Within each Flood Zone new development should be directed to sites at the lowest probability of flooding from all sources.

The development proposal includes 'More Vulnerable' residential uses to be developed on this site. With reference to Table 8.1 above, the proposed development passes the Sequential Test and does not require the Exception Test. This development would be appropriate for areas within Flood Zone 1.

8.4 Exception test

Due to the location of site within Flood Zone 1, the Exception Test is not required.

9 CONCLUSIONS

This flood risk assessment complies with the NPPF and its Technical Guidance and demonstrates that flood risk from all sources has been considered in the proposed developments. It is also consistence with the Local Planning Authority requirements with regard to flood risk.

The proposed development site lies in an area designated by the Environment Agency as Flood Zone 1. This means that the site has a less than 1 in 1000 annual probability of river flooding (<0.1%) in any year.

NPPF sets out a Sequential Test, which states that preference should be given to development located within Flood Zone 1. This flood risk assessment demonstrates that the requirements of the Sequential Test have been met, with the site's location within Flood Zone 1.

The site is currently a greenfield / brownfield site. The proposed development will alter the local impermeable area by an amount to be confirmed. The surface water runoff from the site (post-development) from brownfield land should be reduced by 30% in line with the Barnsley MBC Core Strategy and restricted to pre-development rates for Greenfield land with a discharge point to the Yorkshire Water surface water sewer beneath Broadway as the most likely option, at a limited rate of 74l/sec following correspondence with Yorkshire Water.

This flood risk assessment has concluded that:

- the site is not at risk of flooding from a fluvial event, and is far enough inland not to be at risk of any tidal flooding event;
- flood risk from surface water is considered low at the site;
- flood risk from other sources – groundwater, sewers, reservoirs and artificial sources – is demonstrated to be low;
- the impact of the development on other forms of flooding is demonstrated to be low;
- any increase in surface water runoff from the proposed development will be attenuated on site and discharged at pre-development rates to the Yorkshire Water surface water sewer beneath Broadway; and
- overall, taking into account the above points, the development of the site should not be precluded on flood risk grounds.

10 References

1. Communities and Local Government “National Planning Policy Framework” NPPF, March 2012.
2. Communities and Local Government “Technical Guidance to the National Planning Policy Framework”, March 2012.
3. DEFRA “Interim Code of Practice for Sustainable Drainage Systems” National SUDS Working Group, July 2004.
4. BS 8533-2011 “Assessing and managing flood risk in development Code of practice”, November 2011.
5. RSK, “Geo-environmental Site Assessment: Kingstone School, Barnsley- 301285-2 (00)” November 2013.
6. Barnsley Metropolitan Borough Council “Strategic Flood Risk Assessment”, September 2010.
7. WRC “Sewers for Adoption” 6th Edition, 2006.
8. Barnsley Metropolitan Borough Council “Preliminary Flood Risk Assessment” July 2011.
9. Environment Agency “Annexes to the PFRA” March 2011.
10. BRE 365, “Soakaway Design”.
11. CIRIA “Infiltration drainage – Manual of good practice. C156.”

APPENDIX A
RSK SERVICE CONSTRAINTS

1. This report is carried out in connection with the report (together the "Services") were compiled and carried out by RSK LDE Ltd (RSK) for Taylor Wimpey Yorkshire (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable Civil Engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.

APPENDIX B
PROPOSED DEVELOPMENT PLANS

APPENDIX C
YORKSHIRE WATER SEWER RECORDS