

Issue 1

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Rybook, New Porsche Centre, High Wycombe

Flood Risk
Assessment and
Drainage Strategy

PCS Consulting Engineers Ltd

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1 EXECUTIVE SUMMARY

PCS Consulting Engineers Ltd (PCS) were commissioned by Dealership Developments Limited to carry out the Flood Risk assessment and Drainage Strategy pertaining to a planning application for a new Porsche Centre and Bentley dealership in High Wycombe.

The site is that of the former Leisure Centre and swimming pool, Handy Cross Hub, High Wycombe. It is located to the north of the new Wycombe Leisure Centre and Waitrose Supermarket. High Wycombe Park and Ride car park is located to the West of the site. Site area is 17,320 sq. m. (4,3 acres).

The assessment indicates that:

- For fluvial flooding the site is entirely within Flood Zone 1 – ‘Low probability’, and the proposed redevelopment is appropriate for this location. The EA flood maps show the site to be entirely within Flood Zone 1.
- The site is not at significant risk of flooding from, groundwater, or from the land surrounding it.
- The proposed end use of the development is entirely appropriate for the site when assessed in accordance with Technical Guidance to the National Planning Policy Framework (TGNPPF).
- The sequential test is not required as the site is entirely within Flood Zone 1.
- The site drainage comprises a site wide SUDS system utilising soakaways designed for the 1 in 100 plus 30% climate change allowance without flooding.
- The development will not lead to flooding problems on the site or other sites adjacent to, and downstream of the development.

2 DEVELOPMENT DESCRIPTION AND LOCATION

The application site is for a proposed new Porsche Centre and Bentley Dealership at the site former sports centre, Marlow Hill, High Wycombe, Buckinghamshire.



Fig 1 Site location plan.



The site is located on the south side of the existing A404, off junction 4 of the M40.

The site consists of a number of plateaus, rising initially from a level of 145.5m AOD adjacent the existing Waitrose store on the southern boundary, up to a high of 152.7m AOD at the northern point of the site adjacent the A404 road junction. The site is bounded to the

north by the A404, to the west by the Handy Cross Park and ride scheme, to the south by Waitrose and Wycombe Leisure Centre, and to the east by residential areas.

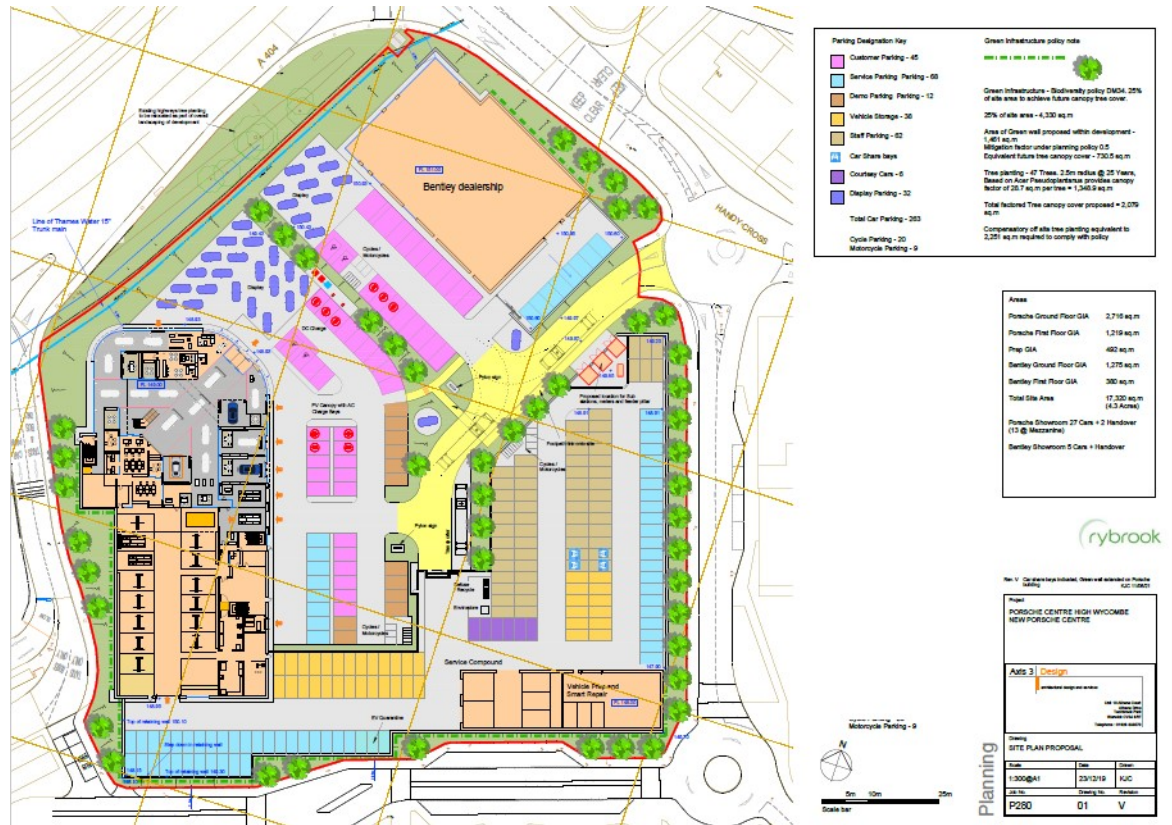


Fig 2 Proposed Site Plan

The proposed development will comprise a new Porsche Centre and Bentley dealership, with an associated service compound, parking and landscaping.

Vulnerability classification

In accordance with TGNPPF table 2: Flood Risk Classification, the proposed building use falls under the category of 'Less Vulnerable'.

Policy Framework

National Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF) and the Technical Guidance that sits alongside it sets out the planning objectives for flood risk management. It states that all forms of flooding and their impacts are material planning considerations. The aim of the policies within the NPPF is to ensure that flood risk is taken into account at all stages of the planning process in order to prevent inappropriate development in 'at risk' areas.

The key objectives for planning are appraising, managing and reducing flood risk. To appraise the risk, it is stated that flood risk areas need to be identified, and that the level of risk needs to be identified. To facilitate this, the NPPF indicates that Regional Flood Risk Appraisals and Strategic Flood Risk Assessments should be prepared by the Local Planning Authority.

To '*manage*' the risk, Local Planning Authorities (LPAs) need to develop policies which "*avoid flood risk to people and property where possible, and manage any residual risk, taking account of the impacts of climate change*". LPAs should also only permit development in flood risk areas if there are no feasible alternatives located in areas of lower flood risk.

TGNPPF also gives specific advice for determining planning applications, which needs to be considered when developing policy. LPAs should ensure that flood risk assessments (FRAs) are submitted with planning applications where this is appropriate; they should apply the sequential approach (defined in the TGNPPF) which ensures that lower risk areas are considered preferable to higher risk areas; priority should be given to the use of SUDS; and new development should be designed to be resilient to flooding as appropriate.

Revised guidance on the allowance for global warming allowance was introduced in February 2016. This gives guidance on river flows for flood modelling, sea level rise and the percentage addition to be applied to rainfall for drainage design.

Wycombe Core Plan

Core policies

Policy CP7 Delivering the Infrastructure to support growth sets out the key infrastructure requirements necessary to support growth. This includes requirements to provide green infrastructure such as:

- *biodiversity improvements and flood management measures including*
- *sustainable drainage systems and provision for their long-term management and maintenance.*

Policy CP9 Sense of Place reiterates the aim to conserve and enhance the natural environment and implementing measures for their enhancement; it is about "making sure the place makes sense for the past, and the future, for humans, and for other species (para 4.100)".

Policy CP10 Green infrastructure and the natural environment provides a strong commitment to work in partnership with the Environment Agency, Natural England and the water companies to protect, manage and improve water quality in the district, particularly the quality of water bodies which are currently failing to meet the Water Framework Directive (WFD) requirements as set out in the Thames River Basin Management Plan (RBMP).

This will positively impact the biodiversity value of rivers and streams and their corridors, as highlighted in the Thames River Basin Management Plan. This is reiterated in policy DM15 of the Delivery and Site allocations Plan which seeks to restore ecosystems in and around these water bodies.

Policy CP12 Mitigating climate change sets out how the council will mitigate and adapt to climate change in relation to the water environment through:

- *Ensuring allocations in this plan have taken account of climate change allowances using the information provided by the Strategic Flood Risk Assessment level 1 and 2 and through the sequential testing of sites, and ensuring through detailed development management policy that applications fully factor in climate change in their flood risk assessments;*
- *Integrating blue and green infrastructure into the design of new development, including the use of Sustainable Drainage Systems (SuDS); and*
- *Adopting higher water efficiency standards to contribute to alleviating water stress across the district.*

The Council strategy on managing flood risk and SuDS stems from the need to replace DM17 of the Delivery and Site Allocations Plan as the PPG has introduced the need to consider all forms of flooding when dealing with flood risk. Policy DM39 in the new Local Plan addresses

this and also reflects the national commitment towards implementing Sustainable Drainage Systems (SuDS) in new developments whenever feasible. The Strategic Flood Risk Assessment Level 1 and 2 provide further detailed recommendations on managing flood risk and

implementing SuDS. SuDS can have multiple benefits in terms of managing the water environment as they can act as pollution filters, contributing to protecting water quality, as well as contribute to controlling and managing rainfall to avoid/manage flood.

This strategy document demonstrates how the proposed development complies.

Sequential Test

The Sequential test is the process that Local Authorities use to give priority in allocating and permitting sites for development, when drawing up or revising policies or in considering planning applications. In the case of flooding, the risk based Sequential test is meant to steer new development towards those sites with little or no risk of flooding (i.e., the lowest probability of flooding, Flood Zone 1) in preference to areas of higher risk.

A sequential test is not required in this case as the site is entirely within Flood Zone 1 (the lowest category of flood risk).

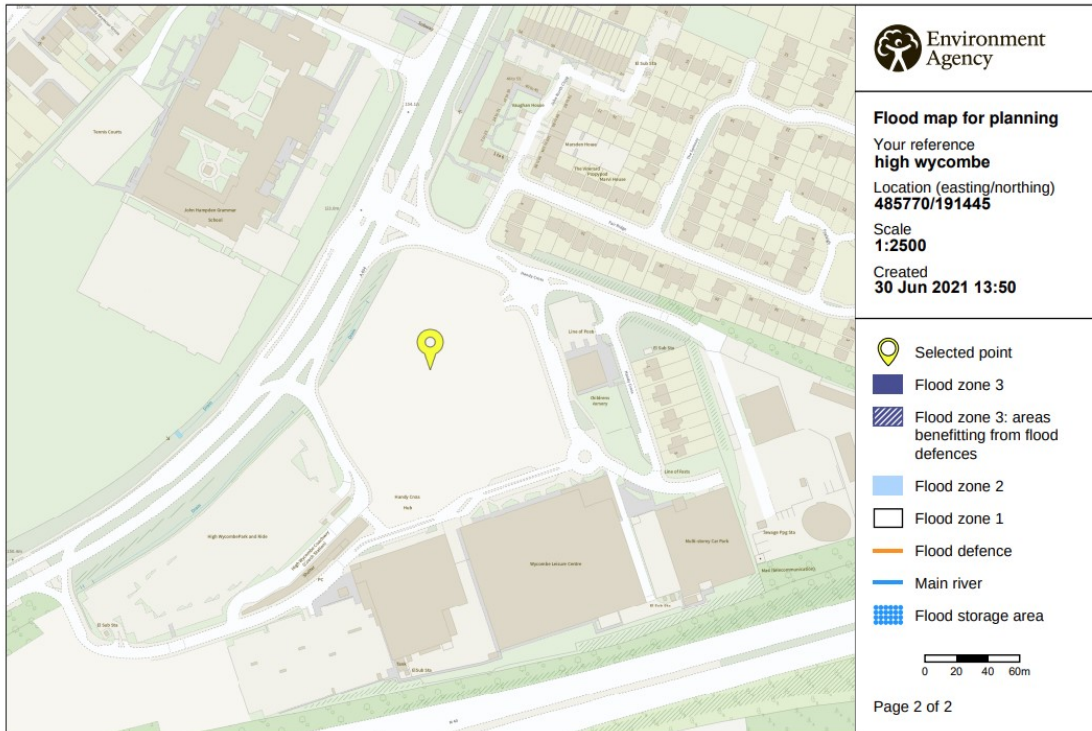
3 DEFINITION OF POTENTIAL FLOOD HAZARD

Flooding from the Sea

The site is not at risk from flooding from the Sea.

Flooding from Rivers

The nearest watercourse is the River Wye approximately 1km to the northeast of the site.



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Figure 3. EA mapping showing extent of flooding for planning

The EA indicative flood maps show the site to be entirely within Flood Zone 1 for fluvial flooding (the lowest risk category for flooding).

Flooding from the Site

Any flows generated within the development will be directed towards new drainage built at the low points of the car parking areas and roads, and from there into the drainage system. If for any reason the drainage system should fail, the falls on the site will direct overland flows away from the building footprint and towards the southern boundary of the site where it will then drain into the existing drainage systems provided as part of the wider Handy Cross development.

Flooding from the areas around the site (Surface Water)

This part of Blythe Valley slopes with a general fall towards the south. Building ground floor slab levels are raised above the land immediately around them.

Consequently, there is limited potential for runoff from the areas adjacent to the site to cause flooding on the site.



Extent of flooding from surface water

● High ● Medium ● Low ○ Very Low ⊕ Location you selected

Figure 4. EA mapping showing extent of flooding from surface water

Any flows off the adjacent roads would only affect the site in the event of a failure in the drainage system and in this case would flow to the lower land to the south of the development site.

As a consequence, flooding from the areas around the site itself is considered to be an extremely low risk. This risk is reflected in Figure 4, which shows the potential of surface water flooding based on historical topography.

Flooding from Groundwater

The site investigation shows that the site is underlain by made ground and clay over Chalk at relatively shallow depth.

Groundwater was not recorded below the site during the field work or within boreholes during subsequent monitoring visits. The ground water table is believed to be at a considerable depth below the site.

Based on the above the risks from groundwater flooding are considered to be low.

Flooding from Sewers

The site is served by private surface water drains along the east, west and southern boundaries of the site.

There are no records of flooding out of the existing site wide drainage system. Even in the event of a discharge out of these private drains, they are set at a level well below the proposed site level, and any flooding would be directed to the lower land to the south.

In summary the site is not at risk from flooding from sewers due to the existing and proposed levels.

Existing surface water drainage arrangements for the site

The wider Handy Cross development includes a series of private surface water drains positioned within the roads surrounding the site to the west, south and east. These drain to communal soakaways constructed within the park and ride car park and the Leisure Centre Car Park.

Spurs were left into the site to provide surface water connections for future use.

This original site wide surface water strategy is shown on Curtins Consulting drawing 90355A-HC-109F, within Appendix A. This strategy envisaged surface water discharge at the west boundary of the site with on plot attenuation. The discharge would enter the surface water system within the roads to the west and south of site and from there to communal soakaways.

Existing foul water drainage arrangements for the site

There is a dedicated connection for the foul water discharge: along the southern boundary of the site and from there to the existing sewer to the east of the Leisure Centre car park.

4 PROBABILITY OF FLOODING

The EA indicative flood maps and the Strategic Flood Risk Assessments show the site to be entirely within flood zone 1 – Low probability of flooding for fluvial flooding. Flood zone 1 comprises land assessed as having less than 1 in 1000 annual probability of river flooding (<0.1%).

Strategic Flood Risk Assessment

The Wycombe District Council Level 1 Strategic Flood Risk Assessment, dated December 2008 and Level 2 Strategic Flood Risk Assessment, dated September 2017 (both by Jacobs) are relevant to the site.

Both reports consider the flood risks from fluvial sources and other sources, and show that the site is within Flood Zone 1 for fluvial sources.

Based on the Strategic Flood Risk Assessment and site-specific assessments, the site is not at significant risk of flooding from fluvial sources, groundwater, on site or off site sources.

Based on this specific assessment, the site is not at significant risk of flooding from fluvial sources, groundwater, on site or off site sources.

5 CLIMATE CHANGE

How is flood risk at the site likely to be affected by climate change?

The SFRA considered the impact of climate change on the flood zones. The additional allowance for climate change did not change the flood zone classification of the site in respect of flooding so that all of the site would remain within zone 1.

For development considerations, the effects of climate change should be accounted for in the drainage calculations used to model the sustainable drainage systems for the site. The design life of the development should be considered as 40 years. In accordance with TGNPPF, the rainfall intensities have been increased by 30% to account for climate change when calculating development runoff. As a consequence, the site will not be at significant risk of flooding as a result of climate change.

The additional climate change allowance has been applied to the 1:100-year event in the design of the proposed surface water drainage system.

6 DETAILED DEVELOPMENT PROPOSALS

Development plan details are shown in Section 2, figure 2 of this report.

Placing development within those parts of the site that are at least risk of flooding.

For fluvial flooding the entire site is located in Flood Zone 1, it is not critical for the proposed redevelopment facilities to be located in certain areas of the site. The intended use is classified as 'less vulnerable' and is appropriate for use in Flood Zone 1.

7 OFF SITE IMPACTS

The TGNPPF states that 'surface water arising from a developed site should, as far as practical, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, whilst reducing the flood risk to the site itself and elsewhere, taking climate change into account'. The TGNPPF requirement is typically applied to the 1 in 1 year, 1 in 30 year and 1 in 100 year annual probability storm events, restricting the developed sites surface water discharge rates to its equivalent existing conditions or lower.

The new development will drain to a new drainage system designed to prevent run off from the site, onto third party land.

8 DRAINAGE STRATEGY AND SUDS

Development of the site must be undertaken using SUDS that meet EA regulations. Implementation of SUDS for new developments is generally viewed as potentially more beneficial than conventional drainage systems for a number of reasons such as: (1) better control of water discharge rates and volumes; (2) water quality improvements through the reduction of pollutants; (3) recharge of aquifers; and (4) amenity improvement and facilitation of wildlife habitat.

Suds Techniques

Soakaways

The site is underlain by permeable Chalk at relatively shallow depths. The groundwater table was not found within any of the site investigation boreholes or recorded during monitoring visits and is therefore at a considerable depth below the site.

The site investigation included a number of BRE soakaway tests within the Chalk at six different locations. Infiltration rates varied between 1.1×10^{-4} m/sec to 3.1×10^{-5} m/sec.

Conventional soakaways are therefore entirely suitable and are the recommended form of SuDS to be adopted on the site.

Infiltration trenches and ditches

These are trenches that are filled with permeable material into which surface water flows from the edge of paved areas. A slotted or perforated pipe may be built into the base of the trench to collect or convey the water.

Infiltration trenches can also intercept overland flows from sloping ground.

Infiltration trenches are not a viable option for this site and their use is not proposed due to the layer of impermeable clay and made ground, sitting above the Chalk. Infiltration trenches would be unviable due to the depth required.

Swales

These are vegetated landscape depressions with a shallow gradient to drain water evenly off impermeable surfaces mimicking natural drainage patterns. Swales will normally be dry but during periods of rainfall a swale will fill, slowing and filtering flows through the vegetation, and allowing minor infiltration.

The levels differences across the site are managed in part by landscaped strips. The drop in levels across these landscapes strips prohibits their use a swales or ditches. Consequently, the use of swales and ditches on the site is not considered to be viable.

Basins and Ponds

These are structures designed to attenuate flows by storing runoff during the storm and releasing it at a controlled rate during and after the storm. Ponds are basins that have a permanent standing water level which provide amenity and wildlife benefits in addition to storage.

There is not sufficient room on the site, to accommodate ponds or basins and their use is not considered to be viable.

Drainage Strategy

The original drainage strategy for the wider Handy Cross development was for this site to utilise the drainage installed in adjacent roads, and the communal soakaways within the park and ride and Leisure Centre car parks. Attenuation on plot would still have been required due to limitations on permitted flows into this drainage network.

The proposed drainage strategy is to split the site into three specific catchments, each with its own pipe system, interceptor and soakaway. Refer to PCS drg 900 rev A within Appendix B. This has the advantage of maintaining the entire surface water system within the plot. It also reduces the load on the existing drainage system and soakaways across the rest of the Handy Cross development.

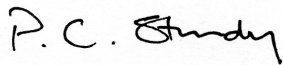
Catchment 1 comprises the Bentley dealership and has a total impermeable area of 2880m². Catchment 2 comprises the Vehicle Prep building and associated external areas, and has a total impermeable area of 4300m². Catchment 3 comprises the Porsche centre and associated external areas, and has a total impermeable area of 6980m².

Interceptors are class 1, with silt storage and catchpits are provided upstream of interceptors.

The soakaways are designed to accommodate the 1 in 100 year storm+30% for climate change without flooding. Calculations are presented within Appendix C.

Design parameters for the pipework systems are simulation for short and long term duration storms, for return periods of 1 year, 30 years and 100 years plus 30% for climate change, using Microdrainage. Surcharging of the system is allowed for the 1:30 year event. No flooding is allowed out of the system for the 1 in 100 plus 30% event unless its less than 10m³ per catchment and is retained on the plot by kerbs and away from building footprints.

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Director

Appendix A - Handy Cross Site Wide Drainage System

Appendix B - Proposed Drainage Strategy PCS Drg 900

Appendix C – Drainage Calculations