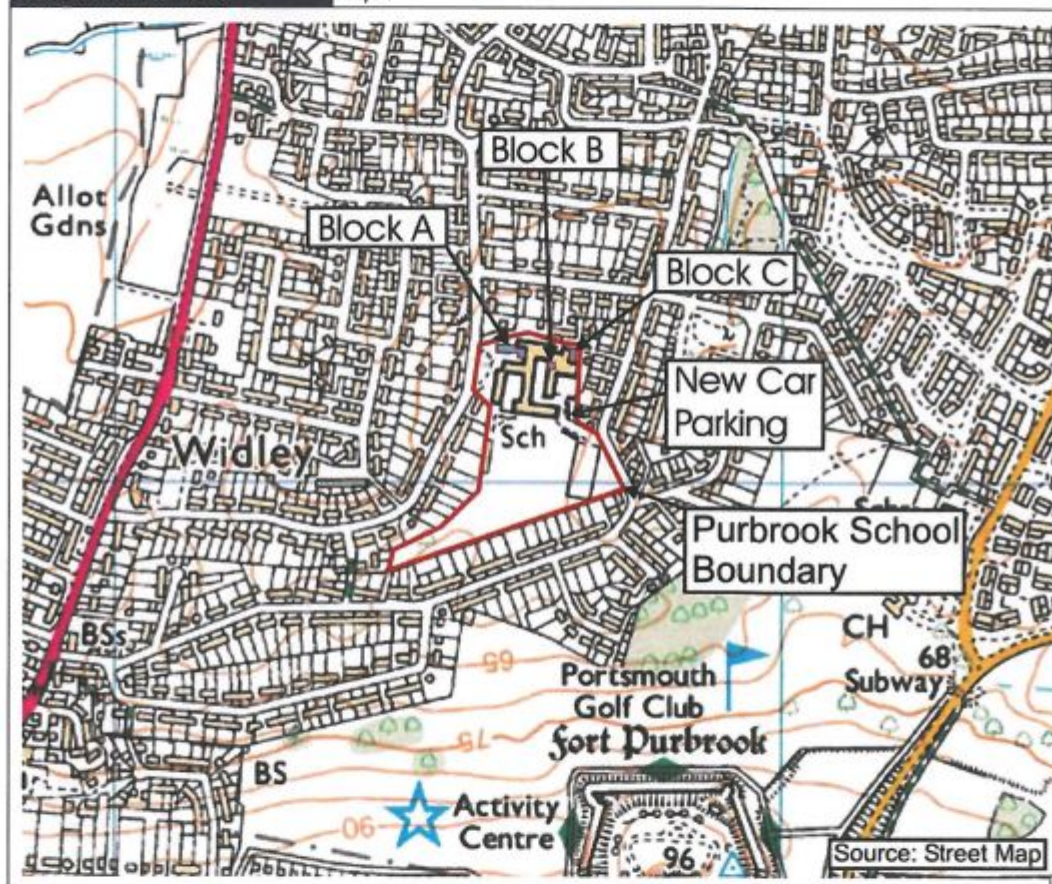


4.1.2 Figure 1, provides details of the proposed Re-Development areas.

Figure 1: Purbrook Park School Development Location.

Site Name	Purbrook Park School
Site Area	1,040 m ² (0.01ha combined area)
Purpose of Development	Building extensions, internal remodelling and external works
Existing Land-Use	Educational facility
OS NGR	467612E, 107163N
Country	England
County	Hampshire
Local Planning Authority	Hampshire county council
Other Authorities	N/A



4.2 Topography

4.2.1 The existing topographic survey of the School area shows that the ground levels vary at the sites for the proposed Re-Development:

- Block A: ground levels vary between 58.16m AOD on the west and 58.41m AOD on the east.
- Block B: ground levels vary between 55.44m AOD on the north and 55.33m AOD on the south.
- Block C: ground levels vary between 54.68m AOD on the south and 54.49m AOD on the north.

- New car parking spaces: ground levels vary between 55.92m AOD and 54.56m AOD.

4.2.2 A plan showing the existing topographic survey is included in Appendix 2

4.3 Geology

4.3.1 Information obtained from the British Geological Survey website^(Ref.8), provided an indicative representation of the geology beneath the School boundary. It shows the School is directly underlain by Head superficial deposits comprising of clay, silt, sand and gravel. The bedrock varies between Wittering Formation (sedimentary bedrock formed of clay, silt and sand) and London Clay Formation (sedimentary bedrock formed of clay, silt and sand).

4.4 Water Bodies

4.4.1 The site falls within the catchment of a small watercourse which is a tributary of Wallington River. The small watercourse lies approximately 900m to the northwest of the School and runs through urban area of Purbrook, first in a northerly and then in a westerly direction. The small watercourse is classified as a 'Main River' by Defra and the EA is responsible for its maintenance. The watercourse falls within the EA's River Basin District of South East.

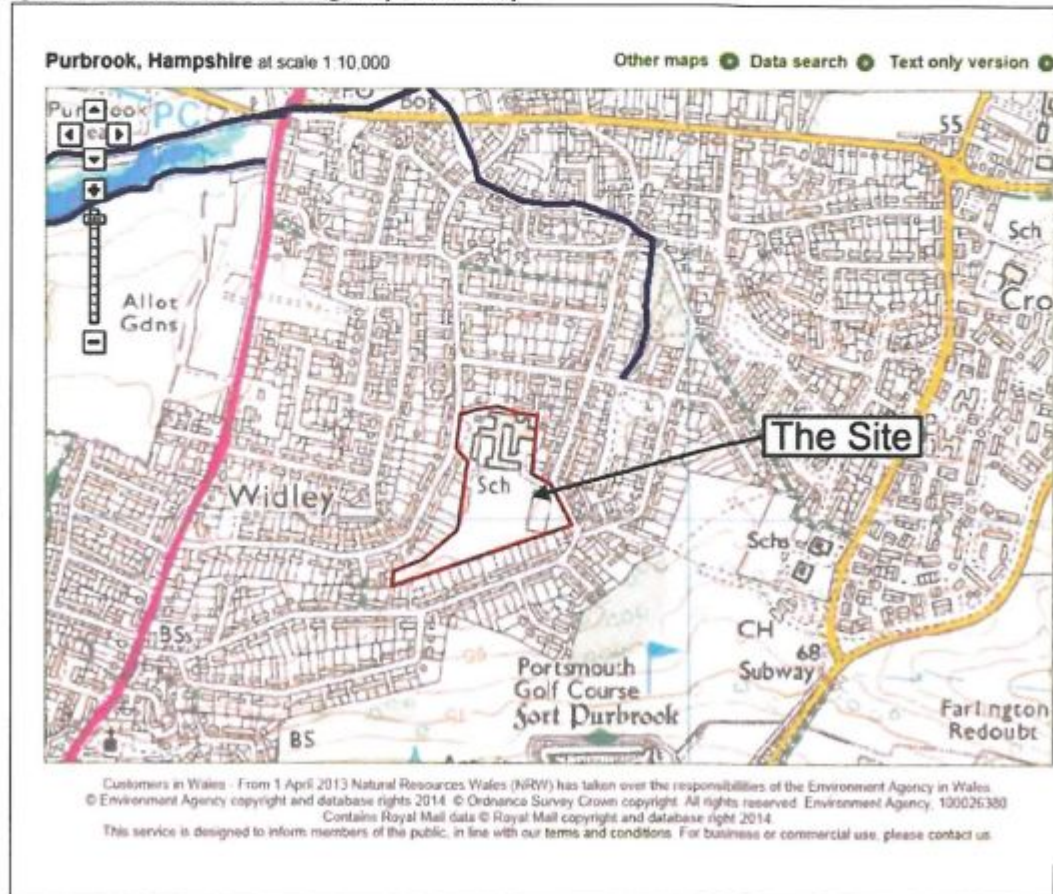
4.4.2 There is an existing pond which is located about 880m to the northeast of the School on lower elevation of about 49m AOD.

4.5 Flood Zones

4.5.1 The EA has developed a Flood Map which shows the risk of flooding in England and Wales for different return period events. Flood Zones assume that no defences are present and so where defences do exist they are only indicative of the potential flood.

4.5.2 Based on the EA's Flood Map, see Figure 2, the proposed redevelopment is located within Flood Zone 1 and is therefore classified as being at a 'Low Risk' of flooding.

Figure 2: The Environment Agency Flood Map



4.6 Historic flooding

- 4.6.1 No historic flooding has been documented at the School. However based on the local knowledge there is localised surface water flooding at the School in periods of heavy rainfall.

5.0 CLIMATE CHANGE

5.1 Technical Guidance Recommendations to the National Planning Policy Framework

- 5.1.1 Global climate change may have a significant effect on the frequency and intensity of flood events in Britain and could have wide-ranging impacts on flood risk. More precise and detailed information will gradually emerge in future.
- 5.1.2 The Technical guidance to NPPF considers both sea level changes and rainfall intensity changes that are related to potential future changes in climate. As tidal influence is not applicable to this site, the climate change influence will be concentrated on changes to rainfall and river flow. Table 1, summarises the current NPPF recommendations.

Table 1: Recommended National Precautionary Sensitivity Ranges for Peak Rainfall Intensity and Peak Flow

Parameter	1990 to 2025	2025 to 2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak River flow	+10%	+20%		
Offshore wind speed	+5%		+10%	
Extreme wave height	+5%		+10%	

Source NPPF

6.0 DEVELOPMENT PROPOSALS

6.1.1 The development proposal comprises of the following:

- New Build Block 'A' – A two storey extension at the front of the school
- New Build Block 'B' – An infill building housing Music and Drama.
- New Build block 'C' – A gym store building.
- 29 additional parking spaces

6.1.2 The proposed Re-development is included in Appendix 1.

6.2 The Existing Drainage

6.2.1 Drainage investigations have confirmed surface water runoff is directed into a system of onsite soakaways with the exception of runoff from a portion of the east of the site which drains in a southerly direction and leaving the site along the southern boundary of the site.

6.2.2 A plan showing the existing site drainage is included in Appendix 3

6.3 Infiltration Tests

6.3.1 Infiltration tests were carried out at the locations of the proposed soakaways by Discovery, a firm of Geotechnical and Environmental Engineers in April 2014. In total 5 infiltration tests were carried out based on that described in BRE Digest 365^(Ref.9)

6.3.2 The infiltration test results indicated a poor coefficient of permeability at one location and zero coefficient of permeability at the remaining locations.

7.0 SURFACE WATER RUNOFF STRATEGY

7.1 Proposed Development Drainage

7.1.1 Information on surface water drainage proposal for the proposed Re-Development is not available at this stage, however a comparison of the existing and proposed areas shows a net increase in soft landscaping of around 380m² in the area of new build Block A. This is as a

result of new soft landscaping proposed to the northern side of Block A and also within the landscaped pedestrian route to the south. The existing surface areas of Block B and C are 100% impermeable. The existing area for the proposed additional car parking spaces are soft landscaping, hence there will be 100% increase in impermeable area.

- 7.1.2 According to NPPF, in order to satisfactorily manage flood risk from new development, appropriate surface water runoff drainage arrangements i.e. Sustainable Urban Drainage Systems (SUDS) are required to manage the runoff in a suitable manner to mimic the surface runoff flows arising from the site, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.
- 7.1.3 The EA recommends that, where feasible and appropriate, SUDS be incorporated into the site redevelopment, with preference being given first to infiltration drainage techniques such as soakaways.
- 7.1.4 Based on the reported surface water flooding during heavy rainfall and low infiltration test results, it is not feasible to tie into existing or construct new soakaways for the additional surface water runoff from the proposed Re-Development areas.

7.2 SUDS Options for the Proposed Re-Development

- 7.2.1 The urbanised site location restricts the choice of SUDS techniques to suit the development. Hence, not all SUDS options will be appropriate for site.
- 7.2.2 The runoff from the proposed Re-Development area will be from the roofs of the new buildings. Hence, for the proposed Re-Development, SUDS techniques described in Table 2, should be considered during preliminary and detail design. For this site the suitable SUDS techniques are highlighted in **BOLD**.

Table 2: SUDS Features and their Suitability for the Proposed Re-Development

SUDS Group	Description	Location	Comment*	Used?
Source Control				
Green Roof	The roof of a building that is partially or completely covered with vegetation or another growing medium.	Roofs	Depends on the roof structure	Possible
Rainwater Harvesting	System to collect water from impermeable surfaces for use in non-potable water situations.	Next to the buildings	Either via water butts or re-use of rainwater for non-portable use.	Yes
Pervious Pavements	Surfaces that allow water to soak into the ground, a gravel-filled base with outfall into sewer system of the area. Porous surface replaces traditional hard (impermeable) surfaces.	New car parking areas	Porous surface with porous sub-base to maximise direct infiltration into the ground or attenuated volume discharged into	yes

SUDS Group	Description	Location	Comment*	Used?
			Wessex Water surface water drainage system	
Trench Soakaways/ Ring Soakaways	Excavation or trench that can be filled with filter material. Can be made of pre-cast concrete or polyethylene rings/perforated storage structures that are then backfilled with granular material. Allows water to soak away into the ground.	Within landscape areas	Poor Infiltration	No
Site Control				
Subsurface Storage	Modular plastic systems that can be used to create below ground infiltration or storage.	Under the access roads, car parking areas, landscaping areas	Attenuated volume discharged into Wessex Sewer surface water drainage system	Yes
Infiltration Trench	Stone-filled trenches that allow water to soak into the ground, as close to where the rain lands as possible.	Across landscape areas	Poor Infiltration	No
Infiltration Basin	A vegetated depression designed to store runoff and infiltrate it into the ground.	Across landscape areas	Poor Infiltration	No
Surface Sand Filter	A ground level open structure consisting of a filter bed chamber. The filtered runoff is collected and returned to drainage system or infiltrated into soil.	Across landscape areas	Poor Infiltration	No
Sub-Surface Sand Filter	Underground chamber for use in space-limited areas. Runoff flows in through inlet pipe. The filtered runoff is collected and returned to drainage system or infiltrated into soil.	Possible in open space areas	Poor Infiltration	No
Perimeter Sand Filters	An enclosed filter system typically constructed just below ground level along the edge of an impervious area. Runoff flows in from above through a series of inlet grates. The filtered runoff is collected and returned to drainage system or infiltrated into soil.	Along the access roads	Poor Infiltration	No

SUDS Group	Description	Location	Comment*	Used?
Bioretention	Depressions backfilled with a sand/soil mixture and planted with vegetation. Water enters through a vegetated surface and then trickles into the gravel filled tank below allowing water to soak away into the ground.	Possible in open space areas	Poor Infiltration	No
Filter Strip	A vegetated area of gently sloping ground designed to drain water evenly off impermeable areas and filter out silt and other material.	On road embankments and car parking areas	No sloping ground proposed for re-development	No
Filter Trench/Drain	Gravel filled trenches with perforated/filter pipe.	Along the roads, gardens and car parking areas	Not suitable for the school re-development	No
Conveyance Swale	Shallow vegetated swales that can run parallel to hard surfaces, allowing runoff to trickle down the side slopes and into the base of the component. Water is then transported in a controlled manner to another SUDS component or to a stream or river downstream.	Along the existing access roads	Existing access roads will not be affected by re-development	No
Enhanced Dry Swale (Trench Trough)	Open landscaped channels which can be vegetated, over filter medium and under-drained. Used to convey, attenuate and improve water quality.	In lieu of pipelines	Depends on the proposed re-development	Possible
Enhanced Wet Swale	Similar to conveyance swale but designed to encourage wet and marshy conditions in the base to enhance treatment processes. This can be done using liners or, where underlying soils are poorly drained in combination with shallow gradients.	In lieu of pipelines	Depends on the proposed re-development	Possible
Wetland Channel	Open landscaped channels which can be vegetated, used to convey water from one SUDS component to another.	In lieu of swale	Depends on the proposed re-development	Possible
Rain Garden	Vegetated area into which runoff is drained, attenuated and stored. Water infiltrates into the ground or is taken up by plants.	Along the existing roads	Depends on the proposed re-development	Possible

SUDS Group	Description	Location	Comment*	Used?
Detention Basin	Shallow dry vegetated depressions to control the amount and rate of runoff and some water quality improvement.	Possible in open spaces	Limited area available	No
Regional Control				
Retention (Balancing) Pond	Artificial ponds with an open water area and marginal wetland around the edge. Also, should incorporate a stilling/settlement area at the inlet to allow for some treatment and attenuation and calming of storm flows to prevent shock loading of the main water body.	Possible in open spaces	Development of the existing pond in the south east corner within the school boundary with a restricted runoff to the Southern Water public sewer	Possible
Shallow Wetland	Retention ponds with more emergent aquatic vegetation and a smaller open water area.	Possible in open spaces	Limited area available	No
Extended Detention Wetland	As shallow wetland but have the capacity to control and treat a greater volume of stormwater in a smaller area. Extended temporary detention is available above the surface of the marsh.	Possible in open spaces	Limited area available	No
Pond/ Wetland	Incorporates 2 separate cells: a wet pond and a shallow marsh. More permanent water bodies. Receive the attenuated runoff from several site controls.	Possible in open spaces	Limited area available	No
Submerged Gravel Wetland	A wetland containing one or more treatment cells filled with crushed rock or gravel designed to allow stormwater to flow through the facility beneath the surface.	Possible in open spaces	Limited area available	No

7.2.3 The proposed drainage strategy will be required to be approved by local authorities. However, Subject to discussion with Southern Water, It is anticipated that the proposed SUDS will provide sufficient storage volume to accommodate the runoff generated up to and including the 100-year storm event based on the rate of limited discharge into Southern Water existing drainage system for the area.