

Boddingtons Planning

WICK FC Change of surface from natural grass to artificial

June 2026

Drainage strategy.

The site will be redeveloped replacing a grass pitch with a full sized artificial football pitch double pitch with fencing around. Floodlighting is already in situ and will be retained

The pitch will not generate surface water run off but will in fact maintain the existing situation if not improve it. There are no gulleys or drains around the outside of the pitch to take surface water run off as it will not occur being entirely porous but will be served by a new soakaway and herringbone drainage system beneath the pitch. This works effectively.

The pitch is constructed, and acts, as a large soakaway. Rainwater percolates through the artificial grass and the sand ballast through a porous tarmac into the sub-base of a minimum 250mm of Type 3 stone. This is separated from the base soils by a terram layer to prevent stone and soils mixing. Therefore, it will drain better than the natural soils leading to an improved position in respect of drainage.

There is no historical evidence that flooding is an issue in this area, but the EA plan indicates that there may be a liability for small areas of the field to flood but not in the area of the proposed pitch. The SFRA indicates that the land is in Zone 1. We are familiar with the soil conditions and know that a herring bones drainage system works on the site. As a result, we consider the drainage position to be better than existing. The improvement of the drainage on the grass pitches will make them more useable and improve the drainage of the site.

Below the artificial grass and permeable tarmac layer is a 250mm layer of type 3 stone and then a herringbone drainage system at 10m intervals with a perimeter system beneath the pitch as a belt and braces approach to the draining of the site (see edge detail on submitted plans). The levels on this site are consistent with those required for the Artificial pitch to leave the site drainage with a 1:100 slope (approx.) irrespective of the gradient on the pitch. It will not flow off the pitch and the carpet will control the water before draining

through the porous tarmac level but there is a perimeter drain.

The drains and soakaway will be set at 600mm depth, which is 300mm below the level of the stone in the subbase of the soils and at set at 10m intervals. By the time that water reaches these levels it is already percolated into the soil base levels. As a result, the drains and soakaway system is rarely used and water at best will be a trickle into the pond. They are most effective in already wet landscapes as opposed to dealing with water generated off the surface.

Wet soils around the drains will be assisted by the drainage system. As the majority of this site does not fall into a flood zone liable to flood we conclude that the pitch will aid surface water percolation over the existing grass area.

The main issue in relation to maintaining the drainage regime is to ensure that the pitch is properly looked after. It is usual that the pitch would be maintained once a week to allow movement of the sand ballast so that it cannot become clogged with detritus. Deep cleans are usually undertaken by the contractor's company at least once a year. Assuming that this is done, and it is in the interests of the school for performance reasons as well as drainage, there is unlikely to be any issues relating to pooling of water or reduced drainage capacity.

There are rodding points for the perimeter drains which will be maintained regularly to ensure no silting up of the system

Overall, we will see an improved situation regarding drainage of soil as a result of the development.

Drainage construction requirement

Arising from the existing the following details will be specified in the specification.

4.3 Drainage

4.3.1 Drainage work should only proceed when ground conditions are suitable. Any damage caused due to operations undertaken in adverse conditions shall be rectified at the expense of the Pitch Contractor to the satisfaction of the PS.

4.3.2 The Pitch Contractor shall install a surface water drainage system adequate to maintain the infiltration rate agreed.

4.3.3 There must be no back falls on the installed drains.

4.3.4 The base of the excavated trenches must be clean, smooth and free from loose material prior to pipe laying and back filling.

4.3.5 All spoil shall be disposed on site as shown on the plans.

4.3.6 The back filling of drains with appropriate filter material must avoid damage or displacement of the drainage pipe and ensure sufficient consolidation to avoid settlement. Any settlement shall be rectified at the Pitch Contractor's expense.

4.3.7 The Pitch Contractor is deemed to have satisfied himself by inspection tests or otherwise as to the exact nature of the materials to be encountered in the parts of the site where excavation is to take place and shall include for this in his price.

4.3.8 The main drains and lateral drains shall be excavated by approved mechanical excavator, tracked not wheeled, the drainage tracks shall be excavated clean and be true to line and levels indicated on the Pitch Contractor's drawings. All over excavation shall be filled with approved selected excavated material and compacted evenly to PS's satisfaction in layers no greater than 50mm all at Pitch Contractor's expense.

4.3.9 The drainpipes shall be as follows:-

UPVC perforated drain pipes, purpose made junctions and connectors shall be of an approved make and conform to BS 4962: 1952.

Slotted and non-slotted twin wall, smooth bore pipe and fittings (bends, junctions, connectors, sealing rings and end caps) shall be as provided.

4.3.10 No pipe bedding shall be laid in tracks until PS has approved line and level and no pipes shall be back filled until the pipe laying has been approved by PS. The pipes shall be laid on 50mm bed of 6-20 angular clean stone and as stated only couplers, reducers and junctions manufactured for the purpose shall be allowed.

4.3.11 Care shall be taken when back filling to ensure even distribution of gravel and no intrusion of subsoil or other deleterious material. The Contractor must ensure that pipes are not lifted during back-filling and remain true to gradient. All pipes shall be bedded in 6-20mm angular clean stone filler material, which will extend to the sub-base layer of the pitch construction.

4.3.12 After drains have been excavated and back filled, the Contractor shall regulate the formation levels, removing any rutted areas by easing compaction either by hand or by approved mechanical means and in-filling carefully as necessary with approved selected excavated subsoil or coarse medium sand.

4.3.13 It is emphasized the full width of the drain lines complete with clean stone must be evident on the formation level prior to laying the geotextile and spreading the stone

layer. Any drain lines capped with soil or other deleterious material shall be cleaned by hand and fully reinstated to the satisfaction of the PS.

4.3.14 The Contractor shall have installed an out-fall chamber adjacent to the pitch to receive the drainage water. The Pitch Contractor shall allow for connecting the pitch drainage chamber to the out-fall chamber including full reinstatement of the out-fall chamber to the PS's satisfaction.

4.4 Stone Layer

4.4.1 The Pitch Contractor shall supply and lay an approved geotextile (Terram 1000 or equal approved) over the formation level, but not covering the drain lines, after applying the herbicide and prior to spreading the stone layer.

4.4.2 Geotextile Formation to achieve a minimum CBR of 5%

The sub-base to comprise of a min. 300mm consolidated clean graded, free draining hard irregular angular crushed material, frost resistant Type 3 MOT Stone Material. The layers to be imported and built up in layers not exceeding 125mm. The final 50mm to be laid ensuring correct level tolerances prior to laying of the surface, and of Type 1 MOT Stone Material.

The use of **recycled material** may be permitted subject to samples and should be costed as a separate item.

4.4.3 B.S. Sieves Passing

75mm	100
37.5mm	25-75
20mm	15-50
5mm	5-25
600um	0-10
75um	0-5

4.4.4 It is envisaged that the stone layers shall be spread in three layers with the base layers being laid and consolidated prior to the final 50mm of stone being laid with the use of a laser-controlled paver to ensure that the required tolerances are achieved.

4.4.5 The stone layer shall have a tolerance of +1-10mm under a 3m straight edge with the design tolerance +10-10mm on a 5m grid across the pitch area.

Building regulations

Although not particularly pertinent in that building regulations are not required for the build some LPA's refer to it. Part H deals with Surface water drainage and is included below. The drainage system design for this pitch based on the

geotechnical information researched from site takes in to account the requirements of Part H in terms of size of pipes and gradients etc.

Section 3: Surface water drainage

3.1 This section gives guidance on the design of surface water drainage systems. It is applicable to the drainage of small catchments with impervious areas up to 2 hectares. For the design of systems serving larger catchments, reference should be made to BS EN 752-4 (see paragraph 3.36).

Outlets

3.2 Surface water drainage should discharge to a soakaway or other infiltration system where practicable.

3.3 Discharge to a watercourse may require a consent from the Environment Agency, who may limit the rate of discharge. Maximum flow rates can be limited by provision of detention basins (see paragraph 3.35).

3.4 Where other forms of outlet are not practicable, discharge should be made to a sewer.

Combined systems

3.5 Some sewers carry both foul water and surface water (combined systems) in the same pipe. Where they do the sewerage undertaker can allow surface water to discharge into the system if the sewer has enough capacity to take the added flow (see Approved Document H1 paragraph 2.1). Some private sewers (drains serving more than one building that have not been adopted by the sewerage undertaker) also carry both foul water and surface water. If a sewer operated as a combined system does not have enough capacity, the surface water should be run in a separate system with its own outfall.

3.6 In some circumstances, where a sewer is operated as a combined system and has sufficient capacity, separate drainage should still be provided (see Approved Document H5).

3.7 Surface water drainage connected to combined sewers should have traps on all inlets.

Design rainfall intensities

3.8 Design rainfall intensities of 0.014 litres/second/m² may be assumed for normal situations. Alternatively the rainfall intensity may be obtained from Diagram 2.

3.9 Where low levels of surface flooding could cause flooding of buildings the rainfall intensities should be obtained from BS EN 752-4 (see paragraph 3.36).

Design

3.10 Where there is evidence of a liability to surcharging from sewers, or levels in the building or on the site make gravity connection impracticable, surface water lifting equipment will be needed (see Approved Document H1 paragraphs 2.8 to 2.12).

Layout

3.11 Refer to paragraphs 2.13 to 2.21 of Approved Document H1.

Depth of pipes

3.12 Refer to paragraphs 2.27 and 2.28 of Approved Document H1.

Pipe gradients and sizes

3.13 Drains should have enough capacity to carry the flow. The capacity depends on the size and gradients of the pipes.

3.14 Drains should be at least 75mm diameter. Surface water sewers (serving more than one building) should have a minimum size of 100mm. Diagram 3 shows the capacities of drains of various sizes at different gradients. However the capacity can be increased by increasing the gradient, or by using larger pipes.

3.15 75mm and 100mm rainwater drains should be laid at not less than 1:100. 150mm drains and sewers should be laid at gradients not less than 1:150 and 225mm drains should be laid at gradients not less than 1:225. For minimum gradients for larger pipes see BS EN 752-4 (see paragraph 3.36).

Diagram 3 Discharge capacities of rainwater drains running full

