

LILLESHALL NATIONAL SPORTS CENTRE

SHROPSHIRE

Status: Completed 2009

Client: Sport England

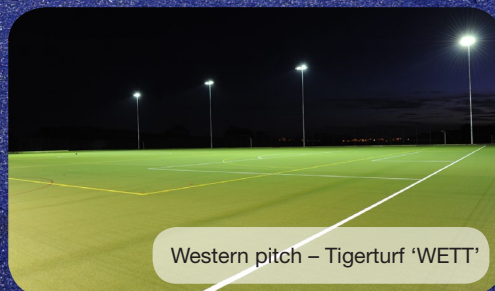
Value: £1.365 million



Lilleshall National Sports Centre is Sport England's Midlands outdoor sports centre, with a range of high-quality sports facilities serving a number of National Governing Bodies (NGBs).

Two water based artificial grass hockey pitches, both with irrigation and lighting to 500 lux, have been built side-by-side on a greenfield site at the centre. Both pitches are used for top-level hockey. The Western pitch is also used for football.

The Project was funded by Sport England.



Eastern pitch – Poligras 'Olympia'

Western pitch – Tigerturf 'WETT'

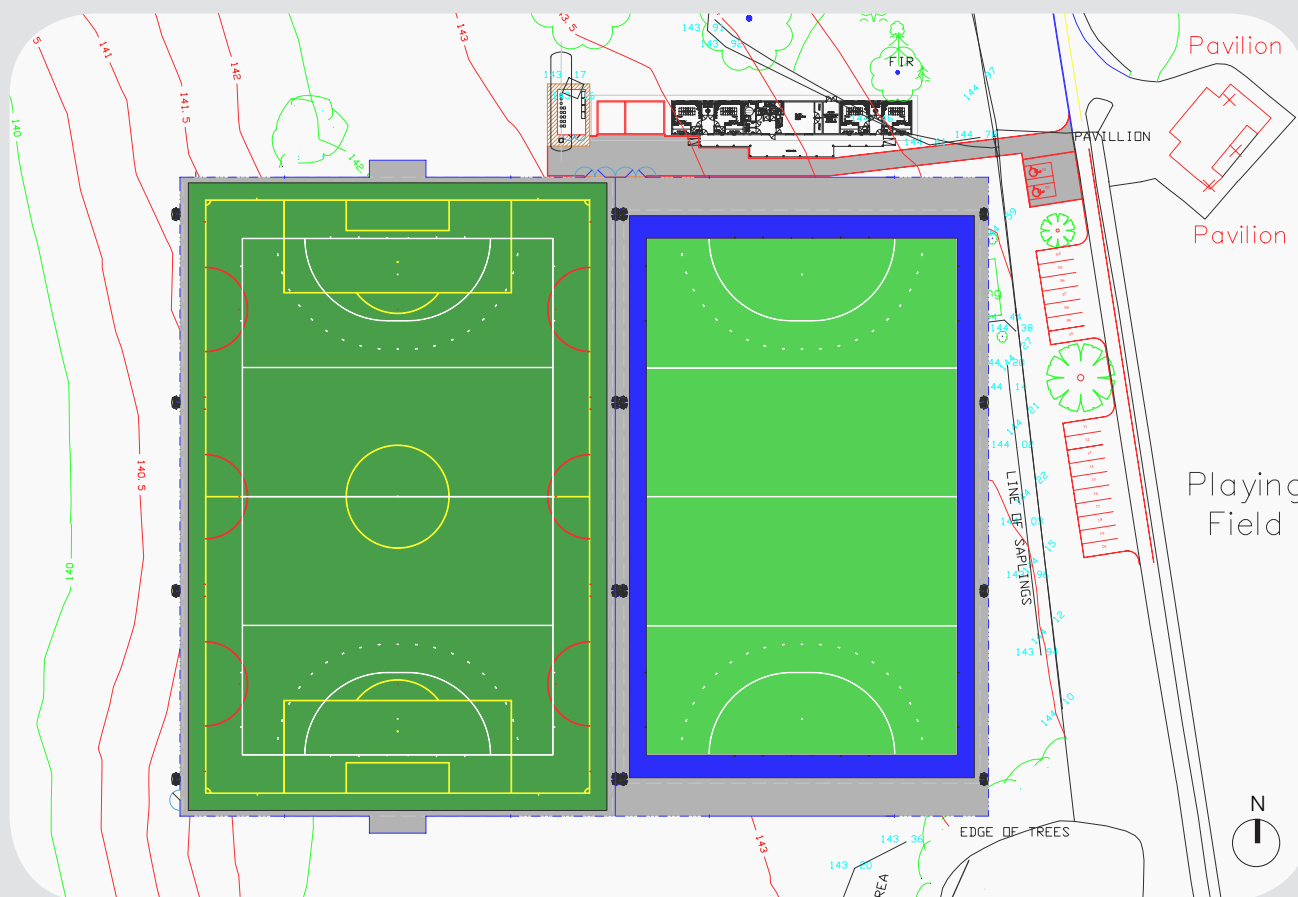


Site preparation works and the water storage tank prior to being buried underground

A plateau with an east-west gradient of 1:200 was formed on the site by cutting and filling. The formation was lime/cement stabilised and a shallow regulating and drainage bed of MoT Type 1 stone was laid. Over this, a 2-layer permeable bitumen macadam base for the pitches was constructed. Drainage was taken to a borehole, drilled to a depth of approximately 120 m, down into the fractured sandstone underlying the clay.

The water supply for the irrigation system was taken from a second, deeper borehole located about 100 m from the drainage borehole. It was estimated that even after paying for the boreholes, there would be a saving over the life of the pitches of about £500,000 in water charges at 2009 prices and rates. It is of note that more than one year elapsed from the start of the application process to the final issue of the borehole abstraction license.

A buried glass-fibre storage tank of 160 m³ capacity was used. Buried tanks are significantly more expensive than



Layout

Two water based artificial grass hockey pitches with irrigation and lighting to 500 Lux, built on a greenfield site at the centre

General Description of Key Specifications and Materials

Pitches		
Site preparation and stabilisation	After the topsoil had been stripped and stockpiled for use in site reinstatement, the clay subsoil was formed to the correct gradients using cut-and-fill methods. The prepared clay formation was stabilised by incorporating lime and cement and rolling hard. On the few days when the ground was too dry, additional water was added to ensure the cement would set acceptably rapidly	
Drainage	80 mm diameter perforated plastic laterals were laid into slots cut into the stabilised base on 10 m centres, feeding to a 110 mm diameter collector drain. From a catchpit, a solid-wall drain leads to the drainage borehole	
Stone sub-base	MOT Type 1 material was installed at 150 mm depth onto the stabilised formation, to act as a drainage blanket and also as a regulating layer	
Macadam base	Two-layer macadam, comprising 40 mm thickness of 20 mm porous macadam topped with 25 mm thickness of 10 mm porous macadam	
Kerbs	150 x 50 mm pcc units. Galvanised carpet gripper channels cast in place against the inner kerbs	
Fencing	4.5 m high weldmesh, with panels of 358-grade mesh behind all football goals	
Pitch dimensions	Western pitch (Multi-use): Enclosure 113 x 77 m Carpet 111 x 74 m Football 105 x 68 m	Eastern pitch (Hockey): Enclosure 113 x 66 m Carpet 99.4 x 61 m Hockey 91.4 x 55 m
Shockpad	15mm thick in-situ formed (resin bound rubber crumb)	
Artificial grass surfacing	Western pitch (Multi-use): Tiger 'WETT' - unfilled, curly monofilament pile artificial grass carpet	Eastern pitch (Hockey): Poligras 'Olympia' - unfilled, twisted fibrillated pile artificial grass carpet
Lighting		
Lighting columns	A total of 12 no. 'raise-and-lower' lighting columns, 18 m high, galvanised finish	
Luminaire types	A total of 60 no. Thorn Champion fitted with 2 kW lamps; 32 luminaires on the larger, multi-use pitch and 28 luminaires on the hockey pitch. Some of the luminaires are fitted with long-arc lamps and standard lamp operating gear. A proportion of the luminaires have short-arc lamps and hot-restrike lamp-operating gear, which produces a much higher ignition voltage than the standard gear.	
Lux levels	500 lux for hockey, 350 lux for hockey training and football	
Irrigation System		
Pump house	8 x 5 m sectional steel building built above the storage tank, housing the electrical intake, pumps and all distribution boards for the irrigation and floodlighting systems	
Pumps	5 x 22 kW vertical axis pumps with linked microprocessor control	
Dosing system	Automatic injection system, dosing the irrigation water with algicide at a low concentration to inhibit the growth of algae and moss in the artificial grass carpet	
Emitters	6 no. ranguns on each pitch, mounted at high level, operating in pairs. Behind each goal, one pair of pop-up sprinklers to provide extra wetting of the hockey striking circles	
Storage	160 m ³ buried storage tank	
Water supply	Borehole, approximately 120 m deep, extending into the fractured limestone underlying the clay soils of the site. 15 kW pump, operated by a level switch in the storage tank	
Area served	As well as the two artificial grass pitches, the system is used to provide irrigation of the nearby grass pitches, with strict priority given to the artificial grass pitches	

Schedule of Areas

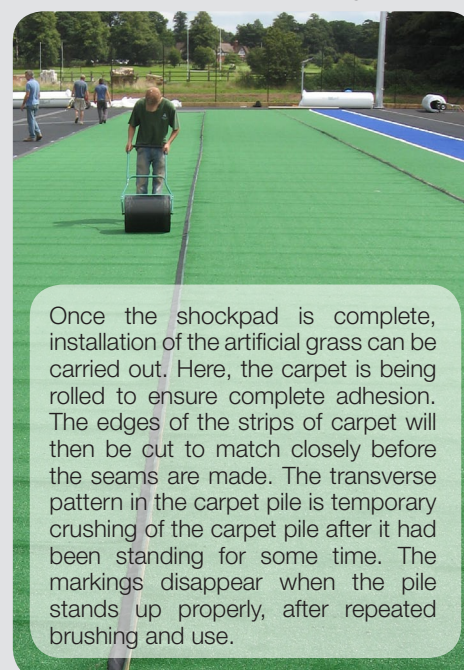
Total area of new pitches	16,219 m ²
Eastern pitch:	
Enclosed Area	7,458 m ²
Area of artificial grass	6,063 m ²
Western pitch:	
Enclosed Area	8,761 m ²
Area of artificial grass	8,214 m ²

General Accommodation / Standards

Hockey (eastern pitch)	1 senior / top-level pitch
Multi-use (western pitch including hockey and football)	1 senior pitch

above-ground sectional steel storage tanks. The use of a buried tank was only considered because of Planning considerations. The tank was sized on the basis of use of both pitches throughout a summer's day, with a projected continuous supply of 15 m³ per hour from the borehole.

Because of the intended use of the pitches for high-level hockey, lighting and irrigation must be available at all times. However, the electrical supply available at the pitch site was not adequate to power the entire irrigation system and both pitch lighting installations at the same time. For this reason, interlocks were provided, so that some of the lights switch off automatically when the irrigation system is started. Normal metal-halide lights must be allowed to cool until they can be switched on again, which



Once the shockpad is complete, installation of the artificial grass can be carried out. Here, the carpet is being rolled to ensure complete adhesion. The edges of the strips of carpet will then be cut to match closely before the seams are made. The transverse pattern in the carpet pile is temporary crushing of the carpet pile after it had been standing for some time. The markings disappear when the pile stands up properly, after repeated brushing and use.

Obtaining Statutory Consents

As well as the normal requirement for Planning Permission, Environment Agency (EA) consent is required for the drilling and use of a borehole.

The Planning process was relatively straightforward, though was slightly extended as a result of negotiations over operating hours for the lighting. No unusual conditions were imposed. A screen of trees was planted to the west of the new pitches. The pump house was clad in cedar boards, to match the pavilions.

Obtaining Environment Agency approval for an extraction borehole is a lengthy process, with uncertainty at every stage:

- Desktop study of local geological and hydrological conditions, to assess the likelihood that a borehole will provide the required quantities of water
- Assessment of any conditions imposed locally by the EA
- Application to EA
- Drill borehole. Assess quantity of water produced
- If adequate, proceed with EA application process
- Test pump, monitoring other local water features – ponds, streams, boreholes
- Report to EA
- Await EA licence, with permitted extraction rates, possibly with limited life.

Summary of Elemental Costs

	Element	Total Cost (£)	Cost (£) per m ²
1	Contractor's preliminaries: Design work, insurance, performance bond, site security, temporary fencing etc.	22,500	-
2	Pitch base works: Preparatory work - excavation, stabilisation of prepared clay formation, stone sub-base, drainage, macadam, kerbs	430,000	26.50
3	Artificial grass surfacing: Shockpads Unfilled FIH-Global artificial grass carpets (Note that the rate for artificial grass surfacing is the overall average for both pitches.)	400,000	28.00
4	Fencing	81,000	-
5	Floodlighting	157,000	11.00
6	Irrigation system, including boreholes	170,000	11.91
7	Maintenance equipment: No equipment was included in this contract, because maintenance contracts for the maintenance of the pitch were taken out to commence on completion	-	-
8	Sports equipment: Hockey and football goals for both pitches	30,000	-
9	Landscaping and reinstatement	9,500	1.00
10	Contingencies - 5% of subtotal	65,000	-
TOTAL CONTRACT SUM		1,365,000	-

Notes:

- Costs stated are approximate 'rounded-up' at 2009
- Costs stated exclude VAT
- Costs stated exclude consultant / statutory / other fees
- The above contract sum excludes construction costs for a small pavilion and the initial pitch maintenance for 12 months following construction.

Procurement / Programme

Tender	9 tenderers
Tender period	4 weeks
Contract	JCT with Contractor's Design
Duration	26 weeks

takes about 20 minutes. Such a delay would not be acceptable during a hockey match. The lights which switch off automatically were therefore fitted with hot-restrike gear and lamps. The additional cost was a small fraction of the estimate for bringing an adequate power supply to the site.

The fence between the two pitches is fully clad on both faces. On the western pitch, heavy-duty mesh was used in the panels behind all the football goals. Side over-runs on the western, multi-use pitch are 0.5 m wider than usual, to allow for possible use of fence-mounted, swing-out five-a-side goals.

Side over-runs on the eastern hockey pitch are 1.5 m wider than usual, because the floodlighting columns are located inside the eastern pitch enclosure. Hockey pitch end run-outs are very wide. This was done partly to keep the fencelines tidy, but also to simplify the design and construction of the pitch bases and the irrigation and lighting systems. The additional space provides a very useful hard, clean space for warm-up; for players' bag and equipment storage; positioning of video-recording towers; and for off-pitch storage of goals.

The western pitch is surfaced with Tiger 'Wett', an unfilled polypropylene-pile carpet. The eastern pitch is surfaced with Poligras 'Olympia', an unfilled polyethylene-pile carpet. Installation methods for the Poligras carpet are unusual, in that the carpet is fully bonded to the shockpad.



Eastern pitch with wide surrounds

[Click here for 'User Guide'](#)

[Click here for current 'Design and Cost Guidance'](#)

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