

MATCH LIGHTING STUDIO

Sheen Lawn Tennis and Squash Club | Lighting Analysis

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Introduction

Match Lighting Studio were approached by Nicholas Taylor Associates to provide assistance in assessing the illuminance levels for a new floodlighting scheme serving two tennis courts at the Sheen Lawn Tennis and Squash Club.

A permanent lighting scheme consisting of LED floodlights has already been proposed and designed by others. However, permission for such scheme has currently not been granted by the local authorities on the grounds that it would negatively impact the surrounding properties.

The main focus of the lighting consultancy is to evaluate the impact on the surrounding properties of a temporary floodlighting installation on mobile telescopic units with power plug-in capability, which are instead currently allowed to be adopted on site.

The brief is to provide isolux plans showing the illuminance levels generated with the same metal halide floodlights on mobile towers currently adopted elsewhere at the Tennis Club, when arranged in a viable layout to achieve similar lux levels and uniformity as the proposed fixed lighting scheme.

LED alternatives on mobile towers will also be assessed and conclusions will be drawn regarding the impact of such floodlighting options on surrounding properties.

For the purpose of this exercise, the following assumptions have been made:

- selected buildings and private gardens immediately surrounding the play area within the scope have been modelled so as to show the impact of the floodlights on these properties and building façades;
- some of the dense hedges surrounding the tennis courts have been modelled, but no trees, as the screening conditions may vary with the seasons (in any case having similar mitigating effect on any proposed lighting scheme);
- A 2.55m high fence with green solid screen surrounds the tennis courts.

The illuminance levels being targeted on the tennis courts are as follows:

- Court Principal Playing Area: 500 lux average with 0.7 Uniformity (E_{min}/E_{av})
- Court Wider Playing Area: 400 lux average with 0.6 Uniformity (E_{min}/E_{av})

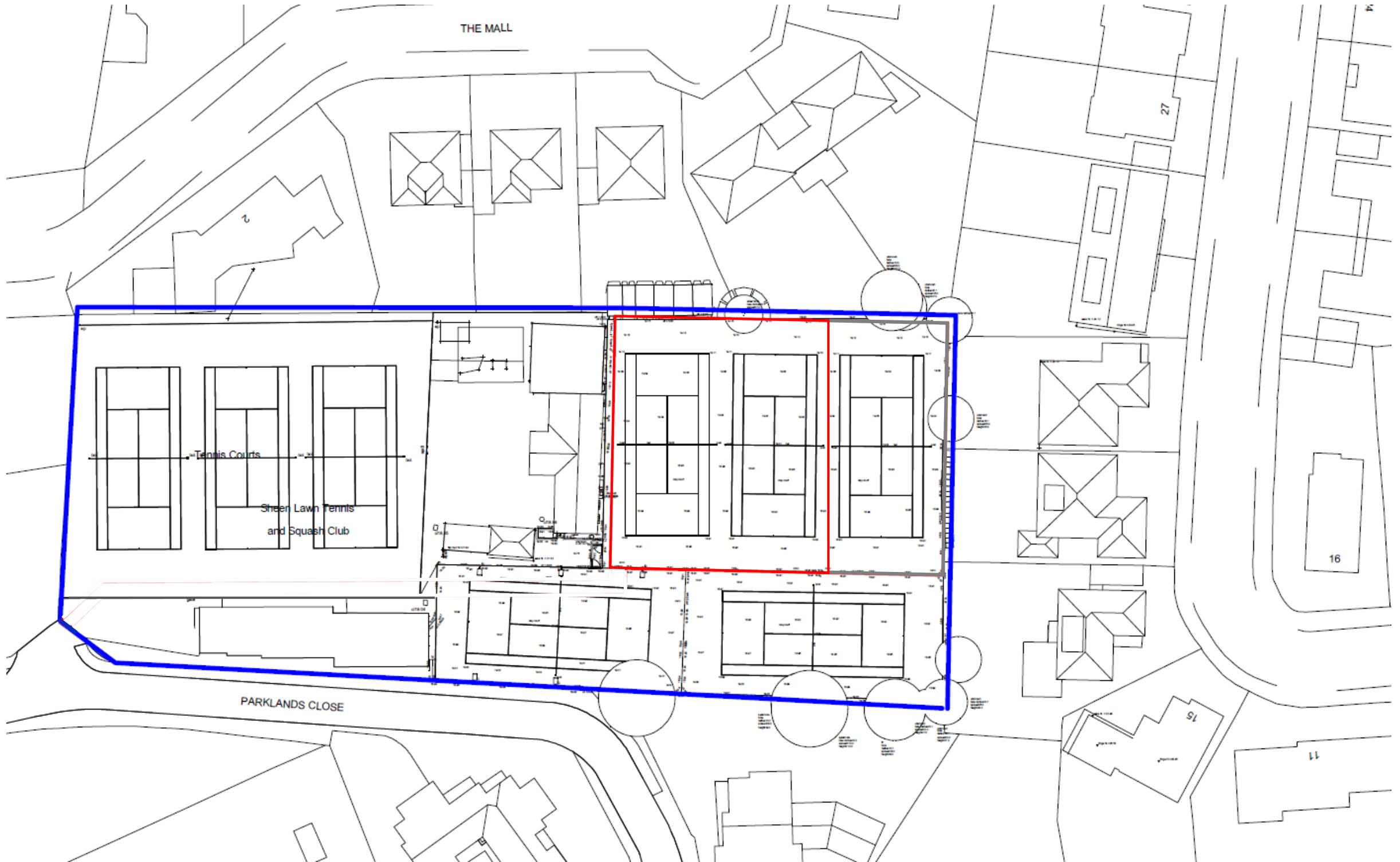


Aerial view of Sheen Lawn Tennis and Squash Club



Close-up view of the tennis courts and surrounding areas under assessment

Site Plan

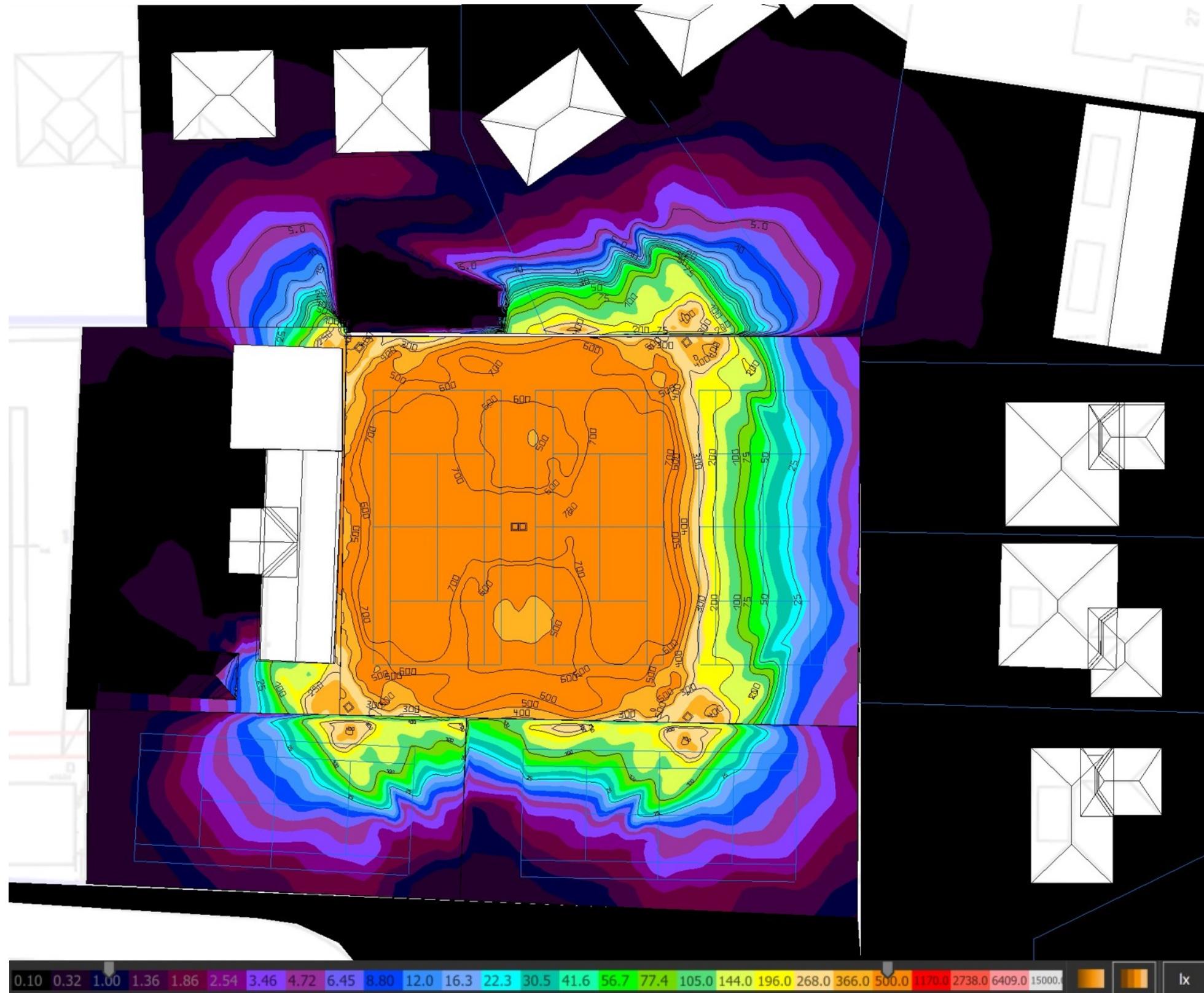


Lighting Simulation 1: arrangement

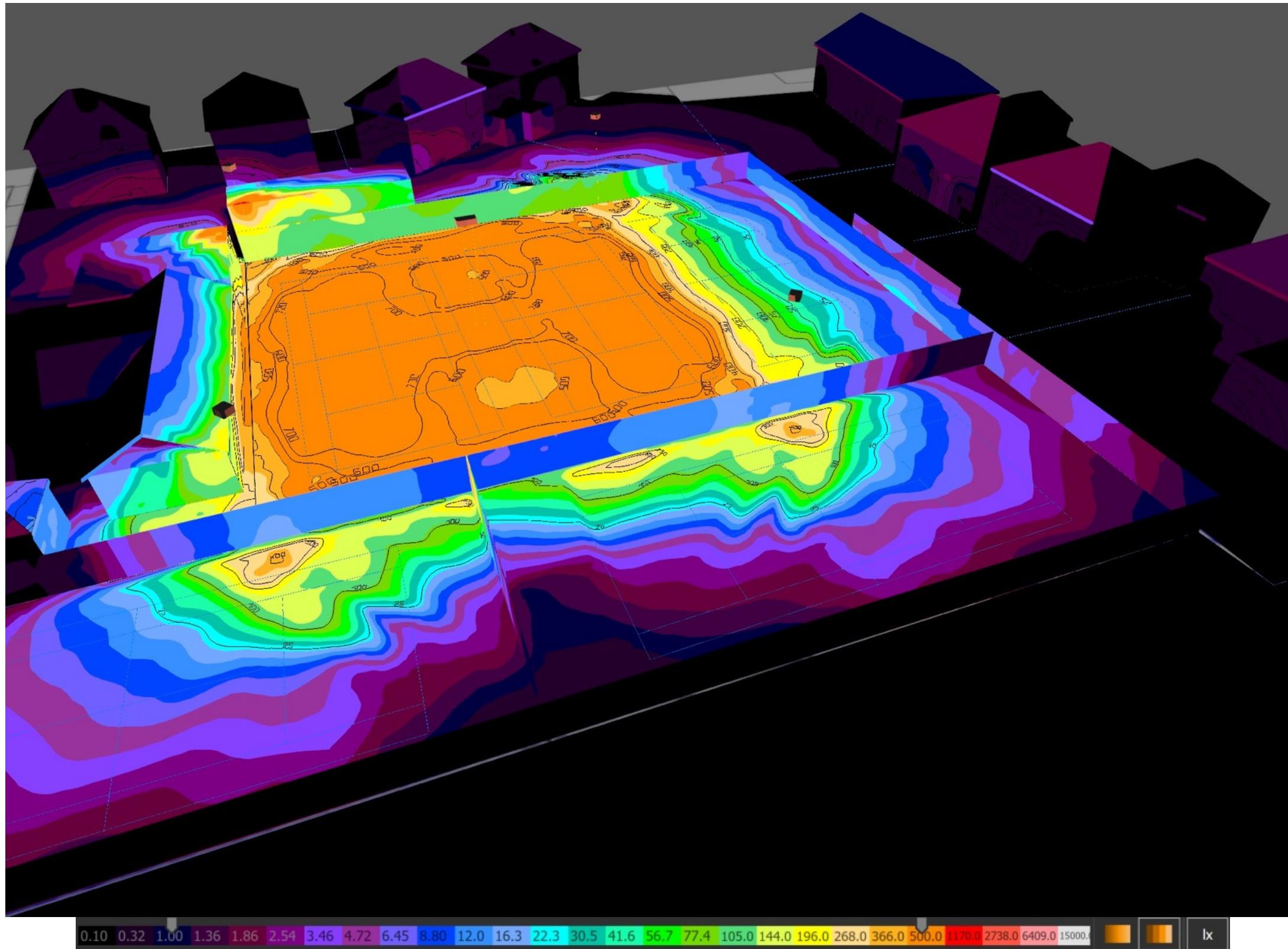
- 5 x temporary poles, 8m high: one at each corner of the playing area, one centred between the two courts.
- 6 x Philips MVP507 MHN-LA2000W/400V/842 MB/60 Metal Halide asymmetric floodlights, 2kW, 220,000lm each; one on each pole at the corners and two on the pole at the centre.



Lighting Simulation 1: isolux false colour plan



Lighting Simulation 1: isolux false colour 3D

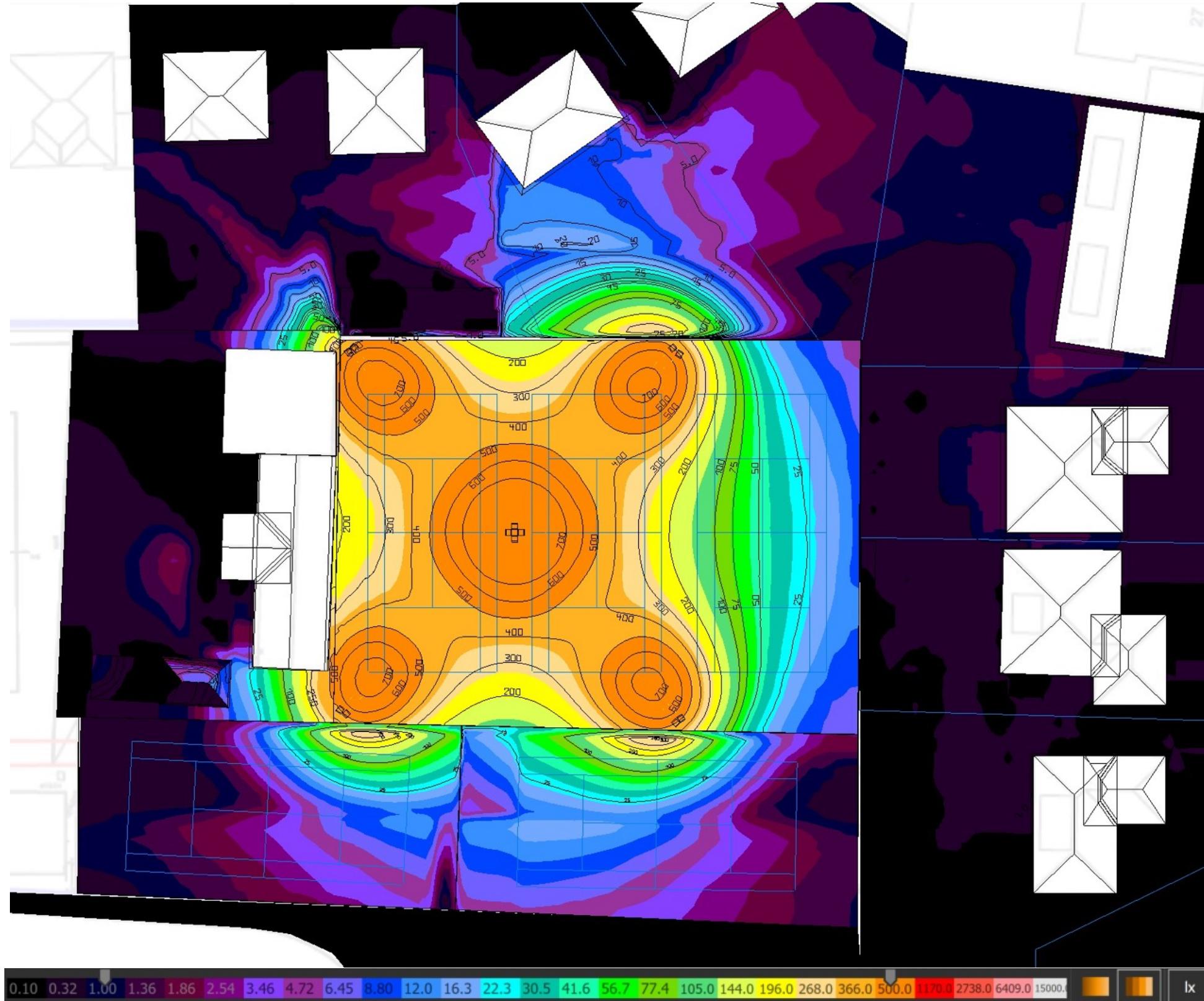


Lighting Simulation 2: arrangement

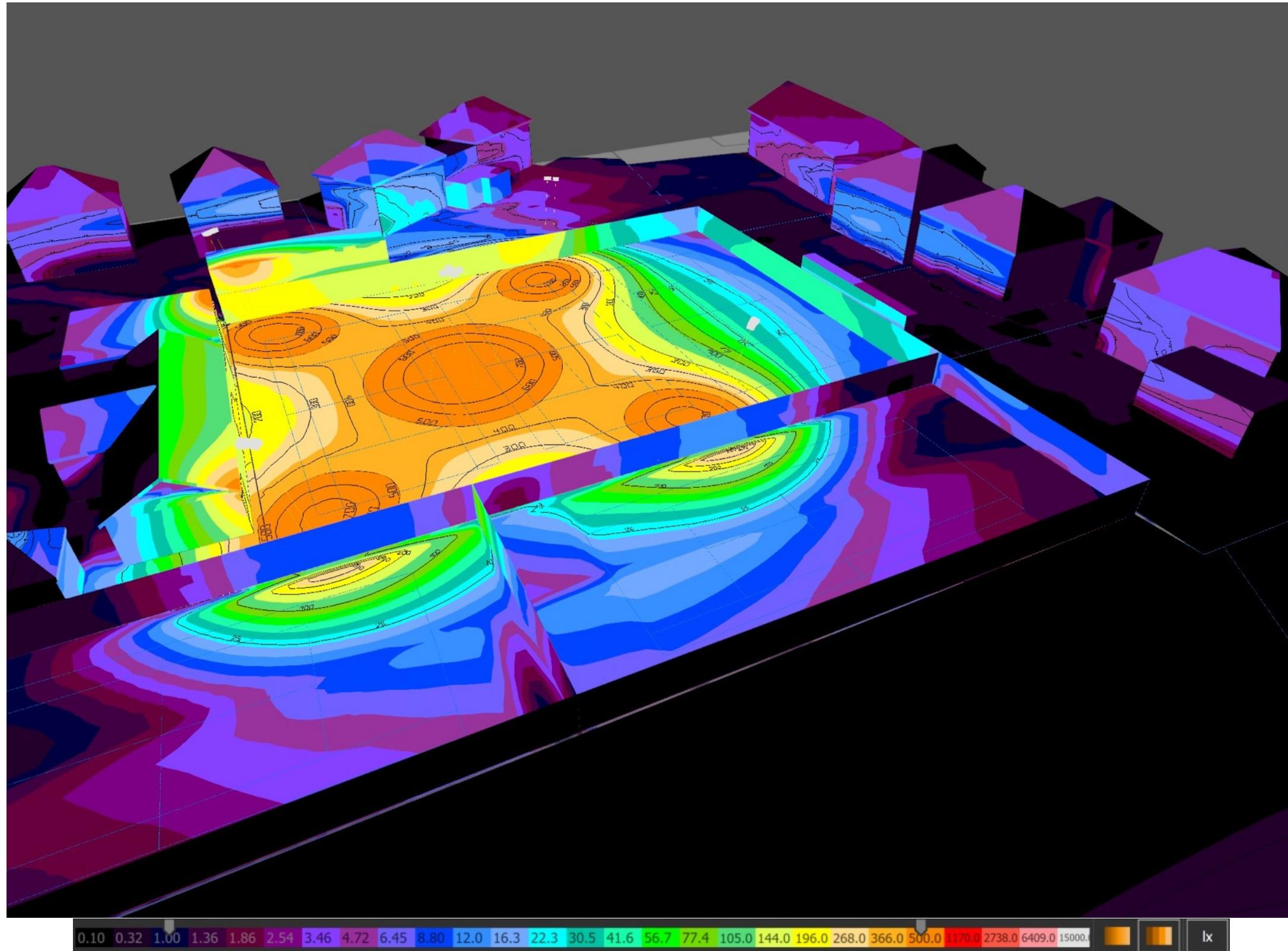
- 5 x temporary poles, 8m high: one at each corner of the playing area, one centred between the two courts.
- 12 x Abacus AL7000 Vela LED sports floodlights, 600W, 63,000lm each; two on each pole at the perimeter and four on the pole at the centre



Lighting Simulation 2: isolux false colour plan



Lighting Simulation 2: isolux false colour 3D



Observations and Conclusions:

There are several downsides of a temporary lighting installation when compared to a permanent one, such as:

- Safety: in order to be stable, temporary units with telescopic poles require a wide base, to prevent them from falling under certain wind conditions as well as when accidentally hit.
- Distribution: the number of temporary units should be minimised and their positions carefully planned so to limit the potential interference and accidents with the players. One unit at the centre and four at the corners of the area spanning over the two tennis courts is deemed to be as the best acceptable compromise.
- Power density and uniformity: given it would not be safe nor practical having several temporary units around the playing area, a higher number of floodlights per pole, or the same number but more powerful floodlights would be required on each pole, in order to achieve the required illuminance and uniformity levels. For the same reason, the poles would be extended as high as possible (8m in this instance). This higher density of power and luminous flux has inevitably an impact on the surrounding areas.
- Positioning: unlike a permanent installation where the lighting positions are fixed, the placement of any temporary lights are not. With this, the position of any temporary lights may be alter or move in the slightest over time. Even the slightest in any given direction could potentially cause greater spillage into the adjacent gardens.

The lighting simulations have been carried out with 5 poles locations and two types of luminaires:

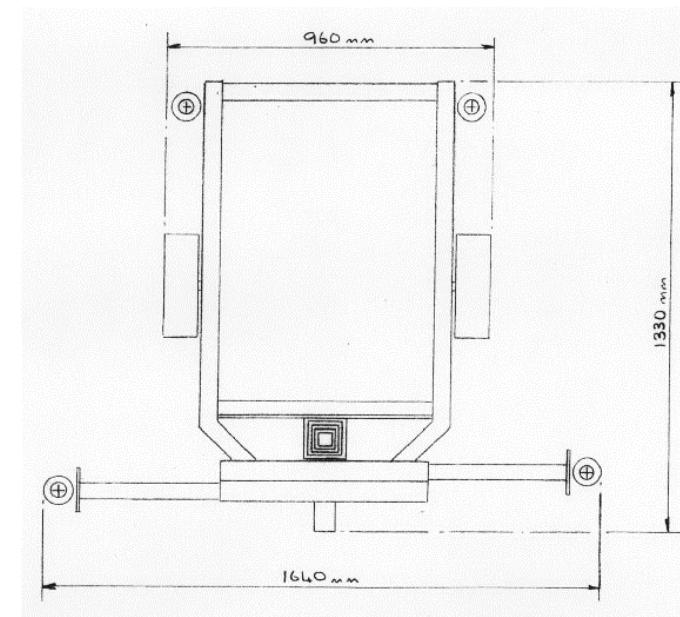
- High power metal halide floodlights, the same as those currently adopted on site.
- High power highly efficient LED floodlights, in double the number when compared to the metal halide units, so as to achieve an equivalent the required illuminance levels and uniformity.

The calculation results show that in both instances there is substantial spill of light on some of the surrounding properties, particularly those on the Mall, given their closer proximity to the playing area.

The screening effect of the solid fence screen and of the dense tall hedges immediately around the playing areas have been considered. However, the potential screening effect of the trees along the site ownership boundaries have not been modelled, as it would be largely affected by a number of factors, which could vary both seasonally and spatially along the boundaries, such as the heights of the trees, the density of the foliage at various heights and across different seasons, the impact of rain and wind, etc.

It should be noted that the potential mitigation to the spill of light offered by trees is likely to be stronger in the case of a permanent installation with poles at 6m than those on temporary units fully extended to 8m.

Our conclusion is that a fixed permanent installation on 6m tall poles, safely fixed to the ground and distributed in higher number around the tennis courts would therefore be a much better option than any temporary installation on 8m tall poles, both in terms of visibility from and light spillage onto neighbouring properties, as well as in terms of energy efficiency, practicality, safety and aesthetics.



Typical space take of temporary units with telescopic poles

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