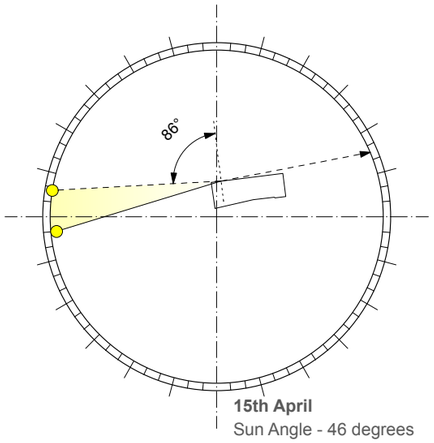
Vertical Elevation - Worcester Place
Hall Elevation

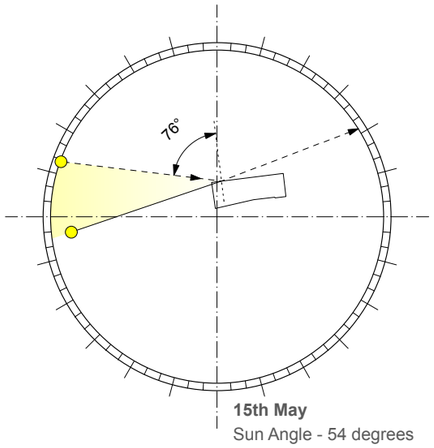
4.2

These diagrams illustrate an approximate angle of reflection, for the oblique sun light hitting the corner of the hall elevation along Worcester Place.

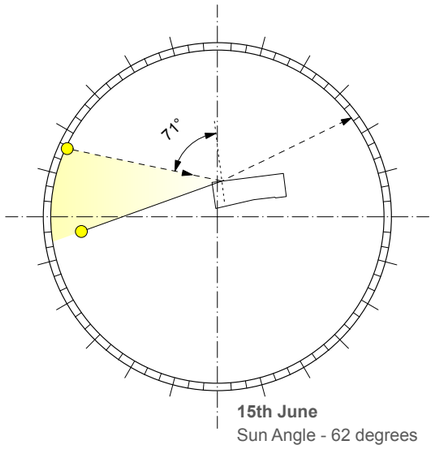
From these diagrams we can see that the angle of the sun is always greater that 60 degrees, and for this reason always results in a angle of reflection of an equal angle towards the north east, of the site.



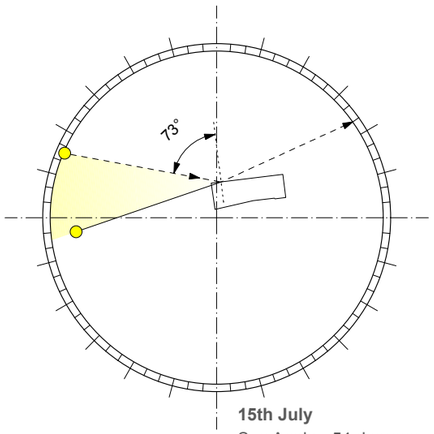
15th April
Sun Angle - 46 degrees
6.05pm till 7.20pm = 1hr 15min
Angle of Incidence Approximately - 86 degrees



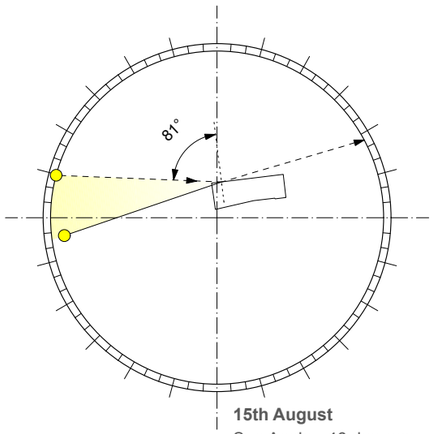
15th May
Sun Angle - 54 degrees
5.30pm till 7.40pm = 2hr 10min
Angle of Incidence Approximately - 76 degrees



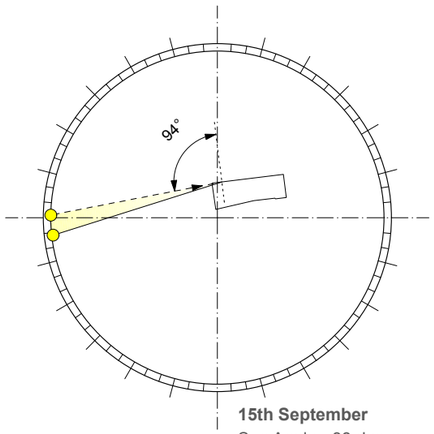
15th June
Sun Angle - 62 degrees
5.15pm till 7.55pm = 2hr 45min
Angle of Incidence Approximately - 71 degrees



15th July
Sun Angle - 54 degrees
5.30pm till 8.00pm = 2hr 30min
Angle of Incidence Approximately - 73 degrees



15th August
Sun Angle - 46 degrees
5.50pm till 7.40pm = 1hr 30min
Angle of Incidence Approximately - 81



15th September
Sun Angle - 38 degrees
6.20pm till 6.55pm = 35min
Angle of Incidence Approximately - 84 degrees

Diagram 10
Sun Path Diagram, the Reflectivity of the Sun to the Corner of the Hall Elevation, Vertical Elevation.

4.3 Roof Pitch - Worcester Place
Analysis of Diffused Light

Following further local stakeholder consultations, ABA have been able to use the three dimensional software, to analyse when sun light would hit the pitched sections of the roofs facing Worcester Place. This has allowed us to record the months of the year and the hours of the day in which the sun would obliquely hit the pitched section of the roof facing Worcester Place, from a southernly direction.

Due to the adjacency of the properties opposite the New Walton Street Quadrangle, along Worcester Place, this study focuses on the lowered pitched section of roof, of the central learning commons block and the Hall.

The pitch of the learning commons roof is 42 degrees, with the pitch of the hall roof being 28 degrees (from the horizontal).

<u>The Lower Section of the Learning Commons Block Roof:</u>

- On average the oblique southernly sun angle only sits the slopping learning commons pitched roof for 5 months of the year, from 12 pm.

- The dormers and adjacent roof over shadow the learning commons pitched roof until noon.

We can see from these studies, that due to the angle of the sun during the winter to spring months, the sun will only hit the pitched section of the learning commons roof and all the other adjacent houses and buildings along Worcester Place, for 5 months of the year, between April and August. This is when the solar altitude is between 42 and 62 degrees (from the horizontal). It is also possible to see that it is not until mid day, that the adjacent roof section and dormers to the roof, no longer cast long shadows over this section of roof.

Therefore the Central Learning Commons section of roof will only received approximately 5 hours of sun light, with the majority of this sun light hitting the pitched section of the roof at an oblique angle. Again it should be noted this study is based on a clear sunny day with no cloud coverage.

The diagrams to the left, represent stills taken from the 3D model between 9am and 5pm, at regular intervals throughout the year to illustrate the varying conditions on the roof.

<u>The Hall Roof:</u>

- On average the oblique southernly sun angle only sits the slopping learning commons pitched roof for 8 months of the year, from 12 pm.

This same study has been carried out on the pitched section of the Hall roof. We can see from these studies, that the sun will hit the pitched section of the hall roof for 8 months of the year, between March and October.

June 15th

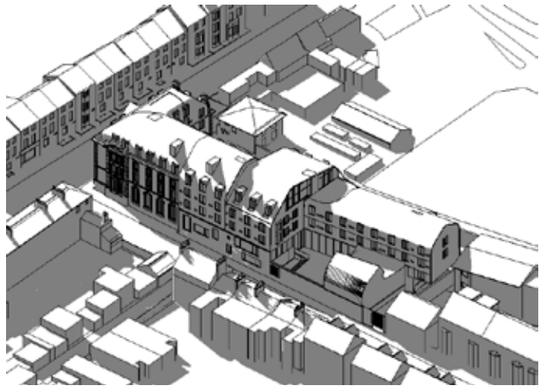


Diagram 01

9.00am 15th June

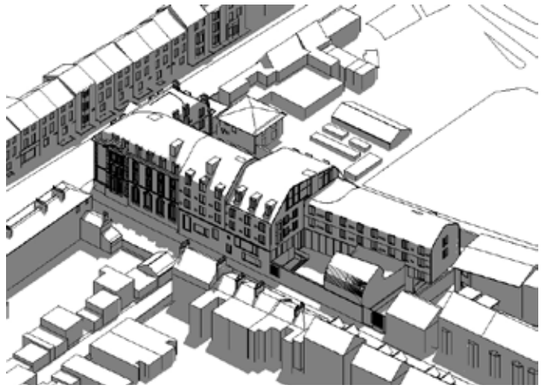


Diagram 02

12.00pm 15th June

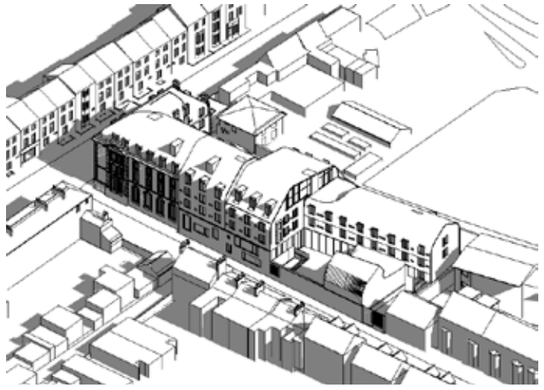


Diagram 03

5.00pm 15th June

September 15th

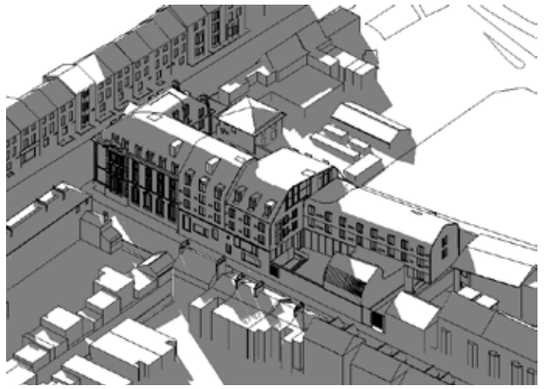


Diagram 04

9.00am 15th September

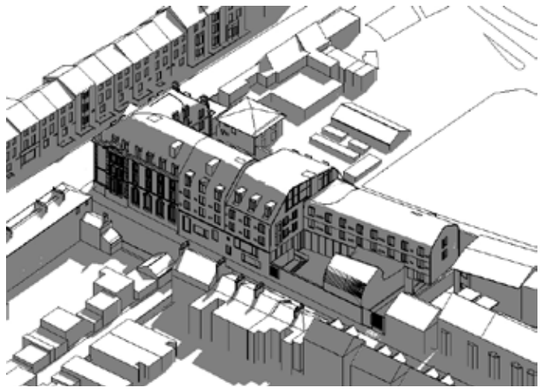


Diagram 05

12.00pm 15th September

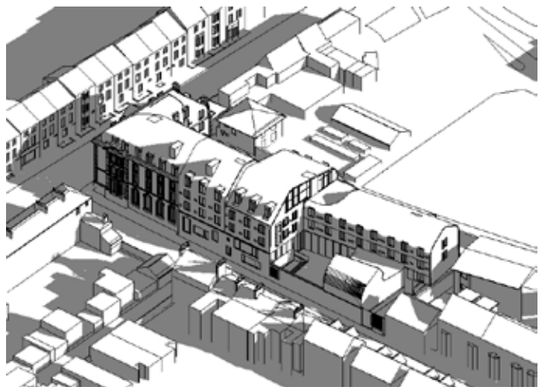


Diagram 06

5.00pm 15th September

January 15th

Diagram 07

9.00am 15th January

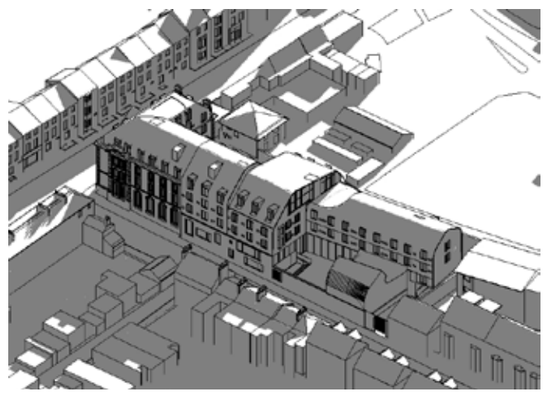


Diagram 08

12.00pm 15th January

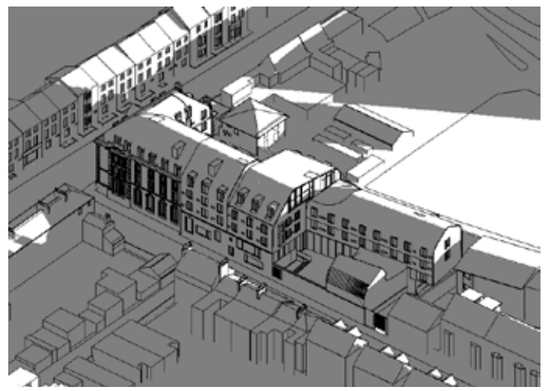


Diagram 09

5.00pm 15th January

Image 01
Two Mock Ups North Facing on Site

Image 02
The Folds within the Shingles

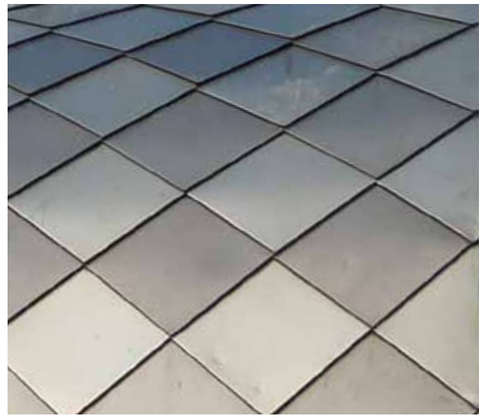


Image 03
The Folds within the Shingles

Although the average angle of the roofs for the lowered learning commons block and the hall, can be described as 42 degrees and 28 degrees (from the horizontal), when looking at the actual construction detail of the shingles, we can see that this angle is not representative of the individual shingles, due to the fact each shingle is interlocked.

For example on the 42 degree roof pitch, the actual angle of the shingles would more accurately be 38 degrees. This reduces the overall pitch of the surface from which the light is diffused.

It is apparent from the mock ups produced and displayed on site, the effect the folding and interlocking process has on the overall perception of the roof. As the tiles are folded on four sides, due to the orientation of the tiles, each tiles casts a shadow onto the next tile to which it interlocks.

As outlines on page 16, the surface treatment, patterning and bead blasting to the shingles, will result in any light hitting the surface being absorbed and diffused.

Diagram 01 and 02, illustrate how the light would be diffused off the patterned / stippled bead blasted shingle surface, and highlights the overlapping, shading and angle to the shingles, in comparison to the average roof pitch.

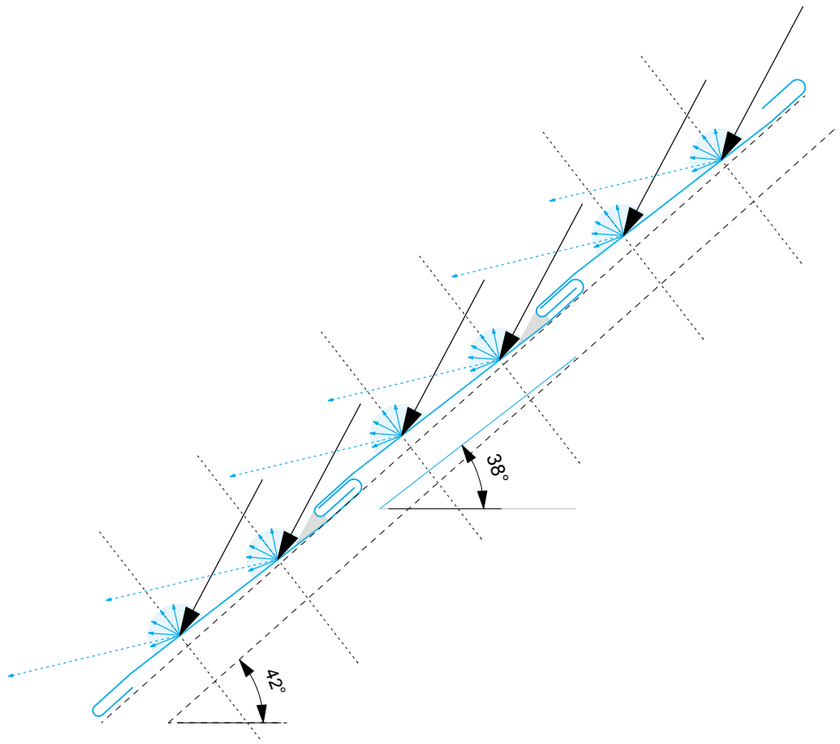


Diagram 01
Detailed section through three shingles - 62 Degrees Summer Solstice

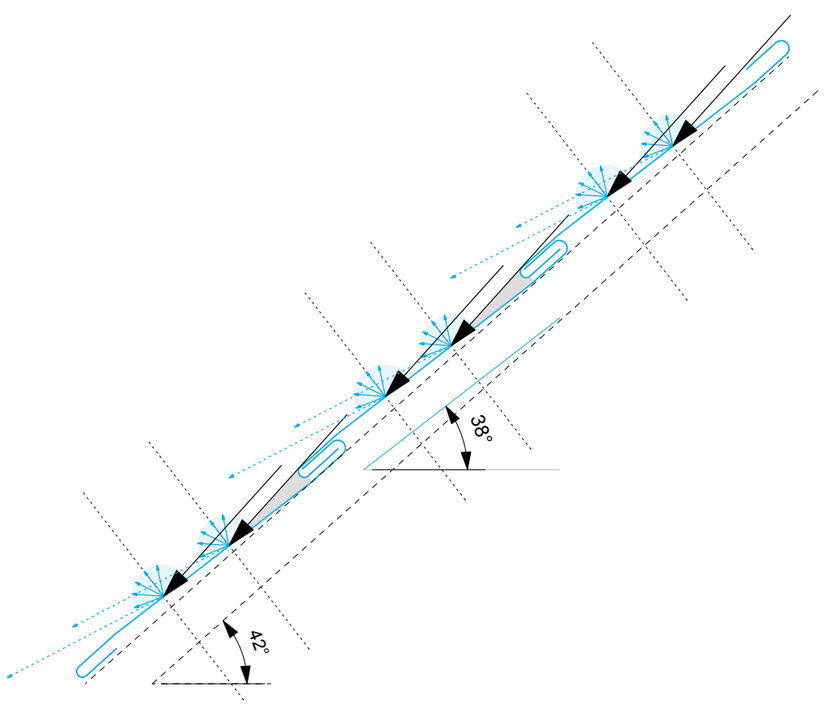


Diagram 02
Detailed section through three shingles - 46 Degrees April / August Sun Angles

4.3 Roof Pitch - Worcester Place
Analysis of Diffused Light

This same study can be shown with sectional diagrams. This illustrates the solar altitude at the summer solstice (62 degrees) and spring / summer equinox (48 degrees), when the sun would be hitting this pitched section of the roofs along Worcester Place.

This is in fact a shadow study, showing that at noon any light hitting the pitched section of the roofs, over the 6 months of the year will not impact the adjacent properties, due to the angles of the proposed roofs.

The properties along Worcester Place have south facing elevations, the point in which the sun is hitting the roofs from a southerly angle at noon, the sun itself is in fact the greatest source of light directly affecting these properties and the roof cladding will leave no greater impact that the ambient environmental conditions, caused by the direct sun light.

The new Walton Street Quadrangle, compared to the existing building massing, pulls the massing back from Worcester Place, with the creation of the North Quad.

The proposed tree to the North Quad, and the three trees proposed trees along Worcester Place, will improve the existing and proposed micro climate of Worcester Place.

These trees will fundamentally shade the street surface, which cools down the ground conditions. The trees will also help remove greenhouse gases from the atmosphere and help lower ambient temperatures. Trees transpire water through their leaves, this evaporation of water from a trees leaves, act an a natural cooling effect.

Diagram 01- Worcester Place Shadow Study
Illustrates the shadows cast across Worcester Place during the summer solstice.

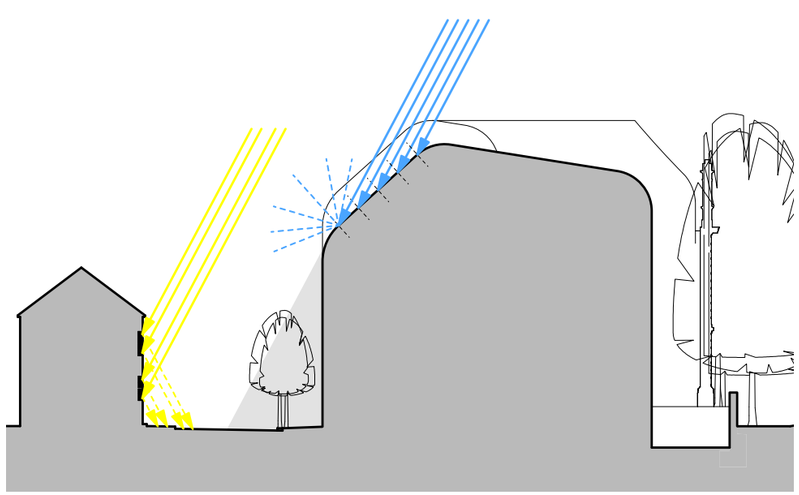


Diagram 02
Learning Commons Block - Adjacent to No.28 Worcester Place
62 Degrees - Summer Solstice

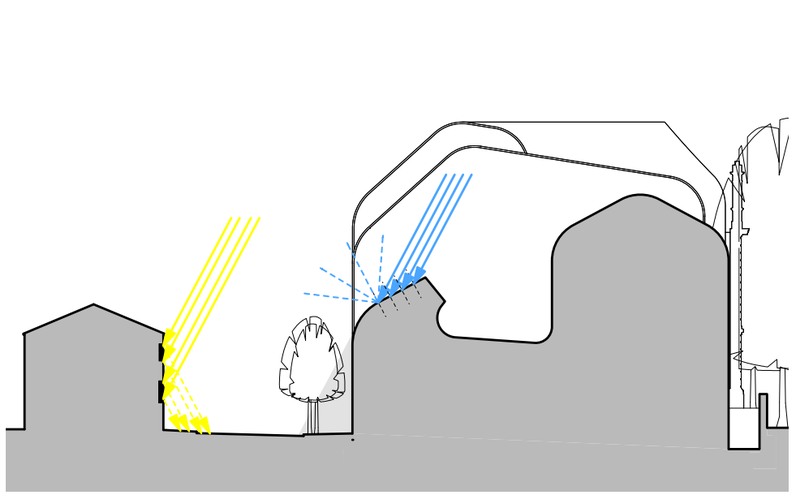


Diagram 03
Hall - Adjacent to No.24 Worcester Place
62 Degrees - Summer Solstice

Existing Worcester Place Building Elevation

Proposed Worcester Place Building Elevation

05

Southern Elevation
Holm Oak Trees

5.1 Ruskin Lane - South Elevation

Due to the regular dormer pattern and student room desk reading windows, the total are of the vertical section of elevation on the west wing is only 17sqm.

The vertical section of elevation to the learning commons block is 33sqm, this elevation is obscured behind the mature 14 holmoak evergreen trees, which are approximately 17m tall.

Ruskin Lane Elevation

Vertical Section of the West Wing Elevation

Area - 17 sqm

Ruskin Lane Elevation - Holmoak Evergreen Trees

View of the Holmoaks From Worcester College Car Park

Shadows of the Holmoak Trees
10.00am

Shadows of the Holmoak Trees
11.30am

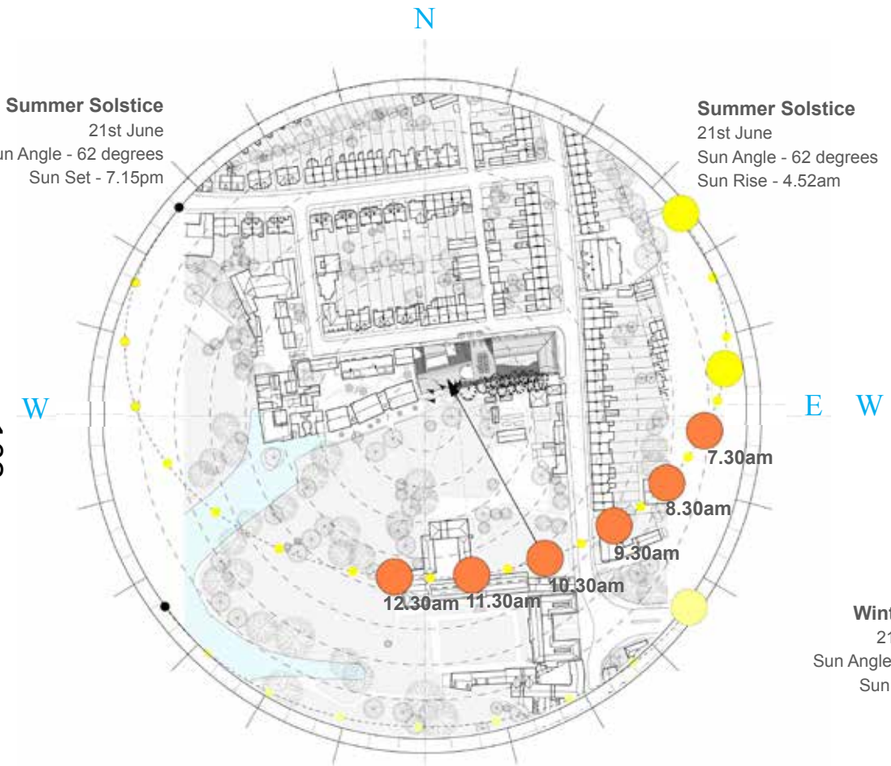


Diagram 01 - Sun Path, Summer Solstice
Holmoak Trees

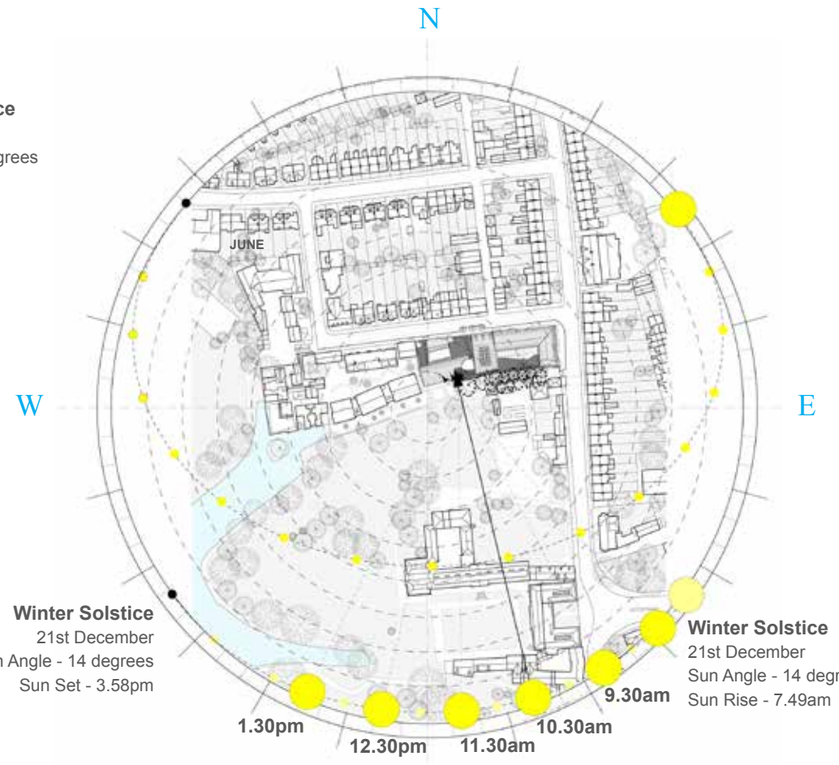


Diagram 02 - Sun Path, Winter Solstice
Holmoak Trees

Using the three dimensional environmental analysis software Vasari, ABA have been able to see how the 14 mature existing evergreen Holmoak trees along Ruskin Lane, will obscure the elevation of the learning commons block and will cast speckled shadows across the west wing elevation.

During the Summer Solstice on the 21st June (when the sun is at 62 degrees), the Holmoak trees will cast shadows across the west wing elevation from 7am till 12pm. Illustrated diagrammatically in image 01.

During the Winter Solstice on the 21st December (when the sun is at 14 degrees), the Holmoak trees will cast shadows across the west wing elevation from 7am till 2pm. Illustrated diagrammatically in image 02.

Summer Solstice - 10.30 am

Ruskin Lane Elevation - Holmoak Evergreen Trees
Summer Solstice 10.30 am

Ruskin Lane Elevation - Holmoak Evergreen Trees
Winter Solstice 10.30 am

Winter Solstice - 10.30 am

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