

Design PH - SketchUp experimentation

Multiple small windows

Heat balance

Project overview

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Climate: London (Central) [change](#)

Annual heat demand (Q_h): 19.7 kWh/m²a

Treated Floor Area (TFA): 106 m² (Estimated for 3.0 storeys)

Thermal envelope area: 227 m²

Heat Loss Form Factor: 2.15

Projected building footprint: --- m²

Number of windows: 17 [details](#)

Number of thermal surfaces: 31 [details](#)

Number of thermal bridges: None defined [details](#)

Thermal envelope checks

The thermal envelope appears to be incomplete!

This may be caused by incorrectly assigned non-thermal surfaces, reversed faces, a hole, glued components, or unintersected faces in the envelope!

Projection along Blue axis: 16.4% variance

Large windows

Heat balance

Project overview

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Climate: London (Central)

Annual heat demand (Q_h): 18.3 kWh/m²a

Treated Floor Area (TFA): 106 m² (Estimated for 3.0 storeys)

Thermal envelope area: 227 m²

Heat Loss Form Factor: 2.15

Projected building footprint: --- m²

Number of windows: 11 [details](#)

Number of thermal surfaces: 31 [details](#)

Number of thermal bridges: None defined [details](#)

Thermal envelope checks

The thermal envelope appears to be incomplete!

This may be caused by incorrectly assigned non-thermal surfaces, reversed faces, a hole, glued components, or unintersected faces in the envelope!

Projection along Blue axis: 16.4% variance

Projection along Red axis: 3.1% variance

Projection along Green axis: 8.0% variance

Result

Reducing the amount of windows through converting two individual windows that are placed next to one another into one large window. Therefore window surface area remains the same, however, there is a reduction of transmission heat loss. This is due to the glass have better thermal properties than the frames – which therefore reduces thermal bridging.

Form and partition walls

Heat balance

Project overview

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Climate: London (Central)

Annual heat demand (Q_h): 38.3 kWh/m²a

Treated Floor Area (TFA): 135 m² (Estimated for 3.0 storeys)

Thermal envelope area: 584 m²

Heat Loss Form Factor: 4.33

Projected building footprint: --- m²

Number of windows: 23 [details](#)

Number of thermal surfaces: 60 [details](#)

Number of thermal bridges: None defined [details](#)

Thermal envelope checks

The thermal envelope appears to be incomplete!

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Projection along Blue axis: 9.5% variance

Projection along Red axis: 0.0% variance

Projection along Green axis: 0.0% variance

Result

In order to reduce the annual heat demand, a form with minimal thermal surfaces is the most successful – therefore design flat façade cube form buildings. End terraces in comparison to middle terrace are a lot less energy efficient – therefore I ensured within my masterplan to have the terraces rather than semi-detached to limit the amount of end terrace.

Typology two - Families

Heat balance

Project overview

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Climate: London (Central)

Annual heat demand (Q_h): 19.6 kWh/m²a

Treated Floor Area (TFA): 227 m² (Estimated for 3.0 storeys)

Thermal envelope area: 513 m²

Heat Loss Form Factor: 2.26

Projected building footprint: --- m²

Number of windows: 23 [details](#)

Number of thermal surfaces: 45 [details](#)

Number of thermal bridges: None defined [details](#)

Thermal envelope checks

The thermal envelope appears to be complete!

Typology two – Young professionals

Heat balance

Project overview

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Climate: London (Central)

Annual heat demand (Q_h): 14.7 kWh/m²a

Treated Floor Area (TFA): 152 m² (Estimated for 3.0 storeys)

Thermal envelope area: 260 m²

Heat Loss Form Factor: 1.71

Projected building footprint: --- m²

Number of windows: 14 [details](#)

Number of thermal surfaces: 30 [details](#)

Number of thermal bridges: None defined [details](#)

Thermal envelope checks

The thermal envelope appears to be incomplete!

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Climate: London (Central)

Annual heat demand (Q_h): 19.6 kWh/m²a

TFA: 227 m² (Estimated for 3.0 storeys)

Heat Loss Form Factor: 2.26

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Climate: London (Central)

Annual heat demand (Q_h): 14.7 kWh/m²a

TFA: 152 m² (Estimated for 3.0 storeys)

Heat Loss Form Factor: 1.71