CONSULTING ENGINEERS

RESIDENTIAL EXTENSION
CORNER BI-FOLD DOORS

Brief

Riddwood Consulting Engineers was employed to design a residential single-storey rear extension. The client wished to maximise the amount of light entering the rear living room and to gain unobstructed access to the garden. Riddwood Consulting Engineers designed a corner bi-fold doors opening and the support for a 2m long x 1.5m wide roof lantern, meeting the client's requirements and achieving unobstructed access to the garden by eliminating the need for a corner post.

Project Submission

Riddwood Consulting Engineers submitted the structural calculations and drawings within a week of securing the job, allowing the immediate commencement of the construction process. We then provided continuous and prompt support to the contractor to ensure the smooth operation of the construction phase plan.

Engineering ideas into reality.

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Design Process

Riddwood Consulting Engineers designed a steel frame that was completely hidden inside the rear wall of the extension. The posts of the frame were chosen slender enough to allow the insulation installation and to avoid a cold bridge through the rear wall. The beam at the top of the frame was designed to extend further at its right side, creating the necessary support for the roof rafters above the corner opening.

The nature of the steel frame resulted in the uplift of the left post, which couldn't be tied to the very deep foundations (greater than 1.75m deep). We solved this issue by first optimizing the frame geometry and roof weight distribution (to minimize the uplift force) and then introducing a concrete counter weight at the base of the left post. The proposed solution was discussed with the contractor to ensure its feasibility and ease of construction.

A further restriction was introduced by the bi-fold doors manufacturer, who required the deflection of the supporting structure above the doors to be less than 15 mm. We ensured that our design easily met the above criteria, to avoid any future malfunction of the bi-fold doors. Eventually, we achieved a 2m by 3.4m corner opening, exactly as our client had envisaged.

Design Codes Used

- BS 6399 – Loading for Buildings
- BS 5268 – Structural Use of Timber
- BS 5950 – Structural Use of Steelwork in Building
- BS 5628 – Code of Practice for Use of Masonry

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Figure 1 • Existing and final rear elevation

Figure 2 • Internal and external view of final opening

Figure 3 • View from the living room to the garden

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