

Question 1. Butterfly observation platform

Client's requirements

1. The trustees of a woodland nature reserve require a butterfly observation platform to be constructed within the reserve, adjacent to a woodland track. The site for the observation platform, chosen by the trustees, is on the edge of a clearing. The site includes a well-established hornbeam tree which the trustees would like to integrate into the structure in some way. See Figure Q1.
2. The optimum height for the platform is 3.0m above existing ground level.
3. The observation platform is to have a minimum floor area of 10.0m² to allow for use by up to ten people at any one time.
4. No excavation is permitted within the footprint of the tree canopy.
5. The woodland track is to remain unobstructed by the proposed structure.

Imposed loading

6. Platform deck: 2.50kN/m²

Balustrade loading: 1.50kN/m² applied to the infill; 3.0kN/m horizontal line load (to be applied 1.10m above the finished platform level).

Site conditions

7. Mean hourly wind speed 22m/s
8. Ground conditions are consistent across the site:

| | |
|------------|------------------------------|
| 0 – 1.0m | Top soil |
| 1.0 – 6.0m | Soft to firm clay |
| Below 6.0m | Dense sand and gravel, N =25 |

Groundwater was encountered 1.0m below ground level

Omit from consideration

9. Detailed design of access ladder, stairs or ramp to platform
10. Detailed design of foundations

SECTION 1

- a. Prepare a design appraisal with appropriate sketches indicating two distinct and viable solutions including the proposed foundation type. Indicate clearly the functional framing, load transfer, and stability aspects of each scheme. Identify the solution you recommend giving reasons for your choice.

