# Engineering Consideration

Leonardslee Lakes & Gardens

# Contents



# Document Release

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Date: 07/12/2025

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Date: 08/12/2025

# Scope of Consideration

Tennyson Suite Ltd have been asked to provide Fire Safety advice to Leonardslee Lakes & Gardens in relation to proposed building works at several locations across the estate. The full scope of works includes:

- Extension to the Visitor Entrance Building to accommodate a new ticket sales area and café;
- Infilling of the former Generator Block courtyard roof to create an events space;
- Addition of a single-storey winter garden conservatory to the Stable Block café, including a new external deck overlooking the gardens;
- Change of use of redundant staff offices and accommodation within the Stable Block to guest accommodation, including an extension to Honey Cottage;
- Change of use of part of the first floor of the Red House to staff accommodation;
- A small WC extension to the Engine House;
- Construction of a lightweight wedding pavilion on the lawn south of Leonardslee House;
- Associated landscaping works, including enhancements to the forecourt of Leonardslee House.

Tennyson Suite Ltd have specifically been asked to provide professional fire-safety advice on:

a) Water for Firefighting
b) Firefighting Vehicle Access
c) Recommended Fire Alarm Installation for the Red House

This advice relates to existing buildings within the estate undergoing modification or change of use. Leonardslee is listed on the Historic England Register as a Grade I Park and Garden of Special Historic Interest and includes several historic buildings and structures. As such, adaptation or upgrade works can be challenging and must be considered carefully within the context of heritage constraints

The principal reference used in the preparation of this advice is Approved Document B – Volume 2: Buildings other than dwellings (hereafter referenced as ADB), supported where necessary by relevant British Standards and recognised operational firefighting practices.

Layout Plans have been provided for reference:

| Title | Author |
|---|---|
| Fire Tender Tracking | GTA Civils & Transport |
| Existing Site Plan Showing Fire Appliance Access | Purcell Architecture Ltd |
| Proposed Site Fire Strategy Plan – Showing Fire Appliance Access | Purcell Architecture Ltd |
| Existing Site Location Plan | Purcell Architecture Ltd |
| Proposed Site Location Plan | Purcell Architecture Ltd |
| Leonardslee Gardens Building Perimeter | Tennyson Suite Ltd |

# Considerations

## Water for Firefighting

### Hydrant Provision

The following buildings are currently in scope of this guidance:

- Red House
- Visitor Entrance Buildings
- Former Generator Block
- Clocktower Café
- Leonardslee House Hotel

Two private fire hydrants are provided within the Leonardslee Estate. One is located between the Red House, Clocktower Café and Former Generator Block, and the second is positioned within the car park in front of Leonardslee House Hotel. These are likely historical installations, compensating for the lack of suitably located statutory hydrants on the A281.

Approved Document B (ADB) recommends that private hydrants should be located within 90 m of the entry point to the building they serve. Using the *Proposed Site Plan* (1:2500 scale), approximate distance checks have been carried out. Several buildings—including Red House, Clocktower Café, Former Generator Block and Leonardslee House Hotel—fall within this range.

However, the Visitor Entrance Building is located beyond 90 m from either private hydrant. Likely appliance positioning at the front of the building would result in hose runs of approximately 100–120 m, exceeding the preferred ADB distance. Operationally, this is still manageable through the deployment of up to five lengths of 70 mm hose, but it requires additional time and resources. The building remains capable of being supplied from either hydrant, but the gradient difference between both private hydrants to the Visitor Entrance Centre will require greater pump pressure to provide water supply. Therefore, it is important that the private hydrants are maintained correctly to ensure full pressure and flow if required. An additional private hydrant located to the west of the Visitor Entrance Centre would ensure compliance with ADB.

### Alternative Water Supplies (AWS)

ADB requires that an Alternative Water Supply to fulfil both of the following;

- *Providing or storing a minimum of 45,000 litres of water at all times.*
- *Providing access, space and a hardstanding for a pumping appliance.*

Several large ornamental lakes lie at the bottom of the valley to the east (Waterfall Pond, Engine Pond, Middle Pond, Leucothoe Pond, Mossy Ghyll Pond). Although sizable and probably sufficient for the quantity of water required, they are considered unsuitable as operational AWS for firefighting because:

- There is no direct appliance access,
- The valley sides are steep and heavily vegetated,
- Ground conditions are poor for siting an appliance,
- The site's heritage planting makes clearance inappropriate.

Another AWS is located at the southern boundary of the estate and is reachable via a gravel access track from the A281. This track must remain suitable year-round for appliance use, particularly in wet conditions. Once an appliance is positioned at this pond, the distance to the nearest major building (Leonardslee House Hotel) is c.200–300 m, requiring at least eight lengths of 70 mm hose to be deployed over soft and uneven terrain and up a rising elevation. This makes the AWS operationally viable but arduous. Also, it has not been confirmed what the capacity of this water source is, and thus whether it can achieve the minimum required and therefore this water source could only be considered appropriate only as a contingency supply.

### Summary

The two private hydrants represent the primary and most reliable firefighting water supplies for the Leonardslee Estate. In accordance with BS 9990:2015, they should be flow- and pressure-tested every 12 months to verify adequate performance for Fire & Rescue Service operations. While the Visitor Entrance Building lies beyond the preferred 90 m hydrant distance, it remains fully accessible to water supplies through extended hose deployment from the two private hydrants. The AWS arrangements, whilst not ideal, could offer contingency water supply in the event of failure or reduced performance of the private hydrants.

Based upon this, it is considered that the development complies with Requirement B5 of the Building Regulations

*Note - An additional private hydrant constructed to the west of the Visitor Entrance Building would provide additional resilience and negate the requirement for longer hose runs, should a fire occur at the Visitor Entrance Building. Although not considered a requirement for this development, the RP may wish to consider providing additional private hydrants when opportune to do so.*

## Firefighting Vehicle Access

The buildings on the estate are not fitted with Fire Mains because no storey within any of the buildings exceeds 18 metres above Fire and Rescue Service access level, and none of the buildings have total floor areas approaching the thresholds that would require firefighting shafts. With regard to Table 15.1 which considers vehicle access for buildings not fitted with fire mains, this is based on Total Floor Area and Height. It is considered that none of the buildings on the estate are

11m in height and none are thought to have total floor areas of greater than 8000m². This means that under Table 15.1 either of the following should be applied to provide access for a 'Pump' appliance:

- *15% if the perimeter, or*
- *Within 45m of every point of the footprint of the building.*

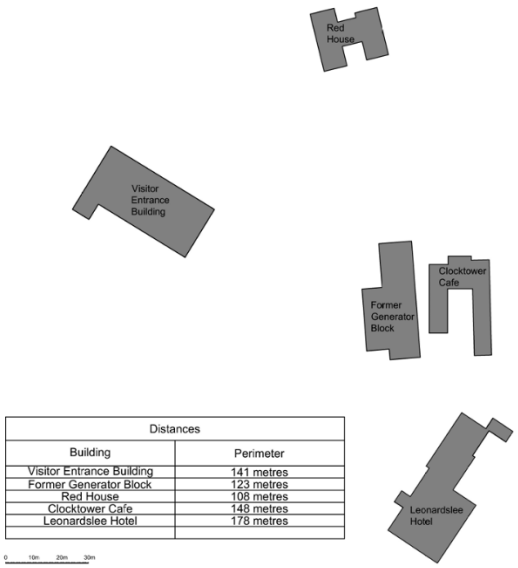
**Table 15.1 Fire and rescue service vehicle access to buildings not fitted with fire mains**

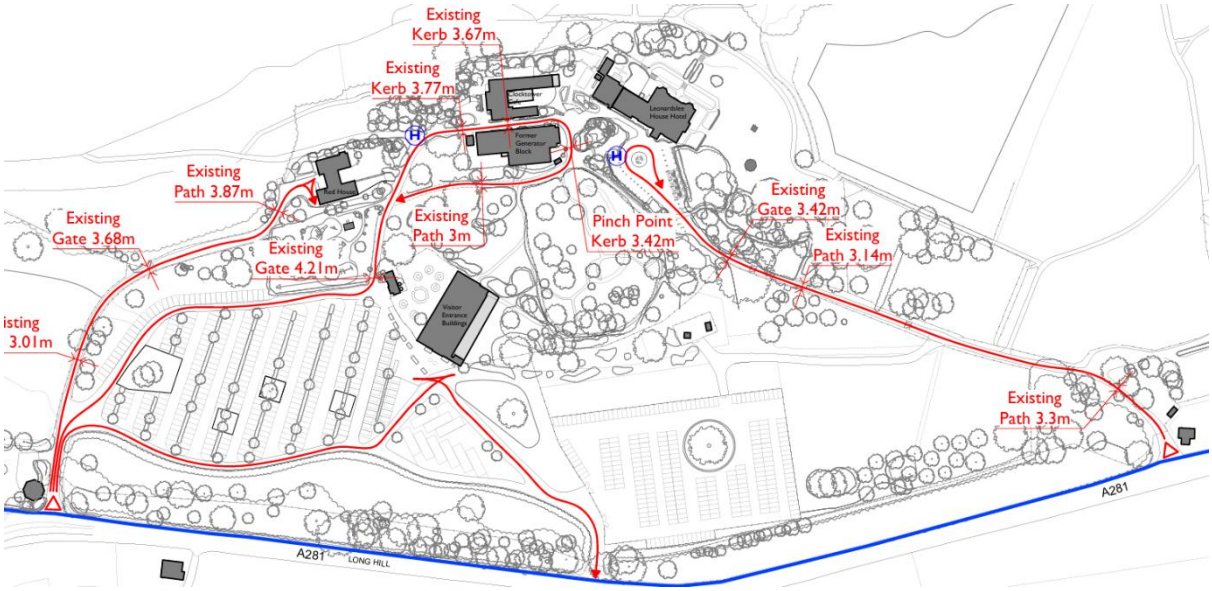
| Total floor area[1] of building (m²) | Height of floor of top storey above ground (m)[2] | Provide vehicle access to: | Type of appliance |
|---|---|---|---|
| Up to 2000 | Up to 11<br>Over 11 | See paragraph 15.1<br>15% of perimeter | Pump<br>High reach |
| 2000–8000 | Up to 11<br>Over 11 | 15% of perimeter<br>50% of perimeter | Pump<br>High reach |
| 8000–16,000 | Up to 11<br>Over 11 | 50% of perimeter<br>50% of perimeter | Pump<br>High reach |
| 16,000–24,000 | Up to 11<br>Over 11 | 75% of perimeter<br>75% of perimeter | Pump<br>High reach |
| Over 24,000 | Up to 11<br>Over 11 | 100% of perimeter<br>100% of perimeter | Pump<br>High reach |

**NOTES:**

1. The sum of the area of all storeys in the building (excluding basements).
2. For storage buildings (purpose group 7(a)), measure height to mean roof level (see Appendix D).

We have been provided with drawings (242769-PUR-01-00-DR-A-6001, 242769-PUR-05-00-DR-A-6001 and 242769-PUR-08-00-DR-A-6001) detailing hose routes around the properties, given the layouts it is considered that all areas are able to be reached within 45m of the fire appliance. Additionally, a perimeter calculation has been carried out for each building on the estate, which demonstrates that 15% accessibility is achievable. Both tests for access are therefore achievable and this is considered to demonstrate compliance with Requirement B5 of the Building Regulations.






The access routes to the buildings on the site are a mixture of hard standing tarmac and hard packed gravel along the car parking areas. This is considered suitable for a standard fire appliance (minimum carrying capacity – 12.5 tonnes) to drive without becoming stuck. A High Reach appliance is not considered necessary due to all the buildings being less than 11metres in height.

Access widths provided for a standard pump appliance in ADB are 3.7m minimum width of road between kerbs, and 3.1m minimum width of gateways. Referencing *Proposed Site Strategy Plan*, there are some pinch points where it is stated that the width of access routes are less than the minimum width of road between kerbs. The minimum width for gateways appears to be compliant. Where there are widths below the minimum, this is mitigated because access is only required for a standard pump appliance and not a high reach appliance. Standard pump appliances are considerably narrower than the 3.7m stated in ADB. The table below illustrates width measurements for common UK fire service appliances:

| Appliance Type | Body Width | Overall Width (with mirrors) |
|---|---|---|
| Rosenbauer / Scania Pump | ~2.30 m | ~2.55 m |
| Emergency One (E1) Pump | ~2.32 m | ~2.60 m |
| Angloco Pump | ~2.30 m | ~2.55–2.70 m |

The site is heritage, which limits the potential for works to widen access. However, the access routes are not bordered by houses, as they would be in a built-up town/city. Instead, they are bordered by soft, open foliage and vegetation, which provides less obstruction to a fire appliance. It is considered that access width is sufficient.

There is 1 x Dead-end access route longer than 20metres accessing the North Elevation of the Red House. All other buildings at Leonardslee appear to allow a turnabout for a standard fire appliance. This is demonstrated by referencing the plan – *Fire Tender Tracking*. Red House is also accessible from the South Elevation, albeit within 5m and not allowing the appliance direct access to the external wall of the Red House. A path links the North and South elevations allows a fire hose to be run for an appliance parked at either end of this building.

If access is gained to the North Elevation, this presents the dead-end access condition. ADB provides a minimum turning circle required for this dead-end access as 16.8m between curbs/19.2m between walls. This would not appear to be possible. However, the hardstanding access to the North Elevation of Red House is not laid out as a straight road, as illustrated in Diagram 15.3 of ADB. Instead, it is laid out as a wider front drive, which would present the possibility for a fire appliance to manoeuvre using a small reverse and turn to allow an emergency exit, should this be required. Buildings at Leonardslee are a Heritage design, which limits the extent to which alterations for access and egress can be made. It is thus considered that Firefighting Vehicle Access is suitable.

### Recommended Fire Alarm Installation for the Red House

The Red House is undergoing a change of use to permit staff accommodation on the first floor. As this introduces sleeping risk, the building will fall under Purpose Group 2(a) or 2(b) as defined in Approved Document B. Premises containing sleeping accommodation require the installation of an automatic fire detection and alarm system.

BS 5839-1:2025 provides guidance on the category of system appropriate for such use. Table A.1 recommends that buildings with sleeping accommodation should have at least a Category L2 system. An L2 system provides detection in:

- All escape routes;
- All rooms opening onto escape routes;
- All high-risk rooms.

BS 5839-1 further requires that, in sleeping accommodation, the alarm signal should achieve a minimum of 85 dB(A) at the bedhead, ensuring that sleeping occupants are reliably awoken in an emergency.

Given the relatively small footprint and simple layout of the Red House, it is likely that detectors will be required not only within escape routes and high-risk rooms but also within the individual bedrooms to meet audibility and early-warning requirements. In practice, this level of coverage would constitute a Category L1 system, which provides automatic detection throughout all rooms and circulation spaces within the building. An L1 system represents the highest level of life-safety protection under BS 5839-1 and is therefore considered an appropriate and proportionate measure for Red House in its proposed use.

# Conclusion

Based on the assessment undertaken, it is considered that the proposed works across the Leonardslee Estate can achieve an appropriate standard of fire safety when measured against the relevant provisions of Approved Document B, supporting British Standards, and recognised operational firefighting practices.
The estate benefits from two existing private fire hydrants that provide the primary and most reliable firefighting water supplies. While the Visitor Entrance Building lies beyond the preferred 90 m distance from these hydrants, it remains operationally serviceable through extended hose deployment, and overall compliance with Requirement B5 of the Building Regulations is maintained. The alternative water supply at the southern boundary offers a supplementary contingency, though it presents practical challenges and should not be relied upon as the primary provision.

Firefighting vehicle access across the estate is constrained by heritage limitations and existing landscaping; however, sufficient appliance access to at least 15% of each building perimeter is achievable, as permitted under ADB for buildings of the size and height present. Access routes are suitable for standard pumping appliances, and although pinch points exist, these do not materially compromise operational access. Minor enhancement—specifically, the creation of a path or hose route between the north and south elevations of the Red House—would further support efficient firefighting operations.

With respect to the Red House, its proposed use for sleeping accommodation necessitates an automatic fire detection and alarm system. Given the building's layout and audibility requirements, a Category L2 system is considered the most appropriate and proportionate means of providing comprehensive life safety protection.

Overall, subject to the ongoing maintenance of the private hydrants and the implementation of the recommended measures, the fire safety provisions for the proposed works are deemed suitable and compliant. Tennyson Suite Ltd therefore considers that the development can proceed without requiring further strategic fire safety intervention.

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