

Southern Lightning Engineers Limited

LIGHTNING CONDUCTOR ENGINEERS

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Our Ref: RC/TK/SL37300/50101

(Please quote the above reference on all correspondence)

Holden Refurbishments

20 June 2023

For the attention of Andrew Holden

Email: holdenrefurbishments@googlemail.com

Dear Sirs

RE: Lightning Protection – Nurstead Hall, Nurstead Ln, Longfield, Kent, DA3 7AN

Further to your recent inquiry, we have pleasure in submitting our recommendations and quotations as follows.

We recommend assessing the following risk with regards to the building and its use: -

- Risk of loss of human life
(this is the primary consideration in the application of any assessment within the UK)

We have compiled the following assumptions with regards to the profile of the building, its construction, its use, its geographical location, and finally the main services entering the building, which we assume as 2no. (power and telecoms). These details have been used to carry out the Risk Assessment in accordance with the BSEN62305:2011/12. If this is incorrect, please let us know immediately as the data used for the Risk Assessment will need amending which will affect the overall result. At this stage we have assumed the maximum cable lengths of 1000m because exact lengths from the supplies are unknown.

The overall dimensions of each building have been entered into the risk assessment software along with the following assumptions:

We assume the structure is of a:

- Non-conducting frame with non-conducting cladding and with typical door openings.
- We have assumed that no fire precaution such as fire alarms, fire extinguishers and/or fire alarms are present.
- Ordinary fire risk.
- No real level of panic in the event of a evacuation.



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The initial assessment was done with only the 'Loss of Human Life' assessed. This resulted in the following:-

Provide a 'Level IV (4) Lightning Protection System' and 'Surge Protection' to ensure adequate protection against the effects of lightning (both direct and indirect). The roof network will be a 20m x 20m grid and the down conductors and earth terminations will be at 20m intervals starting at the main corners.

Please see attached form detailing parameter/factors used for the risk assessment in accordance with the BS EN62305:2011/12 – Part 2.

With the above in mind, please find the following quotation for a Level 4 (IV) LPS – The lowest level of protection allowed.

Tender Documents

Drawing Nos.:

Not applicable. Site visit completed for survey.

Specification:

BS EN62305:2011/12 and following specification.

We have used R1 – 'Loss of Human Life'. Should plant exist at roof level then these may require additional protection via elevated air terminals.

Lightning Protection (LPS Level IV (4)):

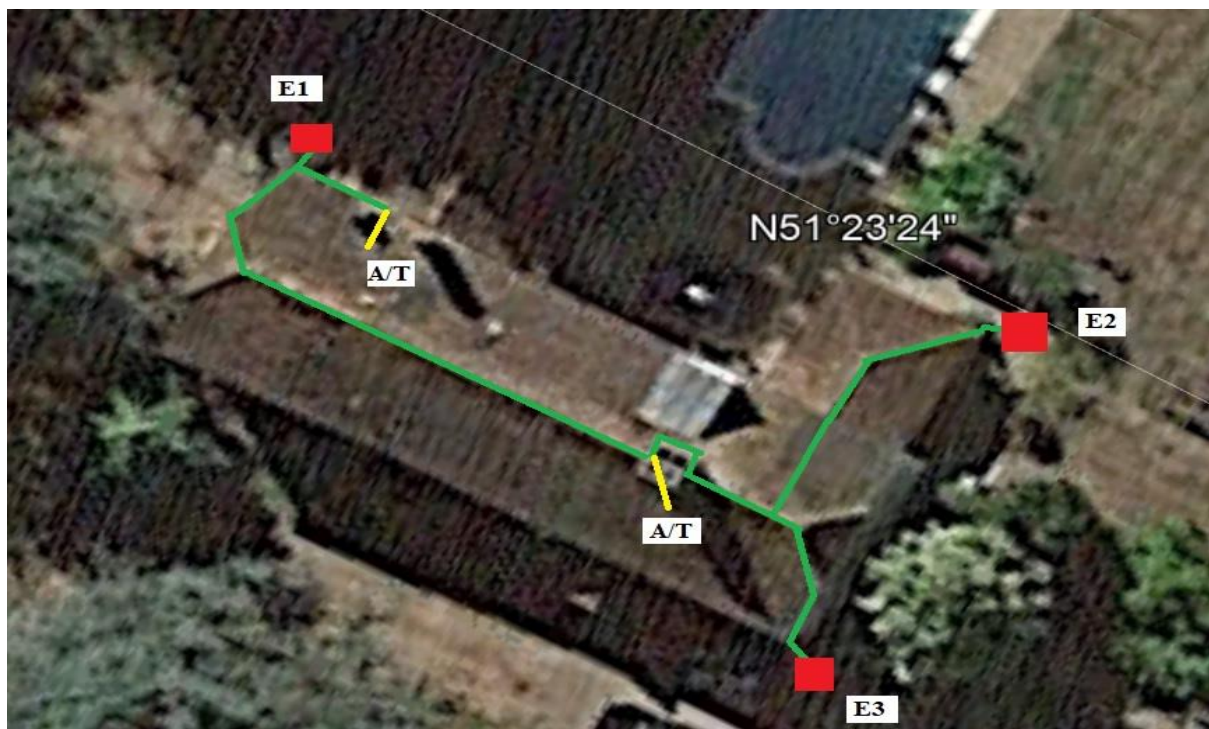
To supply and install a surface/externally run lightning protection system in accordance with the BS EN62305:2011/12 and attached Specifications.

Cost £3,993.00 + VAT

Excludes Air Terminals and Surge Protection. See below for additional costs.

We have allowed for a total of 4no. 1-day visits to complete the works.

The structure is an existing non-conducting build and therefore we have not included for any Type B earthing arrangement.



Proposed lightning protection layout

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Type 1 Lightning Current Arrestors (Must be installed for compliance):

Lightning Current Arrestors to the same level as the external protection **must** be fitted to the main incoming and outgoing services/cables. We have not allowed for these in the above quotation. We can provide the units for installation by the main electrical contractor or others. These units must be installed as part of the main external works in order to obtain a final compliant certificate.

Lightning Current Arrestors should be considered for:-

- All incoming/outgoing electrical supply cables to the structure (e.g. AHUs, Heat Pump Distribution Panel(s), Passenger/Fire Fighting Lift(s))
- All incoming telecoms lines to the structure (excludes fibre optics).
- Incoming TV aerials/Satellite aerials/DAB/FM Antennas (each co-axial cable shall need to be protected before it terminates into the splitter equipment)
- Roof mounted PV/Solar Panels and Inverters
- Incoming Fire Alarm cables.
- Incoming Signalling cables.
- Incoming PA systems cables.
- Outgoing cables to street lighting, columns or bollard lighting.
- Internet Links.
- Security Links.
- This list is not exhaustive.

Below is a selection of possible devices that may be required:-

Mains intake (415-volt, Level 3&4) – Dehn Shield

Cost £395.00 + VAT

Note: The above is supply cost only with enclosure per cable in. Not wiring accessories or installation costs.

Other services to consider:

Telecoms lines (Single BT Jack Plug)

Budget Cost £97.00 + VAT/line/pair

And/or

Telecoms lines (10no. lines in PBXBox)

Budget Cost £167.00 + VAT per 10 lines

Aerial/Satellite Systems

Budget Cost £92.00 + VAT per cable

Note: The above is supply cost only with enclosure per cable in. Not wiring accessories or installation costs.

Internet Links

Budget Cost £TBA + VAT per cable

Security Links

Budget Cost £TBA + VAT per cable

Note: The above is supply cost only with enclosure per cable in. Not wiring accessories or installation costs.

Other cables to be agreed

Cost £TBC

Surge Protection for Sensitive Electronic Equipment:

The Standard also recommends that if sensitive electronic equipment exists within the building then additional measures with regards surge protection are taken locally to ensure adequate protection of sensitive electronic equipment. This should be via surge protection devices installed to sub-distribution boards in excess of 10m from the MDB or to individual supply circuits for individual equipment. Should this be of interest to you or your client, please call for more details.

Roof-Mounted Plant and Equipment:

We have seen no evidence of equipment at roof level, so no protection has been allowed for.

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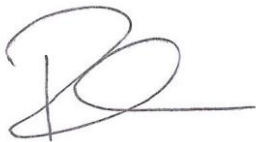
Notes

1. The above cost excludes all safe access requirements such as scaffolding and MEWP access. Should the quote be of interest I will visit site to discuss the best way forward to ensure a safe installation can be achieved.
2. The BS EN62305:2011/12 states that if a **Level I,II,III,IV Lightning Protection System** is installed to the building, then the incoming electrical cables **MUST** be fitted with a **Level I,II,III,IV Type 1 Lightning Current Arrestors**. This includes the incoming electrical cables, data cables, external services and telecoms cables. We can supply these units for installation by others as detailed above.
3. **IMPORTANT:** The BSEN62305:2011/12 requires that a buried ring conductor is installed at ground level to link all earth points together for non-conducting structures. This is normally achieved by burying a bare 25mm x 3mm copper conductor in a trench approx. 600mm deep. Please see GT1 MCA item 16 for more details and cost.
4. Where we have detailed the use of a metallic roof then the sheeting must comply with the minimum thickness laid down in Table 3 below. Consideration must be given to possible damage to the roof sheeting should the system suffer a direct strike. If these thicknesses cannot be complied with then a surface roof network of conductors should be considered with a matrix/grid network conforming to the level of protection.
5. **IMPORTANT:** Please advise if this invalidates any warranties issued by the main roofing contractor/supplier. We have **not** included for any fixings to specialist PVC/Rubber membrane roof covering, if so then an additional cost will be incurred. This may apply to the central upper flat roof area and would need the original installers present with the correct fixings,
6. Please see our standard qualifications GT1 MCA attached.

We trust this meets with your approval and await your further instructions.

Yours faithfully

SOUTHERN LIGHTNING ENGINEERS LIMITED



Russell Crittenden
Senior Contracts Manager

Enc.

Southern Lightning Engineers Limited

SPECIFICATION SL37300 (Lightning Protection to BS EN62305:2011/12)

Project Title: Nurstead Hall

Date: 20 June 2023

Project Address: Nurstead Lane, Longfield, Kent, DA3 7AN

Our Quote Ref: RC/TK/SL37300/50101

Author: R. S. Crittenden

Air Network/Air termination:

An air finial will be installed to the summit of the 2no. main chimney stacks with a connection to the main roof level.

A matrix of PVC coated 25mm x 3mm aluminium tape will be run around the pitched roof areas to form a 20m x 20m grid network.

These conductors will now generally be run surface in all areas. Black PVC coated conductor will be used on the slate tiles and White on the facades.

Install link conductors between upper and lower roof levels.

Fixings: (IMPORTANT)

We have allowed to secure to tiles, brickwork, cladding, non-specialist felts and stone at 1000mm intervals using non-metallic direct contact clips.

The roofing contractor is to supply and install fixings to specialist felt and PVC membrane roof coverings at no extra cost to Southern Lightning Engineers.

Please advise if this invalidates any warranties issued by the main roofing contractor/supplier.

Down Conductor(s):

3no. 25mm x 3mm PVC coated aluminium down conductors will be installed. These will be run from the roof network vertically to ground level. They will be secured externally to the main façades of the building at 20m intervals, starting on the main corners.

Fixings:

The aluminium conductors will be secured using non-metallic direct contact clips at 1000mm intervals.

Bonding Connection(s):

We have allowed for :-

3no. bonding connections to metallic items at roof level as required.

NOTE: Bonding to electrical earth bar by others (see Note 3 of GT1 MCA)

NOTE: Bonding to the lift shaft rails by others (see Note 4 of GT1 MCA)

NOTE: Bonding of aerial and sat systems will only be possible if they are in place and safe access is available during our agreed visits to site.

Fixings:

Nut and Bolt using proprietary clamp.

Test Facilities:

3no. via either the 'A' clamp with the inspection pit housings or a stainless steel bi-metallic test clamp at approx. 300-500mm above ground level in each down conductor.

Fixings:

Bolt connection.

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SPECIFICATION SL37300 (Lightning Protection to BS EN62305:2011/12) continued...

Earth Terminations(s):

3no. 2400mm x 16mm diameter earth electrodes housed within lightweight inspection pit covers. Supplied by Southern Lightning Engineers and installed by others.

Joints and Connections:

Proprietary aluminium 'B' Bond clamps and square clamps.

Bonding to Main Electrical Earth:

To be supplied and installed by others.

See Note 3 of GT1 MCA

Bonding to Lift Shaft Rails:

To be supplied and installed by others. NA

See Note 4 of GT1 MCA

Type 1 Lightning Current Arrestors & Surge Protection Devices (SPDs):

To be supplied at additional cost by us (as above) and installed by others.

See above

General Information:

Test Certificates to be issued upon completion.

Log Book information provided for insertion into O M Manuals upon request.

Please see attached GT1 MCA for further qualifications.

The following dimensions must be considered when utilising elements of the building/structure as part of the Lightning Protection System.

The following are taken from Table 3 of the BS EN62305:2011/12 Part 3:-

Class of LPS	Roof Material	Thickness 'a' (mm)	Thickness 'b' (mm)
1 to 4	Lead	-	2.0
1 to 4	Steel (stainless, galvanised)	4	0.5
1 to 4	Titanium	4	0.5
1 to 4	Copper	5	0.5
1 to 4	Aluminium	7	0.65
1 to 4	Zinc	-	0.7

'a' – prevents puncture, hot spot or ignition.

'b' – only for metal sheets if it is not important to prevent puncture, hot spotting or ignition problems.

Please see attached GT1 MCA for further qualifications of tender.

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QUALIFICATIONS OF TENDER

GT1 MCA

1. It is assumed that all builders' work, including excavation/reinstatement for earth terminations, would be provided free of charge by others.
2. It is assumed that all access, i.e. free-standing scaffold (boarded at all levels) or hydraulic platforms, capable of reaching all our working areas, would be provided free of charge by others.
3. It is assumed that bonding between the main earth terminal and the lightning protection system would be by others.
4. We have not included to bond the top and bottom of the lift shaft rails. We have assumed the main lift installation contractor will carry out this work.
5. We have not included to produce any drawings for the project, other than marking-up prints for draughting purposes by others.
6. The electrical cables entering and leaving the building **MUST** be protected by either surge protection or current arrestors to the same level as the LPS and now form and integral part of the system in accordance with the BSEN62305 Parts 1,2,3 & 4 – 2011/12.
7. It is assumed that the structural steelwork and sheeting panels can be utilised as a natural air network with connections to earth terminations at 20 metre intervals. The sheet panels must be a minimum thickness of 0.7mm for Aluminium/Zinc with the external skin fixed directly to the structural steel frame.
8. It is assumed that the metallic roof/wall sheeting can be utilised as a natural air network with connections to earth terminations at ground level only. The metallic roof/wall sheeting must be a minimum thickness as laid out in **special exclusions above** with the external surface that is both electrically and mechanically continuous. A roof network would need to be installed if the minimum dimensions are not met or the client is not prepared to accept damage in the event of a direct strike. This has not been allowed for in the above quotation.
9. We have designed the system in accordance with the attached specification SL37300. However, should the building design change and influence our design then any variations may have an effect upon our price quoted.
10. We have not included for any fixings to specialist PVC/Rubber membrane roof covering. We assume that the main roofing contractor will install these free of charge.
11. Any costs associated with excavation and reinstatement of public highways and footpaths have not been included within this quotation.
12. Should further electrodes be required (In addition to the first 2.4m) then an additional cost of £32.00 + VAT per 1.2m of electrode would be incurred.
13. Should deep driven electrodes not be possible (as detailed in No. 12 above for an additional cost) and further points be required to form an array of electrodes then an additional cost must be assumed.
14. **The BSEN62305:2011/12 recommends that where sensitive electronic equipment is used within the structure then further protection surge protection devices are required on sub-distribution boards and final circuits. This is important to ensure continual running of the equipment in the event of a lightning protection or induced voltages. Please contact us for further information.**
15. When installing the deep earth electrodes every effort will be made to ensure that the ground is checked against as fitted drawings and ground scans for electrical services is done. We will also require that the site management make final decisions as to where the earth electrodes are to be sited. If this help is not forthcoming, it may delay the installation of the said earthing systems. In all cases we cannot be held responsible for any damage should buried services be fouled.
16. Where the reinforced or steel frame structure is utilised the Electrical or Building Contractor is to ensure that steps are taken to achieve both mechanical and electrical continuity from roof to ground level and that overall a continuity of 0.2 ohms or less is achieved to satisfy Para 4.3 or the BSEN62305:2011/12 Part 3. This is best achieved by ensuring either welded, clamped or overlapped joints a minimum of 20 times their diameter and bound securely. The Electrical Contractor is to determine if any supplementary down conductors or clamps are necessary and include for their provisions.
17. Where the protected structure is not conducting (ie, wood, masonry or traditional building methods) it is a requirement of the BSEN62305:2011/12 Part 3, Clause E.5.4.3.4 that a ring conductor is installed between the earth electrodes to ensure interconnection at ground level between the down conductors. This is generally only possible on new build installations and if considered would have an additional cost associated of approx. £350.00 + VAT per earth location.
18. Our quotation is based on standard working hours – Monday to Friday – 8am to 4pm.
19. The above cost for copper tape is based on the London Metal Exchange copper rate of £7800 per 1000kgs (1 tonne). Should there be any variation in the rate we will notify you accordingly at the time of order.
20. Our client and the main contractor are responsible for programming our works. We will generally not attend site unless instructed.
21. If the aerial/satellite system is identified above as being cross bonded, this will only be possible if the equipment is in place during our agreed number of site visits and safe access is available.