Work in proximity to overhead lines

Whenever work is to be carried out in proximity to overhead lines, consideration shall always be given to the possibility of making the line dead, or diverting it around the area affected. All work near live overhead power lines must be fully justifiable and satisfy all three requirements of Regulation 14 of the Electricity at Work Regulations 1989.

The HSE provides guidance for the avoidance of danger from overhead lines in their Guidance Note GS6. The ENAMC shall be prepared to provide, preferably in writing, safety clearances and advice on safe working methods to those working in proximity to overhead lines. Where work can only be carried out safely with the line dead, this shall be the subject of precise written agreement between the ENAMC and site operators.

Horizontal clearances –
Working near but not underneath overhead lines

GS6 recommends that the ENAMC should be contacted for advice for any work within 10 m, measured at ground level horizontally from below the nearest overhead line. For steel tower overhead lines, a larger horizontal clearance of 15 m is adhered to.

GS6 recommends the erection of safety barriers to establish a safety zone parallel to the overhead line to maintain clearance from it. The table "Horizontal distance to safety barriers" below details typical minimum values for horizontal separation of the overhead lines and safety barriers.

Horizontal distances to safety barriers						
Description	Clearance (m)					
	<33kV Wood Pole	66kV Wood Pole	132kV Wood Pole	132kV Tower	275kV Tower	400kV Tower
Minimum horizontal distance to safety barrier	6.0	6.0	6.0	9.0	12.0	14.0
NOTE: Site conditions will dictate whether this clearance is adequate and consideration shall be given to line parameters, e.g. span length, maximum sag etc. when calculating an actual clearance.						

Vertical passing clearances –
Passing underneath overhead lines on work sites

GS6 specifies the use of passageways where plant or vehicles have to pass underneath the overhead line at the work sites.

Plant or vehicles passing underneath overhead lines must not breach the safety clearance distance. The table "Vertical passing clearances" below details these passing clearances.

The vertical clearances given in table below are minimum clearances and must not be infringed under any circumstances. Greater vertical clearances shall be specified for vehicles which may not be of fixed height by virtue of: ground level variability; the nature of the load and the operations carried out by the vehicle.

Vertical passing clearances					
Description	Clearance (m)				
	<33kV	66kV	132kV	275kV	400kV
Passing clearance fixed height loads	0.8	1.0	1.4	2.4	3.1

The above clearances shall be used to determine the maximum distance to the underside of the passageway crossbar/rope erected to prevent vehicles or plant from infringing these clearances whilst traversing the line. The maximum height to the underside of the crossbar/rope shall be the minimum ground clearance of the line less the specified passing clearance.

It is important that the minimum ground clearance of the line is determined at the specified maximum conductor temperature, when specifying the passageway height.

Vertical clearances –
On sites where work will be undertaken beneath the line

Work beneath the line shall be deemed to be any work carried out within the minimum horizontal distances specified in the "Horizontal distances to safety barriers" table above or the calculated distance (see NOTE) whichever is greater.

GS6 provides recommendations for working under the line and describes two general cases: ground-level work and erection of buildings or structures close or underneath an overhead line. Exclusion zones from the overhead line are stipulated for the various voltages.

GS6 recommends that the ENAMC should be consulted when there is doubt about the use of the exclusion zones. In the cases where the exclusion zone may be breached, it is imperative that the clearances maintained shall satisfy "Vertical passing Clearances" Table above.

Work at ground-level only

Where work is carried out at ground-level the passing clearance of fixed height loads is permissible, as GS6 requires that no vehicle, item of plant, ladders or poles shall reach beyond the safe clearance limit. Where plant such as cranes and excavators has the capability to reach into the safe clearance limit it shall be fitted with a physical restraint in order to prevent such action.

GS6 requires that all such work shall be "directly supervised by someone who is familiar with the risks"

Work on buildings or structures close to or underneath an overhead line

This work includes erection of permanent and temporary structures as specified by GS6. A horizontal physical barrier should be erected to form a roof between the area of work and the overhead line such that the safe clearance limit cannot be infringed. The distances in the table "Vertical passing clearances" above, Item 1 shall be treated as a minimum necessary clearance and shall be used to calculate the height of the underside of the physical barrier. Where a conductive material is used to form the barrier this shall be earthed. The line shall be made dead if, during the erection of the physical barrier, safety clearances would be infringed.

Clearances to objects

Clearances to objects shall be maintained such that under no circumstances will the 'safety distance', as quoted in the Distribution Safety Rules, be infringed. This condition shall apply to both fixed objects and to any temporary objects that can be placed on or adjacent to fixed objects, for example a ladder against a building, or a mobile platform adjacent to a street lighting column. Clearances to objects shall be maintained under all likely line conditions, i.e. at maximum and minimum sag and with conductors hanging in still air and deflected due to wind. The two most probable conditions relative to objects are set out below.

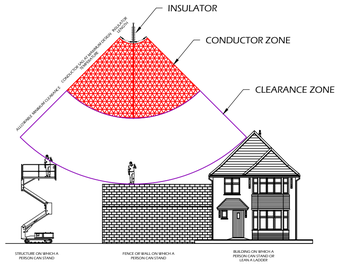
Normal clearance

This is the distance between the conductor at maximum sag hanging vertically or deflected by any angle up to 45˚ and an object. It is not normal to permit any object to be placed above an electric line. If a person can stand on the object or any temporary object adjacent to it, then the normal clearance shall include an 'application factor' of 2.2 m to allow for the person to move their arm whilst holding a short metallic object. Should it be necessary for a person to move their arm whilst holding a longer object, then this normal clearance may have to be increased by a distance of up to the length of the object.

Passing clearance

This is the minimum distance between the conductor at maximum sag hanging vertically or at an angle of up to 45˚ towards an object and the object itself when it is moving relative to the line. The passing clearance therefore does not normally require an 'application factor' since it is intended for objects which are moving, and on which no person may be able to stand, relative to the line. This clearance can also be applied to any object when there is no likelihood of any temporary platform being situated adjacent to it.

Derivation of normal and passing clearances					
Description	Clearance (m)				
	<33kV	66kV	132kV	275kV	400kV
Normal Clearance	3.0	3.2	3.6	4.6	5.3
Passing Clearance	0.8	1.0	1.4	2.4	3.1

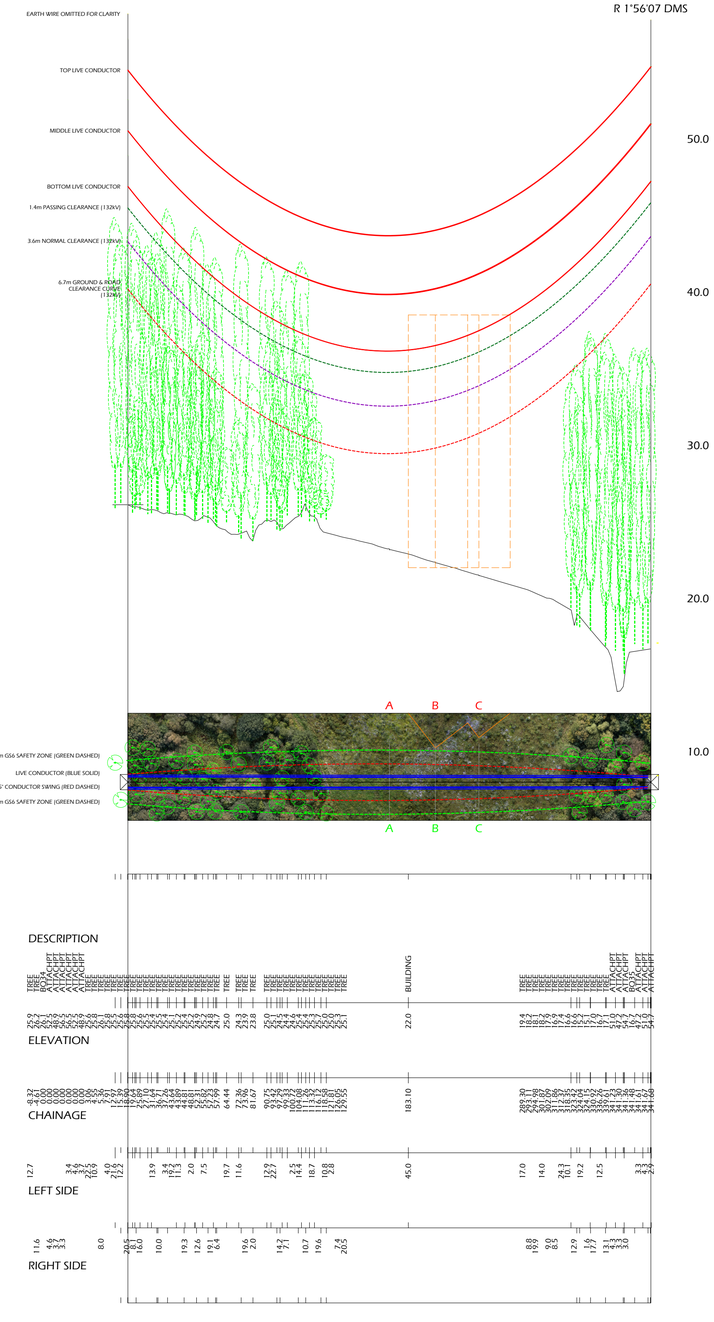


LYNX 36kN PL16
TEMP. 75.00 deg C ,WEIGHT bare
SECTION 341.31 metres
TENSION 11.50 kN
EQUI. SPAN 341.31 metres

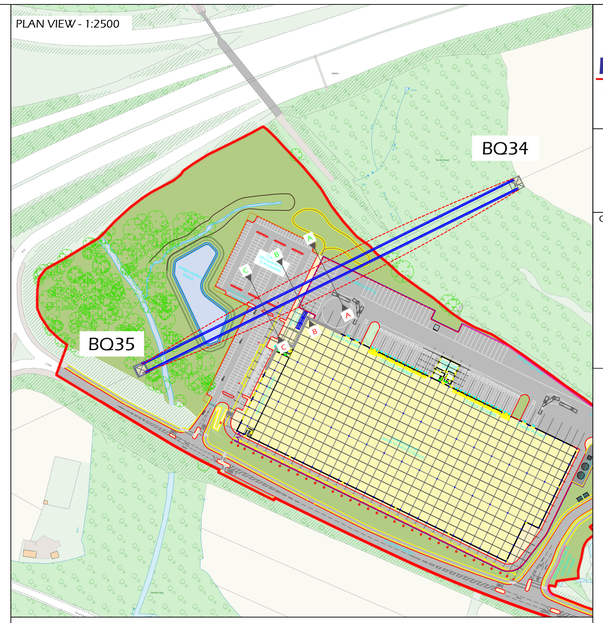
SPAN 341.31
SAG 10.90

BQ34
TOWER
PL16 D2(S) E20˚
(0-2)

BQ35
TOWER
L4(m) D E12
(0-10)
R 1°56'07 DMS

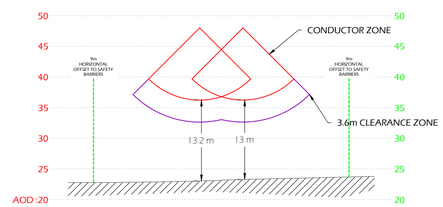


PLAN VIEW - 1:2500

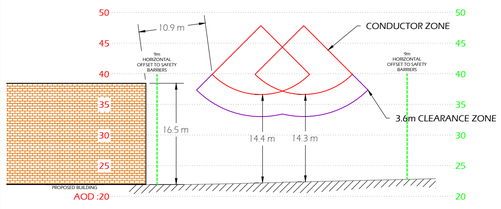


SECTION VIEW - 1:500

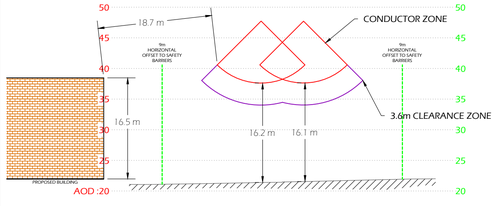
SECTION A



SECTION B



SECTION C



THE LAW

The Health and Safety at Work etc Act 1974 (HSW Act) places responsibilities on everyone concerned with work activities, including employers, the self-employed and employees.

The Management of Health and Safety at Work Regulations 1999 require that:

- risks are properly assessed and controlled;
- employees are provided with adequate health and safety training;
- employers who share a workplace consult and co-ordinate with each other.

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integra consulting

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CDM ADVICE

- ONLY COMPETENT CONTRACTORS SHALL BE APPOINTED TO UNDERTAKE THIS WORK.
- THIS DRAWING IS TO READ IN CONJUNCTION WITH PROJECT SPECIFICATION AND ANY OTHER ASSOCIATED DOCUMENTS ISSUED BY THE CLIENT.
- CONTRACTORS SHALL CONSIDER ALL PHASES OF WORK AND ENSURE SAFETY RULES ARE ADHERED TO AND MEASURES TO MITIGATE RISK ARE TAKEN.
- CONTRACTOR SHALL ADHERED TO ALL MANUFACTURES GUIDELINES AND INSTALLATION PROCEDURES.
- CONTRACTOR SHALL HAVE ASSESED RISKS AND USE SAFE WORKING METHODS TO COMPLY WITH CURRENT HEALTH AND SAFETY LEGISLATION AND CDM REGULATIONS.

CONDUCTOR DETAILS

Units:	Metric	Load case 1. Max Work Tension	
Conductor:	LYNX 36kN PL16		
Mnemonic:	LY36	Tension:	36 kN
Type:	(1)	Temp:	-5.6 deg C
Basis tensions	loadcase defined	Wind pres:	0.38 kN/m2
Wt loaded:	0.026106 kN/m	Rad. ice:	12.5 mm
Wt bare:	0.008598 kN/m	Wt loaded:	0.026106 kN/m
Wt iced:	0.01988 kN/m	Wt winded:	0.016921 kN/m
Wt winded:	0.011357 kN/m	Min wt span:	49 ?
Wind pres:	0.38 kN/m2	Max wt span:	49 ?
Rad. ice:	12.5 mm	Transverse:	51 ?
Area:	226.2 sq.mm	Longitudinal:	49 ?
Diameter:	19.53 mm	Load case 2. Every Day Stress	
Cold temp:	-5.6 deg C		
UTS:	79.8 kN	Tension:	16 kN
Reduced:		Temp:	15 deg C
Tension:	4.5 kN	Wt loaded:	0.008598 kN/m
Temp:	-5.6 deg C	Load case 3. Erection Tension	
Weight:	Wt bare		
Erection: By temperature shift		Tension:	22 kN
Temp:	20 ^deg C	Temp:	-20 deg C
For spans <=	236 metres	Wt loaded:	0.008598 kN/m
Tension:	22 kN		
Temp:	-20 deg C		
Weight:	Wt bare initial		
For spans <=	263 metres And for spans > 236 metres		
Tension:	16 kN		
Temp:	15 deg C		
Weight:	Wt bare initial		
And for spans >	263 metres		
Tension:	36 kN		
Temp:	-5.6 deg C		
Weight:	Wt loaded initial		
initial			
Young's modulus	84 kN/mm2		
Coeff. expansion	1.8e-005 /deg C		
C1 (sqrt(YA/24))	28.1372 sqt.kN		
C2 (YEA)	0.342014 kN/˚C		
final			
Young's modulus	84 kN/mm2		
Coeff. expansion	1.8e-005 /deg C		
C1 (sqrt(YA/24))	28.1372 sqt.kN		
C2 (YEA)	0.342014 kN/˚C		
Erection temps	0,5,10,15,20,25 deg C		

CLEARANCE CURVE & TEMPERATURE

6.7m @ 75° C
MAXIMUM DESIGN TEMPERATURE

STATUS	REVISION	SCALE
INFORMATION	A	V1:200 H1:2000 VP Locked - YES

DRAWN	CHECKED	APPROVED	DATE PLOTTED
Peter Jones	Sadie Jones	Peter Jones	28.09.2023

LOCATION

CRONTON

TITLE

SWING CLEARANCE STUDY

BQ34 - BQ35 132kV OVERHEAD LINE

DRAWING NO.	PAGE	
LDT-451-BQ-SWING-001	1 of 1	A1

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