

Phone: (02) 9553 1857
Postal Address: PO BOX 910
HURSTVILLE NSW 1481
ABN: 33160935142

OVERHEAD POWER MAINS ASSESSMENT

Summer Hill, 74 Carlton Cres



Document History

Revision	Date	Approved By	Revision Details
Final 1.0	21.06.2019		
Final 2.0	18.07.2019		

DISCLAIMER

This Overhead Mains Clearance assessment is subject to an ongoing review, the information in this document may be amended at any time by the Author, AA Power Engineering. This document has been developed using information available from Batesmart Architects, LTS Lockley surveying, Sydney Trains and other sources and is intended to be applicable to the overhead mains in relation to the proposed structures and building/construction works.

AA Power Engineering disclaims any and all liability to any person or persons for any procedure, process or any other thing done or not done, as a result of this overhead power mains assessment. This assessment is both a guide and awareness mechanism. Industry safety standards must be adhered to at all times. This report is to be revisited upon any changes to the plans issued by Bates Smart Architects on 21/6/2019.

INTERPRETATION

If, in the event that a user of this Overhead Power Mains Assessment is uncertain about any information or provision, the user should request clarification from AA Power Engineering.

Contents

SCOPE	4
BLOWOUT DESIGN AND CALCULATIONS.....	5
CONCLUSION.....	8
AS7000	8
Table 1: AS7000 Compliance.....	9
COMPLIANCE WITH AS7000	9
ISSC 20.....	10
SMS-06-GD-0268.....	11
COMPLIANCE WITH SMS-06-GD-0268.....	13
SUMMARY AND COMPLIANCE WITH RELEANT TRANSPORT FOR NSW ASSET STANDARDS AND AUTHORITY STANDARDS/GUIDELINES	14

SCOPE

This assessment is to address blow out calculation as requested by Iglu, in response to a Transport Sydney Trains request. The assessment is based on a proposed development at 74 Carlton Crescent, Summer Hill. 11kV Sydney Trains mains exist adjacent the property boundary along Carlton Crescent (front of site).

This assessment only takes into consideration Sydney Trains Mains. The assessment is based on:

- Batessmart Architects plans - 21/06/2019
- LTS Lockley surveying – 17/09/2018
- Site visit and assessment – 7/05/2019
- Sydney Trains provided information – 7/06/2019

The report aims to address the impact of the development on Sydney Trains overhead power mains located along the front property boundary. No other impacts or technical assessments were addressed other than those relating to existing Sydney Trains overhead mains.

The assessment was based on clearances of proposed building structure to Sydney Trains mains along the northern property boundary of the development, to assess compliance with below standards:

- Compliance with AS 7000
- Compliance with ISSC 20, Guideline for the management of activities with Electrical Easements and Close electrical infrastructure.
- Compliance with SMS-06-GD-0268 – Working around electrical equipment
- Compliance with relevant Transport for NSW Asset Standards Authority standards/guidelines

Regarding the construction methodology, the nominated builder is to prepare a construction management plan if requested by Sydney Trains to show compliance with the above nominated standards and policies. Additional to the above standards and policies the construction management plan is to also comply with the following code and guide.

- Work Cover “Work Near Overhead Power Lines” Code of Practice 2006
- Australian Standard “AS/NZS 4576:1995 Guidelines for scaffolding”



Proposed Development Site along Carlton Cres

BLOWOUT DESIGN AND CALCULATIONS

Conductor blowout is the horizontal ‘sag’ or deviation of powerline conductors from the central position, caused by wind forces.

A blowout calculation is required to determine the distance/clearance of existing Sydney Trains 11kV Feeder 622 between poles No.10, 11 and 12 along the eastern side of the proposed development, to the closest point of the proposed structure.

The span which effects the proposed building structure is between poles 10 and 11.

Blowout calculation specifications

11kV Feeder: 11kV Feeder (622) – Conductor 7/2.75 HDBC

Span Reference: Between Poles 10 & 11

Span Length: 76m

Blowout at 50 °C = 840mm



Sydney Trains Pole 10



Sydney Trains Pole 11



Development Site – Sydney Trains mains along rear of site

BLOWOUT CONCLUSION

Due to the design of the proposed building and arrangement of the existing spans, the maximum determined blowout is for centre of the 76m span (38m), from pole 10 to 11. Maximum exaggerated blowout at the Eastern boundary of development is 840mm for the 11kV feeder. The northern boundary was determined to be the location of the closest point between the proposed structure and the existing 11kV feeder once blowout had been taken into consideration. The existing structure to be retained has not been considered in this blow out calculation.

After taking blowout into consideration at the location of the existing overhead mains, the minimum radial clearance to proposed building structure for 11kV is 3218mm (see attached appendix A).

AS7000

AS/NZS 7000:2010 – Overhead line design – Detailed procedures: This standard has been prepared by the AN/NZS committee to provide an industry standard for overhead line design. The standard goes through extensive and detailed overhead line design in which majority of details are not required for the findings of this report. In this situation we are assessing existing power lines in relation to a new building development. AAPE have applied the guidelines in Section 3 “Electrical Requirements” part 3.11.2 “Clearances to buildings, other lines and recreational areas”, and particularly 3.11.2.1 “Structures and Buildings”

The approach taken to determine the findings was a reverse engineering approach. AAPE have used the survey information of existing overhead power mains along with a site investigation and assessed the site based on the DA Plans and other relevant information against the AS7000 standard.

Findings as per Table 3.8 “Clearances from structures” under section 3.11.2 “Clearances to buildings, other lines and recreational areas” are listed below:

Clearance of nearest conductor to proposed structures. (determined taking exaggerated blowout into consideration)	Minimum clearance to Conductor - Up to 33kV	Outcome by applying Table 3.8 in AS7000	Findings
1. Vertically above those parts of any structure normally accessible to persons	4.5m	The overhead power mains are not above any building structures; therefore, this restriction does not apply.	Complies
2. Vertically above those parts of any structure not normally accessible to persons but on which a person can stand	3.7m	The proposed structures are clear to air within the 3.7m restriction zone, with no electrical conductor. This clearance requirement also requires compliance to extend outwards in an arc taking into account dimension in 3 below.	Complies
3. In any direction (other than vertically above) from those parts of any structure normally accessible to persons but on which a person can stand	2.1m	Closest conductor in worst case scenario to building is more than 2.1m clear of any structure normally accessible to persons but on which a person can stand.	Complies
4. In any direction from those parts of any structure not normally accessible to persons	1.5m	As Above.	Complies
5. In any direction from ground	5.5m	Conductor more than 10m from the ground.	Complies

Table 1: AS7000 Compliance

COMPLIANCE WITH AS7000

Taking a reverse engineering approach, findings show clearances of overhead 11kV Sydney Trains mains to proposed new building structure complies with AS7000. The findings are based on the nearest 11 kV overhead conductor phase to proposed structures, considering exaggerated blowout.

ISSC 20

ISSC 20 - Guideline for the Management of Activities within Electricity Easements and Close to Electricity Infrastructure. As the name implies the ISSC 20 document is a guideline document to manage works close to electricity infrastructure and as defined in the scope of the document:

- Ensure public safety
- Minimise the likely impact of structures or other impediments on electricity easements and infrastructure
- Maintain unimpeded access to electricity easements and infrastructure for the purposes of the electricity network operators
- Define responsibilities of developers, property owners and occupiers, consent authorities and proponents with respect to activities close to electricity easements and infrastructure.

As per section 5 of ISSC 20, approval from the Sydney Trains must be sought for any works deemed within close vicinity to its electricity infrastructure. This assessment is a request to seek approval from Sydney Trains for works within close vicinity to the 11kV overhead mains within the development property.

As mentioned above, the electrical infrastructure of relevance is the overhead 11kV mains running along the northern property boundary. Section 7 of the ISSC 20 document states that a clearance distance of 5m (minimum) from conductors taking blow-out into consideration for a typical span. In this instance we have a clearance to the proposed building of approx. 3218mm as per Appendix A (closest point between the structure and blow out). Due to this clearance non-compliance we are seeking formal approval from Sydney Trains for this non-compliance. Other standards such as AS7000 are in compliance. Construction of the structure will be mitigated with appropriate power outages and separation protection installation as per the section below.

SMS-06-GD-0268

SMS-06-GD-0268 is a NSW Transport System Guide to working around Electrical equipment. The guide is quite thorough in detailing the hazards associated with working around electrical apparatus and the procedures required to eliminate the risk or minimise risk as far as is reasonably practicable.

For purposes of this report and the proposed building structure within close vicinity to the 11kV overhead mains, we have assessed the proposal in taking into consideration:

- Section 3 (Summary of Safe Approach Distances)
- Section 11 (Safe Approach Distances)
- Appendix B Temporary Structures around Electrical Equipment

Section 3/Section 11 (Summary of Safe Approach Distances “SADs”)

- Table 1: Minimum Safe approach distances for *nominal voltage* above 11,000V up to and including 33,000V is 3m for non-accredited persons. Minimum approach distance for personnel is likely to be encroached, being within 3m during construction. The structure is 3.218m from the conductor in the worst-case location. Conductor blow out has been considered in this calculation. Compliance has not been achieved in relation to SAD's and therefore mitigation for this issue will be required as per the below section. As previously mentioned, once construction has been completed, AS7000 is compliant in all proposed structure locations.

Appendix B Temporary Structures Around Electrical Equipment

- Table A – Minimum Safe Approach Distances for a Temporary Structure / Temporary Structure Work and Live Exposed Electrical Equipment unless performed under an Electrical Permit is 4m. This is based on a conductor span of 125m or less. The applicable conductor span is less than 125m therefore Table A is applicable. By assuming industry standards for similar developments applying scaffolding width of 1m, we have determined this distance will be encroached. Scaffold will require mitigation as per section 5.3.3 states. *“Separation - Where it is not reasonably practicable to eliminate the risk, the next level of control is to separate the hazard. This can be achieved by:*

- *setting up equipment so that it or any load or work piece cannot encroach on the minimum SAD.*
- *using alternative equipment that cannot encroach on the minimum SAD.*
- *using hard (solid and rigid and capable of withstanding foreseeable forces) barriers and/or movement restriction devices, such as mechanical stops/constraints, interlocking devices or control devices, to prevent movement of plant, equipment or persons into the minimum SAD”.*

Areas where scaffold must be covered has been shown in Appendix B – 4m Temporary Structure Restriction.

To provide compliant separation, we refer to Work Cover “Work Near Overhead Power Lines” Code of Practice 2006. Section 6 of this particular Work Cover standard provides information on potential ways to mitigate scaffolding breaching the minimum safe approach distance of 4m as per item 2 – *“Separating the hazard. This could mean erecting a physical barrier on the scaffold to prevent a person or anything held by a person, or attached to the person, encroaching with the 4-metre approach distance”.*

Section 6 of the Work Cover code of practice describes the requirements for the use of hoarding/enclosure over temporary structures including scaffold. Firstly, the 11kV feeder will need to be de-energised for all scaffold installation within the 4m SAD. The Sydney trains network operator will need to be contacted for this arrangement to be made. The following conditions must be adhered to in order to achieve compliance:

- All gaps between sheets of plywood used to cover scaffolding may not exceed 3mm.
- There are to be no exposed cut or drilled holes in ply-wood sheets.
- Scaffold erector is responsible for attaching the plywood sheets to the scaffold and must ensure the completed arrangement can withstand high wind load/conditions.
- Warning signs must be appropriated installed to the inner/safe side of the scaffold, warning that the hoarding/plywood must not be removed due to the electrical hazard on the opposite side.
- A competent person must visually inspect the hoarding and enclosure daily to ensure the hoarding and enclosure is in a compliant condition and is impenetrable.
- If the hoarding is not in a satisfactory condition, work must stop immediately, and appropriate safety measures completed (fix hoarding separation protection under 11kV

mains power outage). The nominated builder is to ensure this is satisfactory to work cover requirements.

- Ply must be minimum 9mm thick marine ply or 17mm thick concrete form ply, securely fixed to the face of the scaffold. No supports are to be attached to any nearby Sydney Trains poles, as per figure 12 (*Work Cover “Work Near Overhead Power Lines” Code of Practice 2006*).

NOTE: The top of all scaffold must also be enclosed as per above requirements, not just the northern face of the scaffold.

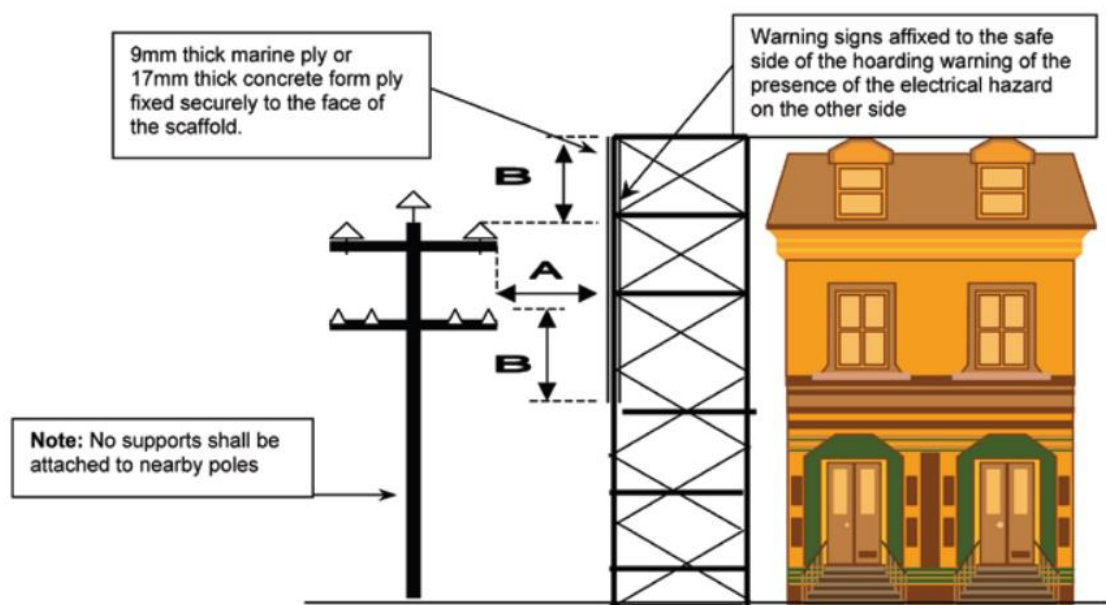


Figure 12 – Scaffolding with hoarding

No scaffold is permitted within 1.5m of maximum blow out, regardless of if the scaffold has been covered, as per item B.5.2.1 table B. Structure is required not to infringe the 1.5m SAD – Refer to Appendix C.

COMPLIANCE WITH SMS-06-GD-0268

The clearance between the proposed building structures and Sydney Trains overhead conductor's, taking blowout into consideration is approx. 3.218m. Minimum safe approach distances for personnel and tools of 3m, and scaffolding clearances to temporary structure of 4.0m minimum, are required for the structure to be constructible. Based on the above,

compliance is not achieved for personnel restrictions, with scaffold/temporary structure restrictions requiring mitigation as per the above in order to obtain compliance, pending Sydney Trains approval. The above-mentioned mitigation measures are to be appropriately reflected in the construction management plan.

SUMMARY AND COMPLIANCE WITH RELEANT TRANSPORT FOR NSW ASSET STANDARDS AND AUTHORITY STANDARDS/GUIDELINES

Combined with industry norms and practices, this report has been based on the following references and standard guidelines being:

- AS 7000
- ISSC 20
- SMS-06-GD-0268
- Work Cover “Work Near Overhead Power Lines” Code of Practice 2006
- Australian Standard “AS/NZS 4576:1995 Guidelines for scaffolding”;

The radial clearances between 11kV overhead power lines and the proposed building structure at 74 Carlton Crescent are compliant with the minimum clearance distances required in AS7000. Breaching of ISSC20 and SMS-06-GD-0268 has been mitigated as per Work Cover Code of Practice. We are seeking approval from Sydney trains for the implementation of these mitigation measures in accordance with Work Cover “Work Near Overhead Power Lines” 2006.

Mitigation measures are to be appropriately reflected in the construction management plan.

This report has found the proposed final development structure to be compliant with AS7000 subject to the above documents, standards, guidelines and due diligence being implemented and Sydney Trains approval.

The outcome is based on the architectural plan with blowout shown in Appendix A & B. This applies to existing overhead span between poles 10 and 11 (11kV feeder 622).