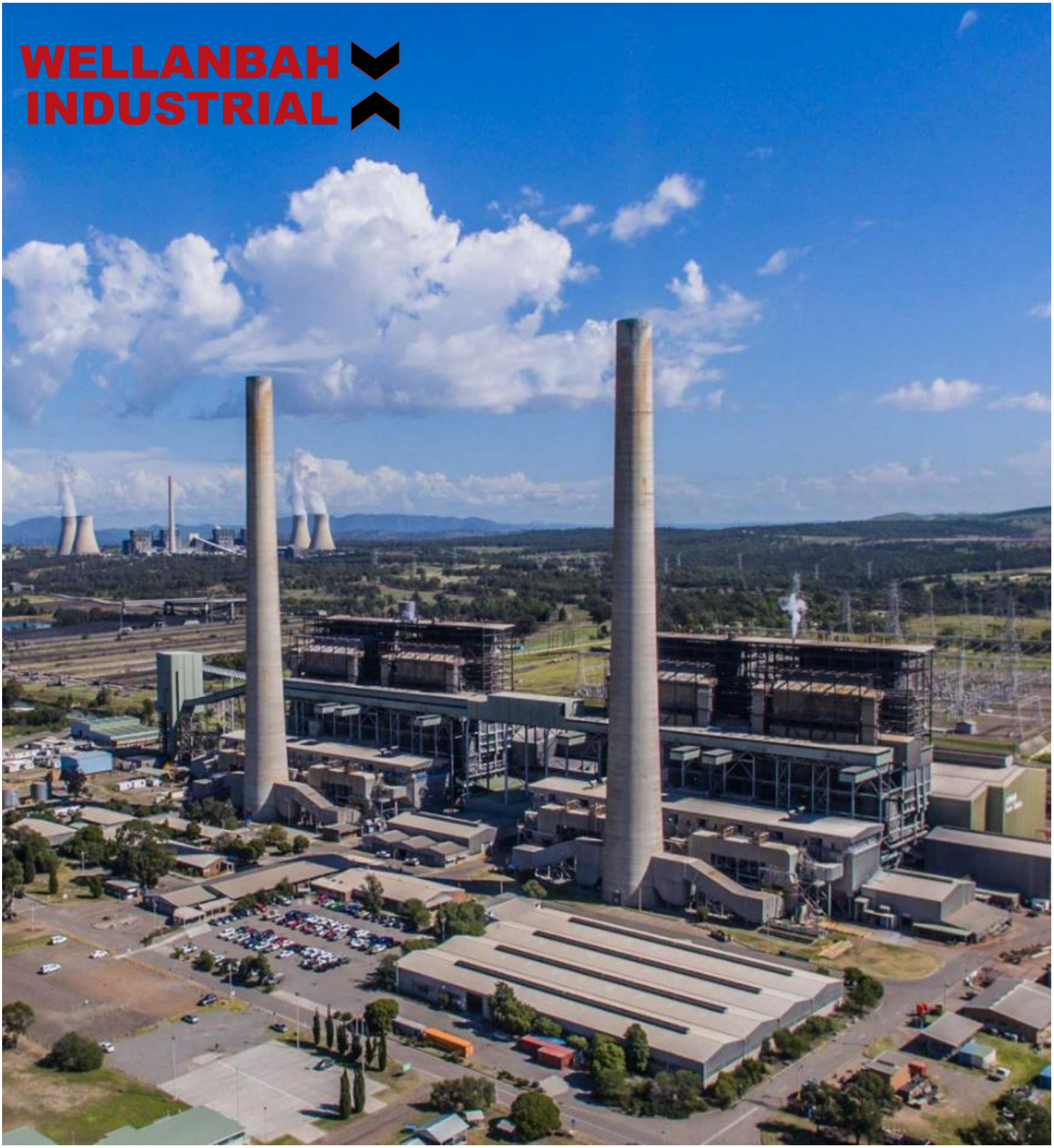
WELLANBAH INDUSTRIAL



BLAST MANAGEMENT SUB-PLAN

LIDDELL POWER STATION CHIMNEY STRUCTURES - DEMOLITION

WI-BMSP-W057-001 – REV 5

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DOCUMENT REVISION STATUS

REV	DATE	DESCRIPTION OF CHANGE	WRITTEN BY	REVIEWED BY
0	6/06/25	INITIAL ISSUE OF MANAGEMENT PLAN	D. HEALY	B. HEALY
1	17/09/25	UPDATES FOLLOWING THIRD PARTY REVIEWS	D. HEALY	B. HEALY
2	4/11/25	FURTHER UPDATES FOLLOWING THIRD PARTY REVIEWS	D. HEALY	B. HEALY
3	31/03/26	UPDATED POWDER FACTOR FOLLOWING TEST BLASTS & DUST SUPRESSION	D. HEALY	B. HEALY
4	24/04/26	FINAL BMSP UPDATES FOLLOWING REVIEW	D. HEALY	B. HEALY
5	8/05/26	UPDATES FOLLOWING DPHI REVIEW	D. HEALY	B. HEALY

SHOTFIRER SIGNOFF

DATE OF BLAST	SHOTFIRER NAME	SIGNATURE

TABLE OF CONTENTS

1 DOCUMENT PURPOSE 7

1.1 COMPLIANCE WITH CONDITIONS OF CONSENT 7

2 INVESTIGATION OF STRUCTURE 15

2.1 MATERIALS OF CONSTRUCTION 15

2.2 STRUCTURAL SYSTEM AND SEQUENCE OF CONSTRUCTION 16

2.3 STRUCTURAL STABILITY 19

2.4 SERVICES 19

2.5 GENERAL CONDITION DETAILS 19

2.6 CONFINED SPACES 19

3 INVESTIGATION OF SITE 20

4 LEGAL STATUS REVIEW 22

5 DEMOLITION METHOD ASSESSMENT 23

5.1 DEMOLITION METHOD 23

5.2 STRUCTURAL ASSESSMENT 25

6 BLAST DESIGN ASSESSMENT 26

7 BLAST PLAN 27

7.1 LOCATION OF PROPOSED BLASTING 27

7.2 DESCRIPTION OF PROPOSED BLASTING 28

7.3 PERMITS / LICENSES REQUIRED FOR THE PROJECT 28

7.4 KEY APPOINTMENTS AND RESPONSIBILITIES 29

7.5 SHOTFIRER'S DETAILS 29

7.6 DETAILS OF THE RISK MANAGEMENT ASSESSMENT 30

7.7 DETAILS OF ADJACENT STRUCTURES OR SERVICES THAT INFLUENCE THE BLAST DESIGN 30

7.8 DETAILS OF REPORTS, DRAWINGS AND RECORDS CONSULTED 30

7.9 LAYOUT PLAN OF THE BLAST 31

7.10 DETONATION SEQUENCE / EFFECTIVE CHARGE MASS PER DELAY (MIC) 34

7.11 TYPE OF EXPLOSIVE TO BE USED AND QUANTITY REQUIRED 36

7.12 METHOD OF INITIATION 36

7.13 TYPE OF FIRING EQUIPMENT AND PROCEDURES 37

7.14 DRILLING PROCEDURES 37

7.15 EXPLOSIVE LOADING AND CHARGING PROCEDURES 37

7.15.1 QUALITY CONTROL PROCESS 38

7.16 EXPLOSIVE STORAGE AND HANDLING PROCEDURES 38

7.17 SECURITY PROCEDURES FOR THE SITE AND THE BLAST, INCLUDING EXPLOSIVES 40
7.18 ENVIRONMENTAL CONSIDERATIONS FOR AIRBLAST OVERPRESSURE, GROUND VIBRATION, FLY AND DUST 41
7.19 CONTROL MEASURES FOR ENVIRONMENTAL EFFECTS 50
7.20 MONITORING PROCEDURES FOR AIRBLAST OVERPRESSURE, GROUND VIBRATION AND DUST 51
7.21 DETAILS OF COMMUNICATION SYSTEMS & PLACEMENT OF WARNING SIGNS 52
7.22 WARNING / SIGNALLING PROCEDURES 53
7.23 TRAFFIC MANAGEMENT PLAN 54
7.24 PROPOSED DATES AND TIMES OF BLASTING 54
7.25 DETAILS OF EXCLUSION ZONE 55
7.26 METHOD OF NOTIFICATION / CONSULTATION TO OWNERS AND OCCUPIERS OF STRUCTURES, AND PROVIDERS OF SERVICES ADJACENT TO BLAST 56
7.27 PROTECTION OF SERVICES 57
7.28 INFLUENCE OF WEATHER 57
7.29 LOADING IN POOR LIGHT CONDITIONS OR REDUCED VISIBILITY 58
7.30 CESSATION OF EXPLOSIVE-RELATED ACTIVITIES DURING ELECTRICAL STORMS 58
7.31 EVACUATION PROCEDURES 58
7.32 CROWD CONTROL 58
7.33 PRE-BLAST FINAL INSPECTION 59
7.34 MISFIRE MANAGEMENT SYSTEM & CONTINGENCY PLAN 59
7.34.1 WAITING INTERVAL 59
7.34.2 MISFIRE TREATMENT PROCEDURES 60
7.35 POST BLAST ASSESSMENT AND INSPECTION PROCEDURES 61
7.36 PROVISION FOR POST-BLAST COMMENTS 63
7.37 BLAST PLAN SIGN OFF 63
8 STAKEHOLDER NOTIFICATIONS & CONSULTATION 64
8.1 STAKEHOLDER NOTIFICATIONS 64
8.2 CONSULTATION WITH PRIVATE LANDOWNERS OR INFRASTRUCTURE OWNERS 64
8.3 CONSULTATION FOR ROAD CLOSURES 64
8.4 CONSULTATION WITH SAFEWORK NSW 65
8.5 CONSULTATION WITH DEPARTMENT OF PLANNING, HOUSING AND INFRASTRUCTURE 65
9 COMPLIANCE NOTIFICATIONS, INCIDENT NOTIFICATIONS AND REVISIONS 66
9.1 COMPLIANCE AND NON-COMPLIANCE NOTIFICATIONS 66
9.2 INCIDENT NOTIFICATIONS 66
9.3 REVISIONS 66
APPENDIX A – BLAST DAY RECORD SHEET 67

APPENDIX B – BLAST DESIGN 82
APPENDIX C – ENGINEERING REPORT 89
APPENDIX D – TECHNICAL DATA SHEETS 256
APPENDIX E – PERSONNEL QUALIFICATIONS 272
APPENDIX F – INSPECTION TEST PLAN 284
APPENDIX G – SAFE WORK METHOD STATEMENT 298
APPENDIX H – BLAST MONITORING LOCATIONS 313
APPENDIX I – AIRBLAST OVER PRESSURE CONTOURS AND SENSITIVE RECEIVERS 319
APPENDIX J – VIBRATION CONTOURS AND SENSITIVE RECEIVERS 322
APPENDIX K – LICENCED OFFSITE STORAGE FACILITY DETAILS & TRANSPORT VEHICLE CERTIFICATIONS 325
APPENDIX L – TRIGGER ACTION RESPONSE PLAN – LIGHTNING AND HIGH WIND 345
APPENDIX M – MAGAZINE RULES 347
APPENDIX N – CUTTING - DRILLING - CHARGE LOADING QUALITY CONTROL SCHEDULE - WI-QC-057-001 349
APPENDIX O – INNER EXCLUSION ZONE DRAWING 352
APPENDIX P – CHIMNEY BLASTING WORKS PROGRAM - SIMPLIFIED 354
APPENDIX Q – SENTRY / EXCLUSION ZONE AERIAL MAP 356
APPENDIX R – LIDDELL CHIMNEY BLAST – CLIENT CHECKLIST: WI-QC-057-002 370
APPENDIX S – ROSE PE REVIEW LETTER AND KEY PERSONNEL CV 374
APPENDIX T – CDI REVIEW LETTER AND KEY PERSONNEL CV 386
APPENDIX U – WGA REVIEW LETTER 389
APPENDIX V – DUST CONTROL MEASURES OVERVIEW 398
APPENDIX W – GROUND PROTECTION MEASURES OVERVIEW 400
APPENDIX X – TRAFFIC MANAGEMENT PLAN / TRAFFIC MANAGEMENT CONTROL PLANS / ROAD OCCUPATION LICENSE 402
APPENDIX Y – LIDDELL STACK AND BOILER HOUSE DEMOLITION: AIR QUALITY MANAGEMENT SUPPORT (ERM) 496
APPENDIX Z – ASBESTOS CONTROL PLAN – LIDDELL STACK FELLING(PRENSA) 623
APPENDIX AA – CONSULTATION RECORDS 765
APPENDIX AB – ENVIRONMENTAL RISK ASSESSMENT 779

TABLES

TABLE 1: CONSENT CONDITION COMPLIANCE SUMMARY 7
TABLE 2: LEGAL REQUIREMENTS CHECKLIST 22
TABLE 3 – PERMIT AND LICENSE REQUIREMENTS 28
TABLE 4 – ROLES AND RESPONSIBILITIES 29
TABLE 5 – SHOTFIRER'S DETAILS 29
TABLE 6 – MAXIMUM INSTANTANEOUS CHARGE 34
TABLE 7 – AIR OVER PRESSURE VALUES AT VARIOUS DISTANCES 42
TABLE 8 – AIR OVER PRESSURE VALUE AT SENSITIVE / CRITICAL RECEIVERS 43
TABLE 9 – ASSESSED VIBRATION AT VARIOUS RADII – PEAK PARTICLE VELOCITY 46
TABLE 10 – VIBRATION VALUES AT SENSITIVE / CRITICAL RECEIVERS 47
TABLE 11 – VIBRATION LIMITS AS PER AS2187.2-2006 48
TABLE 12 – ENVIRONMENTAL RISK ASSESSMENT CONTROLS 51
TABLE 13 – PROPOSED DATES AND TIMES 54
TABLE 14 – MISFIRE PROCEDURES 60
TABLE 15 – POST-BLAST INSPECTION REQUIREMENTS 61
TABLE 16 – RATING PROCEDURE FOR POST-BLAST FUMES 61

FIGURES

FIGURE 1 – CROSS SECTION OF CHIMNEY 17
FIGURE 2 – ELEVATION OF CHIMNEY 18
FIGURE 3 – AERIAL PHOTOGRAPH OF SITE LOCATION 20
FIGURE 4 – PHOTO OF U1/2 CHIMNEY 21
FIGURE 5 – PLANNED FELL DIRECTION OF CHIMNEYS 23
FIGURE 6 – CHIMNEY COLLAPSE MECHANISM 24
FIGURE 7 – OVERVIEW OF DEMOLITION METHOD 24
FIGURE 8 – FINITE ELEMENT ANALYSIS OF PRE-CUTS 25
FIGURE 9 – AERIAL PHOTOGRAPH OF LIDDELL POWER STATION – CHIMNEYS EAST OF SITE 27
FIGURE 10 – BASE OF CHIMNEY AND APPROXIMATE LOCATION OF CHARGES 28
FIGURE 11 – CROSS SECTION OF CHIMNEY BASE 31
FIGURE 12 – EXTRACT OF BLAST LAYOUT – 1 OF 2 32
FIGURE 13 – EXTRACT OF BLAST LAYOUT – 2 OF 2 32
FIGURE 14 – PLAN VIEW EXCLUSION ZONE 33
FIGURE 15 – FIRING EQUIPMENT – DAVEYTRONIC DIGITAL BLASTING SYSTEM 37
FIGURE 16 – SEPP 33 EXTRACT – TABLE 1: SCREENING METHOD TO BE USED 40
FIGURE 17 – SEPP 33 EXTRACT – HAZARDOUS REGION ASSESSMENT GRAPH FOR EXPLOSIVES 40
FIGURE 18 – EXTRACT FROM AS2187 – AIRBLAST LIMITS FOR HUMAN COMFORT 43
FIGURE 19 – EXTRACT FROM CONDITIONS OF CONSENT - SSD-24937520 44
FIGURE 20 – EXTRACT FROM AS2187.2 AIRBLAST RECOMMENDED LIMITS FOR DAMAGE CONTROL 45
FIGURE 21 – ATTENUATION OF EXPECTED & UPPER BOUND VIBRATION VS. DISTANCE 46
FIGURE 22 – EXTRACT FROM AS2187 – VIBRATION LIMITS FOR HUMAN COMFORT 48
FIGURE 23 – USE OF CHARGED VESSELS FOR DUST SUPPRESSION ON CHIMNEY DEMOLITION 50
FIGURE 23 –WARNING SIGNS & INNER EXCLUSION ZONE 53
FIGURE 24 – INNER EXCLUSION ZONE – PRIOR TO CONNECTING DETONATORS 55
FIGURE 25 – 600m OUTER EXCLUSION ZONE 56
FIGURE 26 – EXTRACT FROM QLD DEEDI – FACTSHEET ON BLAST FUMES 61
FIGURE 27 – FUME RATING GUIDANCE 62

1 DOCUMENT PURPOSE

This Blast Management Sub-Plan details the procedures that are to be followed in executing the explosive demolition of the two chimney structures, which are currently located at the AGL Liddell Power Station, in the Hunter Region of NSW, Australia.

In accordance consent condition C20 clause a) this blast management plan has been prepared by suitably qualified and experienced person Daniel Healy. Refer to Appendix E for details regarding qualifications and experience for the individual.

It has been specifically developed in accordance with AS2601-2025: The Demolition of Structures and AS2187.2-2006: Explosives – Storage and Use, to ensure that all activities are compliant with legislative requirements and that appropriate risk mitigation strategies are employed throughout the project. The document has been formulated in consultation with suitably qualified and experienced personnel to ensure that industry best practice is also adhered with at all times.

The specific layout provides a step-by-step approach to the project execution; a number of supporting documents are included as appendices for additional pertinent details.

1.1 Compliance with Conditions of Consent

In accordance with the State Significant Development (SSD) planning approval, numerous conditions related to the demolition blast event must be adhered with. These conditions are provided within the conditions of consent – Approval Number: SSD-24937520. The consent conditions relevant to the blast event have been provided in Table 1 below.

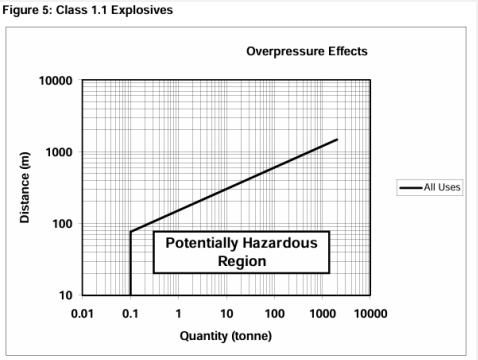
As per consent condition C20 clause c) (i) a description of the mitigation measures that will be implemented to comply with the conditions of consent is provided herein. This will include having the Blast Management Sub-Plan developed by a suitability qualified and experienced persons to ensure that the plan includes the required mitigation measure listed in the conditions of consent. A summary of all consent conditions and the location where it is addressed is provided within Table 1.

TABLE 1: CONSENT CONDITION COMPLIANCE SUMMARY

#	CONDITION	SUMMARY OF COMPLIANCE	REFERENCE
C20	A blast management sub-plan must be prepared as part of the demolition environmental management plan. The plan must: a) Be prepared by a suitably qualified and experienced person/s. b) Include:	a) Refer Section 1, Section 7.5 and Appendix E of BMSP for Shotfirers qualifications and relevant experience. b) (i) Refer BMSP Section 7.18 for environmental assessments for airblast overpressure, ground vibration, fly and dust	a) Refer Section 1 and Section 7.5 of BMSP & Appendix E b) (i)BMSP 7.18 Appendix I & J (ii) BMSP 7.26

	(i) an assessment of blasting impacts at sensitive receivers and infrastructure, including the Liddell Ash Dam including the predicted airblast overpressure and ground vibration. (ii) consultation with the relevant private landowners or infrastructure owners if the assessment predicts blasting by the development will impact sensitive receivers. (iii) a strategy to monitor, assess, mitigate or compensate for the effects of blasting at sensitive receivers identified by the assessment required by condition C20(b)(i) of the Consent. c) Describe the mitigation measures that will be implemented to: (i) comply with the conditions of the Consent. (ii) manage the risks identified in the environmental risk assessment required by condition B1 of the Consent. (iii) manage blast generated dust and fumes, protect public safety and manage road closures.	(ii) Refer to section 7.26for details of notification to owners and occupiers of structures, and providers of services adjacent to blast (iii) Monitoring to be completed in accordance with monitoring plan and details provided in 7.20 of this BMSP. Environmental effect to be managed by delays in detonation sequence, covering charges, distance to receivers, with dust control measures as detailed within the BMSP. Refer BMSP Sections 7.19 and 7.20 as well as Appendix H c) (i) This will include having the Blast Management Sub-Plan developed by a suitability qualified and experienced persons to ensure that the plan includes the required mitigation measure listed in the conditions of consent. A summary of all consent conditions and the location where it is addressed is provided within Table 1 (ii) In accordance with the environmental risk assessment, control measures to manage this risks as noted in the environmental risk assessment	(iii) BMSP 7.18, 7.19, 7.20 Appendix H c) (i) Section 1.1, (ii) 7.18, 7.19, 7.20, 8, Appendix C and Appendix Gof BMSP (iii) Section 7.18, 7.35 and 7.23 of BMSP

	d) Include a monitoring, evaluation and reporting program that uses an approach that is consistent with the environmental management strategy required by condition B1.	are provided in Section 7.18, 7.19, 7.20, 8, Appendix C and Appendix G which include: Engineering designs, monitoring and reporting, SWMS, competent contractors, stakeholder engagement. (iii) Dust is to be managed in accordance with the controls in Section 7.18 and includes the use of water cannons (sprinklers, pre-wetting, and completing the event under allowable weather conditions. Fumes are to be managed in accordance with Section 7.35 of this BMSP. Road closures are to be managed in accordance with Section 7.23 d) Monitoring plan has been developed and is provided in Appendix H to indicate locations and type of monitoring that must be undertaken for the planned blast event. The basis for the plan is to nominate locations to confirm that no exceedances have occurred at the nominated locations.	d) Sections 7.18, 7.19 & 7.20 of BMSP Appendix H
C22	A dust management sub-plan must be prepared as part of the demolition environmental management plan. The plan must: (a) be prepared by a suitably qualified and experienced person/s; (b) describe the mitigation measures that will be implemented to: i. comply with the conditions of this consent; and	The dust management sub-plan is a separate document previously submitted and approved (IS501900_DMP_D0v5). This BMSP has been written in accordance with the requirements of Section 7.2 "Management Measures" of this Dust Management Sub-Plan. Refer to Sections 7.19 & 7.20 of BMSP for dust management details.	Section 7.19, 7.20 of BMSP Appendix H

	ii. (ii) manage the risks identified in the environmental risk assessment required by condition B1; Include a monitoring, evaluation and reporting program that uses an approach that is consistent with the environmental management strategy required by condition B1.		
B18	The quantities of dangerous goods stored and handled by the development must be below the threshold quantities listed in the Department's Hazardous and Offensive Development Application Guidelines – Applying SEPP 33 at all times.	Refer SEP33 Table 1, and Figure 5 **Table 1: Screening Method to be Used** **Class** / **Method to Use/Minimum Quantity** 1.1 / Use graph at Figure 5 if greater than 10 **Figure 5: Class 1.1 Explosives**  Refer 7.11 of BMSP, 521kg of explosives to be used in blast event. As such, allowance for 525kg of explosives, as per Figure 5, necessitates approximately 140 meter minimum exclusion zone. Site evaluation determined that the BESS is the closest asset at approximately 220m, which achieves compliance.	Sections 7.11 & 7.16 of BMSP
B19	Dangerous goods must be stored and handled strictly in accordance with: (a) all relevant Australian Standards; and (b) for liquids, the NSW EPA's Storing and Handling of Liquids: Environmental Protection – Participants Manual. In the event of inconsistency between the requirements of condition B19(a) and B19(b), the most stringent requirement must prevail to the extent of the inconsistency.	(a) Dangerous goods must be handled and stored in accordance with AS2187 – Explosives- Storage, Transport and Use. BMSP developed to comply with AS2187. Wellanbah Industrial has offsite NSW licensed explosives storage facilities. (b) N/A, Wellanbah Industrial does not require storage or handling of liquids.	AS2187, Section 7.16 of BMSP.

DM5	Dust management measures will be included in the PEMS, and implemented during demolition.	Dust management measures included in PEMS are to be implemented as detailed in t Sections 7.18 & 7.19 of BMSP	Sections 7.18 & 7.19 of BMSP
DM7	Identify any critical infrastructure that may be damaged by vibration and develop monitoring plan to be included in the PEMS.	Critical infrastructure identified in the PEMS has been assessed in Section 7.18 of BMSP. These assets include the Transgrid switchyard, battery storage facility, Lake Liddell Dam wall and Liddell Ash Dam. Prior to completing the blast event, allowable limits will be agreed with effected stakeholders. Monitoring plan as per Appendix H of BMSP	Section 7.18 of BMSP Appendix H of BMSP
AQ2	Preparation of a Blast Management Plan and Asbestos Control Plan, which would including specific measures for minimising impacts during blasting and handling of ACM, including: - Soft-strip inside buildings before demolition - Pre-watering - Forecasting Sprinklers Due to the potentially high emissions of dust during blasting events, a monitoring plan is recommended. This would include boundary and receptor monitoring. A report after each blasting event summarising the results of the air quality monitoring during and after the event would be prepared.	Dust is to be managed in accordance with controls listed in Section 7.18 & 7.19 of BMSP as well as the Asbestos Control Plan – Liddell Stack Felling. Report to be prepared detailing the results of all monitoring, as specified in Section 7.20 of this BMSP	Section 7.20 of BMSP Appendix H
HR1	BMP is a risk control plan used to ensure blasts do not harm people in the area and limit damage to the environment. The BMP will describe the design of the blast necessary for the task and what procedures will ensure the charge is prepared and fired safely. This information includes: - Layout of the blast including any drilling pattern and hole depth.	Wellanbah Industrial has developed a comprehensive BMSP in compliance with worksafe NSW requirements and AS2187. This Blast Management Sub-Plan includes: - Layout of the blast including any drilling pattern and hole depth. - Explosives type/quantity, firing equipment and method.	AS2187, BMSP Section 7.9 of BMSP and Appendix B

	- Explosives type/quantity, firing equipment and method. - Detonation sequence/effective charge mass per delay (MIC) 'powder factor.' - Misfire procedures including assessment and actions for any foreseeable misfires. This includes any explosive/detonators found during blasted material pile loading by mobile plant. - Details of reports, drawings and records consulted. - Post blast assessment and inspection procedures. The Blast Management Plan will be prepared.	- Detonation sequence/effective charge mass per delay (MIC) 'powder factor.' - Misfire procedures including assessment and actions for any foreseeable misfires. This includes any explosive/detonators found during blasted material pile loading by mobile plant. - Details of reports, drawings and records consulted. - Post blast assessment and inspection procedures.	Sections 7.10, 7.11 and 7.12 of BMSP and Appendix B Section 7.10 of BMSP Section 7.34 of BMSP Section 7.8 of BMSP Section 7.35 of BMSP
HR2	Explosives will be stored in a non-ferrous receptacle clearly marked 'Explosives' that is kept closed and locked (except during use by authorised personnel) and stored in the original containers which are securely sealed. The storage area should be a well-ventilated magazine licenced for Inter-governmental Maritime Consultative Organisation (IMCO) Class 1.1 explosives, which protects the explosives from the weather, contamination, sources of ignition and access from unauthorised individuals. Storage will be isolated from other dangerous good stores and the area free of debris, waste and combustibles. The explosives containers should be protected against physical damage and regularly checked for spills and leaks.	Section 7.16 of this BMSP provides the details regarding storage of explosives. All explosives will be stored as per requirements, in offsite NSW licensed explosive magazine. All explosives brought on to site will be in original approved compliant packaging. All explosives will be inspected for damage, spills etc prior to transport to site and upon arrival. On arrival to site all explosives to be locked in shotfirers vehicle certified to carry Category 2 explosive quantities ie up to 250kg.	AS2187, AEC3, Section 7.16 of BMSP BMSP Appendix K: NSW Storage Facility License MACS engineering certificate of conformance
HR3	Magazines are required to comply with the requirements of AS2187.1 Explosives Storage, transport and use Storage which addresses issues with design and location of the	Wellanbah Industrial Magazines have been built and certified by R. Duncan Pty Ltd in compliance with AS2187 Magazine storage license issued by worksafe NSW	Refer to Appendix K of BMSP: R. Duncan Certificate of conformance,

	magazine, security, inventory and management of the explosives, and safety concerns.	Note that no magazines are required onsite for these works.	Worksafe NSW explosives storage license
HR4	Where more than 2.5 kg of Class 1.1 explosives are stored on a site, every perimeter entrance to the site must be labelled with a 'Hazchem' placard in accordance with the Explosives Regulations. Adequate security needs to be provided for the explosive's storage area, and only those who are authorised for unsupervised access to the area may have means to unlock the explosive storage magazine	Refer to section 7.16 for compliance details. 'Hazchem' placard and 'class 1 explosives' diamond to be installed at each site entrance as per section 7.1 of NSW WHS regulation. Magazines to be locked at all times, only authorised Wellanbah Industrial Shotfirers authorised on Wellanbah Industrials 'SECURITY PLAN FOR STORAGE AND HANDLING OF EXPLOSIVES' as approved by SafeWork NSW	Refer to Section 7.16 of BMSP 7.1 NSW WHS Regulation
HR5	Explosive storage and use areas will be no smoking and not contain naked light, heat or ignition sources. The explosives stock will be rotated to prevent ageing (use on first in-first out basis).	Refer Section 7.16 of BMSP and AS2187 and Wellanbah Industrial 'Magazine Rules' Product procured for project to be within usable date range (purchased specifically for project, hence old product not a risk).	Section 7.16 of BMSP. Appendix M of BMSP
D4	Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must: (a) be in writing; (b) submitted via the NSW planning portal (Major Projects); (c) identify the development (including the development application number and name); (d) set out the condition of this consent that the development is non-compliant with; (e) why it does not comply; (f) the reasons for the non-compliance (if known); and (g) what actions have been undertaken, or will be undertaken; and when, to address the non-compliance	Refer to section 9.1 of BMSP	Section 9.1 of BMSP
D5	The Applicant must notify the Department within 24 hours of becoming aware of an incident. The notification must be made via the NSW planning portal (Major Projects) and address details of the incident including:	Refer to section 9.2 of BMSP	Section 9.2 of BMSP

	(a) date, time and location; (b) a brief description of what occurred and why it has been classified as an incident; (c) a description of what immediate steps were taken in relation to the incident; and (d) identifying a contact person for further communication regarding the incident.		
D6	The Applicant must provide the Department with a subsequent incident report in accordance with Appendix 6 (Incident Notification and Reporting Requirements).	Refer to section 9.2 of BMSP	Section 9.2 of BMSP
D7	Within three months of the following events: (a) the submission of an incident report under conditions D5 or D6; (b) the submission of a compliance report under condition D3; (c) the submission of an Independent Environmental Audit under condition D1; (d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or (e) notification of a change in the development phase under condition A10; The suitability of the existing environmental management documents required under this consent must be reviewed. If the review concludes an update to an environmental management document is required, or to comply with a directive, the relevant environmental management document must be revised and submitted to the Planning Secretary for approval within three months of the review.	Refer to section 9.3 of BMSP	Section 9.3 of BMSP

2 INVESTIGATION OF STRUCTURE

In accordance with Clause 2.2.2 of AS2601, an investigation of the structure has been completed by competent persons with appropriate experience in demolishing structures of a similar type (Refer to Appendix E for qualifications and experience of nominated competent person Daniel Healy). These investigations have determined the following.

2.1 Materials of Construction

The structures which are to be demolished in accordance with this BMSP, consist of two significant chimneys with a total height of approximately 169m each. The base outside diameter is 18.6m, with a wall thickness of 610mm; the top outside diameter is 9.8m, with a wall thickness of 216mm. The material of construction is reinforced concrete, with the size and layout of the reinforcement varying throughout the height of the structure.

In addition, the chimneys include a number of corbels at regular spacings up the height of the structure, these corbels support the internal brick lining, and an internal concrete slab which is supported also on four columns at approx. 6.7m above ground level.

It is also noteworthy that asbestos has been identified as a material used in the construction of the chimneys based on both details called up in the structural drawings, and subsequently laboratory testing of samples taken from site.

The areas of either identified or assumed asbestos which includes:

Bitumastic joints to capping at the top of the chimney stack (~169m from ground level):

- Assumed ACM only – not detailed as asbestos on the drawings
- ~12.7mm wide bitumastic between the joints to each capping piece
- There are 48 joints in total at ~1.092m long each joint

Vent pipes at the top of the chimney stack (~168m from ground level):

- Detailed as ACM on drawings
- ~101mm diameter asbestos cement vent pipe running through the chimney stack wall evenly spaced around the circumference of the stack
- There are 10 x pipes at ~101mm diameter x ~228mm long x ~6.4mm wall thickness

Caulking material around each exhaust duct (~6m from ground level to bottom of duct and ~15m from ground level to top of the duct):

- Detailed as ACM on drawings
- ~6.4mm asbestos rope caulking around the perimeter of each duct at the interface with internal brick lining at ~27.9m long around the duct x 2 ducts per stack

Insulation material around each exhaust duct (~6m from ground level to bottom of duct and ~15m from ground level to top of the duct):

- Lab testing completed which confirms material is asbestos
- Residual 80% Magnesia insulation material between duct and concrete wall around the perimeter of each duct (insultation material originally existed at ~609mm deep x

~101mm thick x ~27.9m long around the duct x 2 ducts per stack – approximately 98% of this material has since been removed

Caulking material at the interface of the internal brick lining sitting on top of the concrete slab and the brick wall lining to circumference of the chimney (slab level at ~6m above ground level):

- Detailed as ACM on drawings
- ~25.4mm asbestos rope ~53.9m long

Caulking material across the top of the exhaust duct, between brick lining and concrete wall at the interface of the glass insulation behind the brick wall and the concrete wall at ~RL486 (~RL 148m)

- Detailed as ACM on drawings
- ~6.4mm asbestos rope caulking at ~5.5m long x 2 ducts (across the top)

It is estimated that the asbestos in the above ACMs accounts for ~0.02% of the overall volume of material in each chimney stack. Prior to the blast event, SafeWork NSW approval to leave the above ACM insitu will be obtained.

Asbestos will be managed in accordance with the project Asbestos Management Sub-Plan as well as the Asbestos Control Plan – Liddell Stack Felling in consultation with SafeWork NSW in accordance with Consent Condition C15.

Refer to Appendix Z for the Asbestos Control Plan – Liddell Stack Felling, which is to be implemented for the chimney demolition works. .

2.2 Structural System and Sequence of Construction

The structural system of the chimneys is primarily that of a gravity structure, whereby the mass of the chimney is typically sufficient to maintain a net compression in the walls of the structure and to resist overturning. The function of the reinforcement is to provide some additional tensile capacity and crack control.

During typical operation, the structural system resists overturning from wind or earthquakes as a single large cantilevered circular hollow section. Applied loads are transferred from throughout the height of the structure to the base via this section, and the overturning is resisted by the stabilising weight of the structure and base foundations.

The sequence of construction was that of a sliding formwork, starting from the base and progressively working up to the top pours. The formwork was constricted with height, owing to the reduced loading towards the top of the structure.

Figures 1 and 2 are extracts from available existing drawings of the structures.

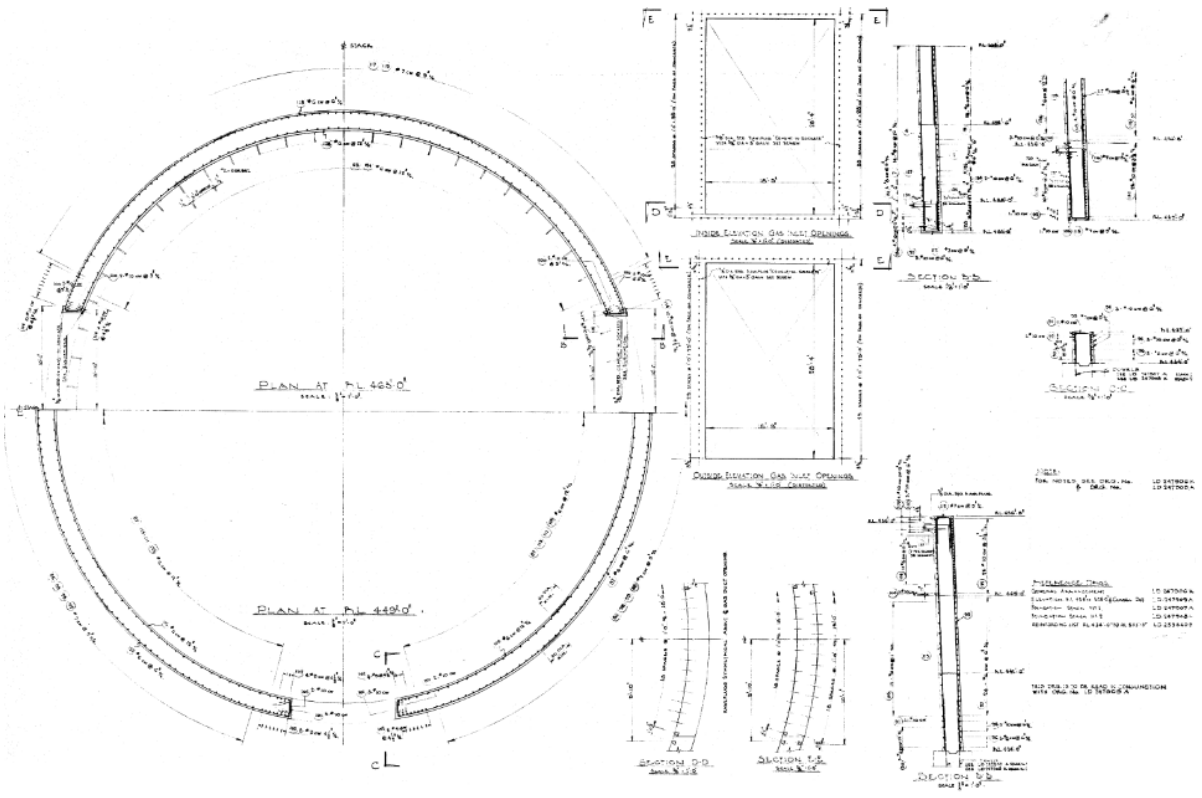


FIGURE 1 – CROSS SECTION OF CHIMNEY

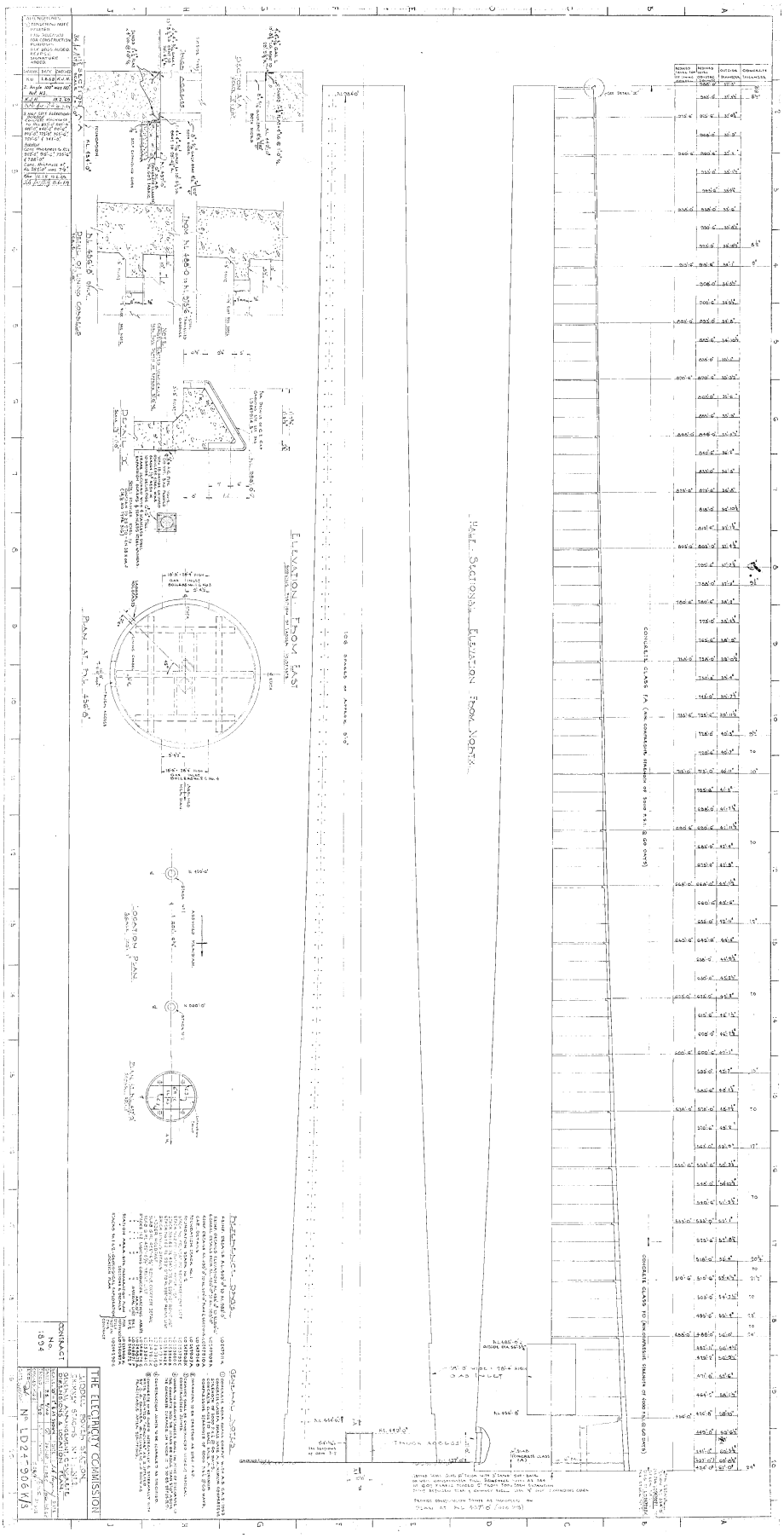


FIGURE 2 – ELEVATION OF CHIMNEY

2.3 Structural Stability

The global stability of the structure is dependent on the following key elements:

+ Reinforced Concrete Shell
+ Base Foundations

Based on the above, it is evident that these elements must not be compromised to the extent that an instability occurs. The explosive induced collapse method is implemented due to the minimal disturbance of the structural system and therefore structural stability up until the initiation of the explosives. At such time, a significant exclusion zone will have been established, thus eliminating the potential risk to personnel due to a pre-mature collapse of the structures.

A structural assessment has been undertaken on the chimneys, (Refer to Section 5.2), to ensure the blast plan will achieve the desired collapse mechanism.

2.4 Services

Prior to completing the works, services to the area are to be disconnected and isolated. Furthermore, any services within the fell path are also to be disconnected and isolated prior to the blast or covered by an impact bund as appropriate. These works will be confirmed / recorded as part of the final client checklist – refer to Appendix R – Liddell Chimney Blast – Client Checklist: WI-QC-057-002.

2.5 General Condition Details

In general, the structure is in sound condition with minimal evidence of significant corrosion / concrete cancer which would lead to concerns regarding the integrity of the structure. Previous condition assessments have identified some spalling towards the top of the chimneys. Although these do not pose a risk to the overall structural integrity.

The risk associated with falling debris has been further assessed, and is being managed as a separate exercise which will have controls in place for the asbestos abatement works, which will be carried over into the drilling / charging works.

2.6 Confined Spaces

The current work scope does not require access to confined spaces. Note the base of the chimneys was previously considered as a confined space, however a risk assessment has been completed by CMA Contracting, confirming the re-designation of the area for the works.

3 INVESTIGATION OF SITE

The chimneys are located at the AGL Liddell Power Station, in the Hunter Region of NSW, Australia. This is a significant site, which presents various constraints which have been considered in the development of the proposed demolition method. These constraints include critical assets that are to be retained, existing services, below ground infrastructure, site geographical features.

The direction of collapse has been selected to fall away from the retained assets (inc. Transgrid switchyard) and assets which are to be demolished at a later stage of the project. Existing services within the fell path are to be disconnected or protected prior to the demolition of the chimneys.

There are several geographical site constraints which have been considered in the finalising of the collapse direction. This includes vegetation zones, Lake Liddell, the sediment ponds, and the lake front exclusion zones. Drawing WI-24057-06-S110 provides an aerial overlay of all known site constraints, and confirmation that adherence with AS2601 has been achieved based on the nominated fell path / orientation (Refer to Appendix B).



FIGURE 3 – AERIAL PHOTOGRAPH OF SITE LOCATION

The demolition area will be wholly within the power station site boundary, with the nearest public on land access approx. 1.5 km from the chimneys. There is the possibility that the general public may encroach on the exclusion zone via water access from the lake, and this risk will be managed via positioning sentries at strategic locations (with assistance of drones) and available watercraft for the blast event. In addition, local fencing and signage will be placed at entrance and exit locations to the base of the chimney during the preparation works, as detailed in Section 7 of this document.



FIGURE 4 – PHOTO OF U1/2 CHIMNEY

4 LEGAL STATUS REVIEW

In accordance with Appendix A of AS 2601-2001, the following checklist has been completed for the proposed scope of works to confirm the legal status of the project.

TABLE 2: LEGAL REQUIREMENTS CHECKLIST

ITEM	DESCRIPTION	INVESTIGATION RESULTS	STATUS
(a)	Are there any statutory, regulatory, or other legal impediments to the demolition of the building?	Demolition subject Approval for State Significant Planning, which has been granted.	Closed
(b)	Is the owner/principal legally empowered to have the building demolished?	Yes.	Closed
(c)	Has the owner/principal identified all hazardous substances located on site including asbestos, PCBs, lead paint, underground storage tanks, chemicals, etc. as per Clause 1.6.1?	Extensive hazardous materials investigations have been completed, and known asbestos in relation to the chimney has been identified and is to be managed in consultation with SafeWork NSW.	Closed
(d)	Has the owner/principal obtained permission to occupy adjoining neighbours' property, including airspace, for the purpose of erecting protective scaffold/screens for the demolition works.	Occupation of neighbouring properties not required for the purpose of erecting protective scaffold/screens for the demolition works.	Closed
(e)	Has the owner/principal provided all existing architectural, services and engineering drawings available for the demolition project?	Details of the power station have been provided by the site owner	Closed
(f)	Are the tender/contract documents sufficient and complete?	Completed.	Closed

5 DEMOLITION METHOD ASSESSMENT

5.1 Demolition Method

The demolition methodology is to be completed in accordance with this document.

The demolition of the two chimney structures is to be achieved via an explosive induced collapse.

This process includes several steps as detailed herein.

- 200mm core holes drilled at termination points of birds mouth;
- Triangular/trapezoidal portion of chimney removed between 200mm core hole and start of charge pattern;
- 38mm holes drilled in the front face of the chimney (fell direction side) in accordance with blast design;
- Rear portion of chimney wire saw cut to extents provided in blast design;
- Holes packed with explosive charges;
- Explosives detonated to remove front portion (bird's mouth) of the chimney base, and induce the collapse of the structures crossing over on an alignment which is 20 degrees from a site North to South orientation;
- Establish asbestos management controls in accordance with the Asbestos Control Plan – Liddell Stack Felling (Refer to Appendix Z);
- Excavators are to be used for processing and loadout of materials.

For detailed blast design, refer to Appendix B of this BMSP.

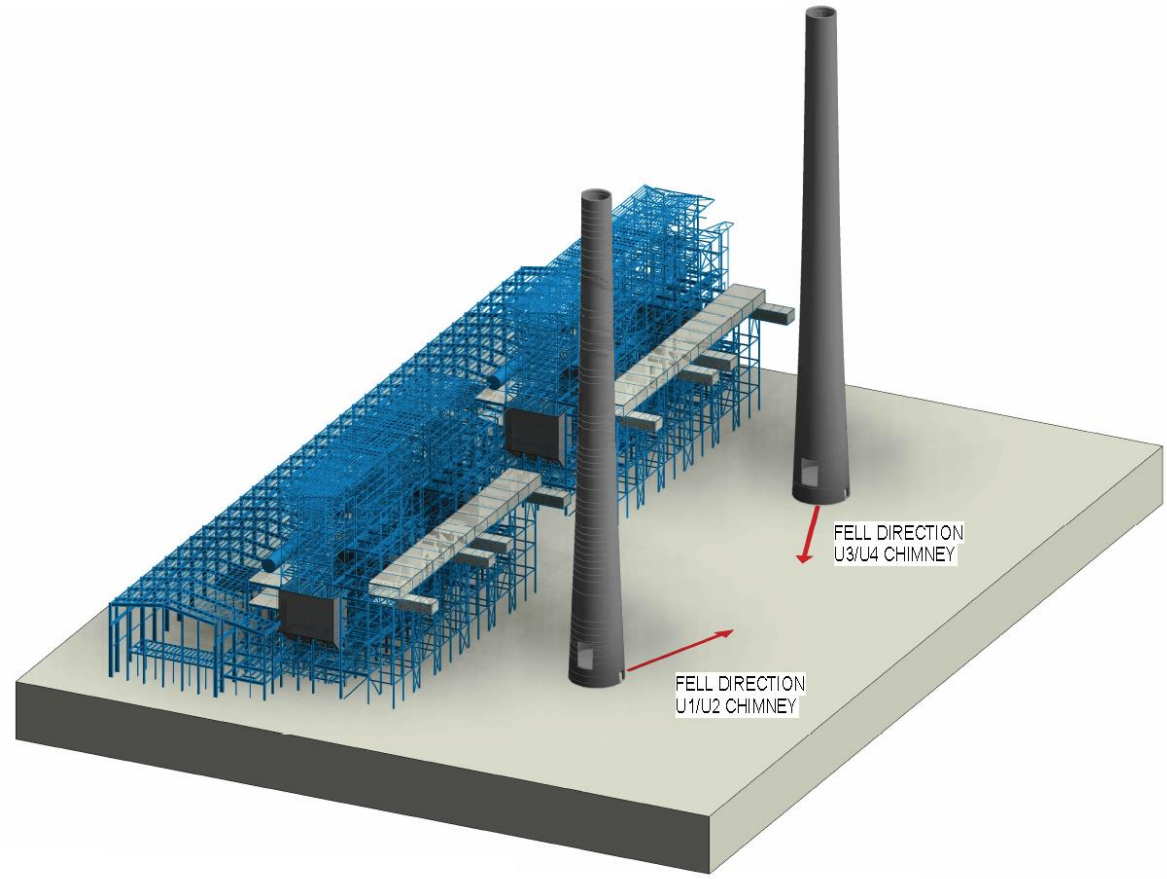


FIGURE 5 – PLANNED FELL DIRECTION OF CHIMNEYS

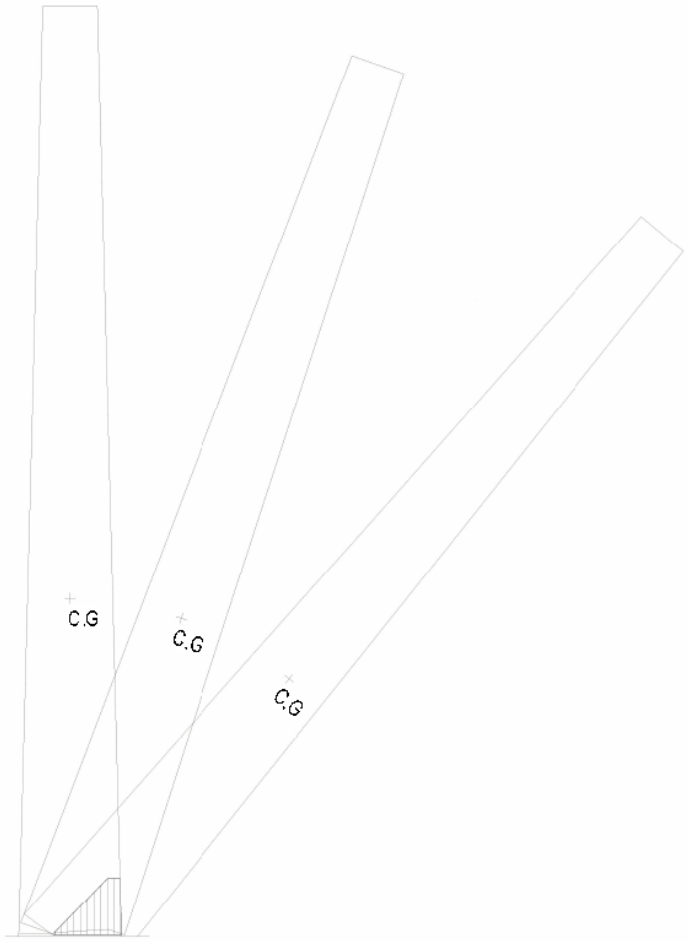


FIGURE 6 – CHIMNEY COLLAPSE MECHANISM

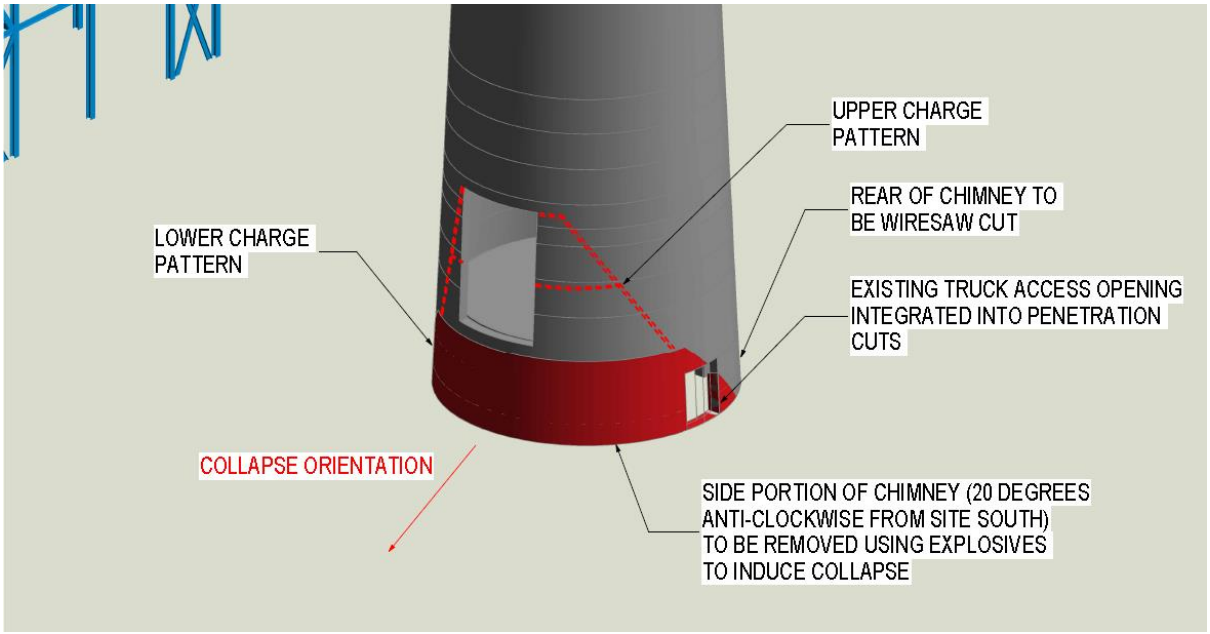


FIGURE 7 – OVERVIEW OF DEMOLITION METHOD

5.2 Structural Assessment

A structural analysis has been undertaken on the proposed demolition method in order to ensure that the base of the chimney is not overstressed following the detonation of the charges, and that the subsequent collapse mechanism matches the design intent.

The results of the analysis indicate that the provided drill pattern / explosive removal of the front bird's mouth will result in an initial peak axial bearing stress of 8.12 MPa. This is well within the design adopted concrete grade of 24.5 MPa, based on concrete testing completed on the structures. This indicates that there is adequate strength at the rear of the chimney to induce rotation post blast.

The change in eccentricity will then result in an increase stress due to bending in the order of 45.1 MPa at the Eastern toe (compression) and 28.8 MPa at the rear heel (tension). As the tension cannot be developed, this will result in the structure beginning to fail and rotate, with the stress temporarily distributed to the hinges only. The stresses at this point within the hinges are 99.4MPa (compression) at the Western toe and 69.8MPa (tension) at the Eastern heel. As such, failure and subsequent rotation is guaranteed to be achieved based upon the concrete grade of 24.5 MPa.

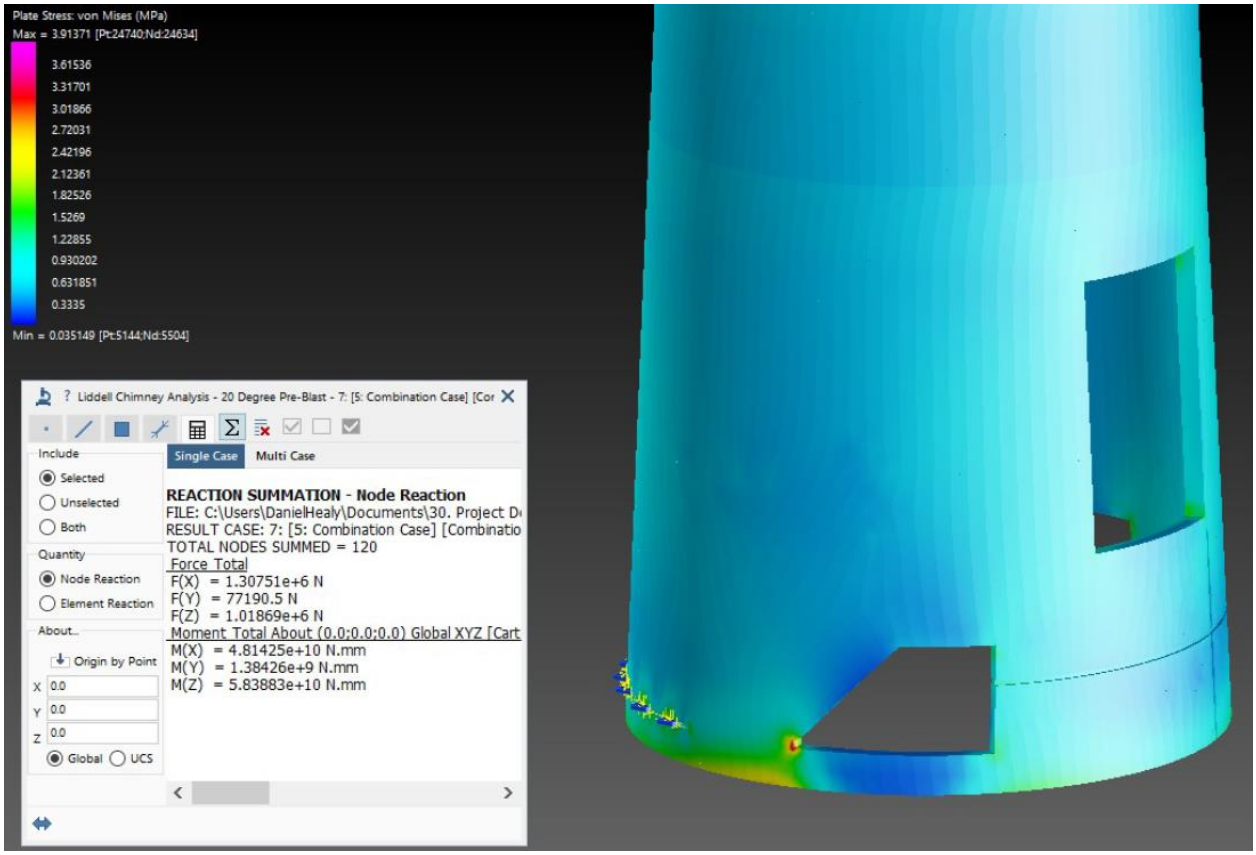


FIGURE 8 – FINITE ELEMENT ANALYSIS OF PRE-CUTS

6 BLAST DESIGN ASSESSMENT

The specific blast design has been developed by the shotfirer to ensure appropriate application of charges for the intended purpose.

The blast design is to include 680 blast holes drilled into the front of each chimney in accordance with the drill pattern provided in Appendix B of this document. A further 10 blast holes will be drilled into the four columns which support the suspended slab at RL 456’ 8’’. The holes are to be filled with packaged emulsion in accordance with the charge schedule, with appropriate delays applied.

Following the completion of the rear wire saw cuts, the charges will be detonated, which will remove the concrete from the fell side of the chimney base, and result in the induced collapse of the structure.

7 BLAST PLAN

The following Blast Plan has been developed to satisfy the requirements of AS2601-2025 Demolition of Structures, clause 2.3, and AS2187.2-2006 Explosives Storage and Use – Part 2 Use, clause 5.1. It details the process that must be followed in executing the project scope. Note that a number of supporting documents to the Blast Plan are provided in the Appendices of this document.

7.1 Location of Proposed Blasting

The blasting is to take place within the Liddell Power Station Site, located within the Hunter Valley, NSW. The chimneys are positioned on the eastern side of the site, between the boiler houses and Lake Liddell. The specific location of the charges will be in the base of the two chimney structures.

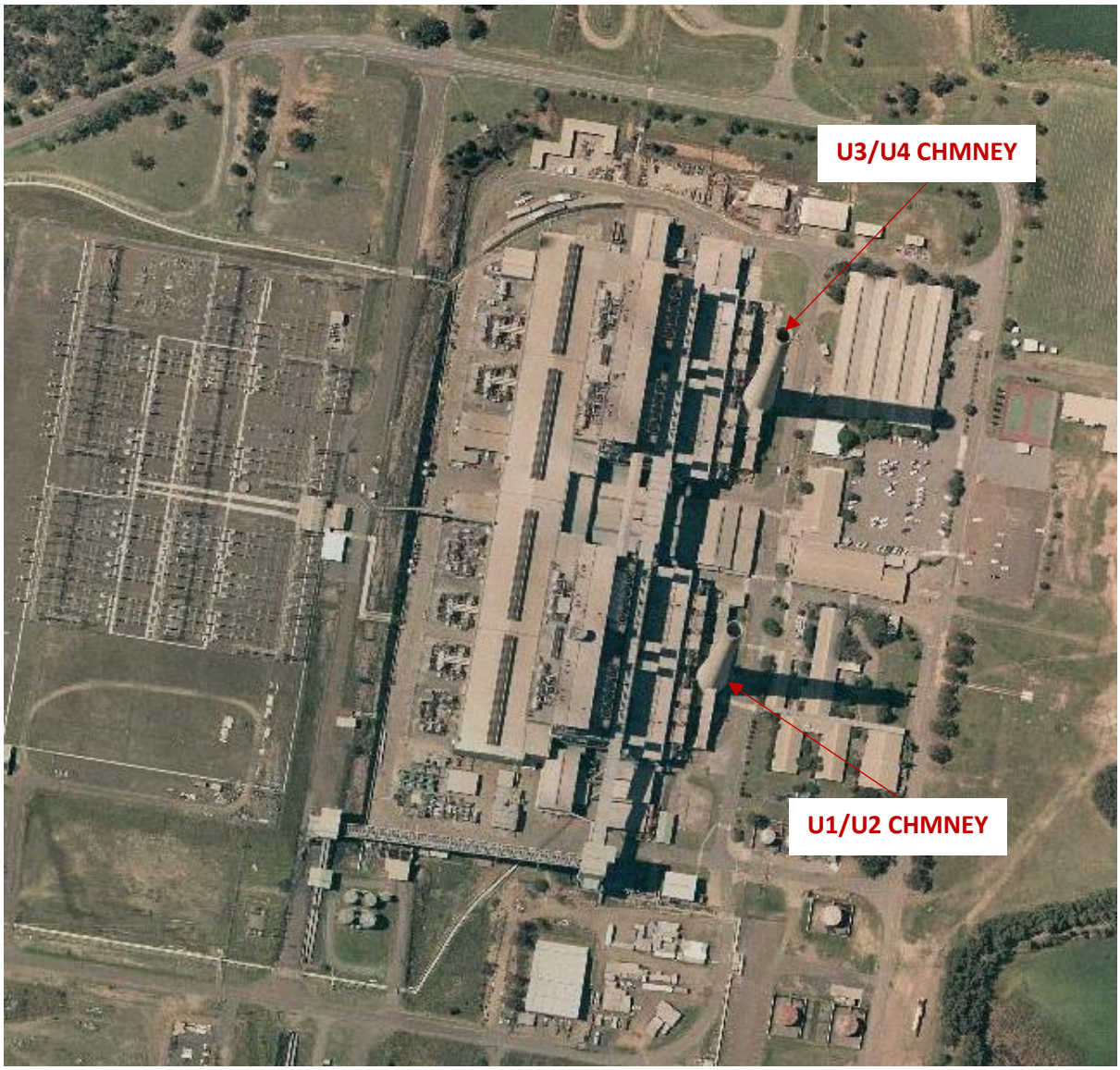


FIGURE 9 – AERIAL PHOTOGRAPH OF LIDDELL POWER STATION – CHIMNEYS EAST OF SITE

7.2 Description of Proposed Blasting

The blasting will include the placement of 2580 charges into 1520 holes which will be pre-drilled into the chimney structures in accordance with the drill pattern / blast plan. In addition, 190 charges will be placed beneath 38 water filled vessels, (5 charges per vessel), to assist with dust suppression for the event.

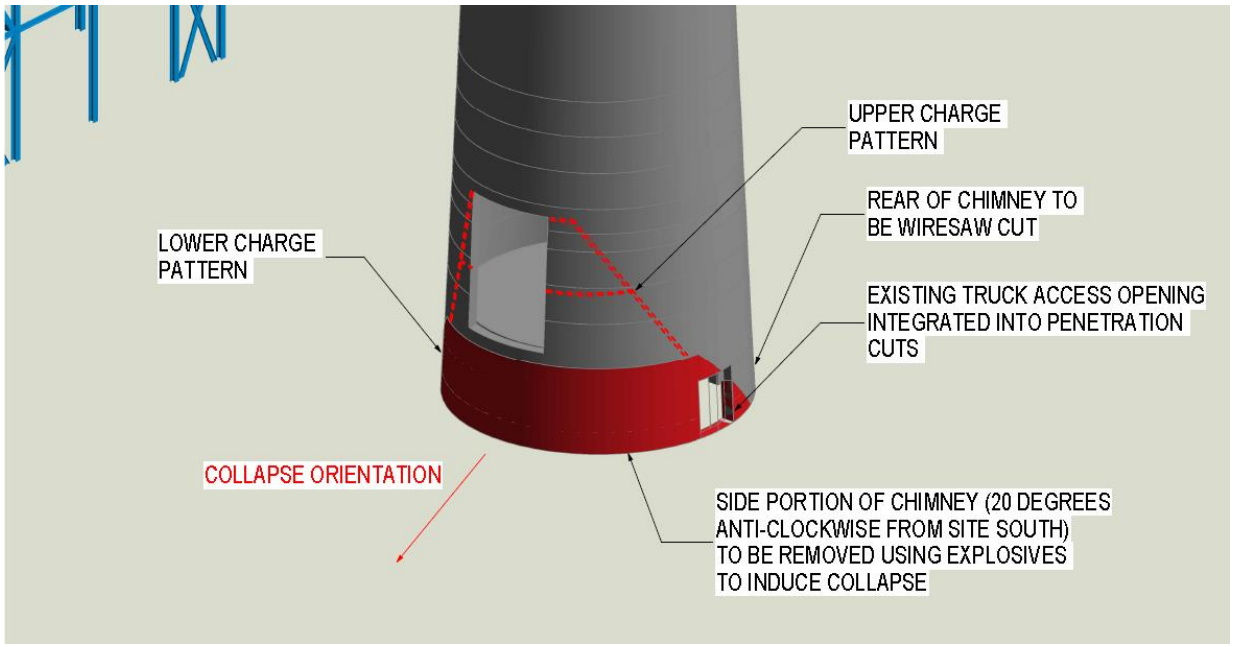


FIGURE 10 – BASE OF CHIMNEY AND APPROXIMATE LOCATION OF CHARGES

7.3 Permits / Licenses Required for the Project

Prior to executing these works, the following will be required in addition to the project wide State Significant Development approval:

TABLE 3 – PERMIT AND LICENSE REQUIREMENTS

ITEM	DESCRIPTION
SAFEWORK BLASTING NOTIFICATION	BLASTING NOTIFICATION COMPLETED BY BEUL HOLDER – 7 DAYS BEFORE WORKS
SAFEWORK NSW DEMOLITION NOTIFICATION	DEMOLITION VIA EXPLOSIVES NOTIFICATION – 21 DAYS BEFORE WORKS
SECURITY CLEARANCE	NSW SECURITY CLEARANCE FOR DANGEROUS GOODS
SHOTFIRER LICENSE	SHOTFIRER LICENSE
DEMOLITION SUPERVISOR	SAFEWORK NSW REGISTERED DEMOLITION SUPERVISOR
NOTIFICATION TO STAKEHOLDERS	VARIOUS STAKEHOLDERS TO BE NOTIFIED AS REQUIRED

7.4 Key Appointments and Responsibilities

The below provides a break down of the roles and responsibilities in relation to the blast event only. For details regarding project wide responsibilities and compliance with the conditions of consent, refer to Section 4.1 of Environmental Management Strategy - Liddell Future Land Use and Enabling Works.

TABLE 4 – ROLES AND RESPONSIBILITIES

POSITION	RESPONSIBILITIES
CMA CONTRACTING PROJECT MANAGER	AS REPRESENTING THE PRINCIPAL DEMOLITION CONTRACTOR - OVERARCHING MANAGEMENT OF PROJECT AND RESPONSIBLE FOR LIASON WITH SITE OPERATOR AGL
CMA SITE MANAGER	SITE MANAGEMENT OF PROJECT AND CO-ORDINATION WITH SITE OPERATOR AGL THROUGHOUT PROJECT
CMA DEMOLITION SUPERVISOR	WORKING WITH SHOTFIRING CREW TO ENSURE THAT PREPARATION WORKS ARE COMPLETED. ALSO PROVIDING ASSISTANCE TO SHOTFIRER TO MANAGE WORK EXCLUSION ZONES AND SENTRIES.
WELLANBAH PROJECT MANAGER / DEMOLITION SUPERVISOR	RESPONSIBLE FOR ENSURE PLANNING AND EXECUTION DOCUMENTATION IS COMPLETED, AND TO MANAGE ONSITE EXECUTION OF WORKS INCLUDING INSPECTION TEST PLANS, SIGN OFFS, AND COMPLIANCE WITH BLAST DESIGN.
WELLANBAH SHOTFIRERS	TRANSPORT, PLACEMENT AND DETONATION OF EXPLOSIVES IN ACCORDANCE WITH THIS BLAST MANAGEMENT SUB-PLAN.
WELLANBAH / ROSE STRUCTURAL ENGINEER	ANALYSIS OF DEMOLITION METHODOLOGY
AGL LIDDELL CLOSURE PROJECT MANAGER	FACILITATE CONSULTATION WITH STAKEHOLDERS AFFECTED BY BLASTING EVENT

7.5 Shotfirer's Details

In accordance consent condition C20 clause a) this blast management plan has been prepared by suitably qualified and experienced person Daniel Healy. Refer to Appendix E for details regarding qualifications and experience for the individual.

TABLE 5 – SHOTFIRER'S DETAILS

NAME	POSITION	QUALIFICATIONS
DANIEL HEALY*	SHOTFIRER / DEMOLITION SUPERVISOR	SHOTFIRER LICENSE CERTIFICATE IV DEMOLITION BACHELOR CIVIL ENGINEERING (HONS I) CHARTERED PROFESSIONAL ENGINEER – STRUCTURAL MASTER BUSINESS ADMINISTRATION (DIST.)

7.6 Details of the Risk Management Assessment

In evaluating the proposed demolition scope, the following risks have been identified:

- Transport to and from site
- Inclement weather (lightning, high winds)
- Working at heights / impact from falling debris
- Working with explosives – misfires, premature detonation
- Failure to remove concrete resulting in partial stand up
- Global instability of chimney post blast
- Fly / fragmentation from blast
- Management of adjacent road ways (New England Hwy)
- Air over blast pressure
- Vibration
- Dust
- Damage to adjacent structures or services
- Maintaining exclusion zones and preventing public access to area during blast event
- Exposure to hazardous materials (asbestos)
- Working in close proximity to a deteriorated structure

In order to manage each of these risks, a specific evaluation of all items will be undertaken, and appropriate control measures put in place prior to execution phase. The results of these evaluations and subsequent controls will be captured within the Safe Work Method Statements or associated project management plans as appropriate.

7.7 Details of Adjacent Structures or Services that Influence the Blast Design

The collapse direction has been selected such that retained, critical or existing structures will not be damaged due to the blast event inclusive of subsequent collapse of the chimneys. Section 7.18 lists critical infrastructure which has influenced the blast design, and has been evaluated as part of the environmental considerations.

Services in the vicinity of the fell path are to be disconnected prior to the blast.

7.8 Details of Reports, Drawings and Records Consulted

In developing this Blast Management Sub-Plan, the following was reviewed:

- Existing Chimney Construction Drawings
- Physical Site Inspections

These formed the basis of the structural analysis and blast design.

7.9 Layout Plan of the Blast

The following details the layout plan for the blast. Due to the size of the structure, the below is only an extract of the layout plan, refer to Appendix B of this document for the blast design drawings in high resolution.

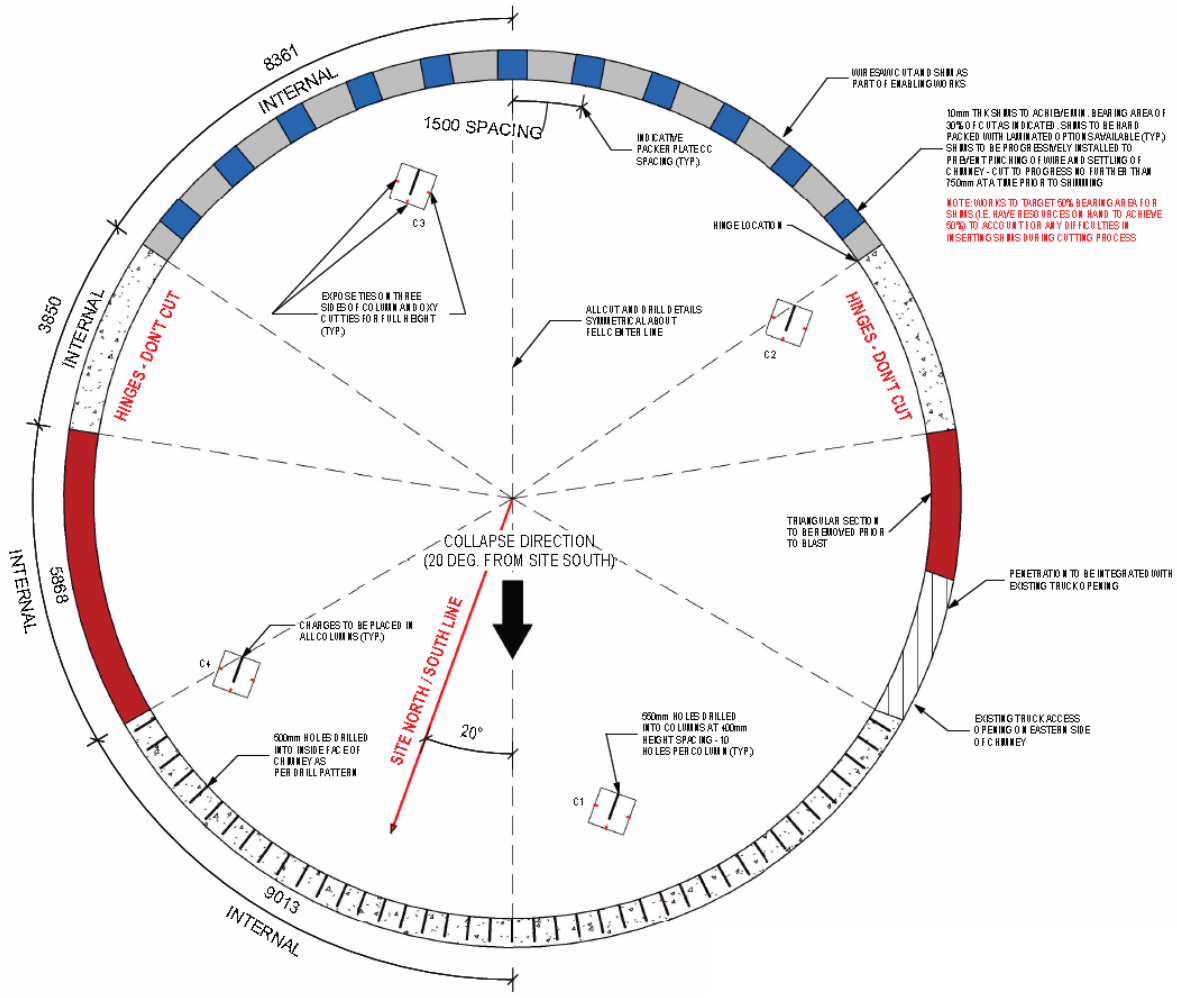


FIGURE 11 – CROSS SECTION OF CHIMNEY BASE

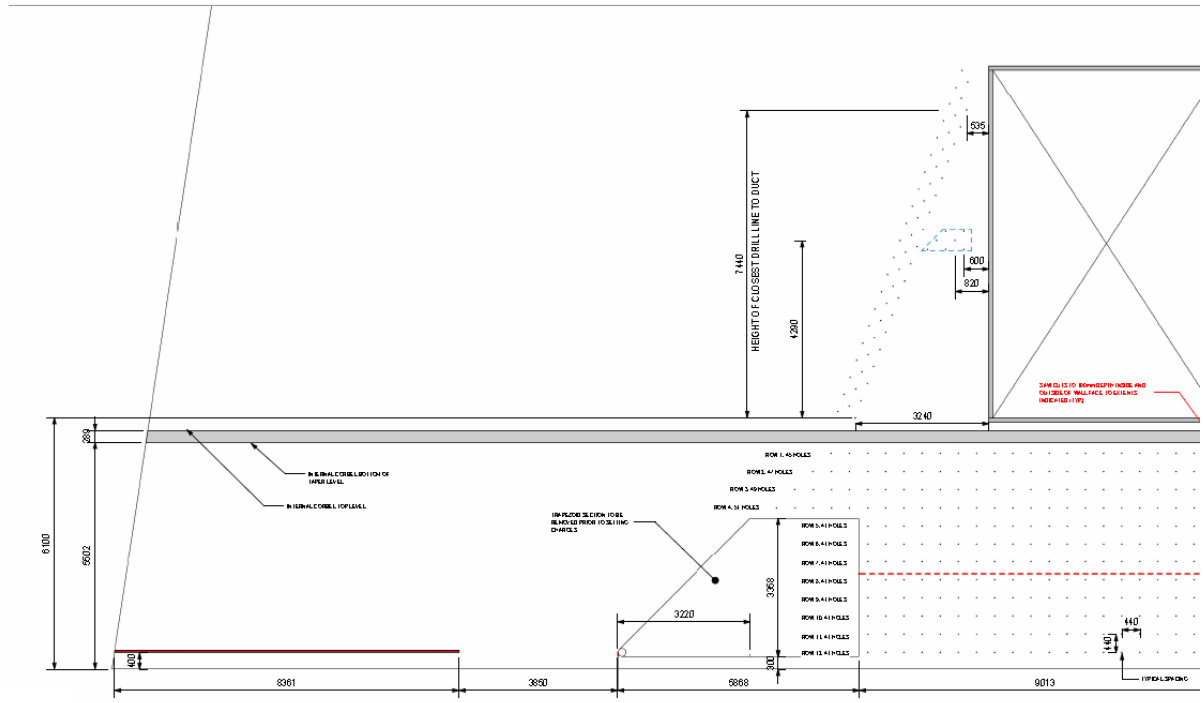


FIGURE 12 – EXTRACT OF BLAST LAYOUT – 1 OF 2

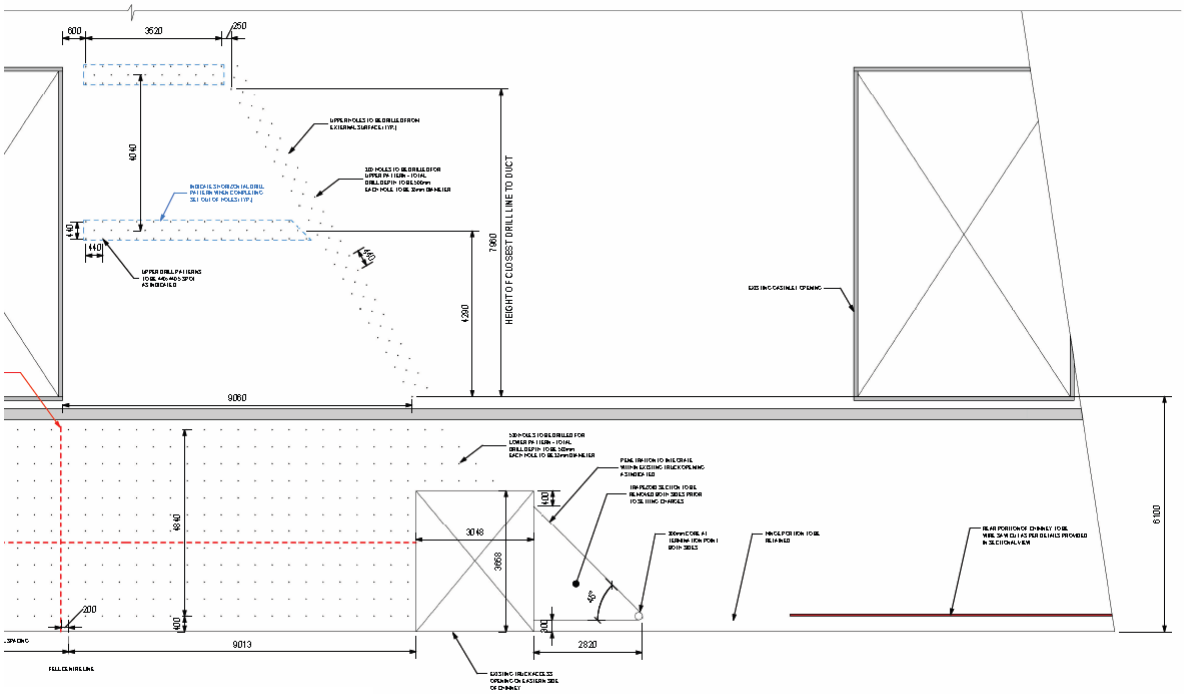
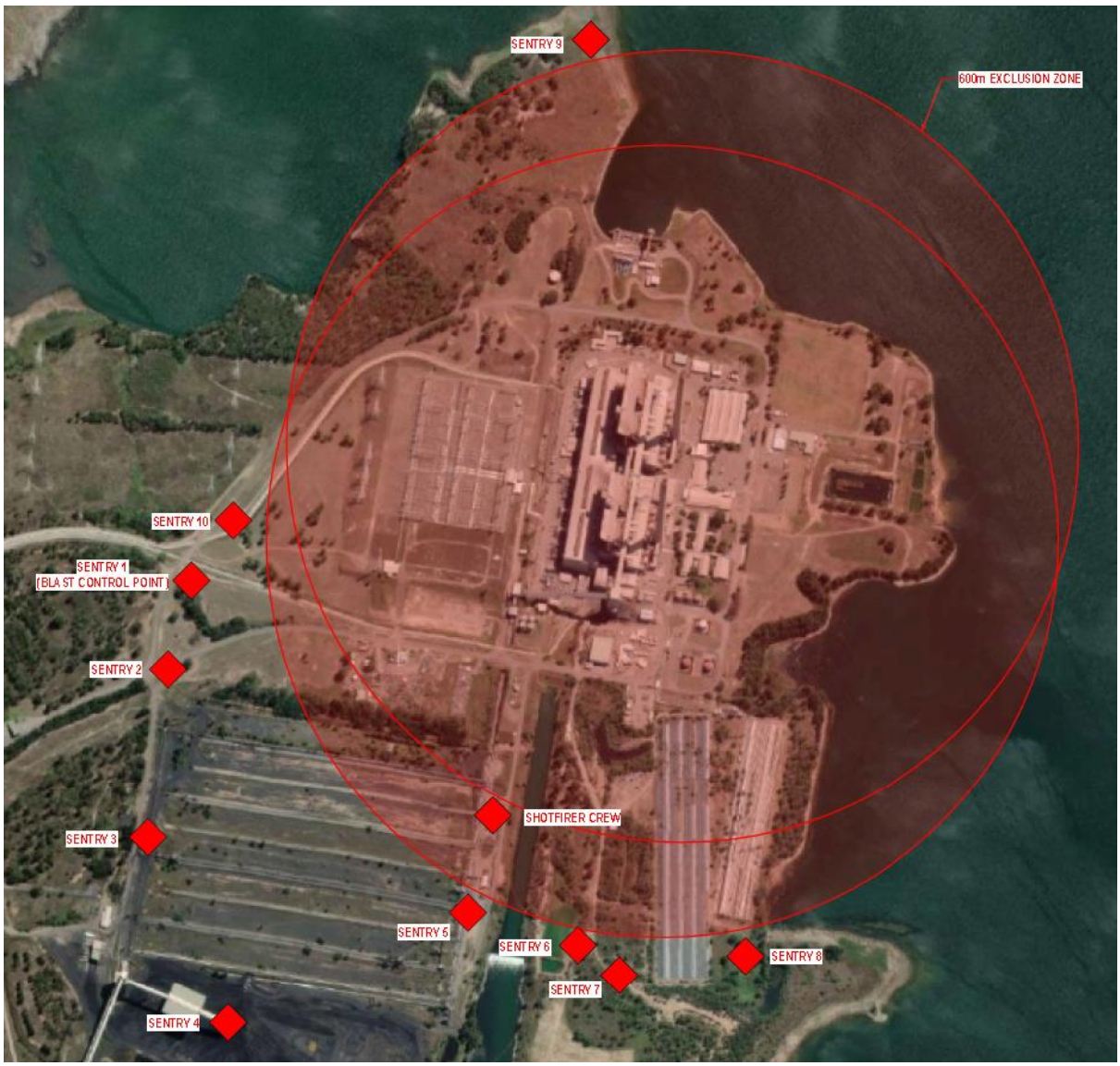


FIGURE 13 – EXTRACT OF BLAST LAYOUT – 2 OF 2



REFER TO APPENDIX Q FOR HIGH RESOLUTION DRAWING WITH EXCLUSION ZONE DETAILS

FIGURE 14 – PLAN VIEW EXCLUSION ZONE

The charges are to be detonated from the position indicated herein. An exclusion zone of 600m will be established for all personnel not including the blast crew. The exclusion zone will be secured by sentries positioned around the perimeter of the site as indicated in Figure 14. Sentry positions on Lake Liddell may be able to be monitored using drones, with a vessel in the water ready to support as required.

7.10 Detonation Sequence / Effective Charge Mass per delay (MIC)

In order to manage expected peak Air Over Pressure, the initiation of each chimney will be detonated with a delay of 4,000ms between the structures. For dust suppression, a total of 38 vessels are to be placed over charges (19 at the landing point of each chimney) and detonated part way through rotation - 10,000ms following the initiation of the respective chimney. This is to mitigate the dissipation of the water curtain prior to final chimney impact on grade.

As per Table 5 below, this results in an MIC of approximately 238.65 kg and this value has been used in the assessment of Peak Air Over Pressure (refer section 7.18). For specific charge delays, refer to Appendix B Blast Design Drawings for each structure / vessel.

TABLE 6 – MAXIMUM INSTANTANEOUS CHARGE

ROW ID#	NUMBER OF HOLES IN ROW	CHARGES PER HOLE	CHARGES FOR ROW	CHARGE WEIGHT OF ROW (KG)	CHARGE TYPE	ROW DELAY TIMING (MS)
U1/2 CHIMNEY CHARGE SCHEDULE						
1	45	1.75	78.75	14.57	SENATEL 32-200	VARIES
2	47	1.75	82.25	15.22	SENATEL 32-200	VARIES
3	49	1.75	85.75	15.86	SENATEL 32-200	VARIES
4	51	1.75	89.25	16.51	SENATEL 32-200	VARIES
5	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
6	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
7	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
8	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
9	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
10	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
11	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
12	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
UPPER	200	1.5	300	55.50	SENATEL 32-200	420
C1	10	2	20	3.70	SENATEL 32-200	180
C2	10	2	20	3.70	SENATEL 32-200	500
C3	10	2	20	3.70	SENATEL 32-200	500
C4	10	2	20	3.70	SENATEL 32-200	440
U1/U2 TOTALS	**760**		**1290**	**238.65**		
U3/4 CHIMNEY CHARGE SCHEDULE						
1	45	1.75	78.75	14.57	SENATEL 32-200	VARIES
2	47	1.75	82.25	15.22	SENATEL 32-200	VARIES
3	49	1.75	85.75	15.86	SENATEL 32-200	VARIES
4	51	1.75	89.25	16.51	SENATEL 32-200	VARIES
5	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
6	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
7	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
8	41	1.75	71.75	13.27	SENATEL 32-200	VARIES

9	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
10	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
11	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
12	41	1.75	71.75	13.27	SENATEL 32-200	VARIES
UPPER	200	1.5	300	55.50	SENATEL 32-200	4420
C1	10	2	20	3.70	SENATEL 32-200	4180
C2	10	2	20	3.70	SENATEL 32-200	4500
C3	10	2	20	3.70	SENATEL 32-200	4500
C4	10	2	20	3.70	SENATEL 32-200	4440
U3/U4 TOTALS	**760**		**1290**	**238.65**		

U1/U2 CHARGED VESSELS SCHEDULE

ID#	DET. CORD LENGTH (10g/m)	DET. CORD CHARGE WEIGHT (kg)	EMULSION CHARGE NO.	CHARGE WEIGHT	CHARGE TYPE	DELAY TIMING (MS)
V1	22m	0.22	5	0.925	SENATEL 32-200	10000
V2	22m	0.22	5	0.925	SENATEL 32-200	10000
V3	22m	0.22	5	0.925	SENATEL 32-200	10000
V4	22m	0.22	5	0.925	SENATEL 32-200	10000
V5	22m	0.22	5	0.925	SENATEL 32-200	10000
V6	22m	0.22	5	0.925	SENATEL 32-200	10000
V7	22m	0.22	5	0.925	SENATEL 32-200	10000
V8	22m	0.22	5	0.925	SENATEL 32-200	10000
V9	22m	0.22	5	0.925	SENATEL 32-200	10000
V10	22m	0.22	5	0.925	SENATEL 32-200	10000
V11	22m	0.22	5	0.925	SENATEL 32-200	10000
V12	22m	0.22	5	0.925	SENATEL 32-200	10000
V13	22m	0.22	5	0.925	SENATEL 32-200	10000
V14	22m	0.22	5	0.925	SENATEL 32-200	10000
V15	22m	0.22	5	0.925	SENATEL 32-200	10000
V16	22m	0.22	5	0.925	SENATEL 32-200	10000
V17	22m	0.22	5	0.925	SENATEL 32-200	10000
V18	22m	0.22	5	0.925	SENATEL 32-200	10000
V19	22m	0.22	5	0.925	SENATEL 32-200	10000
TOTALS		**4.18**	**95**	**17.575**		

U3/U4 CHARGED VESSELS SCHEDULE

V20	22m	0.22	5	0.925	SENATEL 32-200	14000
V21	22m	0.22	5	0.925	SENATEL 32-200	14000
V22	22m	0.22	5	0.925	SENATEL 32-200	14000
V23	22m	0.22	5	0.925	SENATEL 32-200	14000
V24	22m	0.22	5	0.925	SENATEL 32-200	14000
V25	22m	0.22	5	0.925	SENATEL 32-200	14000

V26	22m	0.22	5	0.925	SENATEL 32-200	14000
V27	22m	0.22	5	0.925	SENATEL 32-200	14000
V28	22m	0.22	5	0.925	SENATEL 32-200	14000
V29	22m	0.22	5	0.925	SENATEL 32-200	14000
V30	22m	0.22	5	0.925	SENATEL 32-200	14000
V31	22m	0.22	5	0.925	SENATEL 32-200	14000
V32	22m	0.22	5	0.925	SENATEL 32-200	14000
V33	22m	0.22	5	0.925	SENATEL 32-200	14000
V34	22m	0.22	5	0.925	SENATEL 32-200	14000
V35	22m	0.22	5	0.925	SENATEL 32-200	14000
V36	22m	0.22	5	0.925	SENATEL 32-200	14000
V37	22m	0.22	5	0.925	SENATEL 32-200	14000
V38	22m	0.22	5	0.925	SENATEL 32-200	14000
V20	22m	0.22	5	0.925	SENATEL 32-200	14000
V21	22m	0.22	5	0.925	SENATEL 32-200	14000
V22	22m	0.22	5	0.925	SENATEL 32-200	14000
V23	22m	0.22	5	0.925	SENATEL 32-200	14000
V24	22m	0.22	5	0.925	SENATEL 32-200	14000
V25	22m	0.22	5	0.925	SENATEL 32-200	14000
V26	22m	0.22	5	0.925	SENATEL 32-200	14000
V27	22m	0.22	5	0.925	SENATEL 32-200	14000
V28	22m	0.22	5	0.925	SENATEL 32-200	14000
V29	22m	0.22	5	0.925	SENATEL 32-200	14000
V30	22m	0.22	5	0.925	SENATEL 32-200	14000
V31	22m	0.22	5	0.925	SENATEL 32-200	14000
TOTALS		**4.18**	**95**	**17.575**		
GRAND TOTAL				**520.81**		
MIC				**238.65**		

7.11 Type of Explosive to be Used and Quantity Required

For type of explosives and quantity required, refer to Table 5 above. The explosives utilised will be Senatel packaged emulsions, detonating cord, and electronic detonators. The total quantity of explosives for the event will be 520.81 kg.

7.12 Method of Initiation

The method of initiation is to be electronic detonation of charges.

7.13 Type of Firing Equipment and Procedures

Firing is to be completed with the DaveyTronic Digital Blasting System (Electronic System). The procedure is to be as follows:

1. Tape electronic detonators onto start of detonating cord initiation lines
2. Clip in detonators to harness wire to register with programming unit (PU) and program delays
3. Transfer programming data to Remote Blaster (DRB2)
4. Run pre-blast checks (remote operation)
5. Commence count down / warning procedures and detonate charges



FIGURE 15 – FIRING EQUIPMENT – DAVEYTRONIC DIGITAL BLASTING SYSTEM

7.14 Drilling Procedures

The pre-drilling will be completed in accordance with Standard Operating Procedures and a site specific Safe Work Method Statement. The drilling is to be in accordance with the drill pattern provided in Appendix B of this document.

7.15 Explosive Loading and Charging Procedures

The following procedure is to be followed for loading and charging:

1. Emulsion charges to be removed from transportable magazine and inspected for damage prior to the packing
2. Charges are to have electronic detonator or detonating cord inserted into bottom end, and taped to cartridge depending on blast pattern application.
3. Cartridges to be firmly pushed into charge holes (tamped) in accordance with blast layout plan
4. Charge holes to be stemmed with clay / expanding foam
5. Tie detonating cord tails into linking detonating cord lines forming matrix where applicable

6. Attach electronic detonators to combined tails at either side of blast pattern (detonator to be fixed on either side of pattern for redundancy for upper pattern blast)
7. Clip in detonators to downline to register with programming unit and program delays
8. Transfer programming data to Remote Blaster (DRB2)
9. Run pre-blast checks (remote operation)
10. Commence count down / warning procedures and detonate charges
11. Following countdown / warning procedures, initiation to take place
12. Post-blast inspection and all clear procedures to then be followed

7.15.1 Quality Control Process

In order to ensure compliance with the blast design, works are to be verified as they progress with a record of compliance maintained within the blast specific Cutting - Drilling - Charge Loading Quality Control Schedule. This schedule is to be completed by the shotfirer, and signed off upon finalising of works.

Refer to Appendix N: Cutting - Drilling - Charge Loading Quality Control Schedule - WI-QC-057-001

In relation to confirming completion of the blast support works (stakeholder engagement, exclusion zones, services protection etc.), the client checklist is to be compiled, with reference documents included within the final pre-blast signoff by the shotfirer. This is a live document, that is to be completed as planning for the event is finalised.

Refer to Appendix R: Liddell Chimney Blast – Client Checklist - WI-QC-057-002

In addition to the above, from a blast design quality consideration, Wellanbah has engaged third-party specialists to review the design from both a structural and blast perspective. For the structural design third-party review, Rose PE have been engaged, with their review letter and key personnel CV provided in Appendix S. For the blast design review, Controlled Demolition Incorporated have been engaged, with their review letter and key personnel CV provided in Appendix T.

Principal Contractor CMA Contracting have also engaged consultant WGA to complete an independent structural review of the blast design. The outcome of this review is included in Appendix U.

7.16 Explosive Storage and Handling Procedures

As per the requirements of consent condition B18, the quantities of dangerous goods stored and handled by the development are below the threshold quantities listed in the Department's Hazardous and Offensive Development Application Guidelines – Applying SEPP 33 at all times as detailed herein.

In addition, in accordance with consent condition B19 all Dangerous goods are to be stored and handled strictly in accordance with all relevant Australian Standards (AS2187) as detailed herein.

Furthermore, in accordance with consent condition HR2, explosives will be stored in a non-ferrous receptacle clearly marked 'Explosives' that is kept closed and locked (except during use by authorised personnel) and stored in the original containers which are securely sealed.
The storage area should be a well-ventilated magazine licenced for Inter-governmental Maritime Consultative Organisation (IMCO) Class 1.1 explosives, which protects the explosives from the

weather, contamination, sources of ignition and access from unauthorised individuals. Storage will be isolated from other dangerous good stores and the area free of debris, waste and combustibles. The explosives containers should be protected against physical damage and regularly checked for spills and leaks.

In accordance with consent condition HR4, where more than 2.5 kg of Class 1.1 explosives are stored on a site, every perimeter entrance to the site must be labelled with a 'Hazchem' placard in accordance with the Explosives Regulations. Adequate security needs to be provided for the explosive's storage area, and only those who are authorised for unsupervised access to the area may have means to unlock the explosive storage magazine.

In accordance with consent condition HR5, Explosive storage and use areas will be no smoking and not contain naked light, heat or ignition sources. The explosives stock will be rotated to prevent ageing (use on first in-first out basis).

The following procedures are to be adhered with in relation to explosive storage and handling. It is noteworthy that due to the short term duration of the works, a storage facility will not be established onsite. Wellanbah Industrial's SafeWork NSW Licensed Facility will be used for storage, with explosives directly transported to site via a Category 2 Explosives Transport Vehicle, and fitted to the chimney structure in accordance with this Blast Management Sub-Plan.

The general process to be implemented is as follows:

1. Explosives storage compound is offsite and registered with SafeWork NSW for the first stage of the project.
2. Explosives register to be maintained for the offsite compound, listing types and quantities of explosives removed/returned to magazine throughout works. Keys to the magazine will be held by the shotfirer nominated on the storage license.
3. Charges to be picked up directly from offsite storage magazine, and transported to site for charge placement.
4. Transport vehicle to be fitted with transportable magazine and magazine to be locked at all times (key to remain in possession of shotfirer)
5. When placing charges, explosives to only be handled by personnel with Security Clearance.
6. Excess explosives to be placed back in transportable magazine which is to remained parked adjacent to the chimney stack overnight
7. Security is to be provided overnight for both the placed charges, and the transportable magazine.
8. Any tooling to be explosive specific, and clothing is to be low static.

In addition to these requirements, compliance with Department's Hazardous and Offensive Development Application Guidelines – Applying SEPP 33 will be achieved at all time.

The requirements of SEPP 33 are provided within the below Figures. Based on the maximum amount of explosive to be utilised <525kg, confirmation that the product doesn't fall into the Potentially Hazardous Region has been undertaken.

Table 1: Screening Method to be Used

Class	Method to Use/Minimum Quantity
1.1	Use graph at Figure 5 if greater than 100 kg

FIGURE 16 – SEPP 33 EXTRACT – TABLE 1: SCREENING METHOD TO BE USED

Figure 5: Class 1.1 Explosives

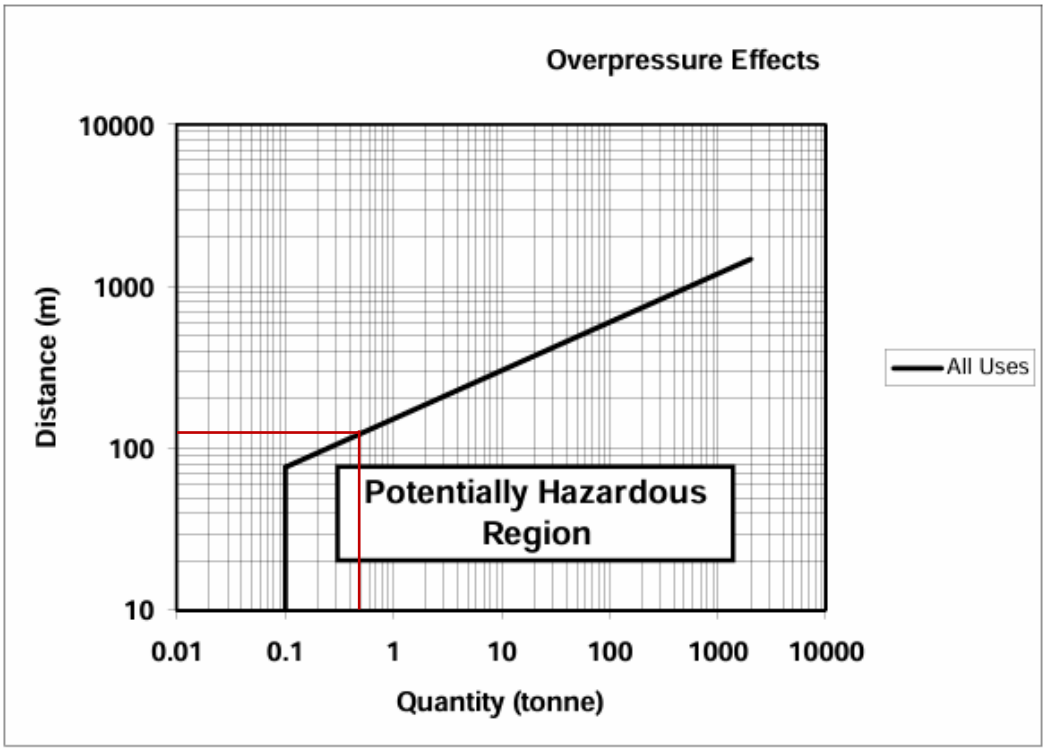


FIGURE 17 – SEPP 33 EXTRACT – HAZARDOUS REGION ASSESSMENT GRAPH FOR EXPLOSIVES

As per the SEPP 33 Hazardous Region Assessment, for 525 kg of explosives there needs to be a minimum of 140m to sensitive receivers. Based on the location of the chimney stacks, the nearest receiver is the Battery Storage Facility (BESS), which is approximately 220m from the structures. Hence compliance with the SEPP 33 requirements is readily achieved.

7.17 Security Procedures for the Site and the Blast, including Explosives

The following security procedures are to be followed onsite

1. All personnel must log onto site in accordance with site procedures
2. Inner exclusion zone to be set up in accordance Section 7.25, providing a physical barrier (chainwire fence), around the base of the chimney stacks.
3. Only pre-approved personnel to be permitted within the inner exclusion zone
4. Explosives only to be handled by personnel with appropriate NSW Security Clearance

5. Explosives either be locked inside transportable magazine, or under direct supervision of personnel with NSW Security Clearance at all times
6. All explosives to be accounted for in the explosives use register.
7. For sleeping charges overnight, guards are to be positioned at the chimney stacks to maintain security of the placed charges.
8. Explosives transport, vehicle fitted with transportable magazine, to remain parked next to chimney, and be under direct surveillance of security guards overnight.
9. For blast day, outer exclusion zone to be established in accordance with Blast Day Record Sheet (Refer to Appendix A)
10. Areas to be "swept" to ensure no unauthorised personnel are within the exclusion zone.
11. Sentries to be positioned around perimeter of exclusion zone to restrict any subsequent access
12. Pre-blast sentry checks and countdown procedure to be implemented as per Blast Day Record Sheet (Refer to Appendix A)
13. Exclusion zone to be maintained post blast, until the "all clear" is given by the shotfirer. The exclusion zone will than be handed over to the CMA Site Supervisor for further instruction from the hygienist to re-open the site in consideration of dust / air quality.

7.18 Environmental Considerations for Airblast Overpressure, Ground Vibration, Fly and Dust

In accordance with consent condition C20 clause b) (i) an assessment of blasting impacts at sensitive receivers and infrastructure, including the Liddell Ash Dam including the predicted airblast overpressure and ground vibration has been completed as provided herein.

Based on the nature of an explosive demolition blast event, there is potential to cause impact to neighbouring properties or assets due to airblast overpressure, ground vibration, fly and dust. This section outlines the predicted environmental effects that may arise due to the blast event as well as recommended mitigation measures in the event that standardised allowable limits are likely to be exceeded as required by the consent conditions, specifically C20.

Airblast Overpressure

As noted in Section 7.10, the Maximum Instantaneous Charge for the blast event is 238.65 kg of explosives.

The estimated peak airblast overpressure has been calculated in accordance with AS2187.2, clause J7.2, with appropriate values for the site exponent and site constant to account for the explosives confinement within the chimney walls.

The anticipated airblast overpressure has been assessed at regular intervals working radially from the chimney stacks. The values correlate with contour maps provided on Drawing WI-24057-06-E001 (refer to Appendix I).

TABLE 7 – AIR OVER PRESSURE VALUES AT VARIOUS DISTANCES

DISTANCE (m)	ESTIMATE PEAK AOP (DBL)
50	167.7
100	159.0
200	150.2
300	145.1
400	141.5
500	138.7
750	133.6
1000	130.0
1250	127.2
1500	124.9
2000	121.2
2500	118.4
3000	116.1

In addition, as per the requirements of the conditions of consent and AS2187.2, the expected Airblast Overpressure at critical (and sensitive) receivers must be assessment based on the MIC. These receivers are detailed within the consent conditions for SSD-24937520 and provided overleaf in Figure 19. Note that the noise logger locations are not applicable for this blast management sub-plan, as they refer to long term background noise monitors. Refer to Appendix H for monitoring locations for the blast event.

The closest sensitive receiver is a non-residential receptor HA01. This receptor is approximately 2200m from the nearest chimney. The calculated peak airblast overpressure at this receiver was 120.0 DBL. As per the limits specified in AS2187 Table J5.4(A), this is below the limit for a sensitive site with blasting operations lasting less than 12 months.

Further to the assessment of sensitive receivers, a number of critical assets are to be evaluated, including:

- Liddell Ash Dam
- Lake Liddell Dam Wall
- Transgrid Switchyard
- Battery Storage Facility (BESS)
- Transition 330/33kv Substation

The distance to each of these assets and the corresponding airblast overpressure values are provided in the below table. For locations of the below assets, refer to the site aerial provided in Appendix I.

In addition, consideration has been given to the Liddell 33kV switchyard located adjacent to the Hunter Valley Gas Turbines. However, due to the distance from the blast event, this will not be effected by the proposed works.

TABLE 8 – AIR OVER PRESSURE VALUE AT SENSITIVE / CRITICAL RECEIVERS

RECEIVER DETAILS	DISTANCE	ESTIMATE PEAK AOP
Closest Zone NCA1 Receiver – HA01	2200m	120.0 dBL
Closest Zone NCA2 Receiver – R03	4950m	109.8 dBL
Liddell Ash Dam	1800m	122.6 dBL
Lake Liddell Dam Wall	2300m	119.5 dBL
Transgrid Switchyard	230m	148.5 dBL
Battery Storage Facility (BESS)	220m	149.0 dBL
Transition 330/33kv Substation	330m	143.9 dBL

As per AS2187.2, the suggested limits for human discomfort are provided in Table J5.4(A). As per this table, the receivers identified within the consent conditions will not be exposed to peak sound pressure levels above the recommended limit of 125 dBL for irregular blast events. As such, no mitigation measures are required for these locations.

Receivers within the Liddell Power Station site will have all personnel vacated for the blast event, and hence human exposure for the blast event for these receivers will be managed via the exclusion zone.

TABLE J5.4(A)

AIRBLAST LIMITS FOR HUMAN COMFORT CHOSEN BY SOME REGULATORY AUTHORITIES (see Note to Table J5.4(B))

Category	Type of blasting operations	Peak sound pressure level (dBL)
Human comfort limits		
Sensitive site*	Operations lasting longer than 12 months or more than 20 blasts	115 dBL for 95% blasts per year. 120 dBL maximum unless agreement is reached with occupier that a higher limit may apply
Sensitive site*	Operations lasting for less than 12 months or less than 20 blasts	120 dBL mm/s for 95% blasts. 125 dBL maximum unless agreement is reached with occupier that a higher limit may apply
Occupied non-sensitive sites, such as factories and commercial premises	All blasting	125 dBL maximum unless agreement is reached with the occupier that a higher limit may apply. For sites containing equipment sensitive to vibration, the vibration should be kept below manufacturer's specifications or levels that can be shown to adversely effect the equipment operation

* A sensitive site includes houses and low rise residential buildings, hospitals, theatres, schools, etc., occupied by people.

FIGURE 18 – EXTRACT FROM AS2187 – AIRBLAST LIMITS FOR HUMAN COMFORT

APPENDIX 3 SENSITIVE RECEIVERS

Figure 3 – Sensitive receivers

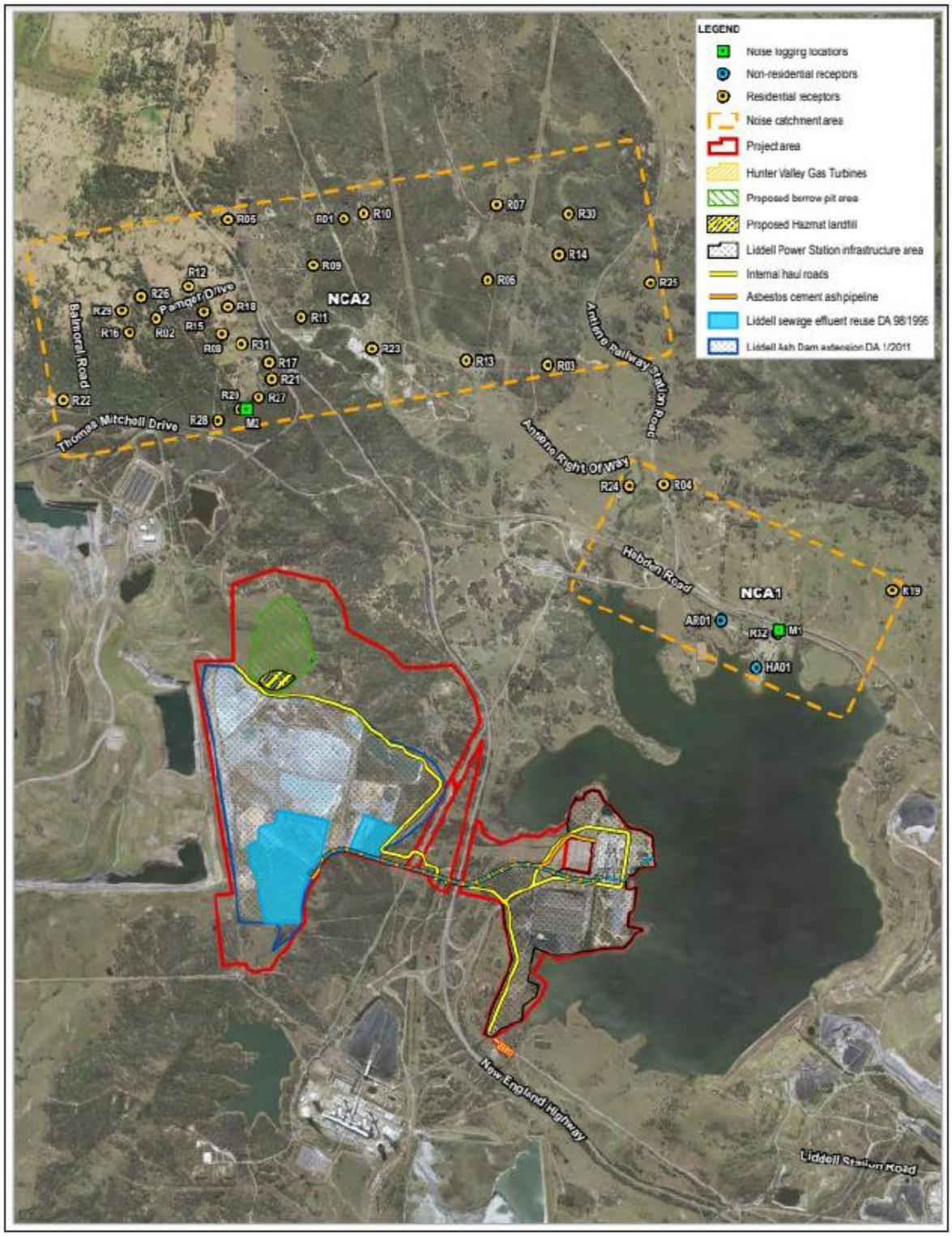


FIGURE 19 – EXTRACT FROM CONDITIONS OF CONSENT - SSD-24937520

In relation to damage to adjacent assets, it is evident that the Transgrid Switchyard, Battery Storage Facility (BESS) and Transition 330/33kv Substation will be exposed to peak sound pressure levels which exceed the generic recommended limits of AS2187.2 Table J5.4(B).

The Asset owners have been consulted further and additional information presented to demonstrate the anticipate effects of the blast on their assets. A record of this consultation is provided in Appendix R.

Note that all other assets within the vicinity of the blast event have peak sound pressure levels well below the recommended limits, and therefore no mitigation measures are required.

TABLE J5.4(B)

RECOMMENDED AIRBLAST LIMITS FOR DAMAGE CONTROL (see Note)

Category	Type of blasting operations	Peak sound pressure level (dBL)
Damage control limits		
Structures that include masonry, plaster and plasterboard in their construction and also unoccupied structures of reinforced concrete or steel construction	All blasting	133 dBL maximum unless agreement is reached with the owner that a higher limit may apply
Service structures, such as pipelines, powerlines and cables located above the ground	All blasting	Limit to be determined by structural design methodology

NOTE: Tables J5.4(A) and J5.4(B) are intended to be informative and do not override statutory requirements, particularly with respect to human comfort limits set by various authorities. They should be read in conjunction with any such statutory requirements and with regard to their respective jurisdictions.

FIGURE 20 – EXTRACT FROM AS2187.2 AIRBLAST RECOMMENDED LIMITS FOR DAMAGE CONTROL

Ground Vibration

Due to the nature of the blast event (size & location of charges above ground) explosive induced vibration is not deemed a risk for this project. However, the impact of the chimney upon grade will result in a ground vibration wave that will transmit through the site and is to be assessed herein.

The vibration induced by a ground impact is determined based on three key parameters, namely the mass of the structure, height above grade and the distance to the receivers / adjacent assets.

The properties of the structure have been determined based on the available design information, and in accordance with the staging of the demolition method the magnitude of energy released by the collapse event has been determined. The total mass of each chimney structure is approximately 7075 tonnes, and the centre of mass is at a height of approximately 60m.

The vibration assessment was conducted in accordance with conservative equations provided in Kim et al. (2010). These equations are used to assess both upper bound and expected vibration magnitudes for fell events. The method is based on normalized plots of vibration data from various demolition and dynamic compaction events, to provide a line of best fit for predictive purposes.

These analytical models have been utilised to assess upper bound and expected vibration values at various radii stepping out from the base of the chimney. This evaluation determined that the upper

bound vibration reduces to 15 mm/s within 175m of the chimney, with the expected vibration reducing to 15 mm/s within 57.5m of the base. The determined values at nominated radial contours is provided below, and correlates with Drawing WI-24057-06-E003 (refer to Appendix J). Figure 21 provides a graph of the attenuation of the vibration magnitude vs. distance.

TABLE 9 – ASSESSED VIBRATION AT VARIOUS RADII – PEAK PARTICLE VELOCITY

EXPECTED VALUES		UPPER BOUND VALUES	
PVV (mm/s)	Distance (m)	PVV (mm/s)	Distance (m)
18.82	50.0	125.50	50.0
5.79	100.0	38.63	100.0
2.91	150.0	19.39	150.0
1.78	200.0	11.89	200.0
0.90	300.0	5.97	300.0
0.55	400.0	3.66	400.0
0.38	500.0	2.50	500.0
0.19	750.0	1.26	750.0
0.12	1000.0	0.77	1000.0
0.08	1250.0	0.53	1250.0
0.06	1500.0	0.39	1500.0
0.04	1750.0	0.30	1750.0
0.04	2000.0	0.24	2000.0
0.03	2250.0	0.19	2250.0
0.02	2500.0	0.16	2500.0

In addition to this assessment, the conditions of consent for the state significant development specify that vibration at sensitive receivers be evaluated, and if required further controlled. The sensitive receiver locations are provided with the conditions of consent, as per Figure 19 above.

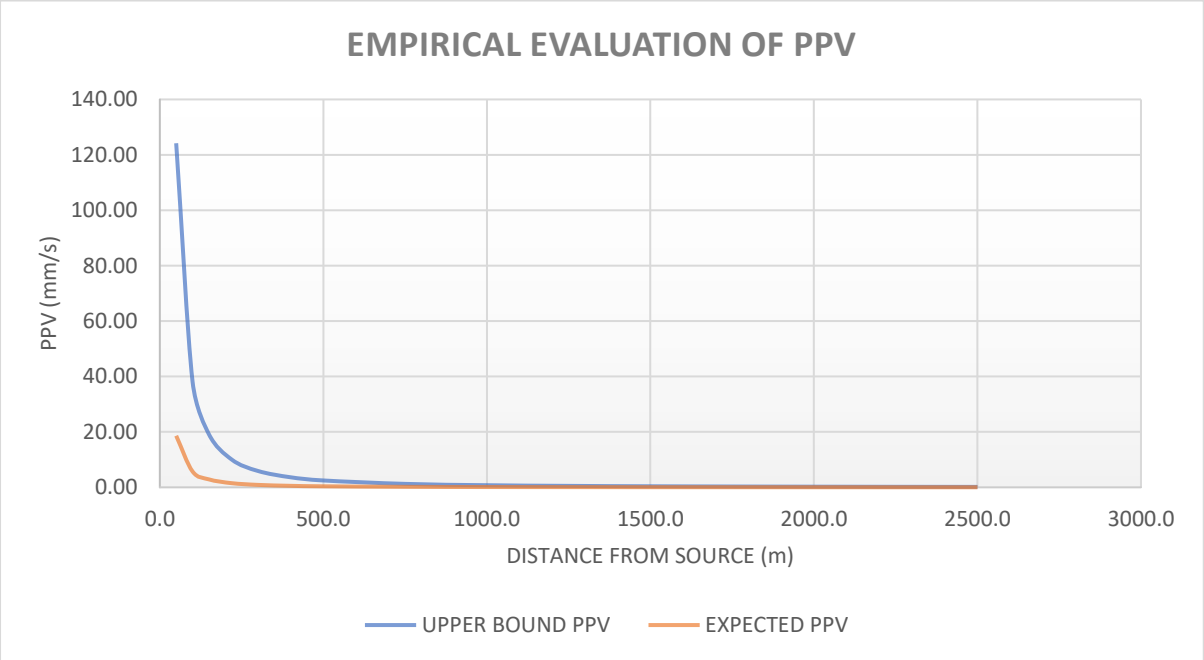


FIGURE 21 – ATTENUATION OF EXPECTED & UPPER BOUND VIBRATION VS. DISTANCE

The closest sensitive receiver is a non-residential receptor HA01. This receptor is approximately 2200m from the nearest chimney, and the upper bound vibration at this receptor has been calculated as 0.2 mm/s, which is within allowable limits and therefore no mitigation measures are required.

Further to the assessment of sensitive receivers, a number of critical assets have been evaluated, including:

- Liddell Ash Dam
- Lake Liddell Dam Wall
- Transgrid Switchyard
- Battery Storage Facility
- Transition 330/33kv Substation

The distance to each of these assets and the corresponding vibration evaluations are provided in the below table. For locations of the below assets, refer to the site aerial provided in Appendix J.

In addition, consideration has been given to the Liddell 33kV switchyard located adjacent to the Hunter Valley Gas Turbines. However due to the distance from the blast event, this will not be effected by the proposed works.

TABLE 10 – VIBRATION VALUES AT SENSITIVE / CRITICAL RECEIVERS

RECEIVER DETAILS	DISTANCE	EXPECTED VIBRATION (PPV)	UPPER BOUND VIBRATION (PPV)
Closest Zone NCA1 Receiver – HA01	2200m	0.03 mm/s	0.2 mm/s
Closest Zone NCA2 Receiver – R03	4950m	0.01 mm/s	0.05 mm/s
Liddell Ash Dam	1800m	0.04 mm/s	0.28 mm/s
Lake Liddell Dam Wall	2300m	0.03 mm/s	0.19 mm/s
Transgrid Switchyard	230m	1.4 mm/s	9.4 mm/s
Battery Storage Facility	220m	1.5 mm/s	10.1 mm/s
Transition 330/33kv Substation	330m	0.76 mm/s	5.07 mm/s

The determined values have been assessed against acceptable limits in accordance with AS2187.2. As per Table J4.5(A), the limits for a sensitive site for human discomfort is 10mm/s for operations less than 12 month. The upper bound vibration has been determined as 0.2mm/s, and hence is well within this criteria, and no mitigation measures are required.

TABLE J4.5(A)

GROUND VIBRATION LIMITS FOR HUMAN COMFORT CHOSEN BY SOME REGULATORY AUTHORITIES (see Note to Table J4.5(B))

Category	Type of blasting operations	Peak component particle velocity (mm/s)
Sensitive site*	Operations lasting longer than 12 months or more than 20 blasts	5 mm/s for 95% blasts per year 10 mm/s maximum unless agreement is reached with the occupier that a higher limit may apply
Sensitive site*	Operations lasting for less than 12 months or less than 20 blasts	10 mm/s maximum unless agreement is reached with occupier that a higher limit may apply
Occupied non-sensitive sites, such as factories and commercial premises	All blasting	25 mm/s maximum unless agreement is reached with occupier that a higher limit may apply. For sites containing equipment sensitive to vibration, the vibration should be kept below manufacturer's specifications or levels that can be shown to adversely effect the equipment operation

*A sensitive site includes houses and low rise residential buildings, theatres, schools, and other similar buildings occupied by people.

NOTE: The recommendations in Table J4.5(A) are intended to be informative and do not override statutory requirements with respect to human comfort limits set by various authorities. They should be read in conjunction with any such statutory requirements and with regard to their respective jurisdictions.

FIGURE 22 – EXTRACT FROM AS2187 – VIBRATION LIMITS FOR HUMAN COMFORT

Furthermore, as per the damage criteria detailed in AS2187.2, expected damage for reinforced or heavy commercial structures doesn't occur in vibration less than 50mm/s. Damage for unreinforced structures is not expected up to 15 mm/s. As such, vibration due to the induced collapse is not expected to cause any damage to the identified critical assets, and therefore no mitigation measures are required.

TABLE 11 – VIBRATION LIMITS AS PER AS2187.2-2006

TYPE OF STRUCTURE	PPV – VIBRATION LIMIT	REFERENCE
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s	AS2187.2-2006 Table J4.4.2.1
Unreinforced or light framed structure. Residential or light commercial type buildings	15 mm/s	AS2187.2-2006 Table J4.4.2.1

The Liddell Future Land Use and Enabling Works – Noise and Vibration Management Plan – document IS501900_NVMP_D0v4, Table 5-4 specifies a vibration limit for particularly sensitive structures of 3 mm/s. Hence, the evaluated vibration values at both the Liddell Ash Dam and Lake Liddell Dam of 0.28 mm/s and 0.19mm/s are well below these limits, an no mitigation measures are required.

Fly (projection of material from blast epicentre)

There is a possibility of fly due to the detonation of the charges. In order to manage risk of fly, the following control measures are to be in place:

1. Exclusion zone of 600m to be established
2. Charges to have protection / wrapping around the base of either the following:
    a. Single layer of chainwire mesh fencing and geofabric hung from dynabolt hook supports for upper charge group
    b. Conveyor belt dyna-bolted to outside surface of chimney wall
3. Exclusion zone to ensure no personnel are in the line of fire (projection line) of the blast.

Note that based on the distances to all critical infrastructure (refer to section7.18), the above listed mitigation measures are sufficient, and no additional mitigation measures are required.

Dust

Dust is to be managed in accordance with the project Dust Management Sub-Plan: Liddell Future Land Use and Enabling Works – DMP D0v5.

Management measurements to be implemented include:

- Fell path of chimney (impact zone) is to be pre-wet prior to planned collapse event
- Wet down may be achieved by water trucks prior to establishing final exclusion zone
- Dust suppression equipment to be installed consisting water cannons on the Northern and Southern extends of the impact zone to provide post blast dust suppression
- Installation of 38 charged vessels (19 at each chimney tip) to generate water curtain prior to impact of the chimney on grade
- Exclusion zone of 600m to be established, with personnel not to enter the area until any dust has dissipated
- Road management completed in consultation with NSW Police and Transport for NSW.
- All sentries to be issued with dust masks, in the event that unexpected dust is generated
- Water trucks to be on stand by to provide additional dust suppression post blast
- Air quality monitors to be installed in accordance with the monitoring plan for the works

Appendix V provides and overview of the dust control measures to be established onsite.



FIGURE 23 – USE OF CHARGED VESSELS FOR DUST SUPPRESSION ON CHIMNEY DEMOLITION

In addition, secondary dust migration control measures are to be implemented in accordance with the Asbestos Control Plan – Liddell Stack Felling, as provided in Appendix Z.

- Removal of critical equipment from external areas, where possible, or coverage of equipment with plastic sheeting;
- Blast protection (plywood, netting, etc.) over windows to protect from debris;
- Closing of doors and windows;
- Stoppage of HVAC systems drawing external fresh air into internal areas;
- Sealing over vents and other similar penetrations into occupied spaces;

Finally, the blast event is to be completed under allowable conditions provided in ERM Air Quality Management Support assessment (refer to Appendix Y). This report details allowable wind speeds and direction for the fell event to manage dust as follows:

- Hourly average wind speeds greater than 2 m/s (~4 knots); and
- Wind directions from the south through to the west-north-west (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure areas.

7.19 Control Measures for Environmental Effects

In accordance with consent condition C20 clause (iii) a strategy to monitor, assess, mitigate or compensate for the effects of blasting at sensitive receivers identified by the assessment required by condition C20(b)(i) of the Consent has been developed as referenced herein. Note that an assessment of environmental effects was completed in Section 7.18 and this assessment determined

that no sensitive receivers will be affected by the blast. However, industry best practice mitigation strategies will still be applied to further mitigate potential environmental effects.

The following control measures are to be implemented for environmental effects

1. Establishment of appropriate exclusion zone
2. Evaluation of airblast overpressure against allowable limits, hence ensuring blast design does not exceed noise limits
3. Delay implemented between charge groups to reduce MIC
4. Placement of protection around charges
5. Communication with all affected stakeholders (infrastructure owners in this case)
6. Dust suppression to be utilised as per the listed controls in Section 7.18
7. Airblast overpressure and vibration evaluated as per Section 7.18 of this document

In addition to the above, as per consent condition C20(c)(ii) manage the risks identified in the environmental risk assessment required by Condition B1, the following controls are to be implemented as relevant to the blast event:

TABLE 12 – ENVIRONMENTAL RISK ASSESSMENT CONTROLS

RISK EVENT	CONTROLS
Emissions to the air (dust & air quality)	Installation of dust suppression (sprinklers, water cannons) for blast event. Utilise charge vessel to generate water curtain following blast Assessment on allowable wind conditions for event (W, SW above 2 m/s) Dust monitoring for event
Noise and vibration exceed limits	Engineering assessment of blast design Monitoring of blast event Following notification / reporting protocols Detailed blast design to be implemented for works 3rd party engineering and blast design review Exclusion zones established Minimise maximum instantaneous charge with delays

The Environmental Risk Assessment is provided in Appendix AB of this BMSP.

7.20 Monitoring Procedures for Airblast Overpressure, Ground Vibration and Dust

In accordance with consent condition C20 clause (iii) a strategy to monitor, assess, mitigate or compensate for the effects of blasting at sensitive receivers identified by the assessment required by condition C20(b)(i) of the Consent has been developed as referenced herein.

In order to confirm compliance with allowable exceedance levels for vibration, air quality and airblast overpressure, monitoring devices will be positioned at various locations onsite. The specific locations have been provided within the monitoring plan (Appendix H).

The locations have been specifically selected to include the closest receivers in the sensitive Noise Catchment Area 1 and Noise Catchment Area 2. In addition, locations for sensitive site assets have also been nominated including the battery storage facility, Transgrid switch yard, Liddell Ash Dam, and selected site boundaries. Refer to Appendix H for specific locations.

As the blast is a single event, the monitoring program will include monitoring for the day of the event. Reporting will be undertaken in accordance with the EPL 2122 license requirements and as per the SSDS consent requirements. The results of the monitoring will be evaluated against the allowable limit of 125 dBL at each of the sensitive receiver locations to confirm compliance was achieved. In the event of an exceedance (in addition to the reporting requirements) the event will be reviewed to inform future blasting works onsite.

In addition, monitoring for dust and asbestos fibres is to be completed in accordance with the Asbestos Control Plan – Liddell Stack Felling (Appendix Z).

7.21 Details of Communication Systems & Placement of Warning Signs

Communication Systems:

Communication during the establishment of the exclusion zone and the countdown will be completed in consultation with the Principal Contractor via two-way radios issued to all personnel. In addition, all personnel associated with the blast day event (including adjacent stakeholder representatives) will attend a mandatory training session/dry run for managing the exclusion zone, and the pre-start meeting where the planned activities for the day and specific arrangements for the blast event are broadcast to all personnel.

Initial Work Area (Inner Exclusion Zone) Warning Signs:

Warning signs “Danger – Blasting Keep Well Clear”, are to be positioned at all boundaries to the chimney work area / inner exclusion zone. The inner exclusion zone during the placement of charges is to encompass the site areas at the base of each chimney as indicate in Figure 23 below.

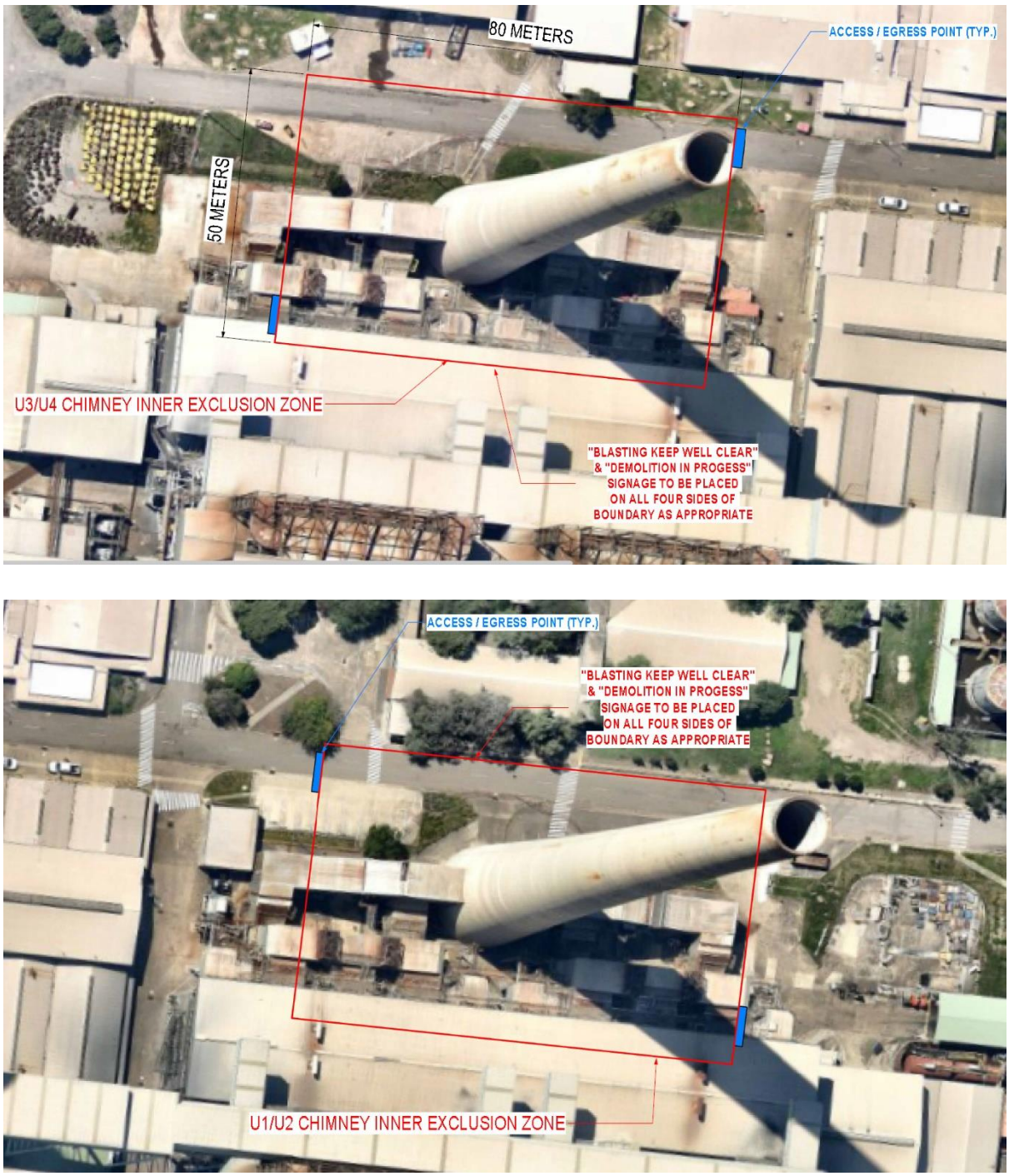


FIGURE 24 –WARNING SIGNS & INNER EXCLUSION ZONE (DURING DRILLING, CUTTING & PLACEMENT WORKS)

7.22 Warning / Signalling Procedures

The following warning / signalling procedure is to be followed for the execution of the planned blast event.

Prior to commencing countdown, an exclusion check over the radios is to be completed to confirm the exclusion zone is clear, the 10-minute countdown will then commence:

@ 10 min. – 5 siren blasts

@ 1 min. – single 10 second-long blast and radio silence

@ 10 seconds – final countdown broadcast over radio from 10 down to 5 seconds

@ 5 seconds – Radio silence maintained

@ 0 second – Shotfirer to broadcast “Firing Now”, and charges will be detonated.

Note - Sentries will monitor this exclusion zone throughout the countdown, and advise any unauthorized entry and if abort is required. This will be completed by broadcasting over the radio abort, abort, abort. If the shotfirer does not respond, repeat the broadcast and await confirmation from the shotfirer prior to providing details of intrusion.

Post blast inspection to be undertaken by the shotfirer following the event, with the exclusion zone to remain in place until the “All Clear” from the shotfirer in relation to explosives only is broadcast over the radio. In the event of a misfire, exclusion zone and sentries to remain in position, until execution of mis-fire treatments.

Note that the exclusion zone for hazardous materials and dust will still remain in place, with the clearance process to be completed in accordance with the Asbestos Management Control Plan, provided in Appendix Z of this BMSP.

7.23 Traffic Management Plan

All traffic movements are to be completed in accordance with the project specific Traffic Management Plan. This Traffic Management Plan includes requirements for Traffic Control Plans to manage any temporary traffic control arrangements, of which documents will be prepared by a suitably qualified person in accordance with the Austroads Guidelines.

Note that for the duration of the blasting exercise, all vehicles, with the exception of the explosives transport vehicle, will not be permitted within the initial working exclusion zone (inner exclusion zone) – Refer to Figure 24. In addition, for the planned blast event, traffic management controls will be implemented for the New England Highway in consultation with NSW Police to ensure appropriate risk mitigations are in place for traffic in the vicinity of the event.

Refer to Appendix W for Traffic Management Plan / Traffic Management Control Plans / Road Occupation License details.

7.24 Proposed Dates and Times of Blasting

The demolition of the Liddell Power Station has commenced, and it is proposed that the chimney blast event be executed within May 2026.

TABLE 13 – PROPOSED DATES AND TIMES

DATE RANGE	TIME RANGE	COMMENTS
May 2026	9:00AM TO 5:00PM	Intended blast time to be 1:30pm, subject to weather and site requirements

7.25 Details of Exclusion Zone

For the project, two exclusion zones will be established, as per the below aerial.

1. An inner exclusion zone is to be established for the installation of the charges, encompassing the base of the chimney stacks – Refer to Appendix O.
2. An outer 600m exclusion zone is to be established prior to connecting the detonators to the initiation lines, and subsequently the final countdown / initiation of blast – Refer to Appendix Q.

Sentry positioning for the 600m exclusion zone is to be completed in accordance with the Blast Day Sheet and Sentry Map (Refer to Appendix A & Appendix Q Drawing WI-24057-06-E005).

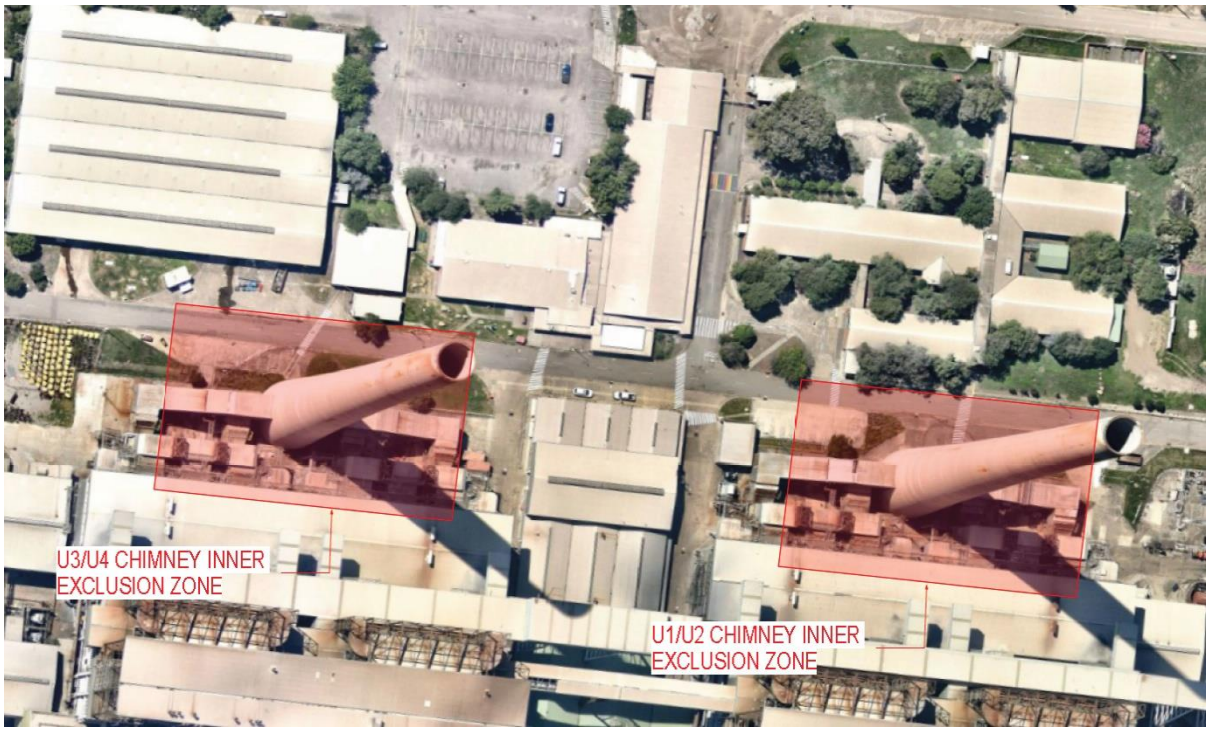


FIGURE 25 – INNER EXCLUSION ZONE – PRIOR TO CONNECTING DETONATORS



FIGURE 26 – 600m OUTER EXCLUSION ZONE

7.26 Method of Notification / Consultation to Owners and Occupiers of Structures, and Providers of Services Adjacent to Blast

In accordance with Condition Consent Clause C20 b) ii) AGL will complete consultation with the relevant private landowners or infrastructure owners if the assessment predicts blasting by the development will impact sensitive receivers (Refer to Section 7.18). A record of this consultation is to be included in Appendix R of this BMSP.

Based on the environmental effects assessment (refer to Section 7.18), the noise and vibration generated by the blast event is below the threshold for sensitive receivers. This is due to the significant buffer zone around the power station. Although, there is no requirement for receivers outside the site area to be notified of this particular blast event, as they remain unimpacted, consultation will be undertaken in co-ordination with the site owner AGL and Principal Contractor CMA in the lead up to the blast event.

Onsite stakeholders which are identified during the risk assessment process are to be notified of the blast in co-ordination with the site owner AGL and this is to be captured with the Pre-Blast Client Checklist – Refer to Appendix R.

7.27 Protection of Services

Following a review of the site services/assets, the primary item which requires protections is the subsurface drainage network which has numerous inlet pits / connecting pipes within the vicinity of the chimney impact zone. In order to protect these services, steel plate caps and soil bunds are to be placed over the affected areas.

In addition, as a precaution, the Principal Contractor is to install a barrier of shipping containers along the Southern spray zone to provide additional protection to the BESS facility.

Refer to Appendix W for the layout of the proposed protection measures.

Consideration has also been given to the Transgrid switchyard located to the West of the chimney stacks, however it is noted that protection is inherently provided to the critical Transgrid switchyard asset based on the positioning / retention of the boiler house and turbine hall to the West of the chimneys, thus providing a barrier between the blast and the Transgrid switchyard.

7.28 Influence of Weather

The following weather conditions may result in a pause or cessation of the planned blast:

- Wind in excess of allowable limits / allowable directions as defined in the engineering drawings (Refer to Appendix B) and ERM Air Quality Management Support Plan (Refer to Appendix Z) – Refer to Section 7.31 for evacuation process in event of allowable wind speed exceedance.
- Heavy rain – determined based on site conditions
- Electrical Storms – Refer to Section 7.31 for evacuation process in event of allowable wind speed exceedance.

In addition to the above, the weather conditions will be assessed in advance of the scheduled blast day, and postponed if the forecast is deemed unsuitable for the planned activities. Execution of works is to be completed in accordance with the controls of the Trigger Action Response Plan, provided within Appendix L. Note that the TARP is applicable up until the time that the rear heel cuts are completed. After this point, the allowable wind speeds are governed by the engineering specification provided in Appendix B. This includes a reduction in allowable gust wind speed of 22.5 m/s following heel cuts and an allowable wind speed from a structural perspective of 15 m/s for the blast event.

Furthermore, the blast event is to be completed under allowable conditions provided in ERM Air Quality Management Support assessment (refer to Appendix Z). This report details allowable wind speeds and direction for the fell event to manage dust as follows:

- Hourly average wind speeds greater than 2 m/s (~4 knots); and

- Wind directions from the south through to the west-north-west (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure areas.

7.29 Loading in poor light conditions or reduced visibility

All works are only to be completed during daylight hours. In addition, due to the nature of the charge placement, poor light / reduced visibility is unlikely to become a risk.

In the event that heavy fog, or other meteorological circumstances reduce visibility, works are to be postponed until safe to proceed with works.

7.30 Cessation of Explosive-related Activities During Electrical Storms

Throughout the placement process, lightning trackers are to be reviewed in 15-minute intervals if any risk of electrical storms is possible. This is to be monitored by the shotfirer using a Lightning Tracker App, which is also programmed to provide updates of any lightning strikes within 60km of the site. Response is to be in accordance with the Trigger Action Response Plan (TARP) as provided in Appendix L.

In the event of an approaching electrical storm, area is to be locally made-safe, and the exclusion zone noted in the TARP is to be set in place until storm has passed. However, works are to be scheduled in consideration of weather forecast to reduce probability of electrical storm occurrence.

7.31 Evacuation Procedures

The evacuation procedure is to be as follows:

1. Requirement for evacuation broadcast on the radio, to notify all personnel within the exclusion zone of the need to immediately evacuate. This notification is to be stated as follows: **“Evacuate, evacuate, evacuate, all personnel to immediately evacuate the chimney blasting area”**
2. All personnel within the exclusion zone are to relocate to the pre-determined muster point for the site.
3. This specific location will be broadcast on the morning of the blast.
4. Roll calls to be completed for all personnel to ensure all are accounted for
5. Depending on the nature of the evacuation, emergency procedures or corrective actions to be developed by shotfirer or structural engineer (depending on whether the trigger was due to high-wind or lightning) and CMA Site Supervisor prior to returning to the work area.

The requirement to evacuate is influenced by weather conditions due to potential for lightning or high winds. Appendix L provides the Trigger Action Response Plan (TARP) to be implemented for the project.

Additional wind limitation limits are to be complied with in accordance with the blast design drawings (Appendix B) in the lead up to the blast event.

7.32 Crowd Control

The location of the blast is within the significant power station site, hence crowd control will be achieved through the positioning of sentries at all potential access locations (Refer to Appendix A) and existing site security fencing.

Crowds from the general public are not to be encouraged. However, they will be able to achieve access to the Caravan Park on the Northern side of Lake Liddell, which will be outside the site / exclusion zone. Lake Liddell is already closed, and a representative is to be positioned at the boat ramp to prevent the general public entering the lake via watercraft / kayaks.

Several road closures are also to be completed and have been determined in consultation with Muswellbrook Council,Transport for NSW and NSW police.

7.33 Pre-Blast Final Inspection

The following pre-blast final inspection is to be undertaken, which will also be detailed within the Inspection Test Plan for execution phase.

1. Following placement of charges and/or tie in of detonating cord matrix, assess charges and knots for any dislodgement / looseness in the system.
2. Inspect connection between initiation lines and electronic detonators.
3. Inspect protection placed around the base of the chimney for potential cut off to any areas of detonating cord or the detonator wires.
4. Inspect vessels and explosives for dust control measures (ensure water is at correct level, no sources of cut-off or damage to explosives
5. Ensure electronic detonator clips are securely fastened to harness wire
6. Run pre-blast checks on initiation system (missing det search, leakage/broken line, det count)
7. Take control of the exclusion zone from the demolition supervisor following final sentry checks and commence countdown procedure before initiating charges

7.34 Misfire Management System & Contingency Plan

The following procedures are to be followed in the event of a misfire.

Note that due to the site specific nature of the blast event, the below provides guidance only, specific misfire procedures are to be finalised on a case by case basis, with a risk assessment undertaken prior to implementing proposed procedure.

7.34.1 Waiting Interval

A waiting interval of 5 min is to be observed prior to approaching an expected misfire (Clause 10.3.2 of AS 2187.2-2006).

7.34.2 Misfire Treatment Procedures

TABLE 14 – MISFIRE PROCEDURES

CAUSE OF MISFIRE	POTENTIAL TREATMENT ACTION
Failure to detonate charges	After mandatory 5 min waiting interval observed, identify reason for mis-fire, rectify and complete firing procedure / countdown again.
Explosives detonate, but structure fails to collapse structure (stand-up)	Exclusion zone to be maintained, and structure investigated remotely via drones. Cause of stand-up to be identified, with particular focus on the extent of retained concrete. Based on this information, consultation to be held with structural engineer and demolition supervisor to determine rectification measures. Measures may include utilising remote controlled excavators to hammer out the front of the chimney to encourage rotation of the structure. In the event that the entire structure settles and remains vertical, engineering/risk assessment may be considered to facilitate re-approaching the chimney under low wind conditions to re-drill / load the structure, for secondary firing of charges. Exact rectification subject to risk assessment and key stakeholder consultation.
Explosives detonate, but result in partial collapse.	Exclusion zone to be maintained, and structure investigated remotely via drones. Cause of partial to be identified. Based on this information, consultation to be held with structural engineer and demolition supervisor to determine rectification measures. Measures may include utilising remote controlled excavators to hammer out the front of the chimney to encourage rotation of the structure. In the event that the entire structure settles and remains vertical, engineering/risk assessment may be considered to facilitate re-approaching the chimney under low wind conditions to re-drill / load the structure, for secondary firing of charges.

7.35 Post Blast Assessment and Inspection Procedures

The following checklist is to be followed when undertaking post blast assessment (note this checklist is included within the Blast Day Record Sheet – Appendix A):

TABLE 15 – POST-BLAST INSPECTION REQUIREMENTS

ITEM	DESCRIPTION
BLAST FUMES – NOXIOUS AND TOXIOUS GASES	BLAST FUMES TO BE VISUALLY ASSESSED PRIOR TO APPROACHING BLAST ZONE
STANDUP OF STRUCTURE	FAILURE OF STRUCTURE TO COLLAPSE, CONFIRM FROM A SAFE DISTANCE CAUSE AND LOCATION OF FAILURE STRUCTURAL ENGINEER TO ASSESS AS REQUIRED
EVIDENCE OF MISFIRE	EVIDENCE OF ANY UNEXPLODED CHARGES
STABILITY OF STRUCTURE	CONFIRM STRUCTURE IN STABLE POSITION / TYPE OF EXCLUSION ZONE WHICH MUST BE MAINTAINED
HAZMAT	ANY UNEXPECTED FINDS IN RELATION TO HAZMAT – ASBESTOS ETC.

Post-blast fumes are to be assessed in accordance with the below colour coding. As per QLD DEEDI advise, the area should not be entered until the adequate dilution of fumes. In emergencies, level of 5 ppm, can be tolerated in short term, however as a general rule, the area should not be approached until there are no visible fumes.

TABLE 16 – RATING PROCEDURE FOR POST-BLAST FUMES

POST-FIRING FUME CONDITIONS						
FUME RATING						
	0	1	2	3	4	5
	☐	☐	☐	☐	☐	☐

Nitrogen dioxide (NO_2) concentrations for odour, visibility and 'immediate danger to life and health' (IDLH)

Odour threshold	0.12 ppm
Visible	2.5 ppm
Any atmosphere in which nitrogen dioxide (NO_2) is noticeable by smell, irritation and colour should be regarded as potentially dangerous.	3 ppm – 5 ppm
Specific symptoms may materialise above this level and can result in immediate danger to life and health (IDLH). IDLH is defined as exposure to airborne contaminants that are likely to cause death or immediate or delayed adverse health effects, or prevent escape from such an environment.	20 ppm+

FIGURE 27 – EXTRACT FROM QLD DEEDI – FACTSHEET ON BLAST FUMES

The below figure provides additional guidance on safe levels of post-blast fumes.

Level	Typical Appearance
Level 0 No NOx gas	
Level 1 Slight NOx gas 1A Localised 1B Medium 1C Extensive	
Level 2 Minor yellow/orange gas 2A Localised 2B Medium 2C Extensive	
Level 3 Orange gas 3A Localised 3B Medium 3C Extensive	
Level 4 Orange/red gas 4A Localised 4B Medium 4C Extensive	
Level 5 Red/purple gas 5A Localised 5B Medium 5C Extensive	

FIGURE 28 – FUME RATING GUIDANCE

7.36 Provision for post-blast comments

Section for post-blast comments is included within the Blast Day Record Sheet. Refer to Appendix A.

7.37 Blast Plan Sign Off

Page 2 of this blast plan is to be signed off prior to executing works.

In addition, the Blast Day Record Sheet and Inspection Test Plan, are to be completed by the shotfirer through the duration of the blasting activities and kept as a record post blast.

Copy of this Blast Management Sub-Plan must be retained at the work front at all times.

8 STAKEHOLDER NOTIFICATIONS & CONSULTATION

8.1 STAKEHOLDER NOTIFICATIONS

Stakeholder notifications are to be completed for the planned blast activity. Records regarding the completion of the stakeholder notifications are provided within the client pre-blast checklist: WI-QC-057-002 in Appendix R. A register of notifications (and consultation) is provided in Appendix AA.

8.2 CONSULTATION WITH PRIVATE LANDOWNERS OR INFRASTRUCTURE OWNERS

Consultation has been completed in accordance with consent condition C20 (b)(ii) with all private landowners or infrastructure owners at locations where the blast will impact the receiver. As per Section 7.26, the assessment determined that the BESS Facility, the Transgrid Switchyard and the Transition 330/33kv Substation with be within the influence zone of the blast and therefore require consultation. No other private landowners will be impacted by the blast.

BESS Facility:

BESS Facility is an AGL owned asset, and consultation has been undertaken within AGL with internal approval granted to proceed with the blast event.

Transgrid Switchyard:

Consultation has been undertaken with Transgrid since the 16.10.25. The consultation process included discussions around the blast design, access restrictions, the blast day sequence of events and the potential effects of the blast on Transgrid's assets.

The outcome of the consultation was that Transgrid is to develop recoverable works agreement for the event. (agreement developed and under final review by AGL and Transgrid.).

Transition 330/33kv Substation

The Transition 330/33kv Substation is an AGL owned asset, and consultation has been undertaken within AGL with internal approval granted to proceed with the blast event.

A summary regarding the consultation process with these infrastructure owners is provided in Appendix AA – Consultation Records.

8.3 CONSULTATION FOR ROAD CLOSURES

Consultation has been held with NSW Police, TfNSW and Muswellbrook Council in relation to road closures for the planned blast event. The outcome of the consultation is that a road occupation license has been granted for the event. Refer to Appendix AA – Consultation Records, for a summary of the consultation process.

8.4 CONSULTATION WITH SAFEWORK NSW

Consultation has been undertaken with SafeWork NSW, and they have indicated that they are satisfied with the planned demolition approach and agree with the assessments associated with the management of the event.

A summary regarding the consultation process with SafeWork NSW is provided in Appendix AA – Consultation Records.

8.5 CONSULTATION WITH DEPARTMENT OF PLANNING, HOUSING AND INFRASTRUCTURE

In finalising this blast management sub-plan, consultation has been completed with Department of Planning, Housing and Infrastructure as well as SafeWork NSW.

Records of this consultation are provided within Appendix AA of this document.

9 COMPLIANCE NOTIFICATIONS, INCIDENT NOTIFICATIONS AND REVISIONS

9.1 COMPLIANCE AND NON-COMPLIANCE NOTIFICATIONS

As per consent condition D4. within seven days of becoming aware of a non-compliance, the Department will be notified of the non-compliance. The notification will:

(a) be in writing;
(b) submitted via the NSW planning portal (Major Projects); (c) identify the development (including the development application number and name);
(d) set out the condition of this consent that the development is non-compliant with;
(e) why it does not comply;
(f) the reasons for the non-compliance (if known); and
(g) what actions have been undertaken, or will be undertaken; and when, to address the non-compliance

9.2 INCIDENT NOTIFICATIONS

In accordance with D5. The Department will be notified within 24 hours of becoming aware of an incident. The notification will be made via the NSW planning portal (Major Projects) and address details of the incident including:

(a) date, time and location;
(b) a brief description of what occurred and why it has been classified as an incident;
(c) a description of what immediate steps were taken in relation to the incident; and
(d) identifying a contact person for further communication regarding the incident.
In accordance with consent condition D6. the Department will be provided with a subsequent incident report in accordance with their Appendix 6 (Incident Notification and Reporting Requirements).

9.3 REVISIONS

In accordance with consent condition D7. Revisions are to be completed within three months of the following events:

(a) the submission of an incident report under conditions D5 or D6;
(b) the submission of a compliance report under condition D3;
(c) the submission of an Independent Environmental Audit under condition D1;
(d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or
(e) notification of a change in the development phase under condition A10;
The suitability of the existing environmental management documents required under this consent must be reviewed. If the review concludes an update to an environmental management document is required, or to comply with a directive, the relevant environmental management document must be revised and submitted to the Planning Secretary for approval within three months of the review.

APPENDIX A – BLAST DAY RECORD SHEET

BLAST DAY RECORD SHEET

In accordance with AS2187.2-2006 Explosives Storage and Use – Part 2 Use, clause A3, a Blast Day Record Sheet must be completed for all projects which contains the details provided herein.

1. PROJECT AND BLASTING DETAILS

ITEM	DESCRIPTION		
PROJECT NAME	LIDDELL POWER STATION - CHIMNEY DEMOLITION		
SITE LOCATION	LIDDELL POWER STATION, MUSWELLBROOK NSW		
DATE OF BLAST			
TIME OF BLAST			
SHOTFIRER DETAILS	DANIEL HEALY – 0432 164 748		
SHOTFIRER SIGNOFF		**DATE**	
BLASTING METHOD **(NOTE – STEPS 1 – 5 WILL BE COMPLETED IN DAYS PRIOR TO BLAST EVENT)**	General blasting method includes drilling 720 blast holes into the front of each chimney in accordance with the drill pattern provided in Appendix B of this document. A further 10 blast holes will be drilled into the eastern two front columns which support the suspended slab at RL 456' 8''. The holes are to be filled with packaged emulsion in accordance with the charge schedule, with appropriate delays applied. Following the completion of the rear saw cuts, the charges will be detonated to induce the collapse of the structures. In addition, 38 vessels will be set out with charges to generate a water curtain to assist with managing dust for the event. The charge placement includes the following steps: 1. Emulsion charges to be removed from transportable magazine and inspected for damage prior to the packing 2. Charges are to have electronic detonator or detonating cord inserted into bottom end, and taped to cartridge depending on blast pattern application. 3. Cartridges to be firmly pushed into charge holes (tamped) in accordance with blast layout plan 4. Charge holes to be stemmed with clay / expanding foam 5. Tie detonating cord tails into linking detonating cord lines forming matrix where applicable 6. Attach electronic detonators to combined tails at either side of blast pattern (detonator to be fixed on either side of pattern for redundancy for upper pattern blast) 7. Clip in detonators to downline to register with programming unit and program delays 8. Transfer programming data to Remote Blaster (DRB2) 9. Run pre-blast checks (remote operation) 10. Commence count down / warning procedures and detonate charges 11. Following countdown / warning procedures, initiation to take place Post-blast inspection and all clear procedures to then be followed		

2. KEY PERSONNEL

POSITION	NAME & CONTACT NUMBER	RESPONSIBILITIES
CMA GROUP PROJECT MANAGER	TBC	OVERARCHING MANAGEMENT OF PROJECT AND RESPONSIBLE FOR LIASON WITH ASSET OWNER
CMA SITE MANAGER	TBC	SITE MANAGEMENT OF PROJECT AND CO-ORDINATION WITH LIDDELL THROUGHOUT PROJECT
CMA DEMOLITION SUPERVISOR	TBC	WORKING WITH SHOTFIRING CREW TO ENSURE THAT PREPARATION WORKS ARE COMPLETED. ALSO PROVIDING ASSISTANCE TO SHOTFIRER TO MANAGE WORK EXCLUSION ZONES AND SENTRIES.
WELLANBAH PROJECT MANAGER / DEMOLITION SUPERVISOR	TBC	RESPONSIBLE FOR ENSURE PLANNING AND EXECUTION DOCUMENTATION IS COMPLETED, AND TO MANAGE ONSITE EXECUTION OF WORKS INCLUDING INSPECTION TEST PLANS, SIGN OFFS, AND COMPLIANCE WITH BLAST DESIGN.
WELLANBAH SHOTFIRERS	TBC	TRANSPORT, PLACEMENT AND DETONATION OF EXPLOSIVES IN ACCORDANCE WITH THIS BLAST MANAGEMENT SUB-PLAN.
WELLANBAH / ROSE STRUCTURAL ENGINEER	TBC	ANALYSIS OF DEMOLITION METHODOLOGY
AGL LIDDELL CLOSURE PROJECT MANAGER	TBC	CONSULTED REGARDING WORKS
AGL THIRD PARTIES DECONSULT / BROWN AND MASON	TBC	REVIEW BLAST DESIGN

3. PROGRAM OF BLAST WORKS – EXCLUDING DRILLING AND CUTTING WORKS

The program of blast works has been delineated into works prior to the blast day event, and the blast day schedule.

Note that a detailed project program has been included in Appendix P, which provides an overview of tasks to be completed in the lead up to the blast event and anticipated completion dates.

ITEM	DESCRIPTION	
CHARGE LOADING DAYS		
INTENDED PROGRAM FOR ACTIVITIES	6:00AM – 6:30AM:	PRE-START MEETING WITH ALL PERSONNEL
	6:30AM – 7:00AM:	FINALISATION OF WORK PERMITS AND PRE-START CHECKS ON EQUIPMENT
	7:00AM – 7:15AM	HANDOVER OF INNER EXCLUSION ZONE FROM OVERNIGHT SECURITY TO SHOTFIRER
	7:15AM – 5:00PM:	PREPARE CARTRIDGES FOR PLACEMENT
		INSERT CARTRIDGES INTO CHARGE HOLES
		TAMP AND PLACE STEMMING
		TIE IN HORIZONTAL INITIATION LINES
	5:00 PM – 7:00 AM	HANDOVER OF INNER EXCLUSION ZONE FROM SHOTFIRER TO GUARDS FOR OVERNIGHT SECURITY – (NOTE SPLIT-SHIFT MAY NEED TO BE DETERMINED)
DAY PRIOR TO BLAST		
INTENDED PROGRAM FOR ACTIVITIES	6:00AM – 6:30AM:	PRE-START MEETING WITH ALL PERSONNEL
	6:30AM – 7:00AM:	FINALISATION OF WORK PERMITS AND PRE-START CHECKS ON EQUIPMENT
	7:00AM – 7:15AM	HANDOVER OF INNER EXCLUSION ZONE FROM OVERNIGHT SECURITY TO SHOTFIRER
	7:15AM – 5:00PM:	CONNECT VERITCAL INITIATION LINES TO HORIZONTAL INITIATION LINES
		PLACE REMAINING PROTECTION OVER CHARGES
		COMPLETE ANY REMAINING QC ASSESSMENTS AND SIGNOFF ON PROGRESS
	5:00 PM – 6:00 AM	HANDOVER OF INNER EXCLUSION ZONE FROM SHOTFIRER TO GUARDS FOR OVERNIGHT SECURITY – (NOTE SPLIT-SHIFT MAY NEED TO BE DETERMINED)

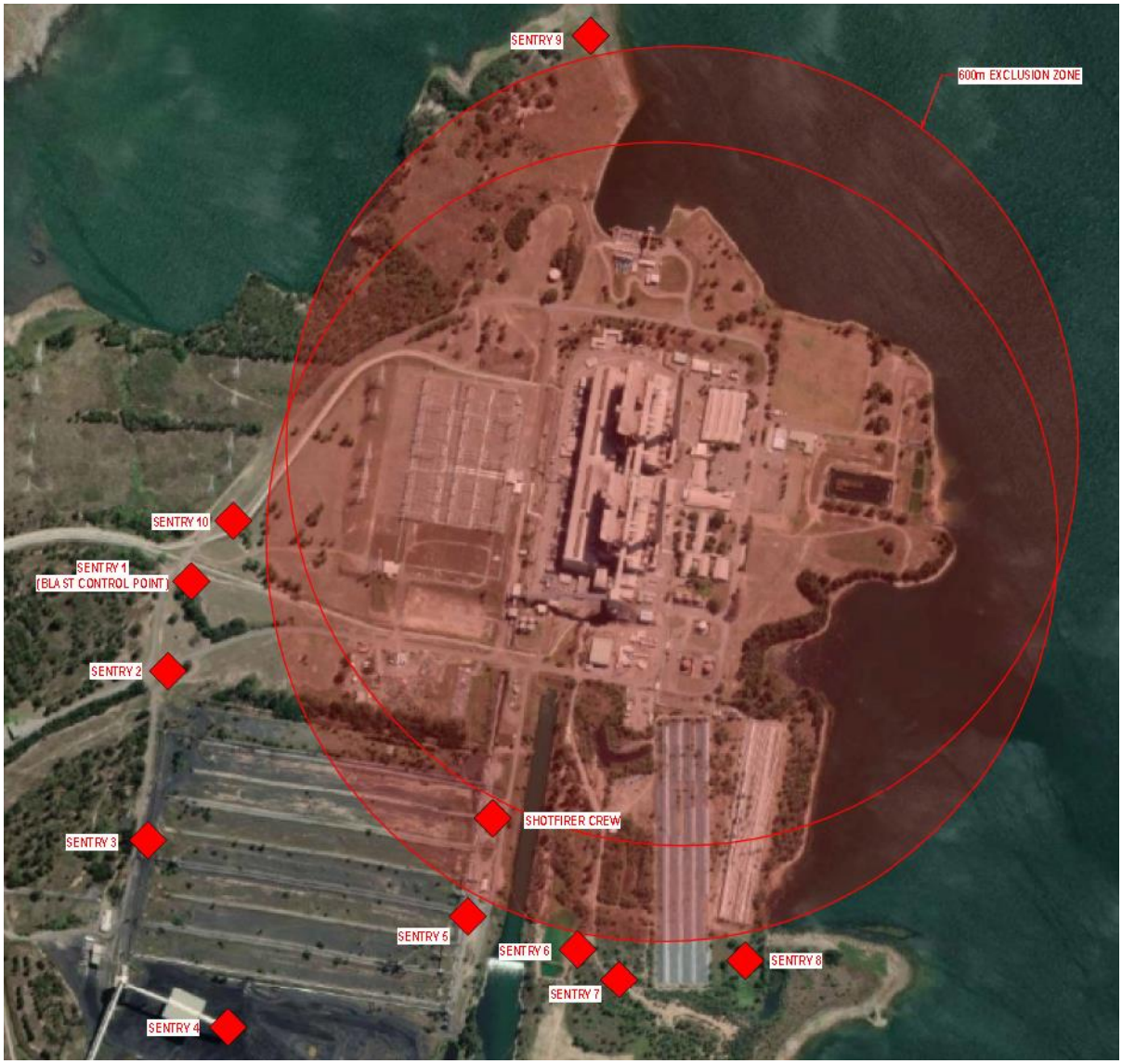
ITEM	DESCRIPTION	
DAY OF BLAST		
INTENDED PROGRAM FOR ACTIVITIES	6:00AM – 6:30AM:	PRE-START MEETING WITH ALL PERSONNEL
	6:30AM – 7:00AM:	SENTRY BRIEFING SESSION
	7:00AM – 8:00AM:	SENTRIES TO MOVE INTO POSITIONS
	8:00AM – 8:15AM:	INITIAL SENTRY CALLS TO CONFIRM OUTER EXCLUSION ZONE HAS BEEN ESTABLISHED
	8:15AM – 10:15AM:	CLEARANCE SWEEPS OF ALL POWER STATION AREAS WITHIN THE EXCLUSION ZONE FOR ANY NON-ESSENTIAL PERSONNEL
	8:15AM – 11:30AM:	SET OUT OF MONITORING EQUIPMENT
	8:15AM – 11:30AM:	SET OUT OF CAMERAS
	8:15AM – 12:00PM	ATTACH DETONATORS AND PROGRAM CHARGES – COMPLETE PRE-CHECKS
	8:15AM – 12:00PM	PLACE ANY REMAINING PROTECTION AS REQUIRED
	11:00AM – 12:00PM	COMPLETE PRE-WET DOWN AND TURN ON DUST SUPPRESSION
	12:00PM – 12:30PM	COMPLETE SENTRY CALLS AND ROLL CALL TO ACCOUNT FOR ALL PERSONNEL
	12:30PM – 1:00PM	RE-COMPLETE PRE-CHECKS OF INITIATION SYSTEM AND RUN HARNESS WIRE TO FIRING LOCATION
	1:00PM – 1:20PM	COMPLETE FINAL SENTRY CHECKS ESTABLISH TRAFFIC CONTROL MEASURES HANDOVER CONTROL TO SHOTFIRER FOR FINAL COUNTDOWN
	1:20PM – 1:30PM	10 MINUTE COUNTDOWN
	1:30PM	INITIATE BLAST
	1:30PM – 2:00PM	COMPLETE POST-BLAST INSPECTION
	2:00PM	BROADCAST ALL CLEAR, AND HAND SITE CONTROL BACK TO CMA SUPERVISOR
	2:00PM	REMOVE TRAFFIC CONTROL MEASURES (EXACT TIMING TBC)
	2:00PM	REDUCE EXCLUSION ZONE TO EXTENTS NOTED IN ASBESTOS CONTROL PLAN – LIDDELL STACK FELLING
	2:00PM-4:00PM	PROCEED WITH HAZMAT PROTOCOLS PRIOR TO ALLOWING ACCESS TO SITE

4. ENVIRONMENTAL CONDITIONS

ITEM	DESCRIPTION
ENVIRONMENTAL CONDITIONS AT TIME OF BLAST	WIND: RAIN: LIGHTNING: CLOUD COVER:

5. SENTRY DETAILS AND EXCLUSION ZONE

Sentries are to be positioned in accordance with the below plan.



REFER TO APPENDIX Q FOR HIGH RESOLUTION DRAWING WITH EXCLUSION ZONE DETAILS

600m Exclusion Zone

SENTRY NUMBER	ASSIGNED PERSONNEL	CONTACT NUMBER
1 – CONTROL POINT		
2		
3		
4		
5		
6		
7		
8		
9		
10		
NEW ENGLAND HWY		
LAKE LIDDELL		
SHOTFIRER CREW	DANIEL HEALY	0432 164 748
RADIO CHANNEL		

6. WARNING / SIGNALLING PROCEDURE

The following warning / signalling procedure is to be followed for the execution of the planned blast event.

Prior to commencing countdown, an exclusion check over the radios is to be completed to confirm the exclusion zone is clear, the 10-minute countdown will then commence:

@ 10 min. – 5 siren blasts

@ 1 min. – single 10 second-long blast and radio silence

@ 10 seconds – final countdown broadcast over radio from 10 down to 5 seconds

@ 5 seconds – Radio silence maintained to allow for sentries to make abort call due to intrusion to exclusion zone

@ 0 second – Shotfirer to broadcast “Firing Now”, and charges will be detonated.

Note - Sentries will monitor this exclusion zone throughout the countdown, and advise any unauthorized entry and if abort is required. This will be completed by broadcasting over the radio “**abort, abort, abort”**. If the shotfirer does not respond, repeat the broadcast and await confirmation from the shotfirer prior to providing details of intrusion.

Post blast inspection to be undertaken by the shotfirer following the event, with the exclusion zone to remain in place until the “All Clear” from the shotfirer in relation to explosives only is broadcast over the radio. In the event of a misfire, exclusion zone and sentries to remain in position, until execution of mis-fire treatments.

Note that the exclusion zone for hazardous materials and dust will still remain in place, with the clearance process to be completed in accordance with the, Asbestos Control Plan – Liddell Stack Felling provided in Appendix Z of this BMSP.

7. PRE-BLAST CHECKLIST

ITEM	DESCRIPTION	STATUS	SIGNED
1	Following placement of charges and/or tie in of detonating cord matrix, assess charges and knots for any dislodgement / looseness in the system.		
2	Inspect connection between initiation lines and electronic detonators.		
3	Inspect protection placed around the base of the chimney for potential cut off to any areas of detonating cord or the detonator wires.		
4	Inspect vessels and explosives for dust control measures (ensure water is at correct level, no sources of cut-off or damage to explosives		
5	Ensure electronic detonator clips are securely fastened to harness wire		
6	Run pre-blast checks on initiation system (missing det search, leakage/broken line, det count)		
7	Take control of the exclusion zone from the demolition supervisor following final sentry checks and commence countdown procedure before initiating charges		

8. MISFIRE PROCEDURES

CAUSE OF MISFIRE	POTENTIAL TREATMENT ACTION
Failure to detonate charges	After mandatory 5 min waiting interval observed, identify reason for mis-fire, rectify and complete firing procedure / countdown again.
Explosives detonate, but structure fails to collapse structure (stand-up)	Exclusion zone to be maintained, and structure investigated remotely via drones. Cause of stand-up to be identified, with particular focus on the extent of retained concrete. Based on this information, consultation to be held with structural engineer and demolition supervisor to determine rectification measures. Measures may include utilising remote controlled excavators to hammer out the front of the chimney to encourage rotation of the structure. In the event that the entire structure settles and remains vertical, engineering/risk assessment may be considered to facilitate re-approaching the chimney under low wind conditions to re-drill / load the structure, for secondary firing of charges. Exact rectification subject to risk assessment and key stakeholder consultation.
Explosives detonate, but result in partial collapse.	Exclusion zone to be maintained, and structure investigated remotely via drones. Cause of stand-up to be identified, with particular focus on the extent of retained concrete. Based on this information, consultation to be held with structural engineer and demolition supervisor to determine rectification measures. Measures may include utilising remote controlled excavators to hammer out the front of the chimney to encourage rotation of the structure. In the event that the entire structure settles and remains vertical, engineering/risk assessment may be considered to facilitate re-approaching the chimney under low wind conditions to re-drill / load the structure, for secondary firing of charges. Exact rectification subject to risk assessment and key stakeholder consultation.

9. MONITORING EQUIPMENT

ITEM	DESCRIPTION
VIBRATION MONITOR	Vibration monitoring to be completed with INFRA C22 Wireless Triaxial Vibration Monitor units. Refer to Appendix H for monitor locations and equipment specifications.
AIR PRESSURE MONITOR	Air Over Pressure monitoring to be completed with INFRA S10/S11 Air Blast Sensor units. Refer to Appendix H for monitor locations and equipment specifications.
DUST MONITOR	Refer to Appendix Z for Dust monitoring details

10. POST BLAST CHECKLIST

ITEM	DESCRIPTION	STATUS / RESULTS
BLAST FUMES – NOXIOUS AND TOXIOUS GASES	BLAST FUMES TO BE VISUALLY ASSESSED PRIOR TO APPROACHING BLAST ZONE (COMPLETE BELOW RATING TABLE)	
STANDUP OF STRUCTURE	FAILURE OF STRUCTURE TO COLLAPSE, CONFIRM FROM A SAFE DISTANCE CAUSE AND LOCATION OF FAILURE STRUCTURAL ENGINEER TO ASSESS AS REQUIRED	
EVIDENCE OF MISFIRE	EVIDENCE OF ANY UNEXPLODED CHARGES	
STABILITY OF STRUCTURE	CONFIRM STRUCTURE IN STABLE POSITION / TYPE OF EXCLUSION ZONE WHICH MUST BE MAINTAIN	
HAZMAT	ANY UNEXPECTED FINDS IN RELATION TO HAZMAT – ASBESTOS ETC.	
ALL CLEAR ANNOUNCEMENT	BROADCAST “ALL CLEAR” TO SENTRIES	

POST-FIRING FUME CONDITIONS						
FUME RATING	0	1	2	3	4	5
	☐	☐	☐	☐	☐	☐

11. RECORDS BLASTING ACTIVITY

ITEM	DESCRIPTION
MONITORING RECORDS	
DETAILS OF FLYROCK OR FLY	
DETAILS OF DUST	
DETAILS OF INCIDENTS AND COMPLAINTS	

12. ADDITIONAL CLOSEOUT AND COMMENTS

ITEM	DESCRIPTION
COMMENTS ON RESULTS OF BLAST	
PROPOSED MODIFCATION TO THE BLAST PLAN FOR FUTURE SHOTS	

13. FINAL POST-BLAST SIGNOFF

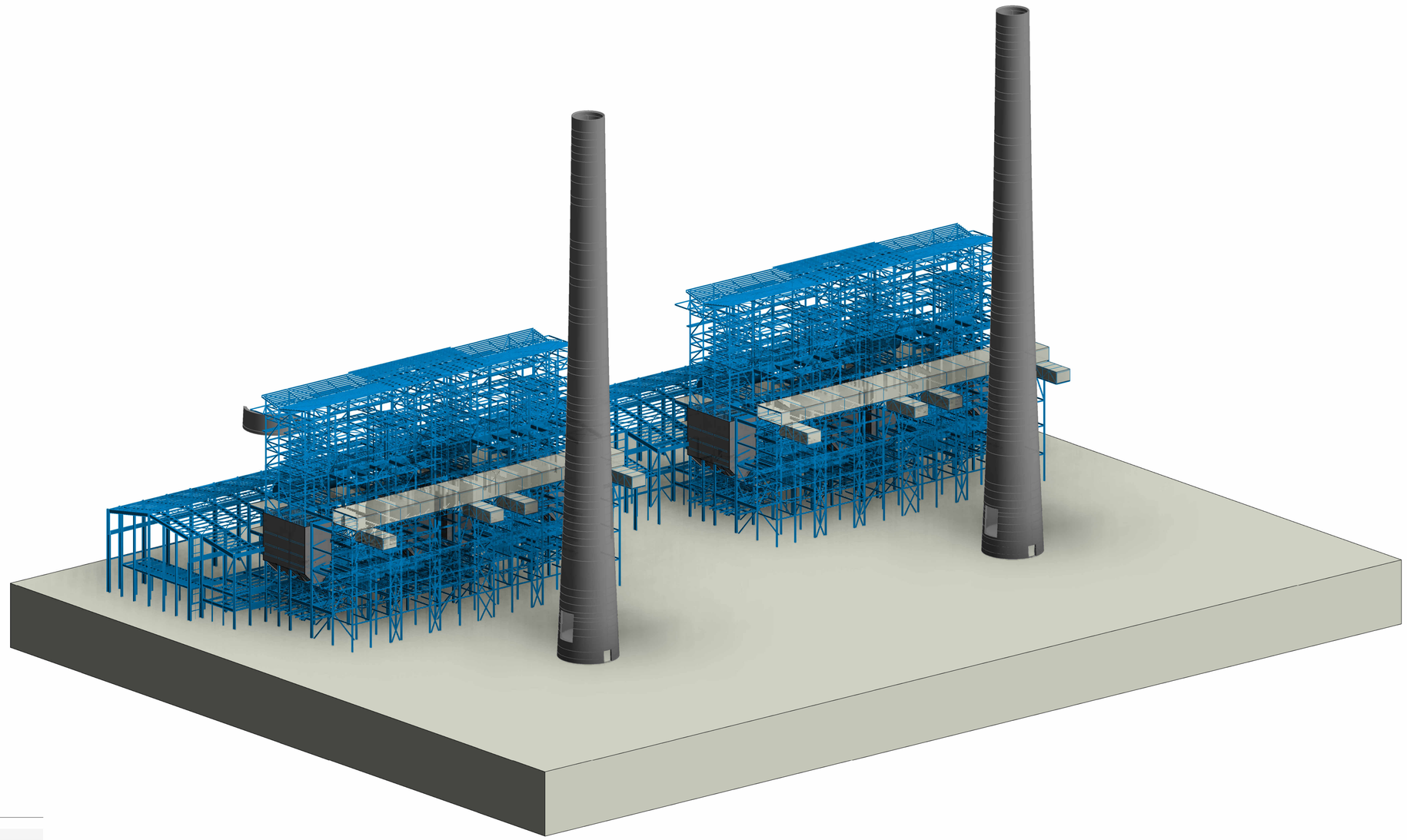
FINAL POST-BLAST SIGNOFF	
SHOTFIRER:	
SIGNATURE:	
TIME:	
DATE:	
CLOSING COMMENTS:	

Note: an additional signoff will be required from the Hygienist in accordance with the Asbestos Control Plan – Liddell Stack Felling provided in Appendix Z of the BMSP, prior to allowing access to the area.

APPENDIX B – BLAST DESIGN

LIDDELL POWER STATION

CHIMNEY DEMOLITION - BLAST DESIGN



STRUCTURAL DRAWING INDEX

NUMBER	TITLE
S000	CHIMNEY BLAST - COVER SHEET
S100	CHIMNEY BLAST - OVERVIEW
S110	20 DEG. ROTATION - FELL PATH OVERLAY
S200	20 DEGREE HINGE ROTATION - PREP. DETAILS
S201	U1/U2 CHIMNEY BLAST - CHARGE SCHEDULE
S202	U3/U4 CHIMNEY BLAST - CHARGE SCHEDULE
S203	DUST SUPPRESSION - CHARGE SCHEDULE
S300	U1/U2 CHIMNEY BLAST DELAYS
S301	U3/U4 CHIMNEY BLAST DELAYS

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED WITH VESSELS AND DELAYS		DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN		DH	DH	BH	3.09.25
B	REVIEW UPDATES		DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE		DH	DH	BH	12.02.25

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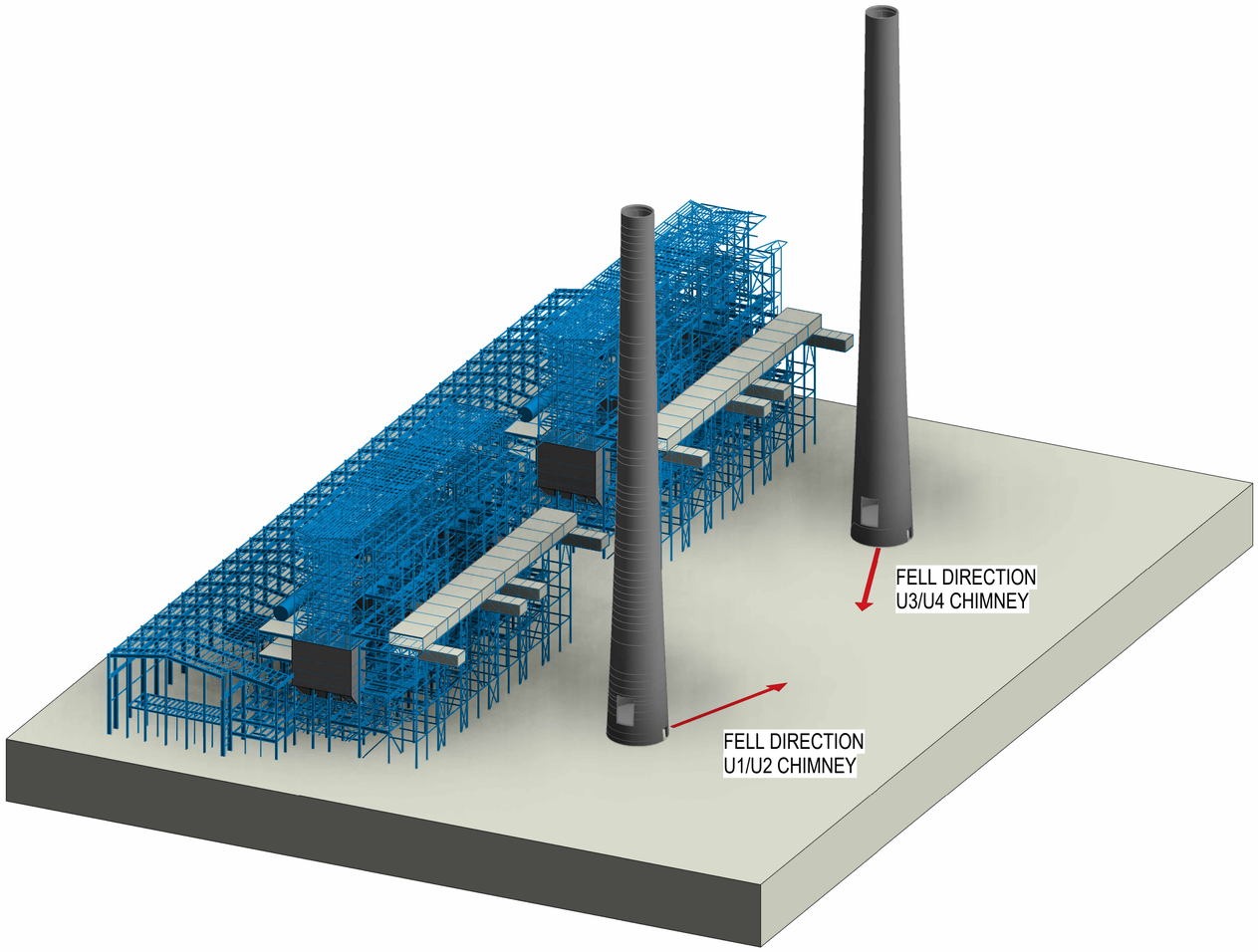
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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
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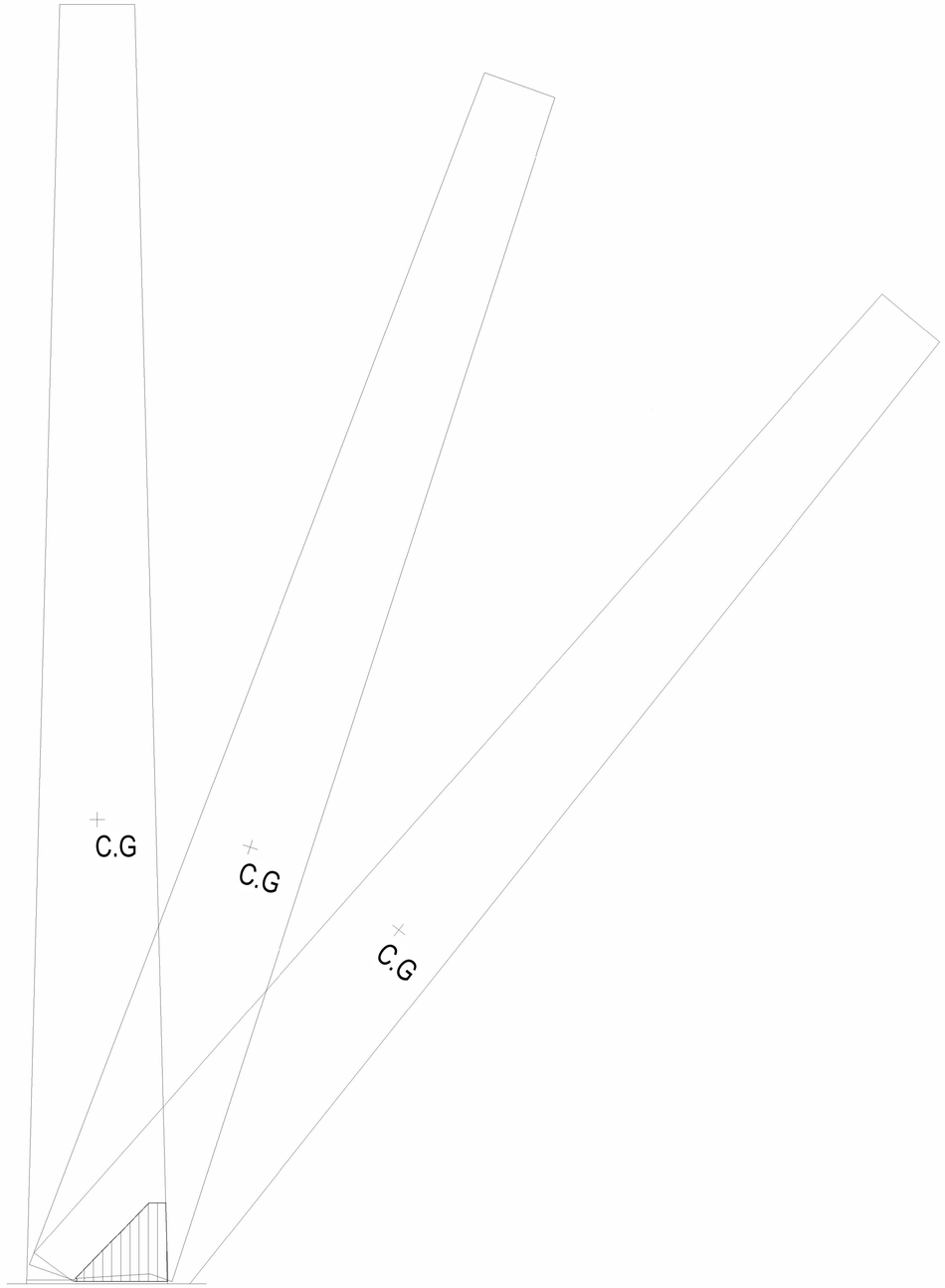
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST - COVER SHEET**

Original Size **A1**
Drawing No: **WI-24057-06-S000**
Rev: D

Plot Date: 31/03/2026 6:29:56 PM



SITE OVERVIEW
SCALE : NTS



CHIMNEY COLLAPSE MECHANISM
SCALE 1 : 400

NOTES:
1. THIS DOCUMENT PROVIDES THE BLAST DESIGN FOR THE DEMOLITION OF TWO REINFORCED CONCRETE CHIMNEYS LOCATED AT THE LIDDELL POWER STATION SITE.
2. THE CHIMNEYS ARE APPROXIMATELY 169m IN HEIGHT, AND HAVE AN OUTSIDE BASE DIAMETER OF 18.6m.
3. THE CHIMNEYS ARE TO BE COLLAPSED IN A DIRECTION WHICH IS 20 DEGREES OFF THE SITE NORTH-SOUTH DIRECTION, NOTING THAT THE SITE NORTH ORIENTATION IS 9 DEGREES CLOCKWISE OF TRUE NORTH.
4. ALL STRUCTURES WITHIN THE FELL PATH OF THE CHIMNEYS ARE TO BE DEMOLISHED PRIOR TO THE BLAST.

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	UPDATED COG POSITION	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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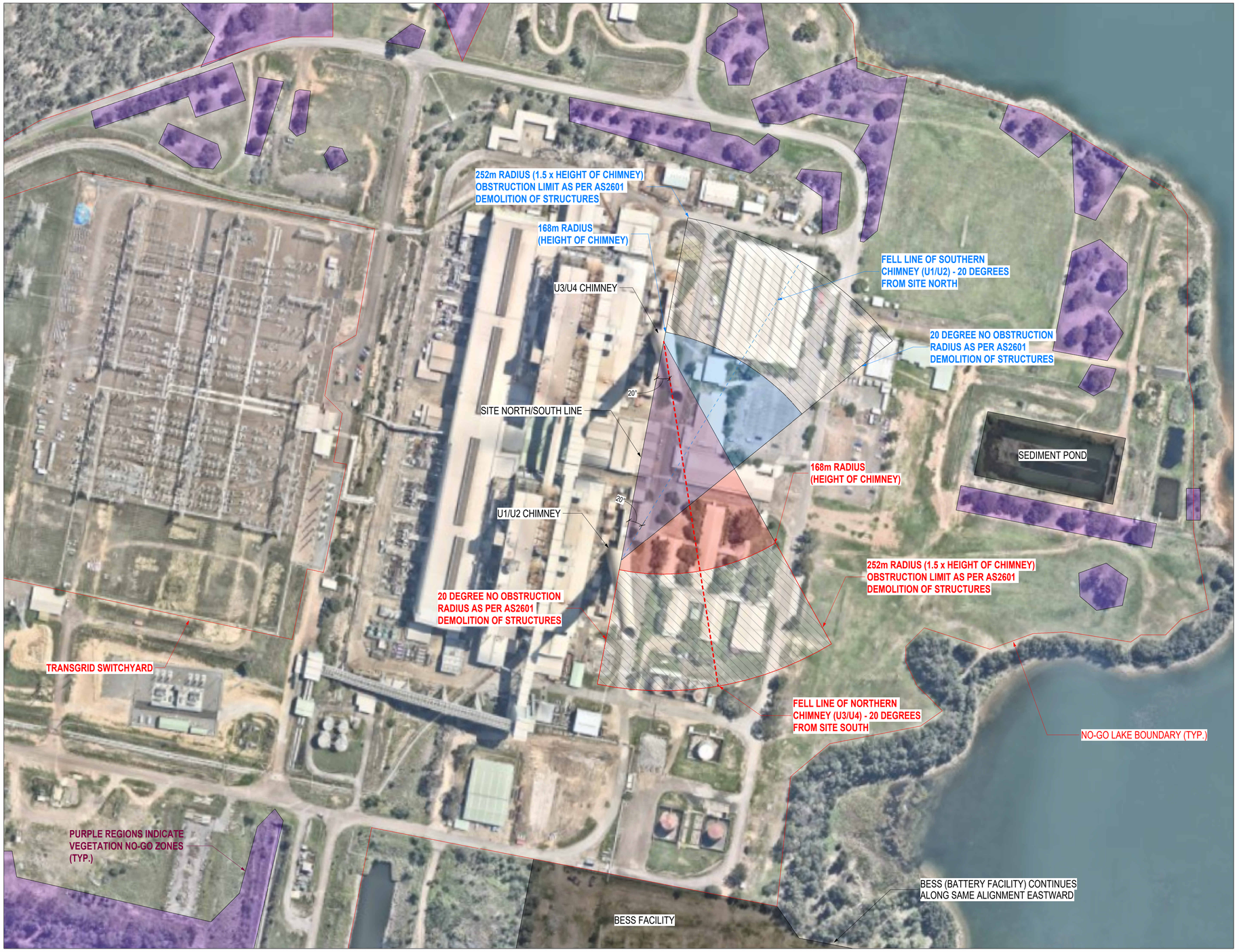
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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST - OVERVIEW**
Original Size **A1**
Drawing No: **WI-24057-06-S100**
Rev: C

Plot Date: 31/03/2026 6:33:30 PM



LIDDELL CHIMNEY COLLAPSE ORIENTATION - 20 DEGREE ROTATION

SCALE 1 : 1500

LIDDELL POWER STATION CHIMNEY DEMOLITION - OPTION 1 COMPLIANCE SCHEDULE

SITE CONSTRAINT	NEAREST DISTANCE FROM BASE OF CHIMNEY WITHIN FELL PATH	COMMENTS
1. BATTERY ENERGY STORAGE SYSTEM (BESS)	376m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO EDGE OF COMPOUND FENCE LINE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
2. VEGETATION NO - GO ZONES	254m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO VEGETATION NO-GO ZONE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
3. SITE BOUNDARY AT LAKE	314m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO LAKE BOUNDARY LINE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
4. SEDIMENT POND (INC. BURIED PIPELINE)	N.A	ASSET OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3
5. TRANSGRID SWITCHYARD	N.A	ASSET OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3
6. SITE INFRASTRUCTURE YET TO BE DEMOLISHED	N.A	STRUCTURES OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED VEGETATION DETAILS	DH	DH	BH	31.03.26
C	UPDATED TRANSGRID SWITCHYARD REFERENCES	DH	DH	BH	31.10.25
B	FINALISED DESIGN ISSUE	DH	DH	BH	3.09.25
A	PRELIMINARY ISSUE	DH	DH	BH	31.07.25

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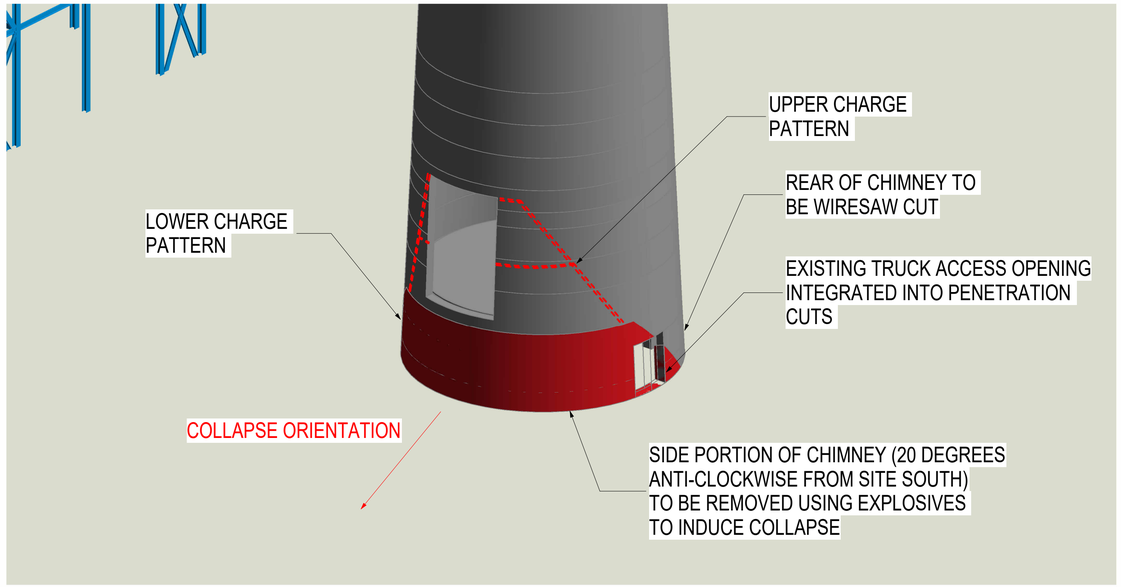
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Date 31.07.25
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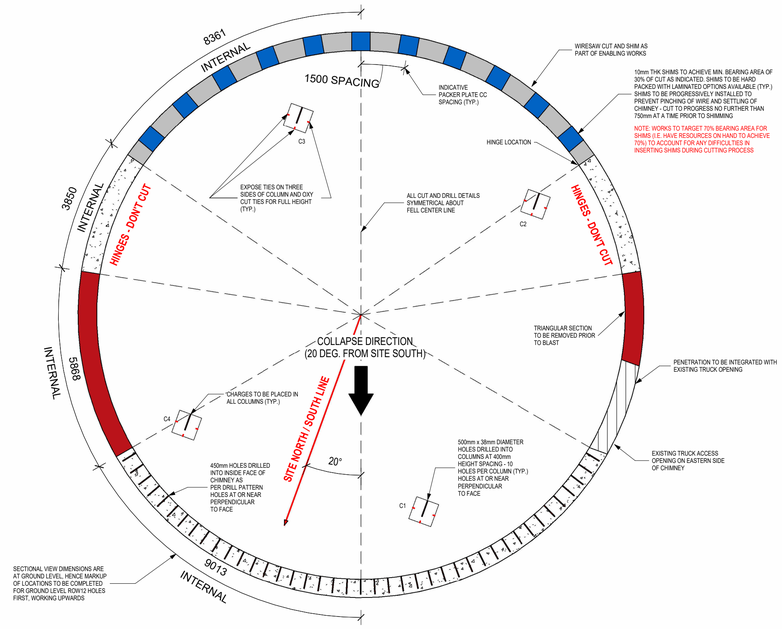
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **20 DEG. ROTATION - FELL PATH OVERLAY**

Original Size **A1**
Drawing No: **WI-24057-06-S110**
Rev: D

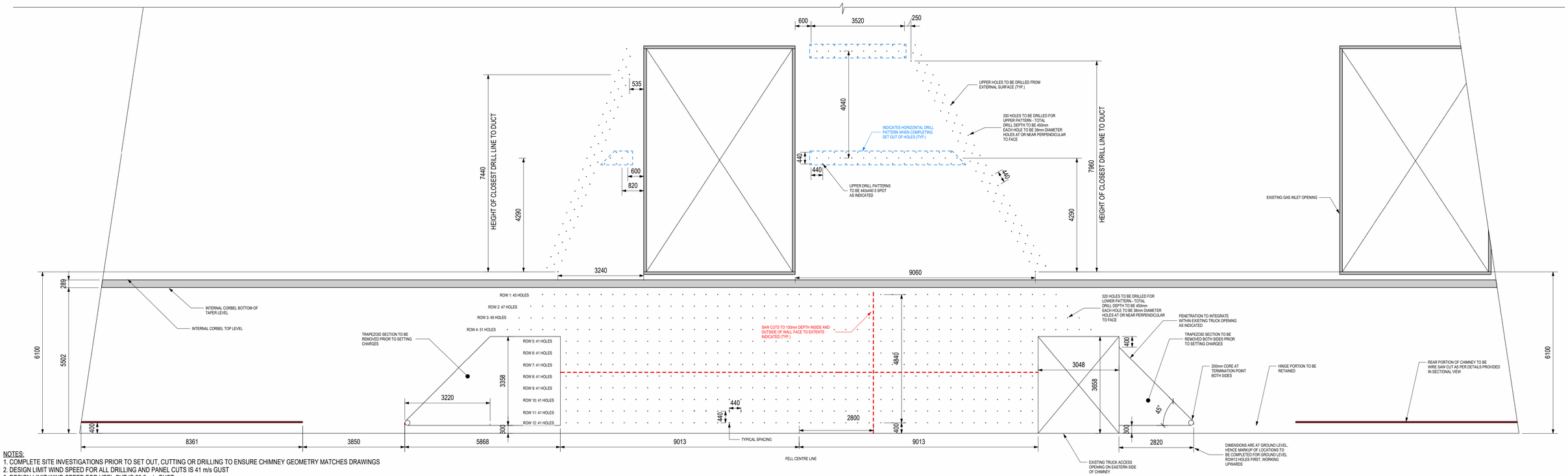
Plot Date: 31/03/2026 6:33:34 PM



3D VIEW - CHIMNEY BASE - 20 DEG. ROTATION
SCALE : NTS



CHIMNEY BASE SECTIONAL VIEW - 20 DEG. ROTATION
SCALE 1 : 100



NOTES:
1. COMPLETE SITE INVESTIGATIONS PRIOR TO SET OUT, CUTTING OR DRILLING TO ENSURE CHIMNEY GEOMETRY MATCHES DRAWINGS
2. DESIGN LIMIT WIND SPEED FOR ALL DRILLING AND PANEL CUTS IS 41 m/s GUST
3. DESIGN LIMIT WIND SPEED FOR HEEL CUT IS 22.5 m/s GUST
4. DESIGN LIMIT WIND SPEED FOR BLAST EVENT IS 15 m/s GUST; LIVE SITE WIND MONITORING TO BE COMPLETED BY MOUNTING UNIT IN VICINITY OF CHIMNEYS AT HEIGHT OF 10m. LOCATION TO BE SELECTED SUCH THAT NO SHIELDING OR VORTEX LOADING WILL INFLUENCE MONITORING.
5. TOLERANCE ON DRILL PATTERN +/- 75mm, TOLERANCE ON HOLE DEPTH +/-25mm.
6. BLAST PATTERN DETAILS HEREIN FOR U3/U4 CHIMNEY - PATTERN IS TO BE MIRRORED FOR U1/U2 CHIMNEY

DRILL PATTERN & CHARGE LAYOUT - 20 DEG. ROTATION
SCALE 1 : 75

No	Revision	Drawn	Designed	Reviewed	Date
E	FINALISED HOLE DEPTH	DH	DH	BH	10.02.26
D	REVISED HOLE DIAMETER	DH	DH	BH	9.01.26
C	UPDATED NOTES AND VERTICAL CUT LINE POSITION	DH	DH	BH	1.11.25
B	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
A	PRELIMINARY ISSUE	DH	DH	BH	31.07.25

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Drafting Check	B. HEALY		
Approved	D. HEALY		
Date	31.07.25		
Scale		This Drawing must not be used for Construction unless signed as Approved	

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **20 DEGREE HINGE ROTATION - PREP. DETAILS**
Original Size **A1**
Drawing No: **WI-24057-06-S200**
Rev: E

Plot Date: 31/03/2026 6:33:39 PM

CHARGE SCHEDULE U1/U2 CHIMNEY

ROW ID#	NUMBER OF HOLES	CHARGES PER HOLE	CHARGES FOR ROW	CHARGE WEIGHT OF ROW (KG)	CHARGE TYPE	DELAY TIMING MS
1	45	1.75	78.75	15.22	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
2	47	1.75	82.25	15.86	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
3	49	1.75	85.75	16.51	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
4	51	1.75	89.25	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
5	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
6	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
7	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
8	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
9	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
10	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
11	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
12	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
UPPER PATTERN	200	1.5	300	55.50	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C1	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C2	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C3	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C4	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
TOTALS	760		1290	238.65		

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED POWDER FACTORS	DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	REVIEW UPDATES	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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Approved D. HEALY
Date 12.02.25
Scale
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **U1/U2 CHIMNEY BLAST - CHARGE SCHEDULE**

Original Size **A1**
Drawing No: **WI-24057-06-S201**
Rev: D

Plot Date: 31/03/2026 6:33:42 PM

CHARGE SCHEDULE U3/4 CHIMNEY						
ROW ID#	NUMBER OF HOLES IN ROW	CHARGES PER HOLE	CHARGES FOR ROW	CHARGE WEIGHT OF ROW (KG)	CHARGE TYPE	DELAY TIMING MS
1	45	1.75	78.75	14.57	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
2	47	1.75	82.85	15.22	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
3	49	1.75	85.75	15.86	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
4	51	1.75	89.25	16.51	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
5	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
6	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
7	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
8	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
9	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
10	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
11	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
12	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
UPPER PATTERN	200	1.5	300	55.5	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C1	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C2	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C3	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C4	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
TOTALS	760		1290	238.65		

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED POWDER FACTORS	DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	REVIEW UPDATES	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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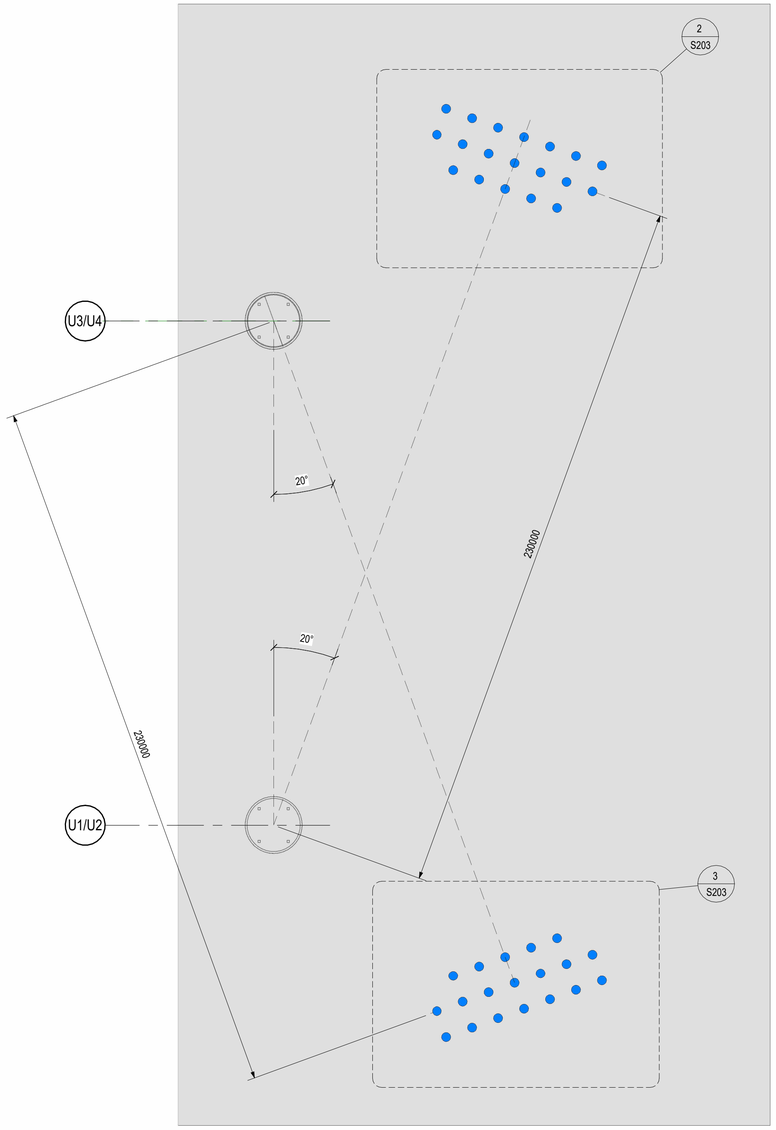
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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
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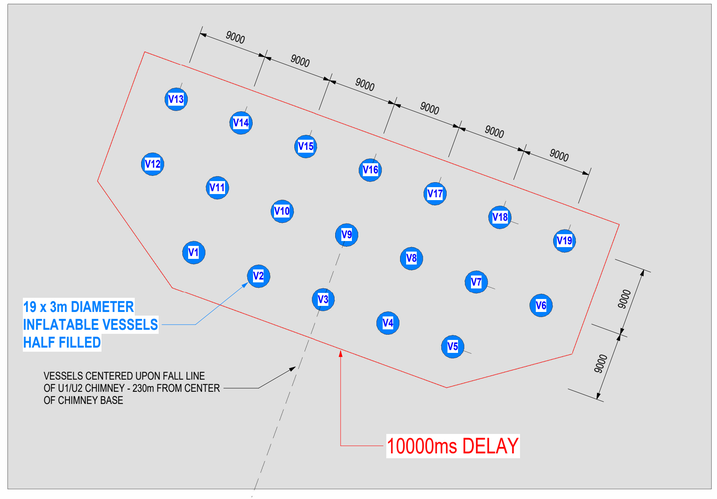
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **U3/U4 CHIMNEY BLAST - CHARGE SCHEDULE**

Original Size **A1**
Drawing No: **WI-24057-06-S202**
Rev: D

Plot Date: 31/03/2026 6:33:46 PM



CHARGED VESSEL LAYOUT - PLAN VIEW
SCALE 1 : 1000



2 U1/U2 VESSELS
1 : 400

3 U3/U4 VESSELS
1 : 400

DUST SUPPRESSION VESSELS - CHARGE SCHEDULE

ID#	DET. CORD LENGTH (10g/m)	DET. CORD CHARGE WEIGHT (kg)	CHARGE NO.	CHARGE TYPE	CHARGE WEIGHT	TOTAL CHARGE WEIGHT	DELAY TIMING - (ms)
U1 / U2 CHARGED VESSELS							
V1	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V2	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V3	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V4	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V5	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
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U3 / U4 CHARGED VESSELS							
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V36	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V37	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V38	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
					MIC	**21.755**	

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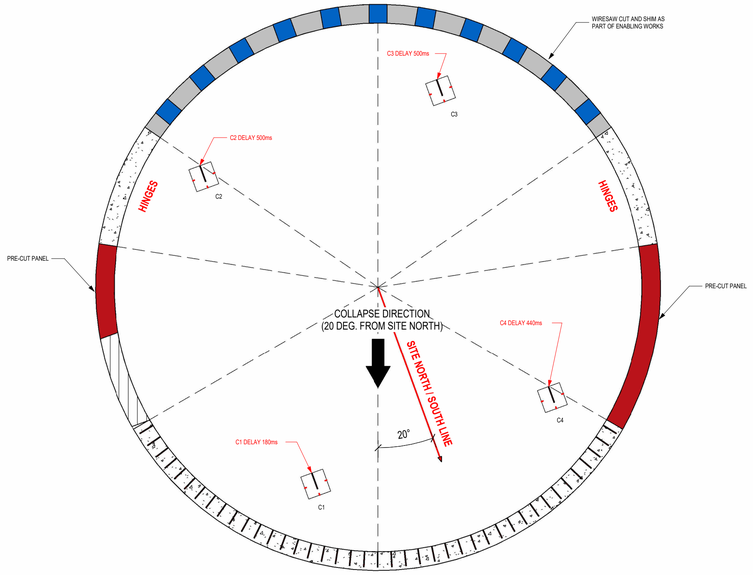
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Drafting Check B. HEALY
Approved D. HEALY
Date 31.03.26
Scale
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Client CMA CONTRACTING PTY LTD
Project LIDDELL POWER STATION DEMOLITION
Title DUST SUPPRESSION - CHARGE SCHEDULE

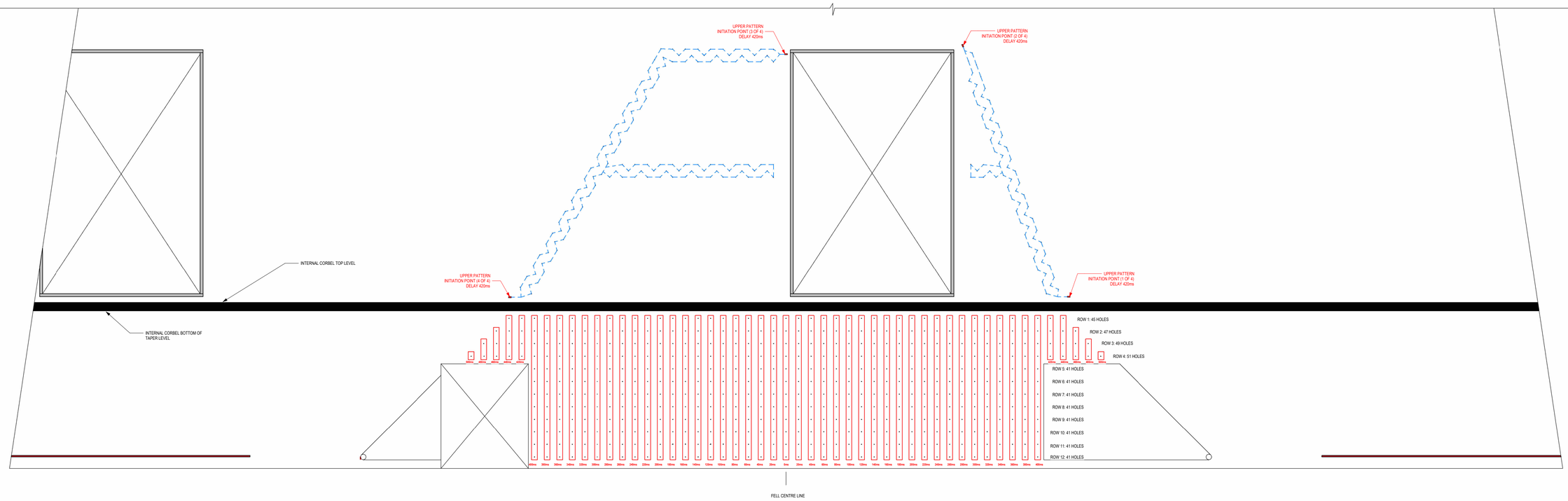
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CHIMNEY BASE SECTIONAL VIEW - U1/U2 DELAYS

SCALE 1 : 100



U1/U2 CHIMNEY DELAY SEQUENCE

SCALE 1 : 75

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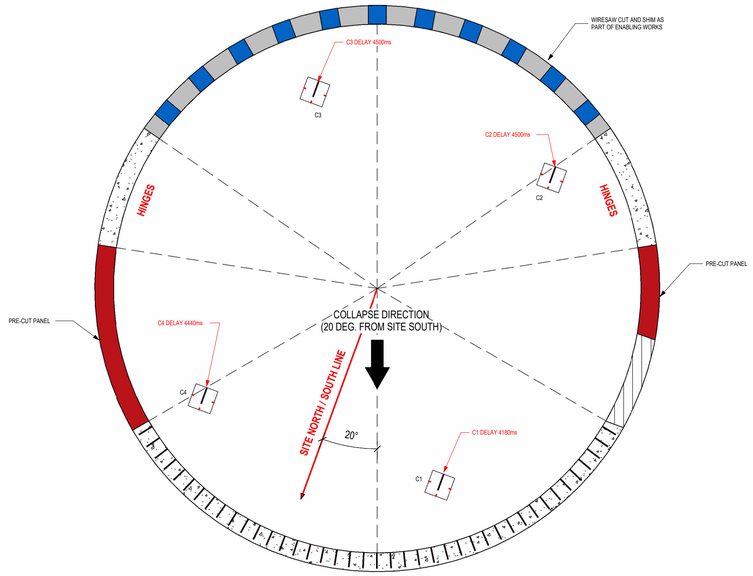
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Project **LIDDELL POWER STATION DEMOLITION**
Title **U1/U2 CHIMNEY BLAST DELAYS**

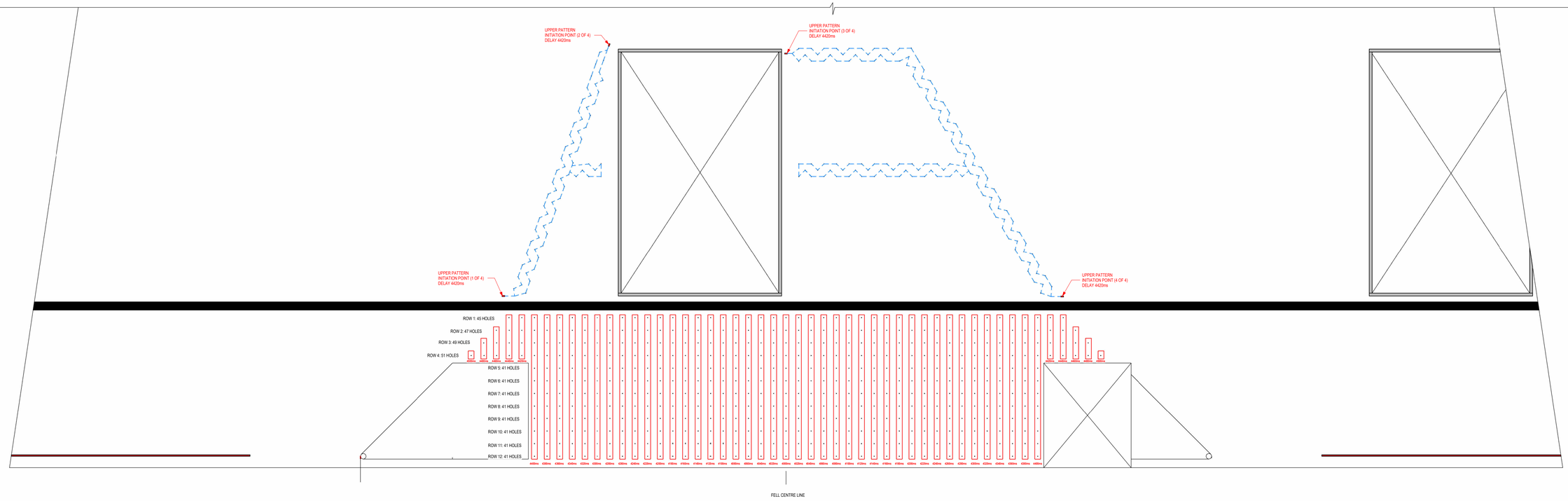
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Rev: A

Plot Date: 31/03/2026 6:33:53 PM



CHIMNEY BASE SECTIONAL VIEW - U3/U4 DELAYS

SCALE 1 : 100



U3/U4 CHIMNEY DELAY SEQUENCE

SCALE 1 : 75

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Client **CMA CONTRACTING PTY LTD**

Project **LIDDELL POWER STATION DEMOLITION**

Title **U3/U4 CHIMNEY BLAST DELAYS**

Original Size **A1**

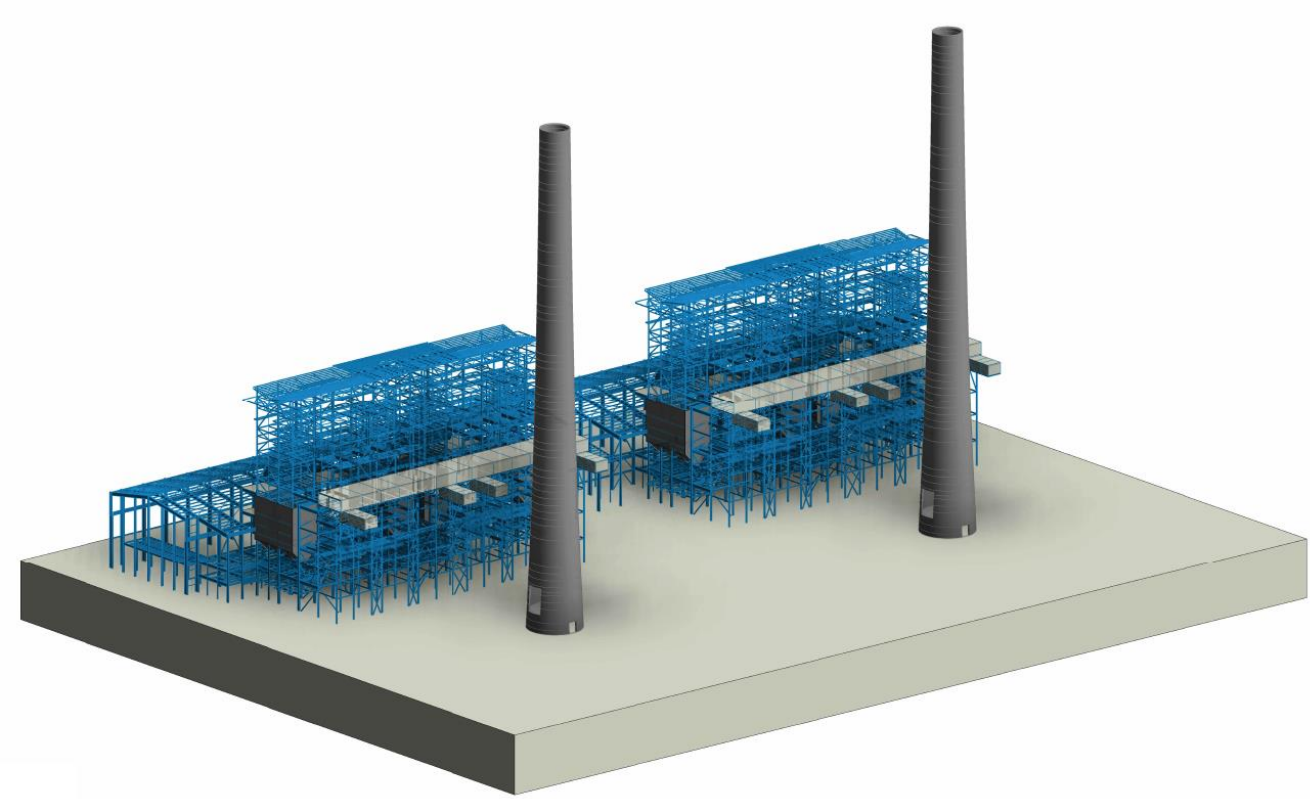
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APPENDIX C – ENGINEERING REPORT

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ENGINEERING ANALYSIS REPORT

LIDDELL POWER STATION CHIMNEY DEMOLITION

WI-ENG-2057-006-REV 3

MARCH 2026

DOCUMENT CONTROL RECORD

DOCUMENT CONTROL				
REPORT TITLE		LIDDELL POWER STATION CHIMNEY DEMOLITION ENGINEERING ANALYSIS REPORT		
DOCUMENT CODE		WI-ENG-2057-006	**PROJECT NUMBER**	WI-2057
CLIENT		CMA CONTRACTING		
REV	**DATE**	**REVISION DETAILS/STATUS**		**APPROVED BY**
REV 0	14/02/25	ISSUED FOR REVIEW		D. HEALY
REV 1	6/06/25	UPDATES FOLLOWING THIRD PARTY REVIEW		D. HEALY
REV 2	3/09/25	REVISED COLLAPSE DIRECTION / DESIGN		D. HEALY
REV 3	31/03/26	FINALISED BLAST DESIGN DRAWING SET		D. HEALY

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EXECUTIVE SUMMARY

CMA Contracting are currently executing the demolition of the Liddell Power Station Site on behalf of asset owner AGL. The redundant site is located within the Hunter Valley, approximately 18 km from the township of Muswellbrook, New South Wales.

A key component of these works is the demolition of the two chimney stack structures which are positioned on the Eastern side of the main power station footprint.

The structures are of height approximately 169m; the base outside diameter is 18.6m, with a wall thickness of 610mm; the top outside diameter is 9.8m, with a wall thickness of 216mm. The material of construction is reinforced concrete, with the size and layout of the reinforcement varying throughout the height of the structure. In addition, the chimneys include a number of corbels at regular spacings, and these corbels support the internal brick lining. There is also an internal concrete slab which is supported on four columns at approx. 6.7m above ground level.

In order to demolish these assets, it has been determined that the safest and most practicable method is that of an industry standard explosive induced collapse. Wellanbah Industrial have been engaged by CMA Contracting to undertake the engineering assessment and subsequent blasting activities onsite.

The method entails completing various pre-cuts to the chimney, followed by the installation and initiation of explosive charges installed in the front face the structure (on the fell side). The detonation of the explosives will result in the removal of the front concrete, causing the structure to pivot about the rear base and fall to grade.

This document summarises the outcomes of the engineering analysis to facilitate onsite works with the demolition blast design drawings related to the assessment provided in Appendix A of this document.

The assessment focused on two critical aspects of structural stability, which included the assessment of the chimney stack following the completion of various cuts in accordance with the blast design, and the analysis of hinge stresses following the initiation of the explosives.

A structural model was developed based on the existing drawings/site invesitgations and a finite element analysis was undertaken to evaluate the global stability of the chimney structures following the completion of enabling / charge placement works. Following the analysis, it was determined that the proposed enabling works can be completed provided that the forecast (and subsequent experienced) gust wind speed stays below 147.6 km/hr. It is noteworthy that the gust wind speeds are determined as a value which is 45% higher than the forecast average wind speeds. Hence if the forecast wind speed is in excess of 101km/hr it is recommended that the planned works be rescheduled, or the structure be vacated with an exclusion zone established until the wind levels reduce to acceptable levels. It should be noted that such a wind speed is based on 1:100 year probability, hence it is not expected that such an event will occur during the minor schedule of works (approx. 1 month).

In addition, it was determined that with the proposed cuts the structure will remain in net compression, even under the design demolition wind loading.

For the blast event, the wind limitation is to be set at a 15 m/s peak gust. Live wind speed monitoring is to be complete onsite, so ensure this is not exceeded at time of initiating the explosives.

A stress analysis was completed to evaluate the rear heel and hinges of the structure following the initiation of the explosives. It was determined that immediately upon blasting, the axial stress for both the hinges and the rear heel increase from 2.28 MPa to 8.12 MPa. This value is still well within the lower bound unconfined capacity of the concrete (24.5 MPa).

The change in eccentricity will then result in an increase stress due to bending in the order of 45.1 MPa at the Eastern toe (compression) and 28.8 MPa at the rear heel (tension). As the tension cannot be developed, this will result in the structure beginning to fail and rotate, with the stress temporarily distributed to the hinges only.

The stresses at this point within the hinges are 99.4 MPa (compression) at the Western toe and 69.8 MPa (tension) at the Eastern heel. As such, failure and subsequent rotation is guaranteed to be achieved based upon the concrete grade of 24.5 MPa.

In conclusion, following the structural analysis of the proposed blast design, it was determined that the structure will remain stable during the pre-cutting works up until a gust wind speed of 147.6 km/hr. In addition, upon detonation, the stresses in the chimney stack are within the range that will encourage rotation of the chimneys prior to crushing of the hinges, and therefore the expected overturning and collapse of the structures will match the design intent. The blast event is to be undertaken under a limiting wind speed of 15 m/s gust, and to be confirmed onsite via live wind monitoring.

TABLE OF CONTENTS

DOCUMENT CONTROL RECORD 2
EXECUTIVE SUMMARY 3
1 INTRODUCTION 7
1.1 REFERENCE DOCUMENTS 7
1.2 LIMITATIONS AND ASSUMPTIONS 7
2 SITE DETAILS 8
3 GEOMETRY / STRUCTURAL SYSTEM 10
3.1 GEOMETRY 10
3.2 CONCRETE GRADE 11
3.3 STRUCTURAL SYSTEM 13
3.4 ANALYTICAL MODEL 13
4 DEMOLITION METHOD 15
5 LOADING 18
5.1 OVERVIEW 18
5.2 DEAD LOAD 18
5.3 WIND LOAD 22
5.4 EARTHQUAKE LOAD 31
5.5 LOAD COMBINATIONS 34
6 DESIGN ACTIONS & ANALYSIS 35
6.1 BASE OVERTURNING MOMENT – WIND (STAGE 1) 35
6.2 POST BLAST HINGE STRESS ANALYSIS (STAGE 2) 40
7 CONCLUSION 44
APPENDICIES 45
APPENDIX A – LIDDELL POWER STATION – CHIMNEY DEMOLITION BLAST DESIGN DRAWINGS 46
APPENDIX B – EXISTING STRUCTURAL DRAWINGS 47
APPENDIX C – LOAD TAKEDOWN FOR CHIMNEY 48
APPENDIX D – BRICK LINER DENSITY DETAILS 49
APPENDIX E – CHIMNEY GEOMETRY & CONCRETE STRENGTH VERIFICATION MEMO 50

TABLES

TABLE 1 – CONCRETE GRADE VS HEIGHT 11
TABLE 2 – CONCRETE STRENGTH TEST RESULTS 12
TABLE 3 – SUMMARY DATA FROM FEA MODEL 20
TABLE 3 – SPECTRAL RESPONSE – RESULTS SUMMARY 32

FIGURES

FIGURE 1 – LIDDELL POWER STATION SITE LOCATION 8
FIGURE 2 – AERIAL PHOTO OF THE LIDDELL CHIMNEY STACKS 9
FIGURE 3 – OVERVIEW OF U1/2 CHIMNEY 10
FIGURE 4 – CONCRETE GRADE EXTRACT FROM DRAWING LD247906 K/3 11
FIGURE 5 – CONCRETE GRADE EXTRACT FROM DRAWING LD247906 K/3 – LOWER LIFTS 12
FIGURE 6 – FINITE ELEMENT ANALYSIS MODEL OF LIDDELL CHIMNEY STACK 14
FIGURE 7 – BASIC OVERVIEW OF METHOD 15
FIGURE 8 – CROSS SECTION OF CHIMNEY BASE WITH BLAST AND CUT SETOUT 16
FIGURE 9 – FELL DIRECTION FOR CHIMNEYS 17
FIGURE 10 – COLLAPSE MECHANISM FOR CHIMNEYS 17
FIGURE 11 – VOLUME OF CONCRETE FROM MODEL 18
FIGURE 12 – VOLUME OF BRICK FROM MODEL 19
FIGURE 13 – NON-STRUCTURAL MASS ADDED TO FEA MODEL 21
FIGURE 14 – EXTRACT FROM AS1170.2 23
FIGURE 15 – EXTRACT FROM AS1170.2 – TABLE C3 24
FIGURE 16 – EXTRACT FROM AS1170.2 25
FIGURE 17 – FUNDAMENTAL FREQUENCY FROM FINITE ELEMENT ANALYSIS 26
FIGURE 18 – PROJECTED AREA OF CHIMNEY 28
FIGURE 19 – APPLICATION OF DEMO WIND LOAD ONTO FEA MODEL 29
FIGURE 20 – APPLICATION OF ULTIMATE WIND LOAD ONTO FEA MODEL 30
FIGURE 21 – NORMALISED RESPONSE SPECTRA – De SOIL 32
FIGURE 22 – BASE REACTIONS AND STRESS ANALYSIS – COMBINATION 5 33
FIGURE 23 – STRESS RESULTS – 1.2G + Wdemo 35
FIGURE 24 – PROJECTED SURFACE OF LIDDELL CHIMNEY STACK 36
FIGURE 25 – GEOMETRY OF BASE FOLLOWING PREP CUTS 37
FIGURE 26 – SECTION PROPERTIES FOR CHIMNEY BASE POST CUTS 38
FIGURE 27 – STRESS ANALYSIS POST BLAST – HINGES & REAR VS. HINGES 40
FIGURE 28 – GEOMETRIC SECTION PROPERTIES FOR HINGES & REAR 41
FIGURE 29 – GEOMETRIC SECTION PROPERTIES FOR HINGES ONLY 41
FIGURE 30 – INLET DUCT STRESSES POST BLAST - G 43

1 INTRODUCTION

AGL are currently undertaking the demolition of redundant infrastructure located within the Liddell Power Station Site. CMA Contracting have been awarded the contract to complete the demolition scope and Wellanbah Industrial have been engaged to undertake the explosive demolition of the two reinforced concrete chimney stacks located on the Eastern site of the main power station assets. In order to finalise the blast design, a structural analysis of the planned demolition method is required to ensure the appropriate response and collapse of the structures following the blast event. This document includes the design basis and calculations for this assessment.

The structural analysis of the demolition method has been completed in consideration of the following Australian Standards and the reference documents listed in Section 1.1 of this report:

- AS 1170.0:2002 Structural design actions Part 0: General Principles
- AS 1170.1:2002 Structural design actions Part 1: Permanent, imposed and other actions
- AS 1170.2:2021 Structural design actions Part 2: Wind Actions
- AS 1170.4:2007 Structural design actions Part 4: Earthquake Actions
- AS 3600:2018 Concrete Structures
- AS 2601:2001 The Demolition of Structures

1.1 Reference Documents

The following reference documents have been relied upon in completing the structural analysis:

- Appendix A – Liddell Power Station – Chimney Blast Design Drawings
- Appendix B – Existing Structural Drawings
- Appendix C – Chimney Weight Takedown

1.2 Limitations and Assumptions

The structural assessment relies upon to the following limitations and assumptions:

- No significant modifications have been made to the structure post initial construction
- Concrete grade is to be confirmed onsite prior to set out and drilling of blast holes

2 SITE DETAILS

The two chimney stacks are positioned within the Liddell Power Station site. The specific location is provided the below FIGURE 1 and FIGURE 2.

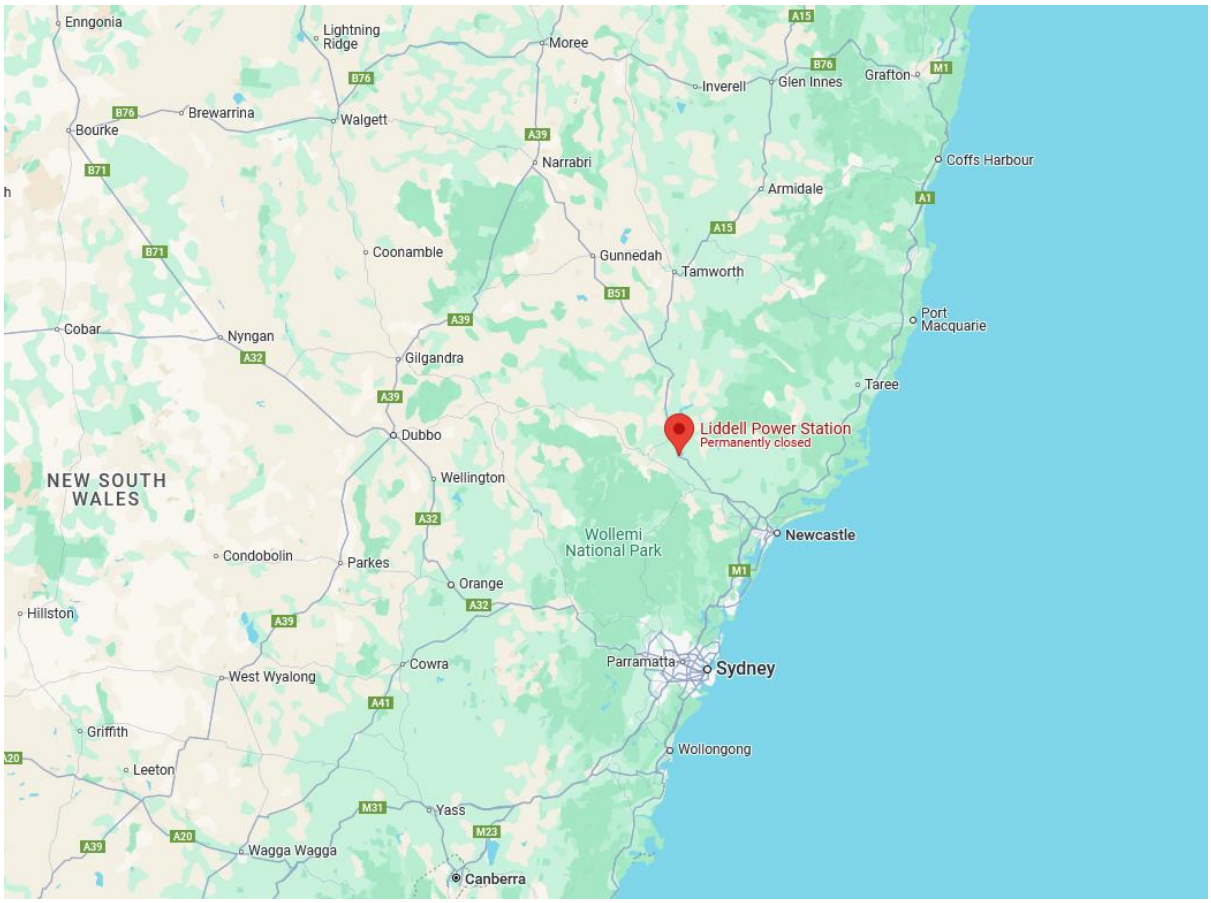


FIGURE 1 – LIDDELL POWER STATION SITE LOCATION

Prior to completing the demolition of the structure, all services are to be disconnected and terminated. Furthermore, any retained assets / services are to be identified and marked onsite.

The demolition area will be wholly within the power station boundary, however additional local fencing and signage may be installed as required based on other site operations. Furthermore, an exclusion zone will be established both during the enabling works and the induced collapse event which will extend into Lake Liddell.

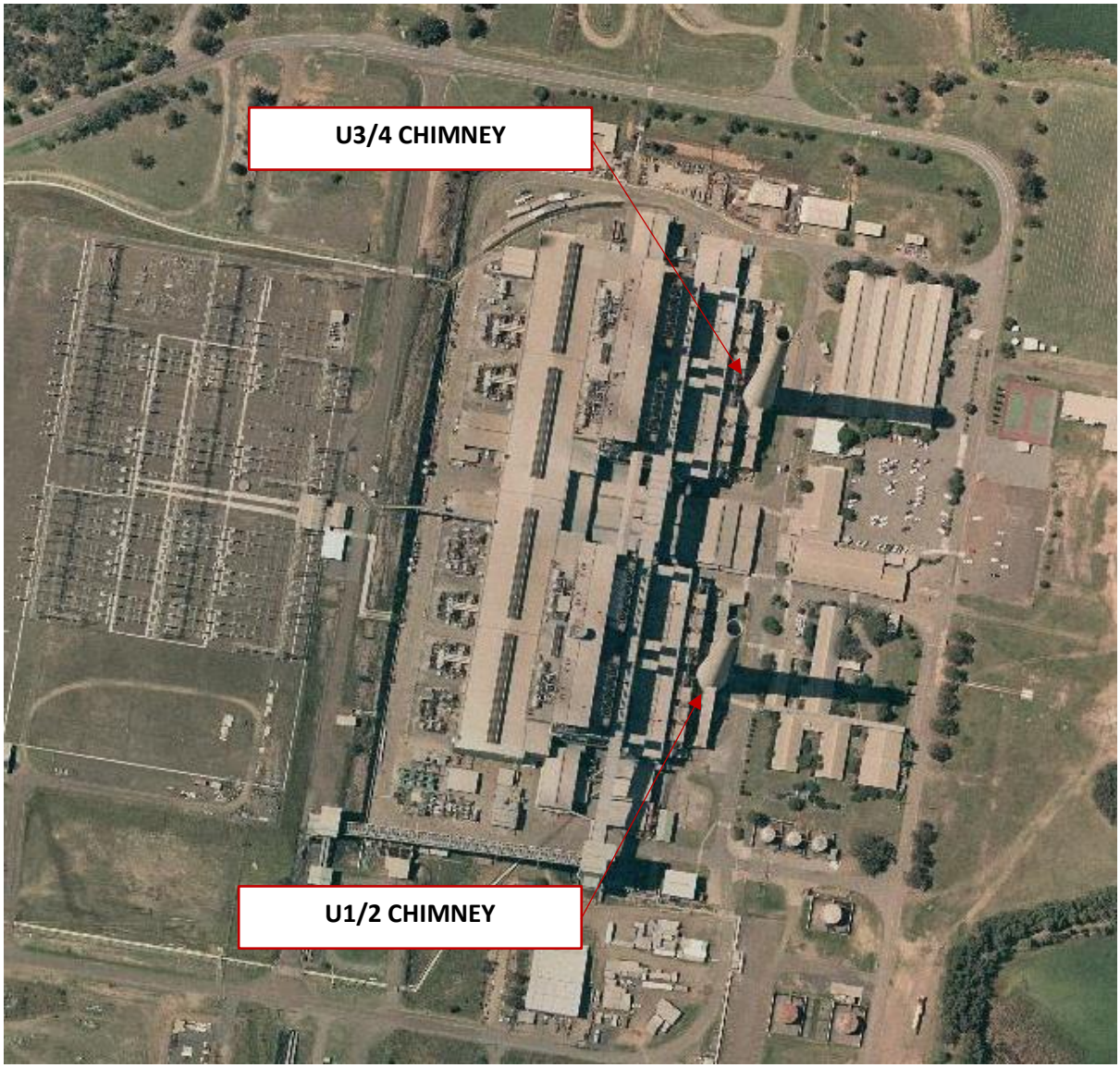


FIGURE 2 – AERIAL PHOTO OF THE LIDDELL CHIMNEY STACKS

3 GEOMETRY / STRUCTURAL SYSTEM

3.1 Geometry

The structures consist of two significant chimneys with a total height of approximately 169m each. The base outside diameter is 18.6m, with a wall thickness of 610mm; the top outside diameter is 9.8m, with a wall thickness of 216mm. The material of construction is reinforced concrete, with the size and layout of the reinforcement varying throughout the height of the structure.

In addition, the chimneys include a number of corbels at regular spacings up the height of the structure, these corbels support the internal brick lining, and an internal concrete slab which is supported on four columns at approx. 6.7m above ground level. FIGURE 3 provides an overview of the structure. The geometry provided within the drawings was confirmed via site investigations, which determined a good correlation between the drawings and the chimney construct (Refer to Appendix E for record of site investigations).



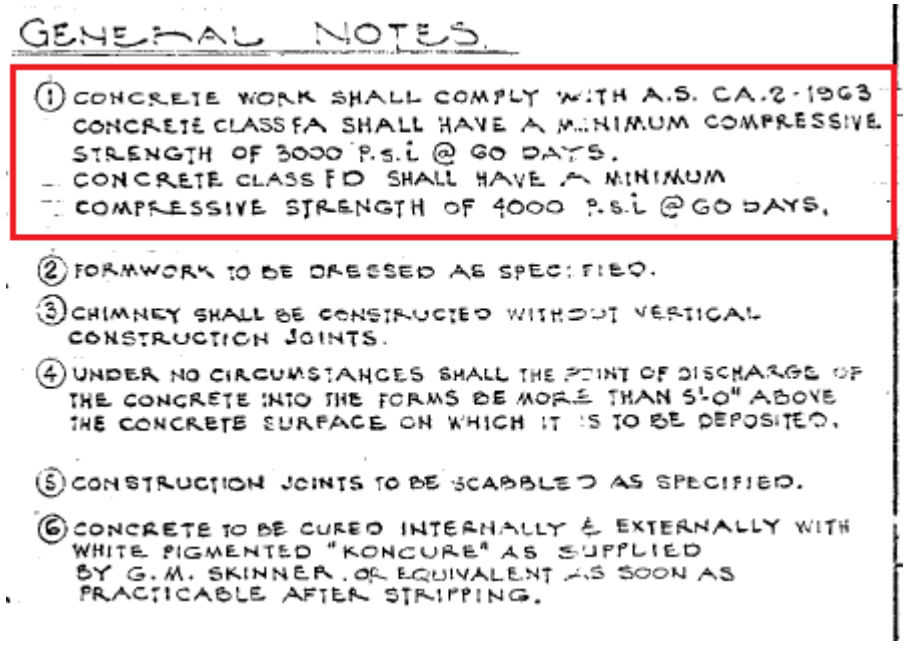
FIGURE 3 – OVERVIEW OF U1/2 CHIMNEY

3.2 Concrete Grade

In order to complete the structural analysis on the chimneys, the concrete grade of the material needs to be assessed. The initial design was based upon the concrete grade specified within the structural drawings.

TABLE 1 – CONCRETE GRADE VS HEIGHT

Relative Level	Description	Concrete Grade at 60 Days	
RL 434' – 0" to RL 525' – 6"	CLASS FD	4000 PSI	27.6 MPa
RL 525' – 6" to RL 988' – 0"	CLASS FA	3000 PSI	20.7 MPa


GENERAL NOTES.

1. CONCRETE WORK SHALL COMPLY WITH A.S. CA.2-1963 CONCRETE CLASS FA SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 P.S.I @ 60 DAYS. CONCRETE CLASS FD SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 P.S.I @ 60 DAYS.
2. FORMWORK TO BE DRESSED AS SPECIFIED.
3. CHIMNEY SHALL BE CONSTRUCTED WITHOUT VERTICAL CONSTRUCTION JOINTS.
4. UNDER NO CIRCUMSTANCES SHALL THE POINT OF DISCHARGE OF THE CONCRETE INTO THE FORMS BE MORE THAN 5'-0" ABOVE THE CONCRETE SURFACE ON WHICH IT IS TO BE DEPOSITED.
5. CONSTRUCTION JOINTS TO BE SCABBLED AS SPECIFIED.
6. CONCRETE TO BE CURED INTERNALLY & EXTERNALLY WITH WHITE PIGMENTED "KONCURE" AS SUPPLIED BY G.M. SKINNER. OR EQUIVALENT AS SOON AS PRACTICABLE AFTER STRIPPING.

FIGURE 4 – CONCRETE GRADE EXTRACT FROM DRAWING LD247906 K/3

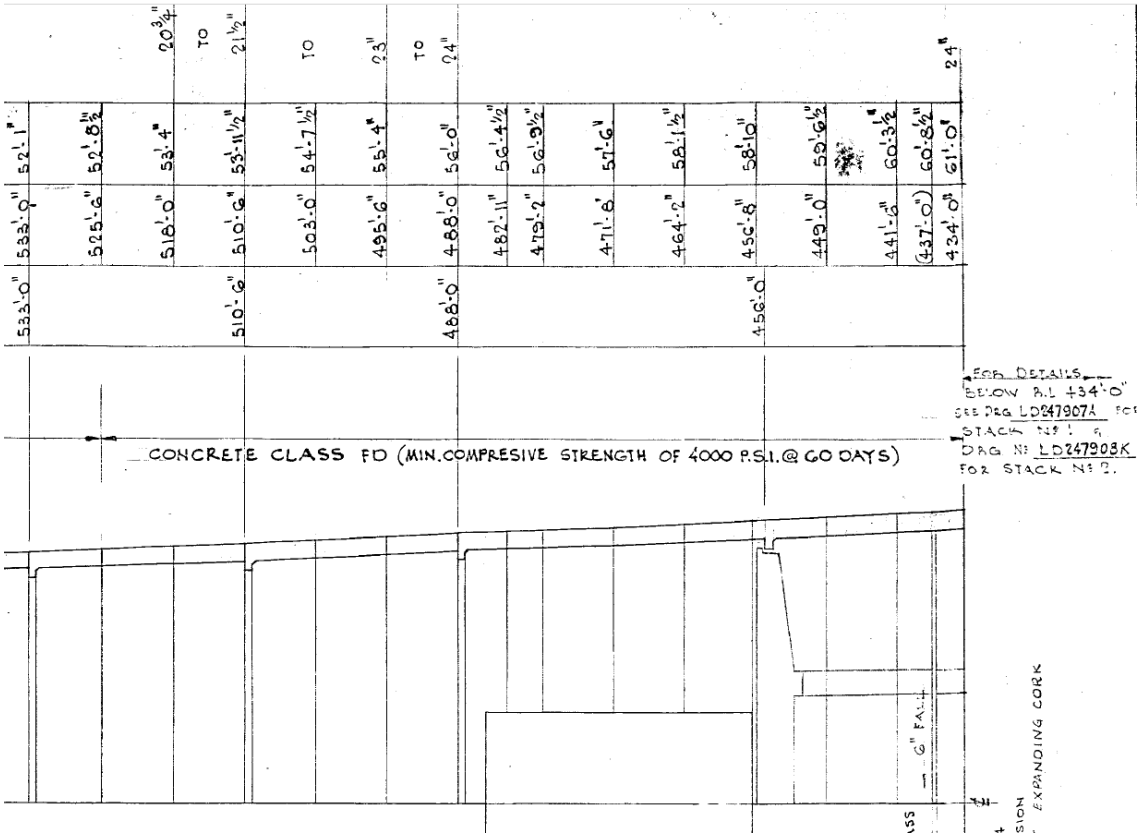


FIGURE 5 – CONCRETE GRADE EXTRACT FROM DRAWING LD247906 K/3 – LOWER LIFTS

In order to verify the concrete grade on the drawings, several core samples were taken from the structure for offsite unconfined compression strength testing. In addition, Schmidt hammer testing was completed in-situ to assess consistency of strength around the circumference of the structure. Appendix E of this document provides a report with the full results of the testing. In general, the results returned with strengths in excess of the specifications of 27.6 MPa, however one of the core samples returned a result of 24.5 MPa. As such, this has been taken as the lower bound value for the analysis of the structure.

TABLE 2 – CONCRETE STRENGTH TEST RESULTS

SPECIMEN ID NO.	CHIMNEY	DATE OF TEST	CORE STRENGTH (MPa)	CORRECTED COMPRESSIVE STRENGTH (MPa)	CORE LOCATION
NEWC5177A	U1/U2	16.06.2025	30.5	30.5	S1C1
NEWC5177B	U1/U2	16.06.2025	30.5	30.5	S1C2
NEWC5177C	U3/U4	16.06.2025	24.5	24.5	S2C3
NEWC5177D	U3/U4	16.06.2025	28.0	28.0	S2C4

3.3 Structural System

The global stability of the chimney is dependent on the capacity of the external concrete shell. As such, the various stages of the works are to be assessed against appropriate dead and live design loads to ensure integrity is maintained in the shell up until the time of initiation.

The demolition stages to be assessed include:

- Initial core holes for concrete testing
- Triangular panels and front charge holes
- Rear heel wire saw cuts

3.4 Analytical Model

In order to analyse the structure, a finite element analysis has been completed to verify the expected stresses at the various stages of works as well as the hinge and heel behaviour post blast. This has also been crossed checked with a first principles stress analysis to confirm the results.

The model was based on the existing structural drawings, which are provided in Appendix B of this document.



FIGURE 6 – FINITE ELEMENT ANALYSIS MODEL OF LIDDELL CHIMNEY STACK

4 DEMOLITION METHOD

The demolition of the two chimney structures is to be achieved via an explosive induced collapse.

This process includes several steps as detailed herein.

- 200mm core holes drilled at termination points of birds mouth;
- Triangular/trapezoidal portion of chimney removed between 200mm core hole and start of charge pattern;
- 28mm holes drilled in the front face of the chimney (fell direction site) in accordance with blast design;
- Rear portion of chimney wire saw cut to extents provided in blast design;
- Holes packed with explosive charges;
- Explosives detonated to remove front portion (bird's mouth) of the chimney base, and induce the collapse of the structure, with the chimneys crossing over at a 20 degree angle from site North-South;
- Establish asbestos management controls in accordance with the asbestos management plan
- Excavators are to be used for processing and loadout of materials.

For detailed design, refer to Appendix A of this document.

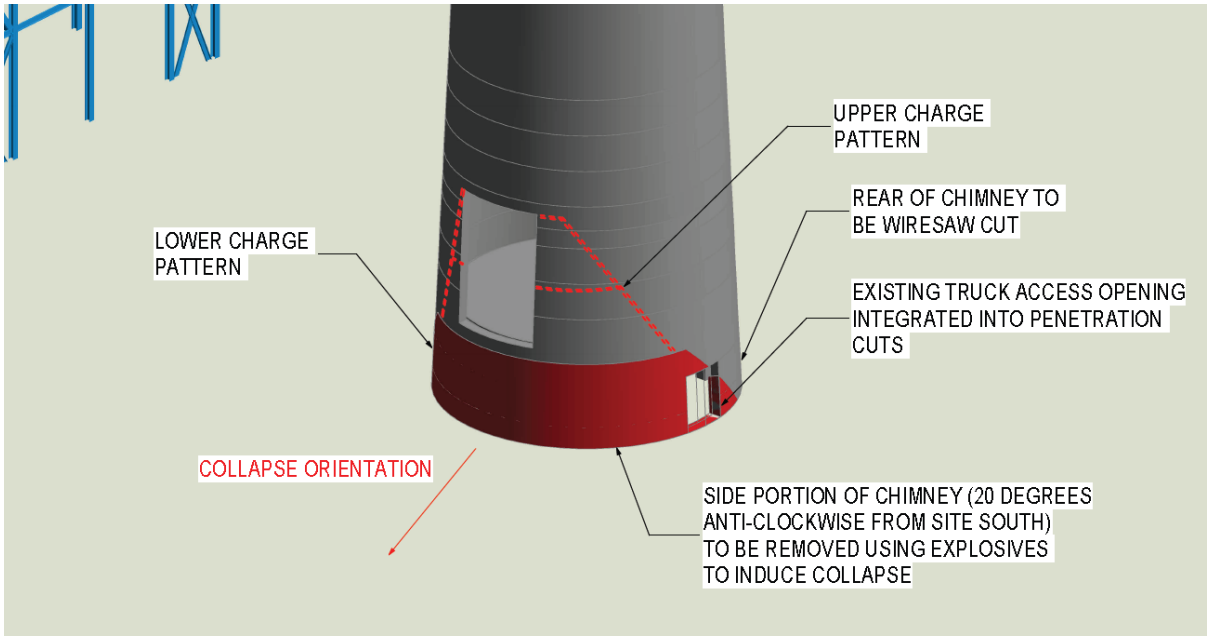
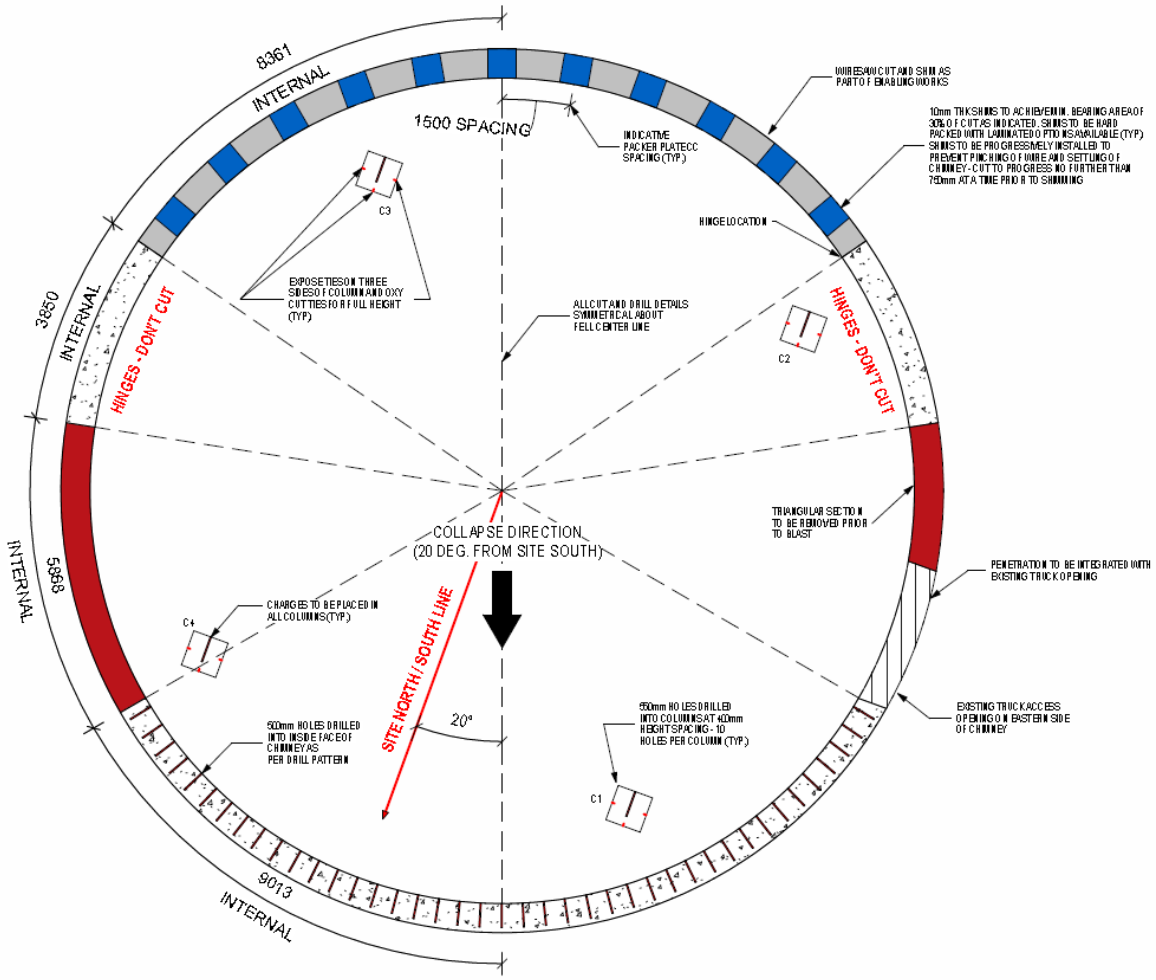


FIGURE 7 – BASIC OVERVIEW OF METHOD

The outcomes of the structural analysis have informed the specific cut details and blast pattern that is to be executed onsite. The design is specified to ensure that failure of the hinges is induced, whilst ensuring that the rear heel of the structure maintains adequate capacity to facilitate rotation as the hinges crush. The below figure provides an overview of the cut details and blast pattern at ground level.



Note: Refer to Appendix A for higher resolution drawing of base set out

FIGURE 8 – CROSS SECTION OF CHIMNEY BASE WITH BLAST AND CUT SETOUT

The intention for the design is to have the chimney collapse via base overturning in a direction which is 20 degrees off site North / South respectively as per the below figure.

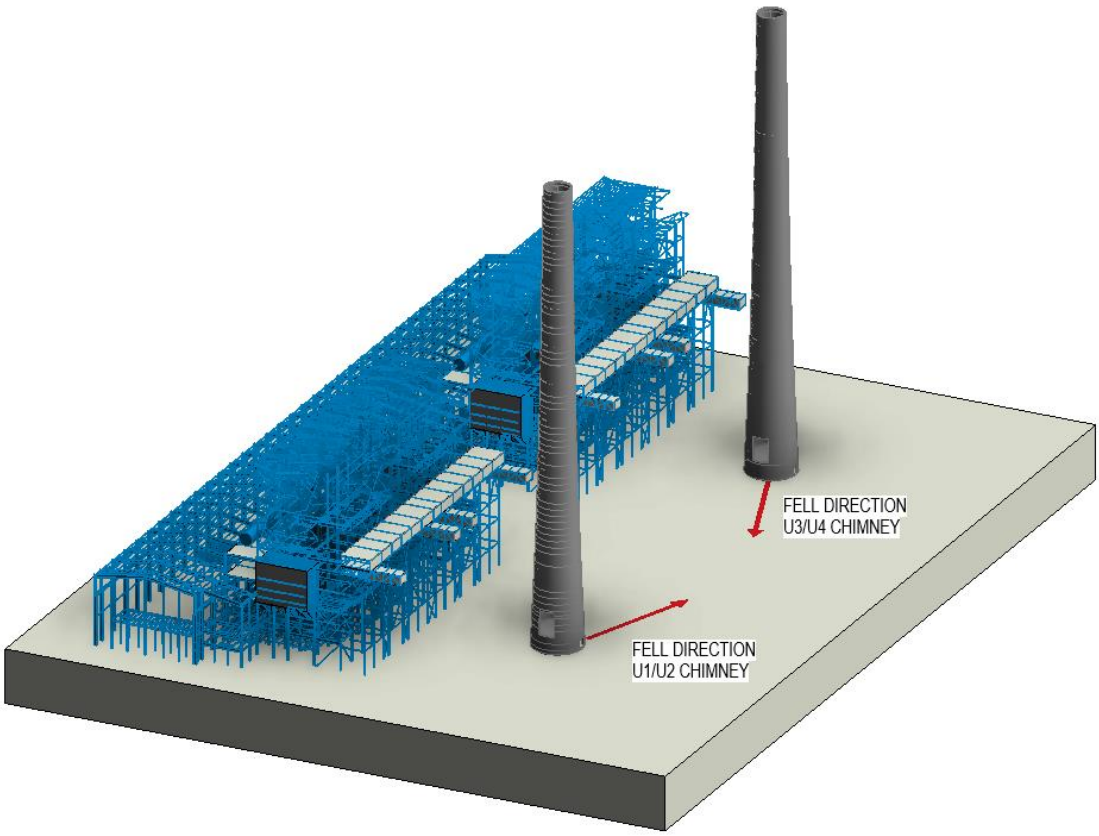


FIGURE 9 – FELL DIRECTION FOR CHIMNEYS

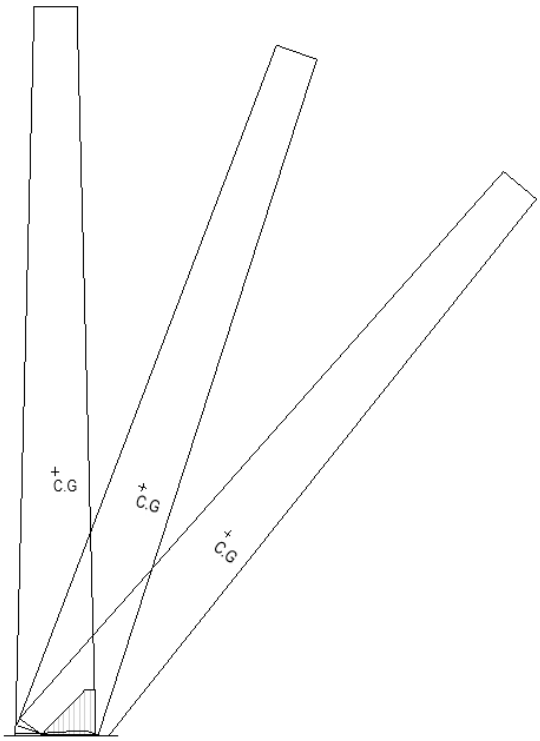


FIGURE 10 – COLLAPSE MECHANISM FOR CHIMNEYS

$kNm := kN \cdot m$

5 LOADING

5.1 Overview

In order to assess both the integrity of the structure during enabling works and the behaviour of the structure post blast, design loads have been evaluated in accordance with AS1170.

5.2 Dead Load

The dead load has been determined based on a model of the structure within Ansys. This analysis returned a self-weight as per below:

$\rho_{conc} := 2.41 \cdot \frac{tonne}{m^3}$

$Volume_{chimney_shell} := 2391433832650.59\ mm^3$

$Mass_{chimney_shell} := Volume_{chimney_shell} \cdot \rho_{conc} = 5763.4\ tonne$

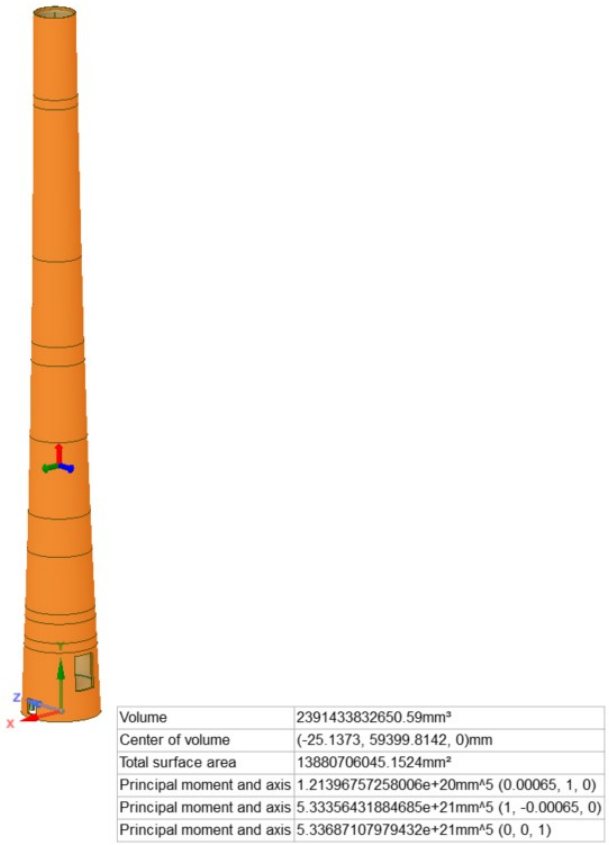


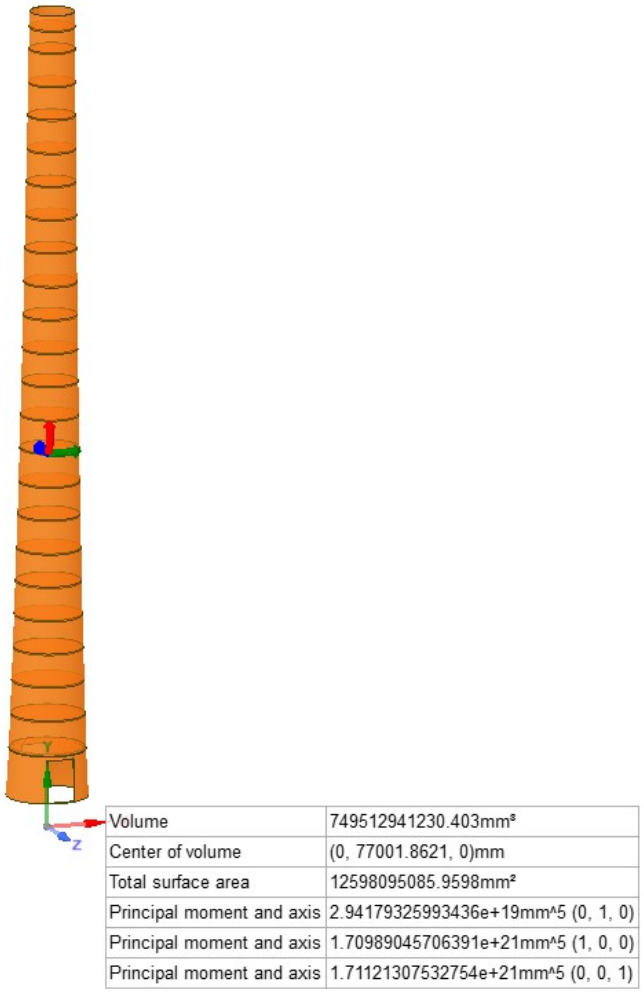
FIGURE 11 - VOLUME OF CONCRETE FROM MODEL

$Volume_{brick_liner} := 749512941230.4\ mm^3$

$\rho_{brick} := 2.3 \cdot \frac{tonne}{m^3}$

Refer to Appendix D for limited brick details. 2.3 density adopted for assessment

$Mass_{brick_liner} := Volume_{brick_liner} \cdot \rho_{brick} = 1723.9\ tonne$



Volume	749512941230.403mm³
Center of volume	(0, 77001.8621, 0)mm
Total surface area	12598095085.9598mm²
Principal moment and axis	2.94179325993436e+19mm^5 (0, 1, 0)
Principal moment and axis	1.70989045706391e+21mm^5 (1, 0, 0)
Principal moment and axis	1.71121307532754e+21mm^5 (0, 0, 1)

FIGURE 12 - VOLUME OF BRICK FROM MODEL

$TOTAL_MASS_{chimney} := Mass_{chimney_shell} + Mass_{brick_liner} = 7487.2\ tonne$

As provided in Appendix C, calculations from first principles were also completed to cross check these weights. These high level calculations returned a total mass of 7409 tonne, hence within 1.1% of the model values. Hence the conservative model value has been adopted.

In order to analyse the stress distribution on the concrete, a finite element analysis model has been developed.

TABLE 3 - SUMMARY DATA FROM FEA MODEL

Bill of Materials | Centre of Mass | Local Inertia | Global Inertia

	Mass t	Volume mm^3	Length mm	Area mm^2	Count	Material	Type	Section
GRAND TOTAL	**5815.67**	**2.4232×10^{12}**		**6.84067×10^{9}**				
PLATE PROPERTIES								
1: Conc 609.6mm	1372.19	5.71746×10^{11}		9.37904×10^{8}	923	Isotropic	Plate/Shell	
2: Conc 584mm	335.751	1.39896×10^{11}		2.39549×10^{8}	263	Isotropic	Plate/Shell	
3: Conc 546mm	154.464	6.43599×10^{10}		1.17875×10^{8}	103	Isotropic	Plate/Shell	
4: Conc 480mm	780.087	3.25036×10^{11}		6.77159×10^{8}	694	Isotropic	Plate/Shell	
5: Conc 405mm	414.287	1.72619×10^{11}		4.26221×10^{8}	423	Isotropic	Plate/Shell	
6: Conc 343mm	659.317	2.74716×10^{11}		8.0092×10^{8}	788	Isotropic	Plate/Shell	
7: Conc 279mm	497.06	2.07108×10^{11}		7.42324×10^{8}	730	Isotropic	Plate/Shell	
8: Conc 248mm	105.662	4.40258×10^{10}		1.77523×10^{8}	195	Isotropic	Plate/Shell	
9: Conc 241mm	443.266	1.84694×10^{11}		7.66365×10^{8}	769	Isotropic	Plate/Shell	
10: Conc 229mm	689.283	2.87201×10^{11}		1.25415×10^{9}	1282	Isotropic	Plate/Shell	
11: Conc 222mm	39.6505	1.65211×10^{10}		7.44192×10^{7}	65	Isotropic	Plate/Shell	
12: Conc 216mm	324.653	1.35272×10^{11}		6.26259×10^{8}	631	Isotropic	Plate/Shell	
TOTAL	**5815.67**	**2.4232×10^{12}**		**6.84067×10^{9}**	**6866**			

The weight determined within the model is approximately 5815.7 tonne, which has shortfall due to missing brick liner & corbels.

As such, a non-structural mass has been added to the model to account for these elements.

$$Mass_{FEA} := 5815.7 \ tonne$$

$$Require_Mass_{FEA} := TOTAL_MASS_{chimney} - Mass_{FEA} = \left(1.672 \cdot 10^{3}\right) \ tonne$$

$$FEA_{surface_area} := 6840670000 \ mm^{2}$$

$$Add_{mass} := \frac{Require_Mass_{FEA}}{FEA_{surface_area}} = \left(2.444 \cdot 10^{-7}\right) \frac{tonne}{mm^{2}}$$

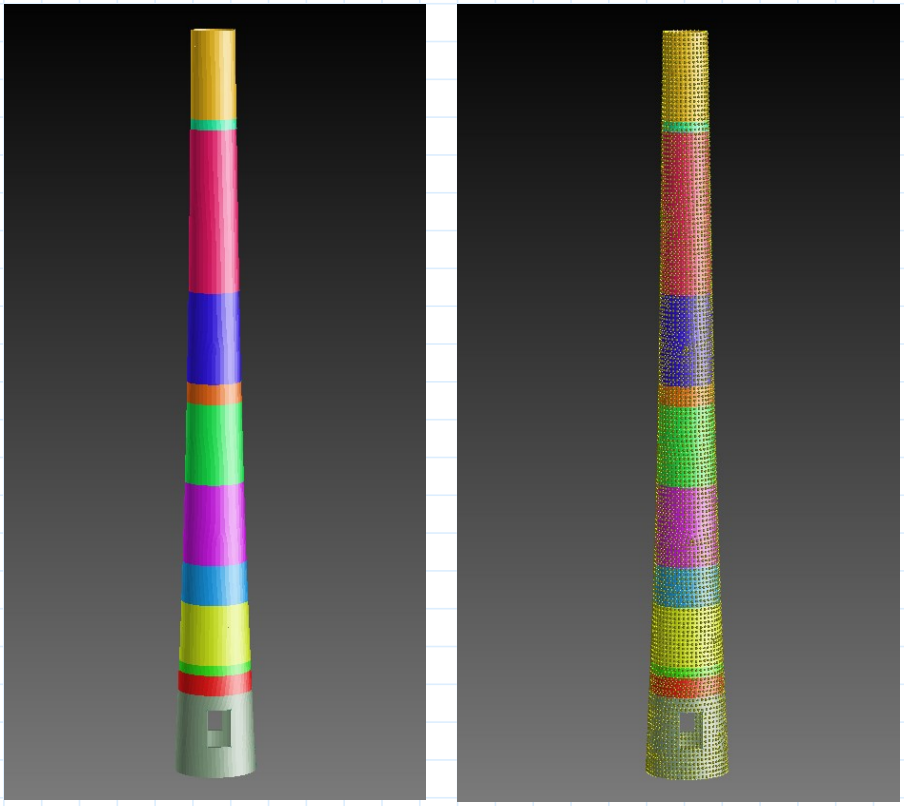


FIGURE 13 - NON-STRUCTURAL MASS ADDED TO FEA MODEL

5.3 Wind Load

The design wind speed for the pre-weakening has been nominated as 41 m/s which is based upon a 6 month design working life for an importance level 2 structure. This results in a 1:100 annual probability of exceedance requirement.

Furthermore, in order to assess an allowable wind speed for the blast event, and potential impacts of wind on the rotation of the chimney during collapse, wind speed of 15 m/s.

In order to complete a comparative analysis, a load case for the ultimate design wind speed is also to be assessed. This is considered for an importance level 3 structure with a 50 year design working life, which equates to a 1:1000 annual probability of exceedance requirement.

The wind loading is determined by the following

$\rho_{air} := 1.2 \ \frac{kg}{m^3}$ $V_{R_demo} := 41 \ \frac{m}{s}$ $V_{R_design} := 46 \ \frac{m}{s}$

$V_{blast_limit} := 15 \ \frac{m}{s}$

$M_d := 1.0$	Wind direction multiplier
Wind Region = A3	Upper Hunter Region - NSW
$M_{z_cat} := 1.37$	Exposed terrain - conservative
$M_s := 1.0$	Assume no shielding
$M_t := 1.0$	Flat approach on all sides
$V_{Des} := V_{R_demo} \cdot M_d \cdot M_{z_cat} \cdot M_s \cdot M_t = 56.17 \ \frac{m}{s}$	Final design wind velocity
$V_{Des_Sens} := V_{R_design} \cdot M_d \cdot M_{z_cat} \cdot M_s \cdot M_t = 63.02 \ \frac{m}{s}$	Original design wind velocity for sensitivity analysis
$V_{Des_Blast_Limit} := V_{blast_limit} \cdot M_d \cdot M_{z_cat} \cdot M_s \cdot M_t = 20.55 \ \frac{m}{s}$	For blast assessment

External Pressure Calculations

Check for compliance with Section A5 of AS1170.2 to assess wind actions as silo

$c_{chimney} := 169\ m$ $b_{chimney} := 18.6\ m$

c/b must be between 0.25 - 4.0

$A5_{check} := \frac{c_{chimney}}{b_{chimney}} = 9.086$

As such, adopt aerodynamic shape factors in accordance with Appendix C of AS1170.2

If using Section A5, a Cfig of 0.63 would be adopted.

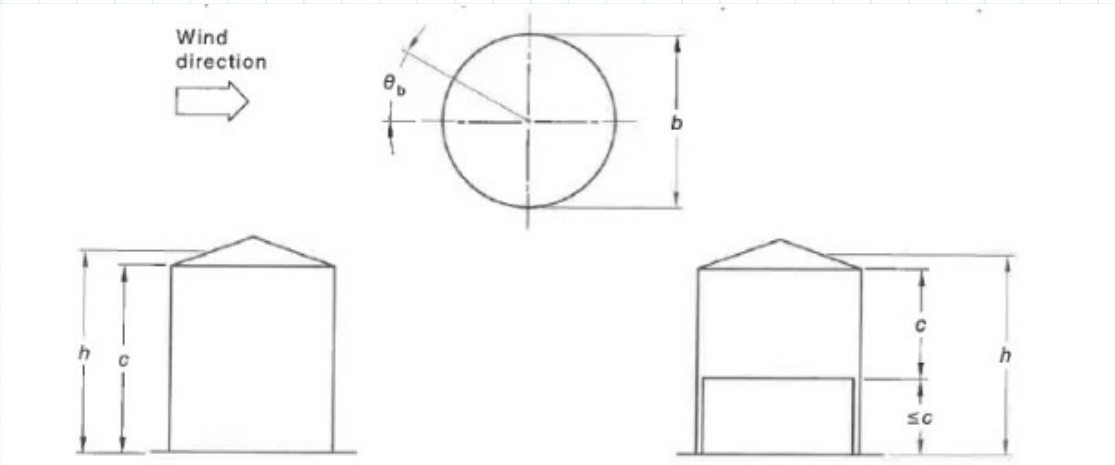


Figure A.5 — External pressure coefficients ($C_{p,b}$) on walls of circular bins, silos and tanks ($0.25 \le c/b \le 4.0$)

FIGURE 14 - EXTRACT FROM AS1170.2

Adopting values from Table C3 of AS1170.2

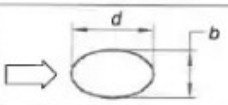
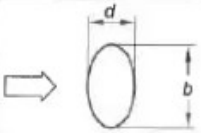
$h_r := 1 \cdot 10^{-3} \cdot \frac{s}{m}$ Rough concrete

$C_{d_chimney} := 1 + \left(0.033 \cdot \left(\log\left(V_{Des} \cdot h_r\right)\right)\right) - \left(0.025\ \left(\log\left(V_{Des} \cdot h_r\right)\right)^2\right) = 0.92$

Note that the utilising the American ASCE 7 Figure 6-21, would return a value of approximately 0.8.

Hence the determined value is appropriate

Table C.3 — Drag force coefficients (C_d) for rounded cylindrical shapes

Cross-sectional shape	Description	Drag force coefficient (C_d)	
		$bV_{des,\theta} < 4$ m²/s	$bV_{des,\theta} > 10$ m²/s
	Cylindrical	1.2	See Clause C.3.1
 Ellipse $\frac{b}{d} = \frac{1}{2}$	Ellipse narrow side to wind	0.7	0.3
 Ellipse $\frac{b}{d} = 2$	Ellipse broad side to wind	1.7	1.5
 $\frac{b}{d} = 1$ $\frac{r}{b} = \frac{1}{3}$	Square with rounded corners	1.2	0.6

NOTE Attachments to circular cross-sections (e.g. ladders, pipes, etc.) projecting more than 1 % of the diameter of the cylinder will induce aerodynamic separation and in these cases $C_d = 1.2$.

FIGURE 15 - EXTRACT FROM AS1170.2 - TABLE C3

Based on these values, determine the design wind pressure:

$$C_{fig} := C_{d_chimney} = 0.92$$

Assess structure for dynamic wind response. As per AS1170.2, for chimney structures with a height to width ratio greater than 5, a dynamic

6.3 Other structures

The following requirements apply:

(a) For buildings and free-standing towers, with first mode natural frequencies in the range 0.2 to 1 Hz, C_{dyn} shall be as defined in Clause 6.4 for along-wind response and Clause 6.5 for crosswind response.

(b) For cantilevered roofs with a first mode natural frequency between 0.5 Hz and 1 Hz, C_{dyn} shall be as defined in Clause B.5.

(c) The dynamic response of poles, masts and chimneys of circular cross-section with height to average diameter aspect ratio greater than 5 shall be determined from Clause 6.4.2 and Clause 6.5.3.

(d) The dynamic response factor for horizontal slender structures with a first mode natural frequency between 1 Hz and 0.5 Hz, C_{dyn} shall be as defined in Clause 6.4.3.

NOTE 1 Appendix E provides information on calculating accelerations for serviceability in tall wind-sensitive structures.

NOTE 2 Special studies such as wind-tunnel testing should be undertaken for dynamically-sensitive structures not covered by this Standard.

FIGURE 16 - EXTRACT FROM AS1170.2

Hence the along wind and cross wind dynamic response is to be determined.

Along-Wind Response:

$I_h := 0.088$ — Terrain Category 1

$g_v := 3.4$ — peak factor upwind velocity fluctuations

$h_c := 169$

$L_h := 85 \cdot \left(\frac{h_c}{10}\right)^{0.25} = 172.342$ — Turbulence length scale

$s_{chimney} := 0$ — Base overturning only

$b_{sh} := 12.9$ — Average width

$B_s := \frac{1}{1 + \frac{\sqrt{0.26 \cdot \left(h_c - s_{chimney}\right)^2 + 0.46 \cdot {b_{sh}}^2}}{L_h}} = 0.666$ — Background factor

$H_s := 1 + \left(\frac{s_{chimney}}{h_c}\right)^2 = 1$ — Height factor

$n_a := 0.427$ Fundamental Frequency

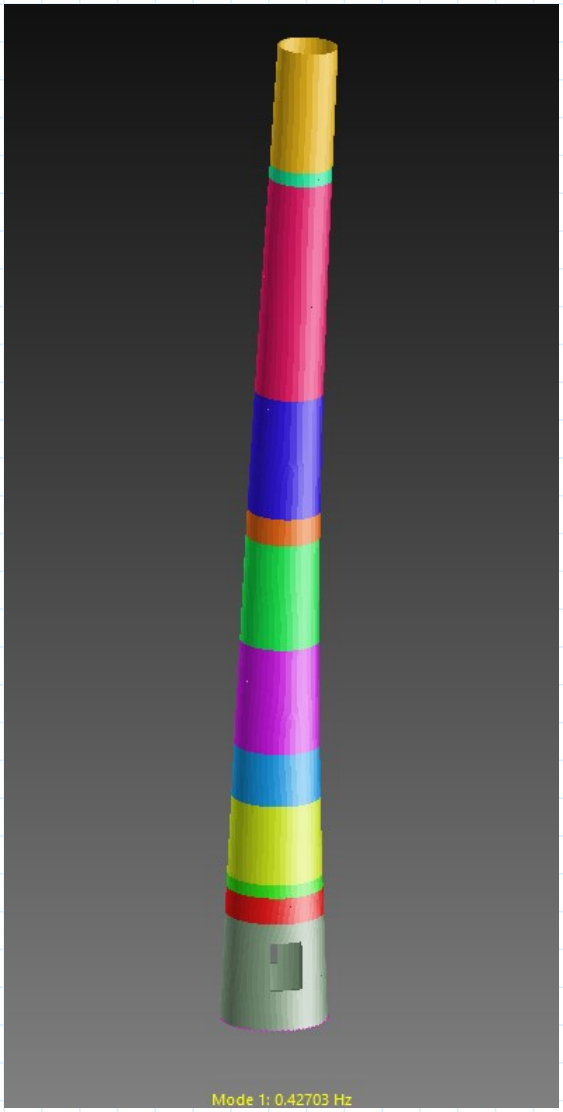


FIGURE 17 - FUNDAMENTAL FREQUENCE FROM FINITE ELEMENT ANALYSIS

$g_R := \sqrt{1.2 + 2\ \ln\left(600 \cdot n_a\right)}$ Peak factor resonant response

$V_{des_unitless} := \frac{V_{Des}}{m} \cdot s = 56.17$

$N := \frac{n_a \cdot L_h \cdot \left(1 + \left(g_v \cdot I_h\right)\right)}{V_{des_unitless}}$ Reduced frequency

$$E_t := \frac{\pi \cdot N}{\left(1 + 70.8 \cdot N^2\right)^{\left(\frac{5}{6}\right)}} = 0.063$$

Spectrum of turbulence

$$\zeta_{chimney} := 0.03$$

ratio of damping - reinforced concrete for ultimate limit state assessment

$$S_{chimney} := \frac{1}{\left(1 + \frac{3.5 \cdot n_a \cdot h_c \cdot \left(1 + g_v \cdot I_h\right)}{V_{des_unitless}}\right) \cdot \left(1 + \frac{4 \cdot n_a \cdot b_{sh} \cdot \left(1 + g_v \cdot I_h\right)}{V_{des_unitless}}\right)}$$

Size reduction factor

$$C_{dyn_chimney} := \frac{1 + 2 \cdot I_h \cdot \sqrt{\left(g_v{}^2 \cdot B_s\right) + \frac{H_s \cdot g_R{}^2 \cdot S_{chimney} \cdot E_t}{\zeta_{chimney}}}}{\left(1 + \left(2 \cdot g_v \cdot I_h\right)\right)} = 0.977$$

Hence modified pressure on stack as per below:

$$p_{stack} := \left(0.5 \cdot \rho_{air}\right) \cdot \left(V_{Des}\right)^2 \cdot C_{fig} \cdot C_{dyn_chimney} = 1.701 \ \boldsymbol{kPa}$$

$$p_{stack_sensitivity} := \left(0.5 \cdot \rho_{air}\right) \cdot \left(V_{Des_Sens}\right)^2 \cdot C_{fig} \cdot C_{dyn_chimney} = 2.141 \ \boldsymbol{kPa}$$

$$p_{stack_blast} := \left(0.5 \cdot \rho_{air}\right) \cdot \left(V_{Des_Blast_Limit}\right)^2 \cdot C_{fig} \cdot C_{dyn_chimney} = 0.228 \ \boldsymbol{kPa}$$

Cross-Wind Response:

As per clause 6.3.3.2, also determine equivalent static crosswind force:

$n_1 := 0.427 \ \boldsymbol{Hz}$ Fundamental Frequency

$b_t := 10.569 \ \boldsymbol{m}$ average breadth of top third of structure

$$V_{crit} := 5 \cdot n_1 \cdot b_t = 22.565 \ \frac{\boldsymbol{m}}{\boldsymbol{s}}$$

$$w_{chimney} := 0.5 \cdot \rho_{air} \cdot \left(V_{crit}\right)^2 \cdot b_t \cdot C_{fig} \cdot C_{dyn_chimney} = 2.902 \ \frac{1}{\boldsymbol{m}} \cdot \boldsymbol{kN}$$

As noted in AS1170.2 Section 6.6.1, it is confirmed that the critical velocity at the top of the chimney which is the velocity in which the structure is susceptible to vortex shedding, is well below the design velocity, the cross wind response does not need to be further assessed in determining the base overturning moment, which is the focus of this analysis.

For wind loading, apply pressure over projected area of chimney. The area has been generated from the model of the structure.

$Project_Area_{chimney} := 2211623805.9\ mm^2 = 2211.6\ m^2$

$Centre_Area_{chimney} := 75436.45\ mm = 75.436\ m$

$W_{Force_Chimney} := Project_Area_{chimney} \cdot p_{stack} = 3762.5\ kN$

$W_{Force_Chimney_sens} := Project_Area_{chimney} \cdot p_{stack_sensitivity} = 4736.1\ kN$

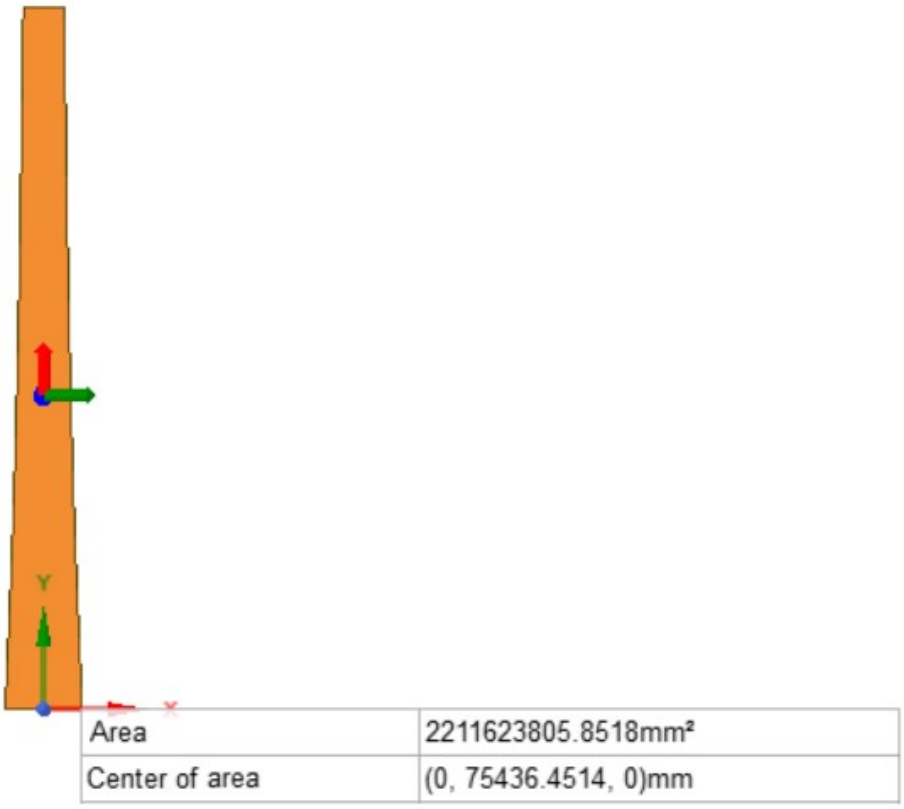


FIGURE 18 - PROJECTED AREA OF CHIMNEY

Applying wind load evenly to a front strip of the structure, noting that this will result in a conservative over estimate of the overturning moment.

$$No_{nodes_strip} := 15571$$

$$Force_{FEA} := \frac{W_{Force_Chimney}}{No_{nodes_strip}} = 241.6\ N$$

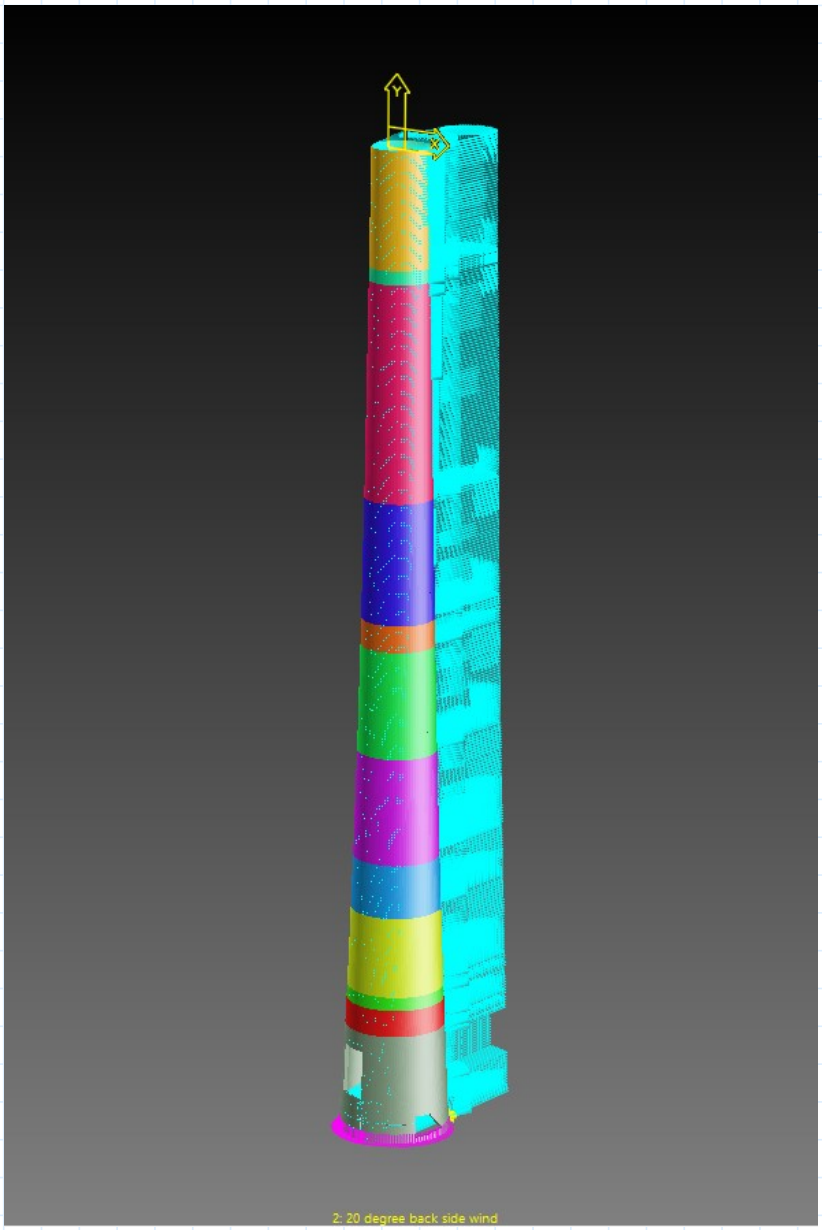


FIGURE 19 - APPLICATION OF DEMO WIND LOAD ONTO FEA MODEL

For comparative assessment, apply the original design load into the uncut FEA model, down a strip of 3882 nodes within the FEA Model.

$$No_{nodes_comparison} := 3882$$

$$Force_{FEA_SENS} := \frac{W_{Force_Chimney_sens}}{No_{nodes_comparison}} = 1220\ N$$

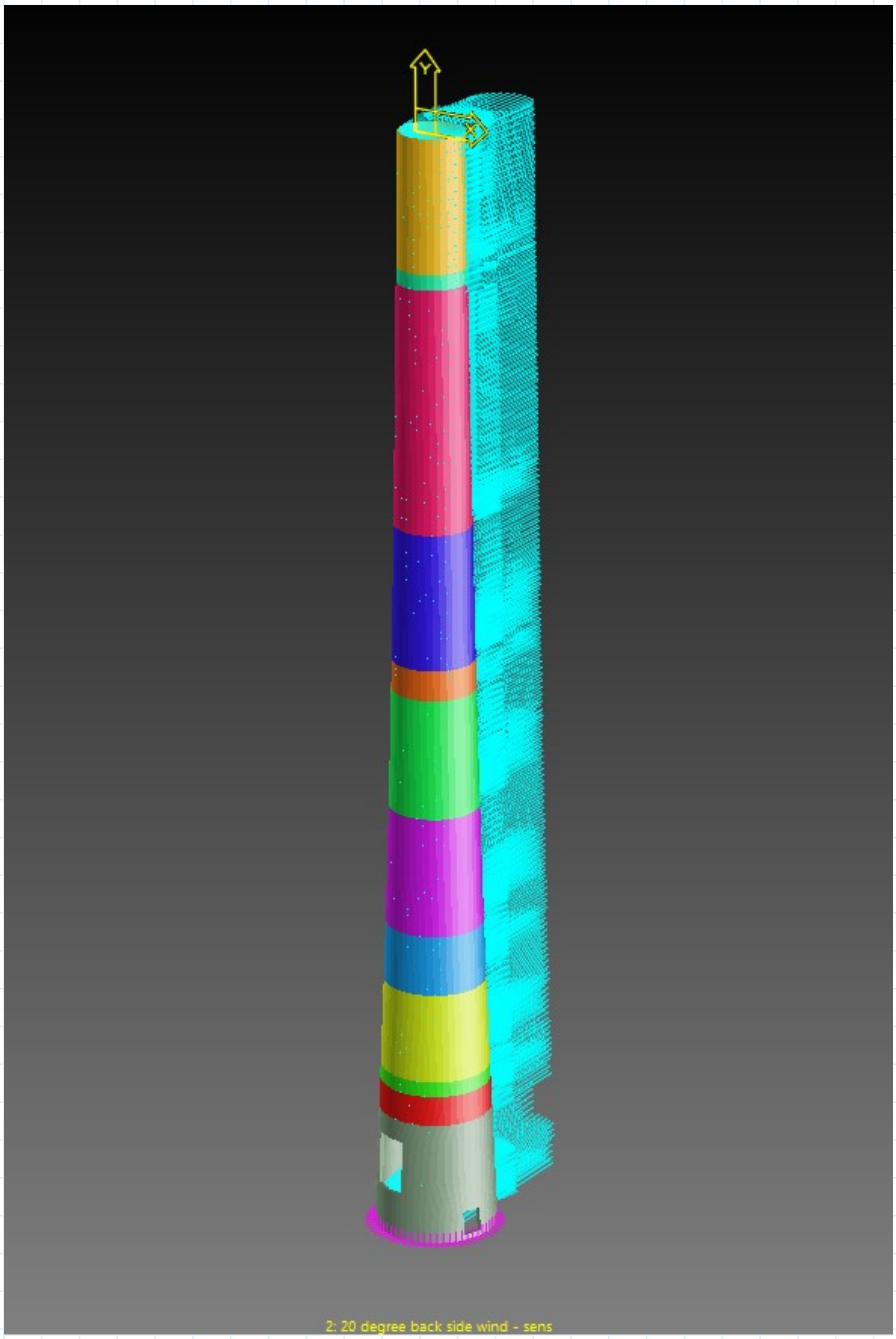


FIGURE 20 - APPLICATION OF ULTIMATE WIND LOAD ONTO FEA MODEL

5.4 Earthquake Load

Based on the height of the structure > 50m, AS1170.4 requires a dynamic analysis of the structure in order to assess the peak earthquake design actions. This was completed via a Spectral Response Solver, and combining the results into a SRSS file.

Adopting 1:100 exceedance probability:

$k_p := 0.5$ — As per Table 3.1 of AS1170.4 for 1:100 probability

$Z := 0.10$ — As per Figure 3.2 of AS1170.4 - Muswellbrook

Soil Class: De — Deep or Soft Soil

$\mu := 3$ — Table B1 - AS1170.4 - Cantilever Structures

$S_p := 1$ — Table B1 - AS1170.4 - Cantilever Structures

Determine number of modes to be evaluated. As per AS1170.2, the number of modes must include those down to a value of 5% of the fundamental period.

$T := 2.342\ s$ — Fundamental Natural Period

$T_5 := 0.05 \cdot T = 0.117\ s$ — 5% of T

This equates to a frequency of 8.55 Hz. Hence need to include adequate modes to this frequency.

As per the FEA, this the first 40 modes to be evaluated.

For input into Strand7, need to evaluate the terms which are not determined intrinsically within the model.

$Base_factor := \frac{k_p \cdot Z \cdot S_p}{\mu} \cdot 9810 = 163.5$ — Multiplying acceleration as 9810mm/s2

$Base_factor_0.3 := 0.3 \cdot \frac{k_p \cdot Z \cdot S_p}{\mu} \cdot 9810 = 49.05$ — Included factor for 30% cardinal direction

For the De soil type, the appropriate normalised response spectra has been adopted:

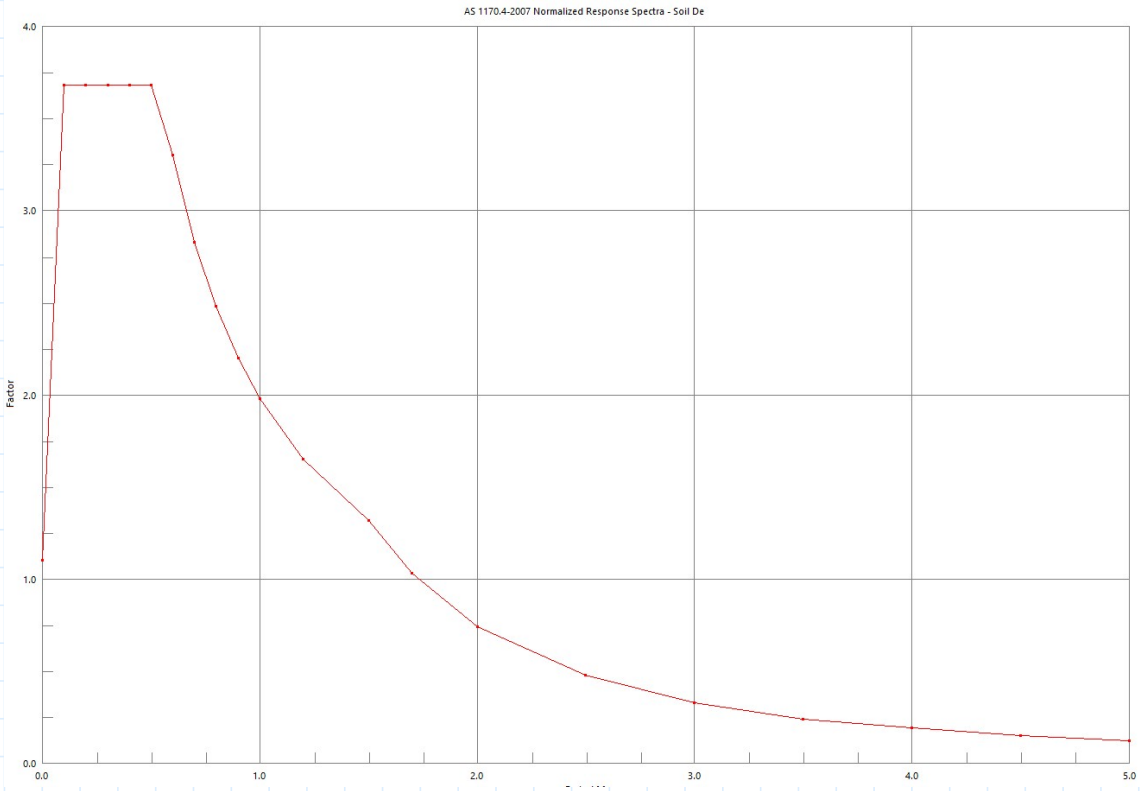


FIGURE 21 - NORMALISED RESPONSE SPECTRA - De Soil

In order to combine the spectral response, eight combinations were developed to account for each direction with the 30% and 100% breakdown of the cardinal directions as required by AS1170.4. This returned the following base reactions and peak stresses.

TABLE 3 - SPECTRAL RESPONSE - RESULTS SUMMARY

Combination Details	FX - N	FZ - N	Resolved - N	kN	tonne	VM - Mpa
1 Combination: 1.0N/S + 0.3E/W	1054660	1187610	1588308.9	1588.3	161.9	3.81
2 Combination: (-1.0N/S) + 0.3E/W	401188	750850	851309.3	851.3	86.8	1.99
3 Combination: (-1.0N/S) + (-0.3E/W)	-1054660	-1187610	1588308.9	1588.3	161.9	3.81
4 Combination: 1.0N/S + (-0.3E/W)	401188	750850	851309.3	851.3	86.8	1.99
5 Combination: 0.3N/S + 1.0E/W	1307510	1018690	1657501.6	1657.5	169.0	3.91
6 Combination: (-0.3N/S)+ 1.0E/W	870750	437158	974326.8	974.3	99.3	2.17
7 Combination: (-0.3N/S + (-1.0E/W)	-1307510	-1018690	1657501.6	1657.5	169.0	3.91
8 Combination: 0.3N/S + (-1.0E/W)	-870750	-437158	974326.8	974.3	99.3	2.17

The critical case was combination 5, which is a 100% value originating from the West, pushing the stack eastward, combined with a 30% Northern component.

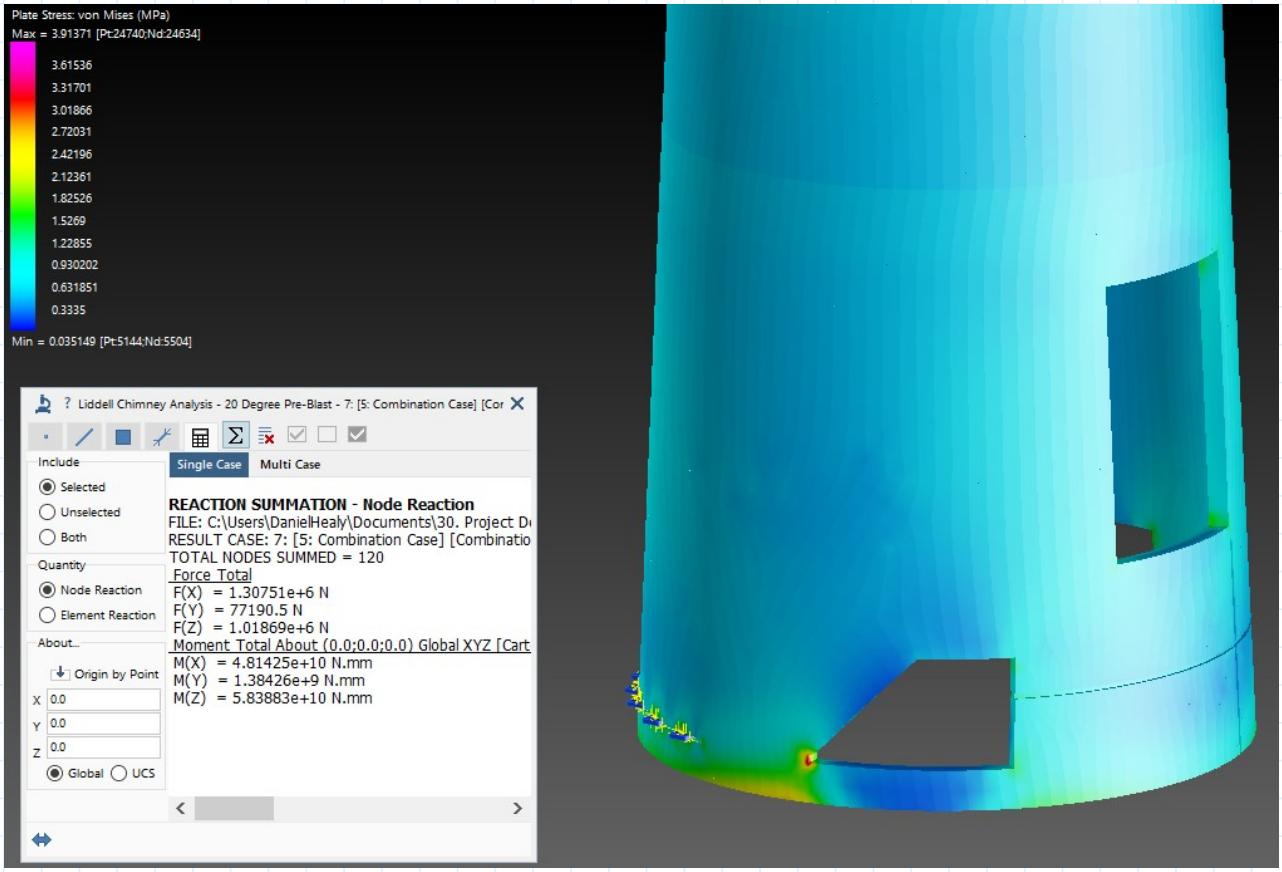


FIGURE 22 - BASE REACTIONS AND STRESS ANALYSIS - COMBINATION 5

As per the analysis, the peak reaction within the SRSS combinations was approximately 169t when resolved into a single force, or 133.3 in the East-West direction and 103.8t in the North-South direction.

This resulted in a peak combined stress of 3.91 MPa, which is well within allowable limits. It is noted that due to the SRSS combination, the negative or positive cannot be assumed for the reaction. This is critical in consideration of the shims at the rear of the cuts, as they have no tensile / uplift resistance.

However, the analysis indicates that the stresses are within limits in a general sense, and it also confirms that the base shear force is well below that caused by the wind design actions (approx. 384t). Hence wind is the governing design and will be assessed further. The wind design actions will also assess the potential for uplift at the heel and ensure the self-weight surcharge is not exceeded at these locations.

In addition, the Equivalent Static Base Shear has been calculated using the provisions of Section 6 of AS1170.4, as a cross check for spectral response results.

$C_h(T) := 0.64$

As per AS1170.4 Spectral Shape Factor Table for Class De soil adopting conservative period of 2.2s

$$V_{base_chimney_factor} := \left(k_p \cdot Z \cdot C_h(T) \cdot \frac{S_p}{\mu}\right) = 0.011$$

$V_{base_chimney_mass} := V_{base_chimney_factor} \cdot TOTAL_MASS_{chimney} = 79.9\ tonne$

Lower than spectral results

Hence the base shear from this analysis is lower than that of the spectral response assessment.

In addition, it is confirmed that the design is governed by wind design actions, and hence earthquake actions are not considered in the remaining sections of this calculation package.

5.5 Load Combinations

The load combinations to be assessed are in accordance with AS1170.0

Case 1 - Permanent action only: 1.35G

Case 2 - Permanent and Wind: 1.2G + Wu

Case 3 - Permanent and wind action reversal: 0.9G + Wu

Note that for the combinations listed, sub cases to account for the cardinal directions have been included within the assessment (I.e. North, South, East, West).

6 DESIGN ACTIONS & ANALYSIS

The demolition method encompasses two stages which have been analysed and detailed within this calculation package. Stage 1 will include the completion of both penetration cuts and rear heel wire saw cut to the chimney stack. Stage 2 includes the post blast response of the structure and associated stress analysis of the hinges / rear of the chimney.

6.1 Base Overturning Moment - Wind (STAGE 1)

The results for the design demolition wind load have been analysed applying a limit of allowable stress to a 0.65 reduction, approximately 15.9 MPa (0.65 x unconfined concrete strength), as per the below, it is clear that there are stress spikes at the toe, and some areas of the duct openings. However, these are likely nodal spikes due to corners and node supports within the FEA model. In general, the model indicates that the stress flow around the openings is within allowable limits. In addition, a stress analysis was completed using first principles, which confirms that stresses around the circumference are within allowable limits.

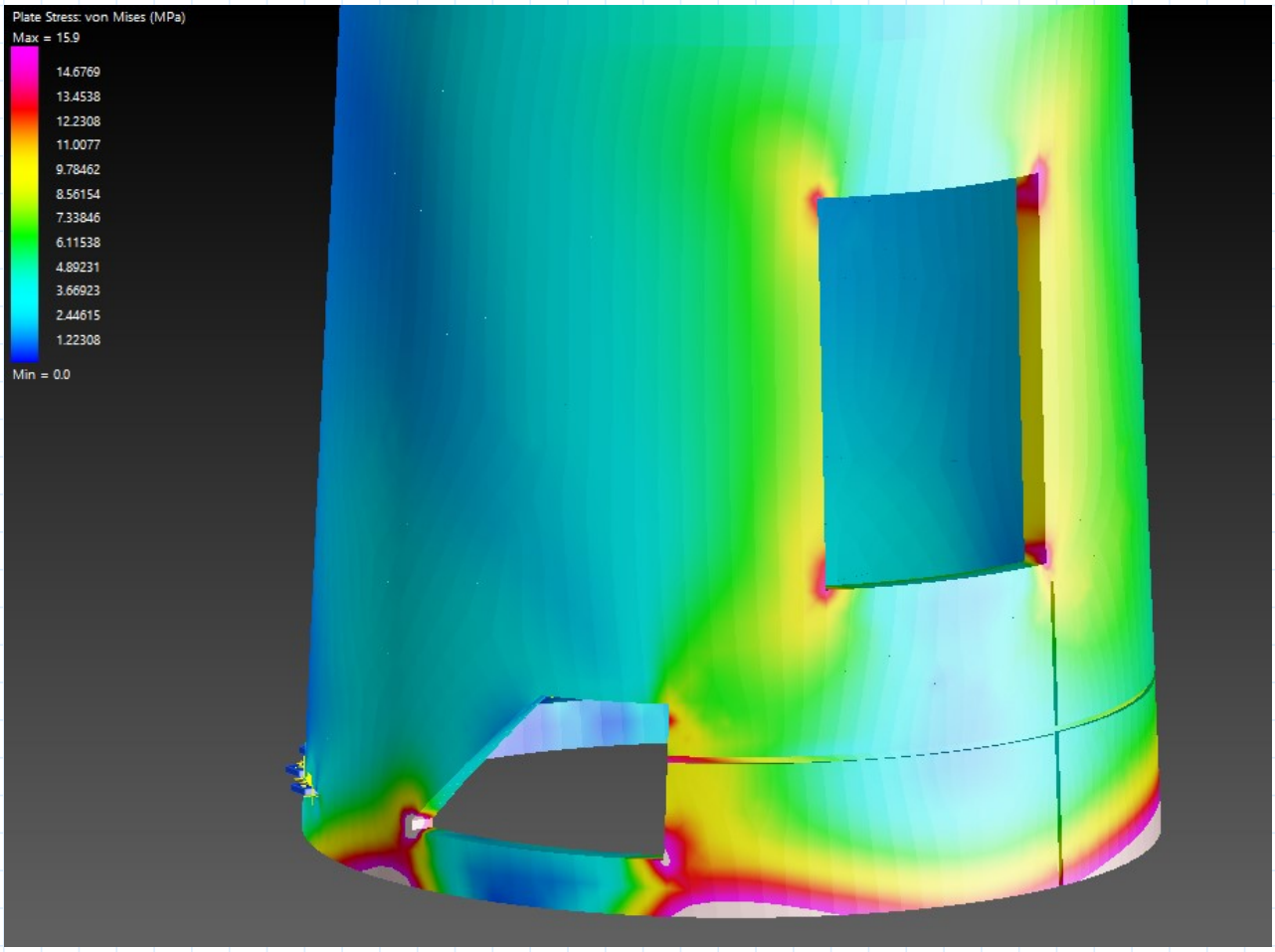


FIGURE 23 - STRESS RESULTS - 1.2G + Wdemo

CROSS CHECK ON UPLIFT USING FIRST PRINCIPLES

As per the previously determined design loads:

$$V_{BASE_WIND} := p_{stack} \cdot Project_Area_{chimney} = 3762.5 \ \boldsymbol{kN}$$

$$M_{BASE_WIND} := p_{stack} \cdot Project_Area_{chimney} \cdot Centre_Area_{chimney} = \left(2.8 \cdot 10^{5}\right) \ \boldsymbol{kNm}$$

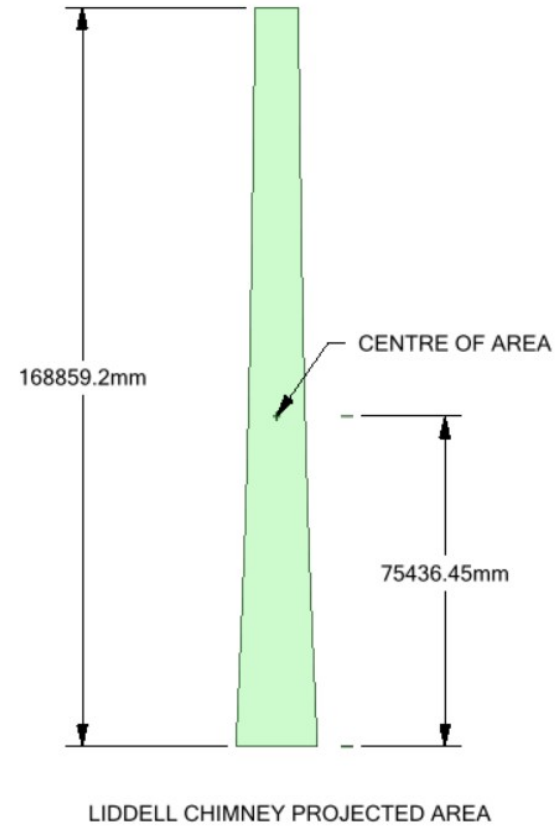


FIGURE 24 - PROJECTED SURFACE OF LIDDELL CHIMNEY STACK

Based on the peak overturning moment, calculate the stress distribution at the base of the stack and confirm net compression has been retained.

The cross section of the chimney base is as provided below, with the Eastern side base fitted with steel packing plates progressively installed as the concrete is wire cut.

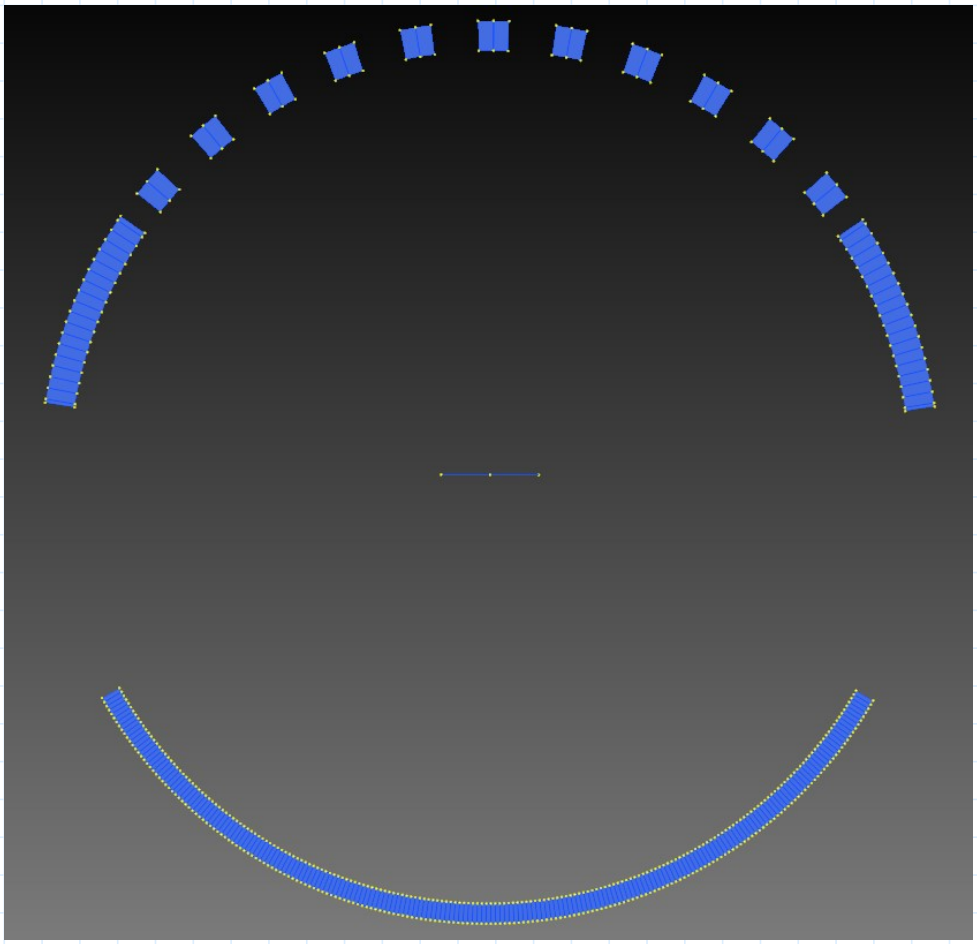
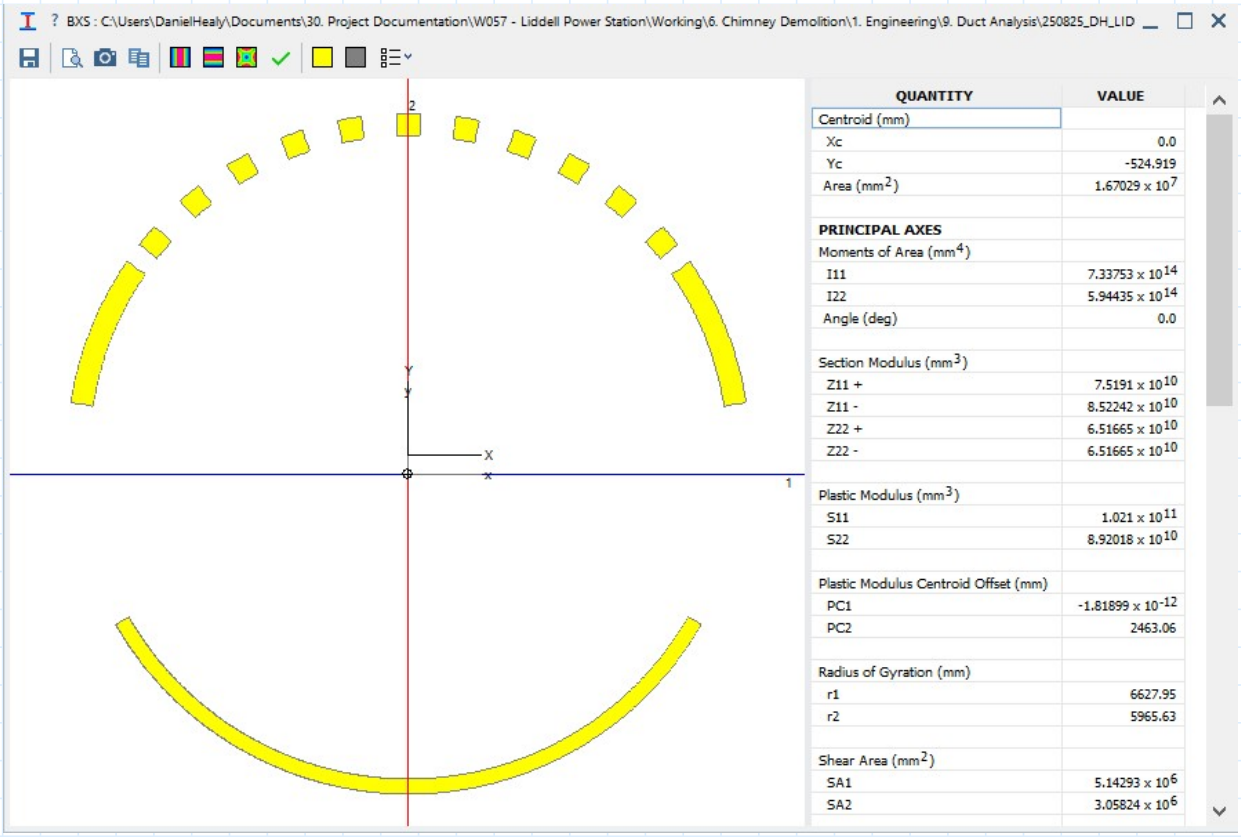


FIGURE 25 - GEOMETRY OF BASE FOLLOWING PREP CUTS

The section properties of the retained cut section have been generated, determining:

$I_{x_chimney_cut} := 7.34 \cdot 10^{14}\ mm^4$

$y_{tens} := 8708.7\ mm$ $y_{comp} := 9659.5\ mm$



QUANTITY	VALUE
Centroid (mm)	
Xc	0.0
Yc	-524.919
Area (mm^2)	1.67029×10^7
PRINCIPAL AXES	
Moments of Area (mm^4)	
I11	7.33753×10^{14}
I22	5.94435×10^{14}
Angle (deg)	0.0
Section Modulus (mm^3)	
Z11 +	7.5191×10^{10}
Z11 -	8.52242×10^{10}
Z22 +	6.51665×10^{10}
Z22 -	6.51665×10^{10}
Plastic Modulus (mm^3)	
S11	1.021×10^{11}
S22	8.92018×10^{10}
Plastic Modulus Centroid Offset (mm)	
PC1	-1.81899×10^{-12}
PC2	2463.06
Radius of Gyration (mm)	
r1	6627.95
r2	5965.63
Shear Area (mm^2)	
SA1	5.14293×10^6
SA2	3.05824×10^6

FIGURE 26 - SECTION PROPERTIES FOR CHIMNEY BASE POST CUTS

Determine peak tensile stress due to ultimate wind load:

$$\sigma_{demo_wind} := \frac{M_{BASE_WIND} \cdot y_{tens}}{I_{x_chimney_cut}} = 3.368 \ MPa$$

Hence need to confirm stress surcharge due to self-weight stablising moment.

$$Area_{cut_base} := 1.67 \cdot 10^{7} \ mm^{2}$$

$$\sigma_{selfweigth_surcharge} := \frac{0.9 \cdot TOTAL_MASS_{chimney} \cdot g}{Area_{cut_base}} = 3.957 \ MPa$$

Also need to add in stablising eccentricity stresses:

$$Lever_{cut_section} := 524.9 \ mm$$

Distance between centre of mass and centre of stiffness

$$M_{chimney_sw_eccentricity} := 0.9 \cdot TOTAL_MASS_{chimney} \cdot g \cdot Lever_{cut_section} = \left(3.469 \cdot 10^{4}\right) \ kNm$$

$$\sigma_{sw_bending_surcharge} := \frac{M_{chimney_sw_eccentricity} \cdot y_{tens}}{I_{x_chimney_cut}} = 0.412 \ MPa$$

$$\sigma_{total_self_weight_surcharge} := \sigma_{selfweigth_surcharge} + \sigma_{sw_bending_surcharge} = 4.369 \ MPa$$

As such, shims are retained in net compression during design demolition wind speeds.

6.2 Post Blast Hinge Stress Analysis (STAGE 2)

Following the blast event, a significant front portion of the chimney stack will be ejected, which will result in the centre of stiffness shifting Westward, inducing a significant overturning moment that will result in failure of the hinges and rotation of the chimney structure. This section analyses the stress distribution post blast, to ensure that the hinges / heel of the chimney base are not instantaneously overstressed, and hence sufficient integrity is maintained to generate initial overturning of the chimney prior to crushing of the hinges.

Based on the stress analysis provided below, it is evident that immediately upon blasting, the axial stress for both the hinges and the rear heel increase from 2.28 MPa to 8.12 MPa. This value is still well within the lower bound unconfined capacity of the concrete (24.5 MPa).

The change in eccentricity will result in an increase due bending of 45.1 MPa at the Eastern toe (compression) and 28.8 MPa at the rear heel (tension). As the tension cannot be developed, this will result in the structure beginning to fail and rotate, with the stress temporarily distributed to the hinges only.

The stresses at this point within the hinges are 99.4MPa (compression) at the Western toe and 69.8MPa (tension) at the Eastern heel. As such, failure and subsequent rotation is guaranteed to be achieved based upon the concrete grade of 24.5 MPa to 30.5 MPa.

Hinge & Rear		
Axial Force	73449.4	kN
Eccentricity	5287.61	mm
Bending at Initial blast	388372.0	kNm
Initial Area	32270675	mm2
Axial Stress	**2.28**	**MPa**
Area Post Blast	**9040000.0**	**mm2**
Axial Stress Post Blast	**8.12**	**MPa**
Ixx	4.152E+13	mm4
y_bar_comp	3953.5	mm
y_bar_tens	3946	mm
Bending Stress - Comp	36.98	Mpa
Bending Stress - Tens.	36.91	MPa
Total Comp.	**45.11**	**Mpa**
Total Ten.	**28.79**	**Mpa**

Hinges Only		
Axial Force	73449.4	kN
Eccentricity	3275.1	mm
Bending at rear lift off	240554.2	kNm
Area (Inc. Post Blast)	**4863400**	**mm2**
Axial Stress Post Blast	**15.10**	**MPa**
Area	4863400	mm2
Axial Stress Only	15.10	MPa
Ixx	5.54E+12	mm4
y_bar_comp	1941	mm
y_bar_tens	1954.5	mm
Bending Stress - Comp	84.28	Mpa
Bending Stress - Tens.	84.87	MPa
Total Comp.	**99.38**	**Mpa**
Total Ten.	**69.76**	**Mpa**

FIGURE 27 - STRESS ANALYSIS POST BLAST - HINGES & REAR VS HINGES

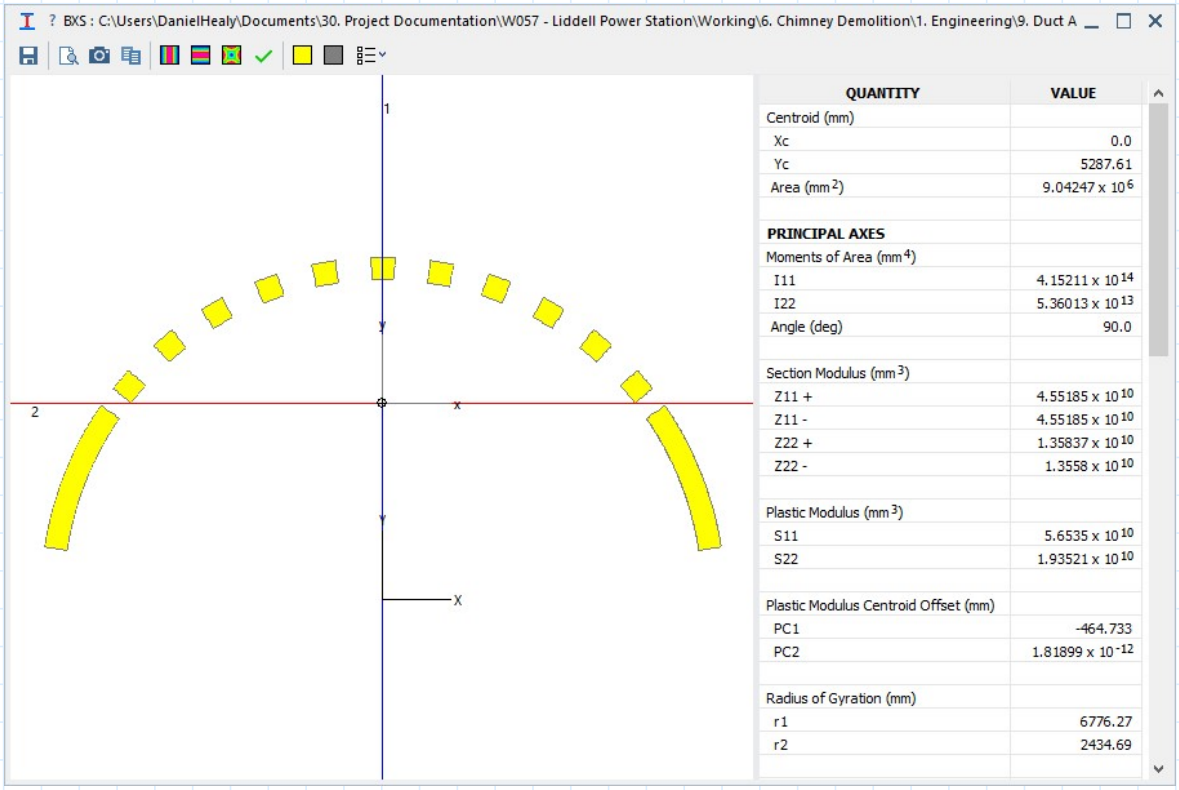


FIGURE 28 - GEOMETRIC SECTION PROPERTIES FOR HINGES & REAR

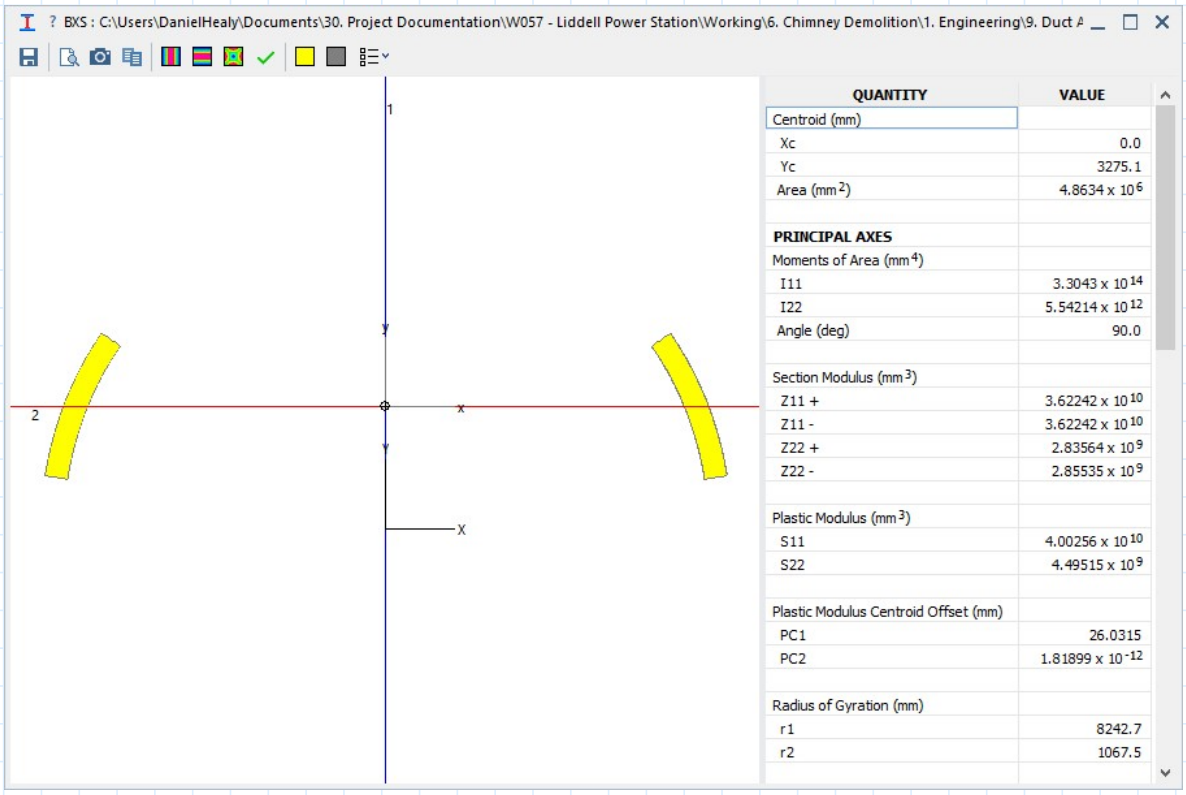


FIGURE 29 - GEOMETRIC SECTION PROPERTIES FOR HINGES ONLY

Assess Allowable Wind During Blast Event:

Adopting an allowable wind gust of 15 m/s, impact on hinge stresses post blast.

$V_{BASE_WIND_BLAST} := p_{stack_blast} \cdot Project_Area_{chimney} = 503.6\ kN$

$M_{BASE_WIND_BLAST} := p_{stack_blast} \cdot Project_Area_{chimney} \cdot Centre_Area_{chimney} = 37989.8\ kNm$

Taking moments about base 20 degrees from East West Direction:

$Ixx_hinge := 5.542 \cdot 10^{12} \cdot mm^4$

$y_{bar_comp} := 1941\ mm$ $\quad$ $y_{bar_tens} := 1954.5\ mm$

$\sigma_{hinge_EW_comp} := \frac{M_{BASE_WIND_BLAST} \cdot y_{bar_comp}}{Ixx_hinge}$ $\quad$ $\sigma_{hinge_EW_ten} := \frac{M_{BASE_WIND_BLAST} \cdot y_{bar_tens}}{Ixx_hinge}$

$\sigma_{hinge_EW_comp} = 13.305\ MPa$ $\quad$ $\sigma_{hinge_EW_ten} = 13.398\ MPa$

The increase in stresses based on the allowable wind speed are in the order of 13.3 MPa. The orientation of the wind will either temporarily provide resistance to the stack, or it will push the stack over. Based on the hinge stresses, even with a 13.3 MPa reduction, the stresses are sufficient to cause failure of the hinge.

Taking moments about base at 20 degrees from North South Direction:

$Iyy_hinge := 3.16 \cdot 10^{14} \cdot mm^4$

$y_{bar_NS} := 9046\ mm$

$\sigma_{hinge_NS} := \frac{M_{BASE_WIND_BLAST} \cdot y_{bar_NS}}{Iyy_hinge}$

$\sigma_{hinge_NS} = 1.088\ MPa$

Hence, impact of allowable blast wind speed in North - South direction is negligible.

Assess Duct Penetrations for Post Blast Stresses:

A key consideration in the analysis is the response of the duct opening following the blast event. An FEA analysis was completed to review the stresses in this area once the front birdsmouth has been removed via the detonation of explosives. As per the below results, it is evident that the stresses around the duct are in the order of 8 MPa, which is within allowable limits. It is noteworthy that the hinge stresses are exceeding the lower bound unconfined compressive strength of 24.5 MPa, and this is intended as the hinges are designed to fail in order to cause rotation / collapse of the chimey.

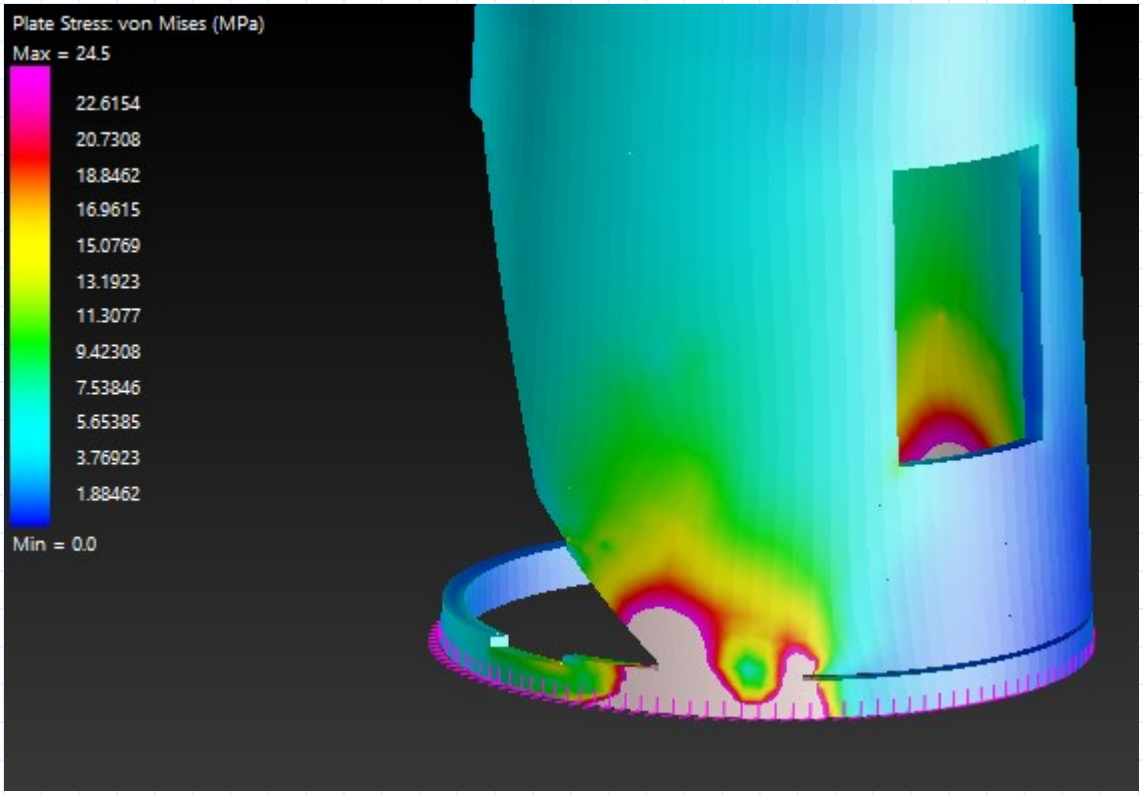


FIGURE 30 - INLET DUCT STRESSES POST BLAST - G

7 CONCLUSION

As part of the Liddell Power Station Demolition Project, Wellanbah Industrial have been engaged to undertake the structural analysis and subsequent onsite execution of the proposed demolition method for the two chimney stacks which are currently onsite.

The method entails completing various pre-cuts to the chimney, followed by the installation and initiation of explosive charges installed in the front face of the structure (on the fell side). The detonation of the explosives will result in the removal of the front concrete, causing the structure to pivot about the rear base and fall to grade.

The assessment focused on two critical aspects of structural stability, which included the assessment of the chimney stack following the completion of various cuts in accordance with the blast design, and the analysis of hinge stresses following the initiation of the explosives.

A structural model was developed based on the existing drawings and a finite element analysis was undertaken to evaluate the global stability of the chimney structures following the completion of enabling / charge placement works. Following the analysis, it was determined that the proposed enabling works can be completed provided that the forecast (and subsequent experienced) gust wind speed stays below 147.6 km/hr. It is noteworthy that the gust wind speeds are determined as a value which is 45% higher than the forecast average wind speeds. Hence if the forecast wind speed is in excess of 101km/hr it is recommended that the planned works be rescheduled, or the structure be vacated with an exclusion zone established until the wind levels reduce to acceptable levels. It should be noted that such a wind speed is based on 1:100 year probability, hence it is not expected that such an event will occur during the minor schedule of works (approx. 1 month). In addition, it was determined that with the proposed cuts the structure will remain in net compression, even under the design demolition wind loading.

A stress analysis was completed to evaluate the rear heel and hinges of the structure following the initiation of the explosives. It was determined that immediately upon blasting, the axial stress for both the hinges and the rear heel increase from 2.28 MPa to 8.12 MPa. This value is still well within the lower bound unconfined capacity of the concrete (24.5 MPa).

The change in eccentricity will then result in an increase stress due to bending in the order of 45.1 MPa at the Eastern toe (compression) and 28.8 MPa at the rear heel (tension). As the tension cannot be developed, this will result in the structure beginning to fail and rotate, with the stress temporarily distributed to the hinges only. The stresses at this point within the hinges are 99.4 MPa (compression) at the Western toe and 69.8 MPa (tension) at the Eastern heel. As such, failure and subsequent rotation is guaranteed to be achieved based upon the concrete grade of 24.5 MPa.

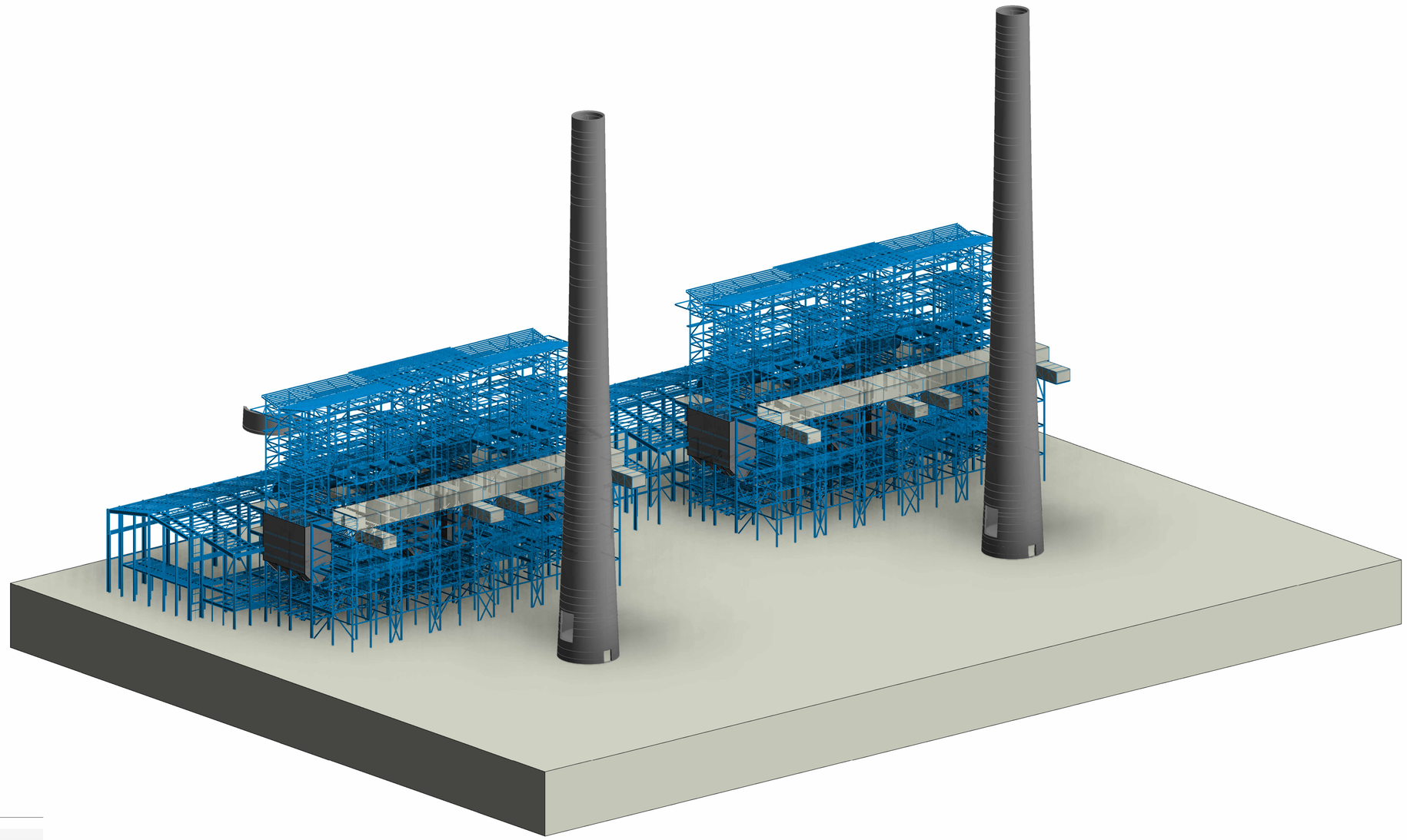
In conclusion, following the structural analysis of the proposed blast design, it was determined that the structure will remain stable during the pre-cutting works up until a gust wind speed up to 147.6 km/hr. In addition, upon detonation, the stresses in the chimney stack are within the range that will encourage rotation of the chimneys prior to crushing of the hinges, and therefore the expected overturning and collapse of the structures will match the design intent. The blast event is to be undertaken under a limiting wind speed of 15 m/s gust, and to be confirmed onsite via live wind monitoring.

APPENDICIES

APPENDIX A – LIDDELL POWER STATION – CHIMNEY DEMOLITION BLAST DESIGN DRAWINGS

LIDDELL POWER STATION

CHIMNEY DEMOLITION - BLAST DESIGN



STRUCTURAL DRAWING INDEX

NUMBER	TITLE
S000	CHIMNEY BLAST - COVER SHEET
S100	CHIMNEY BLAST - OVERVIEW
S110	20 DEG. ROTATION - FELL PATH OVERLAY
S200	20 DEGREE HINGE ROTATION - PREP. DETAILS
S201	U1/U2 CHIMNEY BLAST - CHARGE SCHEDULE
S202	U3/U4 CHIMNEY BLAST - CHARGE SCHEDULE
S203	DUST SUPPRESSION - CHARGE SCHEDULE
S300	U1/U2 CHIMNEY BLAST DELAYS
S301	U3/U4 CHIMNEY BLAST DELAYS

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED WITH VESSELS AND DELAYS		DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN		DH	DH	BH	3.09.25
B	REVIEW UPDATES		DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE		DH	DH	BH	12.02.25

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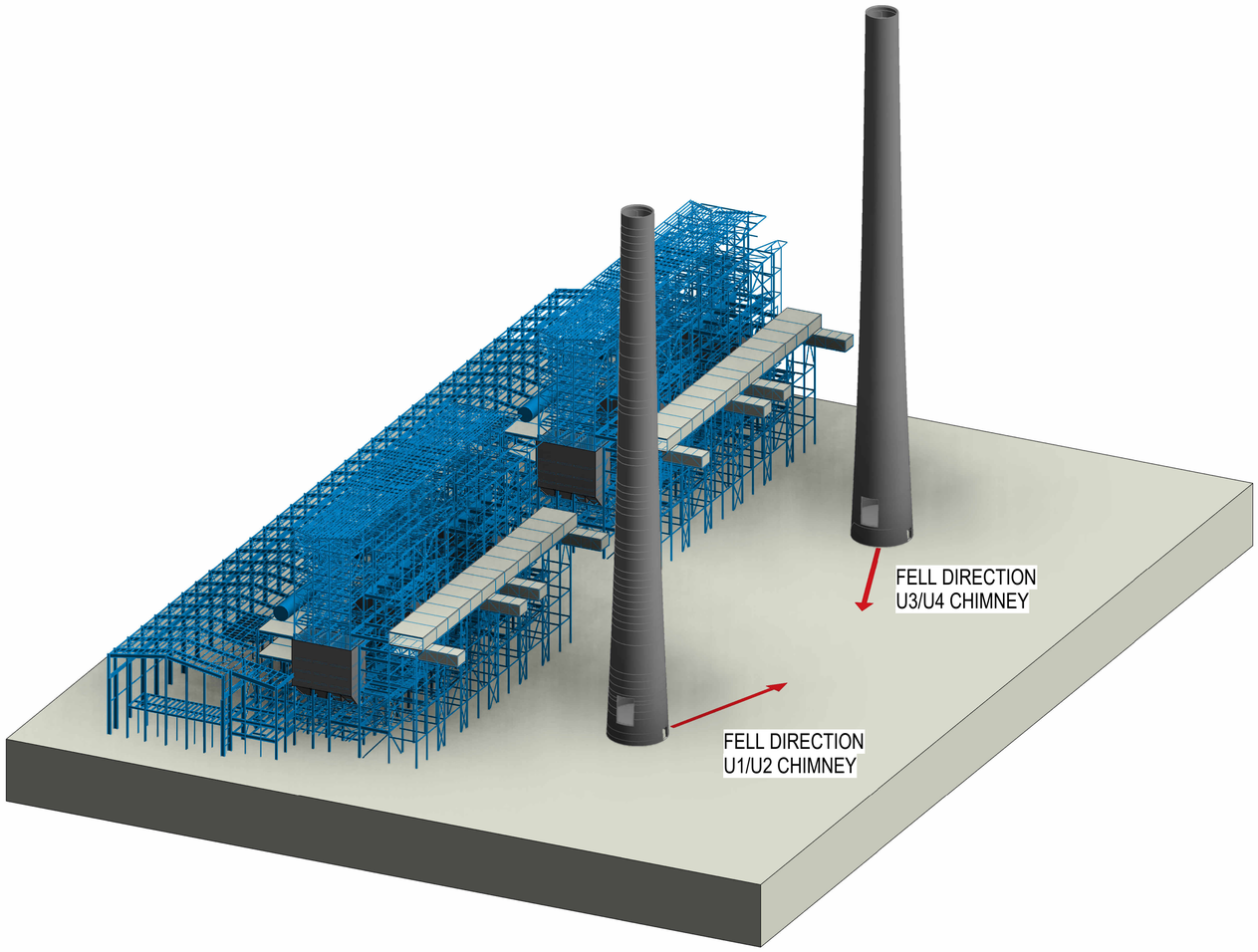
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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
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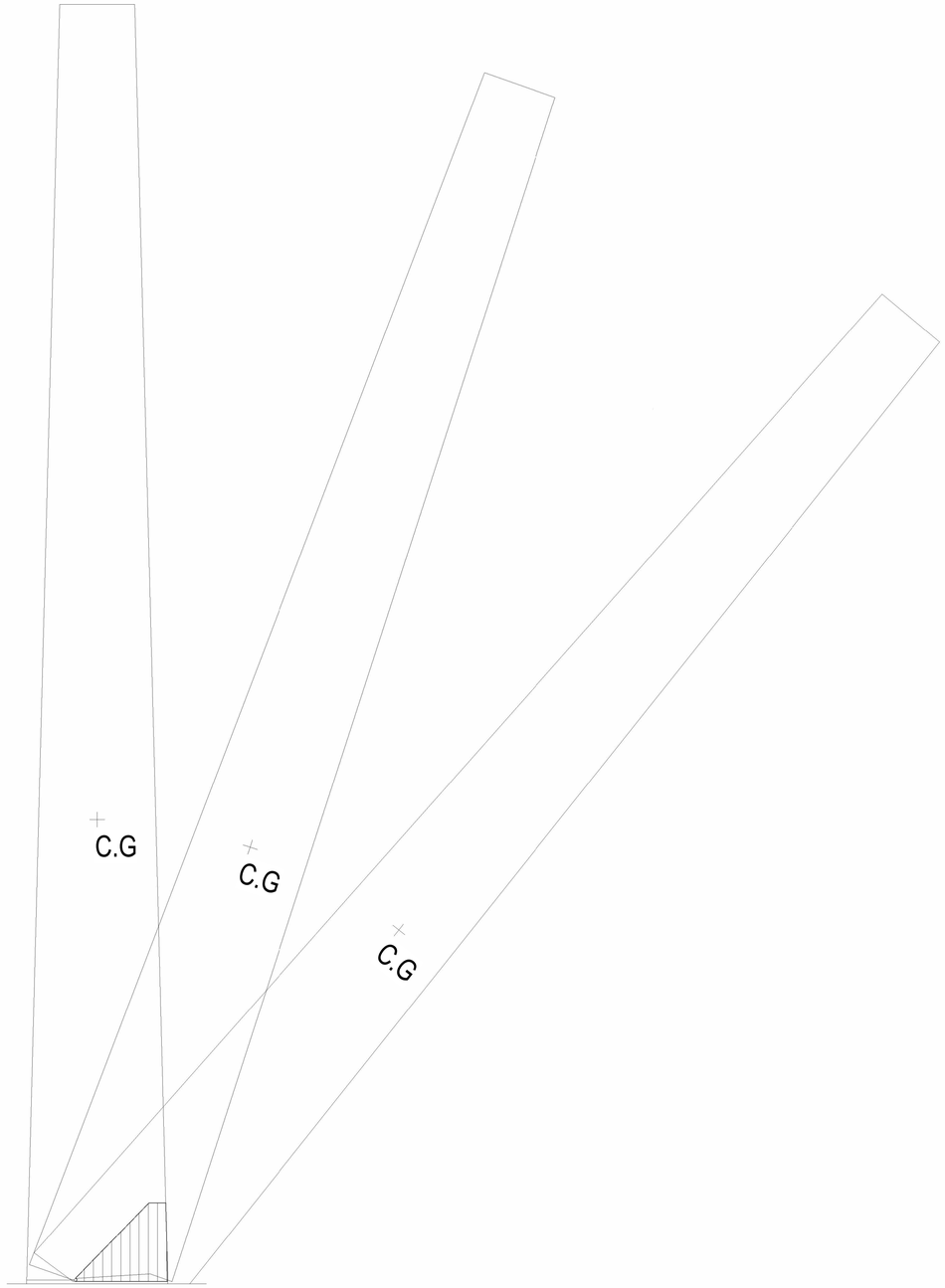
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST - COVER SHEET**

Original Size **A1**
Drawing No: **WI-24057-06-S000**
Rev: D

Plot Date: 31/03/2026 6:29:56 PM



SITE OVERVIEW
SCALE : NTS



CHIMNEY COLLAPSE MECHANISM
SCALE 1 : 400

NOTES:
1. THIS DOCUMENT PROVIDES THE BLAST DESIGN FOR THE DEMOLITION OF TWO REINFORCED CONCRETE CHIMNEYS LOCATED AT THE LIDDELL POWER STATION SITE.
2. THE CHIMNEYS ARE APPROXIMATELY 169m IN HEIGHT, AND HAVE AN OUTSIDE BASE DIAMETER OF 18.6m.
3. THE CHIMNEYS ARE TO BE COLLAPSED IN A DIRECTION WHICH IS 20 DEGREES OFF THE SITE NORTH-SOUTH DIRECTION, NOTING THAT THE SITE NORTH ORIENTATION IS 9 DEGREES CLOCKWISE OF TRUE NORTH.
4. ALL STRUCTURES WITHIN THE FELL PATH OF THE CHIMNEYS ARE TO BE DEMOLISHED PRIOR TO THE BLAST.

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	UPDATED COG POSITION	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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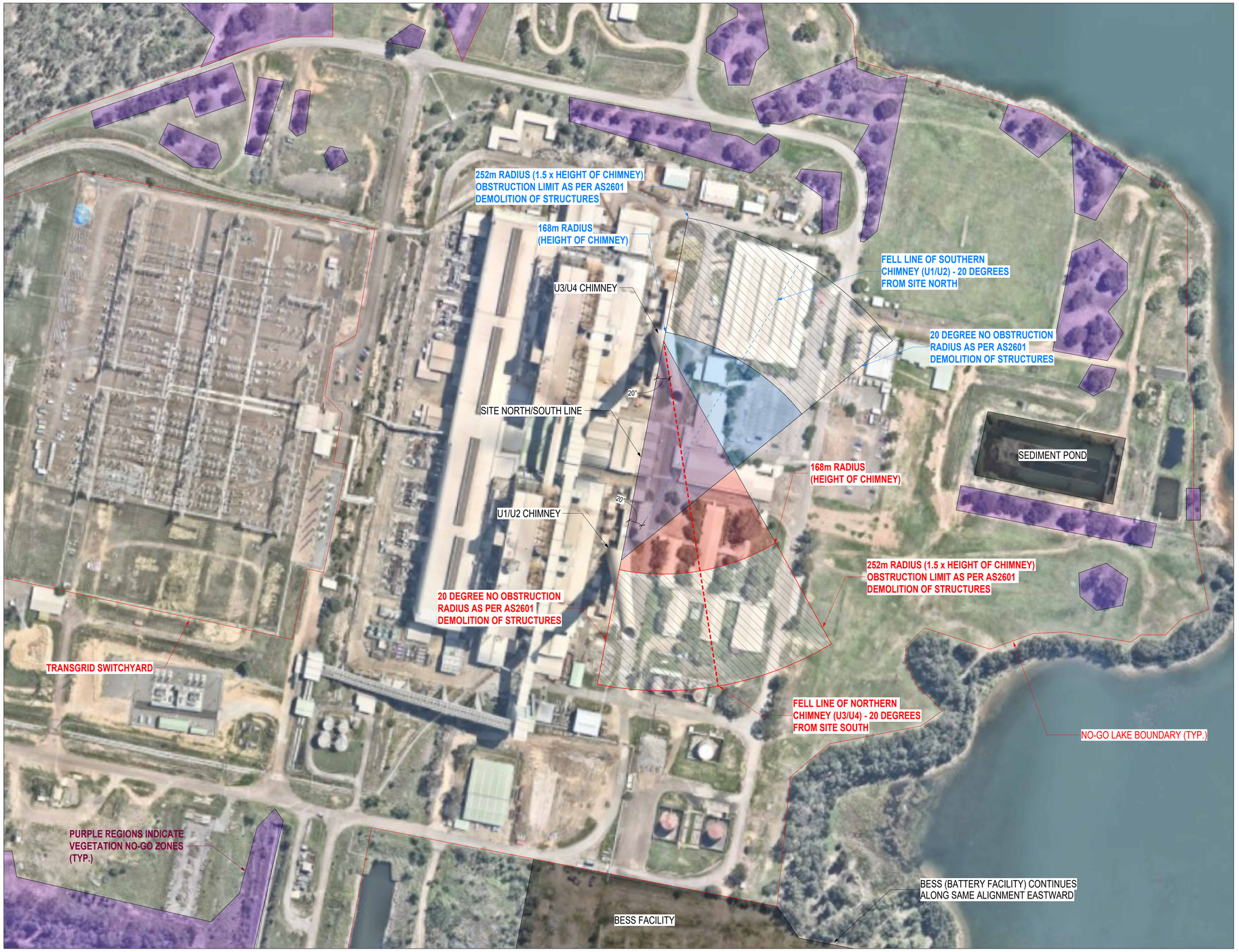
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Approved D. HEALY
Date 12.02.25
Scale
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST - OVERVIEW**
Original Size **A1**
Drawing No: **WI-24057-06-S100**
Rev: C

Plot Date: 31/03/2026 6:33:30 PM



LIDDELL CHIMNEY COLLAPSE ORIENTATION - 20 DEGREE ROTATION

SCALE 1 : 1500

LIDDELL POWER STATION CHIMNEY DEMOLITION - OPTION 1 COMPLIANCE SCHEDULE

SITE CONSTRAINT	NEAREST DISTANCE FROM BASE OF CHIMNEY WITHIN FELL PATH	COMMENTS
1. BATTERY ENERGY STORAGE SYSTEM (BESS)	376m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO EDGE OF COMPOUND FENCE LINE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
2. VEGETATION NO - GO ZONES	254m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO VEGETATION NO-GO ZONE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
3. SITE BOUNDARY AT LAKE	314m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO LAKE BOUNDARY LINE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
4. SEDIMENT POND (INC. BURIED PIPELINE)	N.A	ASSET OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3
5. TRANSGRID SWITCHYARD	N.A	ASSET OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3
6. SITE INFRASTRUCTURE YET TO BE DEMOLISHED	N.A	STRUCTURES OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED VEGETATION DETAILS	DH	DH	BH	31.03.26
C	UPDATED TRANSGRID SWITCHYARD REFERENCES	DH	DH	BH	31.10.25
B	FINALISED DESIGN ISSUE	DH	DH	BH	3.09.25
A	PRELIMINARY ISSUE	DH	DH	BH	31.07.25

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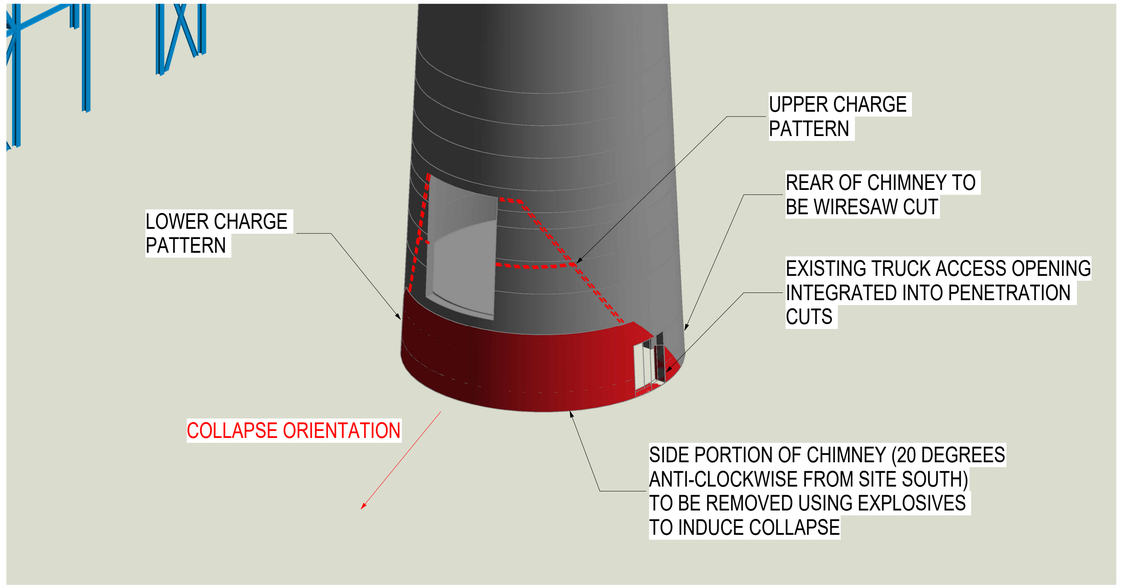
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Date 31.07.25
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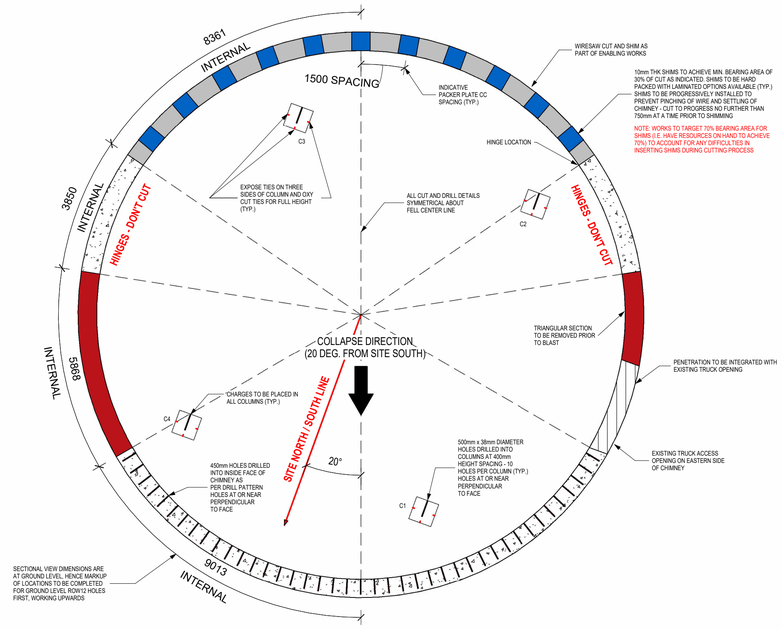
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **20 DEG. ROTATION - FELL PATH OVERLAY**

Original Size **A1**
Drawing No: **WI-24057-06-S110**
Rev: D

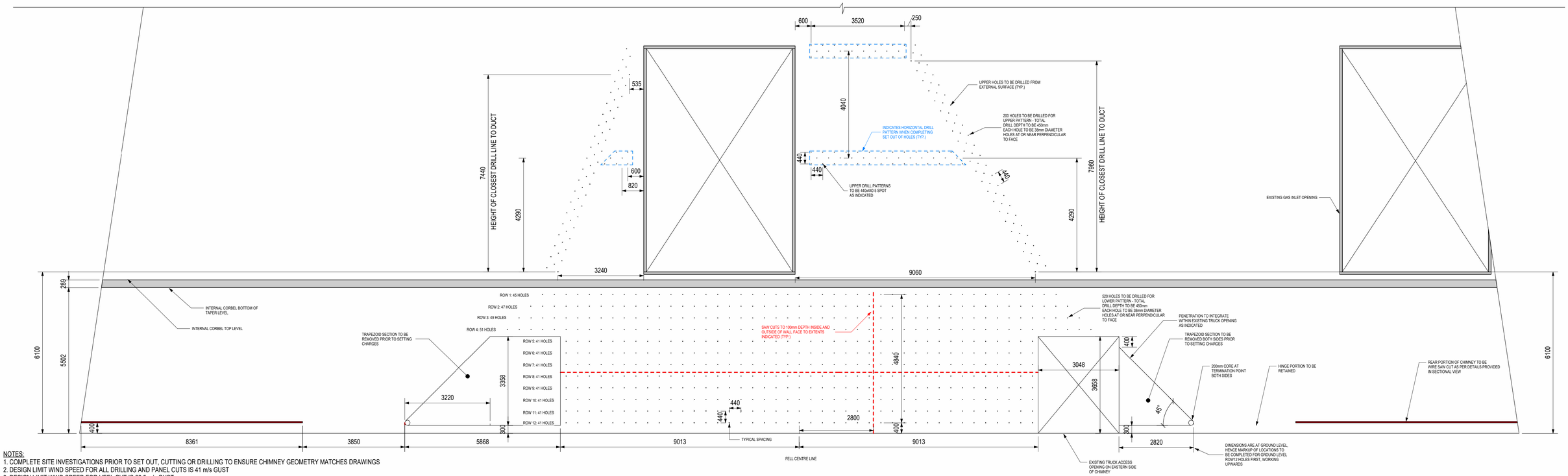
Plot Date: 31/03/2026 6:33:34 PM



3D VIEW - CHIMNEY BASE - 20 DEG. ROTATION
SCALE : NTS



CHIMNEY BASE SECTIONAL VIEW - 20 DEG. ROTATION
SCALE 1 : 100



NOTES:
1. COMPLETE SITE INVESTIGATIONS PRIOR TO SET OUT, CUTTING OR DRILLING TO ENSURE CHIMNEY GEOMETRY MATCHES DRAWINGS
2. DESIGN LIMIT WIND SPEED FOR ALL DRILLING AND PANEL CUTS IS 41 m/s GUST
3. DESIGN LIMIT WIND SPEED FOR HEEL CUT IS 22.5 m/s GUST
4. DESIGN LIMIT WIND SPEED FOR BLAST EVENT IS 15 m/s GUST; LIVE SITE WIND MONITORING TO BE COMPLETED BY MOUNTING UNIT IN VICINITY OF CHIMNEYS AT HEIGHT OF 10m. LOCATION TO BE SELECTED SUCH THAT NO SHIELDING OR VORTEX LOADING WILL INFLUENCE MONITORING.
5. TOLERANCE ON DRILL PATTERN +/- 75mm, TOLERANCE ON HOLE DEPTH +/-25mm.
6. BLAST PATTERN DETAILS HEREIN FOR U3/U4 CHIMNEY - PATTERN IS TO BE MIRRORED FOR U1/U2 CHIMNEY

DRILL PATTERN & CHARGE LAYOUT - 20 DEG. ROTATION
SCALE 1 : 75

No	Revision	Drawn	Designed	Reviewed	Date
E	FINALISED HOLE DEPTH	DH	DH	BH	10.02.26
D	REVISED HOLE DIAMETER	DH	DH	BH	9.01.26
C	UPDATED NOTES AND VERTICAL CUT LINE POSITION	DH	DH	BH	1.11.25
B	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
A	PRELIMINARY ISSUE	DH	DH	BH	31.07.25

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Drawn	D. HEALY	Designer	D. HEALY
Drafting Check	B. HEALY		
Approved	D. HEALY		
Date	31.07.25		
Scale		This Drawing must not be used for Construction unless signed as Approved	

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **20 DEGREE HINGE ROTATION - PREP. DETAILS**
Original Size **A1**
Drawing No: **WI-24057-06-S200**
Rev: E

Plot Date: 31/03/2026 6:33:39 PM

CHARGE SCHEDULE U1/U2 CHIMNEY

ROW ID#	NUMBER OF HOLES	CHARGES PER HOLE	CHARGES FOR ROW	CHARGE WEIGHT OF ROW (KG)	CHARGE TYPE	DELAY TIMING MS
1	45	1.75	78.75	15.22	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
2	47	1.75	82.25	15.86	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
3	49	1.75	85.75	16.51	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
4	51	1.75	89.25	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
5	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
6	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
7	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
8	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
9	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
10	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
11	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
12	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
UPPER PATTERN	200	1.5	300	55.50	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C1	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C2	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C3	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C4	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
TOTALS	760		1290	238.65		

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED POWDER FACTORS	DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	REVIEW UPDATES	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **U1/U2 CHIMNEY BLAST - CHARGE SCHEDULE**

Original Size **A1**
Drawing No: **WI-24057-06-S201**
Rev: D

Plot Date: 31/03/2026 6:33:42 PM

CHARGE SCHEDULE U3/4 CHIMNEY						
ROW ID#	NUMBER OF HOLES IN ROW	CHARGES PER HOLE	CHARGES FOR ROW	CHARGE WEIGHT OF ROW (KG)	CHARGE TYPE	DELAY TIMING MS
1	45	1.75	78.75	14.57	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
2	47	1.75	82.85	15.22	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
3	49	1.75	85.75	15.86	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
4	51	1.75	89.25	16.51	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
5	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
6	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
7	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
8	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
9	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
10	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
11	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
12	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
UPPER PATTERN	200	1.5	300	55.5	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C1	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C2	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C3	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C4	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
TOTALS	760		1290	238.65		

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED POWDER FACTORS	DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	REVIEW UPDATES	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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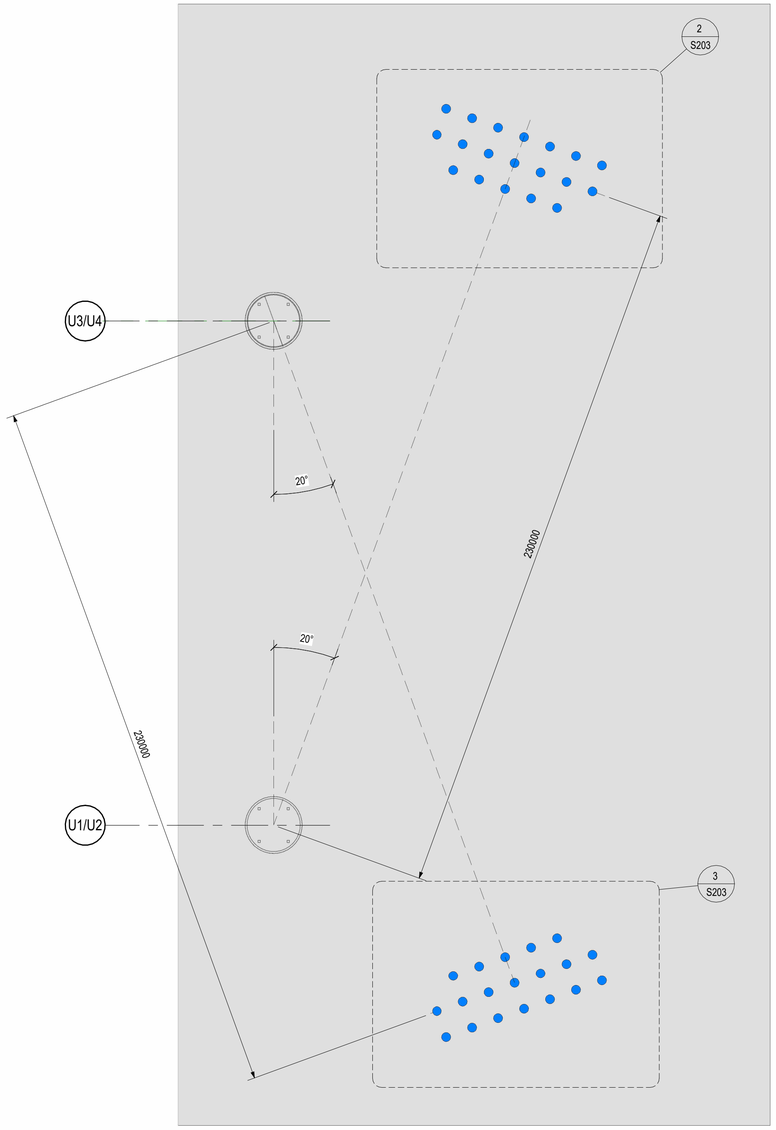
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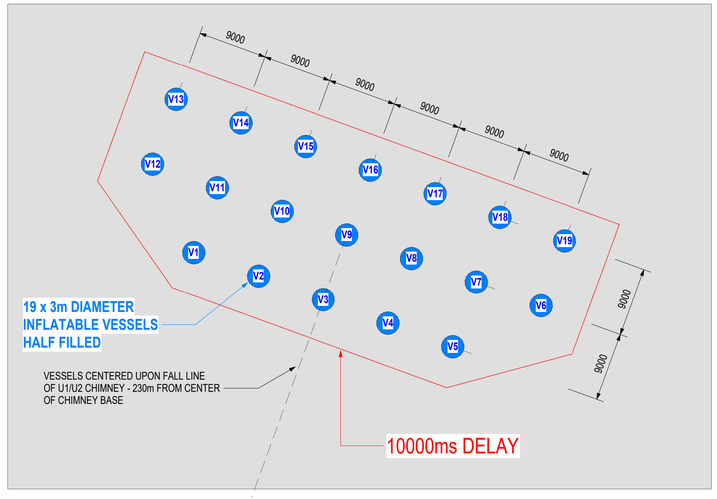
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **U3/U4 CHIMNEY BLAST - CHARGE SCHEDULE**

Original Size **A1**
Drawing No: **WI-24057-06-S202**
Rev: D

Plot Date: 31/03/2026 6:33:46 PM



CHARGED VESSEL LAYOUT - PLAN VIEW
SCALE 1 : 1000



2 U1/U2 VESSELS
1 : 400

3 U3/U4 VESSELS
1 : 400

DUST SUPPRESSION VESSELS - CHARGE SCHEDULE

ID#	DET. CORD LENGTH (10g/m)	DET. CORD CHARGE WEIGHT (kg)	CHARGE NO.	CHARGE TYPE	CHARGE WEIGHT	TOTAL CHARGE WEIGHT	DELAY TIMING - (ms)
U1 / U2 CHARGED VESSELS							
V1	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V2	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V3	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V4	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V5	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V6	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V7	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V8	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V9	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V10	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V11	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V12	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V13	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V14	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V15	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V16	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V17	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V18	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
V19	22m	0.22	5	SENATEL 32-200	0.925	1.145	10000
					MIC	**21.755**	
U3 / U4 CHARGED VESSELS							
V20	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V21	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V22	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V23	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V24	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V25	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V26	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V27	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V28	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V29	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V30	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V31	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V32	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V33	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V34	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V35	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V36	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V37	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
V38	22m	0.22	5	SENATEL 32-200	0.925	1.145	14000
					MIC	**21.755**	

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A	INITIAL ISSUE	DH	DH	BH	31.03.26

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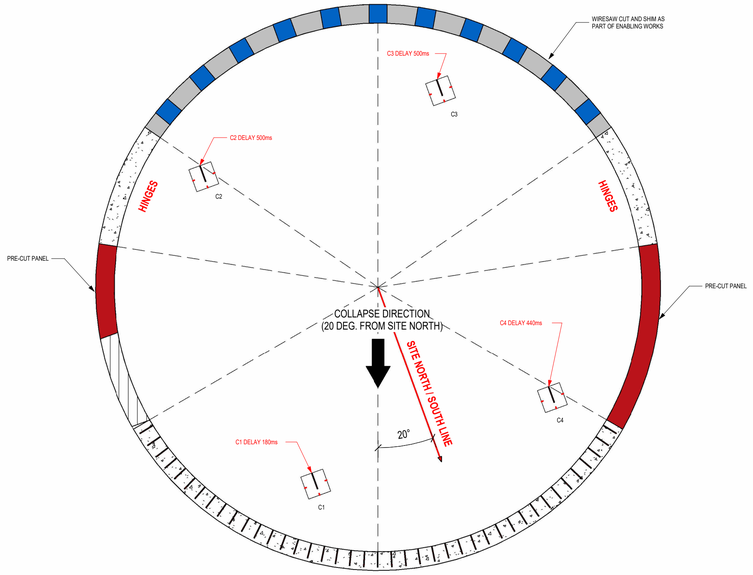
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Drafting Check B. HEALY
Approved D. HEALY
Date 31.03.26
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Client CMA CONTRACTING PTY LTD
Project LIDDELL POWER STATION DEMOLITION
Title DUST SUPPRESSION - CHARGE SCHEDULE

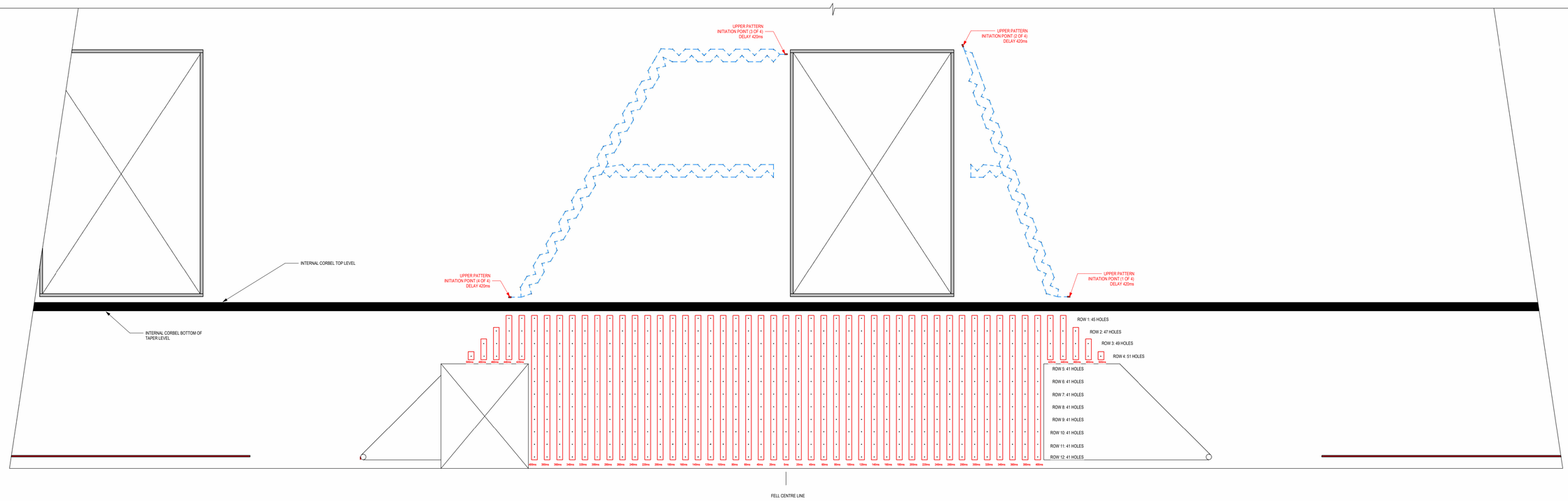
Original Size A1
Drawing No: WI-24057-06-S203
Rev: A

Plot Date: 31/03/2026 6:33:49 PM



CHIMNEY BASE SECTIONAL VIEW - U1/U2 DELAYS

SCALE 1 : 100



U1/U2 CHIMNEY DELAY SEQUENCE

SCALE 1 : 75

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	INITIAL ISSUE OF DRAWING	DH	DH	BH	31.03.26

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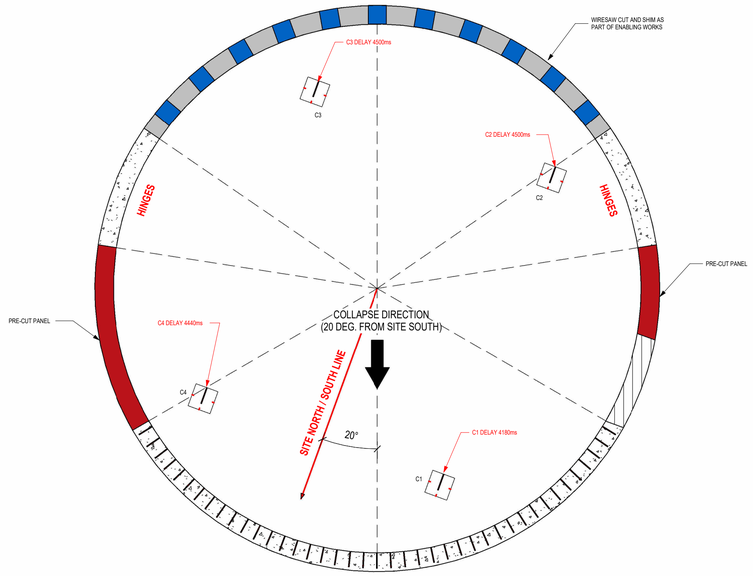
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Date 31.03.26
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **U1/U2 CHIMNEY BLAST DELAYS**

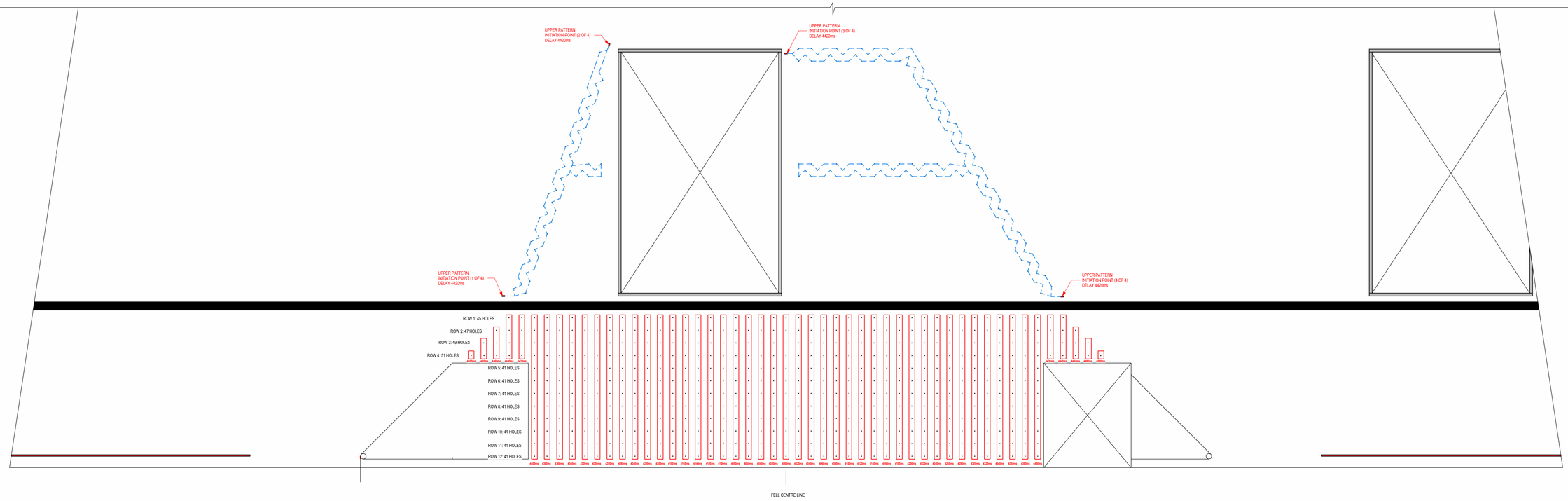
Original Size **A1**
Drawing No: **WI-24057-06-S300**
Rev: A

Plot Date: 31/03/2026 6:33:53 PM



CHIMNEY BASE SECTIONAL VIEW - U3/U4 DELAYS

SCALE 1 : 100



U3/U4 CHIMNEY DELAY SEQUENCE

SCALE 1 : 75

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	INITIAL ISSUE OF DRAWING		DH	DH	BH	31.03.26

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Drafting Check	B. HEALY	
Approved	D. HEALY	
Date	31.03.26	
Scale		This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**

Project **LIDDELL POWER STATION DEMOLITION**

Title **U3/U4 CHIMNEY BLAST DELAYS**

Original Size **A1**

Drawing No: **WI-24057-06-S301**

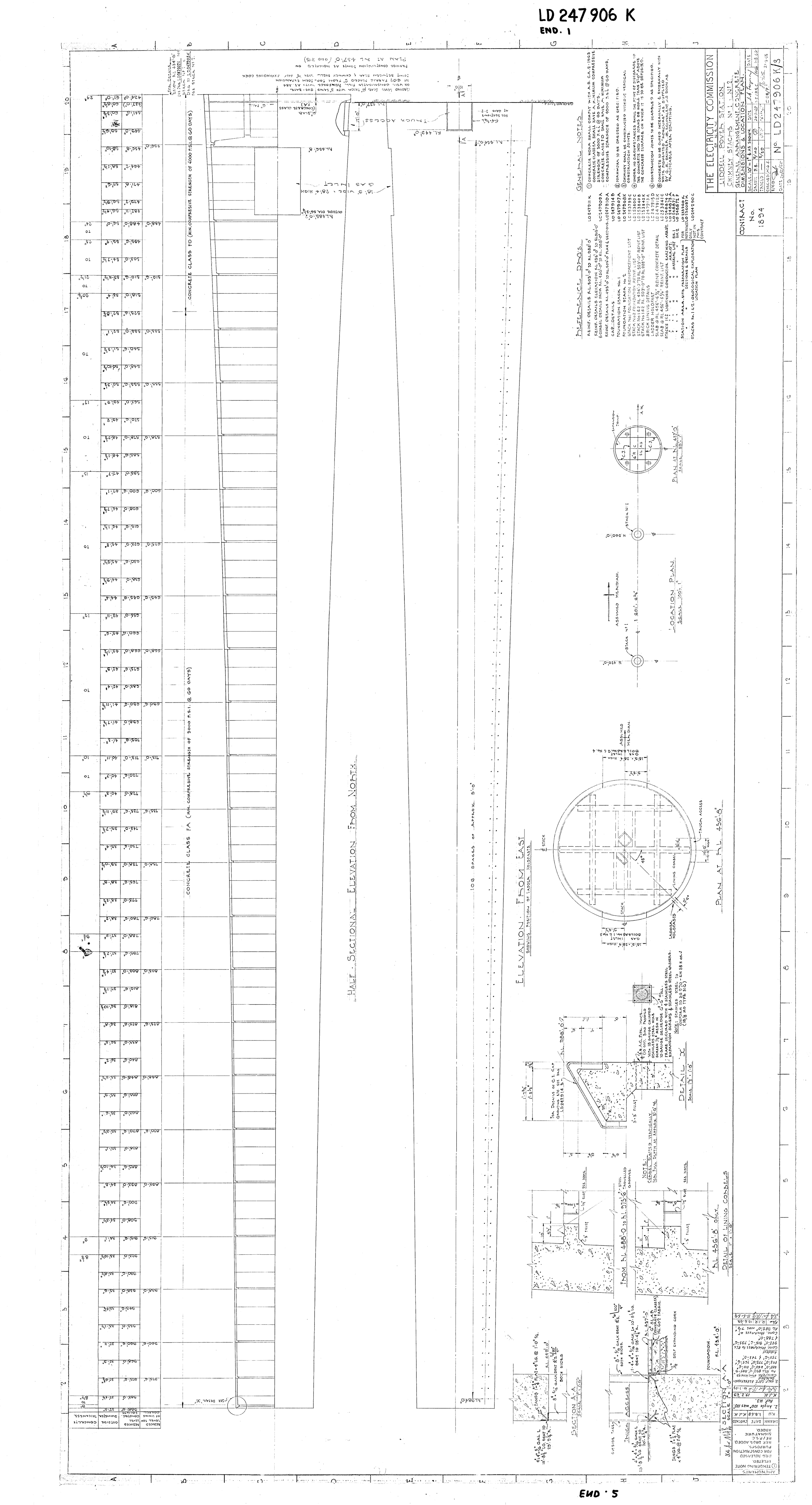
Rev: A

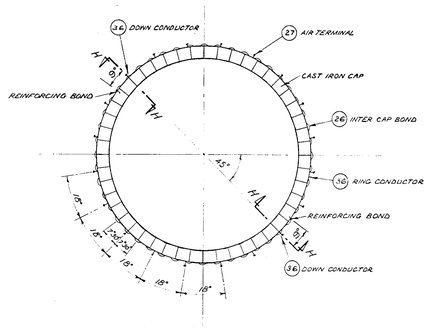
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APPENDIX B – EXISTING STRUCTURAL DRAWINGS

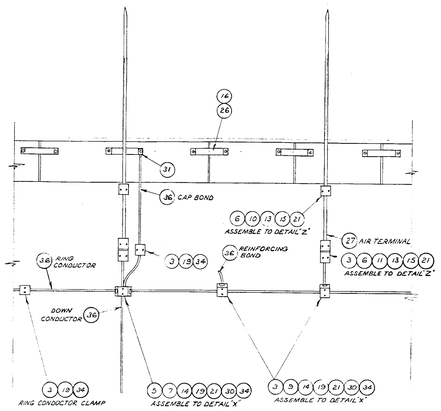
LD 247906 K

END. 1

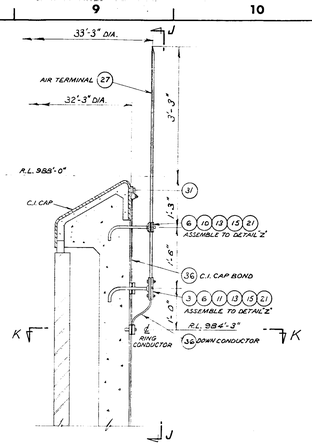

THE ELECTRICITY COMMISSION
OF N.S.W.
LIDDELL POWER STATION
CHIMNEY STACKS No 1 & No 2
GENERAL ARRANGEMENT PLANT
CONTRACT No. 1894
No. LD 247906 K/3
GENERAL NOTES
REFERENCE DRGS.
CONCRETE CLASS F1 (MIN. COMPRESSIVE STRENGTH OF 4000 PSI. @ 60 DAYS)
CONCRETE CLASS F4 (MIN. COMPRESSIVE STRENGTH OF 3000 P.S.I. @ 60 DAYS)
HALF SECTIONAL ELEVATION FROM NORTH
ELEVATION FROM EAST
LOCATION PLAN
PLAN AT RL 456.0
DETAIL 'X'
DETAIL OF LINING CORBELS
SECTION A-A
SECTION B-B
108 SPACES @ APPROX. 5'-0"
GAS FLUE
TRUCK ACCESS
GROUND LEVEL
RL 456.0
RL 449.0
RL 454.6
RL 455.0
RL 485.0
RL 486.0
RL 541.0
OUTSIDE DIA 33'-6"
INSIDE DIA 28'-6"
CONCRETE LINING
ASSUMED MERIDIAN
STACK No 1
STACK No 2
N 860.0'
N 450.0'
E 1601.6'
SCALE 1:500
SCALE 1:100
SCALE 1:50
SCALE 1:10
SCALE 1:20
SCALE 1:25
SCALE 1:5
SCALE 1:2
SCALE 1:1
SCALE 1:1.5
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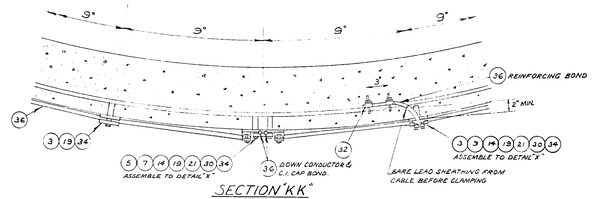
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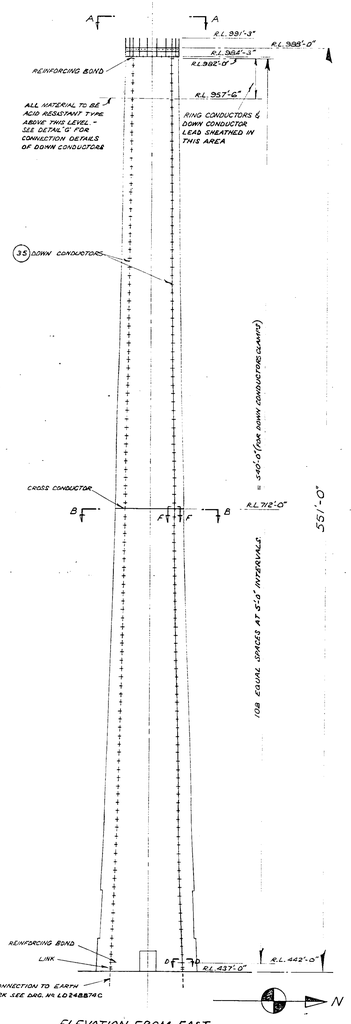
ELEVATION "JJ"
SCALE: 1/4 IN. = 1FT.



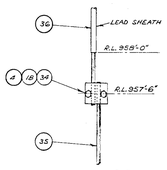
SECTION "HH"
SCALE: 1/4 IN. = 1FT.



SECTION "KK"
SCALE: 1 1/2 IN. = 1FT.
R.L. 984'-6"

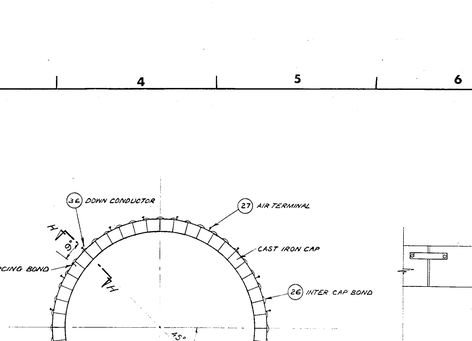


ELEVATION FROM EAST
SCALE: 1/32 IN. = 1FT.

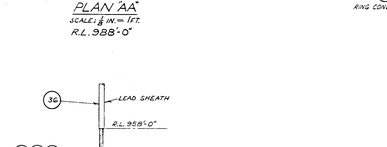


DETAIL "G"
SCALE: 1 1/2 IN. = 1FT.

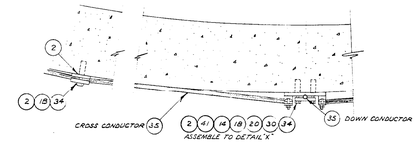
METHOD OF CONNECTING DOWN CONDUCTORS AT COMMENCEMENT OF LEAD SHEATH.



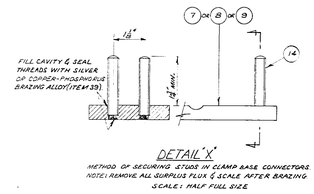
PLAN "BB"
SCALE: 1/16 IN. = 1FT.
R.L. 712'-0"



SECTION "DD"
SCALE: 1 1/2 INCH 1FT.
R.L. 442'-0"

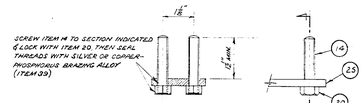


SECTION "FF"
SCALE: 1 1/2 IN. = 1FT.
R.L. 712'-0"



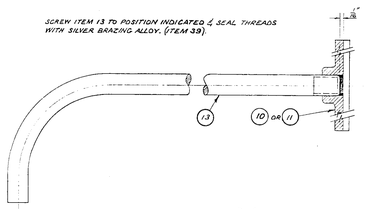
DETAIL "X"

METHOD OF SECURING STUDS IN CLAMP BASE CONNECTORS.
NOTE: REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
SCALE: HALF FULL SIZE



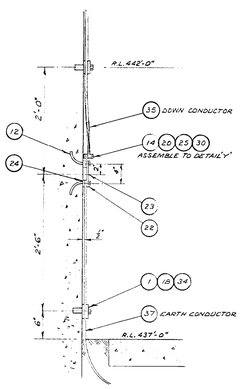
DETAIL "Y"

METHOD OF SECURING STUDS IN TEST LINK CABLE ADAPTOR.
NOTE: REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
SCALE: HALF FULL SIZE



DETAIL "Z"

METHOD OF SECURING HOOK BOLT IN CLAMP BASE.
NOTE: REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
SCALE: HALF FULL SIZE



SECTIONAL ELEVATION "EE"
SCALE: 1IN. = 1FT.

REFERENCE DRAWINGS

LD 248874 C - CHIMNEY STACKS N°1 & N°2 - LIGHTNING CONDUCTOR - EARTHING ARRANGEMENT.
LD 248871 P - CHIMNEY STACKS N°1 & N°2 - LIGHTNING CONDUCTOR - MATERIAL LIST - SHEET 1.
LD 248872 P - CHIMNEY STACKS N°1 & N°2 - LIGHTNING CONDUCTOR - MATERIAL LIST - SHEET 2.
LD 247906 K - CHIMNEY STACKS N°1 & N°2 - GENERAL ARRANGEMENT - CONCRETE FOUNDATION & PLAN LAYOUT.
LD 247907 A - CHIMNEY STACK N°1 - FOUNDATION.
LD 247908 K - CHIMNEY STACK N°2 - FOUNDATION.
LD 247914 A - CAP DETAILS.

NOTES

1. ITEM Nos. ENCIRCLED THUS (1) REFER TO ITEM Nos. LISTED ON MATERIAL LIST DRGS. Nos. LD 248871 P & LD 248872 P.
2. LEGS OF BOLTS FOR DOWN CONDUCTOR CLAMPING TO BE IN HORIZONTAL PLANE.
   LEGS OF BOLTS FOR ALL EARTH CLAMPING TO BE IN VERTICAL PLANE.
   LEGS OF HOOK BOLTS FOR TEST LINK & AIR TERMINAL TO BE IN VERTICAL PLANE.
3. EXPANDING PLUG TYPE MASONRY ANCHORS, ITEM 34, ARE TO BE SECURED INTO CHIMNEY IN ACCORDANCE WITH MAKER'S STANDARD INSTRUCTIONS.
4. LOWEST BOLTS AT R.L. 437'-6" MUST NOT BE IN ELECTRICAL CONTACT WITH ANY SURROUNDING REINFORCING METAL - ON NO ACCOUNT MUST LEGS OR HOOK BOLTS (FOR TEST LINK) TOUCH OR FORM ELECTRICAL CONNECTION WITH ONE ANOTHER OR WITH REINFORCING METAL ETC.
5. CONDUCTOR CLAMPS & CONNECTORS TO BE SECURELY TIGHTENED ONTO CONDUCTOR. CLAMPS SHALL BE SUFFICIENTLY TIGHT TO SUPPORT EACH CORRESPONDING LENGTH OF CONDUCTOR. CONNECTIONS SHALL POSSESS A STRENGTH IN TENSION OF AT LEAST 7 TONS / SQ. IN.
6. REINFORCING BONDS TO BE FIRMLY CLAMPED TO REINFORCING BAR. BONDING AT TOP OF CHIMNEY TO BE LEAD SHEATHED.
7. LEGS OF HOOK BOLTS (FOR TEST LINK) TO BE PERPENDICULAR & PROJECTING 1 1/2 IN. MIN. FROM FACE OF CHIMNEY.
8. CLAMPS SPACED ON 5'-0" CENTRES TO SUIT CONCRETE POUR LIFTS OF 5'-0".
9. THE RADIUS OF ANY BEND IN CONDUCTOR MUST NOT BE LESS THAN 8".
10. DOWN CONDUCTORS ABOVE R.L. 957'-6"; RING CONDUCTOR & BONDS AT R.L. 982'-6" TO BE CAPPED WITH LEAD ON STRIPPED ENDS OF CONDUCTOR. CAPPING TO BE WIPED TO CONDUCTOR SHEATHING TO MINIMUM THICKNESS OF LEAD EQUIVALENT TO RADIAL THICKNESS OF SHEATHING.
11. ALL EXPOSED CLAMPING & CONNECTIONS ABOVE R.L. 957'-6" TO BE OVER LEAD SHEATHING.
12. REINFORCING SHALL BE ELECTRICALLY CONTINUOUS FROM R.L. 984'-3" TO THE BASE OF THE STACK. WIRE TIES SHALL BE SUFFICIENT FOR THIS PURPOSE. LADDER HOLDFASTS TO BE IN ELECTRICAL CONTACT WITH REINFORCING WHERE POSSIBLE.

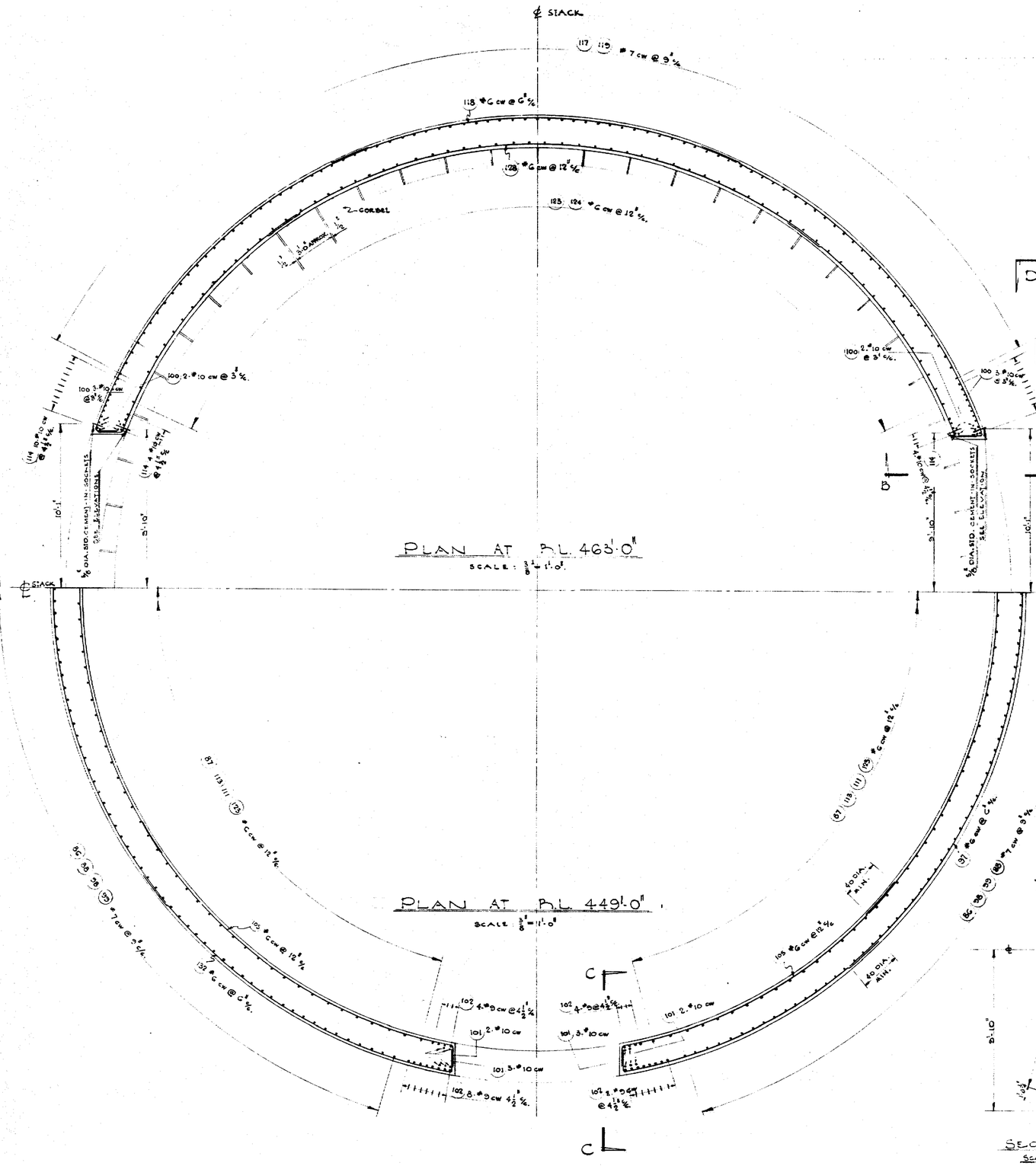
AMENDMENTS		
1. 1ST ISSUE AS REVISED		
2. NOTE RE TENDERING		
DELETED	CKD. K.K.	
REVD. K.S.W.	7.8.68	

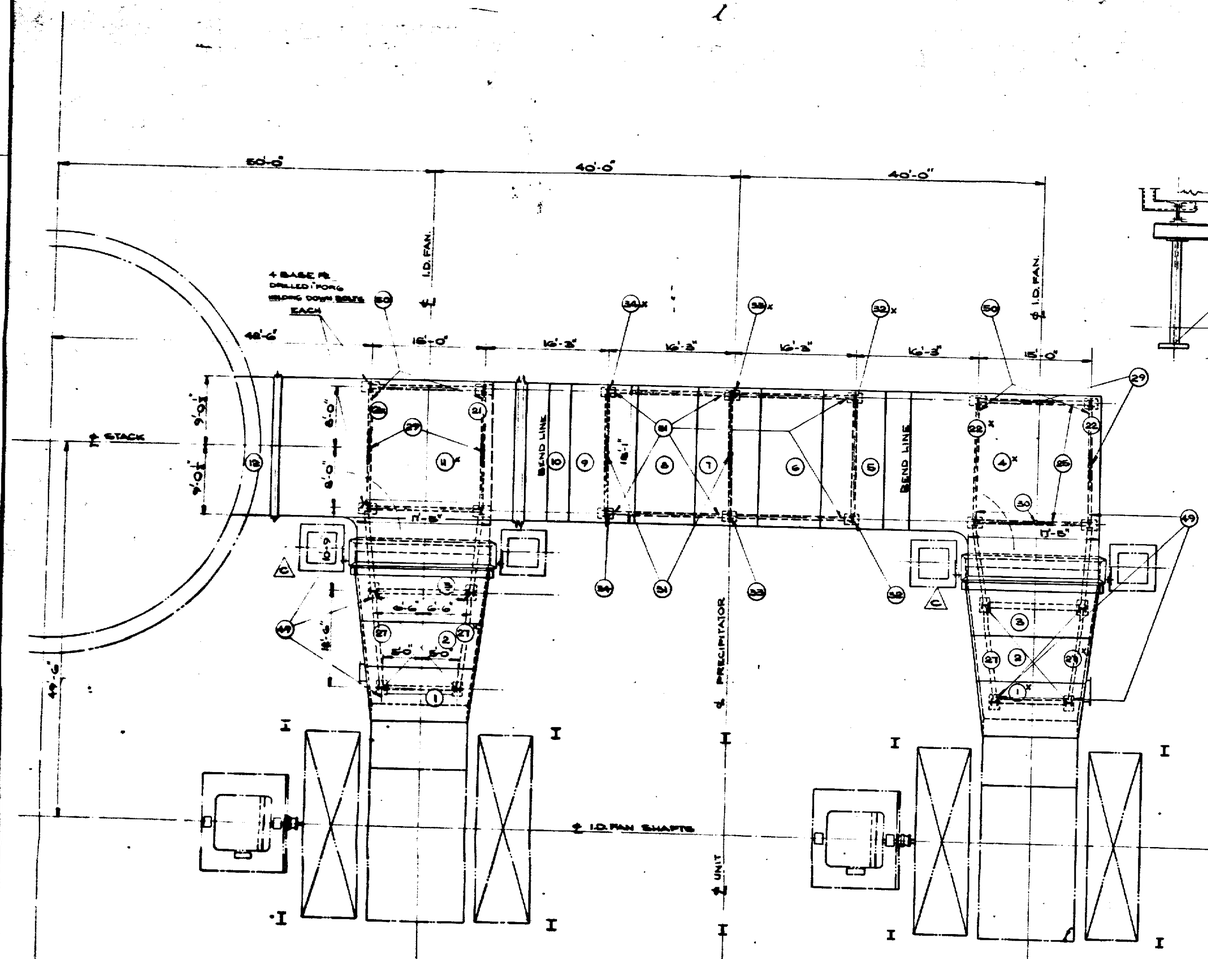
CONTRACT
Nº
1894

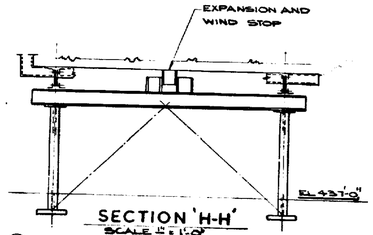
THE ELECTRICITY COMMISSION
OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS Nº1 & Nº2
LIGHTNING CONDUCTOR
ARRANGEMENT

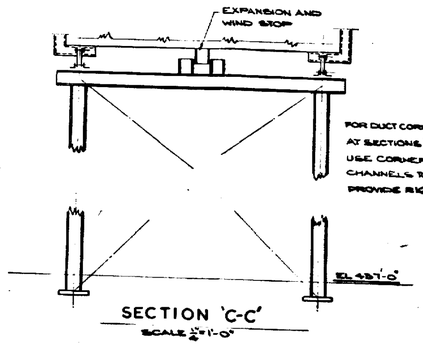
SCALE AS SHOWN				DATE	F.J.A.	DATE
DRAWN	K.R.	E/MP		16/3/68	D.C.E./POWER:	30/5/68
TRACED		L.E.S.A.			A.A. Ferguson	31/5/68
CHECKED	S.G.				P.E./CON.	
S.E./E.D.O:						
DATE	13-3-68				LD248873 A 2	


℄ STACK
117 115 #7 cw @ 9"c/c
118 #6 cw @ 6" c/c
128 #6 cw @ 12" c/c
123 124 #6 cw @ 12" c/c
2-CORBEL
3'-0" APPROX.
100 2-#10 cw @ 3" c/c
100 3-#10 cw @ 8" c/c
114 #10 cw @ 4½" c/c
114 #10 cw @ 9" c/c
10'-1"
5'-10"
5/8" DIA. STD. CEMENT IN SOCKETS
SEE ELEVATION
B
B
100 2-#10 cw @ 3" c/c
100 3-#10 cw @ 8" c/c
114 #10 cw @ 4½" c/c
114 #10 cw @ 9" c/c
5/8" DIA. STD. CEMENT IN SOCKETS SEE ELEVATION
PLAN AT R.L. 463'-0"
SCALE: 3/8" = 1'-0"
℄ STACK
87 113 111 #6 cw @ 12" c/c
33 #6 cw @ 6" c/c
95 #7 cw @ 9" c/c
103 #6 cw @ 12" c/c
105 #6 cw @ 12" c/c
57 #6 cw @ 6" c/c
57 #6 cw @ 9" c/c
86 88 89 #7 cw @ 9" c/c
40 DIA. MIN.
40 DIA. MIN.
PLAN AT R.L. 449'-0"
SCALE 3/8" = 1'-0"
C
C
102 4-#9 cw @ 4½" c/c
101 2-#10 cw
101 3-#10 cw
102 8-#9 cw @ 4½" c/c
102 4-#9 cw @ 4½" c/c
101 2-#10 cw
101 3-#10 cw
102 8-#9 cw @ 4½" c/c
C
C
E
D
25 SPACES @ 1'-0" = 25'-0" (ON FACE OF CONCRETE)
7½"
20'-4"
5/8" DIA. STD. RAWLPLUG "CEMENT-IN-SOCKETS" WITH ⅜" DIA x 3" GALV. SET SCREW
16'-5"
4½"
INSIDE ELEVATION GAS INLET OPENINGS.
SCALE ¾" = 1'-0" (DISTORTED)
E
D
5/8" DIA. STD. RAWLPLUG "CEMENT-IN-SOCKETS" WITH ⅜" DIA x 3" GALV. SET SCREW
25 SPACES @ 1'-0" = 25'-0" (ON FACE OF CONCRETE)
20'-4"
16'-5"
3½"
8½"
OUTSIDE ELEVATION GAS INLET OPENINGS
SCALE ¾" = 1'-0" (DISTORTED)
E
E
R.L. 498'-0"
R.L. 495'-0"
R.L. 488'-0"
R.L. 485'-0"
3-#10 cw @ 3" c/c
2-#10 cw @ 3" c/c
1-#10 cw
3-#10 cw @ 3" c/c
112 #7 cw @ 9" c/c
SECTION B-B
SCALE 5/8" = 1'-0"
117 #7 cw @ 3" c/c
3-#10 cw @ 3" c/c
R.L. 456'-6"
116 #7 cw @ 15" c/c
R.L. 450'-0"
1-#10 cw
100 115 #7 cw @ 9" c/c
94 3-#10 cw @ 3" c/c
91 1-#10 cw
95 #7 cw @ 9" c/c
R.L. 437'-0"
92 1-#10 cw
96 3-#10 cw @ 8" c/c
36 3-#6 cw @ 6" c/c
R.L. 434'-0"
DOWELS
SEE LD 247907 A STACK N°1
SEE LD 247908 K STACK N°2
SECTION C-C
SCALE 5/8" = 1'-0"
D
D
5/8" DIA. STD. RAWLPLUGS
112 #7 cw @ 9" c/c
R.L. 456'-8"
R.L. 456'-0"
10 #6 cw @ 6" c/c
3-#10 cw @ 3" c/c
137 3/4" CHAMFER
7 PER SEGMENT
56 SEGMENTS
26-#10 cw @ 3" c/c
R.L. 449'-0"
1-#10 cw
15
R.L. 441'-6"
12-#6 cw @ 12" c/c
97 24-#6 cw @ 6" c/c
91 1-#10 cw
96 3-#10 cw @ 8" c/c
36 3-#6 cw @ 6" c/c
R.L. 434'-0"
DOWELS
SEE LD 247907 A STACK N°1
SEE LD 247908 K STACK N°2
SECTION D-D
SCALE 3/8" = 1'-0"
RAWLPLUGS SYMMETRICAL ABOUT ℄ GAS DUCT OPENING.
18 SPACES @ 1'-0" = 18'-0"
5'-10"
1'-6"
SECTION E-E
SCALE 3/8" = 1'-0"
18 SPACES @ 1'-0" = 18'-0"
5'-10"
10'-1"
SECTION B-B
SCALE 3/8" = 1'-0"
NOTE:
FOR NOTES SEE DRG. No. LD 247906 K
& DRG. No. LD 247909 A
REFERENCE DRGS.
GENERAL ARRANGEMENT LD 247906 K
ELEVATION R.L 434'-0 TO SCB'G & CORBEL DET LD 247909 A
FOUNDATION STACK N°1 LD 247907 A
FOUNDATION STACK N°2 LD 247908 K
REINFORCING LIST RL 434'-0" TO RL 503'-0" LD 253840 B
THIS DRG. IS TO BE READ IN CONJUNCTION WITH DRG. No. LD 247909 A
DRG RELEASED FOR CONSTRUCTION
CONTRACT No.
REF. DRGS. ADDED
P.E./PSC. R.E./M.P.
SIGNATURES ADDED.
DRAWN DATE CHECKED
K.U. 2.8.68 RS
CONTRACT N° 1894
THE ELECTRICITY COMMISSION OF N.S.W.
LIDDELL POWER STATION
CHIMNEY STACKS N°1 & N°2
REINFORCEMENT DETAILS R.L. 434'-0" TO R.L. 503'-0"
PLAN & SECTIONS
SCALE AS SHOWN
DRAWN P.C.
TRACED
CHECKED G.F.
DATE
E/MP
DATE 8.4.68
DATE 8.8.68
LD 247910 A/1
A
B
C
D
E
F
G
H
J
K
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15



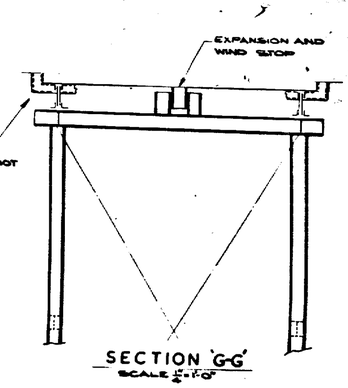


SECTION 'H-H'
SCALE 1/4" = 1'-0"



FOR DUCT CORNER CONNECTIONS AT SECTIONS 'CC', 'GG' & 'HH' DO NOT USE CORNER PLATES. CHANNELS TO LAP CORNER TO PROVIDE RIGID FRAME.

SECTION 'C-C'
SCALE 1/4"=1'-0"



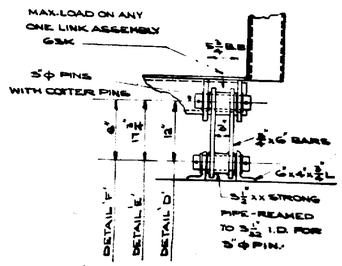
SECTION 'G-G'
SCALE 1/4"=1'-0"

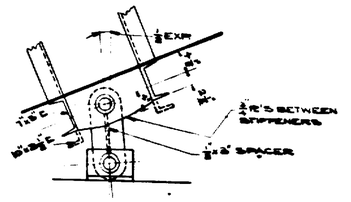
SHACKLE TYPE MOUNTING

MARK N°S	DIMENSION 'V'	N° OFF
49	6"	12
50	17 3/4"	4
51	12"	6

WIND TIE

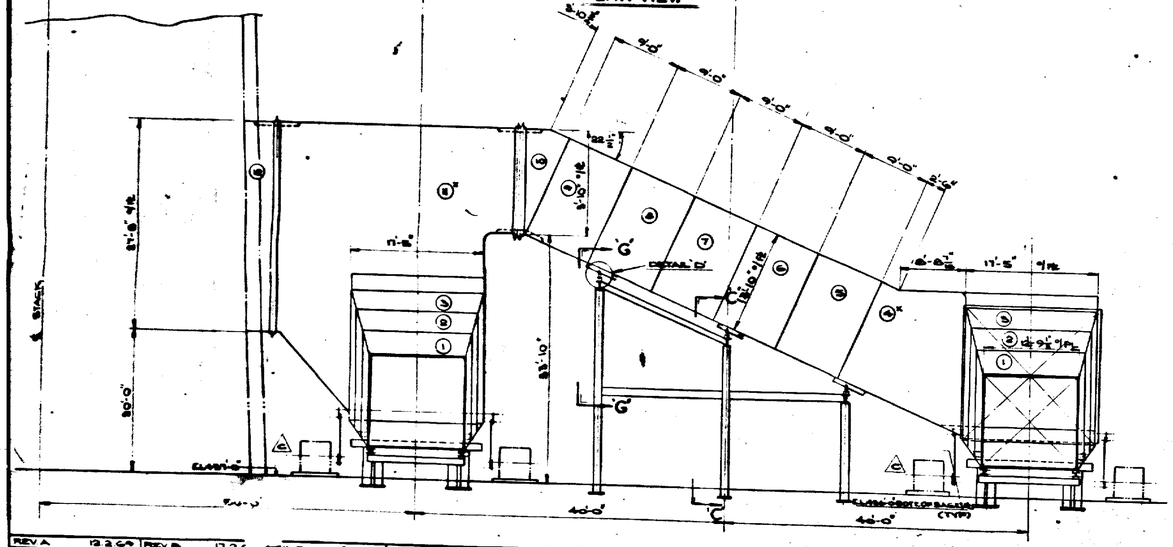
MARK N°	N° OFF
29	4
30	1
31	2



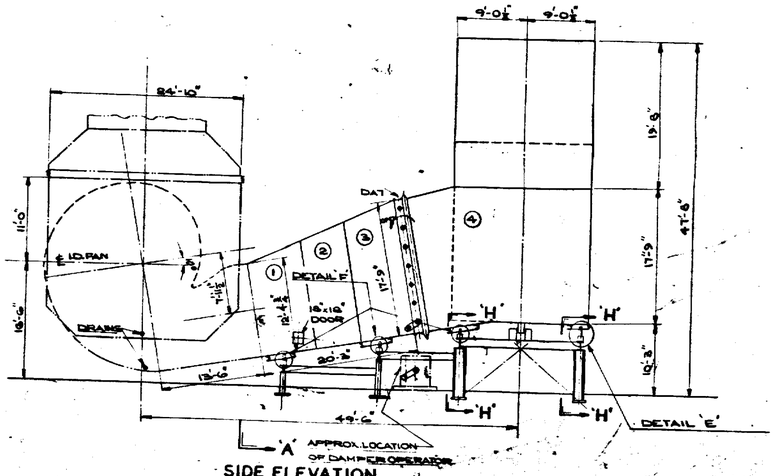


DETAIL 'D'
DETAIL 'E'
DETAIL 'F'
SCALE 1"=1'-0"

PLAN VIEW



FRONT ELEVATION



SIDE ELEVATION

REV	DATE	DESCRIPTION	BY
A	12.2.69	DIMENSION 249'1" FROM ℄ STACK TO DUPLICATION IT DELETED ALSO DETAIL 'D' REPOSITIONED MODIFIED PER C.E. TELEX 29/1/69	WK
B	17.2.69	PAINTING SCHEDULE ADDED	DAB
C	27.6.69	SECOND CONTROL UNIT ADDED FOR DAMPER D7, SHOWN FOR BLR N°S 1 & 2 CESO LETTER 5-935-028, 17.6.69	WK RHW
D	22.11.70	DRG TRACED WITHOUT ALTERATION	DB JS

NOTES 3RD ANGLE PROJECTION

ONE BOILER SET, AS DRAWN, FOR BOILER N°1
ONE BOILER SET, AS DRAWN, FOR BOILER N°3

MARK N°S TO BE PAINTED ON DUCTING IN BLACK LETTERING ON APPROPRIATE COLOUR PATCH

N°1 BLR	RED	PATCH
N°2 "	WHITE	"
N°3 "	GREEN	"
N°4 BLR	YELLOW	PATCH

REF DRGS

GAS DUCT, I.D. FAN TO STACK, DETAILS SHT1	268\10\5
GAS DUCT, I.D. FAN TO STACK, DETAILS SHT2	268\10\6
GAS DUCT, SUPPORTS	268\10\7
ARRGT OF I.D. DUCTING FOR BLRS 3 & 4	268\10\4
DETAILS OF DUCTING & SUPPORTS (I.D.)	268\10\1
MATL. LIST (DUCT SCHEDULE 'P5')	268\10\3

PAINTING

SURFACE PREPARATION & PAINTING TO BE DONE AT SITE TO N° 2L PAINTING SCHEDULE 29-APR-68. FOR DUCTING ITEM 10 FOR STEELWORK ITEM 1

LETTER FILED	CONTRACT NO.
NOV 570	1600

SUBSTANDARD FOR MICROFILMING

LD257271A/2

THIS DRG WAS REPRODUCED FROM C.E. DRG. N° E732-481-5

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INTERNATIONAL COMBUSTION (AUSTRALIA) LTD.

EC OF N.S.W. - LIDDELL POWER STATION - UNITS 1 & 2

ARRANGEMENT OF GAS DUCTING
I.D. FAN TO STACK.

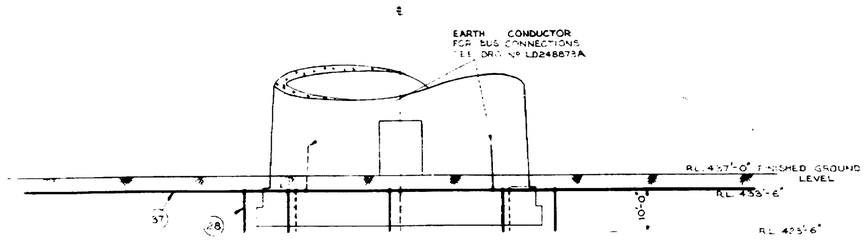
ITEM 11-20

C.E. DRG N° E-935-028-0

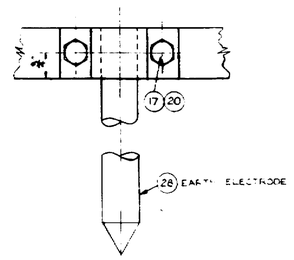
C. BROWN JS 22.1.70
WK 27.1.69
ADS
SCALE 1/8"=1'-0"

268 10 /2
REV D

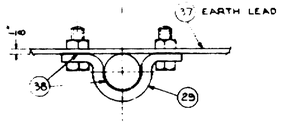
KODAK 16-11-70



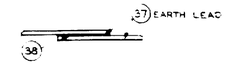
ELEVATION



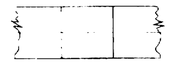
ELEVATION



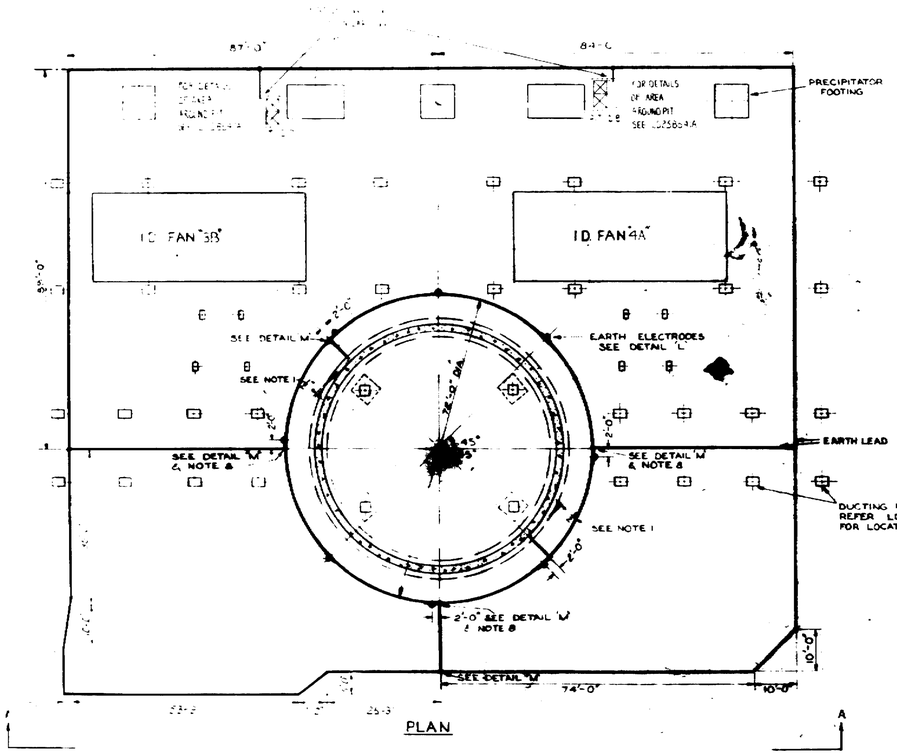
PLAN
DETAIL 'L'



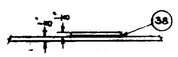
ELEVATION



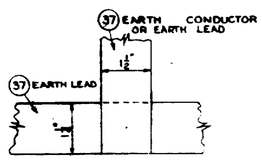
PLAN
DETAIL 'N'



PLAN



ELEVATION



PLAN
DETAIL 'M'

REFERENCE DRAWINGS

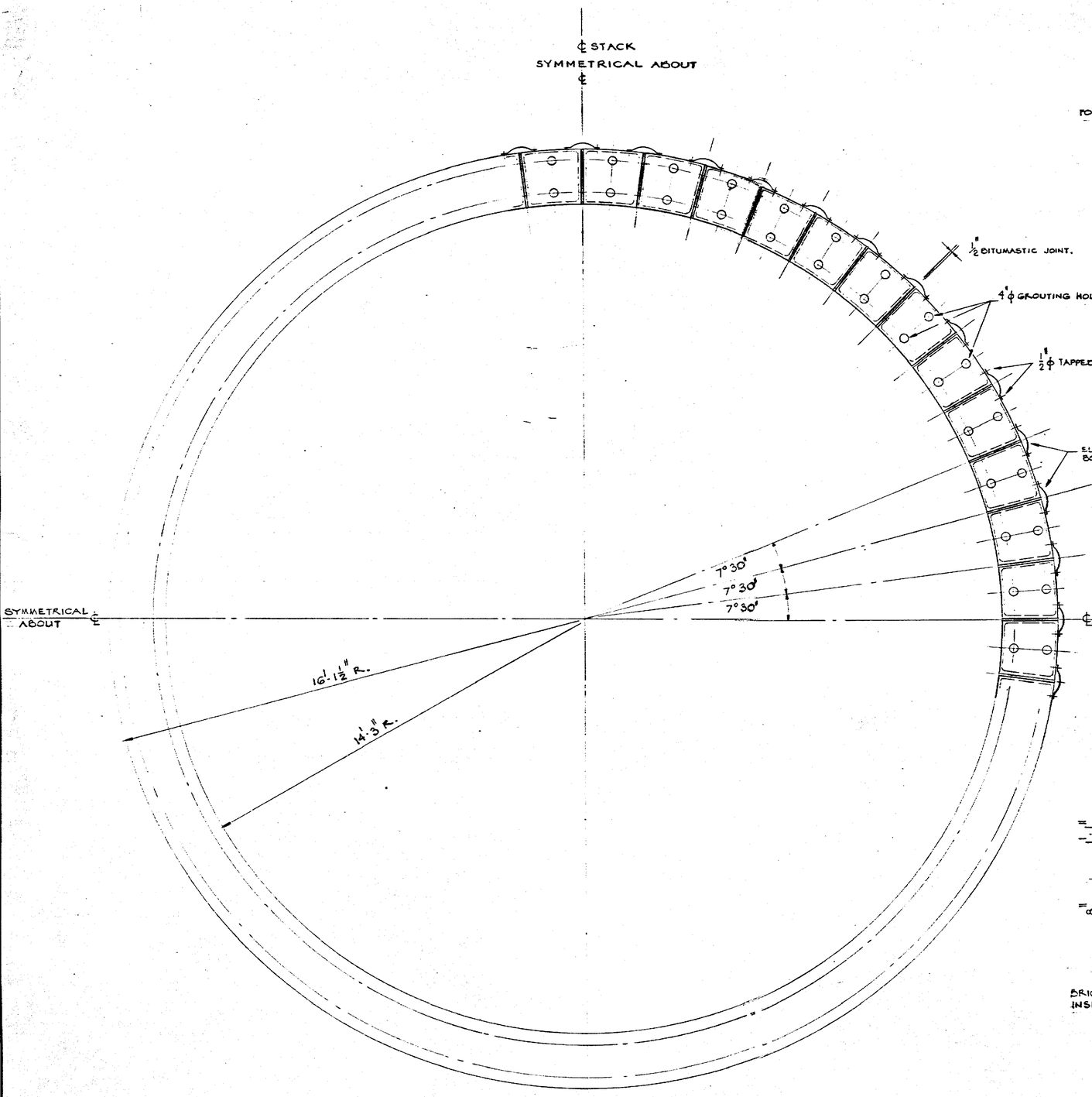
LD247908 K - CHIMNEY STACK No 2 - FOUNDATION
LD248873 A - CHIMNEY STACKS No 1 & No 2 - LIGHTNING CONDUCTOR - ARRANGEMENT
LD248871 P - CHIMNEY STACKS No 1 & No 2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 1
LD248872 P - CHIMNEY STACKS No 1 & No 2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 2
LD258640A - BOILERS 3 & 4 - PRECIPITATORS & I.D. FANS AREA - CABLE PITS, TUNNEL & CONDUIT LAYOUT.
LD258641A - " " I.D. FANS 4A & 4B AREA - CABLE PITS & CONDUIT DETAILS
LD258642A - " " " 3A & 3B " " " " "
[illegible] - CHIMNEY STACK No 1 - LIGHTNING CONDUCTOR EARTHING ARRANGEMENT

NOTES.

1. EARTH CONDUCTOR TO BE ½" CLEAR OF & PARALLEL TO FINISHED FACE OF STACK AS INDICATED IN PLAN. EARTH CONDUCTOR TO BE EXTENDED UP TO RL 441'-0" FOR EARTHING OF SCAFFOLDING (REINFORCEMENT BE DURING CHIMNEY CONSTRUCTION) ON COMPLETION OF CHIMNEY CONSTRUCTION, EARTH CONDUCTORS ARE TO BE TERMINATED AT TEST LINK IN ACCORDANCE WITH SECTION [illegible] ON RISE MILDENHALL
2. TEMPORARY LEADS FOR EARTHING OF SCAFFOLDING ETC DURING CHIMNEY CONSTRUCTION SHALL BE FIRMLY BONDED TO EARTH CONDUCTOR AT R.L. 441'-0". THE EARTH LEAD CONDUCTOR CONCENTRIC TO THE STACK OUTSIDE STACK SHALL BE COMPLETELY COVERED & THEMFLY PACKED WITH [illegible] MIN. R.L. OF 465'-0" PRIOR TO BONDING OF EARTH CONDUCTOR
3. ALL MATING SURFACES OF JOINTS IN DETAIL 'L' ARE TO BE [illegible] WITH A CONTINUOUS COATING OF ALLOY BY INTERPOSING STRIPS OF SILVER BRAZING ALLOY RIBBON OR COPPER PHOSPHORUS BRAZING ALLOY RIBBON (SHIM) (TYPE SIL OR CUP) BETWEEN MATING SURFACES BEFORE CLAMPING & BRAZING
4. EARTH LEAD TO BE FORMED UP FROM LONGEST AVAILABLE LENGTHS OF CONDUIT & JOINED WHEREVER NECESSARY IN ACCORDANCE WITH DETAIL 'M' NOTE 11.
5. REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
6. DRIVE TOP OF EARTH ELECTRODES TO RECESS OF [illegible]
7. BENDS IN EARTH CONDUCTOR TO BE 6" MIN. RAD.
8. THE THREE LOCATIONS SHOWN SHOULD [illegible] BEEN CARRIED OUT TO DETERMINE THE EARTH TERMINATION NETWORK. (CALCULATED)
9. ITEM Nos ENCIRCLED THUS (30) REFER TO ITEMS LISTED ON DRG. Nos LD248871 & 72 P.
10. IF AN ELECTRODE STRIKES ROCK, A 6" DIA. HOLE IS TO BE [illegible] REQUIRED DEPTH & THE ELECTRODE PLACED [illegible] OF BENTONITE & PLASTER OF PARIS SHALL BE [illegible] A SLURRY & POURED INTO THE HOLE AROUND
11. ALL JOINTS, SHOWN IN DETAIL 'M' & 'N' [illegible] EITHER SILVER-BRAZING ALLOY OR COPPER [illegible]

		M.J.C.	
		FLT	G.A.G. 22.12.70
A.S.E.E.A.			LD281230

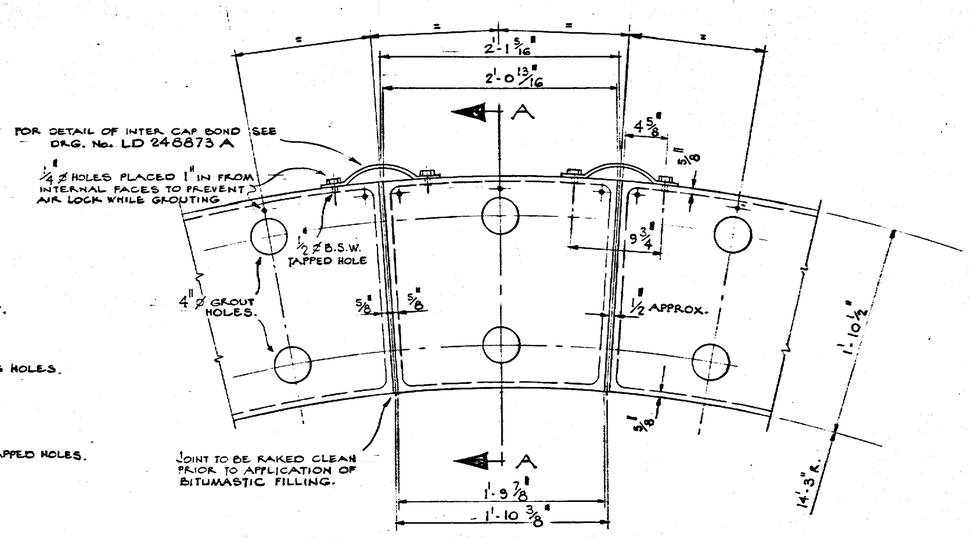
AMENDMENTS



PLAN ON CAP PLATES

COMPOSED OF 48 EQUAL SECTIONS WITH ½" GAP BETWEEN EACH SECTION.

SCALE 1½" = 1'-0"



PART PLAN

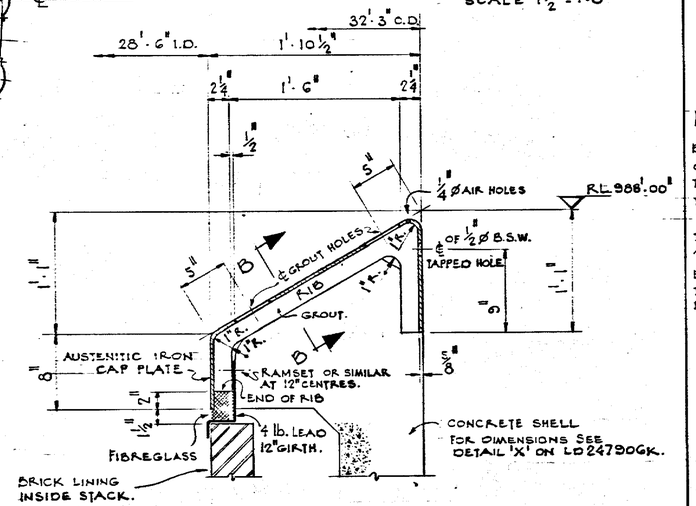
SCALE 1½" = 1'-0"



SECTION B-B

CAP ONLY

SCALE 1½" = 1'-0"



SECTION A-A

SCALE 1½" = 1'-0"

NOTE:
COMPLETE BRICKWORK; PLACE LEAD AND SECURE IN POSITION, PLACE CAP PLATES AND TEMPORARILY HOLD IN POSITION, CAULK JOINT AT BOTTOM OF CAP WITH FIBRE GLASS AND THEN GROUT CAP PLATE USING 1 PART SULPHATE RESISTING CEMENT, 2 PARTS FINE SAND, 5½ GALLONS WATER PER BAG OF CEMENT, TROWEL OFF AT CORE HOLES.

REFERENCE DRG'S:
General Arrg't. & Concrete Dimensions. LD247906K
Lightning conductor arrg't. LD248873A

NOTES.

BEFORE FABRICATION OF THE CAP SECTIONS THE MEASUREMENTS OF THE CHIMNEY STACK SHALL BE TAKEN FROM THE SITE AND TEMPLATES PREPARED FOR THE CASTINGS.

THE AUSTINITIC IRON FOR THE CHIMNEY CAPS CASTINGS SHALL BE AS SPECIFIED.

THE CASTINGS SHALL BE TRUE TO SHAPE AND MEASUREMENTS AND ACCURATE IN CONTOUR.

BEFORE FIXING, THE CAP SECTIONS SHALL BE SET OUT ON THE FLOOR IN ORDER TO CHECK AGAINST THE MEASUREMENTS PREVIOUSLY TAKEN.

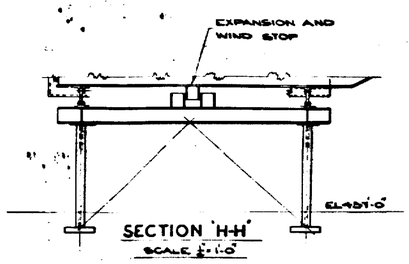
AMENDMENTS	DRAWN	DATE	CHECKED
(1) TENDERING NOTE DELETED. DRG RELEASED FOR CONSTRUCTION PURPOSES. REF DRGS. ADDED. PE/PSC SIGNATURE ADDED.	K.U.	2-8-68	K.J.H.

CONTRACT No. 1894

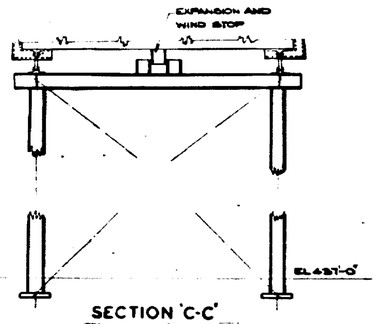
THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS No. 1 & No. 2
CAP DETAILS

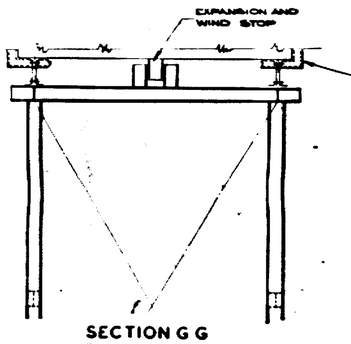
SCALE AS NOTED.				DATE		DATE
DRAWN	K.M.				PE/PSC	2-8-68
TRACED	—					
CHECKED	M.G.S					
E/GD.						
DATE	20/2/68				LD 247914 B/1	



SECTION 'H-H'
SCALE 1/4"=1'-0"

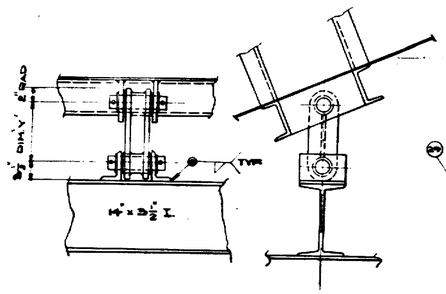


SECTION 'C-C'
SCALE 1/4"=1'-0"



SECTION G G
SCALE 1/4"=1'-0"

FOR DUCT CORNER CONNECTION AT SECTIONS 'CC', 'GG' & 'HH' DO NOT USE CORNER PLATES, CHANNELS TO LAP CORNER TO PROVIDE RIGID FRAME.

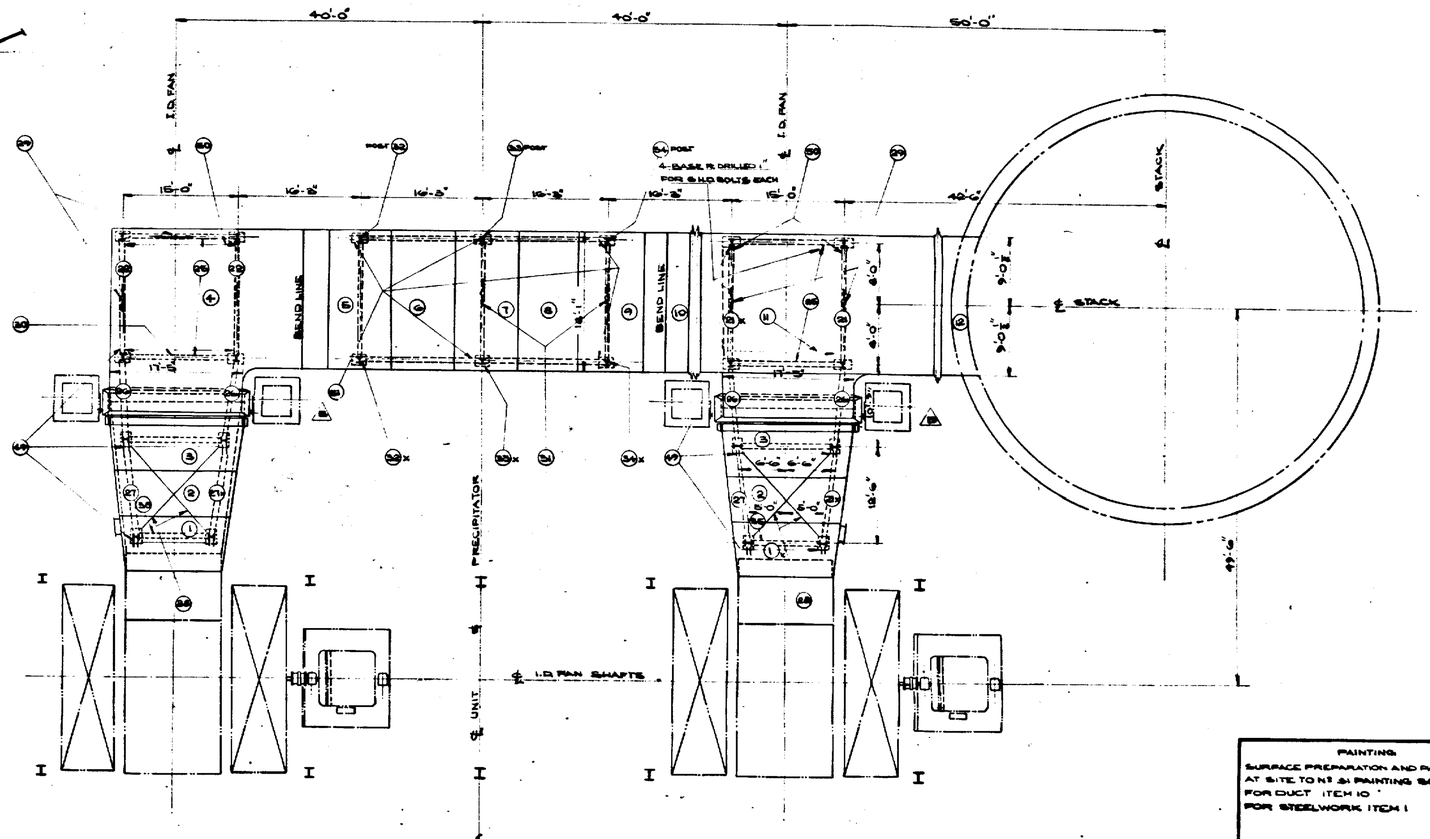


SHACKLE TYPE MOUNTING

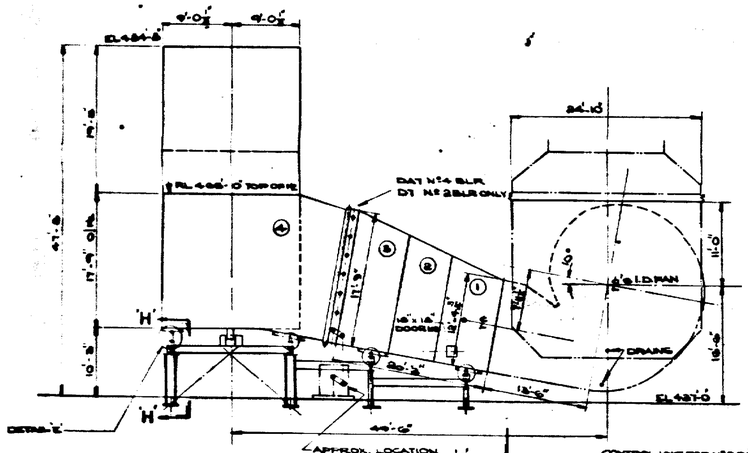
MARK Nº	DIMENSION 'Y'	NO. OFF
49	8"	12
50	17"	4
51	18"	6

WIND TIE

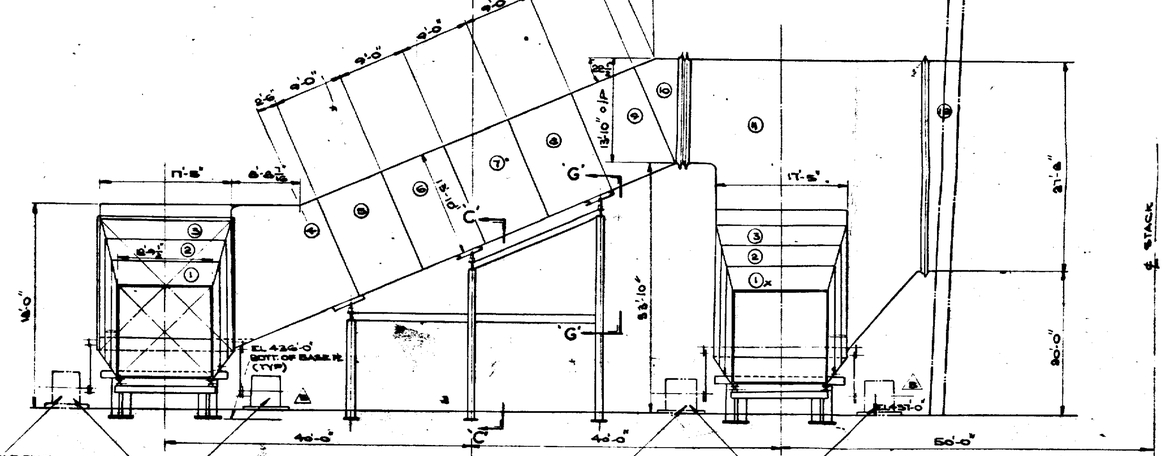
MARK Nº	Nº OFF
29	4
30	1
31	2



PLAN VIEW



SIDE ELEVATION



FRONT ELEVATION

CONTROL UNITS FOR Nº4 BLR

PAINTING
SURFACE PREPARATION AND PAINTING TO BE DONE AT SITE TO Nº 3a PAINTING SCHEDULE 29-APR-1968
FOR DUCT ITEM 10
FOR STEELWORK ITEM 1

NOTES 3RD ANGLE PROJECTION

ONE BOILER SET, AS DRAWN, FOR BOILER 2
" " " OPP HAND " " 1
ONE BOILER SET, OPP HAND, FOR BOILER 3
MARK Nºs TO BE PAINTED ON DUCTING IN BLACK LETTERING ON APPROPRIATE COLOUR PATCH :-
Nº 1 BLR RED PATCH
Nº 2 " WHITE "
Nº 3 " GREEN "
Nº 4 BLR YELLOW PATCH

REF DRGS.

GAS DUCT I.D. FAN TO STACK DETAILS SHT 1	268/10/13
GAS DUCT I.D. FAN TO STACK DETAILS SHT 2	268/10/14
GAS DUCT SUPPORTS	268/10/7
I.D. DUCT ARRGT FOR BLRS 1 & 3	268/10/2
MATL LIST (DUCT SCHEDULE 5)	268/10/5
DETAILS OF I.D. DUCTS & SUPPORTS	268/10/1

SUBSTANDARD FOR MICROFILMING

LETTER NUMBER	CONTRACT NO.
NOV 570	1600

LD257273A/3

THIS DRG WAS REPRODUCED & TRACED FROM C.E. DRG Nº E-935-030-0

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INTERNATIONAL COMBUSTION AUSTRALIA LTD.

ITEM 11-20
C.E. DRG Nº E-935-030-0

EC OF N.S.W. - LIDDELL POWER STATION - UNITS 2 & 4
ARRANGEMENT OF GAS DUCTING
- I.D. FAN TO STACK -

DRAWN	C. BROWN	NUMBER
TRACED	23-11-70	268 10/4
CHECKED	WN 29.7.68	
PASS	ADS	
SCALE	1/4"=1'-0"	A1 S.C.

REV A PAINTING SCHEDULE ADDED DAB
REV B CONTROL UNIT INDICATED FOR Nº 2 BLR ONLY ALSO SECOND ENTRY FOR Nº 4 BLR-CE&D LETTER 4-45130
REV C DRG TRACED WITHOUT ALTERATION

KODAK 18-11-70

C LD253841

TAG	SIZE	DETAIL	NO.OFF
1	#5CW	14'-6"	22
2	#5CW	ONE OFF: 12'-6" ONE OFF: 15'-3"	2
3	#5CW	ONE OFF: 10'-3" ONE OFF: 9'-6"	2
4	#5CW	ONE OFF: 11'-0" ONE OFF: 11'-6"	2
5	#5CW	10'-0"	2
6	#5CW	ONE OFF: 11'-6" ONE OFF: 12'-6"	2
7	#5CW	11'-9"	2
8	#5CW	ONE OFF: 13'-0" ONE OFF: 14'-2"	2
9	#5CW	11'-3"	1
10	#5CW	ONE OFF: 10'-3" ONE OFF: 9'-6"	2
11	#5CW	10'-9" to 12'-6" — 3 variants	3
12	#5CW	18'-9"	2.5
13	#5CW	16'-6" to 16'-9" — 4 variants	4
14	#5CW	12'-6"	1
15	#5CW	17'-3"	3
16	#5CW	16'-9" to 18'-4" — 3 variants	3
17	#5CW	16'-0" to 16'-2" — 4 variants	4
18	#4CW	7'-0"	2
19	#4CW	16'-6"	2
20	#4CW	18'-5"	2
21	#4CW	22'-7"	2
22	#4CW	26'-0"	2
23	#4CW	29'-5"	2
24	#4CW	5'-2"	2
25	#4CW	5'-7"	2
26	#4CW	19'-2"	4
27	#7CW	23'-5" to 23'-9" — 4 variants	4
28	#7CW	24'-0" to 25'-11" — 4 variants	4
29	#7CW	25'-8" to 27'-2" — 4 variants	4
30	#7CW	23'-8" to 24'-11" — 4 variants	4
31	#7CW	27'-8"	2
32	#7CW	25'-8"	2
33	#7CW	24'-11" 9" 9" L	1
34	#7CW	L= 23'-11" to 24'-8" 3 variants	3
35	#7CW	L= ONE OFF 25'-5" ONE OFF 26'-5"	2
36	#7CW	L= ONE OFF 24'-2" ONE OFF 24'-11"	2
37	#7CW	L= 23'-8"	1
38	#7CW	L= ONE OFF 24'-5" ONE OFF 25'-2"	2
39	#7CW	L= 23'-8" to 24'-9" 3 variants	3
40	#7CW	28'-9" 4.5°	2
41	#7CW	26'-2"	1
42	#7CW	27'-9"	1
43	#7CW	24'-9" to 25'-8" 4 variants	4
44	#7CW	25'-4" to 26'-8" 4 variants	4
45	#7CW	21'-6" to 23'-1" 4 variants	4
46	#7CW	22'-6" to 24'-8" 4 variants	4
47	#7CW	13'-0"	50
48	#5CW	17'-0"	30
49	#5CW	6'-3"	2
50	#5CW	15'-10"	2
51	#5CW	20'-6"	2
52	#5CW	25'-5"	2
53	#5CW	28'-5"	2
54	#5CW	31'-1"	2
55	#5CW	14'-8"	2
56	#5CW	30'-3"	12
57	#5CW	8'-11"	2
58	#5CW	12'-5"	10
59	#5CW	7'-0"	2

TAG	SIZE	DETAIL	NO.OFF
60		Not used	
61		Not used	
62	#5CW	13'-3"	2
63		Not used	
64	#5CW	9'-0"	2
65	#5CW	11'-8"	8
66	#5CW	5'-2"	2
67	#5CW	11'-8" to 13'-2" 4 variants	4
68	#5CW	13'-8" to 14'-5" 4 variants	8
69	#6CW	28'-5"	2
70	#5CW	ONE OFF 20'-6" ONE OFF 21'-8"	2
71	#5CW	20'-10" to 23'-7" 4 variants	4
72	#6CW	12'-6" to 12'-11" 3 variants	3
73	#5CW	28'-0"	15
74	#5CW	12'-8" to 13'-11" 4 variants	4
75	#5CW	15'-0" to 15'-10" 4 variants	8
76	#5CW	19'-9" to 21'-0" 4 variants	4
77	#6CW	20'-4" to 22'-2" 3 variants	3
78	#6CW	27'-8"	1
79	#5CW	13'-8" to 13'-0" 3 variants	3
80	#5CW	15'-0"	36
81	#5CW	9" L 21'-9" 9"	1
82	#4CW	STOCK LENGTHS — 170 FT.	
83	#7CW	1'-5" 22'-9"	3
84	#7CW	1'-3" 23'-9"	3
85	#5CW	1'-9" ONE OFF 21'-6" ONE OFF 31'-3"	2
86	#7CW	1'-3" 24'-2"	2
TAG Nos. 87 to 90 incl. NOT USED			
91	#10CW	28'-6"	11
92	#10CW	14'-9"	30
93	#10CW	18'-6"	12
94	#6CW	23'-0"	4
95	#10CW	28'-5"	6
96	#10CW	18'-0"	4
97	#6CW	28'-9"	4
98	#6CW	15'-5"	6
99		Not used	
100	#10CW	4'-0" 19'-6" 2 @ 45° c/c 20'-0"	64
101	#10CW	35'-0"	12
102	#10CW	2'-3"	28
103	#10CW	26'-6"	16
104	#6CW	19'-6"	4
105	#6CW	27'-0"	4
106	#10CW	15'-6"	20
107	#10CW	32'-6"	4
108	#10CW	24'-6"	4
109	#6CW	22'-0"	6
110	#6CW	100° 17'-7" 13'-6"	6
111	#6CW	154° 116° 37'-7" 31'-0" 3'-3"	12
112	#10CW	8'-6" 7'-6" 45° 45° 5'-0"	12

TAG	SIZE	DETAIL	NO.OFF
113	#4CW	1'-7" 1'-7"	52
114	#4CW	2'-2" 2'-2"	52
	#5CW	11'-9" a	
115		a=from 1'4" to 2'0" 4 variants	8
116		a=from 2'0" to 3'-1½" 5 variants	10
117		a=from 3'3½" to 5'-8½" 6 variants	12
118		a= 3'-8½"	168
	#5CW	2'-3"	
119		a= 4'-1" to 5'-3¾" 4 variants	16
120		a= 5'-3¾"	102
121	#10CW	17'-0"	6

TAG	SIZE	DETAIL	NO.OFF
501	#7CW	10'-3"	4
502	#7CW	9'-6"	2
503	#7CW	7'-0"	2
504	#7CW	7'-9"	1
505		Not used	
506		Not used	
507	#7CW	11'-9"	4
508	#7CW	8'-0"	3
509	#7CW	7'-9"	1
510	#9CW	16'-3"	4
511	#9CW	10'-6"	2
512	#9CW	17'-0"	4
513	#9CW	11'-6"	2
514	#9CW	24'-1"	1
515	#9CW	15'-6"	1
516	#9CW	10'-0"	5
517		Not used	
518	#9CW	6½" R 21'-0" 21'-6"	2
519	#9CW	6½" R 21'-0" 7'-0"	2
520	#9CW	30'-0"	1
521	#9CW	6½" R 21'-0" 22'-6"	1
522		Not used	
523	#9CW	24'-11"	2
524	#4CW	11" 2'-3½"	94
525	#7CW	10'-3"	2

REFERENCE DRAWINGS:
Slab at R.L 456'-6⅝" Beams & Cols.; R.C. Details ... LD 247312 K
Diagram of Bar Bending Shapes ..... S 228581 D
Stacks Nos 1 & 2 General Arrangement ..... LD 247906 K

NOTES:
* indicates Cold-Worked Steel deformed Bars as per A.S. No. A85. Number indicates dia. in eighths of an inch, e.g. #7CW indicates ⅞".
Steel Fabric as per A.S. No. A 84. (See Plan)

Reinforcement listed for one Stack only.
Reinforcement Required for TWO Stacks.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH LD 247312 K

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS No 1 & No 2
SLAB AT R.L 456'-6⅝", BEAMS AND COLUMNS
REINFORCEMENT LIST

			DATE
SCALE:			
DRAWN	M.V.S.		
TRACED	—		
CHECKED	J.M.		
E.I.C.D.			
DATE	2.8.68		

CONTRACT No. 1894

Nº LD253841 C/

AMENDMENTS

10 5 4349 21.8.68 5 10

REINFORCEMENT LIST

TAG	SIZE	DETAIL	No OFF	LOCATION	TAG	SIZE	DETAIL	No OFF	LOCATION
1	#8CW	3'-3" 3'-5" 8'-5"	248	SECTION E-E	13	#8CW	29'-10" 29'-6"	70	SECTION E-E
2	#8CW	6'-0" 1'-0"	496	"	14	#8CW	7'-9"	510	PART PLAN RL 434'-0"
3	#8CW	4'-0" 2'-0"	496	"	15	#8CW	6'-0"	26	"
4	#8CW	3'-0" 2'-0"	496	"	16	#4CW	1'-7" 1'-7"	64	COLUMN P1 TO P4
5	#8CW	33'-6" 33'-2"	56	"	17	#4CW	2'-2" 2'-2"	64	"
6	#8CW	32'-5" 32'-5"	77	"	18	#10CW	26'-3" 1'-0"	64	"
7	#8CW	31'-5" 31'-3"	63	"					
8	#8CW	32'-4" 27'-8"	54	"					
9	#8CW	31'-0" 26'-5"	68	"					
10	#8CW	29'-10" 25'-6"	48	"					

REFERENCE DRG'S.

FOUNDATION STACK No 2.	LD 247908 K
CHIMNEY STACKS No 1 & No 2	LD 247906 K
DIAGRAM OF BAR BENDING SHAPES	S 228581 D

NOTE:

STEEL REINFORCEMENT: #CW INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A83. NUMBER INDICATES DIAMETER IN EIGHTS OF AN INCH. e.g. "8 CW = 1"

DELIVER TO SITE IN TAGGED BUNDLES.

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING, BUNDLED SEPARATELY.

AMENDMENTS

CONTRACT No. 1894

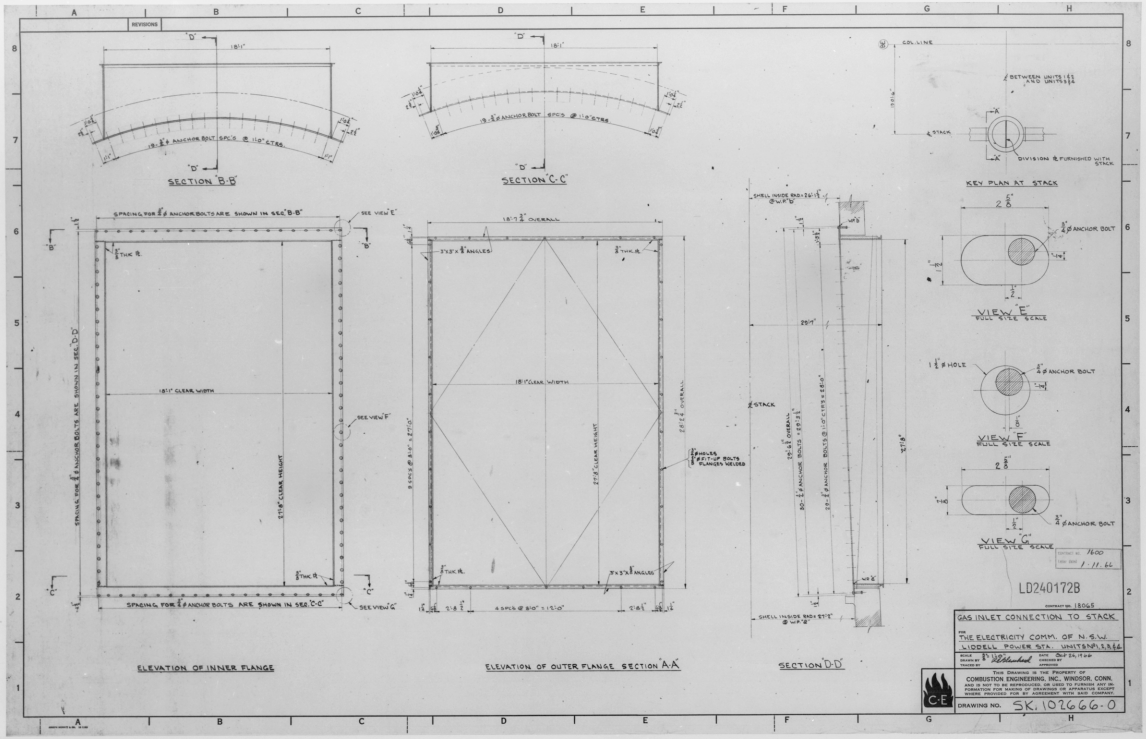
THE ELECTRICITY COMMISSION OF N.S.W.

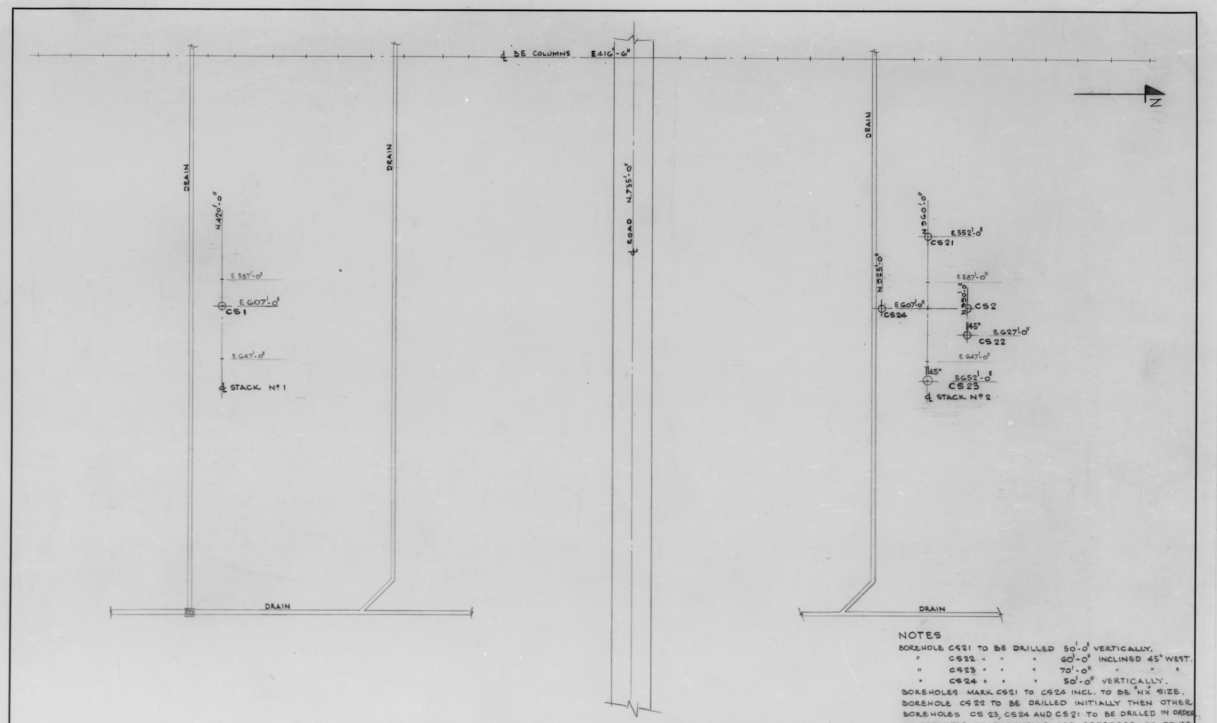
LIDDELL POWER STATION
CHIMNEY STACK No 2
FOUNDATION REINFORCEMENT LIST

			DATE	DATE
SCALE	—			
DRAWN	K.U.		PE/TSC	19/9/68
TRACED	—			
CHECKED	J.C.Q.			
E/CD	K.A. for MA			
DATE	2.9.68			

LD 253800 C1

5 436 Z 19.9.68 5


REVISIONS
SECTION 'B-B'
SECTION 'C-C'
ELEVATION OF INNER FLANGE
ELEVATION OF OUTER FLANGE SECTION 'A-A'
SECTION 'D-D'
KEY PLAN AT STACK
VIEW 'E'
VIEW 'F'
VIEW 'G'
LD240172B
GAS INLET CONNECTION TO STACK
THE ELECTRICITY COMM. OF N.S.W.
LIDDELL POWER STA. UNITS NO. 3, 3 & 4
DRAWN BY
TRACED BY
DATE Oct 24, 1966
APPROVED BY
THIS DRAWING IS THE PROPERTY OF COMBUSTION ENGINEERING, INC. WINDSOR, CONN.
DRAWING NO. SK. 102660-0



AMENDMENTS

INITIAL ISSUED TO TENDERERS.
BOREHOLE CS23 HAS LOCATED AT E687'-0" AND HAS TO BE VERTICALLY NOTES ON BOREHOLES FOR DRILLING ADDED. K.B.P. 28.7.67
2. CS1 (N 420 E 607) CS21 (N 950 E 607) ADDED. K.B.P. 31.7.67

WORKS ORDER Nº W2596/67

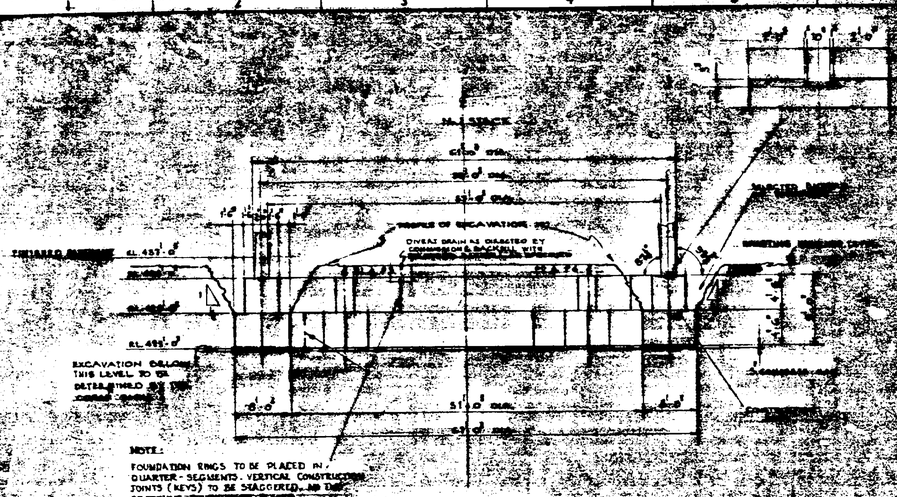
THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
STACKS Nos 1 AND 2
GEOLOGICAL EXPLORATION
LOCATION PLAN

SCALE 40 FT. = 1 IN.			DATE		DATE
DRAWN	K.B.P.				
TRACED					
CHECKED	C.F.M.				
S.E. AND A.					
DATE	28/7/67				

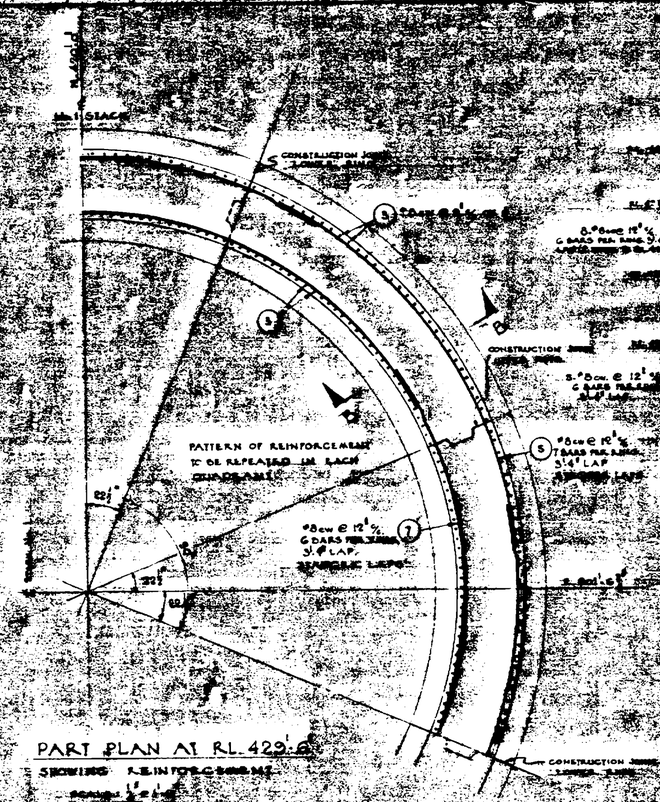
LD 244290 C/2

5 4279 19.4.68 5

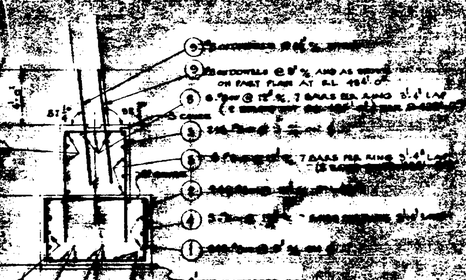


SECTION A-A

NOTE:
ROCK TO BE INSPECTED BY THE COMMISSION'S DESIGN & GEOLOGICAL STAFF PRIOR TO PLACING OF CONCRETE.

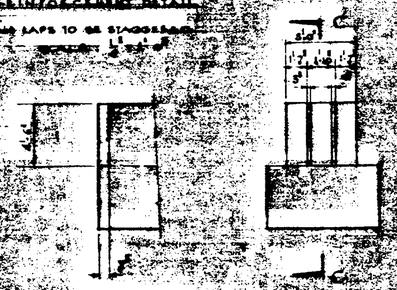


PART PLAN AT RL. 429'-6"
SHOWING REINFORCEMENT

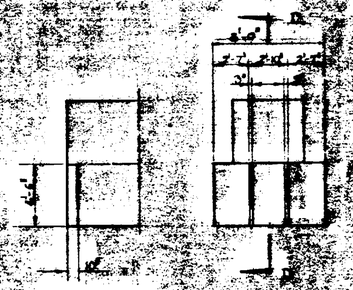


SECTION B-B
REINFORCEMENT DETAIL

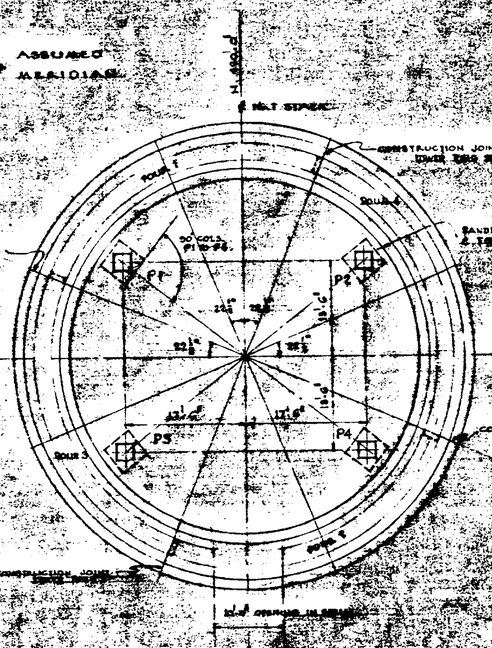
NOTE:
ALL LAPS TO BE STAGGERED



SECTION C-C

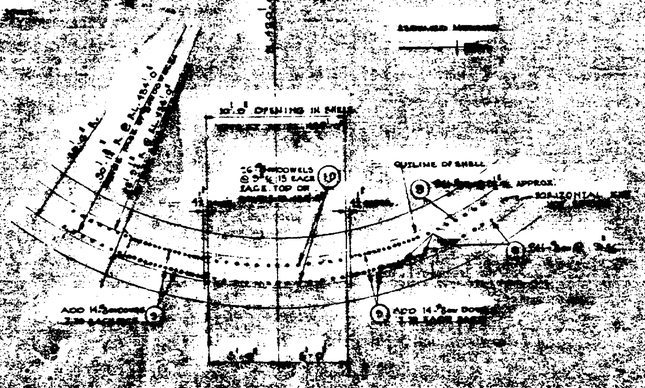


SECTION D-D



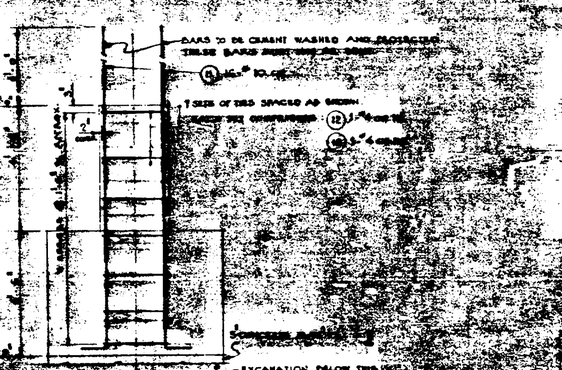
PLAN AT RL. 434'-0"

NOTE:
6 DAYS TO ELAPSE BETWEEN ADJACENT CONCRETE PLACEMENTS.
FACES OF BASE FOR EACH PLACEMENT OF
CRORDS WITH STRAIGHT FORMS 6'-0" LONG
TORUS FOR CLOSING CROWD TO BE CUT TO SUIT.
FORAMINOR IF USED BELOW RL. 429'-0" (SEE NOTES) MAY BE FORMED



PART PLAN AT RL. 434'-0"

DETAIL OF CONSTRUCTION JOINTS



DETAILS OF COLUMNS P1 TO P4

REFERENCE DRG'S.
GENERAL ARRG'T & CONCRETE DIMENSIONS ED 24/1966 A
DIAGRAM OF BAR BENDING SCHEDULE S 32 6581 D

NOTES.
CONCRETE WORK SHALL COMPLY WITH AS. CA 2 - 1964
CONCRETE GRADE 25 MPa SHALL HAVE A MINIMUM
STEEL REINFORCEMENT SHALL COMPLY WITH THE FOLLOWING SPECIFICATION: AS. NA 35 COLD WORKED DEFORMED STEEL BARS, EXCEPTING BARS #5 DIAM.
CONCRETE COVER TO REINFORCEMENT
AND BOTTOM UNLESS NOTED OTHERWISE
CONCRETE TO BE CURED AS PRESCRIBED
CONSTRUCTION JOINTS TO BE TREATED AS SPECIFIED.
EXCAVATION BELOW RL 430'-0" TO

THE ELECTRICITY COMMISSION OF N.S.W.
LIDDELL POWER STATION
CHIMNEY STACK No. 1
FOUNDATION
R.C. DETAILS

SCALE	1/4"-1'-0" unless shown	DATE	
DRAWN	[illegible]	DATE	
TRACED	—		
CHECKED	[illegible]	DATE	
E.E.		DATE	

DRAWING No. LD 24190 A

CONTRACT No. 1825

AMENDMENTS
1 TENDERING ISSUE
2 ISSUE RELEASED FOR CONSTRUCTION
3 REF DRG'S ADDED, REF DRG'S CHANGED, TOTAL NUMBER
DRAWN DATE CORR
E.E. DATE

TAG	SIZE	DETAIL	No OFF	LOCATION
1	#7CW	17'-11"	114	VERTICAL OUTSIDE FACE FROM RL 503'-0"
2	#6CW	17'-6"	1294	" FROM RL 510'-6"
3	#5CW	17'-1"	1872	" FROM RL 593'-0"
4	#6CW	17'-6"	697	VERT INSIDE FACE FROM RL 503'-0"
5	#4CW	16'-8"	2473	" FROM RL 735'-6"
6	#5CW	17'-1"	840	" FROM RL 570'-6"
7	#6CW	24'-7" 25'-1" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 172'-9" TO 176'-0"	15 RINGS	HORIZ INS. FACE RL 503'-0"
8	#6CW	24'-7" 25'-1" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 169'-6" TO 172'-9"	15 RINGS	" RL 518'-0"
9	#6CW	24'-1" 24'-7" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 166'-6" TO 169'-6"	15 RINGS	" RL 533'-0"
10	#6CW	23'-8" 24'-1" MIN. LAP 2'-6" EACH RING 6BARS TOTAL LENGTH 163'-6" TO 166'-6"	15 RINGS	" RL 548'-0"
11	#6CW	23'-2" 23'-8" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 162'-0" TO 163'-6"	6 RINGS	" RL 563'-0"
12	#5CW	23'-2" 23'-6" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 158'-0" TO 159'-6"	8 RINGS	" RL 570'-6"
13	#5CW	23'-2" 23'-6" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 155'-3" TO 158'-0"	15 RINGS	" RL 578'-0"
14	#5CW	22'-7" 23'-2" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 152'-6" TO 155'-3"	15 RINGS	" RL 593'-0"
15	#5CW	22'-1" 22'-7" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 147'-9" TO 150'-6"	15 RINGS	" RL 608'-0"
16	#5CW	21'-6" 21'-11" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 145'-6" TO 147'-9"	15 RINGS	RL 623'-0"
17	#5CW	20'-11" 21'-6" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 142'-3" TO 145'-6"	15 RINGS	RL 638'-0"
18	#5CW	20'-5" 20'-11" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 140'-0" TO 142'-3"	23 RINGS	RL 653'-0"
19A	#7CW	21'-10" MIN. LAP 2'-11" EACH RING 7 BARS TOTAL LENGTH 190'-0"	10 RINGS	HORIZ. OUTSIDE FACE RL 505'-9"
20	#6CW	21'-6" 21'-10" MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 184'-0" TO 186'-0"	15 RINGS	RL 510'-9"

TAG	SIZE	DETAIL	No OFF	LOCATION
21	#5CW	20'-7" 21'-0" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 177'-0 TO 179'-0"	20 RINGS	HORIZ. OUTSIDE FACE RL 517'-3"
22	#6CW	20'-0" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 178'-0"	10 RINGS	" RL 528'-3"
23	#5CW	19'-7" 20'-0" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 171'-0" TO 175'-0"	35 RINGS	" RL 533'-3"
24	#6CW	19'-1" 19'-7" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 173'-6"	10 RINGS	" RL 550'-3"
25	#5CW	18'-6" 19'-1" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 165'-6"TO 169'-6"	35 RINGS	" RL 565'-3"
26	#6CW	18'-0" 18'-6" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 167'-6"	10 RINGS	" RL 573'-3"
27	#5CW	17'-5" 17'-11" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 161'-0 TO 163'-6"	35 RINGS	" RL 578'-3"
28	#5CW	16'-10" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 163'-0"	10 RINGS	" RL 595'-3"
29	#5CW	16'-4" 16'-10" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 158'-0" TO 160'-0"	15 RINGS	" RL 600'-9"
30	#4CW	24'-10" 25'-4" MIN. LAP 1'-8" EACH RING 6 BARS TOTAL LENGTH 153'-9" TO 155'-6"	20 RINGS	" RL 608'-3"
31	#5CW	24'-3" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 155'-6"	10 RINGS	" RL 618'-3"
32	#4CW	23'-11" 24'-4" MIN. LAP 1'-8" EACH RING 6 BARS TOTAL LENGTH 150'-0" TO 152'-6"	35 RINGS	" RL 623'-3"
33	#5CW	23'-3" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 150'-0"	10 RINGS	" RL 640'-9"
34	#4CW	23'-1" 23'-6" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 144'-3 TO 146'-9"	35 RINGS	" RL 645'-9"
35	#5CW	22'-5" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 145'-6"	10 RINGS	" RL 663'-3"
36	#4CW	22'-0" 22'-5" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 140'-6" TO 143'-0"	35 RINGS	" RL 668'-3"
37	#5CW	20'-0" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 141'-3"	10 RINGS	" RL 685'-9"
38	#4CW	20'-5" 20'-10" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 137'-0" TO 139'-3"	35 RINGS	" RL 690'-9"
39	#5CW	20'-1" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 138'-0"	10 RINGS	RL 708'-3"
40	#4CW	19'-7" 20'-0" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 134'-0" TO 136'-0"	35 RINGS	RL 713'-3"

TAG	SIZE	DETAIL	No OFF	LOCATION
41	#5CW	19'-10" MIN. LAP 2'-1" EACH RING 5 BARS TOTALLENGTH 135'-3"	10 RINGS	HORIZ. OUTSIDE FACE RL 730'-9"
42	#4CW	19'-4" 19'-10" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 131'-0" TO 133'-0"	35 RINGS	" RL 735'-9"
43	#5CW	19'-3" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 132'-3"	10 RINGS	" RL 753'-3"
44	#4CW	18'-10" 19'-4" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 128'-3" TO 130'-3"	35 RINGS	" RL 758'-3"
45	#5CW	18'-11" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 129'-3"	10 RINGS	" RL 775'-9"
46	#4CW	18'-2" 18'-7" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 125'-6 TO 127'-3"	35 RINGS	" RL 780'-9"
47	#5CW	18'-6" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 127'-0"	10 RINGS	" RL 798'-3"
48	#4CW	17'-11" 18'-2" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 123'-0" TO 125'-0"	35 RINGS	" RL 803'-3"
49	#5CW	18'-2" MIN. LAP 2'-1" EACH RING 5BARS TOTAL LENGTH 125'-0"	10 RINGS	" RL 820'-9"
50	#4CW	17'-6" 17'-11" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 121'-0" TO 123'-0"	35 RINGS	" RL 825'-9"
51	#5CW	17'-10" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 120'-6"	10 RINGS	" RL 843'-3"
52	#4CW	17'-2" 17'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 117'-3" TO 119'-0"	35 RINGS	" RL 848'-3"
53	#5CW	17'-6" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 118'-6"	10 RINGS	" RL 865'-9"
54	#4CW	17'-3" 17'-6" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 115'-0" TO 116'-6"	35 RINGS	" RL 870'-9"
55	#5CW	17'-2" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 116'-6"	10 RINGS	" RL 888'-3"
56	#4CW	17'-0" 17'-3" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 113'-3" TO 114'-9"	35 RINGS	" RL 893'-3"
57	#5CW	16'-10" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 114'-6"	10 RINGS	" RL 910'-9"
58	#4CW	16'-6" 16'-11" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 111'-3" TO 112'-9"	35 RINGS	" RL 915'-9"
59	#5CW	16'-7" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 113'-0"	10 RINGS	" RL 933'-3"
60	#4CW	16'-3" 16'-7" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 110'-0" TO 111'-0"	35 RINGS	" RL 938'-3"

TAG	SIZE	DETAIL	No OFF	LOCATION
61	#5CW	16'-2" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 110'-6	10 RINGS	HORIZ OUTSIDE FACE RL 955'-9"
62	#4CW	16'-2" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 109'-0"	20 RINGS	" RL 960'-9"
63	#5CW	16'-1" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 110'-6"	10 RINGS	" RL 970'-6"
64	#4CW	15'-10" MIN. LAP 1'-8" EACH RING 4BARS TOTAL LENGTH 106'-9"	24 RINGS	" RL 975'-9"
65	#4CW	15'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 102'-3"	1 RING	HORIZ. INSIDE FACE AT TOP
66	#4CW	11'-11" O/A 2" INT. RAD. 60° 11½" O/A	134	CAP BARS RL 968'-0" AT TOP
67	#4CW	12'-6"	68	VERTICAL INSIDE FACE FROM RL 968'-0"
68	#4CW	2'-6"	996	HORIZ. AT ALL CORBELS
		2'-9" 2" INT. RAD. 3" O/A		
		X A B		
69	#4CW	93° 2'-2½" 2'-0"	265	RL 510'-6"
70	#4CW	93° 2'-0½" 1'-10"	255	RL 533'-0"
71	#4CW	93° 1'-10½" 1'-8"	250	RL 555'-6"
72	#4CW	93° 1'-9" 1'-6"	240	RL 578'-0"
73	#4CW	92° 1'-7½" 1'-5"	230	RL 600'-6"
74	#4CW	92° 1'-6½" 1'-4"	225	RL 623'-0"
76	#4CW	92° 1'-5" 1'-2"	435	RL 645'-6" RL 668'-0"
76	#4CW	92° 1'-4" 1'-1"	210	RL 690'-6"
77	#4CW	92° 1'-3" 1'-0"	205	RL 713'-0"
78	#4CW	92° 1'-2½" 1'-0"	200	RL 735'-6"
79	#4CW	92° 1'-2" 11"	195	RL 758'-0"
80	#4CW	91° 1'-1½" 11"	380	RL 780'-6" RL 803'-0"
81	#4CW	91° 1'-1" 10"	185	RL 825'-6"
82	#3CW	91° 1'-0½" 10"	360	RL 848'-0" RL 870'-6"
83	#4CW	91° 1'-0½" 10"	175	RL 893'-0"
84	#3CW	91° 1'-0½" 10"	340	RL 915'-6" RL 938'-0
85	#4CW	91° 1'-0½" 10"	330	RL 960'-6" RL 975'-6"
99	#4CW	20'-3" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 135'-6"	10 RINGS	HORIZ. INS. FACE RL 687'-3"

TAG	SIZE	DETAIL	No OFF	LOCATION
113	#4CW	10'-0"	2101	VERTICAL INSIDE FACE FROM RL 686'-9"
140	#4CW	19'-9" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 132'-6"	10 RINGS	HORIZ. INS. FACE RL 699'-9"
141	#4CW	19'-5" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 129'-9"	10 RINGS	" RL 732'-3"
142	#4CW	19'-1" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 127'-3"	10 RINGS	" RL 754'-9"
143	#4CW	18'-8" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 124'-6"	10 RINGS	" RL 777'-3"
144	#4CW	18'-3" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 122'-6"	10 RINGS	" RL 799'-9"
145	#4CW	17'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 119'-0	10 RINGS	" RL 822'-3"
146	#4CW	17'-5" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 116'-6"	10 RINGS	" RL 844'-9"
147	#4CW	17'-0" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 114'-6"	10 RINGS	" RL 867'-3"
148	#4CW	16'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 112'-9"	10 RINGS	" RL 889'-9"
149	#4CW	16'-7" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 110'-0"	10 RINGS	" RL 912'-3"
150	#4CW	16'-3" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 108'-3"	10 RINGS	" RL 934'-9"
151	#4CW	16'-0" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 107'-3"	10 RINGS	" RL 957'-3"
152	#4CW	15'-9" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 106'-0"	10 RINGS	" RL 972'-3"
153	#5CW	15'-0"	66	RL 660'-6"
154	#5CW	7'-6"	66	RL 668'-0"
155	#6CW	21'-0" MIN. LAP 2'-6 EACH RING 7 BARS TOTAL LENGTH 187'-0"	5 RINGS	HORIZ. OUTSIDE FACE

REFERENCE DRG'S.

REINFORCEMENT DETAILS RL 503'-0" TO RL 988'-0" } LD 247911 K
SECTIONAL ELEVATION
CHIMNEY STACK No1 & No2 LD 247906 K
DIAGRAM BAR BENDING SHAPES S 228581 D

NOTES

STEEL REINFORCEMENT. #CW INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A93. NUMBER INDICATES DIAMETER IN EIGHTS OF AN INCH e.g. #7CW = 7/8"

DELIVER TO SITE IN TAGGED BUNDLES.

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING BUNDLED SEPARATELY.

REINFORCEMENT LISTED FOR ONE STACK ONLY
REINFORCEMENT REQ'D FOR TWO STACKS

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS No1 & 2
RL 503'-0" TO RL 988'-0"
REINFORCEMENT LIST

CONTRACT No. 1894

		DATE		DATE
SCALE			P.E./P.S.C.	7/6/67
DRAWN	K.U.			
TRACED	—			
CHECKED	E/C.D.			
DATE	2.2.68			

No. LD 253842 K/

REINFORCEMENT LIST

TAG	SIZE	DETAIL	No OFF	LOCATION
1	#ACW	3'-9" / 21'-6"	248	SECTION B-B
2	#ACW	7'-6" / 3'-0"	248	"
3	#ACW	4'-6" / 7'-3"	248	"
4	#ACW	33'-2" / 33'-1" R	35	"
5	#ACW	31'-8" / 31'-7" R	56	"
6	#ACW	30'-4" / 28'-10" R	30	"
7	#ACW	32'-0" / 27'-4" R	48	"
8	#ACW	29'-6" / 29'-6" R	42	"
9	#ACW	7'-9"	540	"
10	#ACW	6'-0"	26	PART PLAN EL 436'-0"
11	#ACW	1'-0" / 12'-9"	64	COLUMNS A1 TO B6
12	#ACW	1'-7" / 1'-7"	28	"
13	#ACW	2'-2" / 2'-2"	28	"

REFERENCE DRG'S

CHIMNEY STACKS No 1 & No 2	LD 247906 H
FOUNDATION STACK No 1	LD 247907 A
DIAGRAM OF BAR BENDING SHAPES	S 228591 D

NOTE

STEEL REINFORCEMENT: #cw INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A 83. NUMBER INDICATES DIAMETER IN EIGHTHS OF AN INCH. e.g. "8cw-1"

DELIVER TO SITE IN TAGGED BUNDLES.

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING BUNDLED SEPARATELY.

AMENDMENTS

CONTRACT No. 1896

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACK No 1
FOUNDATION REINFORCEMENT LIST

					DATE
DRAWN	K.J.F				
TRACED	—				
CHECKED	MCS				
DATE	1.8.68				

DATE 1-8-68

LD 253799 C

LD 247912K

PLAN at R.L 456'6½"

Beam reinforcement not shown — See Sections

Note: Minimum lap to be 48 bar diameters unless noted

SECTION C-C (Beam "3")

Slab reinforcement not shown

SECTION A-A (Beam "1M")

SECTION A1-A1 (Beam "1S")

Slab reinforcement not shown

SECTION B-B (Beam "2M")

SECTION B1-B1 (Beam "2S")

Slab reinforcement not shown

SECTION 1-1

SECTION 2-2

SECTION D-D

SECTION 3-3

SECTION E-E

SECTION 4-4

SECTION 5-E

SECTION 6-6

SECTION 7-7

DETAIL "Z"

PART — PLAN

Showing Beams Nos. 4,5,6

Scale: 1/4" = 1'-0"

Place 6" thick concrete in Situ. Reinforce full length with 4 cw bars @ 1'-0" ctrs. both ways, soan lap & bent bars. Bars tag (60)

REFERENCE DRAWINGS:

Stacks N^os 1 & 2 General Arrgt & Concrete Dimensions ... LD 247906 M
Brick Lining Details ... LD 247915 A
Position Cement List ... LD 2538416
Stack N^o1 Foundation ... LD 247907 A
Stack N^o2 Foundation ... LD 247908 A

NOTES:

Concrete work shall comply with AS CA2 1963

Concrete class 'A' shall have a minimum compressive strength of 3000 p.s.i. 28 days

Formwork to be dressed as specified. Formwork not to be stripped within fourteen days of placing concrete.

Clear cover to reinforcing bars to be as marked.

Concrete to be cured as specified.

Floor designed for a Live Load of 200 p.s.f.

STEEL REINFORCEMENT 9^m cw INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS. No. A 63 - NUMBER INDICATES DIAMETER IN EIGHTHS OF AN INCH e.g. 9^m cw = 9/8" DIA. COLD-WORKED.

ALTERATIONS

1) ENTERING NOTE
P.G. RELEASED
FOR CONSTRUCTION
P.G. ISSUED
P.G. ISSUED
P.G. ISSUED
THE ADDED

DRAWN DATE CHECKED
1. R.L. 2.5.63 J.C.A.
2. R.L. 2.5.63 J.C.A.
Beam Nos. Ref. No. Dimensions adjusted
Hill 2 Hill
Dimensions adjusted
Hill 2 Hill
14 cw bars 15" and
14 cw bars 9"
R.L. 2.5.63 J.C.A.

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION

CHIMNEY STACKS N^o 1 & N^o 2

STACK AT R.L 456'-6½", BEAMS AND COLUMNS R.C. DETAILS

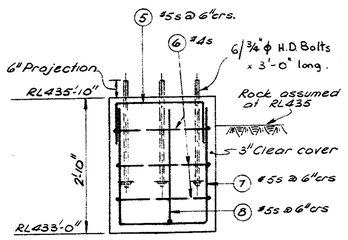
CONTRACT No. 1894

SCALE 1/8" = 1'-0" & as shown | DATE

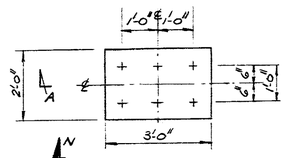
DRAWN | TRACED | CHECKED | P.E. | SUPT. | DATE

P/CO | DATE

No LD 247912 K/2

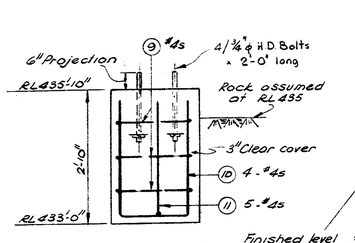


SECTION 'A-A'

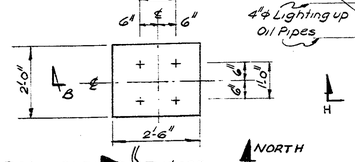


Footings: D103 , D110 , D116 , D117
D203 , D210 , D216 , D217
D303 , D310 , D316 , D317
D403 , D410 , D416 , D417

16 OFF

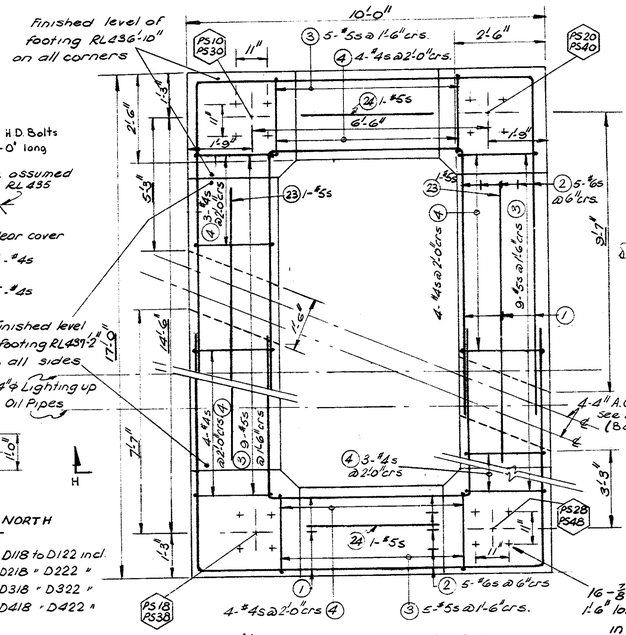


SECTION 'B-B'



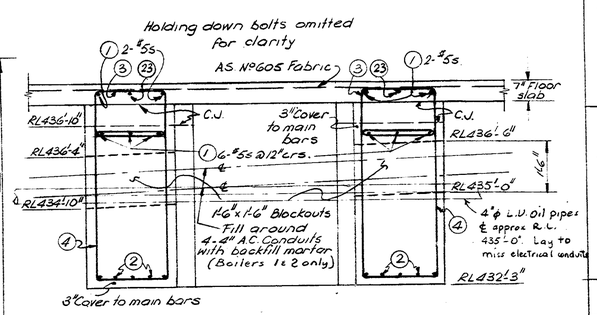
Footings: D101 to D108 incl.
D201 " D208 "
D301 " D308 "
D401 " D408 "

Footings D111 to D115 incl. D118 to D122 incl.
D211 " D215 " D218 " D222 "
D311 " D315 " D318 " D322 "
D411 " D415 " D418 " D422 "

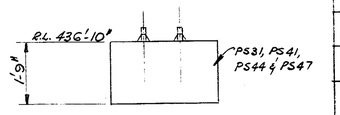


ACCESS STAIRS FOOTING
BOILERS 1 & 2 AND 3 & 4 - 20 OFF

Not to Scale

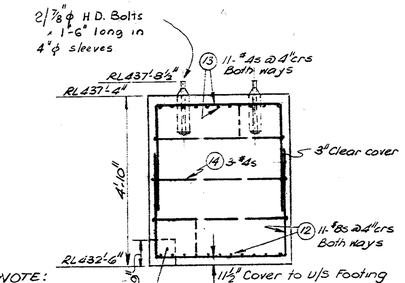


SECTION 'H-H'



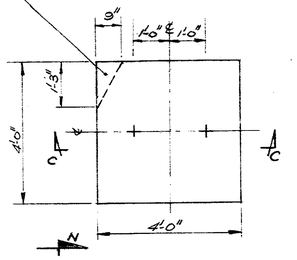
SECTION J-J
WORK AS EXECUTED

72 OFF



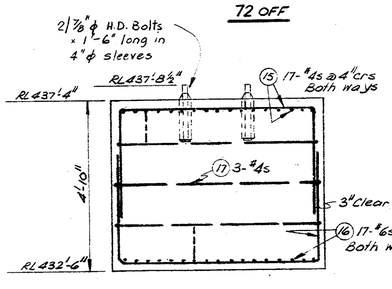
NOTE:
This blockout applicable to PC22 and PC42 ONLY

SECTION 'C-C'

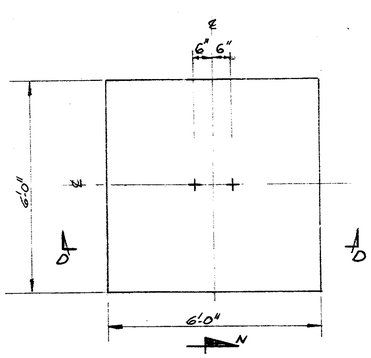


Footings: PC12 , PC13 , PC15, PC16
See above note PC22 PC23 , PC25, PC26
PC32 PC33 , PC35, PC36
PC42 PC43 , PC45, PC46.

16 OFF

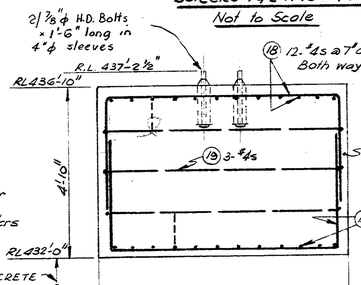


SECTION 'D-D'

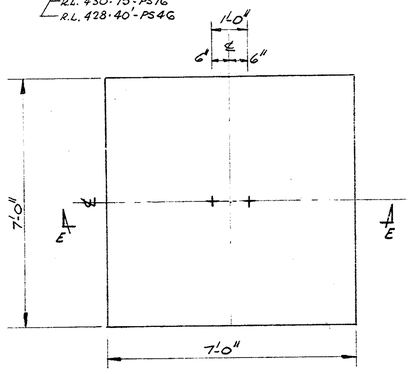


All 'PD' Footings &
PC 11 , PC 14 , PC 17
PC 21 , PC 24 , PC 27
PC 31 , PC 34 , PC 37
PC 41 , PC 44 , PC 47.

40 OFF

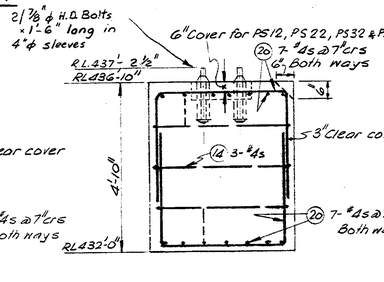


SECTION 'E-E'



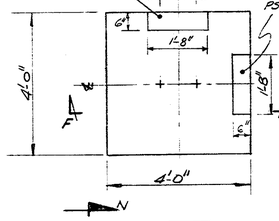
Footings: PS15 , PS16
PS25 , PS26
PS35, PS36
PS45, PS46

8 OFF



SECTION 'F-F'

NOTE
This blockout for PS42 ONLY

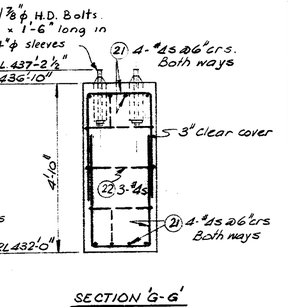


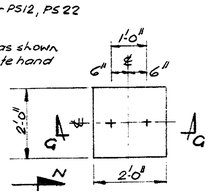
Footings: PS12 , PS18
See above note. PS22 PS23
PS32 PS33
PS42 PS43

8 OFF

NOTE:
This blockout for PS12, PS22 and PS32 only.
PS12 and PS32 - as shown
PS22 - opposite hand

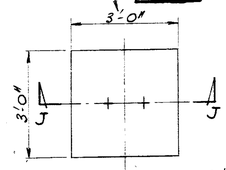
SECTION 'G-G'





Footings: PS11, PS14, PS17
PS21, PS24, PS27
PS31, PS34, PS37
PS41, PS44, PS47

12 OFF



FOOTINGS "PS31, PS41, PS44 & PS47 WORK AS EXECUTED"

REINFORCEMENT LIST

Tag	Size	Detail	No. off.
1	#5s	a, b — 1. 4 off 2. 2 off 3. 4 off. 3 Variants - a = 7'-3" b = 5'-7½" 1. a = 8'-3" b = 7'-6" 2. a = 9'-3" b = 9'-6" 3.	20
2	#6s	a, a, b — 5 Variants - 2 off each. a = 7'-6" b = 5'-7½" a = 8'-0" b = 6'-6" a = 8'-6" b = 7'-6" a = 9'-0" b = 8'-6" a = 9'-6" b = 9'-6"	20
3	#5s	2'-0", 11", 4'-3"	56
4	#4s	2'-0"	44
5	#5s	2'-0", 2'-6"	64
6	#4s	1'-6", 2'-6"	48
7	#5s	2'-6", 2'-6"	64
8	#5s	2'-6", 1'-6", 2'-6"	96
9	#4s	1'-6", 2'-0"	216
10	#4s	2'-6", 2'-0"	288
11	#4s	1'-6", 2'-6"	360
12	#8s	3'-8", 3'-4"	352
13	#4s	3'-8", 3'-1"	352
14	#4s	3'-6", 3'-6"	72
15	#4s	3'-6", 3'-0", 3'-5"	1360
16	#6s	3'-6", 3'-5"	1360
17	#4s	5'-6", 3'-6"	120
18	#4s	3'-0", 6'-5"	384
19	#4s	6'-6", 6'-6"	24
20	#4s	3'-0", 3'-5"	224
21	#4s	1'-5", 3'-0"	192
22	#4s	1'-6", 1'-6"	36
23	#5s	10'-6"	4
24	#5s	3'-8"	4

NOTES: Concrete to be Class "F.A." as specified.
Steel reinforcement shall comply with the following specification: (1) Structural grade deformed bars - A.S. N° A92
Reinforcement List shows TOTAL quantities for Boilers 1 to 4 footings
All H.D. Bolts (& sleeves) to be supplied by Mechanical Plant Contractor & cast in by Civil Contractor.
All Bolts in Sleeves to be worked at cast-in so that they are free to move after concrete has set.

For location of footings see:
Blr. 1 — LD 25111 2A — LD 248530A — Blr. 2
Blr. 3 — LD 25111 3A — LD 25111 4A — Blr. 4

AMENDMENTS

1. Drawing Title and sheet size altered. Tender ing note deleted. Drawing completely revised. Reinforcement List added. — CKR MCJ 30.9.68
2. Location of blockouts in Access Stair foot. ing altered. Note re grouting of conduits added Ref. B8. Blockout details for PC 22 and PS12, PS32 added Ref. G-1 and G-7 — CKR MCJ 17/10/68 — E/ED G.A.K. 18/10/68
3. Bolts shown on ℄ 1'-0" centres were shown off centre. F34. at 1'-9" centres. PC footings named (3) Bolt sizes, length & sleeves added to all footings. Note added G10, 11. L.U. oil pipes shown in Sect. H-H. B9. Note added to Elec. Conduits. C7, B8. — R.M. G.P. 21-1-'69 — RA for MCA 22/1/69
4. Blockouts shown for Footings PC42 PS32 and PS42. Ref. E1, E2, E8 — K.B.F. P.M. 6.3.69 — RA for MCA 10.3.69
5. UNDERSIDE RL's & DIMENSIONS OF CONCRETE BACKFILL ADDED. Ref. E5, C9 & G9 "WORK AS EXECUTED" — C.E. H.T. 11-11-70 — A.S.E. 17.11.70 — S.E/C.D.

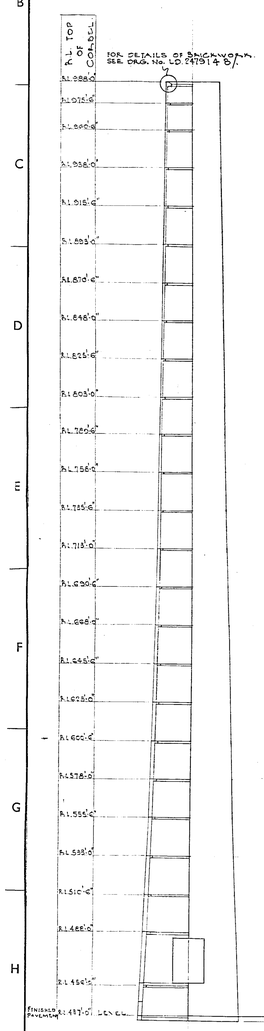
CONTRACT N° 1948

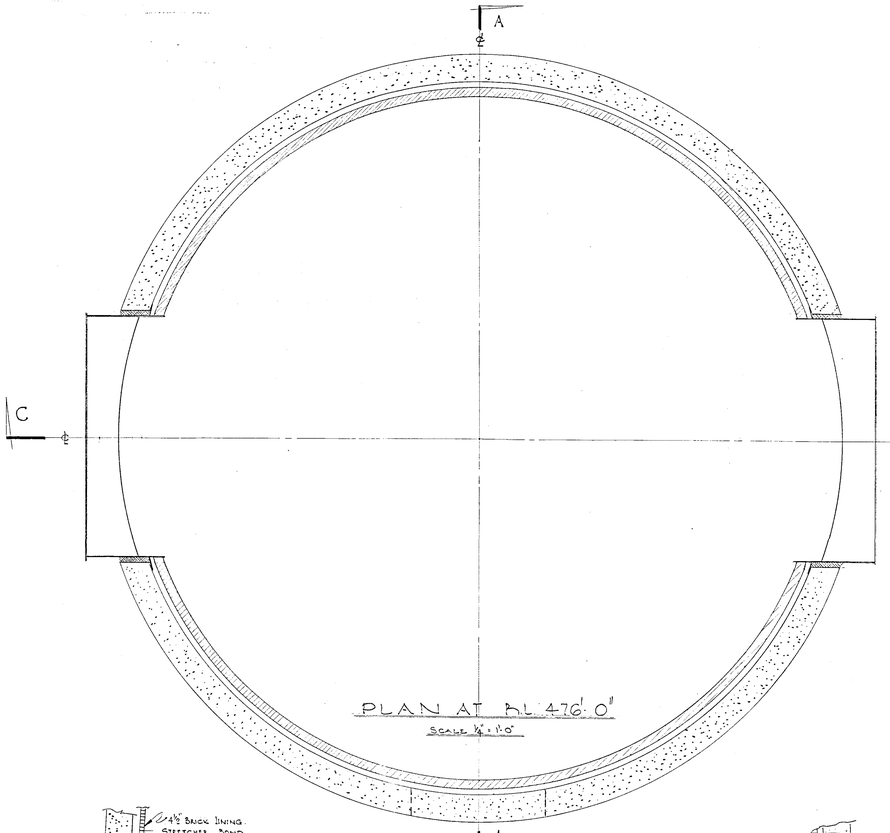
THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
BOILERS N° 1 TO 4
FOOTINGS FOR COL. MARKS D, PC, PD AND PS AND ACCESS STAIRS — R.C. DETAILS

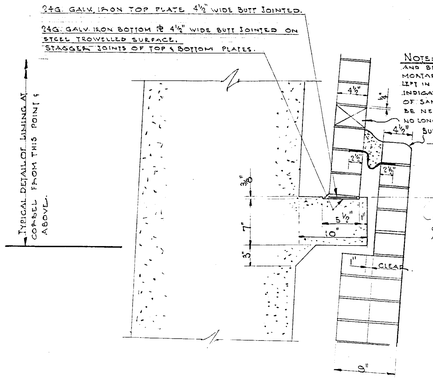
SCALE	1/2"=1'-0"		DATE		DATE
DRAWN	CKR	E/E.P.		S.S.E.A.	24/1/69
TRACED	—	E/M.P.	31/3/69		
CHECKED	M.C.J.			D.C.E./POWER.	30/5/69
E/C.D.					
DATE			LD25111 1		B/5

KODAK 23·11·70

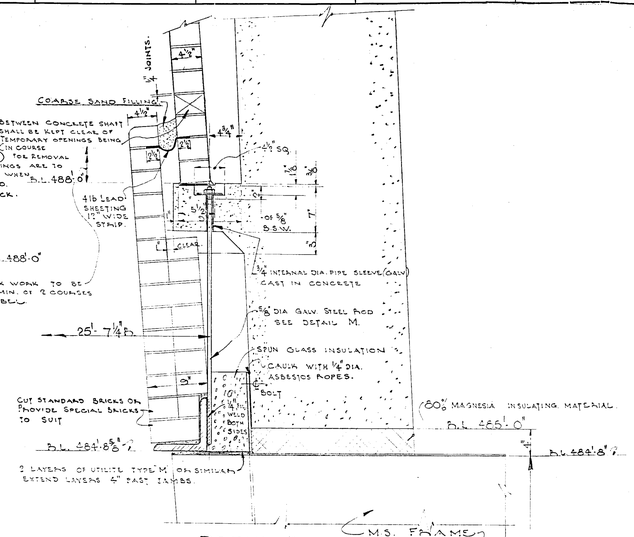




PLAN AT R.L. 476'-0"
SCALE 1/4" = 1'-0"

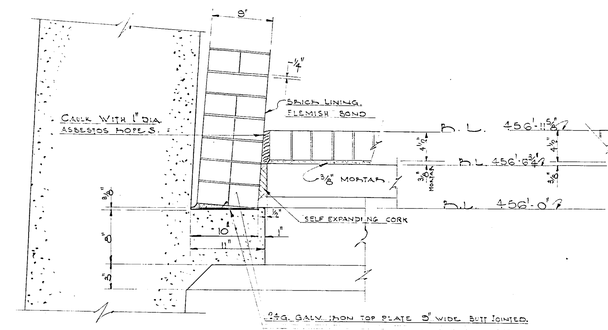


DETAIL G
SCALE 1½" = 1'-0"

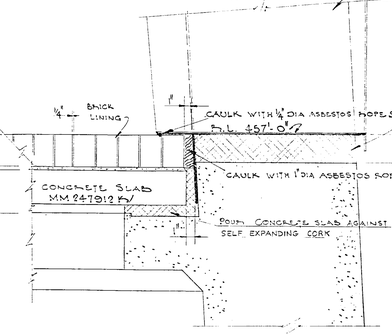


DETAIL H
SCALE 1½" = 1'-0"

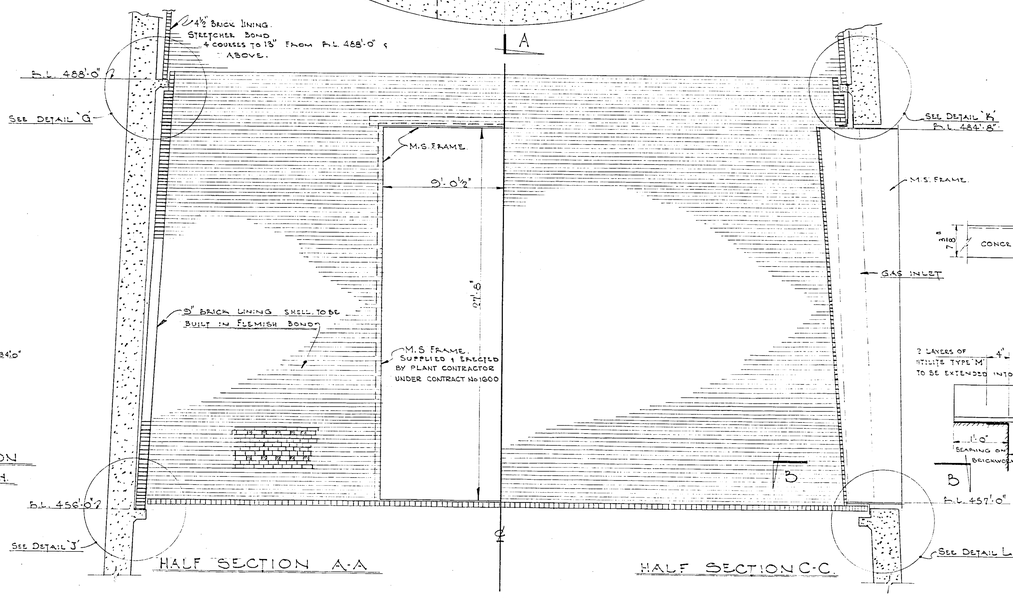
M.S. FRAME SUPPLIED & FIXED BY PLANT CONTRACTOR UNDER CONTRACT No. 1900



DETAIL J
SCALE 1½" = 1'-0"



DETAIL L
SCALE 1½" = 1'-0"

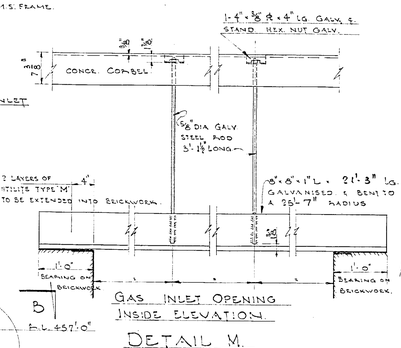


HALF SECTION & HALF ELEVATION OF CHIMNEY FROM NORTH
SCALE 1/32" = 1'-0"

HALF SECTION A-A

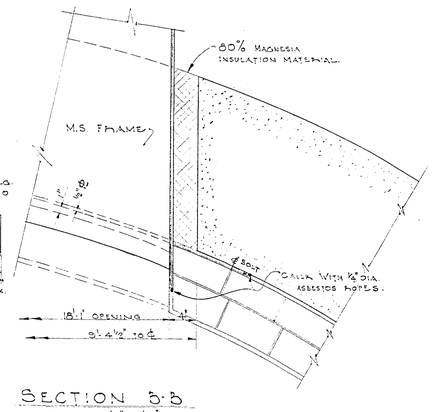
HALF SECTION C-C

SCALE 1/4" = 1'-0"



GAS INLET OPENING INSIDE ELEVATION

DETAIL M.
SCALE 1" = 1'-0"



SECTION B-B
SCALE 1½" = 1'-0"

REFERENCE DRGS.

GENERAL ARRANGEMENT	LD 247906 G/1
SLAB AT R.L. 456'-6¾" BEAMS COLS. & R.C. DET.	LD 247912 A
CAST IRON CAP DETAILS.	LD 247914 B

NOTES:

1. ALL BRICKS FOR LINING CHIMNEY SHAFT SHALL CONSIST OF GOOD QUALITY ACID & HEAT RESISTING BRICKS OF A SILICEOUS TYPE OF SIZE 9" x 4½" x 3".
2. CAPPING BRICKS SHALL BE BULLNOSED.
3. ALL LINING SHALL BE SET, JOINTED AND POINTED IN ACID & HEAT RESISTING MORTAR.
4. 9" THICK LINING TO BE BUILT IN FLEMISH BOND.
   4½" " SHALL BE BUILT IN STRETCHER BOND 4 COURSES TO 13".
5. MANUFACTURER'S RECOMMENDATIONS ARE TO BE FOLLOWED REGARDING PROPORTION OF QUICK-SET ACID AND HEAT RESISTANT CEMENT USED IN MORTARS.
6. STRAIGHT BRICKS TO BE LAID TO REQUIRED RADII OVER ENTIRE HEIGHT OF STACK.
7. PARTICULAR ATTENTION IS TO BE GIVEN TO THE ½" SLOTS IN THE CORBELS. THESE MUST BE KEPT CLEAN FOR THE FULL DEPTH OF SLOTS.
8. ASBESTOS ROPES MUST PROVIDE A COMPLETE SEAL. ROPE SIZES MAY BE VARIED WHERE NECESSARY.
9. FOR DETAILS OF BRICKWORK & CAST IRON CAP SEE DRG. LD 247914 B.

AMENDMENTS	DRAWN	DATE	CHECKED
(1) TENDERING NOTE (2) REVISED CHIM. SELF-RAISED FLUE (3) MISCELLANEOUS ALTERATIONS TO FLUE & CAP. (4) FLUE ADDED	K.U.	12.8.66	K.H.

CONTRACT No 1894

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION

CHIMNEY STACKS No 1 & No 2

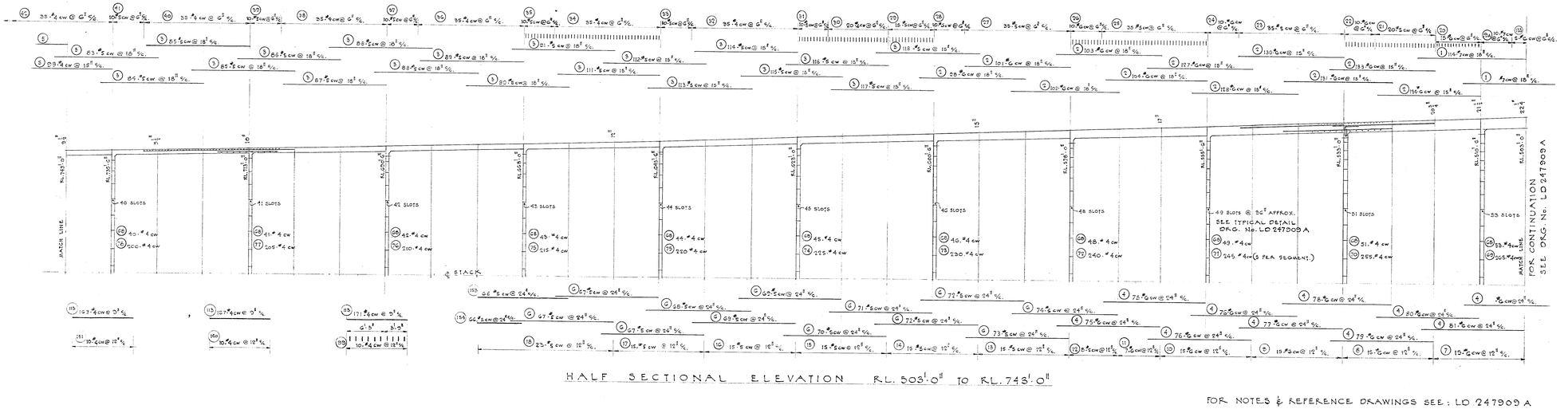
BRICK LINING DETAILS

SCALE AS SHOWN.		DATE		DATE
DRAWN	R.S.	S.M.D.		26.8.66
TRACED	—	—		30.3.67
CHECKED	K.H.			
E.I.C.S. DATE				

LD 247913 A/1



HALF SECTIONAL ELEVATION RL. 743'-0" TO RL. 988'-0"



HALF SECTIONAL ELEVATION RL. 503'-0" TO RL. 743'-0"

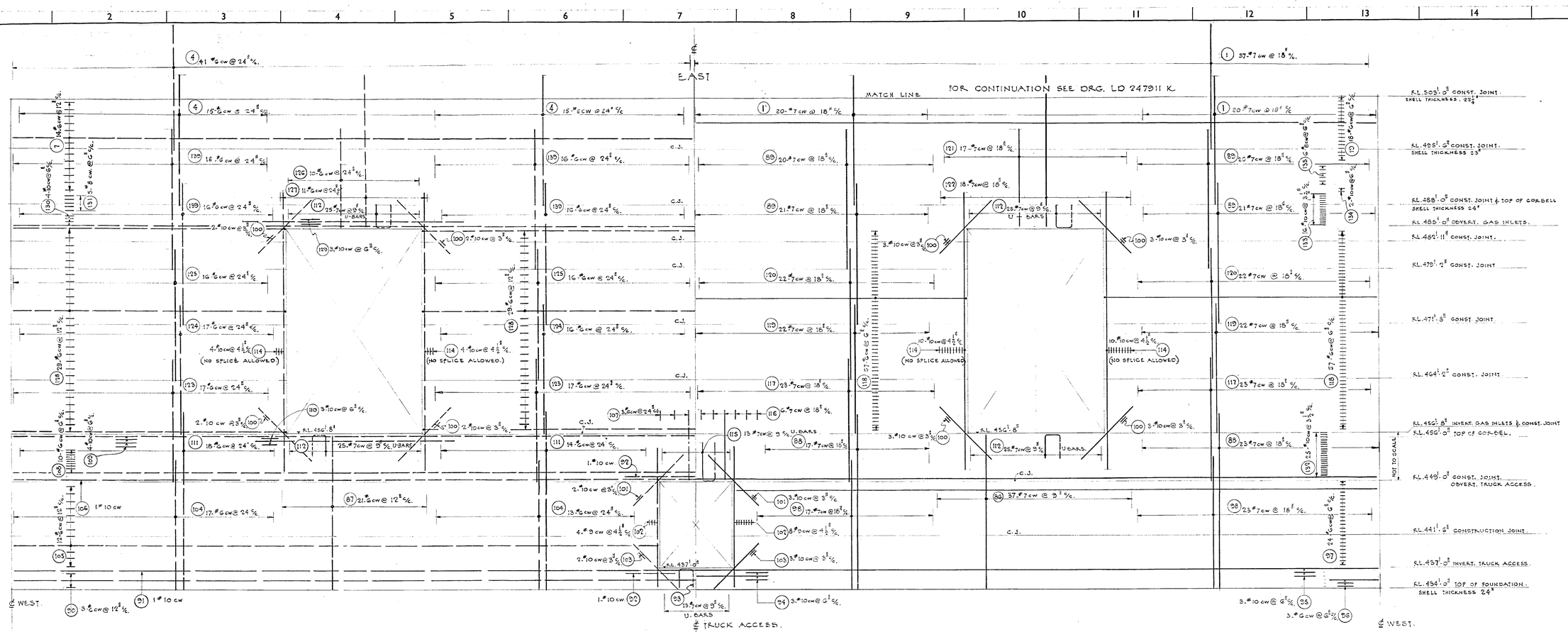
FOR NOTES & REFERENCE DRAWINGS SEE: LD 247909 A

FOR REINFORCEMENT LIST SEE DRG: LD 253842 K

AMENDMENTS
OUTSTANDING NOTE DELETED.
SEE DRG. ADDED IN DISTRIBUTION.
INSTRUCTION BY LETTER SIGNATURE
REVISION | DATE | INITIALS
S.I. No. 1 | 12.8.61 | K.A.H.
S.I. No. 2 | 11.1.62 | K.A.H.
S.I. No. 3 | 11.1.62 | K.A.H.
S.I. No. 4 | 11.1.62 | K.A.H.
S.I. No. 5 | 11.1.62 | K.A.H.
S.I. No. 6 | 11.1.62 | K.A.H.
S.I. No. 7 | 11.1.62 | K.A.H.
S.I. No. 8 | 11.1.62 | K.A.H.
S.I. No. 9 | 11.1.62 | K.A.H.
S.I. No. 10 | 11.1.62 | K.A.H.
S.I. No. 11 | 11.1.62 | K.A.H.
S.I. No. 12 | 11.1.62 | K.A.H.
S.I. No. 13 | 11.1.62 | K.A.H.
S.I. No. 14 | 11.1.62 | K.A.H.
S.I. No. 15 | 11.1.62 | K.A.H.
S.I. No. 16 | 11.1.62 | K.A.H.
S.I. No. 17 | 11.1.62 | K.A.H.
S.I. No. 18 | 11.1.62 | K.A.H.
S.I. No. 19 | 11.1.62 | K.A.H.
S.I. No. 20 | 11.1.62 | K.A.H.
S.I. No. 21 | 11.1.62 | K.A.H.
S.I. No. 22 | 11.1.62 | K.A.H.
S.I. No. 23 | 11.1.62 | K.A.H.
S.I. No. 24 | 11.1.62 | K.A.H.
S.I. No. 25 | 11.1.62 | K.A.H.
S.I. No. 26 | 11.1.62 | K.A.H.
S.I. No. 27 | 11.1.62 | K.A.H.
S.I. No. 28 | 11.1.62 | K.A.H.
S.I. No. 29 | 11.1.62 | K.A.H.
S.I. No. 30 | 11.1.62 | K.A.H.
S.I. No. 31 | 11.1.62 | K.A.H.
S.I. No. 32 | 11.1.62 | K.A.H.
S.I. No. 33 | 11.1.62 | K.A.H.
S.I. No. 34 | 11.1.62 | K.A.H.
S.I. No. 35 | 11.1.62 | K.A.H.
S.I. No. 36 | 11.1.62 | K.A.H.
S.I. No. 37 | 11.1.62 | K.A.H.
S.I. No. 38 | 11.1.62 | K.A.H.
S.I. No. 39 | 11.1.62 | K.A.H.
S.I. No. 40 | 11.1.62 | K.A.H.
S.I. No. 41 | 11.1.62 | K.A.H.
S.I. No. 42 | 11.1.62 | K.A.H.
S.I. No. 43 | 11.1.62 | K.A.H.
S.I. No. 44 | 11.1.62 | K.A.H.
S.I. No. 45 | 11.1.62 | K.A.H.
S.I. No. 46 | 11.1.62 | K.A.H.
S.I. No. 47 | 11.1.62 | K.A.H.
S.I. No. 48 | 11.1.62 | K.A.H.
S.I. No. 49 | 11.1.62 | K.A.H.
S.I. No. 50 | 11.1.62 | K.A.H.
S.I. No. 51 | 11.1.62 | K.A.H.
S.I. No. 52 | 11.1.62 | K.A.H.
S.I. No. 53 | 11.1.62 | K.A.H.
S.I. No. 54 | 11.1.62 | K.A.H.
S.I. No. 55 | 11.1.62 | K.A.H.
S.I. No. 56 | 11.1.62 | K.A.H.
S.I. No. 57 | 11.1.62 | K.A.H.
S.I. No. 58 | 11.1.62 | K.A.H.
S.I. No. 59 | 11.1.62 | K.A.H.
S.I. No. 60 | 11.1.62 | K.A.H.
S.I. No. 61 | 11.1.62 | K.A.H.
S.I. No. 62 | 11.1.62 | K.A.H.
S.I. No. 63 | 11.1.62 | K.A.H.
S.I. No. 64 | 11.1.62 | K.A.H.
S.I. No. 65 | 11.1.62 | K.A.H.
S.I. No. 66 | 11.1.62 | K.A.H.
S.I. No. 67 | 11.1.62 | K.A.H.
S.I. No. 68 | 11.1.62 | K.A.H.

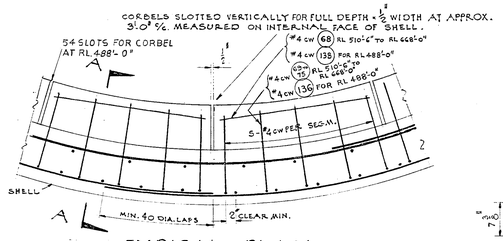
CONTRACT No. 1894	THE ELECTRICITY COMMISSION OF N.S.W.
	LIDDELL POWER STATION CHIMNEY STACKS Nº1 & Nº2 REINFORCEMENT DETAILS RL. 503'-0" TO RL. 988'-0" SECTIONAL ELEVATION
	SCALE: 3/16" = 1'-0" DRAWN R.M. TRACED — CHECKED W.G.S. E/CO [illegible] DATE 1/1/62
	DATE 1/1/62 P.E. [illegible] DATE 7/1/62
	Nº LD 247911 K/2

LD 247911 K
END. 1



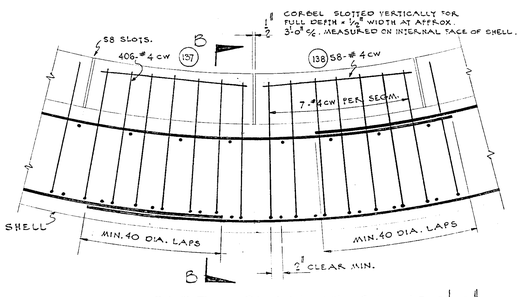
DEVELOPED SURFACE OF SHELL

(DISTORTED SCALE)

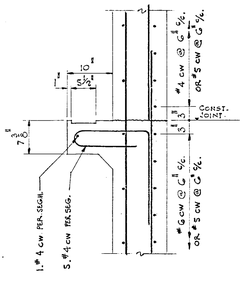


TYPICAL PLAN

CORBELS RL. 488'-0" TO RL. 668'-0"

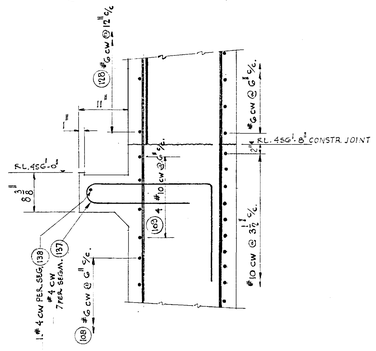


PART PLAN AT RL. 456'-0"



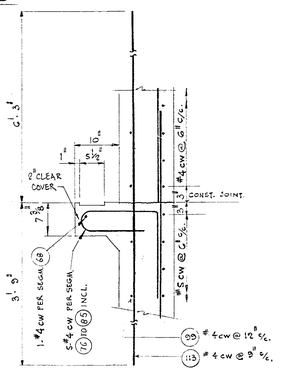
SECTION A·A

(SEE ALSO TYPICAL PLAN)



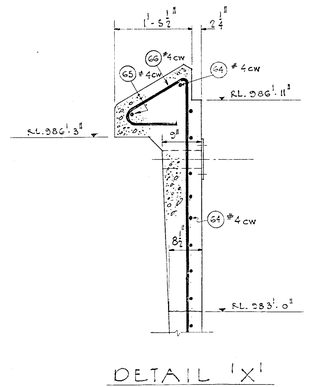
SECTION B·B

(SEE ALSO PART PLAN)



CORBEL DETAILS

R.L. 690'-6" & ABOVE



DETAIL 'X'

REFERENCE DRG'S.

GENERAL ARRG'T.	LD 247906 K
REINFORCEMENT DETAILS R.L. 503'-0" to R.L. 988'-0"	LD 247911 K
REINF. DETAILS R.L. 434'-0" to R.L. 503'-0"	LD 247910 K
FOUNDATION - STACK No. 1	LD 247907 A
FOUNDATION - STACK No. 2	LD 247908 K
CAP DETAILS	LD 247914 B
DIAGRAM OF BAR BENDING SHAPES	S 228581 D
REINFORCEMENT LIST – RL 434'-0" TO RL 503'-0"	LD 253840 B
REINFORCEMENT LIST – RL 503'-0" TO RL 988'-0"	LD 253842 K

NOTES.

1. STEEL REINFORCEMENT. #7cw INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A83. NUMBER INDICATES DIAMETER IN EIGHTHS OF AN INCH e.g. #7cw = 7/8"ø
2. COVER TO REINFORCEMENT TO BE 2" UNLESS OTHERWISE NOTED.
3. MINIMUM LAP TO BE 40 BAR DIAMETERS.
4. ALL LAPS TO BE STAGGERED.
5. SPACING OF VERTICAL BARS GIVEN AT LOWEST POINT OF BAR.

AMENDMENTS	DRAWN	DATE	CHECKED
(1) TENDERING NOTE DELETED. DRG RELEASED FOR CONSTRUCTION PURPOSES. REF DRGS. ADDED RE/PSC SIGNATURE ADDED.	R.U.	15-6-68	R.J.H.
2. Detail 'X' Dimension was 7½" 2" clear cover added as per Amdt. 1 to AS 1480-1968.	R.J.R.	10.6.69	R.J.H. 11.6.69

CONTRACT No. 1894

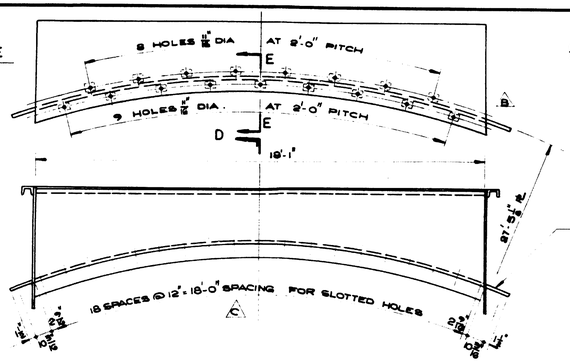
THE ELECTRICITY COMMISSION OF N.S.W.

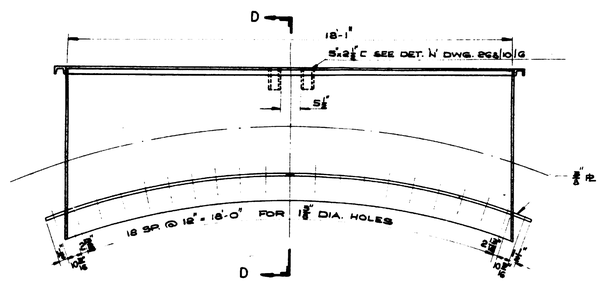
LIDDELL POWER STATION

CHIMNEY STACKS No. 1 & 2. REINFORCEMENT DETAILS ELEVATION R.L. 434'-0" TO R.L. 503'-0" & CORBEL DETAILS FROM R.L. 456'-0" TO R.L. 988'-0"

		DATE		DATE
SCALE 3/16" & 1" = 1'-0"			A.A. Ferguson	20/5/68
DRAWN K.M.			RE/P.S.C.	
TRACED —				
CHECKED M.G.S.				
S/CO DATE 20/5/68			LD247909 A/2	

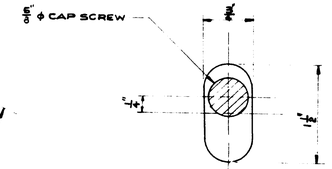
PLAN ON BOTTOM PLATE





SECTION "B-B"

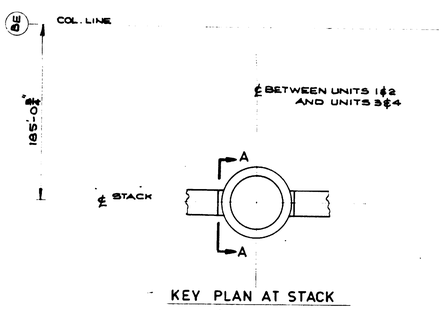
SECTION "C-C"



DETAIL "J"
FULL SIZE SCALE

PAINT MARK Nos ON DUCTS IN BLACK LETTERING ON APPROPRIATE BOILER COLOUR PATCH:-

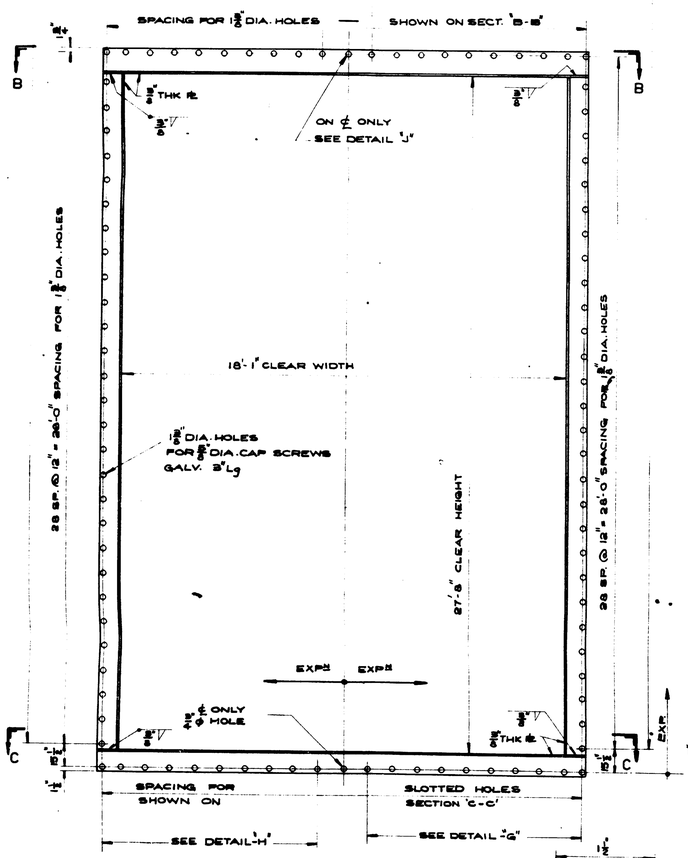
No 1 BOILER	—	RED PATCH
No 2 "	—	WHITE "
No 3 "	—	GREEN "
No 4 "	—	YELLOW "



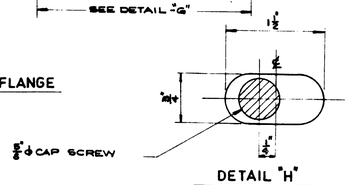
KEY PLAN AT STACK

SEE DETAIL-"F"

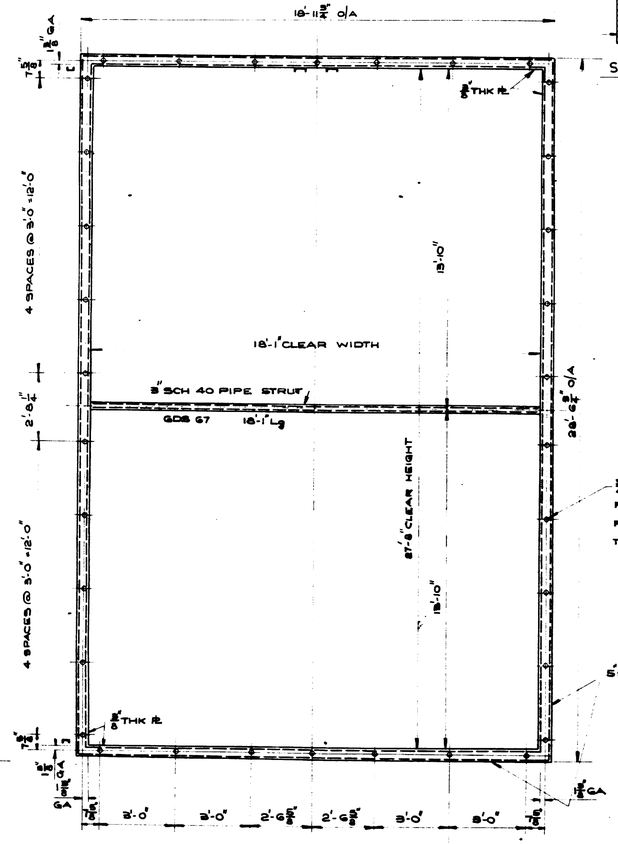
SEE DETAIL-"E"



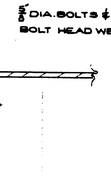
ELEVATION OF INNER FLANGE



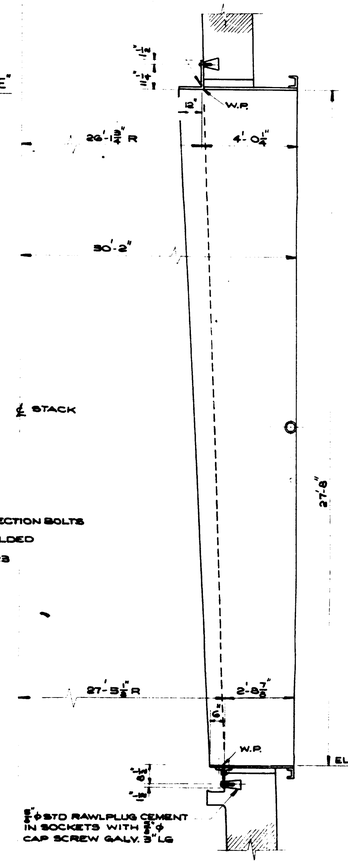
DETAIL "H"
FULL SIZE SCALE



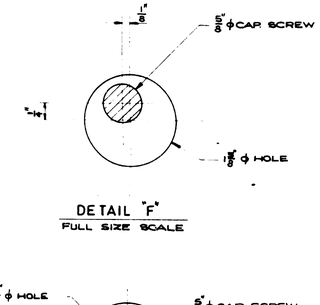
ELEVATION OF OUTER FLANGE SECTION "A-A"
SEE KEY PLAN
MK G.D.S. 12



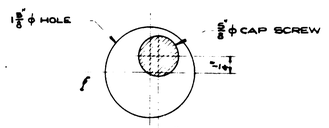
SECTION "E-E"
ENLARGED)



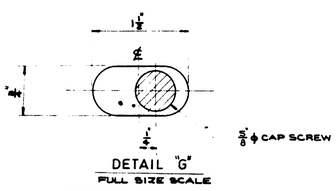
SECTION "D-D"



DETAIL "F"
FULL SIZE SCALE



DETAIL "E"
FULL SIZE SCALE



DETAIL "G"
FULL SIZE SCALE

NOTES

THIS DRG REPRODUCED FROM CE ORG DGS-221-442-1

REF. DRGS.	
GAS DUCT I.D. FAN TO STACK (SHEET 1)	268/10/5
ARR'GT OF GAS DUCT, I.D. FAN TO STACK.	SLRS 8 & 4 - 268/10/4
ARR'GT " " " " " "	SLRS 1 & 2 - 268/10/2
DETAILS " " " ℄ SUPPORTS	268/10/1
MATERIAL LIST FOR I.D. DUCT WORK	268/10/3

LD257751B/2

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INTERNATIONAL COMBUSTION AUSTRALIA LTD.
SOUTH STREET, RYDALMERE, N.S.W.

GAS INLET CONNECTION TO STACK MK C.D.S. 12
ELECTRICITY COMM. OF N.S.W. (SHT 3 OF 3)
LIDDELL POWER STA. UNITS No 1, 2, 3 & 4

ITEM No 11-80	C-E DRAWING No D-935-368-6	DRAWING NUMBER 268/10/68
	DRAWN TRACED 25 11.8.70 CHECKED WH 26 NOV 68 PASSED ADB SCALE	REV.

STANDARD FOR MICROFILMING

CONTRACT NO.	LETTER DATED
1600	NOV 570

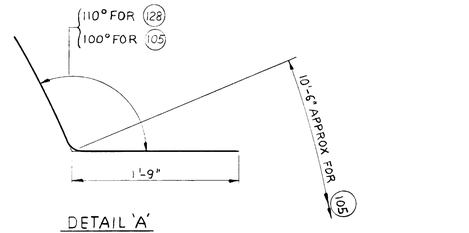
REVISIONS: PIPE STRUT SHOWN IN SECTION D-D SEE CE DRG D&S/221/442-1 | PLAN ON BOTTOM PLATE ADDED, SECTION E-E ADDED, SITE LETTER 1.12.69 S.12.69 RSB | DRILLING OF HOLES ON SEC. CC 4.2.70 MODIFIED TO SUIT DRG D-935-368-1 CE LETTER DEC. 30/69 WH | DRILLING FOR OUTER FLANGE SEC A-A REMAIN WH | DRILLING & SPACING FOR 13/16 DIA HOLES (ORG DGS-221-442-2) 6.2.70 WAS DRILLING & SPACING FOR 3/4 CAP SCREWS CESO LETTER 10/146 RHW | SECT C-C DIMS ALTERED (ORG CORRECTED) 19.2.70 5/16 "WAS 5/16" & 10 5/16 "WAS 11 5/16" RHW | ORG. TRACED WITHOUT ALTERATION. J.S. 11.8.70

KODAK 16-11-70

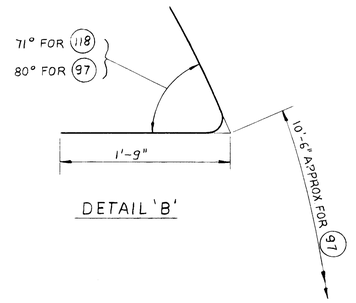
TAG	SIZE	DETAIL	No OFF	LOCATION
1	#7CW	17'-11"	194	VERTICAL EXTERNAL FACE
4	#6CW	17'-6"	142	VERTICAL INTERNAL FACE
7	#6CW	25'-5" / 26'-2" — MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 176'-0" TO 179'-6"	14 RINGS	HORIZ. INTERNAL FACE
19	#6CW	27'-2" / 27'-6" — MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 185'-9" TO 187'-9"	18 RINGS	HORIZ. EXTERNAL FACE
86	#7CW	22'-6"	74	VERT. EXTERNAL FACE
87	#6CW	22'-6"	42	VERT. INTERNAL FACE
88	#7CW	25'-7"	80	VERT. EXTERNAL FACE
69	#7CW	19'-3"	164	〃
90	#6CW	28'-7" — MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 197'-3"	3 RINGS	HORIZ. INTERNAL FACE
91	#10CW	28'-6" — MIN. LAP 4'-11" RING -7 BARS TOTAL LENGTH 213'-6"	1 RING	〃
92	#10CW	20'-0" / 28'-6" / 27'-11"	2 ARCS	〃 (AT TRUCK OPENING)
93	#7CW	2'-9" / 1'-6"	13	AT TRUCK OPENING
94	#10CW	20'-0" / 30'-2"	3	HORIZ. EXT. FACE
95	#10CW	30'-2" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 224'-0"	3 RINGS	〃
96	#6CW	30'-3" — MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 207'-6"	3 RINGS	〃
97	#6CW	29'-7" / 30'-2" / 10'-6" APPROX — MIN. LAP 2'-6" EACH ARC 7 BARS TOTAL LENGTH 196'-6" TO 200'-0" SEE DETAIL 'B'	24 ARCS	〃
98	#7CW	17'-11"	80	VERT. EXTERNAL FACE
100	#10CW	10'-0"	40	DIAGONAL TRIMMERS AT GAS INL.
101	#10CW	10'-0"	10	DIAGONAL TRIMMERS

TAG	SIZE	DETAIL	No OFF	LOCATION
102	#9CW	20'-0"	24	VERTICAL AT TRUCK OPENING
103	#10CW	9'-0"	10	DIAGONAL TRIMMERS
104	#6CW	17'-6"	60	VERTICAL INTERNAL FACE
105	#6CW	27'-11" / 28'-6" / 10'-6" APPROX — MIN. LAP 2'-6" EACH ARC 7 BARS TOTAL LENGTH 185'-9" TO 189'-6" SEE DETAIL 'A'	12 ARCS	HORIZ INTERNAL FACE
106	#6CW	27'-11" — MIN. LAP 4'-11" RING 7 BARS TOTAL LENGTH 209'-9"	1 RING	〃
107	#6CW	10'-0"	6	VERTICAL INTERNAL FACE
108	#6CW	27'-9" — MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 192'-0"	10 RINGS	〃
109	#10CW	27'-7" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 208'-0"	4 RINGS	〃
110	#10CW	30'-0" / 27'-7"	6 ARCS	〃 AT GAS INLETS
111	#6CW	25'-2"	64	VERTICAL INTERNAL FACE
112	#7CW	2'-9" / 1'-6"	100	AT GAS INLET
114	#10CW	38'-4"	56	VERTICAL AT GAS INLETS
115	#7CW	5'-0" / 1'-6"	13	AT TRUCK OPENING
116	#7CW	10'-5"	12	VERTICAL EXTERNAL FACE
117	#7CW	18'-1"	92	〃
118	#6CW	28'-0" / 29'-3" — MIN. LAP 2'-6" EACH ARC 3 BARS TOTAL LENGTH 77'-0" TO 80'-6" SEE DET. 'B' 57 VARIANTS	114 ARCS	HORIZ EXTERNAL FACE
119	#7CW	17'-11"	88	VERTICAL EXTERNAL FACE
120	#7CW	17'-11"	88	〃
121	#7CW	13'-3"	34	〃
122	#7CW	20'-9"	36	〃

TAG	SIZE	DETAIL	No OFF	LOCATION
123	#6CW	17'-8"	68	VERTICAL INTERNAL FACE
124	#6CW	17'-6"	66	〃
125	#6CW	17'-6"	64	〃
126	#6CW	12'-10"	20	〃
127	#6CW	20'-4"	22	〃
128	#6CW	25'-3" / 27'-7" — MIN. LAP 2'-6" EACH ARC 3 BARS TOTAL LENGTH 71'-0" SEE DET 'A' TO 75'-3" 28 VARIANTS	58 ARCS	HORIZ. INTERNAL FACE
129	#10CW	30'-0" / 26'-3"	6 ARCS	〃 AT GAS INLETS
130	#10CW	26'-3" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 199'-6"	4 RINGS	HORIZ INTERNAL FACE
131	#8CW	26'-2" — MIN. LAP 3'-3" EACH RING 7 BARS TOTAL LENGTH 188'-3"	5 RINGS	〃
132	#10CW	29'-3" / 29'-7" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 217'-3" TO 220'-6"	25 RINGS	HORIZ EXTERNAL FACE
133	#10CW	28'-0" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 210'-6"	16 RINGS	〃
134	#10CW	27'-11" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 209'-9"	2 RINGS	〃
135	#8CW	27'-6" — MIN. LAP 3'-3" EACH RING 7 BARS TOTAL LENGTH 194'-6"	6 RINGS	〃
136	#4CW	2'-4½" / 3" INTRAD. / 1" INTERNAL RAD / 2'-2" / 93° / 2'-9"	270	AT CORBEL RL 488'-0"
137	#4CW	2'-4½" / 3" INT. RAD. / 1" INTERNAL RAD / 2'-2" / 93° / 2'-9"	406	AT CORBEL RL 456'-0"
138	#4CW	2'-8"	112	AT CORBEL RL 456'-0" & RL 488'-0"
139	#6CW	18'-10"	128	VERTICAL INTERNAL FACE



DETAIL 'A'



DETAIL 'B'

REFERENCE DRG'S.

CHIMNEY STACK 1 & 2 REINFORCEMENT DET. ELEVATION RL 434'-0" TO RL 503'-0"	LD 247909 A
CHIMNEY STACK No1 & 2	LD 247906 K
DIAGRAM BAR BENDING SHAPES	S 228581 D

NOTES

STEEL REINFORCEMENT: #CW INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A 83. NUMBER INDICATES DIAMETER IN EIGHTS OF AN INCH e.g. #8CW = 1"

DELIVER TO SITE IN TAGGED BUNDLES

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING BUNDLED SEPARATELY

TAGS 97, 105, 118, 128 ARE TO BE MADE IN SUCH A WAY, THAT, WHEN PLACED, ALL THE LAPS ARE STAGGERED.

REINFORCEMENT LISTED FOR ONE STACK ONLY
REINFORCEMENT REQUIRED FOR TWO STACKS.

AMENDMENTS

1. Tag 136 No off was 220, tag 138 was 111.	K.J.H.	27.8.68

SA for MD 27/9/68

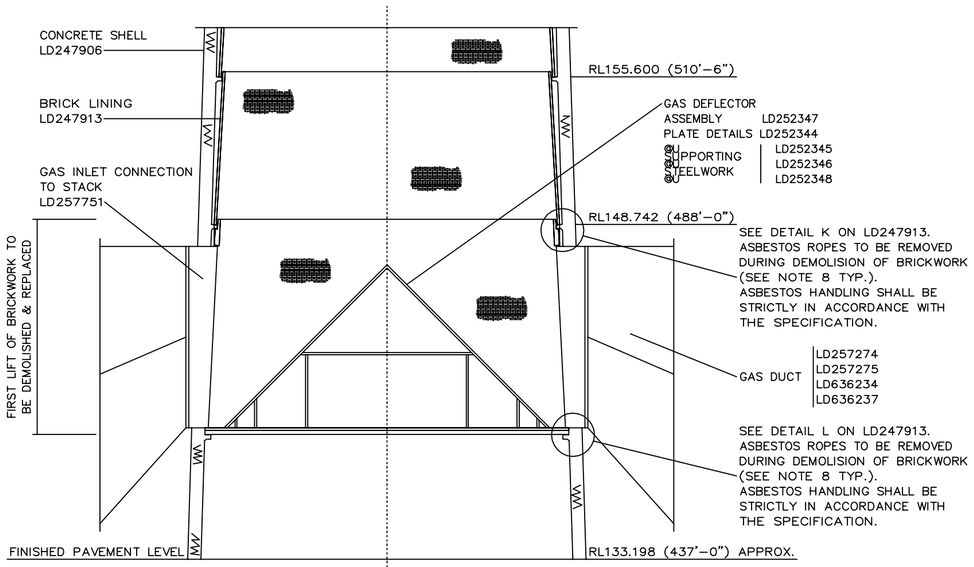
CONTRACT No. 1894

THE ELECTRICITY COMMISSION OF N.S.W.

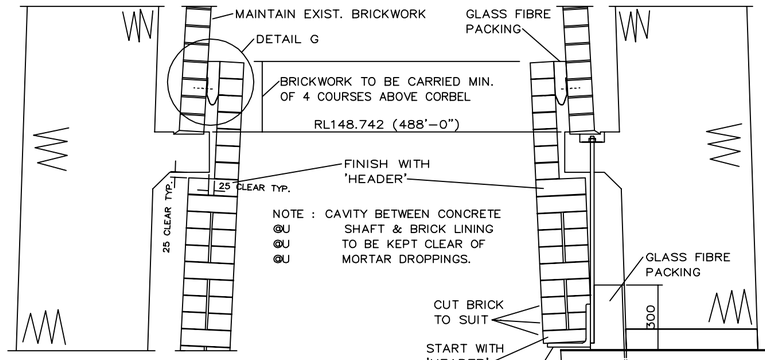
LIDDELL POWER STATION
CHIMNEY STACKS No1 & 2
ELEVATION RL. 434'-0" TO RL. 503'-0"
REINFORCEMENT LIST

SCALE	N.T.S.				DATE	DATE
DRAWN	K.U.				P.E./P.S.C.	1-8-68
TRACED	—					
CHECKED	A.C.D.					
E/CD.	SA for MD					
DATE	1.8.68					

LD 253840 B/1

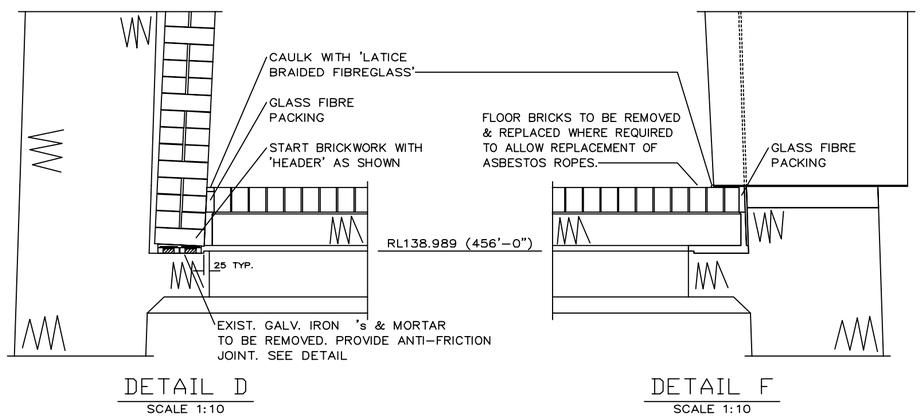


EXISTING CHIMNEY STACK DETAILS
SCALE 1:100



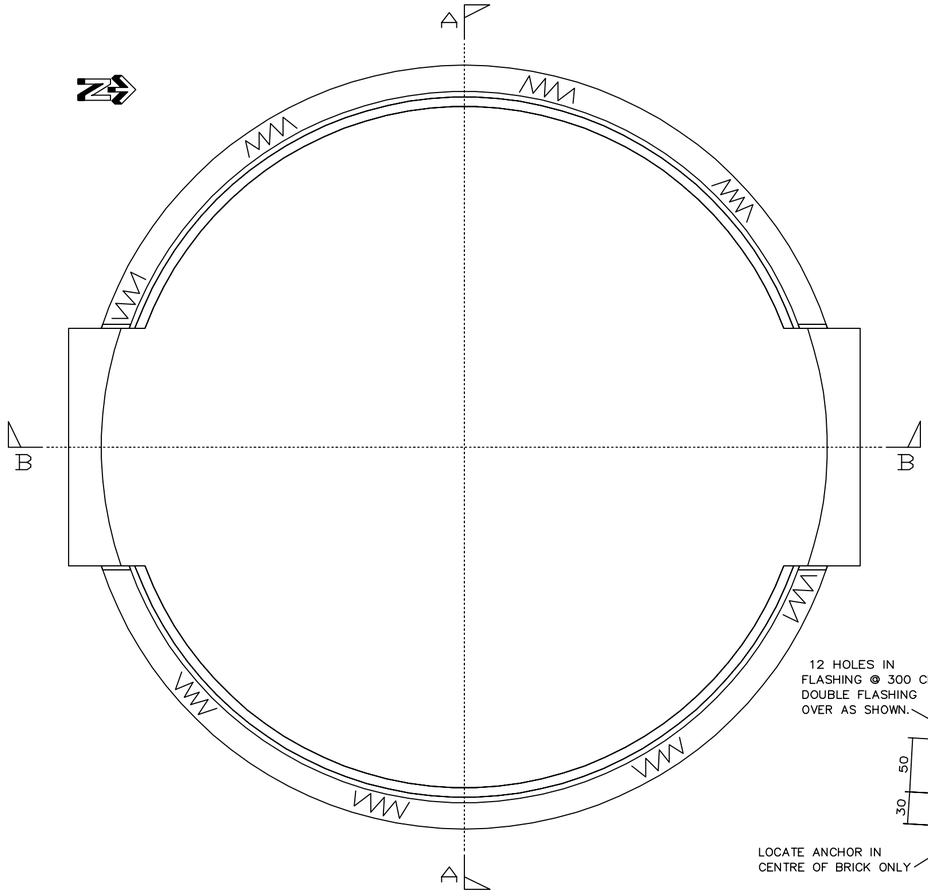
DETAIL C
SCALE 1:10

DETAIL E
SCALE 1:10

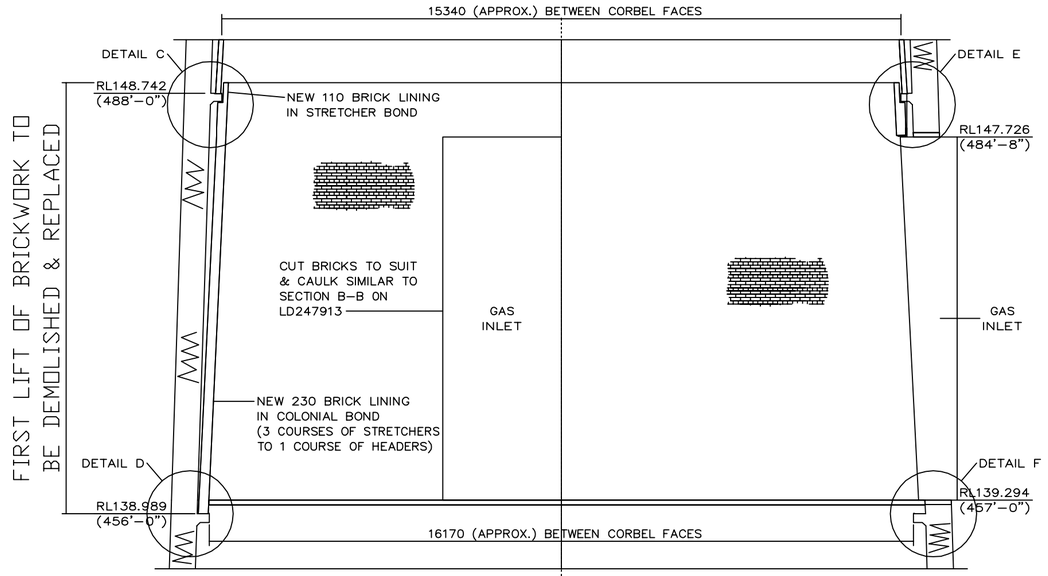


DETAIL D
SCALE 1:10

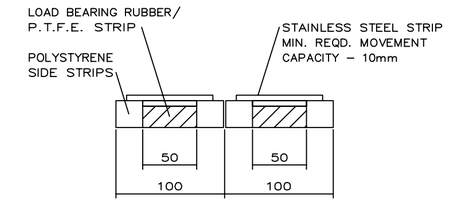
DETAIL F
SCALE 1:10



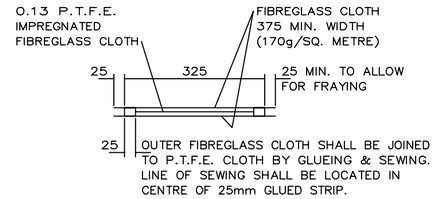
PLAN AT RL145.085
SCALE 1:50
GAS DEFLECTOR NOT SHOWN



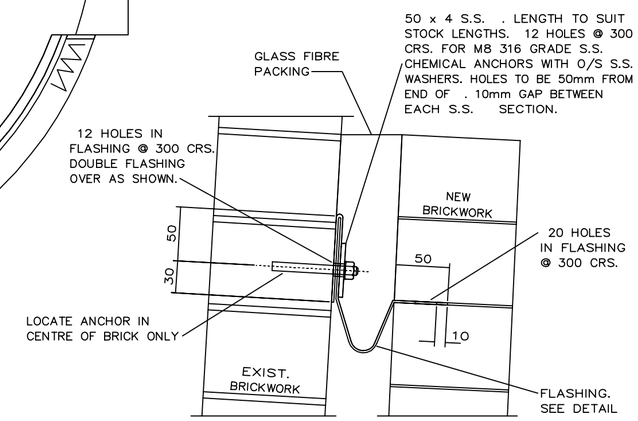
HALF SECTION A-A
HALF SECTION B-B
SCALE 1:50



ANTI-FRICTION JOINT
SCALE 1:2



FLASHING DETAIL
N.T.S.



DETAIL G
SCALE 1:2

NOTES

1. THE CONTRACTOR SHALL CONFIRM ALL DIMENSIONS & REDUCED LEVELS ON SITE BEFORE CONSTRUCTION COMMENCES.
2. ASBESTOS HANDLING & REMOVAL SHALL BE STRICTLY IN ACCORDANCE WITH THE SPECIFICATION.
3. EXISTING GLASS INSULATION SHALL BE REPLACED WITH NEW GLASS FIBRE PACKING IN ACCORDANCE WITH THE SPECIFICATION.
4. ALL STAINLESS STEEL PLATE, ANCHORS, NUTS & WASHERS SHALL BE GRADE 316.
5. M8 CHEMICAL ANCHORS SHALL BE INSTALLED IN THE CENTRE OF THE EXISTING BRICKS ONLY.
6. BRICK LINING SHALL BE GAS TIGHT. BRICKS SHALL BE LAID IN COLONIAL BOND (DOUBLE SKIN) & STRETCHER BOND (SINGLE SKIN) WITH 2mm TO 6mm JOINTS ALL AS SPECIFIED.
7. ALL HOLES IN FLASHING MATERIAL SHALL BE PUNCHED ONLY.
8. ASBESTOS ROPE SHALL BE REPLACED WITH 'LATICE BRAIDED FIBREGLASS' OF EQUIVALENT SIZE AS SPECIFIED.

REFERENCE DRAWINGS

LD247906	GENERAL ARRANGEMENT - CONCRETE
LD247913	BRICK LINING DETAILS
LD252344	GAS DEFLECTOR - PLATE DETAILS
LD252345	GAS DEFLECTOR - COLUMN & BRACE DETAILS
LD252346	GAS DEFLECTOR - BEAM & TIE DETAILS
LD252347	GAS DEFLECTOR ASS'Y
LD252348	GAS DEFLECTOR - BEAM & RAFTER DETAIL
LD257274	GAS DUCT I.D. FAN TO STACK - ARRG'T
LD257275	GAS DUCT I.D. FAN TO STACK - DETAILS
LD257751	GAS INLET CONNECTION TO STACK
LD243632	TYP. WELDING & CONSTR. DETS. FOR DUCTING
LD636234	UNIT 3 - I.D. FAN TO STACK DUCTING
@U	ADDITIONAL STIFFENING BEAMS
LD636237	UNIT 4 - I.D. FAN TO STACK DUCTING
@U	ADDITIONAL STIFFENING BEAMS

LINES STRAIGHTENED, BUILDINGS & DRAWINGS REALIGNED) SQUARED (DRAWING REALIGNED) ADDITIONAL CORRELATIVES INFORMATION ADDED (MINOR NOTES) REMOVED FROM AUTOCAD CONVERSION. SYSTEM COLOUR REDEFINED

01	CKD	PF
DATE	06-SEP-93	

804x1136mm

PACIFIC POWER SERVICES

CONTRACT No.	DRAWN	DM	
QUOTE NO. W269/93	DESIGN		
	DRG'D	DO	RT
	ENG		
	PASSED	PS	
REFERENCE DRAWINGS			

gad DO NOT AMEND MANUALLY

©Copyright

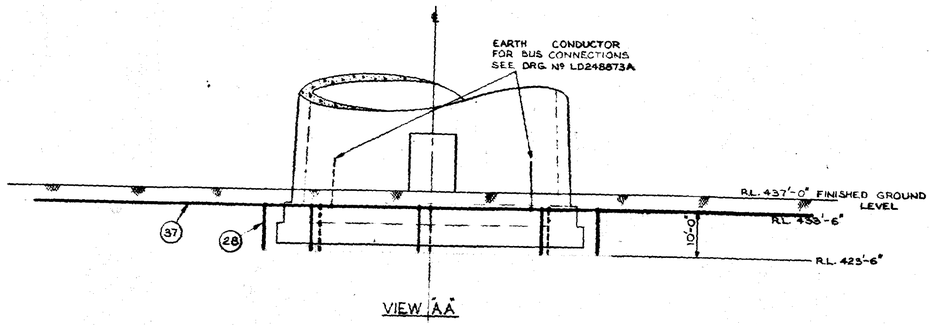
KKS CODING	UHN
ORIGINAL DRAWING APPROVED BY	C STARK per PS
MANAGER/PPE	4-JUN-1993
APPROVED	
DRAWING STATUS	
SCALE	AS SHOWN

Macquarie Generation

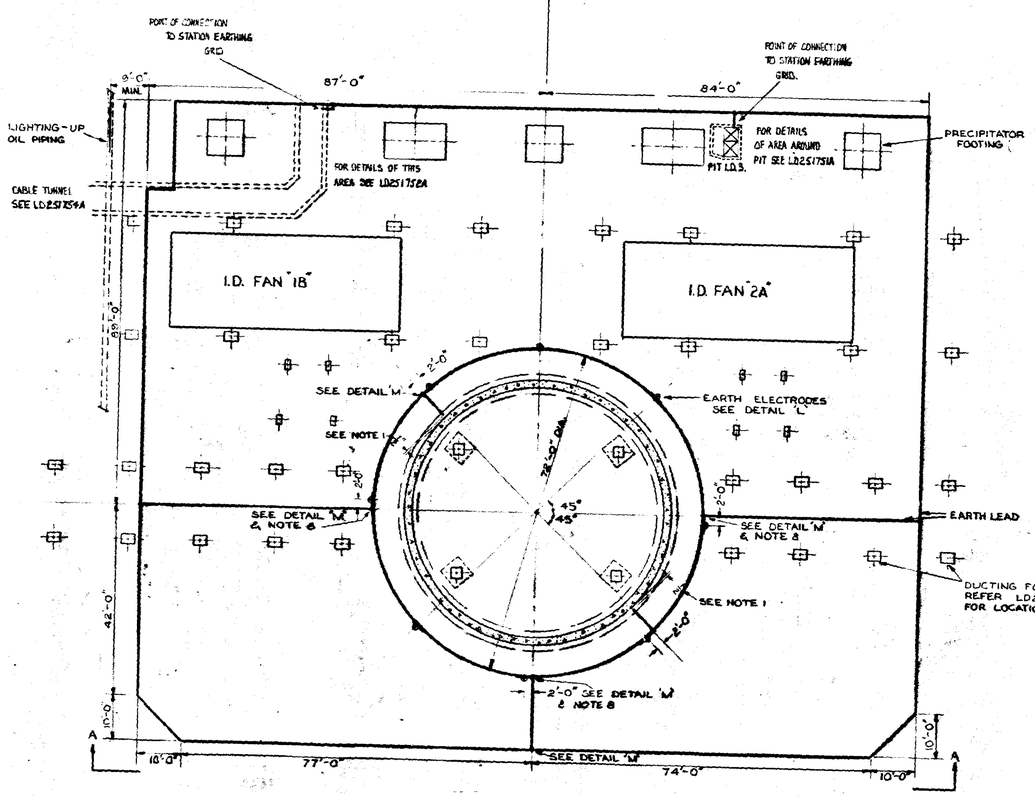
LIDDELL POWER STATION UNITS 3 & 4
CHIMNEY STACK
REPAIRS TO BRICK LINING
DETAILS

A0 | LD637160 | 01
PREFIX NUMBER SHEET AMDT

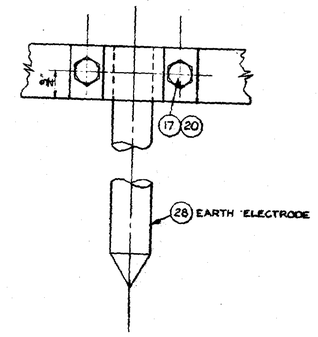
PLOT ISSUE No. 5 | PLOT ISSUE DATE 06SEP93 | COPIED FROM | SUPERSEDES | SUPERSEDED BY | INDEX CLASS'N —



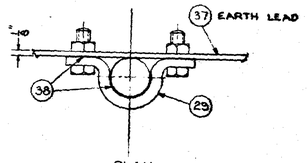
VIEW 'AA'



PLAN



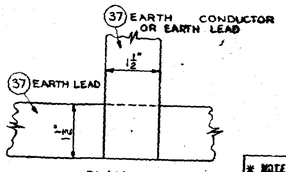
ELEVATION



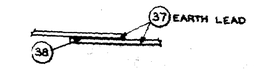
PLAN
DETAIL 'L'



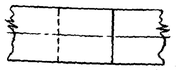
ELEVATION



PLAN
DETAIL 'M'



ELEVATION



PLAN
DETAIL 'N'

REFERENCE DRAWINGS

LD247907A - CHIMNEY STACK Nº1-FOUNDATION

LD248873A - CHIMNEY STACKS Nº1 & Nº2 - LIGHTNING CONDUCTOR - ARRANGEMENT
LD248871P - CHIMNEY STACKS Nº1 & Nº2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 1.
LD248872P - CHIMNEY STACKS Nº1 & Nº2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 2.
LD246715A - BOILERS 1 & 2 - PRECIPITATORS & I.D. FANS AREA - CABLE PITS, TUNNEL & CONDUIT LAYOUT.
LD251751A - I.D FANS 2A & 2B AREA - CABLE PITS & CONDUIT DETAILS
LD251752A - " " " 1A & 1B " " " " " "
LD28.230A - CHIMNEY STACK Nº2 - LIGHTNING CONDUCTOR EARTHING ARRANGEMENT

NOTES.

1. EARTH CONDUCTOR TO BE ½" CLEAR OF & PARALLEL TO FINISHED FACE OF STACK AS INDICATED IN PLAN. EARTH CONDUCTOR TO BE EXTENDED UP TO RL 441'-0" FOR EARTHING OF SCAFFOLDING & REINFORCEMENT ETC. DURING CHIMNEY CONSTRUCTION. ON COMPLETION OF CHIMNEY CONSTRUCTION, EARTH CONDUCTORS ARE TO BE TERMINATED AT TEST LINK IN ACCORDANCE WITH SECTION 'EE' ON DRG. Nº LD248873A.
2. TEMPORARY LEADS FOR EARTHING OF SCAFFOLDING ETC. DURING CHIMNEY CONSTRUCTION SHALL BE FIRMLY BONDED TO EARTH CONDUCTOR AT R.L. 441'-0". THE EARTH LEAD CONDUCTOR CONCENTRIC TO THE BASE OF THE STACK SHALL BE COMPLETELY COVERED & TIGHTLY PACKED WITH FINE SOIL TO A MIN. R.L. OF 435'-0" PRIOR TO BONDING OF EARTH CONDUCTOR TO THE TEMPORARY LEADS.
3. ALL MATING SURFACES OF JOINTS IN DETAIL 'L' ARE TO BE COMPLETELY BONDED WITH A CONTINUOUS COATING OF ALLOY & INTERPOSING STRIPS OF SILVER BRAZING ALLOY RIBBON OR COPPER PROSPHORUS BRAZING ALLOY RIBBON (SHIM). (TYPE CP1 OR CP2) BETWEEN MATING SURFACES BEFORE CLAMPING & BRAZING.
4. EARTH LEAD TO BE FORMED UP FROM LONGEST AVAILABLE LENGTHS OF COPPER & JOINED WHEREVER NECESSARY IN ACCORDANCE WITH DETAIL 'N' & NOTE 11.
5. REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
6. DRIVE TOP OF EARTH ELECTRODES TO RL 433'-6" AS INDICATED ON ELEVATION.
7. BENDS IN EARTH CONDUCTOR TO BE 8" MIN. RAD.
8. THE THREE LOCATIONS SHOWN SHOULD NOT BE JOINED UNTIL TESTS HAVE BEEN CARRIED OUT TO DETERMINE THE EARTH RESISTANCE OF THE CONCENTRIC EARTH TERMINATION NETWORK (CALCULATED VALUE 1·6 OHM)
9. ITEM Nºs ENCIRCLED THUS (29) REFER TO ITEMS LISTED ON MATERIAL LIST DRG. Nºs LD248871 & 72P.
10. IF AN ELECTRODE STRIKES ROCK, A 1½" DIA. HOLE IS TO BE DRILLED TO THE REQUIRED DEPTH & THE ELECTRODE PLACED IN HOLE. THEN AN EQUAL MIXTURE OF BENTONITE & PLASTER OF PARIS SHALL BE MIXED WITH WATER TO FORM A SLURRY & POURED INTO THE HOLE AROUND THE ELECTRODE.
11. ALL JOINTS SHOWN IN DETAIL 'M & N' SHALL BE BRAZED JOINTS USING EITHER SILVER-BRAZING ALLOY OR COPPER-PHOSPHORUS BRAZING ALLOY.

* NOTE FOR CONTRACT NO. 2133

This drawing to be used for information only in tendering for Contract No. 2133 in accordance with the requirements of Specification No. 2133 - General-Drawings.

Reference Drawings listed hereon shall only be used for Contract 2133 if specifically supplied and listed in the Specification No. 2133.

AMENDMENTS
NOTES 1 & 3 & 4 MODIFIED. NOTE 11 ADDED. CONTRACT Nº ADDED. DRN: K.R. CKD: W.A.S. APP: A.A.F. 6/6/68
3 NOTE CHANGED. 2133 (WALLSEND AS) ADDED. (G.R.G-W) DRN: C.V. CKD: E.J.A. APP: A.A.F. 11.12.70
4. EARTHING GRID REVISED TO SUIT SITE LAYOUT. PIT 10.3.8 CABLE TUNNEL ADDED TO SHOW POINTS OF CONNECTION BETWEEN STATION EARTH & STACK GRID. REF DRGS ADDED TO THE ALTERED. DRN: M.J.K. CKD: E.J.A. APP: A.A.F. 12.12.72

* CONTRACT Nº	CONTRACT Nº
2133	1894

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACK Nº1
LIGHTNING CONDUCTOR EARTHING ARRANGEMENT

SCALE ½ IN. = 1 FT. & ½ IN. = 1 IN.				DATE	E.J.A.	DATE
DRAWN	K.R.	E/M's		11/3/68	DCE/POWER	
TRACED	J.D.W.	SE & A		11/3/68	A.A. Farquhar	27/3/68
CHECKED	S.G.				PE/CON	
SE/E.D.O. DATE				13-3-68		

LD248874 B/4

APPENDIX C – LOAD TAKEDOWN FOR CHIMNEY

LIDDELL PS CHIMNEY - CONCRETE SHELL MASS CALCULATIONS

RL Height			Segment Height	Outside Diameter			Outside Area	Inside Area	Wall Area	Wall Volume	Wall Thickness	
Ft	In.	mm	mm	ft	in	mm	mm2	mm2	mm2	mm3	In.	mm
434	0	132283.2	0	61	0	18592.8	271506028.3	237066134.3	34439893.9	0.0	24	609.6
437	0	133197.6	914.4	60	8.5	18503.9	268915866.3	234646226.1	34269640.2	31336159022.9	24	609.6
441	6	134569.2	1371.6	60	3.5	18376.9	265237170	231210749.4	34026420.6	46670638544.8	24	609.6
449	0	136855.2	2286	59	6.5	18148.3	258679361.8	225090736.5	33588625.4	76783597605.9	24	609.6
456	8	139192	2336.8	58	10	17932.4	252561249.1	219386097	33175152.1	77523695360.6	24	609.6
464	2	141478	2286	58	1.5	17716.5	246516355.5	213754676.7	32761678.8	74893197664.9	24	609.6
471	8	143764	2286	57	6	17526	241243430.8	208846581.4	32396849.4	74059197690.9	24	609.6
479	2	146050	2286	56	9.5	17310.1	235336361.7	203352985.6	31983376.1	73113997720.3	24	609.6
482	11	147193	1143	56	4.5	17183.1	231895817.9	200155661.4	31740156.5	36278998868.8	24	609.6
488	0	148742.4	1549.4	56	0	17068.8	228820990.2	197299731.4	31521258.9	48839038477.2	24	609.6
495	6	151028.4	2286	55	4	16865.6	223405300.7	193523747.2	29881553.5	68309231203.5	23	584.2
503	0	153314.4	2286	54	7.5	16649.7	217722196.3	188236888.1	29485308.2	67403414565.1	23	584.2
510	6	155600.4	2286	53	11.5	16446.5	212440277.5	185161173.7	27279103.8	62360031389.0	21.5	546.1
518	0	157886.4	2286	53	4	16256	207547383.4	181503759.1	26043624.3	59535725227.0	20.75	527.05
525	6	160172.4	2286	52	8.5	16065.5	202711493.9	176983295	25728198.9	58814662749.5	20.75	527.05
533	0	162458.4	2286	52	1	15875	197932609	172519835.5	25412773.5	58093600272.0	20.75	527.05
540	6	164744.4	2286	51	5.5	15684.5	193210728.7	168113380.6	25097348.1	57372537794.5	20.75	527.05
548	0	167030.4	2286	50	10.5	15506.7	188855071.2	164052120.1	24802951.1	56699546148.8	20.75	527.05
555	6	169316.4	2286	50	3.5	15328.9	184549071.1	160040517	24508554.0	56026554503.1	20.75	527.05
563	0	171602.4	2286	49	9	15163.8	180595105.9	160610562.9	19984543.0	45684665242.2	17	431.8
570	6	173888.4	2286	49	2	14986	176384873.5	156641523.3	19743350.2	45133298592.8	17	431.8
578	0	176174.4	2286	48	7.5	14820.9	172519835.5	153000450	19519385.5	44621315275.4	17	431.8
585	6	178460.4	2286	48	1.5	14668.5	168990111.2	149677462.3	19312648.9	44148715290.1	17	431.8
593	0	180746.4	2286	47	7	14503.4	165207413.2	148303651.7	16903761.5	38641998795.2	15	381
600	6	183032.4	2286	47	1	14351	161753695	145032348.2	16721346.8	38224998808.2	15	381
608	0	185318.4	2286	46	7.5	14211.3	158619835.9	142065702.6	16554133.3	37842748820.1	15	381
615	6	187604.4	2286	46	1.5	14058.9	155236043.4	138864324.7	16371718.6	37425748833.1	15	381
623	0	189890.4	2286	45	8	13919.2	152166282.8	135961777.6	16204505.2	37043498845.0	15	381
630	6	192176.4	2286	45	2.5	13779.5	149127178	133089886.3	16037291.7	36661248856.9	15	381
638	0	194462.4	2286	44	9.5	13652.5	146390957.6	130505678.2	15885279.5	36313748867.7	15	381
645	6	196748.4	2286	44	4	13512.8	143410377.6	127692311.6	15718066.0	35931498879.7	15	381
653	0	199034.4	2286	43	11	13385.8	140727361.5	128201552.6	12525808.9	28633999107.2	12	304.8
660	6	201320.4	2286	43	6	13258.8	138069680.7	125665481.6	12404199.1	28355999115.9	12	304.8
668	0	203606.4	2286	43	1.5	13144.5	135699429.8	123404679.6	12294750.3	28105799123.7	12	304.8
675	6	205892.4	2286	42	9	13030.2	133349700.6	121164399.1	12185301.5	27855599131.5	12	304.8
683	0	208178.4	2286	42	4	12903.2	130762958.9	118699267.2	12063691.7	27577599140.1	12	304.8
690	6	210464.4	2286	41	11.5	12788.9	128456553.1	116502310.3	11954242.8	27327399147.9	12	304.8
698	0	212750.4	2286	41	7.5	12687.3	126423642.7	114566687.7	11856955.0	27104999154.9	12	304.8
705	6	215036.4	2286	41	3	12573	124156000.1	112408493.9	11747506.2	26854799162.7	12	304.8
713	0	217322.4	2286	40	11	12471.4	122157545.8	112408493.9	9749051.9	22286332638.5	10	254
720	6	219608.4	2286	40	7	12369.8	120175306.1	110507327.4	9667978.7	22100999310.9	10	254
728	0	221894.4	2286	40	3	12268.2	118209281.1	109092093.4	9117187.7	20841891016.8	9.5	241.3
735	6	224180.4	2286	39	11.5	12179.3	116502310.3	107452514.7	9049795.6	20687832688.3	9.5	241.3
743	0	226466.4	2286	39	7.5	12077.7	114566687.7	105593911.7	8972776.0	20511766027.1	9.5	241.3
750	6	228752.4	2286	39	4	11988.8	112886319	103980935.1	8905383.9	20357707698.6	9.5	241.3
758	0	231038.4	2286	39	0.5	11899.9	111218364.7	102380372.8	8837991.9	20203649370.1	9.5	241.3
765	6	233324.4	2286	38	9	11811	109562824.7	100792224.9	8770599.8	20049591041.5	9.5	241.3
773	0	235610.4	2286	38	5.5	11722.1	107919699	99216491.33	8703207.7	19895532713.0	9.5	241.3
780	6	237896.4	2286	38	2	11633.2	106288987.6	97653172.08	8635815.6	19741474384.5	9.5	241.3
788	0	240182.4	2286	37	11	11557	104901115.9	96323064.95	8578050.9	19609424388.6	9.5	241.3

795	6	242468.4	2286	37	7.5	11468.1	103293459.7	95221609.56	8071850.1	18452249424.7	9	228.6
803	0	244754.4	2286	37	4.5	11391.9	101925349.5	93908223.78	8017125.7	18327149428.6	9	228.6
810	6	247040.4	2286	37	1.5	11315.7	100566360.1	92603958.73	7962401.3	18202049432.5	9	228.6
818	0	249326.4	2286	36	10.5	11239.5	99216491.33	91308814.41	7907676.9	18076949436.4	9	228.6
825	6	251612.4	2286	36	8	11176	98098567.95	90236494.71	7862073.2	17972699439.6	9	228.6
833	0	253898.4	2286	36	5	11099.8	96765420.58	88958071.74	7807348.8	17847599443.5	9	228.6
840	6	256184.4	2286	36	2	11023.6	95441393.93	87688769.5	7752624.4	17722499447.4	9	228.6
848	0	258470.4	2286	35	11.5	10960.1	94345005.62	86637984.87	7707020.8	17618249450.7	9	228.6
855	6	260756.4	2286	35	9	10896.6	93254951.16	85593534.08	7661417.1	17513999453.9	9	228.6
863	0	263042.4	2286	35	6	10820.4	91955246.48	84348553.8	7606692.7	17388899457.8	9	228.6
870	6	265328.4	2286	35	3.5	10756.9	90879126.47	83318037.46	7561089.0	17284649461.1	9	228.6
878	0	267614.4	2286	35	1	10693.4	89809340.3	82293854.97	7515485.3	17180399464.3	9	228.6
885	6	269900.4	2286	34	10.5	10629.9	88745887.98	81276006.32	7469881.7	17076149467.6	9	228.6
893	0	272186.4	2286	34	8	10566.4	87688769.5	80264491.52	7424278.0	16971899470.8	9	228.6
900	6	274472.4	2286	34	5.5	10502.9	86637984.87	79259310.56	7378674.3	16867649474.1	9	228.6
908	0	276758.4	2286	34	3.5	10452.1	85801917.53	78459726.16	7342191.4	16784249476.7	9	228.6
915	6	279044.4	2286	34	1	10388.6	84762533.81	77465946.11	7296587.7	16679999479.9	9	228.6
923	0	281330.4	2286	33	10.5	10325.1	83729483.94	76872718.33	6856765.6	15674566177.9	8.5	215.9
930	6	283616.4	2286	33	8.5	10274.3	82907604.41	76085294.91	6822309.5	15595799513.7	8.5	215.9
938	0	285902.4	2286	33	6	10210.8	81885955.45	75106716.09	6779239.4	15497341183.5	8.5	215.9
945	6	288188.4	2286	33	3.5	10147.3	80870640.34	74134471.11	6736169.2	15398882853.2	8.5	215.9
953	0	290474.4	2286	33	1.5	10096.5	80062948.62	73361235.5	6701713.1	15320116189.0	8.5	215.9
960	6	292760.4	2286	32	11	10033	79059034.43	72400391.44	6658643.0	15221657858.7	8.5	215.9
968	0	295046.4	2286	32	9	9982.2	78260463.44	71636276.56	6624186.9	15142891194.5	8.5	215.9
975	6	297332.4	2286	32	6.5	9918.7	77267950.16	70686833.43	6581116.7	15044432864.3	8.5	215.9
983	0	299618.4	2286	32	4.5	9867.9	76478499.91	69931839.28	6546660.6	14965666200.0	8.5	215.9
988	0	301142.4	1524	32	3	9829.8	75889072.44	68993797.06	6895275.4	10508399672.4	9	228.6
Deduct:												
Gas Inlet			8636	18	9	5715				30086649504.0	24	609.6
Gas Inlet			8636	18	9	5715				30086649504.0	24	609.6
Truck Access			3657.6	10	0	3048				6796043182	24	609.6
Totals												
Volume										2389257456503.4	mm3	
Volume										2389.3	m3	
Mass										5758.1	tonne	

LIDDELL PS CHIMNEY - BRICK LINER MASS CALCULATIONS

RL Height			Segment Height	Outside Diameter			Outside Area	Inside Area	Wall Area	Wall Volume	Wall Thickness	
Ft	In.	mm	mm	ft	in	mm	mm2	mm2	mm2	mm3	In.	mm
434	0	132283.2	0	61	-56	17170.4	231553157	231553157	0.0	0.0	0	0
437	0	133197.6	914.4	60	-47.5	17081.5	229161624.3	229161624.3	0.0	0.0	0	0
441	6	134569.2	1371.6	60	-52.5	16954.5	225766684.2	225766684.2	0.0	0.0	0	0
449	0	136855.2	2286	59	-49.5	16725.9	219719637.2	219719637.2	0.0	0.0	0	0
456	8	139192	2336.8	58	-46	16510	214083909.9	214083909.9	0.0	0.0	0	0
464	2	141478	2286	58	-54.5	16294.1	208521401.9	196983672.6	11537729.3	26375249177.6	9	228.6
471	8	143764	2286	57	-50	16103.6	203674111.5	192273193.2	11400918.3	26062499187.4	9	228.6
479	2	146050	2286	56	-46.5	15887.7	198249427.9	187003562.1	11245865.8	25708049198.4	9	228.6
482	11	147193	1143	56	-51.5	15760.7	195092640.3	183937981.8	11154658.4	12749774602.5	9	228.6
488	0	148742.4	1809.4	56	-56	15646.4	192273193.2	181200621.4	11072571.8	17155842798.4	9	228.6
495	6	151028.4	2286	55	-50	15494	188545853	183023248.2	5522604.8	12624674606.4	4.5	114.3
503	0	153314.4	2286	54	-46.5	15278.1	183327906	177882827.5	5445078.6	12447449611.9	4.5	114.3
510	6	155600.4	2286	53	-39.5	15151.1	180292728.2	174893253.3	5399474.9	10939336141.9	4.5	114.3

518	0	157886.4	2286	53	-45.5	14998.7	176683957.6	171339207.1	5344750.5	12218099619.0	4.5	114.3
525	6	160172.4	2286	52	-41	14808.2	172224298.4	166947953.4	5276345.0	12061724623.9	4.5	114.3
533	0	162458.4	2546	52	-48.5	14617.7	167821643.8	162613704.3	5207939.5	11905349628.8	4.5	114.3
540	6	164744.4	2286	51	-44	14427.2	163475993.7	158336459.8	5139534.0	11748974633.7	4.5	114.3
548	0	167030.4	2286	50	-39	14249.4	159471484.5	154395795.7	5075688.8	11603024638.2	4.5	114.3
555	6	169316.4	2546	50	-46	14071.6	155516632.7	150504789	5011843.7	11457074642.8	4.5	114.3
563	0	171602.4	2286	49	-33	14097	156078571.2	151057606.8	5020964.4	11477924642.1	4.5	114.3
570	6	173888.4	2286	49	-40	13919.2	152166282.8	147209163.5	4957119.3	11331974646.7	4.5	114.3
578	0	176174.4	2546	48	-34.5	13754.1	148577907.1	143680072.6	4897834.5	11196449650.9	4.5	114.3
585	6	178460.4	2286	48	-40.5	13601.7	145303563.4	140460453.3	4843110.1	11071349654.8	4.5	114.3
593	0	180746.4	2286	47	-31	13538.2	143950021	139129712.8	4820308.2	11019224656.4	4.5	114.3
600	6	183032.4	2546	47	-37	13385.8	140727361.5	135961777.6	4765583.8	10894124660.3	4.5	114.3
608	0	185318.4	2286	46	-30.5	13246.1	137805306.1	133089886.3	4715419.8	10779449663.9	4.5	114.3
615	6	187604.4	2286	46	-36.5	13093.7	134652572.2	129991876.8	4660695.4	10654349667.8	4.5	114.3
623	0	189890.4	2546	45	-30	12954	131794615.3	127184084	4610531.4	10539674671.4	4.5	114.3
630	6	192176.4	2286	45	-35.5	12814.3	128967314.3	124406946.9	4560367.3	10424999675.0	4.5	114.3
638	0	194462.4	2286	44	-28.5	12687.3	126423642.7	121908879.1	4514763.6	10320749678.2	4.5	114.3
645	6	196748.4	2546	44	-34	12547.6	123654866.4	119190266.8	4464599.6	10206074681.8	4.5	114.3
653	0	199034.4	2286	43	-21	12573	124156000.1	119682279.7	4473720.3	10226924681.1	4.5	114.3
660	6	201320.4	2286	43	-26	12446	121660465.7	117232349.1	4428116.7	10122674684.4	4.5	114.3
668	0	203606.4	2546	43	-30.5	12331.7	119436146.6	115049073.2	4387073.4	10028849687.3	4.5	114.3
675	6	205892.4	2286	42	-23	12217.4	117232349.1	112886319	4346030.0	9935024690.2	4.5	114.3
683	0	208178.4	2286	42	-28	12090.4	114807753.8	110507327.4	4300426.4	9830774693.5	4.5	114.3
690	6	210464.4	2546	41	-20.5	11976.1	112647279.8	108387896.7	4259383.1	9736949696.4	4.5	114.3
698	0	212750.4	2286	41	-24.5	11874.5	110744086.5	106521186.3	4222900.1	9653549699.0	4.5	114.3
705	6	215036.4	2286	41	-29	11760.2	108622375.6	104440518.8	4181856.8	9559724701.9	4.5	114.3
713	0	217322.4	2546	40	-17	11760.2	108622375.6	104440518.8	4181856.8	9559724701.9	4.5	114.3
720	6	219608.4	2286	40	-21	11658.6	106753638.4	102608264.5	4145373.9	9476324704.5	4.5	114.3
728	0	221894.4	2286	40	-24	11582.4	105362726.4	101244714.7	4118011.7	9413774706.5	4.5	114.3
735	6	224180.4	2546	39	-15.5	11493.5	103751523.3	99665434.16	4086089.1	9340799708.8	4.5	114.3
743	0	226466.4	2286	39	-19.5	11391.9	101925349.5	97875743.34	4049606.2	9257399711.4	4.5	114.3
750	6	228752.4	2286	39	-23	11303	100340748.5	96323064.95	4017683.6	9184424713.6	4.5	114.3
758	0	231038.4	2546	39	-26.5	11214.1	98768561.92	94782800.89	3985761.0	9111449715.9	4.5	114.3
765	6	233324.4	2286	38	-18	11125.2	97208789.62	93254951.16	3953838.5	9038474718.2	4.5	114.3
773	0	235610.4	2286	38	-21.5	11036.3	95661431.66	91739515.77	3921915.9	8965499720.5	4.5	114.3
780	6	237896.4	2546	38	-25	10947.4	94126488.02	90236494.71	3889993.3	8892524722.7	4.5	114.3
788	0	240182.4	2286	37	-16	10871.2	92820702.85	88958071.74	3862631.1	8829974724.7	4.5	114.3
795	6	242468.4	2286	37	-18.5	10807.7	91739515.77	87899686.49	3839829.3	8777849726.3	4.5	114.3
803	0	244754.4	2546	37	-21.5	10731.5	90450451.94	86637984.87	3812467.1	8715299728.3	4.5	114.3
810	6	247040.4	2286	37	-24.5	10655.3	89170508.85	85385403.98	3785104.9	8652749730.2	4.5	114.3
818	0	249326.4	2286	36	-15.5	10579.1	87899686.49	84141943.83	3757742.7	8590199732.2	4.5	114.3
825	6	251612.4	2546	36	-18	10515.6	86847635.09	83112694.26	3734940.8	8538074733.8	4.5	114.3
833	0	253898.4	2286	36	-21	10439.4	85593534.08	81885955.45	3707578.6	8475524735.7	4.5	114.3
840	6	256184.4	2286	36	-24	10363.2	84348553.8	80668337.38	3680216.4	8412974737.7	4.5	114.3
848	0	258470.4	2546	35	-14.5	10299.7	83318037.46	79660622.88	3657414.6	8360849739.3	4.5	114.3
855	6	260756.4	2286	35	-17	10236.2	82293854.97	78659242.23	3634612.7	8308724740.9	4.5	114.3
863	0	263042.4	2286	35	-20	10160	81073196.66	77465946.11	3607250.5	8246174742.9	4.5	114.3
870	6	265328.4	2546	35	-22.5	10096.5	80062948.62	76478499.91	3584448.7	8194049744.5	4.5	114.3
878	0	267614.4	2286	35	-25	10033	79059034.43	75497387.56	3561646.9	8141924746.1	4.5	114.3
885	6	269900.4	2286	34	-15.5	9969.5	78061454.08	74522609.04	3538845.0	8089799747.8	4.5	114.3
893	0	272186.4	2546	34	-18	9906	77070207.57	73554164.37	3516043.2	8037674749.4	4.5	114.3
900	6	274472.4	2286	34	-20.5	9842.5	76085294.91	72592053.55	3493241.4	7985549751.0	4.5	114.3
908	0	276758.4	2286	34	-22.5	9791.7	75301925.15	71826925.25	3474999.9	7943849752.3	4.5	114.3
915	6	279044.4	2546	34	-25	9728.2	74328413.4	70876215.35	3452198.1	7891724753.9	4.5	114.3
923	0	281330.4	2286	33	-14.5	9690.1	73747346.6	70308829.65	3438517.0	7860449754.9	4.5	114.3

930	6	283616.4	2286	33	-16.5	9639.3	72976137.82	69555862.33	3420275.5	7818749756.2	4.5	114.3
938	0	285902.4	2546	33	-19	9575.8	72017827.3	68620353.65	3397473.6	7766624757.8	4.5	114.3
945	6	288188.4	2286	33	-21.5	9512.3	71065850.62	67691178.81	3374671.8	7714499759.5	4.5	114.3
953	0	290474.4	2286	33	-23.5	9461.5	70308829.65	66952399.3	3356430.3	7672799760.8	4.5	114.3
960	6	292760.4	2546	32	-14	9398	69368253.89	66034625.38	3333628.5	7620674762.4	4.5	114.3
968	0	295046.4	2286	32	-16	9347.2	68620353.65	65304966.61	3315387.0	7578974763.7	4.5	114.3
975	6	297332.4	2546	32	-18.5	9283.7	67691178.81	64398593.61	3292585.2	7526849765.3	4.5	114.3
983	0	299618.4	2286	32	-20.5	9232.9	66952399.3	63678055.58	3274343.7	7485149766.6	4.5	114.3
988	0	301142.4	1524	32	-23	9169.4	66034625.38	62783083.49	3251541.9	4955349845.5	4.5	114.3
Deduct:												
Gas Inlet			8636	18	9	5715				11282493564.0	9	228.6
Gas Inlet			8636	18	9	5715				11282493564.0	9	228.6
Totals												
Volume										717936444599.7	mm3	
Volume										717.9	m3	
Mass										**1651.3**	**tonne**	

FINAL MASS OF CHIMNEY (CONCRETE SHELL AND BRICK LINER)	**7409.4**	**TONNE**

APPENDIX D – BRICK LINER DENSITY DETAILS

AGL MACQUARIE CHIMNEY STACKS INSPECTION RECORD

(Table updated August 2021)

SUMMARY - CHIMNEY STACKS DETAILS AND DATES AND TYPE OF INSPECTIONS

Power Station	Units	Unit size (MW)	Height (m)	Date comp	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
LIDDELL	1 - 2	2 X 500	168.25	1971							2,3				2		1,2,5								3,5,8
LIDDELL	3 - 4	2 X 500	168.25	1972									3	2	7,2*	1,7									3,5,8
BAYSWATER	1 - 2	2 X 660	250.4	1985										2,3	5		3,5,8		1,7		3,5,8				3,5,8,9
BAYSWATER	3 - 4	2 X 660	250.4	1986											5	1,7	3,5,8				3,5,8	1			3,5,8,9

Power Station	Units	Unit size (MW)	Height (m)	Date comp	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
LIDDELL	1 - 2	2 X 500	168.25	1971							3,5,8					5,8,10		8,10		10	8,10				
LIDDELL	3 - 4	2 X 500	168.25	1972							3,5,8					5,8,10		8,10		10	8,10				
BAYSWATER	1 - 2	2 X 660	250.4	1985							3,5,8					5,8,10		8,10,11		10	8,10				
BAYSWATER	3 - 4	2 X 660	250.4	1986							3,5,8					5,8,10		8,10		10	8,10				

LEGEND

1 Inspection carried out by steeplejack under works order
2 Internal inspection of bottom of the stack
2* Internal inspection of bottom of stack 1st outage after repairs made
3 Helicopter taking photographs of the top of the stack
4 Inspection of the top of the stack
5 External inspection of the concrete shell using high powered telescope
6 Internal inspection by video camera attached to a helium balloon
7 Repairs carried out
8 Thermographic Survey
8# Thermographic Survey and Life Management Study/Update
9 External close-up inspection of the concrete shell using a cherry picker
10 UAV External inspection
11 UAV internal inspection

ALL CHIMNEY STACKS HAVE CONCRETE WINDSHELLS WITH INTERNAL BRICK LININGS

STATION	UNITS	CONSTRUCT BY	BRICK DETAILS			MORTAR	FLASHING (see note 1)
			APPARENT POROSITY	RESISTANCE TO ACIDS	COLD CRUSH STRENGTH		
LIDDELL	1 - 2	TILEMAN	20 - 25 %	-	-	ACID & HEAT RESIST	LEAD
LIDDELL	3 - 4	TILEMAN	20 - 25 %	-	-	ACID & HEAT RESIST	LEAD
BAYSWATER	1 - 2	TILEMAN	NGT 10 %	NLT 99 %	NLT 20 MPa	CERELOX	PTFE
BAYSWATER	3 - 4	TILEMAN	NGT 10 %	NLT 99 %	NLT 20 MPa	CERELOX	PTFE

NGT denotes not greater than. **NLT** denotes not less than **PTFE** denotes fibre glass sandwich material flashing

Note 1: Flashing is material to seal between the overlapping brick lining sections

APPENDIX E – LIDDELL POWER STATION - CHIMNEY GEOMETRY & CONCRETE STRENGTH VERIFICATION MEMORANDUM

WELLANBAH INDUSTRIAL



LIDDELL POWER STATION CHIMNEY GEOMETRY VERIFICATION & CONCRETE STRENGTH TESTING

cma | A DELTA GROUP COMPANY
contracting

25 August 2025 **Document Ref: WI-ENG-2057-006-016-R0**

Ruan Zaayman
CMA Contracting
Project Manager
Mob: 0499 566 496
Email: ruan.zaayman@cmacontracting.com.au

Dear Ruan,

RE: LIDDELL POWER STATION – CHIMNEY GEOMETRY VERIFICATION & CONCRETE STRENGTH TESTING

As part of the Liddell Power Station chimney demolition works, there is a need to confirm the chimney structural geometry and concrete strength in order to ensure the engineering assessment of the demolition methodology is founded upon accurate design input data.

Structural Geometry Verification:

On the 29.07.25 & 8.08.25 Wellanbah Industrial Structural Engineer, Daniel Healy, completed site inspections with the purpose of reviewing the chimney structures geometry against details provided within the drawing set.

As per the drawing set, key features of the structure which were confirmed included:

- Base Diameter of Chimney
- Shell thickness
- Height of internal roof slab
- Geometry of truck access door
- Layout of roof slab support columns and internal beams
- Height to underside of corbel
- Reinforcement layout

Following a review of the structure, it was evident that the layout of key elements matched the details provided within the drawings. In addition, the measurements correlated very well with the values nominated, with measurements typically being within 2-3% of the values nominated on the drawings. It is noteworthy that the discrepancy is attributed to the method of verification, which consisted of a laser distance unit and tape measure. However, based on the nature of the structure, this accuracy is sufficient.

The values measured from site have been collated onto a cross section of each chimney, which is provided in Attachment 1 of this memorandum. Within this drawing, the geometry as noted on the drawings has been included to allow for a cross check of the measured values. The existing drawings have been included as Attachment 2.

It is noteworthy that the geometry / construct of both chimney structures was near identical, with very minor discrepancies in geometry noted, however once again this is likely attributed to the method adopted for taking site measurements.



FIGURE 1 – PHOTO AT BASE OF U1/U2 CHIMNEY



FIGURE 2 – PHOTO AT BASE OF U3/U4 CHIMNEY

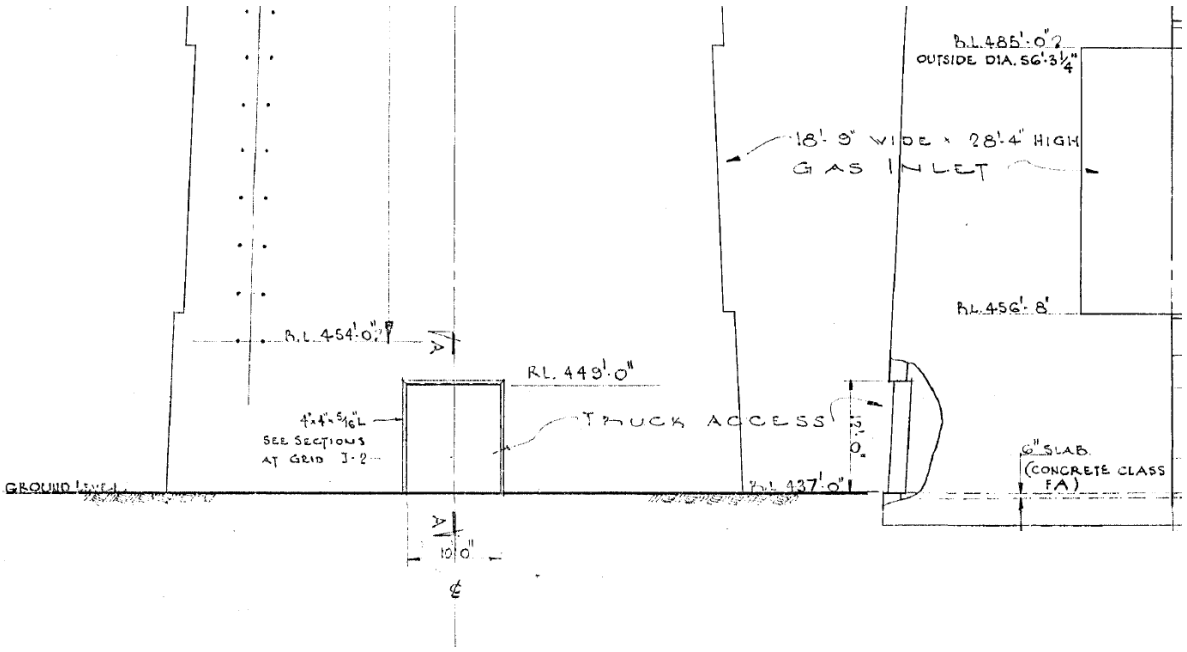


FIGURE 3 – EXTRACT FROM DRAWING LD247906K/3 – TRUCK ACCESS DETAILS



FIGURE 4 – PHOTO OF U1/U2 TRUCK ACCESS DOOR



FIGURE 5 – PHOTO OF U1/U2 EASTERN SIDE ROOF



FIGURE 6 – PHOTO OF U1/U2 INTERNAL ROOF SLAB



FIGURE 7 – PHOTO OF U3/U4 INTERNAL ROOF SLAB

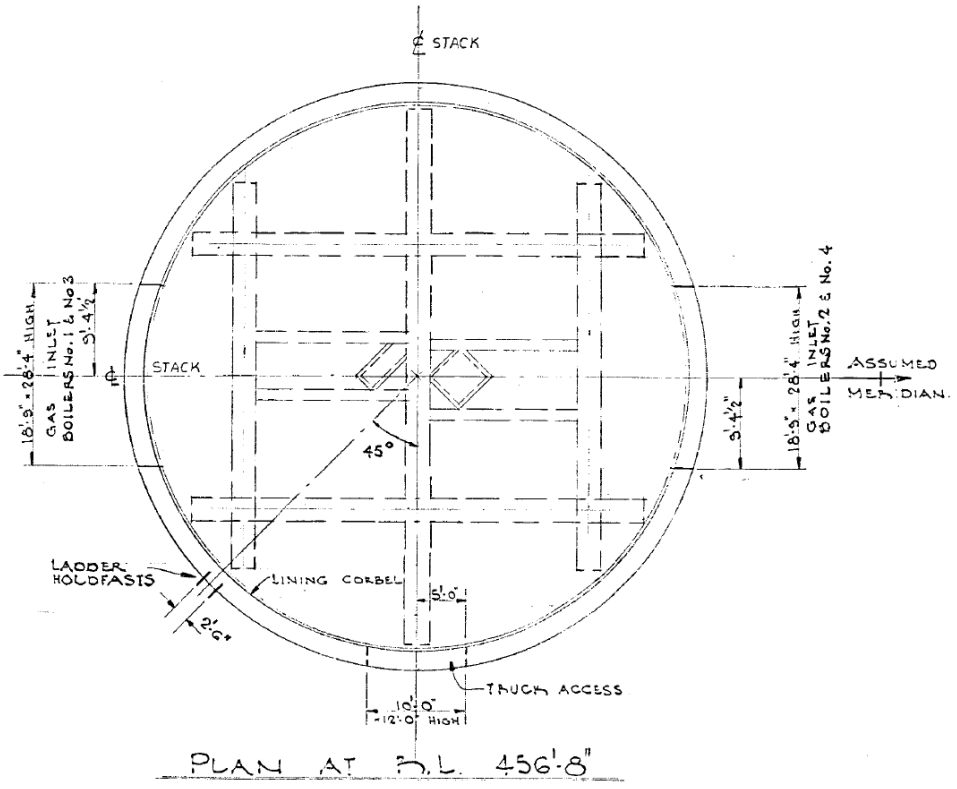


FIGURE 8 – EXTRACT FROM DRAWING LD247906K/3 – ROOF BEAM LAYOUT

Reinforcement Bar Layout:

As per the structural drawings, the reinforcement bar at the base of the chimney consists of the following:

TABLE 1 – LIDDELL POWER STATION CHIMNEYS – REBAR LAYOUT AS PER DRAWINGS

REBAR LOCATION	REBAR ORIENTATION	BAR NOTATION	DIAMETER (mm)	SPACING (mm)
Inside Face	Horizontal Bars	#6 CW @12" c/c	19	304.8
Inside Face	Vertical Bars	#6 CW @12" c/c	19	304.8
Outside Face	Horizontal Bars	#6 CW @ 6" c/c	19	152.4
Outside Face	Vertical Bars	#7 CW @ 9" c/c	22.2	228.6

Note that various areas adjacent to penetrations have reduced spacing, trimmer bars etc., which is not detailed in the above table.

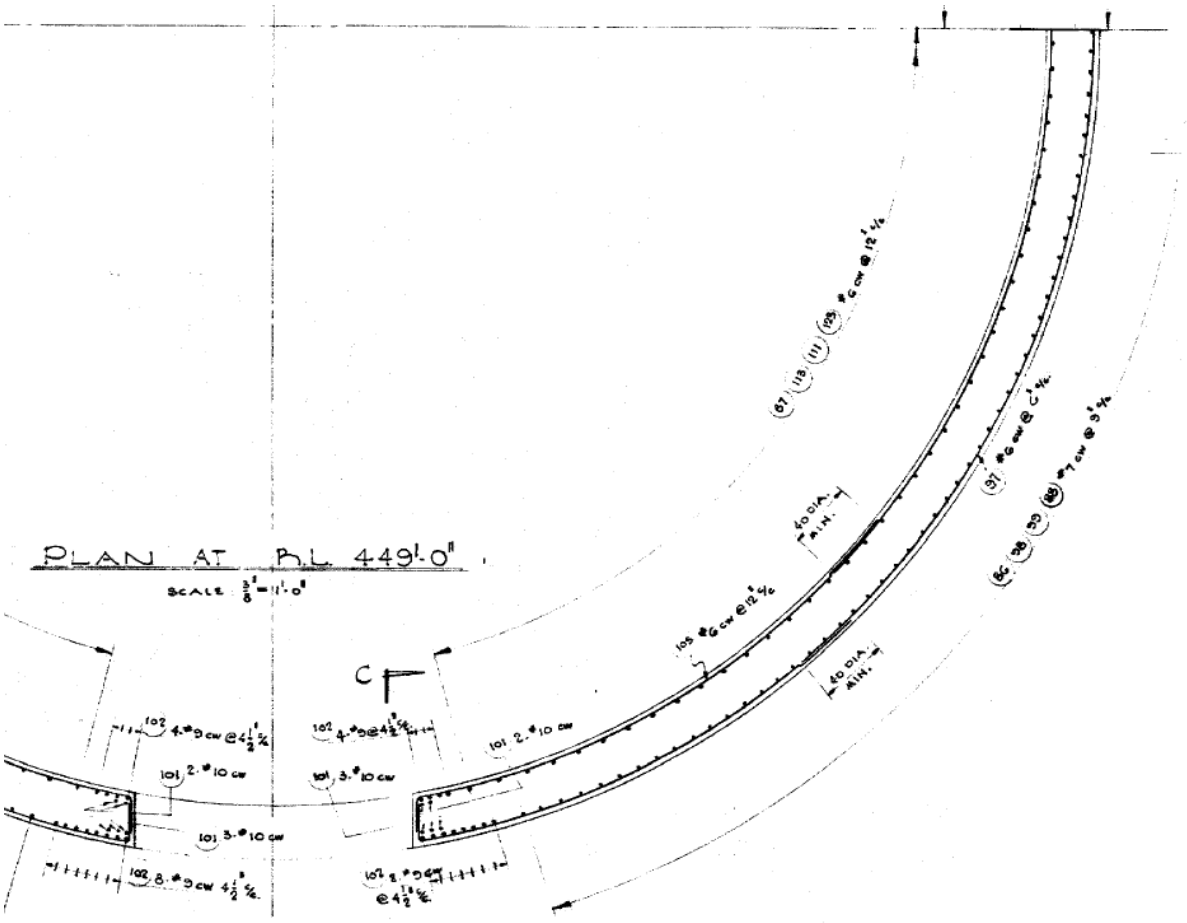


FIGURE 9 – EXTRACT FROM DRAWING LD247910A/1 – REBAR LAYOUT

In order to assess the reinforcement bar layout, concrete scanning was completed at several locations on the external and internal faces of the chimney. The bar diameter is most instances was able to be assessed by measuring bars which passed through core hole locations. However, no cores passed through the external vertical rebar on chimney U1/U2, hence this value was unable to be assessed, and will be confirmed once the break-out panels are removed closer to the blast event.

U1/U2 Chimney Rebar Site Measurements:



FIGURE 10 – U1/U2 EXTERNAL VERTICAL REBAR SPACING ≈ 225mm

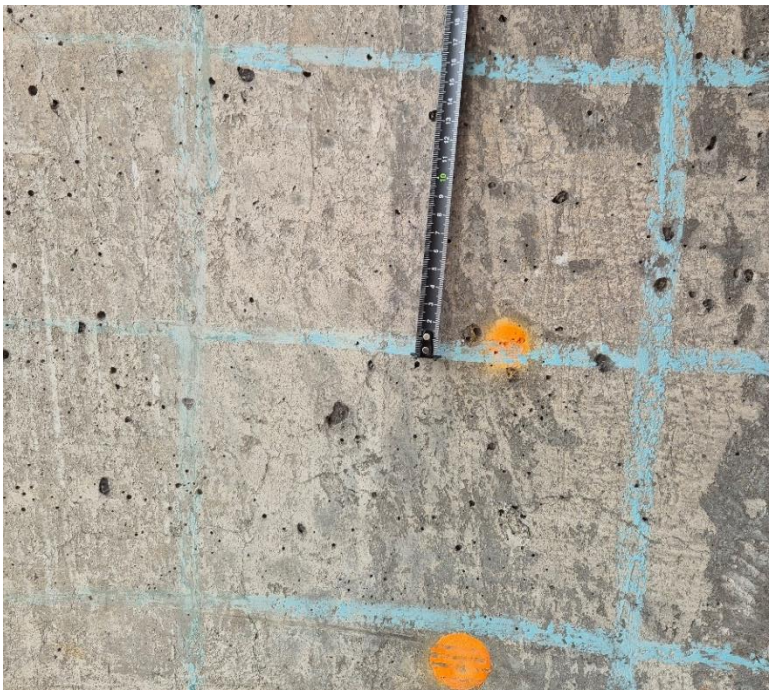


FIGURE 11 – U1/U2 EXTERNAL HORIZONTAL REBAR SPACING ≈ 160mm



FIGURE 12 – U1/U2 EXTERNAL HORIZONTAL REBAR OVERVIEW



FIGURE 13 – U1/U2 EXTERNAL HORIZONTAL REBAR DIAMETER ≈ 19mm



FIGURE 14 – U1/U2 INTERNAL VERTICAL REBAR SPACING ≈ 290mm



FIGURE 15 – U1/U2 INTERNAL HORIZONTAL REBAR SPACING ≈ 295mm



FIGURE 16 – U1/U2 INTERNAL HORIZONTAL REBAR OVERVIEW



FIGURE 17 – U1/U2 INTERNAL HORIZONTAL REBAR DIAMETER ≈ 20mm



FIGURE 18 – U1/U2 INTERNAL VERTICAL REBAR OVERVIEW



FIGURE 19 – U1/U2 INTERNAL VERTICAL REBAR DIAMETER ≈ 18mm

Following the site measurements, it is evident that both the reinforcement diameter and spacing correlate well with the structural drawings, hence we don't anticipate a significant discrepancy between the drawings and the construct of the chimney. Note that the rebar size and spacing will be further verified once the breakout panels are removed from the structure in accordance with the blast design.

TABLE 2 – U1/U2 CHIMNEY REBAR MEASUREMENTS SUMMARY

REBAR LOCATION	REBAR ORIENTATION	MEASURED DIAMETER (mm)	NOTABLE DISCREPENCY	MEASURED SPACING (mm)	NOTABLE DISCREPENCY
Inside Face	Horizontal Bars	20	Nil	295	Nil
Inside Face	Vertical Bars	18	Nil	290	Nil
Outside Face	Horizontal Bars	19	Nil	160	Nil
Outside Face	Vertical Bars	-	N.A	225	Nil

U3/U4 Chimney Rebar Site Measurements:



FIGURE 20 – U3/U4 EXTERNAL VERTICAL REBAR SPACING ≈ 235mm



FIGURE 21 – U3/U4 EXTERNAL HORIZONTAL REBAR SPACING ≈ 150mm



FIGURE 22 – U3/U4 EXTERNAL HORIZONTAL REBAR DIAMETER ≈ 19mm



FIGURE 23 – U3/U4 EXTERNAL VERTICAL REBAR OVERVIEW



FIGURE 24 – U3/U4 EXTERNAL VERTICAL REBAR DIAMETER ≈ 20mm

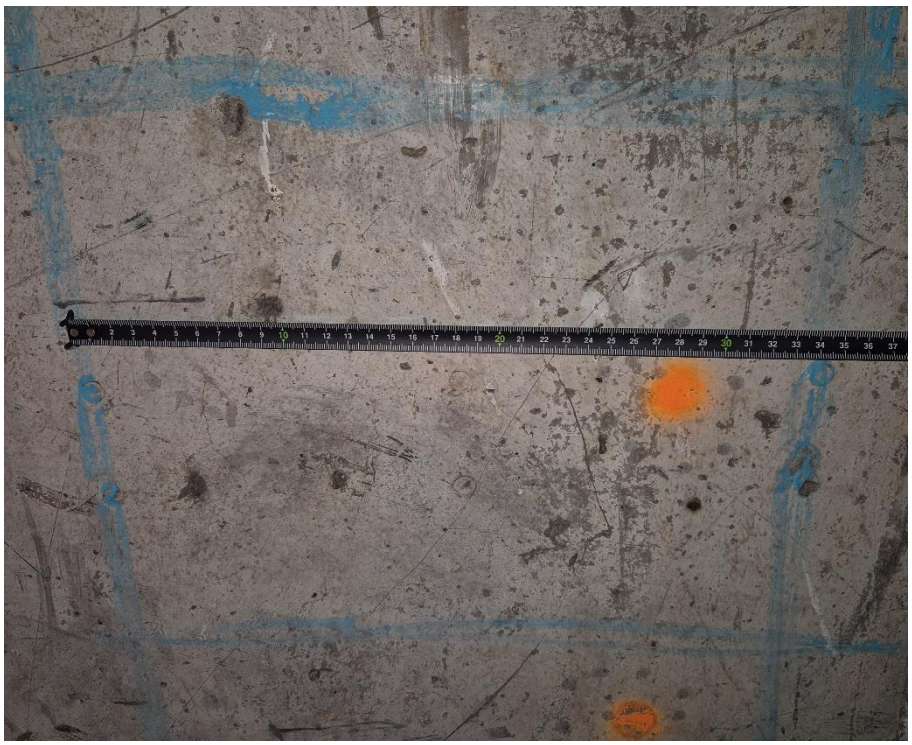


FIGURE 25 – U3/U4 INTERNAL VERTICAL REBAR SPACING ≈ 340mm



FIGURE 26 – U3/U4 INTERNAL HORIZONTAL REBAR SPACING ≈ 280mm



FIGURE 27 – U3/U4 INTERNAL HORIZONTAL REBAR OVERVIEW



FIGURE 28 – U3/U4 INTERNAL HORIZONTAL REBAR DIAMETER ≈ 18mm



FIGURE 29 – U3/U4 INTERNAL VERTICAL REBAR DIAMETER ≈ 18mm

Following the site measurements, it is evident that both the reinforcement diameter and spacing for the U3/U4 chimney also correlate reasonably well with the structural drawings. There were some minor potential discrepancies on the vertical external rebar (20mm measured vs. 22mm on drawings), and internal vertical bar spacing (340mm measured vs. 304.8mm on drawings), however these are not a concern for the blast design. They will also be further verified once the breakout panels are removed from the structure in accordance with the blast design.

TABLE 3 – U3/U4 CHIMNEY REBAR MEASUREMENTS SUMMARY

REBAR LOCATION	REBAR ORIENTATION	MEASURED DIAMETER (mm)	NOTABLE DISCREPENCY	MEASURED SPACING (mm)	NOTABLE DISCREPENCY
Inside Face	Horizontal Bars	18	Nil	280	Nil
Inside Face	Vertical Bars	18	Nil	340	Minor
Outside Face	Horizontal Bars	19	Nil	150	Nil
Outside Face	Vertical Bars	20	Minor	235	Nil

Concrete Strength Testing

In order to determine the strength of the concrete, two types of tests were completed on the Liddell Power Station chimney stacks. This include taking core samples from the chimney for offsite lab unconfined compression tests, as well as in-situ testing via a Schmidt hammer.

The notes on the structural drawings indicate that the concrete specification at the base of the chimneys was for 4000 PSI concrete at 60 days. This is the equivalent of 27.6 MPa concrete. The purpose of the testing was to confirm the minimum concrete grade to inform the structural analysis.

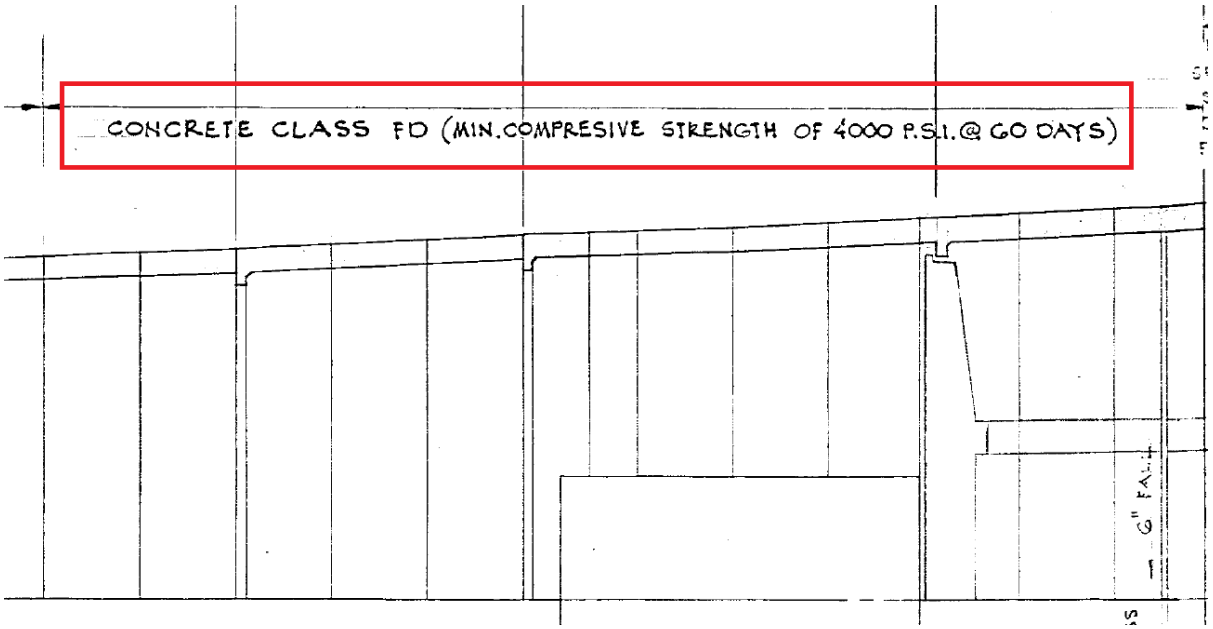


FIGURE 30 – EXTRACT FROM DRAWING LD247906K/3 – CONCRETE GRADE – 4000 PSI

Lab Test Results:

Core samples were taken from two locations per chimney (refer to Attachment 3), and analysed at Coffey Testing NATA certified laboratory (accreditation number 431). A summary of the results of these tests is provided in Table 2 below, with the lab report provided in Attachment 4.

TABLE 4 – COMPRESSION TEST RESULTS SUMMARY

SPECIMEN ID NO.	CHIMNEY	DATE OF TEST	CORE STRENGTH (MPa)	CORRECTED COMPRESSIVE STRENGTH (MPa)	CORE LOCATION
NEWC5177A	U1/U2	16.06.2025	30.5	30.5	S1C1
NEWC5177B	U1/U2	16.06.2025	30.5	30.5	S1C2
NEWC5177C	U3/U4	16.06.2025	24.5	24.5	S2C3
NEWC5177D	U3/U4	16.06.2025	28.0	28.0	S2C4

The results for the compression tests on the samples ranged from a low of 24.5 MPa to a high of 30.5 MPa. The lower bound sample represents a 3.1 MPa reduction to the specified concrete grade on the drawings.

Note that a set of samples were taken prior to this test, however the results were deemed void due to damage identified in the specimens following extraction / transport to the laboratory.

In-situ Test Results:
Due to the magnitude of the surface area of the chimneys, secondary in-situ testing was completed to both verify the results of the laboratory testing, and to evaluate general consistency of strength around the circumference of the chimneys. To achieve this, a regime of Schmidt Hammer Hardness Testing was completed on both chimney structures. The results reports and locations of tests are provided in Attachments 5 – 8, with the results summarised on the below tables.

TABLE 5 – SCHMIDT HAMMER TEST RESULTS SUMMARY – U1/U2 CHIMNEY

CHIMNEY	LOCATION	TEST NUMBER	APPARENT COMPRESSIVE TEST READING (MPa)	LOCATION	TEST NUMBER	APPARENT COMPRESSIVE TEST READING (MPa)
U1/U2	Inside Face	1	52	Outside Face	1	38
		2	54		2	38
		3	52		3	40
		4	55		4	39
		5	45		5	49
		6	46		6	50
		7	47		7	47
		8	47		8	44
		9	47		9	41
		10	38		10	39
		11	44		11	41
		12	52		12	39
		13	47		13	43
		14	44		14	43
		15	55		15	39
		16	49		16	30
		17	51		17	44
		18	43		18	44
					19	45
					20	43
					21	52
					22	54
					23	51
					24	47

TABLE 6 – SCHMIDT HAMMER TEST RESULTS SUMMARY – U3/U4 CHIMNEY

CHIMNEY	LOCATION	TEST NUMBER	APPARENT COMPRESSIVE TEST READING (MPa)	LOCATION	TEST NUMBER	APPARENT COMPRESSIVE TEST READING (MPa)
U3/U4	Inside Face	1	60	Outside Face	1	49
		2	60		2	49
		3	59		3	47
		4	59		4	46
		5	55		5	46
		6	51		6	50
		7	59		7	44
		8	60		8	49
		9	52		9	52
		10	57		10	54
		11	34		11	49
		12	44		12	51
		13	39		13	52
		14	52		14	47
		15	59		15	46
		16	54		16	46
		17	59		17	51
		18	59		18	49
		19	60		19	47
		20	60		20	47
		21	44		21	54
		22	55		22	57

As per the above results, it is evident that the compressive strength of the concrete is reasonably consistent for the structures. In addition, the testing resulted in a lower bound strength of 30 MPa, which as a single test hit on Chimney U1/U2, with the remaining results all exceeding 38 MPa.

In addition, the upper bound strength results reached 60 MPa, at numerous locations. Based on the hammer test results in combination of the laboratory compression test results, it is recommended that the engineering analysis of the blast / collapse design consider the possibility that the concrete strength may be as low as 24.5 MPa, and as high as 60 MPa. This is critical in ensuring that adequate integrity of the structures is maintained during the preparation works, but also that following the blast event, the structures are adequately weakened to cause rotation and subsequent collapse.

Summary:

In summary, the site investigations determined that the geometry of the Liddell Power Station Chimney Stacks matched the details provided within the relevant structural drawings. It was determined that there is potential that the concrete strength of chimney U3/U4 is 3.1 MPa lower than that specified 27.6 MPa strength, and this needs to be considered in finalising the detailed structural analysis of the demolition method.

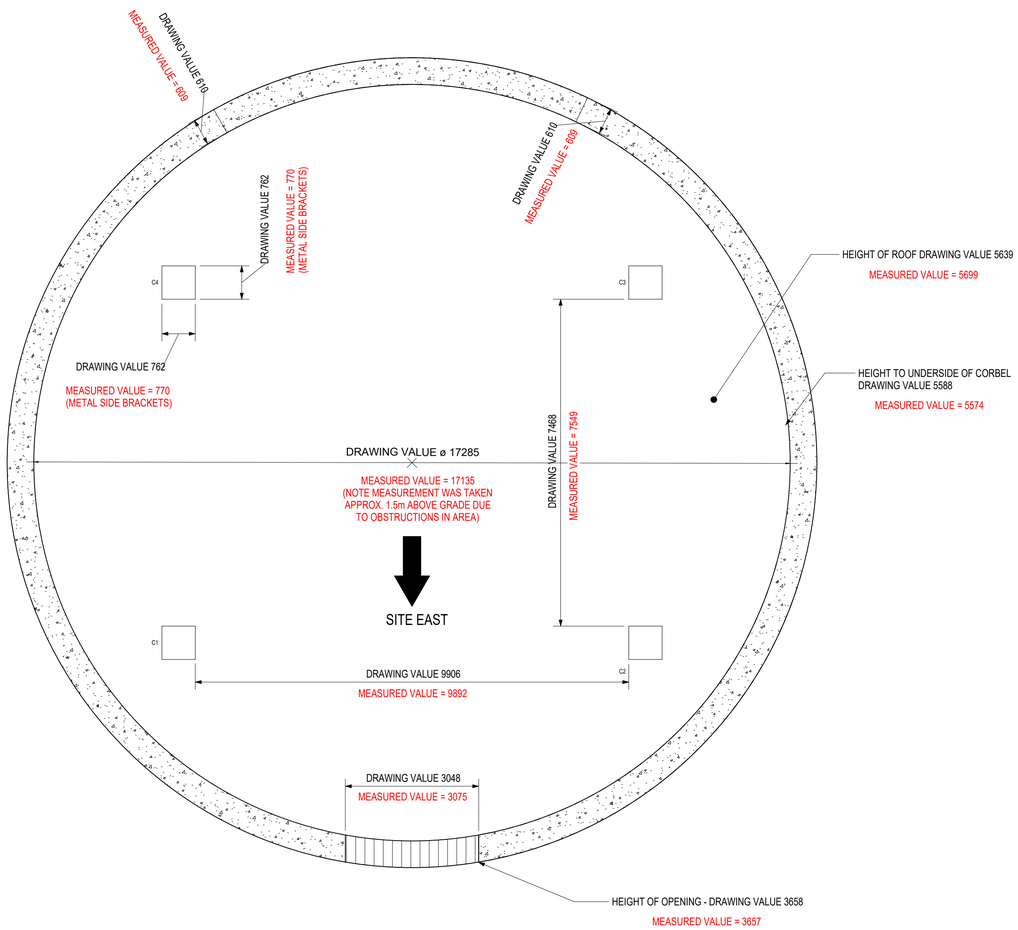
Should you require any further information or clarification regarding this assessment, please feel free to contact the undersigned at your earliest convenience.

Kind regards,

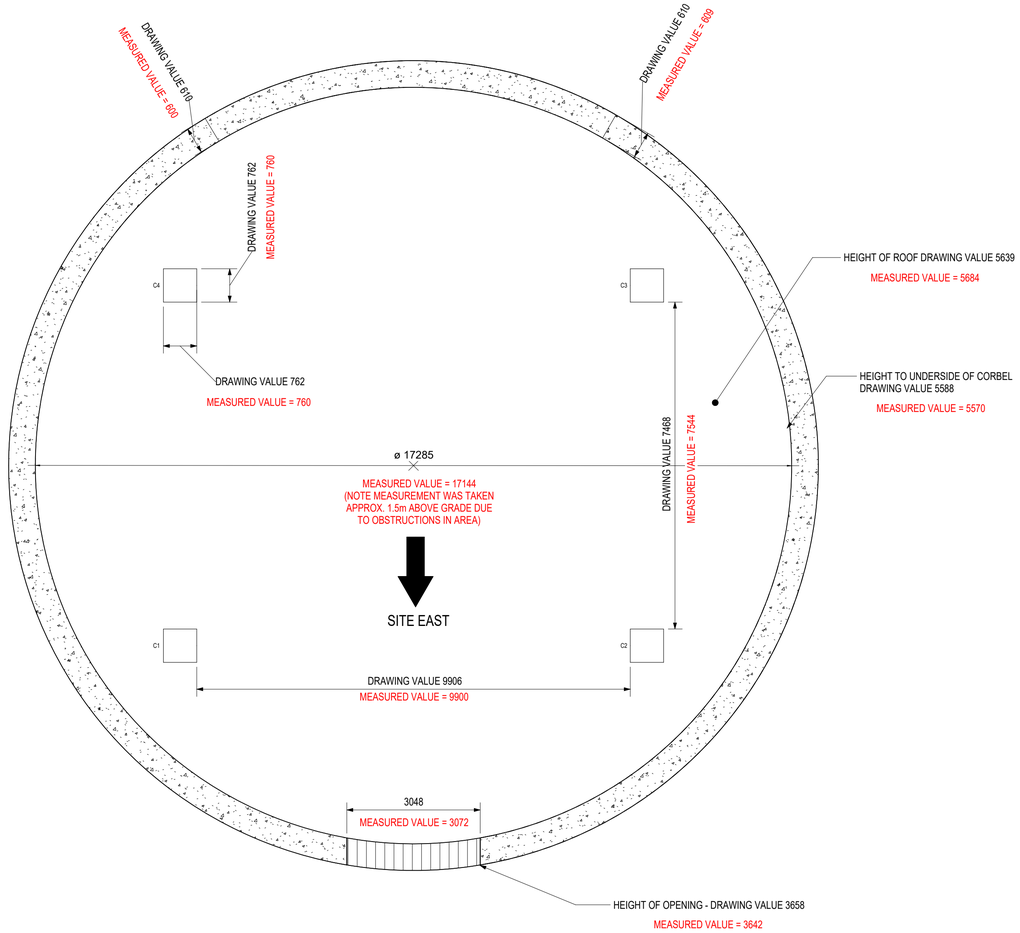


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Email: daniel.healy@wied.com.au

ATTACHMENT 1 – SITE MEASUREMENTS



CHIMNEY BASE SECTION - U1/U2
SCALE 1 : 70



CHIMNEY BASE SECTION - U3/U4
SCALE 1 : 70

NOTES:
1. SITE MEASUREMENTS WERE TAKEN DURING AN INSPECTION COMPLETED ON THE 29.07.2025 BY WELLANBAH STRUCTURAL ENGINEER DANIEL HEALY.
2. ALL DIMENSIONS PROVIDED ARE IN MILLIMETERS

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	ISSUED FOR INFORMATION	DH	DH	-	31.07.25

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Date 31.07.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY - SITE MEASUREMENTS**

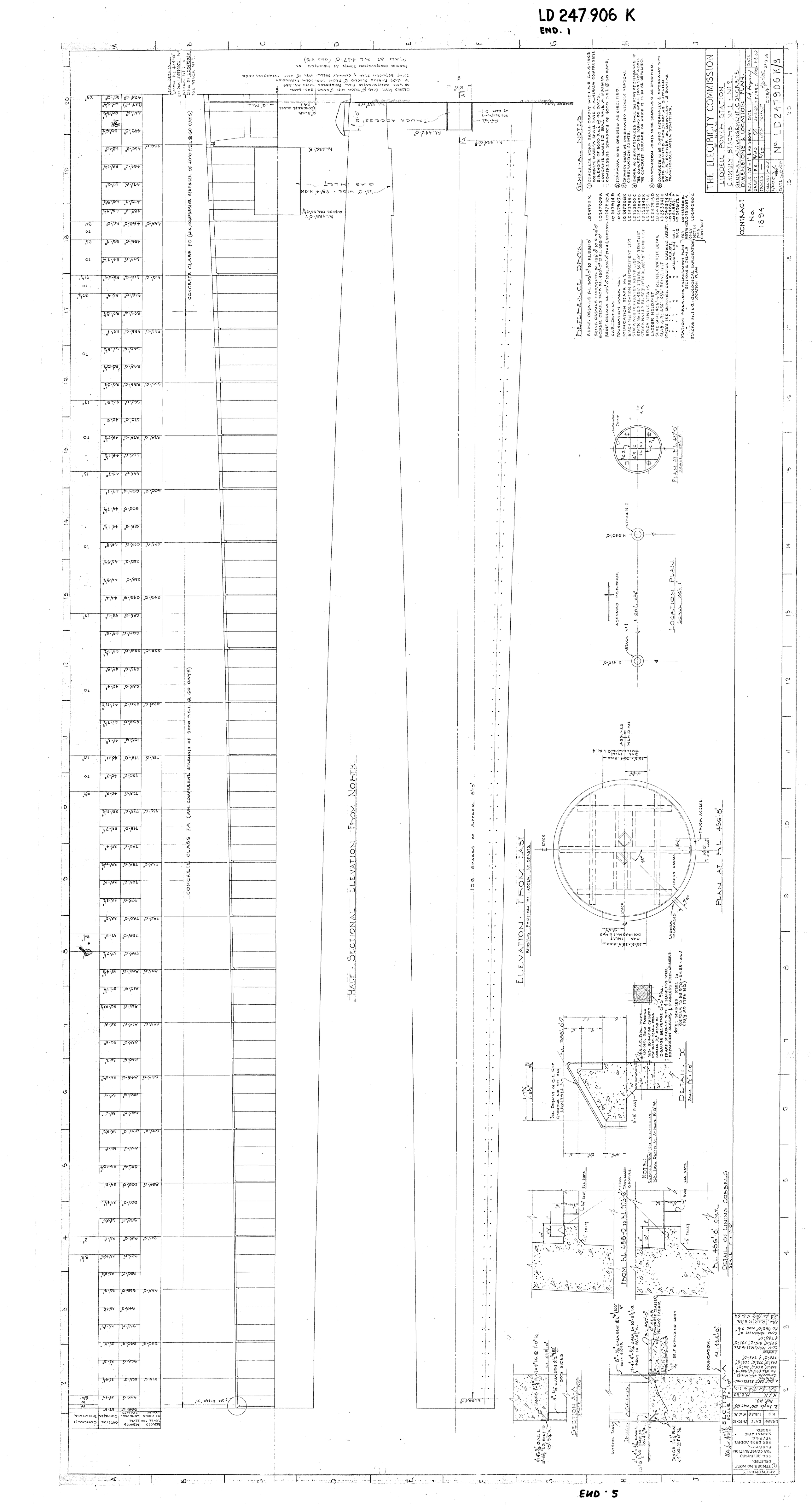
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Rev: A

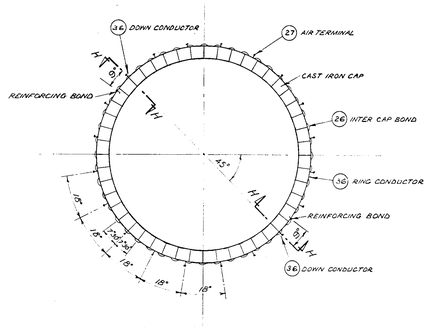
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ATTACHMENT 2 – EXISTING STRUCTURAL DRAWINGS

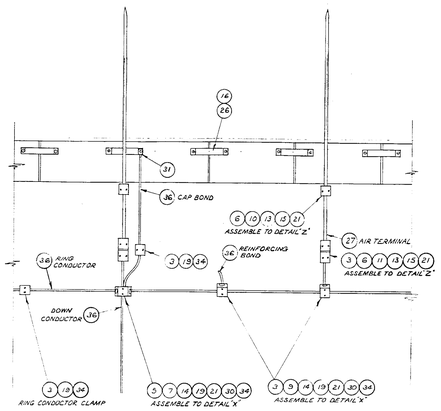
LD 247906 K

END. 1

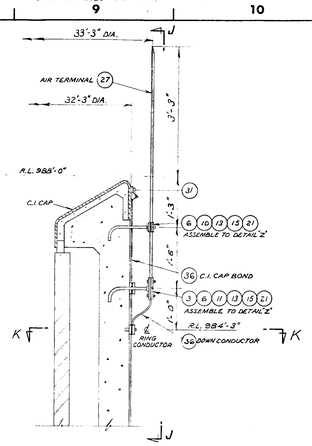

THE ELECTRICITY COMMISSION
OF N.S.W.
LIDDELL POWER STATION
CHIMNEY STACKS No 1 & No 2
GENERAL ARRANGEMENT PLANT
CONTRACT No. 1894
No. LD 247906 K/3
GENERAL NOTES
REFERENCE DRGS.
CONCRETE CLASS F1 (MIN. COMPRESSIVE STRENGTH OF 4000 PSI. @ 60 DAYS)
CONCRETE CLASS F4 (MIN. COMPRESSIVE STRENGTH OF 3000 P.S.I. @ 60 DAYS)
HALF SECTIONAL ELEVATION FROM NORTH
ELEVATION FROM EAST
LOCATION PLAN
PLAN AT RL 456.0
DETAIL 'X'
DETAIL OF LINING CORBELS
SECTION A-A
SECTION B-B
108 SPACES @ APPROX. 5'-0"
GAS FLUE
TRUCK ACCESS
GROUND LEVEL
RL 456.0
RL 449.0
RL 454.6
RL 455.0
RL 485.0
RL 486.0
RL 541.0
OUTSIDE DIA 33'-6"
INSIDE DIA 28'-6"
CONCRETE LINING
ASSUMED MERIDIAN
STACK No 1
STACK No 2
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N 450.0'
E 1601.6'
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SCALE 1:100
SCALE 1:50
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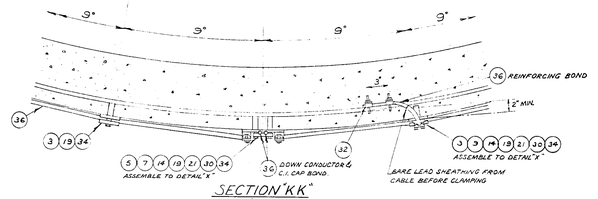
PLAN "AA"
SCALE: 1/4 IN. = 1FT.
R.L. 988'-0"



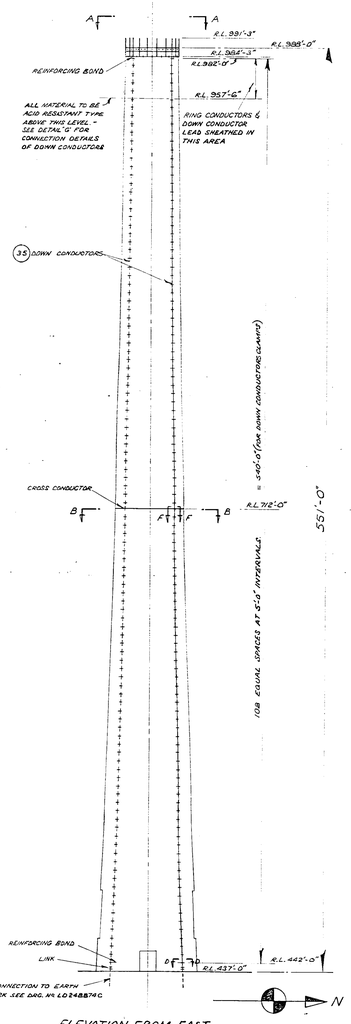
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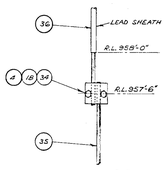
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SECTION "KK"
SCALE: 1 1/2 IN. = 1FT.
R.L. 984'-6"

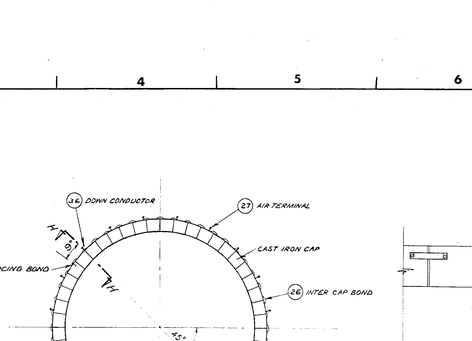


ELEVATION FROM EAST
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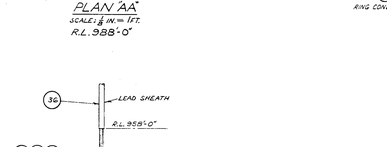


DETAIL "G"
SCALE: 1 1/2 IN. = 1FT.

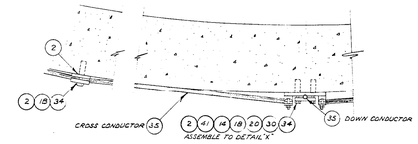
METHOD OF CONNECTING DOWN CONDUCTORS AT COMMENCEMENT OF LEAD SHEATH.



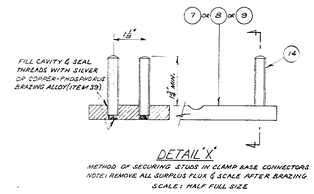
PLAN "BB"
SCALE: 1/16 IN. = 1FT.
R.L. 712'-0"



SECTION "DD"
SCALE: 1 1/2 INCH 1FT.
R.L. 442'-0"

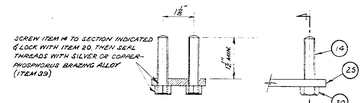


SECTION "FF"
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R.L. 712'-0"



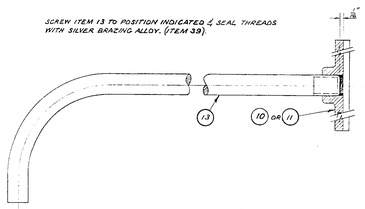
DETAIL "X"

METHOD OF SECURING STUDS IN CLAMP BASE CONNECTORS.
NOTE: REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
SCALE: HALF FULL SIZE



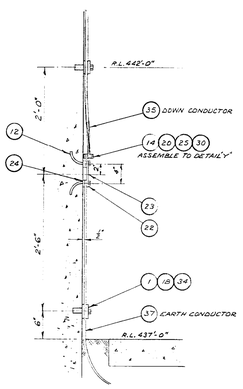
DETAIL "Y"

METHOD OF SECURING STUDS IN TEST LINK CABLE ADAPTOR.
NOTE: REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
SCALE: HALF FULL SIZE



DETAIL "Z"

METHOD OF SECURING HOOK BOLT IN CLAMP BASE.
NOTE: REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
SCALE: HALF FULL SIZE



SECTIONAL ELEVATION "EE"
SCALE: 1IN. = 1FT.

REFERENCE DRAWINGS

LD 248874 C - CHIMNEY STACKS N°1 & N°2 - LIGHTNING CONDUCTOR - EARTHING ARRANGEMENT.
LD 248871 P - CHIMNEY STACKS N°1 & N°2 - LIGHTNING CONDUCTOR - MATERIAL LIST - SHEET 1.
LD 248872 P - CHIMNEY STACKS N°1 & N°2 - LIGHTNING CONDUCTOR - MATERIAL LIST - SHEET 2.
LD 247906 K - CHIMNEY STACKS N°1 & N°2 - GENERAL ARRANGEMENT - CONCRETE FOUNDATION & PLAN LAYOUT.
LD 247907 A - CHIMNEY STACK N°1 - FOUNDATION.
LD 247908 K - CHIMNEY STACK N°2 - FOUNDATION.
LD 247914 A - CAP DETAILS.

NOTES

1. ITEM Nos. ENCIRCLED THUS (1) REFER TO ITEM Nos. LISTED ON MATERIAL LIST DRGS. Nos. LD 248871 P & LD 248872 P.
2. LEGS OF BOLTS FOR DOWN CONDUCTOR CLAMPING TO BE IN HORIZONTAL PLANE.
   LEGS OF BOLTS FOR ALL EARTH CLAMPING TO BE IN VERTICAL PLANE.
   LEGS OF HOOK BOLTS FOR TEST LINK & AIR TERMINAL TO BE IN VERTICAL PLANE.
3. EXPANDING PLUG TYPE MASONRY ANCHORS, ITEM 34, ARE TO BE SECURED INTO CHIMNEY IN ACCORDANCE WITH MAKER'S STANDARD INSTRUCTIONS.
4. LOWEST BOLTS AT R.L. 437'-6" MUST NOT BE IN ELECTRICAL CONTACT WITH ANY SURROUNDING REINFORCING METAL - ON NO ACCOUNT MUST LEGS OR HOOK BOLTS (FOR TEST LINK) TOUCH OR FORM ELECTRICAL CONNECTION WITH ONE ANOTHER OR WITH REINFORCING METAL ETC.
5. CONDUCTOR CLAMPS & CONNECTORS TO BE SECURELY TIGHTENED ONTO CONDUCTOR. CLAMPS SHALL BE SUFFICIENTLY TIGHT TO SUPPORT EACH CORRESPONDING LENGTH OF CONDUCTOR. CONNECTIONS SHALL POSSESS A STRENGTH IN TENSION OF AT LEAST 7 TONS / SQ. IN.
6. REINFORCING BONDS TO BE FIRMLY CLAMPED TO REINFORCING BAR. BONDING AT TOP OF CHIMNEY TO BE LEAD SHEATHED.
7. LEGS OF HOOK BOLTS (FOR TEST LINK) TO BE PERPENDICULAR & PROJECTING 1 1/2 IN. MIN. FROM FACE OF CHIMNEY.
8. CLAMPS SPACED ON 5'-0" CENTRES TO SUIT CONCRETE POUR LIFTS OF 5'-0".
9. THE RADIUS OF ANY BEND IN CONDUCTOR MUST NOT BE LESS THAN 8".
10. DOWN CONDUCTORS ABOVE R.L. 957'-6"; RING CONDUCTOR & BONDS AT R.L. 982'-6" TO BE CAPPED WITH LEAD ON STRIPPED ENDS OF CONDUCTOR. CAPPING TO BE WIPED TO CONDUCTOR SHEATHING TO MINIMUM THICKNESS OF LEAD EQUIVALENT TO RADIAL THICKNESS OF SHEATHING.
11. ALL EXPOSED CLAMPING & CONNECTIONS ABOVE R.L. 957'-6" TO BE OVER LEAD SHEATHING.
12. REINFORCING SHALL BE ELECTRICALLY CONTINUOUS FROM R.L. 984'-3" TO THE BASE OF THE STACK. WIRE TIES SHALL BE SUFFICIENT FOR THIS PURPOSE. LADDER HOLDFASTS TO BE IN ELECTRICAL CONTACT WITH REINFORCING WHERE POSSIBLE.

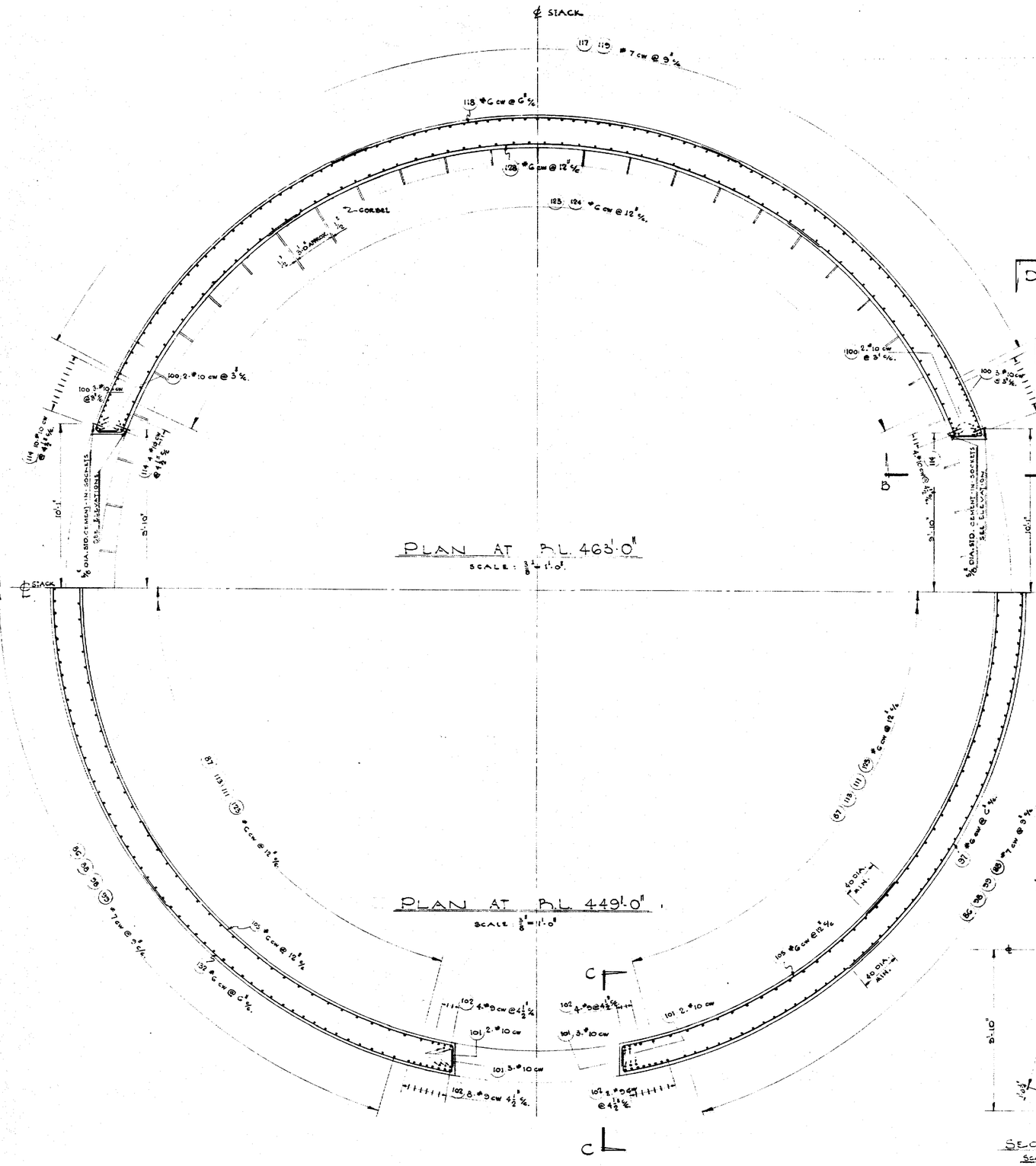
AMENDMENTS		
1. 1ST ISSUE AS REVISED		
2. NOTE RE TENDERING		
DELETED	CKD. K.K.	
REVD. K.S.W.	7.8.68	

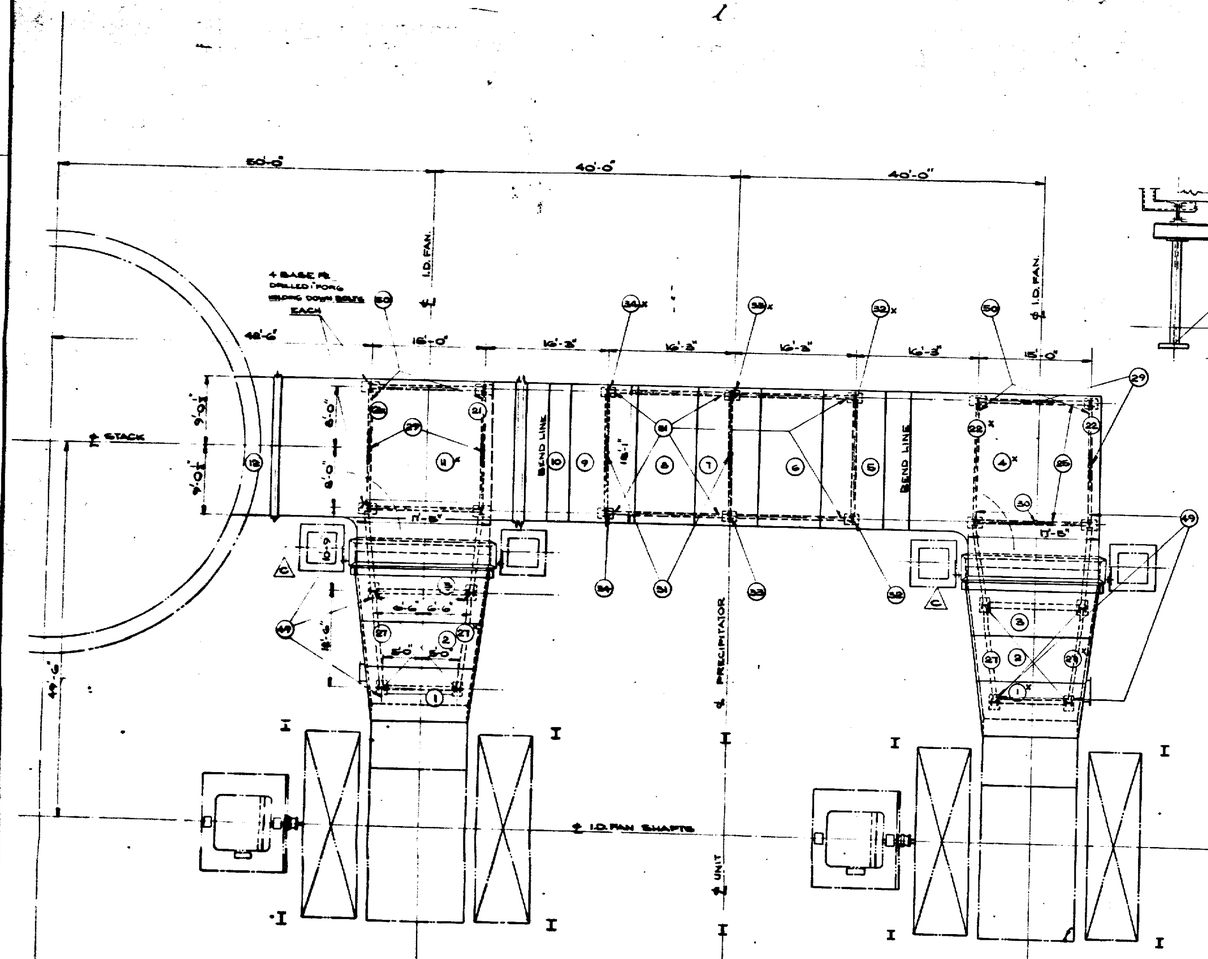
CONTRACT
Nº
1894

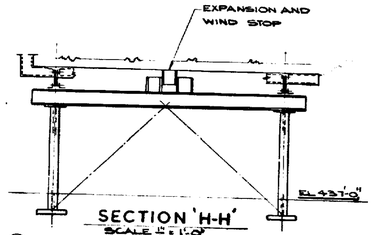
THE ELECTRICITY COMMISSION
OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS Nº1 & Nº2
LIGHTNING CONDUCTOR
ARRANGEMENT

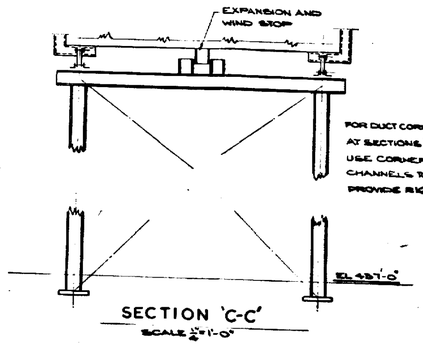
SCALE AS SHOWN				DATE	F.J.A.	DATE
DRAWN	K.R.	E/MP		16/3/68	D.C.E./POWER:	30/5/68
TRACED		L.E.S.A.			A.A. Ferguson	31/5/68
CHECKED	S.G.				P.E./CON.	
S.E./E.D.O:						
DATE	13-3-68				LD248873 A 2	


℄ STACK
117 115 #7 cw @ 9"c/c
118 #6 cw @ 6" c/c
128 #6 cw @ 12" c/c
123 124 #6 cw @ 12" c/c
2-CORBEL
3'-0" APPROX.
100 2-#10 cw @ 3" c/c
100 3-#10 cw @ 8" c/c
114 #10 cw @ 4½" c/c
114 #10 cw @ 9" c/c
10'-1"
5'-10"
5/8" DIA. STD. CEMENT IN SOCKETS
SEE ELEVATION
B
B
100 2-#10 cw @ 3" c/c
100 3-#10 cw @ 8" c/c
114 #10 cw @ 4½" c/c
114 #10 cw @ 9" c/c
5/8" DIA. STD. CEMENT IN SOCKETS SEE ELEVATION
PLAN AT R.L. 463'-0"
SCALE: 3/8" = 1'-0"
℄ STACK
87 113 111 #6 cw @ 12" c/c
33 #6 cw @ 6" c/c
95 #7 cw @ 9" c/c
103 #6 cw @ 12" c/c
105 #6 cw @ 12" c/c
57 #6 cw @ 6" c/c
57 #6 cw @ 9" c/c
86 88 89 #7 cw @ 9" c/c
40 DIA. MIN.
40 DIA. MIN.
PLAN AT R.L. 449'-0"
SCALE 3/8" = 1'-0"
C
C
102 4-#9 cw @ 4½" c/c
101 2-#10 cw
101 3-#10 cw
102 8-#9 cw @ 4½" c/c
102 4-#9 cw @ 4½" c/c
101 2-#10 cw
101 3-#10 cw
102 8-#9 cw @ 4½" c/c
C
C
E
D
25 SPACES @ 1'-0" = 25'-0" (ON FACE OF CONCRETE)
7½"
20'-4"
5/8" DIA. STD. RAWLPLUG "CEMENT-IN-SOCKETS" WITH ⅜" DIA x 3" GALV. SET SCREW
16'-5"
4½"
INSIDE ELEVATION GAS INLET OPENINGS.
SCALE ¾" = 1'-0" (DISTORTED)
E
D
5/8" DIA. STD. RAWLPLUG "CEMENT-IN-SOCKETS" WITH ⅜" DIA x 3" GALV. SET SCREW
25 SPACES @ 1'-0" = 25'-0" (ON FACE OF CONCRETE)
20'-4"
16'-5"
3½"
8½"
OUTSIDE ELEVATION GAS INLET OPENINGS
SCALE ¾" = 1'-0" (DISTORTED)
E
E
R.L. 498'-0"
R.L. 495'-0"
R.L. 488'-0"
R.L. 485'-0"
3-#10 cw @ 3" c/c
2-#10 cw @ 3" c/c
1-#10 cw
3-#10 cw @ 3" c/c
112 #7 cw @ 9" c/c
SECTION B-B
SCALE 5/8" = 1'-0"
117 #7 cw @ 3" c/c
3-#10 cw @ 3" c/c
R.L. 456'-6"
116 #7 cw @ 15" c/c
R.L. 450'-0"
1-#10 cw
100 115 #7 cw @ 9" c/c
94 3-#10 cw @ 3" c/c
91 1-#10 cw
95 #7 cw @ 9" c/c
R.L. 437'-0"
92 1-#10 cw
96 3-#10 cw @ 8" c/c
36 3-#6 cw @ 6" c/c
R.L. 434'-0"
DOWELS
SEE LD 247907 A STACK N°1
SEE LD 247908 K STACK N°2
SECTION C-C
SCALE 5/8" = 1'-0"
D
D
5/8" DIA. STD. RAWLPLUGS
112 #7 cw @ 9" c/c
R.L. 456'-8"
R.L. 456'-0"
10 #6 cw @ 6" c/c
3-#10 cw @ 3" c/c
137 3/4" CHAMFER
7 PER SEGMENT
56 SEGMENTS
26-#10 cw @ 3" c/c
R.L. 449'-0"
1-#10 cw
15
R.L. 441'-6"
12-#6 cw @ 12" c/c
97 24-#6 cw @ 6" c/c
91 1-#10 cw
96 3-#10 cw @ 8" c/c
36 3-#6 cw @ 6" c/c
R.L. 434'-0"
DOWELS
SEE LD 247907 A STACK N°1
SEE LD 247908 K STACK N°2
SECTION D-D
SCALE 3/8" = 1'-0"
RAWLPLUGS SYMMETRICAL ABOUT ℄ GAS DUCT OPENING.
18 SPACES @ 1'-0" = 18'-0"
5'-10"
1'-6"
SECTION E-E
SCALE 3/8" = 1'-0"
18 SPACES @ 1'-0" = 18'-0"
5'-10"
10'-1"
SECTION B-B
SCALE 3/8" = 1'-0"
NOTE:
FOR NOTES SEE DRG. No. LD 247906 K
& DRG. No. LD 247909 A
REFERENCE DRGS.
GENERAL ARRANGEMENT LD 247906 K
ELEVATION R.L 434'-0 TO SCB'G & CORBEL DET LD 247909 A
FOUNDATION STACK N°1 LD 247907 A
FOUNDATION STACK N°2 LD 247908 K
REINFORCING LIST RL 434'-0" TO RL 503'-0" LD 253840 B
THIS DRG. IS TO BE READ IN CONJUNCTION WITH DRG. No. LD 247909 A
DRG RELEASED FOR CONSTRUCTION
CONTRACT No.
REF. DRGS. ADDED
P.E./PSC. R.E./M.P.
SIGNATURES ADDED.
DRAWN DATE CHECKED
K.U. 2.8.68 RS
CONTRACT N° 1894
THE ELECTRICITY COMMISSION OF N.S.W.
LIDDELL POWER STATION
CHIMNEY STACKS N°1 & N°2
REINFORCEMENT DETAILS R.L. 434'-0" TO R.L. 503'-0"
PLAN & SECTIONS
SCALE AS SHOWN
DRAWN P.C.
TRACED
CHECKED G.F.
DATE
E/MP
DATE 8.4.68
DATE 8.8.68
LD 247910 A/1
A
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C
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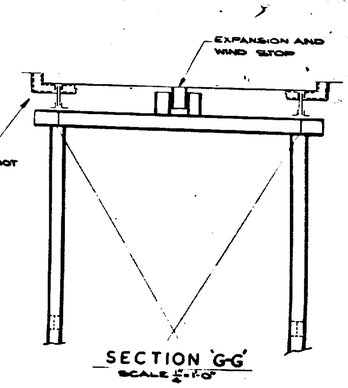


SECTION 'H-H'
SCALE 1/4" = 1'-0"



FOR DUCT CORNER CONNECTIONS AT SECTIONS 'CC', 'GG' & 'HH' DO NOT USE CORNER PLATES. CHANNELS TO LAP CORNER TO PROVIDE RIGID FRAME.

SECTION 'C-C'
SCALE 1/4"=1'-0"



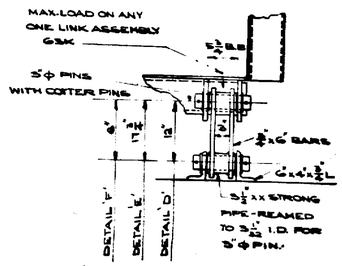
SECTION 'G-G'
SCALE 1/4"=1'-0"

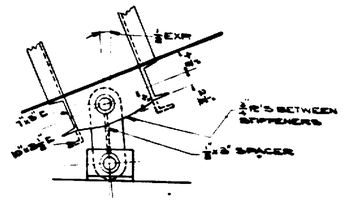
SHACKLE TYPE MOUNTING

MARK N°S	DIMENSION 'V'	N° OFF
49	6"	12
50	17 3/4"	4
51	12"	6

WIND TIE

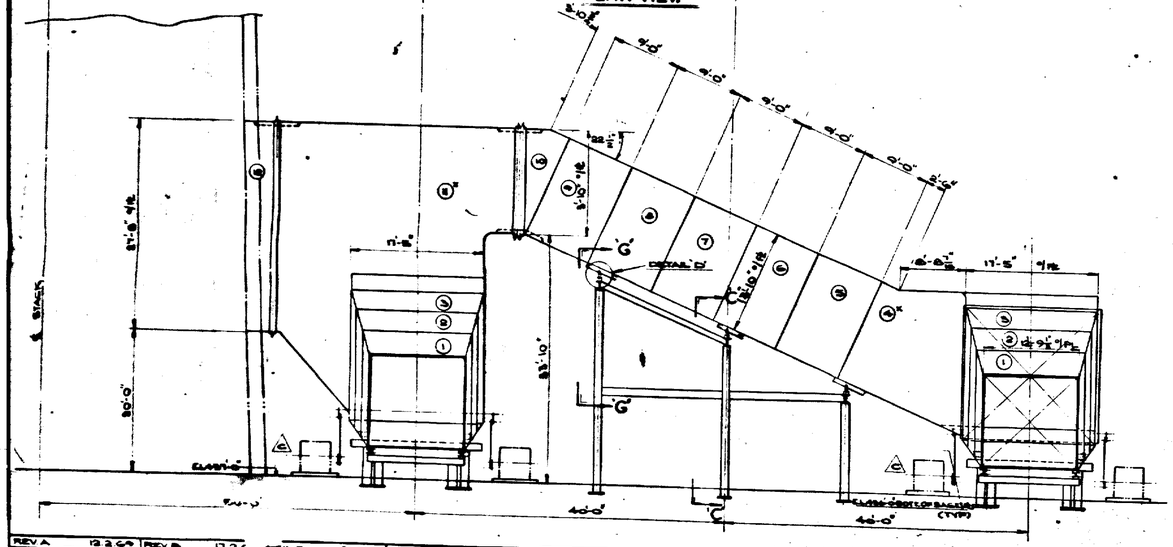
MARK N°	N° OFF
29	4
30	1
31	2



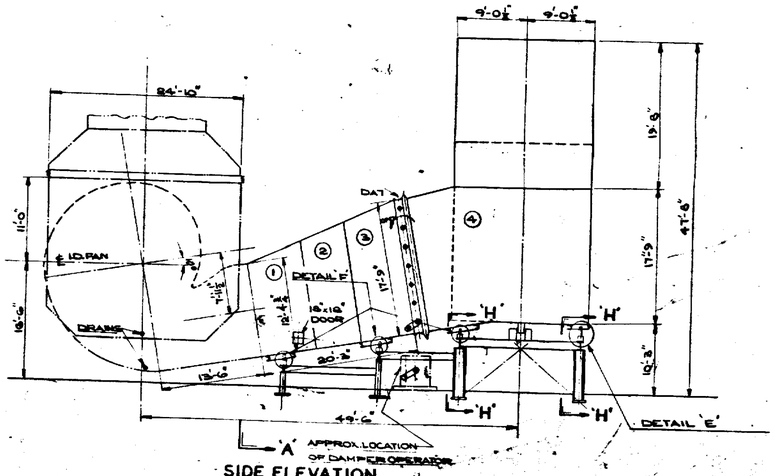


DETAIL 'D'
DETAIL 'E'
DETAIL 'F'
SCALE 1"=1'-0"

PLAN VIEW



FRONT ELEVATION



SIDE ELEVATION

REV	DATE	DESCRIPTION	BY
A	12.2.69	DIMENSION 249'1" FROM ℄ STACK TO DUPLICATION IT DELETED ALSO DETAIL 'D' REPOSITIONED MODIFIED PER C.E. TELEX 29/1/69	WK
B	17.2.69	PAINTING SCHEDULE ADDED	DAB
C	27.6.69	SECOND CONTROL UNIT ADDED FOR DAMPER D7, SHOWN FOR BLR N°S 1 & 2 CESO LETTER 5-935-028, 17.6.69	WK RHW
D	22.11.70	DRG TRACED WITHOUT ALTERATION	DB JS

NOTES 3RD ANGLE PROJECTION

ONE BOILER SET, AS DRAWN, FOR BOILER N°1
ONE BOILER SET, AS DRAWN, FOR BOILER N°3

MARK N°S TO BE PAINTED ON DUCTING IN BLACK LETTERING ON APPROPRIATE COLOUR PATCH

N°1 BLR	RED	PATCH
N°2 "	WHITE	"
N°3 "	GREEN	"
N°4 BLR	YELLOW	PATCH

REF DRGS

GAS DUCT, I.D. FAN TO STACK, DETAILS SHT1	268\10\5
GAS DUCT, I.D. FAN TO STACK, DETAILS SHT2	268\10\6
GAS DUCT, SUPPORTS	268\10\7
ARRGT OF I.D. DUCTING FOR BLRS 3 & 4	268\10\4
DETAILS OF DUCTING & SUPPORTS (I.D.)	268\10\1
MATL. LIST (DUCT SCHEDULE 'P5')	268\10\3

PAINTING

SURFACE PREPARATION & PAINTING TO BE DONE AT SITE TO N° 2L PAINTING SCHEDULE 29-APR-68. FOR DUCTING ITEM 10 FOR STEELWORK ITEM 1

LETTER FILED	CONTRACT NO.
NOV 570	1600

SUBSTANDARD FOR MICROFILMING

LD257271A/2

THIS DRG WAS REPRODUCED FROM C.E. DRG. N° E732-481-5

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INTERNATIONAL COMBUSTION (AUSTRALIA) LTD.

EC OF N.S.W. - LIDDELL POWER STATION - UNITS 1 & 2

ARRANGEMENT OF GAS DUCTING
I.D. FAN TO STACK.

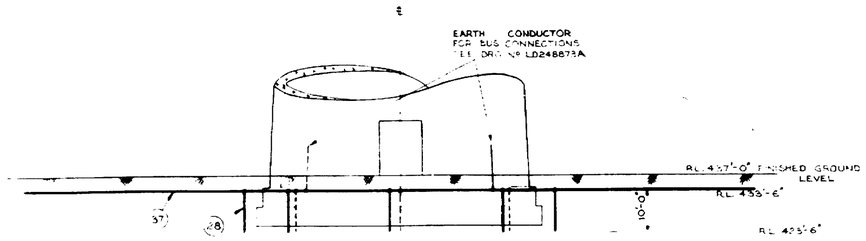
ITEM 11-20

C.E. DRG N° E-935-028-0

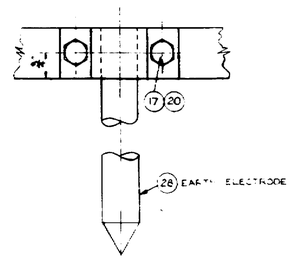
C. BROWN JS 22.1.70
WK 27.1.69
ADS
SCALE 1/8"=1'-0"

268 10 /2
REV D

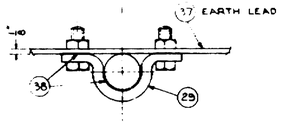
KODAK 16-11-70



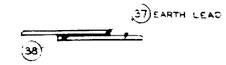
ELEVATION



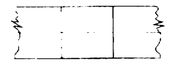
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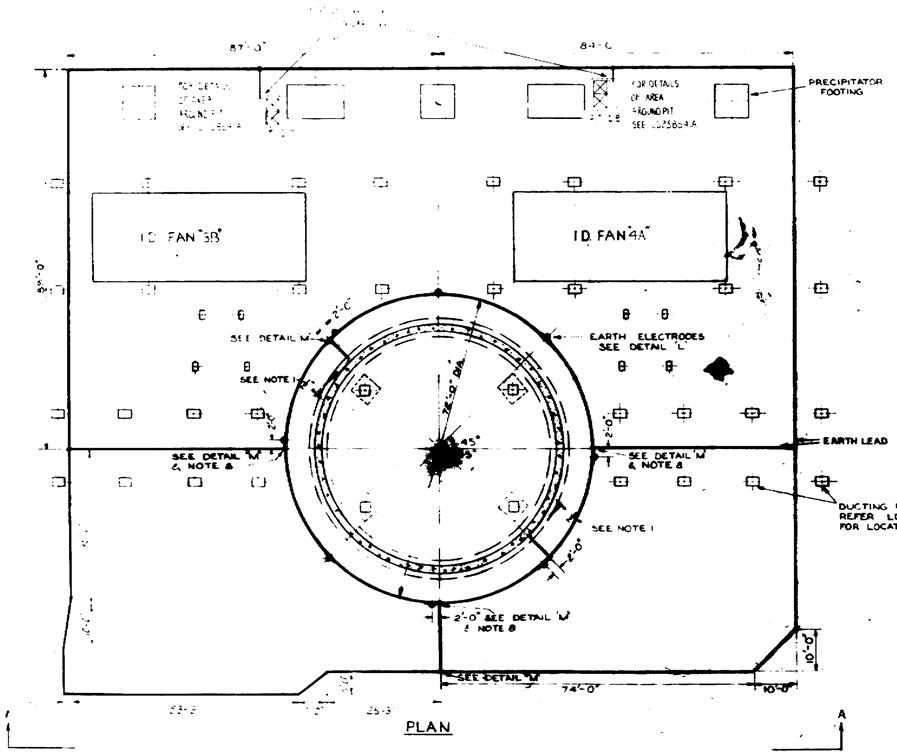
PLAN
DETAIL 'L'



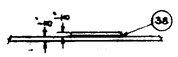
ELEVATION



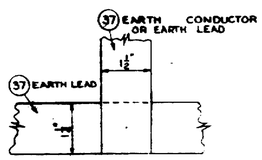
PLAN
DETAIL 'N'



PLAN



ELEVATION



PLAN
DETAIL 'M'

REFERENCE DRAWINGS

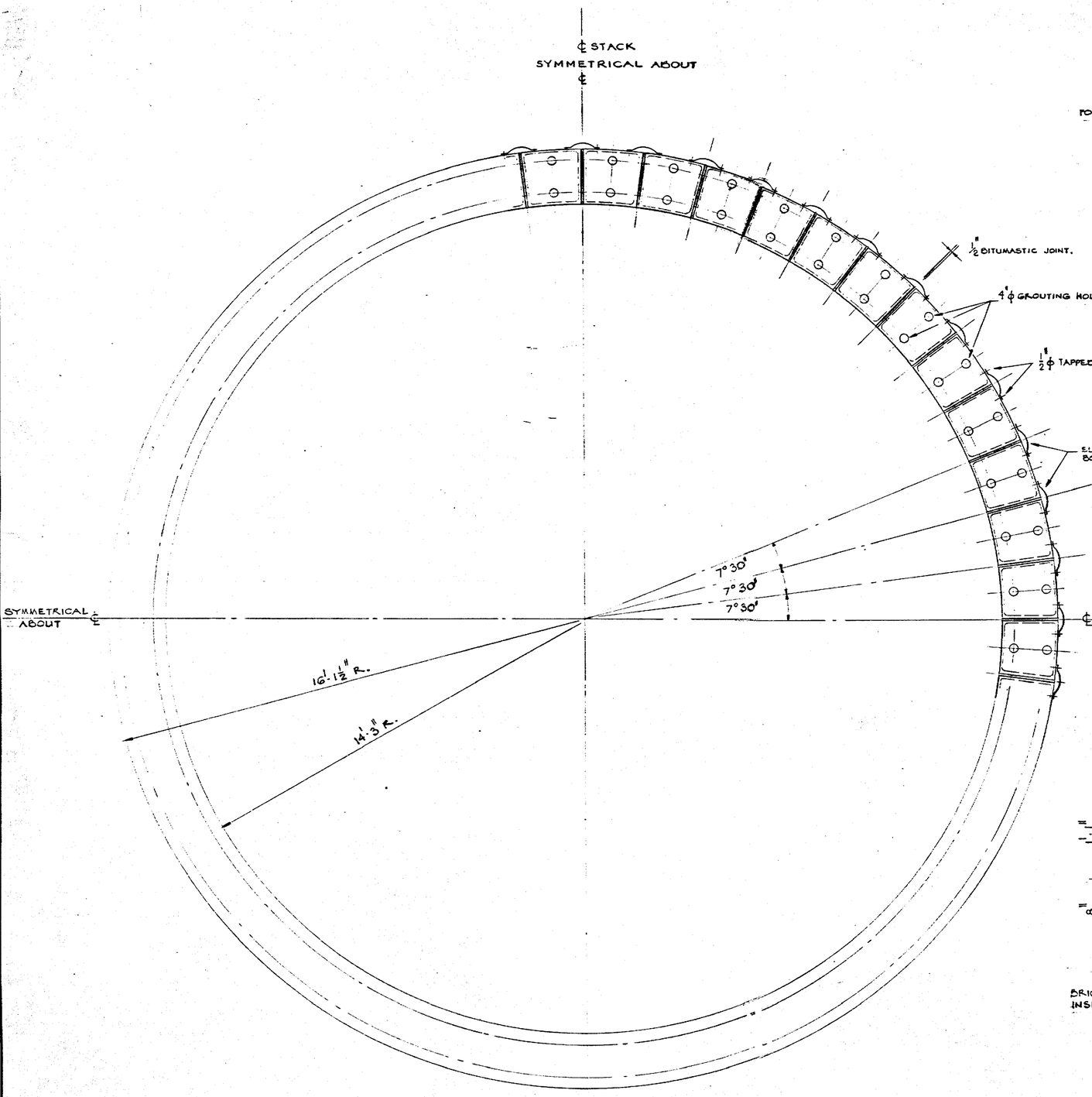
LD247908 K - CHIMNEY STACK No 2 - FOUNDATION
LD248873 A - CHIMNEY STACKS No 1 & No 2 - LIGHTNING CONDUCTOR - ARRANGEMENT
LD248871 P - CHIMNEY STACKS No 1 & No 2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 1
LD248872 P - CHIMNEY STACKS No 1 & No 2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 2
LD258640A - BOILERS 3 & 4 - PRECIPITATORS & I.D. FANS AREA - CABLE PITS, TUNNEL & CONDUIT LAYOUT.
LD258641A - " " I.D. FANS 4A & 4B AREA - CABLE PITS & CONDUIT DETAILS
LD258642A - " " " 3A & 3B " " " " "
[illegible] - CHIMNEY STACK No 1 - LIGHTNING CONDUCTOR EARTHING ARRANGEMENT

NOTES.

1. EARTH CONDUCTOR TO BE ½" CLEAR OF & PARALLEL TO FINISHED FACE OF STACK AS INDICATED IN PLAN. EARTH CONDUCTOR TO BE EXTENDED UP TO RL 441'-0" FOR EARTHING OF SCAFFOLDING (REINFORCEMENT BE DURING CHIMNEY CONSTRUCTION) ON COMPLETION OF CHIMNEY CONSTRUCTION, EARTH CONDUCTORS ARE TO BE TERMINATED AT TEST LINK IN ACCORDANCE WITH SECTION [illegible] ON RISE MILDENHALL
2. TEMPORARY LEADS FOR EARTHING OF SCAFFOLDING ETC DURING CHIMNEY CONSTRUCTION SHALL BE FIRMLY BONDED TO EARTH CONDUCTOR AT R.L. 441'-0". THE EARTH LEAD CONDUCTOR CONCENTRIC TO THE STACK OUTSIDE STACK SHALL BE COMPLETELY COVERED & THEMFLY PACKED WITH [illegible] MIN. R.L. OF 465'-0" PRIOR TO BONDING OF EARTH CONDUCTOR
3. ALL MATING SURFACES OF JOINTS IN DETAIL 'L' ARE TO BE [illegible] WITH A CONTINUOUS COATING OF ALLOY BY INTERPOSING STRIPS OF SILVER BRAZING ALLOY RIBBON OR COPPER PHOSPHORUS BRAZING ALLOY RIBBON (SHIM) (TYPE SIL OR CUP) BETWEEN MATING SURFACES BEFORE CLAMPING & BRAZING
4. EARTH LEAD TO BE FORMED UP FROM LONGEST AVAILABLE LENGTHS OF CONDUIT & JOINED WHEREVER NECESSARY IN ACCORDANCE WITH DETAIL 'M' NOTE 11.
5. REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
6. DRIVE TOP OF EARTH ELECTRODES TO RECESS OF [illegible]
7. BENDS IN EARTH CONDUCTOR TO BE 6" MIN. RAD.
8. THE THREE LOCATIONS SHOWN SHOULD [illegible] BEEN CARRIED OUT TO DETERMINE THE EARTH TERMINATION NETWORK. (CALCULATED)
9. ITEM Nos ENCIRCLED THUS (30) REFER TO ITEMS LISTED ON DRG. Nos LD248871 & 72 P.
10. IF AN ELECTRODE STRIKES ROCK, A 6" DIA. HOLE IS TO BE [illegible] REQUIRED DEPTH & THE ELECTRODE PLACED [illegible] OF BENTONITE & PLASTER OF PARIS SHALL BE [illegible] A SLURRY & POURED INTO THE HOLE AROUND
11. ALL JOINTS, SHOWN IN DETAIL 'M' & 'N' [illegible] EITHER SILVER-BRAZING ALLOY OR COPPER [illegible]

		M.J.C.	
		FLT	G.A.G. 22.12.70
A.S.E.E.A.			LD281230

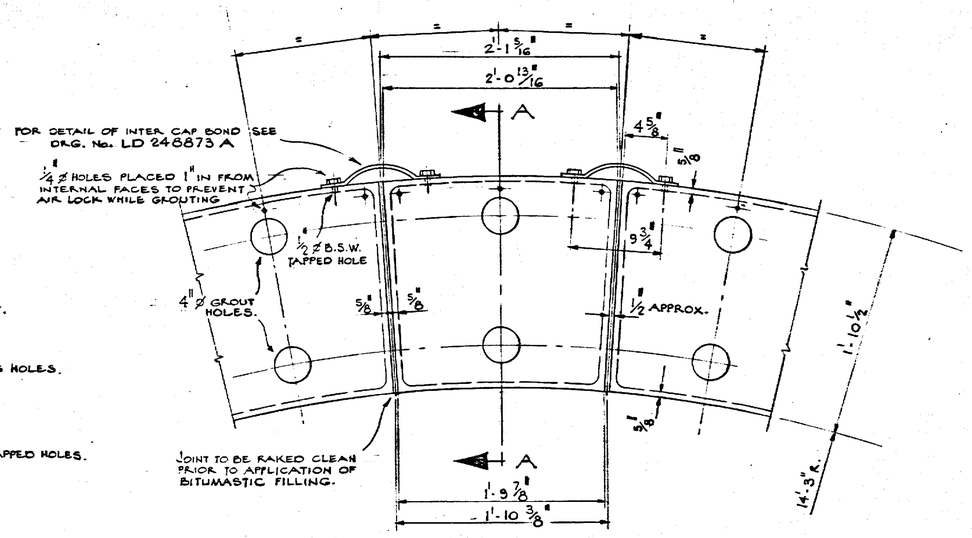
AMENDMENTS



PLAN ON CAP PLATES

COMPOSED OF 48 EQUAL SECTIONS WITH ½" GAP BETWEEN EACH SECTION.

SCALE 1½" = 1'-0"



PART PLAN

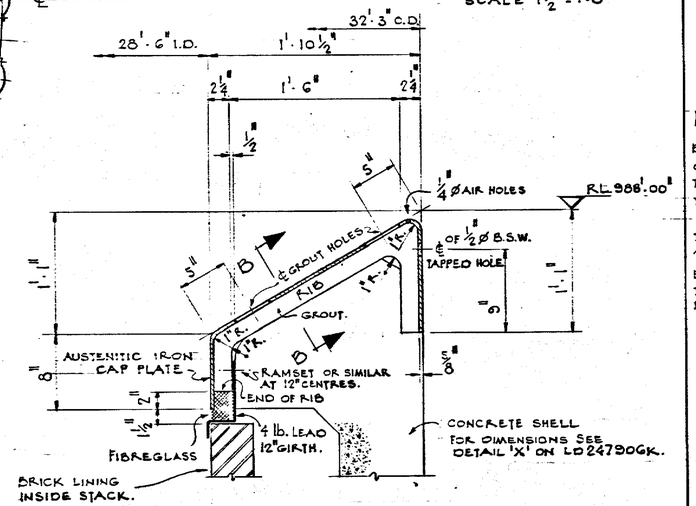
SCALE 1½" = 1'-0"



SECTION B-B

CAP ONLY

SCALE 1½" = 1'-0"



SECTION A-A

SCALE 1½" = 1'-0"

NOTE:
COMPLETE BRICKWORK; PLACE LEAD AND SECURE IN POSITION, PLACE CAP PLATES AND TEMPORARILY HOLD IN POSITION, CAULK JOINT AT BOTTOM OF CAP WITH FIBRE GLASS AND THEN GROUT CAP PLATE USING 1 PART SULPHATE RESISTING CEMENT, 2 PARTS FINE SAND, 5½ GALLONS WATER PER BAG OF CEMENT, TROWEL OFF AT CORE HOLES.

REFERENCE DRG'S:
General Arrg't. & Concrete Dimensions. LD247906K
Lightning conductor arrg't. LD248873A

NOTES.

BEFORE FABRICATION OF THE CAP SECTIONS THE MEASUREMENTS OF THE CHIMNEY STACK SHALL BE TAKEN FROM THE SITE AND TEMPLATES PREPARED FOR THE CASTINGS.

THE AUSTINITIC IRON FOR THE CHIMNEY CAPS CASTINGS SHALL BE AS SPECIFIED.

THE CASTINGS SHALL BE TRUE TO SHAPE AND MEASUREMENTS AND ACCURATE IN CONTOUR.

BEFORE FIXING, THE CAP SECTIONS SHALL BE SET OUT ON THE FLOOR IN ORDER TO CHECK AGAINST THE MEASUREMENTS PREVIOUSLY TAKEN.

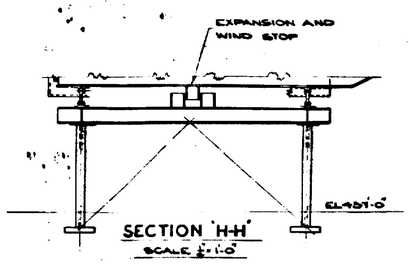
AMENDMENTS	DRAWN	DATE	CHECKED
(1) TENDERING NOTE DELETED. DRG RELEASED FOR CONSTRUCTION PURPOSES. REF DRGS. ADDED. PE/PSC SIGNATURE ADDED.	K.U.	2-8-68	K.J.H.

CONTRACT No. 1894

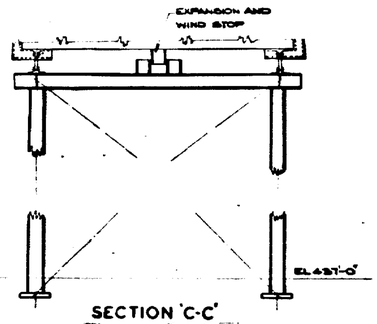
THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS No. 1 & No. 2
CAP DETAILS

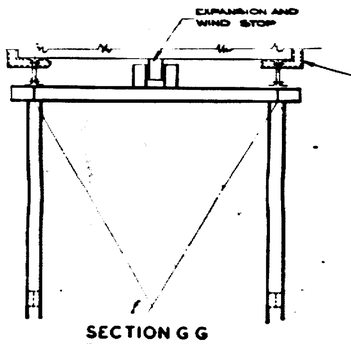
SCALE AS NOTED.				DATE		DATE
DRAWN	K.M.				PE/PSC	2-8-68
TRACED	—					
CHECKED	M.G.S					
E/GD.						
DATE	20/2/68				LD 247914 B/1	



SECTION 'H-H'
SCALE 1/4"=1'-0"

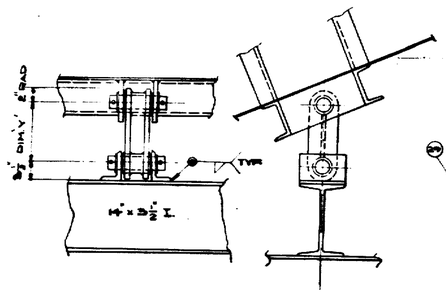


SECTION 'C-C'
SCALE 1/4"=1'-0"



SECTION G G
SCALE 1/4"=1'-0"

FOR DUCT CORNER CONNECTION AT SECTIONS 'CC', 'GG' & 'HH' DO NOT USE CORNER PLATES, CHANNELS TO LAP CORNER TO PROVIDE RIGID FRAME.

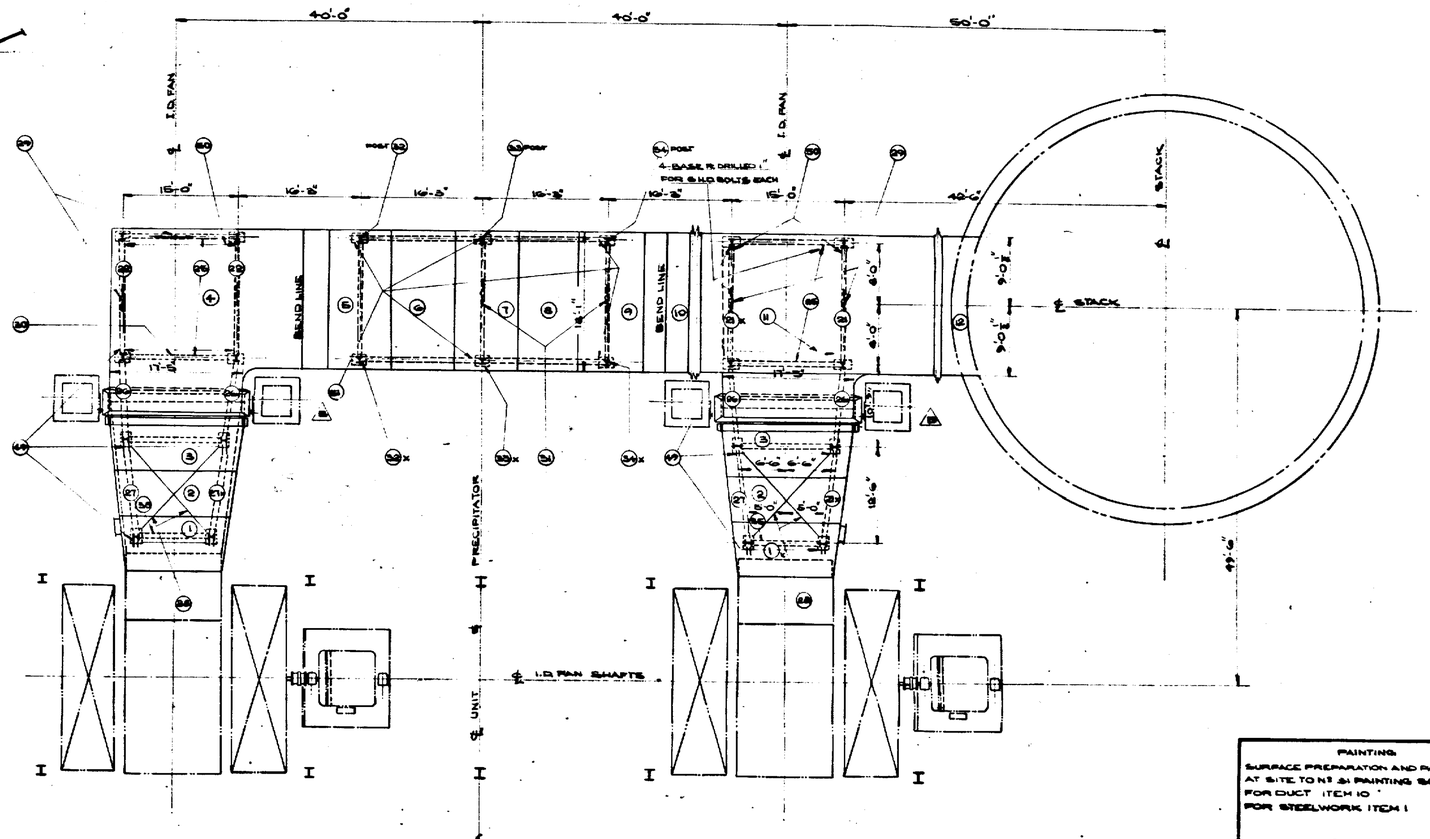


SHACKLE TYPE MOUNTING

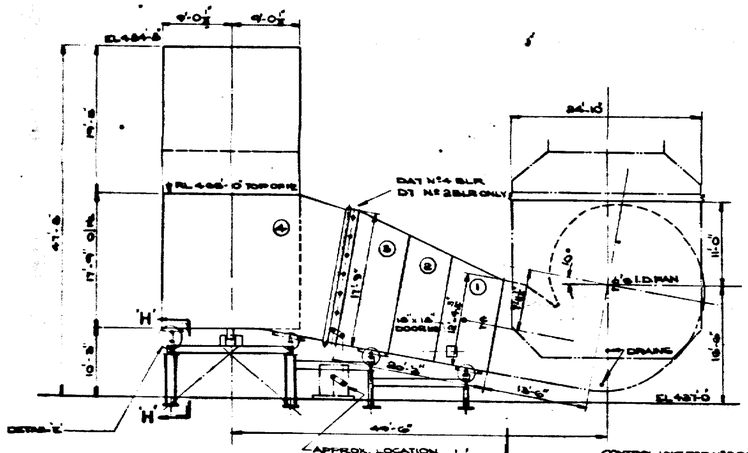
MARK Nº	DIMENSION 'Y'	NO. OFF
49	8"	12
50	17"	4
51	18"	6

WIND TIE

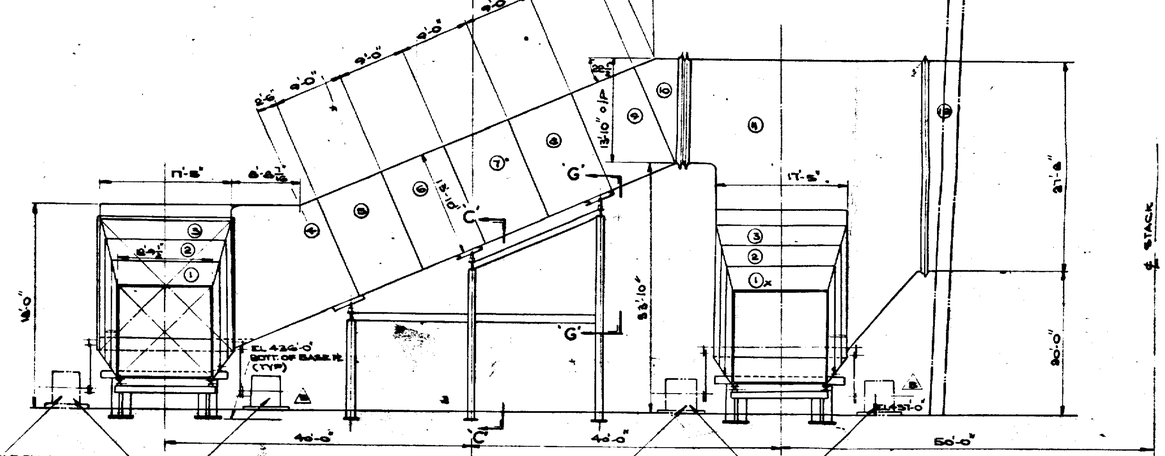
MARK Nº	Nº OFF
29	4
30	1
31	2



PLAN VIEW



SIDE ELEVATION



FRONT ELEVATION

CONTROL UNITS FOR Nº4 BLR

PAINTING
SURFACE PREPARATION AND PAINTING TO BE DONE AT SITE TO Nº 3a PAINTING SCHEDULE 29-APR-1968
FOR DUCT ITEM 10
FOR STEELWORK ITEM 1

NOTES 3RD ANGLE PROJECTION

ONE BOILER SET, AS DRAWN, FOR BOILER 2
" " " OPP HAND " " 1
ONE BOILER SET, OPP HAND, FOR BOILER 3
MARK Nºs TO BE PAINTED ON DUCTING IN BLACK LETTERING ON APPROPRIATE COLOUR PATCH :-
Nº 1 BLR RED PATCH
Nº 2 " WHITE "
Nº 3 " GREEN "
Nº 4 BLR YELLOW PATCH

REF DRGS.

GAS DUCT I.D. FAN TO STACK DETAILS SHT 1	268/10/13
GAS DUCT I.D. FAN TO STACK DETAILS SHT 2	268/10/14
GAS DUCT SUPPORTS	268/10/7
I.D. DUCT ARRGT FOR BLRS 1 & 3	268/10/2
MATL LIST (DUCT SCHEDULE 5)	268/10/5
DETAILS OF I.D. DUCTS & SUPPORTS	268/10/1

SUBSTANDARD FOR MICROFILMING

LETTER NUMBER	CONTRACT NO.
NOV 570	1600

LD257273A/3

THIS DRG WAS REPRODUCED & TRACED FROM C.E. DRG Nº E-935-030-0

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INTERNATIONAL COMBUSTION AUSTRALIA LTD.

ITEM 11-20
C.E. DRG Nº E-935-030-0

EC OF N.S.W. - LIDDELL POWER STATION - UNITS 2 & 4
ARRANGEMENT OF GAS DUCTING
- I.D. FAN TO STACK -

DRAWN	C. BROWN	NUMBER
TRACED	23-11-70	268 10/4
CHECKED	WN 29.7.68	
PASS	ADS	
SCALE	1/4"=1'-0"	A1 S.C.

REV A PAINTING SCHEDULE ADDED DAB
REV B CONTROL UNIT INDICATED FOR Nº 2 BLR ONLY ALSO SECOND ENTRY FOR Nº 4 BLR-CE&D LETTER 4-45130
REV C DRG TRACED WITHOUT ALTERATION

KODAK 18-11-70

C LD253841

TAG	SIZE	DETAIL	NO.OFF
1	#5CW	14'-6"	22
2	#5CW	ONE OFF: 12'-6" ONE OFF: 15'-3"	2
3	#5CW	ONE OFF: 10'-3" ONE OFF: 9'-6"	2
4	#5CW	ONE OFF: 11'-0" ONE OFF: 11'-6"	2
5	#5CW	10'-0"	2
6	#5CW	ONE OFF: 11'-6" ONE OFF: 12'-6"	2
7	#5CW	11'-9"	2
8	#5CW	ONE OFF: 13'-0" ONE OFF: 14'-2"	2
9	#5CW	11'-3"	1
10	#5CW	ONE OFF: 10'-3" ONE OFF: 9'-6"	2
11	#5CW	10'-9" to 12'-6" — 3 variants	3
12	#5CW	18'-9"	2.5
13	#5CW	16'-6" to 16'-9" — 4 variants	4
14	#5CW	12'-6"	1
15	#5CW	17'-3"	3
16	#5CW	16'-9" to 18'-4" — 3 variants	3
17	#5CW	16'-0" to 16'-2" — 4 variants	4
18	#4CW	7'-0"	2
19	#4CW	16'-6"	2
20	#4CW	18'-5"	2
21	#4CW	22'-7"	2
22	#4CW	26'-0"	2
23	#4CW	29'-5"	2
24	#4CW	5'-2"	2
25	#4CW	5'-7"	2
26	#4CW	19'-2"	4
27	#7CW	23'-5" to 23'-9" — 4 variants	4
28	#7CW	24'-0" to 25'-11" — 4 variants	4
29	#7CW	25'-8" to 27'-2" — 4 variants	4
30	#7CW	23'-8" to 24'-11" — 4 variants	4
31	#7CW	27'-8"	2
32	#7CW	25'-8"	2
33	#7CW	24'-11" 9" 9" L	1
34	#7CW	L= 23'-11" to 24'-8" 3 variants	3
35	#7CW	L= ONE OFF 25'-5" ONE OFF 26'-5"	2
36	#7CW	L= ONE OFF 24'-2" ONE OFF 24'-11"	2
37	#7CW	L= 23'-8"	1
38	#7CW	L= ONE OFF 24'-5" ONE OFF 25'-2"	2
39	#7CW	L= 23'-8" to 24'-9" 3 variants	3
40	#7CW	28'-9" 4.5°	2
41	#7CW	26'-2"	1
42	#7CW	27'-9"	1
43	#7CW	24'-9" to 25'-8" 4 variants	4
44	#7CW	25'-4" to 26'-8" 4 variants	4
45	#7CW	21'-6" to 23'-1" 4 variants	4
46	#7CW	22'-6" to 24'-8" 4 variants	4
47	#7CW	13'-0"	50
48	#5CW	17'-0"	30
49	#5CW	6'-3"	2
50	#5CW	15'-10"	2
51	#5CW	20'-6"	2
52	#5CW	25'-5"	2
53	#5CW	28'-5"	2
54	#5CW	31'-1"	2
55	#5CW	14'-8"	2
56	#5CW	30'-3"	12
57	#5CW	8'-11"	2
58	#5CW	12'-5"	10
59	#5CW	7'-0"	2

TAG	SIZE	DETAIL	NO.OFF
60		Not used	
61		Not used	
62	#5CW	13'-3"	2
63		Not used	
64	#5CW	9'-0"	2
65	#5CW	11'-8"	8
66	#5CW	5'-2"	2
67	#5CW	11'-8" to 13'-2" 4 variants	4
68	#5CW	13'-8" to 14'-5" 4 variants	8
69	#6CW	28'-5"	2
70	#5CW	ONE OFF 20'-6" ONE OFF 21'-8"	2
71	#5CW	20'-10" to 23'-7" 4 variants	4
72	#6CW	12'-6" to 12'-11" 3 variants	3
73	#5CW	28'-0"	15
74	#5CW	12'-8" to 13'-11" 4 variants	4
75	#5CW	15'-0" to 15'-10" 4 variants	8
76	#5CW	19'-9" to 21'-0" 4 variants	4
77	#6CW	20'-4" to 22'-2" 3 variants	3
78	#6CW	27'-8"	1
79	#5CW	13'-8" to 13'-0" 3 variants	3
80	#5CW	15'-0"	36
81	#5CW	9" L 21'-9" 9"	1
82	#4CW	STOCK LENGTHS — 170 FT.	
83	#7CW	1'-5" 22'-9"	3
84	#7CW	1'-3" 23'-9"	3
85	#5CW	1'-9" ONE OFF 21'-6" ONE OFF 31'-3"	2
86	#7CW	1'-3" 24'-2"	2
TAG Nos. 87 to 90 incl. NOT USED			
91	#10CW	28'-6"	11
92	#10CW	14'-9"	30
93	#10CW	18'-6"	12
94	#6CW	23'-0"	4
95	#10CW	28'-5"	6
96	#10CW	18'-0"	4
97	#6CW	28'-9"	4
98	#6CW	15'-5"	6
99		Not used	
100	#10CW	4'-0" 19'-6" 2 @ 45° c/c 20'-0"	64
101	#10CW	35'-0"	12
102	#10CW	2'-3"	28
103	#10CW	26'-6"	16
104	#6CW	19'-6"	4
105	#6CW	27'-0"	4
106	#10CW	15'-6"	20
107	#10CW	32'-6"	4
108	#10CW	24'-6"	4
109	#6CW	22'-0"	6
110	#6CW	100° 17'-7" 13'-6"	6
111	#6CW	154° 116° 37'-7" 31'-0" 3'-3"	12
112	#10CW	8'-6" 7'-6" 45° 45° 5'-0"	12

TAG	SIZE	DETAIL	NO.OFF
113	#4CW	1'-7" 1'-7"	52
114	#4CW	2'-2" 2'-2"	52
	#5CW	11'-9" a	
115		a=from 1'4" to 2'0" 4 variants	8
116		a=from 2'0" to 3'-1½" 5 variants	10
117		a=from 3'3½" to 5'-8½" 6 variants	12
118		a= 3'-8½"	168
	#5CW	2'-3"	
119		a= 4'-1" to 5'-3¾" 4 variants	16
120		a= 5'-3¾"	102
121	#10CW	17'-0"	6

TAG	SIZE	DETAIL	NO.OFF
501	#7CW	10'-3"	4
502	#7CW	9'-6"	2
503	#7CW	7'-0"	2
504	#7CW	7'-9"	1
505		Not used	
506		Not used	
507	#7CW	11'-9"	4
508	#7CW	8'-0"	3
509	#7CW	7'-9"	1
510	#9CW	16'-3"	4
511	#9CW	10'-6"	2
512	#9CW	17'-0"	4
513	#9CW	11'-6"	2
514	#9CW	24'-1"	1
515	#9CW	15'-6"	1
516	#9CW	10'-0"	5
517		Not used	
518	#9CW	6½" R 21'-0" 21'-6"	2
519	#9CW	6½" R 21'-0" 7'-0"	2
520	#9CW	30'-0"	1
521	#9CW	6½" R 21'-0" 22'-6"	1
522		Not used	
523	#9CW	24'-11"	2
524	#4CW	11" 2'-3½"	94
525	#7CW	10'-3"	2

REFERENCE DRAWINGS:
Slab at R.L 456'-6⅝" Beams & Cols.; R.C. Details ... LD 247312 K
Diagram of Bar Bending Shapes ..... S 228581 D
Stacks Nos 1 & 2 General Arrangement ..... LD 247906 K

NOTES:
* indicates Cold-Worked Steel deformed Bars as per A.S. No. A85. Number indicates dia. in eighths of an inch, e.g. #7CW indicates ⅞".
Steel Fabric as per A.S. No. A 84. (See Plan)

Reinforcement listed for one Stack only.
Reinforcement Required for TWO Stacks.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH LD 247312 K

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS No 1 & No 2
SLAB AT R.L 456'-6⅝", BEAMS AND COLUMNS
REINFORCEMENT LIST

			DATE
SCALE:			
DRAWN	M.V.S.		
TRACED	—		
CHECKED	J.M.		
E.I.C.D.			
DATE	2.8.68		

CONTRACT No. 1894

Nº LD253841 C/

AMENDMENTS

10 5 4349 21.8.68 5 10

REINFORCEMENT LIST

TAG	SIZE	DETAIL	No OFF	LOCATION	TAG	SIZE	DETAIL	No OFF	LOCATION
1	#8CW	3'-3" 3'-5" 8'-5"	248	SECTION E-E	13	#8CW	29'-10" 29'-6"	70	SECTION E-E
2	#8CW	6'-0" 1'-0"	496	"	14	#8CW	7'-9"	510	PART PLAN RL 434'-0"
3	#8CW	4'-0" 2'-0"	496	"	15	#8CW	6'-0"	26	"
4	#8CW	3'-0" 2'-0"	496	"	16	#4CW	1'-7" 1'-7"	64	COLUMN P1 TO P4
5	#8CW	33'-6" 33'-2"	56	"	17	#4CW	2'-2" 2'-2"	64	"
6	#8CW	32'-5" 32'-5"	77	"	18	#10CW	26'-3" 1'-0"	64	"
7	#8CW	31'-5" 31'-3"	63	"					
8	#8CW	32'-4" 27'-8"	54	"					
9	#8CW	31'-0" 26'-5"	68	"					
10	#8CW	29'-10" 25'-6"	48	"					

REFERENCE DRG'S.

FOUNDATION STACK No 2.	LD 247908 K
CHIMNEY STACKS No 1 & No 2	LD 247906 K
DIAGRAM OF BAR BENDING SHAPES	S 228581 D

NOTE:

STEEL REINFORCEMENT: #CW INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A83. NUMBER INDICATES DIAMETER IN EIGHTS OF AN INCH. e.g. "8 CW = 1"

DELIVER TO SITE IN TAGGED BUNDLES.

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING, BUNDLED SEPARATELY.

AMENDMENTS

CONTRACT No. 1894

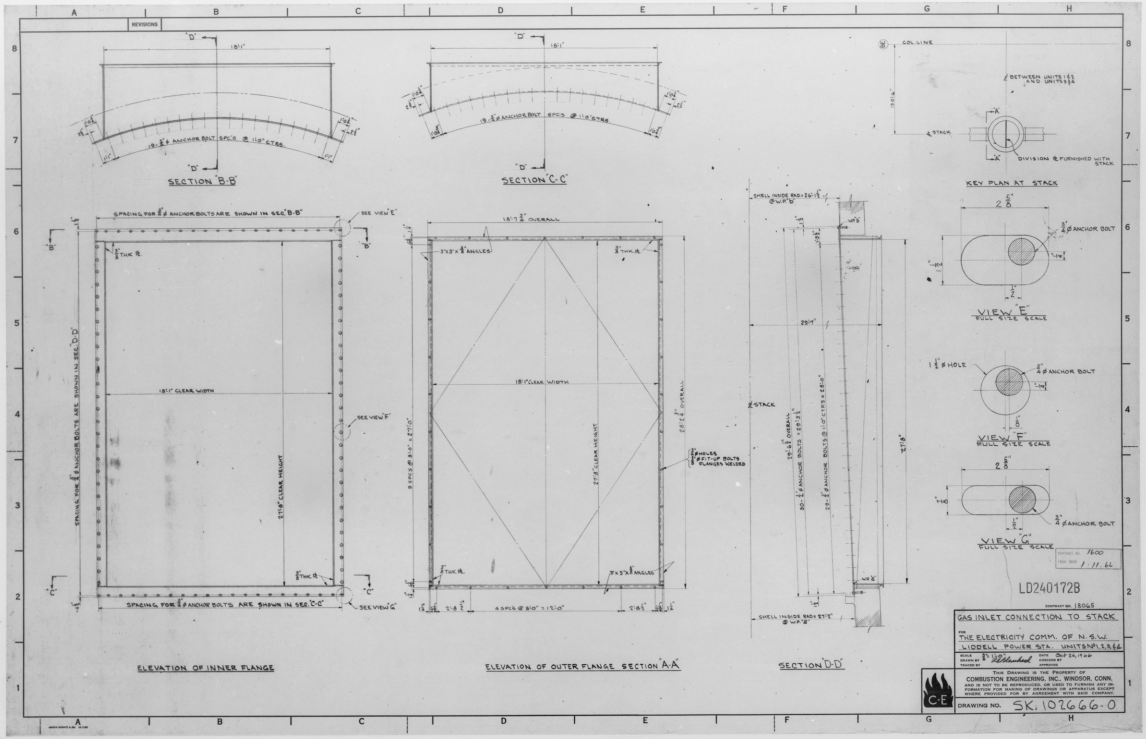
THE ELECTRICITY COMMISSION OF N.S.W.

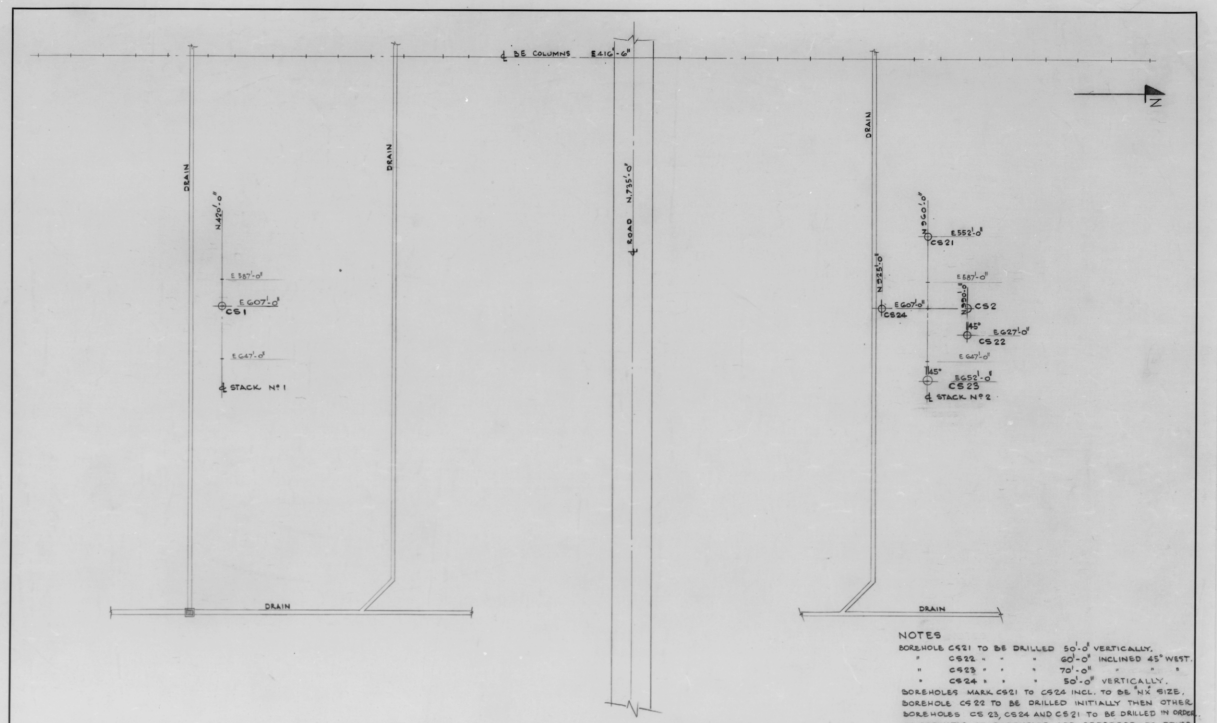
LIDDELL POWER STATION
CHIMNEY STACK No 2
FOUNDATION REINFORCEMENT LIST

			DATE	DATE
SCALE	—			
DRAWN	K.U.		PE/TSC	19/9/68
TRACED	—			
CHECKED	J.C.Q.			
E/CD	K.A. for MA			
DATE	2.9.68			

LD 253800 C1

5 436 Z 19.9.68 5


REVISIONS
SECTION 'B-B'
SECTION 'C-C'
ELEVATION OF INNER FLANGE
ELEVATION OF OUTER FLANGE SECTION 'A-A'
SECTION 'D-D'
KEY PLAN AT STACK
VIEW 'E'
VIEW 'F'
VIEW 'G'
LD240172B
GAS INLET CONNECTION TO STACK
THE ELECTRICITY COMM. OF N.S.W.
LIDDELL POWER STA. UNITS NO. 3, 3 & 4
DRAWN BY
TRACED BY
DATE Oct 24, 1966
APPROVED BY
THIS DRAWING IS THE PROPERTY OF COMBUSTION ENGINEERING, INC. WINDSOR, CONN.
DRAWING NO. SK. 102660-0



AMENDMENTS

INITIAL ISSUED TO TENDERERS.
BOREHOLE CS23 HAS LOCATED AT E687'-0" AND HAS TO BE VERTICALLY NOTES ON BOREHOLES FOR DRILLING ADDED. K.B.P. 28.7.67
2. CS1 (N 420 E 607) CS21 (N 950 E 607) ADDED. K.B.P. 31.7.67

WORKS ORDER Nº W2596/67

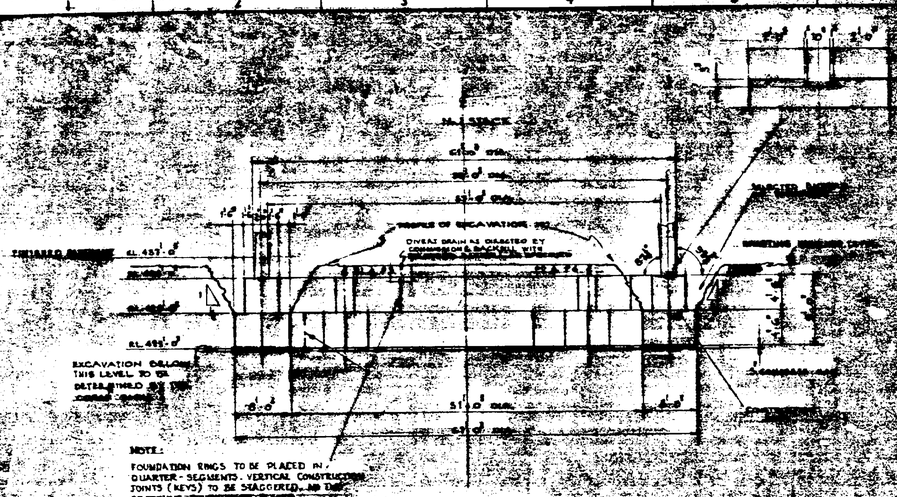
THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
STACKS Nos 1 AND 2
GEOLOGICAL EXPLORATION
LOCATION PLAN

SCALE 40 FT. = 1 IN.			DATE		DATE
DRAWN	K.B.P.				
TRACED					
CHECKED	C.F.M.				
S.E. AND A.					
DATE	28/7/67				

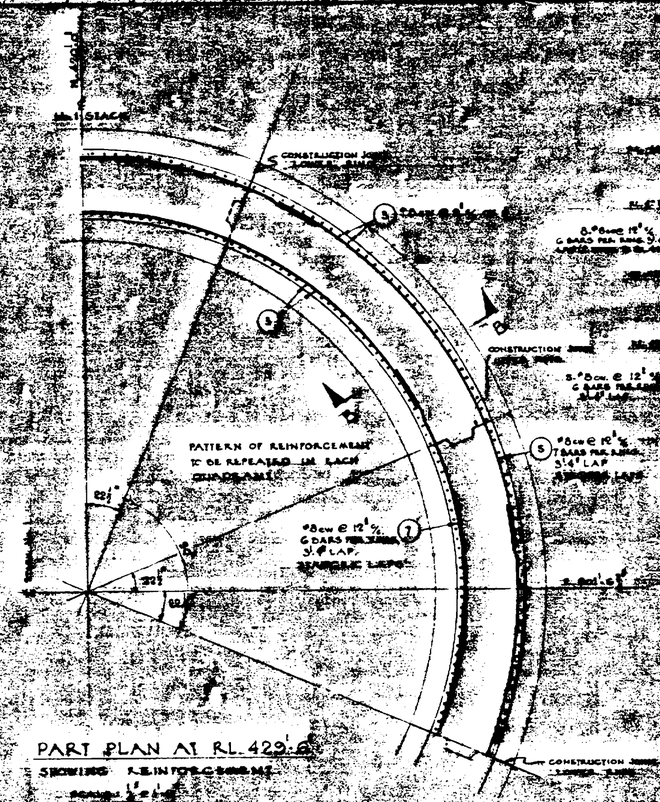
LD 244290 C/2

5 4279 19.4.68 5

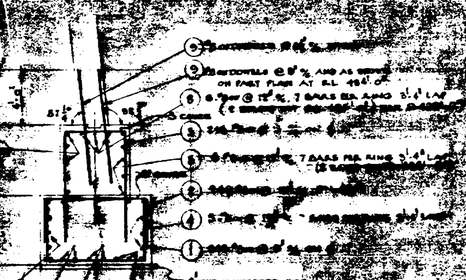


SECTION A-A

NOTE:
ROCK TO BE INSPECTED BY THE COMMISSION'S DESIGN & GEOLOGICAL STAFF PRIOR TO PLACING OF CONCRETE.

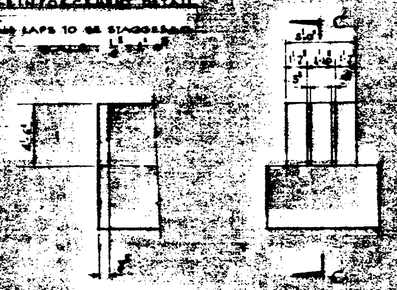


PART PLAN AT RL. 429'-6"
SHOWING REINFORCEMENT

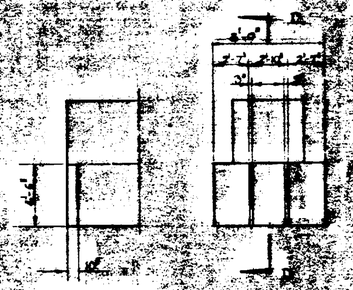


SECTION B-B
REINFORCEMENT DETAIL

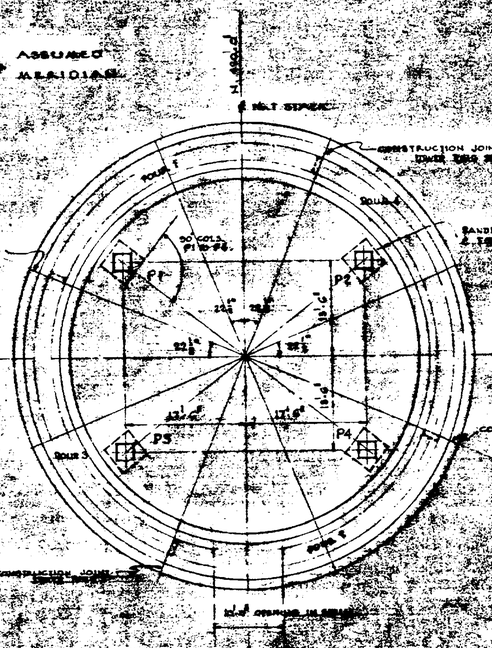
NOTE:
ALL LAPS TO BE STAGGERED



SECTION C-C

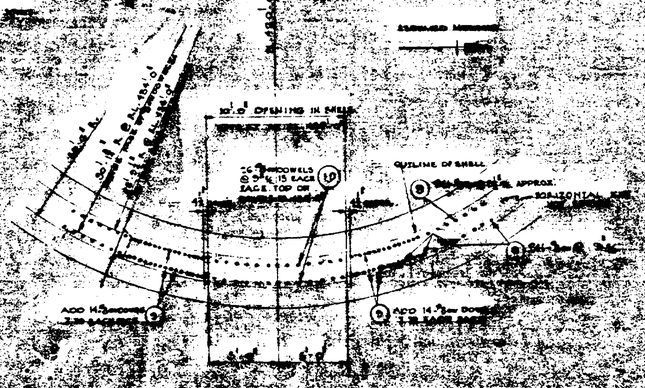


SECTION D-D



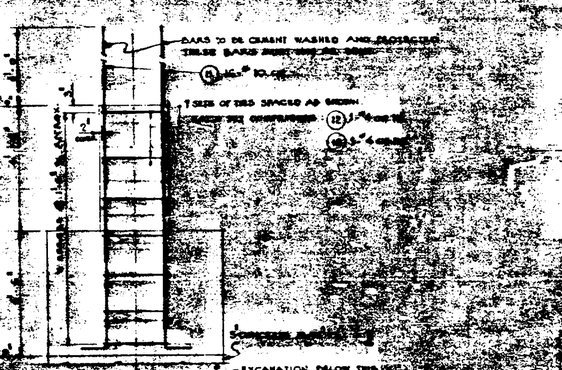
PLAN AT RL. 434'-0"

NOTE:
6 DAYS TO ELAPSE BETWEEN ADJACENT CONCRETE PLACEMENTS.
FACES OF BASE FOR EACH PLACEMENT OF
CRORDS WITH STRAIGHT FORMS 6'-0" LONG
TORUS FOR CLOSING CROWD TO BE CUT TO SUIT.
FORAMINOR IF USED BELOW RL. 429'-0" (SEE NOTES) MAY BE FORMED



PART PLAN AT RL. 434'-0"

DETAIL OF CONSTRUCTION JOINTS



DETAILS OF COLUMNS P1 TO P4

REFERENCE DRG'S.
GENERAL ARRG'T & CONCRETE DIMENSIONS ED 24/1966 A
DIAGRAM OF BAR BENDING SCHEDULE S 32 6581 D

NOTES.
CONCRETE WORK SHALL COMPLY WITH AS. CA 2 - 1964
CONCRETE GRADE 25 MPa SHALL HAVE A MINIMUM
STEEL REINFORCEMENT SHALL COMPLY WITH THE FOLLOWING SPECIFICATION: AS. NA 35 COLD WORKED DEFORMED STEEL BARS, EXCEPTING BARS #5 DIAM.
CONCRETE COVER TO REINFORCEMENT
AND BOTTOM UNLESS NOTED OTHERWISE
CONCRETE TO BE CURED AS PRESCRIBED
CONSTRUCTION JOINTS TO BE TREATED AS SPECIFIED.
EXCAVATION BELOW RL 430'-0" TO

THE ELECTRICITY COMMISSION OF N.S.W.
LIDDELL POWER STATION
CHIMNEY STACK No. 1
FOUNDATION
R.C. DETAILS

SCALE	1/4"-1'-0" unless shown	DATE	
DRAWN	[illegible]	DATE	
TRACED	—		
CHECKED	[illegible]	DATE	
E.E.		DATE	

DRAWING No. LD 24190 A

CONTRACT No. 1825

AMENDMENTS
1 TENDERING ISSUE
2 ISSUE RELEASED FOR CONSTRUCTION
3 REF DRG'S ADDED, REF DRG'S CHANGED, TOTAL NUMBER
DRAWN DATE CORR
E.E. DATE

TAG	SIZE	DETAIL	No OFF	LOCATION
1	#7CW	17'-11"	114	VERTICAL OUTSIDE FACE FROM RL 503'-0"
2	#6CW	17'-6"	1294	" FROM RL 510'-6"
3	#5CW	17'-1"	1872	" FROM RL 593'-0"
4	#6CW	17'-6"	697	VERT INSIDE FACE FROM RL 503'-0"
5	#4CW	16'-8"	2473	" FROM RL 735'-6"
6	#5CW	17'-1"	840	" FROM RL 570'-6"
7	#6CW	24'-7" 25'-1" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 172'-9" TO 176'-0"	15 RINGS	HORIZ INS. FACE RL 503'-0"
8	#6CW	24'-7" 25'-1" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 169'-6" TO 172'-9"	15 RINGS	" RL 518'-0"
9	#6CW	24'-1" 24'-7" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 166'-6" TO 169'-6"	15 RINGS	" RL 533'-0"
10	#6CW	23'-8" 24'-1" MIN. LAP 2'-6" EACH RING 6BARS TOTAL LENGTH 163'-6" TO 166'-6"	15 RINGS	" RL 548'-0"
11	#6CW	23'-2" 23'-8" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 162'-0" TO 163'-6"	6 RINGS	" RL 563'-0"
12	#5CW	23'-2" 23'-6" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 158'-0" TO 159'-6"	8 RINGS	" RL 570'-6"
13	#5CW	23'-2" 23'-6" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 155'-3" TO 158'-0"	15 RINGS	" RL 578'-0"
14	#5CW	22'-7" 23'-2" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 152'-6" TO 155'-3"	15 RINGS	" RL 593'-0"
15	#5CW	22'-1" 22'-7" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 147'-9" TO 150'-6"	15 RINGS	" RL 608'-0"
16	#5CW	21'-6" 21'-11" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 145'-6" TO 147'-9"	15 RINGS	RL 623'-0"
17	#5CW	20'-11" 21'-6" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 142'-3" TO 145'-6"	15 RINGS	RL 638'-0"
18	#5CW	20'-5" 20'-11" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 140'-0" TO 142'-3"	23 RINGS	RL 653'-0"
19A	#7CW	21'-10" MIN. LAP 2'-11" EACH RING 7 BARS TOTAL LENGTH 190'-0"	10 RINGS	HORIZ. OUTSIDE FACE RL 505'-9"
20	#6CW	21'-6" 21'-10" MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 184'-0" TO 186'-0"	15 RINGS	RL 510'-9"

TAG	SIZE	DETAIL	No OFF	LOCATION
21	#5CW	20'-7" 21'-0" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 177'-0 TO 179'-0"	20 RINGS	HORIZ. OUTSIDE FACE RL 517'-3"
22	#6CW	20'-0" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 178'-0"	10 RINGS	" RL 528'-3"
23	#5CW	19'-7" 20'-0" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 171'-0" TO 175'-0"	35 RINGS	" RL 533'-3"
24	#6CW	19'-1" 19'-7" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 173'-6"	10 RINGS	" RL 550'-3"
25	#5CW	18'-6" 19'-1" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 165'-6"TO 169'-6"	35 RINGS	" RL 565'-3"
26	#6CW	18'-0" 18'-6" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 167'-6"	10 RINGS	" RL 573'-3"
27	#5CW	17'-5" 17'-11" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 161'-0 TO 163'-6"	35 RINGS	" RL 578'-3"
28	#5CW	16'-10" MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 163'-0"	10 RINGS	" RL 595'-3"
29	#5CW	16'-4" 16'-10" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 158'-0" TO 160'-0"	15 RINGS	" RL 600'-9"
30	#4CW	24'-10" 25'-4" MIN. LAP 1'-8" EACH RING 6 BARS TOTAL LENGTH 153'-9" TO 155'-6"	20 RINGS	" RL 608'-3"
31	#5CW	24'-3" MIN. LAP 2'-1" EACH RING 6 BARS TOTAL LENGTH 155'-6"	10 RINGS	" RL 618'-3"
32	#4CW	23'-11" 24'-4" MIN. LAP 1'-8" EACH RING 6 BARS TOTAL LENGTH 150'-0" TO 152'-6"	35 RINGS	" RL 623'-3"
33	#5CW	23'-3" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 150'-0"	10 RINGS	" RL 640'-9"
34	#4CW	23'-1" 23'-6" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 144'-3 TO 146'-9"	35 RINGS	" RL 645'-9"
35	#5CW	22'-5" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 145'-6"	10 RINGS	" RL 663'-3"
36	#4CW	22'-0" 22'-5" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 140'-6" TO 143'-0"	35 RINGS	" RL 668'-3"
37	#5CW	20'-0" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 141'-3"	10 RINGS	" RL 685'-9"
38	#4CW	20'-5" 20'-10" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 137'-0" TO 139'-3"	35 RINGS	" RL 690'-9"
39	#5CW	20'-1" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 138'-0"	10 RINGS	RL 708'-3"
40	#4CW	19'-7" 20'-0" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 134'-0" TO 136'-0"	35 RINGS	RL 713'-3"

TAG	SIZE	DETAIL	No OFF	LOCATION
41	#5CW	19'-10" MIN. LAP 2'-1" EACH RING 5 BARS TOTALLENGTH 135'-3"	10 RINGS	HORIZ. OUTSIDE FACE RL 730'-9"
42	#4CW	19'-4" 19'-10" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 131'-0" TO 133'-0"	35 RINGS	" RL 735'-9"
43	#5CW	19'-3" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 132'-3"	10 RINGS	" RL 753'-3"
44	#4CW	18'-10" 19'-4" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 128'-3" TO 130'-3"	35 RINGS	" RL 758'-3"
45	#5CW	18'-11" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 129'-3"	10 RINGS	" RL 775'-9"
46	#4CW	18'-2" 18'-7" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 125'-6 TO 127'-3"	35 RINGS	" RL 780'-9"
47	#5CW	18'-6" MIN. LAP 2'-1" EACH RING 5 BARS TOTAL LENGTH 127'-0"	10 RINGS	" RL 798'-3"
48	#4CW	17'-11" 18'-2" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 123'-0" TO 125'-0"	35 RINGS	" RL 803'-3"
49	#5CW	18'-2" MIN. LAP 2'-1" EACH RING 5BARS TOTAL LENGTH 125'-0"	10 RINGS	" RL 820'-9"
50	#4CW	17'-6" 17'-11" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 121'-0" TO 123'-0"	35 RINGS	" RL 825'-9"
51	#5CW	17'-10" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 120'-6"	10 RINGS	" RL 843'-3"
52	#4CW	17'-2" 17'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 117'-3" TO 119'-0"	35 RINGS	" RL 848'-3"
53	#5CW	17'-6" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 118'-6"	10 RINGS	" RL 865'-9"
54	#4CW	17'-3" 17'-6" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 115'-0" TO 116'-6"	35 RINGS	" RL 870'-9"
55	#5CW	17'-2" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 116'-6"	10 RINGS	" RL 888'-3"
56	#4CW	17'-0" 17'-3" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 113'-3" TO 114'-9"	35 RINGS	" RL 893'-3"
57	#5CW	16'-10" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 114'-6"	10 RINGS	" RL 910'-9"
58	#4CW	16'-6" 16'-11" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 111'-3" TO 112'-9"	35 RINGS	" RL 915'-9"
59	#5CW	16'-7" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 113'-0"	10 RINGS	" RL 933'-3"
60	#4CW	16'-3" 16'-7" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 110'-0" TO 111'-0"	35 RINGS	" RL 938'-3"

TAG	SIZE	DETAIL	No OFF	LOCATION
61	#5CW	16'-2" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 110'-6	10 RINGS	HORIZ OUTSIDE FACE RL 955'-9"
62	#4CW	16'-2" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 109'-0"	20 RINGS	" RL 960'-9"
63	#5CW	16'-1" MIN. LAP 2'-1" EACH RING 4 BARS TOTAL LENGTH 110'-6"	10 RINGS	" RL 970'-6"
64	#4CW	15'-10" MIN. LAP 1'-8" EACH RING 4BARS TOTAL LENGTH 106'-9"	24 RINGS	" RL 975'-9"
65	#4CW	15'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 102'-3"	1 RING	HORIZ. INSIDE FACE AT TOP
66	#4CW	11'-11" O/A 2" INT. RAD. 60° 11½" O/A	134	CAP BARS RL 968'-0" AT TOP
67	#4CW	12'-6"	68	VERTICAL INSIDE FACE FROM RL 968'-0"
68	#4CW	2'-6"	996	HORIZ. AT ALL CORBELS
		2'-9" 2" INT. RAD. 3" O/A		
		X A B		
69	#4CW	93° 2'-2½" 2'-0"	265	RL 510'-6"
70	#4CW	93° 2'-0½" 1'-10"	255	RL 533'-0"
71	#4CW	93° 1'-10½" 1'-8"	250	RL 555'-6"
72	#4CW	93° 1'-9" 1'-6"	240	RL 578'-0"
73	#4CW	92° 1'-7½" 1'-5"	230	RL 600'-6"
74	#4CW	92° 1'-6½" 1'-4"	225	RL 623'-0"
76	#4CW	92° 1'-5" 1'-2"	435	RL 645'-6" RL 668'-0"
76	#4CW	92° 1'-4" 1'-1"	210	RL 690'-6"
77	#4CW	92° 1'-3" 1'-0"	205	RL 713'-0"
78	#4CW	92° 1'-2½" 1'-0"	200	RL 735'-6"
79	#4CW	92° 1'-2" 11"	195	RL 758'-0"
80	#4CW	91° 1'-1½" 11"	380	RL 780'-6" RL 803'-0"
81	#4CW	91° 1'-1" 10"	185	RL 825'-6"
82	#3CW	91° 1'-0½" 10"	360	RL 848'-0" RL 870'-6"
83	#4CW	91° 1'-0½" 10"	175	RL 893'-0"
84	#3CW	91° 1'-0½" 10"	340	RL 915'-6" RL 938'-0
85	#4CW	91° 1'-0½" 10"	330	RL 960'-6" RL 975'-6"
99	#4CW	20'-3" MIN. LAP 1'-8" EACH RING 5BARS TOTAL LENGTH 135'-6"	10 RINGS	HORIZ. INS. FACE RL 687'-3"

TAG	SIZE	DETAIL	No OFF	LOCATION
113	#4CW	10'-0"	2101	VERTICAL INSIDE FACE FROM RL 686'-9"
140	#4CW	19'-9" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 132'-6"	10 RINGS	HORIZ. INS. FACE RL 699'-9"
141	#4CW	19'-5" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 129'-9"	10 RINGS	" RL 732'-3"
142	#4CW	19'-1" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 127'-3"	10 RINGS	" RL 754'-9"
143	#4CW	18'-8" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 124'-6"	10 RINGS	" RL 777'-3"
144	#4CW	18'-3" MIN. LAP 1'-8" EACH RING 5 BARS TOTAL LENGTH 122'-6"	10 RINGS	" RL 799'-9"
145	#4CW	17'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 119'-0	10 RINGS	" RL 822'-3"
146	#4CW	17'-5" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 116'-6"	10 RINGS	" RL 844'-9"
147	#4CW	17'-0" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 114'-6"	10 RINGS	" RL 867'-3"
148	#4CW	16'-10" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 112'-9"	10 RINGS	" RL 889'-9"
149	#4CW	16'-7" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 110'-0"	10 RINGS	" RL 912'-3"
150	#4CW	16'-3" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 108'-3"	10 RINGS	" RL 934'-9"
151	#4CW	16'-0" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 107'-3"	10 RINGS	" RL 957'-3"
152	#4CW	15'-9" MIN. LAP 1'-8" EACH RING 4 BARS TOTAL LENGTH 106'-0"	10 RINGS	" RL 972'-3"
153	#5CW	15'-0"	66	RL 660'-6"
154	#5CW	7'-6"	66	RL 668'-0"
155	#6CW	21'-0" MIN. LAP 2'-6 EACH RING 7 BARS TOTAL LENGTH 187'-0"	5 RINGS	HORIZ. OUTSIDE FACE

REFERENCE DRG'S.

REINFORCEMENT DETAILS RL 503'-0" TO RL 988'-0" } LD 247911 K
SECTIONAL ELEVATION
CHIMNEY STACK No1 & No2 LD 247906 K
DIAGRAM BAR BENDING SHAPES S 228581 D

NOTES

STEEL REINFORCEMENT. #CW INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A93. NUMBER INDICATES DIAMETER IN EIGHTS OF AN INCH e.g. #7CW = 7/8"

DELIVER TO SITE IN TAGGED BUNDLES.

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING BUNDLED SEPARATELY.

REINFORCEMENT LISTED FOR ONE STACK ONLY
REINFORCEMENT REQ'D FOR TWO STACKS

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACKS No1 & 2
RL 503'-0" TO RL 988'-0"
REINFORCEMENT LIST

CONTRACT No. 1894

		DATE		DATE
SCALE			P.E./P.S.C.	7/6/67
DRAWN	K.U.			
TRACED	—			
CHECKED	E/C.D.			
DATE	2.2.68			

No. LD 253842 K/

REINFORCEMENT LIST

TAG	SIZE	DETAIL	No OFF	LOCATION
1	#ACW	3'-9" / 21'-6"	248	SECTION B-B
2	#ACW	7'-6" / 3'-0"	248	"
3	#ACW	4'-6" / 7'-3"	248	"
4	#ACW	33'-2" / 33'-1" R	35	"
5	#ACW	31'-8" / 31'-7" R	56	"
6	#ACW	30'-4" / 28'-10" R	30	"
7	#ACW	32'-0" / 27'-4" R	48	"
8	#ACW	29'-6" / 29'-6" R	42	"
9	#ACW	7'-9"	540	"
10	#ACW	6'-0"	26	PART PLAN EL 436'-0"
11	#ACW	1'-0" / 12'-9"	64	COLUMNS A1 TO B6
12	#ACW	1'-7" / 1'-7"	28	"
13	#ACW	2'-2" / 2'-2"	28	"

REFERENCE DRG'S

CHIMNEY STACKS No 1 & No 2	LD 247906 H
FOUNDATION STACK No 1	LD 247907 A
DIAGRAM OF BAR BENDING SHAPES	S 228591 D

NOTE

STEEL REINFORCEMENT: #cw INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A 83. NUMBER INDICATES DIAMETER IN EIGHTHS OF AN INCH. e.g. "8cw-1"

DELIVER TO SITE IN TAGGED BUNDLES.

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING BUNDLED SEPARATELY.

AMENDMENTS

CONTRACT No. 1896

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACK No 1
FOUNDATION REINFORCEMENT LIST

					DATE
DRAWN	K.J.F				
TRACED	—				
CHECKED	MCS				
DATE	1.8.68				

DATE 1-8-68

LD 253799 C

LD 247912K

PLAN at R.L 456'6½"

Beam reinforcement not shown — See Sections

Note: Minimum lap to be 48 bar diameters unless noted

SECTION C-C (Beam "3")

Slab reinforcement not shown

SECTION A-A (Beam "1M")

SECTION A1-A1 (Beam "1S")

Slab reinforcement not shown

SECTION B-B (Beam "2M")

SECTION B1-B1 (Beam "2S")

Slab reinforcement not shown

SECTION 1-1

SECTION 2-2

SECTION D-D

SECTION 3-3

SECTION E-E

SECTION 4-4

SECTION 5-E

SECTION 6-6

SECTION 7-7

DETAIL "Z"

PART — PLAN

Showing Beams Nos. 4,5,6

Scale: 1/4" = 1'-0"

Place 6" thick concrete in Situ. Reinforce full length with 4 cw bars @ 1'-0" ctrs. both ways, soan lap & bent bars. Bars tag (60)

REFERENCE DRAWINGS:

Stacks N^os 1 & 2 General Arrgt & Concrete Dimensions ... LD 247906 M
Brick Lining Details ... LD 247915 A
Position Cement List ... LD 2538416
Stack N^o1 Foundation ... LD 247907 A
Stack N^o2 Foundation ... LD 247908 A

NOTES:

Concrete work shall comply with AS CA2 1963

Concrete class 'A' shall have a minimum compressive strength of 3000 p.s.i. 28 days

Formwork to be dressed as specified. Formwork not to be stripped within fourteen days of placing concrete.

Clear cover to reinforcing bars to be as marked.

Concrete to be cured as specified.

Floor designed for a Live Load of 200 p.s.f.

STEEL REINFORCEMENT 9^m cw INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS. No. A 63 - NUMBER INDICATES DIAMETER IN EIGHTHS OF AN INCH e.g. 9^m cw = 9/8" DIA. COLD-WORKED.

ALTERATIONS

1) ENTERING NOTE
P.G. RELEASED
FOR CONSTRUCTION
P.G. ISSUED
P.G. ISSUED
P.G. ISSUED
THE ADDED

DRAWN DATE CHECKED
1. R.L. 2.5.63 J.C.A.
2. R.L. 2.5.63 J.C.A.
Beam Nos. Ref. No. Dimensions adjusted
Hill 2 Hill
Dimensions adjusted
Hill 2 Hill
14 cw bars 15" and
14 cw bars 9"
R.L. 2.5.63 J.C.A.

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION

CHIMNEY STACKS N^o 1 & N^o 2

STACK AT R.L 456'-6½", BEAMS AND COLUMNS R.C. DETAILS

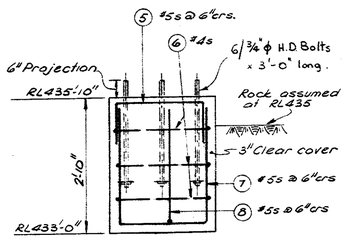
CONTRACT No. 1894

SCALE 1/8" = 1'-0" & as shown | DATE

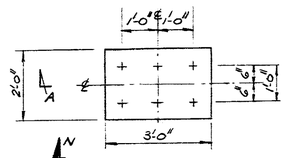
DRAWN | TRACED | CHECKED | P.E. | SUPT. | DATE

P/CO | DATE

No LD 247912 K/2

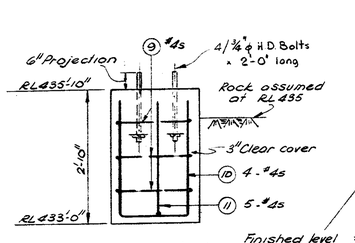


SECTION 'A-A'

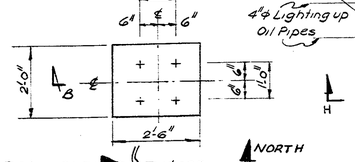


Footings: D103 , D110 , D116 , D117
D203 , D210 , D216 , D217
D303 , D310 , D316 , D317
D403 , D410 , D416 , D417

16 OFF

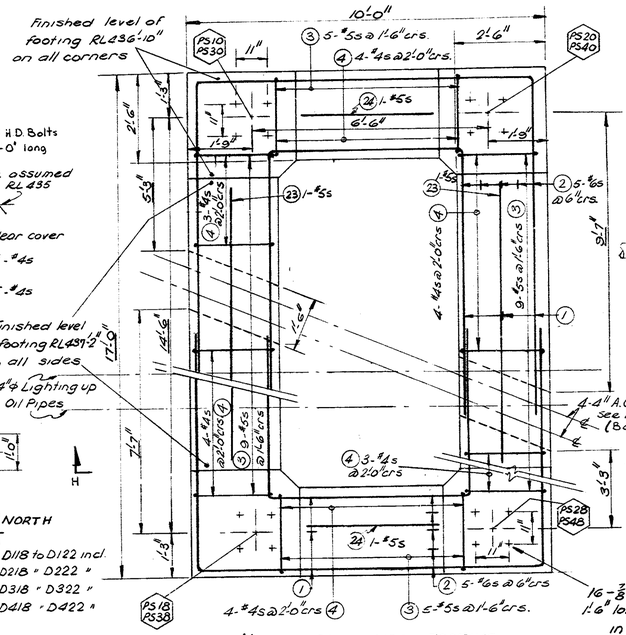


SECTION 'B-B'



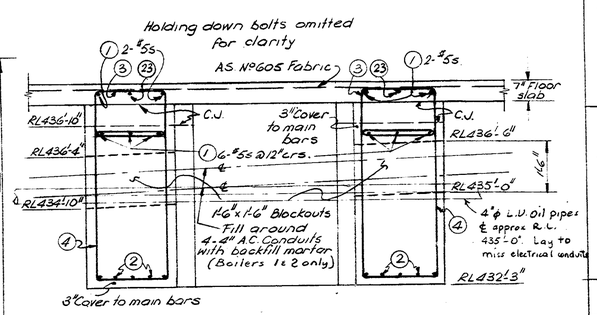
Footings: D101 to D108 incl.
D201 " D208 "
D301 " D308 "
D401 " D408 "

Footings D111 to D115 incl. D118 to D122 incl.
D211 " D215 " D218 " D222 "
D311 " D315 " D318 " D322 "
D411 " D415 " D418 " D422 "

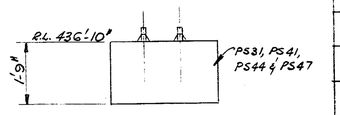


ACCESS STAIRS FOOTING
BOILERS 1 & 2 AND 3 & 4 - 20 OFF

Not to Scale

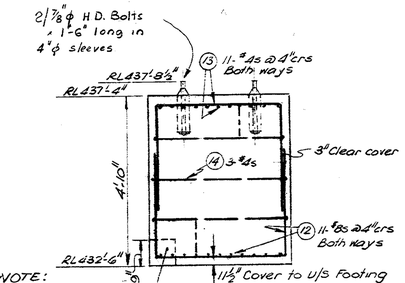


SECTION 'H-H'



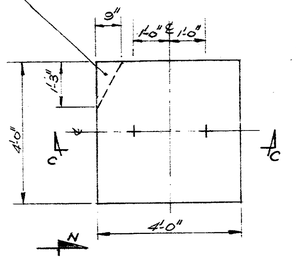
SECTION J-J
WORK AS EXECUTED

72 OFF



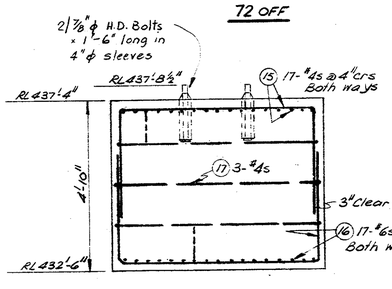
NOTE:
This blockout applicable to PC22 and PC42 ONLY

SECTION 'C-C'

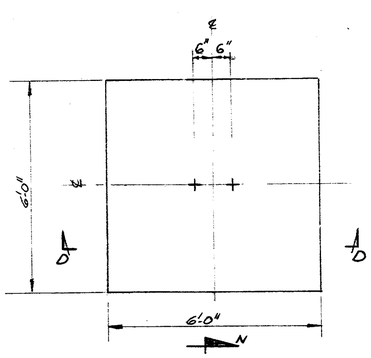


Footings: PC12 , PC13 , PC15, PC16
See above note PC22 PC23 , PC25, PC26
PC32 PC33 , PC35, PC36
PC42 PC43 , PC45, PC46.

16 OFF

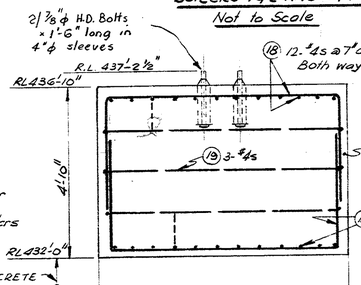


SECTION 'D-D'

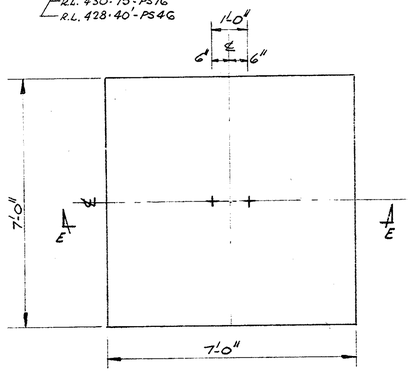


All 'PD' Footings &
PC 11 , PC 14 , PC 17
PC 21 , PC 24 , PC 27
PC 31 , PC 34 , PC 37
PC 41 , PC 44 , PC 47.

40 OFF

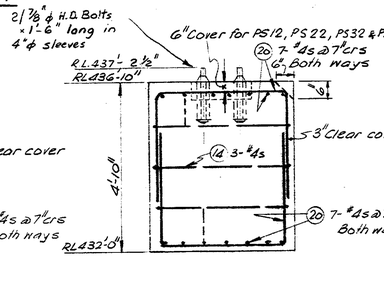


SECTION 'E-E'



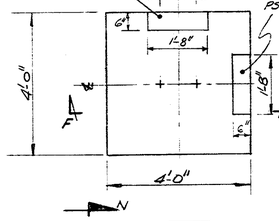
Footings: PS15 , PS16
PS25 , PS26
PS35, PS36
PS45, PS46

8 OFF



SECTION 'F-F'

NOTE
This blockout for PS42 ONLY

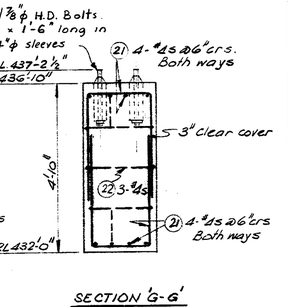


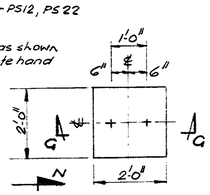
Footings: PS12 , PS18
See above note. PS22 PS23
PS32 PS33
PS42 PS43

8 OFF

NOTE:
This blockout for PS12, PS22 and PS32 only.
PS12 and PS32 - as shown
PS22 - opposite hand

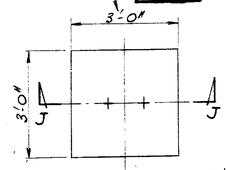
SECTION 'G-G'





Footings: PS11, PS14, PS17
PS21, PS24, PS27
PS31, PS34, PS37
PS41, PS44, PS47

12 OFF



FOOTINGS "PS31, PS41, PS44 & PS47 WORK AS EXECUTED"

REINFORCEMENT LIST

Tag	Size	Detail	No. off.
1	#5s	a, b — 1. 4 off 2. 2 off 3. 4 off. 3 Variants - a = 7'-3" b = 5'-7½" 1. a = 8'-3" b = 7'-6" 2. a = 9'-3" b = 9'-6" 3.	20
2	#6s	a, a, b — 5 Variants - 2 off each. a = 7'-6" b = 5'-7½" a = 8'-0" b = 6'-6" a = 8'-6" b = 7'-6" a = 9'-0" b = 8'-6" a = 9'-6" b = 9'-6"	20
3	#5s	2'-0", 11", 4'-3"	56
4	#4s	2'-0"	44
5	#5s	2'-0", 2'-6"	64
6	#4s	1'-6", 2'-6"	48
7	#5s	2'-6", 2'-6"	64
8	#5s	2'-6", 1'-6", 2'-6"	96
9	#4s	1'-6", 2'-0"	216
10	#4s	2'-6", 2'-0"	288
11	#4s	1'-6", 2'-6"	360
12	#8s	3'-8", 3'-4"	352
13	#4s	3'-8", 3'-1"	352
14	#4s	3'-6", 3'-6"	72
15	#4s	3'-6", 3'-0", 3'-5"	1360
16	#6s	3'-6", 3'-5"	1360
17	#4s	5'-6", 3'-6"	120
18	#4s	3'-0", 6'-5"	384
19	#4s	6'-6", 6'-6"	24
20	#4s	3'-0", 3'-5"	224
21	#4s	1'-5", 3'-0"	192
22	#4s	1'-6", 1'-6"	36
23	#5s	10'-6"	4
24	#5s	3'-8"	4

NOTES: Concrete to be Class "F.A." as specified.
Steel reinforcement shall comply with the following specification: (1) Structural grade deformed bars - A.S. N° A92
Reinforcement List shows TOTAL quantities for Boilers 1 to 4 footings
All H.D. Bolts (& sleeves) to be supplied by Mechanical Plant Contractor & cast in by Civil Contractor.
All Bolts in Sleeves to be worked at cast-in so that they are free to move after concrete has set.

For location of footings see:
Blr. 1 — LD 25111 2A — LD 248530A — Blr. 2
Blr. 3 — LD 25111 3A — LD 25111 4A — Blr. 4

AMENDMENTS

1. Drawing Title and sheet size altered. Tender ing note deleted. Drawing completely revised. Reinforcement List added. — CKR MCJ 30.9.68
2. Location of blockouts in Access Stair foot. ing altered. Note re grouting of conduits added Ref. B8. Blockout details for PC 22 and PS12, PS32 added Ref. G-1 and G-7 — CKR MCJ 17/10/68 — E/ED G.A.K. 18/10/68
3. Bolts shown on ℄ 1'-0" centres were shown off centre. F34. at 1'-9" centres. PC footings named (3) Bolt sizes, length & sleeves added to all footings. Note added G10, 11. L.U. oil pipes shown in Sect. H-H. B9. Note added to Elec. Conduits. C7, B8. — R.M. G.P. 21-1-'69 — RA for MCA 22/1/69
4. Blockouts shown for Footings PC42 PS32 and PS42. Ref. E1, E2, E8 — K.B.F. P.M. 6.3.69 — RA for MCA 10.3.69
5. UNDERSIDE RL's & DIMENSIONS OF CONCRETE BACKFILL ADDED. Ref. E5, C9 & G9 "WORK AS EXECUTED" — C.E. H.T. 11-11-70 — A.S.E. 17.11.70 — S.E/C.D.

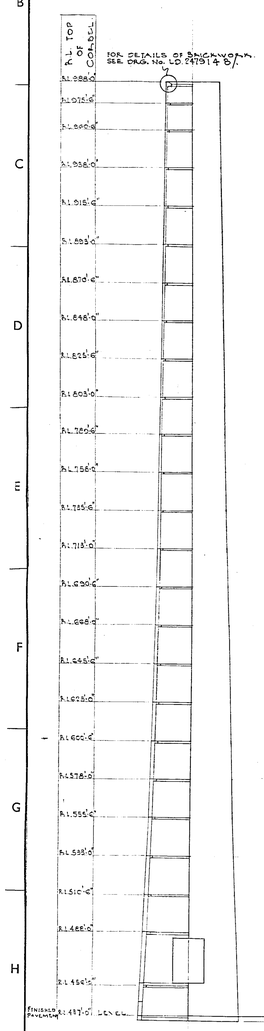
CONTRACT N° 1948

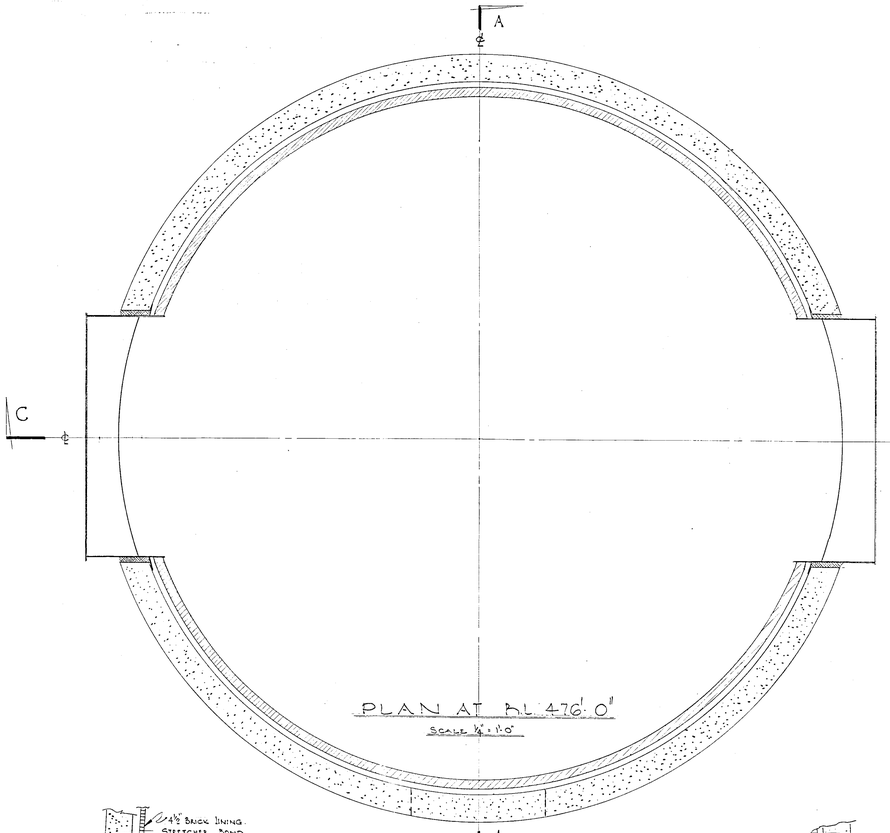
THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
BOILERS N° 1 TO 4
FOOTINGS FOR COL. MARKS D, PC, PD AND PS AND ACCESS STAIRS — R.C. DETAILS

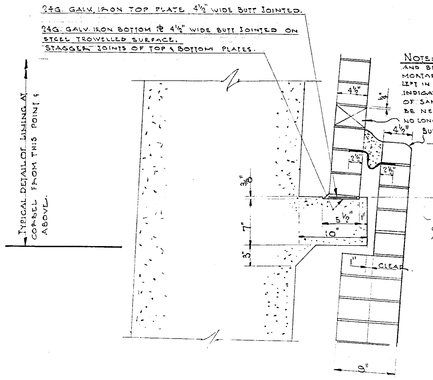
SCALE	1/2"=1'-0"		DATE		DATE
DRAWN	CKR	E/E.P.		S.S.E.A.	24/1/69
TRACED	—	E/M.P.	31/3/69		
CHECKED	M.C.J.			D.C.E./POWER.	30/5/69
E/C.D.					
DATE			LD25111 1		B/5

KODAK 23·11·70

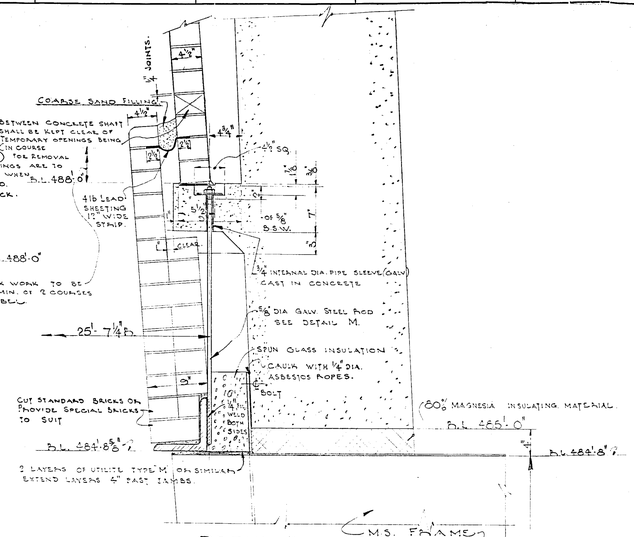




PLAN AT R.L. 476'-0"
SCALE 1/4" = 1'-0"

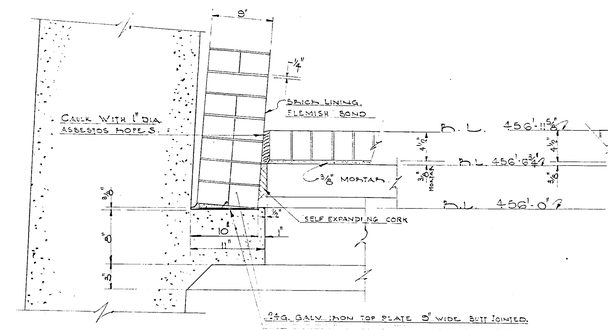


DETAIL G
SCALE 1½" = 1'-0"

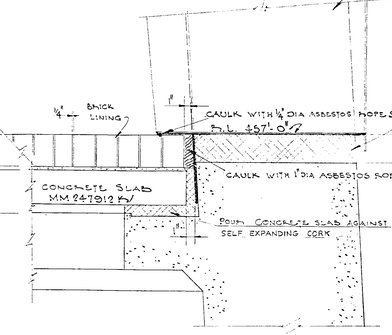


DETAIL H
SCALE 1½" = 1'-0"

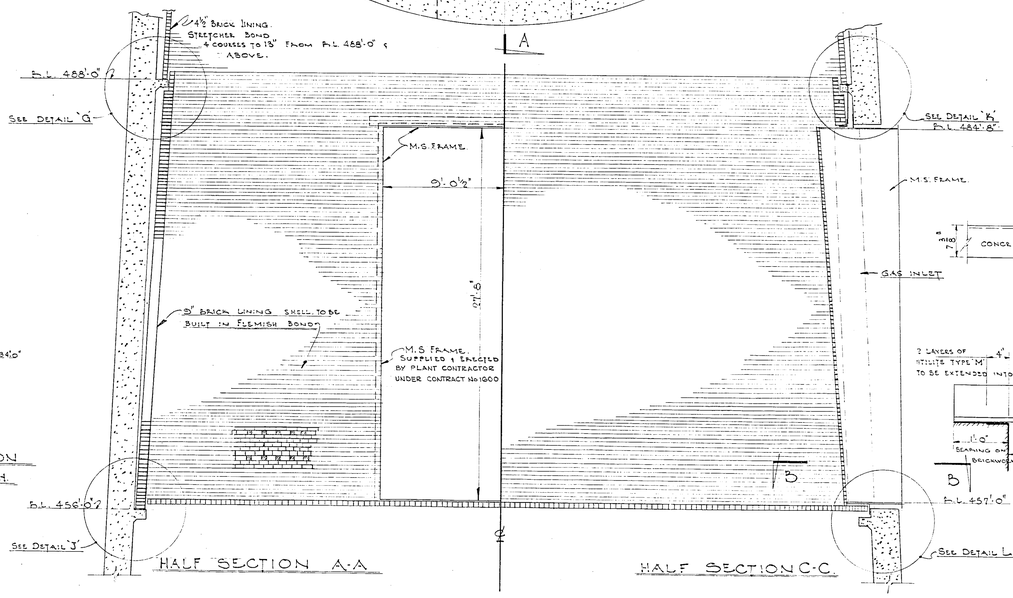
M.S. FRAME SUPPLIED & FIXED BY PLANT CONTRACTOR UNDER CONTRACT No. 1900



DETAIL J
SCALE 1½" = 1'-0"



DETAIL L
SCALE 1½" = 1'-0"

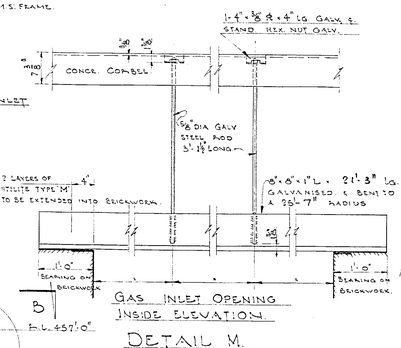


HALF SECTION & HALF ELEVATION OF CHIMNEY FROM NORTH
SCALE 1/32" = 1'-0"

HALF SECTION A-A

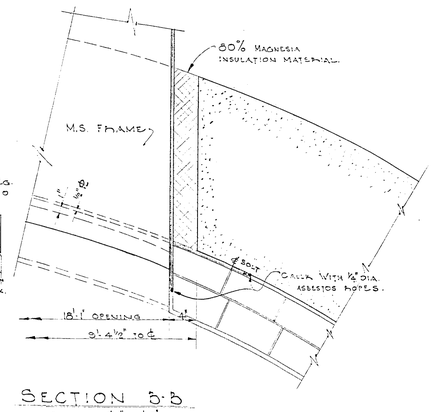
HALF SECTION C-C

SCALE 1/4" = 1'-0"



GAS INLET OPENING INSIDE ELEVATION

DETAIL M.
SCALE 1" = 1'-0"



SECTION B-B
SCALE 1½" = 1'-0"

REFERENCE DRGS.

GENERAL ARRANGEMENT	LD 247906 G/1
SLAB AT R.L. 456'-6¾" BEAMS COLS. & R.C. DET.	LD 247912 A
CAST IRON CAP DETAILS.	LD 247914 B

NOTES:

1. ALL BRICKS FOR LINING CHIMNEY SHAFT SHALL CONSIST OF GOOD QUALITY ACID & HEAT RESISTING BRICKS OF A SILICEOUS TYPE OF SIZE 9" x 4½" x 3".
2. CAPPING BRICKS SHALL BE BULLNOSED.
3. ALL LINING SHALL BE SET, JOINTED AND POINTED IN ACID & HEAT RESISTING MORTAR.
4. 9" THICK LINING TO BE BUILT IN FLEMISH BOND.
   4½" " SHALL BE BUILT IN STRETCHER BOND 4 COURSES TO 13".
5. MANUFACTURER'S RECOMMENDATIONS ARE TO BE FOLLOWED REGARDING PROPORTION OF QUICK-SET ACID AND HEAT RESISTANT CEMENT USED IN MORTARS.
6. STRAIGHT BRICKS TO BE LAID TO REQUIRED RADII OVER ENTIRE HEIGHT OF STACK.
7. PARTICULAR ATTENTION IS TO BE GIVEN TO THE ½" SLOTS IN THE CORBELS. THESE MUST BE KEPT CLEAN FOR THE FULL DEPTH OF SLOTS.
8. ASBESTOS ROPES MUST PROVIDE A COMPLETE SEAL. ROPE SIZES MAY BE VARIED WHERE NECESSARY.
9. FOR DETAILS OF BRICKWORK & CAST IRON CAP SEE DRG. LD 247914 B.

AMENDMENTS	DRAWN	DATE	CHECKED
(1) TENDERING NOTE (2) REVISED CHIM. SELF-RAISED FLUE (3) MISCELLANEOUS ALTERATIONS TO FLUE & CAP. (4) FLUE ADDED	K.U.	12.8.66	K.H.

CONTRACT No 1894

THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION

CHIMNEY STACKS No 1 & No 2

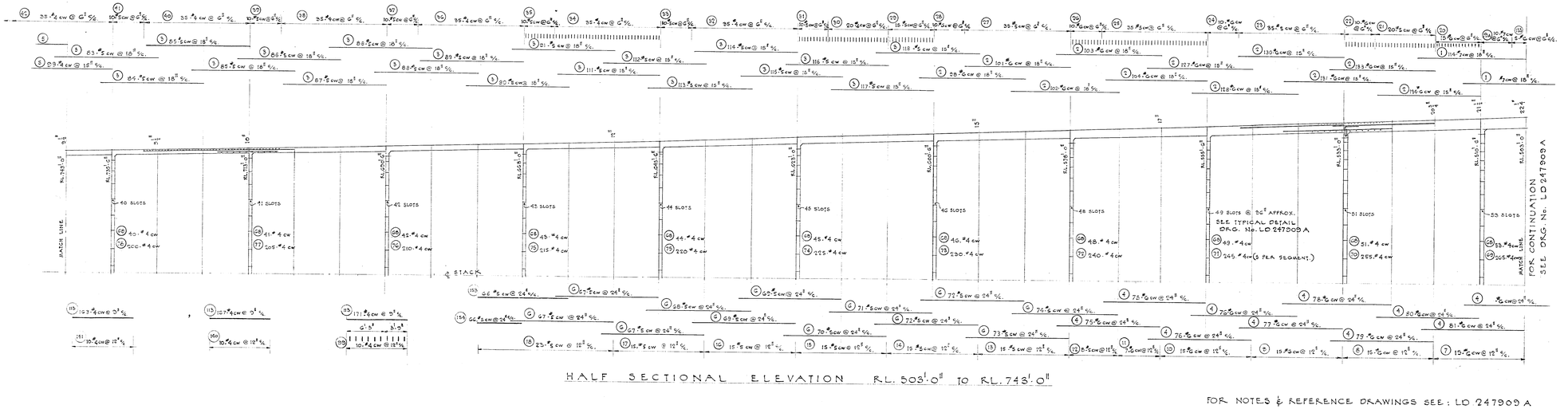
BRICK LINING DETAILS

SCALE AS SHOWN.		DATE		DATE
DRAWN	R.S.	S.M.D.		26.8.66
TRACED	—	—		30.3.67
CHECKED	K.H.			
E.I.C.S. DATE				

LD 247913 A/1



HALF SECTIONAL ELEVATION RL. 743'-0" TO RL. 988'-0"



HALF SECTIONAL ELEVATION RL. 503'-0" TO RL. 743'-0"

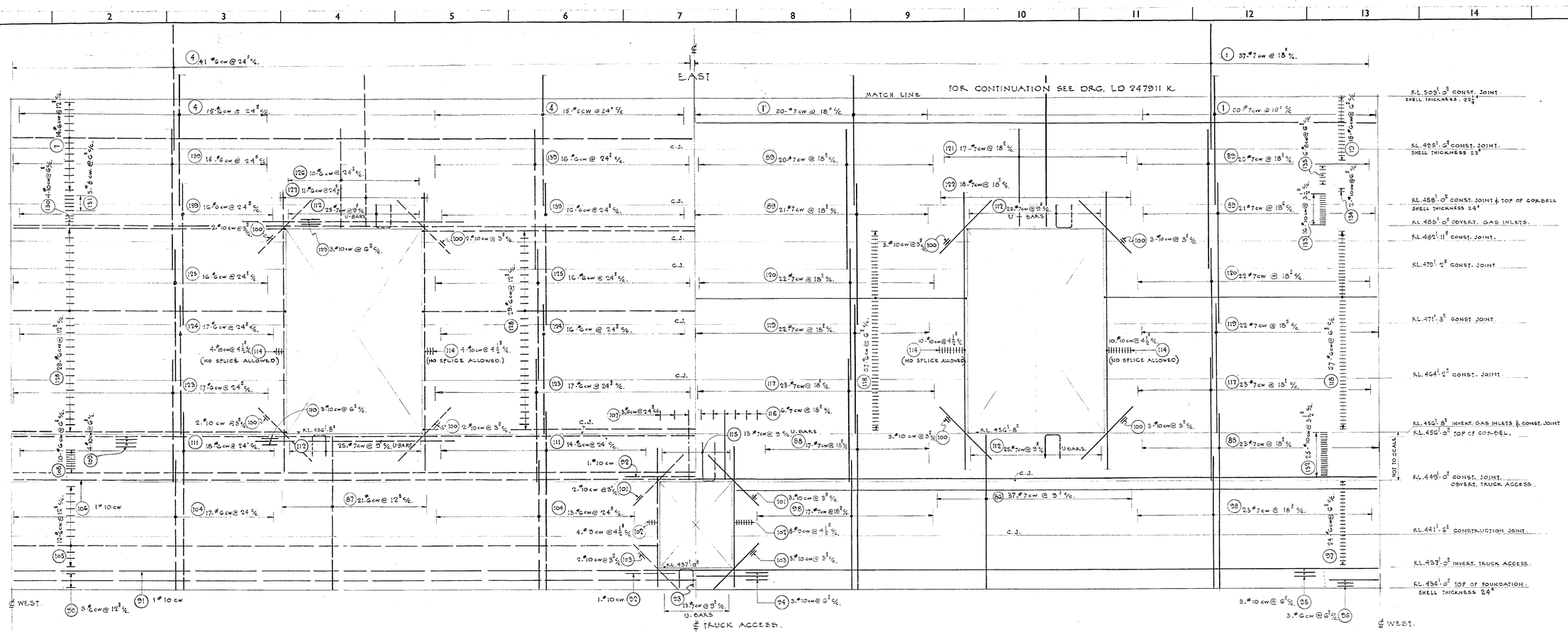
FOR NOTES & REFERENCE DRAWINGS SEE: LD 247909 A

FOR REINFORCEMENT LIST SEE DRG: LD 253842 K

AMENDMENTS
OUTSTANDING NOTE DELETED.
SEE DRG. ADDED IN DISTRIBUTION.
INSTRUCTION BY LETTER SIGNATURE
REVISION | DATE | INITIALS
S.I. No. 1 | 12.8.61 | K.A.H.
S.I. No. 2 | 11.1.62 | K.A.H.
S.I. No. 3 | 11.1.62 | K.A.H.
S.I. No. 4 | 11.1.62 | K.A.H.
S.I. No. 5 | 11.1.62 | K.A.H.
S.I. No. 6 | 11.1.62 | K.A.H.
S.I. No. 7 | 11.1.62 | K.A.H.
S.I. No. 8 | 11.1.62 | K.A.H.
S.I. No. 9 | 11.1.62 | K.A.H.
S.I. No. 10 | 11.1.62 | K.A.H.
S.I. No. 11 | 11.1.62 | K.A.H.
S.I. No. 12 | 11.1.62 | K.A.H.
S.I. No. 13 | 11.1.62 | K.A.H.
S.I. No. 14 | 11.1.62 | K.A.H.
S.I. No. 15 | 11.1.62 | K.A.H.
S.I. No. 16 | 11.1.62 | K.A.H.
S.I. No. 17 | 11.1.62 | K.A.H.
S.I. No. 18 | 11.1.62 | K.A.H.
S.I. No. 19 | 11.1.62 | K.A.H.
S.I. No. 20 | 11.1.62 | K.A.H.
S.I. No. 21 | 11.1.62 | K.A.H.
S.I. No. 22 | 11.1.62 | K.A.H.
S.I. No. 23 | 11.1.62 | K.A.H.
S.I. No. 24 | 11.1.62 | K.A.H.
S.I. No. 25 | 11.1.62 | K.A.H.
S.I. No. 26 | 11.1.62 | K.A.H.
S.I. No. 27 | 11.1.62 | K.A.H.
S.I. No. 28 | 11.1.62 | K.A.H.
S.I. No. 29 | 11.1.62 | K.A.H.
S.I. No. 30 | 11.1.62 | K.A.H.
S.I. No. 31 | 11.1.62 | K.A.H.
S.I. No. 32 | 11.1.62 | K.A.H.
S.I. No. 33 | 11.1.62 | K.A.H.
S.I. No. 34 | 11.1.62 | K.A.H.
S.I. No. 35 | 11.1.62 | K.A.H.
S.I. No. 36 | 11.1.62 | K.A.H.
S.I. No. 37 | 11.1.62 | K.A.H.
S.I. No. 38 | 11.1.62 | K.A.H.
S.I. No. 39 | 11.1.62 | K.A.H.
S.I. No. 40 | 11.1.62 | K.A.H.
S.I. No. 41 | 11.1.62 | K.A.H.
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S.I. No. 43 | 11.1.62 | K.A.H.
S.I. No. 44 | 11.1.62 | K.A.H.
S.I. No. 45 | 11.1.62 | K.A.H.
S.I. No. 46 | 11.1.62 | K.A.H.
S.I. No. 47 | 11.1.62 | K.A.H.
S.I. No. 48 | 11.1.62 | K.A.H.
S.I. No. 49 | 11.1.62 | K.A.H.
S.I. No. 50 | 11.1.62 | K.A.H.
S.I. No. 51 | 11.1.62 | K.A.H.
S.I. No. 52 | 11.1.62 | K.A.H.
S.I. No. 53 | 11.1.62 | K.A.H.
S.I. No. 54 | 11.1.62 | K.A.H.
S.I. No. 55 | 11.1.62 | K.A.H.
S.I. No. 56 | 11.1.62 | K.A.H.
S.I. No. 57 | 11.1.62 | K.A.H.
S.I. No. 58 | 11.1.62 | K.A.H.
S.I. No. 59 | 11.1.62 | K.A.H.
S.I. No. 60 | 11.1.62 | K.A.H.
S.I. No. 61 | 11.1.62 | K.A.H.
S.I. No. 62 | 11.1.62 | K.A.H.
S.I. No. 63 | 11.1.62 | K.A.H.
S.I. No. 64 | 11.1.62 | K.A.H.
S.I. No. 65 | 11.1.62 | K.A.H.
S.I. No. 66 | 11.1.62 | K.A.H.
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S.I. No. 68 | 11.1.62 | K.A.H.

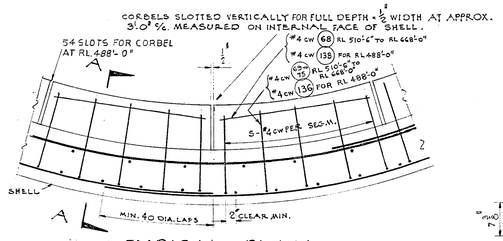
CONTRACT No. 1894	THE ELECTRICITY COMMISSION OF N.S.W.
	LIDDELL POWER STATION CHIMNEY STACKS Nº1 & Nº2 REINFORCEMENT DETAILS RL. 503'-0" TO RL. 988'-0" SECTIONAL ELEVATION
	SCALE: 3/16" = 1'-0" DRAWN R.M. TRACED — CHECKED W.G.S. E/CO [illegible] DATE 1/1/62
	DATE 1/1/62 P.E. [illegible] DATE 7/1/62
	Nº LD 247911 K/2

LD 247911 K
END. 1



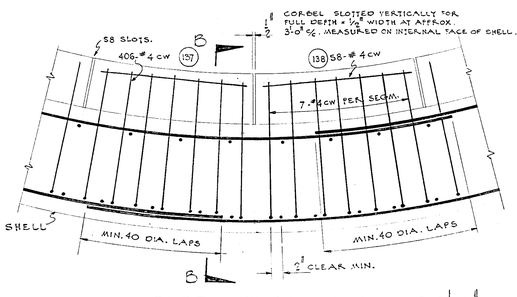
DEVELOPED SURFACE OF SHELL

(DISTORTED SCALE)

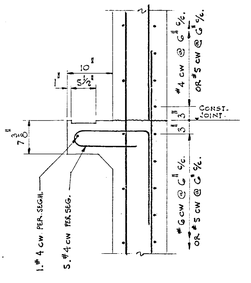


TYPICAL PLAN

CORBELS RL. 488'-0" TO RL. 668'-0"

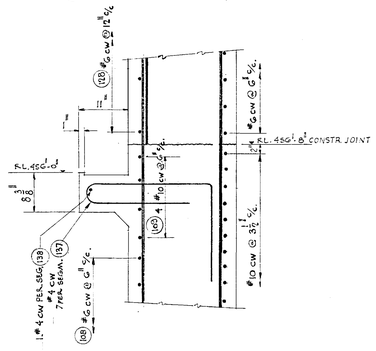


PART PLAN AT RL. 456'-0"



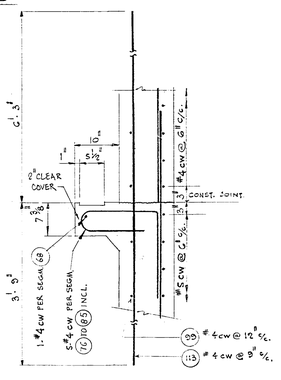
SECTION A·A

(SEE ALSO TYPICAL PLAN)



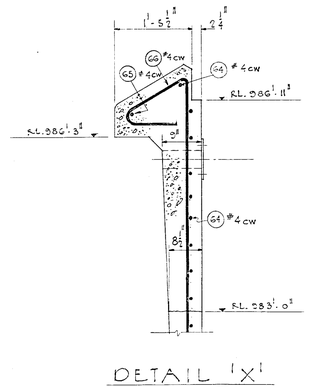
SECTION B·B

(SEE ALSO PART PLAN)



CORBEL DETAILS

R.L. 690'-6" & ABOVE



DETAIL 'X'

REFERENCE DRG'S.

GENERAL ARRG'T.	LD 247906 K
REINFORCEMENT DETAILS R.L. 503'-0" to R.L. 988'-0"	LD 247911 K
REINF. DETAILS R.L. 434'-0" to R.L. 503'-0"	LD 247910 K
FOUNDATION - STACK No. 1	LD 247907 A
FOUNDATION - STACK No. 2	LD 247908 K
CAP DETAILS	LD 247914 B
DIAGRAM OF BAR BENDING SHAPES	S 228581 D
REINFORCEMENT LIST – RL 434'-0" TO RL 503'-0"	LD 253840 B
REINFORCEMENT LIST – RL 503'-0" TO RL 988'-0"	LD 253842 K

NOTES.

1. STEEL REINFORCEMENT. #7cw INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A83. NUMBER INDICATES DIAMETER IN EIGHTHS OF AN INCH e.g. #7cw = 7/8"ø
2. COVER TO REINFORCEMENT TO BE 2" UNLESS OTHERWISE NOTED.
3. MINIMUM LAP TO BE 40 BAR DIAMETERS.
4. ALL LAPS TO BE STAGGERED.
5. SPACING OF VERTICAL BARS GIVEN AT LOWEST POINT OF BAR.

AMENDMENTS	DRAWN	DATE	CHECKED
(1) TENDERING NOTE DELETED. DRG RELEASED FOR CONSTRUCTION PURPOSES. REF DRGS. ADDED RE/PSC SIGNATURE ADDED.	R.U.	15-6-68	R.J.H.
2. Detail 'X' Dimension was 7½" 2" clear cover added as per Amdt. 1 to AS 1480-1968.	R.J.R.	10.6.69	R.J.H. 11.6.69

CONTRACT No. 1894

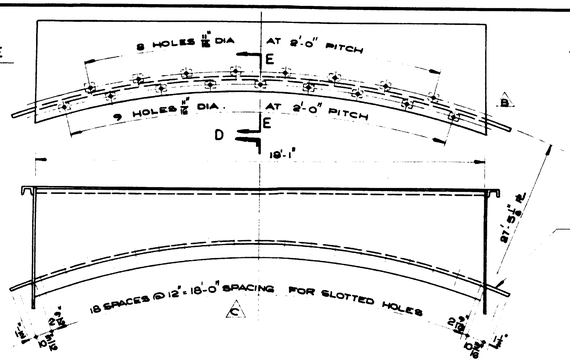
THE ELECTRICITY COMMISSION OF N.S.W.

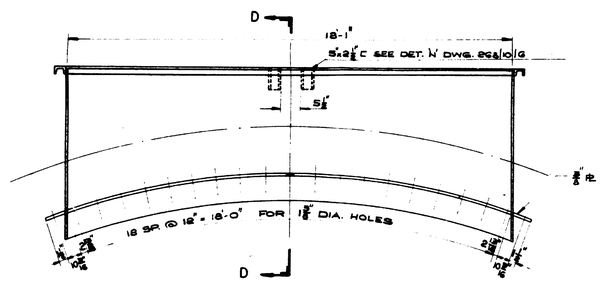
LIDDELL POWER STATION

CHIMNEY STACKS No. 1 & 2. REINFORCEMENT DETAILS ELEVATION R.L. 434'-0" TO R.L. 503'-0" & CORBEL DETAILS FROM R.L. 456'-0" TO R.L. 988'-0"

		DATE		DATE
SCALE 3/16" & 1" = 1'-0"			A.A. Ferguson	20/5/68
DRAWN K.M.			RE/P.S.C.	
TRACED —				
CHECKED M.G.S.				
S/CO DATE 20/5/68			LD247909 A/2	

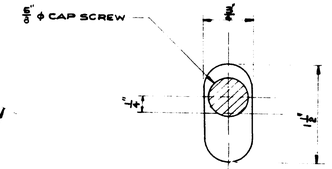
PLAN ON BOTTOM PLATE





SECTION "B-B"

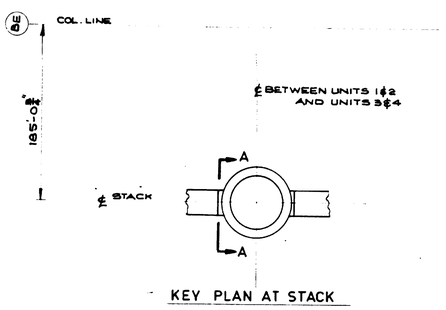
SECTION "C-C"



DETAIL "J"
FULL SIZE SCALE

PAINT MARK Nos ON DUCTS IN BLACK LETTERING ON APPROPRIATE BOILER COLOUR PATCH:-

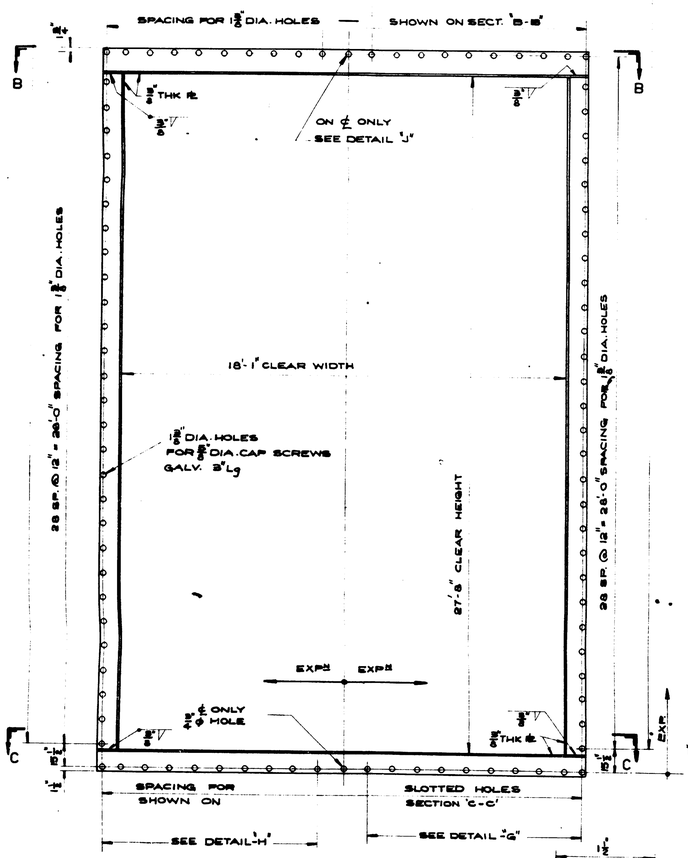
No 1 BOILER	—	RED PATCH
No 2 "	—	WHITE "
No 3 "	—	GREEN "
No 4 "	—	YELLOW "



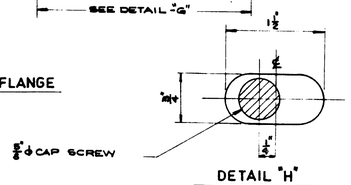
KEY PLAN AT STACK

SEE DETAIL-"F"

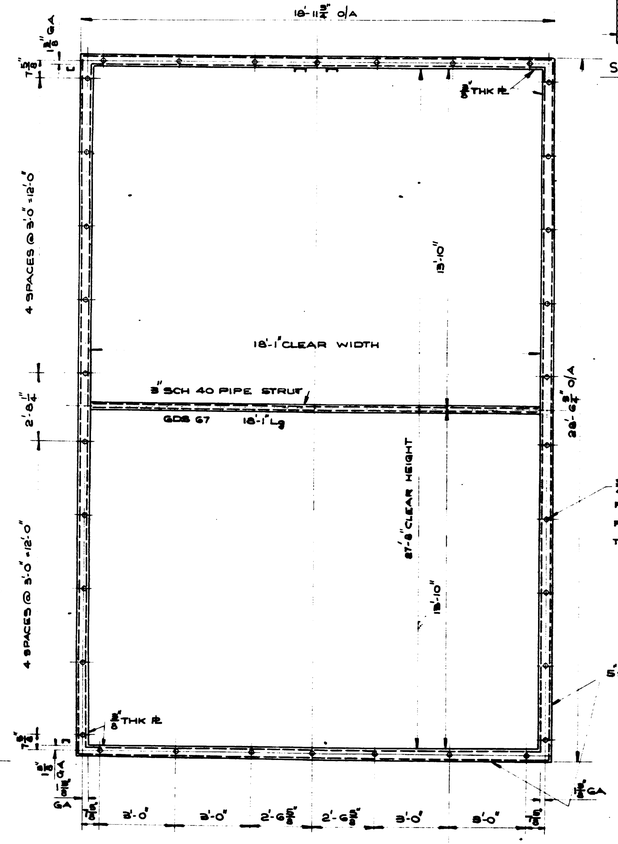
SEE DETAIL-"E"



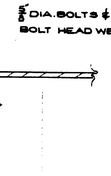
ELEVATION OF INNER FLANGE



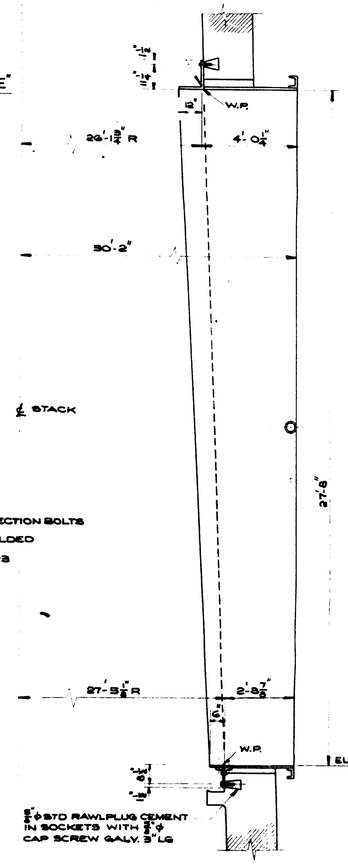
DETAIL "H"
FULL SIZE SCALE



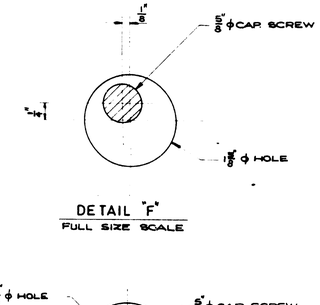
ELEVATION OF OUTER FLANGE SECTION "A-A"
SEE KEY PLAN
MK G.D.S. 12



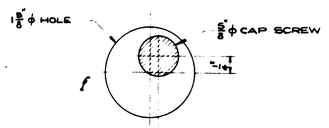
SECTION "E-E"
ENLARGED)



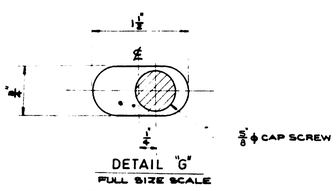
SECTION "D-D"



DETAIL "F"
FULL SIZE SCALE



DETAIL "E"
FULL SIZE SCALE



DETAIL "G"
FULL SIZE SCALE

NOTES

THIS DRG REPRODUCED FROM CE ORG DGS-221-442-1

REF. DRGS.	
GAS DUCT I.D. FAN TO STACK (SHEET 1)	268/10/5
ARR'GT OF GAS DUCT, I.D. FAN TO STACK.	SLRS 8 & 4 - 268/10/4
ARR'GT " " " " " "	SLRS 1 & 2 - 268/10/2
DETAILS " " " ℄ SUPPORTS	268/10/1
MATERIAL LIST FOR I.D. DUCT WORK	268/10/3

LD257751B/2

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INTERNATIONAL COMBUSTION AUSTRALIA LTD.
SOUTH STREET, RYDALMERE, N.S.W.

GAS INLET CONNECTION TO STACK MK C.D.S. 12
ELECTRICITY COMM. OF N.S.W. (SHT 3 OF 3)
LIDDELL POWER STA. UNITS No 1, 2, 3 & 4

ITEM No 11-80	C-E DRAWING No D-935-368-6	DRAWING NUMBER 268/10/68
	DRAWN TRACED 25 11.8.70 CHECKED WH 26 NOV 68 PASSED ADB SCALE	REV.

STANDARD FOR MICROFILMING

CONTRACT NO.	LETTER DATED
1600	NOV 570

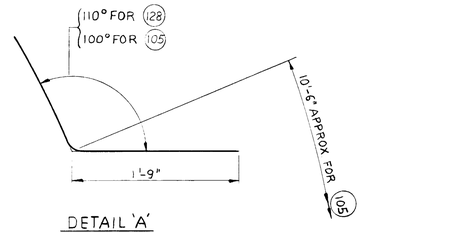
REVISIONS: PIPE STRUT SHOWN IN SECTION D-D SEE CE DRG D&S/221/442-1 | PLAN ON BOTTOM PLATE ADDED, SECTION E-E ADDED, SITE LETTER 1.12.69 S.12.69 RSB | DRILLING OF HOLES ON SEC. CC 4.2.70 MODIFIED TO SUIT DRG D-935-368-1 CE LETTER DEC. 30/69 WH | DRILLING FOR OUTER FLANGE SEC A-A REMAIN WH | DRILLING & SPACING FOR 13/16 DIA HOLES (ORG DGS-221-442-2) 6.2.70 WAS DRILLING & SPACING FOR 3/4 CAP SCREWS CESO LETTER 10/146 RHW | SECT C-C DIMS ALTERED (ORG CORRECTED) 19.2.70 5/16 "WAS 5/16" & 10 5/16 "WAS 11 5/16" RHW | ORG. TRACED WITHOUT ALTERATION. J.S. 11.8.70

KODAK 16-11-70

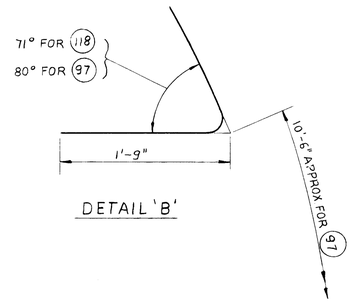
TAG	SIZE	DETAIL	No OFF	LOCATION
1	#7CW	17'-11"	194	VERTICAL EXTERNAL FACE
4	#6CW	17'-6"	142	VERTICAL INTERNAL FACE
7	#6CW	25'-5" / 26'-2" — MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 176'-0" TO 179'-6"	14 RINGS	HORIZ. INTERNAL FACE
19	#6CW	27'-2" / 27'-6" — MIN. LAP 2'-6" EACH RING 6 BARS TOTAL LENGTH 185'-9" TO 187'-9"	18 RINGS	HORIZ. EXTERNAL FACE
86	#7CW	22'-6"	74	VERT. EXTERNAL FACE
87	#6CW	22'-6"	42	VERT. INTERNAL FACE
88	#7CW	25'-7"	80	VERT. EXTERNAL FACE
69	#7CW	19'-3"	164	〃
90	#6CW	28'-7" — MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 197'-3"	3 RINGS	HORIZ. INTERNAL FACE
91	#10CW	28'-6" — MIN. LAP 4'-11" RING -7 BARS TOTAL LENGTH 213'-6"	1 RING	〃
92	#10CW	20'-0" / 28'-6" / 27'-11"	2 ARCS	〃 (AT TRUCK OPENING)
93	#7CW	2'-9" / 1'-6"	13	AT TRUCK OPENING
94	#10CW	20'-0" / 30'-2"	3	HORIZ. EXT. FACE
95	#10CW	30'-2" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 224'-0"	3 RINGS	〃
96	#6CW	30'-3" — MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 207'-6"	3 RINGS	〃
97	#6CW	29'-7" / 30'-2" / 10'-6" APPROX — MIN. LAP 2'-6" EACH ARC 7 BARS TOTAL LENGTH 196'-6" TO 200'-0" SEE DETAIL 'B'	24 ARCS	〃
98	#7CW	17'-11"	80	VERT. EXTERNAL FACE
100	#10CW	10'-0"	40	DIAGONAL TRIMMERS AT GAS INL.
101	#10CW	10'-0"	10	DIAGONAL TRIMMERS

TAG	SIZE	DETAIL	No OFF	LOCATION
102	#9CW	20'-0"	24	VERTICAL AT TRUCK OPENING
103	#10CW	9'-0"	10	DIAGONAL TRIMMERS
104	#6CW	17'-6"	60	VERTICAL INTERNAL FACE
105	#6CW	27'-11" / 28'-6" / 10'-6" APPROX — MIN. LAP 2'-6" EACH ARC 7 BARS TOTAL LENGTH 185'-9" TO 189'-6" SEE DETAIL 'A'	12 ARCS	HORIZ INTERNAL FACE
106	#6CW	27'-11" — MIN. LAP 4'-11" RING 7 BARS TOTAL LENGTH 209'-9"	1 RING	〃
107	#6CW	10'-0"	6	VERTICAL INTERNAL FACE
108	#6CW	27'-9" — MIN. LAP 2'-6" EACH RING 7 BARS TOTAL LENGTH 192'-0"	10 RINGS	〃
109	#10CW	27'-7" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 208'-0"	4 RINGS	〃
110	#10CW	30'-0" / 27'-7"	6 ARCS	〃 AT GAS INLETS
111	#6CW	25'-2"	64	VERTICAL INTERNAL FACE
112	#7CW	2'-9" / 1'-6"	100	AT GAS INLET
114	#10CW	38'-4"	56	VERTICAL AT GAS INLETS
115	#7CW	5'-0" / 1'-6"	13	AT TRUCK OPENING
116	#7CW	10'-5"	12	VERTICAL EXTERNAL FACE
117	#7CW	18'-1"	92	〃
118	#6CW	28'-0" / 29'-3" — MIN. LAP 2'-6" EACH ARC 3 BARS TOTAL LENGTH 77'-0" TO 80'-6" SEE DET. 'B' 57 VARIANTS	114 ARCS	HORIZ EXTERNAL FACE
119	#7CW	17'-11"	88	VERTICAL EXTERNAL FACE
120	#7CW	17'-11"	88	〃
121	#7CW	13'-3"	34	〃
122	#7CW	20'-9"	36	〃

TAG	SIZE	DETAIL	No OFF	LOCATION
123	#6CW	17'-8"	68	VERTICAL INTERNAL FACE
124	#6CW	17'-6"	66	〃
125	#6CW	17'-6"	64	〃
126	#6CW	12'-10"	20	〃
127	#6CW	20'-4"	22	〃
128	#6CW	25'-3" / 27'-7" — MIN. LAP 2'-6" EACH ARC 3 BARS TOTAL LENGTH 71'-0" SEE DET 'A' TO 75'-3" 28 VARIANTS	58 ARCS	HORIZ. INTERNAL FACE
129	#10CW	30'-0" / 26'-3"	6 ARCS	〃 AT GAS INLETS
130	#10CW	26'-3" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 199'-6"	4 RINGS	HORIZ INTERNAL FACE
131	#8CW	26'-2" — MIN. LAP 3'-3" EACH RING 7 BARS TOTAL LENGTH 188'-3"	5 RINGS	〃
132	#10CW	29'-3" / 29'-7" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 217'-3" TO 220'-6"	25 RINGS	HORIZ EXTERNAL FACE
133	#10CW	28'-0" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 210'-6"	16 RINGS	〃
134	#10CW	27'-11" — MIN. LAP 4'-11" EACH RING 7 BARS TOTAL LENGTH 209'-9"	2 RINGS	〃
135	#8CW	27'-6" — MIN. LAP 3'-3" EACH RING 7 BARS TOTAL LENGTH 194'-6"	6 RINGS	〃
136	#4CW	2'-4½" / 3" INTRAD. / 1" INTERNAL RAD / 2'-2" / 93° / 2'-9"	270	AT CORBEL RL 488'-0"
137	#4CW	2'-4½" / 3" INT. RAD. / 1" INTERNAL RAD / 2'-2" / 93° / 2'-9"	406	AT CORBEL RL 456'-0"
138	#4CW	2'-8"	112	AT CORBEL RL 456'-0" & RL 488'-0"
139	#6CW	18'-10"	128	VERTICAL INTERNAL FACE



DETAIL 'A'



DETAIL 'B'

REFERENCE DRG'S.

CHIMNEY STACK 1 & 2 REINFORCEMENT DET. ELEVATION RL 434'-0" TO RL 503'-0"	LD 247909 A
CHIMNEY STACK No1 & 2	LD 247906 K
DIAGRAM BAR BENDING SHAPES	S 228581 D

NOTES

STEEL REINFORCEMENT: #CW INDICATES COLD-WORKED STEEL DEFORMED BARS AS PER AS No A 83. NUMBER INDICATES DIAMETER IN EIGHTS OF AN INCH e.g. #8CW = 1"

DELIVER TO SITE IN TAGGED BUNDLES

HORIZONTAL REINFORCEMENT, CONSISTING OF TWO OR MORE BARS FORMING A RING, SHALL HAVE THE BARS COMPRISING EACH RING BUNDLED SEPARATELY

TAGS 97, 105, 118, 128 ARE TO BE MADE IN SUCH A WAY, THAT, WHEN PLACED, ALL THE LAPS ARE STAGGERED.

REINFORCEMENT LISTED FOR ONE STACK ONLY
REINFORCEMENT REQUIRED FOR TWO STACKS.

AMENDMENTS

1. Tag 136 No off was 220, tag 138 was 111.	K.J.H.	27.8.68

SA for MD 27/9/68

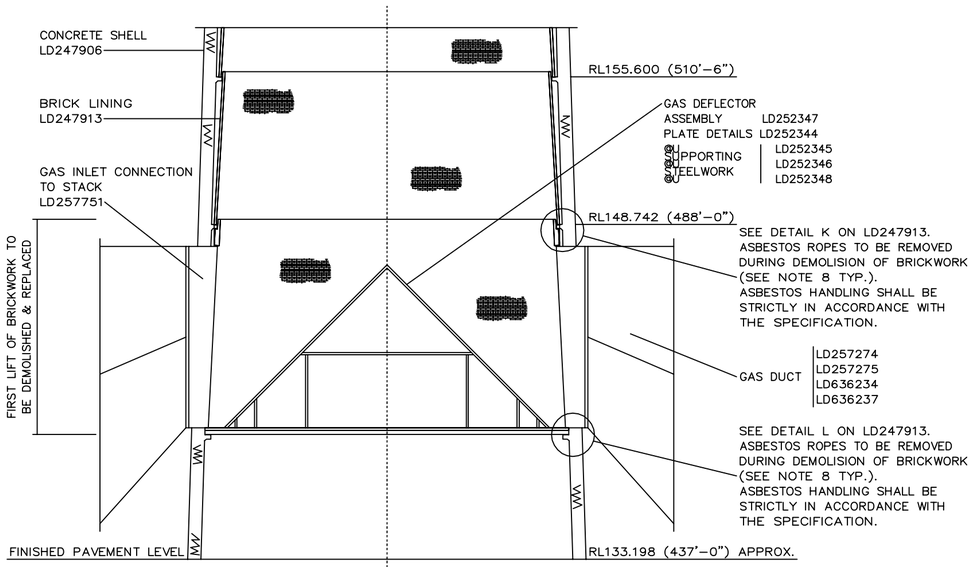
CONTRACT No. 1894

THE ELECTRICITY COMMISSION OF N.S.W.

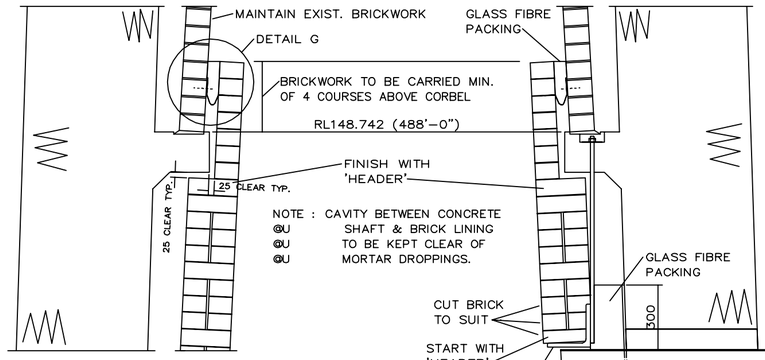
LIDDELL POWER STATION
CHIMNEY STACKS No1 & 2
ELEVATION RL. 434'-0" TO RL. 503'-0"
REINFORCEMENT LIST

SCALE	N.T.S.				DATE	DATE
DRAWN	K.U.				P.E./P.S.C.	1-8-68
TRACED	—					
CHECKED	A.C.D.					
E/CD.	SA for MD					
DATE	1.8.68					

LD 253840 B/1

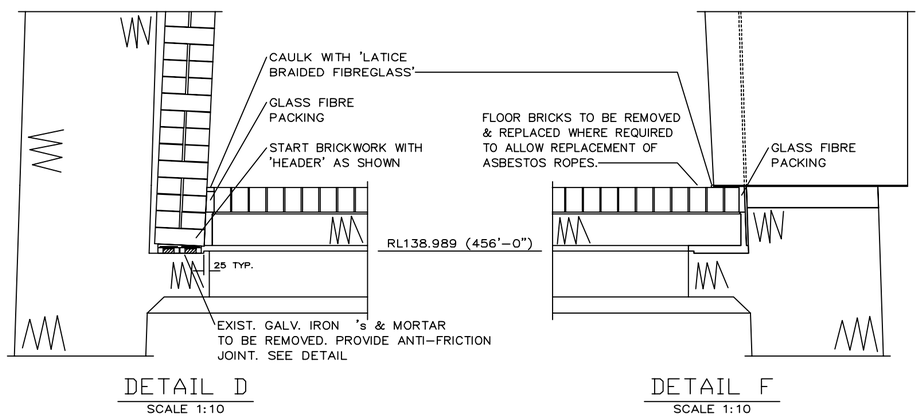


EXISTING CHIMNEY STACK DETAILS
SCALE 1:100



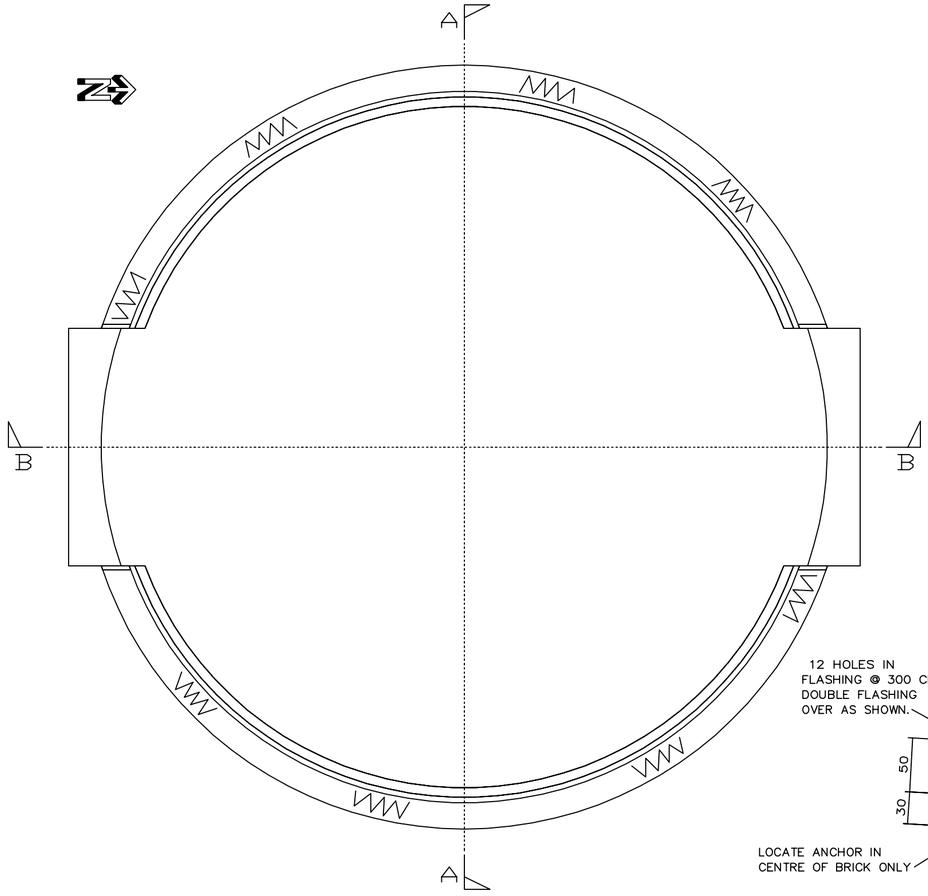
DETAIL C
SCALE 1:10

DETAIL E
SCALE 1:10

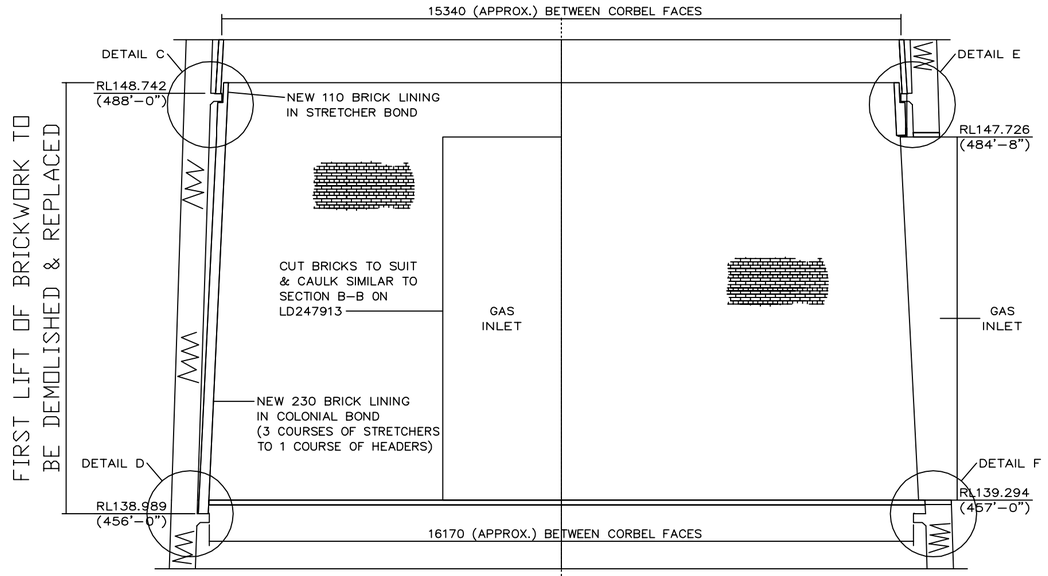


DETAIL D
SCALE 1:10

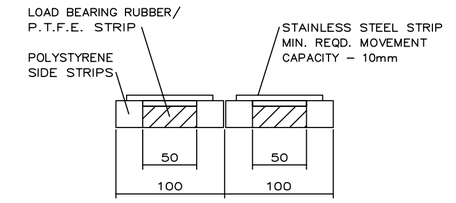
DETAIL F
SCALE 1:10



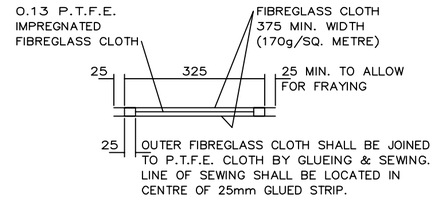
PLAN AT RL145.085
SCALE 1:50
GAS DEFLECTOR NOT SHOWN



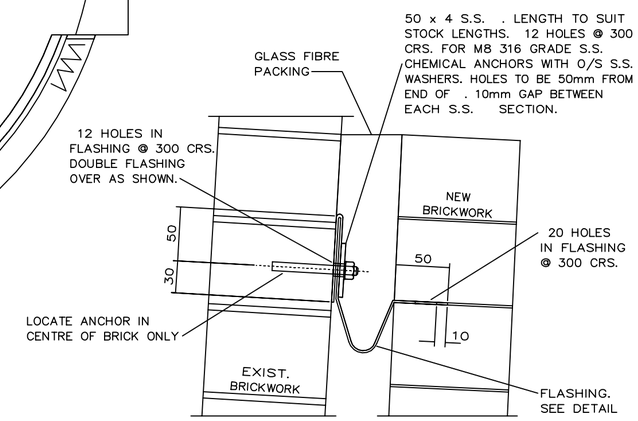
HALF SECTION A-A
HALF SECTION B-B
SCALE 1:50



ANTI-FRICTION JOINT
SCALE 1:2



FLASHING DETAIL
N.T.S.



DETAIL G
SCALE 1:2

NOTES

1. THE CONTRACTOR SHALL CONFIRM ALL DIMENSIONS & REDUCED LEVELS ON SITE BEFORE CONSTRUCTION COMMENCES.
2. ASBESTOS HANDLING & REMOVAL SHALL BE STRICTLY IN ACCORDANCE WITH THE SPECIFICATION.
3. EXISTING GLASS INSULATION SHALL BE REPLACED WITH NEW GLASS FIBRE PACKING IN ACCORDANCE WITH THE SPECIFICATION.
4. ALL STAINLESS STEEL PLATE, ANCHORS, NUTS & WASHERS SHALL BE GRADE 316.
5. M8 CHEMICAL ANCHORS SHALL BE INSTALLED IN THE CENTRE OF THE EXISTING BRICKS ONLY.
6. BRICK LINING SHALL BE GAS TIGHT. BRICKS SHALL BE LAID IN COLONIAL BOND (DOUBLE SKIN) & STRETCHER BOND (SINGLE SKIN) WITH 2mm TO 6mm JOINTS ALL AS SPECIFIED.
7. ALL HOLES IN FLASHING MATERIAL SHALL BE PUNCHED ONLY.
8. ASBESTOS ROPE SHALL BE REPLACED WITH 'LATICE BRAIDED FIBREGLASS' OF EQUIVALENT SIZE AS SPECIFIED.

REFERENCE DRAWINGS

LD247906	GENERAL ARRANGEMENT - CONCRETE
LD247913	BRICK LINING DETAILS
LD252344	GAS DEFLECTOR - PLATE DETAILS
LD252345	GAS DEFLECTOR - COLUMN & BRACE DETAILS
LD252346	GAS DEFLECTOR - BEAM & TIE DETAILS
LD252347	GAS DEFLECTOR ASS'Y
LD252348	GAS DEFLECTOR - BEAM & RAFTER DETAIL
LD257274	GAS DUCT I.D. FAN TO STACK - ARRG'T
LD257275	GAS DUCT I.D. FAN TO STACK - DETAILS
LD257751	GAS INLET CONNECTION TO STACK
LD243632	TYP. WELDING & CONSTR. DETS. FOR DUCTING
LD636234	UNIT 3 - I.D. FAN TO STACK DUCTING
@U	ADDITIONAL STIFFENING BEAMS
LD636237	UNIT 4 - I.D. FAN TO STACK DUCTING
@U	ADDITIONAL STIFFENING BEAMS

LINES STRAIGHTENED, BUILDINGS & DRAWINGS REALIGNED) SQUARED (DRAWING REALIGNED) ADDITIONAL CORRELATIVES INFORMATION ADDED (MINOR NOTES) REMOVED FROM AUTOCAD CONVERSION. SYSTEM COLOUR REDEFINED

01	CKD	PF
DATE	06-SEP-93	

804x1136mm

PACIFIC POWER SERVICES

CONTRACT No.	DRAWN	DM	
QUOTE NO. W269/93	DESIGN		
	DRG'D	DO	RT
	ENG		
	PASSED	PS	
REFERENCE DRAWINGS			

gad DO NOT AMEND MANUALLY

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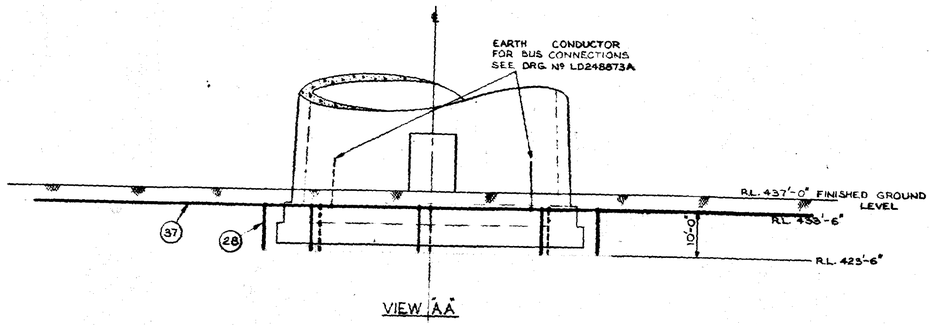
KKS CODING	UHN
ORIGINAL DRAWING APPROVED BY	C STARK per PS
MANAGER/PPE	4-JUN-1993
APPROVED	
DRAWING STATUS	
SCALE	AS SHOWN

Macquarie Generation

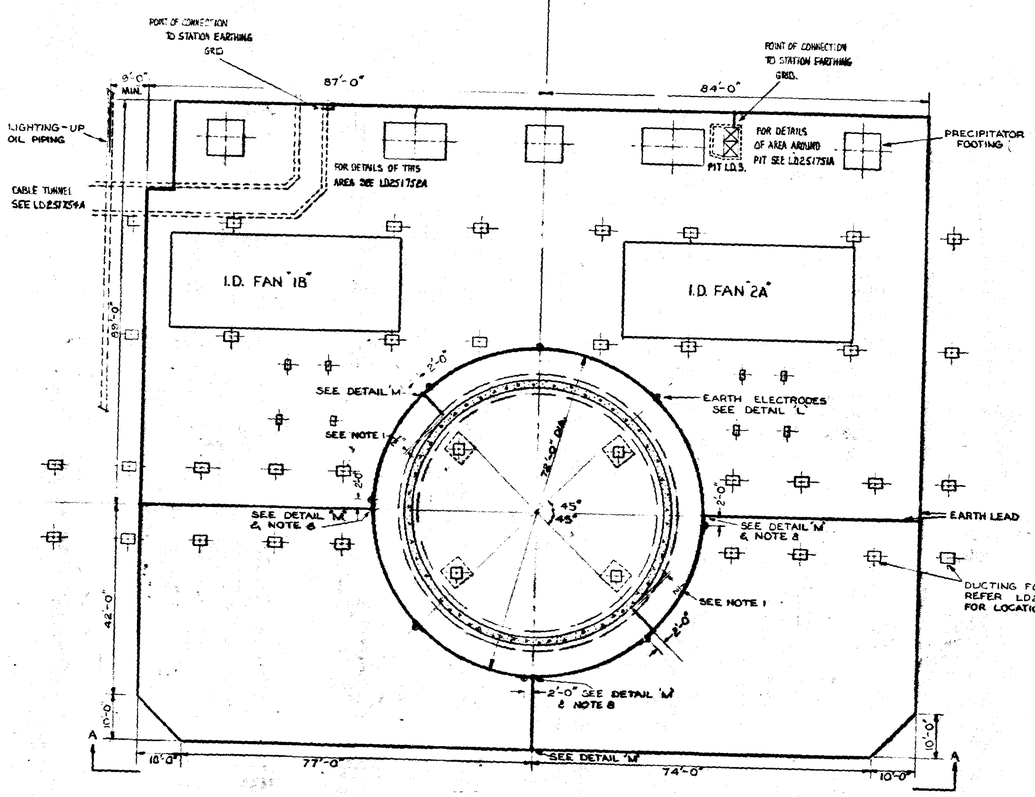
LIDDELL POWER STATION UNITS 3 & 4
CHIMNEY STACK
REPAIRS TO BRICK LINING
DETAILS

A0 | LD637160 | 01
PREFIX NUMBER SHEET AMDT

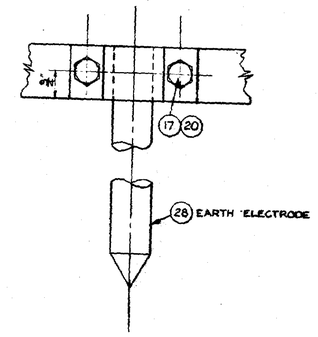
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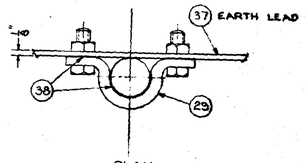
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PLAN



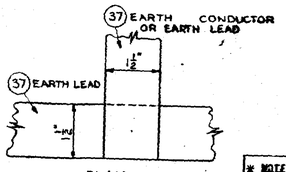
ELEVATION



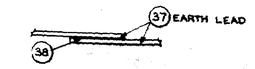
PLAN
DETAIL 'L'



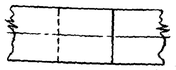
ELEVATION



PLAN
DETAIL 'M'



ELEVATION



PLAN
DETAIL 'N'

REFERENCE DRAWINGS

LD247907A - CHIMNEY STACK Nº1-FOUNDATION

LD248873A - CHIMNEY STACKS Nº1 & Nº2 - LIGHTNING CONDUCTOR - ARRANGEMENT
LD248871P - CHIMNEY STACKS Nº1 & Nº2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 1.
LD248872P - CHIMNEY STACKS Nº1 & Nº2 - LIGHTNING CONDUCTOR MATERIAL LIST - SHEET 2.
LD246715A - BOILERS 1 & 2 - PRECIPITATORS & I.D. FANS AREA - CABLE PITS, TUNNEL & CONDUIT LAYOUT.
LD251751A - I.D FANS 2A & 2B AREA - CABLE PITS & CONDUIT DETAILS
LD251752A - " " " 1A & 1B " " " " " "
LD28.230A - CHIMNEY STACK Nº2 - LIGHTNING CONDUCTOR EARTHING ARRANGEMENT

NOTES.

1. EARTH CONDUCTOR TO BE ½" CLEAR OF & PARALLEL TO FINISHED FACE OF STACK AS INDICATED IN PLAN. EARTH CONDUCTOR TO BE EXTENDED UP TO RL 441'-0" FOR EARTHING OF SCAFFOLDING & REINFORCEMENT ETC. DURING CHIMNEY CONSTRUCTION. ON COMPLETION OF CHIMNEY CONSTRUCTION, EARTH CONDUCTORS ARE TO BE TERMINATED AT TEST LINK IN ACCORDANCE WITH SECTION 'EE' ON DRG. Nº LD248873A.
2. TEMPORARY LEADS FOR EARTHING OF SCAFFOLDING ETC. DURING CHIMNEY CONSTRUCTION SHALL BE FIRMLY BONDED TO EARTH CONDUCTOR AT R.L. 441'-0". THE EARTH LEAD CONDUCTOR CONCENTRIC TO THE BASE OF THE STACK SHALL BE COMPLETELY COVERED & TIGHTLY PACKED WITH FINE SOIL TO A MIN. R.L. OF 435'-0" PRIOR TO BONDING OF EARTH CONDUCTOR TO THE TEMPORARY LEADS.
3. ALL MATING SURFACES OF JOINTS IN DETAIL 'L' ARE TO BE COMPLETELY BONDED WITH A CONTINUOUS COATING OF ALLOY & INTERPOSING STRIPS OF SILVER BRAZING ALLOY RIBBON OR COPPER PROSPHORUS BRAZING ALLOY RIBBON (SHIM). (TYPE CP1 OR CP2) BETWEEN MATING SURFACES BEFORE CLAMPING & BRAZING.
4. EARTH LEAD TO BE FORMED UP FROM LONGEST AVAILABLE LENGTHS OF COPPER & JOINED WHEREVER NECESSARY IN ACCORDANCE WITH DETAIL 'N' & NOTE 11.
5. REMOVE ALL SURPLUS FLUX & SCALE AFTER BRAZING.
6. DRIVE TOP OF EARTH ELECTRODES TO RL 433'-6" AS INDICATED ON ELEVATION.
7. BENDS IN EARTH CONDUCTOR TO BE 8" MIN. RAD.
8. THE THREE LOCATIONS SHOWN SHOULD NOT BE JOINED UNTIL TESTS HAVE BEEN CARRIED OUT TO DETERMINE THE EARTH RESISTANCE OF THE CONCENTRIC EARTH TERMINATION NETWORK (CALCULATED VALUE 1·6 OHM)
9. ITEM Nºs ENCIRCLED THUS (29) REFER TO ITEMS LISTED ON MATERIAL LIST DRG. Nºs LD248871 & 72P.
10. IF AN ELECTRODE STRIKES ROCK, A 1½" DIA. HOLE IS TO BE DRILLED TO THE REQUIRED DEPTH & THE ELECTRODE PLACED IN HOLE. THEN AN EQUAL MIXTURE OF BENTONITE & PLASTER OF PARIS SHALL BE MIXED WITH WATER TO FORM A SLURRY & POURED INTO THE HOLE AROUND THE ELECTRODE.
11. ALL JOINTS SHOWN IN DETAIL 'M & N' SHALL BE BRAZED JOINTS USING EITHER SILVER-BRAZING ALLOY OR COPPER-PHOSPHORUS BRAZING ALLOY.

* NOTE FOR CONTRACT NO. 2133

This drawing to be used for information only in tendering for Contract No. 2133 in accordance with the requirements of Specification No. 2133 - General-Drawings.

Reference Drawings listed hereon shall only be used for Contract 2133 if specifically supplied and listed in the Specification No. 2133.

AMENDMENTS
NOTES 1 & 3 & 4 MODIFIED. NOTE 11 ADDED. CONTRACT Nº ADDED. DRN: K.R. CKD: W.A.S. APP: A.A.F. 6/6/68
3 NOTE CHANGED. 2133 (WALLSEND AS) ADDED. (G.R.G-W) DRN: C.V. CKD: E.J.A. APP: A.A.F. 11.12.70
4. EARTHING GRID REVISED TO SUIT SITE LAYOUT. PIT 10.3.8 CABLE TUNNEL ADDED TO SHOW POINTS OF CONNECTION BETWEEN STATION EARTH & STACK GRID. REF DRGS ADDED TO THE ALTERED. DRN: M.J.K. CKD: E.J.A. APP: A.A.F. 12.12.72

* CONTRACT Nº	CONTRACT Nº
2133	1894

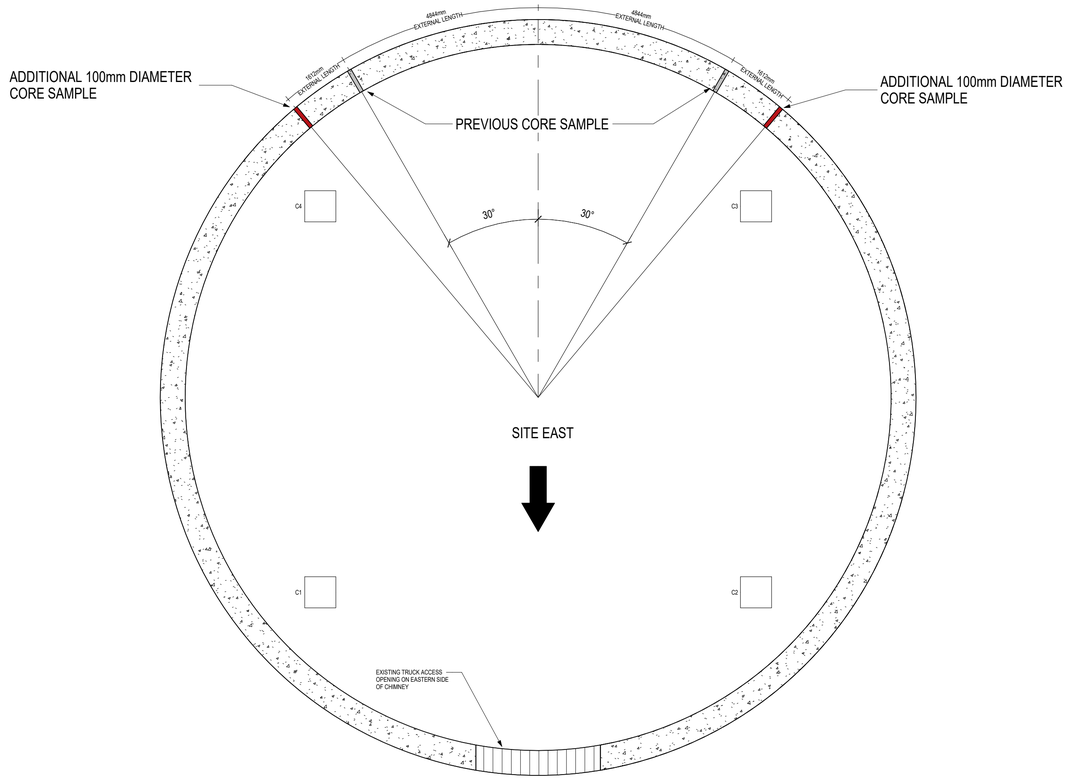
THE ELECTRICITY COMMISSION OF N.S.W.

LIDDELL POWER STATION
CHIMNEY STACK Nº1
LIGHTNING CONDUCTOR EARTHING ARRANGEMENT

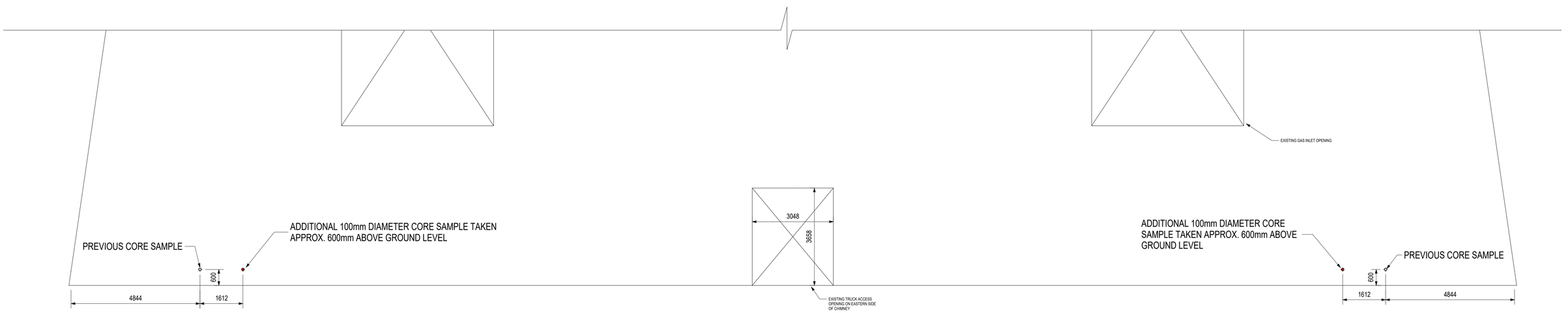
SCALE ½ IN. = 1 FT. & ½ IN. = 1 IN.				DATE	E.J.A.	DATE
DRAWN	K.R.	E/M's		11/3/68	DCE/POWER	
TRACED	J.D.W.	SE & A		11/3/68	A.A. Farquhar	27/3/68
CHECKED	S.G.				PE/CON	
SE/E.D.O. DATE				13-3-68		

LD248874 B/4

ATTACHMENT 3 – CORE SAMPLE LOCATIONS



CHIMNEY BASE SECTIONAL VIEW
SCALE 1 : 75



CORE SAMPLE LOCATION ELEVATION
SCALE 1 : 75

NOTES:
1. CORE SAMPLES TO BE TAKEN FROM SAME LOCATION FOR BOTH CHIMNEY #1 AND CHIMNEY #2
2. CORE SAMPLES MUST BE MINIMUM 200mm IN LENGTH
3. EXACT LOCATIONS MAY BE ALTERED UP TO 100mm ONSITE TO MISS EXISTING REBAR, BUT ENSURE SAMPLE IS TAKEN FROM FIRST LIFT.

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
1	ADDITIONAL CORE LOCATIONS FOR SECONDARY TESTING	DH	DH	BH	5.06.25
0	INITIAL ISSUE OF DRAWING	DH	DH	BH	27.05.25

WELLANBAH INDUSTRIAL

DO NOT SCALE

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Drawn D. HEALY | Designer D. HEALY
Drafting Check B. HEALY
Approved D. HEALY
Date 27.05.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST - CORE SAMPLE LOCATIONS**

Original Size **A1**
Drawing No: WI-24057-006
Rev: B

Plot Date: 5/06/2025 5:05:16 PM

ATTACHMENT 4 – LABORATORY TEST RESULT – COMPRESSION TESTING

CONCRETE CORE COMPRESSIVE STRENGTH REPORT

Report Number: **NEWC25328-1**
Issue Number: 2 - *This version supersedes all previous issues*
Reissue Reason: *Core location change*
Date Issued: 12/08/2025
Client: CMA Contracting
Unit 2, 42 Wermol Street, Kurri Kurri NSW 2327
Contact: Marina James
Project: NEWC25328 - Liddell Power Station
Client Reference: C0269
Work Request: 5177
Sampling Method: Sampled by Client
The results apply to the sample as received
Site Selection: Selected by Client
Location: Concrete Cores
Dates Cored: 12/06/2025 - 12/06/2025
Concrete Strength (MPa):
Layer:

coffey TESTING
Newcastle Laboratory
16 Callistemon Close Warabrook NSW 2304
Phone: (02) 4016 2300
Email: Newcastle Laboratory

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Jackson Antilla
Laboratory Manager
Laboratory Accreditation Number: 431

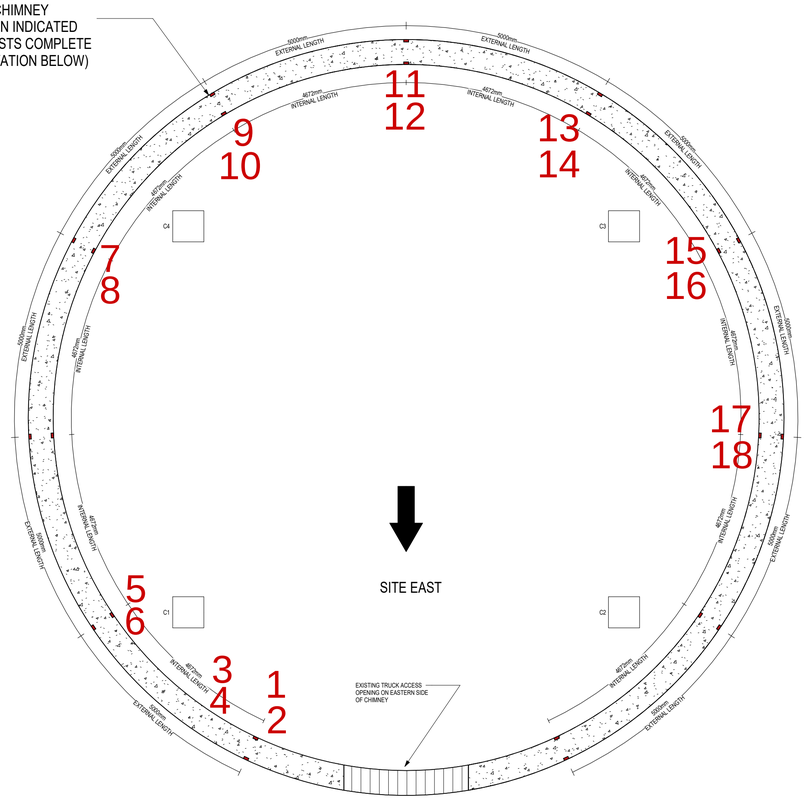
Concrete Cores AS 1012 14 & 9 & 12.1												
Specimen Id. No.	Date of Test	Initial Length (mm)	Initial Reinforcement Location (mm)	Trimmed Core Length (mm)	Trimmed Reinforcement Location (mm)	Average Diameter (mm)	Mass/Unit Volume (kg/m^3)	Core Strength (MPa)	Corrected Compressive Strength (MPa)	Cap Type	Age (days)	Core Location / Remarks
NEWC5177A	16/06/2025	**	**	193.7	**	101.1	2380	30.5	30.5	S	**	S1C1
NEWC5177B	16/06/2025	**	**	189.3	**	101.1	2380	31.0	30.5	S	**	S1C2
NEWC5177C	16/06/2025	**	**	191.3	**	101.1	2380	24.5	24.5	S	**	S2C3
NEWC5177D	16/06/2025	**	**	190.7	**	101.1	2340	28.0	28.0	S	**	S2C4

NOTE: Unless otherwise stated to the contrary the following apply:
1. Density in accordance with AS 1012.12.1 with Moisture Condition SSD
2. Compressive Strength in accordance with AS 1012.9
3. Capping: S - Sulphur
4. Preconditioning: Wet-conditioning
5. Curing in accordance with AS 1012.8.1 9.3 Standard Temperate Zone.

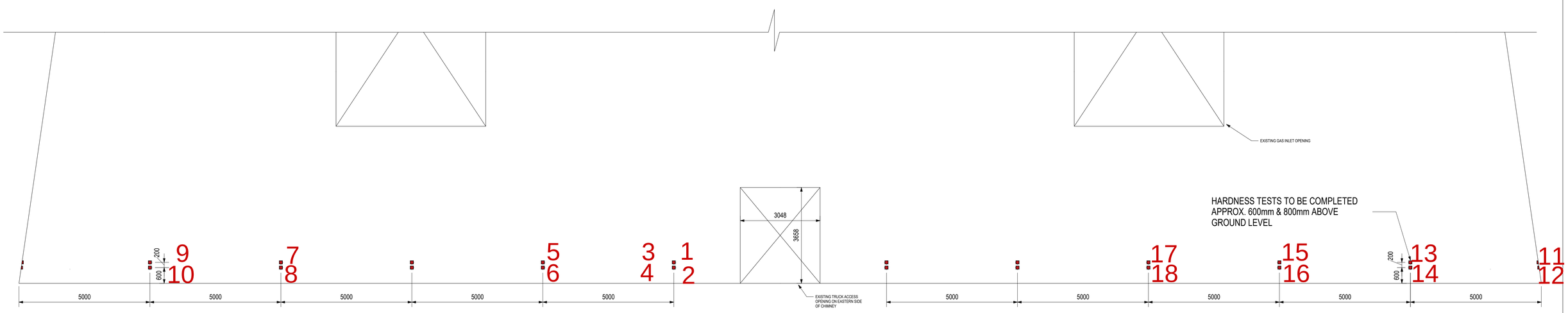
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Results relate only to the items tested/sampled.

ATTACHMENT 5 – SCHMIDT TEST RESULTS CHIMNEY U1/U2 INSIDE FACE

Chimney 1-2 - Inner Rim
HUNT25107
24/06/25



CHIMNEY BASE SECTION
SCALE 1 : 75



NOTES:
1. SCHMIDT HARDNESS TESTS TO BE TAKEN FROM SAME LOCATION FOR BOTH CHIMNEY #1 AND CHIMNEY #2
2. EXACT LOCATIONS MAY BE ALTERED ONSITE TO MISS EXISTING REBAR, BUT ENSURE SAMPLE IS TAKEN FROM FIRST LIFT.
3. TWENTY TWO TESTS TO BE TAKEN ON EXTERNAL SURFACE, AND TWENTY-TWO ON INTERNAL SURFACE, FORTY-FOUR TOTAL PER CHIMNEY

HARDNESS TEST LOCATIONS - EXTERNAL
SCALE 1 : 75

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	INITIAL ISSUE OF DRAWING	DH	DH	-	18.06.25

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Drawn D. HEALY | Designer D. HEALY
Drafting Check -
Approved D. HEALY
Date 18.06.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY - HARDNESS TEST LOCATIONS**

Original Size **A1**
Drawing No: **WI-24057-007**
Rev: A

Plot Date: 18/06/2025 9:34:39 PM

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	1	2	3	4	5
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	1	51	52	35	56	46
	2	44	55	55	50	42
	3	53	58	51	50	50
	4	49	52	50	54	46
	5	51	53	53	52	44
	6	52	52	58	53	45
	7	50	50	50	59	53
	8	59	40	50	51	50
	9	49	52	53	55	41
	10	51	53	51	47	51
Average of 10		**50.9**	**51.7**	**50.6**	**52.7**	**46.8**
Average of conforming readings		**51**	**52**	**51**	**53**	**47**
Apparent Compressive Strength (MPA)		**52**	**54**	**52**	**55**	**45**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

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Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	6	7	8	9	10
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	43	45	45	51	41
	2	49	46	48	45	34
	3	50	45	49	49	38
	4	49	55	49	39	43
	5	44	40	55	45	45
	6	51	50	41	48	47
	7	48	55	49	50	45
	8	45	50	49	49	38
	9	45	45	49	51	40
	10	47	47	49	48	41
Average of 10		**47.1**	**47.8**	**48.3**	**47.5**	**41.2**
Average of conforming readings		**47**	**48**	**48**	**48**	**41**
Apparent Compressive Strength (MPA)		**46**	**47**	**47**	**47**	**38**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	11	12	13	14	15
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	49	51	50	45	49
	2	50	49	47	21	55
	3	50	59	51	52	55
	4	51	52	41	35	55
	5	50	54	48	50	45
	6	43	51	41	48	51
	7	34	50	49	52	50
	8	39	50	46	52	55
	9	47	52	50	48	55
	10	37	40	52	45	55
Average of 10		**45**	**50.8**	**47.5**	**44.8**	**52.5**
Average of conforming readings		**45**	**51**	**48**	**45**	**53**
Apparent Compressive Strength (MPA)		**44**	**52**	**47**	**44**	**55**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number		16	17	18		
test location details		View attached sketch	View attached sketch	View attached sketch		
element tested		Concrete	Concrete	Concrete		
surface texture		Smooth	Smooth	Smooth		
area form material						
surface moisture condition		Dry	Dry	Dry		
surface ground		No	No	No		
hammer orientation		Horizontal	Horizontal	Horizontal		

Test Results

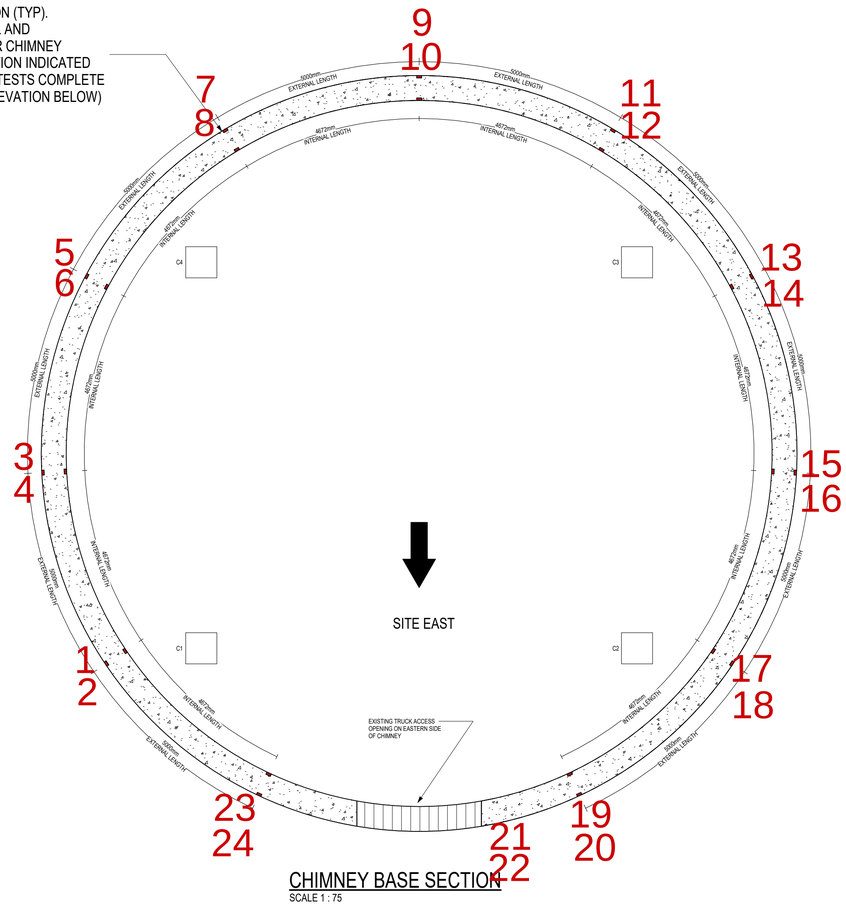
Rebound Readings	**1**	51	45	51		
	2	55	50	41		
	3	51	49	45		
	4	51	45	45		
	5	46	55	40		
	6	52	50	41		
	7	45	51	46		
	8	50	51	40		
	9	44	50	50		
	10	49	49	45		
Average of 10		**49.4**	**49.5**	**44.4**		
Average of conforming readings		**49**	**50**	**44**		
Apparent Compressive Strength (MPA)		**49**	**51**	**43**		
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

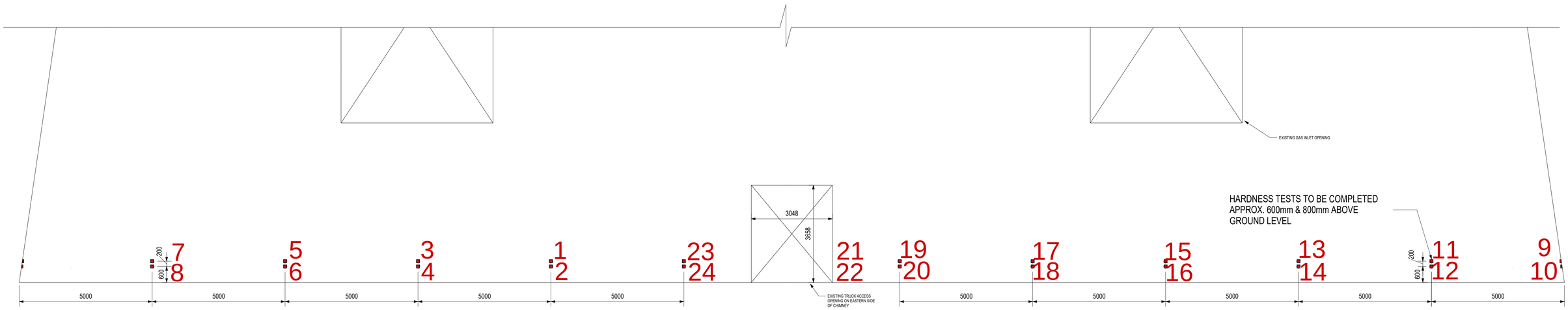
Comments:

ATTACHMENT 6 – SCHMIDT TEST RESULTS CHIMNEY U1/U2 OUTSIDE FACE

Chimney 1-2 - Outer Rim
HUNT25107
24/06/25



CHIMNEY BASE SECTION
SCALE 1 : 75



HARDNESS TEST LOCATIONS - EXTERNAL
SCALE 1 : 75

NOTES:
1. SCHMIDT HARDNESS TESTS TO BE TAKEN FROM SAME LOCATION FOR BOTH CHIMNEY #1 AND CHIMNEY #2
2. EXACT LOCATIONS MAY BE ALTERED ONSITE TO MISS EXISTING REBAR, BUT ENSURE SAMPLE IS TAKEN FROM FIRST LIFT.
3. TWENTY TWO TESTS TO BE TAKEN ON EXTERNAL SURFACE, AND TWENTY-TWO ON INTERNAL SURFACE, FORTY-FOUR TOTAL PER CHIMNEY

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	INITIAL ISSUE OF DRAWING	DH	DH	-	18.06.25

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DO NOT SCALE

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This document may only be used by intended client for the purpose for which it was prepared and must not be used by any other person or for any other purpose.

Drawn D. HEALY | Designer D. HEALY
Drafting Check -
Approved D. HEALY
Date 18.06.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY - HARDNESS TEST LOCATIONS**

Original Size **A1**
Drawing No: **WI-24057-007**
Rev: A

Plot Date: 18/06/2025 9:34:39 PM

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-1

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	1	2	3	4	5
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	1	42	41	40	33	51
	2	44	48	45	56	50
	3	40	40	45	45	44
	4	41	48	46	39	51
	5	42	38	45	44	46
	6	46	35	39	32	46
	7	46	46	45	46	46
	8	42	44	50	44	42
	9	41	45	44	42	42
	10	45	44	45	45	54
Average of 10		**42.9**	**42.9**	**44.4**	**42.6**	**47.2**
Average of conforming readings		**43**	**43**	**44**	**43**	**49**
Apparent Compressive Strength (MPA)		**38**	**38**	**40**	**39**	**49**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-2

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	6	7	8	9	10
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	54	50	47	48	44
	2	51	48	46	46	44
	3	47	49	42	49	40
	4	50	50	50	44	45
	5	52	48	46	38	40
	6	52	47	45	40	41
	7	45	48	44	47	39
	8	51	47	46	38	39
	9	52	50	45	44	45
	10	49	47	47	46	46
Average of 10		**50.3**	**48.4**	**45.8**	**44**	**42.3**
Average of conforming readings		**50**	**48**	**46**	**44**	**42**
Apparent Compressive Strength (MPA)		**50**	**47**	**44**	**41**	**39**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-3

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	11	12	13	14	15
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	43	38	35	43	40
	2	50	45	45	46	40
	3	45	45	45	44	46
	4	46	42	45	46	42
	5	47	40	47	47	40
	6	41	45	48	46	40
	7	38	45	45	46	40
	8	43	40	44	41	42
	9	35	38	46	46	45
	10	52	42	46	46	45
Average of 10		**44**	**42**	**44.6**	**45.1**	**42**
Average of conforming readings		**44**	**42**	**45**	**45**	**42**
Apparent Compressive Strength (MPA)		**41**	**39**	**43**	**43**	**39**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-4

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 1/2 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	16	17	18	19	20
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	35	46	44	43	48
	2	36	49	49	50	45
	3	36	49	49	49	50
	4	37	40	41	41	45
	5	38	49	41	50	40
	6	40	41	45	49	43
	7	32	45	48	49	40
	8	43	49	44	50	46
	9	35	46	50	45	45
	10	36	46	48	40	49
Average of 10		**36.8**	**46**	**45.9**	**46.6**	**45.1**
Average of conforming readings		**37**	**46**	**46**	**47**	**45**
Apparent Compressive Strength (MPA)		**30**	**44**	**44**	**45**	**43**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-5

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW
Test area in structure: Chimney 1/2 - Outer Rim
Concrete mix: N/A
Type of aggregate: 20mm

Date Tested: 23/06/2025
Time Tested:
Air Temperature: (°C): 18
Age of Concrete: N/A
Specified Strength (Mpa): 32

Test Conditions

test number	21	22	23	24	
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	
element tested	Concrete	Concrete	Concrete	Concrete	
surface texture	Smooth	Smooth	Smooth	Smooth	
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	
surface ground	No	No	No	No	
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	

Test Results

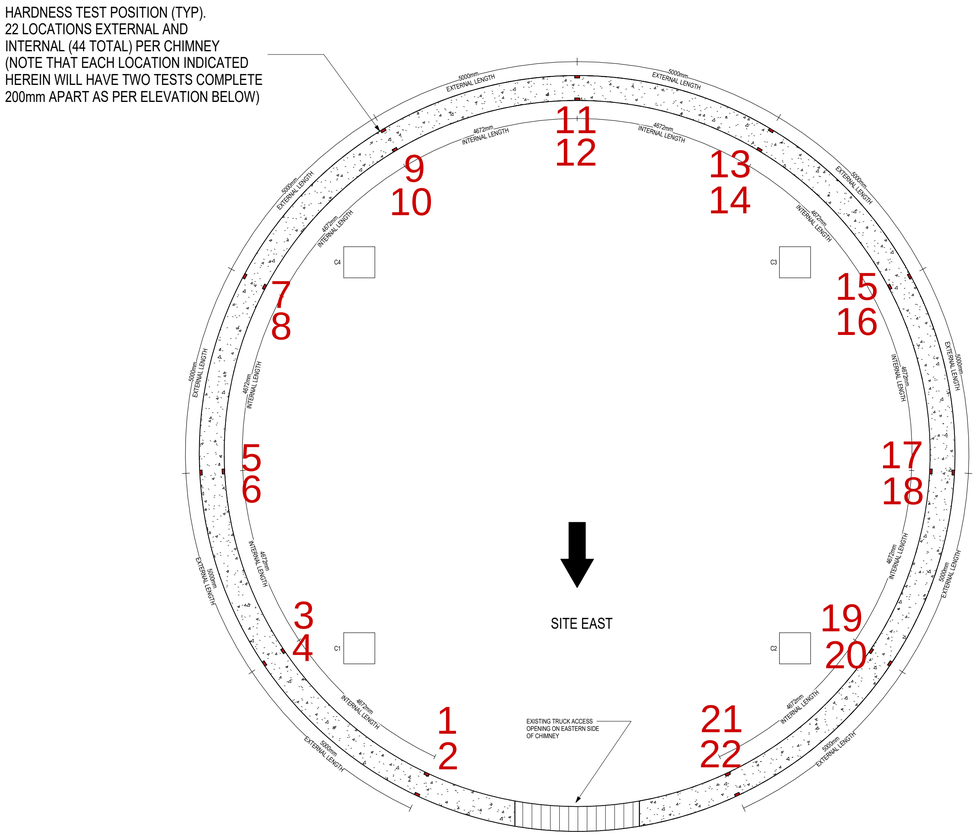
Rebound Readings	**1**	50	52	49	49	
	2	50	54	45	47	
	3	48	53	51	47	
	4	53	51	50	47	
	5	50	48	50	48	
	6	51	53	50	49	
	7	54	53	53	49	
	8	50	53	52	49	
	9	53	52	51	51	
	10	49	53	50	48	
Average of 10		**50.8**	**52.2**	**50.1**	**48.4**	
Average of conforming readings		**51**	**52**	**50**	**48**	
Apparent Compressive Strength (MPA)		**52**	**54**	**51**	**47**	
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

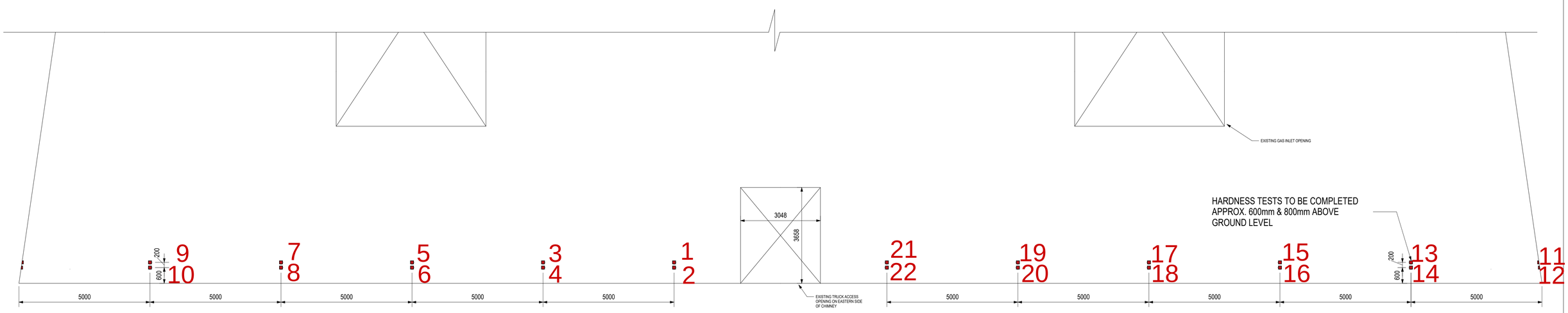
Comments:

ATTACHMENT 7 – SCHMIDT TEST RESULTS CHIMNEY U3/U4 INSIDE FACE

Chimney 3-4 - Inner Rim
HUNT25107
24/06/25



CHIMNEY BASE SECTION
SCALE 1 : 75



NOTES:
1. SCHMIDT HARDNESS TESTS TO BE TAKEN FROM SAME LOCATION FOR BOTH CHIMNEY #1 AND CHIMNEY #2
2. EXACT LOCATIONS MAY BE ALTERED ONSITE TO MISS EXISTING REBAR, BUT ENSURE SAMPLE IS TAKEN FROM FIRST LIFT.
3. TWENTY TWO TESTS TO BE TAKEN ON EXTERNAL SURFACE, AND TWENTY-TWO ON INTERNAL SURFACE, FORTY-FOUR TOTAL PER CHIMNEY

HARDNESS TEST LOCATIONS - EXTERNAL
SCALE 1 : 75

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	INITIAL ISSUE OF DRAWING	DH	DH	-	18.06.25

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Drawn D. HEALY | Designer D. HEALY
Drafting Check -
Approved D. HEALY
Date 18.06.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY - HARDNESS TEST LOCATIONS**

Original Size **A1**
Drawing No: **WI-24057-007**
Rev: A

Plot Date: 18/06/2025 9:34:39 PM

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	1	2	3	4	5
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	1	58	57	56	56	64
	2	58	54	58	57	52
	3	54	57	55	55	54
	4	59	57	53	51	56
	5	55	58	59	58	52
	6	55	60	57	59	48
	7	51	60	48	65	55
	8	56	59	54	52	48
	9	58	59	56	55	52
	10	59	56	57	52	48
Average of 10		**56.3**	**57.7**	**55.3**	**56**	**52.9**
Average of conforming readings		**57**	**58**	**55**	**56**	**53**
Apparent Compressive Strength (MPA)		**60**	**60**	**59**	**59**	**55**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	6	7	8	9	10
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	54	52	59	50	61
	2	51	54	61	48	54
	3	41	55	61	42	55
	4	42	60	60	50	55
	5	54	59	59	57	46
	6	49	59	58	57	55
	7	52	56	51	52	55
	8	53	51	60	55	54
	9	54	49	58	45	55
	10	50	50	58	50	50
Average of 10		**50**	**54.5**	**58.5**	**50.6**	**54**
Average of conforming readings		**50**	**55**	**59**	**51**	**54**
Apparent Compressive Strength (MPA)		**51**	**59**	**60**	**52**	**57**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	11	12	13	14	15
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	35	54	40	56	61
	2	42	55	40	50	54
	3	44	49	42	51	50
	4	45	52	43	53	59
	5	44	41	51	50	59
	6	26	46	45	48	60
	7	40	45	39	45	48
	8	47	46	39	53	58
	9	44	45	40	53	60
	10	35	29	45	48	45
Average of 10		**40.2**	**46.2**	**42.4**	**50.7**	**55.4**
Average of conforming readings		**40**	**46**	**42**	**51**	**55**
Apparent Compressive Strength (MPA)		**34**	**44**	**39**	**52**	**59**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	16	17	18	19	20
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	40	60	59	60	60
	2	59	50	58	59	60
	3	49	57	60	58	59
	4	53	58	44	36	59
	5	54	57	60	60	58
	6	55	40	60	59	56
	7	53	55	58	59	56
	8	55	62	41	62	50
	9	55	60	48	61	57
	10	48	58	58	61	52
Average of 10		**52.1**	**55.7**	**54.6**	**57.5**	**56.7**
Average of conforming readings		**52**	**56**	**55**	**58**	**57**
Apparent Compressive Strength (MPA)		**54**	**59**	**59**	**60**	**60**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Inner Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number		21	22			
test location details		View attached sketch	View attached sketch			
element tested		Concrete	Concrete			
surface texture		Smooth	Smooth			
area form material						
surface moisture condition		Dry	Dry			
surface ground		No	No			
hammer orientation		Horizontal	Horizontal			

Test Results

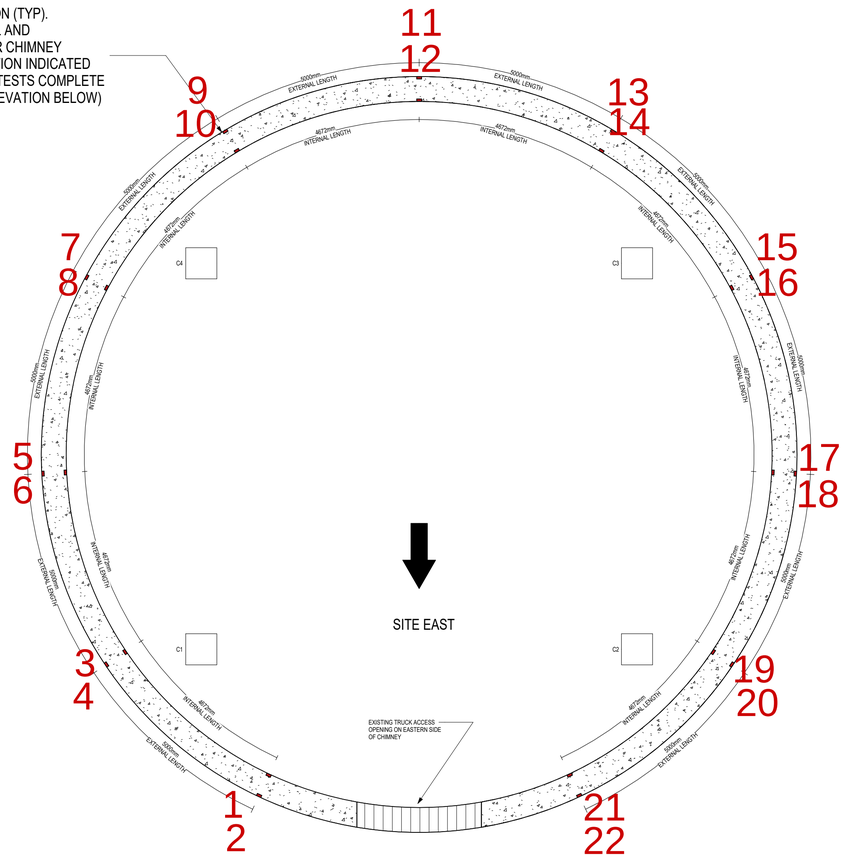
Rebound Readings	**1**	46	54			
	2	42	54			
	3	51	53			
	4	50	52			
	5	50	55			
	6	48	52			
	7	43	52			
	8	43	52			
	9	28	52			
	10	45	49			
Average of 10		**44.6**	**52.5**			
Average of conforming readings		**45**	**53**			
Apparent Compressive Strength (MPA)		**44**	**55**			
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

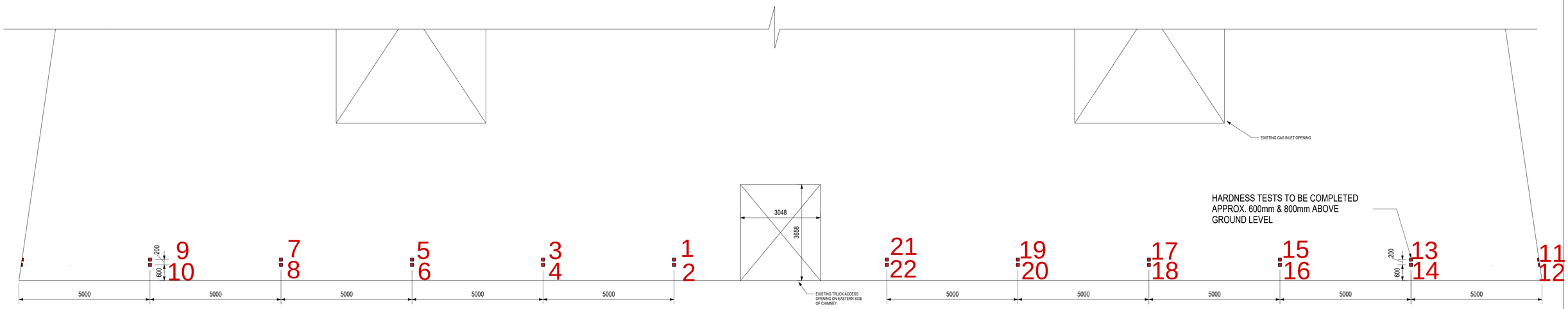
Comments:

ATTACHMENT 8 – SCHMIDT TEST RESULTS CHIMNEY U3/U4 OUTSIDE FACE

Chimney 3-4 - Outer Rim
HUNT25107
24/06/25



CHIMNEY BASE SECTION
SCALE 1 : 75



HARDNESS TEST LOCATIONS - EXTERNAL
SCALE 1 : 75

NOTES:
1. SCHMIDT HARDNESS TESTS TO BE TAKEN FROM SAME LOCATION FOR BOTH CHIMNEY #1 AND CHIMNEY #2
2. EXACT LOCATIONS MAY BE ALTERED ONSITE TO MISS EXISTING REBAR, BUT ENSURE SAMPLE IS TAKEN FROM FIRST LIFT.
3. TWENTY TWO TESTS TO BE TAKEN ON EXTERNAL SURFACE, AND TWENTY-TWO ON INTERNAL SURFACE, FORTY-FOUR TOTAL PER CHIMNEY

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	INITIAL ISSUE OF DRAWING	DH	DH	-	18.06.25

WELLANBAH INDUSTRIAL

DO NOT SCALE

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Drawn D. HEALY	Designer D. HEALY	
Drafting Check -		
Approved D. HEALY		
Date 18.06.25		
Scale	This Drawing must not be used for Construction unless signed as Approved	

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY - HARDNESS TEST LOCATIONS**

Original Size **A1**
Drawing No: **WI-24057-007**
Rev: A

Plot Date: 18/06/2025 9:34:39 PM

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

Schmidt Hammer Test Report

Report No.: 2341-6

Issue No.: 1

This report replaces all previous issues of report no. 'MAT:(type number here)'.

Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	1	2	3	4	5
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	1	53	49	51	49	51
	2	48	46	42	42	48
	3	48	51	48	41	49
	4	53	50	43	51	50
	5	55	50	48	46	43
	6	51	50	50	55	51
	7	45	48	45	45	43
	8	43	49	50	39	45
	9	48	47	50	49	49
	10	42	50	50	49	41
Average of 10		**48.6**	**49**	**47.7**	**46.6**	**47**
Average of conforming readings		**49**	**49**	**48**	**47**	**47**
Apparent Compressive Strength (MPA)		**49**	**49**	**47**	**46**	**46**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

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Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	6	7	8	9	10
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	50	45	53	50	46
	2	45	41	49	51	55
	3	51	47	45	48	50
	4	48	47	51	49	45
	5	52	43	48	55	55
	6	50	45	49	42	55
	7	48	50	46	53	49
	8	56	47	50	53	50
	9	50	50	52	50	55
	10	48	41	50	55	56
Average of 10		**49.8**	**45.6**	**49.3**	**50.6**	**51.6**
Average of conforming readings		**50**	**46**	**49**	**51**	**52**
Apparent Compressive Strength (MPA)		**50**	**44**	**49**	**52**	**54**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
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Telephone: 02 4016 2300

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Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	11	12	13	14	15
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	52	47	49	48	51
	2	45	54	52	50	51
	3	54	48	52	49	49
	4	51	45	52	48	50
	5	50	50	50	50	50
	6	50	48	52	41	41
	7	48	52	51	48	50
	8	44	55	48	49	45
	9	51	48	53	55	50
	10	49	52	53	40	30
Average of 10		**49.4**	**49.9**	**51**	**47.8**	**47**
Average of conforming readings		**49**	**50**	**51**	**48**	**47**
Apparent Compressive Strength (MPA)		**49**	**51**	**52**	**47**	**46**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
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Report No.: 2341-6

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Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number	16	17	18	19	20
test location details	View attached sketch	View attached sketch	View attached sketch	View attached sketch	View attached sketch
element tested	Concrete	Concrete	Concrete	Concrete	Concrete
surface texture	Smooth	Smooth	Smooth	Smooth	Smooth
area form material					
surface moisture condition	Dry	Dry	Dry	Dry	Dry
surface ground	No	No	No	No	No
hammer orientation	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal

Test Results

Rebound Readings	**1**	49	51	45	36	45
	2	50	48	50	50	50
	3	45	52	45	49	50
	4	39	51	51	52	51
	5	49	50	49	48	48
	6	49	50	42	50	47
	7	51	49	51	50	49
	8	50	50	49	49	53
	9	45	49	56	47	48
	10	47	45	49	49	51
Average of 10		**47.4**	**49.5**	**48.7**	**48**	**49.2**
Average of conforming readings		**47**	**50**	**49**	**48**	**48**
Apparent Compressive Strength (MPA)		**46**	**51**	**49**	**47**	**47**
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

(Type Name) Laboratory
Coffey Testing Pty Ltd
ABN 92 114 364 046
Unit 5, 28-32 Enterprize Crescent
Musswellbrook NSW
Telephone: 02 4016 2300

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Issue No.: 1

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Client: CMA Contracting
Unit 2, 42 Wermol St
Kurri Kurri NSW 2327

Principal:

Project No.: HUNT25107

Project Name: Liddell Chimneys Testing

Lot No.: **TRN:**



Approved Signatory: Matthew Lee
Laboratory Supervisor

Date of Issue: 24/06/2025

Concrete Details

Project Location: Liddell NSW

Test area in structure: Chimney 3/4 - Outer Rim

Concrete mix: N/A

Type of aggregate: 20mm

Date Tested: 23/06/2025

Time Tested:

Air Temperature: (°C): 18

Age of Concrete: N/A

Specified Strength (Mpa): 32

Test Conditions

test number		21	22			
test location details		View attached sketch	View attached sketch			
element tested		Concrete	Concrete			
surface texture		Smooth	Smooth			
area form material						
surface moisture condition		Dry	Dry			
surface ground		No	No			
hammer orientation		Horizontal	Horizontal			

Test Results

Rebound Readings	**1**	50	49			
	2	50	54			
	3	51	53			
	4	50	53			
	5	57	57			
	6	57	57			
	7	45	58			
	8	56	53			
	9	50	50			
	10	52	56			
Average of 10		**51.8**	**54**			
Average of conforming readings		**52**	**54**			
Apparent Compressive Strength (MPA)		**54**	**57**			
Remarks						

Note: Reference against Fig 3b Cylinder Compressive Strength in N/mm^2 plotted against the Rebound number.
In accordance with test procedure ASTM C805/C805M-08

Comments:

APPENDIX D – TECHNICAL DATA SHEETS

TECHNICAL DATA SHEET

Senatel™ Magnum™

Australia



Description

Senatel™ Magnum™ packaged emulsion explosive is a robust, maximum strength, detonator sensitive explosive. The explosive is grey in colour with a firm putty-like consistency.

Application

Senatel™ Magnum™ is a water resistant packaged explosive designed for priming applications, and as a high-energy column explosive, in surface and underground mining and general blasting.

The high detonation velocity and the robust nature of Senatel™ Magnum™ make it an ideal primer for the initiation of ANFO columns.

Senatel™ Magnum™ cartridges readily split during tamping to maximise coupling and bulk strength within a blasthole.

Senatel™ Magnum™ is not suitable for ground containing reactive sulphides.

Key Benefits

- Senatel™ Magnum™ is a maximum energy emulsion formulation with high pre-compression resistance. This gives excellent blast results in the toughest ground even with tight drilling patterns as found in shaft sinking and other extreme blasting environments.
- Specially formulated for underground use, Senatel™ Magnum™ reduces post-blast fumes and improves turnaround time.
- Senatel™ Magnum™ is highly water resistant, which minimises leaching and reduces environmental impact.

Technical Properties

Density[1]	**1.23g/cc**
Relative Effective Energy[2]	
Relative Weight Strength	132%
Relative Bulk Strength • to ANFO @ 0.8g/cc • to ANFO @ 0.95 g/cc	 201% 153%
Minimum Velocity of Detonation[3]	3.4km/s

Recommendations for Use

Blasthole Depth

Senatel™ Magnum™ is suitable for use in blastholes of any practical depth providing contained water does not exceed 20m depth.

Priming and Initiation

Senatel™ Magnum™ at temperatures higher than -20°C can be reliably initiated by an electric No.8*, Exel™ detonator (min. 8* strength) eDev™ detonator, uni tronic™ detonator, or i-kon™ system detonator.

Cordtex™ 10P may also be used to initiate Senatel™ Magnum™ however detonating cords of charge mass lower than 10 g/m are not recommended for initiation of Senatel™ Magnum™.

Charging

In small diameter blastholes maximum energy per metre of blasthole can be achieved by tamping the explosive with a wooden tamping rod appropriate to the hole diameter.

No metal instrument should be used to tamp explosives. The primer cartridge containing a detonator must not be tamped.

Sleep-Time Within Blastholes

In dry blastholes, given the explosives packaging is undamaged, Senatel™ Magnum™ may be charged and fired several months later (provided the product remains within its recommended shelf life).

orica.com

Senatel™ Magnum™

Australia

If the explosives packaging is damaged, the sleep-time in a blasthole is influenced by the extent of damage to the packaging and by the nature of any water present. Even with full length slitting of cartridges, the explosive will give good performance after two weeks immersion.

An Orica Technical Representative should be consulted if special conditions exist.

Reactive Ground and Ground Temperature

Reactive Ground [4] – Senatel™ Magnum™ is not suitable for use in ground containing reactive sulphides.

Elevated Temperature[4] – Senatel™ Magnum™ is suitable for use in ground temperatures from 0°C up to 70ºC.[3]

However, If your application requires you to operate at elevated temperature, above 55ºC please contact your Orica Technical Representative in advance for further information about product compatibility, sleep time and use.

Packaging

Both the Senatel™ Magnum™ packaging cases and film are colour highlighted in red. It is packaged in white plastic film with coloured printing. Each box contains nominally 25kg of product with standard cartridge sizes and counts as follows:

Diameter (mm)	Nominal Length (mm)	Nominal Mass (g)	Cartridges per Box
25	200	115	215
25	700	420	60
32	200	185	135
32	700	650	38

Product Quality

Senatel™ Magnum™ is manufactured using an ISO9001 accredited quality process. Senatel™ Magnum™ has been developed by Orica Australia specifically for the mining industry using ISO9001 accredited research and engineering processes.

Storage and Handling

Product Classification

Authorised Name:	Senatel™ Magnum™
Proper Shipping Name:	Explosive, Blasting, Type E
UN No:	0241
Classification:	1.1D

All regulations pertaining to the handling and use of such explosives apply.

Storage

Store Senatel™ Magnum™ in a suitably licensed magazine for Class 1.1D explosives. The cases should be stacked in the manner designated on the cases.

Senatel™ Magnum™ has a storage life of up to 12 months in an approved magazine; however exposure to hot or cold extremes may cause the product to deteriorate prematurely. Senatel™ Magnum™ is best stored at temperatures above -20°C.

Disposal

Disposal of explosive materials can be hazardous. Methods of safe disposal of explosives may vary depending on the user's situation. Please contact an Orica Technical Representative for information on safe practices.

Safety

The post detonation fume characteristics of Senatel™ Magnum™ make it suitable for both underground and surface blasting applications. Users should ensure that adequate ventilation is provided prior to re-entry into the blast area.

Senatel™ Magnum™ can be initiated by extremes of shock, friction or mechanical impact. As with all explosives, Senatel™ Magnum™ should be handled and stored with care. Senatel™ Magnum™ does not burn easily, but it must be kept clear of flame and excessive heat.

Explosives based on Ammonium Nitrate such as Senatel™ Magnum™ may react with sulphides in the ground and create potentially hazardous situations. Orica accepts no responsibility for any loss or liability arising from use of the product in ground containing sulphides or other reactive material.

Senatel™ Magnum™

Australia

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Emergency Telephone Numbers

Within Australia: 1800 033 111
Outside Australia: +61 3 9663 2130

Notes:

(1.) Nominal density only.

(2.) REE is the Effective Energy relative to ANFO at a density of 0.8 g/cm^3. ANFO has an effective energy of 2.30 MJ/kg. Energies quoted are based on ideal detonation calculations with a 100MPa cut-off pressure.

(3.) The actual VOD depends on the conditions of use including the diameter of the hole and the degree of confinement. The range quoted refers to unconfined minimum diameter up to calculated ideal VOD.

(4.) Reactive ground and elevated temperature as defined in the Australian Explosives Industry Safety Group (AEISG) Code of Practice for Elevated Temperature and Reactive Ground.

TECHNICAL DATA SHEET

Cordtex™ 10P Detonating Cord

Australia



Technical Properties

Nominal Coreload	10 g/m
Colour	Red
Nominal Tensile Strength	70 kgf
Nominal Velocity of Detonation	6.5 to 7.0 km/s
Nominal Diameter	4.6 mm (Average)

Description

Cordtex™ 10P is a strong, flexible detonating cord with a nominal core charge of 10 g/m PETN.

Cordtex™ 10P consists of a continuous core of PETN powder encased by high strength textiles. This is covered by a seamless plastic jacket. It is designed to maintain stability under all but the most demanding conditions.

Safety

Cordtex™ 10P contains explosive which is relatively insensitive to accidental initiation by shock, friction or mechanical impact under normal conditions of use.

Cordtex™ 10P can detonate if subjected to extremely high temperatures, but remains stable and safe to use below 80ºC. For temperatures between 70ºC and 80ºC, exposure time should not exceed 24 hours.

Cordtex™ 10P is supplied in Class 1.1D packaging and has UN Number 0065.

Application

Cordtex™ 10P is suited for use as a surface trunkline, as it will reliably initiate itself through suitable knots and is compatible with Exel™ Millisecond Connectors (MSCs). Cordtex™ 10P will reliably initiate most Pentex™ boosters. Refer to the relevant Technical Data Sheet for application details.

Cordtex™ 10P will not generally initiate primer-sensitive blasting agents, but in some circumstances desensitisation or side-initiation can occur. Consequently the manufacturer or supplier should be consulted for specific recommendations in each situation.

Cordtex™ 10P has excellent resistance to penetration from water and oil. It has good flexibility and knot holding at normal ambient temperatures.

Recommendations For Use

Cordtex™ 10P should only be cut using a single bladed cutter, or a sharp knife on a non-ferrous block.

Cordtex™ 10P can be reliably initiated by an Exel™ Lead-In-Line, Exel™ Trunkline Delay or #8 Strength Electric Detonator. The detonator should be firmly attached to the cord, with its base at least 150 mm from a dry cut end and pointing in the desired direction of propagation. When using electric detonators, two detonators are recommended for reliability.

Cordtex™ 10P can be reliably initiated by detonating cords of 5 g/m or greater core charge when approved connections are used. For extending surface trunklines, cord should be tied together with a "reef" knot (Figure 1).

The knot should be 150mm from each cut end and pulled tight, with the free ends taped back along the cord to ensure positive contact. For attaching downlines and branchlines to a surface

Cordtex™ 10P Detonating Cord

Australia

trunkline, connections should be made using an approved knot (Figure 1).

All connections should be tight and made at right angles, to minimise the chance of "approach"-type cutoff failures. Cordtex™ 10P surface trunklines should be laid out with no loops, kinks, tight bends or excessive slack.

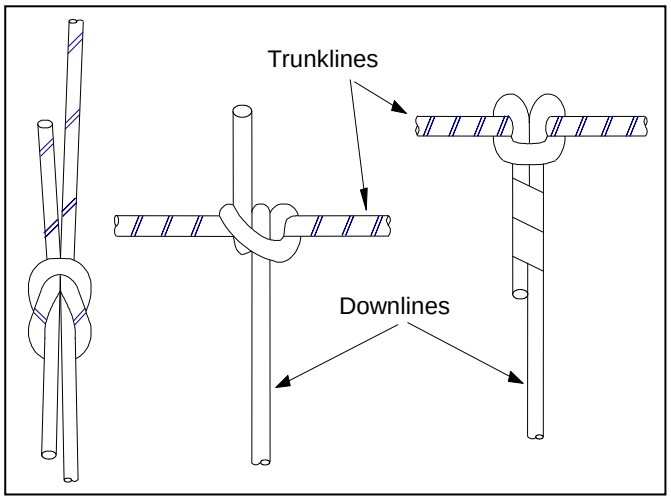


Figure 1.Approved knots, from left to right: Reef knot, Double wrap clove hitch, Double half hitch.

A closed loop of cord is recommended to provide insurance against poor connections. It should never be pulled off the reel over an end flange, as this can cause kinks.

Packaging

Cordtex™ 10P detonating cord is supplied on chipboard spools, which hold 350 metres of cord. A standard cardboard outer case contains 2 of these spools, measures 0.54 x 0.28 x 0.27 m and weighs approximately 18 kg. The weight of contained explosive material is 7.0 kg per case.

Storage and Handling

Cordtex™ 10P should be in a cool, dry, well-ventilated magazine licensed for Class 1.1D explosives.

Cordtex™ 10P has a maximum shelf life of 5 years when stored correctly

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Emergency Telephone Numbers

Within Australia: 1800 033 111
Outside Australia: 61 3 9663 2130

DaveyTronic® SP

Davey Bickford Enaex

Surface mining
Digital Blasting System / Electronic Detonators



PRODUCTIVITY

- The high **accuracy** and **reliability** of the **DaveyTronic® SP** detonator significantly **improves blast performance**:
  - Fragmentation and material uniformity
  - Muck pile control (excavation rate and dilution control)
  - Vibration control and repeatability
- The **Synchroblast™** and **Multiblast** modes enables **larger blasts** to further reduce downtime through less blast windows.

  You can remotely control a network of several blast drivers located at different areas of the mine to fire several blasts simultaneously from a central location.
  - Synchroblast™: up to 4500 detonators for a single location blast
  - Multiblast: up to 5 different blast locations of 1500 detonators each

SAFETY

DaveyTronic® is designed for complete safety throughout the blasting procedure

- **Safer at detonator level**
  - Exclusive double capacitor: one for two-way communication with blasting equipment and one for firing
  - Exclusive Smartshunt, isolating the fuse head until the firing command is received
  - Excellent EMP/ESD protection
- **Safer at system level**
  - Continuous testing procedures up to the firing command
  - Electronic safety lock to authorize the firing procedure
  - Pre-blast equipment coupling ensures immunity to other RF devices





SECURITY

DaveyTronic® SP features a proprietary secure encoded communication protocol for both firing line control and wireless data transmission.

The embedded RFID technology and the unique ID tracking number of each detonator complete the security features.

DESCRIPTION

The **DaveyTronic® SP** digital blasting system includes a set of three rugged types of units:

- 1 hand held remote blaster (DRB), managing testing and firing procedure, communicating remotely with each detonator
- 2 programming units (PU), identifying and diagnostically testing each detonator on the bench and assigning the delay time
- 1 compact blast driver (DBD), communication wirelessly the instructions from the remote blaster and providing designed energy to fire up to 1500 detonators per DBD

Products described herein are potentially hazardous and must be used in accordance with applicable laws or regulatory provisions. Since Davey Bickford cannot anticipate all of the possible applications, and conditions under which this information and its products may be used, it is the responsibility of each user to review the information in the specific context of the intended application. Davey Bickford specifically disclaims all warranties, express or implied, including accuracy, non-infringement and implied warranties of merchantability or fitness for a particular purpose. Davey Bickford specifically disclaims, and will not be responsible for, any liability or damages resulting from the use or reliance of this information.

DaveyTronic® SP

Surface mining
Digital Blasting System

Davey Bickford
Enaex



1 - Remote Blaster (DRB2)
2 - Blast Driver (DBD)
3 - Programming Units (PU)
4 - RFID Tag
5 - Set of Antennas
6 - Spider Charger
7 - 12V Charger
8 - Waterproof Transport Case

OPERATIONAL CHARACTERISTICS	
Detonators	Only to be used with DaveyTronic® SP Detonators
Monoblast Mode	Up to 1500 detonators
Multiblast Mode	Maximum 5 DBD driven by one DRB2 (additional DBD in option)
Synchroblast Mode	Up to 4500 detonators in one blast
Programming	Maximum 6 PU can be associated to one DBD
Connection Modes	4 modes: One by One - Easy One by One - On Line - Easy On Line
Programming Modes	3 modes: Manual - Incremental - Automatic (blast plan on computer)
Connection of DBD to DRB2	Wired or Internal Radio Modem or External Modem*
Accessories / Wires	SP Blasting System shall only be used with authorized bus / harness / bell wire

TECHNICAL CHARACTERISTICS			
	Remote Blaster - DRB2	Blast Driver - DBD	Programming Unit - PU
Weight (kg / lbs)	1.8 / 4.0	1.9 / 4.2	1.2 / 2.7
Size (mm) (inches)	240 x 190 x 32 9.4” x 7.5” x 1.3”	185 x 185 x 55 7.3” x 7.3” x 2.2”	220 x 140 x 32 8.7” x 5.5” x 1.3”
Available Languages	English / French / Spanish / Portuguese**		
Event Recorders	Procedure history file, line data logger		/
Safety Key	Unique RFID security tag	/	/
Second Safety Firing Key	Optional	/	/
GNSS Positioning	Optional Module	/	/
Firmware Upgrade	Through USB com port		
Battery Type	Li-Ion Technology		
Battery Autonomy	4 hours - Battery level indicator	4 hours of stand-by + 1 hour in talk mode	8 hours - Battery level indicator
Charger	Input: 100-240 V AC / 50-60 Hz, 2.0 A - Output: 10-12 V DC - Rated current: 4 A max Charging time: 4 hours up to 4 equipments		
Ingress Protection Rating	IP 65	IP 67	IP 65
Display	5.7” backlit TFT Colour QVGA	4 LED status indicators	3.5” backlit FSTN B&W
Keyboard	14 backlit keys	/	18 backlit keys
Integrated Speaker	Vocal intructions / beeps	/	Beeps
Communication Ports	RS232 / RS 485 - USB - RFID - ETHERNET		USB - RFID - ETHERNET
Device Capacity	1 500 detonators		1 000 detonators
Wireless Range	Up to 3000 meters, expandable with repeaters (optional DBD or other)		
Frequency	868 MHz or 923 MHz (except Europe) or 2.4 GHz		/
Operating Temperature	Operating: -20°C to +50°C / -4°F to +122°F / Battery Charging: 0°C to +40°C / +32°F to +104°F		
Storage Temperature	-40°C to +70°C / -40°F to +158°F		
Waterproof Transport Cases	1 DRB2 + 1 DBD + 2 PU: Pelicase 1520 Orange - Cardboard box: 50 x 40 x 25 cm / 19.7” x 15.7” x 9.8” - 13 kg / 29 lbs 6 PU or 1 DRB2 + 3 DBD: Pelicase 1600 Orange - Cardboard box: 65 x 52 x 25 cm / 25.6” x 20.5” x 9.8” - 17 kg / 37 lbs		
Certificates	Complies with European Standards CEN TS/ 13763-26 & 27 Complies with South African Standards SANS 1717-1 and ARP 1717-1 CE Mark - Certificated FCC - IC - C-Tick Transport Classification UN 3481, Cl9, Gr2		

* External modem compatibility must be checked with Davey Bickford Technical Support
** PU also available in Russian / Finnish / Swedish / Turkish

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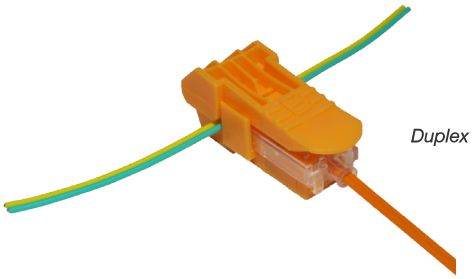
DaveyTronic® SP

Davey Bickford
Enaex

Surface mining
Electronic Detonator



Electronic Integrated Delay



Duplex Bus Connection

TECHNICAL CHARACTERISTICS	
Detonator Base Charge	PETN 800mg (#8 cap strength)
Detonator Initiating Charge	Primary explosive 200mg
Detonator Shell Material	Aluminium or Copper alloy (for heavy duty environment)
Lead wire	STD Wire: Ø=0.3 mm galvanized steel - Orange Polyethylene HD Wire: Ø=0.5 mm coppered steel - Red Polypropylene Folded Wire: Ø=0.5 mm galvanized steel - Pink Polyethylene XO wire: Ø=0.5 mm coppered steel - Red Polypropylene with Blue PVC overcoating
Connector	Polypropylene - Silicone waterproof gel - Hydrocarbon compatible
Radio Frequency Resistance	Compliant with EN13763-27 - Up to 30 V/m for 80 MHz to 2 GHz bandwidth
ESD Resistance	Compliant with EN 13763-13 (cl. II) 30kV / 3500pF

PERFORMANCES	
Delay Range	From 0 to 14,000 ms - Programming increments of 1 ms
Blasting System	To be used with DaveyTronic® Blasting System
Communication	Two way communication, fully testable two capacitors concept
Accessories / Bus / Wire	SP Detonators shall only be used with authorized bus / harness / bell wire
Water Resistance	13 bars for 7 days (spooled) / 4 bars for 7 days (folded)
Dynamic Shock Resistance	>1,000 bars - 15,000 PSI (Al shell) / >1,400 bars - 20,000 PSI (Cu shell)
Tensile Strength	STD wire: 328 N - 74 lbs / HD wire: 391 N - 88 lbs / Folded wire: 168 N - 38 lbs / XO wire: 478 N - 107 lbs
Abrasion Resistance	Exceeds EN 13763-4 (class II)
Operating Temperature	-20°C to +45°C / -4°F to +113°F (tested to 70°C - 158°F in hot emulsions)
Storage Temperature	-40°C to +70°C / -40°F to +158°F
Shelf Life	2 years
Certificates 	Compliant with European Standards CEN TS/ 13763-26-27 and with Explosive Directive 2014/28/EU Certified by INERIS : EC Inspection Certificate of Type: 0080.EXP.98.0013 Compliant with European Directive REACH 1907/2006/EC Transport Certification and Packaging UN 0513 - 1.4S

			Aluminium Shell		Copper Shell	
			STD/Spooled Wire	HD Wire	STD/Spooled Wire	HD Wire
Label Colour	Wire Length (m/ft)	Units/Box	Gross weight (kg/lbs)	Gross weight (kg/lbs)	Gross weight (kg/lbs)	Gross weight (kg/lbs)
	4 / 13 (spooled)	144	11.5 / 25.4	-	12.5 / 27.6	-
	6 / 20 (spooled)	112	11.5 / 25.4	-	12.0 / 26.5	-
	8 / 26 (spooled)	96	11.0 / 24.3	-	11.5 / 25.4	-
	10 / 33	80	7.0 / 15.4	8.0 / 17.6	7.0 / 15.4	8.5 / 18.7
	15 / 49	72	8.0 / 17.6	9.5 / 20.9	8.0 / 17.6	10.0 / 22.0
	20 / 66	72	9.5 / 20.9	11.5 / 25.4	9.5 / 20.9	12.0 / 26.5
	25 / 82	72	11.0 / 24.3	14.0 / 30.9	11.5 / 25.4	14.5 / 32.0
	30 / 98	64	11.5 / 25.4	14.5 / 32.0	11.5 / 25.4	15.0 / 33.1
	35 / 115	56	11.5 / 25.4	14.5 / 32.0	11.5 / 25.4	15.0 / 33.1
	40 / 131	56	12.5 / 27.6	16.0 / 35.3	12.5 / 27.6	16.0 / 35.3
	50 / 164	36	10.0 / 22.0	13.5 / 29.8	10.5 / 23.1	13.5 / 29.8
	60 / 197	36	11.5 / 25.4	15.5 / 34.2	12.0 / 26.5	15.5 / 34.2
Packaging Size		Spooled, cardboard box: 445 x 230 x 300 mm (0,031 m^3) / 17.5" x 9.1" x 11.8" (1879 in^3) Folded, cardboard box: 430 x 400 x 320 mm (0,055 m^3) / 16.9" x 15.7" x 12.6" (3343 in^3)				

For other options, please contact your DaveyTronic® SP representative.

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DaveyTronic® SP

Davey Bickford Enaex

Implementation Teams
Enaex Mining Technical Solutions (EMTS)

IMPLEMENTATION TEAMS: Ensuring that our DaveyTronic® system delivers real value

Maximizing productivity is not only about cutting-edge technology. It's also about guided, expert use of that technology with support from engineers and field experts.

Our reputation is built on measurable and tangible improvements that our customers can see and feel. That's the goal of every custom built client solution we design, and our people play the single most important role.

That's why the **DaveyTronic®** system always comes with high added-value implementation services:

- Proving operational advice and support
- Diagnosing customer needs on site
- Training relevant personnel in system usage
- Ensuring fit for purpose functioning equipment
- Providing on bench training and assessment
- Measuring and validating outcomes

The implementation team is made up of industry professionals in client operations, for whom safety, efficiency and the fulfillment of commitments guide their actions.



This includes local small contractors, medium sized mining companies and global mining corporations.

Enaex Mining Technical Solutions ("EMTS") is a global, specialised team of all Enaex business units (Enaex Servicios, Enaex Britanite and Davey Bickford Enaex) expert engineers operating in Australia, the Americas, Africa, Asia and Europe. They range from recent graduates of advanced mining and blasting education programs to PhD holding experts with nearly 30 years in the field of blast research and engineering. All have experience with major international explosives companies and are considered experts in the blast optimization field.



They have the following passions in common:

- Support you in overcoming your blasting challenges
- Unlocking the total value in your production process
- Delivering maximum operational excellence and profitability
- Maintaining world-class Corporate Social Responsibility performance

EMTS TEAMS: bringing significant expertise in optimization of underground (including tunneling) and surface drill and blast operations, covering the production of:

- Gold
- Silver
- Base metals
- Industrial minerals
- Coal
- Aggregates

By technically optimizing the blast designs, our EMTS team empowers customers with the ability to influence the outcome of every blast event. This creates immediate and long-term economic value to mining and tunneling operations throughout the world, with tangible gains in both safety and environmental ethos. The achievement of goals, productivity and business success of our partners is at the core of EMTS.

Do you want to get in touch with one of our experts?

Davey Bickford SAS
Le Moulin Gaspard • Chemin de la Pyrotechnie • 89550 Héry • France
Tel.: +33 (0)3 86 47 30 00

Please visit our website:
www.DaveyBickfordEnaex.com
or mail us directly at
info@DaveyBickfordEnaex.com

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

PRODUCT IDENTIFICATION: **DAVEYTRONIC® SP (1.4S)**

PRODUCT USE: **Electronic Detonator**

SUPPLIER:

Davey Bickford Enaex Australia Pty Ltd.

Suite 4, 37 Cedric Street, Stirling,
Western Australia, 6021

Tel (08) 9207 1066

admin@daveybickfordenaex.com.au

CONTACTS:

Telephone: +61 8 9207 1066

Emergency: 1800 033 111

Please refer to limitations of this Safety Data Sheet in Section 16 "Other information"

2. HAZARDS IDENTIFICATION

CLASSIFICATION: Classified as Dangerous Goods in accordance with regulation (EC) 1272/2008: without packaging electronic detonators are classified H201 (explosive: mass explosion hazard).

HAZARD PICTOGRAM:



SIGNAL WORD: DANGER

HAZARD STATEMENT: H201: Explosive; mass explosion hazard

PRECAUTIONARY STATEMENT(S):

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P250: Do not subject to grinding, shock, friction.

P372: Explosion risk in case of fire

P401: Store in accordance with local regulations and standards.

P501: Dispose of contents / container in accordance with local regulations and standards.

3. COMPOSITION / INFORMATION ON INGREDIENTS

DESCRIPTION

Metal casing enclosing primary explosive (0.2g) Lead Azide and secondary explosive (0.8g) PETN; and a priming cap coated with pyrotechnic paste.

A plastic plug is crimped on the open end of the casing attached to electrical wires.

The detonator is housed within the plastic spool on which the electrical wire is coiled.

	Identification	Name	Concentration	Classification– Regulation 1272/2008
COMPOSITION:	N. CAS : 78-11-5 N. CE : 201-084-3 N. Index : 603-035-01-2 N. Registrazione : 01-2119557827-23-xxxx	Pentaerithrityl tetranitrate	<20%	Expl. 1.1, H201
	N. CAS : 13424-46-9 N. CE : 236-542-1 N. Index : 082-003-00-7 N. Registrazione : 01-2119475503-38-xxxx	lead diazide	<1%	Unst. Expl. 1.1, H200 – Oral Acute Tox.4, H302 – Inhal Acute Tox 4, H332 – Repr. 1A, H360Df – STOT RE 2, H373 – Aquatic Acute 1, H400 – Aquatic Chronic 1, H410
	N. CAS : 15245-44-0 N. CE : 239-290-0 N. Index : 609-019-00-4	lead 2,4,6-trinitro-*m*-phenylene dioxide	<1%	Unst. Expl , H200 – Acute Tox.4, H302 – Acute Tox. 4, H332 – STOT RE 2, H373 – Aquatic Acute 1, H400 – Aquatic Chronic 1, H410 – Repr. 1A, H360Df

4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES: Substances are not directly in contact with users. In case of accidental contact with one of these components, please contact Davey Bickford Enaex Australia immediately for further instructions regarding correct handling procedures.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED: Not applicable

CONTACT WITH SKIN: Seek medical advice for any skin irritation.

CONTACT WITH EYES: Not applicable.

INGESTION: Seek urgent medical advice.

OTHER INFORMATION: Detonators are explosive and should be handled with care. Treat symptomatically.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Do NOT fight fires involving explosives.

SPECIFIC HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE: Explosives material. Evacuate immediately. Set up safety perimeter.

Do not attempt to fight fires that involve explosives.

Whenever possible, measures should be taken to prevent the fire from spreading before they reach the explosives.

PRECAUTIONS FOR FIREFIGHTERS:	Explosives material. The risk of explosion may remain latent even after the fire has been extinguished, depending on the condition of the products. In case of fire that has not involved the explosives, use available fire extinguishing sources, if it is safe to do so, to prevent the fire spreading. In case of fire in storage facility or in transit, evacuate all personnel to muster points or to safety perimeter. Notify authorities, secure site of fire, block all access to all non-essential personnel and await emergency services.

6. ACCIDENTAL RELEASE MEASURES

The disposal of damaged or deteriorated electronic detonators must be carried out in accordance with applicable regulations and standards. Do not dispose of these products in waste bins or public waste disposal area. Disposal of pyrotechnic products by blast or incineration must be done by trained and authorised personnel in a safe area.

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES:	Pyrotechnic materials spilled accidentally must be collected by authorised personnel, so that they can be disposed of appropriately (see waste handling, section 13). Avoid any impact, friction, or anything that may lead to a spark or electrostatic discharge. Keep away from incompatible chemicals.
ENVIRONMENTAL PRECAUTIONS:	Advise local authorities if contamination has occurred.
METHODS FOR CONTAINMENT:	Never handle damaged detonators. Undamaged detonators can be repacked in packaging similar to original boxes. Never use damaged products or partially damaged products (that have been shocked or submitted to excessive temperatures, etc.) In case of potentially or visibly damaged products, contact Davey Bickford Enaex Australia immediately to obtain the necessary handling procedures.

7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING:	Handle with care, avoiding impacts, friction and exposure to heat, and ignition sources. No smoking. Any use not covered in the technical instructions or by untrained personnel is prohibited. Do not use damaged or partly damaged products (impacted by shock, high temperature). The testing of electronic detonators must be carried out with approved equipment and by authorised and trained personnel.
CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES:	Store in approved magazine facilities in accordance with local regulations and standards. Store out of direct sunlight in a well-ventilated facility approved by authorities for the storage of explosives. Do not store with incompatible goods.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

CONTROL PARAMETERS:	Not Applicable

PERSONAL PROTECTION:	– Appropriate Personal Protective Equipment (PPE) should be considered where engineering controls are not required. – Hand protection: wearing gloves recommended – Eye protection: wearing safety glasses recommended – Hearing protection: close to an explosion, wearing hearing protection appropriate for the distance recommended

9. PHYSICAL AND CHEMICAL PROPERTIES

CHEMICAL COMPOUND:	LMNR, Lead Styphnate, Zinc, Lead Azide, PETN
CHARACTERISTICS:	Detonation hazard at a temperature of 120ºC / 248ºF and above
HAZARDS:	Unpacked – Mass detonation hazard. Packed – Hazard Classification 1.4S Detonator, Electric UN 0513

10. STABILITY AND REACTIVITY

REACTIVITY:	Explosive.
CHEMICAL STABILITY:	Stable within the handling and storage recommendations in section 7 and use by trained and authorised personnel.
HAZARDOUS REACTIONS	Explosion may result due to shock, friction, fire and other sources of ignition, creating the potential for shrapnel.
CONDITIONS TO AVOID:	Avoid any exposure to heat, impact, friction and sources of ignition.
INCOMPATIBLE MATERIALS:	Strong acids or alkalis.
HAZARDOUS DECOMPOSITION PRODUCTS:	Fumes contain lead. Possible release of oxides of lead, carbon and nitrogen.

11. TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS:	No hazards identified for the item.

12. ECOLOGICAL INFORMATION

TOXICITY:	No hazards identified for the item.
PERSISTENCE AND DEGRADABILITY:	No hazards identified for the item.
BIOACCUMULATIVE POTENTIAL:	No hazards identified for the item.
MOBILITY IN SOIL:	No hazards identified for the item.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHODS:

Do not place in waste bins, drains, or landfill.

The disposal of damaged or deteriorated electronic detonators must be carried out in accordance with applicable regulations and standards.

Do not dispose of these products in waste bins or public waste disposal area.

Disposal of pyrotechnic products by blast or incineration must be done by trained and authorised personnel in a safe area.

For further information, contact a Davey Bickford Enaex Australia representative.

14. TRANSPORT INFORMATION

UN NO: **0513**

PROPER SHIPPING NAME: **DETONATORS, ELECTRONIC** programmable for blasting

TRANSPORT HAZARD CLASS: **1.4S**

PACKAGING GROUP: Not applicable

ENVIRONMENTAL HAZARDS: No applicable

SPECIAL PRECAUTIONS FOR TRANSPORT:

- ADR specifics (Road) — Australian Code for the Transport of Explosives by Road and Rail.
- IATA specifics (Air) — **Detonators**, **electronic**
- IMDG specifics (Sea) — EMS Fire: F-B EMS Spill: S-X

15. REGULATORY INFORMATION

For all countries, regulations and standards covering the handling, transport, storage, usage, and destruction of explosives must be complied with, and also those regulations and standards governing the safety of workers, their health and the environment.

16. OTHER INFORMATION

This information sheet cannot in any circumstances free the user of the product in question from their obligation to consult applicable legislation.

The information contained here is based on the state of our knowledge of the product concerned at the date of issue. It cannot be considered as exhaustive and deals only with normal use of the product.

This SDS is used in production sites in Australia, United States of America & Europe, and cannot be construed as being a binding injunction; it does not replace the legislation applicable to qualified users of the products in accordance with recognised practices. Standards must be consulted for specific requirements.

DISCLAIMER: We make no warranty of such information; either expressed or implied, and assumes no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.



Duplex Shot Fire F8 Cable

Medium Density Polyethylene Insulated

Conductor: Single Strand Plain copper Conductor to AS/NZS1125

Insulation: PEMD (Medium Density Polyethylene) UV Stabilized , Metal Deactivated and Anti Static

Insulation Color: Green / Yellow

Pack Size: 400mt REELEX Pack

400m Coils





Code	Number of Strands x wire Ø mm	Number of Cores	Nominal Area mm^2	Average Insulation Thickness mm	OFHC Max D.C. Resistance @ 20° C mΩ/m	Nominal O.D. mm	Mass Kg/100mt
	1 /0.60 + - 0.010mm						
EFPP21060		2	0.283	0.43	**66.45**	1.45x3.05	0.774
NOTE: NOT SUITABLE FOR CONNECTION TO MAINS POWER SUPPLY.							

Features:

1. Oxygen Free High Conductivity copper with excellent electric and thermal conductivity properties.

2. Excellent hydrogen enbrittlement resistance, (TPC) Tough pitch copper becomes very brittle when it is heated at higher than 600^0C under a reducing gas atmosphere including hydrogen. Since OFHC contains a very low oxygen content, it does not show any brittleness.
3. Class 1 Conductor.

Please Note!

Austech Wire & Cable Pty. Ltd. takes every precaution to ensure that the information in this publication is correct but accepts no liability of any kind and reserves the right to change any detail in this catalogue without notification.

Austech Wire & Cable 198 Boundary Road, Braeside , Vic. 3195 Tel: (03) 9587 1712 Fax: (03) 9587 7563

APPENDIX E – PERSONNEL QUALIFICATIONS

WELLANBAH INDUSTRIAL

Curriculum Vitae

Daniel Healy

Structural Engineer & Demolition Shotfirer

Qualifications

University of Newcastle, Bachelor of Engineering (Civil), Honours Class I
University of Newcastle, Masters of Business Administration, Distinction
Certificate IV in Demolition
Chartered Professional Engineer (Structural) – Engineers Australia
Member of International Society of Explosive Engineers

Personal Summary

Daniel is a highly regarded subject matter expert with over 18 years' experience across all phases of the demolition process. He has held roles as client engineer and contractor engineer; and he has been instrumental in the successful execution of some of Australia's most significant demolition projects to date, such as Hazelwood Power Station, Energy Brix Power Station and the Hydro Aluminium Smelter.

He specialises in the design and structural analysis of complex demolition methodologies implementing various techniques, such as induced collapse, explosives, craneage, and mechanical top-down approaches. Daniel is also a licensed shotfirer endorsed to execute explosive demolition projects, and has completed numerous explosive induced collapses throughout Australia and overseas. This provides Daniel with the unique insight for the design and practical execution of complex demolition projects.

TRENTON POWER PLANT DEMOLITION – BOILER HOUSE

The Trenton Power Plant Boiler House Demolition included the explosive induced collapse of two redundant boiler structures located within Detroit Michigan. Each of the structures weighed approximately 23,000t. The High-Pressure Unit contained four boilers and associated coal bunkers, and Unit 9 was a significant single boiler structure with Northen coal bunker.

The works were successfully executed within a sensitive environment adjacent to the Detroit River and Trenton residents to the full satisfaction of the asset owner DTE.

TRENTON POWER PLANT DEMOLITION – CHIMNEYS

The DTE Power Plant Demolition was a challenging project located within a densely populated metropolitan area. One of the critical activities was the demolition of dual 170m high reinforced concrete stacks.

The stacks were bordered by river and channel networks on three sides as well as various retained assets which limited the available fell paths. The explosive induced collapse was successfully executed, with both stacks responding in accordance with the results of the detailed analysis complete as part of the planning process and falling directly along the desired fell path without damaging any retained assets onsite.

JAMES DE YOUNG POWER STATION DEMOLITION

The James De Young Power Station Demolition included the explosive induced collapse of the boiler house structure. This significant asset consisted of three top hung boilers, overhead precipitator and three steel stacks.

The structure was approximately 60m in height to the top of the stacks and primarily constructed of heavy steel work. In order to demolish the structure, linear shaped charges were fitted to the nominated columns and extracted to cause rotation of the structure about the pivot columns.

Key challenges included the proximity of the site to adjacent water ways and live operations, as well as the complex column and bracing arrangement. The project was successfully executed without incident, which the collapse mechanism perfectly reflecting the design intent.

WELLANBAH INDUSTRIAL

Curriculum Vitae

OAKY CREEK DRAGLINE DEMOLITION

This project included the explosive induced collapse of the A-frame, mast and boom of a BE 1370 dragline which was located at the Oaky Creek Mine Site in central Queensland.
The project required explosively severing the rear A-frame legs to allow the structure to pivot about front connections to grade. The project was successfully executed and the team received high praise from both the client and the regulator.

COLLINSVILLE DRAGLINE DEMOLITION

The Collinsville dragline demolition project included the severing the main cables in order to trigger the collapse of the mast and boom structures. The project was further complicated due to the intricate explosives tie in required in order to prevent any misfires to adjacent charges as they were initiated.

The results of the blast perfectly matched the design intent, with the structure collapsing within the desired footprint to facilitate subsequent mechanical demolition / processing.

HAZELWOOD POWER STATION DEMOLITION - ENGIE

Australia's largest power station demolition project, the scope included the explosive demolition of eight reinforced concrete chimneys, 140m in height, and four boiler house units 65m in height. Role included structural analysis of demolition methodologies to assess both global behaviour and expected vibration, along with blast design works and onsite execution.

KURRI KURRI ALUMINIUM SMELTER DEMOLITION - HYDRO

The project scope included the demolition of 2.2km of potline structures, overhead cranes, casting building, greenmix structure, steel & concrete chimney stacks, and associated plant & infrastructure. A key component of the project was the explosive demolition of 3 x chimneys and 1 x concrete water tower. Other high rise industrial structures were demolished via specialised induced collapse methods.

ENSHAM DL03 DRAGLINE DEMOLITION

As part of the project team, engaged to execute the explosive demolition component of the Idemitsu 1680t DL03 Dragline Demolition Project.

The dragline was located within the central Queensland, and the demolition was required as part of the overall closure of the mine. Works required the installation of linear shaped charges in order to sever the structural strands and cause the mast and boom elements to fall to grade.

ENERGY BRIX POWER STATION DEMOLITION - EBAC

The Energy Brix Power Station Demolition, in Morwell Victoria comprised of the complete demolition of all major power station assets onsite including the turbine hall, boiler house and coal bunkers.

Role in the project was the comprehensive design of demolition methodologies, structural assessment for expected vibration and subsequent mitigation strategies, and attendance to detailed risk assessment workshops to control various risks inherent with projects of this complexity.

KWINANA POWER STATION DEMOLITION - SYNERGY ENERGY

Scope included the partial demolition of the Kwinana Power Station within a live operating environment. Assets that were demolished included the K3 and L4 boilers along with associated 140 metre high stack.

The stack was demolished utilising a custom made shear suspended from a tower crane (the first of its kind in Australia). The boilers were demolished via an induced collapse, which required significant pre-strengthening to ensure that there was no damage to the live turbine hall during the collapse.

RAVENSWORTH DL301 DRAGLINE DEMOLITION - GLENCORE

The overall project scope included explosive felling of the main boom and mast, induced collapse of A-frame, mechanical demolition of main house and a significant amount of oxy-cutting to down-size heavy steel members. Role in the project was to execute the explosive demolition of the dragline booms, which included detailed blast design, stakeholder consultation, risk assessment and onsite execution.

WELLANBAH INDUSTRIAL

Curriculum Vitae

BAAL BONE COLLIERY DEMOLITION - GLENCORE

The scope of works included the demolition of the coal handling plant, material handling conveyors and stacker, reclaimer tunnels, thickener, and train loadout bin. Role included the design of various demolition methods and onsite execution of induced collapse scope items.

MT ISA HEAVY MINERAL PLANT DEMOLITION - GLENCORE

Project included the demolition of the redundant HMP Building to make way for a new conveyor system to service the sites lead smelter. The structure was approximately 50m in height, and consisted of a heavily braced steel frame which supported ore bins, sizing screens and various other processing infrastructure. The demolition was to take place within a 5 day shutdown, to minimise the impact to site operations, and therefore needed to be meticulously planned and co-ordinated to ensure a successful outcome.

Role in the project was to complete the design and onsite execution of the explosive induced collapse of the main structure. This included blast management plans, method drawings, placement and programming of charges and final initiation of explosives. The project was a great success, and Glencore was highly appreciative of the quality and timely execution of works.

BULGA P&H9020 DRAGLINE DEMOLITION - GLENCORE

The overall project scope included the demolition of the 5,500t dragline located at the Bulga site. This was the largest dragline demolition completed in Australia to date, and required the explosive felling of the main boom and mast, induced collapse of Machinery House and A-frame, and subsequent downsizing of pivot frame, tub and shoe elements.

Role in the project was to complete the explosive demolition of the dragline booms, and the design of machinery house and A-frame induced collapse, along with subsequent onsite execution and monitoring.

ROSEHILL POLYPROPYLENE PLANT DEMOLITION - LYONDELLBASELL

This project included the dismantling and demolition of the Rosehill Polypropylene Plant. The asset had been procured by an overseas company, and the entire plant needed to be dismantled and shipped overseas. Following the removal of all plant, the remaining structures were demolished through a combination of mechanical demolition and induced collapse methods.

WOODLANDS HILL PIT PROGRESSION PROJECT - GLENCORE – BULGA COAL

The scope of works included the dismantling / demolition of the CV701 Overhead Conveyor, BUO Office Buildings and Workshop, Beltana Arch Bridge, Vent Shafts and other minor infrastructure.

A technically challenging portion of the project was the dismantling of the CV701 conveyor. The structure was over 30m in height and had a geometrically complex head end arrange that necessitated significant engineering input to finalise the complex lifting processes.

Additional Areas of Interest

- **Demolition Shotfirer**
  Experienced shotfirer with demolition endorsement, able to execute explosive demolition projects.
- **Dynamic Analysis**
  Conversant with Explicit Dynamic packages to analyse collapse mechanisms and expected vibration as part of the demolition design process.
- **Awards / Scholarships**
  Awarded Newcastle University Industry Scholarship – 2007
  Placed on Deans Merit List – 2009
  Collin Crisp Award for Engineering Excellence – 2012
  Finalist in World Demolition Awards – 2019, 2020, 2022

ENGINEERS AUSTRALIA

National Engineering Register™

CERTIFICATE OF REGISTRATION

Daniel Healy

MIEAust CPEng NER

is registered in the following area(s) of practice

Structural Engineering

valid until 30 June 2026

Bernadette Foley
BE(Hons) FIEAust CPEng EngExec NER
APEC Engineer IntPE(Aus)
Group Executive, Professional Standards and Engineering Practice

Romilly Madew
AO FTSE HonFIEAust
Chief Executive Officer

EA ID
3407199

Date of Issue
01-Aug-2025

ENGINEERS
AUSTRALIA

This is to certify that

Daniel Healy

has been elected

Member

Chartered Professional Engineer

of

The Institution of Engineers Australia

in the

Structural College

on

30 July 2015

Dr David Cruickshanks-Boyd
FIEAust CPEng EngExec
National President

Stephen Durkin
Chief Executive Officer

3407199

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Daniel Gilbert Healy

Bachelor of Engineering
in Civil Engineering
with Honours Class I

CHANCELLOR

VICE-CHANCELLOR
AND UNIVERSITY PRESIDENT

DEPUTY-VICE CHANCELLOR (SERVICES)
AND UNIVERSITY SECRETARY

Admitted to the degree by authority of the Council,
on the 12th day of December, 2011

30115002

THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

By the Authority of the Council

Daniel Gilbert Healy

having satisfied the requirements was admitted to the degree of

Master of Business Administration with Distinction

on the 19th day of December 2013

30133641

CHANCELLOR

VICE CHANCELLOR
AND UNIVERSITY PRESIDENT

The University of Newcastle
I LOOK AHEAD
AUSTRALIA

www.safetyadserv.com
admin@safetyadserv.com
02 4739 9748
RTO #91141

Qualification Certificate

Health and Safety Advisory Service Pty Ltd
National Provider Code (RTO#): 91141

This is to certify that

Daniel Healy
(31259)

has fulfilled the requirements for

CERTIFICATE IV in DEMOLITION
(CPC41013)

on

3rd of October 2019

Signed: Robyn E Delander

ROBYN DELANDER (Chief Executive Officer)

Parchment Number: 31259/902

www.safetyadserv.com
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RTO #91141

Academic Transcript

Health and Safety Advisory Service Pty Ltd
National Provider Code (RTO#): 91141

STUDENT: Daniel Healy

STUDENT ID: 31259

DATE OF AWARD: 3rd of October 2019

DOCUMENT ID: 31259/902

CERTIFICATE IV in DEMOLITION

(CPC41013)

Code	Title	Outcome
BSBWOR402A	Promote team effectiveness	C
CPCCBC4002A	Manage occupational health and safety in the building and construction workplace	CT
CPCCBC4012B	Read and interpret plans and specifications	CT
CPCCBC5018A	Apply structural principles to the construction of medium rise buildings	C
CPCCDE4001A	Plan and prepare for activities on demolition sites	CT
CPCCDE4002A	Plan and supervise demolition work to minimise environmental and public health and safety impact	CT
CPCCDE4003A	Supervise individual activities on demolition sites	CT
CPCCDE4004A	Finalise demolition activities and supervise property handover	CT
CPCCBC4014A	Prepare simple building sketches and drawings	C
CPCCBC4024A	Resolve business disputes	C
CPCCBC4025A	Manage personal work priorities and professional development	C
CPCCBC5001B	Apply building codes and standards to the construction process for medium rise building projects	C
CPCCDE3016A	Identify hazards on demolition sites and apply risk management strategies	CT
CPCCDE3018A	Select and use small plant and equipment for demolition tasks	CT
CPCCWHS1001	Prepare to work safely in the construction industry	RPL

********** End of Record **********
Issued without erasure or alteration

Signed: Robyn E Delander

ROBYN DELANDER (Chief Executive Officer)

NSW GOVERNMENT | SafeWork NSW

EXPLOSIVES LICENCE

NEW SOUTH WALES



DANIEL GILBERT HEALY

D.O.B: 15/07/1988 Expires: 13/05/2030

Description: Blasting Explosives Users Licence Issued under the NSW Explosives Act and the Explosives Regulation

Authorisations:The licence holder is authorised to: Manufacture,Use,Possess,Dispose

Authorisations subject to the licence conditions and class of explosives listed on the reverse

Licence No: XBLS201242

Licence Holder Signature

Category: Agricultural Blasting, Seismic Work, Demolition Work

Licence Conditions: Holders must comply with the SafeWork NSW General Explosives Licence and Security Clearance Conditions and/or the Operational Conditions for Pyrotechnicians and Single Use Fireworks Licences (as applicable)

Licence Restrictions:

Licence Holder Signature

Category: **Agricultural Blasting, Seismic Work, Demolition Work, Above Ground Mining**

Licence Conditions: **Holders must comply with the SafeWork NSW General Explosives Licence and Security Clearance Conditions and/or the Operational Conditions for Pyrotechnicians and Single Use Fireworks Licences (as applicable)**

Licence Restrictions:

NSW GOVERNMENT SafeWork NSW

EXPLOSIVES LICENCE



BENJAMIN JOEL HEALY

D.O.B: 08/01/1986 Expires: 05/04/2028

Description: Blasting Explosives Users Licence Issued under the NSW Explosives Act and the Explosives Regulation

Authorisations:The licence holder is authorised to: Manufacture,Use,Possess,Dispose

Authorisations subject to the licence conditions and class of explosives listed on the reverse

Licence No: XBLS201660

NEW SOUTH WALES

APPENDIX F – INSPECTION TEST PLAN

INSPECTION TEST PLAN	PROJECT NUMBER:	W057	DOCUMENT NUMBER:	W057-ITP-001	WELLANBAH INDUSTRIAL
	PROJECT TITLE:	Liddell Chimney Stacks	DOCUMENT TITLE:	Chimney Stack Blast - ITP	
	DATE:	31/03/26	REVISION STATUS:	REV 3	

PROJECT DETAILS	
CLIENT	CMA Contracting
SITE OWNER	AGL
LOCATION	Liddell
PROJECT DESCRIPTION	DEMOLITION OF CHIMNEY STACKS SPECIFIC SCOPE RELATED TO THIS ITP IS FOR THE EXPLOSIVE INDUCED COLLAPSE OF THE TWO CHIMNEY STACK STRUCTURES.
ITP DEVELOPED BY	B. HEALY
ITP APPROVED BY	D. HEALY

INSPECTION TYPE LEGEND	
INDICATOR	DESCRIPTION
V	VISUAL INSPECTION
T	TEST PROCEDURE (NDT, TRIAXIAL ETC.)
M	MONITORING OR MEASUREMENT (VIBRATION, NOISE)
S	SURVEY
D	DOCUMENTATION

HOLD POINT LEGEND	
INDICATOR	DESCRIPTION
H	HOLD POINT – SIGNED BY WELLANBAH SHOTFIRER/ENGINEER (DANIEL HEALY)
O	OPTIONAL CLIENT INSPECTION
LA	LOCAL AUTHORITY INSPECTION
E	ENGINEER INSPECTION

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
PRE-CHARGE PLACEMENT						
1.	Preliminary Blast Management Plan & Safe Work Method Statements	D	▪ All planning / execution documentation required to complete works developed and submitted for approval process. Noting that some components will be progressively finalised	H		
2.	CMA to conduct dilapidation survey of surrounding areas	V	▪ Photographic evidence of condition of assets within surrounding area and critical adjacent assets (Switchyard, BESS Facility)	H*		
3.	Notification of relevant authorities and neighbouring properties as required.	D	▪ Confirmation that notification process has been completed	H*		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
			▪ Maintain record of notifications in register (CMA/AGL to provide)			
4.	Engineering assessment of structural pre-weakening Material verification	D T	▪ Structural assessment of proposed demolition method completed. ▪ Core hole samples taken from structures ▪ Laboratory compression test of sample completed ▪ Schmidt test on circumference of chimney completed ▪ Results reviewed by structural engineer and design verified prior to engineering approval to proceed.	H E		
5.	Complete inspection for hazardous materials & Removal/Management of hazardous materials	D	▪ Identified hazardous materials to be listed and managed as required. ▪ Traceable reporting documentation of hazardous materials ▪ Confirmation via test report / clearance certificate of removed hazardous materials (asbestos, etc) if required ▪ Approval from regulator to proceed with event with in-situ hazardous materials if required for safety	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
6.	Sentry Points and Viewing Locations determined in consultation with AGL / CMA	V	▪ Sentry Points / View Points Agreed and Established with Register of persons in attendance held by CMA and AGL	H*		
7.	Blast notifications sent to site personnel as appropriate	D	▪ AGL notified site personnel of planned event.	H*		
8.	Consultation with any affected stakeholders completed	D	▪ Consultation with affected stakeholders (Transgrid, BESS etc.) completed and confirmation from AGL that process has been adequately undertaken and acceptance from stakeholders has been secured.	H		
9.	Subject to above, amendments made to Blast Management Sub-Plan	D	▪ Updated BMSP with revised execution details.	H		
10.	Blast Management Sub-Plan Accepted by Principal Contractor and Asset Owner	D	▪ BMSP reviewed by CMA/AGL, and permission granted to proceed. Noting that sentry points and notifications may be progressing.	H		
11.	Complete Site Inductions & Print out Work Packs	D	▪ Complete CMA and AGL Site Inductions ▪ All documents printed in hard copy and included in the work pack for site team	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
12.	Daily Pre-start Meeting (including discussing expected weather for the day)	V	▪ All personnel associated with works to attend daily pre-start meeting. ▪ Confirm whether forecast to stay below allowable limits listed on design drawings (41 m/s gust)	H		
13.	Complete Site Establishment	V	▪ Ensure signage, fencing/flagging/barrier mesh is established to delineate boundaries and main access roads ▪ Site Access/Egress Maintained	H		
14.	Demolition Pre-works ▪ Demolish assets in fell paths ▪ Remove duct work and minor structures in vicinity of chimney base.	V	▪ Removal of assets around base of chimney completed to provide unimpeded access for works.	H		
15.	Drilling & Cutting Works ▪ Complete mark out of drill pattern, panel cut outs, and rear heel sit cut ▪ Complete cutting / removal of panels ▪ Complete drilling of charge holes ▪ Complete Wire saw cutting	V	▪ Cutting - Drilling - Charge Loading Quality Control Schedule: WI-QC-057-001 for Mark Up of works completed ▪ Panels are cut and removed as per blast design ▪ Blast holes are as per BMSP design, correct location, depth, orientation and free from debris.	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
			▪ Any damaged or incomplete holes clearly marked with orange paint, checked holes marked with green paint ▪ Ensure wire saw cut completed as per engineering design.			
16.	Installation of charge protection (conveyor belt, chainwire mesh / geofabric) for areas that are to be protected via this approach.	V	▪ Ensure conveyor belt installed over extents of lower charge holes ▪ Ensure chainwire mesh screen has been installed over upper charge holes ▪ Locally cut out areas where wire is impeding access to charge hole ▪ Roll up geofabric curtain above wire mesh, to allow for dropping down over wire mesh following charge placement / tie in, and fixing into position.	H		
17.	Site Security ▪ Installation of access fencing and signage ▪ Provisions for security for “sleeping” charges overnight	V	▪ Set up of site, in preparation for charge placement works ▪ Ensure arrangements have been made for security of charges over night	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
CHIMNEY CHARGE PACKING DAYS						
18.	Daily Pre-start Meeting (including discussing expected weather for the day)	V	▪ All Wellanbah and CMA Personnel to attend pre-start meeting. ▪ Confirm whether forecast to stay below allowable limits listed on design drawings (41 m/s gust)	H		
19.	Work Authorisation and Permits in place	D	▪ Ensure all required permits are completed and in place (Working at Heights, SWMS)	H		
20.	Set Up Exclusion Zone around the base of the chimney structures (different to blast exclusion zone)	V	▪ Verify exclusion zone is set up in accordance with the BMSP ▪ To consist of site fencing with Demolition in Progress / Blasting Keep Well Clear signage	H		
21.	Visual inspection of work area for loose material or other hazards	V	▪ Assess area for any hazards that may have developed over night	H		
22.	Assess ground conditions prior to using EWP	V	▪ Confirm ground conditions suitable for EWP use.	H		
23.	Complete weather checks	D	▪ Re-assess weather forecast for winds in excess of 12.5 m/s gust, and lightning potential.	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
24.	Installation of Emulsion explosive charges	V	▪ Verify charges match WI-WI-BMP-W057-001 Blast Management Sub-Plan ▪ Ensure tails are inserted into cartridge end and taped to cartridge ▪ Cartridges inserted into charge holes and tamped ▪ Charge holes stemmed post installation/ tamping	H		
25.	Tie in of horizontal initiation lines	V	▪ Verify that all charges have been installed and stemmed ▪ Confirm that all charges have been tied into horizontal initiation lines ▪ Ensure there is no excessive slack in the system	H		
26.	Tie in of vertical initiation lines	V	▪ Verify that all charges are connected to horizontal initiation lines ▪ Confirm that vertical initiation lines are connected to horizontal lines, with two lines of initiation for redundancy in system ▪ Ensure there is no excessive slack in the system ▪ Secure starting ends of vertical initiation lines at	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
			readily accessible location to prepare for attachment of detonators on morning of blast.			
27.	Installation of charge protection	V	▪ Ensure protection has been installed around all charges ▪ Confirm no areas of cut off / pinching of det cord matrix ▪ Drop down geofabric curtain where applicable and fix to wire mesh ▪ Ensure detonator connection points are accessible for morning of blast event (may need to retain area of access to chimney internals, with placement of final panel on morning of blast).	H		
BLAST DAY						
28.	Daily Pre-start Meeting, including weather assessment (this will also be checked in the days leading up to the blast event).	V	▪ All Wellanbah and CMA Personnel to attend pre-start meeting. ▪ Run through sequence of events so all personnel are aware of expected timeframes for event.	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
			▪ Confirm whether forecast to stay below allowable limits listed on design drawings (15 m/s gust) (Note workshop and practice run will be completed with site personnel prior to morning of blast event.)			
29.	Work Authorisation and Permits in place	D	▪ Ensure all required permits are completed and in place (Working at Heights)	H		
30.	Set Up Exclusion Zone around the base of the chimney structures (different to blast exclusion zone)	V	▪ Verify exclusion zone is set up in accordance with the BMSP ▪ To consist of site fencing with Demolition in Progress / Blasting Keep Well Clear signage	H		
31.	Visual inspection of work area for loose material or other hazards	V	▪ Assess area for any hazards that may have developed over night	H		
32.	Visual inspection of charges and initiation lines	V	▪ Visually inspect charges and initiation lines for any dislodgement, cut off or areas of concern			
33.	Complete final weather checks	D	▪ Assess weather forecast for allowable wind direction, speed and potential for lightning (noting this will be completed the days before, and prior to pre-start meeting).	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
			▪ Ensure compliance with dust management plan is to be achieved upon initiation of blast			
34.	Establish 600m Exclusion Zone for all non-essential personnel	V	▪ All non-essential personnel to vacate site to pre-determined points	H		
35.	Daveytronic Blasting equipment checked	M	▪ Wellanbah Shotfirer to check blasting units prior to tie in of detonators to initiation lines (Note the units will have also been checked on the night before the event and two units will be on hand in case of malfunction of a unit during pre-checks).	H		
36.	Attachment of detonators to initiation lines and programming delays	V M	▪ Check that detonators have been attached to lead in lines ▪ Ensure all detonators have been programmed	H		
37.	Pre-Blast Inspection Items 1 - 5	V M	▪ Complete pre-blast checks as per Appendix A – Section 7 of BMSP, up to checks on programming unit only.	H		
38.	Dust Suppression established in accordance with dust management plan	V	▪ Verify Dust suppression is working and is set up ▪ Ensure requirements dust management as per Blast Management Plan adhered to.	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
39.	Establishment of Monitoring Equipment	V	▪ All monitoring equipment to be set up and begin recording for blast event.	H		
40.	Establish 600m Exclusion Zone for all personnel excluding blast crew	V	▪ All personnel with exception of blast crew to vacate site to pre-determined points ▪ CMA Supervisor to complete roll call / radio checks to confirm exclusion zone is established	H		
41.	Run out Harness wire to firing point	V	▪ Harness wire has been run out to firing point	H		
42.	Establish 600m Exclusion Zone	V	▪ Final exclusion zone to be established ▪ Sentry checks complete, and confirmation that area is secure given to shotfirer	H		
43.	Pre-Blast Inspection Item 6 Initiation of Blast	V	▪ Remaining pre-blast procedure completed as per Appendix A – Section 7 of BMSP ▪ Countdown procedure completed as per BMSP, and blast to be initiated ▪ Structure to collapse inside drop zone per WI-BMP-W057-001 Blast Management Sub-Plan	H		
44.	Inspection of Blast Area after detonation & give ALL CLEAR from blasting perspective	V	▪ Shot firer to undertake Post Blast Inspection completed with All Clear given by	H		

ITEM NUMBER	INSPECTION DESCRIPTION	INSPECTION TYPE	INSPECTION CRITERIA	HOLD POINT	NAMES, DATE AND SIGNATURE	COMMENTS
			Wellanbah Shotfirer to sentries /CMA personnel. ▪ Exclusion zone to be maintained until safety check and hygienist review of dust monitors			
45.	Post blast safety inspection for areas of concern (including fires)	V	▪ Wellanbah Shotfirer to inspect site and identify any new hazards caused by the collapse of the structure	H		
46.	Wet down of Area	V	▪ Wet down structure / any areas which pose a fire risk. (unlikely for chimney blast)	H		
47.	Hazmat Inspection	V M	▪ Hygienist to review area, retrieve monitors ▪ Hygienist to provide all clear to “external” exclusion zone ▪ Internal no-go zone to be maintained	H		
48.	Approval to lift the exclusion zones and re-open the site	V	▪ Verify Steps 1-47 are complete ▪ Wellanbah Shotfirer to hand site back over to CMA supervisor to re-open and lift main exclusion zone.	H		
49.	Excess explosives removed from site.	V	▪ Wellanbah to remove any excess explosives from site.	H		

*Hold points for these items may be deferred to be completed before Item 18 – charge placement activities – I.e. charges not to begin being placed until these items are completed.

FINAL SIGNOFF – COMPLETION OF WORK				
COMPANY	**NAME**	**POSITION**	**SIGNATURE**	**DATE**
COMMENTS / SUPPORTING DOCUMENTS:				

APPENDIX G – SAFE WORK METHOD STATEMENT

WELLANBAH INDUSTRIAL	Safe Work Method Statement (SWMS) Worksheet

This form should be used in conjunction with the Blast Management Plan - WI-BMP-057-001 – LIDDELL CHIMNEY DEMOLITION

Section 1: Details of Safe Work Method Statement

BUSINESS UNIT		
Business Unit: DEMOLITION / BLASTING	**Date of assessment: 31/03/2026**	**Location: LIDDELL POWER STATION**

ACTIVITY / PROCESS
Describe the work Task (what, why, where, how): Blasting Liddell Power Station Chimney Stacks
Relevant documents and evidence used during the SWMS: Codes of Practice, Australian Standards, Blast Management Plan
Trades involved with undertaking this work activity (e.g. construction, electrical, etc): Demolition / Blasting (Shotfirer)

SWMS TEAM MEMBERS
Team Leader(s): Daniel Healy
Other personnel involved in the SWMS Process: Ben Healy

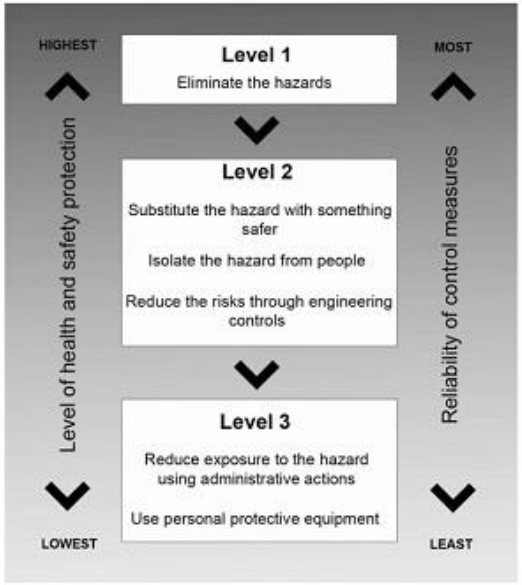
Project Manager - SIGN-OFF AND AUTHORISATION			
Name:	**Position:**	**Signature:**	***Review Date:***

Section 2: Work Activity Steps

You must always aim to eliminate a hazard, which is the most effective control. If this is not reasonably practicable, you must minimise the risk by working through the other alternatives in the hierarchy of Control. See below

Hazard Source	Potential hazards to consider during the hazard identification process
Work Premises	Access/Egress, Layout and condition, structure design, lighting conditions, suitability of equipment and state of deterioration
Physical Working Environment	Electricity, pressure, confined spaces, working at height/depth, confined spaces, fire or explosion, slips/trips/falls, weather conditions, contact with moving or stationary objects, exposure to dust/fumes/ vapour/ noise/ heat/ cold/ vibration/ radiation/static electricity or contaminated atmospheres
Work Practices, Work Systems and Shift Working Arrangements	Hazardous processes, psychological hazards, fatigue-related hazards, training, skills, experience, level of supervision, emergency planning arrangements
Plant and Equipment	Transport, installation, erection, commissioning, use, repair, maintenance, dismantling, storage or disposal of plant, unplanned and uncontrolled energy release, rotating equipment, vehicle movement, plant not used for intended purpose i.e. task specific, tools required for task, plant not maintained to manufacturer and design specifications
Utilising Explosives	Production, handling, use, storage, and transport
Manual Handling	Actions, movements, workplace/workstation layout, posture, duration and frequency of manual handling

Hierarchy of Control
Use this to determine control measures required to minimise the Risks



STEP	Task Step *Break the activity down into steps. List the steps in this column*	Hazard Identification *Identify any potential hazards associated with each step – and any related risks. Detail the hazards and risks in this column*	Controls Implemented *Decide what controls to use to eliminate or minimise the risks using the Hierarchy of Control. Detail the controls in this column*	Responsible Persons *Nominate the persons responsible for implementing the required controls*
1.	Set Up Wellanbah Work Area - Inner Exclusion Zone	Lack of personnel awareness for exclusion zones and communication procedures	- All personnel to have completed AGL and CMA Site Inductions - All personnel to attend morning pre-start meeting and be signed onto required site permits and management plans - Clear signage to be placed at entrance to Wellanbah work area (inner exclusion zone) and Muster Location. - Wellanbah evacuation procedures to be adhered with (all site personnel to be trained in this procedure) - Wellanbah Shotfirer to be responsible for maintaining inner exclusion zone within Wellanbah work area	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Unsafe work area	- Shotfirer and work crew to conduct visual inspection of the work area ensuring all potential hazards are identified and removed (potential debris or loose material) - Work crew to maintain visual awareness for surrounding ground conditions (penetration covers, soft spots). Install visual markers at any such locations. - Ensure the work area is maintained in a clean and tidy state with good house keeping - Authorised workers in inner exclusion zone only - Complete weather check to ensure OK to proceed – Winds less than 12.5m/s, no storm activity evident or forecasted. - Exclusion zone established beneath EWP work area when in use and monitored by spotter.	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Unauthorised personnel movements	- Chainwire mesh fence erected around perimeter of inner exclusion zone, two egress points per zone. Access points to be locked, with essential personnel approved to enter the area provided with access code in event of emergency / evacuation. - Shotfirer to control the movement of personnel within the Wellanbah work area (inner exclusion zone) - Work crew to meet prior to works to outline roles and responsibilities - High risk work to be communicated via alternate radio channel - 'DEMOLITION IN PROGRESS' AND 'DANGER - BLASTING KEEP WELL CLEAR' signage erected on entrances to Wellanbah work area (inner exclusion zone).	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Unsafe Equipment	- All plant to be passed out to operate on the site (EWP/Telehandler) - Trained and competent operators to conduct pre-start inspection, pre-start checklist and documentation prior to operating equipment - Any identified faults are to be reported to supervisor and to be tagged out of order	Supervisor / Shotfirer / Demolition Crew / Blast Crew

STEP	Task Step *Break the activity down into steps. List the steps in this column*	Hazard Identification *Identify any potential hazards associated with each step – and any related risks. Detail the hazards and risks in this column*	Controls Implemented *Decide what controls to use to eliminate or minimise the risks using the Hierarchy of Control. Detail the controls in this column*	Responsible Persons *Nominate the persons responsible for implementing the required controls*
		Exposure to hazardous materials (asbestos) (These controls are to have been completed well in advance of site establishment, but noted here for completeness.)	- Hygienist to undertake inspection and clearance of area - Any latent areas of asbestos to be contained / sealed - Approval granted by regulator to complete collapse event with asbestos in-situ - In the event that personnel identify suspect material not previously identified, works to temporarily cease, after make safe, and site supervisor notified of the material. Personnel to await direction from site supervisor in consultation with hygienist.	Supervisor / Hygienist / Shotfirer / Demolition Crew / Blast Crew
2.	Install Chainwire Mesh Protection via EWP, mesh to be hung off dyna bolt anchors fixed into face of chimney	Controls listed in Working at Heights Permit not implemented, resulting in potential injury of personnel undertaking works	- Prior to starting works, Working at Heights Permit to be reviewed and it is to be confirmed that all listed controls are in place. - All personnel have 'Working at Heights' training completed and in date	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Falling from heights	- Personnel within EWP to have appropriate PPE (full body harness, lanyard and shock absorber) and be connected to approved fall restraint points within the EWP at all times	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Dropped objects from EWP	- No-go zone beneath EWP at any time - Spotter in position to ensure no personnel enter beneath EWP	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Manual handling (drilling and fixing dyna bolts, hanging chainwire mesh)	- Wear appropriate PPE for manual handling tasks - Complete task rotation within work crew - Take regular breaks - Utilise lifting aids as required (telehandler)	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Dust	- Wear appropriate PPE including half face masks - Based on size of drill holes, dust is not expected to be significant, however wet down drill locations as required.	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Plant movements within work area (telehandler and EWP)	- Authorised and trained personnel only to operate plant - Maintain exclusion zones around work areas and adjacent to plant - Positive communication to be made by personnel that intend on approaching area in which plant is operating - Spotter in position, with direct communication to operators	Supervisor / Shotfirer / Demolition Crew / Blast Crew

STEP	Task Step *Break the activity down into steps. List the steps in this column*	Hazard Identification *Identify any potential hazards associated with each step – and any related risks. Detail the hazards and risks in this column*	Controls Implemented *Decide what controls to use to eliminate or minimise the risks using the Hierarchy of Control. Detail the controls in this column*	Responsible Persons *Nominate the persons responsible for implementing the required controls*
3.	Using EWP, explosives to be placed in nominated charge holes in accordance with WI-BMP-W057-001 Blast Management Plan	Inadequate quality control resulting in execution errors.	- Prior to commencing any charge placement works, Inspection Test Plan: W057-ITP-001 and Cutting - Drilling - Charge Loading Quality Control Schedule: WI-QC-057-001 to be completed by shotfirer. This is to include: **Panels have been cut & removed in accordance with blast design** **Charge holes layout and depth matches blast design** **Rear wire saw cut completed, and matches blast design** **Core hole cleared out with compressed air prior to fitment to ensure all moisture and debris removed** **Checked holes marked in green paint – bar strike holes marked in orange paint** Upon completion of above, approval to load charges will be granted by the shotfirer.	Supervisor / Shotfirer / Blast Crew
		Plant movements within work area	- Authorised and trained personnel only to operate plant - Maintain exclusion zones around work areas - Positive communication to be made by personnel that intend on approaching area in which plant is operating - Spotter in position, with direct communication to operators at all times	Supervisor / Shotfirer / Blast Crew
		Explosives transport vehicle movements	- Explosives transport vehicle to drive to site in accordance with route determined in traffic management plan - Vehicle to be parked adjacent to chimney, and remain under visual surveillance of the shotfirer / personnel with security clearance at all times - Wheel chocks to be placed to prevent unexpected movement of vehicle. - Driver to hold appropriate transport license	Supervisor / Shotfirer / Driver
		Security of explosives	- Transportable storage magazines to be locked at all times, with shotfirer to have key in possession at all times - Secure transport form completed, and explosives use register to be filled out. - Explosives to only ever be under possession of personnel with NSW security clearance - Any unloaded charges to be returned to transport vehicle, to remain parked adjacent to the chimneys, locked, and under direct surveillance of security guards for overnight sleeping of charges.	Shotfirer / Blast Crew

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			- Loaded holes are to be under surveillance of shotfirer / personnel with security clearance at all times, as well as under direct surveillance of security guards for overnight sleeping of charges.	
		Falling from heights	- Personnel within EWP to have appropriate PPE (full body harness, lanyard and shock absorber) and be connected to approved fall restraint points within the EWP at all times	Supervisor / Shotfirer / Blast Crew
		Slow response if personnel fall and are hanging from basket	- Spotter to be in position at all times - Spotter to have HRWL and be approved onsite for EWP Operation - Rescue plan to documented and procedure in place as per Working at Heights Permit, procedure to include spotter lowering EWP to grade using ground controls	Supervisor / Shotfirer / Blast Crew
		Falling debris from heights impacting personnel on ground level	- Security of inner exclusion zone to be maintained at all times via physical fencing - Spotter in place to confirm exclusion zone is not breached - Structural investigation and risk assessment undertaken to permit access to the area at chimney base	Supervisor / Shotfirer / Blast Crew
		Collision with structure	- Licensed operator to manoeuvre EWP - Spotter in place at all times - Maintain awareness when raising EWP adjacent to structure	Supervisor / Shotfirer / Blast Crew
		Debris in charge holes or incorrect drill depth	- Carry out an inspection of each blast hole prior to installing explosives, ensuring correct drill depth and free from debris (secondary check in addition to Cutting - Drilling - Charge Loading Quality Control Schedule: WI-QC-057-001) - Any incorrect hole depths, blockages or other defects to be notified to shotfirer, do not load any hole with defects without rectification and approval by Shotfirer/Engineer	Shotfirer / Blast Crew
		Premature explosion whilst installing cartridges	- Check current weather and forecasts are safe to carry out task, no forecast lightning. - Only approved shotfirers, with NSW BEUL to handle explosives. - Anti-static PPE to be worn at all times (100% cotton clothing) - All explosives to be inspected on ground, only essential tooling and explosives to be in the EWP at any time. All tooling to be used whilst explosives are installed is to be intrinsically safe.	Supervisor / Shotfirer / Blast Crew

STEP	Task Step *Break the activity down into steps. List the steps in this column*	Hazard Identification *Identify any potential hazards associated with each step – and any related risks. Detail the hazards and risks in this column*	Controls Implemented *Decide what controls to use to eliminate or minimise the risks using the Hierarchy of Control. Detail the controls in this column*	Responsible Persons *Nominate the persons responsible for implementing the required controls*
			- All tools to be specialised for working with explosives – I.e. Det-cord cutters, timber tamping rod etc. - Emulsion type explosives to be installed in each charge hole by NSW licensed Shotfirers	
		Misfires due to errors in charge placement	- Works to be completed in accordance with BMP - Works completed by qualified shotfirer - Inspection Test Plan: W057-ITP-001 and Cutting - Drilling - Charge Loading Quality Control Schedule: WI-QC-057-001 to be completed, to confirm all steps associated with works are adhered with. - Tails to be inserted into each emulsion charge and taped to side of cartridge for upper charges - Det. cord tails to all be equal length, and marked with coloured electrical tape to indicate insertion length as a cross check for over/under drilled holes. - Detonators inserted and taped to cartridge for lower charges - Charges to be firmly tamped to ensure good coupling in charge hole - Stemming to be applied to secure charges in position immediately after tamping	Shotfirer / Blast Crew
4.	Tie in det. cord tails to initiation lines	Misfires/incorrect timing	- Ensure all knots are tight and all det cord free ends are taped - Work progressively along charge line, ensuring that all charges have been tied into the line - Keep line tort whilst working along face to eliminate slack in the system - Inspect detonating cord for evident of pinching / damage throughout work - Complete Inspection Test Plan: W057-ITP-001 and Cutting - Drilling - Charge Loading Quality Control Schedule: WI-QC-057-001.	Shotfirer / Blast Crew
5.	Installation of protection to external surface of chimney base to prevent Flyrock	Impact from Flying debris following explosion	- Blast protection (conveyor belt and chain wire mesh / geofabric) to be placed by CMA and checked by shotfirer prior to attaching detonators to initiation lines	Supervisor / Shotfirer / Demolition Crew
		Falling from heights	- Personnel within EWP to have appropriate PPE (full body harness, lanyard and shock absorber)	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Slow response if personnel fall and are hanging from basket	- Spotter to be in position at all times - Spotter to have HRWL and be approved onsite for EWP Operation	Supervisor / Shotfirer / Demolition Crew / Blast Crew

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			- Rescue plan to documented and procedure in place as per Working at Heights Permit, procedure to include spotter lowering EWP to grade using ground controls	
		Falling debris from heights impacting personnel on ground level	- Exclusion zone to be maintained at all times - Spotter in place to confirm exclusion zone is not breached	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Misfires	- Extreme care taken when working around prepared explosives - Ensure explosives and down lines are not pinched or disturbed during fitment of protection - Any suspected disturbances to be investigated and inspected before final wrapping (upper charges). - Shotfirer to inspect initiation lines following placement of protection to confirm no areas of concern, and complete Inspection Test Plan: W057-ITP-001 and Cutting - Drilling - Charge Loading Quality Control Schedule: WI-QC-057-001	Supervisor / Shotfirer / Demolition Crew / Blast Crew
		Crushing injuries	- Maintain awareness of surroundings and plant movements - Wear appropriate PPE for activities (gloves) - Use manual aids where appropriate to assist with lifting objects into position - Personnel to stand clear of telehandler during placement of protective measures - Engineer to review placement, and confirm stability will be maintained up until time of blast event.	Supervisor / Shotfirer / Demolition Crew / Blast Crew / Engineer
		Plant movements within work area	- Authorised and trained personnel only to operate plant - Maintain exclusion zones around work areas - Positive communication to be made by personnel that intend on approaching area in which plant is operating - Spotter in position, with direct communication to operators	Supervisor / Shotfirer / Demolition Crew / Blast Crew
6.	Establish 600m exclusion zone for all non-essential personnel	Unauthorized access to area prior to blast	- Sentries to be in positioned around perimeter of exclusion zone in accordance with blast management plan - Sentries to have radios, and be in contact with the site supervisor to notify them of any unauthorised access into the exclusion zone - Essential personnel limited to those undertaking physical tasks for the morning of the blast	Supervisor / Sentries / Essential Personnel

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			▪ **Shotfirer & blast crew** ▪ **Dust suppression team** ▪ **Technicians for monitoring devices** ▪ **Camera crew** ▪ **Area clearance crew**	
		Lack of personnel awareness for exclusion zones and communication procedures	- All relevant personnel to have completed AGL and CMA Site Inductions - Sentries and essential personnel to attend workshop and dry run session for management of exclusion zone and communication procedures. - Personnel to attend morning pre-start meeting and have sequence of event document supplied along with sentry map, communication protocols, evacuation and abortion procedures on hand at all times	Supervisor / Sentries / Essential Personnel / Blast Crew
7.	Complete connection between harness wire and electronic detonators, program detonators in accordance with BMP.	Premature explosion resulting in injury to personnel due to blast, or collapse of chimney stack	- Follow manufacturers procedures for connecting detonators and programming delays. - Complete pre-blast checks using programming unit (PU) - Blasting unit access cards to be in possession of shotfirer at all times - 600m exclusion zone cleared of all non-essential personnel prior to attaching detonators	Supervisor / Shotfirer / Blast Crew
		Misfires	- Inspect initiation lines prior to final attachment of detonators - Follow manufacturers procedures for connecting detonators and programming delays. - Complete pre-blast checks using programming unit (PU) - Inspection Test Plan: W057-ITP-001 and Cutting - Drilling - Charge Loading Quality Control Schedule: WI-QC-057-001 to be completed by shotfirer.	Supervisor / Shotfirer / Blast Crew
8.	Run harness wire out to firing location	Misfires	- Area to be cleared of all essential and non-essential personnel with exception of blast crew. Shotfirer to confirm that exclusion zone has been cleared, and all personnel accounted for prior to final run out of harness wire - Care to be taken when running out line to ensure no kinks in line, excessive tension, or potential areas of abrasion - Harness wire **NOT** to be connected to remote blasting unit until final exclusion zone has been established	Supervisor / Shotfirer / Blast Crew / Sentries

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9.	Establish final 600m exclusion zone	Unauthorized access to area prior to blast	- 30 minutes prior to planned blast, exclusion zone to be established and confirmed by Site Supervisor, Wellanbah Shotfirer and Sentries. - All Wellanbah personnel to be accounted for and vacated site to firing location. - Exclusion zone to be handed over to shotfirer for final warning procedure / count down in accordance with blast management plan.	Supervisor / Shotfirer / Blast Crew / Sentries
		Lack of personnel awareness for exclusion zones and communication procedures	- All involved personnel to have completed AGL and CMA Site Inductions - Sentries and essential personnel to attend workshop and dry run session for management of exclusion zone and communication procedures. - Personnel to attend morning pre-start meeting and have sequence of event document supplied along with sentry map, communication protocols, evacuation and abortion procedures on hand at all times	Supervisor / Sentries / Essential Personnel / Blast Crew
		Detonation of charges prior to establishment of exclusion zone causing injury to personnel	- Harness wire **NOT** to be connected to remote blasting unit until exclusion zone has been established	Supervisor / Shotfirer / Sentries
10.	Complete connection between harness wire and remote blasting unit	Premature explosion / Misfires	- Exclusion zones in place prior to establishing connection - Ensure exclusion zone is clear of all personnel following radio checks - Follow manufacturers procedures in relation to connection of harness wire to blasting unit - Pre-blast checks to be completed using unit - Blasting unit access cards to be in possession of shotfirer at all times Misfire procedure to be carried out as per blast management plan (BMP) section 7.34 if any misfires occur.	Supervisor / Shotfirer / Sentries
11.	Begin warning procedure / countdown	Unauthorized access to blast zone	- Wellanbah shotfirer to manage countdown / warning procedure, as noted in Blast Management Plan - Sentries to remain in direct radio contact with shotfirer and advise of any unauthorised entry to the exclusion zone via the abort protocols provided within the BMP, which is to be issue to all sentries.	Supervisor / Shotfirer / Work Crew /
12.	Detonate charges	Failure to detonate/misfire	- Shotfirer to advise sentries of misfire. Exclusion zones to be maintained.	Supervisor / Shotfirer / Work Crew /

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			- Wait a minimum of 5 minutes, shotfirer only to access exclusion zone to investigate and rectify cause of misfire.	
		Partial standup of structure due to inappropriate blast design, or failure to eject concrete.	- Structural analysis undertaken on blast design - Hole spacing and explosives quantities to be based on appropriate powder factor following results of test shot.	Shotfirer / Structural Engineer
		Flying debris	- Exclusion zones to be maintained throughout detonation until all clear given by shotfirer and site handed over to demolition supervisor. - Charge protection installed to arrest fly rock debris - PPE to be worn at all times, the following PPE is to be worn as a minimum: a. Safety boots b. High viz c. Gloves d. Safety Glasses e. Safety helmet	Supervisor / Shotfirer / Work Crew /
		Noise	- Calculation of expected Air Over Blast Pressure to be completed, to confirm maximum db is below allowable limits. Refer to Blast management sub-plan (BMSP). - All personnel outside of exclusion zones (with exception of firing crew). Personnel at firing location, all sentries and all additional personnel onsite (though outside exclusion zone)to have hearing protection	Shotfirer / Blast Crew
		Dust	- Refer dust management controls included in Blast management plan and follow requirements of plans. (wet down area, wind direction) - Impact areas to be wet down pre-blast to minimise dust - Wind conditions to be monitored prior to blast to ensure wind direction in favourable conditions to avoid dust blowing onto nearby retained structures. - Monitoring to be carried out as per monitoring plan. - Sentries and blast crew to have access to dust masks, in case of unexpected dust plume migration.	Supervisor / Blast Crew / Hygienist / Technicians / Sentries
13.	Inspect chimney structure for misfires or failure to collapse	Obnoxious and toxic dust and gases	- Exclusion zone to be maintained - No personnel (including shotfirer) to approach blast until sufficient time has passed to allow dust to settle and toxic and obnoxious gases to dissipate. Refer BMP 7.35 for Post blast assessment and inspection procedure.	Shotfirer

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		Misfires	- After mandatory wait time (minimum 5 minutes for explosives, longer to allow for dust plume to dissipate), shotfirer to inspect site for misfires and unsafe conditions. Refer BMP section 7.35 for 'Post blast assessment and inspection procedure' - Exclusion zone to be maintained by sentries - Shotfirer to inspect structure from a safe distance prior to approaching - Misfire procedure to be carried out as per blast management plan (BMP) section 7.34 if any misfires are detected. - If misfire identified: 1. Inform sentries and relevant stakeholders (Site Supervisor, AGL, Transgrid, BESS) 2. Confirm the blasting unit has been disconnected from the harness wire (will have been completed immediately after firing, but to be re-confirmed). 3. Shotfirer to inspect the site from outside the line of fire. 4. Shotfirer to investigate and rectify cause of misfire (if safe to do so). Refer to section 7.34 'Misfire management system and contingency plan' in blast management plan (BMP).	Shotfirer / Structural Engineer
		Partial collapse	- Area to inspected by structural engineer from safe distance to ascertain if a partial collapse has occurred, or damage to adjacent assets has been sustained. - In the event of partial collapse, localised exclusion zone around identified structure (1.5 x height as a minimum) to be maintained, until structure can be assessed and rectification works completed.	Shotfirer / Structural Engineer
		Assess area for unsafe conditions (loose debris, potential areas of stored energy, ground penetrations)	- Shotfirer / structural engineer to inspect site for any unsafe conditions (inclusive of above). Unsafe conditions to be communicated to the demolition supervisor prior to 'all clear' and opening site for continued demolition works.	Shotfirer / Structural Engineer
		Unauthorised Access	- Exclusion zone to be maintained by sentries until post blast inspection has been completed.	Supervisor / Shotfirer / Sentries
		Dust / Exposure to hazardous materials (asbestos)	- Allow time for dust plume to dissipate - Post blast inspection personnel to wear asbestos personal protective equipment – (disposable coveralls, respirators, gumboots, gloves, goggles)	Shotfirer / Blast Crew / Engineer
14.	Issue all clear from blasting perspective, and hand over site for hygienist inspection	Misfires / unexploded charges	- After mandatory wait times, shotfirer to have inspected site for misfires / unexploded charges and unsafe conditions (as per Step 13).	Shotfirer

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		Unstable structure	- Structural Engineer to have reviewed structure for signs of unexpected collapse response. - Structural Engineer to have reviewed adjacent structures for potential damage / created hazards - Identified areas of concern or any locations which an exclusion zone must be maintained discussed with site supervisor	Supervisor / Shotfirer / Structural Engineer
		Unsafe conditions	- Any other identified unsafe conditions following Step 13, to be discussed with site supervisor.	Supervisor / Shotfirer / Structural Engineer
		Shotfirer unused explosives or detonation equipment left unattended	- Shotfirer to ensure all equipment has been turned off / access card removed, accounted for and locked away in shotfirers vehicle prior to 'all clear' given. - Transportable magazines to be locked at all times with key in possession of shotfirer. - Any unused explosives to be removed from site following blast event.	Shotfirer
		Dust / Exposure to hazardous materials (asbestos)	- Exclusion zone to be handed over to Site Supervisor to maintain exclusion zone until such time that clearance is provided by Hygienist (confirming that dust levels have reduced to safe levels, air monitoring results reviewed, all clear given by hygienist to reduce exclusion zone size as per Dust Management Plan). - Refer to Dust Management Plan and adhere with procedure for re-opening site	Supervisor / Shotfirer / Hygienist

Section 3: Declaration by workers and parties involved in the work activity (e.g. contractors)

I have been **consulted** and have assisted in the development of this SWMS.
I have been given the opportunity to comment on the content of this SWMS.
I have **read** and **understand** how I am to carry out the activities listed in this SWMS.
I have been supplied with **personal protective equipment** identified on this SWMS and I have been given **training** in the safe use of this equipment.
I have read and understand the requirements set out in the **safety data sheets** for any **workplace chemicals** identified in this SWMS.

NAME	SIGNATURE	DATE

APPENDIX H – BLAST MONITORING LOCATIONS



No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED MONITORING NUMBERS	DH	DH	BH	31.03.26
C	REMOVED DUST MONITORING LOCATIONS	DH	DH	BH	4.11.25
B	REVISED CALL OUTS	DH	DH	BH	19.07.25
A	PRELIMINARY ISSUE	DH	DH	BH	05.06.25

WELLANBAH INDUSTRIAL

DO NOT SCALE

Conditions of Use.
This document may only be used by intended client for the purpose for which it was prepared and must not be used by any other person or for any other purpose.

Drawn D. HEALY | Designer D. HEALY
Drafting Check B. HEALY
Approved D. HEALY
Date 05.06.25
Scale

This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST MONITORING LOCATIONS**

Original Size **A1**
Drawing No: **WI-24057-06-E006**
Rev: D

Plot Date: 31/03/2026 3:58:29 PM

Sigicom

INFRA C22

COMPLETE WIRELESS VIBRATION MONITOR FOR THE INFRA SYSTEM

GPS

INFRA C22
Wireless Triaxial Vibration Monitor

The INFRA system is used to monitor construction activities, blasting, train traffic, road traffic, vibration in buildings etc.

- All-in-one datalogger and vibration sensor
- Up to 4 month of continuous monitoring on internal rechargable batteries
- Built-in 4G modem
- Micro-SD memory card
- Simultaneous bar graph and waveform registration
- Weather proof
- Digital signal processing
- Post-processing, presentation and remote management in INFRA Net
- Multi button keypad
- GPS



INFRA C22 measures according to the following national and international standards:

DIN 4150-3 Anlage	1 – 315 Hz	**NS 8141:2013 Byggverk**	3 – 400 Hz
DIN 4150-2 KB RMS	1 – 80 Hz[1] 125ms	**NS 8141:2001 Byggverk**	5 – 300 Hz
ISEE Seismograph	2 – 250 Hz	**NS 8141-1:2022 Byggverk**	2 – 400 Hz
AS 2187.2-2006	2 – 250 Hz	**NS 8176 Komfort, RMS 1s**	1 – 80 Hz[1]
Arrêté de 1994 (explosif)	1 – 150 Hz	**SS 4604861 Komfort, RMS 1s**	1 – 80 Hz[1]
Circulaire ICPE de 1986	1 – 150 Hz	**SS 4604861 Komfort, RMS 1s**	1 – 80 Hz[5]
Référentiel SNCF - IN 1226	1 – 150 Hz	**OfM 9/1997 dB**	1 – 80 Hz[6]
SBR-A	1 – 100 Hz	**ÖNORM S 9020**	1 – 315 Hz
SBR-B, RMS 125 ms	1 – 80 Hz[1]	**ÖNORM S 9012 RMS 1s**	1 – 80 Hz[5]
Toronto bylaw 514	1 – 100 Hz	**ISO 10816-2 RMS 1s**	5 – 500 Hz[3] 125ms
Toronto bylaw 514	2 – 250 Hz	**ISO 2631-2 RMS 1s**	1 – 80 Hz[1]
Turkey Mining and Quarry	2 – 250 Hz	**ANSI S2.71 RMS 1s**	1 – 80 Hz[1]
BS 7385	1 – 300 Hz	**NCh 3577**	1 – 315 Hz
SN 640 312a	5 – 150 Hz	**Geophone**	5 – 500 Hz
Acceleration	5 – 300 Hz	**PN-B-02170**	1 – 100 Hz[4]
SS 4604866 Spräng	5 – 300 Hz	**PN-B-02170**	1 – 100 Hz[2]
SS 025211 Schakt	5 – 150 Hz	**FTA (VdB)**	1 – 80 Hz[7]
SS 025211 Schakt	2 – 150 Hz	**BS 6841 (VDV)**	

[1]20 mm/s, [2]25 mm/s, [3]200 mm/s, [4]250 mm/s, [5]700 mm/s^2, [6]50-117 dB, [7]50-118 dB

Technical Data

DIRECTION OF SENSITIVITY

C22 measures triaxial vibration.

MEASURING

The unit has built in digital signal processing, which processes all incoming data in real time according to the selected standard. The unit measures maximum values for each interval and at the same time, it records time history data when the vibration level exceeds the user preset threshold.

SAMPLING

The geophone signals are sampled at 4096 Hz using a high resolution A/D converter for a wide dynamic range. When a preset trigger level is exceeded a time history is recorded.

RECORDING

Recording time is up to 2 minutes, with up to 5 seconds pre-trig time.

POWER SUPPLY

Internal Lithium-Ion batteries that easily can be changed.

MEASURING RANGE

Frequency range 1 Hz - 500 Hz. The Geophones have a calibrated sensitivity within +- 2%. Maximum vibration level is 250 mm/s (10 in/sec) dependent on the selected standard.

SENSOR ELEMENT

The sensor elements are rugged high quality velocity sensing geophones with long term stability and wide dynamic range.

IDENTITY

The serial number of the unit and important metadata always follows the recorded data. This makes it possible to trace data to a certain unit.

MEMORY

Micro SD industrial memory card. 1 GB in standard configuration.

DATA TRANSFER

All data is buffered on the memory card and is sent when the next cellular communication takes place. If cellular communication is not possible, data is kept for transfer at a later time.

DATA AND SERVICE MESSAGES

Data and service messages are sent via INFRA Net for maximal flexibilty.

CALIBRATION

The unit has an internal memory for identity, calibration factors, calibration date etc.

SENSOR CHECK

Internal dynamic test performed each time monitoring is initiated to confirm the sensors are responding and the unit is level.

USER INTERFACE

With a keyboard and display settings can be changed. The display also shows battery status, signal strength, and the latest events.

REMOTE OPERATION

Settings can be changed remotely using INFRA Net.

MECHANICAL & ENVIRONMENTAL

Weather proof aluminum house with rubber seals. It has holes for bolts passing through in both horizontal and vertical direction.

Material: Powder coated aluminum house and polycarbonate antenna cover.

Dimension: 146 x 127 x 89 mm (5.8 x 5.0 x 3.5 in)
(Including antenna cover, excluding connector and standoffs.)

Protection class: IP67
Weight: 2100 grams (4.6 lbs) incl 2 batteries
Operating temperature: –20 to + 50 °C (-4 to 122 °F)

CE APPROVAL

EMC: 2014/30/EU
LVD: 2014/35/EU
RoHS: 2011/65/EU (2015/863)

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Sigicom

INFRA S10/S11

A DIGITAL AIR BLAST SENSOR IN THE INFRA SYSTEM

INFRA S10/S11 Air Blast Sensor

The INFRA system is used to monitor construction activities, rock blasting, train traffic, road traffic, vibration in buildings etc.

The S10/S11 is a digital Air Blast sensor.

The Sensor can be directly connected to the bus cable of the INFRA field monitoring system.

All filtering, signal processing and detection is done digitally in the sensor. Before the recording is started you only select the wanted standard that is presented in the Remote part of INFRA Net.

INFRA S10/S11 is extremely robust and protected to work under harsh outdoor conditions.



The INFRA **S10** Air Blast Sensor measures according to the following standards:

SS025210 Luftstötvåg	2000Pa 2-315Hz
AS 2187.2-2006	2000Pa 2-250Hz
AS 2187.2-2006	160dBL 2-250Hz
OSM/USBM Air blast	160dBL 2-250Hz
S23 NS8141-1:2022	2000Pa 2-315Hz

The INFRA **S11** Air Blast Sensor measures according to the following standards:

SS025210 Luftstötvåg	7500Pa 2-315Hz
AS 2187.2-2006	7500Pa 2-250Hz
AS 2187.2-2006	170dBL 2-250Hz
OSM/USBM Air blast	170dBL 2-250Hz
S23 NS8141-1:2022	7500Pa 2-315Hz

Technical Data

MEASURING

The sensor has built in digital signal processing. The signal processor processes all incoming data in real time according to the selected standard. The sensor works in combinational mode. It measures maximum values for each interval (selectable from 5 sec. to 20 min) according to the selected standard and at the same time it triggers and record time histories when the trigger level is exceeded.

SAMPLING

The sensor signal is sampled at 4096 Hz using a 16 bit A/D converter which gives a wide dynamic range. When a preset threshold is exceeded a time history is recorded. Even some time before the trigger time is stored (pre-trig). If any one sensor in a sensor network triggers all sensors will record time history data synchronously.

RECORDING TIME

Recording time up to 40 seconds at 4 kHz sampling.

POWER SUPPLY

The INFRA S10/S11 is powered via the bus cable with 12 Volts DC. Power in monitoring and recording mode 40 mW. Power consumption is higher during communication over the bus.

MEASURING RANGE

Pressure range for S10 is 0.5 Pa to 2000 Pa.
Pressure range for S11 is 1 Pa to 7500 Pa.

Contact Sigicom for further information on standards and measuring ranges.

SENSOR ELEMENT

The element is a high quality pressure sensor. It is very rugged and is long term stable.

IDENTITY

The sensor has a unique ID number that follows the recorded data. This makes it possible to trace data to a certain sensor.

CALIBRATION

Only the sensor has to be calibrated. The rest of the the system handles data communication and data storage. The sensor has an internal memory for identity, calibration factors, calibration date etc. Even the calibration date is supplied with the recorded data.

TRIGG-SYNCRONISATION

All time history recording sensors that are connected to the same INFRA bus cable will record data simultaneously if one sensor triggers. Acts as a multichannel transient recorder.

MECHANICAL

Watertight anodized aluminium house with o-ring seals. It has holes for bolts passing through in two directions. Can easily be bolted to the wall.

Dimension: 78 x 220 x 75 mm (3.1 x 8.7 x 2.9 in)
(excluding connector and standoffs)
Material: Anodized aluminium.
Protection class IP67
Weight: 500 grams (1.1 lb)

Temperature range -20 to +50 °C (-4 to 122 °F)

CE APPROVAL

Fulfills EMC demands according to:
EN 61326-1 (2006)

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Product specifications and descriptions in this document are subject to change without notice.

APPENDIX I – AIRBLAST OVER PRESSURE CONTOURS AND SENSITIVE RECEIVERS



No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
B	UPDATE WITH FINAL BLAST DESIGN MIC	DH	DH	BH	31.03.26
A	PRELIMINARY ISSUE	DH	DH	BH	08.09.25

WELLANBAH INDUSTRIAL

DO NOT SCALE

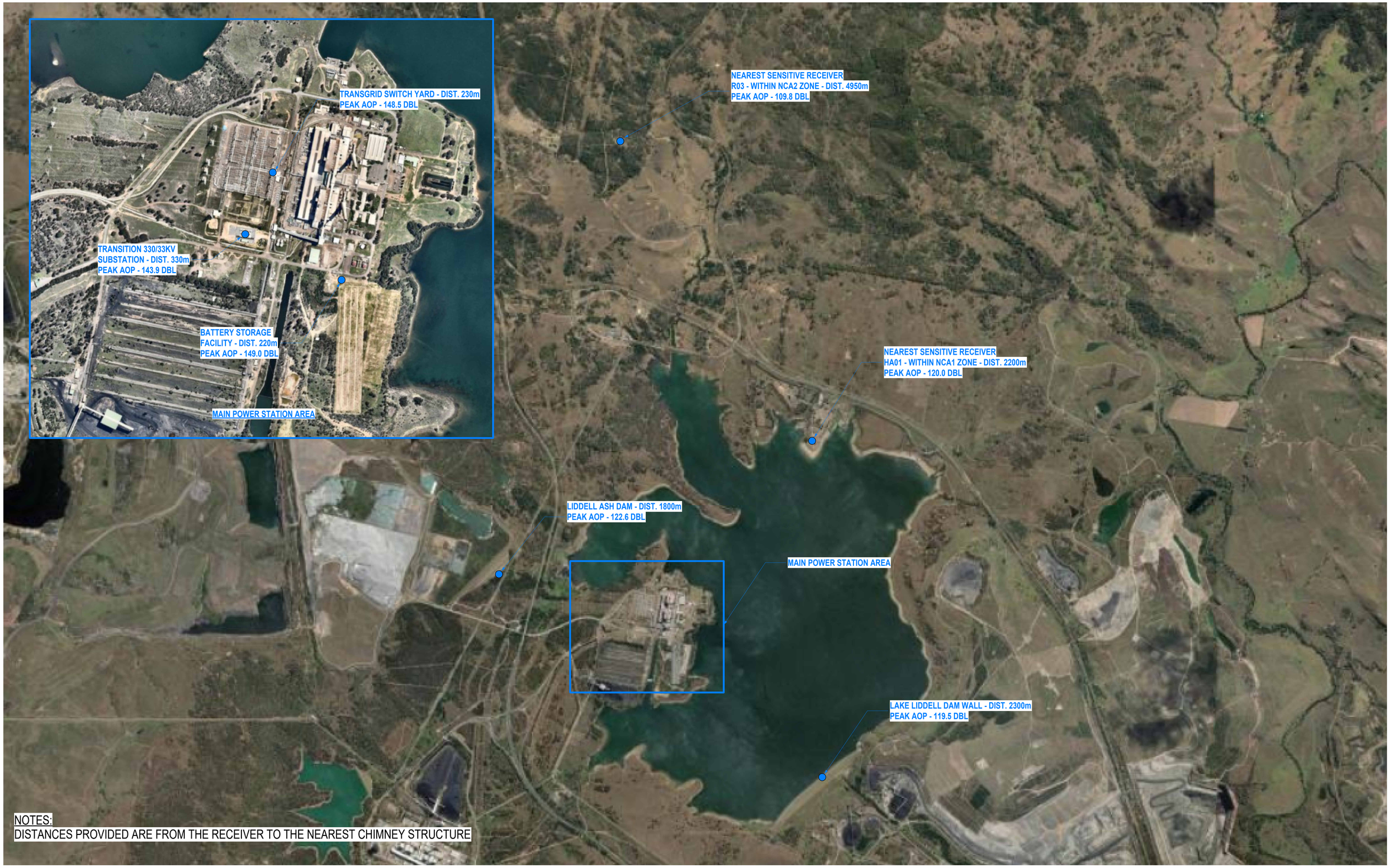
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Drawn D. HEALY | Designer D. HEALY
Drafting Check B. HEALY
Approved D. HEALY
Date 08.09.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST AOP CONTOURS**

Original Size **A1**
Drawing No: **WI-24057-06-E001**
Rev: B

Plot Date: 31/03/2026 4:25:30 PM



NOTES:
DISTANCES PROVIDED ARE FROM THE RECEIVER TO THE NEAREST CHIMNEY STRUCTURE

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
C	UPDATE WITH FINAL BLAST DESIGN MIC	DH	DH	BH	31.03.26
B	REVISED CALL OUTS	DH	DH	BH	8.09.25
A	PRELIMINARY ISSUE	DH	DH	BH	05.06.25

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Drafting Check B. HEALY
Approved D. HEALY
Date 05.06.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST AOP RECEIVERS**

Original Size **A1**
Drawing No: **WI-24057-06-E002**
Rev: C

Plot Date: 31/03/2026 4:25:34 PM

APPENDIX J – VIBRATION CONTOURS AND SENSITIVE RECEIVERS



EXPECTED VIBRATION VALUES AT NOMINATED CONTOURS:

50m - 125.5 mm/s
100m - 38.6 mm/s
150m - 19.4 mm/s
200m - 11.9 mm/s
300m - 6.0 mm/s
400m - 3.7 mm/s
500M - 2.5 mm/s

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	PRELIMINARY ISSUE	DH	DH	BH	05.06.25

WELLANBAH INDUSTRIAL

DO NOT SCALE

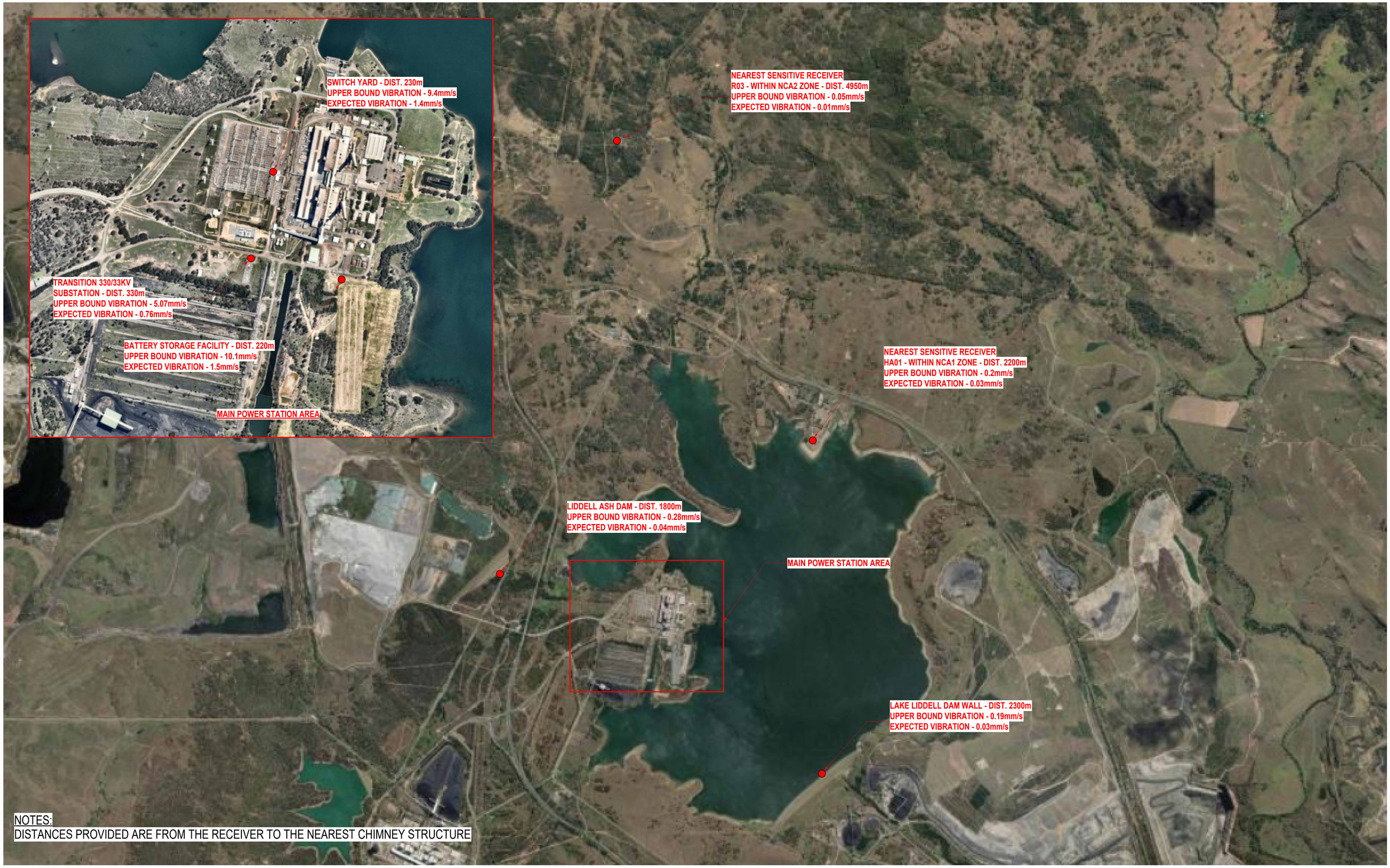
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Drawn D. HEALY | Designer D. HEALY
Drafting Check B. HEALY
Approved D. HEALY
Date 05.06.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST VIBRATION CONTOURS**

Original Size **A1**
Drawing No: **WI-24057-06-E003**
Rev: A

Plot Date: 19/07/2025 8:55:45 PM



No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
B	REVISED CALL OUTS	DH	DH	BH	19.07.25
A	PRELIMINARY ISSUE	DH	DH	BH	05.06.25

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Drafting Check B. HEALY
Approved D. HEALY
Date 05.06.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST VIBRATION RECEIVERS**

Original Size **A1**
Drawing No: **WI-24057-06-E004**
Rev: B

Plot Date: 19/07/2025 8:55:49 PM

APPENDIX K – LICENCED OFFSITE STORAGE FACILITY DETAILS & TRANSPORT VEHICLE CERTIFICATIONS

Licence Number: XSTR200123

Licence to Store Explosives

Issued under and subject to the provisions of the NSW Explosives Act and the NSW Explosives Regulation

Licence Holder: Wellanbah Industrial Pty Ltd

Business Address: 39 BAGENMAR RD, TINTINHULL NSW 2352, AUSTRALIA

Storage Address: 2381 LIMBRI-WEABONGA RD, WEABONGA, NSW 2340 AUSTRALIA

Date of Issue: 13/09/2021

Date of Expiry: 12/09/2026

Print Date: 04/11/2025

AUTHORISED ACTIVITIES

The licence holder is authorised to: Possess, Store

EXPLOSIVES AND/OR EXPLOSIVES PRECURSORS AUTHORISED FOR STORAGE

UN Number	Proper Shipping Name	Classification Code
0030	DETONATORS, ELECTRIC for blasting	1.1B
0042	BOOSTERS without detonator	1.1D
0048	CHARGES, DEMOLITION	1.1D
00065	CORD, DETONATING, flexible	1.1D
0082	EXPLOSIVE, BLASTING, TYPE B	1.1D
0241	EXPLOSIVE, BLASTING, TYPE E	1.1D
0288	CHARGES, SHAPED, FLEXIBLE, LINEAR	1.1D
0360	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1.1B
0384	COMPONENTS, EXPLOSIVE TRAIN, N.O.S.	1.4S
0513	DETONATORS, ELECTRONIC, programmable for blasting	1.4S

AUTHORISED STORES

Storage Facility ID (building name)	Storage Facility Type	Hazard Division	Maximum Storage Quantity
WI101	External Magazine	1.1D	6000KG NEQ
WI102	External Magazine	1.1B	1000 UNITS

Licence Number: XSTR200123

Licence Conditions:
It is a condition of a licence to handle explosives and/or explosive pre-cursors that the holder must comply with the requirements of the NSW Explosives Act and Regulation, as well as the SafeWork NSW General Explosives Licence and Security Clearance Conditions - September 2013.

Specific Licence Conditions: No specific licence conditions.

Nominated Responsible Person:
Daniel Gilbert Healy, UHL206880 Expiry: 19/03/2025

Signature:	D. Healy
Name:	DANIEL GILBERT HEALY

PO Box 71, Raymond Terrace NSW 2324
02 4988 6101
www.rduncan.com.au
enquiries@rduncan.com.au
ABN 98 003 836 397

10th March 2025

Att: Ben Healy
Wellanbah Industrial
Email: ben.healy@wied.com.au

Dear Ben

Re: Letter of Compliance

The following explosive storage magazines were hereby manufactured to comply with Australian Standard 2187.1 'Explosives – Storage, transport and use, Part 1: Storage'.

4,000 – 6,000kg capacity Explosive Storage Magazine:

- 1324

250kg capacity Explosive Storage Magazine:

- 0125

These products were manufactured in Australia by R Duncan Pty Ltd in December 2024 and January 2025, respectively.

Kind Regards



Pennie Lieb

Attachment: R Duncan Pty Ltd GA Drawing 3036-GA-003

MAC-FLEET PTY LTD

Trading as Macs Engineering

4 February 2025

Wellanbah Industrial
39 Bagenmar Road
TINTINHULL NSW 2352

Attn: Mr Ben Healy

Hi Ben,

Re: TOYOTA HILUX DUAL CAB UTE
Registration No. BX-76-JX
Vin No. MROFZ22G601203010

I confirm that the Explosive Boxes fitted to the vehicle described above conform to the "Australian Code for the Transport of Explosives by Road and Rail – Third Edition" – see Engineer's Audit Report below: -

Kind Regards,

Ross Fredrickson
General Manager
Macs Engineering

Mac-Fleet Pty Ltd
1C Victoria Street
Mackay Qld 4740
ABN: 71 167 470 457
Ph: 07 4951 6555
Fax: 07 4951 6542
Web: www.macs.net.au

KEETECH -Mechanical Design for Mines & Manufacturers
Gary Keeton C.Eng, MIMechE, RPEQ
Registered Professional Engineer Queensland
Chartered Engineer, Member of the Institute of Mechanical Engineers (UK)
ABN 92 858 814 278 Ph.02- 49201074 Fax 02-49201074 mob: 0407965872
49 Ironbark Drive, Fern Bay NSW 2295

Design Audit of a CAT 2 Explosives Box For Macs Engineering (Mackay, Qld)

Compiled by: Gary Keeton RPEQ 4455
Report Ref 171110-1
Date: 17.11.2010
Refer attached drawing extract from 01-25-0001-A on page 3, showing the box. Also refer attached photographs on page 2 showing the box. Assessments of suitability and structural integrity are based on design drawings & manufacturing information & the relevant standards.

- The design has been assessed as compliant with the " **Australian Code for the Transport of Explosives by Road & Rail** " - AEC Third Edition section 6.2 (1) (a) through to (h); refer extract on page 4
- The load carried within the box is to be in accordance with Information Explosion Information Bulletin 78; refer page 6 for the extracted bulletin table.
- All MACS explosives carry boxes achieve the minimum CAT2 standards when built to the requirements of this certification.
- All MACS explosives carry boxes built since January 2011 has been done so in accordance with the minimum CAT2 standards when built to the requirements of this certification.

Attach a durable label plate, 3mm letters minimum, on the door of the box stating-

MAC-FLEET PTY LTD

Trading as Macs Engineering

SERIAL NO. :

EXPLOSIVE CARRY BOX IDENTIFICATION PLATE

CATEGORY 2 MIXED LOAD EXPLOSIVES CARRY BOX

UPPER CATEGORY 2 LIMIT 250KG

MAX INCLUDING DETONATORS - 5000 MAX QUANTITY

THIS BOX HAS BEEN BUILT IN ACCORDANCE WITH THE AUSTRALIAN CODE FOR THE TRANSPORT EXPLOSIVES BY ROAD AND RAIL - THIRD EDITION (AEC3). THE DESIGN HAS BEEN ASSESSED, APPROVED & CERTIFIED BY AN INDEPENDENT MECHANICAL ENGINEER.

WARNING - DO NOT REPAIR

1C VICTORIA STREET
MACKAY, QLD-4740
ABN : 71167470457

PH : 4951 6555
FAX : 4951 6542
www.macs.net.au

DATE : J / NO: VIN NO.:

Limitations of this audit as required by the Board of Professional Engineers-Qld.
This document confirms that the mechanical design of the box has been assessed for the conditions specified above. The quality of materials and manufacture are the responsibility of others.

G. Keeton.

Gary Keeton-Mechanical Engineer

17.11.2010 rev1. 25.5.2016 REV2. 20.6.2016 rev3. 18.11.2016 rev4

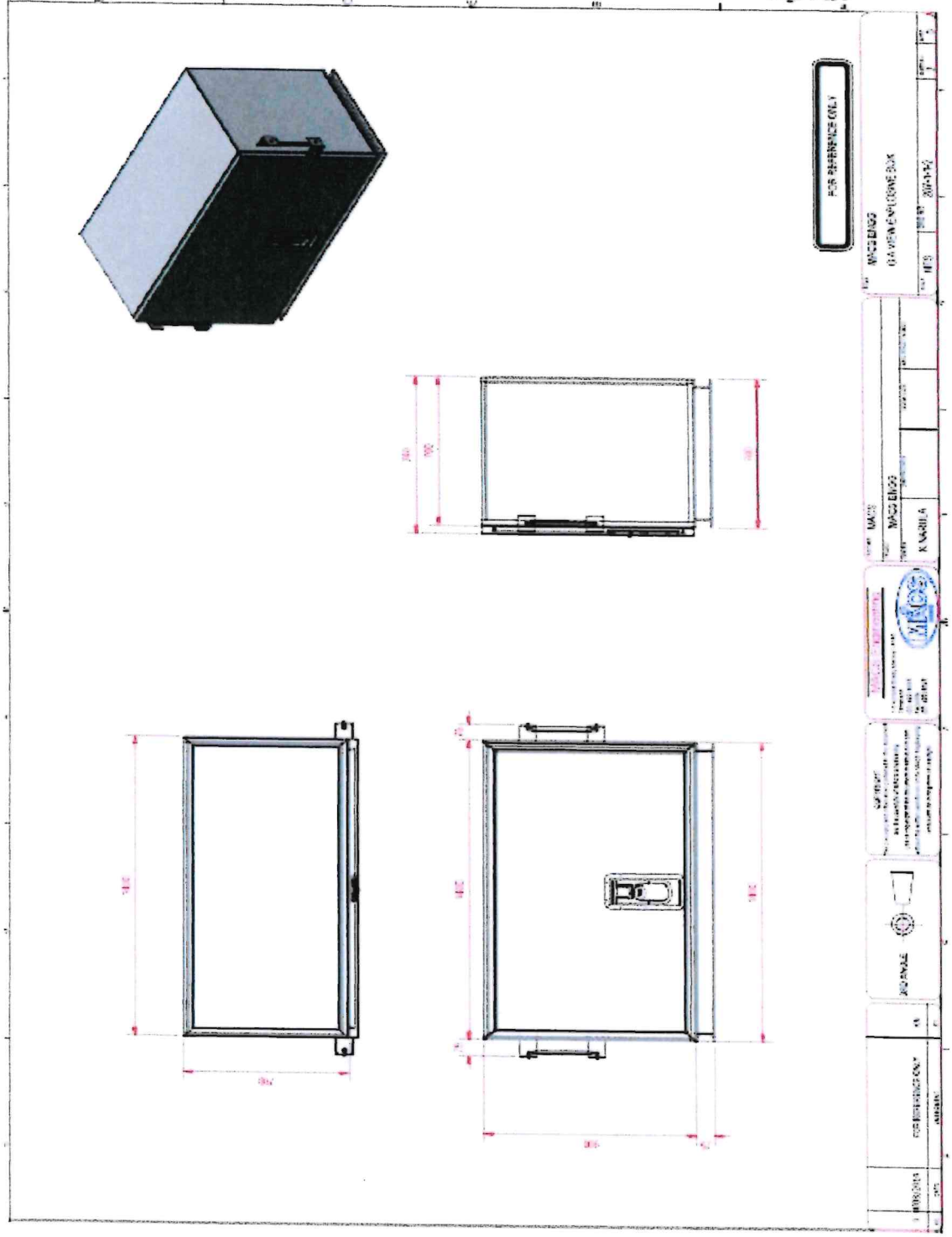


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Mac-Fleet Pty Ltd

1C Victoria Street
Mackay Qld 4740
ABN: 71 167 470 457

Ph: 07 4951 6555
Fax: 07 4951 6542
Web: www.macs.net.au



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CHAPTER 6: CARRY BOX, ENCLOSED VEHICLE BODY, FREIGHT CONTAINER AND VEHICLE DESIGN

6.1 Scope of Section

This Chapter sets out requirements for locks, carry boxes, enclosed vehicle bodies, freight containers, bulk vehicles, rail vehicles and special vehicles used in the transport of explosives.

6.1.1 Requirements for Locks

(1) Any receptacle, carry box, tank or closed transport unit used to transport explosives by road or rail must be lockable.

(2) If locks, such as padlocks or locksets, are used to provide locking security for high security risk loads of explosives being conveyed on a vehicle, the locks must be of a type equivalent to or better than SP3, K1 to K4, D1 or D2, C2 as described in AS 4145.2 and AS 4145.4.

(3) Where other types of locking mechanisms, such as security seals, are used to provide security for high security risk loads of explosives being conveyed on a vehicle, they must provide the level of security outlined in Section 6.1.1(2), above.

Note: Australian Standards, AS 4255.1 and AS 4255.2, provide guidance about seals that may provide such security.

6.2 Requirements for Carry Boxes and Enclosed Vehicle Bodies

(1) When an enclosed vehicle body or carry box is used in the transport of explosives (other than of Classification Code 1.4S, excluding detonators), in Category 1 and 2 quantities, the following requirements apply:

(a) a carry box and an enclosed vehicle body must be lockable;

(b) a carry box, when not contained within an enclosed vehicle body, must be securely attached to the vehicle;

(c) the inside surface of an enclosed vehicle body or carry box must be of wood or some other material incapable of producing incendive sparks;

(d) where the explosives are transported in sealed packages and in any enclosed portion of a road vehicle, a carry box is not required but the explosives must be stowed so that they are incapable of movement within the vehicle;

(e) the box or body must be strong enough to maintain its integrity during transport and built in such a manner that it adequately protects and secures the goods:

(f) the box or body must be weatherproof:

(g) the box or body must be closed and have a continuous floor to contain spillage: and

(h) a portable magazine complying with the requirements of AS 2187.1 may be used as a carry box if the magazine also complies with the carry box requirements.

Explosives Information Bulletin 78

Mixed loads of detonators and high explosives in shotfirer vehicles

Mixed loads of detonators and high explosives can be transported on the same vehicle in separate carry boxes under the segregation requirements in section 7.3.2 of the Australian Explosives Code third edition (AEC3). This bulletin addresses the application of section 7.3.2 to mixed loads of detonators and high explosives up to the Category 2 limit only on vehicles with carry boxes on public roads. The AEC3 introduced changes where the amount of class 1.1B detonators that could be transported in these specially constructed vehicles was reduced from 5000 units to 125 units unless the vehicle is fitted with an effective means of segregation demonstrated to prevent sympathetic detonation of incompatible explosives (approved blast barrier).

The AEC3 also provides for means specifically approved by the Chief Inspector (competent authority under section 7.3.2(5)(b) of the AEC3) and a means specifically approved by the Chief Inspector is addressed in this bulletin. The requirements take recognition of the differences between plain detonators and elemented caps of class 1.1B and electric, non-electric or electronic detonators of class 1.1B and that many shotfirer vehicles are using carry boxes to a Category 3 standard for Category 2 quantities.The table below summaries the minimum standards accepted against section 7.3.2 for Category 2 loads in carry boxes on shotfirer vehicles. These quantities apply to public places only, i.e. public roads. Following the table, notes are provided to support different options in the table.

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1C Victoria Street
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MAC-FLEET PTY LTD

Trading as Macs Engineering

Table 1 Segregation alternatives for mixed loads in shotfirer vehicles

	Detonator Type	Maximum Quantity (mass) of Explosives	Carry Box Standard	Segregation barrier provided	Separation between carry boxes ≥ 2m	AEC3 requirement or Chief Inspector approved means
1	Plain detonators, elemented caps Class 1.1B Quantity 125 max	Upper category 2 limit 250 kg max including detonators	Category 2 or Category 3	No	No	AEC3 requirement
2	Electric, non-electric electronic detonators Class 1.1B Quantity 125	Upper category 2 limit 250 kg max including detonators	Category 2	No	No	AEC3 requirement
3	Plain detonators, Elemented caps Class 1.1B Quantity 5000 max	Upper Category 2 limit 250 kg max including detonators	Category 2 or Category 3	No	Yes	AEC3 requirement
				Yes	No	AEC3 requirement
4	Electric, non electric detonators Class 1.1B Quantity 5000 max	Upper category 2 limit 250 kg max including detonators	Category 2	No	Yes	AEC3 requirement
				Yes	No	AEC3 requirement
5	Electric, non electric detonators Class 1.1B Quantity 5000 max	Upper category 2 limit 250 kg max including detonators	Category 3	No	No	Chief Inspector approved means
6	Detonators of Class 1.4B or Class 1.4S Any Quantity	Upper category 2 limit 250 kg max including detonators	Category 2 or Category 3	No	No	AEC3 requirement

17.11.2010 rev1. 25.5.2016 REV2. 20.6.2016 rev3. 18.11.2016 rev4

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Web: www.macs.net.au

MAC-FLEET PTY LTD

Trading as Macs Engineering

4 February 2025

Wellanbah Industrial
39 Bagenmar Road
TINTINHULL NSW 2352

Attn: Mr Ben Healy

Hi Ben,

Re: TOYOTA HILUX DUAL CAB UTE
Registration No. NSW: FMI71H
Vin No. MR0KA3CD701262146

I confirm that the Explosive Boxes fitted to the vehicle described above conform to the "Australian Code for the Transport of Explosives by Road and Rail – Third Edition" – see Engineer's Audit Report below: -

Kind Regards,

Ross Fredrickson

General Manager

Macs Engineering

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1C Victoria Street Ph: 07 4951 6555
Mackay Qld 4740 Fax: 07 4951 6542
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Chartered Engineer, Member of the Institute of Mechanical Engineers (UK)
ABN 92 858 814 278 Ph.02- 49201074 Fax 02-49201074 mob: 0407965872
49 Ironbark Drive, Fern Bay NSW 2295

Design Audit of a CAT 2 Explosives Box For Macs Engineering (Mackay, Qld)

Compiled by: Gary Keeton RPEQ 4455
Report Ref 171110-1
Date: 17.11.2010
Refer attached drawing extract from 01-25-0001-A on page 3, showing the box. Also refer attached photographs on page 2 showing the box. Assessments of suitability and structural integrity are based on design drawings & manufacturing information & the relevant standards.

- The design has been assessed as compliant with the " **Australian Code for the Transport of Explosives by Road & Rail** " - AEC Third Edition section 6.2 (1) (a) through to (h); refer extract on page 4
- The load carried within the box is to be in accordance with Information Explosion Information Bulletin 78; refer page 6 for the extracted bulletin table.
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- All MACS explosives carry boxes built since January 2011 has been done so in accordance with the minimum CAT2 standards when built to the requirements of this certification.

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MAC-FLEET PTY LTD

Trading as Macs Engineering

SERIAL NO. :

EXPLOSIVE CARRY BOX IDENTIFICATION PLATE

CATEGORY 2 MIXED LOAD EXPLOSIVES CARRY BOX

UPPER CATEGORY 2 LIMIT 250KG

MAX INCLUDING DETONATORS - 5000 MAX QUANTITY

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Limitations of this audit as required by the Board of Professional Engineers-Qld.
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G. Keeton.

Gary Keeton-Mechanical Engineer

17.11.2010 rev1. 25.5.2016 REV2. 20.6.2016 rev3. 18.11.2016 rev4

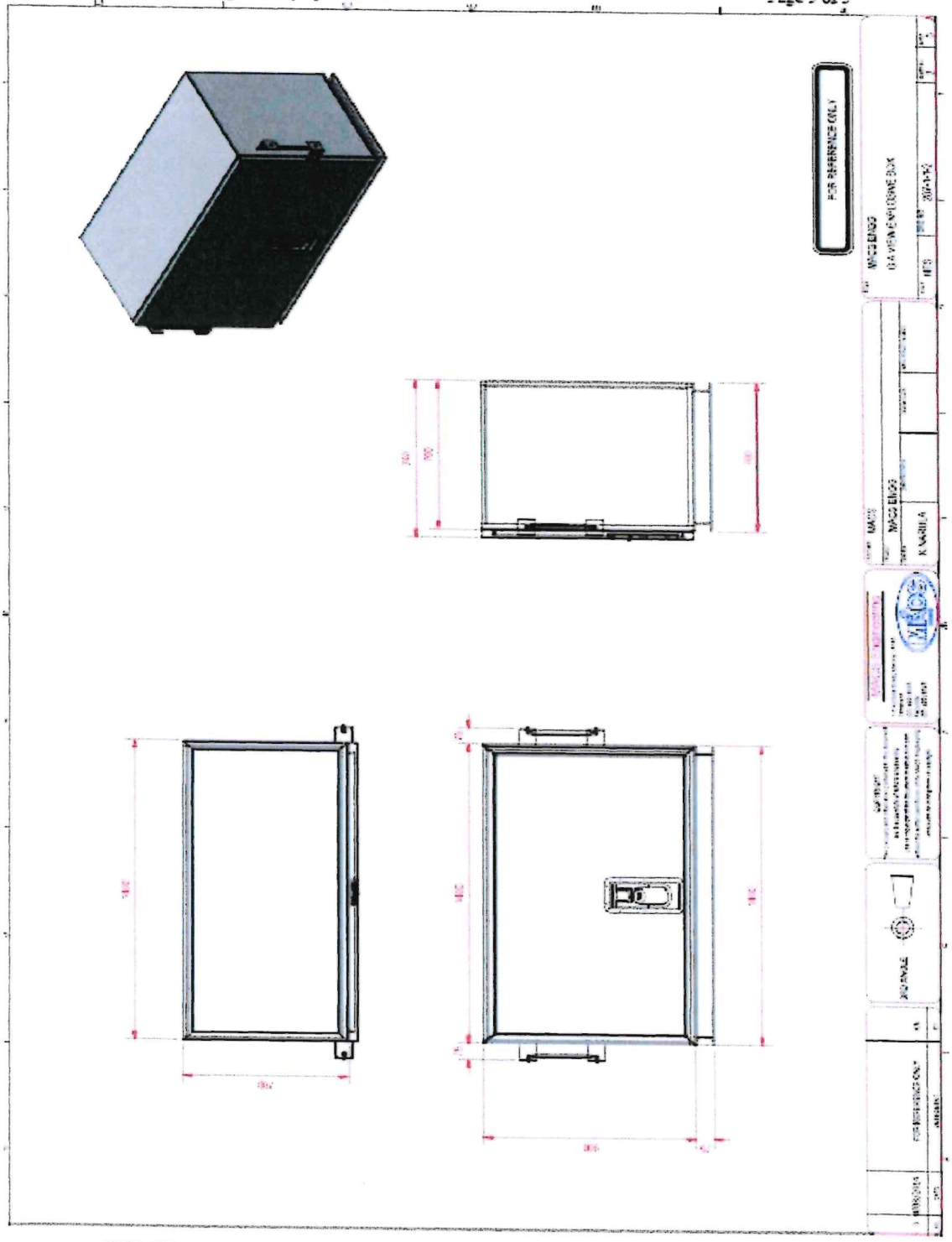


17.11.2010 rev1. 25.5.2016 REV2. 20.6.2016 rev3. 18.11.2016 rev4

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17.11.2010 rev1. 25.5.2016 REV2. 20.6.2016 rev3. 18.11.2016 rev4

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(1) Any receptacle, carry box, tank or closed transport unit used to transport explosives by road or rail must be lockable.

(2) If locks, such as padlocks or locksets, are used to provide locking security for high security risk loads of explosives being conveyed on a vehicle, the locks must be of a type equivalent to or better than SP3, K1 to K4, D1 or D2, C2 as described in AS 4145.2 and AS 4145.4.

(3) Where other types of locking mechanisms, such as security seals, are used to provide security for high security risk loads of explosives being conveyed on a vehicle, they must provide the level of security outlined in Section 6.1.1(2), above.

Note: Australian Standards, AS 4255.1 and AS 4255.2, provide guidance about seals that may provide such security.

6.2 Requirements for Carry Boxes and Enclosed Vehicle Bodies

(1) When an enclosed vehicle body or carry box is used in the transport of explosives (other than of Classification Code 1.4S, excluding detonators), in Category 1 and 2 quantities, the following requirements apply:

(a) a carry box and an enclosed vehicle body must be lockable;

(b) a carry box, when not contained within an enclosed vehicle body, must be securely attached to the vehicle;

(c) the inside surface of an enclosed vehicle body or carry box must be of wood or some other material incapable of producing incendive sparks;

(d) where the explosives are transported in sealed packages and in any enclosed portion of a road vehicle, a carry box is not required but the explosives must be stowed so that they are incapable of movement within the vehicle;

(e) the box or body must be strong enough to maintain its integrity during transport and built in such a manner that it adequately protects and secures the goods:

(f) the box or body must be weatherproof:

(g) the box or body must be closed and have a continuous floor to contain spillage; and

(h) a portable magazine complying with the requirements of AS 2187.1 may be used as a carry box if the magazine also complies with the carry box requirements.

17.11.2010 rev1. 25.5.2016 REV2. 20.6.2016 rev3. 18.11.2016 rev4

Explosives Information Bulletin 78

Mixed loads of detonators and high explosives in shotfirer vehicles

Mixed loads of detonators and high explosives can be transported on the same vehicle in separate carry boxes under the segregation requirements in section 7.3.2 of the Australian Explosives Code third edition (AEC3). This bulletin addresses the application of section 7.3.2 to mixed loads of detonators and high explosives up to the Category 2 limit only on vehicles with carry boxes on public roads. The AEC3 introduced changes where the amount of class 1.1B detonators that could be transported in these specially constructed vehicles was reduced from 5000 units to 125 units unless the vehicle is fitted with an effective means of segregation demonstrated to prevent sympathetic detonation of incompatible explosives (approved blast barrier).

The AEC3 also provides for means specifically approved by the Chief Inspector (competent authority under section 7.3.2(5)(b) of the AEC3) and a means specifically approved by the Chief Inspector is addressed in this bulletin. The requirements take recognition of the differences between plain detonators and elemented caps of class 1.1B and electric, non-electric or electronic detonators of class 1.1B and that many shotfirer vehicles are using carry boxes to a Category 3 standard for Category 2 quantities.The table below summaries the minimum standards accepted against section 7.3.2 for Category 2 loads in carry boxes on shotfirer vehicles. These quantities apply to public places only, i.e. public roads. Following the table, notes are provided to support different options in the table.

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1C Victoria Street
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MAC-FLEET PTY LTD

Trading as Macs Engineering

Table 1 Segregation alternatives for mixed loads in shotfirer vehicles

	Detonator Type	Maximum Quantity (mass) of Explosives	Carry Box Standard	Segregation barrier provided	Separation between carry boxes ≥ 2m	AEC3 requirement or Chief Inspector approved means
1	Plain detonators, elemented caps Class 1.1B Quantity 125 max	Upper category 2 limit 250 kg max including detonators	Category 2 or Category 3	No	No	AEC3 requirement
2	Electric, non-electric electronic detonators Class 1.1B Quantity 125	Upper category 2 limit 250 kg max including detonators	Category 2	No	No	AEC3 requirement
3	Plain detonators, Elemented caps Class 1.1B Quantity 5000 max	Upper Category 2 limit 250 kg max including detonators	Category 2 or Category 3	No	Yes	AEC3 requirement
				Yes	No	AEC3 requirement
4	Electric, non electric detonators Class 1.1B Quantity 5000 max	Upper category 2 limit 250 kg max including detonators	Category 2	No	Yes	AEC3 requirement
				Yes	No	AEC3 requirement
5	Electric, non electric detonators Class 1.1B Quantity 5000 max	Upper category 2 limit 250 kg max including detonators	Category 3	No	No	Chief Inspector approved means
6	Detonators of Class 1.4B or Class 1.4S Any Quantity	Upper category 2 limit 250 kg max including detonators	Category 2 or Category 3	No	No	AEC3 requirement

17.11.2010 rev1. 25.5.2016 REV2. 20.6.2016 rev3. 18.11.2016 rev4

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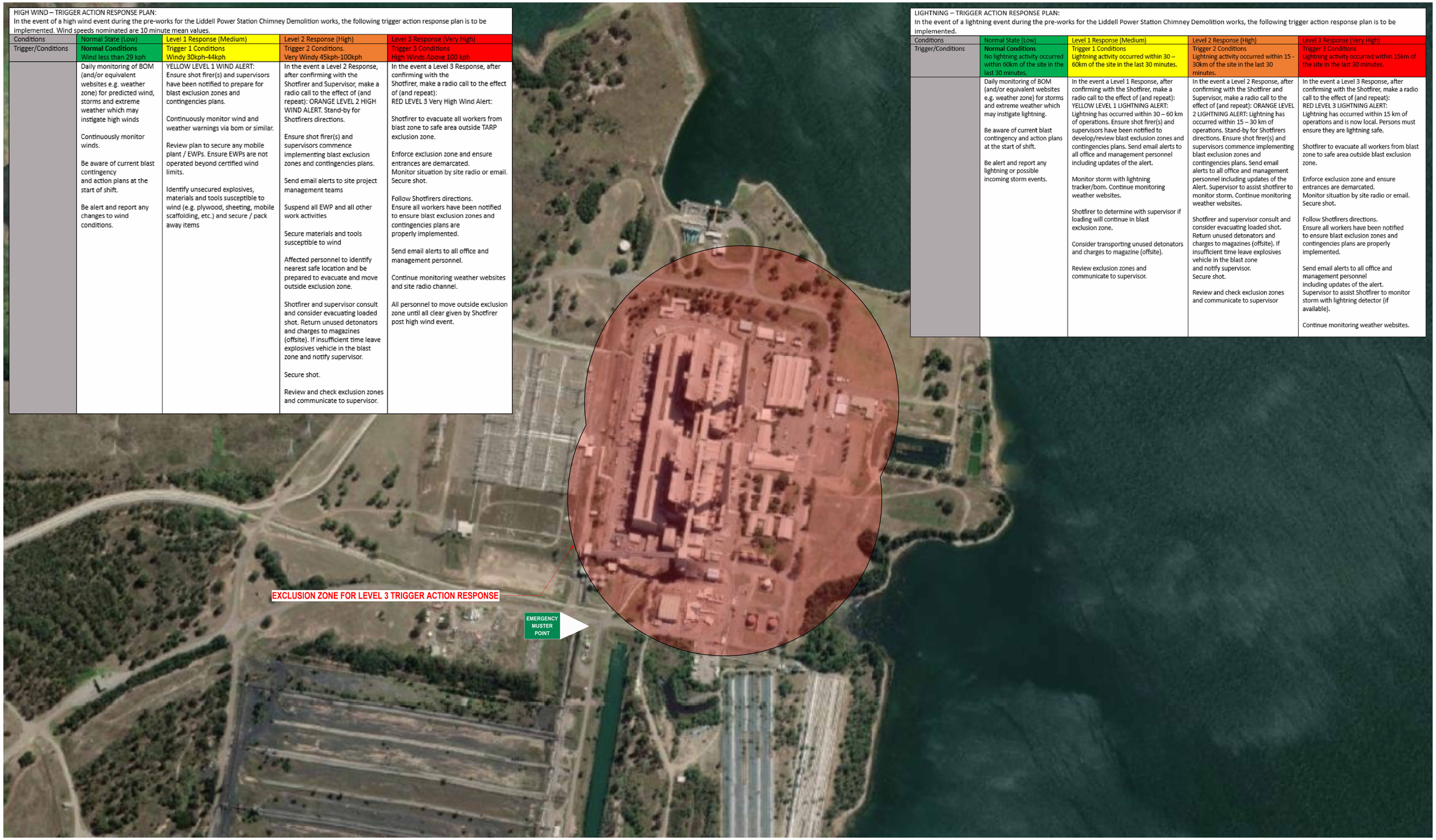
APPENDIX L – TRIGGER ACTION RESPONSE PLAN – LIGHTNING AND HIGH WIND

HIGH WIND – TRIGGER ACTION RESPONSE PLAN:
In the event of a high wind event during the pre-works for the Liddell Power Station Chimney Demolition works, the following trigger action response plan is to be implemented. Wind speeds nominated are 10 minute mean values.

Conditions	Normal State (Low)	Level 1 Response (Medium)	Level 2 Response (High)	Level 3 Response (Very High)
Trigger/Conditions	**Normal Conditions** Wind less than 29 kph	Trigger 1 Conditions Windy 30kph-44kph	Trigger 2 Conditions. Very Windy 45kph-100kph	Trigger 3 Conditions High Winds Above 100 kph
	Daily monitoring of BOM (and/or equivalent websites e.g. weather zone) for predicted wind, storms and extreme weather which may instigate high winds Continuously monitor winds. Be aware of current blast contingency and action plans at the start of shift. Be alert and report any changes to wind conditions.	YELLOW LEVEL 1 WIND ALERT: Ensure shot firer(s) and supervisors have been notified to prepare for blast exclusion zones and contingencies plans. Continuously monitor wind and weather warnings via bom or similar. Review plan to secure any mobile plant / EWPs. Ensure EWPs are not operated beyond certified wind limits. Identify unsecured explosives, materials and tools susceptible to wind (e.g. plywood, sheeting, mobile scaffolding, etc.) and secure / pack away items	In the event a Level 2 Response, after confirming with the Shotfirer and Supervisor, make a radio call to the effect of (and repeat): ORANGE LEVEL 2 HIGH WIND ALERT. Stand-by for Shotfirers directions. Ensure shot firer(s) and supervisors commence implementing blast exclusion zones and contingencies plans. Send email alerts to site project management teams Suspend all EWP and all other work activities Secure materials and tools susceptible to wind Affected personnel to identify nearest safe location and be prepared to evacuate and move outside exclusion zone. Shotfirer and supervisor consult and consider evacuating loaded shot. Return unused detonators and charges to magazines (offsite). If insufficient time leave explosives vehicle in the blast zone and notify supervisor. Secure shot. Review and check exclusion zones and communicate to supervisor.	In the event a Level 3 Response, after confirming with the Shotfirer, make a radio call to the effect of (and repeat): RED LEVEL 3 Very High Wind Alert: Shotfirer to evacuate all workers from blast zone to safe area outside TARP exclusion zone. Enforce exclusion zone and ensure entrances are demarcated. Monitor situation by site radio or email. Secure shot. Follow Shotfirers directions. Ensure all workers have been notified to ensure blast exclusion zones and contingencies plans are properly implemented. Send email alerts to all office and management personnel. Continue monitoring weather websites and site radio channel. All personnel to move outside exclusion zone until all clear given by Shotfirer post high wind event.

LIGHTNING – TRIGGER ACTION RESPONSE PLAN:
In the event of a lightning event during the pre-works for the Liddell Power Station Chimney Demolition works, the following trigger action response plan is to be implemented.

Conditions	Normal State (Low)	Level 1 Response (Medium)	Level 2 Response (High)	Level 3 Response (Very High)
Trigger/Conditions	**Normal Conditions** No lightning activity occurred within 60km of the site in the last 30 minutes.	Trigger 1 Conditions Lightning activity occurred within 30 – 60km of the site in the last 30 minutes.	Trigger 2 Conditions Lightning activity occurred within 15 - 30km of the site in the last 30 minutes.	Trigger 3 Conditions Lightning activity occurred within 15km of the site in the last 30 minutes.
	Daily monitoring of BOM (and/or equivalent websites e.g. weather zone) for storms and extreme weather which may instigate lightning. Be aware of current blast contingency and action plans at the start of shift. Be alert and report any lightning or possible incoming storm events.	In the event a Level 1 Response, after confirming with the Shotfirer, make a radio call to the effect of (and repeat): YELLOW LEVEL 1 LIGHTNING ALERT: Lightning has occurred within 30 – 60 km of operations. Ensure shot firer(s) and supervisors have been notified to develop/review blast exclusion zones and contingencies plans. Send email alerts to all office and management personnel including updates of the alert. Monitor storm with lightning tracker/bom. Continue monitoring weather websites. Shotfirer to determine with supervisor if loading will continue in blast exclusion zone. Consider transporting unused detonators and charges to magazine (offsite). Review exclusion zones and communicate to supervisor.	In the event a Level 2 Response, after confirming with the Shotfirer and Supervisor, make a radio call to the effect of (and repeat): ORANGE LEVEL 2 LIGHTNING ALERT: Lightning has occurred within 15 – 30 km of operations. Stand-by for Shotfirers directions. Ensure shot firer(s) and supervisors commence implementing blast exclusion zones and contingencies plans. Send email alerts to all office and management personnel including updates of the Alert. Supervisor to assist shotfirer to monitor storm. Continue monitoring weather websites. Shotfirer and supervisor consult and consider evacuating loaded shot. Return unused detonators and charges to magazines (offsite). If insufficient time leave explosives vehicle in the blast zone and notify supervisor. Secure shot. Review and check exclusion zones and communicate to supervisor	In the event a Level 3 Response, after confirming with the Shotfirer, make a radio call to the effect of (and repeat): RED LEVEL 3 LIGHTNING ALERT: Lightning has occurred within 15 km of operations and is now local. Persons must ensure they are lightning safe. Shotfirer to evacuate all workers from blast zone to safe area outside blast exclusion zone. Enforce exclusion zone and ensure entrances are demarcated. Monitor situation by site radio or email. Secure shot. Follow Shotfirers directions. Ensure all workers have been notified to ensure blast exclusion zones and contingencies plans are properly implemented. Send email alerts to all office and management personnel including updates of the alert. Supervisor to assist Shotfirer to monitor storm with lightning detector (if available). Continue monitoring weather websites.



No	Revision	Drawn	Designed	Reviewed	Date
A	PRELIMINARY ISSUE	DH	DH	BH	05.06.25

Note: * indicates signatures on original issue of drawing or last revision of drawing

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Drafting Check B. HEALY
Approved D. HEALY
Date 05.06.25
Scale
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Client CMA CONTRACTING PTY LTD
Project LIDDELL POWER STATION DEMOLITION
Title CHIMNEY WORKS LIGHTNING & WIND TARP

Original Size A1
Drawing No: WI-24057-06-E010
Rev: A

Plot Date: 19/07/2025 8:56:01 PM

APPENDIX M – MAGAZINE RULES

MAGAZINE RULES

MAGAZINE NUMBERS: WI01 & WI02

STORAGE LICENSE NUMBER: XSTR200123

1. The magazine shall be used only for the storage of explosives and not as a working place for any other purpose.
2. High explosives must not be kept in the same magazine as detonators.
3. The magazine shall be kept securely closed and locked when not in use.
4. Maintenance work must not be carried out on this magazine except with the approval of: DANIEL HEALY Tel: 0432 164 748
5. The magazine must be kept clean and free from rubbish such as bags, cartons, rags and other waste.
6. The floor of the magazine must be kept clean. A broom and mat shall be provided.
7. Cases must not be stacked more than 2 meters high and must be clear of wall ventilators.
8. Old stock must be used first. Stock that is not useable due to damage or age must not be allowed to remain in the magazine.
9. Loose explosive cartridges or detonators must not be left exposed in the magazine. Any loose plugs or detonators must be repacked in the carton or placed in a special receptacle and disposed of as soon as possible.
10. Steel tools shall not be used to open packages in magazines.
11. Dry undergrowth or combustible materials must not be allowed on the ground within 8 meters of the magazine.
12. The magazine shall be closed and locked during a thunderstorm.
13. The earthing connections shall be checked for electrical continuity at least every twelve months.
14. No smoking is allowed. No matches or cigarette lighters are to be brought into this magazine.
15. All explosives must be kept in original container or a special receptacle.
16. No person affected by liquor, drugs or under the age of 16 years shall be allowed in the magazine.

APPENDIX N – CUTTING - DRILLING - CHARGE LOADING QUALITY CONTROL SCHEDULE - WI-QC-057-001

Liddell Power Station - Chimney Demolition: Cutting, Drilling and Charge Loading QC Schedule

Project	Liddell Power Station Closure Project	**Document Number**	WI-QC-057-001	**Revision Status**	Rev 1	**Reference Documents**	Inspection Test Plan - W057-ITP-001 Blast Management Sub-Plan - WI-BMP-057-001
Project Number	W25-057	**Client**	CMA Contracting	**Date**	31/03/2026		
Document Title	Drilling and Charge Schedule	**Asset Details**	Chimney Structure				

Notes:
This is a live document to be utilised for the management of the execution phase of works.
The purpose of this document is to confirm compliance with the blast design and to track the progress of works as they are completed.
This schedule is to be completed based on the details provided within the Blast Management Sub-Plan (inclusive of blast design drawings) as well as the overarching Inspection Test Plan for the works.
All hold points associated with these works are provided within the Inspection Test Plan, and must be reviewed and signed off at each phase of works.

PRE-DRILLING WORKS

CHIMNEY ID	WORK ITEM DESCRIPTION	SHOTFIRER SIGNOFF	WORK ITEM DESCRIPTION	SHOTFIRER SIGNOFF	CHARGE LOADING DETAILS - LIDDELL POWER STATION CHIMNEYS
U1/U2	MARK OUT OF HEEL CUTS, HINGES, AND BREAKOUT PANELS COMPLETED AND MATCHES DESIGN DRAWINGS		BREAKOUT PANEL CUTS COMPLETED AND PANELS REMOVED WIRE SAW CUTS TO HEELS COMPLETED		CHARGES TO BE FITTED IN ACCORDANCE WITH LIDDELL CHIMNEY STACK BLAST DESIGN DRAWINGS
U3/U4	MARK OUT OF HEEL CUTS, HINGES, AND BREAKOUT PANELS COMPLETED AND MATCHES DESIGN DRAWINGS		BREAKOUT PANEL CUTS COMPLETED AND PANELS REMOVED WIRE SAW CUTS TO HEELS COMPLETED		

DRILLING & LOADING WORKS

CHIMNEY ID	CHARGE ROW ID	NUMBER OF HOLES	MARK OUT OF DRILL PATTERN COMPLETED AND MATCHES DESIGN DRAWINGS	CHARGE HOLES DRILLED IN CORRECT LOCATION TO CORRECT DEPTH	CHARGE HOLES CLEARED OF DEBRIS	COMPLIANT HOLES MARKED IN GREEN PAINT NON-COMPLIANT HOLES MARKED IN ORANGE PAINT	HEEL CUTS COMPLETED, WITH CUT LINE SHIMMED IN ACCORDNCE WITH DESIGN DRAWINGS	CARTRIDGES WITH DET / DET CORD TAILS INSERTED INTO CHARGE HOLES	STEMMING APPLIED TO CHARGE HOLES	ALL TAILS TIED INTO INITIATION LINE	PROTECTION INSTALLED OVER CHARGES	DETONATORS ATTACHED TO INITIATION LINES	DETONATORS PROGRAMMED WITH DELAYS
U1/U2	ROW 1	45											
	ROW 2	47											
	ROW 3	49											
	ROW 4	51											
	ROW 5	41											
	ROW 6	41											
	ROW 7	41											
	ROW 8	41											
	ROW 9	41											
	ROW 10	41											
	ROW 11	41											
	ROW 12	41											
	UPPER PATTERN	200											
	C1	20											
	C2	20											
	C3	20											
	C4	20											
U3/U4	ROW 1	45											
	ROW 2	47											
	ROW 3	49											
	ROW 4	51											
	ROW 5	41											
	ROW 6	41											
	ROW 7	41											
	ROW 8	41											
	ROW 9	41											
	ROW 10	41											
	ROW 11	41											
	ROW 12	41											
	UPPER PATTERN	200											
	C1	20											
	C2	20											
	C3	20											
	C4	20											

FINAL SIGN OFF - CHIMNEYS

SHOTFIRER DETAILS:		**COMMENTS:**
SHOTFIRER SIGNATURE:		
DATE:		

CHARGED VESSEL WORKS								
CHIMNEY ID	**VESSEL ID**	**GROUND WORKS COMPLETED**	**INFLATABLE VESSEL IN POSITION**	**SAND PLACED OVER CHARGES**	**CHARGES INSTALLED BENEATH UNFILLED VESSEL**	**VESSEL HALF FILLED**	**DETONATORS ATTACHED TO INITIATION LINES**	**DETONATORS PROGRAMMED WITH DELAYS**
U1/U2 CHARGED VESSELS	V1							
	V2							
	V3							
	V4							
	V5							
	V6							
	V7							
	V8							
	V9							
	V10							
	V11							
	V12							
	V13							
	V14							
	V15							
	V16							
	V17							
	V18							
	V19							
U3/U4 CHARGED VESSELS	V20							
	V21							
	V22							
	V23							
	V24							
	V25							
	V26							
	V27							
	V28							
	V29							
	V30							
	V31							
	V32							
	V33							
	V34							
	V35							
	V36							
	V37							
	V38							

FINAL SIGN OFF - CHARGED VESSELS		
SHOTFIRER DETAILS:		**COMMENTS:**
SHOTFIRER SIGNATURE:		
DATE:		

APPENDIX O – INNER EXCLUSION ZONE DRAWING



No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
A	PRELIMINARY ISSUE	DH	DH	BH	18.07.25

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Drafting Check	B. HEALY		
Approved	D. HEALY		
Date	18.07.25		
Scale		This Drawing must not be used for Construction unless signed as Approved	

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **INNER CHIMNEY BLAST EXCLUSION ZONE**

Original Size **A1**
Drawing No: **WI-24057-06-E011**
Rev: A

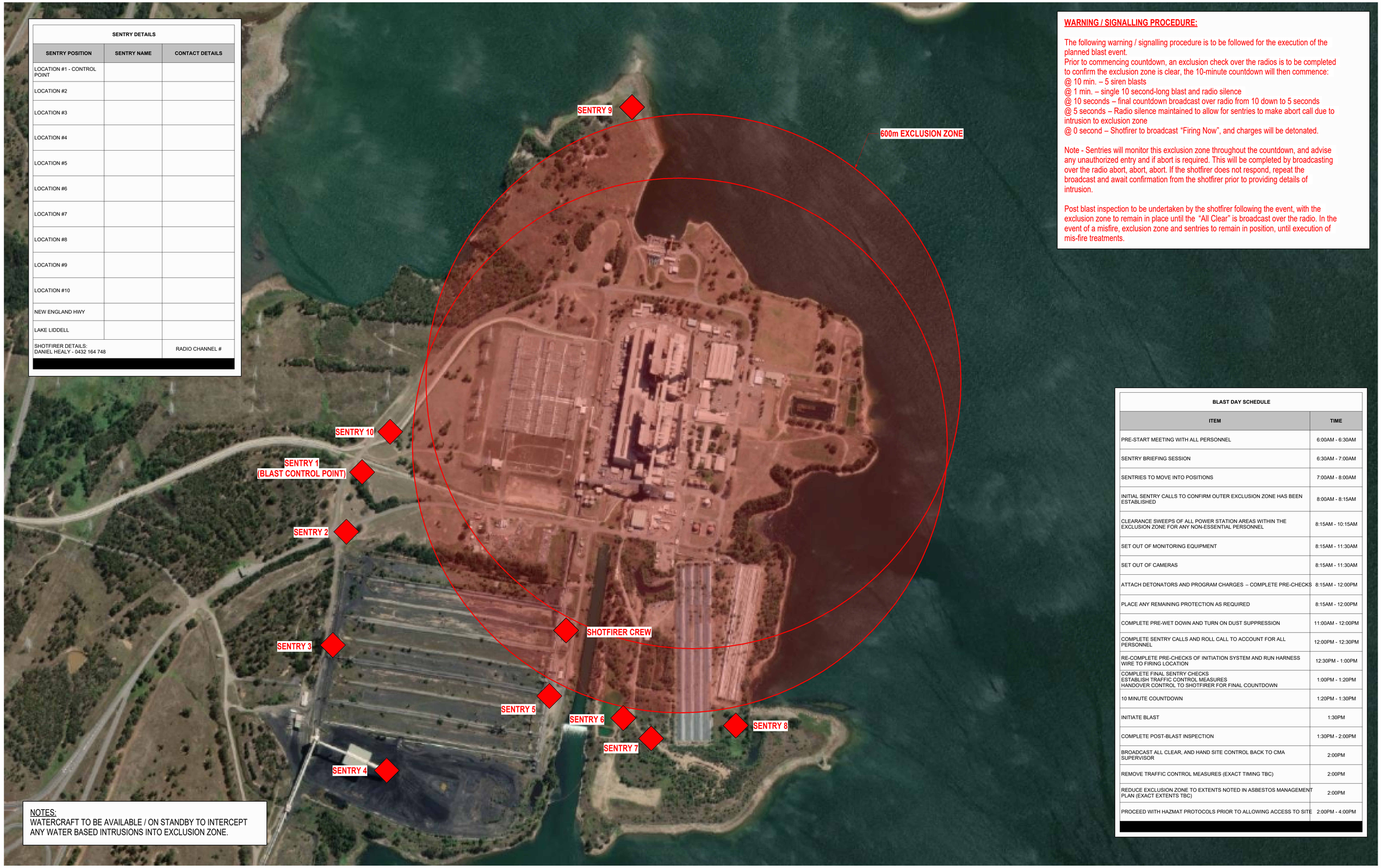
Plot Date: 18/07/2025 9:52:55 AM

APPENDIX P – CHIMNEY BLASTING WORKS PROGRAM - SIMPLIFIED

LIDDELL POWER STATION - SIMPLIFIED CHIMNEY DEMOLITION SCHEDULE			
Task Name	Duration	Start	Finish
Drill and Core for Charges for main Blast - Unit 1/2 & 3/4 (1520 holes)	30 days	Mon 23/02/26	Sat 28/03/26
Install Hinge cuts	4 days	Mon 30/03/26	Thu 2/04/26
Complete Heel Cut	3 days	Fri 8/05/26	Mon 11/05/26
Place Charges and Fly Protection	12 days	Tue 12/05/26	Mon 25/05/26
Blast Chimneys	1 day	Tue 26/05/26	Tue 26/05/26
Hazmat Removal Post Blast	10 days	Wed 27/05/26	Tue 9/06/26
Chimney Processing	10 days	Wed 10/06/26	Sat 20/06/26
Demolition - Plinths and Above Ground Concrete Structures	17 days	Mon 22/06/26	Fri 10/07/26

APPENDIX Q – SENTRY / EXCLUSION ZONE AERIAL MAP

SENTRY DETAILS		
SENTRY POSITION	**SENTRY NAME**	**CONTACT DETAILS**
LOCATION #1 - CONTROL POINT		
LOCATION #2		
LOCATION #3		
LOCATION #4		
LOCATION #5		
LOCATION #6		
LOCATION #7		
LOCATION #8		
LOCATION #9		
LOCATION #10		
NEW ENGLAND HWY		
LAKE LIDDELL		
SHOTFIRER DETAILS: DANIEL HEALY - 0432 164 748		RADIO CHANNEL #
[redacted]		



NOTES:
WATERCRAFT TO BE AVAILABLE / ON STANDBY TO INTERCEPT ANY WATER BASED INTRUSIONS INTO EXCLUSION ZONE.

WARNING / SIGNALLING PROCEDURE:

The following warning / signalling procedure is to be followed for the execution of the planned blast event.
Prior to commencing countdown, an exclusion check over the radios is to be completed to confirm the exclusion zone is clear, the 10-minute countdown will then commence:
@ 10 min. – 5 siren blasts
@ 1 min. – single 10 second-long blast and radio silence
@ 10 seconds – final countdown broadcast over radio from 10 down to 5 seconds
@ 5 seconds – Radio silence maintained to allow for sentries to make abort call due to intrusion to exclusion zone
@ 0 second – Shotfirer to broadcast "Firing Now", and charges will be detonated.

Note - Sentries will monitor this exclusion zone throughout the countdown, and advise any unauthorized entry and if abort is required. This will be completed by broadcasting over the radio abort, abort, abort. If the shotfirer does not respond, repeat the broadcast and await confirmation from the shotfirer prior to providing details of intrusion.

Post blast inspection to be undertaken by the shotfirer following the event, with the exclusion zone to remain in place until the "All Clear" is broadcast over the radio. In the event of a misfire, exclusion zone and sentries to remain in position, until execution of mis-fire treatments.

BLAST DAY SCHEDULE	
ITEM	**TIME**
PRE-START MEETING WITH ALL PERSONNEL	6:00AM - 6:30AM
SENTRY BRIEFING SESSION	6:30AM - 7:00AM
SENTRIES TO MOVE INTO POSITIONS	7:00AM - 8:00AM
INITIAL SENTRY CALLS TO CONFIRM OUTER EXCLUSION ZONE HAS BEEN ESTABLISHED	8:00AM - 8:15AM
CLEARANCE SWEEPS OF ALL POWER STATION AREAS WITHIN THE EXCLUSION ZONE FOR ANY NON-ESSENTIAL PERSONNEL	8:15AM - 10:15AM
SET OUT OF MONITORING EQUIPMENT	8:15AM - 11:30AM
SET OUT OF CAMERAS	8:15AM - 11:30AM
ATTACH DETONATORS AND PROGRAM CHARGES – COMPLETE PRE-CHECKS	8:15AM - 12:00PM
PLACE ANY REMAINING PROTECTION AS REQUIRED	8:15AM - 12:00PM
COMPLETE PRE-WET DOWN AND TURN ON DUST SUPPRESSION	11:00AM - 12:00PM
COMPLETE SENTRY CALLS AND ROLL CALL TO ACCOUNT FOR ALL PERSONNEL	12:00PM - 12:30PM
RE-COMPLETE PRE-CHECKS OF INITIATION SYSTEM AND RUN HARNESS WIRE TO FIRING LOCATION	12:30PM - 1:00PM
COMPLETE FINAL SENTRY CHECKS ESTABLISH TRAFFIC CONTROL MEASURES HANDOVER CONTROL TO SHOTFIRER FOR FINAL COUNTDOWN	1:00PM - 1:20PM
10 MINUTE COUNTDOWN	1:20PM - 1:30PM
INITIATE BLAST	1:30PM
COMPLETE POST-BLAST INSPECTION	1:30PM - 2:00PM
BROADCAST ALL CLEAR, AND HAND SITE CONTROL BACK TO CMA SUPERVISOR	2:00PM
REMOVE TRAFFIC CONTROL MEASURES (EXACT TIMING TBC)	2:00PM
REDUCE EXCLUSION ZONE TO EXTENTS NOTED IN ASBESTOS MANAGEMENT PLAN (EXACT EXTENTS TBC)	2:00PM
PROCEED WITH HAZMAT PROTOCOLS PRIOR TO ALLOWING ACCESS TO SITE	2:00PM - 4:00PM
[redacted]	

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	REVISED SENTRY MAP	DH	DH	BH	22.04.26
C	UPDATED WATERCRAFT REFERENCE	DH	DH	BH	31.10.25
B	UPDATED SENTRY & BLAST DAY DETAILS	DH	DH	BH	16.07.25
A	PRELIMINARY ISSUE	DH	DH	BH	5.06.25

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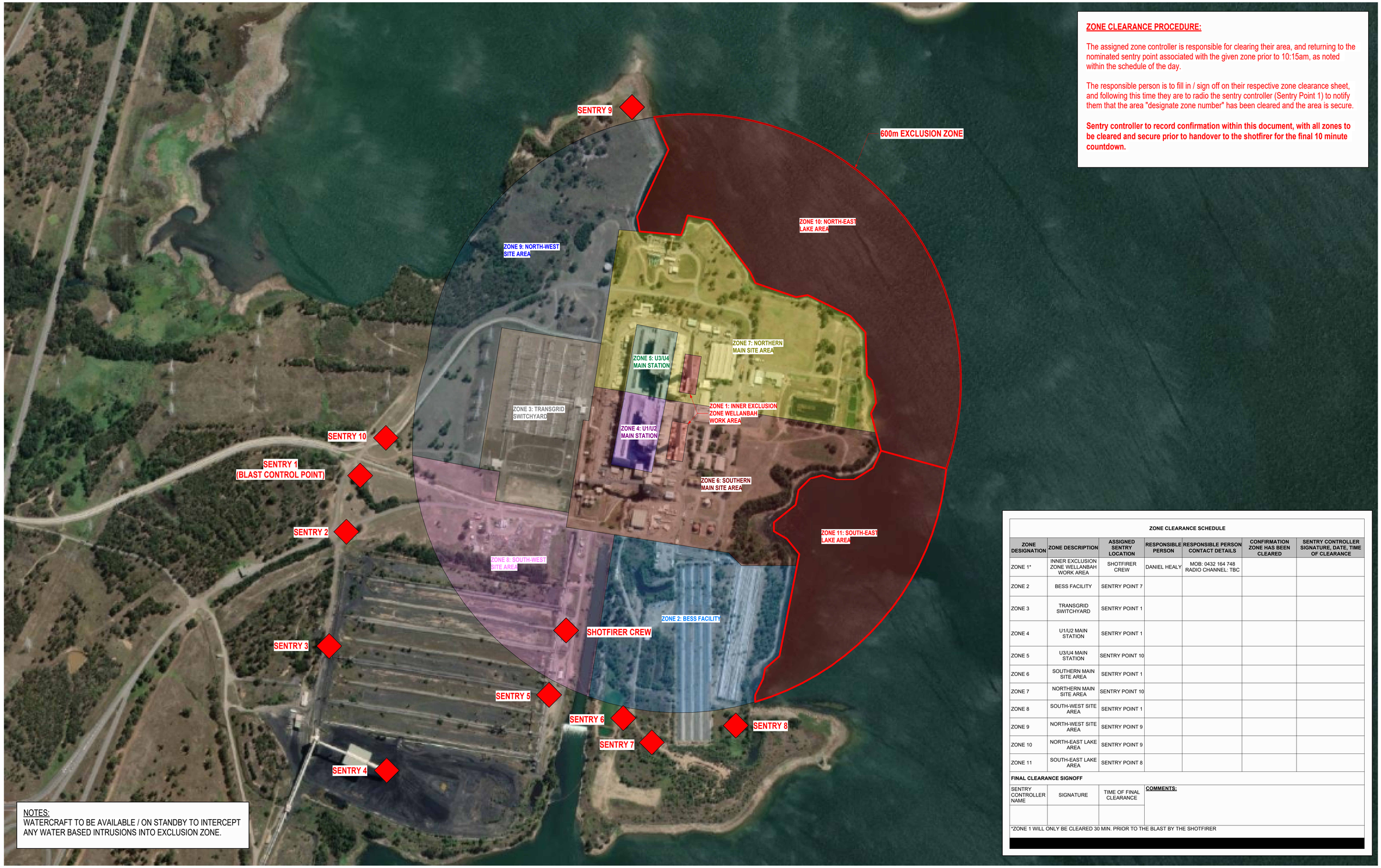
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Approved D. HEALY
Date 5.06.25
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST EXCLUSION ZONE**

Original Size **A1**
Drawing No: **WI-24057-06-E005**
Rev: D

Plot Date: 22/04/2026 2:56:59 PM



ZONE CLEARANCE PROCEDURE:

The assigned zone controller is responsible for clearing their area, and returning to the nominated sentry point associated with the given zone prior to 10:15am, as noted within the schedule of the day.

The responsible person is to fill in / sign off on their respective zone clearance sheet, and following this time they are to radio the sentry controller (Sentry Point 1) to notify them that the area "designate zone number" has been cleared and the area is secure.

Sentry controller to record confirmation within this document, with all zones to be cleared and secure prior to handover to the shotfirer for the final 10 minute countdown.

NOTES:
WATERCRAFT TO BE AVAILABLE / ON STANDBY TO INTERCEPT ANY WATER BASED INTRUSIONS INTO EXCLUSION ZONE.

ZONE CLEARANCE SCHEDULE

ZONE DESIGNATION	ZONE DESCRIPTION	ASSIGNED SENTRY LOCATION	RESPONSIBLE PERSON	RESPONSIBLE PERSON CONTACT DETAILS	CONFIRMATION ZONE HAS BEEN CLEARED	SENTRY CONTROLLER SIGNATURE, DATE, TIME OF CLEARANCE
ZONE 1*	INNER EXCLUSION ZONE WELLANBAH WORK AREA	SHOTFIRER CREW	DANIEL HEALY	MOB: 0432 164 748 RADIO CHANNEL: TBC		
ZONE 2	BESS FACILITY	SENTRY POINT 7				
ZONE 3	TRANSGRID SWITCHYARD	SENTRY POINT 1				
ZONE 4	U1/U2 MAIN STATION	SENTRY POINT 1				
ZONE 5	U3/U4 MAIN STATION	SENTRY POINT 10				
ZONE 6	SOUTHERN MAIN SITE AREA	SENTRY POINT 1				
ZONE 7	NORTHERN MAIN SITE AREA	SENTRY POINT 10				
ZONE 8	SOUTH-WEST SITE AREA	SENTRY POINT 1				
ZONE 9	NORTH-WEST SITE AREA	SENTRY POINT 9				
ZONE 10	NORTH-EAST LAKE AREA	SENTRY POINT 9				
ZONE 11	SOUTH-EAST LAKE AREA	SENTRY POINT 8				

FINAL CLEARANCE SIGNOFF

SENTRY CONTROLLER NAME	SIGNATURE	TIME OF FINAL CLEARANCE	COMMENTS:

*ZONE 1 WILL ONLY BE CLEARED 30 MIN. PRIOR TO THE BLAST BY THE SHOTFIRER

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
B	UPDATED AS PER SENTRY POSITION DETAILS	DH	DH	BH	24.04.26
A	INITIAL ISSUE	DH	DH	BH	31.10.25

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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **ZONE CLEARANCE CONTROL SHEET**

Original Size **A1**
Drawing No: **WI-24057-06-E016**
Rev: B

Plot Date: 24/04/2026 7:26:52 AM

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 1 – INNER EXCLUSION ZONE WELLANBAH WORK AREA:



ZONE 1 – AREA MAP

ZONE 1 DETAILS:	Zone 1 includes the area encompassing the inner exclusion zone around the U1/U2 and U3/U4 chimney stacks. This is the area in which the blasting crew are operating (Wellanbah).
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. Shotfirer to then radio the Sentry Controller and advise that the area has been cleared.
RESPONSIBLE PERSON:	Daniel Healy
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 2 – BESS FACILITY AREA:



ZONE 2 – AREA MAP

ZONE 2 DETAILS:	Zone 2 includes the area encompassing the BESS Facility on the Southern side of the main power station area.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 7, and radio in confirmation of the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 3 – TRANSGRID SWITCHYARD AREA:



ZONE 3 – AREA MAP

ZONE 3 DETAILS:	Zone 3 includes the area encompassing the Transgrid Switchyard on the Western side of the main power station area.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 1, and radio in confirmation (or verbally confirm in person) the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 4 – U1/U2 MAIN STATION AREA:



ZONE 4 – AREA MAP

ZONE 4 DETAILS:	Zone 4 includes the area encompassing the U1/U2 main station area.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 1, and radio in confirmation (or verbally confirm in person) the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 5 – U3/U4 MAIN STATION AREA:



ZONE 5 – AREA MAP

ZONE 5 DETAILS:	Zone 5 includes the area encompassing the U3/U4 main station area.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 10, and radio in confirmation of the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 6 – SOUTHERN MAIN SITE AREA:



ZONE 6 – AREA MAP

ZONE 6 DETAILS:	Zone 6 includes the remaining station footprint area encompassing the Southern side of the site.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 1, and radio in confirmation (or verbally confirm in person) the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 7 – NORTHERN MAIN SITE AREA:



ZONE 7 – AREA MAP

ZONE 7 DETAILS:	Zone 7 includes the remaining station footprint area encompassing the Northern side of the site.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 10, and radio in confirmation of the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 8 – SOUTH-WEST SITE AREA:



ZONE 8 – AREA MAP

ZONE 8 DETAILS:	Zone 8 includes the remaining station footprint area encompassing the South-West side of the site.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 1, and radio in confirmation (or verbally confirm in person) the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 9 – NORTH-WEST SITE AREA:



ZONE 9 – AREA MAP

ZONE 9 DETAILS:	Zone 9 includes the remaining station footprint area encompassing the North-West side of the site.
CLEARANCE PROCESS:	The clearance process is to include a walkthrough of the nominated area to confirm that no personnel (or members of the public) are within the zone. The responsible person is to then return to Sentry Point 9, and radio in confirmation of the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 10 – NORTH-EAST LAKE AREA:



ZONE 10 – AREA MAP

ZONE 10 DETAILS:	Zone 10 includes the area encompassing Lake Liddell, on the North-East side of the main power station area.
CLEARANCE PROCESS:	The clearance process is to include a visual inspection of the nominated area to confirm that no personnel (or members of the public) are within the zone (A police vessel will be in the water and available for assistance if required). The responsible person is to then return to Sentry Point 9, and radio in confirmation of the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

LIDDELL POWER STATION – CHIMMEY DEMOLITION – PRE-BLAST AREA SWEEP ZONE 11 – SOUTH-EAST LAKE AREA:



ZONE 11 – AREA MAP

ZONE 11 DETAILS:	Zone 11 includes the area encompassing Lake Liddell, on the South-East side of the main power station area.
CLEARANCE PROCESS:	The clearance process is to include a visual inspection of the nominated area to confirm that no personnel (or members of the public) are within the zone (A police vessel will be in the water and available for assistance if required). The responsible person is to then return to Sentry Point 7, and radio in confirmation of the clearance to the Sentry Controller.
RESPONSIBLE PERSON:	
DATE:	
TIME:	
SIGNED:	

APPENDIX R – LIDDELL CHIMNEY BLAST – CLIENT CHECKLIST: WI-QC-057-002

Liddell Power Station - Chimney Demolition
Client Pre-Blast Checklist

Project	Liddell Power Station Closure Project	**Document Number**	WI-QC-057-002	**Revision Status**	Rev 0	**Reference Documents**	Inspection Test Plan - W057-ITP-001 - REV 1 Blast Management Sub-Plan - WI-BMP-057-001 - REV 1
Project Number	W25-057	**Client**	CMA Contracting	**Date**	8/09/2025		
Document Title	Client Pre-Blast Checklist	**Asset Details**	Chimney Structure				

Notes:
This is a live document to be utilised for the management of the execution phase of works.
The purpose of this document is to confirm compliance blast management support activities (road closures, stakeholder engagement etc.).
The checklist is to be completed prior to completing the blast event.

CLIENT PRE-BLAST CHECKLIST

ITEM	SUB ITEM	DESCRIPTION	RESPONSIBLE PARTY	RESPONSIBLE INDIVIDUAL	REFERENCE DOCUMENT / RECORD	TARGET COMPLETION DATE	STATUS	STATUS DETAILS
COMMUNITY NOTIFICATIONS	Develop community notification	Develop community notifications via letter, community group post, or project channels already established					Open	
	Issue notification	Issue community notification in lead up to blast event (2-3 weeks)					Open	
	Adjacent landholders	Consultation with any adjacent landholders which may be directly affected by blast. Provide more specific details to landholder with recommendations for blast day: - Expectations around noise / vibration - Management of pets / livestock (I.e. tie up horses) - Requirements to vacate property (if required)					Open	
EXTERNAL STAKEHOLDER ENGAGEMENT	Police	Consultation with Police for general event and road closure recommendations					Open	
	Rural Fire Service	Advise Rural Fire Service of planned event					Open	
	CASA	Notify CASA of planned event					Open	
	Local Council	Notify council of planned event					Open	
	EPA	EPA has been notified as part of the SSDS process					Open	
	SafeWork NSW	SafeWork Notifications / Consultation Completed					Open	
	Major Service Providers	Notify any major service providers which may be influenced by the blast event (gas, petroleum etc.)					Open	
INTERNAL STAKEHOLDER ENGAGEMENT	Ausgrid Switchyard	Finalise consultation process with Ausgrid for environmental effects, as well as area sweeps / sentry attendance.					Open	
	BESS Facility	Finalise consultation process with BESS for environmental effects, as well as area sweeps / sentry attendance.					Open	
	AGL	AGL to review BMP and provide approval to proceed with works					Open	
	Other parties	Any other parties which will be affected by blast event (construction contractors, delivery drivers, onsite stakeholders) Generate list of all stakeholders and record on consultation					Open	
ROAD CLOSURES / TRAFFIC MANAGEMENT	ROL	Apply for Road Occupation License, and arrange for road closures.					Open	
MARINE / WATER WAY CLOSURES	Lake Liddell	Arrange for closure of waterway / partial waterway and have vessel on standby for sentry sweeps						
	Lake Liddell - Boat Ramp	Position representative at boat ramp to ensure public is not access Lake Liddell in lead up to the event.					Open	
CLEARANCE CERTIFICATES	Prensa	Arrange for clearance certificates for hazardous materials, or if left insitu, approval to proceed with works.					Open	
DUST CONTROL MEASURES	General	Develop dust control measures for blast event: - Sprinklers - Water cannons - Water cart pre-soak - Charged reservoirs (in consultation with blast contractor)					Open	
MONITORING DETAILS	Noise	Determine locations for monitors Engage third-party to undertake monitoring Develop monitoring plan / aerial					Open	
	Vibration	Determine locations for monitors Engage third-party to undertake monitoring Develop monitoring plan / aerial					Open	
	Dust	Determine locations for monitors Engage third-party to undertake monitoring Develop monitoring plan / aerial					Open	
SENTRY MANAGEMENT	Sentry Plan	Provide personnel details to assign to sentry map					Open	
	Sentry Training	Undertake Sentry "dry run" with blasting contractor					Open	
	Equipment	Ensure all sentries are provided with appropriate equipment - Radios - Dust Masks - Water / Sun protection					Open	
	Area Sweeps	Personel assigned to area sweeps, with sweep register completed prior to handover to shotfirer for blast event					Open	
DRILLING & CUTTING SUBCONTRACTOR	Side Panels	Engage subcontractor to complete cutting works for side panel					Open	
	Drilling	Engage subcontractor to complete drilling works for charge holes					Open	
	Wire saw	Engage subcontractor to complete wire saw cutting works for heel cut					Open	
POST BLAST ASBESTOS MANAGEMENT	Clearance & Exclusion Zones	Confirm clearance procedures & reduced exclusion zone in relation to post blast asbestos management					Open	
ASSET PROTECTION	Switchyards	Installation of protection measures at sensitive recievers - Ply wood panelling over exposed glass windows					Open	
	General - BESS	Shipping container barrier					Open	
	Relocation of plant	Relocate plant and equipment to safe distance (min. 300m)					Open	
	Buried services	Install bunds / impact barriers over sensitive buried services					Open	

FINAL SIGN OFF

SHOTFIRER DETAILS:		**COMMENTS:**
SHOTFIRER SIGNATURE:		
DATE:		

Liddell Power Station Demolition – stakeholder engagement and communication schedule

When	What	Stakeholder	Method	Responsibility	Status
14/10/25	Update on progress for demolition planning	Lake Liddell Rec Area	In-person	PY/RC	Complete
16/10/2025	Project update and case study from West Burton Power Station, highlighting sensitive receiver modelling and actual blast overpressure results from the turbine fell	Transgrid	Online Presentation	JC	Complete
23/10/25	Update regarding test blast	Lidell BESS	Email	CD	Complete
18/11/25	Update on progress for demolition planning & Lake Liddell study status	Lake Liddell Rec Area	In-person	PY/RC/BW/MP	
20/11/25	Project update	CCC	In-person/online	JC	Complete
28/11/2025	Site visit	Transgrid	In-person		
19/1/2026	Planning session	Transport NSW/Emergency Services	In-person/online		Traffic company to supply quote for services.
2/2/2026	Notification regarding second test blast	Lake Liddell Rec Area	Phone call/Email	PY/	Complete
		Liddell BESS	Email	CD	
		Transgrid	Email/meeting	CD	
		NSW Police	Phone call	PY	
		Employees	Site Comms	PY	
16/2/26	Initial meeting with comms rep	TfNSW	Online	PY/RC	
18/2/26	Briefing on progress & plans for explosive demolition	Neighbour – Ged Elphinstone	In Person	PY/RC	Complete
26/2/2026	CCC briefing	CCC Members	In-person/online	PY/JC	Complete
3/3/2026	High-level briefing	Dave Layzell	In-person	PY	Complete
10/3/2026	Overview of comms & engagement	EPA	Online	PY	Complete
11/3/2026	Briefing on progress	SafeWork	Site visit	AF	Complete
8/4/2026	Demolition update	Bayswater Town Hall	In-person/online	JC	Complete
13/4/2026	Briefing on road closure plans	Mbk Council Traffic Management Committee	In-person/online	JC	Complete
14/4/2026	Briefing on ‘Live Site’ for former employees	Steve Lanesbury Glenn Pyne	In person	PY/JF	Complete

15/4/2026	Brief on demo plans & understand neighbour needs in regard to communications	Neighbour – Patrick & Reggie Wild	Phone call	PY	Complete
15/4/2026	Briefing on asbestos awareness training & dust management	Transgrid	Online	JC	Complete

APPENDIX S – ROSE PE REVIEW LETTER AND KEY PERSONNEL CV

PAUL M. ROSE
PROFESSIONAL ENGINEER

September 14, 2025

Daniel Healy
Director
Wellanbah Industrial Pty Ltd
39 Bagenmar Road
Tamworth, NSW 2340

Daniel.healy@wied.com.au

RE: Liddell Power Station
NSW, Australia

Dear Mr. Healy,

I have completed my peer review of the Demolition Design for the Stacks located at the Liddell Power Station. My review included the following documents:

- Engineering Analysis Report WI-ENG-2057-006-REV 2
- Drawings S000, S100, S101, S102; dated 12.02.25, REV C, 9.3.25. (included in Report)

Reference to Previous Peer Review Report
The description of the stack, the Demolition approach, Stability, and Collapse sequence remain unchanged from the previous Peer Review Report dated June 2, 20205, except for the comments below:

Revised Demolition Approach
Originally, the fall direction of both stacks was to Plant East. This direction aligned the fall side with the construction opening on the east side and placed the breech openings on the center of the north and south side.

The fall direction has been revised to 20 degrees east of south for the north stack and 20 degrees east of north for the south stack. This will result in the stacks falling across each other during demolition. This new orientation places the east construction opening on the sides and as such, these are incorporated in the wedge opening. Because of this placement, wedge openings are larger and slightly different from the original approach. However, this new fall direction does not significantly change the portion of the stack base removed with explosives, hinge cuts, and back cut, or stresses on the stack base during preparation or during demolition.

The new fall direction does place a breach opening on the back side in the high compression area and a breech opening on the fall side. The demolition design uses the breech opening on the fall side to substantially increase the height of concrete removed with explosives from 4,350 mm [14 ft] to 14,000 mm [46 ft].

46 E. 16th Street
Tulsa, OK 74119

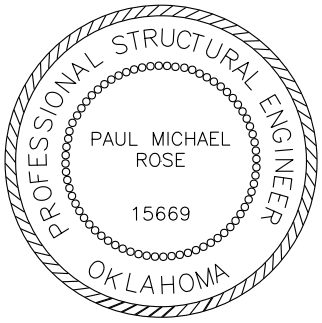
P: 918.488.9995
F: 918.488.9997

Stresses around the back side breech opening are still in the acceptable range during the initial collapse sequence as noted in Wellanbah's calculations. However, experience in other stack collapses with large back side openings has shown that during the collapse sequence, the stack could experience large vertical movement several seconds into the collapse and affect the fall direction slightly. The larger opening on the fall side should allow the stack to continue with a successful collapse in the planned fall direction but could vary up to 15 degrees.

Summary
With Revision 2 changes, the design concepts, geometry, and detailing of the stack preparation are consistent with the known Standard of Care to cause a collapse in the desired direction. Analysis and evaluation of the existing stack is consistent with known engineering principles and Standard of Care. Preparation stresses were consistent with a stable structure and collapse stresses were consistent with a progressive collapse to the east.

Note: Paul M Rose PE shall not be liable for designs or felling of the structures and shall be indemnified and defended by Wellanbah Industries, should any claim be brought against Paul M Rose PE; and Wellanbah Industrial and their Engineer-of-Record bear sole responsibility for the concepts and designs used for the demolition of the structures.

Thank you for consulting with Paul M Rose PE for this demolition design peer review. If you have any questions, please contact me.

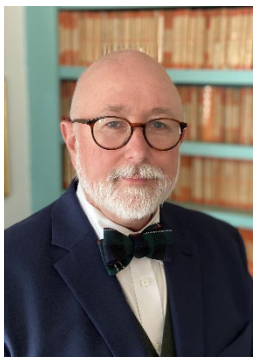


Paul M Rose, Professional Engineer; Structural Engineer
Oklahoma USA

Paul M. Rose, P.E., S.E
Structural, Architectural, and Civil Engineer

46 East 16th Street
Tulsa, OK 74119

918-488-9995
prose@psraec.com



Education

Master of Architectural Engineering - Structures, 1984
Oklahoma State University

University Studies included Architectural Design of Buildings; Building Materials and Systems; Basic Engineering Sciences and Structural Analysis; Design of Structures using Steel, Concrete, Wood and Masonry; Advanced Design of Steel and Concrete Structures; Advanced Structural Analysis including Elastic Stiffness and Finite Element Methods.

European Study Abroad – Independent Study of Dome Structures: St. Paul's Cathedral, London; St. Maria Del Fiore, Florence, 1984
Oklahoma State University

European Study Abroad Program – Versailles, France, 1982
Oklahoma State University

Bachelor of Architectural Studies, 1982
Oklahoma State University

State Board of Registration as Professional Engineer *current*
Oklahoma 1989 (original licensure)
Alabama 2018
Arizona 2020
Arkansas 2003
Colorado 2015
Florida 2018
Georgia 2011
Indiana 2020
Iowa 2017
Kansas 2001
Kentucky 2016
Louisianna 2022
Michigan 2018
Mississippi 2017
Missouri 2011
Montana 2022
New Mexico 2021
New York 2017
North Carolina 2017
North Dakota 2022
Ohio 2016
Pennsylvania 2020
South Carolina 2015

Tennessee 2020
Texas 2001
Virginia 2022
Wisconsin 2017
previous state registrations - not renewed, in good standing
Maine 1994
Rhode Island 1995
Connecticut 1996

Work Experience

Paul M Rose PE PLLC / Paul M. Rose PE
Structural, Civil, and Architectural Engineering
Tulsa, OK
January 2023 – Present
Principal/Owner, Structural Engineer

Phillips Slaughter Rose, Inc. / Paul M. Rose PE
Architecture - Structural Engineering - Construction Management
Tulsa, OK
May 2001 – present
Principal/Owner, Structural Engineer

Wallace Engineering Structural Consultants, Inc.
Tulsa, OK
January 1985 - May 2001
Principal/Owner, Structural Engineer

Professional Affiliations

Oklahoma Structural Engineers Association, Charter Member
American Institute of Steel Construction, Member

Intermittent Affiliations
American Institute of Architects, Associate
American Society of Civil Engineers, Member
American Concrete Institute, Member
Committee 360, Member
Committee 302, Member
International Concrete Repair Institute, Member
American Wood Council, Member

Engineering Experience

Material Design experience includes: Structural Steel, Light Gauge Steel, Cast-in-Place Concrete, Precast Concrete, Unreinforced and Reinforced Masonry, Wood and Heavy Timber, Structural Fire Ratings.

Building Design experience includes: Commercial, Industrial, Educational, Residential; Low-rise and High-rise; Re-use and rehabilitation of existing buildings, historic buildings, and damaged buildings.

Other Structural Design experience includes: Pedestrian Bridges, Sculpture and Art supports; Retaining walls, Culverts, Water Structures, Bridges.

Forensic investigation experience includes: collapse and damage from hurricane, tornado, high winds, earthquake and land slide; damage from foundation settlement, wash-out, and soil heaving; building performance and damage from inadequate design, construction errors, and building envelope issues.

Demolition experience includes evaluation of structures for explosive demolition or mechanical demolition preparation of structural members, collapse concepts, and stability.

Project Management and Construction Management Services experience includes estimating, critical path planning, contracts, inspections, and pay applications.

Engineering Management Experience includes: strategic planning, recruiting, employ hiring and dismissal, policies, payroll, budgeting, contracts, and required insurance procurement.

REPRESENTATIVE PROJECTS

Demolition
Updated 1/23/2024

Consulting for Explosive and Mechanical Demolition: Evaluation for plans, structural member preparation and modification, and structural stability.

Trenton Channel Power Plant, Trenton, MI 2024
550 ft N stack, 560 ft S stack, HP boiler house, Unit 9 boiler house demolition.
Independence Demolition / Dykon Explosive Demolition

TVA Paradise Stage II, Paradise, KY 2024
U1 600 ft stack, U2 600 ft stack, U3 800 ft stack, and Unit 3 FGD 600 ft stack demolition.
D H Griffin / Dykon Explosive Demolition

Lansing Power Plant, Lansing, IA 2023
Stack and Boiler Demolition
Independence Demolition / Dykon Explosive Demolition

Lashkowitz Tower, Fargo, ND 2023
204 ft high, 22-story apartment building explosive demolition.
Target / Dykon Explosive Demolition

Hammond Power Plant, Rome, GA 2023
750 ft stack and 675 ft stack demolition.
Brandenburg / Dykon Explosive Demolition

Dow T102B, Plaquemine, LA 2023
120 ft vessel tower, demolition plan for dismantling.
Bierlein

Dow Tower, Seadrift, TX 2023
65 ft vessel tower demolition by cut and pull.
Bierlein

Nelson Power Plant, Westlake, LA 2023
Evaluation of two boilers for stability, safety, and future demolition.
ERM

GDRR Stack Demolition, Detroit, MI 2023
330 ft stack demolition.
Homrich / Dykon Explosive Demolition

Bayway Water Tower, NJ
Peer review for engineer-of-record for 130 ft water tower demolition
KellerNA-RECON

Heskett Power Plant, Mandan, ND 2023
Power Plant demolition with two 300 ft stacks and 130 ft boiler demolished by explosives and one 100 ft boiler demolished by cutting and pulling.
Bierlein / Dykon Explosive Demolition

TVA Allen Fossil Plant, Memphis, TN 2023
Three 400 ft concrete stacks with masonry liners. Floor evaluations for equipment loads.
Brandenburg / Dykon Explosive Demolition

Echo I-4 and High Mesa Wind Turbine Towers; Oregon and Idaho (in collaboration with SMG Engineering), 2023
Brandeburg / Dykon Explosive Demolition

DTE Monroe Process Building Demolition, Detroit, MI 2022
Single story 80 ft high building. Wrecked by cutting and pulling.
Homrich

Dominion Energy Pittsylvania Plant, Hurt, VA 2022
Power Plant Boiler demolition by tripping. Stack demolition by tipping.
Bierlein

D E Karn Power Plant, Essexville, MI 2022
Evaluation of power plant for demolition concepts; 2 stacks, 2 boilers, 2 precepts, and 10 other structures.
Wood

GDRR Absorber Demolition, Detroit MI 2022
Evaluate and prepare concept for demolishing absorber by tripping.
Homrich

Dominion Energy Mecklenburg, Mecklenburg, VA
Demolition of stack by tipping.
Bierlein

TVA Paradise Cooling Towers, Paradise, KY 2022
Three 350 ft hyperbolic cooling towers demolition.
D H Griffin / Dykon Explosive Demolition

Rex Brown Power Plant, Jackson, MS 2022
Demolition of Boiler House
Brandenburg / Dykon Explosive Demolition

U of A Tutwiler Dormitory Building, Tuskegee, AL 2022
Demolition of 16 story cast-in-place concrete building.
D H Griffin / Dykon Explosive Demolition

PGE Boardman Power Plant, Boardman, OR 2022
Stack and boiler house.
Brandenburg / Dykon Explosive Demolition

NASA Marshall Space Center – Building 4200
Redstone Arsenal Huntsville, AL 2022
10 story building constructed in early 1960's.
Target / Dykon Explosive Demolition

Lewis and Clark Power Plant, Sidney, MT 2022
200 ft concrete and masonry stack demolition
Brandenburg / Dykon Explosive Demolition

TVA Colbert Power Station, Colbert County, GA 2022
Multiple fellings by explosive demolition and mechanical means
Unit 1-4; Unit 5 and SCR; 6 stacks from 400 ft to 600 ft.
Homrich / Dykon Explosive Demolition

Steubenville Furnace Structure, Steubenville, OH 2022
Felling by cutting and pulling over. Consultant to in-house Engineer.
Recon-Keller NA

Oregon State University Reser Stadium Demolition, Covallis, OR 2022
Consultant to local engineer. Explosive Demolition of Stands, Suites, and Press box.
Staten / Dykon Explosive Demolition

US Steel Stacks, Gary, IN 2022
Explosive demolition of four stacks.
Brandenburg / Dykon Explosive Demolition

Gibbons Creek Plant, College Station, TX 2021
Boiler, Coal Conveyor, and stack explosive demolition.
Tri-State Demolition / Dykon Explosive Demolition

TVA Johnsonville, New Johnsonville, TN 2021
Explosive Demolition of 10 units and 600 ft stack.
Brandenburg / Dykon Explosive Demolition

Wild Turkey Rick House, KY 2021
Conventional demolition of damaged 10-story rick house.
Spirtas

Dow Plant, Freeport, TX 2021
Cut and Pull mechanical felling of structure.
Bierlein

Corteva Plant, Midland, MI 2021
Cut and Pull mechanical felling of structure
Bierlein

TVA Widows Creek Plant A, AL 2020
1000 ft stack explosive demolition
Brandenburg / Dykon Explosive Demolition

Salt River Project – Navajo Generating Station, Page, AZ 2020
Multiple Fellings of structures and buildings
Independence Excavating

J B Sims Power Plant, Grand Haven, MI 2020
Unit 1 2 and Unit 3 Coal Conveyor Felling

Boiler Unit 1 2 Wrecking
Bierlein

Montrose Power Plant, Montrose, MO 2020
(2) 500 ft Stacks and (1) 250 ft Stack
Dykon Explosive Demolition / Brandenburg

Weadock Power Plant, Bay City, MI 2020
Premature Collapse Evaluation and Report
Coal Conveyor Felling
Boiler Unit 7 and 8, Duct Truss Explosive Demolition
Dykon Explosive Demolition / Bierlein

M Kapp Power Plant, Clinton, IA 2020
Unit 1 and 2 Boiler House, 250 ft Stack
Dykon Explosive Demolition / Bierlein

Wabash, IN 2020
Boiler 1-6 Structure
Dykon Explosive Demolition / Spirtas

DTE Conners Creek, Detroit, MI 2020
Boiler 16-18 and Turbine Hall Roof
Dykon Explosive Demolition / Independence Excavating

Cobb Power Plant, Muskegon, MI 2019
Unit 1, 2, 3 Boiler Structure
Bierlein Demolition
Unit 4 and 5 Boiler Structure
Dykon Explosive Demolition / Bierlein

Sutherland Power Station, Marshalltown, IA 2019
Unit 1, 2, 3 Boiler Structure
Dykon Explosive Demolition / Bierlein

TVA Widows Creek Power Plant B, AL 2019
Units 7 and 8: Boiler and SCR steel structures; (2) 500’ concrete stacks.
Dykon Explosive Demolition / Brandenburg

Reid Gardner Power Plant, NV 2019
(in conjunction with B+T Engineering)
Unit 1, 2, and 3 Boiler Structures, Unit 4 Boiler Structure, Unit 4 Coal Bin Structure,
Unit 1, 2, and 3 (3) 200’ stack; Unit 4 500’ stack.
Dykon Explosive Demolition / RECON

Morrow Power Plant, Purvis MS 2019
400’ concrete stack, (2) scrubber structures
Dykon Explosive Demolition / Bierlein

Whiting Power Plant, Monroe, MI 2019

Unit 1, 2, 3 Boiler Structure
Bierlein Demolition

Harvey Couch Plant, Stamps, AR 2018
132’ Boiler, 68’ Boiler, 150’ Masonry stack.
Dykon Explosive Demolition / Bierlein

Entergy Delta Plant, Cleveland, MS 2018
120’ Boilers 1-2 Building, structural steel.
Dykon Explosive Demolition / Bierlein

300’ Transmission Tower, Lake Charles, LA. 2018
Structural steel lattice tower.
Dykon Explosive Demolition

Exelon Wind Tower, Panhandle, TX 2018
244’ structural steel column.
Dykon Explosive Demolition

Cedar Bay Power Plant, Jacksonville, FL 2018
414’ stack, (2) 74’ silos, 100’ silo, 134’ silo; cast-in-place concrete.
Dykon Explosive Demolition

Plant Branch, Milledgeville, GA 2017
Boilers 1-4, Turbine House 1-4, Bridges, and Conveyor Bridges; structural steel.
Dykon Explosive Demolition/ Envirocon

Ashtabula Power Plant, Ashtabula, OH 2018
400’ cast-in-place concrete stack.
Dykon Explosive Demolition

Entergy NDS Plant, Cassville, WI 2017
352’ cast-in-place concrete stack, 144’ Boiler 1-2 structural steel building.
Dykon Explosive Demolition / Bierlein

BP Building Demolition, Hastings-on-Hudson, NY 2017
Brick and structural steel building.
Envirocon

Lake Shores Stack and Boiler Unit 18, Cleveland, OH 2017
300’ cast-in-place concrete stack, structural steel boiler.
Dykon Explosive Demolition

Shadyside 850’ stack and boiler house, Shadyside, OH 2017
850’ cast-in-place concrete stack, structural steel boiler house.
Dykon Explosive Demolition

Duke Energy Power Plant, Wilmington, NC 2016
Structural steel Boiler Explosive Demolition,
Structural steel Coal Bin Storage pull-over.

Bierlein

Federal Archive Building, Atlanta, GA 2016
167’ tall, 15 level building; cast-in-place concrete.
Dykon Explosive Demolition

Cecil Lynch Power Plant, Little Rock, AR 2016
150’ cast-in-place stack and structural steel Boiler Unit No. 3.
Dykon Explosive Demolition

University of Colorado Health Science Center, Denver, CO 2015
134’, 10 level cast-in-place concrete building.
Dykon Explosive Demolition

Canadys Power Plant, Walterboro, SC 2015
(3) 200’ chimney stack, cast-in-place concrete.
Dykon Explosive Demolition

TCU Stadium, Ft. Worth, TX 2015
Cast-in-place concrete and structural steel.
Dykon Explosive Demolition

ASARCO Plant Stack, El Paso, TX 2013
800’ and 400’ cast-in-place concrete stacks.
Dykon Explosive Demolition

Macy’s, Houston, TX 2013
9 level, cast-in-place concrete.
Dykon Explosive Demolition

Houston Astrodome Towers, Houston TX 2013
(2) 88’, 9 level spiral parking ramp towers; cast-in-place concrete.
Dykon Explosive Demolition

Space Spiral, Cedar Point, OH 2012
270’ steel column.
Dykon Explosive Demolition

IBM Building, Atlanta, GA 2012
cast-in-place concrete.
Dykon Explosive Demolition

Chocolate Bayou Power Plant, TX 2011
Heater Tower Demolition.
Dykon Explosive Demolition

APPENDIX T – CDI REVIEW LETTER AND KEY PERSONNEL CV

CONTROLLED DEMOLITION INCORPORATED

Mailing Address
PO Box 306

Physical Address
13401
Still Haven
Court

Phoenix, Maryland
21131 USA

410.667.6610
fax 410.667.6624

cdi@controlled-demolition.com

www.controlled-demolition.com

September 10, 2025

SENT VIA EMAIL
daniel.healy@wied.com.au

Mr. Daniel Healy
Wellanbah Industrial Pty, Ltd.
39 Bagenmar Road
Tintinhull, NSW 2352
Australia

Reference: Liddell Power Station Chimneys – Blast Design Drawings
CDI File #22-150

Dear Daniel,

We have reviewed the blast design for the Liddell Power Station chimneys, as detailed in the blast design drawings dated 3 September 2025 (as listed below), and are of the opinion that it is based upon sound design principles which have been adopted for past successful charge felling events for the chimneys.

We have no further commentary in relation to the proposed design.

DRAWING NUMBER	TITLE
WI-24057-06-S000	CHIMNEY BLAST - COVER SHEET
WI-24057-06-S100	CHIMNEY BLAST - OVERVIEW
WI-24057-06-S110	20 DEG. ROTATION - FELL PATH OVERLAY
WI-24057-06-S200	20 DEGREE HINGE ROTATION - PREP. DETAILS
WI-24057-06-S201	U1/U2 CHIMNEY BLAST - CHARGE SCHEDULE
WI-24057-06-S202	U3/U4 CHIMNEY BLAST - CHARGE SCHEDULE

Should you have any questions or require additional information, please do not hesitate to contact me.

Regards,

CONTROLLED DEMOLITION, INC.

Raymond D. Zukowski, Vice President
rdz@controlled-demolition.com

RDZ/ceg:Healy.09-10-25

EXHIBIT A – LIMITATIONS AND ASSUMPTIONS

All work performed by CDI as part of this review is limited to the felling operation of the Liddell Power Station Chimneys only, using the prescribed means and methods as proposed by Wellanbah Industrial Pty, Ltd., the Contractor. CDI's work shall not constitute an opinion as to the viability of any other structural modifications not specified or any Contractor means or methods whatsoever. Any plans, details, reports, other documents, site observations, or any other project involvement performed, or prepared by CDI, shall not constitute, nor be construed as such to direct, control, or assume responsibility for the Contractor's means, methods, safety practices, or approach to the demolition work.

Any service, report, or work product prepared by CDI, that may show sequences or procedures are for the Contractor's convenience only, and shall not constitute direction, control, oversight, or responsibility for, in any way whatsoever, the Contractor's chosen means, methods, or safety practices, for the demolition work.

The Contractor shall be solely responsible for all project safety whatsoever, including project safety plans, project oversight, control, and supervision, and all other safety requirements.

Any deviation in the anticipated structural behavior, including noises, deflections, or excessive movement shall be immediately reported to the engineer, and all demolition operational work shall cease until such time as these concerns are addressed.

Any deviation in the structural system type, configuration, or behavior that differs from the assumption or descriptions outlined above shall be reported to the engineer prior to the start of any demolition activities, and no removals or demolition activities shall be performed until these deviations have been properly addressed.

APPENDIX U – WGA REVIEW LETTER

Level 1, 66 Kings Park Road
West Perth WA 6005

PO Box 8335
Subiaco East WA 6008

E: perth@wga.com.au
P: +61 (0)8 9336 6528

WGAWA Pty Ltd
ABN: 98 600 420 773

WGA.COM.AU

CMA Contracting
Unit 2, 42 Wermol Street
Kurri Kurri NSW 2327
Attention: Ruan Zaayman

16 April 2026
Project #: WGA242184
Doc. WGA242184-LT-ST-0001_B
E: Ruan.Zaayman@cmacontracting.com.au

Dear Ruan,

INDEPENDENT THIRD PARTY STRUCTURAL COMMENTS FOR CHIMNEY FELL DESIGN AT LIDDELL POWER STATION (NSW)

Wallbridge Gilbert Aztec (WGA) has been engaged by CMA Contracting to undertake an independent third party structural verification of the chimney fell design at Liddell Power Station, NSW. The fell design document reviewed was provided by Wellanbah Industrial: WI-ENG-2057-006-REV2 and the relevant design drawings are attached as Appendix A to this letter. The fell design involves weakening the base of the chimneys with saw cuts and then removing a wedge of concrete with explosives to induce the fell.

WGA have independently assessed the structural aspects of the fell design including chimney mass, the extent of concrete removal at the chimney base and applicable wind loads to the relevant Australian Standards. Several design comments were made to Wellanbah Industrial and some revisions to the design have been subsequently included. A review of the explosives design is not part of WGA's scope.

Provided that the explosive blast removes the front concrete wedge as intended, WGA consider that the fell will occur as planned.

We trust that this letter is satisfactory for your needs. If you require any clarification or advice, please do not hesitate to contact the undersigned.

Yours sincerely,



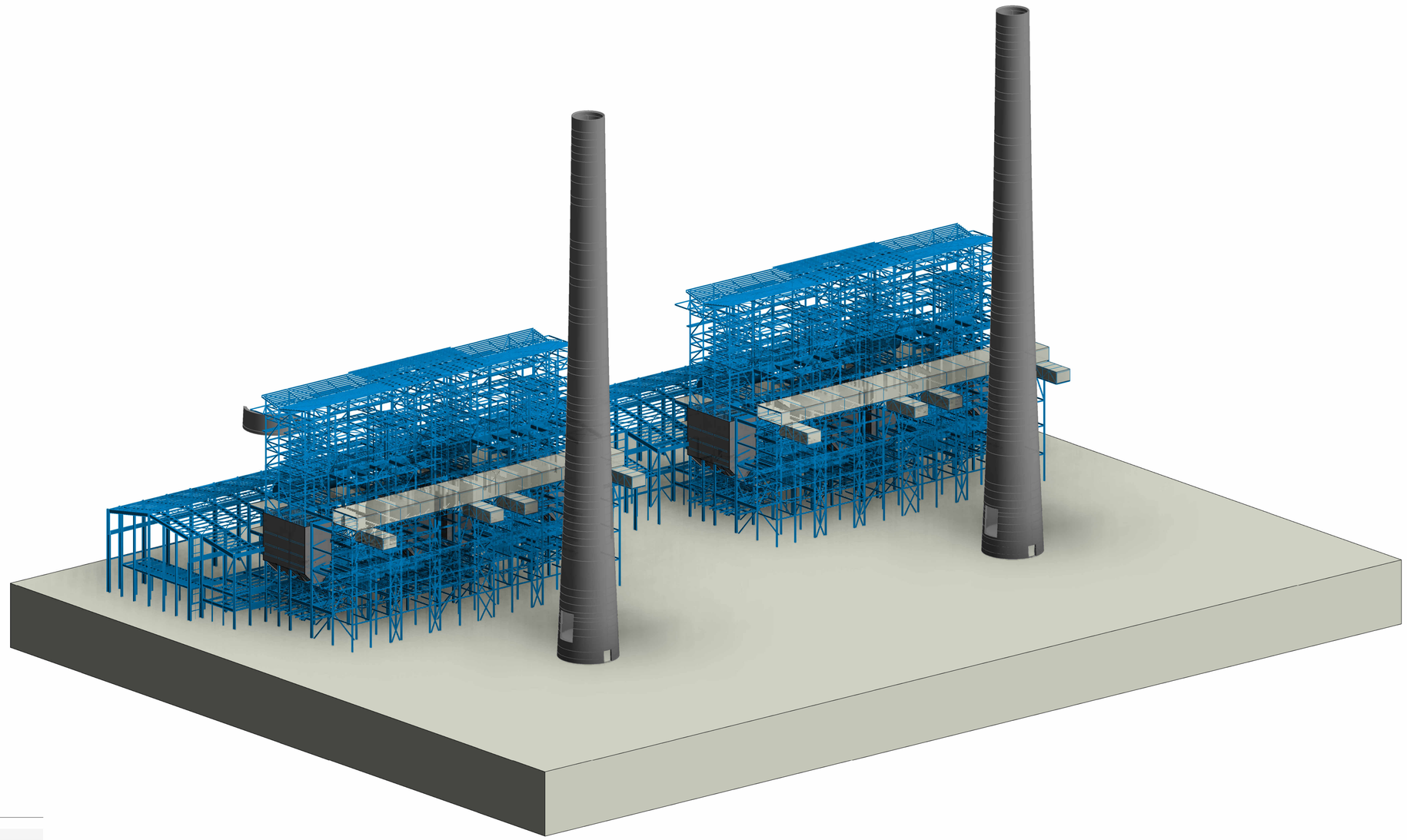
David Lewis
Senior Principal Structural Engineer
WALLBRIDGE GILBERT AZTEC

APPENDIX A DESIGN DRAWINGS

APPENDIX A
DESIGN DRAWINGS

LIDDELL POWER STATION

CHIMNEY DEMOLITION - BLAST DESIGN



STRUCTURAL DRAWING INDEX

NUMBER	TITLE
S000	CHIMNEY BLAST - COVER SHEET
S100	CHIMNEY BLAST - OVERVIEW
S110	20 DEG. ROTATION - FELL PATH OVERLAY
S200	20 DEGREE HINGE ROTATION - PREP. DETAILS
S201	U1/U2 CHIMNEY BLAST - CHARGE SCHEDULE
S202	U3/U4 CHIMNEY BLAST - CHARGE SCHEDULE
S203	DUST SUPPRESSION - CHARGE SCHEDULE
S300	U1/U2 CHIMNEY BLAST DELAYS
S301	U3/U4 CHIMNEY BLAST DELAYS

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED WITH VESSELS AND DELAYS		DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN		DH	DH	BH	3.09.25
B	REVIEW UPDATES		DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE		DH	DH	BH	12.02.25

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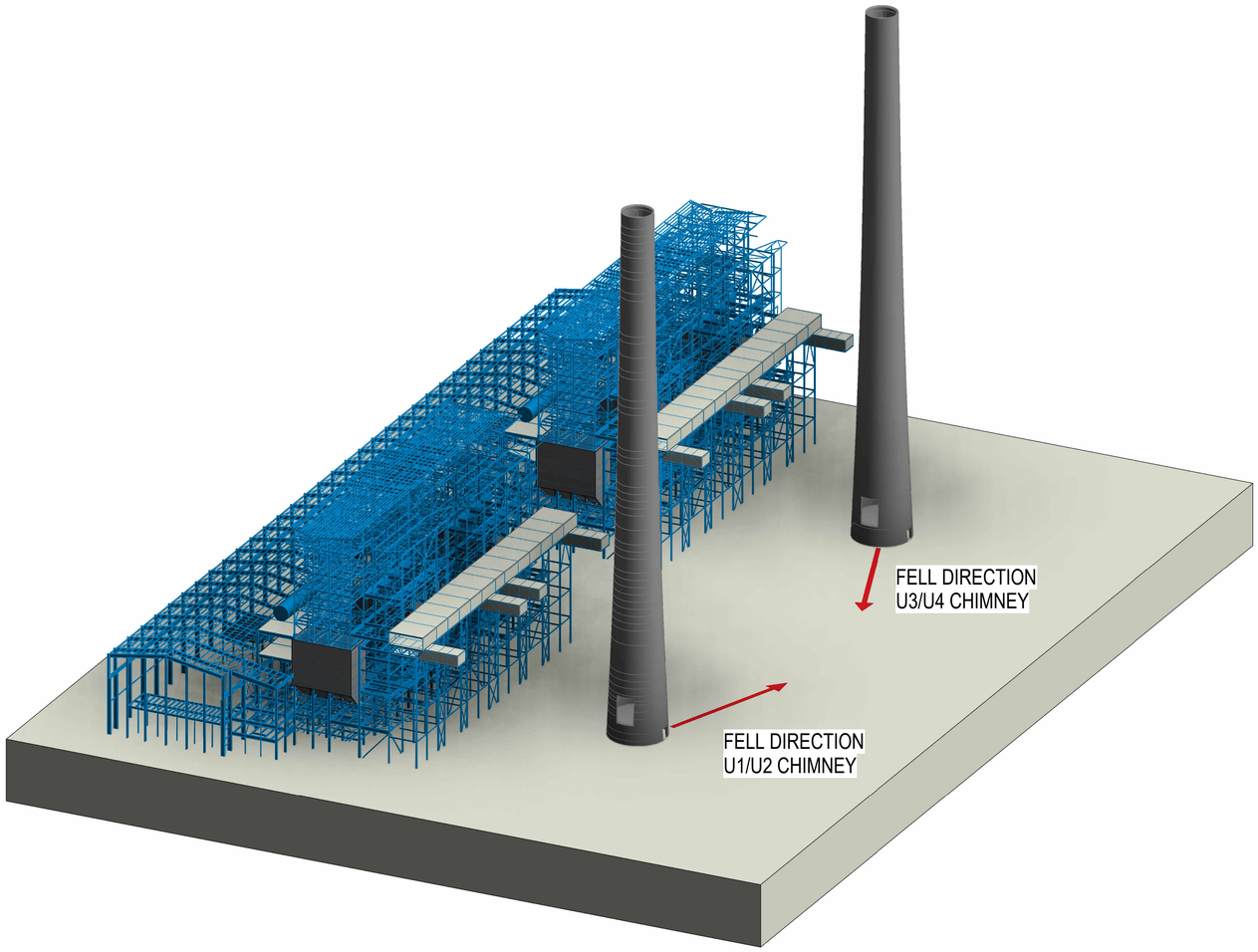
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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
This Drawing must not be used for Construction unless signed as Approved

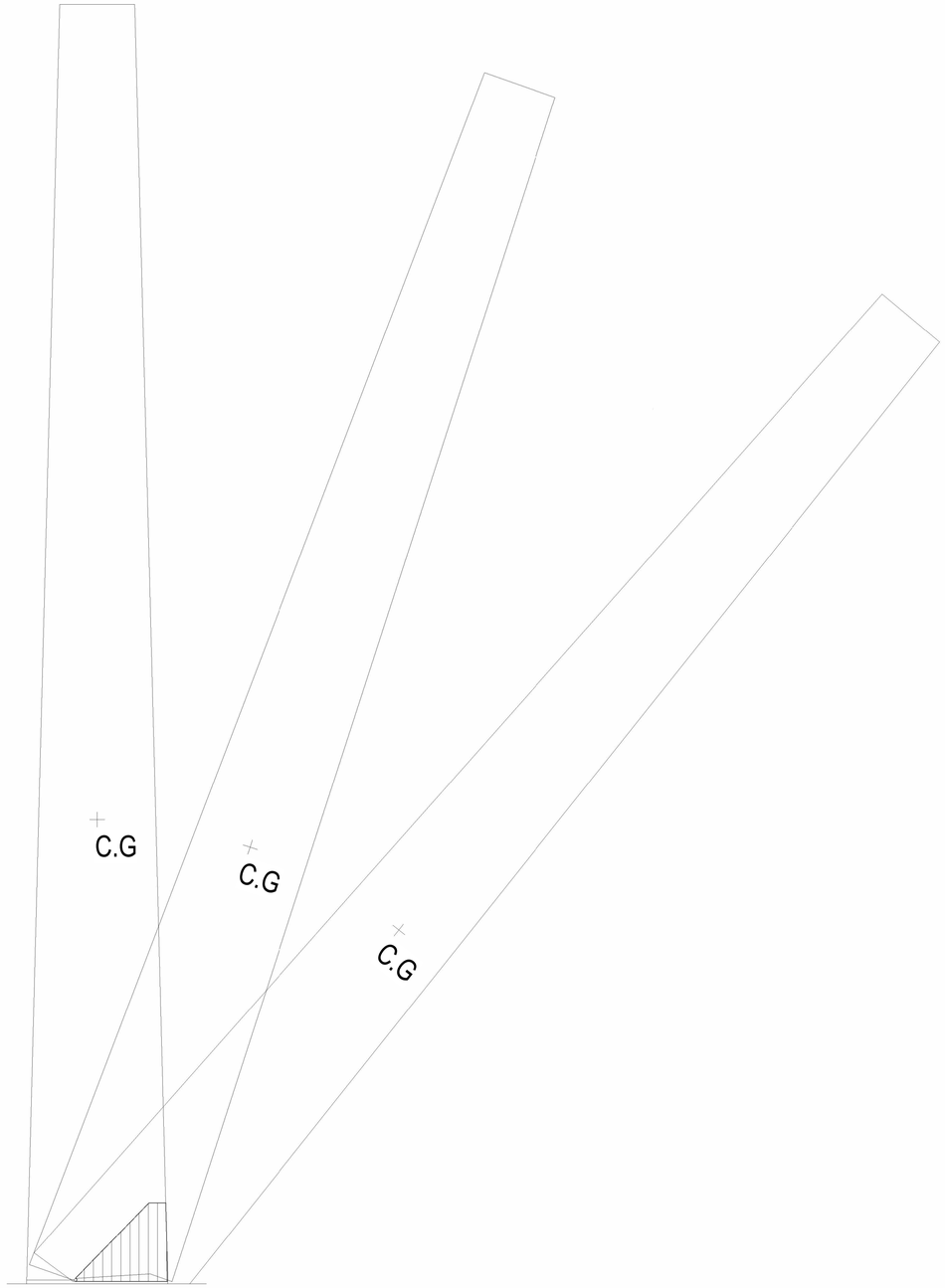
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST - COVER SHEET**

Original Size **A1**
Drawing No: **WI-24057-06-S000**
Rev: D

Plot Date: 31/03/2026 6:29:56 PM



SITE OVERVIEW
SCALE : NTS



CHIMNEY COLLAPSE MECHANISM
SCALE 1 : 400

NOTES:
1. THIS DOCUMENT PROVIDES THE BLAST DESIGN FOR THE DEMOLITION OF TWO REINFORCED CONCRETE CHIMNEYS LOCATED AT THE LIDDELL POWER STATION SITE.
2. THE CHIMNEYS ARE APPROXIMATELY 169m IN HEIGHT, AND HAVE AN OUTSIDE BASE DIAMETER OF 18.6m.
3. THE CHIMNEYS ARE TO BE COLLAPSED IN A DIRECTION WHICH IS 20 DEGREES OFF THE SITE NORTH-SOUTH DIRECTION, NOTING THAT THE SITE NORTH ORIENTATION IS 9 DEGREES CLOCKWISE OF TRUE NORTH.
4. ALL STRUCTURES WITHIN THE FELL PATH OF THE CHIMNEYS ARE TO BE DEMOLISHED PRIOR TO THE BLAST.

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	UPDATED COG POSITION	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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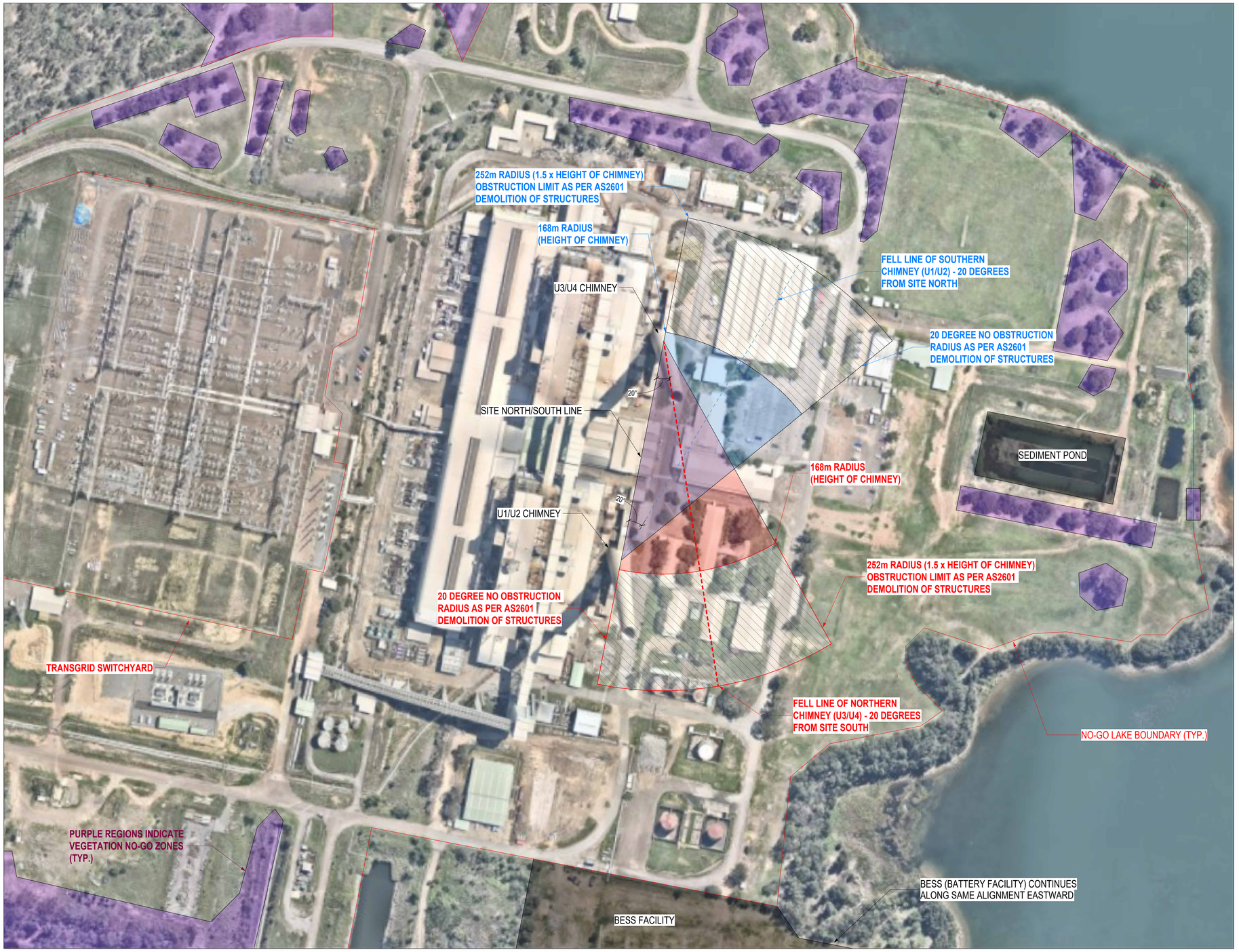
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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **CHIMNEY BLAST - OVERVIEW**
Original Size **A1**
Drawing No: **WI-24057-06-S100**
Rev: C

Plot Date: 31/03/2026 6:33:30 PM



LIDDELL CHIMNEY COLLAPSE ORIENTATION - 20 DEGREE ROTATION

SCALE 1 : 1500

LIDDELL POWER STATION CHIMNEY DEMOLITION - OPTION 1 COMPLIANCE SCHEDULE

SITE CONSTRAINT	NEAREST DISTANCE FROM BASE OF CHIMNEY WITHIN FELL PATH	COMMENTS
1. BATTERY ENERGY STORAGE SYSTEM (BESS)	376m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO EDGE OF COMPOUND FENCE LINE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
2. VEGETATION NO - GO ZONES	254m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO VEGETATION NO-GO ZONE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
3. SITE BOUNDARY AT LAKE	314m	NEAREST DISTANCE BASED ON FELL PATH OF NORTHERN CHIMNEY TO LAKE BOUNDARY LINE - DISTANCE COMPLIES WITH AS2601 - CLAUSE 7.7.4.3
4. SEDIMENT POND (INC. BURIED PIPELINE)	N.A	ASSET OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3
5. TRANSGRID SWITCHYARD	N.A	ASSET OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3
6. SITE INFRASTRUCTURE YET TO BE DEMOLISHED	N.A	STRUCTURES OUTSIDE FELL PATH - COMPLIANT WITH AS2601 - CLAUSE 7.7.4.3

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED VEGETATION DETAILS	DH	DH	BH	31.03.26
C	UPDATED TRANSGRID SWITCHYARD REFERENCES	DH	DH	BH	31.10.25
B	FINALISED DESIGN ISSUE	DH	DH	BH	3.09.25
A	PRELIMINARY ISSUE	DH	DH	BH	31.07.25

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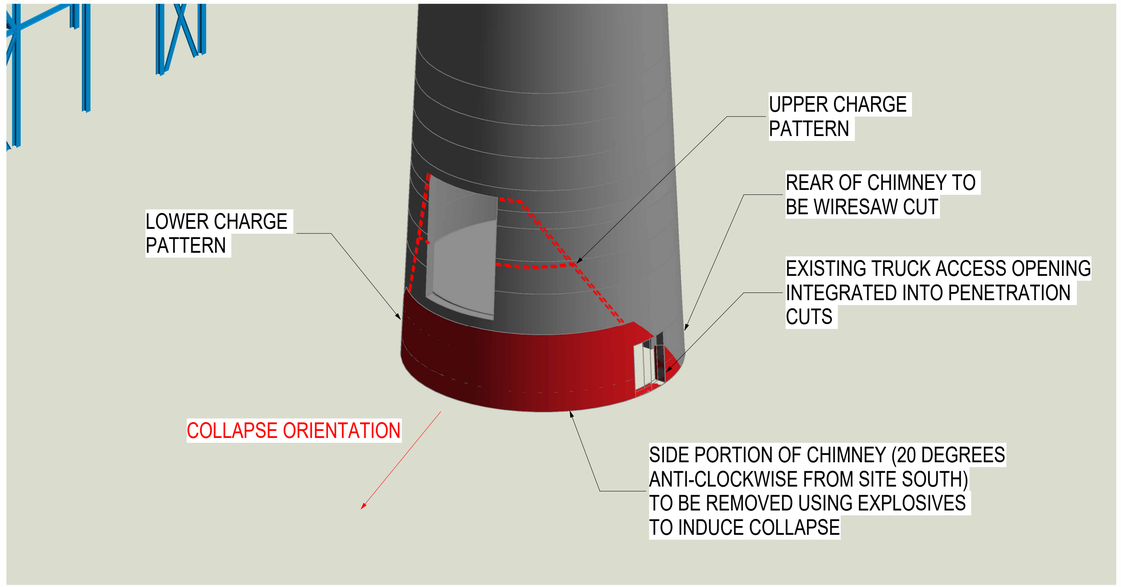
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Drafting Check B. HEALY
Approved D. HEALY
Date 31.07.25
Scale
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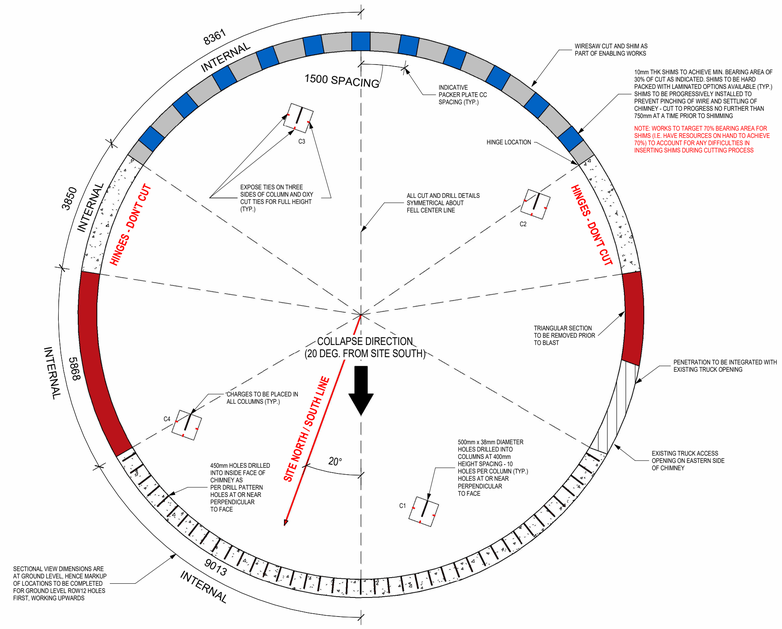
Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **20 DEG. ROTATION - FELL PATH OVERLAY**

Original Size **A1**
Drawing No: **WI-24057-06-S110**
Rev: D

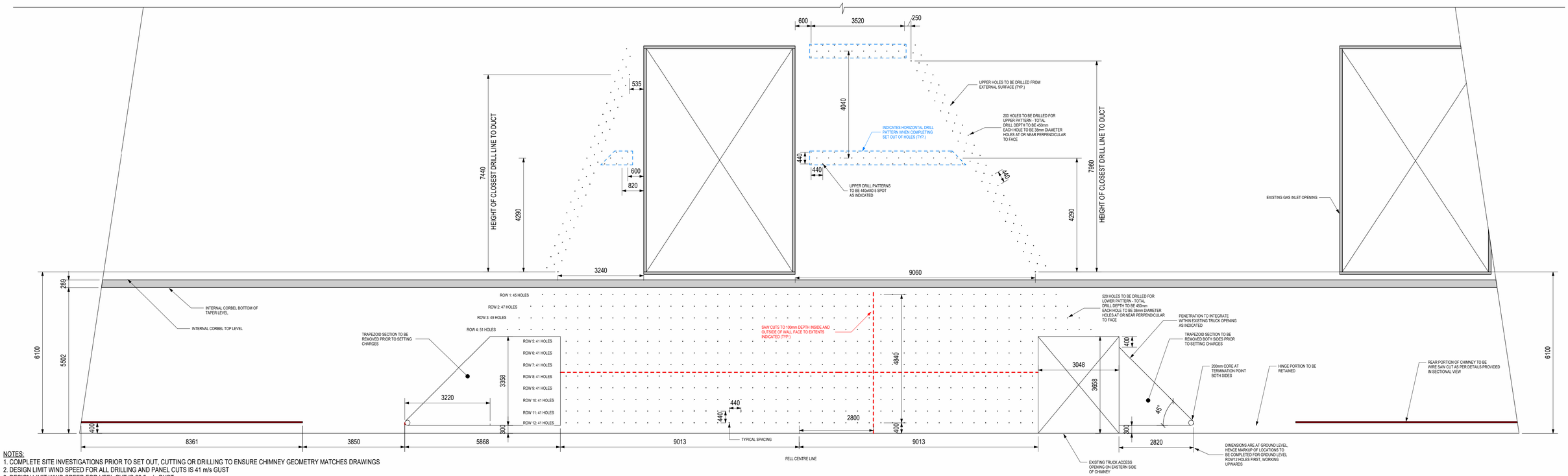
Plot Date: 31/03/2026 6:33:34 PM



3D VIEW - CHIMNEY BASE - 20 DEG. ROTATION
SCALE : NTS



CHIMNEY BASE SECTIONAL VIEW - 20 DEG. ROTATION
SCALE 1 : 100



NOTES:
1. COMPLETE SITE INVESTIGATIONS PRIOR TO SET OUT, CUTTING OR DRILLING TO ENSURE CHIMNEY GEOMETRY MATCHES DRAWINGS
2. DESIGN LIMIT WIND SPEED FOR ALL DRILLING AND PANEL CUTS IS 41 m/s GUST
3. DESIGN LIMIT WIND SPEED FOR HEEL CUT IS 22.5 m/s GUST
4. DESIGN LIMIT WIND SPEED FOR BLAST EVENT IS 15 m/s GUST; LIVE SITE WIND MONITORING TO BE COMPLETED BY MOUNTING UNIT IN VICINITY OF CHIMNEYS AT HEIGHT OF 10m. LOCATION TO BE SELECTED SUCH THAT NO SHIELDING OR VORTEX LOADING WILL INFLUENCE MONITORING.
5. TOLERANCE ON DRILL PATTERN +/- 75mm, TOLERANCE ON HOLE DEPTH +/-25mm.
6. BLAST PATTERN DETAILS HEREIN FOR U3/U4 CHIMNEY - PATTERN IS TO BE MIRRORED FOR U1/U2 CHIMNEY

DRILL PATTERN & CHARGE LAYOUT - 20 DEG. ROTATION
SCALE 1 : 75

No	Revision	Drawn	Designed	Reviewed	Date
E	FINALISED HOLE DEPTH	DH	DH	BH	10.02.26
D	REVISED HOLE DIAMETER	DH	DH	BH	9.01.26
C	UPDATED NOTES AND VERTICAL CUT LINE POSITION	DH	DH	BH	1.11.25
B	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
A	PRELIMINARY ISSUE	DH	DH	BH	31.07.25

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Drafting Check	B. HEALY		
Approved	D. HEALY		
Date	31.07.25		
Scale		This Drawing must not be used for Construction unless signed as Approved	

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **20 DEGREE HINGE ROTATION - PREP. DETAILS**
Original Size **A1**
Drawing No: **WI-24057-06-S200**
Rev: E

Plot Date: 31/03/2026 6:33:39 PM

CHARGE SCHEDULE U1/U2 CHIMNEY

ROW ID#	NUMBER OF HOLES	CHARGES PER HOLE	CHARGES FOR ROW	CHARGE WEIGHT OF ROW (KG)	CHARGE TYPE	DELAY TIMING MS
1	45	1.75	78.75	15.22	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
2	47	1.75	82.25	15.86	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
3	49	1.75	85.75	16.51	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
4	51	1.75	89.25	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
5	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
6	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
7	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
8	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
9	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
10	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
11	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
12	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
UPPER PATTERN	200	1.5	300	55.50	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C1	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C2	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C3	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
C4	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S300
TOTALS	760		1290	238.65		

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED POWDER FACTORS	DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	REVIEW UPDATES	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **U1/U2 CHIMNEY BLAST - CHARGE SCHEDULE**

Original Size **A1**
Drawing No: **WI-24057-06-S201**
Rev: D

Plot Date: 31/03/2026 6:33:42 PM

CHARGE SCHEDULE U3/4 CHIMNEY						
ROW ID#	NUMBER OF HOLES IN ROW	CHARGES PER HOLE	CHARGES FOR ROW	CHARGE WEIGHT OF ROW (KG)	CHARGE TYPE	DELAY TIMING MS
1	45	1.75	78.75	14.57	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
2	47	1.75	82.85	15.22	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
3	49	1.75	85.75	15.86	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
4	51	1.75	89.25	16.51	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
5	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
6	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
7	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
8	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
9	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
10	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
11	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
12	41	1.75	71.75	13.27	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
UPPER PATTERN	200	1.5	300	55.5	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C1	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C2	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C3	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
C4	10	2	20	3.7	SENATEL 32-200	REFER TO DWG WI-24057-06-S301
TOTALS	760		1290	238.65		

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED POWDER FACTORS	DH	DH	BH	31.03.26
C	REVISED BLAST DESIGN	DH	DH	BH	3.09.25
B	REVIEW UPDATES	DH	DH	BH	5.06.25
A	PRELIMINARY ISSUE	DH	DH	BH	12.02.25

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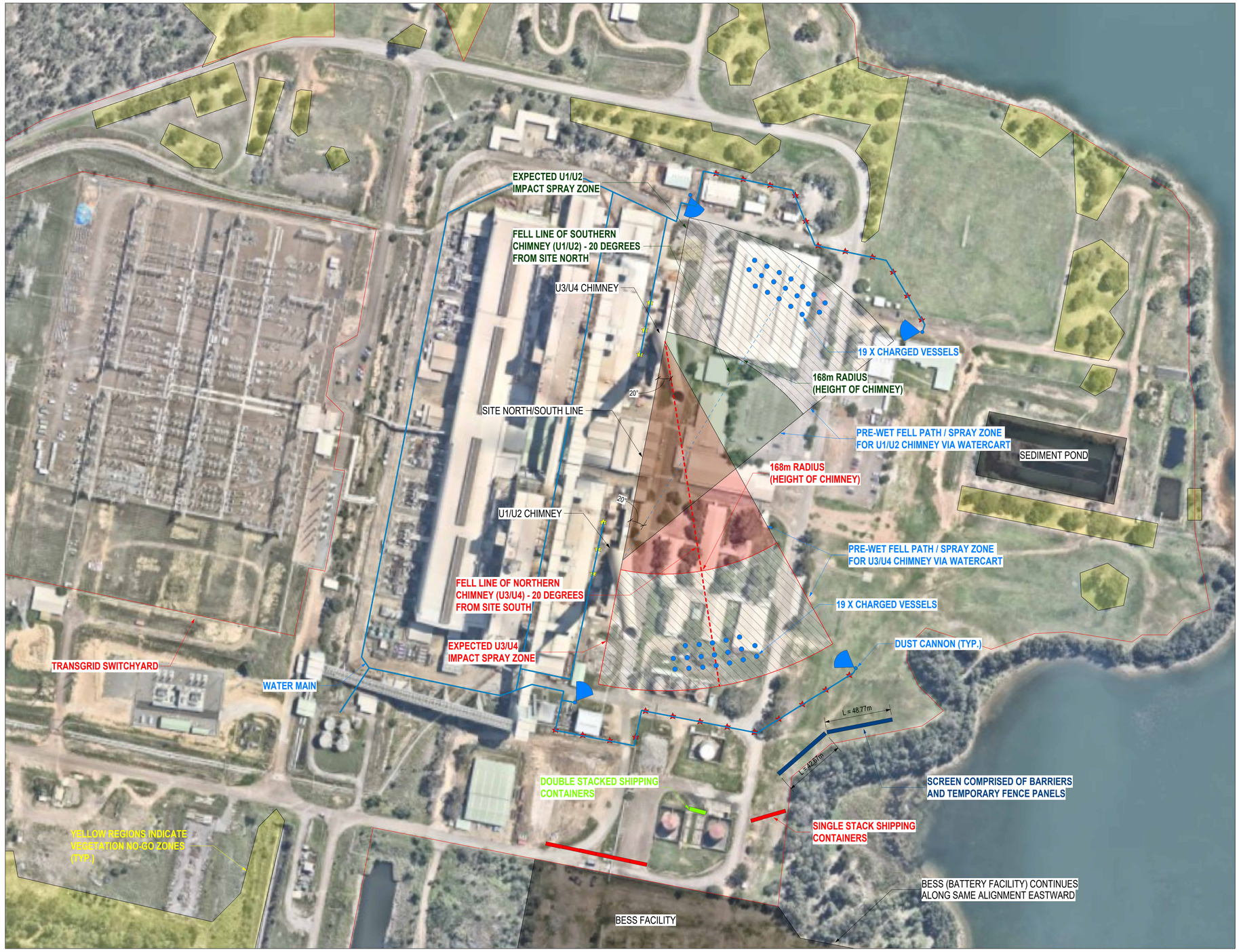
Drawn D. HEALY | Designer D. HEALY
Drafting Check B. HEALY
Approved D. HEALY
Date 12.02.25
Scale
This Drawing must not be used for Construction unless signed as Approved

Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **U3/U4 CHIMNEY BLAST - CHARGE SCHEDULE**

Original Size **A1**
Drawing No: **WI-24057-06-S202**
Rev: D

Plot Date: 31/03/2026 6:33:46 PM

APPENDIX V – DUST CONTROL MEASURES OVERVIEW



LEGEND:

- SPRINKLER CURTAIN
- INDIVIDUAL SPRINKLERS
- DUST CANNON
- DOUBLE STACKED CONTAINERS
- SINGLE STACKED CONTAINERS
- BARRIER SCREEN

LIDDELL CHIMNEY DEMOLITION - DUST CONTROL & PROTECTION MEASURES

SCALE 1 : 1500

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATES FOLLOWING REVIEW	DH	-	RZ	24.04.26
C	UPDATED VEGETATION EXTENTS AND DUST SUPPRESSION	DH	-	RZ	31.03.26
B	UPDATED REFERENCE TO TRANSGRID SWITCHYARD	DH	DH	BH	1.11.25
A	PRELIMINARY ISSUE	DH	DH	BH	9.09.25

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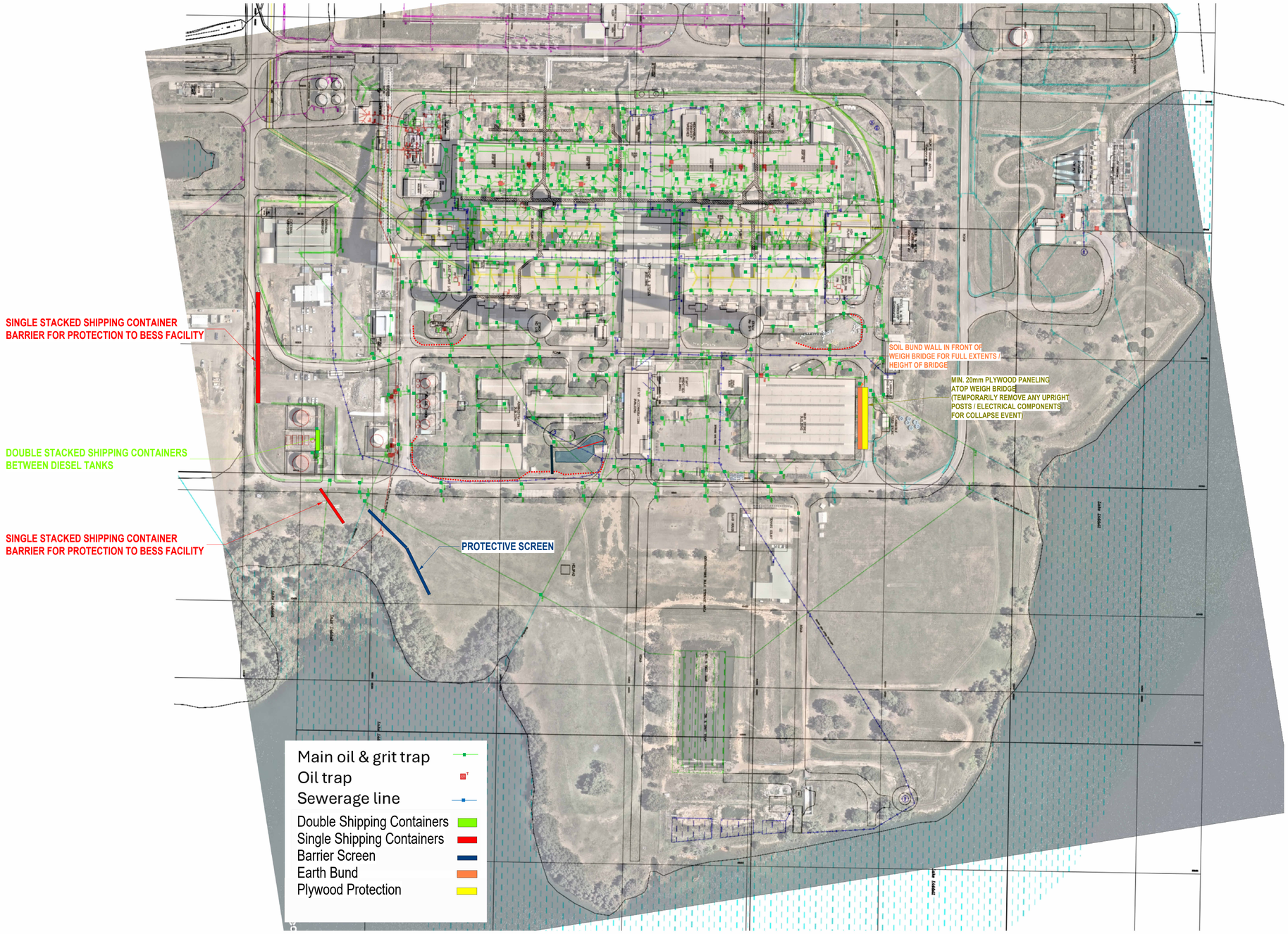
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Drafting Check B. HEALY
Approved D. HEALY
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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **DUST CONTROL & PROTECTION MEASURES**

Original Size **A1**
Drawing No: **WI-24057-06-E013**
Rev: D

Plot Date: 24/04/2026 12:14:53 PM

APPENDIX W – GROUND PROTECTION MEASURES OVERVIEW



NOTES:
1. STACKED SHIPPING CONTAINERS TO BE LOCKED TOGETHER AND WATER OR SAND BALLASTED MIN. 6T PER 20ft CONTAINER TO PREVENT MOVEMENT.
2. SET OUT INDICATIVE ONLY, AND TO BE DETERMINED ONSITE SUBJECT TO SITE CONTOURS

LIDDELL POWER STATION CHIMNEY DEMOLITION - ASSET PROTECTION OVERVIEW

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Designed	Reviewed	Date
D	UPDATED FOLLOWING REVIEW	DH	-	RZ	24.04.26
C	UPDATED PROTECTION DETAILS / LAYOUT	DH	-	RZ	31.03.26
B	FINAL ISSUE	DH	DH	BH	19.02.26
A	PRELIMINARY ISSUE	DH	DH	BH	10.09.25

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Client **CMA CONTRACTING PTY LTD**
Project **LIDDELL POWER STATION DEMOLITION**
Title **PROTECTION MEASURES**

Original Size **A1**
Drawing No: **WI-24057-06-E014**
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APPENDIX X – TRAFFIC MANAGEMENT PLAN / TRAFFIC MANAGEMENT CONTROL PLANS / ROAD OCCUPATION LICENSE

ALTUS GROUP
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TRAFFIC MANAGEMENT PLAN (TMP)

DOCUMENT NUMBER: *AG-TMP-26-03-166796*
CLIENT: *AGL Energy*
LOCATION: *New England Hwy, Muswellbrook NSW 2333, Australia*
PROJECT NAME: *Demolition of Chimney Stacks for Liddell Power Station*
PREPARED FOR: *James Coventry*
DATE: *08/03/2026*



agl
Progress for life

Table I – Document Information	
Document Title	Traffic Management Plan (TMP)
Document Reference	AG-TMP-26-03-166796
Client	AGL ENERGY
Contract or Project	Demolition of Chimney Stacks for Liddell Power Station

Table II – Version Control

Issue	Description	Prepared		Authorised	
		By	Date	By	Date
DRAFT-01	ISSUED FOR APPROVAL	PI	08/03/26	MA	08/03/26
REV A	REVISIONS AS PER AGL & TFNSW COMMENTS	PI	08/04/26	MA	08/04/26

Table III – Document Preparation and Approval

	Name	Competency / Number	Competency Issue Date	Date	Signature
Prepared By	Peter Ingram	TCT0058356	05/04/2016	08/03/2026	
Reviewed By	Marbel Ablahad	TCT0045534	24/05/2018	08/03/2026	
Client Contact	James Coventry	N/A	N/A		

1. Table of Contents

2. Introduction 7
2.1. Purpose of this Traffic Management Plan 7
2.2. Project Overview 7
2.3. Scope of Works 7
2.4. Site Location 8
2.5. Objectives of the Traffic Management Plan 8
2.6. Scope of the TMP 9
2.7. Project Program 9
2.8. Work Hours and Timing of Activities 9
2.9. Applicable Standards and Referenced Documents 10
2.9.1. Legislation 10
2.9.2. TfNSW Specifications and Manuals 10
2.9.3. Austroads Guides and Australian Standards 10
2.9.4. Contract and Project Documents 10
2.9.5. Supporting Project Documentation 10
2.10. Plan Revision and Document Control 10
2.11. Continuous Improvement 11
2.12. Key Stakeholders 11
2.12.1. Project Delivery Team 11
2.12.2. Transport Authorities 11
2.12.3. NSW Police 11
2.12.4. Emergency Services 12
2.12.5. Local Government 12
2.12.6. Community and Road Users 12
3. Traffic Management Roles and Responsibilities 12
3.1. Project And Traffic Management Responsibilities 13
3.1.1. AGL Energy (Project Owner / Client) 13
3.1.2. CMA Contracting (Demolition Contractor) 13
3.1.3. Traffic Management Provider 13
3.2. Traffic Management Sub-Contractor Responsibilities 13
3.2.1. Non-Working Traffic Control Supervisor (NWTCS) 13
3.2.2. Traffic Control Team Leader 14
3.2.3. Traffic Control Crew 14
3.3. Traffic Control Personnel Qualifications 14
3.4. Traffic Management Resources 14
3.4.1. Personnel 14
3.4.2. Vehicles & Plant 15
3.4.3. Traffic Control Devices 15
3.4.4. Monitoring & Adjustments 15
3.5. Traffic Management Key Contacts 15
4. Traffic Management System 16
4.1. Traffic Guidance Scheme's 16
4.1.1. Implementation & Control 17
4.1.2. Amendments to TGSs 17
4.2. Road Occupancy Licence 17
4.2.1. ROL Location and Extent 17
4.2.2. ROL Times and Duration 18
4.2.3. Compliance with ROL Conditions 18
4.2.4. Contingency and Extensions 18
4.3. Speed Zone Authorisations 18
4.3.1. Requested Speed Reductions 18
4.3.2. Application Periods 18
4.3.3. Implementation of Speed Zones 18
4.4. Traffic Delays & Queuing 18
4.4.1. Anticipated Impacts 19
4.4.2. Queue Length Monitoring 19
4.4.3. Quantified Queue and Delay Assessment 19
4.4.4. Peak Period Management 20
4.4.5. Acceptability of Temporary Queues 20
4.4.6. Safety and Risk Consideration 21
4.5. Variable Message Sign (VMS) Strategy 21
4.5.1. Purpose 21
4.5.2. Messaging Strategy 22
4.5.3. VMS Deployment Locations 22
4.5.4. Coordination with Transport Management Centre (TMC) 22
4.5.5. Justification of Strategy 23
4.6. Heavy Vehicle and OSOM Movements 23
4.6.1. Anticipated Heavy Vehicle Activity 23
4.6.2. Management Through the Work Zone 23
4.6.3. Construction Access Points 24
4.6.4. Oversize / Overmass (OSOM) Movements 24
4.6.5. Monitoring and Adjustments 24
4.7. Access to Properties and Side Roads 25
4.7.1. Property Access 25
4.7.2. Side Roads and Intersections 26
4.7.3. Advance Notification 26
4.7.4. Emergency Access 26

4.7.5. Industrial and Site Access Coordination ... 26
4.8. Pedestrians and Cyclists ... 27
4.8.1. Management Measures ... 27
4.8.2. Temporary Detours ... 27
4.8.3. Accessibility ... 27
4.9. Public Transport ... 28
4.9.1. Bus Access Through the Work Zone ... 28
4.9.2. Bus Stops ... 28
4.9.3. Passenger Safety and Assistance ... 28
4.9.4. Communication with Bus Operators ... 28
4.10. Emergency Services ... 28
4.10.1. Access Through the Work Zone ... 29
4.10.2. Communication Protocols ... 29
4.10.3. Site Emergency Response ... 30
4.10.4. Notification and Reporting ... 30
4.10.5. Emergency Contacts ... 30
4.10.6. External Emergency Contact Details ... 30
4.10.7. Nearest Emergency Services ... 31
4.11. Emergency Assembly and Muster Points ... 31
5. Construction Staging and Traffic Impacts ... 32
5.1. Blast Event Traffic Staging Strategy ... 33
5.2. Interface with Demolition Activities ... 33
5.3. Traffic Generation and Interaction with Public Traffic ... 34
5.4. Network Impacts and Mitigation Measures ... 34
5.4.1. Anticipated Impacts ... 34
5.4.2. Mitigation Measures ... 35
5.5. Weather and Environmental Impacts on Traffic ... 35
5.5.1. Weather Management Measures ... 35
5.5.2. Environmental Controls Interface ... 35
5.6. Contingency and Incident Management ... 35
5.6.1. Incident Response ... 35
5.6.2. Recovery and Review ... 35
5.7. Road Environment Classification and Applicable Traffic Category ... 36
5.8. Blast Day Operational Timeline ... 36
5.9. Construction Staging Plan – Summary Table ... 36
5.10. Traffic Control Deployment ... 37
6. Around, Past and Through Traffic Analysis ... 37
6.1. Traffic Travelling *Past* the Works ... 38
6.2. Traffic Travelling *Through* the Works ... 38
6.3. Traffic Travelling *Around* the Works ... 38
6.4. Heavy Vehicle and Freight Considerations ... 39
6.5. Network Performance Summary ... 39
7. Consultation and Communication ... 39
7.1. Stakeholder Identification ... 39
7.2. Consultation Objectives ... 40
7.3. Communication Methods ... 40
7.4. Timing of Notifications ... 40
7.5. Complaints and Enquiries ... 40
8. Traffic Control Devices and Installation ... 41
8.1. Signage Requirements ... 41
8.2. Installation and Removal ... 42
8.3. Installation Procedures ... 42
8.4. Removal Procedures ... 42
8.5. Maintenance and Inspections ... 42
8.6. Protection of Workers and Road Users ... 43
8.7. End-of-Queue Management ... 43
8.8. Inventory of Safety Barriers, Signs and Storage Locations ... 44
9. Monitoring, Audits and Compliance ... 44
9.1. Daily Inspections ... 44
9.2. Audits ... 44
9.3. Non-Conformance Management ... 45
9.4. Record Keeping ... 45
9.5. Compliance with Approvals ... 45
10. Incident Reporting and Emergency Response ... 46
10.1. Types of Incidents ... 46
10.2. Immediate Response ... 46
10.3. Communication and Escalation ... 46
10.3.1. Information Required for Initial Notification ... 46
10.4. Traffic Management During Incidents ... 47
10.5. Post-Incident Actions ... 47
10.6. Training and Preparedness ... 47
10.7. Traffic Incident Investigation Procedure ... 48
10.7.1. Initial Verification of Traffic Controls ... 48
10.7.2. Drive-Through and Video Recording ... 48
10.7.3. Reporting and Corrective Actions ... 48
10.7.4. Records and Review ... 48
10.8. Reporting of Investigation Outcomes and Lessons Learned ... 48
10.8.1. Investigation Reporting Format ... 49

10.8.2. Communication of Findings 49
10.8.3. Continuous Improvement 49
11. Safety and Amenity, Risk and Consultation 49
11.1. Safety and Amenity of Road Users and Stakeholders 49
11.1.1. Mitigation Strategies 50
11.2. Construction & Vehicle Management 50
11.3. Traffic Control Signs and Devices 50
11.4. Signage Placement 50
11.5. Specific Measures for this Project 51
11.5.1. Gates and Access Control Arrangements 51
11.5.2. Blast Exclusion Zone Verification 51
11.6. Traffic Control Inspections 52
11.7. Management of Unplanned Incidents 52
11.8. Management of Special Events 52
11.9. Climatic and Seasonal Conditions 53
11.10. Consultation Objectives 53
11.11. Reporting 53
12. Risk Assessment 53
12.1. Objectives of the Risk Assessment 53
12.2. Summary of Risk Management Approach 53
12.3. Risk Matrix 54
12.4. Detailed Traffic Risk Register 54
13. Health and Safety Responsibilities 56
13.1. Legislative Compliance 56
13.2. Shared Responsibilities 56
13.3. Worker and Traffic Control Crew Responsibilities 57
13.4. Safe Work Method Statements (SWMS) 57
14. TMP Review and Revision Process 57
14.1. Triggers for Review 57
14.2. Revision Procedure 58
14.3. Distribution of Revisions 58
14.4. Document Control 58

Appendices

Appendix A – Site Location Plans 59
Appendix B – Blast Exclusion Zone Plan 61
Appendix C – Traffic Guidance Schemes (TGS) 62
Appendix D – TGS Risk Assessment 74
Appendix E – Road Occupancy Licence (ROL) / Speed Zone Authorisation (SZA) 75
Appendix F – Detour Route Plans 76
Appendix G – VMS Strategy 78
Appendix H – Traffic Control Qualifications 83
Appendix I – Type Approval 84
Appendix J – TfNSW G Registration 86
Appendix K – SWMS 87

Tables

Table I – Document Information 2
Table II – Version Control 2
Table III – Document Preparation and Approval 2
Abbreviations 5
Table IV - TfNSW Traffic Control Qualifications 14
Table V - Traffic Management Key Contacts 16
Table VI - Traffic Management Emergency Contacts 16
Table VII – TGS Register 16
Table VIII – ROL Register 17
Table – Emergency Assembly and Muster Points ..... Error! Bookmark not defined.

Abbreviations

Abbreviation	Meaning
AGTTM	Austroads Guide to Temporary Traffic Management
ALARP	As Low As Reasonably Practicable
AS	Australian Standard
CAR	Corrective Action Report
DDA	Disability Discrimination Act 1992 (Cth)
HSEQ	Health, Safety, Environment, and Quality
HV	Heavy Rigid Vehicle
LV	Light Vehicle
MRV	Medium Rigid Vehicle
OSOM	Over Size Over Mass
PPE	Personal Protective Equipment

Abbreviation	Meaning
PTCD	Portable Traffic Control Device
PWZTMP	Prepare Work Zone Traffic Management Plan
PICOW	Person in Charge of Works
ROL	Road Occupancy Licence
ROLA	Road Occupancy Licence Application
SFAIRP	So Far As Is Reasonably Practicable
SWMS	Safe Work Method Statement
SZA	Speed Zone Authorisation
TC	Traffic Control
TCAWS	TfNSW Traffic Control at Work Sites Manual
TCS	Traffic Control Signals
TCTL	Traffic Control Team Leader
TGS	Traffic Guidance Scheme
TIMP	Traffic Incident Management Plan
TMD	Traffic Management Designer
TMI	Traffic Management Implementer
TMP	Traffic Management Plan
TMC	Transport Management Centre
TTM	Temporary Traffic Management
TfNSW	Transport for New South Wales
VMP	Vehicle Movement Plan
VMS	Variable Message Sign

2. Introduction

2.1. Purpose of this Traffic Management Plan

This Traffic Management Plan (TMP) has been prepared to outline the traffic management arrangements required to facilitate the safe demolition of chimney structures at the Liddell Power Station site.

The demolition works will involve a controlled explosive demolition of the chimney stacks, requiring the establishment of a temporary blast exclusion zone surrounding the site.
To ensure the safety of road users, workers and the surrounding community, temporary traffic management measures will be implemented on the surrounding road network external to the blast exclusion zone to prevent unauthorised access and control traffic movements during the demolition event.

This TMP identifies the traffic control measures required to:

- Support the implementation of road closures surrounding the blast exclusion zone
- Prevent vehicles and pedestrians from entering the blast exclusion zone during the demolition event
- Provide advance warning to motorists of temporary traffic stoppages and short-duration delays
- Minimise disruption to the surrounding road network
- Coordinate traffic control operations with NSW Police, the demolition team and relevant authorities
- Ensure compliance with relevant Transport for NSW (TfNSW), Austroads and legislative requirements
-

This plan has been developed to support the safe delivery of the demolition event while maintaining an appropriate level of service on the surrounding road network.

2.2. Project Overview

The project involves the demolition of the redundant chimney stacks located at the former Liddell Power Station coal-fired power station site.

The demolition will be undertaken using a controlled explosive demolition technique which will cause the structures to collapse within a defined exclusion zone.

Due to the nature of the demolition activity, temporary closures of surrounding roads will be required immediately prior to the blast and maintained until the site is confirmed safe following the demolition event.

The works will be coordinated by the project delivery team in consultation with Transport for NSW, NSW Police, and other relevant stakeholders.

Traffic management measures will be implemented to ensure the safe management of traffic on the surrounding road network during the demolition event.

2.3. Scope of Works

The scope of works covered by this Traffic Management Plan includes the temporary traffic management measures required to facilitate the chimney demolition event.

This TMP applies to traffic control measures implemented on the surrounding road network external to the blast exclusion zone, to support the safe execution of the demolition event.

Key activities include:

- Implementation of temporary road closures on surrounding roads
- Deployment of Traffic Controllers at designated control points
- Installation of advance warning signage and Variable Message Signs (VMS)
- Coordination with NSW Police for enforcement of road closures
- Monitoring and management of traffic queues during the closure period
- Progressive removal of traffic control measures following the demolition and reopening of roads

The establishment and management of the blast exclusion zone is undertaken by the demolition contractor in accordance with the Blast Management Plan (BMP).

Traffic management measures will be implemented to:

- Prevent vehicles and pedestrians from entering the blast exclusion zone
- Maintain controlled traffic stoppages immediately prior to and during the blast event
- Minimise driver distraction associated with the demolition event (e.g. dust plume, debris movement and visual stimuli), which may lead to sudden braking or erratic driver behaviour

The demolition event itself will occur over a short duration; however, traffic closures will be implemented immediately prior to the blast to ensure all roads leading into the exclusion zone are clear of vehicles and pedestrians.

2.4. Site Location

The demolition works will occur at the former Liddell Power Station located near Muswellbrook in the Upper Hunter region of New South Wales.

The surrounding road network servicing the site includes:

- New England Highway
- Hebden Road
- Thomas Mitchell Drive
- Lemington Road
- Jerrys Plains Road
- Golden Highway
-

The New England Highway is a major regional transport corridor connecting Singleton and Muswellbrook and carries both local and regional traffic including heavy vehicles.

Due to the proximity of the demolition site to the highway corridor and surrounding local roads, temporary traffic control measures will be required to prevent traffic entering the blast exclusion zone during the demolition event.

2.5. Objectives of the Traffic Management Plan

The primary objectives of this Traffic Management Plan are to:

- Ensure the safety of road users, workers and the general public during the demolition event
- Prevent unauthorised access to the blast exclusion zone
- Provide clear and effective traffic control arrangements during the demolition works
- Minimise disruption to the surrounding road network
- Provide appropriate advance warning to motorists approaching the area
- Coordinate traffic management activities with NSW Police and relevant authorities

- Ensure compliance with relevant Transport for NSW requirements and standards.

2.6. Scope of the TMP

This Traffic Management Plan applies specifically to the demolition blast event and the associated traffic management measures required to support the activity.

The TMP covers:

- Temporary traffic control arrangements
- Road closures
- Traffic control resources
- Advance warning signage
- Variable Message Sign (VMS) deployment
- Coordination with emergency services and NSW Police
- Traffic monitoring and management during the demolition blast event.

This TMP does not cover construction activities outside of the demolition blast event or other unrelated works occurring within the broader project area.

2.7. Project Program

The demolition blast is currently projected to occur during the week commencing 25 May 2026, subject to weather conditions and demolition readiness.

The demolition blast event will occur within the nominated working hours of:
0700 – 1500
Traffic control measures will be progressively implemented throughout the morning to establish road closures and ensure all roads leading into the blast exclusion zone are cleared prior to the demolition blast event.

The exact timing of the demolition blast will be confirmed on the day, following assessment of:

- Weather conditions
- Wind direction and atmospheric stability
- Demolition readiness and safety verification
-

Traffic stoppages associated with the blast are expected to be of short duration (approximately 10–15 minutes) and will be implemented immediately prior to the demolition blast event.

The timing of the demolition and associated traffic control operations remains indicative and subject to change on the day to ensure safe execution of the works.

2.8. Work Hours and Timing of Activities

Traffic management activities will be undertaken during the demolition day within the following working hours: **0700 – 1500**

Key activities will include:

- Site prestart and coordination meeting
- Deployment of traffic control crews
- Installation of advance warning signage
- Implementation of traffic closures prior to the blast
- Management of traffic during the blast countdown
- Post-blast inspection and confirmation of site safety
- Progressive reopening of roads following the all-clear.

Road closures associated with the blast are expected to remain in place for a short duration only. Traffic is anticipated to be held for approximately 10–15 minutes during the blast window and will be released once the Demolition Supervisor / Blast Control confirms the area is safe.

2.9. Applicable Standards and Referenced Documents

This Traffic Management Plan has been developed in accordance with relevant legislation, standards and guidance documents applicable to temporary traffic management within New South Wales.

2.9.1. Legislation

Relevant legislation includes:

- Road Transport Act 2013 (NSW)
- Work Health and Safety Act 2011 (NSW)
- Work Health and Safety Regulation 2025 (NSW)

2.9.2. TfNSW Specifications and Manuals

Relevant Transport for NSW documents include:

- Traffic Control at Work Sites (TCAWS) Manual
- TfNSW Specification G10 – Traffic Management
- Road Occupancy Manual
- Transport Management Centre requirements.

2.9.3. Austroads Guides and Australian Standards

Relevant Austroads and Australian Standards include:

- Austroads Guide to Temporary Traffic Management
- AS 1742.3 – Manual of Uniform Traffic Control Devices – Traffic Control for Works on Roads
- AS/NZS 3845 – Road Safety Barrier Systems
- AS 1906 – Retroreflective Materials and Devices for Road Traffic Control Purposes.

2.9.4. Contract and Project Documents

The following project documentation has informed the preparation of this TMP:

- Project demolition methodology
- Blast exclusion zone plans
- Traffic data and network information.

2.9.5. Supporting Project Documentation

Additional supporting documents include:

- Traffic count data for the surrounding road network
- Local traffic management plans for the Lake Liddell area
- Consultation outcomes with Transport for NSW and NSW Police.

2.10. Plan Revision and Document Control

This Traffic Management Plan will be reviewed and updated as required throughout the project to ensure that the traffic management arrangements remain appropriate for the works being undertaken.

Revisions may be required due to:

- Changes to the demolition program
- Updates to traffic management arrangements
- Changes to road conditions or traffic volumes
- Feedback from stakeholders or authorities.

-

All revisions to this document will be recorded in the document revision register.

2.11. Continuous Improvement

The project team is committed to continuous improvement in the delivery of traffic management activities.

Lessons learned during the implementation of traffic management measures will be reviewed and incorporated into future planning where appropriate.

Feedback from traffic control personnel, stakeholders and relevant authorities will be considered to improve safety outcomes and ensure the ongoing effectiveness of the traffic management arrangements.

2.12. Key Stakeholders

The demolition works at the Liddell Power Station require coordination between a number of stakeholders to ensure the safe implementation of traffic management measures and the successful execution of the demolition blast event.

Key stakeholders have been identified based on their involvement in the project, their responsibilities relating to traffic management, and their role in emergency response or regulatory oversight.

Coordination and communication between these stakeholders will be maintained throughout the planning and implementation phases of the demolition works.

2.12.1. Project Delivery Team

The project delivery team is responsible for the planning, coordination and execution of the demolition works and associated traffic management arrangements.

Role	Organisation	Responsibility
Project Manager	AGL Energy	Overall project delivery and coordination
Demolition Contractor	CMA Contracting	Management of demolition works
Traffic Management Provider	Traffic Control Contractor	Implementation of traffic control measures

2.12.2. Transport Authorities

Transport authorities will provide oversight of traffic management arrangements and ensure that road network impacts are appropriately managed.

Organisation	Role
Transport for NSW (TfNSW)	Oversight of traffic management arrangements on the state road network
Transport Management Centre (TMC)	Network coordination and incident response where required

2.12.3. NSW Police

NSW Police from the Hunter Valley Police District – Muswellbrook Local Area Command (LAC) will assist with traffic management and enforcement of road closures during the demolition blast event.
Police responsibilities may include:

- Supporting traffic control personnel at hard closure locations
- Ensuring compliance with road closures and exclusion zones
- Managing public safety on the surrounding road network

- Assisting with incident management if required

2.12.4. Emergency Services

Emergency services will be notified of the demolition blast event and associated traffic arrangements to ensure that appropriate emergency response capability is maintained.

Relevant emergency services include:

- NSW Ambulance
- NSW Fire and Rescue
- NSW Rural Fire Service (NSWRFS)
- NSW Police
- State Emergency Service (SES)

Emergency access will be maintained where required to allow rapid response in the event of an incident.

2.12.5. Local Government

Local government authorities may be consulted where required in relation to local road closures and potential impacts on the surrounding community.

Organisation	Role
Muswellbrook Shire Council	Local road authority and community liaison

2.12.6. Community and Road Users

Local residents, businesses and road users may be affected by temporary traffic closures associated with the demolition blast event.

Advance notification will be provided through:

- Variable Message Signs (VMS)
- Project communications
- Traffic control personnel on site.

These measures will assist in ensuring that road users are informed of the temporary closures.

3. Traffic Management Roles and Responsibilities

Effective traffic management for the demolition blast event requires coordination between the project team, traffic management provider, NSW Police and other stakeholders. Clear responsibilities are defined to ensure the safe implementation of traffic control measures and the protection of road users and workers during the demolition blast event.

Traffic management arrangements will be implemented in accordance with:

- Transport for NSW Traffic Control at Work Sites (TCAWS)
- Austroads Guide to Temporary Traffic Management
- AS 1742.3 – Traffic Control for Works on Roads
- Relevant Road Occupancy Licence (ROL) conditions where applicable

Traffic control measures will be implemented to manage temporary closures on the surrounding road network, including the New England Highway and connecting local roads surrounding the Liddell Power Station site.

3.1. Project And Traffic Management Responsibilities

Traffic management responsibilities for the demolition blast event are shared between the project owner, demolition contractor and traffic management provider.

3.1.1. AGL Energy (Project Owner / Client)

AGL Energy is responsible for the overall coordination of the demolition blast event and associated traffic management planning and approvals.

Responsibilities include:

- Approval and endorsement of the Traffic Management Plan (TMP)
- Coordination with Transport for NSW (TfNSW), Transport Management Centre (TMC), NSW Police and other stakeholders
- Ensuring appropriate traffic management strategies are developed for the demolition blast event
- Confirming demolition timing in coordination with traffic management requirements
- Ensuring compliance with applicable legislative and regulatory requirements

3.1.2. CMA Contracting (Demolition Contractor)

CMA Contracting is responsible for the execution of the demolition works and management of the blast exclusion zone in accordance with the Blast Management Plan (BMP).

Responsibilities include:

- Establishment and management of the blast exclusion zone
- Confirmation that the internal exclusion zone is clear prior to blast
- Coordination with traffic control personnel prior to blast initiation
- Authorisation of the blast countdown and execution of demolition activities
- Provision of the “all clear” following post-blast inspection

3.1.3. Traffic Management Provider

The Traffic Management Provider is responsible for the implementation and operation of traffic control measures in accordance with this TMP.

Responsibilities include:

- Implementation of Traffic Guidance Schemes (TGS)
- Establishment of road closures at designated control points
- Deployment of qualified traffic control personnel
- Monitoring traffic conditions and queue lengths
- Adjusting traffic management arrangements as required
- Coordination with NSW Police and project representatives
- Managing staged reopening of the road network following the all-clear

3.2. Traffic Management Sub-Contractor Responsibilities

3.2.1. Non-Working Traffic Control Supervisor (NWTCS)

The Non-Working Traffic Control Supervisor (NWTCS) is responsible for overseeing all traffic management operations.
Responsibilities include:

- Supervising traffic control personnel
- Ensuring compliance with approved Traffic Guidance Schemes
- Monitoring traffic conditions and closure points
- Coordinating traffic control activities with the demolition team and Blast Control
- Liaising with NSW Police and project representatives
- Providing direction where adjustments to traffic control are required

The NWTCS will maintain oversight of traffic management arrangements during pre-blast setup, demolition activities and reopening of the road network.

3.2.2. Traffic Control Team Leader

The Traffic Control Team Leader is responsible for managing the traffic control crew and ensuring the safe implementation of traffic control measures.

Responsibilities include:

- Coordinating traffic control crew deployment
- Conducting site briefings and toolbox talks
- Ensuring traffic control devices are installed correctly
- Maintaining communication with the NWTCS, demolition team and NSW Police
- Confirming that road closures are in place prior to the blast
- Managing controlled release of traffic following the all-clear issued by the Demolition Supervisor / Blast Control.

3.2.3. Traffic Control Crew

Traffic Control Crew members are responsible for implementing traffic control measures on site.

Responsibilities include:

- Installing and maintaining traffic control devices
- Controlling traffic where required
- Monitoring traffic conditions and queue lengths
- Reporting incidents, hazards or non-compliance to the Traffic Control Team Leader
- Ensuring road users comply with traffic control directions

Traffic Controllers will remain at their designated positions until the demolition blast event has been completed and the road network has been confirmed safe for reopening.

3.3. Traffic Control Personnel Qualifications

All traffic control personnel will comply with the traffic control qualifications detailed in Table IV below.

Table IV - TfNSW Traffic Control Qualifications

Control Traffic Role	**TfNSW Traffic Control Training Course**
Control traffic using a “Stop/Slow” bat	**Traffic Controller – RIISS00054**
Set up and work with Traffic Control Plans at a work site	**Implement Traffic Control Plans – RIISS00055**
Design a new Traffic Management Plan, produce upgrades of standard plans, and/or inspect traffic control on construction sites	**Prepare a Work Zone Traffic Management Plan – RIISS00056**
Operate a Truck Mounted Attenuator (TMA)	**Operate TMA - RIIRTM301E**

All personnel will hold current qualifications and will be competent in the implementation of traffic management arrangements in accordance with TfNSW requirements.

3.4. Traffic Management Resources

Traffic management resources will be deployed to safely manage traffic during the demolition blast event and maintain the blast exclusion zone.

3.4.1. Personnel

The following personnel will be deployed for the traffic control operations:

Role	**Estimated Number**
Non-Working Traffic Control Supervisor	1

Role	Estimated Number
Traffic Control Team Leader	1
Traffic Controllers	10–12
Police Officers	As required

Traffic controllers will be positioned at key closure points surrounding the demolition exclusion zone.

3.4.2. Vehicles & Plant

Traffic control vehicles and plant will be used to transport personnel, install traffic control devices and provide protection and visibility for traffic control operations.

Vehicles and plant will include:

- Traffic control utility vehicles
- Traffic Control Vehicles (TCVs) used as shadow vehicles / hard cover
- Truck Mounted Attenuators (TMA) deployed on the primary 100 km/h approaches to closure points
- Traffic control trailers
- UHF radio communication equipment

TMAs and TCVs will be positioned in accordance with approved Traffic Guidance Schemes (TGS) to provide physical protection to traffic control personnel from errant vehicles and to enhance advance warning to approaching motorists.

3.4.3. Traffic Control Devices

Traffic control devices will be installed in accordance with TfNSW requirements.

Devices may include:

- Portable Traffic Control Devices (PTCD)
- Advance warning signage
- Road closure signage
- Traffic cones and delineation devices
- Variable Message Signs (VMS)

A total of five (5) VMS boards will be deployed on the major approaches to provide advance warning of temporary traffic stoppages and expected delays.

3.4.4. Monitoring & Adjustments

Traffic conditions will be monitored throughout the demolition event to ensure safe traffic operations.

Monitoring will include:

- Observation of queue lengths
- Monitoring compliance with road closures
- Adjustments to traffic control positions if required
- Communication with NSW Police and project staff.

Traffic control arrangements may be adjusted in response to changing conditions to maintain safe and efficient traffic flow.

3.5. Traffic Management Key Contacts

Key personnel involved in the implementation of traffic management arrangements are listed below.

Table V - Traffic Management Key Contacts

Role	Function	Organisation	Contact
Project Manager	**Project Coordination (Demolition)**	AGL Energy	James Coventry – 0427 517 017
Project Supervisor	**Demolition Operations**	CMA Contracting	Todd Solomon – 0400 886 842
Site H&S Manager	**Safety / Exclusion Zone Oversight**	AGL Energy	Anthony Flintham
Traffic Control Supervisor (NWTCS)	**Traffic Management Lead (Road Closures)**	Traffic Contractor	[Insert Name / Number]
Traffic Control Team Leader	**On-site Traffic Operations**	Traffic Contractor	[Insert Name / Number]
TfNSW Representative	**Network Oversight**	Transport for NSW	Kylie Skinner
TfNSW Representative	**Network Oversight**	Transport for NSW	Mitchell Parsons
Police Representative	**Road Closure Enforcement**	Muswellbrook LAC	Inspector Todd Hobson

Table VI - Traffic Management Emergency Contacts

Organisation	Role	Contact
Emergency Services	Primary Emergency Contact	000
NSW Police	Law Enforcement / Traffic Control Support	Muswellbrook LAC
NSW Ambulance	Medical Response	000
Fire and Rescue NSW	Structural / Fire Response	000
NSW Rural Fire Service (NSWRFS)	**Primary Response (Rural Areas)**	000

Responsibilities are divided between demolition operations and traffic management functions. Demolition activities and internal exclusion zone control are managed by CMA Contracting, while traffic control measures and management of motorist exclusion zones on the surrounding road network are implemented by the Traffic Management Provider.

4. Traffic Management System

4.1. Traffic Guidance Scheme's

Traffic Guidance Schemes (TGS) will be prepared and implemented in accordance with the requirements of:

- Transport for NSW Traffic Control at Work Sites (TCAWS)
- Austroads Guide to Temporary Traffic Management
- AS 1742.3 – Traffic Control for Works on Roads.

TGS drawings will define the placement of traffic control devices including advance warning signage, road closures and traffic controller locations required to establish the demolition blast exclusion zone.

Table VII – TGS Register

TGS No	Description	Location
TGS 01	New England Hwy Northbound Closure	Thomas Mitchell Dr
TGS 02	Hebden Rd Closure North	New England Hwy Intersection
TGS 03	Hebden Rd Closure South	New England Hwy Intersection
TGS 04	Lemington Rd Stop / Slow Closure	New England Hwy
TGS 05	Liddell / Bayswater Overpass Closure	Overpass Ramps
TGS 06	Pikes Gully Rd Ramp Closure	NB On-Ramp

4.1.1. Implementation & Control

Traffic Guidance Schemes will be implemented by qualified traffic control personnel under the supervision of the Traffic Control Team Leader and Non-Working Traffic Control Supervisor.

All traffic control devices will be installed prior to the demolition event and inspected to ensure compliance with approved plans.

Traffic controllers will maintain positions at closure points until the demolition blast has been completed and the all-clear has been issued.

4.1.2. Amendments to TGSs

Where site conditions differ from those shown on the Traffic Guidance Scheme drawings, adjustments may be required.

Any amendments will be approved by the Traffic Control Team Leader or the Non-Working Traffic Control Supervisor and recorded where required.

4.2. Road Occupancy Licence

Where required, a Road Occupancy Licence (ROL) will be obtained for the temporary closure of roads associated with the demolition blast event.

The ROL will specify the approved closure locations, duration and traffic management requirements.

Table VIII – ROL Register

ROL Number	Road	Location	Duration
XXXXXX	New England Hwy	Liddell Power Station	Blast Window

4.2.1. ROL Location and Extent

The Road Occupancy Licence (ROL) applies to works undertaken on the state road network, including the:

- New England Highway
- Associated ramps and connections to the state road network

Temporary closures of the New England Highway will be implemented under the approved ROL to support the demolition event.

Local and regional roads surrounding the site, including:

- Hebden Road
- Thomas Mitchell Drive
- Lemington Road

are outside the TfNSW state road network and will be managed in accordance with relevant local authority requirements and in coordination with NSW Police.

These roads form part of the broader traffic management arrangements to support the blast exclusion zone; however, they are not subject to the TfNSW ROL unless specifically included in approval conditions.

All roads within the defined closure area will be temporarily closed prior to the demolition to ensure that the blast exclusion zone is clear of vehicles and pedestrians.

4.2.2. ROL Times and Duration

Traffic closures will occur during the demolition window.

Traffic is expected to be held for approximately 10–15 minutes during the blast countdown and demolition event.

Roads will be reopened following confirmation from the Demolition Supervisor / Blast Control that the site is safe.

4.2.3. Compliance with ROL Conditions

All traffic management measures will comply with the conditions specified in the Road Occupancy Licence including:

- Approved closure times
- Traffic control arrangements
- Communication with the Transport Management Centre if required.

4.2.4. Contingency and Extensions

If the demolition event is delayed due to weather or operational issues, the closure period may be extended within the permitted time window.

Traffic management arrangements will remain in place until the demolition event has been completed safely.

4.3. Speed Zone Authorisations

Temporary speed reductions may be implemented where required to safely manage approaching traffic.

Speed reductions will be applied in accordance with approved Speed Zone Authorisations (SZA) where required.

4.3.1. Requested Speed Reductions

Where required, temporary speed reductions may be implemented on approach roads to warn drivers of the upcoming road closures and traffic control.

4.3.2. Application Periods

Temporary speed limit signage will be installed in accordance with TfNSW guidelines and removed following completion of the works.

4.3.3. Implementation of Speed Zones

Temporary traffic delays are expected during the demolition event due to short-term road closures required to establish the blast exclusion zone.
Traffic is expected to be held for approximately 10–15 minutes during the blast window.

4.4. Traffic Delays & Queuing

Temporary traffic delays are expected during the demolition blast event due to the short-duration road closures required to establish the blast exclusion zone surrounding the Liddell Power Station site.

To ensure the safety of road users, workers and surrounding infrastructure, traffic will be temporarily stopped on the New England Highway and surrounding local roads during the blast countdown and demolition event.

The duration of these closures is expected to be approximately 10 to 15 minutes, including the final clearance of the blast exclusion zone, the demolition event itself, and confirmation of the all-clear following the blast.

Due to the short duration of the closures, traffic delays will be temporary and queues are expected to dissipate shortly after traffic is released.

Traffic controllers will monitor traffic conditions throughout the closure period and coordinate the release of traffic once the Demolition Supervisor / Blast Controlconfirms that the area is safe.

4.4.1. Anticipated Impacts

Temporary traffic impacts may occur on the following roads:

- New England Highway
- Hebden Road
- Thomas Mitchell Drive
- Lemington Road
- Pikes Gully Road ramps
- Local access roads within the Lake Liddell area.

The most significant traffic impacts are expected to occur on the New England Highway due to the higher traffic volumes carried by this corridor.

Local roads servicing the Lake Liddell area carry significantly lower traffic volumes and are expected to experience minimal queueing during the temporary closures.

4.4.2. Queue Length Monitoring

Traffic controllers positioned at each closure point will monitor traffic queues throughout the closure period.

Queue monitoring will include:

- Visual observation of queue lengths
- Monitoring proximity of queues to nearby intersections
- Communication with the Traffic Control Team Leader and Non-Working Traffic Control Supervisor
- Coordination with NSW Police where required.

If queues extend toward adjacent intersections or present a potential safety concern, adjustments to traffic control arrangements may be implemented in consultation with NSW Police and the Traffic Control Team Leader.

4.4.3. Quantified Queue and Delay Assessment

Traffic count data collected on the New England Highway indicates an average daily traffic volume of approximately 4,300–4,400 vehicles per day near the project location.
For rural highways, peak hour traffic volumes typically represent approximately 10–12% of the Average Daily Traffic (AADT).
Applying a conservative 12% peak hour factor, the estimated peak hour traffic volume on the highway is:

- Approximately 525 vehicles per hour (two-way)
- Approximately 260 vehicles per hour per direction

During the demolition blast event, traffic will be temporarily stopped at designated closure points for approximately 10 to 15 minutes while the blast exclusion zone is established and the demolition is undertaken.

Vehicles Accumulating During Closure

Based on the estimated peak hour traffic volume:

- 10-minute closure:
  Approximately 40–45 vehicles per direction
- 15-minute closure:
  Approximately 60–70 vehicles per direction

Estimated Queue Length

Queue lengths are estimated using a typical standing vehicle spacing of approximately 8 metres per vehicle, representing mixed traffic conditions including light and heavy vehicles.
Estimated queue lengths are:

- 10-minute closure:
  Approximately 300–350 metres per direction
- 15-minute closure:
  Approximately 500–550 metres per direction

Local Road Network

Traffic volumes on surrounding local roads, including Hebden Road and Thomas Mitchell Drive, are significantly lower than those on the New England Highway.
Traffic monitoring undertaken for the Lake Liddell area indicates peak flows on these roads typically range between 44 and 56 vehicles per hour.
Given these relatively low traffic volumes and the short duration of the demolition closure, queues on local roads are expected to remain minimal and clear quickly once traffic is released.

Queue Dissipation

Following completion of the demolition blast and confirmation that the area is safe, traffic will be progressively released from closure points.
Due to the short duration of the closure and available road capacity along the highway corridor, queues are expected to dissipate rapidly once traffic flow resumes.
Queue clearance is anticipated to occur within approximately 3 to 6 minutes following reopening of the road network.

4.4.4. Peak Period Management

To minimise traffic disruption during the demolition event, several traffic management measures will be implemented including:

- Advance warning through Variable Message Signs (VMS) on all major approaches
- Coordination with NSW Police at key closure locations
- Monitoring of queue lengths by traffic control personnel
- Rapid reopening of roads following the demolition event.

These measures will assist in reducing traffic impacts and ensuring the safe and efficient management of traffic during the demolition event.

4.4.5. Acceptability of Temporary Queues

Temporary traffic queues associated with the demolition blast event are considered acceptable due to the short duration and controlled nature of the activity.

The road closures required to establish the blast exclusion zone are expected to remain in place for approximately 10 to 15 minutes, which represents a very short interruption to traffic operations on the surrounding road network.

The demolition blast itself will occur within a matter of seconds, and traffic will be released immediately following confirmation from the Demolition Supervisor / Blast Control that the area is safe.

While temporary queues may develop on the New England Highway, these queues are expected to dissipate rapidly once traffic flow resumes due to the operating speeds and available road capacity along the highway corridor.

Advance notification will be provided to motorists through the use of Variable Message Signs (VMS) and traffic control personnel, allowing drivers to plan alternative routes where appropriate,

Given the short duration of the closures, the temporary nature of the activity, and the implementation of appropriate traffic management measures, the anticipated traffic delays are considered manageable and acceptable for the safe delivery of the demolition works.

4.4.6. Safety and Risk Consideration

The temporary suspension of traffic during the demolition blast is required to manage risks associated with the controlled explosive demolition of large structures.
Key risks to road users include:

- Potential debris projection beyond the immediate demolition footprint
- Generation of a dust plume impacting driver visibility
- Unpredictable structural behaviour during collapse
- Driver distraction caused by visual stimuli associated with the demolition event (e.g. collapse, dust movement), increasing the likelihood of sudden braking or erratic driver behaviour

To eliminate these risks, a full traffic stoppage will be implemented to ensure that no vehicles or pedestrians are present within, or approaching, the blast exclusion zone during the demolition event.
Alternative traffic management options, including maintaining traffic flow past the site or implementing partial lane closures, were considered but deemed unsuitable due to:

- Inability to control driver behaviour in response to the demolition event
- Increased risk of rear-end collisions due to sudden speed changes
- Potential exposure of road users to debris and reduced visibility conditions

The selected control measure (temporary full road closure) has been determined in accordance with the principle of So Far As Is Reasonably Practicable (SFAIRP), as required under the Work Health and Safety legislation.
The closure duration has been minimised (approximately 10–15 minutes) to balance safety outcomes with network performance.
Accordingly, the implementation of a short-duration full closure represents the most effective and reasonably practicable control measure to eliminate or minimise risk to road users and the public.
Temporary traffic delays and queueing associated with this control are considered acceptable when balanced against the significant safety benefits achieved.

4.5. Variable Message Sign (VMS) Strategy

4.5.1. Purpose

Variable Message Signs (VMS) will be deployed to provide advance and real-time notification to motorists regarding temporary traffic stoppages associated with the Liddell Power Station demolition event.
The objectives of the VMS strategy are to:

- Provide early warning of upcoming traffic stoppages on the New England Highway
- Inform motorists of potential short-duration delays
- Reduce the likelihood of sudden braking and rear-end collisions in a high-speed (100 km/h) environment
- Support safe and efficient traffic management during the blast event
- Assist in managing driver expectations without unnecessarily diverting traffic from the network

4.5.2. Messaging Strategy

VMS messaging will be staged to reflect the evolving traffic conditions before and during the demolition event.

VMS will be deployed in advance of the works to notify motorists of upcoming disruption.

Prior to works
FRAME 1
NEW ENG HWY
LIDDELL
CLOSURE

FRAME 2
25-26 MAY
EXPECT
DELAYS

During the works
FRAME 1
NEW ENG HWY
CLOSED
TO XX PM

FRAME 2
EXPECT
DELAYS

Messaging will be reviewed and adjusted in real time by the Traffic Control Supervisor in coordination with the Transport Management Centre (TMC), where applicable.

4.5.3. VMS Deployment Locations

VMS units will be positioned on key approaches to the work area to maximise visibility and provide sufficient advance warning to motorists.
Indicative locations include:

- New England Highway – northern and southern approaches to the closure extents
- Strategic upstream locations to intercept regional traffic
- Key decision points where motorists may alter travel behaviour

All VMS placements will:

- Be located outside of live traffic lanes
- Maintain required clear zones
- Comply with TCAWS, AGTTM, and ROL conditions

Final locations will be confirmed in consultation with TfNSW and TMC.

4.5.4. Coordination with Transport Management Centre (TMC)

VMS messaging and deployment will be coordinated with the Transport Management Centre (TMC) to ensure consistency with network-wide communication strategies.
This will include:

- Notification to TMC prior to activation of traffic control measures
- Coordination of messaging with any existing network VMS or overhead gantries
- Adjustment of messaging based on real-time traffic conditions
- Provision of updates to TMC during the demolition event

Where applicable, messaging may be mirrored or supported via:

- Live Traffic NSW updates
- TfNSW-controlled VMS infrastructure

4.5.5. Justification of Strategy

The VMS strategy has been developed to reflect the short-duration nature of the demolition event and associated traffic stoppages.
Key considerations include:

- Traffic will be stopped for a short duration only (approximately 10–15 minutes)
- Full detours via alternative routes (e.g. Golden Highway) would result in significantly longer delays (~1 hour)
- As such, detour messaging is not considered appropriate for general traffic

The strategy therefore focuses on:

- Informing motorists of short delays rather than long-term closures
- Avoiding unnecessary diversion of traffic
- Maintaining efficiency of the surrounding road network
- Supporting a controlled and safe traffic environment during the demolition event

4.6. Heavy Vehicle and OSOM Movements

The surrounding road network servicing the demolition works includes the New England Highway, which functions as a key regional freight corridor connecting the Upper Hunter region with Singleton, Muswellbrook and the broader NSW road network.

As a result, the highway carries a proportion of heavy vehicle traffic including freight vehicles, mining-related transport and service vehicles.

Temporary traffic control measures implemented for the demolition blast event will account for the presence of heavy vehicles to ensure safe stopping distances, appropriate queue management and controlled release of traffic following the blast.

Heavy vehicles approaching closure points will be held in queues along with general traffic during the temporary road closures.

4.6.1. Anticipated Heavy Vehicle Activity

The New England Highway is commonly used by heavy vehicles servicing regional freight and mining operations.

Heavy vehicle traffic on the corridor may include:

- B-doubles and semi-trailers
- rigid heavy vehicles
- service and maintenance vehicles associated with mining operations
- construction and maintenance vehicles.

Heavy vehicles may also utilise nearby routes including:

- Hebden Road
- Lemington Road
- Thomas Mitchell Drive
- Golden Highway.

Due to the short duration of the demolition closure, heavy vehicles approaching the work zone will be temporarily held at traffic control points until the all-clear is issued.

4.6.2. Management Through the Work Zone

Heavy vehicles will be managed through the work zone using standard traffic control procedures.

Traffic controllers will ensure that:

- heavy vehicles are safely stopped at designated closure points
- sufficient queue spacing is maintained
- heavy vehicles are able to accelerate safely when traffic is released
- traffic flows are released gradually to prevent congestion or merging conflicts.

Due to the higher stopping distances required by heavy vehicles, traffic control signage and warning devices will be positioned in accordance with TfNSW guidelines to provide adequate advance notice to approaching drivers.

4.6.3. Construction Access Points

Construction access to the demolition site will occur via designated site access points associated with the power station facility.

Access points will be managed to ensure that construction vehicles and authorised vehicles, including NSW Police vehicles, entering or exiting the site do not interfere with the temporary traffic control arrangements.

Construction and authorised vehicles will only access the site when permitted by site management and traffic control personnel.

Where required, traffic controllers will assist vehicles entering or exiting the site to ensure safe interaction with public traffic and maintain the integrity of closure points.

NSW Police vehicles may be required to move between closure points or access the site during the demolition event to support enforcement and operational requirements. These movements will be coordinated with the Traffic Control Team Leader and Non-Working Traffic Control Supervisor to ensure safe passage.

4.6.4. Oversize / Overmass (OSOM) Movements

Oversize and Overmass (OSOM) vehicles may operate along the New England Highway as part of regional freight and mining-related transport activities.

Where OSOM vehicles are scheduled to travel through the affected area during the demolition event, coordination will be undertaken with the Transport Management Centre (TMC) to identify and manage any permitted movements prior to implementation of road closures.

Where practical:

- Advance notification will be provided to TMC to identify active OSOM permits on the network
- OSOM operators may be advised of the planned closure window to avoid arrival during the demolition event

OSOM vehicles approaching the closure area during the temporary stoppage will be:

- Held at designated traffic control points
- Managed in coordination with NSW Police and traffic control personnel
- Released following the all-clear once the road network is confirmed safe

Due to the short duration of the closure (approximately 10–15 minutes), impacts to OSOM movements are expected to be minimal and manageable.

4.6.5. Monitoring and Adjustments

Traffic conditions will be monitored throughout the demolition event by the Traffic Control Team Leader and Non-Working Traffic Control Supervisor.

Monitoring will include:

- observation of heavy vehicle queues
- coordination with NSW Police at closure points
- monitoring of vehicle behaviour and traffic conditions
- adjustments to traffic control arrangements where required.

If heavy vehicle queues approach unsafe lengths or begin to affect nearby intersections, adjustments may be implemented in consultation with NSW Police to ensure the safe and efficient management of traffic.

4.7. Access to Properties and Side Roads

The blast exclusion zone for the demolition event is defined and controlled under the project Blast Management Plan (BMP).

Traffic management measures described in this TMP apply to the surrounding road network external to the blast exclusion zone and are implemented to control access to roads leading into the exclusion area.

Temporary road closures will be established on the surrounding road network, including the New England Highway and connecting local roads, to prevent vehicles and pedestrians from entering the exclusion zone during the demolition event.

Access restrictions will be in place for a short duration (approximately 10–15 minutes) and will be lifted once the Demolition Supervisor / Blast Control confirms that the area has been inspected and declared safe.

Traffic controllers and NSW Police will manage access at designated closure points to ensure compliance with road closures.

Prior to the implementation of full road closures, traffic control personnel will confirm that all roads leading into the exclusion zone are clear of vehicles to ensure that no road users are inadvertently contained within the closure area.

Following the demolition event, closures will remain in place until:

- The Demolition Supervisor / Blast Controlprovides the “all clear”
- The surrounding road network has been inspected and confirmed safe

Traffic will then be released in a controlled and staged manner.

4.7.1. Property Access

Access to properties, industrial facilities and operational sites within or adjacent to the closure area, including Liddell Power Station and Bayswater Power Station, will be temporarily restricted during the demolition event.

To manage access:

- AGL will coordinate with site operators and stakeholders to ensure that all required vehicle movements occur prior to implementation of road closures
- No vehicle access will be permitted into the closure area once the blast exclusion zone is enforced
- Traffic control personnel and NSW Police will manage access at designated control points

Access restrictions are expected to be short-term (approximately 10–15 minutes) and will be lifted once the Demolition Supervisor / Blast Control confirms that the area is safe.

4.7.2. Side Roads and Intersections

Side roads and intersections connecting to the affected road network will be controlled to prevent vehicles entering the blast exclusion zone.

Traffic controllers and NSW Police will be positioned at key locations including:

- New England Highway / Hebden Road
- New England Highway / Lemington Road
- Thomas Mitchell Drive
- Old New England Highway connections
- Pikes Gully Road ramp access
- Liddell and Bayswater overpass access points

Vehicles approaching these locations will be stopped and held until the demolition event has been completed and the all-clear has been issued.

4.7.3. Advance Notification

Advance notification will be provided to road users to minimise disruption associated with the temporary road closures.

Notification measures will include:

- Variable Message Signs (VMS) positioned on major approaches
- Advance warning signage installed in accordance with TfNSW requirements
- Traffic control personnel directing vehicles at closure points
- Coordination with NSW Police to assist with enforcement of closures

VMS messaging will focus on advising motorists of short-duration traffic stoppages and delays, rather than long-term closures or detours, due to the limited duration of the demolition event.

4.7.4. Emergency Access

Emergency access will be maintained wherever practicable throughout the demolition event.

Emergency services including NSW Police, NSW Ambulance, Fire and Rescue NSW and NSW Rural Fire Service (NSWRFS) will be notified of the demolition works and associated traffic management arrangements prior to the event.

Where an emergency vehicle requires access during the closure period, traffic controllers will coordinate with the Traffic Control Team Leader and NSW Police to facilitate safe passage where practicable.

If emergency access into the exclusion zone is required during the final blast countdown period, demolition activities may be temporarily suspended until the situation has been safely managed.

4.7.5. Industrial and Site Access Coordination

There are multiple access points within the vicinity of the demolition works used by power station and mine personnel associated with operations at Liddell and Bayswater Power Stations.

Access to these locations will be coordinated directly with AGL to ensure that operational movements are managed safely during the demolition event.

Coordination measures will ensure that:

- Vehicles do not enter the blast exclusion zone during the demolition event
- Site personnel are aware of the temporary road closures
- Access movements are completed prior to the implementation of full closures

Once closures are in place, access through the affected road network will not be permitted until the demolition event has been completed and the site has been declared safe.
Traffic control personnel will coordinate with AGL representatives to ensure that local access requirements are managed safely throughout the demolition operations.

4.8. Pedestrians and Cyclists

Pedestrian and cyclist activity in the vicinity of the demolition works at the Liddell Power Station is expected to be minimal due to the rural and industrial nature of the surrounding area.

The primary affected road corridor, the New England Highway, functions primarily as a regional highway carrying vehicle and freight traffic and does not include dedicated pedestrian infrastructure in the immediate vicinity of the demolition site.

Local roads within the Lake Liddell area may occasionally be used by recreational cyclists; however, volumes are expected to be very low.

Traffic management measures will ensure that pedestrians and cyclists are prevented from entering the blast exclusion zone during the demolition event

4.8.1. Management Measures

Traffic control personnel and NSW Police will monitor access points and intersections surrounding the demolition site to ensure that pedestrians and cyclists do not enter the blast exclusion zone.

Where pedestrians or cyclists approach closure points, traffic control personnel will provide directions and advise them of the temporary road closures.

Pedestrians and cyclists will not be permitted to proceed beyond the designated closure points until the demolition event has been completed and the all-clear has been issued.

4.8.2. Temporary Detours

Due to the temporary road closures required to establish the blast exclusion zone, pedestrians and cyclists approaching the closure points will be required to be held at control/closure points with motorists.

Given the short duration of the demolition closure period, pedestrians and cyclists will be temporarily held at closure points until the roads are reopened.

4.8.3. Accessibility

The surrounding road network does not include dedicated pedestrian facilities such as footpaths or formal crossing points within the immediate vicinity of the demolition works.

Due to the rural environment and limited pedestrian activity in the area, accessibility impacts associated with the temporary road closures are expected to be minimal.

Traffic control personnel will assist any pedestrians requiring access or direction during the demolition event to ensure their safety.

4.9. Public Transport

Public transport services in the vicinity of the demolition works at the Liddell Power Station are limited due to the rural and industrial nature of the surrounding area.

The primary affected corridor, the New England Highway, primarily services regional vehicle and freight traffic and is not known to carry regular passenger bus services within the immediate vicinity of the demolition site.

Based on the current network conditions, public transport impacts associated with the temporary road closures are expected to be minimal.

4.9.1. Bus Access Through the Work Zone

No scheduled bus routes are known to operate directly through the immediate demolition area.

Should any bus services approach the closure points during the demolition event, they will be managed in the same manner as general traffic and temporarily held until the demolition event has been completed and the all-clear has been issued.

Due to the short duration of the closures (approximately 10–15 minutes), impacts to any potential bus services are expected to be minimal.

4.9.2. Bus Stops

There are no known formal bus stops located external to the blast exclusion zone or immediately adjacent to the affected sections of the road network.

As a result, no bus stop relocations or temporary closures are anticipated as part of the demolition works.

4.9.3. Passenger Safety and Assistance

Given the limited presence of public transport services in the area, passenger safety risks associated with the demolition works are considered low.

Traffic control personnel will monitor closure points and provide directions to any passengers or road users requiring assistance during the demolition event.

Pedestrians and passengers will not be permitted to enter the blast exclusion zone while demolition activities are underway.

4.9.4. Communication with Bus Operators

Although regular public transport services are not expected to be affected, relevant transport operators may be notified of the demolition event and associated road closures where appropriate.

Advance notification will also be provided to road users through the deployment of Variable Message Signs (VMS) and traffic control signage advising of temporary road closures.

4.10. Emergency Services

Emergency services coordination is critical during the demolition blast event to ensure that emergency response capability is maintained while temporary road closures are in place.

Emergency services including:

- NSW Police
- NSW Ambulance

- Fire and Rescue NSW
- NSW Rural Fire Service (NSWRFS)

will be notified of the demolition event and associated traffic management arrangements prior to the works being undertaken.

Depending on location and incident type, NSWRFS may act as the primary response agency for areas affected by the planned road closures, particularly within rural or non-urban sections of the road network.

Temporary road closures required to support the blast exclusion zone will be implemented for a short duration only, and traffic will be released immediately following confirmation that the site is safe.

Where practicable, emergency access will be maintained throughout the demolition event.

4.10.1. Access Through the Work Zone

Traffic control arrangements will ensure that emergency vehicles are able to access the surrounding road network where safe to do so.

Traffic controllers positioned at closure points will coordinate with the Traffic Control Team Leader and NSW Police to allow emergency vehicles to pass through closure points where required.

If an emergency vehicle requires access to an area within the blast exclusion zone during the demolition preparation period, traffic control personnel will coordinate with the Demolition Supervisor / Blast Control to determine whether access can be safely provided.

During the final blast countdown period, access within the exclusion zone may be restricted until the demolition event has been completed and the area confirmed safe.

4.10.2. Communication Protocols

Incident management will be undertaken in accordance with the project Incident Management Procedures and Section 10 – Incident Reporting and Emergency Response of this TMP.

In the event of an incident:

- Traffic controllers will immediately secure the site and stop traffic where required
- The Traffic Control Team Leader and Site Supervisor will be notified immediately
- The Non-Working Traffic Control Supervisor (NWTCS) will assess the situation and implement additional traffic control measures if required
- Emergency services will be contacted where necessary

Relevant authorities will be notified where required, including:

- NSW Police
- SafeWork NSW
- Transport for NSW (where applicable)
- NSW Rural Fire Service (NSWRFS), where relevant
- Other regulatory authorities depending on the nature of the incident

All incidents will be:

- Recorded in accordance with project safety procedures
- Investigated to determine root cause
- Managed to ensure appropriate corrective actions are implemented

Traffic management arrangements will only be reinstated, or demolition activities resumed, once the incident has been resolved and the site has been confirmed safe.

4.10.3. Site Emergency Response

In the event of an incident or emergency during the demolition works, the following actions will be undertaken:

- Traffic controllers will immediately secure the site and stop traffic where required.
- The Traffic Control Team Leader and Site Supervisor will be notified immediately.
- Emergency services will be contacted if required.
- Construction activities will be suspended until the situation has been assessed.
- Emergency services will be provided with access to the site where safe to do so.

The demolition works will only resume once the emergency situation has been resolved and the site has been confirmed safe.

4.10.4. Notification and Reporting

Emergency incidents will be reported in accordance with the project incident management procedures.
Relevant authorities will be notified where required, including:

- NSW Police
- SafeWork NSW
- Transport for NSW (where required)
- other regulatory authorities depending on the nature of the incident.

Incident details will be recorded and investigated in accordance with project safety procedures.

4.10.5. Emergency Contacts

Emergency contact details will be provided to all project personnel prior to the demolition event.

These details will be communicated via:

- Pre-start briefings
- Traffic control crew briefings
- Site office emergency contact boards
- Any site-specific induction materials (where applicable)

All personnel must be familiar with the emergency contact hierarchy and escalation procedures.

4.10.6. External Emergency Contact Details

Organisation / Service	Role / Type	Contact Number	Responsible Person
Emergency Services	Police / Fire / Ambulance	000 (or 112 mobile)	Any person in emergency
NSW Police	Traffic Control / Enforcement	Muswellbrook LAC	Traffic Control Supervisor / Project Representative
NSW Ambulance	Medical Response	000	Any person in emergency
Fire and Rescue NSW	Fire / Rescue Response	000	Any person in emergency
NSW Rural Fire Service (NSWRFS)	Rural Fire / Emergency Response	000	Any person in emergency
SafeWork NSW	Workplace Safety Regulator	13 10 50	Project Manager / WHS Representative
Transport for NSW	Network Management / Incident Notification	TMC / 131 700	Project Manager / Traffic Supervisor

4.10.7. Nearest Emergency Services

The nearest emergency services facilities servicing the project area include emergency services located in the Muswellbrook and Singleton regions.

These facilities provide emergency response coverage to the surrounding road network including the New England Highway corridor and the Lake Liddell area.

Distances and travel times may vary depending on the specific location of emergency services and traffic conditions at the time of the incident.

Emergency services representatives may also be present on site during the demolition event to assist with coordination and emergency response if required.

Organisation / Facility	Service Type	Location	Approx. Distance from Site	Contact
Muswellbrook Police Station	NSW Police	Muswellbrook	~15 km	131 444 (non-emergency) / 000
Muswellbrook Fire and Rescue Station	Fire & Rescue NSW	Muswellbrook	~15 km	000
Muswellbrook Ambulance Station	NSW Ambulance	Muswellbrook	~15 km	000
Muswellbrook District Hospital	Hospital / Emergency Department	Muswellbrook	~16 km	(02) 6542 2000
Singleton Fire Station	Fire & Rescue NSW	Singleton	~30 km	000
Singleton Police Station	NSW Police	Singleton	~30 km	131 444

The above emergency service facilities provide primary response coverage for the road network surrounding the demolition works, including the New England Highway corridor and Lake Liddell area. Response distances are indicative only and may vary depending on operational availability and traffic conditions at the time of an incident.

4.11. Emergency Assembly and Muster Points

Emergency assembly and muster points will be established to ensure that traffic management personnel and site workers can safely assemble and be accounted for in the event of an emergency during the demolition event.

This section applies to traffic management operations and coordination with site emergency procedures, noting that overall emergency management is governed by the project emergency and safety plans.

All personnel, including traffic control crews, will be briefed on muster point locations during pre-start briefings prior to the demolition event.

Muster points will be:

- Located outside the blast exclusion zone
- Positioned to maintain safe separation from demolition activities and live traffic

Emergency Assembly and Muster Points

Muster Point	Location Description	Personnel Assigned	Responsible Supervisor	Notes
MP1	Primary site muster point (outside exclusion zone)	Demolition crew and site staff	Site Supervisor (CMA)	Primary assembly location
MP2	Traffic control muster point at staging area	Traffic control personnel	Traffic Control Team Leader	Traffic crew assembly

Muster Point	Location Description	Personnel Assigned	Responsible Supervisor	Notes
MP3	Emergency coordination point	Emergency services and project representatives	Site Supervisor / NSW Police	Emergency coordination

Muster and Personnel Accountability Procedure
In the event of an emergency:

1. All personnel will cease work immediately and make plant and equipment safe
2. Personnel will proceed to the nearest designated muster point
3. Supervisors will conduct a headcount of personnel under their control
4. Missing personnel will be immediately reported to the Site Supervisor
5. No personnel will re-enter the work area until authorised by the Site Supervisor or Emergency Services

Communication During Emergencies
Emergency communication will be maintained through:

- UHF radio communication between traffic control personnel
- Direct communication with NSW Police and emergency services
- Mobile phone communication where required

The Traffic Control Team Leader will coordinate with the Site Supervisor and emergency services to ensure that traffic management measures support emergency response operations.

Emergency Communication Structure

Level	Role	Responsibility	Communication Method
Level 1	Site Supervisor (CMA)	Overall control of emergency response and coordination with emergency services	Direct / mobile / UHF
Level 2	AGL Project Representative	Liaison with client and external stakeholders	Mobile phone
Level 3	Non-Working Traffic Control Supervisor (NWTCS)	Oversight of traffic operations and coordination of closures	UHF / mobile
Level 4	Traffic Control Team Leader	Supervision of traffic control crews	UHF
Level 5	Traffic Controllers	Implementation of traffic control and reporting hazards	UHF
Level 6	Site Personnel / Contractors	Follow emergency procedures and report incidents	Verbal / radio

All incidents will be reported immediately to the Site Supervisor, who will coordinate the emergency response and liaise with emergency services.

Clear communication channels will be maintained throughout any incident to ensure effective coordination between demolition and traffic management activities.

5. Construction Staging and Traffic Impacts

This section outlines the staging of traffic management arrangements required to safely facilitate the demolition blast at the Liddell Power Station.

Traffic control measures will be progressively implemented on surrounding roads including the New England Highway, Hebden Road, Lemington Road and Thomas Mitchell Drive to establish the required blast exclusion zone.

The demolition blast will occur over a very short duration; however, temporary road closures will be implemented immediately prior to the blast to ensure that all roads within the exclusion zone are clear of vehicles and pedestrians.

Following the demolition event and confirmation that the area is safe, traffic will be progressively released from closure points and the surrounding road network will return to normal operations.

5.1. Blast Event Traffic Staging Strategy

Traffic staging will be implemented in a controlled sequence to safely manage traffic movements before, during and after the demolition blast.

The staging strategy will ensure that:

- All traffic control devices are installed prior to the demolition event
- The blast exclusion zone is fully cleared of vehicles and pedestrians
- Traffic is stopped safely at designated closure points
- Queues are monitored and managed during the closure period
- Traffic is released in a controlled and prioritised manner following the demolition

Traffic control crews will be deployed to closure points surrounding the blast exclusion zone to prevent vehicles entering the area during the demolition event.

5.2. Interface with Demolition Activities

Traffic management operations will be closely coordinated with demolition activities.

Prior to the Demolition Blast:

- Demolition personnel will confirm that all blast preparation activities have been completed in accordance with the Blast Management Plan (BMP), including verification of the blast exclusion zone, completion of final safety checks and confirmation that all personnel are clear of the exclusion area
- Traffic controllers will confirm that the exclusion zone is clear of vehicles and pedestrians
- NSW Police and site supervisors will verify that all closure points are operational

Once all closure points have been confirmed operational and the exclusion zone verified clear, the Demolition Supervisor / Blast Control will authorise the commencement of the blast countdown.

During the Blast:

- Traffic will remain stopped at all designated closure points
- No vehicles or pedestrians will be permitted to enter the blast exclusion zone

Post-Blast Inspection and Verification:

Following the demolition blast, a controlled inspection of the surrounding road network will be undertaken prior to reopening to traffic.
This will include:

- A drive-through inspection of the New England Highway and affected local roads
- Visual assessment for debris, dust accumulation, pavement damage or hazards
- Verification that all lanes, shoulders and intersections are clear and safe

The inspection will be coordinated by the Demolition Supervisor / Blast Control in conjunction with AGL and traffic management personnel.

Contingency – Debris or Road Damage:

If debris, hazards or damage are identified:

- Traffic will remain stopped at all closure points
- Affected areas will be isolated and secured
- Debris will be removed or hazards made safe prior to reopening
- If road damage is identified:
  - AGL will coordinate remediation works
  - Traffic control arrangements will remain in place until the road is confirmed safe
- NSW Police and relevant authorities will be notified where required

Traffic will not be released until the road network is verified as safe.

Traffic Release Strategy:
Once the all-clear is issued:

- Traffic will be released in a controlled and prioritised sequence
- The New England Highway mainline will be released first
- On-ramps and key intersections will be progressively reopened
- Local roads (Hebden Road, Lemington Road and Thomas Mitchell Drive) will be reopened once mainline flow is stabilised

Traffic control personnel and NSW Police will coordinate the staged release to prevent conflicting movements.

5.3. Traffic Generation and Interaction with Public Traffic

The demolition event is not expected to generate significant construction traffic; however, temporary impacts to public traffic will occur due to short-duration road closures associated with the blast.

Traffic impacts will include:

- Temporary stoppage of traffic on the New England Highway and connecting local roads
- Short-term queuing at closure points
- Controlled release of traffic following the demolition event

Traffic control measures have been designed to minimise interaction risks between public traffic and demolition activities by:

- Implementing full road closures during the blast event
- Preventing vehicles from entering the blast exclusion zone
- Eliminating exposure of road users to demolition-related hazards

Due to the short duration of the closure (approximately 10–15 minutes), impacts to the surrounding road network are expected to be minimal and manageable.

Traffic control personnel will monitor traffic conditions and adjust operations where required to maintain safety and efficiency.

5.4. Network Impacts and Mitigation Measures

5.4.1. Anticipated Impacts

Temporary impacts on the road network may include:

- short-duration traffic delays
- temporary traffic queues at closure points

The most significant impacts are expected on the New England Highway due to higher traffic volumes.

Local roads (Hebden Road, Lemington Road and Thomas Mitchell Drive) are expected to experience minimal impacts.

5.4.2. Mitigation Measures

Several measures will be implemented to minimise traffic impacts including:

- advance warning through Variable Message Signs (VMS) on major approaches
- deployment of traffic control personnel at closure points
- coordination with NSW Police during the demolition event
- monitoring of traffic queues by traffic control personnel
- rapid reopening of roads following the demolition blast.

These measures will assist in maintaining safe traffic operations during the demolition event.

5.5. Weather and Environmental Impacts on Traffic

The demolition blast is weather dependent and may be postponed if conditions are unsuitable.

Wind direction, atmospheric stability and other environmental factors will be assessed prior to the demolition event to ensure safe blast operations.

5.5.1. Weather Management Measures

Weather conditions will be monitored leading up to the demolition event, including review of the five-day weather forecast.

If wind direction or other environmental conditions present a risk to public safety or traffic operations, the demolition event may be delayed.

5.5.2. Environmental Controls Interface

Environmental conditions, including wind direction and dust generation, may influence traffic management operations during the demolition event.

Where required:

- Traffic control measures may be adjusted to account for reduced visibility due to dust
- Traffic release may be delayed until visibility is confirmed to be safe
- Additional monitoring will be undertaken during and immediately following the blast

These measures ensure that environmental impacts do not compromise the safety of road users.

5.6. Contingency and Incident Management

Contingency procedures will be implemented to manage unexpected incidents during traffic control operations.

5.6.1. Incident Response

If an incident occurs during traffic control operations:

- Traffic controllers will immediately secure the area and stop traffic where required
- The Traffic Control Team Leader and Non-Working Traffic Control Supervisor (NWTCS) will be notified
- The Demolition Supervisor / Blast Control and AGL Project Representative will be notified immediately
- NSW Police or emergency services will be contacted where required
- Demolition activities may be temporarily suspended until the situation is assessed

5.6.2. Recovery and Review

Following any incident:

- Traffic management arrangements will be reviewed by the NWTCS and Traffic Control Team Leader
- Adjustments will be implemented where required to maintain safety
- Closure points, traffic staging and communication protocols will be reassessed
- Coordination will occur with NSW Police, AGL and the demolition team prior to recommencing operations

Traffic control operations and demolition activities will only resume once:

- The incident has been resolved
- The site has been confirmed safe
- Relevant stakeholders have been notified

Lessons learned will be documented and incorporated into future traffic management planning where applicable.

5.7. Road Environment Classification and Applicable Traffic Category

The New England Highway is classified as a major regional highway carrying both passenger vehicles and heavy freight traffic.
The surrounding road network includes lower volume local roads servicing the Lake Liddell area.
Traffic management arrangements have been developed to account for:

- higher operating speeds on the highway corridor
- the presence of heavy vehicles
- limited pedestrian and cyclist activity
- rural road conditions.

5.8. Blast Day Operational Timeline

Time	Activity	Traffic Management
07:00	Prestart briefing	Traffic crews mobilised
07:30–09:30	Traffic control setup	Signage, VMS and closure points established
09:30–10:30	Exclusion zone verification	Traffic controllers confirm blast zone clear
10:45	Full road closures	Traffic stopped at closure points
10:55	Blast countdown	Traffic held
11:00	Demolition blast	Traffic stopped
11:05	Post-blast inspection	Area inspected for safety
11:10	Traffic release	Queues cleared and roads reopened

Note: The above timing is indicative only and may change on the day of the demolition event due to weather conditions, demolition readiness and safety requirements.

5.9. Construction Staging Plan – Summary Table

Stage	Activity	Traffic Management
Stage 1	Traffic control deployment	Signage and devices installed
Stage 2	Establish blast exclusion zone	Traffic closures implemented
Stage 3	Final demolition preparation	Traffic held at closure points
Stage 4	Demolition blast	Traffic stopped
Stage 5	Post-blast inspection	Safety verification
Stage 6	Traffic release	Roads progressively reopened

5.10. Traffic Control Deployment

Traffic control personnel will be deployed at key locations surrounding the demolition exclusion zone to prevent vehicles and pedestrians entering the affected area during the blast event at the Liddell Power Station.

Closure points will be positioned on approaches to the New England Highway and connecting local roads to ensure that the blast exclusion zone remains clear during the demolition.

Traffic control personnel will remain at their designated positions until the demolition blast has occurred and the all-clear has been issued.

TC Point	Location	Control Type	Traffic Movement Control	Notes
TC-01	NEH & Thomas Mitchell Dr	PTCD	Southbound traffic stopped for duration of blast	Prevents traffic entering exclusion zone from south
TC-02	NEH & Hebden Rd (North)	PTCD	Southbound traffic stopped	No access into or out of Hebden Rd. No SB travel on NEH
TC-03	NEH & Lemington Rd	Stop/Slow / PTCD	Northbound traffic stopped for duration of blast	Controls northern approach
TC-04	NEH & Hebden Rd (South)	Stop/Slow / PTCD	Northbound traffic stopped	No access into or out of Hebden Rd. No NB travel on NEH

Police from the local area command will be present at key closure locations to assist with enforcement of road closures and coordination of traffic management operations.

A total of five Variable Message Signs (VMS) will be deployed on major approaches to provide advance warning of temporary traffic stoppages and expected delays. Messaging will be general in nature and will not specify demolition activities, focusing instead on informing motorists of short-duration impacts to traffic conditions.

Traffic controllers will monitor queue lengths at each closure point and coordinate with the Traffic Control Team Leader and NSW Police to safely release traffic once the demolition event has been completed.

6. Around, Past and Through Traffic Analysis

This section assesses how traffic movements on the surrounding road network interact with the demolition works at the Liddell Power Station.

The surrounding road network is centred on the New England Highway, which serves as a regional transport corridor carrying passenger vehicles, freight traffic and mining-related transport.

Temporary road closures associated with the demolition blast will prevent traffic travelling past or through the demolition area for a short duration while the blast exclusion zone is established.

The following sections consider the movement of traffic travelling past, through and around the demolition site.

6.1. Traffic Travelling *Past* the Works

Traffic travelling past the demolition site primarily occurs along the New England Highway.

During the demolition blast event, traffic travelling past the site will be temporarily stopped at designated closure points to ensure that vehicles are not present within the external exclusion zone.

These closures will remain in place for approximately 10 to 15 minutes while the demolition blast is undertaken and the surrounding area is inspected.

Once the Demolition Supervisor / Blast Control confirms that the area is safe, traffic will be progressively released and normal traffic movements along the highway corridor will resume.

Given the short duration of the closures, the impact on traffic travelling past the works is expected to be temporary and manageable.

6.2. Traffic Travelling *Through* the Works

Due to the location of the Liddell Power Station and existing controlled access arrangements, there is no through traffic travelling directly through the demolition site. Traffic impacts are limited to vehicles travelling on the surrounding road network, including the New England Highway and connecting local roads.

During the demolition event:

- Traffic will be stopped at designated closure points on approach to the blast exclusion zone
- No vehicles or pedestrians will be permitted to enter the exclusion area
- All roads leading into the exclusion zone will be cleared prior to the blast

These measures ensure that no road users are present within, or able to enter, the blast exclusion zone during the demolition.

6.3. Traffic Travelling *Around* the Works

Due to the short duration of the demolition event (approximately 10–15 minutes), traffic will not be actively diverted to alternative routes.

Instead, traffic will be:

- Temporarily held at designated closure points
- Managed through controlled release following completion of the demolition event

The use of alternative routes, including the Golden Highway, has been considered; however:

- Travel times via alternative routes would be significantly longer than the duration of the closure
- Diversion of traffic is not considered appropriate for a short-duration stoppage

Advance warning will be provided to motorists through:

- Variable Message Signs (VMS) advising of temporary traffic stoppages and expected delays
- Traffic control signage on approach to closure points

Traffic control personnel will assist in managing traffic at closure points to ensure safe and efficient operations.

6.4. Heavy Vehicle and Freight Considerations

The New England Highway is a key freight corridor servicing mining operations and regional freight movements within the Upper Hunter region.

Heavy vehicles travelling along the highway will be temporarily stopped at designated closure points during the demolition blast event.

Traffic controllers will ensure that heavy vehicles are safely stopped with adequate advance warning provided through signage and VMS boards.

Once the demolition blast has been completed and the area confirmed safe, heavy vehicles will be released in a controlled manner along with other traffic.

Due to the relatively high operating speeds on the highway corridor, queues are expected to dissipate quickly once traffic flow resumes.

6.5. Network Performance Summary

The demolition blast event will require temporary road closures to establish the blast exclusion zone.

These closures are expected to remain in place for approximately 10 to 15 minutes, resulting in short-duration traffic delays and temporary queues at closure points.

Based on available traffic data and the short duration of the closures, the surrounding road network is expected to continue operating safely and efficiently following the demolition event.

Advance warning signage, traffic control personnel and coordination with NSW Police will assist in managing traffic conditions and minimising impacts to road users.

Overall, the temporary traffic impacts associated with the demolition blast are considered acceptable given the safety requirements associated with controlled explosive demolition activities.

7. Consultation and Communication

Effective consultation and communication are essential to ensure that stakeholders, authorities and road users are aware of the demolition works and associated traffic management arrangements.

Consultation has been undertaken with relevant stakeholders to coordinate the temporary road closures required to establish the blast exclusion zone surrounding the Liddell Power Station.

Communication measures will ensure that stakeholders are informed of the demolition event, traffic management arrangements and any potential impacts to the surrounding road network, including the New England Highway.

7.1. Stakeholder Identification

Key stakeholders associated with the demolition works and traffic management arrangements include:

- Transport for NSW (TfNSW)

- NSW Police – Local Area Command
- Muswellbrook Shire Council
- Emergency services (Police, Fire and Rescue NSW, NSW Ambulance)
- Local road users and freight operators
- Nearby residents and businesses
- Project stakeholders and contractors.

These stakeholders may be affected by the temporary road closures and will be consulted as required prior to the demolition event.

7.2. Consultation Objectives

The objectives of consultation are to:

- inform stakeholders of the demolition event and associated traffic management arrangements
- minimise disruption to road users and surrounding communities
- ensure coordination with emergency services and relevant authorities
- provide stakeholders with advance notice of temporary road closures
- address any concerns raised by stakeholders.

Consultation will also assist in ensuring that traffic management arrangements align with regulatory requirements and stakeholder expectations.

7.3. Communication Methods

Communication with stakeholders and road users will occur through a range of methods including:

- direct consultation with authorities and emergency services
- project correspondence and notifications
- deployment of Variable Message Signs (VMS) on major road approaches
- installation of advance warning signage
- coordination with NSW Police during the demolition event.

These measures will assist in informing road users of temporary road closures.

7.4. Timing of Notifications

Notifications to key stakeholders will occur prior to the demolition event to allow adequate time for planning and coordination.
The timing of notifications may include:

- early notification to authorities and emergency services during project planning
- confirmation of demolition timing once the event date has been finalised
- deployment of VMS boards in advance of the demolition event to warn approaching motorists
- pre-start briefings for project personnel and traffic control crews on the day of the demolition.

The final demolition timing may be subject to change depending on weather conditions and operational considerations.

7.5. Complaints and Enquiries

Complaints and enquiries relating to the demolition works and associated traffic management arrangements will be managed in accordance with the project Communication and Complaints Management Procedures and relevant SSD approval conditions.
Members of the public and stakeholders may raise enquiries or complaints via:

- Project contact details provided in community notifications

- Traffic control personnel on site (who will escalate to the appropriate representative)
- NSW Police or other authorities, where applicable

All complaints and enquiries will be managed as follows:

- Complaints will be recorded in the project complaints register
- The Project Representative (AGL) will be notified as soon as practicable
- An initial response will be provided within 24 hours of receipt (where contact details are available)
- The complaint will be investigated in consultation with relevant stakeholders, including traffic management personnel and the demolition contractor
- Corrective actions will be implemented where required to address the issue
- The complainant will be advised of the outcome, where contact details are available

Where complaints relate to traffic management operations, the Traffic Control Team Leader and Non-Working Traffic Control Supervisor (NWTCS) will be notified to review and adjust traffic control measures if required.

All complaints and enquiries will be documented and managed in accordance with project and SSD requirements.

8. Traffic Control Devices and Installation

Traffic control devices will be installed to safely manage traffic during the demolition blast event at the Liddell Power Station.

Traffic control measures will be implemented in accordance with the relevant Traffic Guidance Schemes (TGS) and applicable standards including the Traffic Control at Work Sites (TCAWS) Manual, Austroads Guide to Temporary Traffic Management (AGTTM) and AS 1742.3 – Traffic Control for Works on Roads.

Traffic control devices will be installed on roads surrounding the demolition site including the New England Highway, Hebden Road, Lemington Road and Thomas Mitchell Drive to establish the blast exclusion zone and manage traffic during the demolition event.

All devices will be installed by trained traffic control personnel prior to the demolition blast and removed once the road network has been confirmed safe for reopening.

8.1. Signage Requirements

Traffic control signage will be installed to provide advance warning to motorists approaching the demolition area and associated temporary road closures.

Signage will include:

- Advance warning signs advising of upcoming traffic stoppages and road closures
- Traffic control signs associated with Stop/Slow and full closure operations
- Variable Message Signs (VMS) advising motorists of changing traffic conditions

All signage will be installed in accordance with:

- Transport for NSW Traffic Control at Work Sites (TCAWS) Manual
- Austroads Guide to Temporary Traffic Management (AGTTM)
- AS 1742.3 – Manual of Uniform Traffic Control Devices

Given the 100 km/h operating environment and the requirement to bring traffic to a controlled stop, C Size (1200 x 900 mm minimum) signs will be utilised as a minimum, with larger signs implemented where required based on site-specific risk assessment.

Duplicate signage will be installed on both sides of the carriageway or repeated where practicable, particularly on high-speed approaches, to maximise visibility and driver compliance.
Sign spacing (Dimension 'D') and placement will be in accordance with TCAWS requirements for high-speed roads and will be designed to provide sufficient perception and reaction time for motorists approaching the closure points.

Where site constraints exist (e.g. limited shoulder width, roadside hazards, or horizontal/vertical geometry), sign locations may be adjusted while maintaining intent, with additional controls implemented where required to ensure visibility and safety are not compromised.

8.2. Installation and Removal

Traffic control devices will be installed prior to the demolition blast event to ensure that all approaches to the blast exclusion zone are appropriately controlled.

Installation will occur in accordance with the relevant Traffic Guidance Schemes and under the direction of the Traffic Control Team Leader.

Following completion of the demolition event and confirmation that the area is safe, traffic control devices will be progressively removed and normal traffic operations restored.

8.3. Installation Procedures

Traffic control devices will be installed in a logical sequence to ensure that traffic is protected throughout the setup process.

Installation procedures will include:

- deployment of traffic control crews to designated locations
- installation of advance warning signage on road approaches
- placement of cones, barriers or other delineation devices where required
- deployment of Variable Message Signs
- confirmation that all closure points are operational prior to the demolition event.

All installations will be carried out in accordance with approved Traffic Guidance Schemes.

8.4. Removal Procedures

Following the demolition blast and confirmation that the area is safe, traffic control devices will be removed in a controlled sequence.

Removal procedures will include:

- confirmation from the Demolition Supervisor / Blast Control that the site is safe
- progressive reopening of roads by traffic control personnel
- removal of traffic control signage and devices
- demobilisation of traffic control crews.

All removal activities will be carried out in a manner that maintains the safety of road users and traffic control personnel.

8.5. Maintenance and Inspections

Traffic control devices will be inspected regularly to ensure that they remain correctly positioned and visible to road users.

Inspections will include checking:

- signage visibility and orientation
- placement of cones and delineation devices
- operation of Variable Message Signs
- general condition of traffic control devices.

Any damaged or displaced devices will be repaired or repositioned immediately.

8.6. Protection of Workers and Road Users

Traffic control arrangements have been designed to ensure the safety of both road users and workers involved in the demolition works.

Measures implemented to protect workers and road users include:

- Establishment of a blast exclusion zone
- Implementation of full road closures during the demolition event
- Deployment of trained and qualified traffic control personnel
- Coordination with NSW Police during the demolition event
- Installation of advance warning signage and traffic control devices

Protection of Traffic Control Personnel

Traffic control personnel will be protected through the following measures:

- Full road closures implemented prior to the demolition event, eliminating live traffic exposure within the work area
- Positioning of traffic controllers at designated control points outside the blast exclusion zone
- Use of advance warning signage and appropriate approach distances (Dimension ‘D’) to provide motorists with adequate reaction time in a 100 km/h environment
- Deployment of Truck Mounted Attenuators (TMA) on the two primary 100 km/h approaches to provide impact protection from errant vehicles
- Use of Traffic Control Vehicles (TCVs) as shadow vehicles / hard cover positioned upstream of traffic controllers to provide an additional physical buffer between live traffic and personnel
- TMAs and TCVs will be positioned in accordance with approved Traffic Guidance Schemes (TGS) to ensure optimal protection and visibility
- Coordination with NSW Police at key closure points to support enforcement and reduce risk of non-compliance
- Provision of safe standing areas and clear escape paths for all traffic control personnel
- Minimisation of exposure duration, with personnel only exposed to live traffic conditions during setup and prior to full closure implementation
- Continuous communication between traffic control personnel via UHF radio to manage traffic safely and respond to changing conditions

8.7. End-of-Queue Management

End-of-queue management is critical during temporary road closures to reduce the risk of rear-end collisions.

Traffic controllers will monitor traffic queues at closure points and communicate with the Traffic Control Team Leader to identify potential queue build-up.

Where required, additional advance warning devices or personnel may be deployed to warn approaching motorists of stopped traffic ahead.

Variable Message Signs will also assist in advising motorists of temporary road closures and potential delays.

8.8. Inventory of Safety Barriers, Signs and Storage Locations

Traffic control devices used for the demolition event will include:

- regulatory and warning signage
- traffic cones and delineation devices
- Variable Message Signs (VMS)
- portable traffic control devices (PTCD).

Traffic control equipment will be transported to site by the traffic management contractor and stored in designated areas prior to installation.

All devices will comply with relevant Australian Standards and TfNSW requirements.

9. Monitoring, Audits and Compliance

Traffic management arrangements implemented for the demolition blast event at the Liddell Power Station will be monitored to ensure compliance with the approved Traffic Management Plan, Traffic Guidance Schemes and applicable standards.

Monitoring and compliance activities will ensure that traffic control measures remain effective and that the safety of road users and project personnel is maintained throughout the demolition event.

Traffic management operations will be carried out in accordance with the Traffic Control at Work Sites (TCAWS) Manual, relevant Austroads guidance and project-specific requirements.

9.1. Daily Inspections

Traffic control arrangements will be inspected by the Traffic Control Team Leader or Non-Working Traffic Control Supervisor prior to the commencement of demolition activities.

Inspections will include verification that:

- traffic control devices are installed in accordance with the approved Traffic Guidance Schemes
- signage is clearly visible and correctly positioned

- closure points are operational
- Variable Message Signs are functioning correctly.

Any issues identified during inspections will be rectified prior to the commencement of demolition operations.

9.2. Audits

Traffic management arrangements may be subject to internal or external audits to ensure compliance with project requirements and relevant standards.

Audits may include:

- verification of traffic control device installation
- review of traffic control personnel qualifications

- confirmation that traffic management arrangements align with the approved Traffic Management Plan
- review of incident reporting procedures.

Audit findings will be documented and any corrective actions will be implemented where required.

9.3. Non-Conformance Management

Where a non-conformance relating to traffic management arrangements is identified, corrective actions will be implemented to address the issue.

Non-conformances may include:

- incorrect placement of traffic control devices
- damaged or missing signage
- deviations from the approved Traffic Guidance Scheme.

Any non-conformances identified will be recorded and addressed promptly to ensure the continued safety of traffic operations.

9.4. Record Keeping

Records relating to traffic management operations will be maintained throughout the demolition event.

Records may include:

- traffic control inspection records
- incident reports
- audit reports
- corrective action records.

Maintaining accurate records will assist in demonstrating compliance with project requirements and regulatory obligations.

9.5. Compliance with Approvals

Traffic management arrangements will comply with all relevant approvals and regulatory requirements.

This includes compliance with:

- Transport for NSW requirements
- Road Occupancy Licence (ROL) conditions where applicable
- Approved Traffic Guidance Schemes (TGS)
- The project Blast Management Plan (BMP)
- The project Emergency Management Procedures
- The project Incident Management Procedures
- The project Communication and Complaints Management Procedures
- Relevant Work Health and Safety (WHS) requirements

Traffic control personnel will ensure that traffic management measures are implemented in accordance with these approvals and procedures throughout the demolition event.

10. Incident Reporting and Emergency Response

Incident management procedures will be implemented to ensure that any incidents occurring during traffic control operations associated with the demolition blast at the Liddell Power Station are managed safely and effectively.

Traffic control personnel, demolition staff and project supervisors will be briefed on incident response procedures prior to the commencement of demolition activities.

All incidents will be reported and managed in accordance with project safety procedures and relevant regulatory requirements.

10.1. Types of Incidents

Potential incidents that may occur during traffic management operations include:

- vehicle breakdown within the closure area or traffic queue
- road traffic collisions near closure points
- vehicles entering the blast exclusion zone
- failure of traffic control devices or signage
- medical emergencies involving workers or road users
- environmental incidents associated with demolition activities.

Traffic control personnel will remain alert to potential incidents and will respond promptly to ensure the safety of road users and project personnel.

10.2. Immediate Response

In the event of an incident, the following actions will be undertaken:

- Traffic controllers will immediately secure the area and stop traffic where required
- The Traffic Control Team Leader and Non-Working Traffic Control Supervisor (NWTCS) will be notified
- The Site Supervisor, Demolition Supervisor / Blast Control and AGL Project Representative will be notified immediately
- Emergency services will be contacted if required
- Demolition activities will be suspended if required until the situation has been assessed
- Traffic management arrangements will be adjusted as necessary to ensure safety

10.3. Communication and Escalation

Clear communication channels will be maintained throughout traffic management operations.

Incidents will be escalated through the following reporting structure:

1. Traffic Controller
2. Traffic Control Team Leader
3. Non-Working Traffic Control Supervisor
4. Site Supervisor / Project Manager.

Where necessary, emergency services and relevant authorities will be notified.

10.3.1. Information Required for Initial Notification

When reporting an incident, the following information should be provided where possible:

- location of the incident
- nature of the incident
- number of vehicles or persons involved

- whether emergency services are required
- current traffic conditions at the site.

Providing accurate information will assist supervisors and emergency services in responding effectively.

10.4. Traffic Management During Incidents

If an incident occurs within or near the traffic control area, traffic management arrangements may be modified to ensure the safety of road users and project personnel.

Traffic control personnel will coordinate with NSW Police and the Traffic Control Team Leader to manage immediate traffic risks.

Overall coordination of incident response and any decision to suspend or recommence demolition activities will be managed by AGL in consultation with the Demolition Supervisor (CMA).

Possible measures may include:

- Temporarily extending closure areas
- Adjusting traffic control locations
- Deploying additional traffic control personnel
- Holding traffic until safe to release

10.5. Post-Incident Actions

Following an incident, the project team will:

- Assess the incident and confirm that the site and road network are safe
- Inspect traffic control arrangements and surrounding road conditions
- Confirm with the Demolition Supervisor / Blast Control and AGL that it is safe to proceed

Where required:

- Traffic control arrangements will be re-established or modified
- Closure points will be reconfirmed operational
- The blast exclusion zone will be re-verified clear
- The Traffic exclusion zone will be re-verified clear

Demolition activities will only recommence once:

- The incident has been resolved
- All safety controls are reimplemented
- Approval to proceed is provided by AGL and the Demolition Supervisor / Blast Control

If the demolition has already occurred:

- Traffic control measures will be maintained until the road network is confirmed safe
- Roads will be progressively reopened in a controlled manner

Lessons learned from incidents will be documented and incorporated into future operations.

10.6. Training and Preparedness

Traffic control personnel and project staff will be briefed on incident response procedures prior to the demolition event.

Briefings will include:

- emergency response procedures
- communication protocols
- reporting requirements
- evacuation and muster procedures.

Ensuring personnel are familiar with these procedures will assist in managing incidents effectively.

10.7. Traffic Incident Investigation Procedure

All incidents associated with traffic management operations will be investigated. Investigations will be undertaken by AGL in accordance with project safety procedures, in consultation with:

- CMA Contracting (Demolition Contractor)
- Traffic Management Provider

10.7.1. Initial Verification of Traffic Controls

Following an incident, traffic control arrangements will be reviewed to verify that traffic control devices were installed in accordance with the approved Traffic Guidance Scheme.

Any discrepancies identified will be addressed immediately.

10.7.2. Drive-Through and Video Recording

Where appropriate, a drive-through inspection of the traffic control setup may be conducted to document the site conditions.

Photographs or video recordings may be taken to assist in the investigation process.

10.7.3. Reporting and Corrective Actions

A formal incident report will be prepared outlining:

- the nature of the incident
- contributing factors
- corrective actions required.

Corrective actions will be implemented to reduce the likelihood of similar incidents occurring in the future.

10.7.4. Records and Review

All incident investigation records will be maintained as part of the project documentation.

These records will be reviewed periodically to identify trends and opportunities for improvement.

10.8. Reporting of Investigation Outcomes and Lessons Learned

Findings from incident investigations will be managed and communicated by **AGL**, in consultation with relevant project stakeholders.

This will include:

- Traffic management personnel
- Demolition contractor (CMA)
- NSW Police (where applicable)

Findings will be communicated through:

- Safety briefings
- Toolbox talks
- Project coordination meetings

Corrective actions and lessons learned will be incorporated into:

- Traffic management arrangements
- Project safety procedures
- Future demolition or traffic operations

10.8.1. Investigation Reporting Format

Incident investigation reports will include:

- incident description
- contributing factors
- corrective actions
- recommendations for improvement.

10.8.2. Communication of Findings

Findings from investigations may be communicated through:

- safety briefings
- toolbox talks
- project meetings.

10.8.3. Continuous Improvement

Lessons learned from incident investigations will be incorporated into project procedures to improve safety and operational performance.

This approach supports continuous improvement in traffic management and demolition safety practices.

11. Safety and Amenity, Risk and Consultation

Traffic management arrangements for the demolition blast at the Liddell Power Station have been designed to ensure the safety and amenity of road users, project personnel and surrounding stakeholders.

Measures outlined in this TMP minimise risks associated with:

- Temporary road closures
- Short-duration traffic delays
- Traffic queues at closure points
- Interaction between demolition activities and public traffic

Traffic control measures will be implemented on the surrounding road network to safely manage traffic during the demolition event.

11.1. Safety and Amenity of Road Users and Stakeholders

Temporary traffic management measures will ensure that road users and nearby stakeholders are protected from hazards associated with the demolition blast.

Potential impacts include:

- Temporary road closures
- Short-duration traffic delays
- Temporary queues

These impacts will be minimised through:

- Advance notification via VMS and signage
- Deployment of traffic control personnel
- Coordination with NSW Police
- Rapid reopening of roads following the blast

11.1.1. Mitigation Strategies

Mitigation measures implemented to protect road users and stakeholders include:

- establishment of a blast exclusion zone
- deployment of trained traffic control personnel
- coordination with NSW Police at closure points
- installation of advance warning signage and Variable Message Signs (VMS)
- monitoring of traffic queues during closure periods
- rapid reopening of roads following the demolition blast.

These measures will assist in maintaining safe and efficient traffic operations.

11.2. Construction & Vehicle Management

Construction and demolition vehicles associated with the project will be managed to ensure safe interaction with public traffic.

Construction vehicle movements will primarily occur outside the demolition blast window.

Vehicle access to the demolition site will occur via designated site access points associated with the power station facility.

Traffic controllers may assist construction vehicles entering or exiting the site where required.

11.3. Traffic Control Signs and Devices

Traffic control signage and devices will be installed in accordance with approved Traffic Guidance Schemes and relevant standards including the Traffic Control at Work Sites (TCAWS) Manual and Austroads Guide to Temporary Traffic Management (AGTTM).

Devices used may include:

- advance warning signage
- regulatory and advisory signs
- traffic cones and delineation devices
- Variable Message Signs (VMS).

These devices will provide advance warning to motorists and assist in guiding traffic safely through the affected area.

11.4. Signage Placement

Traffic control signage will be positioned in accordance with the relevant Traffic Guidance Schemes.

Sign placement will consider factors such as:

- road geometry
- visibility and sight distance
- operating speeds on the road network
- available shoulder width.

Where constraints exist, sign placement may be adjusted while maintaining compliance with applicable guidelines.

11.5. Specific Measures for this Project

Traffic management arrangements have been developed to address the specific risks associated with the controlled demolition blast.

Key measures include:

- Establishment of secure road closures on all approaches to the blast exclusion zone
- Prevention of vehicles and pedestrians entering the exclusion area
- Monitoring of traffic queues during temporary closures
- Coordination with the Demolition Supervisor /Blast Control and NSW Police
- Controlled and staged reopening of roads following confirmation that the area is safe

These measures ensure that demolition activities can proceed safely while minimising disruption to the surrounding road network.

11.5.1. Gates and Access Control Arrangements

Access to the demolition area will be controlled through the implementation of temporary road closures and controlled access points surrounding the blast exclusion zone.
Traffic controllers will be positioned at designated closure locations on all approaches to the demolition area to prevent vehicles and pedestrians entering the exclusion zone during the demolition blast.

These closure points will be supported by NSW Police positioned at key locations to assist with traffic control and enforcement of the closures.

The access control process will involve the following steps:

1. Installation of traffic control measures in accordance with the approved Traffic Guidance Schemes.
2. Implementation of road closures on all roads entering the blast exclusion zone.
3. Verification that the exclusion zone is clear of vehicles, pedestrians and construction plant.
4. Confirmation between traffic control supervisors and Demolition Supervisor / Blast Controls that all closure points are operational.
5. Commencement of the blast countdown once the exclusion zone has been verified clear.

During the closure period, traffic controllers will remain at their designated positions to monitor traffic queues and ensure that no vehicles enter the blast exclusion zone.

Where local property access roads exist within the closure area, vehicles will be temporarily held until the demolition event has been completed and the all-clear has been issued.

Following the demolition blast and post-blast inspection, traffic control personnel will progressively reopen roads and restore normal traffic operations.

11.5.2. Blast Exclusion Zone Verification

Prior to the commencement of the demolition blast, the blast exclusion zone will be verified as clear of vehicles, pedestrians and unauthorised personnel.

Traffic control personnel positioned at closure points will confirm that all road approaches to the exclusion zone are secured and that no vehicles are present within the affected area.

The verification process will include the following steps:

1. **Confirmation of traffic closures** at all designated control points surrounding the exclusion zone.
2. **Visual verification of road sections** within the exclusion zone by traffic control personnel and site supervisors.
3. **coordinated between the Traffic Control Team Leader, Non-Working Traffic Control Supervisor and the Demolition Supervisor / Blast Control** confirming that all closure points are operational and secure.
4. **Final clearance confirmation** that no vehicles, pedestrians or plant remain within the blast exclusion area.
5. **Authorisation to proceed with the demolition blast** once the exclusion zone has been confirmed clear.

This verification process will be coordinated between the Traffic Control Team Leader, Non-Working Traffic Control Supervisor and the Demolition Supervisor / Blast Control.

The demolition blast will only proceed once confirmation has been received that the exclusion zone has been secured and that all personnel are positioned outside the designated blast radius.

Following the demolition blast, the area will be inspected by the demolition team to confirm that it is safe before traffic control personnel begin reopening roads and releasing queued traffic.

11.6. Traffic Control Inspections

Traffic control arrangements will be inspected prior to the demolition event to ensure that traffic control devices are installed correctly.

Inspections will verify that:

- signage is clearly visible
- traffic control devices are correctly positioned
- closure points are operational.

Any issues identified will be rectified before the demolition blast proceeds.

11.7. Management of Unplanned Incidents

Unplanned incidents such as vehicle breakdowns or traffic collisions may occur during traffic control operations.

Traffic controllers will monitor traffic conditions and coordinate with the Traffic Control Team Leader and project supervisors to manage any incidents safely.

Traffic management arrangements may be modified where necessary to ensure the safety of road users and project personnel.

11.8. Management of Special Events

No special events are known to be scheduled in the immediate vicinity of the demolition works during the planned demolition period.

If special events or unusual traffic conditions occur, traffic management arrangements may be reviewed and adjusted accordingly.

11.9. Climatic and Seasonal Conditions

Weather conditions may influence the timing of the demolition blast.

Wind direction, visibility and other environmental factors will be assessed prior to the demolition event to ensure safe demolition operations.

If weather conditions are unsuitable, the demolition event may be postponed.

11.10. Consultation Objectives

Consultation with relevant stakeholders has been undertaken to ensure that traffic management arrangements are appropriate and coordinated with other activities occurring within the area.

11.11. Reporting

Traffic management activities associated with the demolition event will be documented as part of project reporting requirements.

Reports may include traffic control inspection records, incident reports and other documentation associated with traffic management operations.

12. Risk Assessment

A risk assessment has been undertaken to identify potential traffic management risks associated with the demolition blast at the Liddell Power Station.

The purpose of the risk assessment is to identify hazards associated with traffic management activities, evaluate the potential risks to road users and project personnel, and determine appropriate control measures to reduce those risks to an acceptable level.

The risk assessment considers the interaction between demolition activities and the surrounding road network, including the New England Highway and nearby local roads.

Control measures identified through the risk assessment have been incorporated into this Traffic Management Plan.

12.1. Objectives of the Risk Assessment

The objectives of the risk assessment are to:

- identify hazards associated with traffic management during the demolition event
- assess the potential consequences and likelihood of identified risks
- implement appropriate control measures to mitigate identified risks
- ensure the safety of road users, workers and surrounding stakeholders
- ensure compliance with relevant regulatory requirements and industry guidelines.

The risk assessment supports the implementation of traffic management measures that reduce risks so far as is reasonably practicable (SFAIRP).

12.2. Summary of Risk Management Approach

The risk management process for traffic management activities follows a structured approach consistent with industry best practice.

The process includes:

1. **Hazard Identification**
   Identification of hazards associated with traffic management operations, demolition activities and interaction with the surrounding road network.
2. **Risk Assessment**
   Evaluation of the likelihood and consequence of each identified hazard.
3. **Risk Control Measures**
   Implementation of appropriate mitigation measures to reduce identified risks.
4. **Monitoring and Review**
   Ongoing monitoring of traffic management arrangements and review of control measures where necessary.

A detailed traffic risk register identifying specific hazards and mitigation measures associated with the demolition blast is included in this TMP.

12.3. Risk Matrix

Likelihood Rating

Rating	Description
1 – Rare	May occur only in exceptional circumstances
2 – Unlikely	Could occur at some time
3 – Possible	Might occur at some time
4 – Likely	Will probably occur in most circumstances
5 – Almost Certain	Expected to occur in most circumstances

Consequence Rating

Rating	Description
1 – Insignificant	No injury, minimal delay
2 – Minor	Minor injury, short delay
3 – Moderate	Medical treatment required, traffic disruption
4 – Major	Serious injury, major disruption
5 – Catastrophic	Fatality, prolonged network closure

Risk Rating Guide

Likelihood ↓ / Consequence →	1	2	3	4	5
5 – Almost Certain	Medium	High	High	Extreme	Extreme
4 – Likely	Medium	Medium	High	High	Extreme
3 – Possible	Low	Medium	Medium	High	High
2 – Unlikely	Low	Low	Medium	Medium	High
1 – Rare	Low	Low	Low	Medium	Medium

Control measures identified within this Traffic Management Plan have been developed to reduce the risks associated with traffic management operations to an acceptable level. These measures include traffic control arrangements, blast exclusion zone verification, coordination with NSW Police, advance warning signage and monitoring of traffic conditions during the demolition event.

12.4. Detailed Traffic Risk Register

A detailed traffic risk register has been prepared to identify hazards associated with traffic management during the demolition blast event at the Liddell Power Station.

The register outlines potential traffic hazards, assesses the associated risk levels and identifies control measures implemented to mitigate these risks.

The risk assessment considers interactions between demolition activities and the surrounding road network including the New England Highway and nearby local roads.

Control measures described within this Traffic Management Plan have been implemented to reduce identified risks so far as is reasonably practicable (SFAIRP).

Detailed Traffic Risk Register

Hazard	Potential Impact	Control Measures	Residual Risk
Vehicle entering blast exclusion zone	Injury to occupants or damage from blast debris	Full road closures at all approaches, NSW Police presence, blast exclusion verification	Low
Driver ignoring traffic control	Vehicle entering exclusion zone	Trained traffic controllers, police enforcement, advance warning signage	Low
Rear-end collision in traffic queue	Injury to road users, vehicle damage	Advance warning signage, VMS boards, queue monitoring	Medium
Heavy vehicle unable to stop safely	Risk of collision at closure point	Advance warning distances, visible signage, early traffic control deployment	Medium
Vehicle breakdown within queue	Traffic congestion or secondary collision risk	Traffic controllers monitor queues and assist where required	Low
Emergency vehicle requiring access during closure	Delay to emergency response	Coordination with NSW Police and traffic control supervisors	Low
Pedestrian or cyclist entering exclusion zone	Exposure to demolition hazards	Traffic control monitoring and controlled access points	Low
Dust plume reducing visibility	Reduced visibility for drivers	Monitoring of wind conditions and dust suppression measures	Low
Traffic controller exposure to traffic	Risk of injury to traffic control personnel	High visibility PPE, safe traffic control positioning	Low
Vehicle attempting illegal U-turn	Collision risk within queue	Traffic controllers monitor driver behaviour	Low
Driver distraction approaching closure	Increased crash risk	Advance warning signage and traffic control devices	Low
Unexpected traffic surge	Increased queue lengths	Traffic monitoring and staged traffic release	Low
OSOM vehicle approaching closure	Difficulty stopping or turning	Traffic controllers and police manage approach	Low
Adverse weather conditions	Reduced driver visibility and control	Weather monitoring and possible demolition delay	Low

The risks associated with traffic management operations during the demolition event have been assessed and appropriate mitigation measures implemented.
These measures include:

- traffic control deployment at all access points
- coordination with NSW Police
- advance warning signage and Variable Message Signs
- monitoring of traffic queues and road conditions
- verification of the blast exclusion zone prior to demolition.
-

Implementation of these measures reduces the identified risks to an acceptable level while allowing the demolition activities to be undertaken safely.

13. Health and Safety Responsibilities

Health and safety responsibilities associated with traffic management activities for the demolition blast at the Liddell Power Station will be managed in accordance with applicable legislation, project-specific procedures and industry standards.

All personnel involved in traffic management operations must take reasonable steps to ensure their own safety and the safety of others affected by their activities.

Traffic management measures outlined in this TMP have been developed to minimise risks to workers, road users and surrounding stakeholders during the demolition event.

These measures are supported by the following project procedures:

- **Blast Management Plan (BMP)**
- **Emergency Management Procedures**
- **Incident Management Procedures**
- **Traffic Guidance Schemes (TGS)**
- **Communication and Complaints Management Procedures**

Traffic control personnel will carry out their duties in accordance with these procedures and relevant training requirements.

13.1. Legislative Compliance

Traffic management activities associated with the demolition works will comply with relevant legislation and industry guidelines including:

- Work Health and Safety Act 2011 (NSW)
- Work Health and Safety Regulation 2025 (NSW)
- Roads Act 1993 (NSW)
- Transport for NSW Traffic Control at Work Sites (TCAWS) Manual
- Austroads Guide to Temporary Traffic Management (AGTTM)
- AS 1742.3 – Traffic Control for Works on Roads

Compliance with these requirements ensures that traffic management operations are carried out safely and in accordance with regulatory obligations.

13.2. Shared Responsibilities

Health and safety is a shared responsibility between all parties involved in the demolition works.

Project management, supervisors, traffic control personnel and contractors all have responsibilities to ensure that traffic management activities are implemented safely. Responsibilities include:

- complying with approved traffic management arrangements
- following project safety procedures
- reporting hazards and incidents
- participating in safety briefings and toolbox talks.

Maintaining clear communication between project personnel assists in ensuring that safety risks are identified and managed effectively.

13.3. Worker and Traffic Control Crew Responsibilities

Traffic control personnel are responsible for implementing traffic management measures in accordance with the approved Traffic Guidance Schemes and this Traffic Management Plan.

Traffic control crew responsibilities include:

- installing and maintaining traffic control devices
- monitoring traffic conditions at closure points
- communicating with supervisors and other traffic control personnel
- responding to incidents or unsafe conditions
- ensuring that the blast exclusion zone remains secure during demolition operations.

Traffic controllers must remain vigilant and ensure that road users comply with traffic control instructions.

13.4. Safe Work Method Statements (SWMS)

Traffic management activities associated with the demolition works will be undertaken in accordance with relevant Safe Work Method Statements (SWMS).

SWMS documents will outline the hazards associated with traffic control operations and the control measures required to mitigate those risks.

All personnel involved in traffic management activities will be briefed on the relevant SWMS prior to commencing work.

Compliance with SWMS requirements will assist in ensuring that traffic control operations are undertaken safely and consistently throughout the demolition event.

14. TMP Review and Revision Process

This Traffic Management Plan (TMP) will be reviewed and updated as necessary to ensure that traffic management arrangements remain appropriate for the demolition works at the Liddell Power Station.

Reviews will ensure that the TMP continues to reflect current project conditions, traffic management requirements and regulatory obligations.

Where changes to traffic management arrangements are required, the TMP will be revised accordingly and the updated version communicated to relevant project personnel and stakeholders.

14.1. Triggers for Review

The TMP will be reviewed where any of the following occur:

- changes to the scope of works or demolition methodology
- changes to traffic management arrangements or closure locations
- changes to project scheduling that may affect traffic control operations
- incidents or near misses related to traffic management
- feedback from stakeholders, authorities or project personnel
- changes to applicable legislation or standards.

Where required, revisions to the TMP will be prepared and issued prior to the implementation of any changes.

14.2. Revision Procedure

Where revisions to the TMP are required, the following process will be undertaken:

1. Identification of required changes to the TMP.
2. Preparation of updated documentation reflecting the revised traffic management arrangements.
3. Review of the revised TMP by the project management team.
4. Approval of the updated TMP prior to implementation.
5. Communication of the revised TMP to relevant personnel.

Traffic control arrangements will only be implemented once the updated TMP has been reviewed and approved where required.

14.3. Distribution of Revisions

Updated versions of the TMP will be distributed to relevant project personnel and stakeholders including:

- project management personnel
- Demolition Supervisor / Blast Control
- traffic control supervisors and crews
- relevant authorities where required.

Personnel responsible for implementing traffic management measures will be briefed on any revisions prior to the commencement of work.

14.4. Document Control

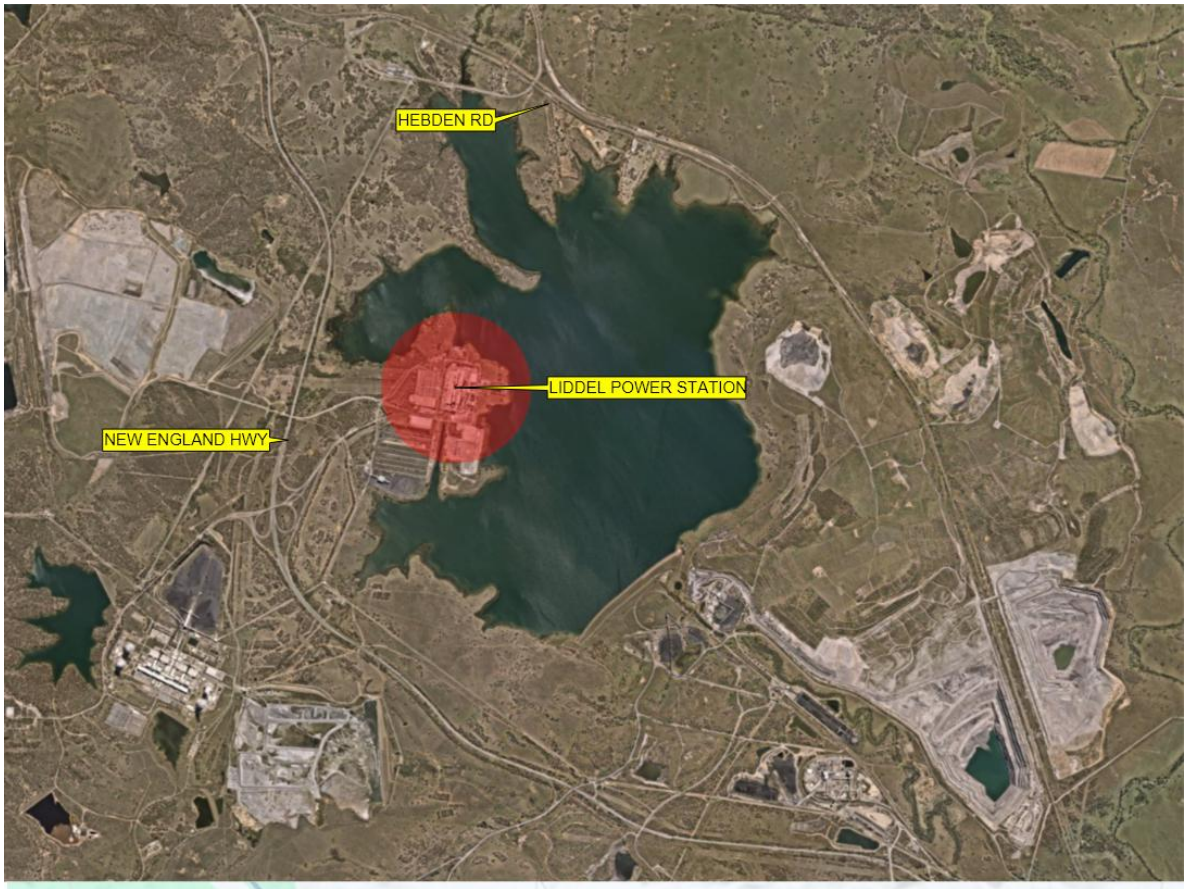
This Traffic Management Plan will be subject to document control procedures to ensure that only the current approved version is used.

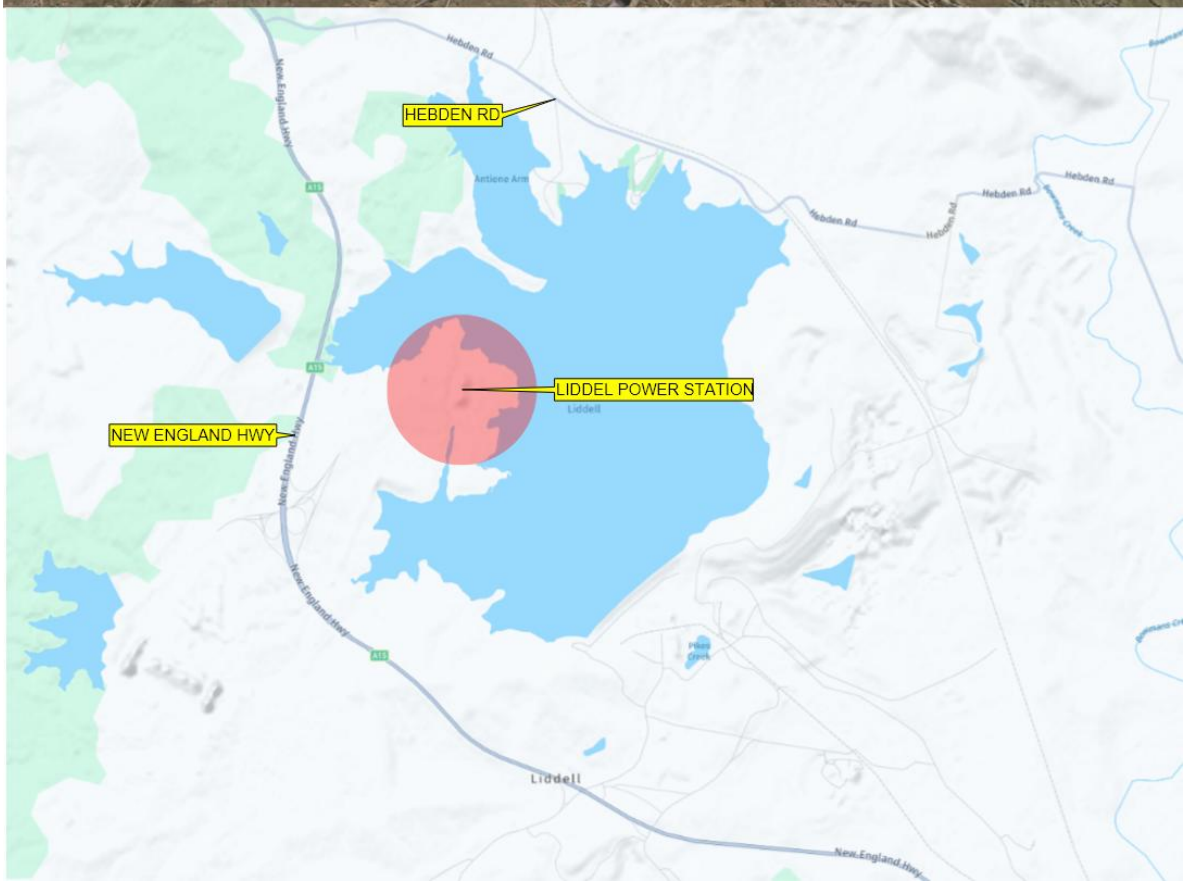
The document control process will include:

- version numbering and revision tracking
- maintenance of a revision register
- controlled distribution of updated versions
- archiving of superseded versions.

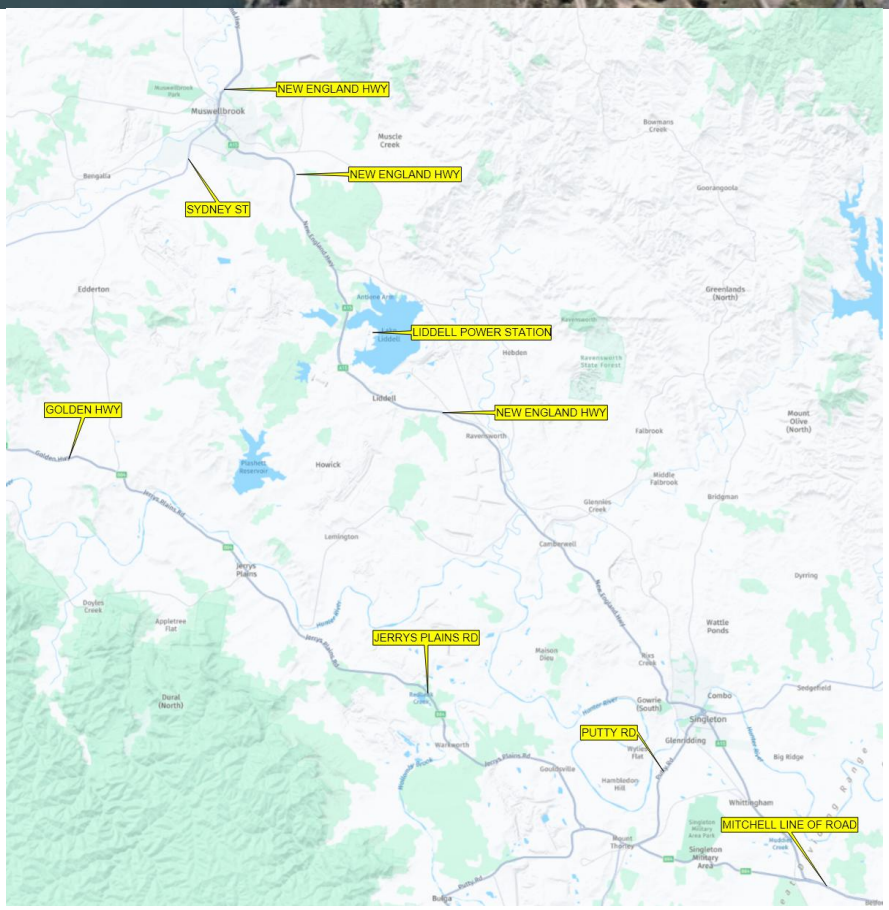
Maintaining proper document control ensures that all personnel are working in accordance with the latest approved traffic management arrangements.

Appendix A – Site Location Plans

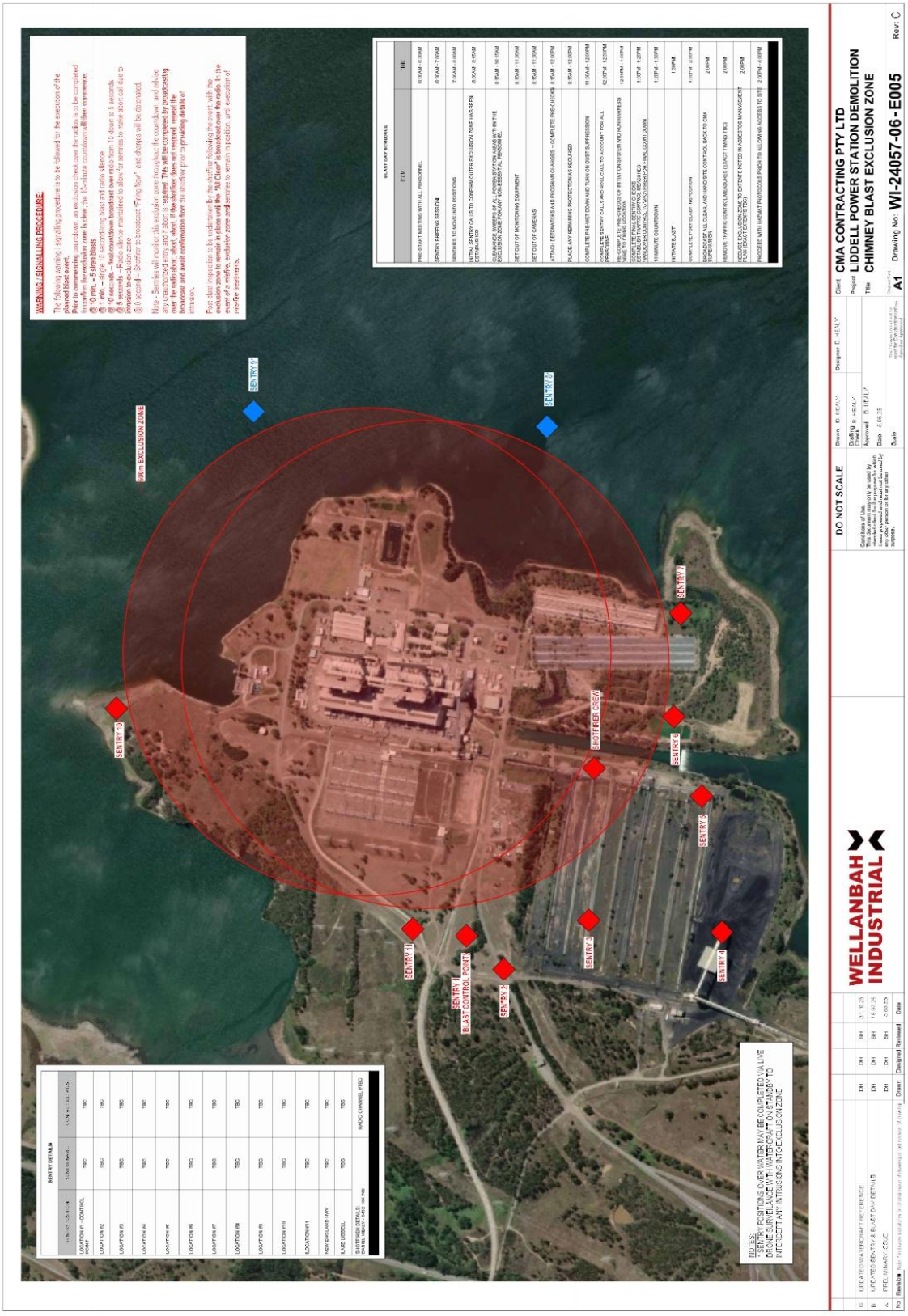




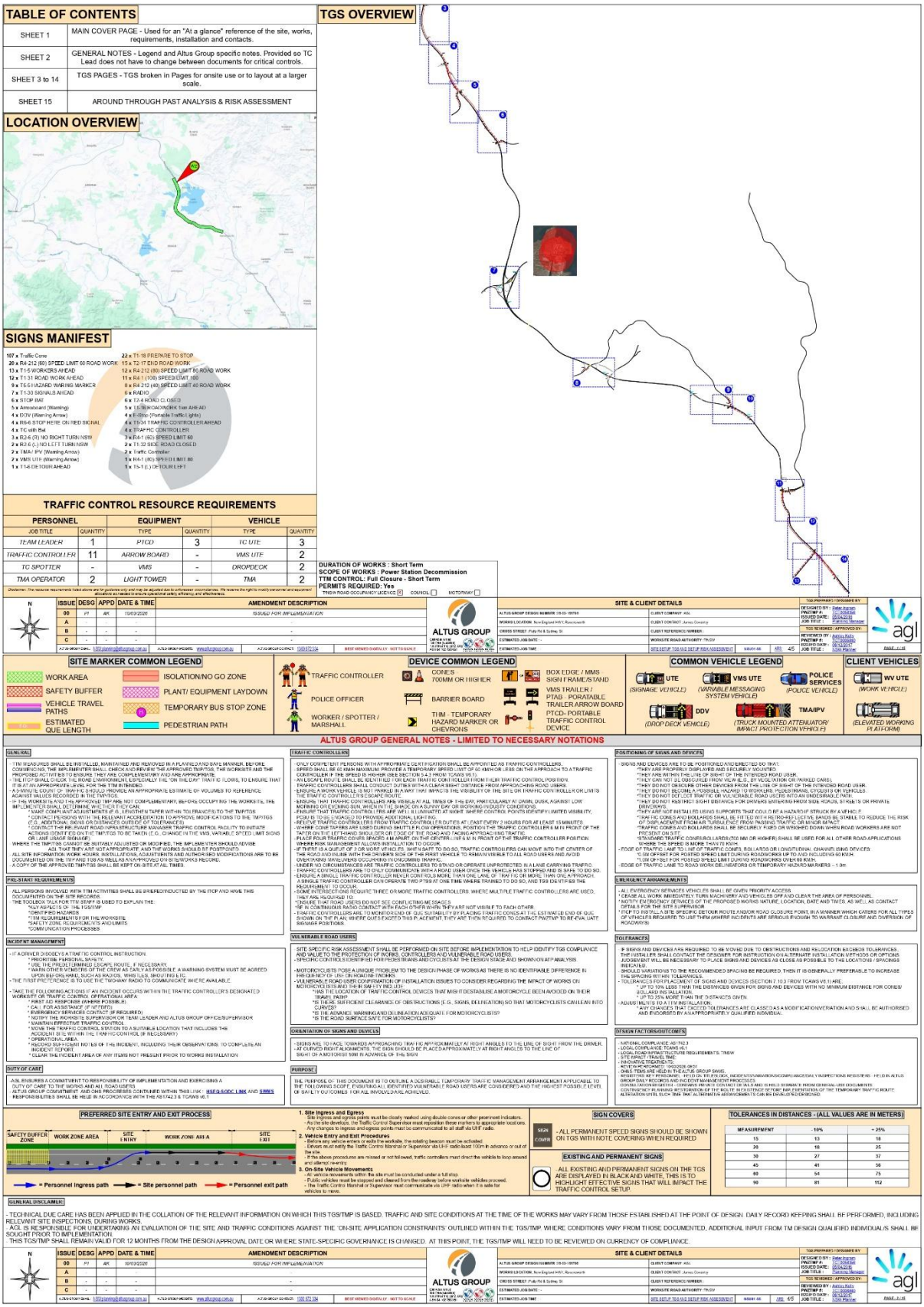



NEW ENGLAND HWY
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GOLDEN HWY
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PUTTY RD
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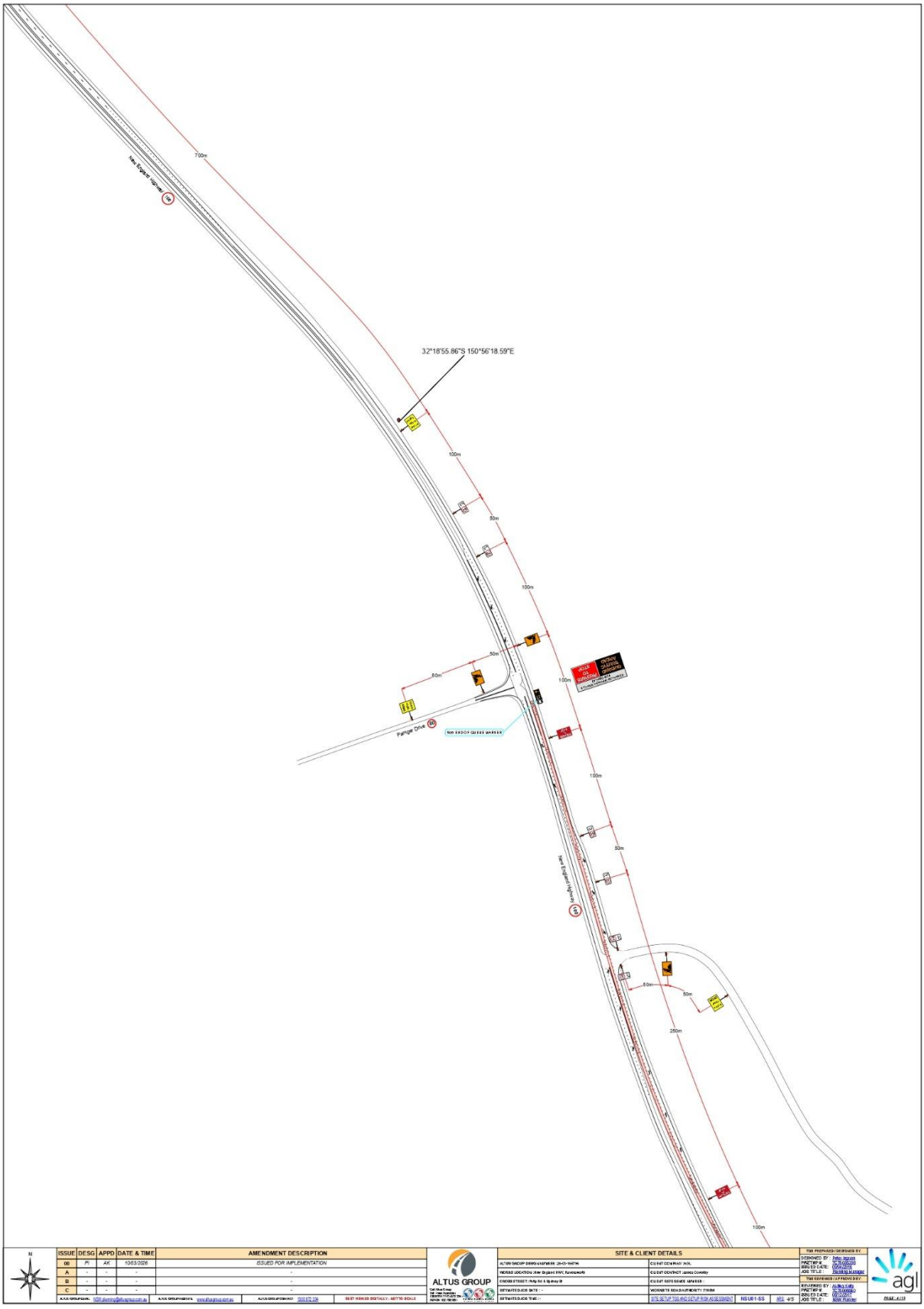
Appendix B – Blast Exclusion Zone Plan

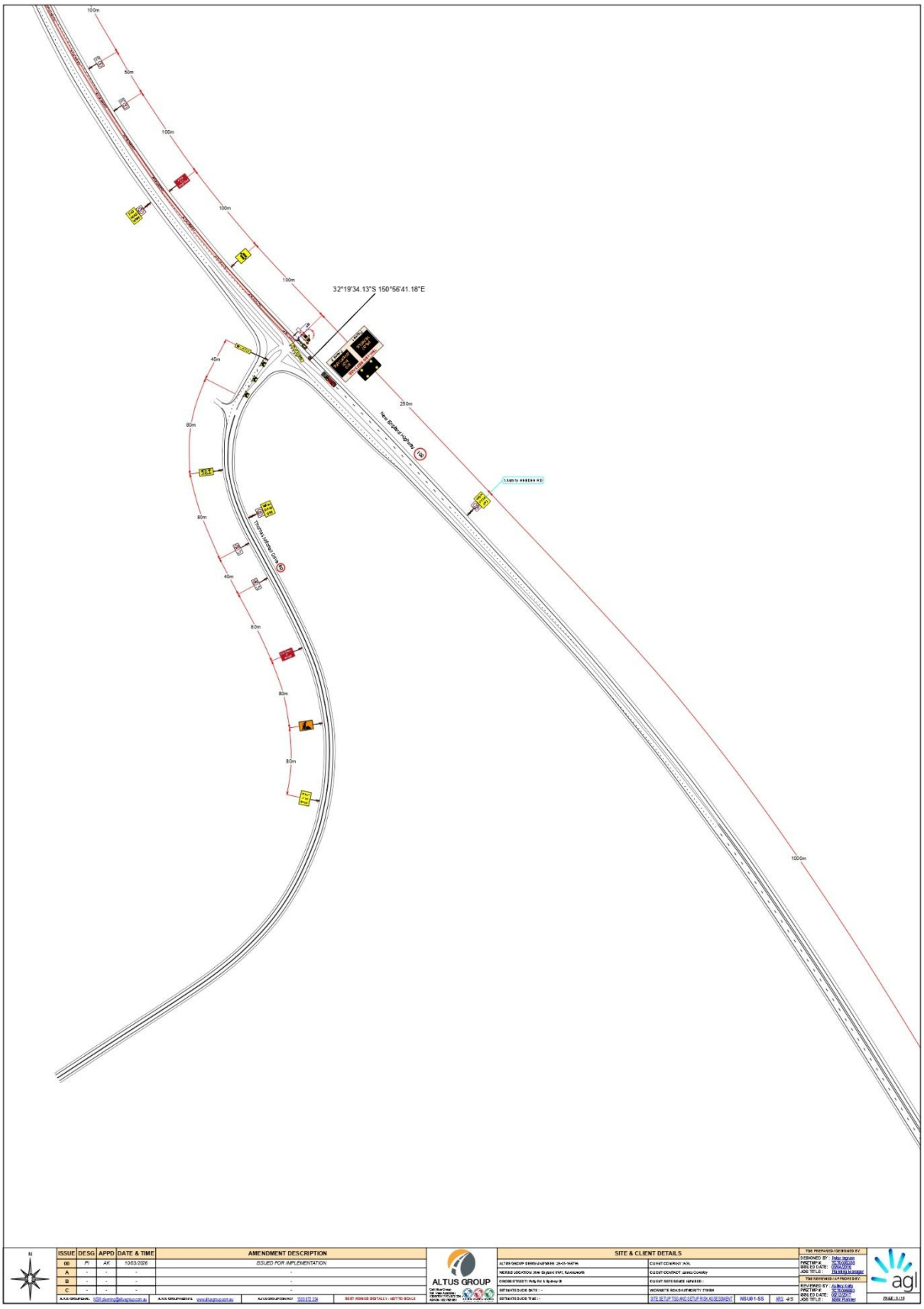


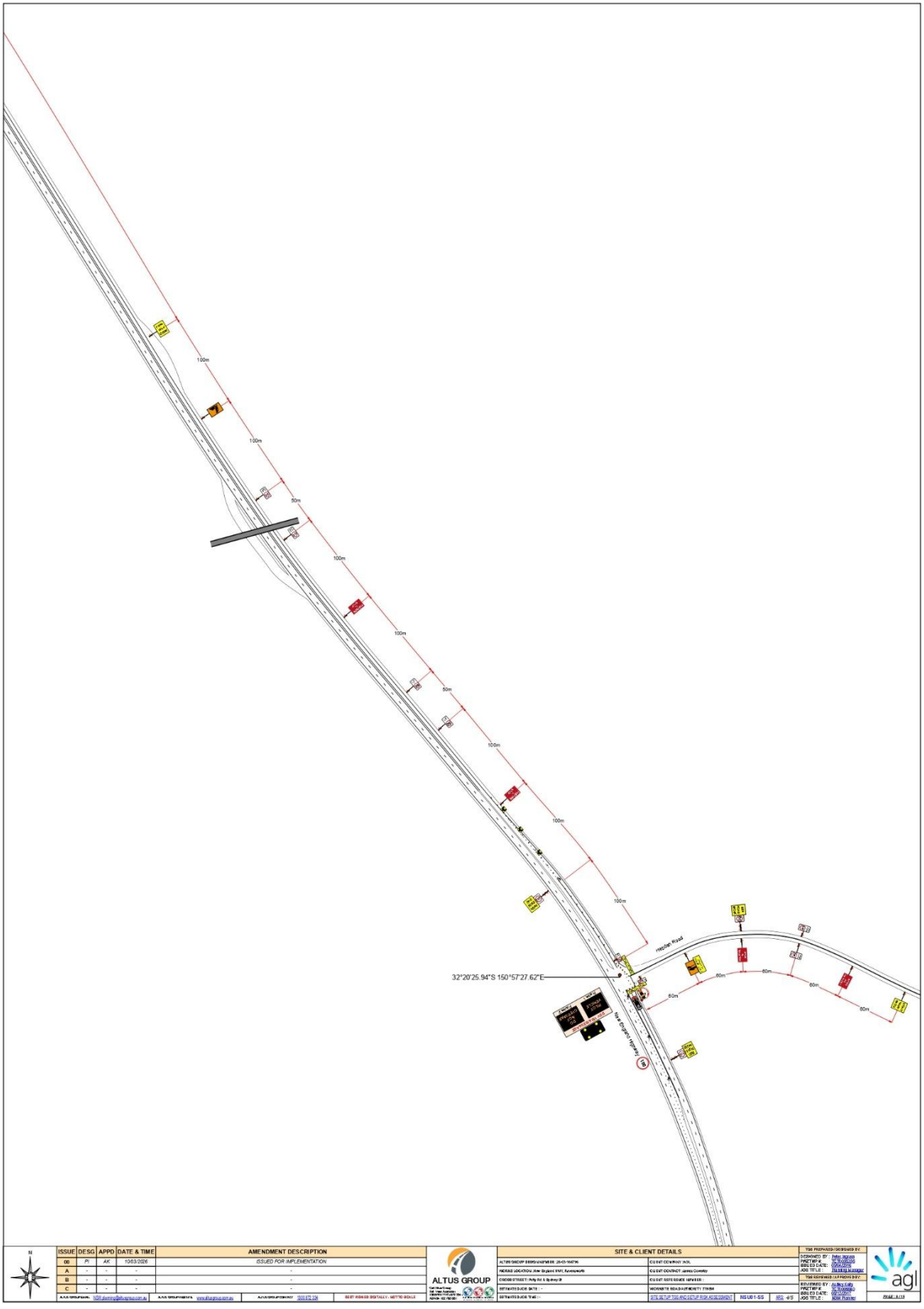
Appendix C – Traffic Guidance Schemes (TGS)

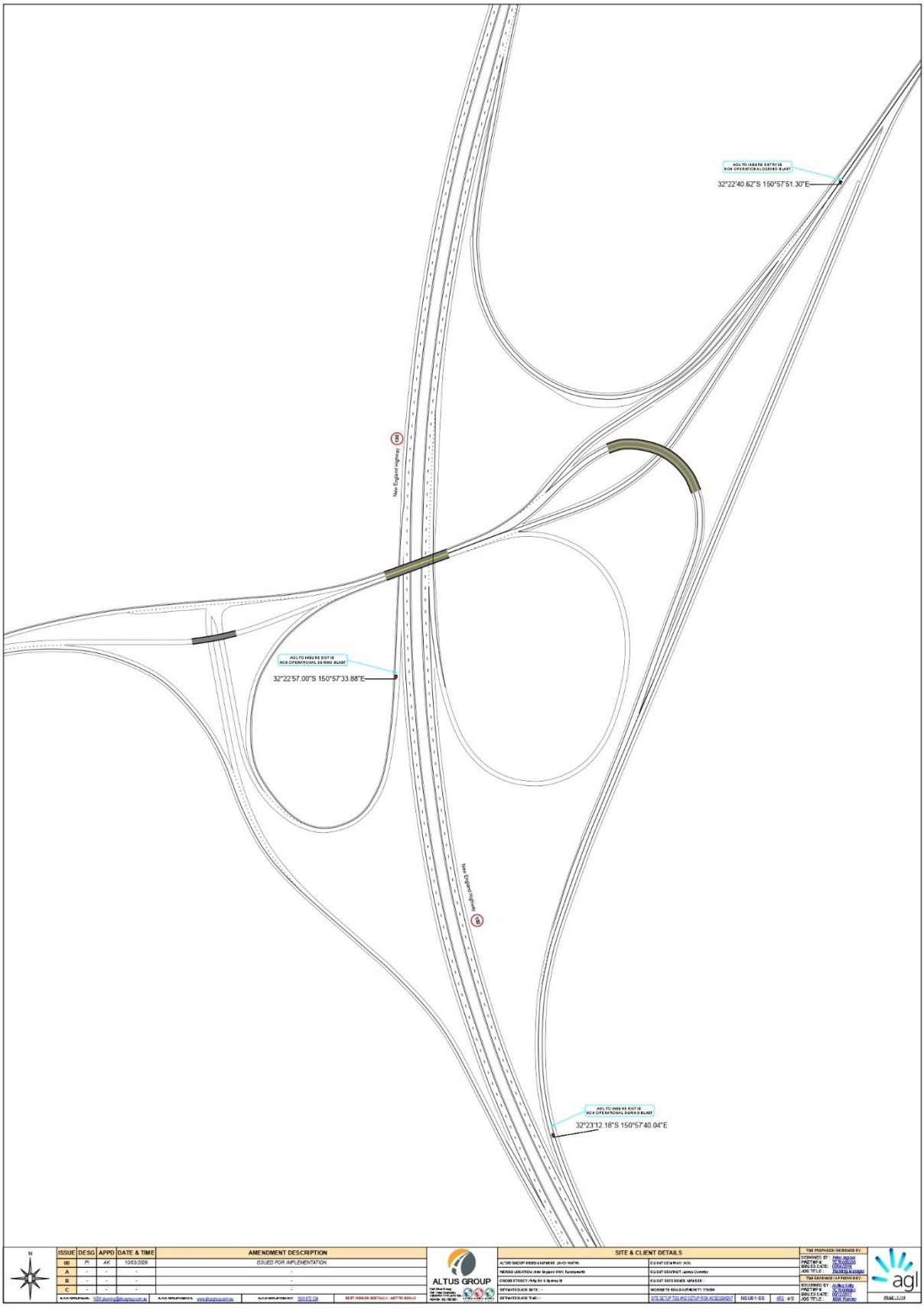


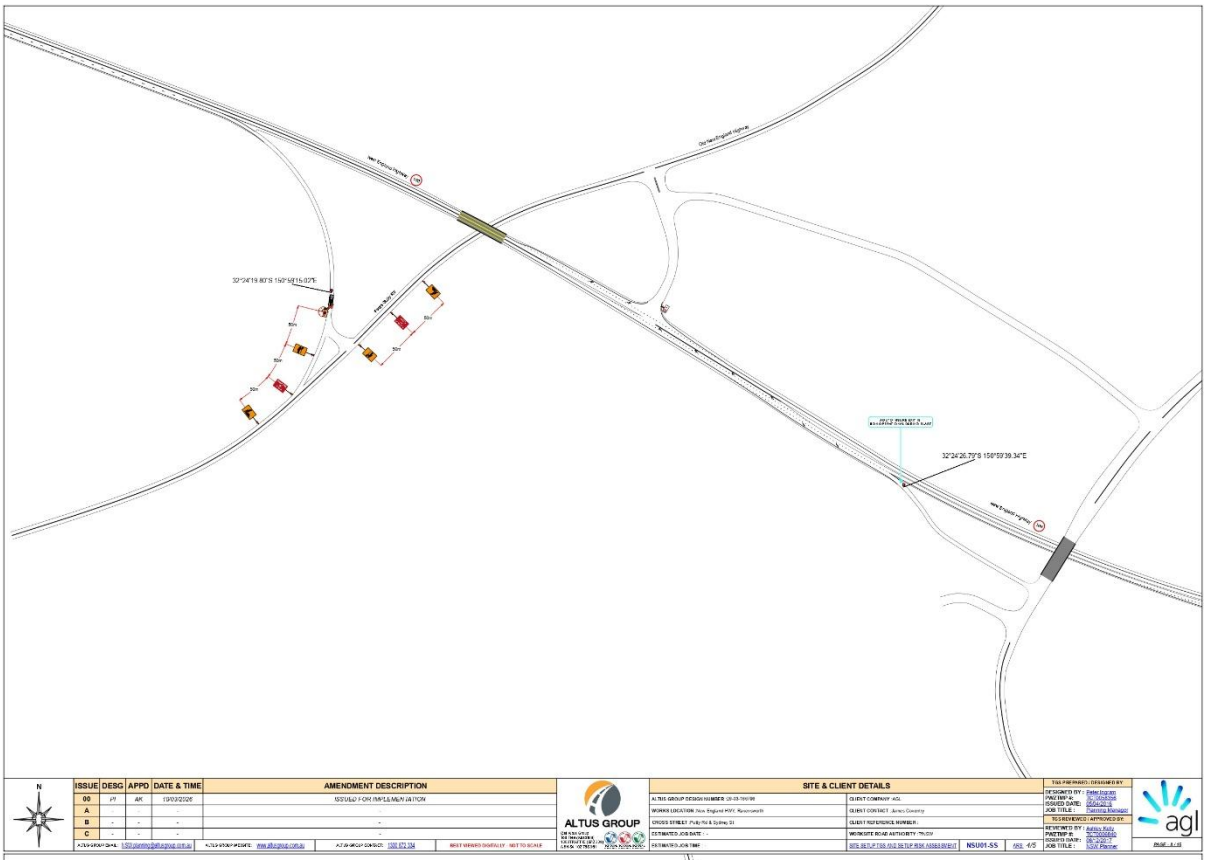

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agl

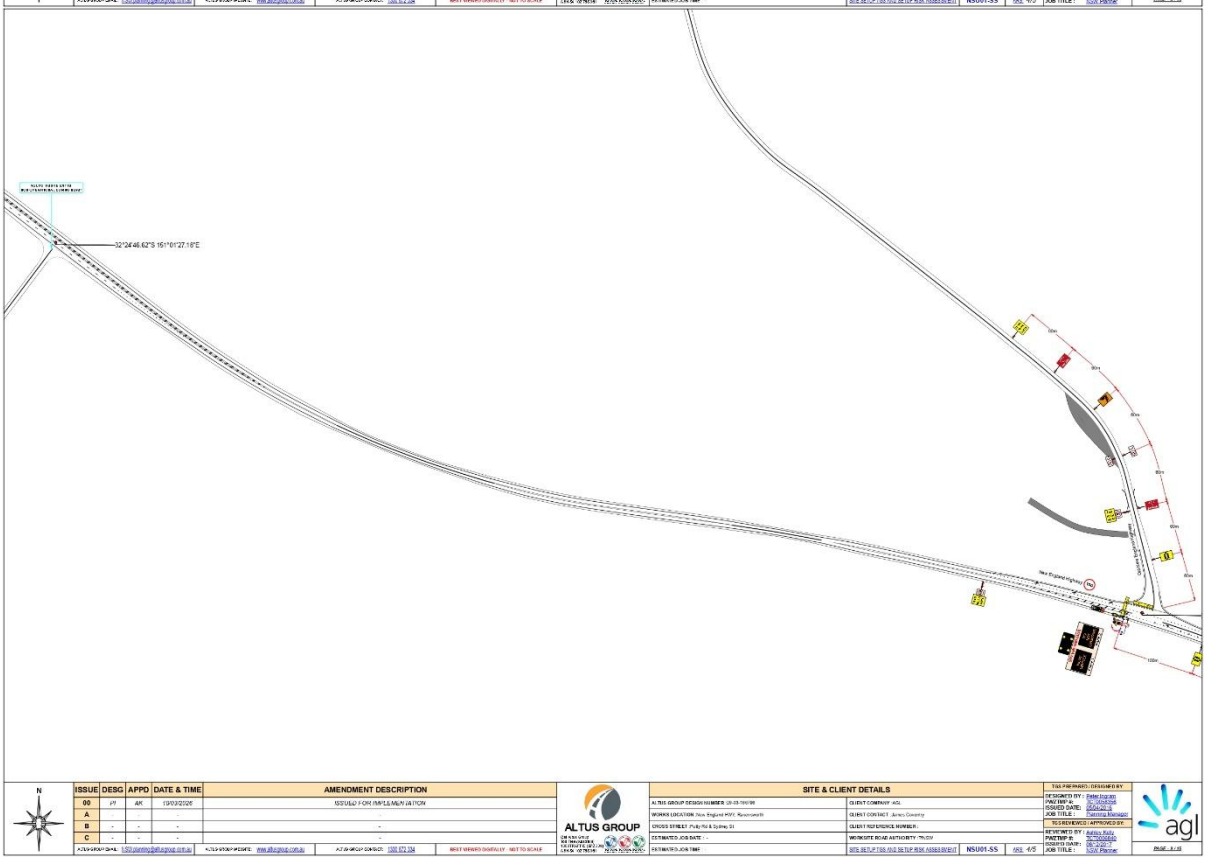

32°18'55.86"S 150°56'18.59"E
700m
100m
50m
80m
250m
New England Highway
Falinge Drive
ISSUE
DESG
APPD
DATE & TIME
AMENDMENT DESCRIPTION
00
PI
AK
10/02/2026
ISSUED FOR IMPLEMENTATION
SITE & CLIENT DETAILS
ALTUS GROUP

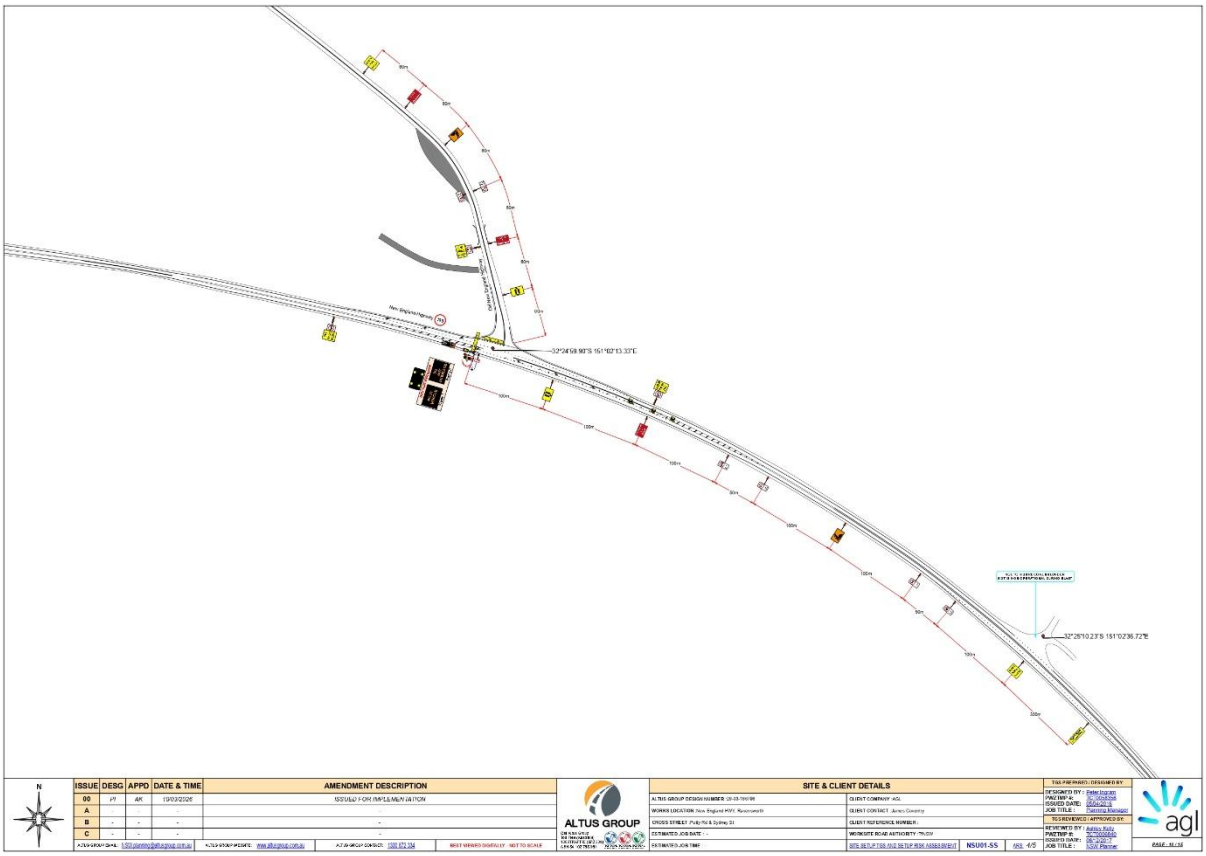

32°19'34.13"S 150°56'41.18"E
New England Highway
Golden Highway
100m
50m
40m
80m
250m
1000m

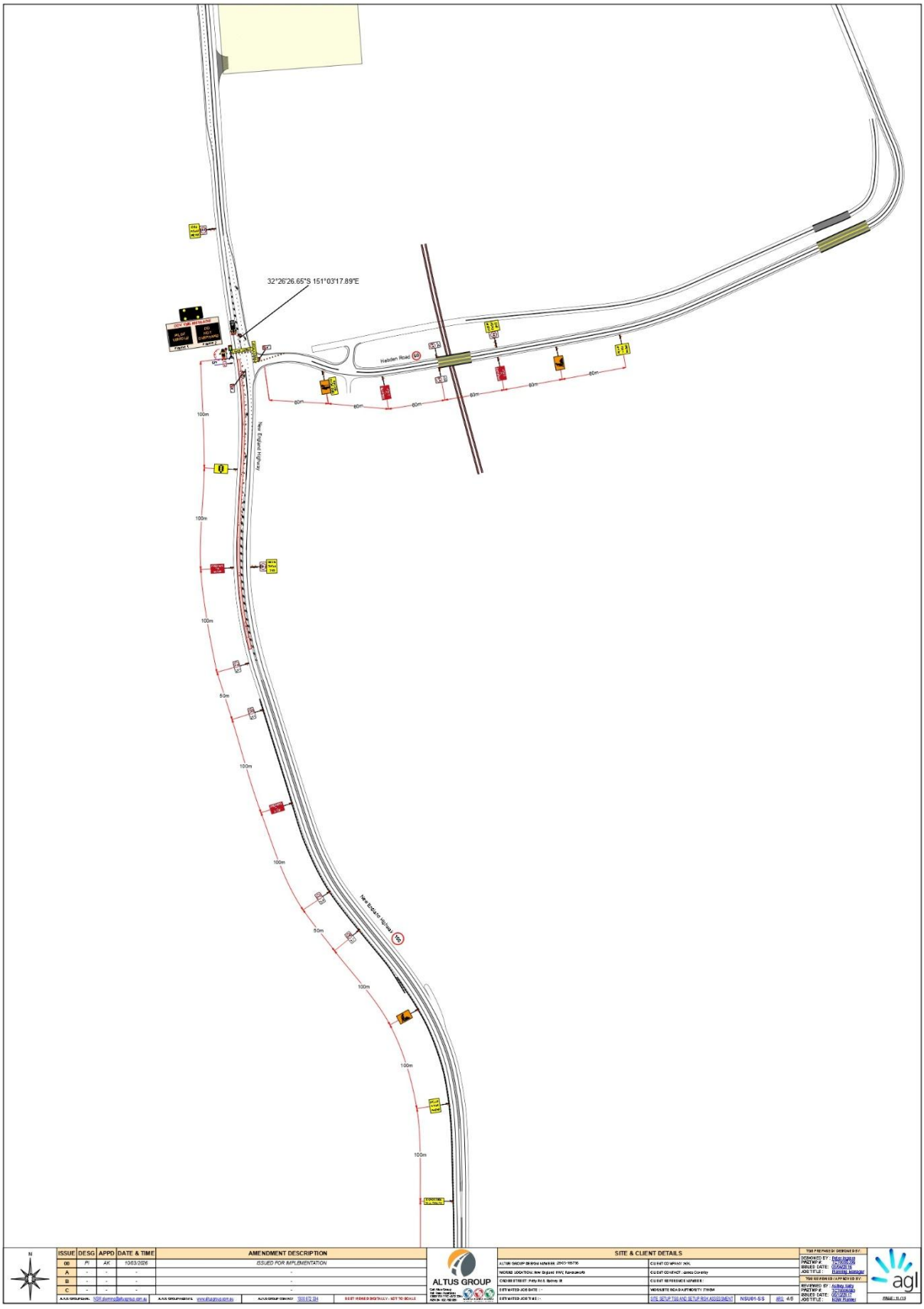

32°20'25.94"S 150°57'27.62"E
New England Highway
Hebden Road
100m
50m
60m

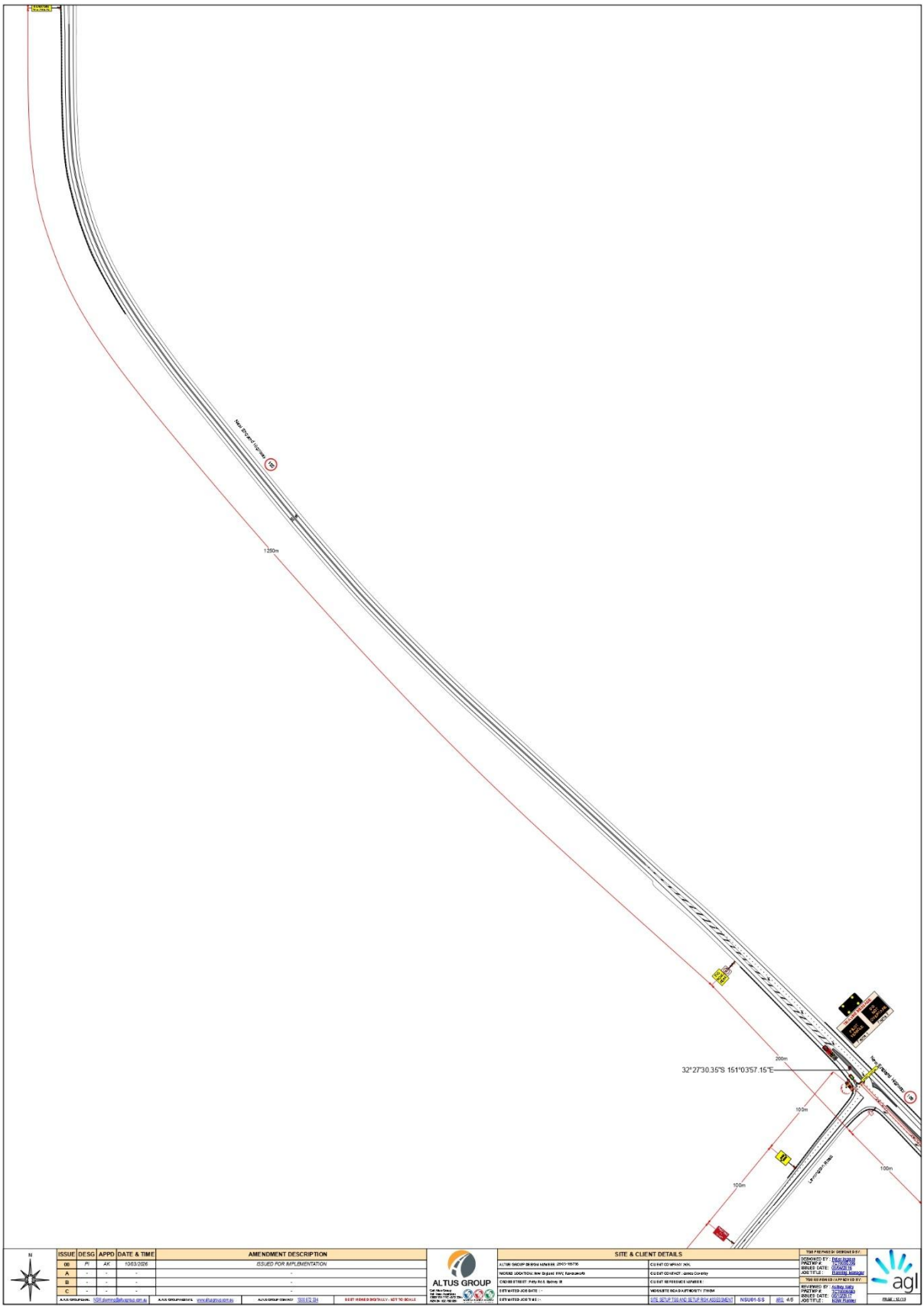

32°22'40.62"S 150°57'51.30"E
32°22'57.00"S 150°57'33.88"E
32°23'12.18"S 150°57'40.04"E
New England Highway
ISSUE
DESG
APPD
DATE & TIME
AMENDMENT DESCRIPTION
00
PI
AK
10/02/2026
ISSUED FOR IMPLEMENTATION
SITE & CLIENT DETAILS
ALTUS GROUP
agl

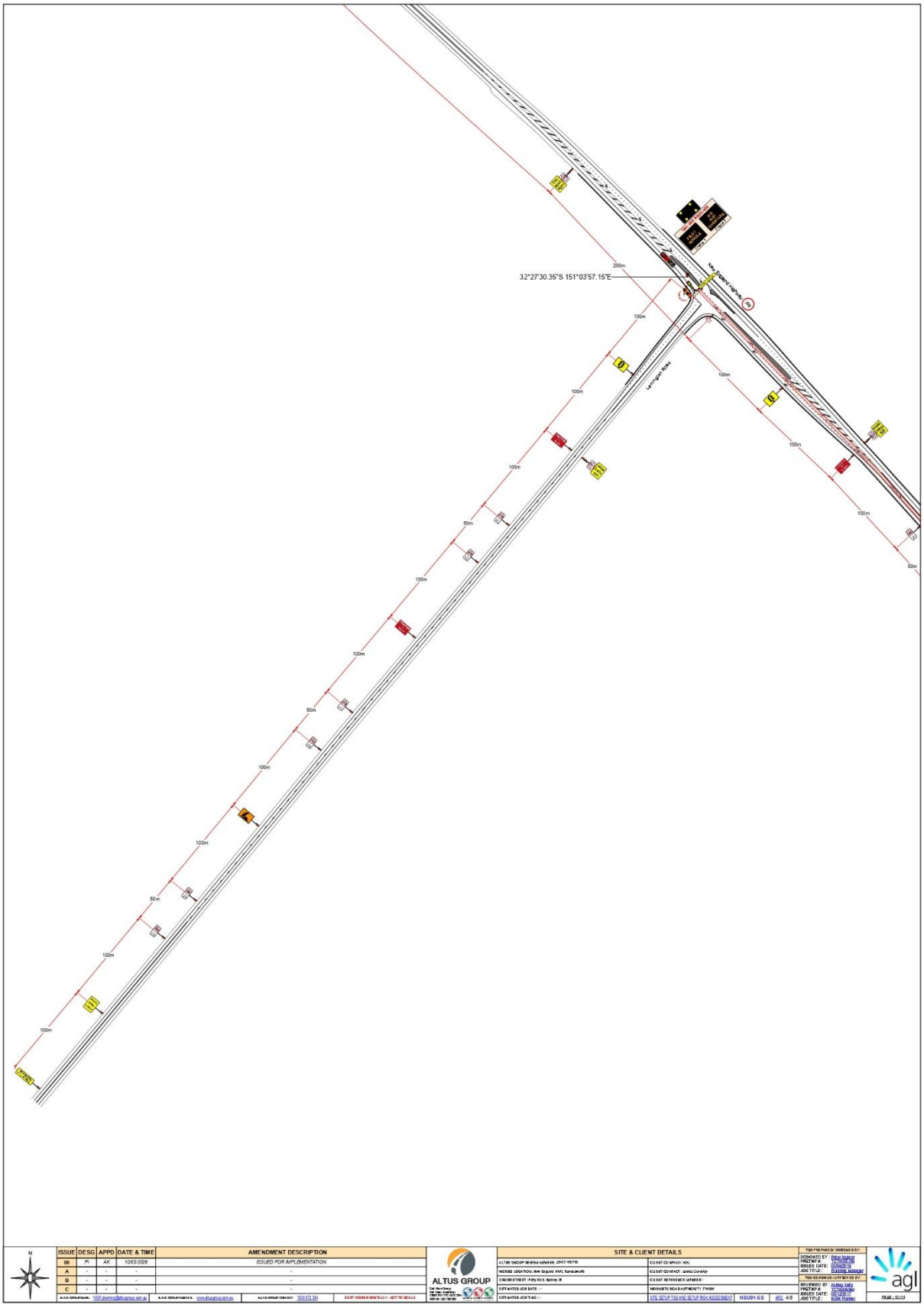

32°24'26.73"S 150°59'39.34"E
ISSUE DESG APPD DATE & TIME AMENDMENT DESCRIPTION
00 AK 19/02/2026 ISSUED FOR RMS/LM/N JATTON
SITE & CLIENT DETAILS
ALTUS GROUP

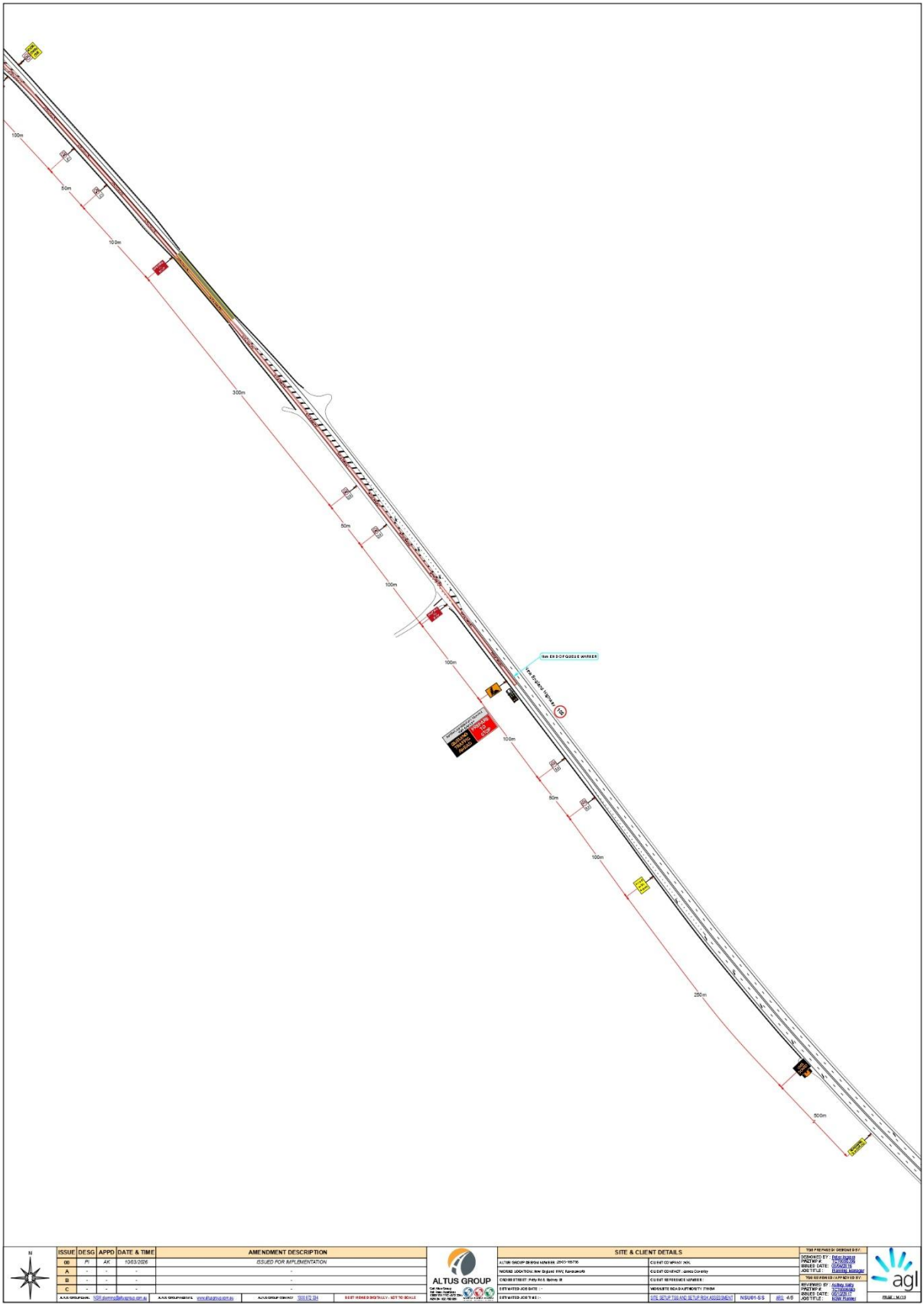

32°24'46.62"S 151°01'27.18"E
ISSUE DESG APPD DATE & TIME AMENDMENT DESCRIPTION
00 AK 19/02/2026 ISSUED FOR RMS/LM/N JATTON
SITE & CLIENT DETAILS
ALTUS GROUP


32°26'58.98"S 151°02'13.33"E
32°26'10.23"S 151°02'36.72"E
ISSUE
DESG
APPD
DATE & TIME
AMENDMENT DESCRIPTION
ISSUED FOR IMPLEMENTATION
SITE & CLIENT DETAILS
ALTUS GROUP
agl


32°26'26.65"S 151°03'17.89"E
Hebden Road
New England Highway
ISSUE
DESG
APPD
DATE & TIME
AMENDMENT DESCRIPTION
00
PI
AK
10/03/2026
ISSUED FOR IMPLEMENTATION
SITE & CLIENT DETAILS
ALTUS GROUP
agl


New England Highway
1250m
32°27'30.35"S 151°03'57.15"E
200m
100m
100m
100m
Lemington Road
New England Highway
ISSUE
DESG
APPD
DATE & TIME
AMENDMENT DESCRIPTION
00
PI
AK
10/02/2026
ISSUED FOR IMPLEMENTATION
SITE & CLIENT DETAILS
ALTUS GROUP
agl


32°27'30.35"S 151°03'57.15"E
New England Highway
Lemington Road
ISSUE
DESG
APPD
DATE & TIME
AMENDMENT DESCRIPTION
ISSUED FOR IMPLEMENTATION
SITE & CLIENT DETAILS
ALTUS GROUP


ISSUE
DESG
APPD
DATE & TIME
AMENDMENT DESCRIPTION
ISSUED FOR IMPLEMENTATION
SITE & CLIENT DETAILS
ALTUS GROUP

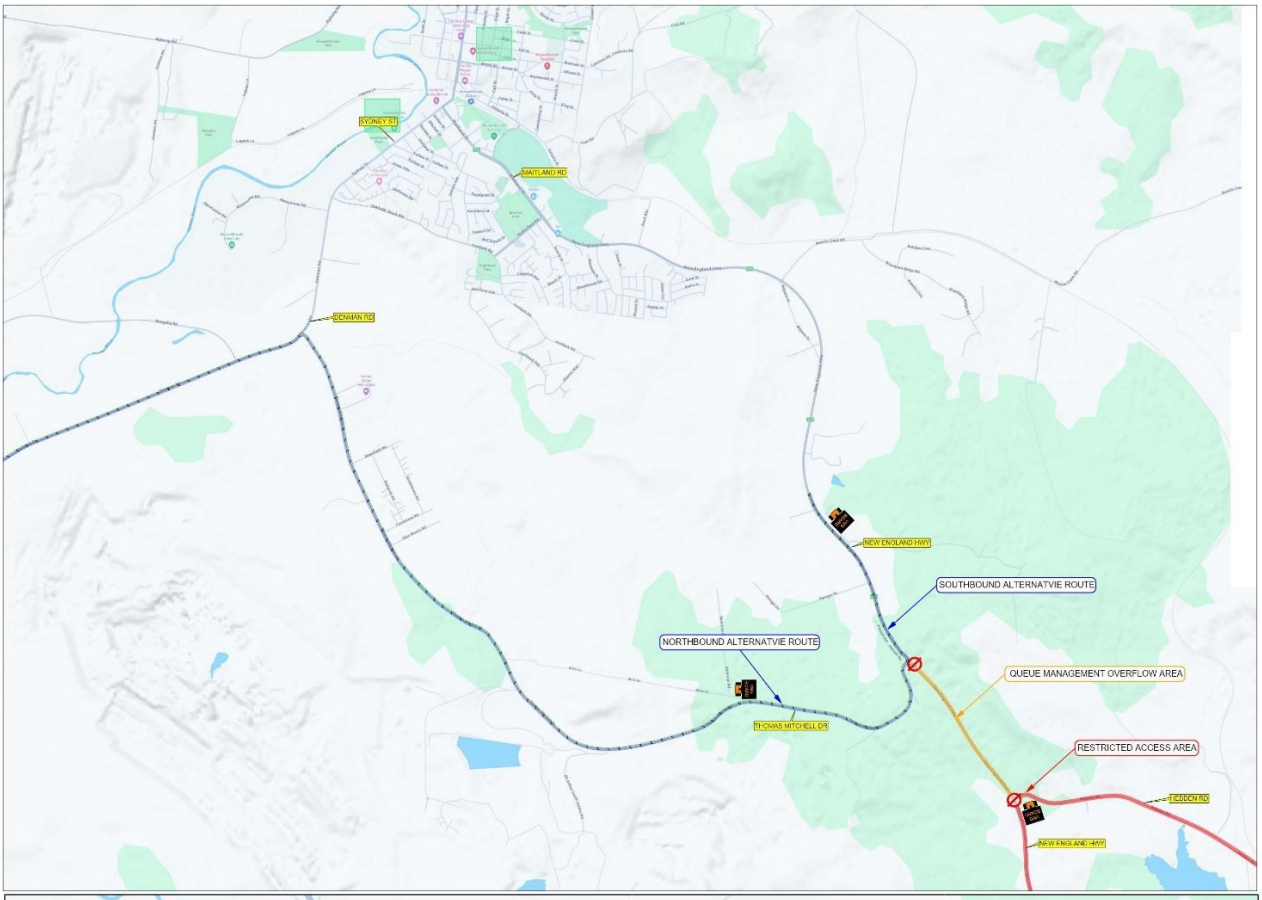
Appendix D – TGS Risk Assessment

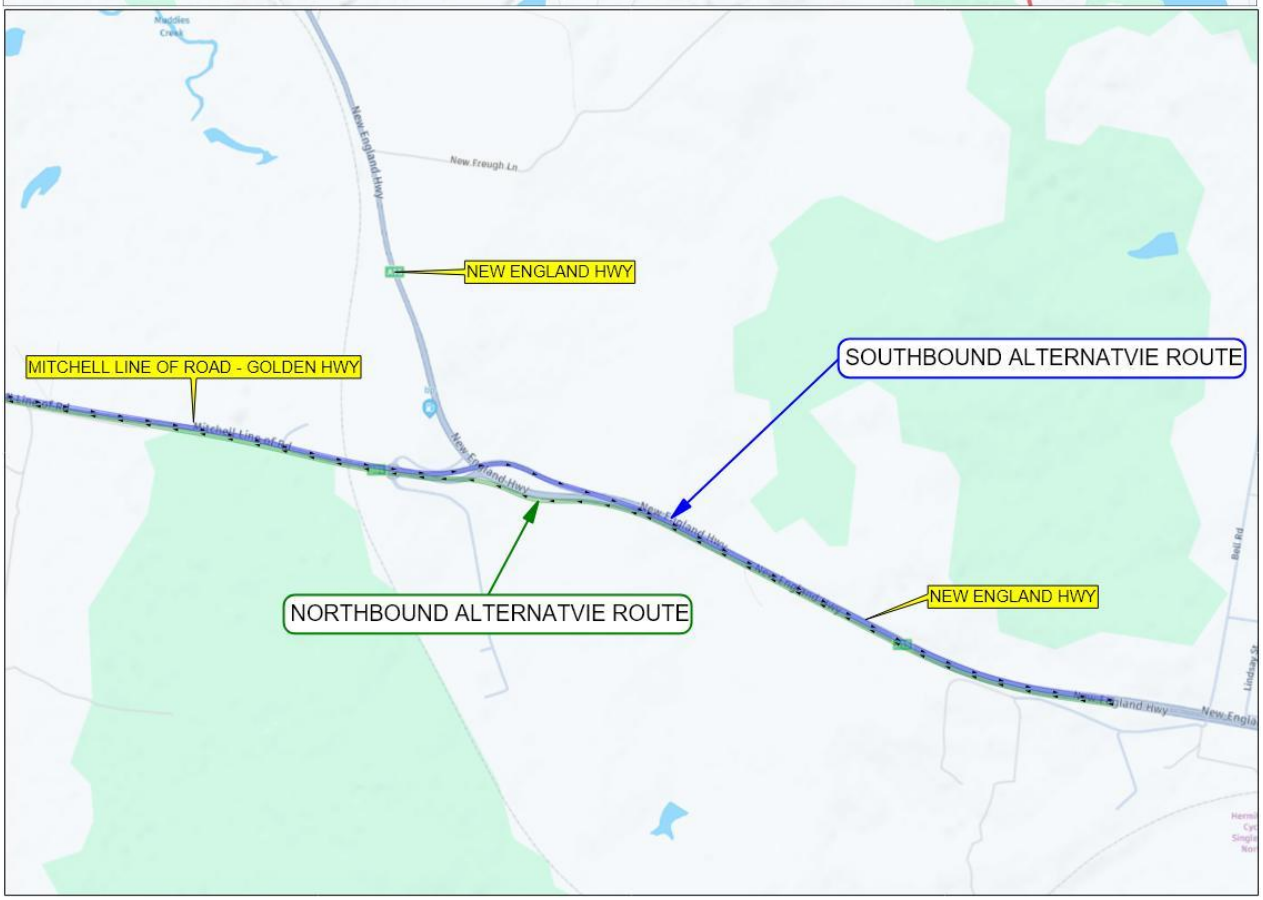
Work Site Component	Potential Hazard	Control Measures	Residual Risk
Traffic interaction during blast	Vehicles entering exclusion zone causing fatality	• Full road closures on all approaches• Traffic held at control points (10–15 mins)• No access into exclusion zone• Release only after all-clear from Blast Control / AGL	Low
Setup / pack-down works	Exposure to live traffic during lane closures	• Lane closures implemented in accordance with TGS• Reduced speed environment where required• Advance warning signage installed• Traffic controllers managing traffic movements	Medium
Stop/Slow operations (if required)	Traffic controller struck by vehicle	• Stop/Slow used only where PTCD not suitable• Traffic controllers positioned with safe escape paths• TCV shadow vehicles providing upstream protection• Minimise time in live lane	Medium
Traffic controllers (100 km/h approaches)	Struck by errant vehicle	• TMAs deployed on primary approaches• TCVs used as shadow / hard cover vehicles• Extended advance warning signage• Controllers positioned outside live lane where possible	Low
Pedestrians and cyclists	Interaction with traffic or entering work zone	• Pedestrian and cyclist paths maintained or controlled• Traffic controllers assist crossing where required• Work areas clearly delineated• No access into exclusion zone during blast	Low
Pre-blast clearance	Vehicles or persons within exclusion zone	• All roads cleared prior to blast• Traffic controllers confirm clearance• Police support enforcement• Coordination with Blast Control / AGL	Low
Post-blast conditions	Debris or hazards on road	• Post-blast inspection completed• Road remains closed until safe• Controlled staged reopening	Low
Queue formation	Rear-end collisions / congestion	• Queue monitoring during closure• Short duration closure (10–15 mins)• Progressive release of traffic• End-of-queue awareness	Low
Communication failure	Unsafe release / delayed response	• UHF communication across all control points• Defined chain of command• No traffic release without Blast Control approval	Low
Environmental conditions	Reduced visibility (dust, wind)	• Monitor weather conditions• Delay release if visibility unsafe• Adjust controls where required	Low
Emergency / incident	Injury or unsafe conditions	• Immediate stop of traffic• Notify NWTCS, Supervisor, AGL, Blast Control• Emergency services contacted if required• Works suspended until safe	Medium
Traffic management implementation	Incorrect setup or non-compliance	• TGS implemented by qualified personnel• Prestart briefings conducted• NWTCS oversight• Compliance with TCAWS, AGTTM, AS1742.3	Low

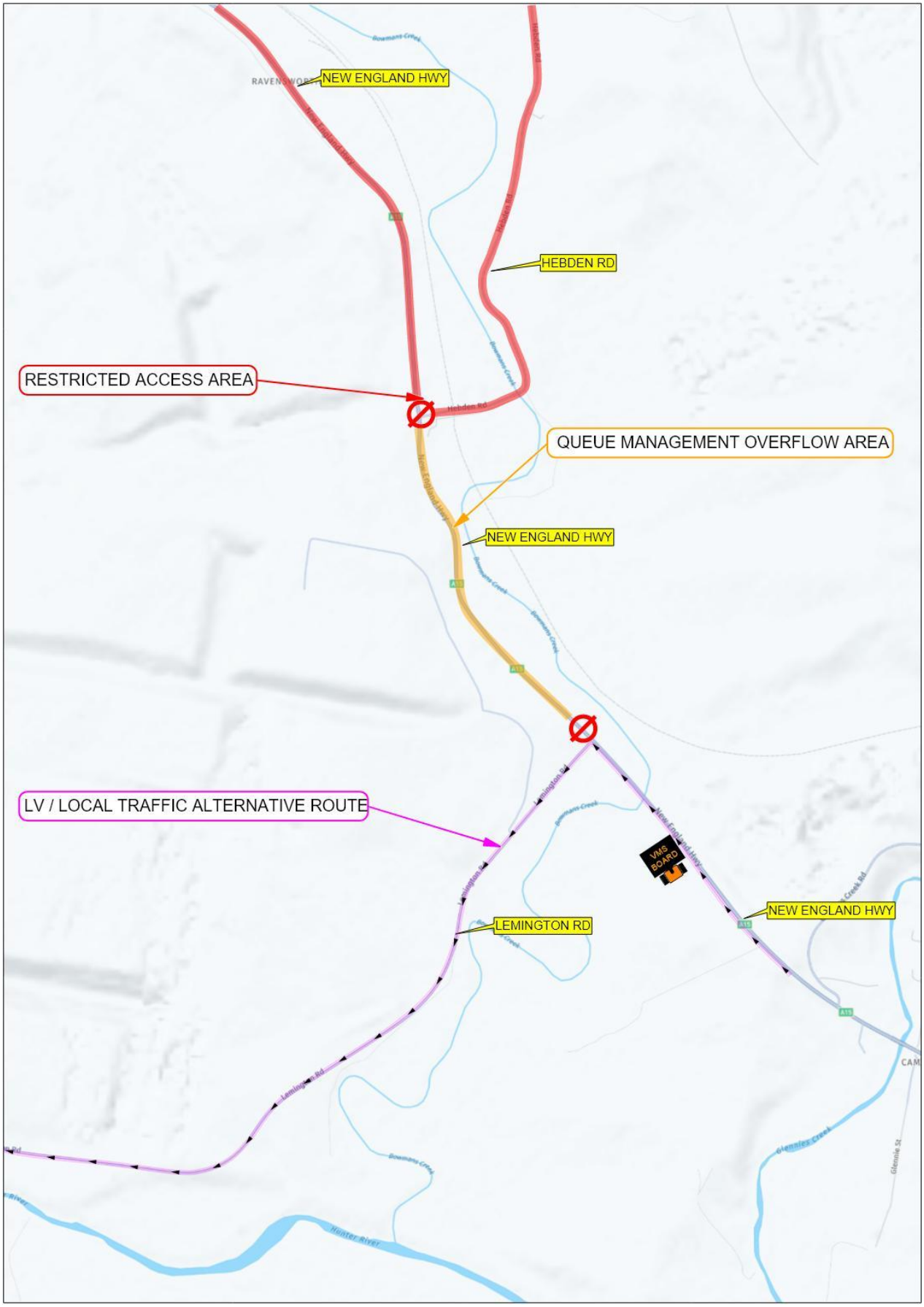
Appendix E – Road Occupancy Licence (ROL) / Speed Zone Authorisation (SZA)

TBA

Appendix F – Alternative Route Plans



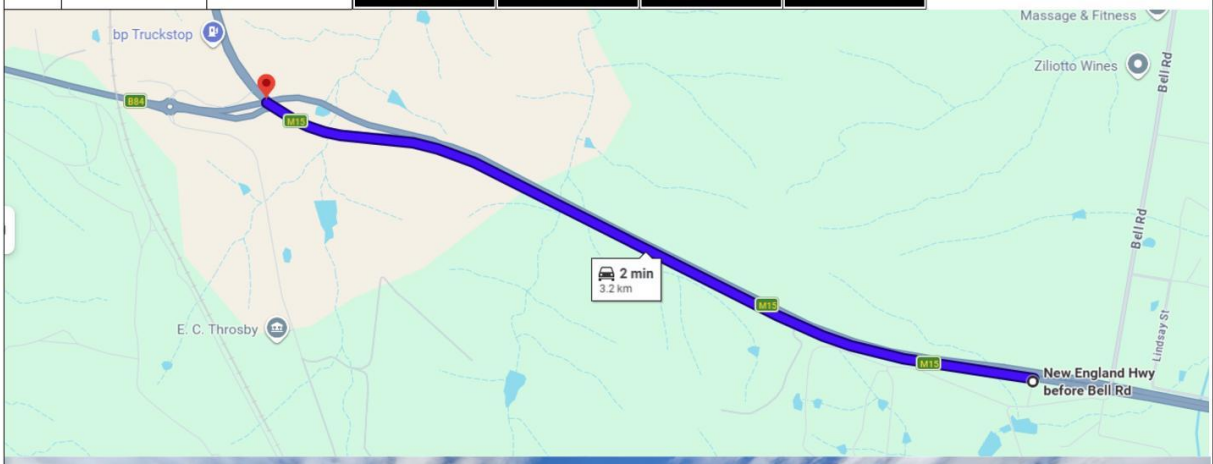



NEW ENGLAND HWY
HEBDEN RD
RESTRICTED ACCESS AREA
QUEUE MANAGEMENT OVERFLOW AREA
NEW ENGLAND HWY
LV / LOCAL TRAFFIC ALTERNATIVE ROUTE
VMS BOARD
LEMINGTON RD
NEW ENGLAND HWY

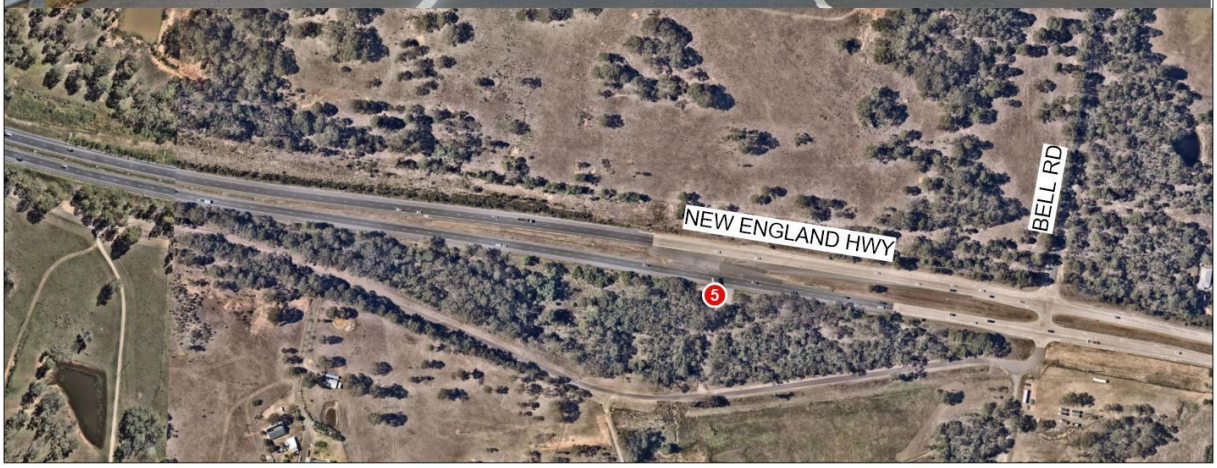
Appendix G – VMS Strategy

VMS MESSAGES

VMS	LOCATION	DIRECTION	PRIOR TO WORKS		DURING WORKS	
			FRAME 1	FRAME 2	FRAME 1	FRAME 2
VMS 5	3.2km SOUTH OF GOLDEN HWY OVERPASS (Hyper Link)	NORTHBOUND	NEW ENG HWY LIDDELL CLOSURE	25-26 MAY EXPECT DELAYS	NEW ENG HWY CLOSED TO XX PM	EXPECT DELAYS

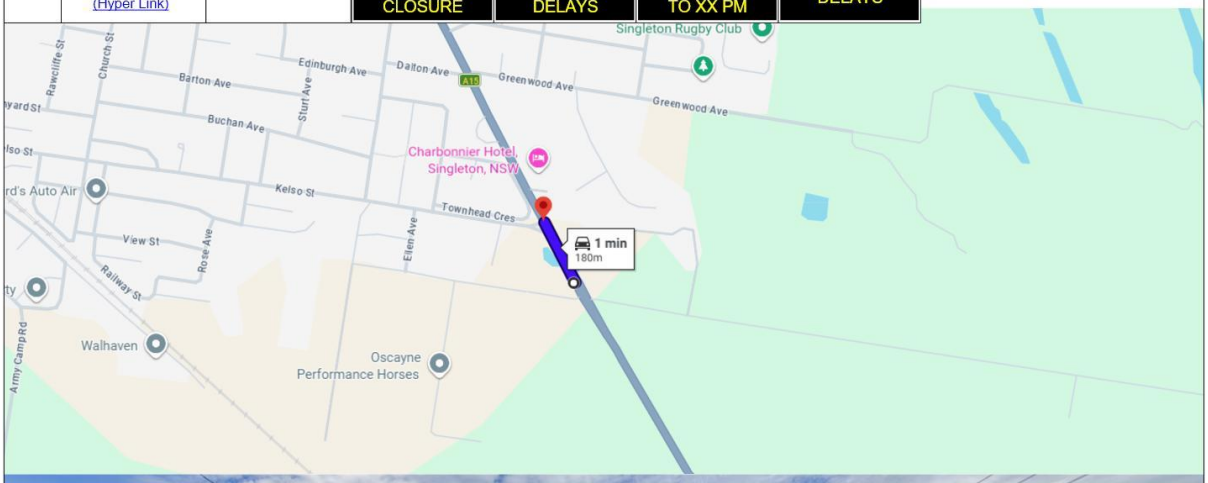




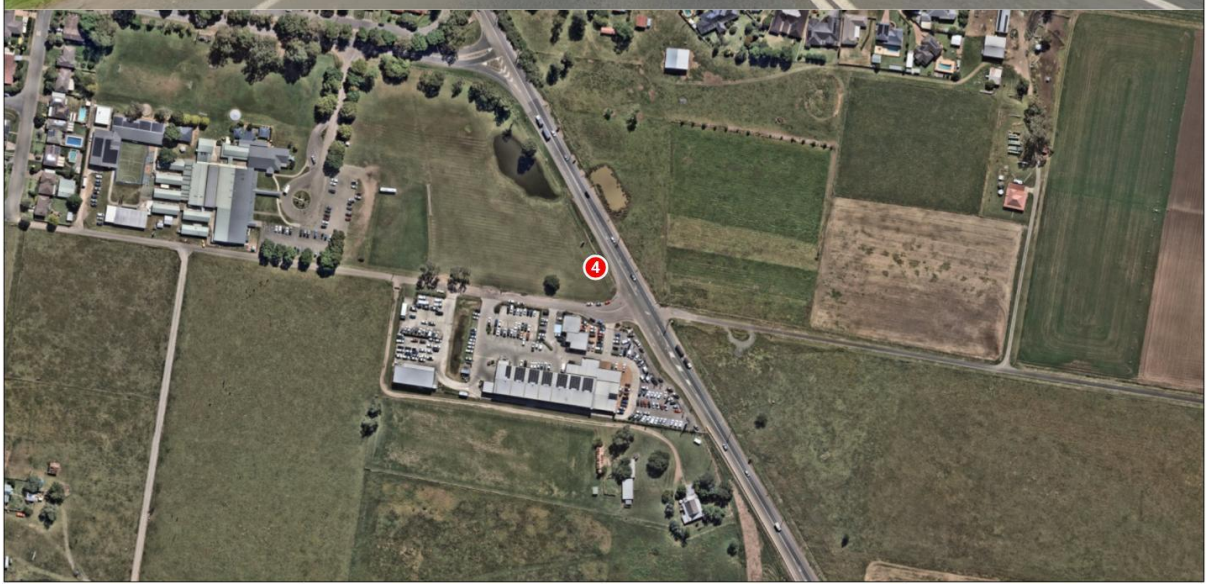


VMS MESSAGES

VMS	LOCATION	DIRECTION	PRIOR TO WORKS		DURING WORKS	
			FRAME 1	FRAME 2	FRAME 1	FRAME 2
VMS 4	180m SOUTH OF KELSO ST (Hyper Link)	NORTHBOUND	NEW ENG HWY LIDDELL CLOSURE	25-26 MAY EXPECT DELAYS	NEW ENG HWY CLOSED TO XX PM	EXPECT DELAYS

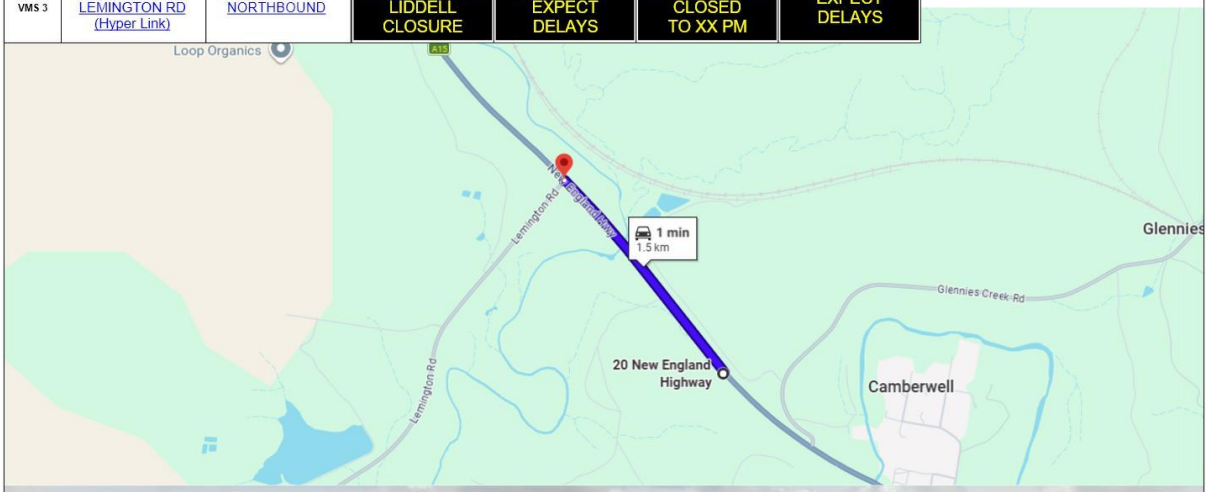




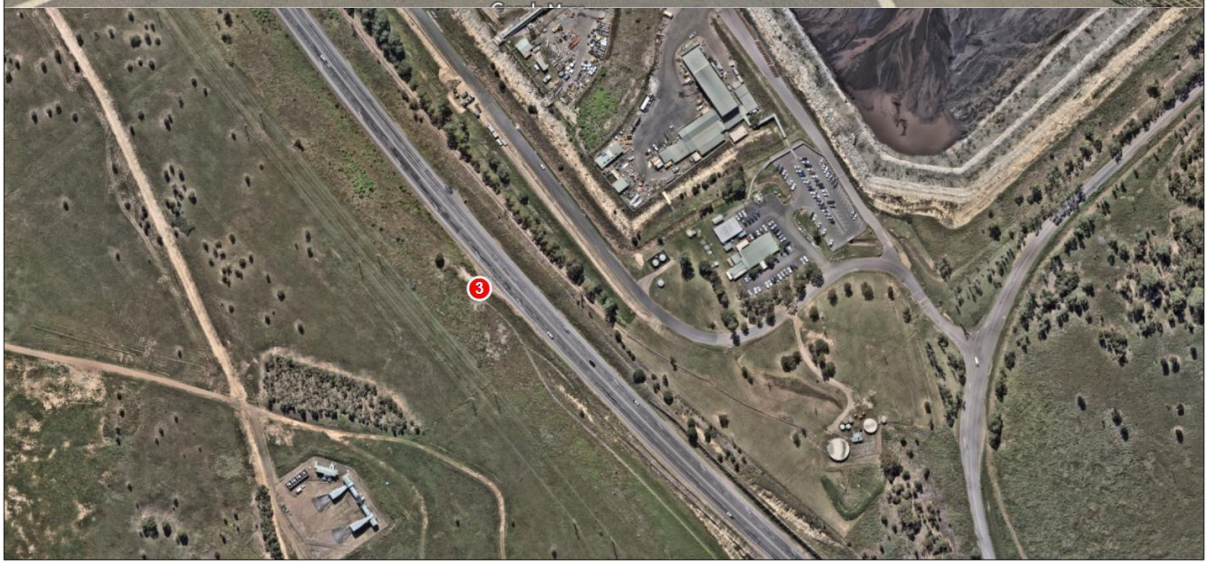


VMS MESSAGES

VMS	LOCATION	DIRECTION	PRIOR TO WORKS		DURING WORKS	
			FRAME 1	FRAME 2	FRAME 1	FRAME 2
VMS 3	1.5km SOUTH OF LEMINGTON RD (Hyper Link)	NORTHBOUND	NEW ENG HWY LIDDELL CLOSURE	25-26 MAY EXPECT DELAYS	NEW ENG HWY CLOSED TO XX PM	EXPECT DELAYS

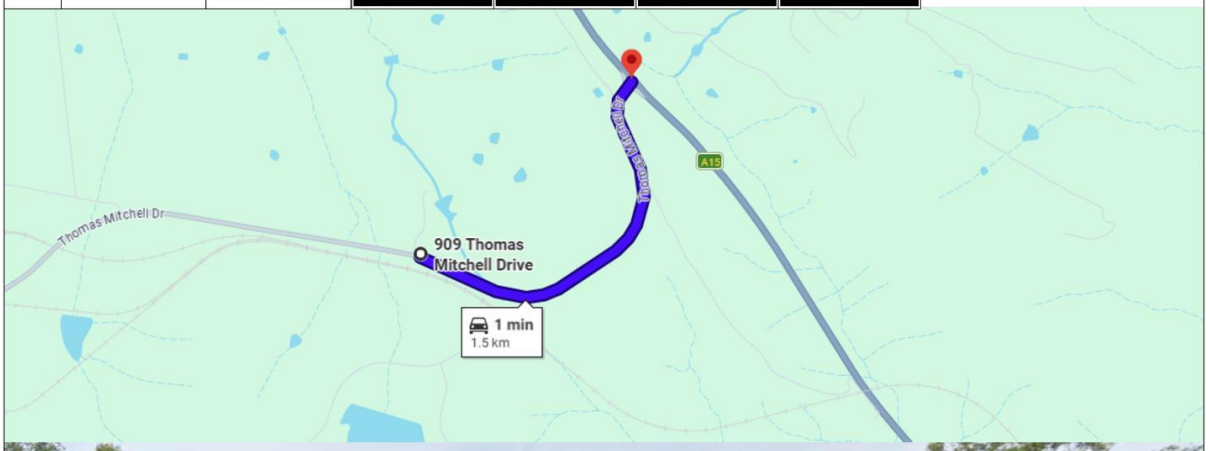




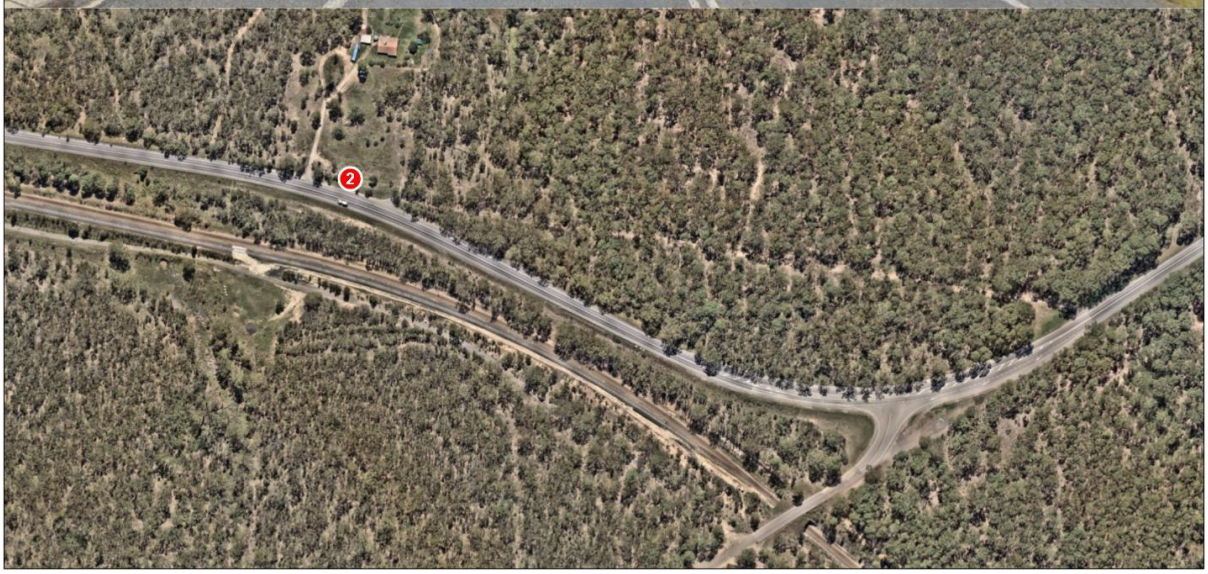


VMS MESSAGES

VMS	LOCATION	DIRECTION	PRIOR TO WORKS		DURING WORKS	
			FRAME 1	FRAME 2	FRAME 1	FRAME 2
VMS 2	1.5km WEST OF NEW ENGLAND HWY (Hyper Link)	EASTBOUND	NEW ENG HWY LIDDELL CLOSURE	25-26 MAY EXPECT DELAYS	NEW ENG HWY CLOSED TO XX PM	EXPECT DELAYS

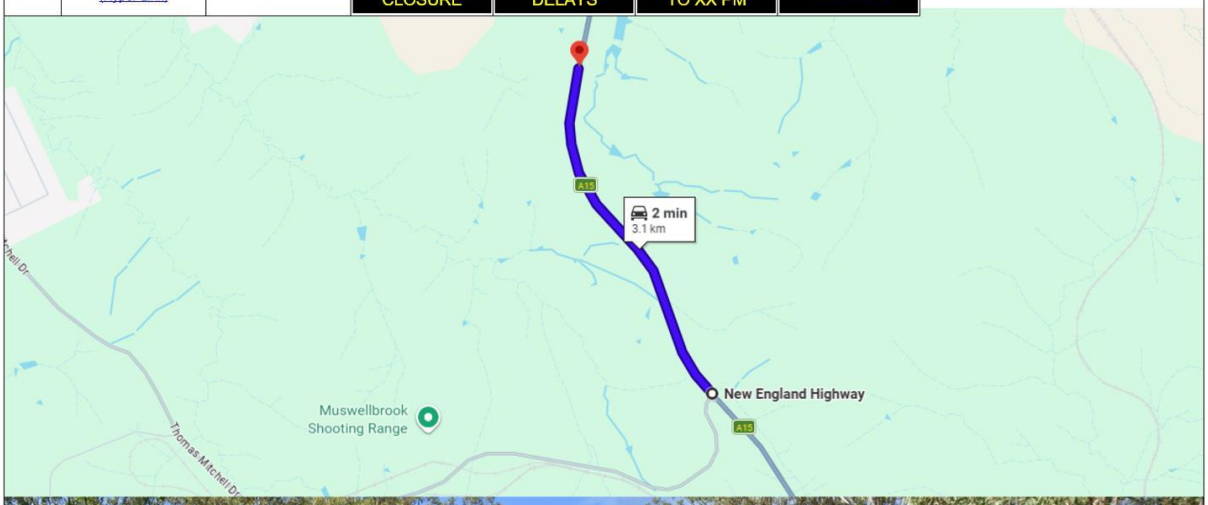




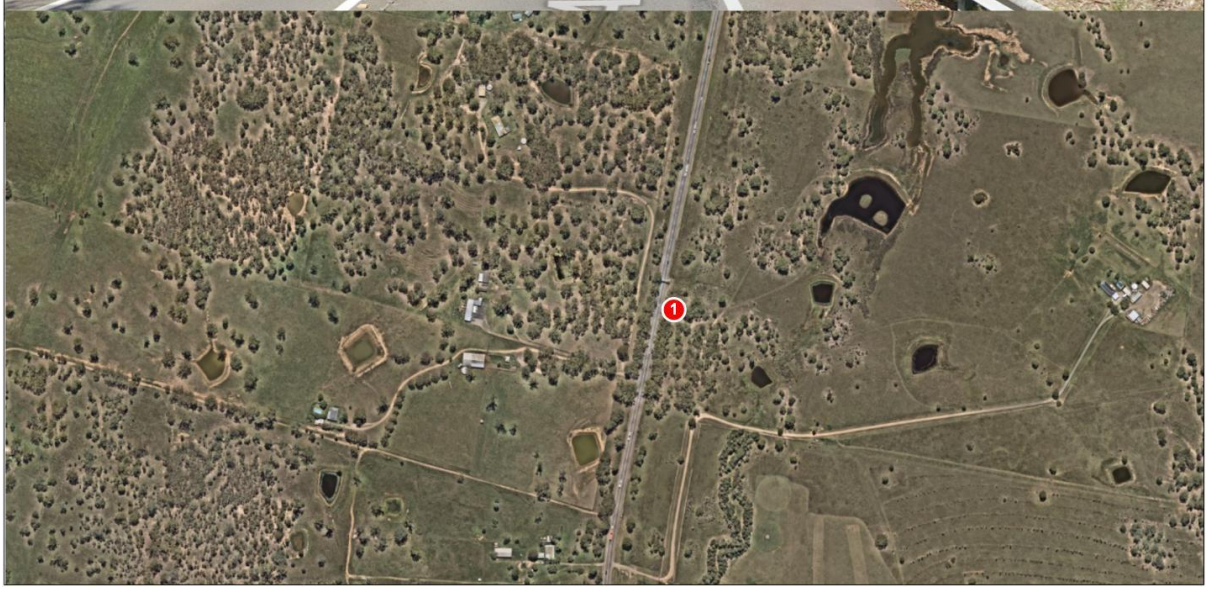


VMS MESSAGES

VMS	LOCATION	DIRECTION	PRIOR TO WORKS		DURING WORKS	
			FRAME 1	FRAME 2	FRAME 1	FRAME 2
VMS 1	3.2km NORTH OF THOMAS MITCHELL DR (Hyper Link)	SOUTHBOUND	NEW ENG HWY LIDDELL CLOSURE	25-26 MAY EXPECT DELAYS	NEW ENG HWY CLOSED TO XX PM	EXPECT DELAYS







Appendix H – Traffic Control Qualifications

First Name	Last Name	Branch Names	Skill Group	Skill	Qualification Number	Expiry Date	Status
Shane	Acton	Hunter	Licenses	Drivers License (C)	13740344	27/02/2027	Current
Shane	Acton	Hunter	Tickets	OHS Card	CGI00639598SEQ1	11/06/2030	Current
Shane	Acton	Hunter	Tickets	Traffic Control (Level 1)	TCT0067031	30/09/2030	Current
Shane	Acton	Hunter	Tickets	Traffic Control (Level 2)	TCT0067031	30/09/2030	Current
Anne	Allen	Hunter	Tickets	Traffic Control (Level 1)	SOC5062067	17/08/2023	Lapsed
Anne	Allen	Hunter	Tickets	Traffic Control (Level 2)	SOC5062797	17/08/2030	Current
Anne	Allen	Hunter	Tickets	OHS Card	SOT3171412	16/08/2023	Lapsed
Anne	Allen	Hunter	Licenses	Drivers License (C)	7702CE	1/12/2025	Current
Ethan	Allerton	Hunter	Licenses	Drivers License (C)	23067053	13/01/2025	Current
Ethan	Allerton	Hunter	Tickets	OHS Card	CGI1635995SEQ01		No expiry
Ethan	Allerton	Hunter	Tickets	Traffic Control (Level 1)	TCT1012070	2/04/2035	Current
Ethan	Allerton	Hunter	Tickets	Traffic Control (Level 2)	TCT1012070	2/04/2035	Current
Kyle	Anderson	Hunter	Tickets	Traffic Control (Level 1)	TCT1014427	21/07/2030	Current
Kyle	Anderson	Hunter	Tickets	Traffic Control (Level 2)	TCT1014427	21/07/2030	Current
Kyle	Anderson	Hunter	Tickets	Traffic Control (Level 3)	TCT1014427	21/07/2030	Current
Kyle	Anderson	Hunter	Tickets	OHS Card	OL908985		No expiry
Kyle	Anderson	Hunter	Licenses	Drivers License (C)	22101978	8/08/2023	Lapsed
Phillip	Andrews	Hunter	Tickets	Traffic Control (Level 1)	TCT1013115	11/06/2030	Current
Phillip	Andrews	Hunter	Tickets	Traffic Control (Level 2)	TCT1013115	11/06/2030	Current
Phillip	Andrews	Hunter	Tickets	OHS Card	CGI1202711SEQ02	3/06/2030	Current
Phillip	Andrews	Hunter	Licenses	Drivers License (C)	8887PR	8/12/2026	Current
Jason	Ayre	Hunter	Tickets	Traffic Control (Level 1)	TCT0032781	20/02/2030	Current
Jason	Ayre	Hunter	Tickets	Traffic Control (Level 2)	TCT0032781	20/02/2030	Current
Jason	Ayre	Hunter	Tickets	Traffic Control (Level 3)	TCT0032781	14/02/2030	Current
Jason	Ayre	Hunter	Tickets	OHS Card	CGI0177018SEQ01	28/02/2030	Current
Jason	Ayre	Hunter	Licenses	Drivers License (MR)	18905447	19/03/2025	Current
Stephanie	Azouri	Hunter	Licenses	Drivers License (C)	21611329	12/11/2025	Current
Stephanie	Azouri	Hunter	Tickets	OHS Card	CGI1567051SEQ01	20/06/2035	Current
Stephanie	Azouri	Hunter	Tickets	Traffic Control (Level 1)	TCT0069265	18/04/2030	Current
Stephanie	Azouri	Hunter	Tickets	Traffic Control (Level 2)	TCT0069265	18/04/2030	Current
Stephanie	Azouri	Hunter	Tickets	Traffic Control (Level 3)	TCT0069265	18/04/2030	Current
Grace	Baker	Hunter	Tickets	OHS Card	CGI1877960SEQ01	3/04/2030	Current
Grace	Baker	Hunter	Tickets	Traffic Control (Level 1)	TCT1040222	5/05/2030	Current
Grace	Baker	Hunter	Tickets	Traffic Control (Level 2)	TCT1040222	5/05/2030	Current
Grace	Baker	Hunter	Licenses	Drivers License (C)	23639044	30/11/2025	Current
Christopher	Bartlett	Hunter, Sydney	Licenses	Drivers License (C)	13961266	2/02/2027	Current
Christopher	Bartlett	Hunter, Sydney	Tickets	OHS Card	CGI1808834SEQ01	8/08/2030	Current
Christopher	Bartlett	Hunter, Sydney	Tickets	Traffic Control (Level 1)	TCT1029099	1/09/2030	Current
Christopher	Bartlett	Hunter, Sydney	Tickets	Traffic Control (Level 2)	TCT1029099	1/09/2030	Current
Ivan	Batros	Hunter	Tickets	OHS Card	799938		No expiry
Ivan	Batros	Hunter	Tickets	Traffic Control (Level 1)	SOC5118985	28/11/2023	Current
Ivan	Batros	Hunter	Tickets	Traffic Control (Level 2)	SOC5118976	29/11/2023	Current
Ivan	Batros	Hunter	Licenses	Drivers License (C)	21539004	1/11/2031	Current
Teesha	Battese	Hunter	Licenses	Drivers License (C)	23497858	27/08/2024	Current
Teesha	Battese	Hunter	Tickets	OHS Card	CGI1841978SEQ01	2/12/2030	Current
Teesha	Battese	Hunter	Tickets	Traffic Control (Level 1)	TCT1037165	3/03/2030	Current
Teesha	Battese	Hunter	Tickets	Traffic Control (Level 2)	TCT1037165	3/03/2030	Current
David	Baxter	Hunter	Licenses	Drivers License (C)	321BBS	2/04/2025	Current
David	Baxter	Hunter	Tickets	Traffic Control (Level 1)	Safe Work NSW	13/12/2030	Current
David	Baxter	Hunter	Tickets	Traffic Control (Level 2)	Safe Work NSW	13/12/2030	Current
David	Baxter	Hunter	Tickets	Traffic Control (Level 3)	Safe Work NSW	13/12/2030	Current
David	Baxter	Hunter	Tickets	OHS Card	CGI00688417SEQ1	13/09/2030	Current
Patrick	Bell	Hunter, Sydney	Tickets	OHS Card	CGI00404001SEQ1	13/12/2030	Current
Patrick	Bell	Hunter, Sydney	Tickets	Traffic Control (Level 1)	TCT0056456	7/09/2030	Current
Patrick	Bell	Hunter, Sydney	Tickets	Traffic Control (Level 2)	TCT0056456	7/09/2030	Current
Patrick	Bell	Hunter, Sydney	Tickets	Traffic Control (Level 3)	TCT0056456	7/09/2030	Current
Patrick	Bell	Hunter, Sydney	Licenses	Drivers License (MR)	44812A	9/04/2027	Current
Andrew	Bettini	Hunter	Tickets	Traffic Control (Level 1)	TCT1043643	14/07/2030	Current
Andrew	Bettini	Hunter	Tickets	Traffic Control (Level 2)	TCT1043643	14/07/2030	Current
Andrew	Bettini	Hunter	Tickets	OHS Card	CGI1098585SEQ02	2/06/2030	Current
Andrew	Bettini	Hunter	Licenses	Drivers License (C)	14904725	17/05/2029	Current
Kira	Bettini	Hunter	Tickets	Traffic Control (Level 1)	TCT1040982	18/05/2030	Current
Kira	Bettini	Hunter	Tickets	Traffic Control (Level 2)	TCT1040982	18/05/2030	Current
Kira	Bettini	Hunter	Tickets	OHS Card	CGI1894194SEQ01	16/05/2030	Current
Kira	Bettini	Hunter	Licenses	Drivers License (C)	15289039	11/06/2025	Current
Monique	Bettini	Hunter	Tickets	Traffic Control (Level 1)	TCT1040978	18/05/2030	Current
Monique	Bettini	Hunter	Tickets	Traffic Control (Level 2)	TCT1040978	18/05/2030	Current
Monique	Bettini	Hunter	Tickets	OHS Card	CGI1894186SEQ01	16/05/2030	Current
Monique	Bettini	Hunter	Licenses	Drivers License (C)	15226991	10/04/2028	Current

Appendix I – Type Approval

NSW GOVERNMENT | Transport for NSW

Intelligent Transport Systems

Type Approval

Certificate No:	ITS-TAN000122

Issued to:

Outsource1 Pty Ltd

For:

Type-1 Portable Traffic Signals			
TfNSW Specification:	TSI-SP-059	Version:	1.0

Summary Scope:

Model: **TL-PTSS-G1**

PTU Controller: **LC-1-02**

PTU Software: **LCFW0.166**

HRC Model: **TriLight HRC**

HRC Software: **HRCFW 0.166**

Note: Conditions of approval are on the reverse side of this certificate.

Evaluation Reference:	ITS-EV0281	Approver:	Manager TSI
Approver Signature:	Raj Roychoudhry	Date:	3rd August 2021

Certificate No: ITS-TAN000122 Page 1 of 2 Form: TSI-FM-001 v1.0

NSW GOVERNMENT | Transport for NSW

Intelligent Transport Systems

Type Approval

Certificate No:	ITS-TAN000130

Issued to:

Arrowes Roading Safety

For:

Type 1 Portable Traffic Signals			
TfNSW Specification:	TSI-SP-059	Version:	1.0

Summary Scope:

Model: **e-STOP**
PTU Controller: **CP000922**
PTU Software: **ATCD_Slave – 7.1**
HRC Model: **CP000214**
HRC Software: **ATCD_Master – 6.1**

Note: Conditions of approval are on the reverse side of this certificate.

Evaluation Reference:	ITS-EV00172	Approver:	Snr Manager S&E
Approver Signature:	Raj Roychoudhury	Date:	8th September 2022

Certificate No: ITS-TAN000130 Page 1 of 2 Form: TSI-FM-001 v1.0

Appendix J – TfNSW G Registration

NSW GOVERNMENT | Transport for NSW

SF2023/229034

25 January 2024

Altus Traffic Pty Ltd
1.05 - 3 Thomas Holt Drive
Macquarie Park NSW 2113

Attn: Sarah Tate
National Sales Business Partner

Mob: 0418 755 487
Email: Sarah.tate@altustraffic.com.au

REGISTRATION OF CONTRACTORS

Dear Madam,

I refer to your renewal application for category G under TfNSW Registration Scheme.

After the assessment, I would like to advise that your registration has been renewed for further 3 years and your company is registered with TfNSW for:

Category G Provision of Traffic Control

The registration will expire on 24 January 2027. It will be your responsibility to ensure that a new application is submitted to TfNSW 6 weeks prior to the expiry date to allow sufficient time for the assessment process.

Yours faithfully,

Chris Martin
Senior Manager, Policy and Governance
Commercial, Performance & Strategy Branch
Infrastructure & Place Division

Transport for NSW
Level 38, 680 George Street Sydney NSW 2000
T 02 9462 6599 | **W** transport.nsw.gov.au | ABN 18 804 239 602

OFFICIAL

Appendix K – SWMS

SWMS

Safe Work Method Statements (SWMS)

HSE 04.02.03 - National Traffic Operations SWMS 01
Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

ALTUS GROUP

Employer/Contractor: Altus Group Pty Ltd
Region: QLD, NSW, TAS, VIC, SA and WA
Head Office: 1.05, 3 Thomas Holt Drive, Macquarie Park NSW 2113

ABN: 92 137 788 544
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Contact Number: 1300 TRAFFIC (872 334)

High Risk Activity:	**Working on, in or adjacent to a road or other traffic corridor in use by traffic other than pedestrians** **Working in proximity to powered mobile plant**
Client/Project:	**Refer to Traffic Management Risk Assessment for the client, work location and worker details**
Date:	
Location and limits of the control area:	
Altus Group Team Leader Name and signature:	
Client Crew Leader Name and signature:	
Responsible person monitoring SWMS:	
Document prepared by:	National HSEQ Team
Document consulted and reviewed by:	Altus Group Management and Workforce Annual Survey
Document approved by:	Chris Thornton — **EGM – HSEQ**
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Altus Group's Life Saving Rules

- **DRUG AND ALCOHOL FREE WORKPLACE** - Attend work free of any trace of alcohol or illegal drugs
- **SAFE DRIVING** - Drive to conditions and follow safe driving laws, procedures and rules
- **EXCLUSION ZONES** - Maintain established exclusion and drop zones around mobile plant and machinery
- **MOBILE PHONES** - No use of phones while performing Stop/Slow; no unauthorised use at other times
- **WORKING IN AND AROUND LIVE TRAFFIC** - Minimise exposure to live traffic
- **SAFETY CONTROLS** - Follow all procedures for safety critical activities

If you are pressured to break a life-saving rule, or feel there is no other option to get the job done, STOP and call your supervisor.
If you choose to break the life-saving rules, you are choosing not to work for the Altus Group.

References (Legislation & Supporting Documents)

- This Safe Work Method Statement acknowledges the responsibilities for the safe conduct of work as detailed in relevant WH&S Legislation and Regulations, Codes of Practice and Road Authority guides and manuals.
- HSE 04.02.55 - Loading and Unloading Vehicles SOP
- HSE 04.02.58 - Hitching and Unhitching Trailers SOP
- HSE 04.02.57 - Lookout Person or Spotter SOP
- HSE 04.02.59 - Portable Traffic Signals SOP
- HSE 04.02.53 - Controlling Traffic with a Stop-Slow Bat or Stop-Go Paddle SOP
- HSE 04.02.54 - Two Way Radio SOP

SWMS

Safe Work Method Statements (SWMS)
HSE 04.02.03 - National Traffic Operations SWMS 01
Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

ALTUS GROUP

NOTE – ALL TASKS & ACTIVITIES DETAILED IN THIS SWMS REQUIRE MANDATED ITEMS OF PPE SPECIFIED BELOW TO BE WORN AT ALL TIMES			
Plant and Equipment Approved for this Activity (May vary from State to State)	• Traffic Control Vehicle (complete with beacons, arrow-board, signage, traffic cones, traffic flags, sign weights etc). • Stop/Slow bats • Hand-held two-way radios • Trucks – including Drop Deck/Cone Deployment vehicles • Trailer Mounted Variable Message Signs (VMS), arrow-boards and traffic lights • Trailer Mounted traffic light/boom gate (TLB) • Truck Mounted Attenuator (TMA) vehicle • Portable Traffic Control Devices – including free-standing traffic lights, boom gate units and speed radar units • Trailers • Pedestrian Control Devices - Pedestrian Tape / "Tiger Tails" • Bollards and bollard bases • Star pickets & Barrier Mesh (only when approved for use)		
Altus Group's approved and supplied Personal Protective Equipment (PPE) required (mandatory and project specific)	**All Shifts**	**Periods of darkness/poor light**	**Other – as required**
	• Long pants • Long sleeve hi-vis, fluorescent shirts and/or vests • Hard hat (with brim and shade cloth in daylight hours) • Compliant hard hat alternative (**ONLY** when approved and supplied by local Branches and subject to documented Risk Assessment) • Safety glasses/Prescription/Over Safety Glasses • Lace up steel cap ankle high boots – to AS/NZS 2210 – correctly fitted. (No jogger-style steel caps) • Protective Gloves	• Night wand • Approved long sleeve hi-vis, fluorescent shirts or TC Vest • Bio-motion compliant reflective hoops on pants and shirts • Clear/Yellow Safety Glasses	• Water resistant jacket/pants • Dust mask • Face mask • Hard hat chin straps • LED Head Lamps
Personnel Qualifications Required for this Activity (Must be available for inspection on site)	• Prepare to Work Safely in the Construction Industry (OHS White Card) - CPCCWHS1001 • Control Traffic with a Stop/Slow Bat- RIIWHS205E or equivalent • Implement Traffic Management Plans- RIIWHS302E or equivalent		
Permits/Licences Required for this Activity	• Current copies of Traffic Guidance Scheme (TGS) and Permits kept on site and made available upon request		

Specific Training Required for this Activity	• All workers must:
	  ○ Have completed the Altus Group induction
	  ○ Have completed relevant Altus Group e-Learning training modules (excludes Trainees)
	  ○ Be trained, inducted and work in compliance with this SWMS
	  ○ Have completed Verification of Competency (VOC) requirements before using specified equipment
	• All workers must complete project or client specific inductions as required		

List Safety Data Sheets (SDS) required for this Activity	• Sunscreen provided is non-hazardous according to NOHSC criteria • No SDSs required for this activity		

SWMS

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HSE 04.02.03 - National Traffic Operations SWMS 01
Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

ALTUS GROUP

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1 a)	**Safe vehicle operation** • Increased likelihood of incident or injury due to undetected vehicle faults	• Complete Vehicle Pre-Start Checklist. • Escalate any faults that you deem may affect the safe operation or roadworthiness of the vehicle immediately to a management representative. • Do not operate vehicles you believe are unsafe. Report and tag out immediately.	M (2B)	L (2D)	• Vehicle Driver • All Site Staff
1 b)	**Safe vehicle operation** • Increased likelihood of incident or injury due to unsafe driving	• Ensure all drivers hold a current driver's licence specific to the vehicle class. • Seat belts **MUST** be worn **at all times** whilst occupying vehicles. • Drive to conditions, check mirrors/blind spots when changing lanes. • Road rules and speed limits must be obeyed at all times – this includes no U-turns over solid white lines or multiple traffic lanes unless signed or marked otherwise.	M (2B)	L (2D)	• Management representative • Vehicle Driver
1 c)	**Safe vehicle operation** • Unsecured equipment becoming a hazard to other road users • Equipment damaged due to improper/unrestrained loading	• Ensure that loads are correctly restrained - as per Loading and Unloading Vehicles SOP • Where transporting portable traffic control devices ensure that purpose-built storage areas, bags etc are utilised as designed • Ensure trailers are correctly and safely secured - **DO NOT hitch or unhitch a trailer unless you have completed the relevant VOC.** As per Hitching and Unhitching Trailers SOP	H (3B)	M (3D)	• Vehicle Driver
1 d)	**Safe vehicle operation** • Obscured rear vision due to rear loads – accidents when reversing, changing lanes or performing U-turns	• To reduce the likelihood of U-turn vehicle incidents, utilise side streets, driveways or other safe turn-around areas so that vehicles are re-entering traffic with clear visibility of approaching traffic from both directions. • Always check mirrors and blind spots before changing lanes. • Whenever possible, drive forward rather than reversing. • Reverse vehicles slowly — no faster than walking pace. • When reversing, prioritise use of a Lookout person; if unavailable safely exit the vehicle to check for hazards. • Where fitted, ensure reverse cameras and/or beepers are in working order and used for all reversing activity. • Where practicable, advise other team members on site of your intention to reverse on two-way radio and wait for acknowledgement.	M (3C)	M (3D)	• Vehicle Driver
1 e)	**Safe vehicle operation** • Distracted/fatigued drivers causing traffic accident	• **Follow the Life Saving Rule re: Mobile Phones** • Do not use mobile phones while driving unless using approved hands-free devices. • DO NOT continue driving if fatigued. Rotate driving or pull off road to revive before continuing. • If unfit to drive, escalate to a line manager to confirm your location and to make alternate travel or accommodation arrangements.	H (3B)	M (3C)	• Vehicle Driver
1 f)	**Safe vehicle operation** • Unsecured vehicle being stolen or becoming a runaway – injury to people or damage to property/equipment • Vehicles or trailers on slopes rolling and hitting or crushing people or other vehicles	• When exiting vehicle, place vehicle in 1st gear (or Park), turn off motor and apply handbrake. Lock vehicle and maintain possession of keys. Turn wheels to kerbside to "control the roll" or use wheel chocks where provided. • Where vehicles are left idling for short periods to maintain arrow board charge, the vehicle MUST be on even ground and the driver must remain in close proximity to the vehicle at these times – no more than 10 meters away. If this cannot be maintained, refer previous point. • Avoid parking trailers on steep slopes wherever possible. If unavoidable: ○ Utilise trailer stabilkiser legs to allow tyres to be elevated. Otherwise, where provided, place chocks on trailed equipment to prevent unplanned rolling or movement.	M (3C)	M (3D)	• Vehicle Driver

SWMS

Safe Work Method Statements (SWMS)

HSE 04.02.03 - National Traffic Operations SWMS 01
Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

ALTUS GROUP

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2	**Arrive at site and prepare for work**
	• Increased likelihood of incident or injury due to:
	  ○ No assessment of site-specific risks and hazards
	  ○ No understanding of scope of works
		• Complete Site Traffic Management Risk Assessment clearly identifying site specific hazards not referenced in this SWMS and how the risks have been controlled. (i.e., wet weather, night works, pedestrian management, proximity to intersections, school zones, blind corners, excavations/fall hazards etc).
		• Complete Pre-Start Meeting/Toolbox with Client and Contractors and sign-on to Pre-Start documentation.
		• **All Traffic Controllers, including Sub-Contractors (Labour Hire) and Trainees, must participate in and sign on to the Traffic Management Risk Assessment/ Pre-Start Declaration to confirm an understanding of site-specific hazards and controls. Team Leaders are responsible for ensuring Trainees, Labour Hire & Sub-Contractors have all signed on.**
		• Trainees are to be supervised by an accredited traffic controller at all times in accordance with approved guidelines.
		• Discuss process for set-up and pack-up sequence in addition to scope of work, plant movements, toilet, rest and meal breaks with client at pre-start/toolbox.
		• Verify Plans & Approvals are appropriate, and all staff are aware of convoy arrangements (for mobile works) and set-up sequence (for static sites)
		• Conduct a drive-through of the approaches to the work area to identify safe and compliant locations for the placement of signage and devices
			M (3C)	M (3D)	• Team Leader
					• All Site Staff
					• Trainees

3 a)	**Installation and Removal of Traffic Control Devices**
	
	Vehicle placement and exiting/entering vehicle
	• Approaching traffic unaware of workers on foot ahead –
	  ○ Worker struck by traffic
	  ○ Vehicle damaged by passing traffic
	• Exposure to vehicle being struck by passing traffic during set-up/pack-up process
		• Position vehicle as safely as possible, off the travelled path wherever possible, and never on blind corners or bends in the road.
		• Activate flashing beacons/strobes & utilise roof-mounted arrow-board (if fitted) – check for overhead obstructions such as tree branches before raising arrow boards.
		• Use arrow to advise of requirement to merge on multi-lane roads; on single lane roads, activate hazard configuration to provide warning of obstruction.
		• Exit vehicle from non-traffic side if possible, utilise a TC passenger to do so where available.
		• Wait for suitable break in traffic. Do not open vehicle door until all approaching traffic has passed and a suitable gap in traffic exists.
		• Use a shadow vehicle where possible for the physical protection of workers on foot. Shadow vehicle driver may act as a Lookout person.
		• Use a dedicated lookout person on foot where possible. (Lookout person must be safely positioned and not performing any other tasks to provide effective early warning of errant vehicles)
		• On lower risk roads where no shadow vehicle is present, park off the travelled path where possible, being mindful of creating a hazard to pedestrians and/or cyclists.
			E (5C)	H (5D)	• Team Leader
					• All Site Staff

3 b)	**Installation and Removal of Traffic Control Devices** **Exiting/entering vehicle** • Uneven surfaces – slips, trips, falls, stumbling into live traffic	• If parked on the shoulder or off-road, look for sloping, uneven, unsteady or rough surfaces, grass-covered holes and concealed objects when entering/exiting vehicle. • Do not rush – investigate surroundings before exiting vehicle. • Ensure appropriate footwear – correctly fitted and secure ankle-high lace/zip boots. • Do not use off-road areas as personal amenities (toilet) areas. All personnel can use the Toilet Finder App on their device to locate the nearest toilet amenities to their location. Apple - National Public Toilet Map on the App Store Android - National Public Toilet Map – Apps on Google Play	M (3C)	M (3D)	• Team Leader • All Site Staff

SWMS Safe Work Method Statements (SWMS)
HSE 04.02.03 - National Traffic Operations SWMS 01
Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

ALTUS GROUP

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3 c)	**Installation and Removal of Traffic Control Devices** **Reversing vehicles** • Injuries and damage to equipment caused by reversing with lack of due care and attention	• **Follow Life Saving Rule – do not drive in a way which could be regarded as dangerous, negligent or careless** • **Prioritise travel in a forward direction on any road** • **No reversing in live lanes** • Use a Lookout person • If no Lookout person, apply **GOAL** principle – **G**et **O**ut **A**nd **L**ook • Where reversing in closed lanes is unavoidable, all reversing strictly at walking pace only • Vehicles may be fitted with reverse awareness technology (cameras, beepers and/or alarms) but do not rely solely on these controls.	H (3B)	M (3C)	• Team Leader • All Site Staff
4 a)	**Installation and Removal of Traffic Control Devices** **Unloading and loading vehicles** • Approaching traffic unaware of workers on foot ahead • Exposure to/being struck by passing traffic • Shadow or traffic control vehicle being shunted by third-party vehicle, striking workers on foot	• **Follow Life Saving Rule – minimise exposure to live traffic** • Shadow vehicle shall be considered for worker protection based upon an assessment of road type, traffic volumes etc. • On lower risk roads, where no shadow vehicle is present, the signage vehicle shall be utilised as protective cover. • Maintain a safe and suitable distance from the front of the vehicle as an exclusion zone in the event of a third-party rear vehicle hit. (Minimum 10 meters). • The provision of a Lookout person is strongly encouraged for all jobs whilst installing or removing signs and devices. • In situations where shadow vehicles and/or Lookout personnel are required but not available for the task, **STOP** work and escalate to your manager. • Prioritise suitable gaps in traffic before accessing equipment. • Handle signs and devices in alignment with the SOP – Loading/Unloading vehicles. • Ensure all required PPE is being worn. (Gloves are mandatory for all manual handling tasks.) • Arrange signage prior to commencement of set-up to minimise exposure to the trafficked side of the road whilst accessing equipment. • Access signage from off-side of road wherever possible – minimise exposure to live traffic at the rear of the vehicle; **where this is unavoidable, a Lookout person and suitable gaps in traffic are a mandatory requirement.** • Maintain an unobstructed escape route. • Pack-up site in reverse order to set-up ensuring advance warning signage remains in place whilst delineation is dismantled. • All staff to assist with pack-up (i.e., act as a Lookout Person, share manual handling) – **no-one to leave site until all signage and devices have been collected.** • Never turn your back to oncoming traffic. Always face oncoming traffic while controlling flow.	H (4C)	M (4D)	• Team Leader • All Site Staff
4 b)	**Installation and Removal of Traffic Control Devices** **Unloading and loading vehicles** • Manual Handling injuries as a result of handling portable traffic devices, signs, bollards cones and other equipment	• **Never attempt to lift weights beyond comfort levels,** seek assistance for heavy lifts if required. Adopt correct manual handling techniques – do not over-exert (Recommended: No more than 4 cones to be lifted/carried at a time) • Take additional care when handling signs in windy conditions. • Job not to be rushed, plan lift and be aware of surroundings (Obstructions, uneven ground, clearance from traffic etc). • Perform all movements in a controlled, balanced and comfortable position. • Minimise repetitive bending, twisting and over-reaching.	M (3C)	M (3D)	• Team Leader • All Site Staff

SWMS Safe Work Method Statements (SWMS)
HSE 04.02.03 - National Traffic Operations SWMS 01
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4 c)	**Installation and Removal of Traffic Control Devices** **Unloading and loading vehicles** • Sign covers and permanent signage maintenance – fall from heights	• Do not use ladders to access signage. Escalate if ground-level access is not possible. • Utilise supplied clips, hooks or brackets to safely secure sign covers.	M (3C)	L (3E)	• Team Leader • All Site Staff
4 d)	**Installation and Removal of Traffic Control Devices** **Unloading and loading vehicles** • Signage becoming a hazard to road users	• Signage to be weighted down (i.e., with sandbags, weight-bases or "weight-mates") and regularly checked for effectiveness against wind gusts and/or passing heavy vehicles. • Signage not to obstruct bike-lanes or create a hazard for pedestrians or approaching traffic. • Place cones adjacent to signs to provide additional visibility and awareness.	M (3C)	L (3E)	• Team Leader • All Site Staff
5	**Installation and Removal of Traffic Control Devices** **All multi-lane road environments** **Two-way roads (Permanent posted speed of 80 km/h & above)** • Risk of injury/death by crossing live lanes of traffic or by positioning vehicle unprotected in a live lane	• **Follow Life Saving Rules - on all multilane roads (any speed) and all other roads with a permanent posted speed of 80km/h and above, live lanes shall not to be crossed under any circumstances.** • Shadow vehicles shall be prioritised for worker protection. A risk assessment is required where no shadow vehicle is provided. • TMAs are strongly recommended on all multi-lane roads with a permanent posted speed of >80km/h (may be mandated by Road Authority). • Light TMAs may be considered for use on roads of 70km/h or less subject to availability and an assessment of risk. • Advance warning vehicle types shall be considered in accordance with safety (road type, normal posted speed, traffic volumes etc) and road authority requirements. • A Lookout person is mandatory for all jobs on these roads (this can be the driver of a shadow vehicle) unless a risk assessment deems otherwise. • Avoid exiting vehicles on the traffic side wherever possible – where this is unavoidable, prioritise gaps in traffic and use of a Lookout person. • Ensure buffer/shadow vehicle remains a suitable distance from workers on foot, a **minimum** distance of 40 metres. • Crews shall do a circuit (loop) to place signs on the opposite side of a multi-lane road. Do not reverse up a lane or shoulder in order to cross multiple lanes to access the other side of a multi-lane road	E (5B)	H (5D)	• Team Leader • All Site Staff
6	**Installation and Removal of Traffic Control Devices** **Two-way roads (Permanent posted speed less than 80 km/h)** • Risk of injury/death by crossing live lanes of traffic or by positioning vehicle unprotected in a live lane	• **Follow Life Saving Rule – minimise exposure to live traffic** • **Crossing live lanes of traffic on two-way roads with a permanent posted speed of less than 80km/h shall be avoided wherever possible.** However, where workers assess that this is the safest option due to local geographic/road conditions, suburban low speed/low volume roads etc, **at least two of the following controls must be met**: ○ Lookout person to warn of approaching motorists. ○ Identify suitable gaps in traffic to install signs safely. ○ Shadow vehicle suitable to the permanent posted speed and volume of traffic provided for physical protection. ○ Where no shadow vehicle is on site, position the work vehicle to provide a buffer to passing vehicles with flashing beacons and/or arrow-board activated.	H (4C)	M (4D)	• Team Leader • All Site Staff

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HSE 04.02.03 - National Traffic Operations SWMS 01
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		○ Ensure ample visibility for approaching traffic in either direction (min 200 metres in either direction recommended on roads with speeds above 50km/h) • **In situations considered to be unsafe without at least two of the above controls able to be safely implemented, STOP work and contact the Principal Contractor representative and/or your line manager and await further instruction.**			
7 a)	**Controlling Traffic using a Stop/Slow bat or a Portable Traffic Control Device (PTCD)** • Entering live lane and being struck by vehicle • Poor selection of control point increasing likelihood of injury	• **Follow Life Saving Rule – no mobile phone use whilst directing traffic.** • **Maintain escape route at all times.** • Do not leave your control point to converse with drivers – this may increase your exposure to live traffic and may reduce your visibility to other road users. • When using a Stop/Slow bat, remain outside of the travelled path. Rely on comms from TC's at control points with unobstructed view of traffic mavements. • When operating PTCDs, a control point should be established a safe distance from the device, recommended 10 metres - taking into account the risk of devices becoming projectiles if struck. • Private vehicles are not to be parked in close proximity to control points where they may impede visibility and/or confuse approaching traffic. All efforts must be made to keep private vehicles clear of control points. • PTCDs are not to be operated from inside a vehicle (unless supported by a valid documented risk assessment) - this limits the workers ability to monitor traffic movements and increases the likelihood of being distracted. • Stop/Slow operations (either with a bat or operating a PTCD) must not be performed whilst leaning against a vehicle. This compromises the escape route.	H (4C)	M (4D)	• Team Leader • All Site Staff
7 b)	**Controlling Traffic using a Stop/Slow bat or a Portable Traffic Control Device (PTCD)** • Motorists confused by changed conditions – breach of work zone or traffic accident on site • Potential breach of procedure leading to double send of traffic	• Synchronise both PTCDs to a single hand control unit to eliminate 'double-sends'. If not possible, document the reason in the risk assessment. • **Do not turn your back to traffic.** • Ensure the control point is clearly visible to approaching drivers. • **Maintain escape route at all times.** • In the event of a breach, alert all personnel, using a call agreed at your pre-start (e.g. 'Breach! Breach! Breach!', 'Stop! Stop! Stop!', or 'Abort! Abort! Abort!') • Avoid stopping heavy vehicles at the front of a traffic queue and ensure approaching vehicles have ample time to stop safely at the control point.	H (4C)	M (4D)	• Team Leader • All Site Staff
7 c)	**Controlling Traffic using a Stop/Slow bat or a Portable Traffic Control Device (PTCD)** • Uneven ground and trip hazards causing injuries as a result of slips, trips and falls	• Ensure control points are established on even ground, free of obstructions and hazards.	M (2B)	L (2D)	• Team Leader • All Site Staff
7 d)	**Controlling Traffic using a Stop/Slow bat or a Portable Traffic Control Device (PTCD)** • Compromised fitness for work – risk of being struck by traffic or causing vehicle incident	• **Follow Life Saving Rules – drug and alcohol-free workplace.** • Arrive for shift well rested and with plenty of food and water. • Ensure you have had a proper meal prior to commencement of shift. • Ensure rest, fatigue and rotation of duties breaks are observed as required. • Escalate immediately to a line manager if access to breaks is an issue.	H (4C)	M (4D)	• Team Leader • All Site Staff

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HSE 04.02.03 - National Traffic Operations SWMS 01
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7 e)	**Controlling Traffic using a Stop/Slow bat or a Portable Traffic Control Device (PTCD)** • Workers at risk of being struck by passing traffic • Potential for vehicle accidents/vehicle breaches into work site	• Monitor work site for changes to conditions, queue lengths and traffic flow – conduct and document sign checks. (every 2 hours) • When workers are within 1.2 metres of live traffic, reduce speed to a maximum of 40km/h (may be less in some States or because of a completed risk assessment). • Monitor workers activities and maintain delineation devices to ensure workers remain separated from live traffic. • On longer sites or sites with increased risk of driver non-compliance, consider use of an escort vehicle to regulate traffic at correct speed.	H (4C)	M (4D)	• Team Leader • All Site Staff
7 f)	**Controlling Traffic using a Stop/Slow bat or a Portable Traffic Control Device (PTCD)** • Work vehicles or mobile plant entering the worksite against traffic signals, creating a risk of collision or confusion for motorists.	• Plant operators/work vehicle drivers to advise TC on point of requirement to enter site. • TC to advise operator/driver they will be required to come to a stop at the head of the traffic queue. • TC changes traffic lights to red or Stop/Slow Bat to Stop to ensure plant/work vehicle stops at the head of the queue. • Whilst on hold, TC communicates to next driver in queue to remain stationary until light turns green or Bat turns to Slow. (TC must not breach exclusion zones by walking directly in front of or behind plant or work vehicles. TC to remain off the travelled path (on the road shoulder) and communicate to drivers through the passenger side window. • TC confirms last vehicle through site from opposite direction. • TC allows work vehicle to move slowly to a position in front of control point. TC to give approval to operator/work vehicle driver to enter site. • Traffic signal/Stop Bat must remain on red/Stop while the work vehicle/plant enters or exits the site and TC monitors queued traffic, • Once the plant or work vehicle has safely entered the site, conduct a final check to ensure it is safe to release traffic before turning traffic light to green or Stop/Slow bat to Slow.	H (4C)	M (4E)	• Team Leader • All Site Staff
7 g)	**Controlling Traffic using a Stop/Slow bat or a Portable Traffic Control Device (PTCD)** • Distracted by mobile phone usage – being struck by vehicle or plant or causing vehicle incident	• **Follow Life Saving Rule – Digital device/mobile phone use is prohibited whilst performing Stop/Slow – including operating PTCDs (such as eStop, QuickStop, Tri-Light)** • Use of devices for non-work-related purposes strictly prohibited. Confine personal use of devices to breaks. • For work-related or emergency calls - Do not take or make calls until you are relieved of duty and in a safe location • Do not wear noise-emitting headphones (for music or phone conversations whilst on site) • Where filming/streaming has been approved for training purposes, only approved, clearly identifiable persons may conduct filming/streaming, and they must be positioned a safe distance from live traffic at the direction of the person-in-control of the site	H (4C)	M (4D)	• Team Leader • All Site Staff • Trainees/ Trainers

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HSE 04.02.03 - National Traffic Operations SWMS 01
Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

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7 h)	**Traffic – Working on the road and controlling and stopping traffic in the vicinity of operating traffic signals, TC struck by passing vehicle** • Injury to worker, confusion by motorists with TC and signals in close proximity	• Where possible, Police shall control traffic through an intersection (no traffic controllers at intersection and signals are turned to flashing amber or off). • Maximum lanes if TC used to control traffic is one lane in each direction generally. Two lanes may be maintained in one direction but one TC per lane must be used. • Relocate TC station to a location not within 50m of the intersection. • Where a traffic controller is to control traffic within 100 metres of a signalized intersection with traffic signals operating in normal mode (such as not flashing amber or switched off) the traffic controller station must be positioned a safe distance from the operating traffic signals. Generally, a safe distance would be within the range of 50 to 100 metres, but in exceptional circumstances it may be safe at less than 50 metres subject to a site-specific risk assessment. • TC should avoid, where possible, stopping traffic on a green signal. • TC shall never direct traffic through a red signal. • TGS can be implemented in the vicinity of traffic signals i.e. lane closure prior to and after signals, but TC position should be 50 metres from operating signals.	H (4C)	M (3D)	• Team Leader • All Site Staff • Trainees / Trainers
7 i)	**Controlling traffic around vulnerable road users** • Trainees, pedestrians, cyclists, mobility scooters at risk of unauthorised entry to site or being struck by passing traffic	• Discuss proximity of vulnerable road users to work area. • Ensure signage is not placed on designated bike lanes. • Ensure adequate signage, barricading and traffic control is in place to manage vulnerable road users. • Escort vulnerable road users through the site where required. • Ensure plant movements and work activities cease where vulnerable road users are in close proximity. • Establish safe zones well clear of live traffic areas where trainees who are on site for assessment purposes but are not engaged in assessment activities can be positioned.	H (4C)	M (4D)	• Team Leader • All Site Staff • Trainees / Trainers
8 a)	**Working around mobile plant and machinery (i.e., bobcats, rollers, forklifts, trucks, pavers, Utes etc)** • Being struck by moving plant	• **Follow the Life Saving Rule – maintain exclusion zones (Roll ahead zones, Safety buffers, Works area)** • Discuss risks associated with plant movements at pre-start. • Observe 10 metre **minimum** exclusion zone (preferably 20 where achievable or higher if mandated by client or as a result of completing a risk assessment) • **NO** personnel movements within exclusion zones unless authorised after direct comms with plant operator(s) where plant movements are confirmed as being on hold. • Do not stand in blind spots or within exclusion zones. Maintain eye contact with plant and machinery operators. • Discuss the use of a spotter with the client when plant is in use in close proximity to workers on foot	E (5C)	H (5D)	• Team Leader • All Site Staff
8 b)	**Working around mobile plant and machinery (i.e., bobcats, rollers, forklifts, trucks, pavers, Utes etc)** • Noise affecting radio comms • Noise affecting hearing	• Ensure communication is maintained either via eye contact, hand signals or radio comms (or combination of these). • Assess control point – remove from noise source if possible. • Hearing protection – can be used but is not the most desirable control measure.	M (3C)	L (3E)	• Team Leader • All Site Staff
8 c)	**Working around mobile plant and machinery (i.e., bobcats, rollers, forklifts, trucks, pavers, Utes etc)** • Exposure to fumes	• Assess control point – remove from fume source if possible. • Rotate or relocate staff where possible to minimise ongoing exposure to noise/fumes. • Escalate to a line manager if unable to comply.	M (3D)	L (3E)	• Team Leader • All Site Staff

SWMS Safe Work Method Statements (SWMS)
HSE 04.02.03 - National Traffic Operations SWMS 01
Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

ALTUS GROUP

Item No.	Task, Steps or Activity to be done • Potential Hazards and Consequences	Controls to be used to manage the risk IR = Initial Risk RR = Residual Risk	IR	RR	Who is responsible for control implementation
9 a)	**Controlling Traffic – Hazardous Environmental Conditions:** **Exposed/Extreme Environment** • Exposure to weather extremes whilst conducting traffic management duties causing injury/illness: o Heat-related illness o Hypothermia	• Strict compliance with PPE requirements. • Liaise with client re: shift lengths, start times, resources etc. • Access to breaks commensurate with conditions and industry requirements. • Discuss rotation of duties to minimise exposure to positions with no shade. • Constant hydration and nourishment during shift. • Apply and re-apply sunscreen as per manufacturer's instructions. • Discuss heat/cold-related illness at prestart and confirm all personnel are fit to work • Escalate immediately to team leader/supervisor if feeling the effects of heat/cold- related illness and look for effects of illness with team-mates when working in temperature extremes.	H (3B)	M (3C)	• Team Leader • All Site Staff
9 b)	**Controlling Traffic – Hazardous Environmental Conditions:** **Isolation/remote works** • Dehydration/heat stress/fatigue increasing likelihood of incident or injury • Long grass on verges -potential for snakes & fire risk from hot exhaust	• Confirm management is aware of your work location. • Ensure regular breaks and hydration – take ample supply of food and water. • Consider shade stations if exposed to elements consistently and where no shade is available (i.e., ongoing remote project works). • Avoid parking in long grass. • Ensure First Aid Kit is fully stocked including pressure bandage. • Check vehicle has fire extinguisher, within test and tag date.	M (3C)	M (3D)	• Team Leader • All Site Staff
9 c)	**Controlling Traffic – Hazardous Environmental Conditions:** **Isolation/remote works** • Break in communications with workers, unable to verify whereabouts and well-being of workers • Driving or workplace incident resulting in injury to workers in remote location	• Create a Journey Management Plan for journeys of more than 200kms to establish a communications program and ensure regular breaks from driving. • Send teams in convoy, rotate drivers every 2 hours wherever possible when driving long distances. • Consider Satellite Phone (or other communication devices) for enhanced comms in remote regions. • No single-person crews to work in remote locations.	H (4C)	M (4D)	• Team Leader • All Site Staff
9 d)	**Controlling Traffic – Hazardous Environmental Conditions:** • **Emergency situations** • Incident or injury arising from accident, fire, explosion, flood etc	• Discuss emergency procedures and assembly area prior to shift commencement. • Ensure the **Field Emergency Response Plan** is available and followed in the event of an emergency situation. • Contact and assist Emergency Services **(000)** on site where required. • Maintain escape routes in case emergency evacuation is required. • Fire extinguishers & first aid kits accessible, all items in date. • Work area clear of debris & fire hazards controlled. • Vehicles kept clear of long grass or flood prone areas. • Always remain vigilant and communicate any sudden changes in weather conditions – monitor weather notifications when safe to do so. • Never attempt to cross flooded roads – "If it's flooded, forget it."	M (3C)	M (3D)	• Team Leader • All Site Staff

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ALTUS GROUP

Item No.	Task, Steps or Activity to be done • Potential Hazards and Consequences	Controls to be used to manage the risk IR = Initial Risk RR = Residual Risk	I R	R R	Who is responsible for control implementation
		• If working in proximity to downed overhead wires because of storm or work activities, always treat wires as live. Create an exclusion zone around the area and escalate the hazard to the site foreman or a line manager.			
9 e)	**Controlling Traffic – Hazardous Environmental Conditions:** • **Crystalline Silica Dust** • Equipment generating airborne silica dust. e.g. profiling, concrete/asphalt cutting, excavating, etc. causing long term illness from Crystalline silica dust exposure.	• Maintain 30 meter exclusion zone from all crystalline silica dust generating equipment and tasks. Where not achievable, escalate to a supervisor immediately. • Regular rotation of positions to reduce exposure frequency. • Known ongoing exposure must be risk assessed and following controls considered: ○ Ventilation and dust suppression. ○ Air and health monitoring. ○ Respirable Protection Equipment (P2 dust mask) fit tested and personnel clean shaven. ○ Any respiratory symptoms must be reported to the supervisor immediately as per Emergency Response Item.	H (4C)	L (2D)	• Team Leader • All Site Staff
10	**Interactions with Hostile Members of Public** • Verbal and/or physical abuse/assault from hostile members of public causing physical and/or psychological injury	• Traffic Controllers must remain calm, professional, and avoid confrontation. • TCs to engage two-way radio 'talk button' to alert others on site of confrontation and seek assistance. • TCs shall strive to remove themselves from volatile situations if they feel they are in physical danger. • TCs to risk assess control points – ensure line of sight to other work crew members where possible, particularly in high-risk environments such as CBD night works etc. Avoid working in isolation wherever possible. Verify clear comms with team-mates if there is no line of sight or request additional support following assessment of risk. • If safe, guide the member of public away from the work zone. • TCs to log all incidents via Near Miss or Incident reporting channels. • If TC is threatened or assaulted, police to be contacted immediately on 000.	H (3B)	M (3C)	• Team Leader • All Site Staff
11	**Emergency Response** **Responding effectively to traumatic/ catastrophic events** Stress and trauma-related reactions as a result of exposure to events resulting in significant or catastrophic outcomes	• Be aware of the location and contents of the Field Emergency Response Plan. • Contact Emergency Services (000). • Immediately escalate all significant incidents to a line manager or consult the Field ERP for alternate escalation options. • Management to provide immediate relief and additional resources to incident site. • Incidents debrief as soon as practicable following incident. • Ongoing Employee Assistance, welfare checks and counselling opportunities.	H (3B)	M (3C)	• All Traffic Controllers • Branch Managers • Executive Managers

SWMS Safe Work Method Statements (SWMS)
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Working On or Adjacent to Roads and in Proximity to Powered Mobile Plant

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1. RISK RATING TABLE (USE FOR INITIAL AND RESIDUAL RISK ASSESSMENTS)

IMPACT	LIKELIHOOD				
Index	E. Rare	D. Unlikely	C. Possible	B. Likely	A. Almost Certain
5. Catastrophic	High (5E)	High (5D)	Extreme (5C)	Extreme (5B)	Extreme (5A)
4. Severe	Medium (4E)	Medium (4D)	High (4C)	High (4B)	Extreme (4A)
3. Major	Low (3E)	Medium (3D)	Medium (3C)	High (3B)	High (3A)
2.Minor	Low (2E)	Low (2D)	Medium (2C)	Medium (2B)	High (2A)
1.Insignificant	Low (1E)	Low (1D)	Low (1C)	Medium (1B)	Medium (1A)

Exposure	Description
Extreme	Stop work! Extreme residual risk is an indicator that hazards have not been controlled to an acceptable level. Immediate intervention and treatment are mandatory before commencing or continuing with work. Escalation to senior management and an approved risk assessment is required prior to proceeding.
High	Risk remains or becomes high following implementation of controls. Stop work and assess if risk has been reduced to ***as low as reasonably practicable*** by implementing all possible controls. Proceed only if an assessment of risk confirms maximum control effectiveness and indicates task can be completed safely with due care.
Medium	Task is considered safe to perform although moderate risk remains following implementation of controls. Continually monitor range of controls and control effectiveness.
Low	Risks are managed through routine procedures with ongoing monitoring and reviews to ensure safe operations.

2. CONSEQUENCE DESCRIPTOR TABLE (USED TO ASSESS HOW SEVERE AN EVENT COULD BE IF IT OCCURRED)

Health, Safety & Environment	
5. CATASTROPHIC	Fatality or multiple fatalities. Catastrophic Environmental harm with long term serious impact or is not rectifiable.
4. SEVERE	Permanent Injury – damage which permanently alters a person's future. Significant Environmental harm with medium to long term impact before rectification
3. MAJOR	Lost Time Injury (LTI) – damage which temporarily alters a person future Major Environmental harm that can be rectified in the medium term (1-3 months)
2. MINOR	Medical Treatment Injury (MTI) – damage which temporarily inconveniences a person. Localised reversable environmental harm that can be rectified <1 month
1. INSIGNIFICANT	First Aid Injury (FAI) – an actual injury which requires either no treatment or simple first aid. Minimal environmental harm that can be quickly rectified.

3. LIKELIHOOD DESCRIPTOR TABLE (USED TO ASSESS HOW LIKELY AN EVENT IS TO HAPPEN)

Likelihood	Description	Frequency	Probability
A. Almost Certain	The threat is a common or frequent occurrence.	One or more events in next 3 months	>95% probability
B. Likely	The threat is known to occur or "It has happened from time to time."	One event every 3-12 months	80-95% probability
C. Possible	The threat could occur sometime or "I've heard of it happening."	One event every 1-5 years	20-80% probability
D. Unlikely	The threat is improbable.	One event every 5-10 years	5-20% probability
E. Rare	The threat is conceivable but only in exceptional circumstances.	One event > 10 years	<5% probability

4. HIERARCHY OF CONTROLS

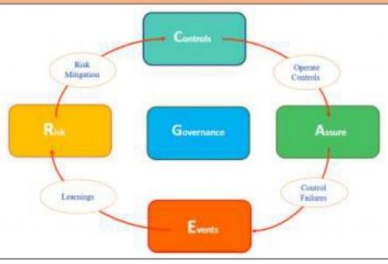
Hierarchy of Controls		
OHS Hazards		
5. Eliminate	Highest level of protection and most effective control. Eliminating the hazard and the risk it creates is the most effective control measure.	**Most Preferred** ↕ **Least Preferred**
4. Automate	Reduce the risks through automation of controls (system lockout)	
3. Engineering/System Based	Reduce the risks through engineering changes or changes to systems of work including isolation and substitution.	
2. Administrative/Manual Control	Use administrative actions to minimise exposure to hazards and to reduce the level of harm.	
1. Personal Protective Equipment (PPE)	Lowest level of protection and least reliable control. Use personal protective equipment to protect people from harm.	
0. Risk Acceptance	Controls either do not exist or are not required - accept the risk.	

Note: Look to utilise combination of more than one control method.

5. Continuous Improvement

Continuous Improvement

Altus Group encourages all staff to engage in the Continuous Improvement Cycle by:
- Planning all tasks;
- Carrying out all tasks safely;
- Checking that your work methods or controls are effective and;
- Taking action if controls need to be altered



Comments:
- Directors and Executive/State Managers to ensure sufficient resources and management support are provided to enable controls to be effective.
- All staff are to be briefed and inducted on SWMS prior to commencing works. SWMS will be reviewed annually or following any significant event or high potential near miss.
- Employee submissions relating to a SWMS will be accepted at any time via the Health and Safety Committee or by contacting your Branch Manager directly.

APPENDIX Y – LIDDELL STACK AND BOILER HOUSE DEMOLITION: AIR QUALITY MANAGEMENT SUPPORT (ERM)

Liddell Stack and Boiler House Demolition

Air Quality Management Support

PREPARED FOR
CMA Contracting Pty Ltd

DATE
October 2025

REFERENCE
0799289



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CONTENTS

EXECUTIVE SUMMARY 1

1. INTRODUCTION 1

1.1 SCOPE OF WORKS 1

2. STRUCTURES PROPOSED FOR DEMOLITION 2

3. SITE AND SURROUNDS 5

3.1 SITE LOCATION 5
3.2 TOPOGRAPHY 5
3.3 MODEL RECEPTORS 8

4. CLIMATE AND LOCAL METEOROLOGY 11

4.1 CLIMATIC CONDITIONS 11
4.2 WIND FIELD 14

5. ESTIMATED EMISSIONS FROM BLASTING 18

6. MODEL CONFIGURATION 20

6.1 SOURCE CONFIGURATION 20
6.2 PARTICLE SIZE DISTRIBUTION 20
6.3 MODELLING METHODOLOGY 20
6.3.1 METEOROLOGICAL MODELLING 20
6.3.2 CALPUFF MODEL DOMAIN AND CONFIGURATION 21

7. DISPERSION METEOROLOGY 22

7.1 WIND FIELD 22
7.2 MIXING HEIGHT 25
7.3 ATMOSPHERIC STABILITY 26

8. DISPERSION MODELLING RESULTS 29

8.1 PREFERRED CONDITIONS 29
8.1.1 CHIMNEY STACK DEMOLITION 29
8.1.2 BOILER HOUSE DEMOLITION 46
8.1.3 PREFERRED METEOROLOGICAL CONDITIONS FOR DEMOLITION 62
8.2 SOUTHEASTERLY WINDS 67
8.2.1 Chimney Stack demolition 67
8.2.2 BOILER HOUSE DEMOLITION 80
8.2.3 Summary and frequency of Southeasterly Winds 91
8.3 COMPARISON OF PREFERRED CONDITIONS AND SOUTHEASTERLY WINDS 95

9. ASSUMPTIONS AND UNCERTAINTIES 104

10. CONCLUSIONS 105

11. STATEMENT OF LIMITATIONS 107

12. REFERENCES 109

APPENDIX A METEOROLOGICAL DATA

A. Selection of Representative Year
B. WRF Model Configureation
C. Initialisation Datasets

LIST OF TABLES

TABLE 3-1	SENSITIVE AND DISCRETE RECEPTORS SURROUNDING THE PROJECT SITE	8
TABLE 4-1	SUMMARY OF CLIMATE STATISTICS FOR SINGLETON DEFENCE AWS FOR THE PERIOD 1969 - 1990	11
TABLE 4-2	SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS	12
TABLE 5-1	LOCATION AND KEY DIMENSIONS FOR THE CHIMNEY STACKS	18
TABLE 5-2	LOCATION AND KEY DIMENSIONS FOR THE BOILER HOUSE	18
TABLE 5-3	EMISSION FACTORS FOR TONNE OF CONCRETE	19
TABLE 5-4	CALCULATED EMISSION RATES	19
TABLE 6-1	SOURCE CONFIGURATION IN MODEL	20
TABLE 7-1	PASQUILL GIFFORD STABILITY CLASSIFICATION	27
TABLE 8-1	NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)	65
TABLE 8-2	NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 M/S FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)	93

LIST OF FIGURES

FIGURE 2-1	LOCATION OF INFRASTRUCTURE FOR DEMOLITION	2
FIGURE 2-2	PLANNED FELL DIRECTION OF THE CHIMNEYS	4
FIGURE 3-1	LOCATION OF THE LIDELL POWER STATION	6
FIGURE 3-2	TOPOGRAPHY SURROUNDING THE PROJECT	7
FIGURE 3-3	SENSITIVE RECEPTORS SURROUNDING THE PROJECT	10
FIGURE 4-1	LOCATION OF SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS	13
FIGURE 4-2	ANNUAL AVERAGE WIND ROSES FOR 2020 TO 2024 (NSW DCCEEW) AND 2024 TO 2025 (AGL)	15
FIGURE 4-3	DIURNAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025	16
FIGURE 4-4	SEASONAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025	17
FIGURE 7-1	COMPARISON OF MODELLED VERSUS OBSERVED ANNUAL WIND FIELD AT AGL FOR 2020 (MODELLED) AND SEPTEMBER 2024 – AUGUST 2025 (OBSERVED)	23
FIGURE 7-2	MODELLED DIURNAL WIND ROSES FOR AGL FOR 2020	24
FIGURE 7-3	MODELLED SEASONAL WIND ROSES FOR AGL FOR 2020	25
FIGURE 7-4	DIURNAL DISTRIBUTION OF MIXING HEIGHTS	26
FIGURE 7-5	FREQUENCY OF ATMOSPHERIC STABILITY CATEGORIES	28
FIGURE 8-1	STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)	31
FIGURE 8-2	STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)	32
FIGURE 8-3	STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)	34
FIGURE 8-4	STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)	35

FIGURE 8-5 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu G/M^3$) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 36
FIGURE 8-6 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 37
FIGURE 8-7 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 38
FIGURE 8-8 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 39
FIGURE 8-9 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 41
FIGURE 8-10 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 42
FIGURE 8-11 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 44
FIGURE 8-12 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 45
FIGURE 8-13 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 47
FIGURE 8-14 BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS) 48
FIGURE 8-15 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 50
FIGURE 8-16 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS) 51
FIGURE 8-17 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 52
FIGURE 8-18 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 53
FIGURE 8-19 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 54
FIGURE 8-20 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 55
FIGURE 8-21 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 57
FIGURE 8-22 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 58
FIGURE 8-23 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 60
FIGURE 8-24 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 61
FIGURE 8-25 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF PREFERRED METEOROLOGICAL CONDITIONS BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET 64
FIGURE 8-26 NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET) 66
FIGURE 8-27 QQ PLOT COMPARING FREQUENCY DISTRIBUTION OF OBSERVED AND MODELLED WINDS 67
FIGURE 8-28 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 69
FIGURE 8-29 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 70
FIGURE 8-30 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 72
FIGURE 8-31 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 73
FIGURE 8-32 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 75

FIGURE 8-33 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 76
FIGURE 8-34 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 78
FIGURE 8-35 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 79
FIGURE 8-36 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 81
FIGURE 8-37 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 82
FIGURE 8-38 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 83
FIGURE 8-39 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 84
FIGURE 8-40 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 86
FIGURE 8-41 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 87
FIGURE 8-42 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 89
FIGURE 8-43 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 90
FIGURE 8-44 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF SOUTHEASTERLY WINDS > 3 M/S BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET 92
FIGURE 8-45 REDUCTION IN 1-HOUR MAXIMUM PREDICTION ACROSS INFRASTRUCTURE RECEPTORS DUE TO APPLICATION OF A WIND SPEED THRESHOLD 93
FIGURE 8-46 NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 M/S FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET) 94
FIGURE 8-47 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 96
FIGURE 8-48 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 97
FIGURE 8-49 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 98
FIGURE 8-50 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 99
FIGURE 8-51 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 100
FIGURE 8-52 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 101
FIGURE 8-53 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 102
FIGURE 8-54 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 103

ACRONYMS AND ABBREVIATIONS

Acronym	Description
AQMS	Air Quality Monitoring Station
AWS	Automatic Weather Station
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
DCCEEW	Department of Climate Change, Energy, the Environment and Water
ERM	Environmental Resources Management Australia Pty Ltd
GLC	Ground Level Concentrations
LGA	Local Government Area
NSW	New South Wales
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 µm
POEA	Protection of the Environment Operations Act 1997
TSP	Total Suspended Particulates
WRF	Weather Research and Forecasting

EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by CMA Contracting Pty Ltd (CMA) to undertake a pre-demolition air quality analysis for the proposed demolition of the two chimney stacks and boiler houses at the AGL Liddell Power Station (the Site) in the Hunter Valley Region of New South Wales (NSW).

CMA has been engaged by AGL to demolish the power station. ERM understands that there are no formal environmental approval conditions to be met with regard to off-site air emissions from the demolition activities. This work is being undertaken voluntarily by CMA to inform the blast risk management plan.

The analysis was completed with the objective of understanding the relative magnitude of potential air quality impacts (focusing on the concentration of particulates in air and deposited dust) for various potential blast windows in order to identify meteorological conditions that are conducive to effective dispersion to inform the selection of blast windows to minimise risk of harm from air emissions so far as reasonably practicable. The study has aimed to provide information to minimise risk of harm at on-site infrastructure as well as across the wider area.

A review of local meteorological data was completed, which indicated that predominant winds occur from the north-westerly and south-easterly sectors. It is noted that terrain in the wider area is complex, and large-scale wind patterns are altered by smaller-scale terrain features scattered throughout the valley.

The subsequent analysis involved the preparation of a site-specific atmospheric dispersion model, incorporating a 1-year long hourly meteorological dataset using the US National Center for Atmospheric Research (NCAR) Weather Research and Forecasting (WRF) meteorological model, in conjunction with the CALMET meteorological processor.

Emissions from stack felling and boiler house demolition were estimated using an existing methodology that was applied for the Engie Hazelwood stack and boiler house demolitions, as well as the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019; 2020). Modelling predictions were prepared for two sets of receptors:

- 'Infrastructure receptors' which were designated at locations around the adjacent TransGrid switchyard and AGL battery energy storage system (BESS), (currently under construction).
- 'Screening receptors' which were designated at areas surrounding the Site for the purposes of providing a generic understanding of the scale of potential impacts in the broader area. Locations generally following the boundary of Lake Liddell to the east and the New England Highway to the west were selected, inclusive of known sensitive receptor locations (residences and a recreation area).

The meteorological and dispersion model configurations were developed with reference to the New South Wales EPA *Approved Methods for the Modelling and Assessment of Pollutants in New South Wales* (2022). For the purposes of this study, relative magnitudes of pollutants at receptor locations have been focused on, rather than assessing predictions against impact assessment criteria as this study is not for compliance purposes but is a planning tool.

The modelling predictions were analysed to identify meteorological conditions which are conducive to effective dispersion of demolition emissions and minimisation of potential impacts on infrastructure receptors.

The modelling predictions vary significantly with wind speed, wind direction and time of day. Based on these predictions, the following meteorological conditions are suggested as preferred conditions for completion of blasting to minimise risk of harm to dust sensitive infrastructure areas and at sensitive receptor locations so far as reasonably practicable:

- Hourly average wind speeds greater than 2 m/s (~4 knots); and
- Wind directions from the south through to the west-north-west (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure areas.

The preferred wind directions do not generally align with the predominant winds, however, they do occur and with greater frequency during the autumn and winter months.

CMA also requested analysis of blasting during predominant southeasterly wind directions. This analysis identified that particulate concentrations could be minimised by blasting during southeasterly winds when the hourly average wind speed was greater than 3 m/s (~6 knots).

A comparison of preferred conditions and southeasterly winds has shown:

- Preferred conditions and southeasterly winds greater than 3 m/s may result in particulate concentrations at screening receptors that are comparable in magnitude. However, particulate concentrations across infrastructure receptors during southeasterly winds greater than 3 m/s are significantly higher than those predicted during preferred conditions (>2 m/s winds from southwest directions).
- Deposition rates across infrastructure receptors due to blasting during southeasterly wind directions cannot be materially reduced by blasting when winds are above a certain speed or during certain hours of day. The Transgrid switchyard is directly downwind of the blast sites during southeasterly winds and the types of hazards and/or damage that may arise due to dust from blasting under these meteorological conditions should be considered during blast planning.

This study focused on PM_{10} and dust deposition, however contour plots for $PM_{2.5}$ have also been produced. In this study, $PM_{2.5}$ will behave in the same fashion as PM_{10} with respect to wind direction and wind speed given that PM_{10} was modelled as a tracer gas, i.e. without accounting for deposition. Contour plots for $PM_{2.5}$ have been produced for the chimney felling and boiler house demolition scenarios to provide an understanding of the reduction in predictions due to blasting during preferred wind directions. $PM_{2.5}$ concentrations have been calculated from PM_{10} concentrations by multiplying by 0.44 which is the ratio of the $PM_{2.5}$ and PM_{10} emission factors developed for blasting in the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019).It is also recommended that blasting be conducted during periods of forecast persistent meteorological conditions, to avoid potential changes in wind speeds or directions immediately before or after blasting that may alter the direction or speed of dispersion.

It is noted that the AGL on-site weather station records lower wind speeds than those generated by the WRF meteorological model and used in the dispersion modelling study. Should the AGL on-site weather station be used to inform blasting decisions, further consideration of the siting influences would be required.

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was appointed by CMA Contracting Pty Ltd (CMA) to undertake a dispersion modelling study of potential dust emissions associated with the proposed demolition of the two chimney stacks and boiler houses at the AGL Liddell Power Station in the Hunter Region of New South Wales (NSW).

Liddell Power Station ceased operations in 2023 and is in the process of transitioning into an industrial renewable energy hub, known as the Hunter Energy Hub. As part of this, a new 500 MW Battery Energy Storage System (BESS) and 330/33 kV Transition Switchyard are being constructed to the south-west of the site and it is understood that this new infrastructure is sensitive to dust. There is also an existing TransGrid 330 kV Switchyard to the immediate west of the site. There is also an existing TransGrid 330 kV Switchyard to the immediate west of the site that has been identified as sensitive to dust. Sensitive receptors are also located to the east and north of Lake Liddell.

CMA has been engaged by AGL to demolish the power station. ERM understands that there are no formal environmental approval conditions to be met with regard to off-site air emissions from the demolition activities. This work is being undertaken voluntarily by CMA to inform the last risk management plan.

This dispersion modelling study aims to understand the relative potential air quality impacts for various potential blast windows. This information will be used to inform blast risk management practices. The study has considered potential air quality impacts on dust-sensitive infrastructure located on-site as well as at key sensitive receptor locations further afield. The study is not intended for compliance purposes and has focused on identifying meteorological conditions that will minimise the risk of harm associated with air emissions from blasting so far as reasonably practicable. It is anticipated that blasting of the chimneys will take place from February to May 2026 and the boiler house later in the year. Blasting is likely to occur during the daytime between 09:00 and 17:00. The intended blast time is to be 13:30 although this is dependent upon the prevailing weather conditions and site requirements (WI, 2025).

1.1 SCOPE OF WORKS

The following scope of works has been completed as part of this study:

- Perform meteorological modelling using the Weather Research and Forecasting (WRF) meteorological model for a representative calendar year;
- Review demolition parameters and define an emission source term for inclusion in the atmospheric dispersion modelling, inclusive of physical parameters and emission quantities of dust and particulate matter;
- Conduct air dispersion modelling using CALPUFF model with generation of contour plots showing the spatial variability of downwind dust and particulate matter concentrations. Modelling has been conducted for one boiler house only; and
- Assess the predicted dust and particulate matter concentrations against the applicable impact assessment criteria on an incremental basis.

2. STRUCTURES PROPOSED FOR DEMOLITION

As part of the Project, two chimney stacks with a total height of 169 metres (m) each and two boiler houses are proposed to be demolished via blasting (Figure 2-1).

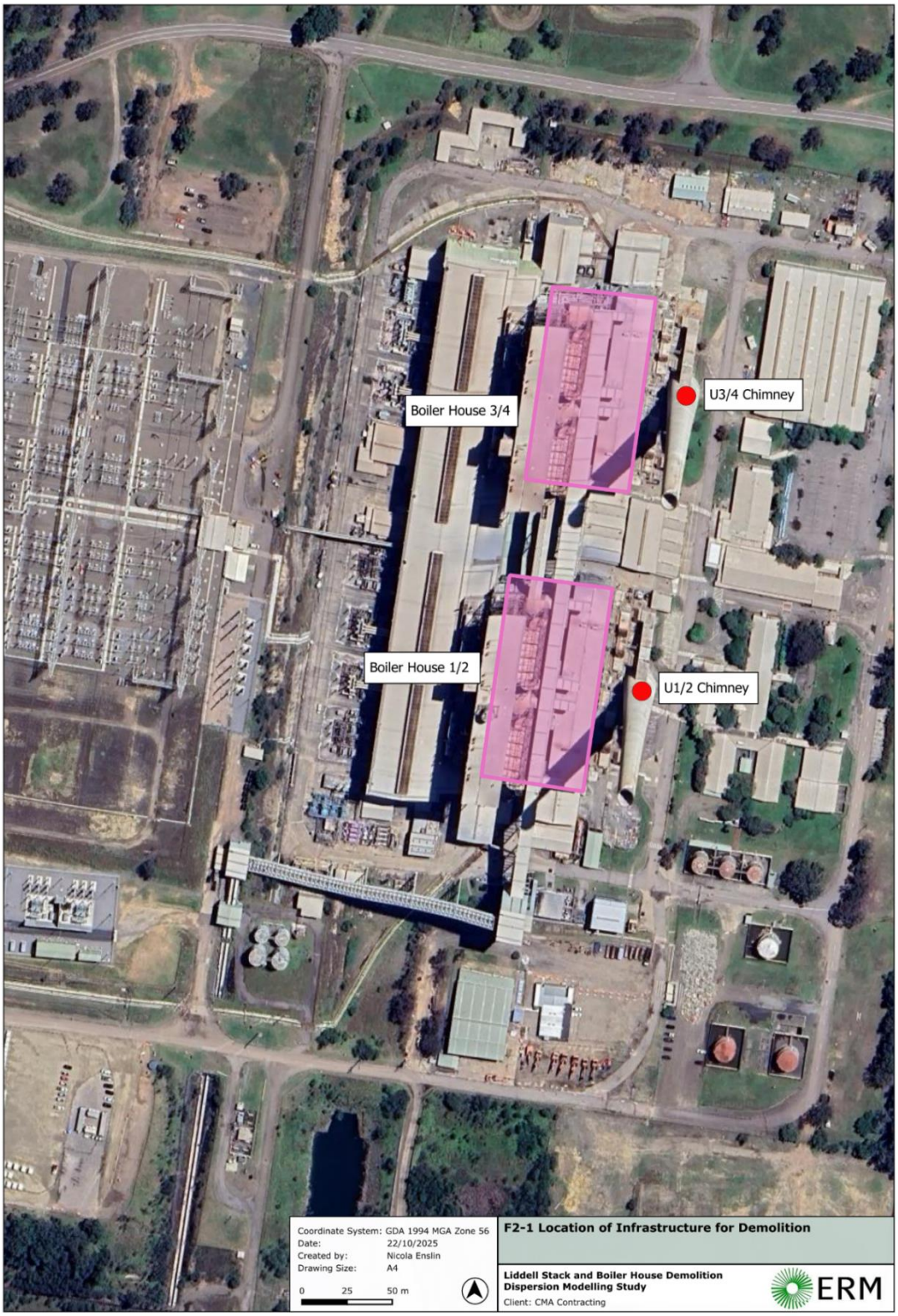


FIGURE 2-1 LOCATION OF INFRASTRUCTURE FOR DEMOLITION

The demolition of the two chimney structures will be achieved via an explosive-induced collapse. This process includes:

- 200 mm core holes drilled at termination points of front portion (bird's mouth);
- Triangular/trapezoidal portion of chimney removed between 200mm core hole and start of charge pattern;
- 28 mm holes drilled in the front face of the chimney (fell direction side) in accordance with blast design;
- Rear portion of chimney saw cut to extents provided in the blast design;
- Holes packed with explosive charges;
- Explosives detonated to remove front portion (bird's mouth) of the chimney base and induce the collapse of the structures crossing over on an alignment which is 20° from a site north to south orientation; and
- Excavators are to be used for processing and loadout of materials.

The chimneys are positioned on the eastern side of the site, between the boiler houses and Lake Liddell. The direction of collapse has been selected to fall away from the switchyard and other infrastructure (Figure 2-2).

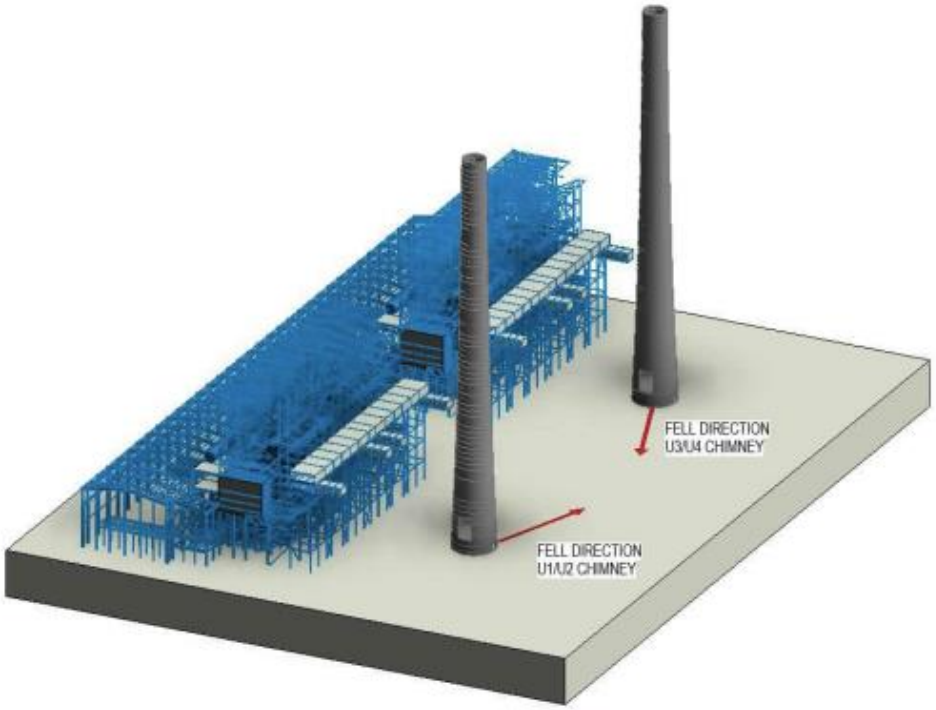


FIGURE 9 – FELL DIRECTION FOR CHIMNEYS

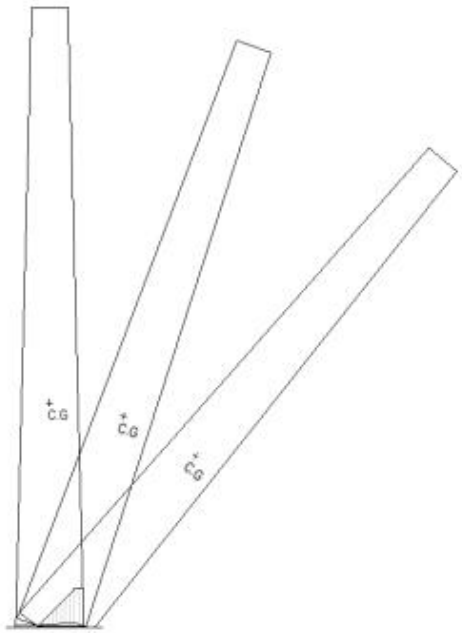


FIGURE 2-2 PLANNED FELL DIRECTION OF THE CHIMNEYS

3. SITE AND SURROUNDS

3.1 SITE LOCATION

The site is situated in the Muswellbrook Local Government Area (LGA), located approximately 15 kilometers (km) southeast of Muswellbrook, 25 km northwest of Singleton and 165 km north-west of Sydney (Figure 3-1). Lake Liddell is located to the immediate east of the site with Bayswater Power Station located approximately 3 km to the south-west of the site. The New England highway runs to the west of the site.

3.2 TOPOGRAPHY

The site is located in the undulating low hills of the Upper Hunter Valley (Figure 3-2). Elevation at the site ranges from approximately 130 to 160 metres above sea level (mAHD). Elevation peaks to the north-east of the site at approximately 674 mAHD. The terrain in the area results in complex meteorological patterns, with valley flows likely to be altered by the smaller scale terrain features scattered throughout the region.

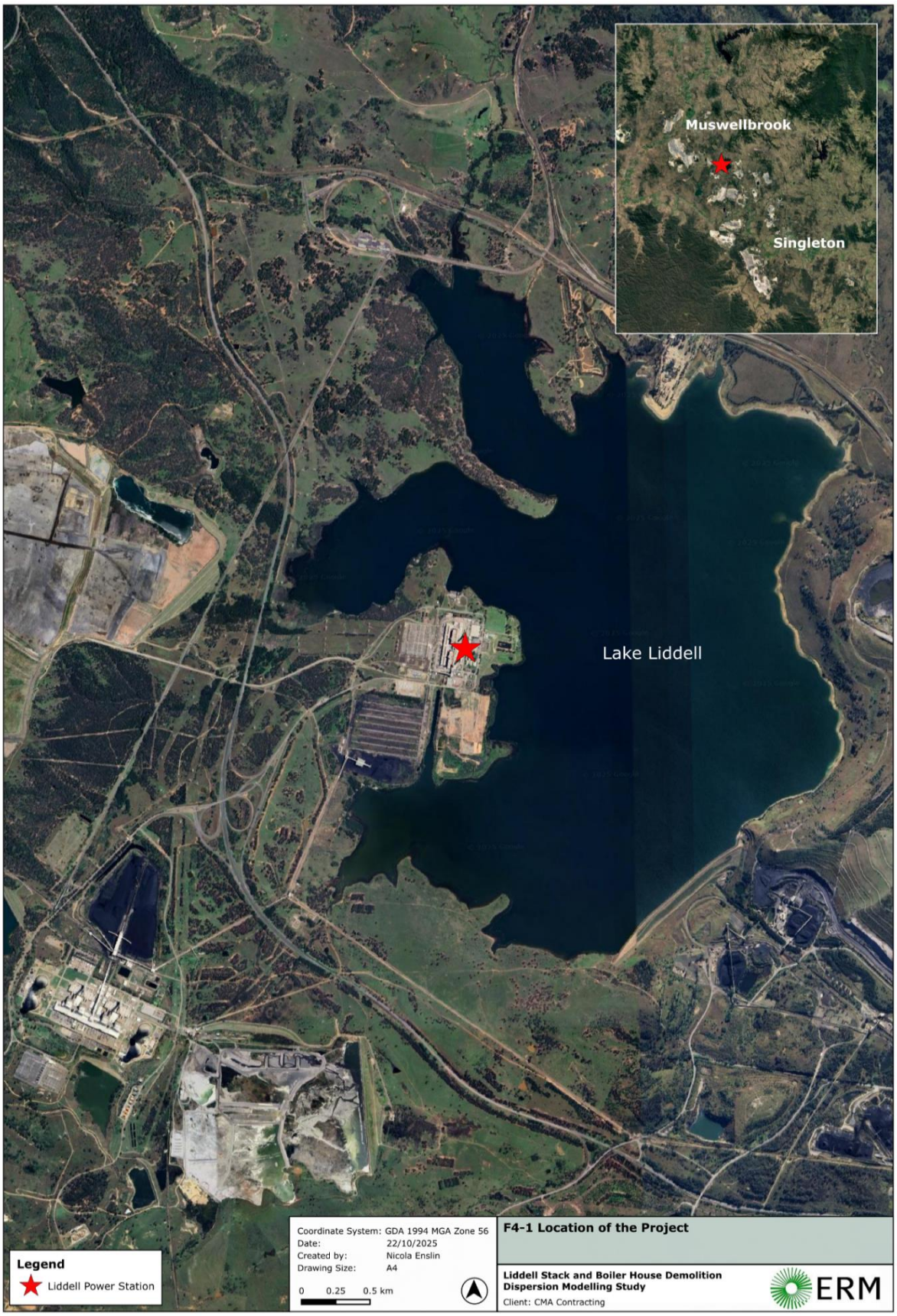


FIGURE 3-1 LOCATION OF THE LIDELL POWER STATION

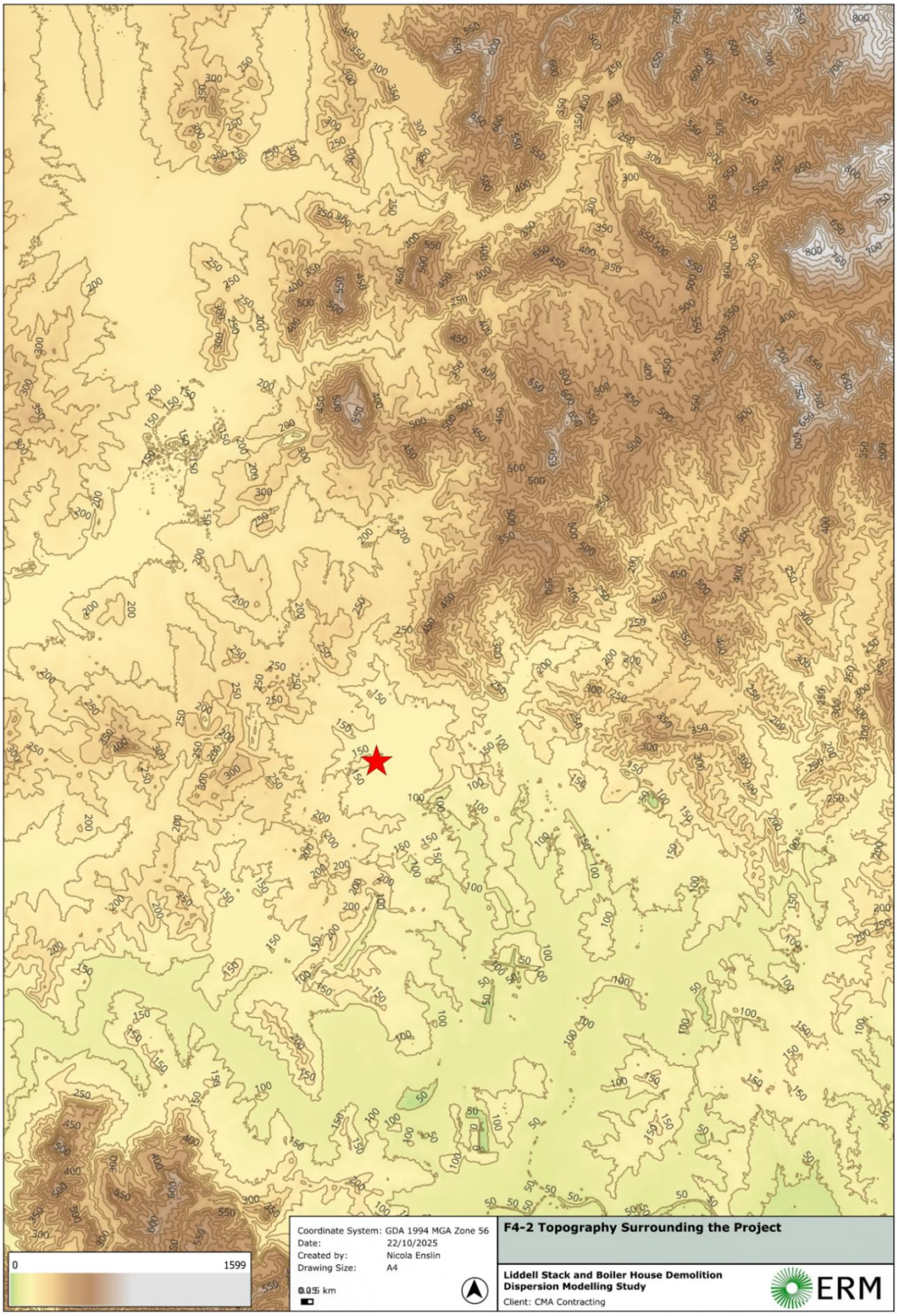


FIGURE 3-2 TOPOGRAPHY SURROUNDING THE PROJECT

3.3 MODEL RECEPTORS

Sensitive receptors applicable to the study were obtained from the Liddell Future Land Use & Enabling Works Air Quality Assessment Report (GHD, 2023) and the Blast Management Sub-Plan for the Liddel Power Station Chimney Structures - Demolition (Wellanbah Industrial, 2025). These comprised five locations on the north and eastern side of Lake Liddell that are recreational or residential locations.

To examine the potential variations in air quality impacts of various blast windows on dust-sensitive infrastructure, a grid of discrete receptors spaced approximately 100m apart across the switchyard and BESS areas have been incorporated into the model.

Boundary receptors have also been included to examine potential variations in air quality impacts in the wider region. Whilst it is acknowledged that AGL own a significant portion of land in the vicinity, it is understood that no other land closures are planned outside the 600 m radius exclusion zone. A ring of discrete receptors generally following the boundary of Lake Liddell to the east and the New England Highway to the west has been included in the model as boundary receptors. It should be noted that these locations are generic and have been selected to enhance the understanding of dispersion across the area. Whilst modelling predictions have also been provided across a 100 m resolution receptor grid, this analysis has not incorporated an assessment of dust impacts to workers located within the area bound by the boundary receptors. It is assumed the potential dust impacts to these personnel will be managed under an occupational exposure framework.

The locations of the discrete receptors included in the dispersion modelling study are shown in Table 3-1 and Figure 3-3.

TABLE 3-1 SENSITIVE AND DISCRETE RECEPTORS SURROUNDING THE PROJECT SITE

Receptor ID	Receptor Name	Receptor Type	Distance and Direction from Site	Easting (m)	Northing (m)
SR1	Lake Liddell Sports and Recreation Area	Recreational	2.2 km North-northeast	311,495	6,418,844
SR2	Residence	Residential	3.5 km North	309,974	6,420,346
SR3	Residence	Residential	3.6 km North	310,329	6,420,362
SR4	Residence	Residential	3.6 km North	312,671	6,419,281
SR5	Residence	Residential	5.0 km North-east	309,139	6,421,587
SR6	Bayswater Power Station	Power Station	2.5 km West-southwest	307,607	6,414,937

Receptor ID	Receptor Name	Receptor Type	Distance and Direction from Site	Easting (m)	Northing (m)
IR1 – 15	TransGrid 330 kV Switchyard	Infrastructure	230 m West	309,575	6,416,596
IR16 - 17	Transition 330/33kV Substation	Infrastructure	330 m South-west	309,455	6,416,302
IR 18 – 32	Battery Energy Storage System	Infrastructure	220 m South	309,848	6,416,237
BR1 – 20	Boundary Receptors	Site Boundary	Various	Various	Various

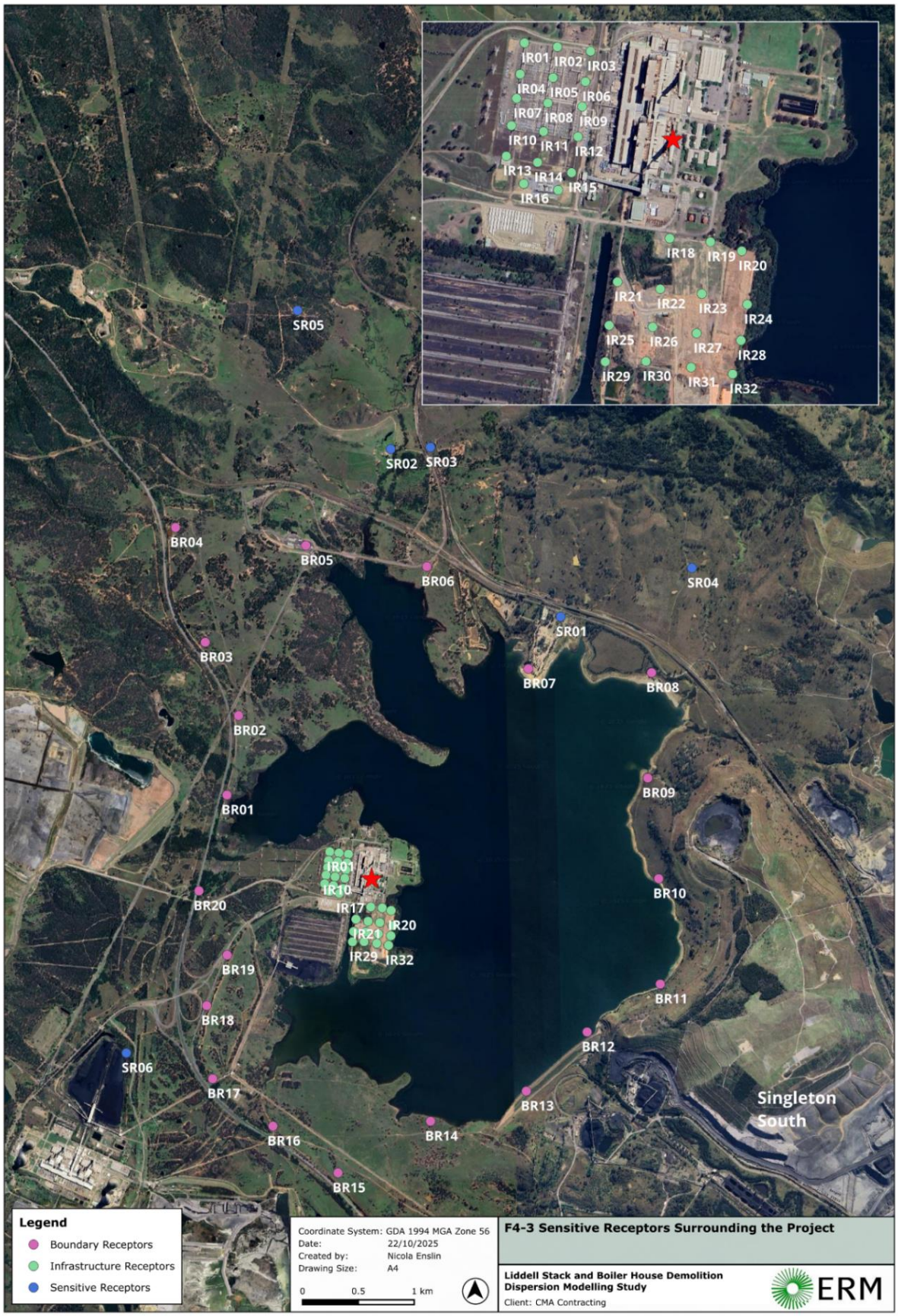


FIGURE 3-3 SENSITIVE RECEPTORS SURROUNDING THE PROJECT

4. CLIMATE AND LOCAL METEOROLOGY

4.1 CLIMATIC CONDITIONS

The Hunter Valley region experiences a temperate climate, characterised by warm to hot summers and mild winters, with most rainfall occurring during the warmer months. Meteorological conditions in the region are influenced by both coastal and inland weather patterns, resulting in variable wind directions and wind speeds throughout the year. The region is prone to atmospheric stability, particularly during the cooler winter months and under calm, clear conditions which are conducive to the formation of temperature inversions. These inversions inhibit vertical atmospheric mixing which can trap pollutants close to the ground, increasing the potential for elevated pollutant concentrations.

A summary of the climate statistics recorded at the Bureau of Meteorology (BoM) Singleton Defence Automatic Weather Station (AWS), the nearest BoM weather station to the site, is given in Table 4-1. This station is located approximately 40 km to the south-east of the site.

The local climate at Singleton Defence AWS is characterised by:

- A mean maximum temperature of 30.6 °C in January (summer) and a mean minimum temperature of 5.4 °C in July (winter); and
- Mean highest rainfall during the summer and early autumn months (January - March) with 94.3 mm recorded in January.

TABLE 4-1 SUMMARY OF CLIMATE STATISTICS FOR SINGLETON DEFENCE AWS FOR THE PERIOD 1969 - 1990

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily Mean Temperature												
Maximum (°C)	30.6	29.6	28.1	24.8	21.0	17.7	17.1	19.2	22.2	25.4	27.4	30.2
Minimum (°C)	17.6	17.8	16.0	12.8	9.7	6.8	5.4	6.3	8.8	11.8	14.1	16.6
Rainfall												
Mean (mm)	94.3	88.9	72.7	58.4	59.7	37.9	28.2	37.1	45.3	69.1	68.5	63.0
Mean days of rain	8.0	7.7	7.7	6.3	6.3	5.4	4.9	5.1	5.7	7.1	7.8	6.5
Mean 9am conditions												
Temperature (°C)	22.6	22.0	21.1	17.7	13.8	10.6	9.6	11.4	15.5	19.1	19.8	22.5
Wind speed (km/hr)	5.6	5.6	6.4	6.3	6.3	6.7	7.9	7.0	7.6	7.7	6.8	6.7
Mean 3pm conditions												
Temperature (°C)	28.6	27.7	26.5	23.4	19.8	16.7	16.2	18.3	21.1	24.1	25.4	28.5
Wind speed (km/hr)	11.2	11.6	10.2	9.1	8.3	8.1	9.7	9.7	9.7	11.2	11.9	12.1

The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) operates a network of ambient air quality and meteorological monitoring stations (AQMS) in the Upper Hunter Valley region. Meteorological data was obtained from the nearest NSW DCCEEW stations to the site for the period January 2020 – December 2024. Liddell Power Station also operates an on-site meteorological monitoring station, located approximately 1.3 km to the west-southwest of the site. Meteorological data was obtained from this station for the period September 2024 – August 2025.

The location of the ambient air quality and meteorological monitoring stations surrounding the site are given in Table 4-2 and shown in Figure 4-1.

TABLE 4-2 SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS

Station Name	Parameters Measured	Easting (m)	Northing (m)
AGL			
AGL Met Station	Wind direction, wind speed, temperature, relative humidity and solar radiation	308268	6416161
NSW DCCEEW			
Camberwell	Wind direction, wind speed, temperature, relative humidity and rain	320690	6405617
Jerry's Plains	Wind direction, wind speed, temperature and relative humidity	300779	6404717
Maison Dieu	Wind direction, wind speed, temperature and relative humidity	317976	6399745
Muswellbrook NW	Wind direction, wind speed, temperature and relative humidity	300418	6429514
Singleton South	Wind direction, wind speed, temperature and relative humidity	331895	6393088

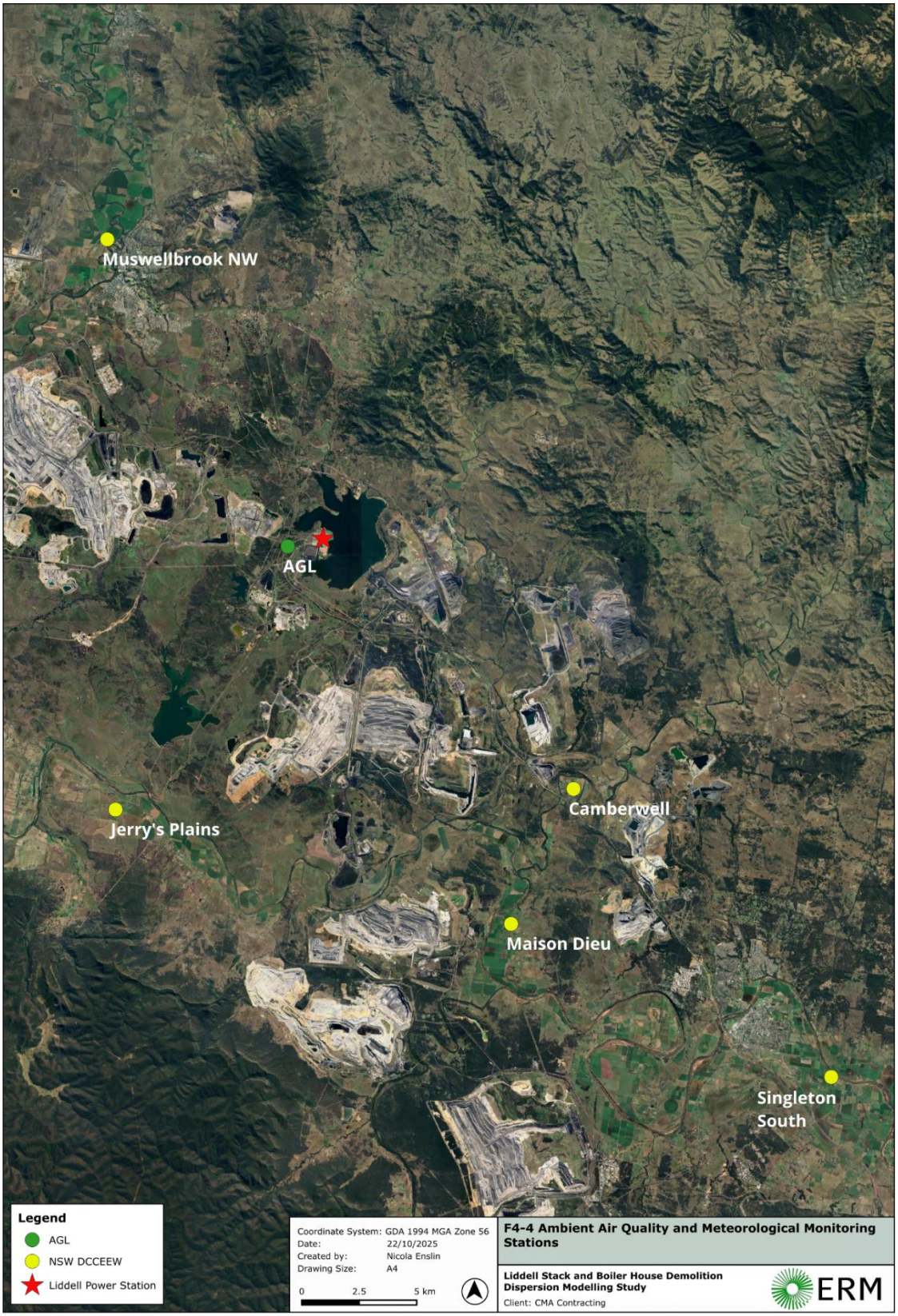


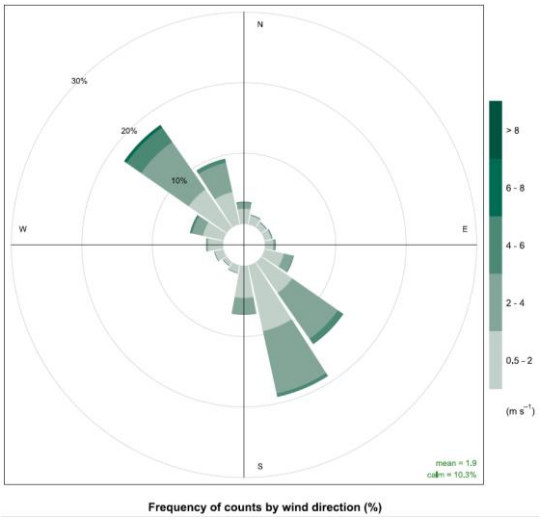
FIGURE 4-1 LOCATION OF SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS

4.2 WIND FIELD

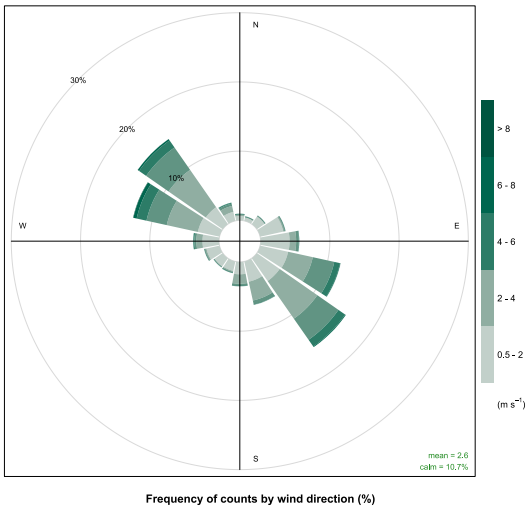
An overview of the prevailing wind field in the region is given in the section below. Annual average wind roses for the NSW DCCEEW Camberwell, Jerry's Plains, Maison Dieu, Muswellbrook NW and Singleton South AQMS for the period January 2020 – December 2024 are shown in . Annual, diurnal and seasonal wind roses for AGL's on-site meteorological station for the period September 2024 to August 2025 are shown in Figure 4-2 to Figure 4-4.

Based on the available meteorological data:

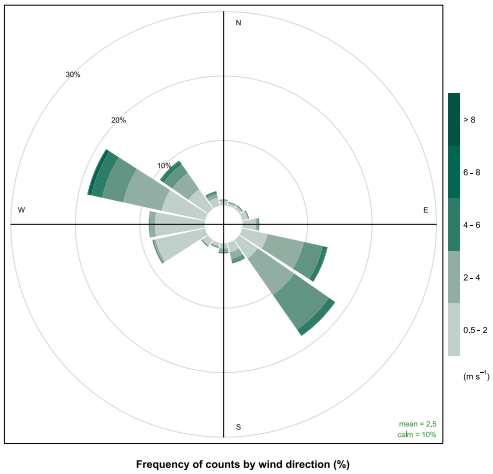
- Winds in the region originate predominantly from the north-westerly and south-easterly sectors at most stations, reflecting the combined influence of local channelling within the Upper Hunter Valley and regional land and sea breezes characteristic of coastal environments. The AGL on-site meteorological station shows a similar signature with winds originating predominantly from the north-west, north-northwest, south-southeast and southeast; A slight variation in the wind field at the Muswellbrook NW station is observed, with predominant winds from the north-east rather than the north-west. This additional north-easterly component is also seen at the Maison Dieu station. The observed differences in the wind field at Muswellbrook NW and Maison Dieu are likely due to localised terrain influences;
- A consistent diurnal wind pattern is observed at the AGL on-site meteorological station, with prevailing winds from the north-westerly and south-easterly sectors over all time periods. Changes in wind speed are observed. During the early morning (00:00 – 06:00), predominant winds are light and increase in strength during the late morning (06:00 – 12:00) and into the afternoon (12:00 – 18:00), before reducing during the evening (18:00 – 24:00). A slight shift in southerly wind directions is also observed, from frequent south-southwesterlies overnight to higher frequencies of southeasterly winds during the day;
- Seasonal winds at the AGL on-site meteorological station are predominantly from the north-westerly and south-easterly sectors during spring (September, October and November). During summer (December, January and February) winds from the north-west are reduced with moderate to strong winds originating predominantly from the south-east and south-southeast. A similar wind field is seen during the autumn months (March, April and May) while during winter (June, July and August), winds shift to the north-west and north-northwest;
- Winds are generally slow to moderate at all stations with mean wind speeds ranging from 1.7 - 2.9 m/s; and
- Calm conditions, which are defined as wind speeds less than 0.5 m/s, are variable and range from 4 to 14.6% of time across the stations. Calm conditions were observed to be much more frequent during the autumn (14.2%) and winter (14.6%) months at the AGL on-site meteorological station compared with spring and summer months (approximately 6%).



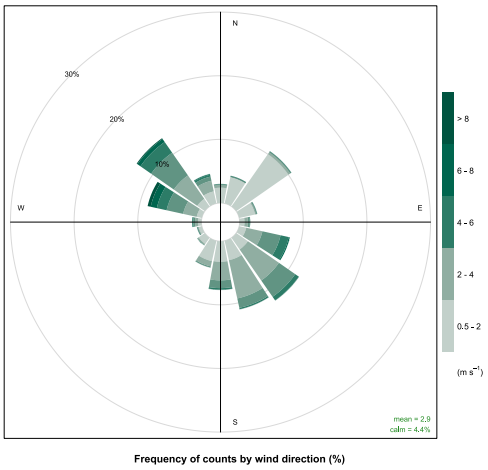
AGL On-site



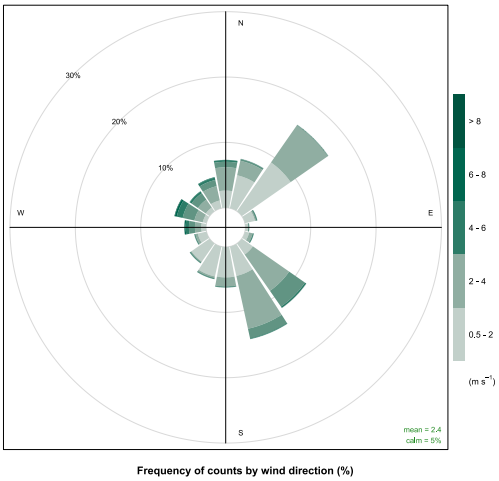
Camberwell



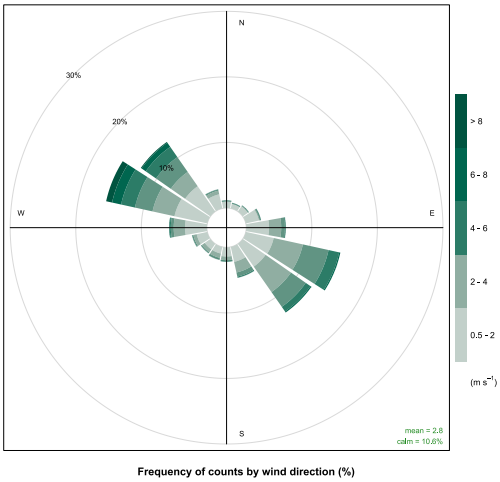
Jerry's Plain



Maison Dieu



Muswellbrooke NW



Singleton South

FIGURE 4-2 ANNUAL AVERAGE WIND ROSES FOR 2020 TO 2024 (NSW DCCEEW) AND 2024 TO 2025 (AGL)

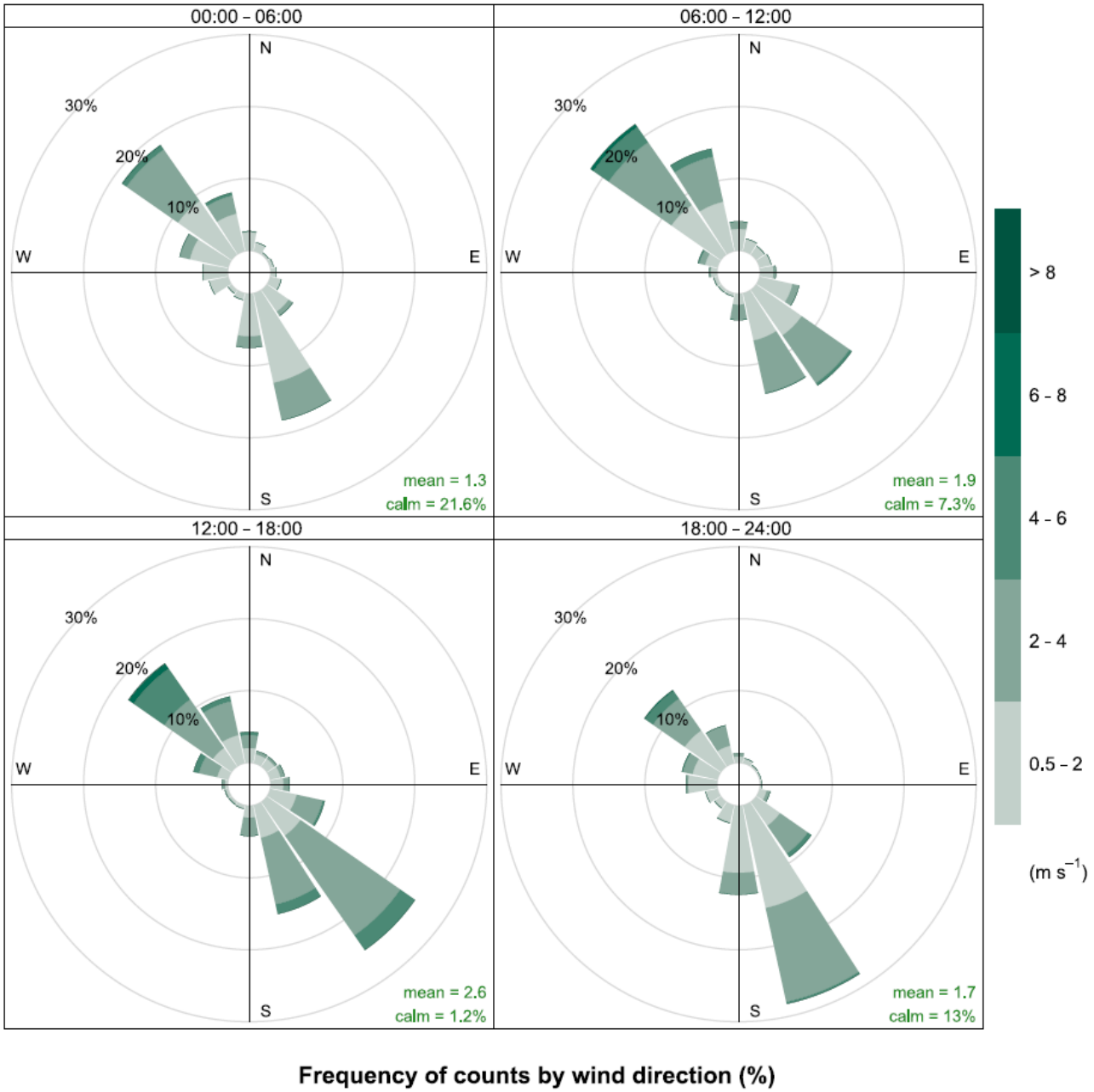


FIGURE 4-3 DIURNAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025

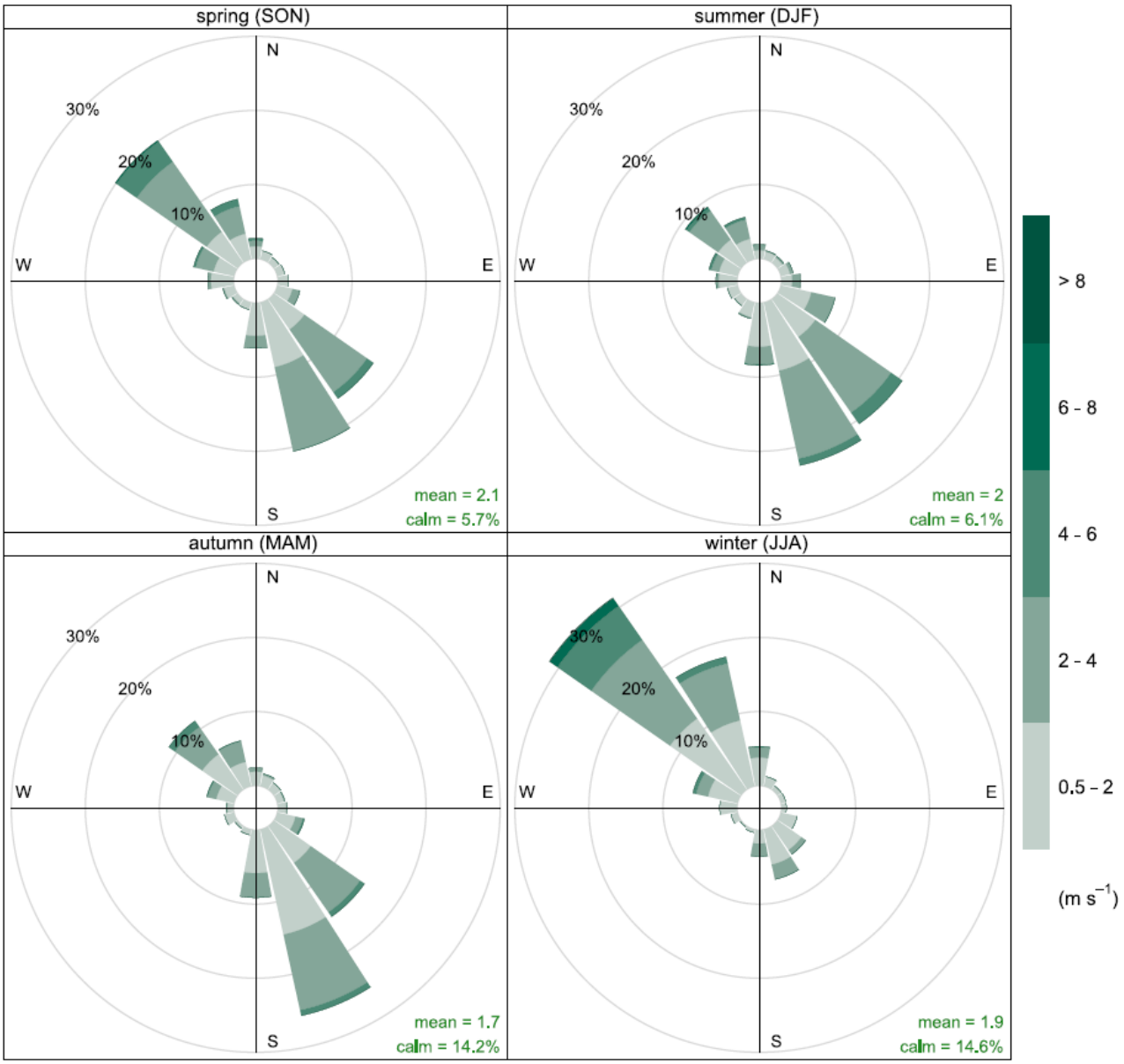


FIGURE 4-4 SEASONAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025

5. ESTIMATED EMISSIONS FROM BLASTING

Particulate matter and dust are the main sources of emission associated with demolition activities. Source parameters for the chimney stacks and boiler houses are given in Table 5-1 and Table 5-2, respectively. Dimensions for the chimney stacks were sourced the Blast Management Sub-Plan (WI, 2025) which identifies the stacks as being primarily constructed from reinforced concrete. Dimensions and construction details for the boiler houses were provided by CMA. The boiler houses are comprised of steel (used for the main frame, equipment and walkways), concrete (foundations, slabs and firewalls) and metal sheeting (roof and wall cladding), It is understood that Boiler House 3/4 will be demolished first followed by Boiler House 1/2. However, for the purposes of this study, the impact of dust emissions from Boiler House 1/2 has been evaluated as it is located closest to the BESS and other on-site infrastructure which has been identified as sensitive to dust.

TABLE 5-1 LOCATION AND KEY DIMENSIONS FOR THE CHIMNEY STACKS

Parameter	Source	
	Stack U1/2	Stack U3/4
Easting (m)	309,825	309,802
Northing (m)	6,416,656	6,416,494
Stack Height (m)	169	169
Stack diameter at base (m)	18.6	18.6
Stack diameter at top (m)	9.8	9.8
Wall thickness at base (m)	0.61	0.61

TABLE 5-2 LOCATION AND KEY DIMENSIONS FOR THE BOILER HOUSE

Parameter	Boiler House 1/2
Easting (m)	309,691
Northing (m)	6,416,414
Building Height (m)	26
Building Width (m)	58
Building Length (m)	110
Quantity of concrete (tonnes)	12,000

Emission factors adopted for this study were obtained from the Kurri Kurri Stack Demolition (ERM, 2019) (Table 5-3) which were derived from the measurement and modelling of particulate matter during a stack demolition project at the former Kurri Kurri Aluminum Smelter in 2019.

TABLE 5-3 EMISSION FACTORS FOR TONNE OF CONCRETE

Size Fraction	Emissions (g/t of concrete/event)
TSP	12.8
PM_{10}	11.9
$PM_{2.5}$	5.2

The calculated TSP, PM_{10} and $PM_{2.5}$ emission rates for demolition of the two stacks and boiler house are given in Table 5-4. These have been calculated assuming that the total quantity of dust released from each blast event is emitted over one minute. No mitigation measures were included in this modelling, therefore the modelled emission rates are considered to be conservative.

This study has focused on PM_{10} concentration as this is the key particulate size fraction relevant to emissions from mechanical processes such as demolition, while TSP has been included for the purpose of generating deposition predictions.

$PM_{2.5}$ comprises a smaller component of total particulate emissions (40%) and will behave in the same fashion as PM_{10} with respect to wind direction and wind speed given that PM_{10} was modelled as a tracer gas, i.e. without accounting for deposition. Whilst the analysis has focused on $PM_{2.5}$, contour plots have been produced for the chimney felling and boiler house demolition scenarios to provide an understanding of the reduction in predictions due to blasting during preferred wind directions. $PM_{2.5}$ concentrations have been calculated from PM_{10} concentrations by multiplying by the $PM_{2.5}/PM_{10}$ emission factor ratio of 0.44.

TABLE 5-4 CALCULATED EMISSION RATES

Source	Emission rates (g/s)		
	TSP	PM_{10}	$PM_{2.5}$
U1/2	1,595	1,483	648
U3/4	1,595	1,483	648
Boiler House 1/2	2,560	2,380	1,040

6. MODEL CONFIGURATION

Dispersion modelling has been conducted for two scenarios:

- Preferred conditions: Dispersion modelling for blasting of the chimney and boiler house between 9am and 5pm throughout the entire year have been analysed to determine meteorological conditions that would minimise air quality impacts at infrastructure and across the wider domain; and
- South-easterly winds: CMA requested this scenario that limits blasting to south-easterly winds given that these are frequent. Model results have been analysed to determine options for minimising air quality impacts due to blasting during these wind directions.

6.1 SOURCE CONFIGURATION

For both model scenarios, the chimney stacks and boiler house were modelled as a series of volume sources. The chimney stacks were modelled as six volume sources along the length of the stack with the boiler house also represented by six angled volume sources. Configuration of the sources in the model are given in Table 6-1. The boiler house was modelled as six volume sources (two lines of three, to represent its rectangular shape).

TABLE 6-1 SOURCE CONFIGURATION IN MODEL

Parameter	Stacks	Boiler House 1/2
Source type	Volume	Volume
Initial length of plume (m)	1.5 × stack height = 253.5	1.72 × building height = 99.8
Initial width of plume (m)	7 × stack base = 130.2	1.72 × building base = 189.2
Effective Height (m)	37.2	13
Sigma Y (m)	60.6	6.1
Sigma Z (m)	17.3	29.3

6.2 PARTICLE SIZE DISTRIBUTION

For the evaluation of deposition, the particle size distribution was adopted from the air quality monitoring conducted for the Kurri Kurri Aluminum Smelter stacks (ERM, 2019), which derived a geometric mass mean diameter of 4.76 µm and geometric standard deviation of 3.22 µm. PM_{10} was modelled as a tracer gas.

$PM_{2.5}$ results were determined from the PM_{10} results as described in Section 5 using the ratio of $PM_{2.5}$ and PM_{10} emission factors from Kurri Kurri Aluminum Smelter stacks (ERM, 2019). This means that both PM_{10} and $PM_{2.5}$ concentrations have been predicted in this study without accounting for losses due to deposition.

6.3 MODELLING METHODOLOGY

6.3.1 METEOROLOGICAL MODELLING

Long-term hourly observational data from the AGL on-site meteorological monitoring station was not available. The nearest long-term observational datasets that were available are those collected by the NSW DCCEEW, which has a network of ambient air quality and meteorological monitoring stations in the region. Meteorological data from Muswellbrook NW and Singleton

South AQMS for the last 5 years has been reviewed, with nomination of the calendar year 2020 as a year that contains meteorological patterns that are consistent with long-term trends. Meteorological modelling using WRF has been conducted to obtain representative upper-air meteorological fields for the 2020 calendar year. Further details of this process can be found in Appendix A. This is generally consistent with guidance in the Approved Methods for selection of meteorological data for use in dispersion modelling.

6.3.2 CALPUFF MODEL DOMAIN AND CONFIGURATION

CALMET is a meteorological pre-processor that provides the meteorological inputs required to run the CALPUFF dispersion model (Exponent, 2011). CALMET creates a three-dimensional meteorological field and includes a wind field generator that considers slope flows, terrain effects and terrain blocking effects. CALMET produces fields of wind components, air temperature, relative humidity, mixing height and other micro-meteorological variables for each hour of the modelling period.

CALMET was configured with reference to the NSW EPA guidelines, entitled: "Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia'.

Key parameters used in the CALMET configuration include:

- Outer domain of 121 x 121 grid cells at 250 m spacing, with a south-west coordinate of 294,425 m and 3,401,975 m (UTM zone 56 S);
- Inner domain of 121 x 121 grid cells at 100 m spacing, with a south-west coordinate of 303,950 m and 6,410,950 m (UTM zone 56 S);
- No-obs mode driven by meteorological data generated by prognostic model WRF used as the initial guess field;
- Froude number adjustments and slope flow effects; and
- Radius of influence of terrain features of 2 km.

The dispersion model was configured with blasting occurring between 9 am and 5 pm. Separate runs were used for blasting during each hour, to avoid any potential cumulative impacts from more than one blast in any given hour. Blasting was modelled as occurring every day of the year in order to provide an understanding of potential variation in impacts during the full range of meteorological conditions included in the calendar year selected.

It should be noted that the modelling was conducted in local standard time, and does not include adjustments in operations due to daylight savings.

7. DISPERSION METEOROLOGY

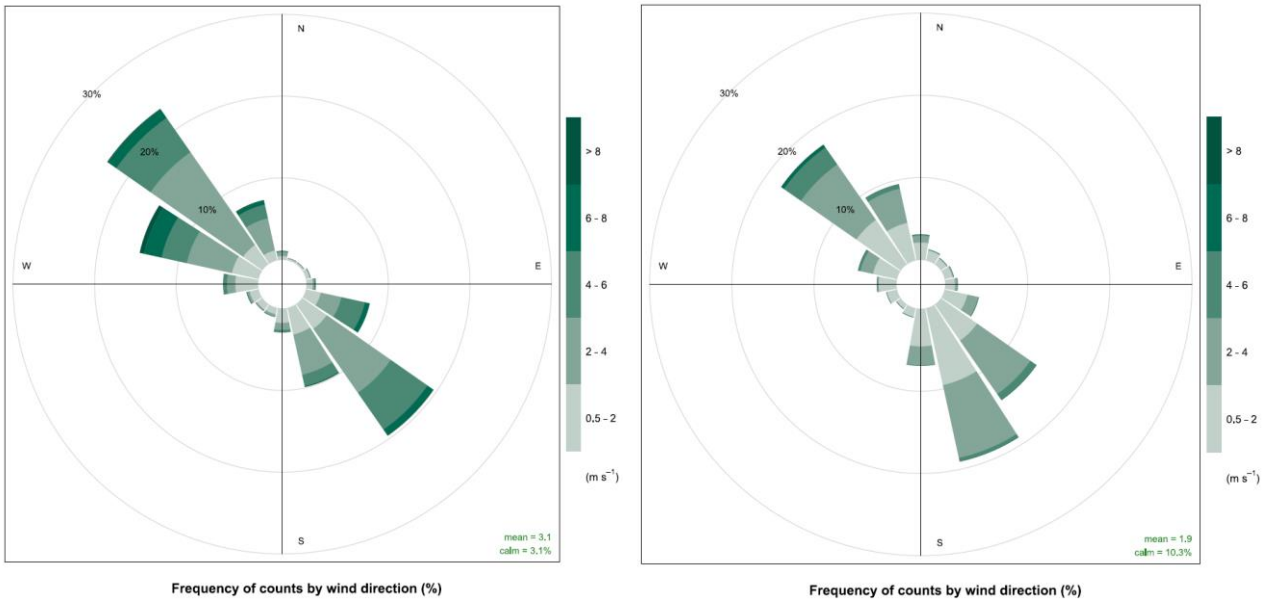
The output from the coupled WRF and CALMET meteorological model is summarised in the section below. This data has been used to drive the CALPUFF dispersion model.

7.1 WIND FIELD

Annual, diurnal and seasonal wind roses for the AGL on-site meteorological station as compared to the modelled CALMET meteorological data for the site are shown in Figure 7-1 to Figure 7-3. Good agreement is seen between the modelled and observed annual wind field with the model having reproduced the predominant north-westerly and south-easterly wind field. However, some variation is seen in the modelled wind speeds as higher wind speeds are predicted (a mean speed of 3.1 m/s) compared to the observed data (a mean speed of 1.9 m/s). This is also reflected in the lower percentage of calm conditions seen in the modelled dataset.

Modelled daytime (06:00 – 18:00) and night-time (18:00 – 06:00) winds also show generally good agreement with the observed data although there is some variability in the frequency of the night-time winds, especially during the early morning (00:00 – 06:00). Modelled seasonal winds have predicted the predominant wind directions for the spring, summer and winter months although autumn shows a slight discrepancy with predominant winds from the north-west (as compared to south-southwest in the observed dataset).

It is normal to observe some deviation between CALMET results and observational data as CALMET blends multiple meteorological inputs (e.g. surface and upper air observations, or gridded field from meteorological models such as WRF) and adjusts them to ensure consistency with local terrain, land-use and flow features (e.g., sea breezes, slow flows). As a diagnostic model, its primary goal is to generate a spatially and physically consistent three-dimensional wind field rather than to replicate each observation exactly. If CALMET successfully captures the dominant flow patterns, wind direction frequencies and temporal trends, its performance can be considered good.



Modelled Observed

FIGURE 7-1 COMPARISON OF MODELLED VERSUS OBSERVED ANNUAL WIND FIELD AT AGL FOR 2020 (MODELLED) AND SEPTEMBER 2024 – AUGUST 2025 (OBSERVED)

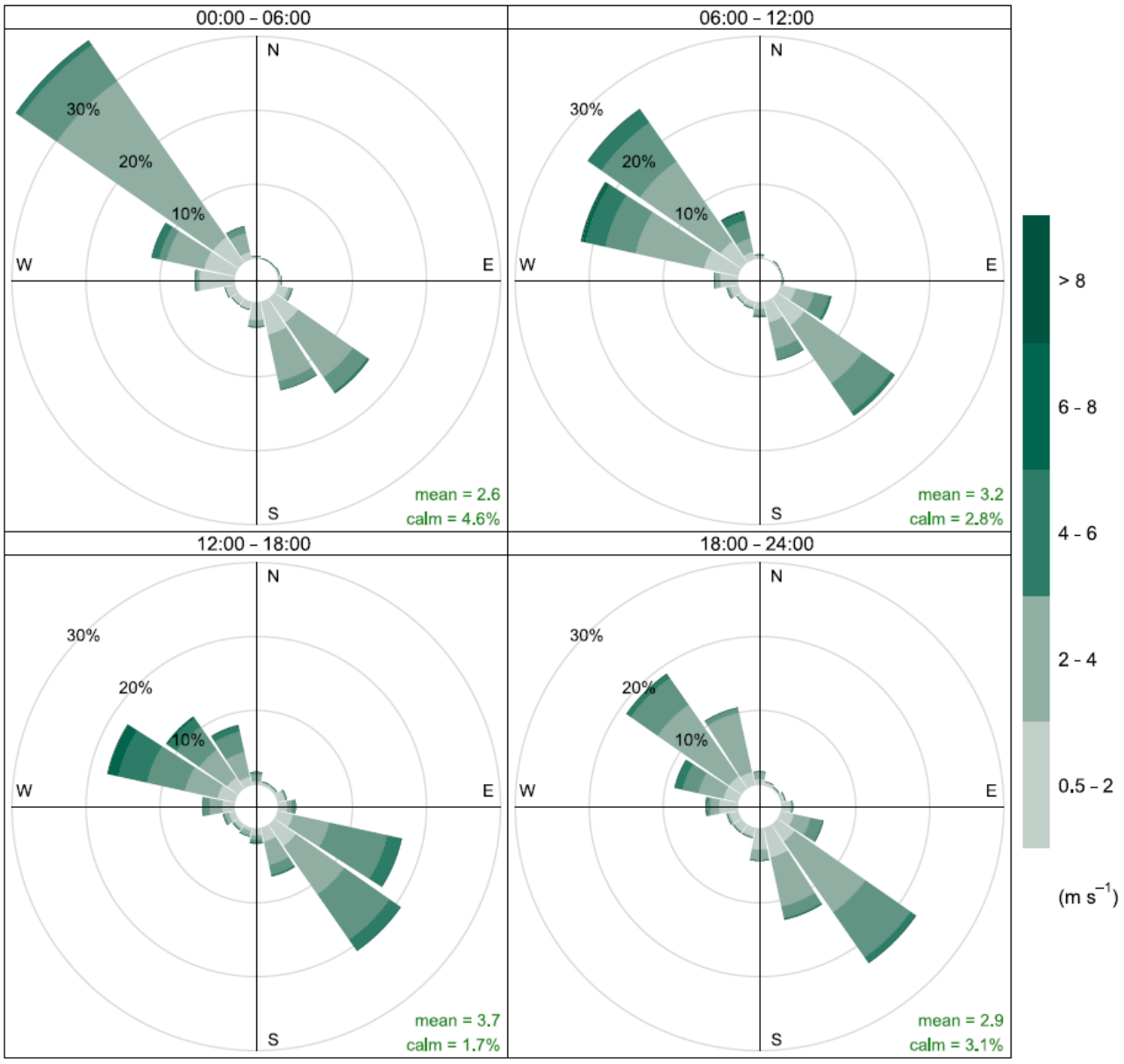


FIGURE 7-2 MODELLED DIURNAL WIND ROSES FOR AGL FOR 2020

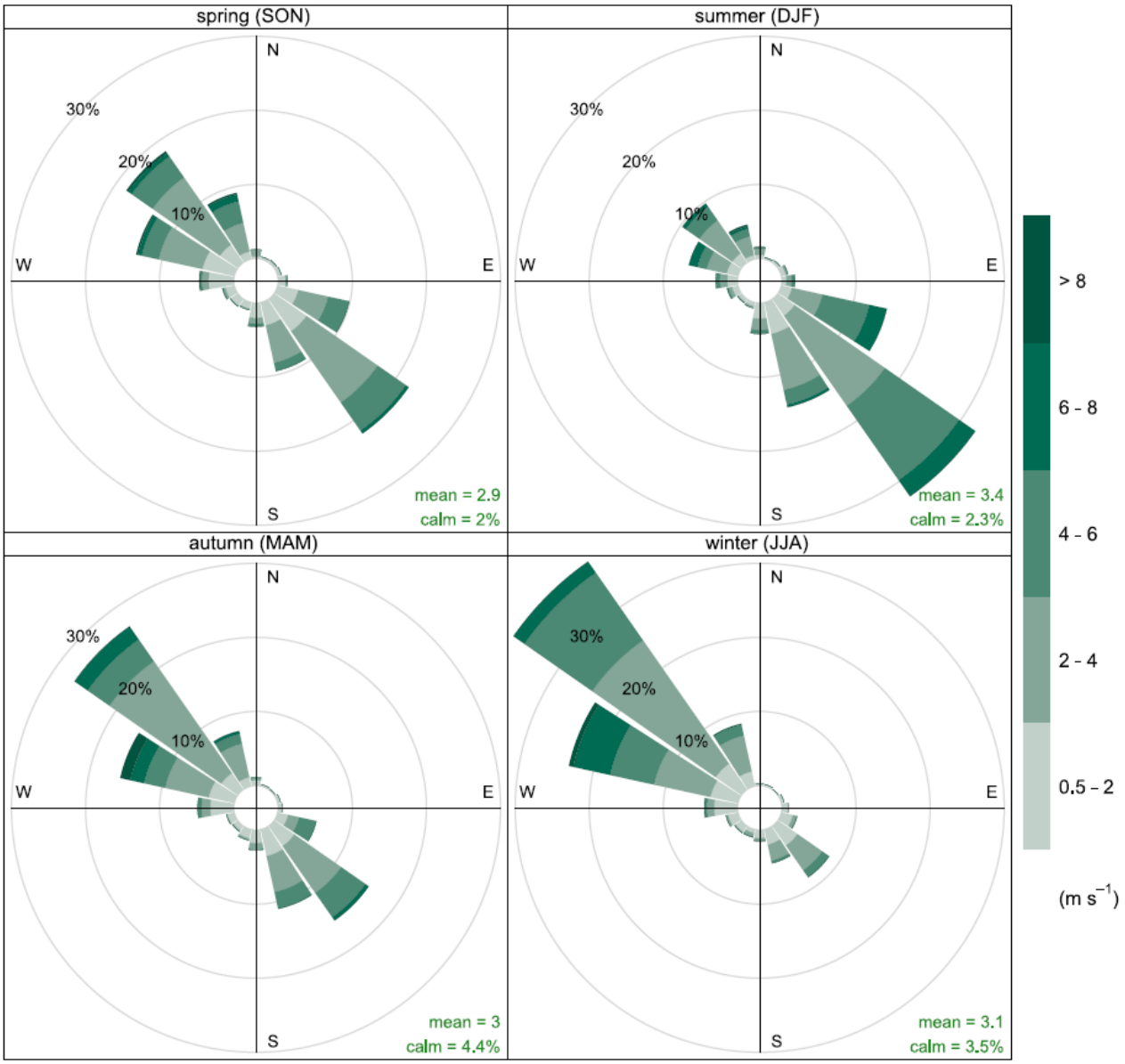


FIGURE 7-3 MODELLED SEASONAL WIND ROSES FOR AGL FOR 2020

7.2 MIXING HEIGHT

The mixing height defines the vertical extent of the turbulent layer of the atmosphere within which pollutants are mixed and dispersed. When the mixing height is high, pollutants are more effectively dispersed and diluted in the atmosphere, resulting in lower ground-level concentrations and improved air quality. Conversely, when the mixing height is shallow, pollutants can become trapped beneath temperature inversions which limit vertical mixing and lead to poor dispersion and elevated ground-level pollutant concentrations.

The predicted mixing height for the site is shown in Figure 7-4. The modelled mixing height exhibits a typical diurnal cycle with low mixing heights during the early morning hours when conditions are stable. After sunrise, surface heating promotes convective activity, leading to a gradual increase in the mixing height, which typically peaks in the early afternoon around 1,300m. Following sunset, as surface cooling produces stable conditions and the mixing height decreases steadily through the late evening and night-time period.

This diurnal pattern is consistent with expected boundary layer behaviour under typical daytime convective and night-time stable conditions. This indicates that CALMET has realistically captured the temporal evolution of the mixing layer at the site.

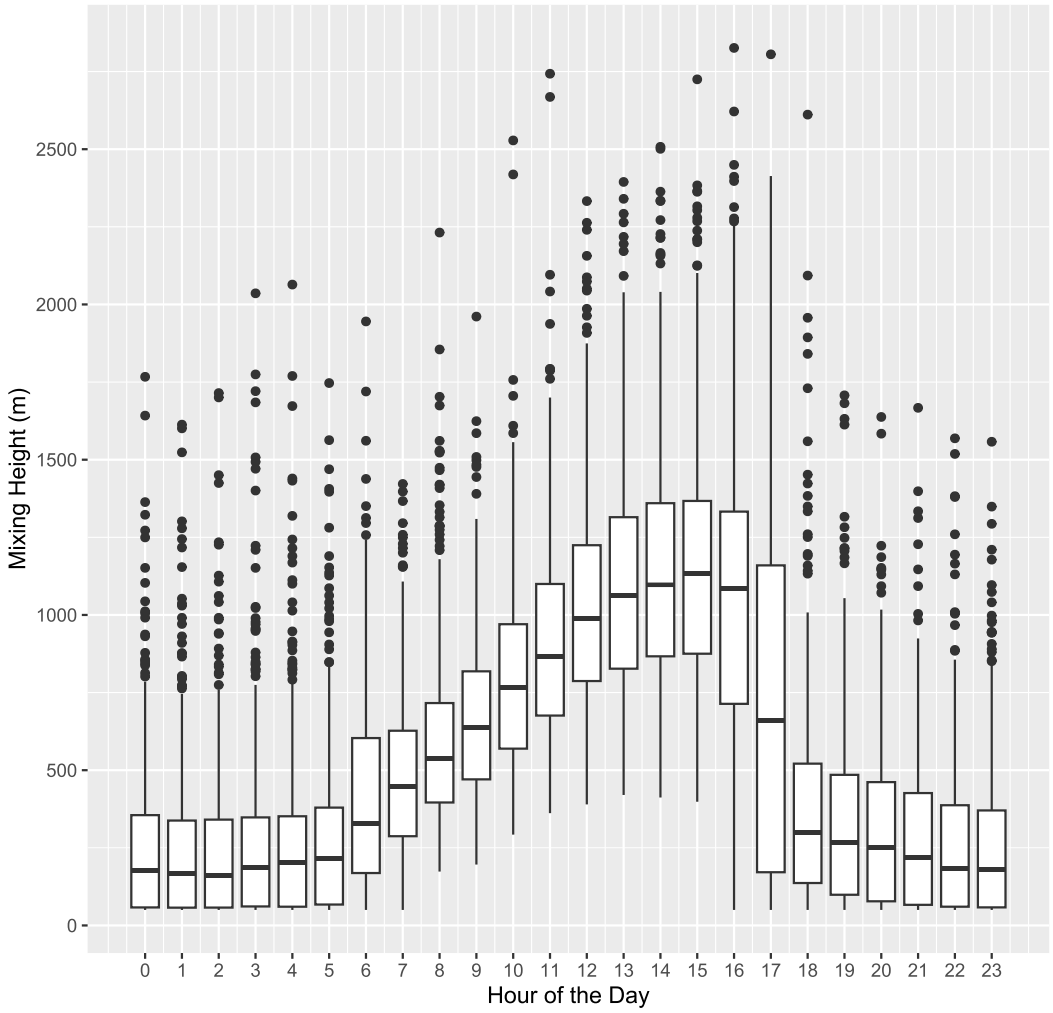


FIGURE 7-4 DIURNAL DISTRIBUTION OF MIXING HEIGHTS

7.3 ATMOSPHERIC STABILITY

Atmospheric stability is one of the key parameters that affects dispersion and dilution of emissions away from source. In essence it describes the degree of thermal and mechanical mixing of the atmosphere that occurs due to wind and thermal heating.

Atmospheric stability is described by the Pasquill-Gifford classification (Table 7-1). Unstable conditions (classes A – C) promote vertical mixing which is good for dispersion and less ground-level impacts. Neutral conditions (class D), common under overcast skies or strong winds, promote moderate dispersion while stable conditions (classes E – F) suppress mixing, resulting in poor dispersion conditions and higher ground-level concentrations.

TABLE 7-1 PASQUILL GIFFORD STABILITY CLASSIFICATION

Class	Description	Conditions	Stability Type
A (1)	Very Unstable	Strong sunshine, light wind	Maximum mixing
B (2)	Unstable	Sunny, moderate wind	Strong mixing
C (3)	Slightly Unstable	Slightly cloudy, moderate wind	Moderate mixing
D (4)	Neutral	Overcast or windy, day or night	Neutral mixing
E (5)	Slightly Stable	Clear skies, light wind (evening)	Limited mixing

The predicted frequency distribution of atmospheric stability categories for the site is shown in Figure 7-5. The site is characterized by stable atmospheric conditions during the night-time period (18:00 – 06:00) (Categories E and F), which are typically associated with clear and calm conditions. During the daytime, conditions are generally neutral (Category D). Moderately unstable conditions (Categories B and C), indicative of sunny weather and moderate wind speeds, also occur frequently throughout the day. In contrast, very unstable conditions (Category A), associated with very sunny and light winds, are infrequent and generally limited to late morning and early afternoon (10:00 – 13:00).

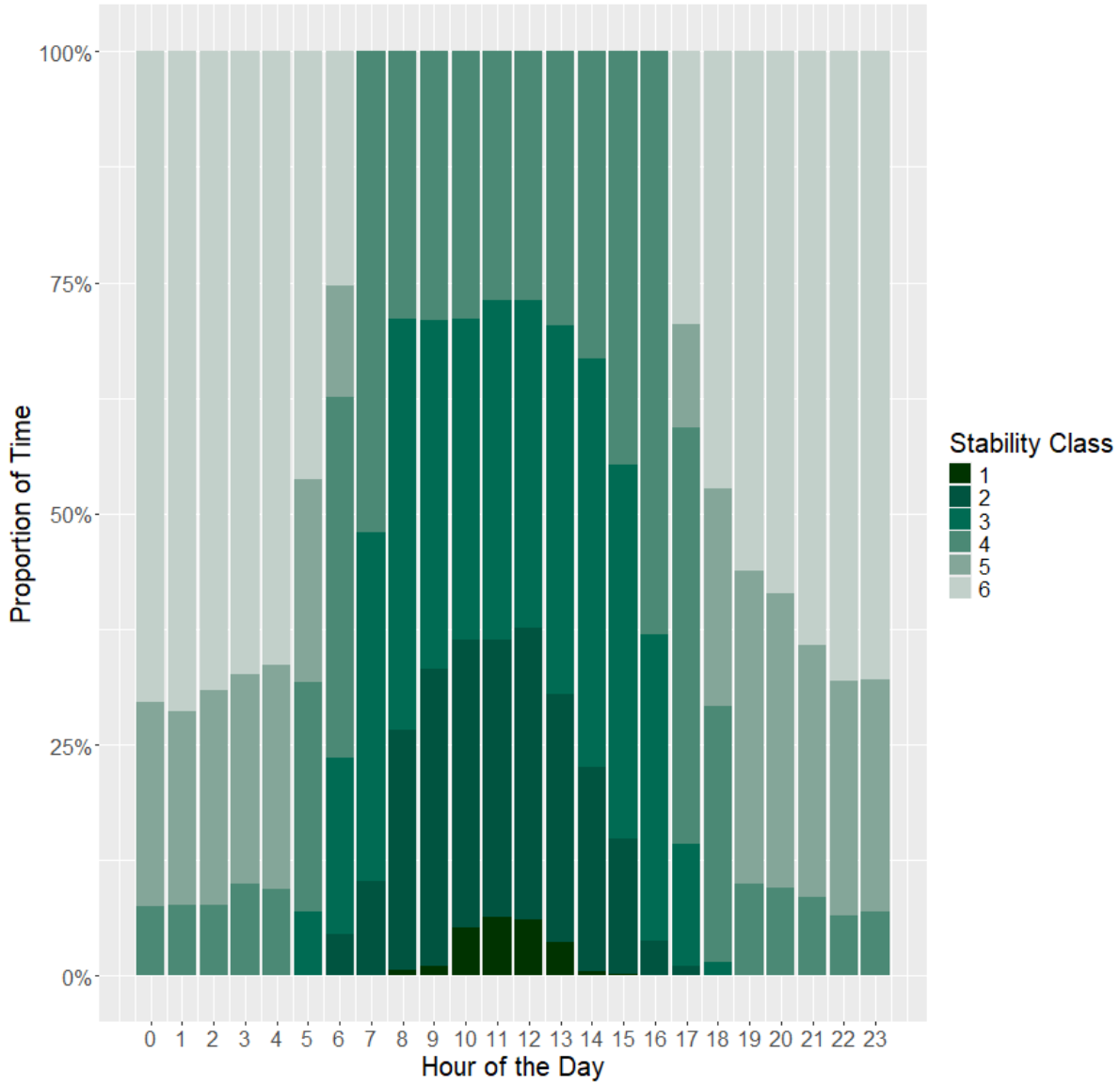


FIGURE 7-5 FREQUENCY OF ATMOSPHERIC STABILITY CATEGORIES

8. DISPERSION MODELLING RESULTS

Dust and particulate matter concentrations have been predicted at the nearest sensitive receptors and across the modelled domain.

Dispersion modelling results for the chimney blast and boiler house blast have been analysed in a similar manner. For both scenarios, model predictions at the dust-sensitive infrastructure have been considered first to understand how they vary with wind speed, wind direction and the hour of day in which blasting occurs.

To do this, time series were extracted from the separate model runs conducted for blasting during each hour of day between 9am and 5pm at the location of each receptor. Model results indicated that dust generally dispersed during the hour in which blasting occurred. To include maximum model predictions in the analysis, the maximum 1-hour concentration predicted at each receptor during each day was calculated and assigned to the hour of blasting. A single time series was then generated of the maximum of these 1-hr concentrations across all industrial receptor locations.

The resulting time series has then been examined using scatter plots to understand how concentrations vary with wind speed, direction and hour of day.

From this analysis, a set of preferred conditions has been identified to be met during the blasting hour in order to minimise potential dust impacts across these sensitive infrastructure areas. Following this, the model results at the nominated off-site receptor locations have been analysed to understand how impacts at these locations would vary if these preferred blasting conditions were met. Finally, the frequency of these preferred blasting conditions has been determined for each month of the year to provide context that may assist blast scheduling.

TSP and $PM_{2.5}$ have not been analysed separately, as these concentrations will proportional to PM_{10} and will therefore show the same trends with wind speed, direction and hour of day.

8.1 PREFERRED CONDITIONS

8.1.1 CHIMNEY STACK DEMOLITION

8.1.1.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-1 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting. Key observations include:

- Highest particulate predictions occur under lighter wind conditions. This is typically the case, with stronger winds promoting dispersion.
- High particulate predictions occur under a range of wind directions, with the highest occurring under northerly winds, and winds from easterly and north-northwest directions also of note. During these wind directions, areas of the on-site infrastructure would be downwind of the blast site.
- Particulate predictions vary somewhat throughout the day, with the highest predictions occurring between 9 and 10am, and 4 to 5pm. This reflects typical diurnal variations in dispersion, with conditions overnight often being poorer than during the day as wind speeds typically strengthen during the day, stability reduces and inversion conditions, if present, subside.

Based on the above analysis, the following meteorological conditions ('preferred conditions') have been nominated that would remove the most significant particle concentrations:

- Wind speeds greater than 2 m/s (~4 knots); and
- Wind directions from the south through to the west north-west (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure area.

Figure 8-2 illustrates that completion of the blasting under the preferred conditions reduces the maximum 1-hour average particulate predictions by several orders of magnitude across the infrastructure areas.

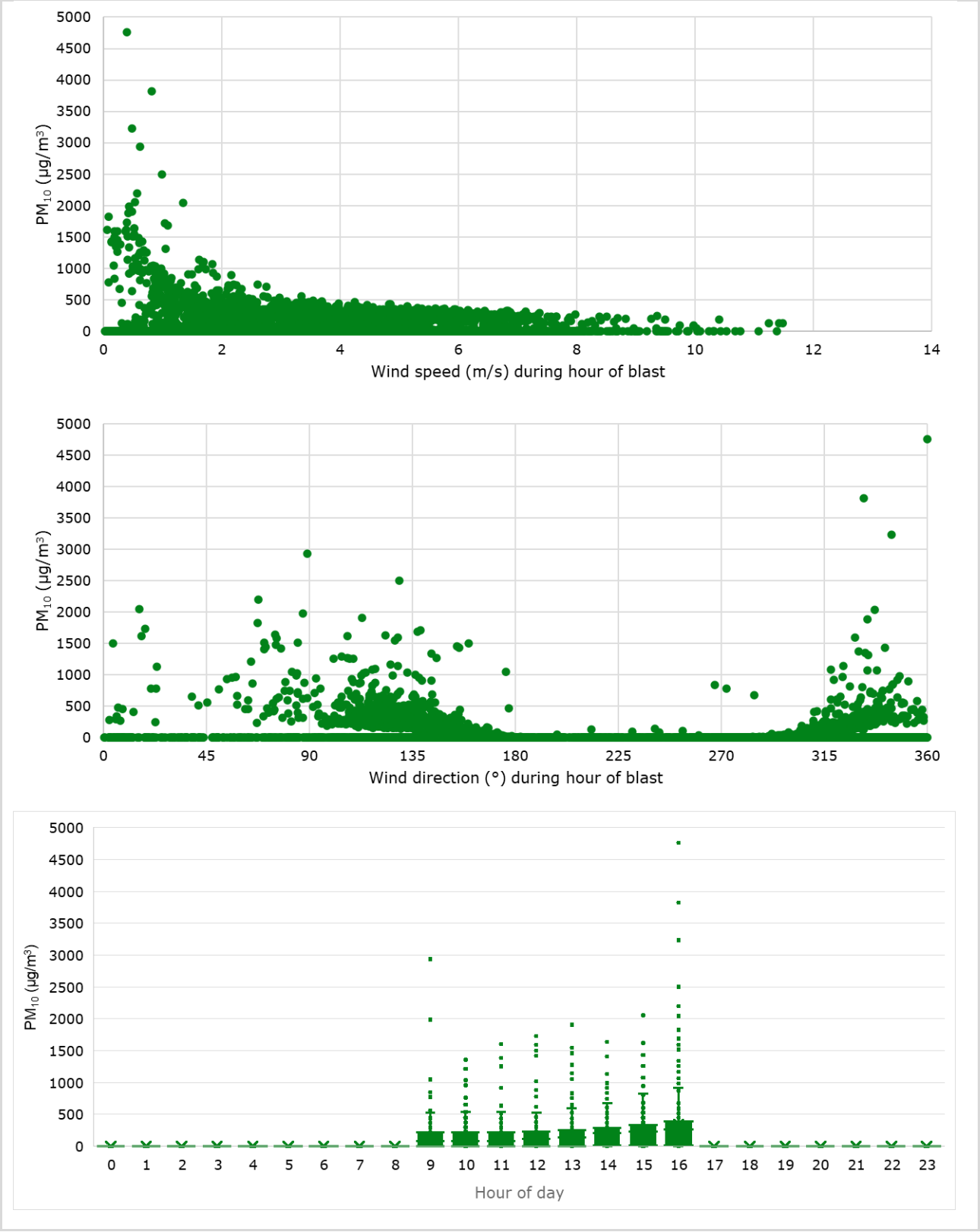


FIGURE 8-1 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

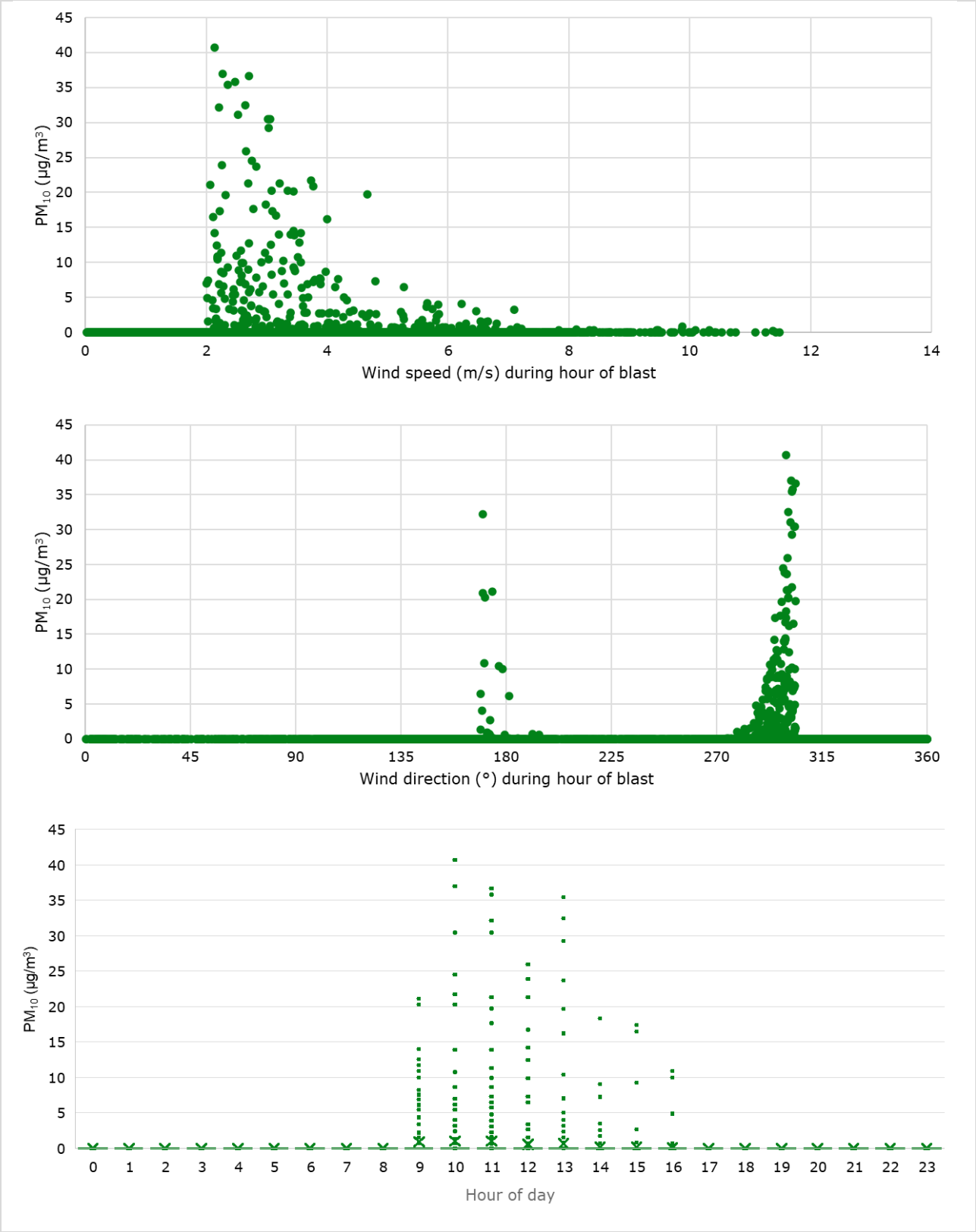


FIGURE 8-2 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

8.1.1.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-3 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. Particulate predictions are more scattered, with preferred wind directions less apparent. Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-4 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during hours with preferred meteorological conditions. This reduces the maximum dust concentrations by an order of magnitude.

Figure 8-5 to Figure 8-8 illustrate the maximum 1-hour and 24-hour average predicted PM_{10} and $PM_{2.5}$ concentrations across the model domain, for blasting occurring any hour between 9am and 5pm and for blasting only during hours with preferred meteorological conditions. Maximum 24-hour average PM_{10} concentrations at the off-site sensitive receptor locations to the north and east of Lake Liddell are approximately 5-10 µg/m^3 during preferred conditions. For comparison, the typical ambient air quality assessment criteria for 24-hour average PM_{10} concentrations is 50 µg/m^3 which is used to assess the total concentration inclusive of contributions from all dust sources in an airshed. This report is not a compliance assessment, however, the predicted model results indicate that suitable dust management measures during blasting will assist in significantly reducing the contribution that blasting has on the airshed.

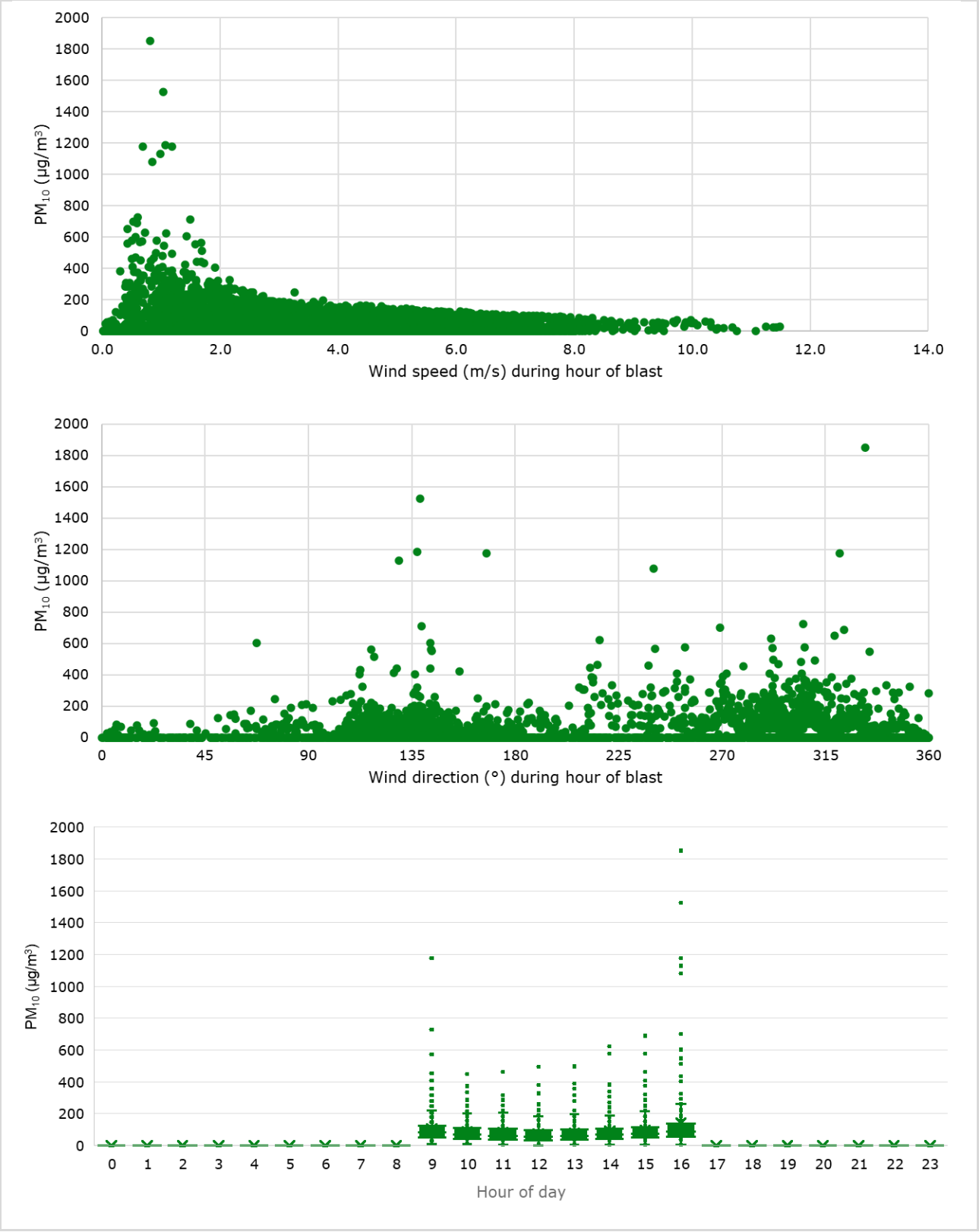


FIGURE 8-3 STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)



FIGURE 8-4 STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

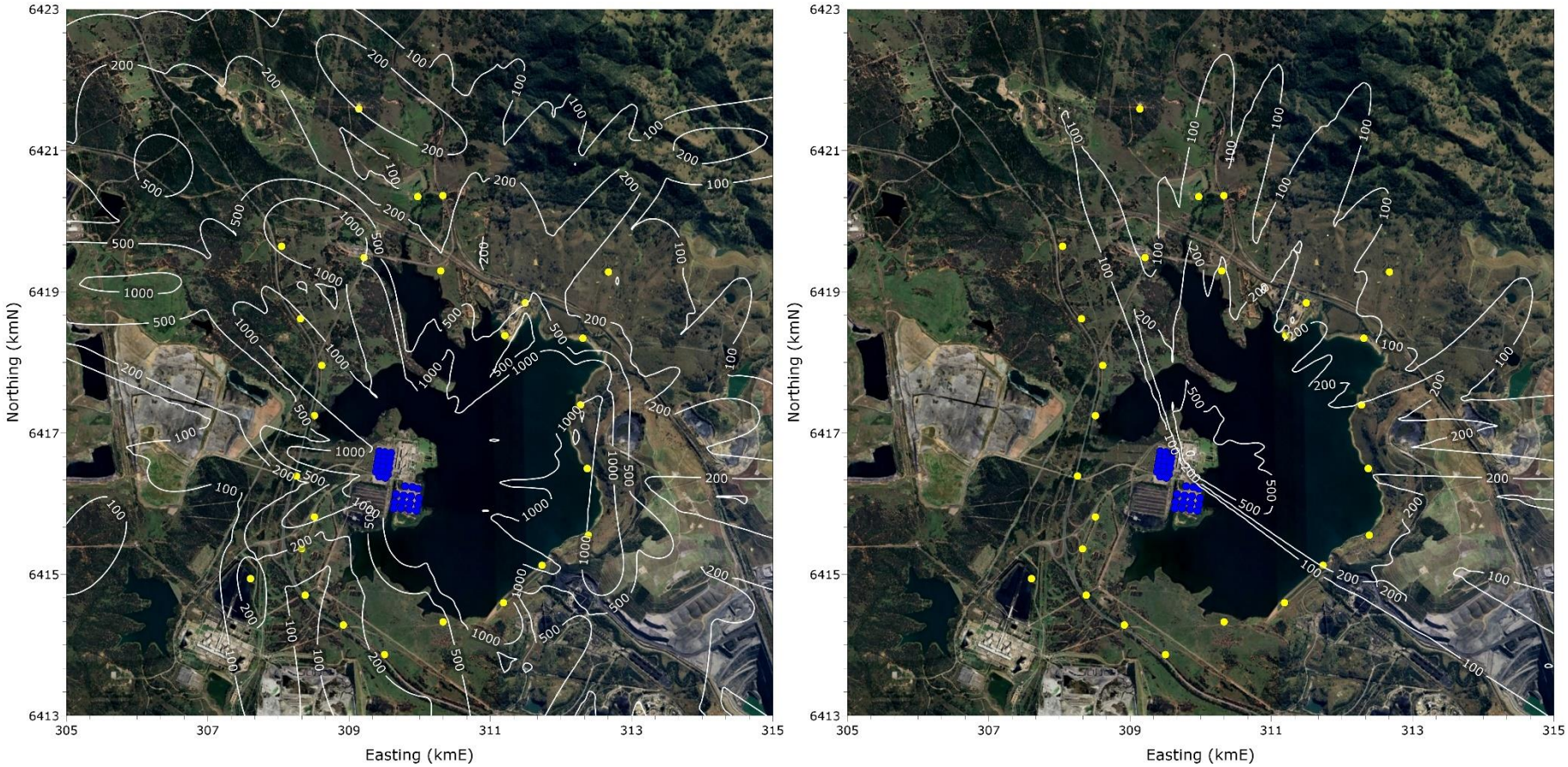


FIGURE 8-5 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu g/m^3$) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

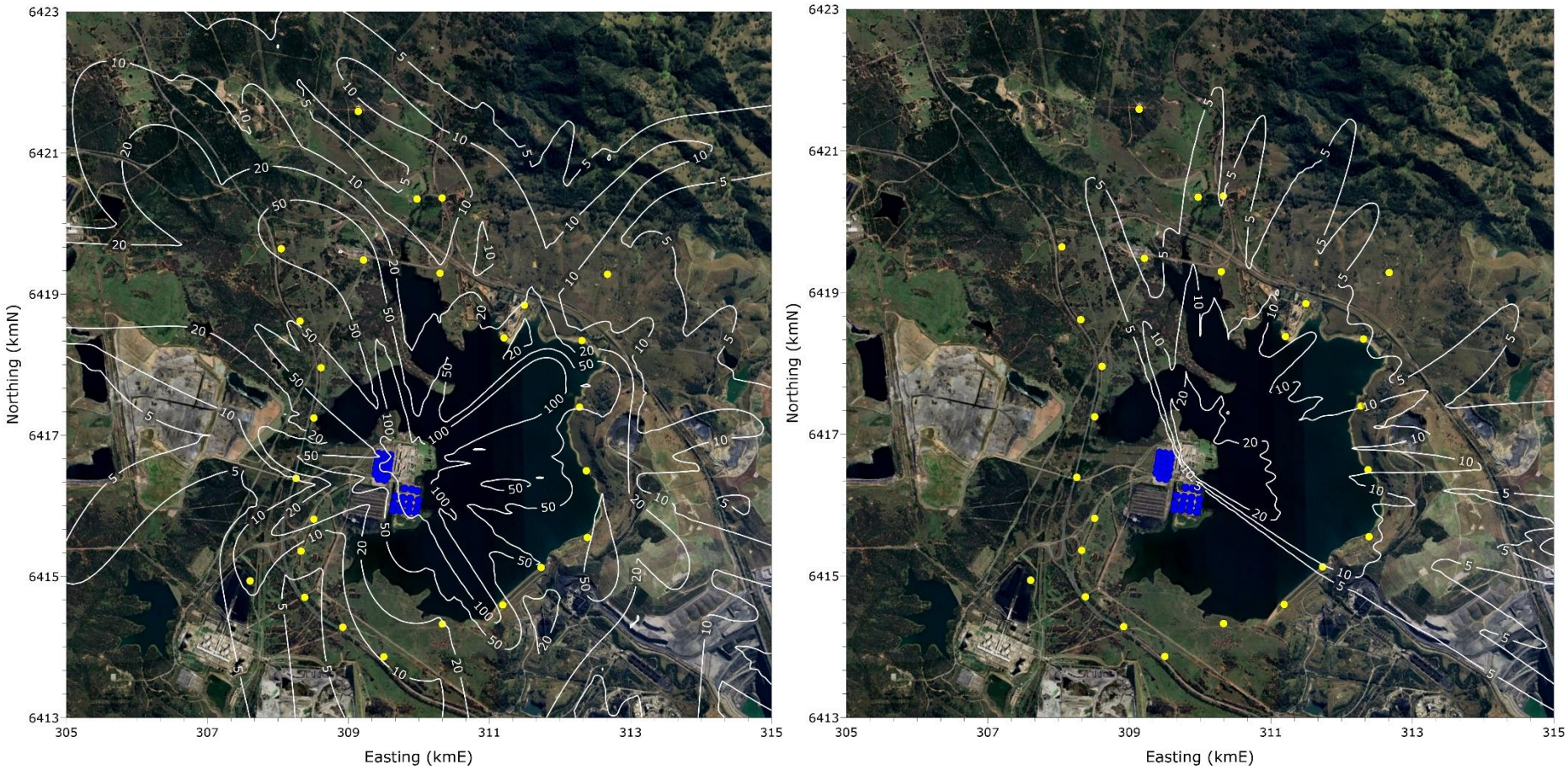


FIGURE 8-6 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} (µg/m^3) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

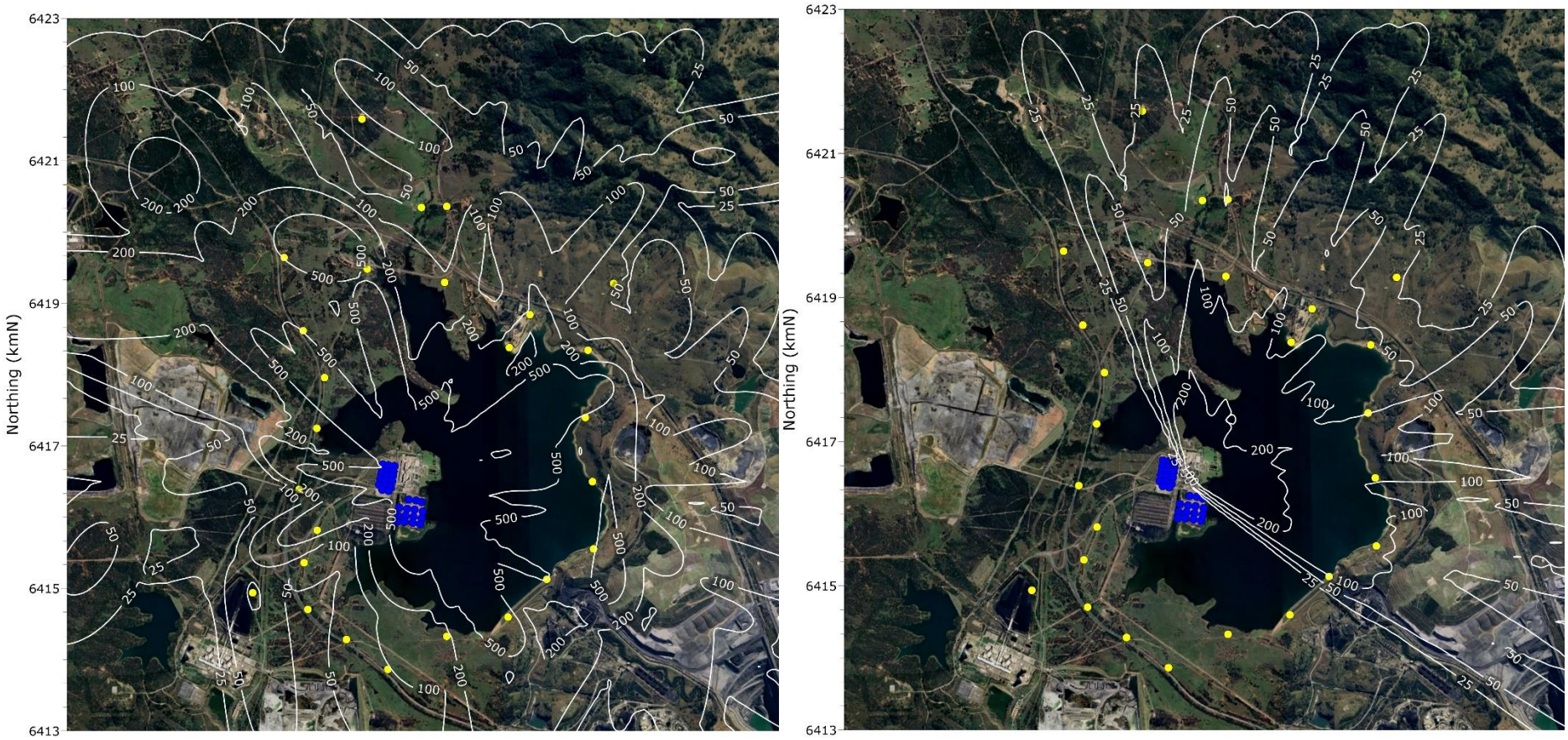


FIGURE 8-7 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

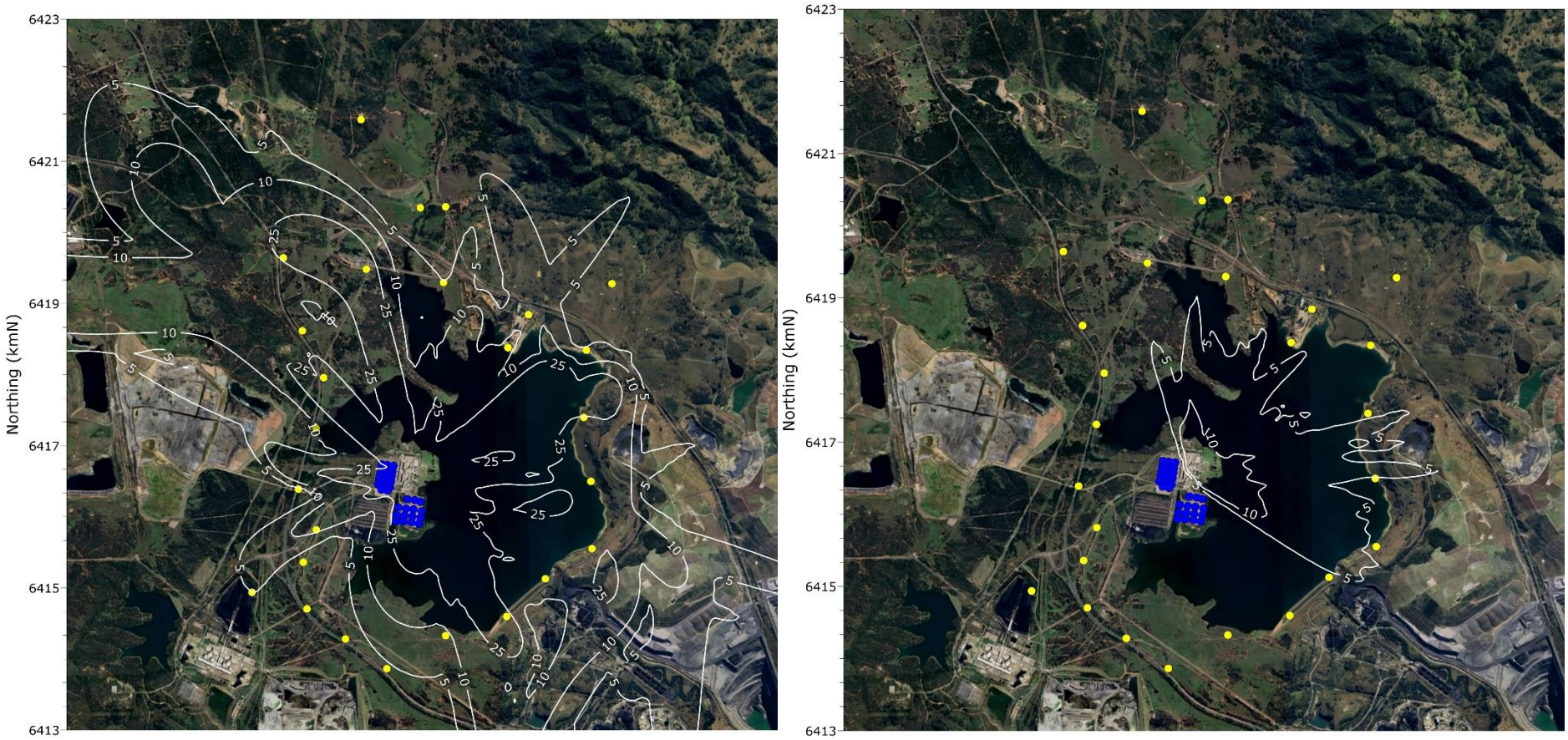


FIGURE 8-8 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

8.1.1.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-9 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. These show:

- The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts may occur under a wide range of wind speeds
- There is a clear variation with wind direction, with southeasterly and northwest to northerly directions resulting in higher deposition rates.
- A gradual increase in deposition rates with time of day.

Figure 8-10 presents the maximum deposition rates if blasting occurred only during hours with the previously identified preferred meteorological conditions. This illustrates that despite deposition rates showing a different behaviour with respect to wind speed compared with particulate concentrations, applying the wind speed and direction restrictions significantly reduces the predicted deposition rates. Based on these preferred conditions, the highest deposition rates are predicted to occur under south-southeasterly winds.

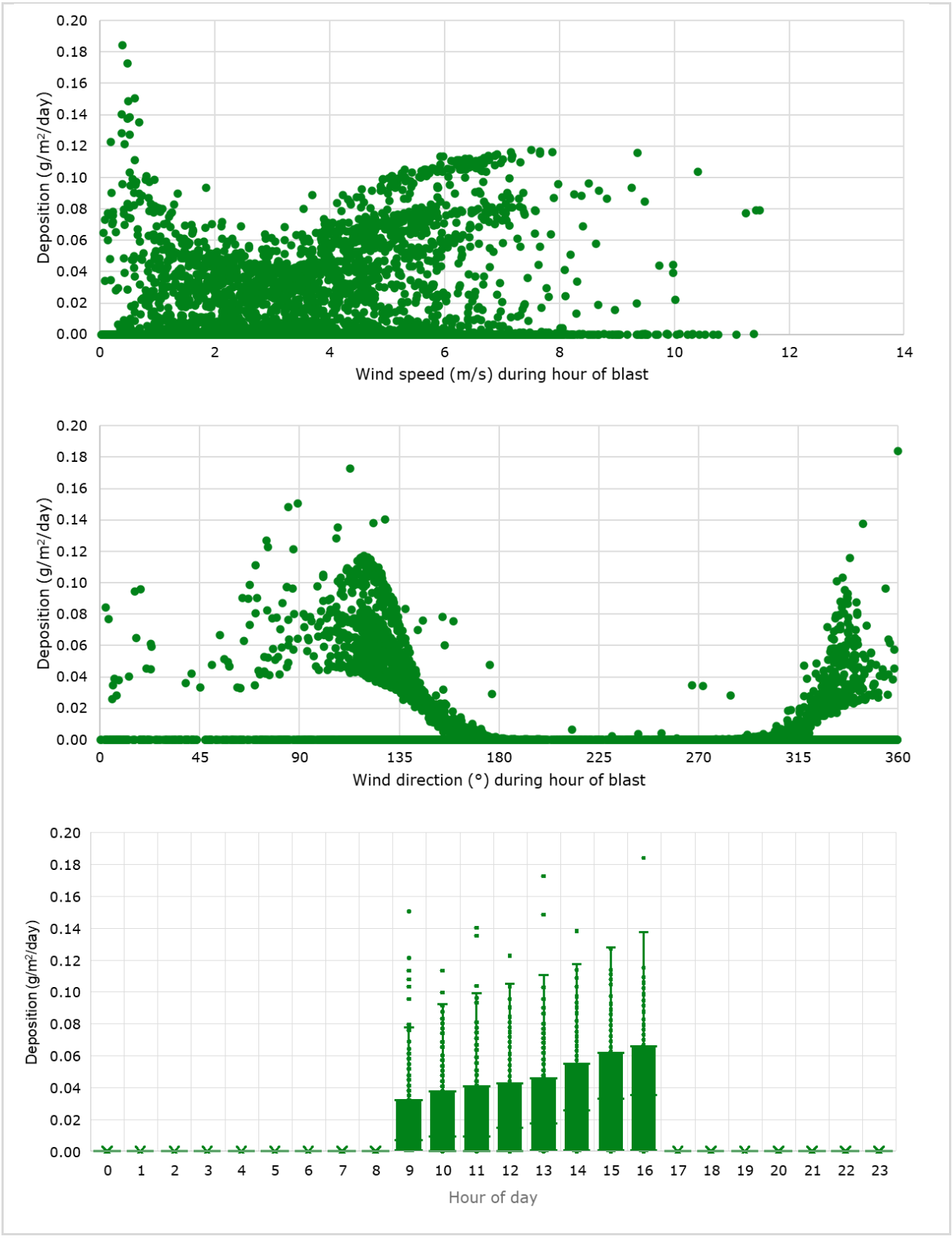


FIGURE 8-9 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

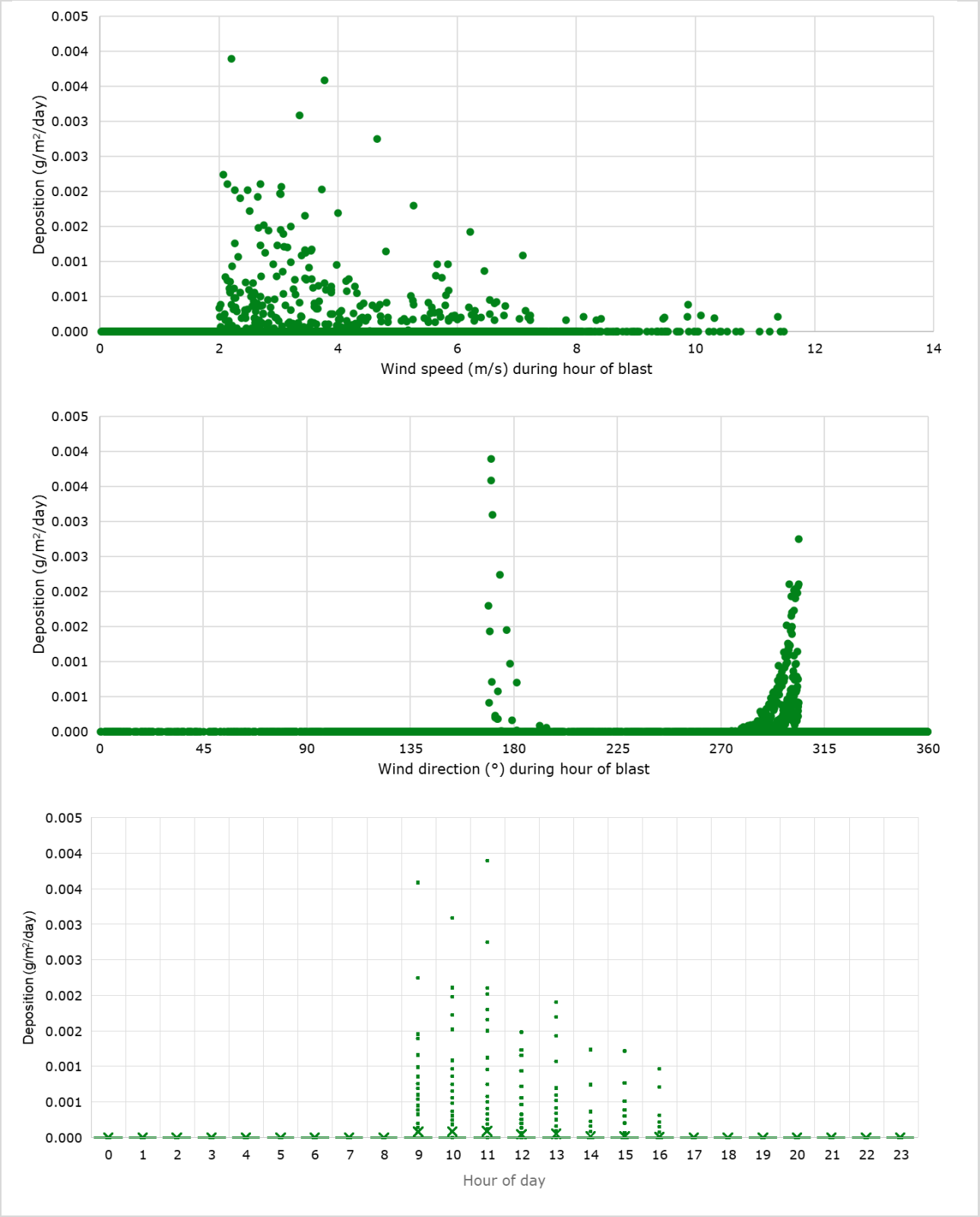


FIGURE 8-10 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.1.4 DEPOSITION RATES ACROSS THE WIDER DOMAIN

Figure 8-11 illustrates variations in predicted deposition rates at the selected receptors in the wider area with wind speed, direction and hour of day. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area;
- Minimal variation with wind speed;
- Higher deposition rates during some southeasterly winds, and north-northwesterlies, however the wind direction dependence is not as strong as at on-site receptor locations
- Minimal variation with hour of day.

Figure 8-12 presents the predicted deposition rates at these locations due to blasting occurring only during hours when the preferred meteorological conditions occur. As with the infrastructure receptors, this removes some of the highest predicted deposition rates at the discrete receptor locations further afield. Predicted deposition rates at the selected sensitive receptors are higher than predictions at the infrastructure receptors during preferred conditions.

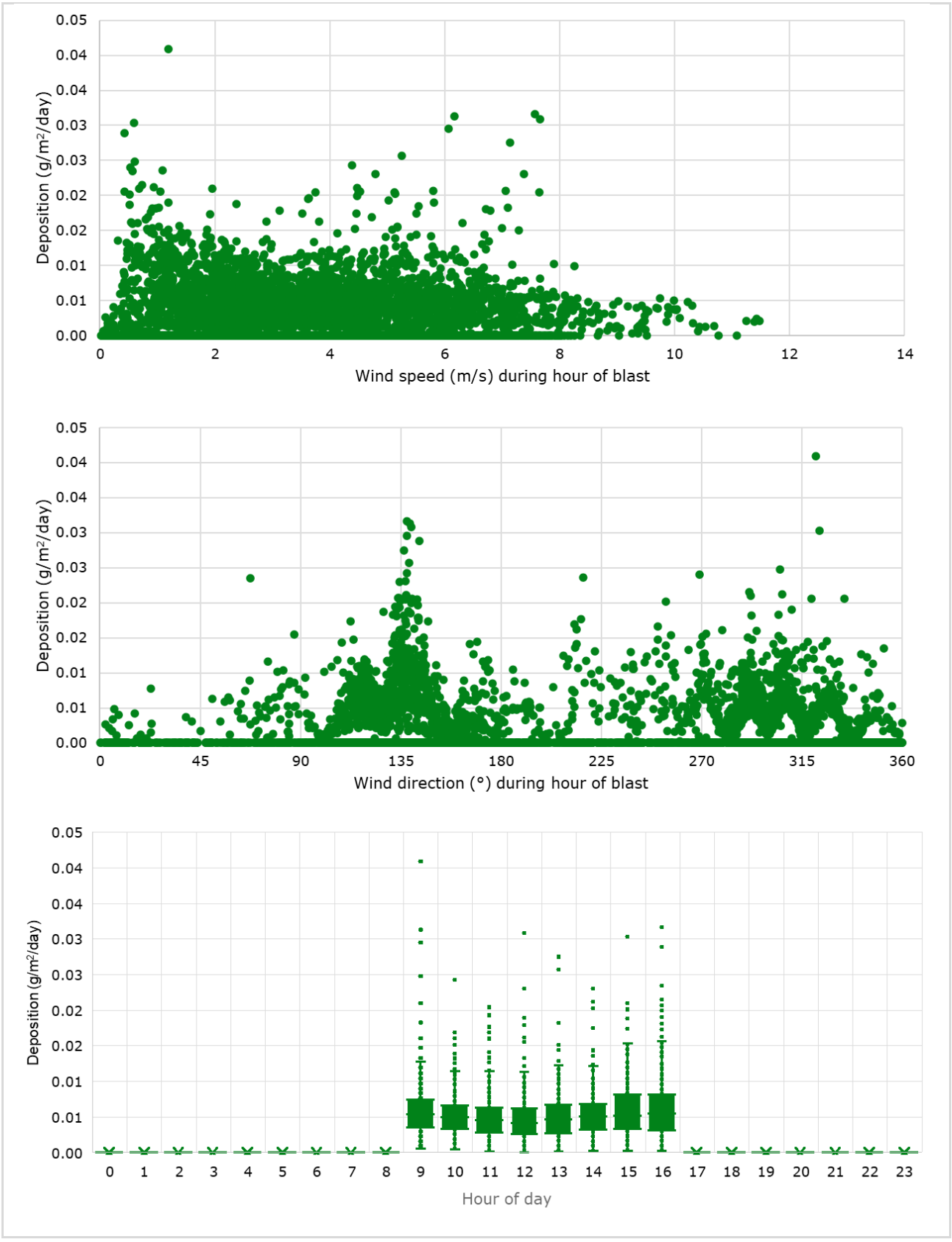


FIGURE 8-11 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

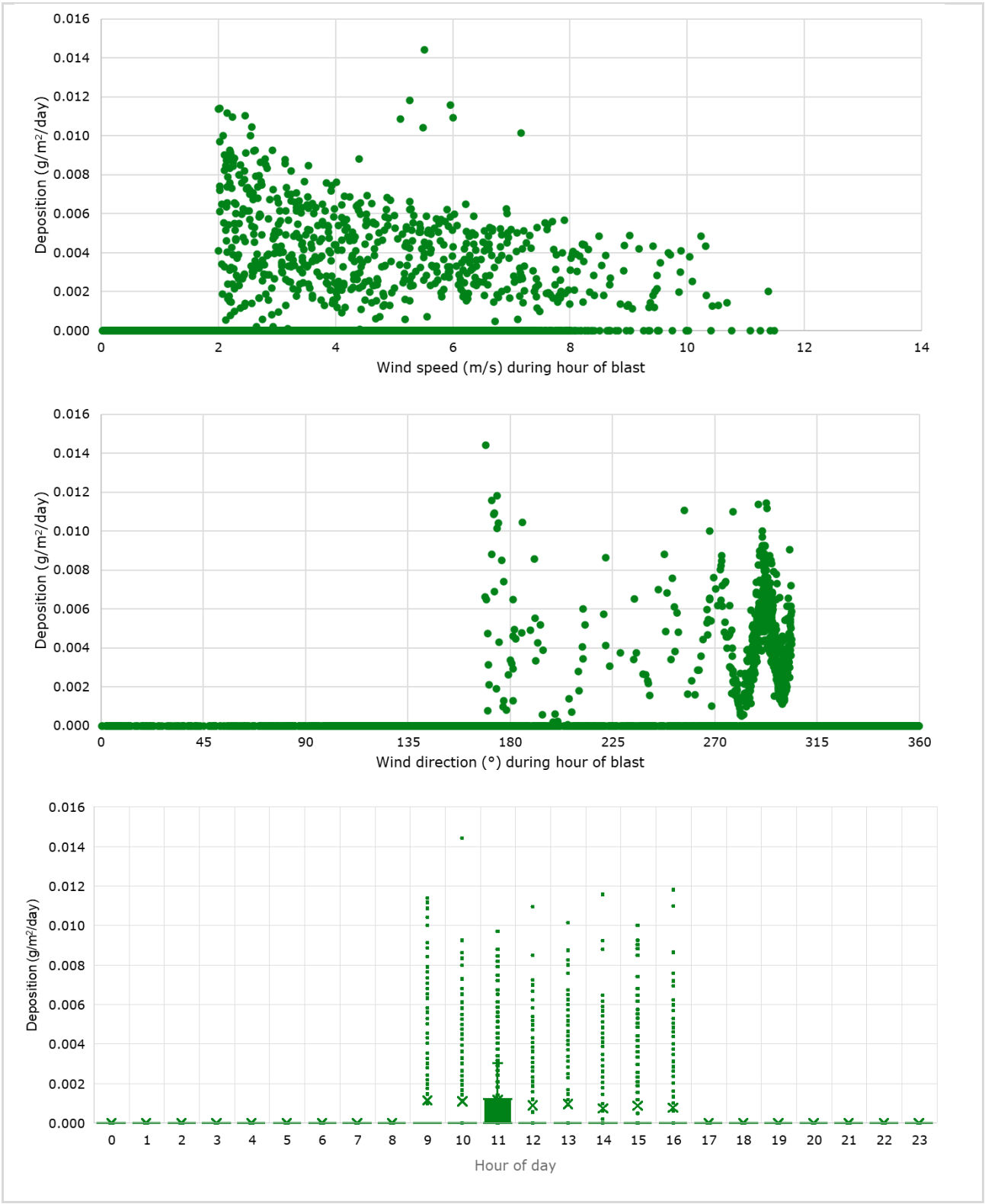


FIGURE 8-12 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.2 BOILER HOUSE DEMOLITION

8.1.2.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-13 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting for the boiler house demolition modelling. Key observations align with those for the chimney stack demolition, i.e.:

- Highest particulate predictions occur under lighter wind conditions;
- High particulate predictions occur under a range of wind directions, with the highest occurring under northerly winds, and winds from easterly and north-northwest directions also of note. During these wind directions, areas of the on-site infrastructure would be downwind of the blast site.
- Particulate predictions vary somewhat throughout the day, with the highest predictions occurring between 9 and 10am, and 4 to 5pm.

It is noted that particulate predictions due to the boiler house demolition are higher overall than those predicted for the chimney demolition, and remain comparatively high over a range of wind speeds.

Figure 8-14 illustrates that completion of the blasting under the preferred conditions identified in Section 8.1 reduces the maximum 1-hour average particulate predictions at the infrastructure receptors considerably, but not to the same extent as was seen in the stack demolition modelling. To further minimise potential dust impacts, preferred wind directions could be narrowed further.

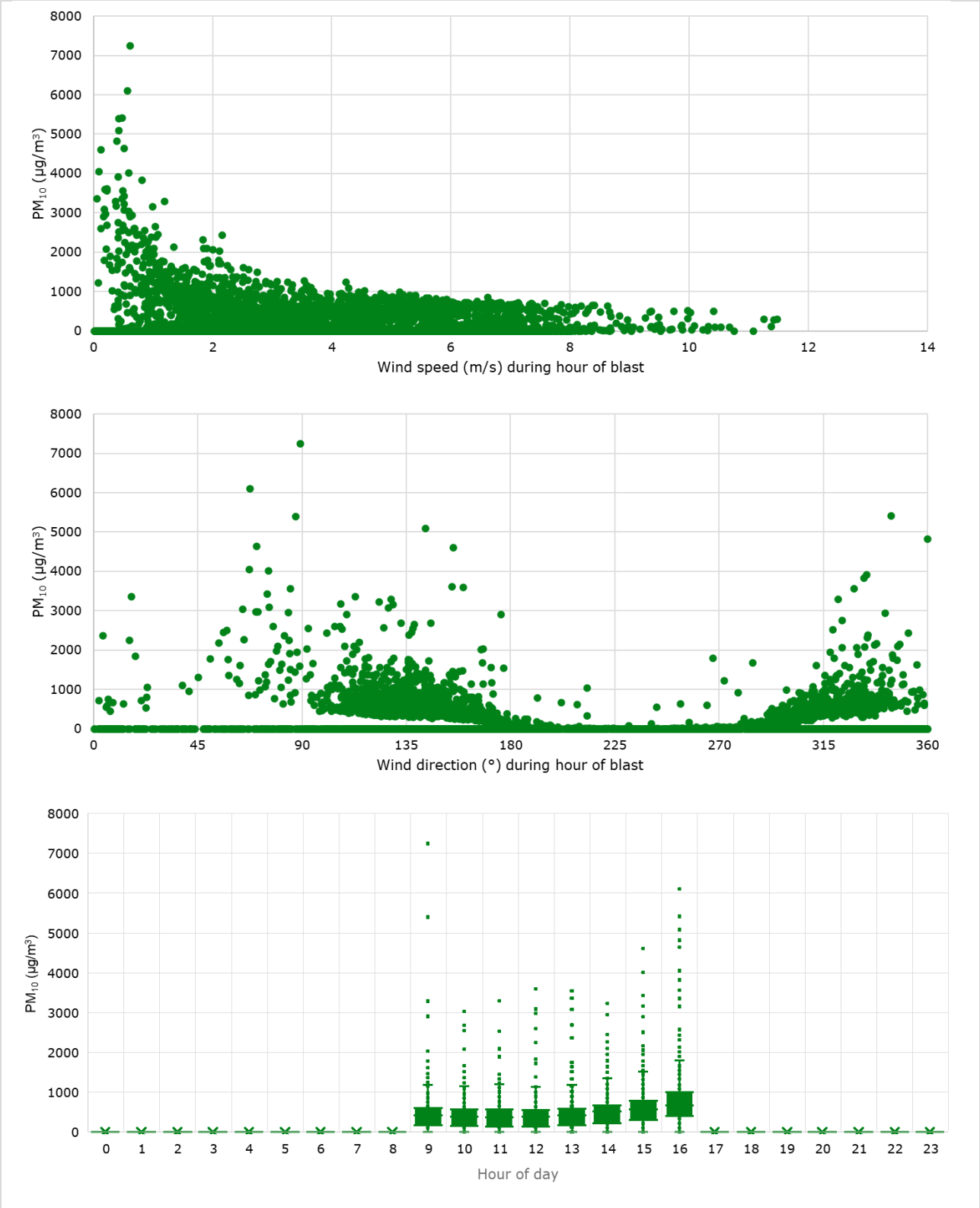


FIGURE 8-13 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

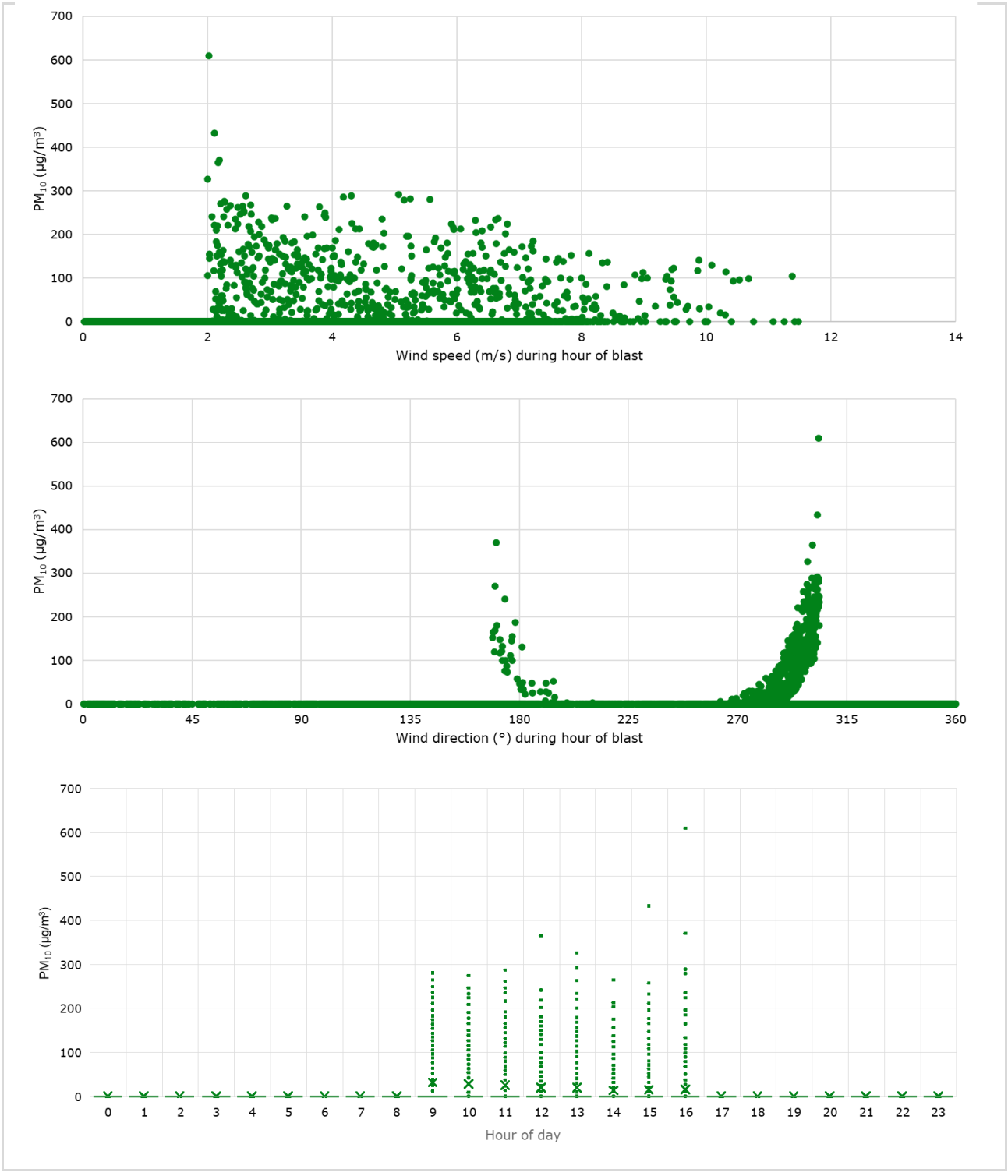


FIGURE 8-14 BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

8.1.2.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-15 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. As for the chimney stack demolition modelling, particulate predictions are more scattered compared with predictions at the infrastructure receptors, with preferred wind directions less apparent. Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-16 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during hours with preferred meteorological conditions. This reduces the maximum dust concentrations by an order of magnitude.

Figure 8-17 to Figure 8-20 illustrate the maximum 1-hour and 24-hour average predicted PM_{10} and $PM_{2.5}$ concentrations across the model domain, for blasting occurring any hour between 9am and 5pm and for blasting only during hours with preferred meteorological conditions. Maximum predictions at sensitive receptor locations on the north and eastern side of Lake Liddell reduce somewhat, however, predictions across the infrastructure area are reduced significantly.

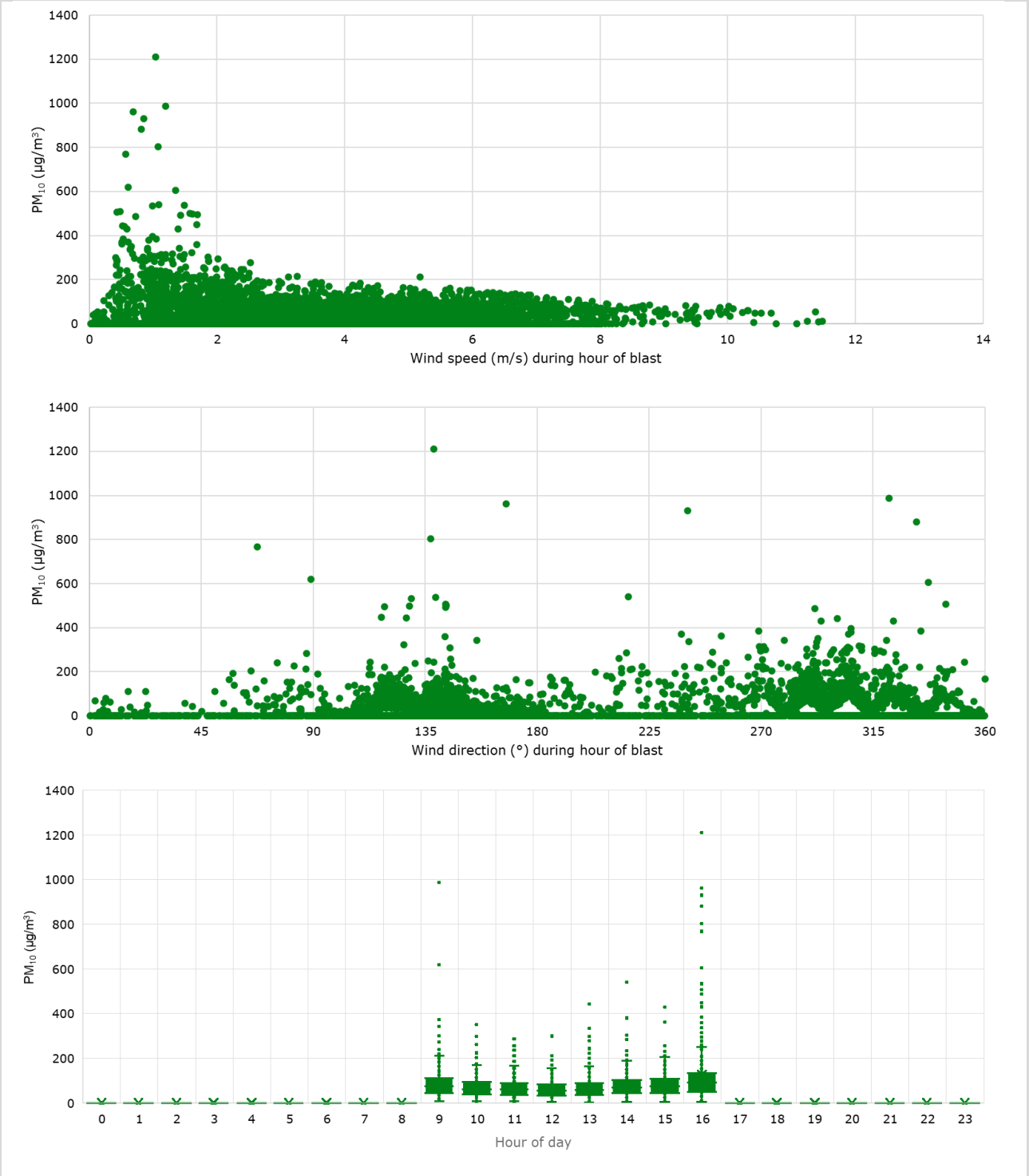


FIGURE 8-15 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)



FIGURE 8-16 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

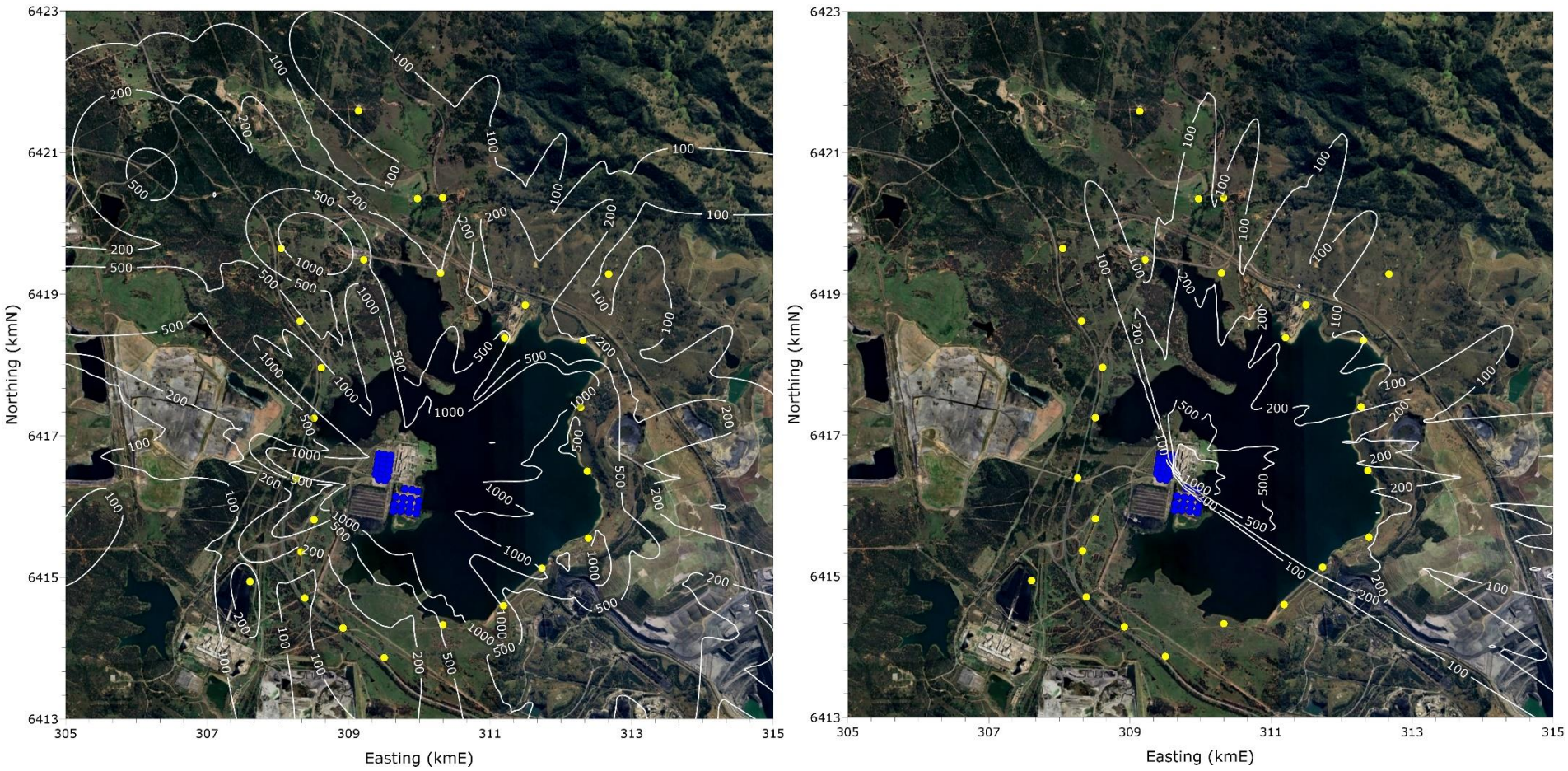


FIGURE 8-17 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

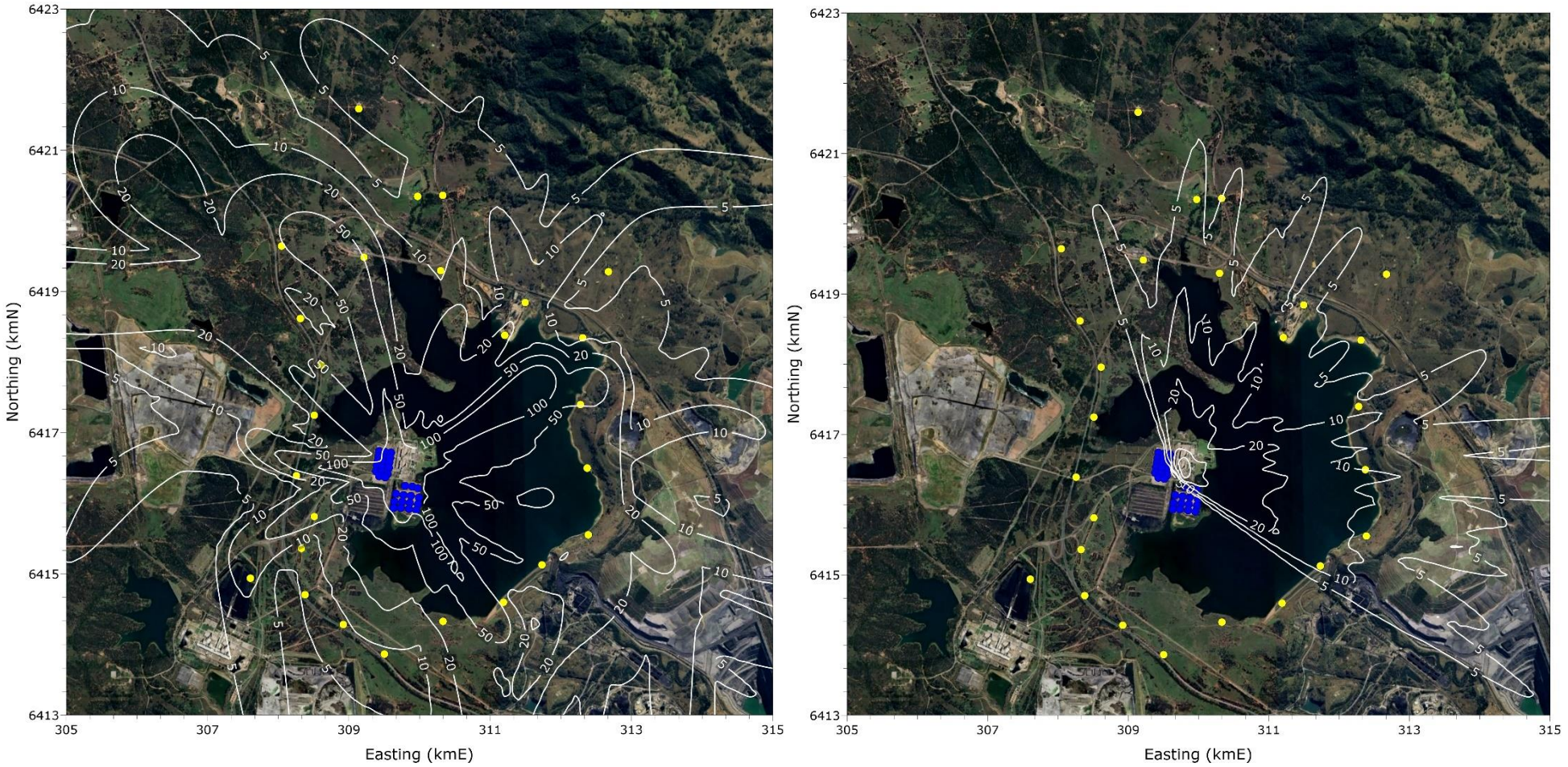


FIGURE 8-18 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

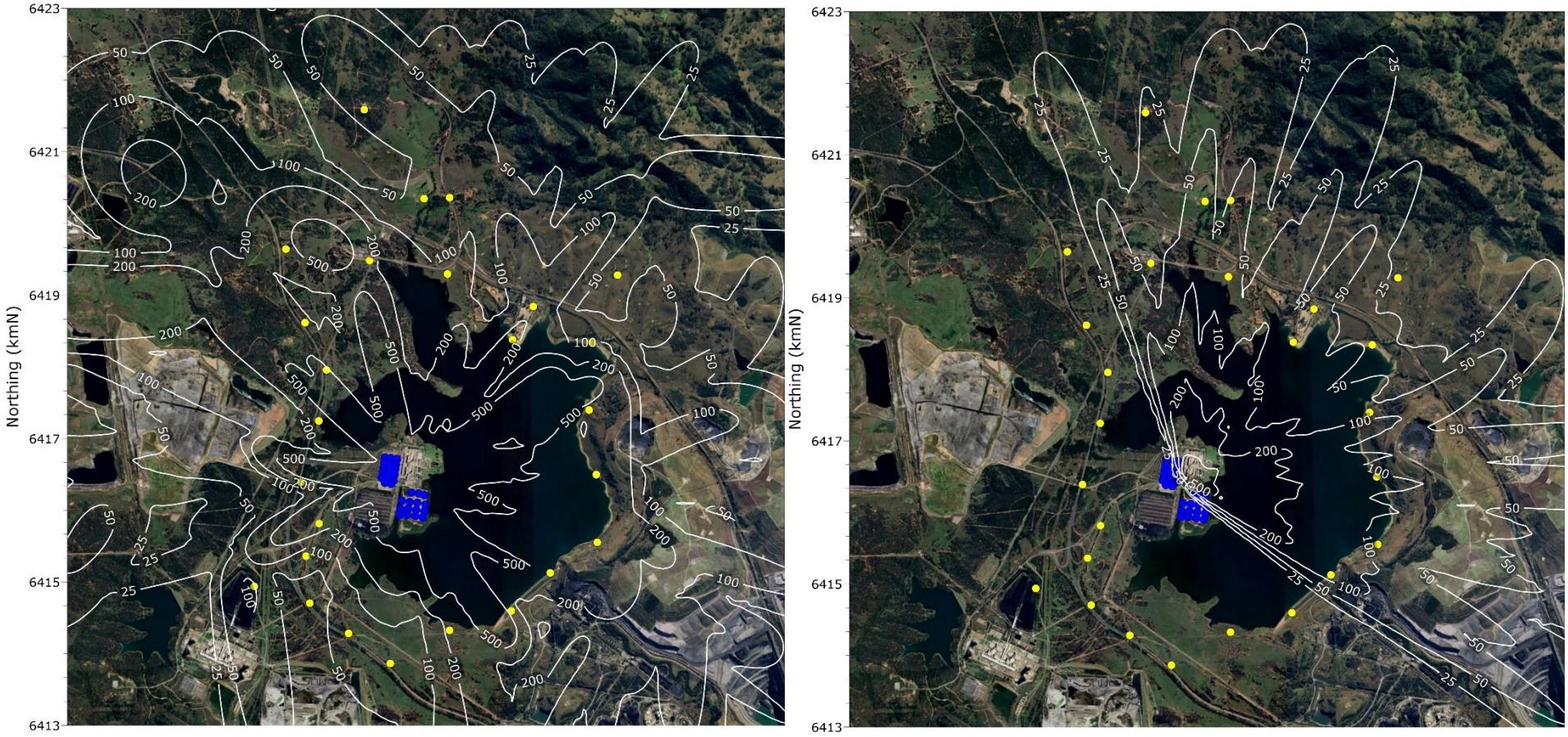


FIGURE 8-19 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

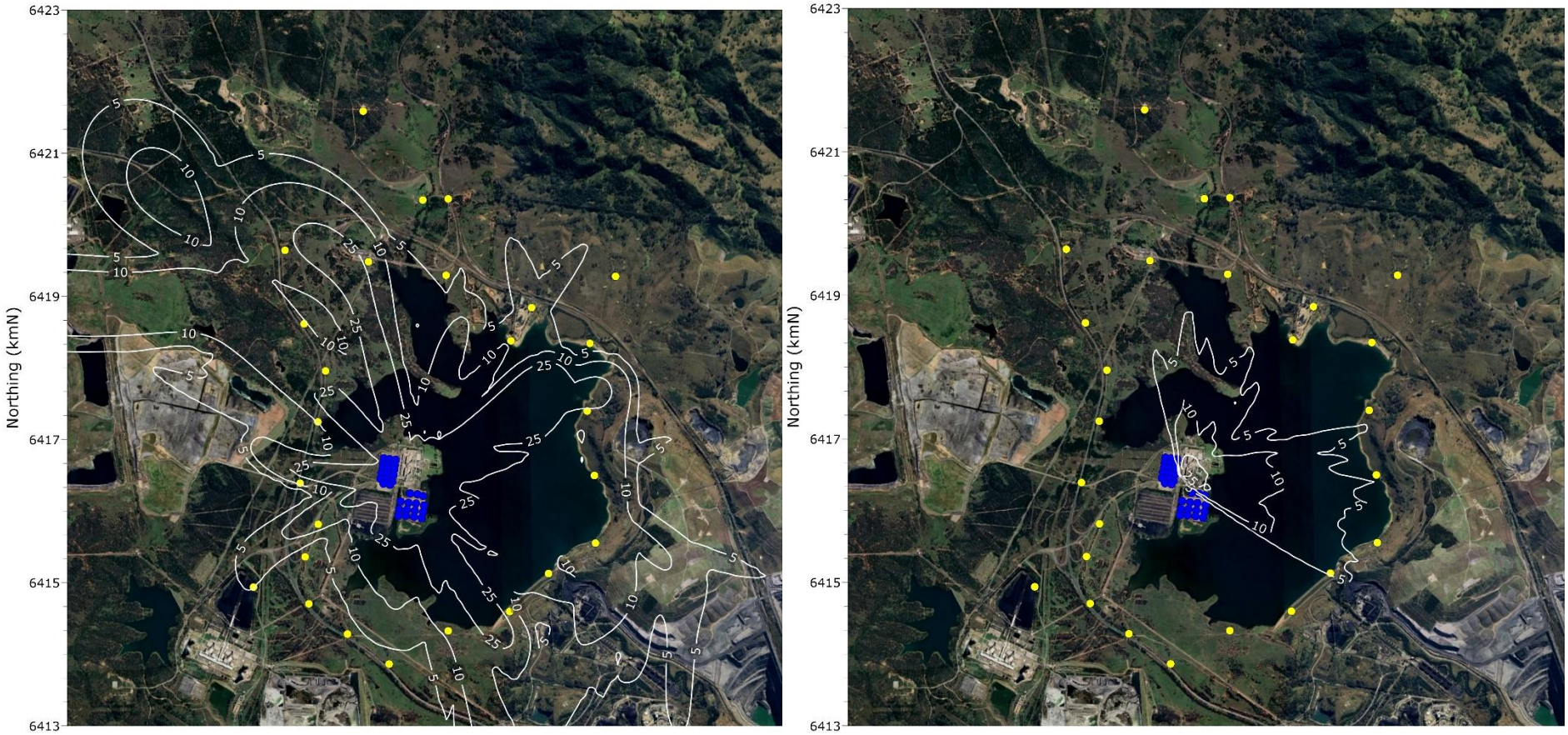


FIGURE 8-20 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

8.1.2.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-21 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. These show:

- The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts occur under a wide range of wind speeds
- There is a clear variation with wind direction, with southeasterly and northwest to northerly directions resulting in higher deposition rates.
- A gradual increase in deposition rates with time of day.

Figure 8-22 presents the maximum deposition rates if blasting occurred only during hours with the previously identified preferred meteorological conditions. This illustrates that despite deposition rates showing a different behaviour with respect to wind speed compared with particulate concentrations, applying the wind speed and direction restrictions significantly reduces the predicted deposition rates by an order of magnitude. To further minimise dust deposition across the infrastructure area, the preferred wind direction range could be further narrowed.



FIGURE 8-21 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

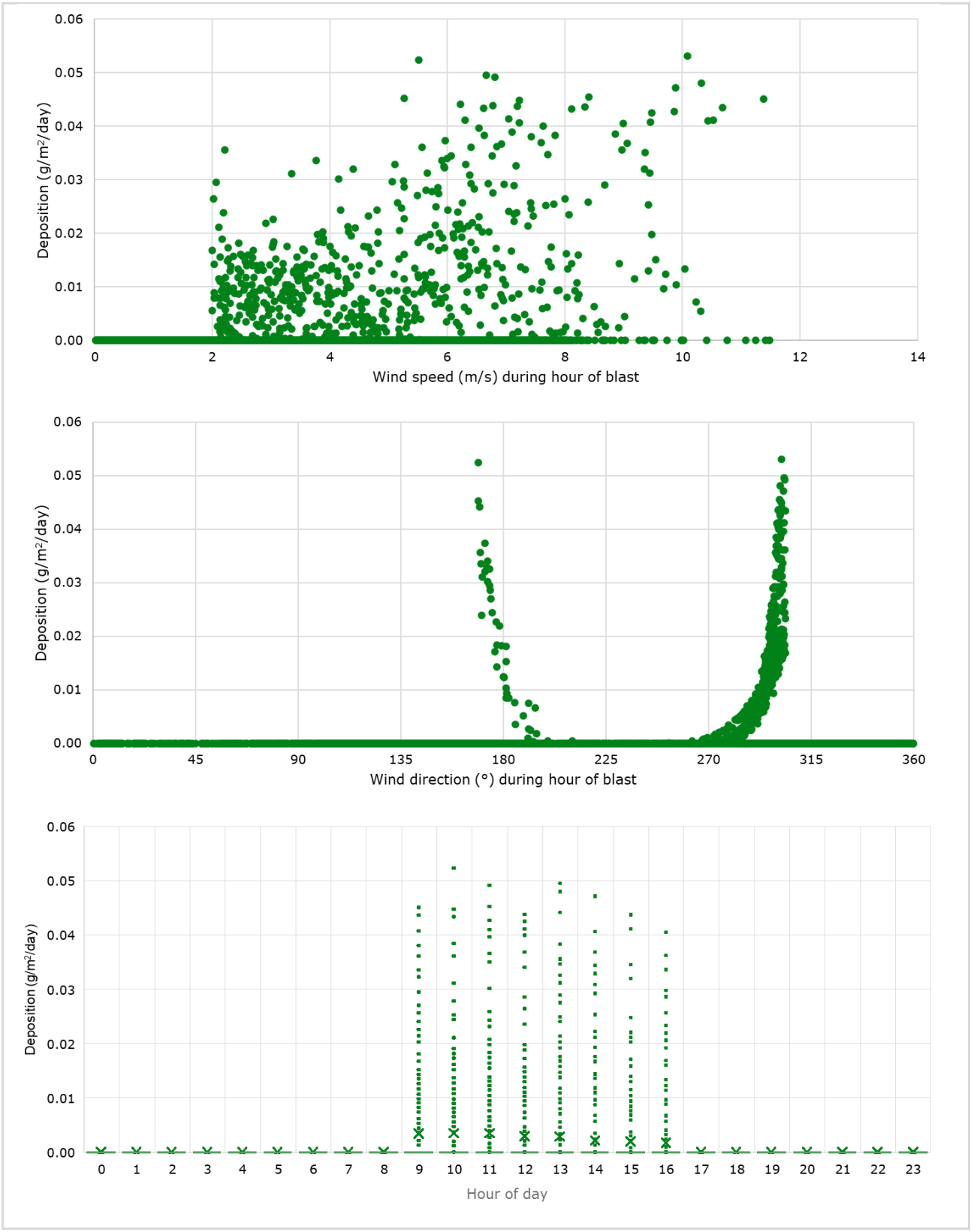


FIGURE 8-22 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.2.4 DEPOSITION RATES ACROSS THE WIDER AREA

Figure 8-23 illustrates variations in predicted deposition rates at the selected receptors in the wider area with wind speed, direction and hour of day. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area; and
- Minimal variation with wind speed, wind direction or hour of day.

Figure 8-24 presents the predicted deposition rates at these locations due to blasting occurring only during hours when the preferred meteorological conditions occur. As with the infrastructure receptors, this removes some of the highest predicted deposition rates at the discrete receptor locations further afield.

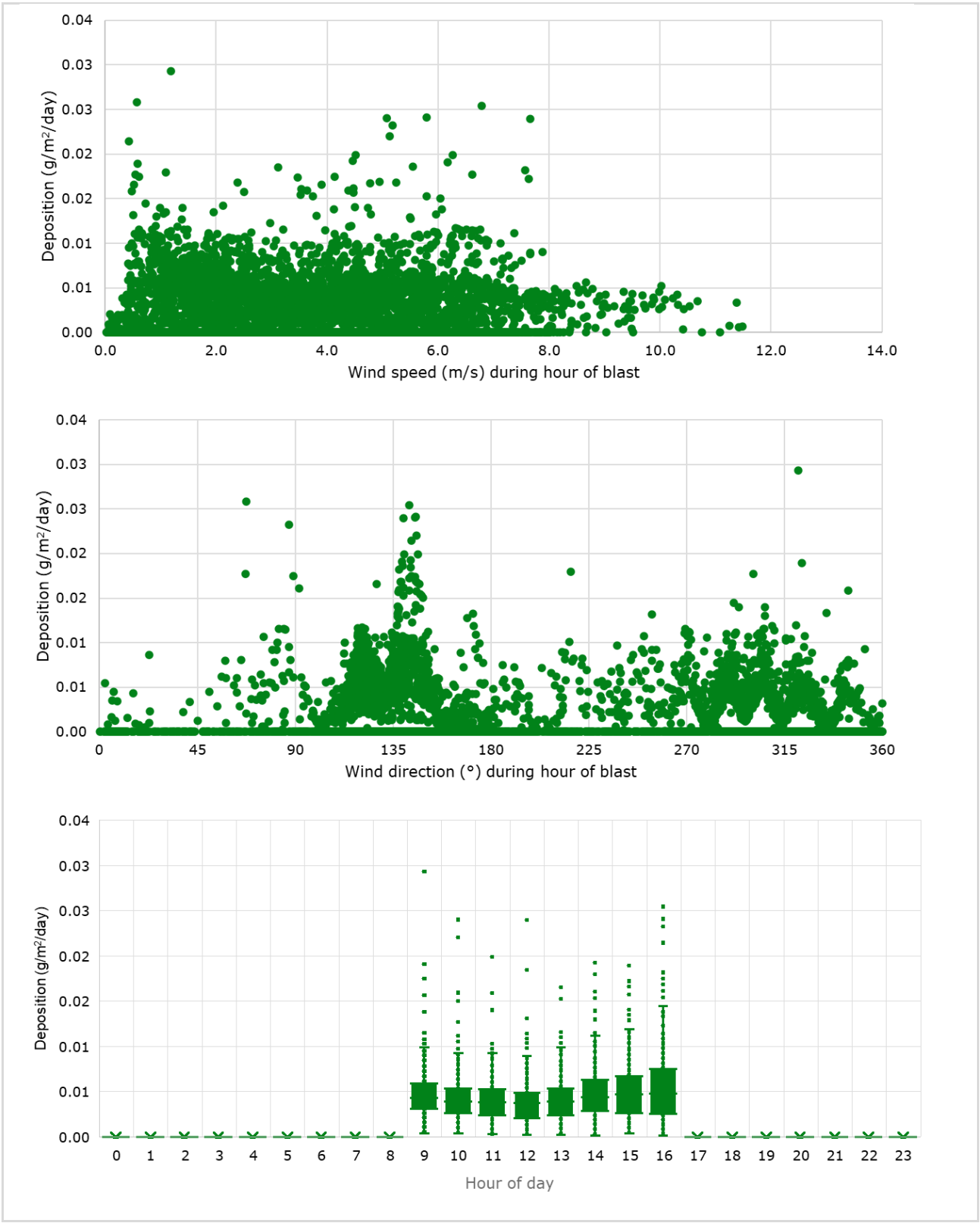


FIGURE 8-23 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)



FIGURE 8-24 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.3 PREFERRED METEOROLOGICAL CONDITIONS FOR DEMOLITION

It is anticipated that blasting of the chimneys will take place between February and May 2026 with blasting of the boiler houses to occur later in the year. The intended blast time is to be 13:30 although this is dependent upon the prevailing weather conditions and site requirements (WI, 2025).

Based on the dispersion modelling analysis, demolition activities are recommended to be conducted when winds are greater than 2 m/s and originate from the southerly and westerly sectors, specifically for winds from the:

- South;
- South-southwest;
- South-west;
- West-southwest;
- West; and
- West-northwest.

Winds from these directions will promote the dispersion of dust emissions towards the north and east, over Lake Liddell and away from sensitive receptors including on-site infrastructure.

Figure 8-25 presents the number of hours per day during 2020 that these preferred meteorological conditions were predicted within the modelling dataset. The frequency of preferred conditions is higher during the autumn and winter months, with fewer occasions present in spring and summer.

Table 8-1 presents the number of days each month on which preferred conditions were predicted for each blast hour. Figure 8-26 presents this data visually. Frequencies of preferred conditions are generally higher during the months of April to August, and reduce slightly in the late afternoon. The highest frequency of preferred conditions per month occur during August between 11am and 1pm. April to June have a slightly higher frequency of preferred conditions for blasting between 9am to 11am.

Additional considerations for blast planning include:

- Dispersion modelling results for blasting at 9am and 4pm indicate that dust from blasting disperses within one hour. However, it would be prudent to plan blasting for a time when preferred meteorological conditions are expected to remain and shifts in wind speed or direction are not likely for a few hours after blasting.
- It is also suggested that whilst a wind speed threshold has been defined, it may also be prudent to aim to blast during the middle hours of the day to assist in avoiding periods of poor dispersion in the early morning or evening such as stable conditions or inversions.
- Selection of wind speed trigger:
    - Evaluation of the meteorological field generated by WRF/CALMET identified that while there was general consistency between the modelled meteorological patterns and those observed at the AGL on-site weather station, modelled wind speeds were on average, higher than those observed. The QQ-plot in Figure 8-27 illustrates this difference, with modelled wind speeds, on average, 1.7 times higher than observed.
    - This may need to be considered during the implementation of blast planning so that an appropriate wind speed threshold is selected.

- It is noted that based on aerial imagery, the AGL on-site weather station is sited with trees approximately 15-20m away in most directions. The Australian Standard AS/NZS 3580.14:2014 for Meteorological monitoring for ambient air quality monitoring applications notes that an anemometer should be distance from any obstruction by at least 10 times the height of the obstruction. This separation distance does not appear to be met, and is expected to produce a reduction in wind speeds in the vicinity of the weather station compared to those experienced in the wider area.
- Should the AGL on-site weather station be used to inform blasting decisions, further consideration of the siting influences would be required.

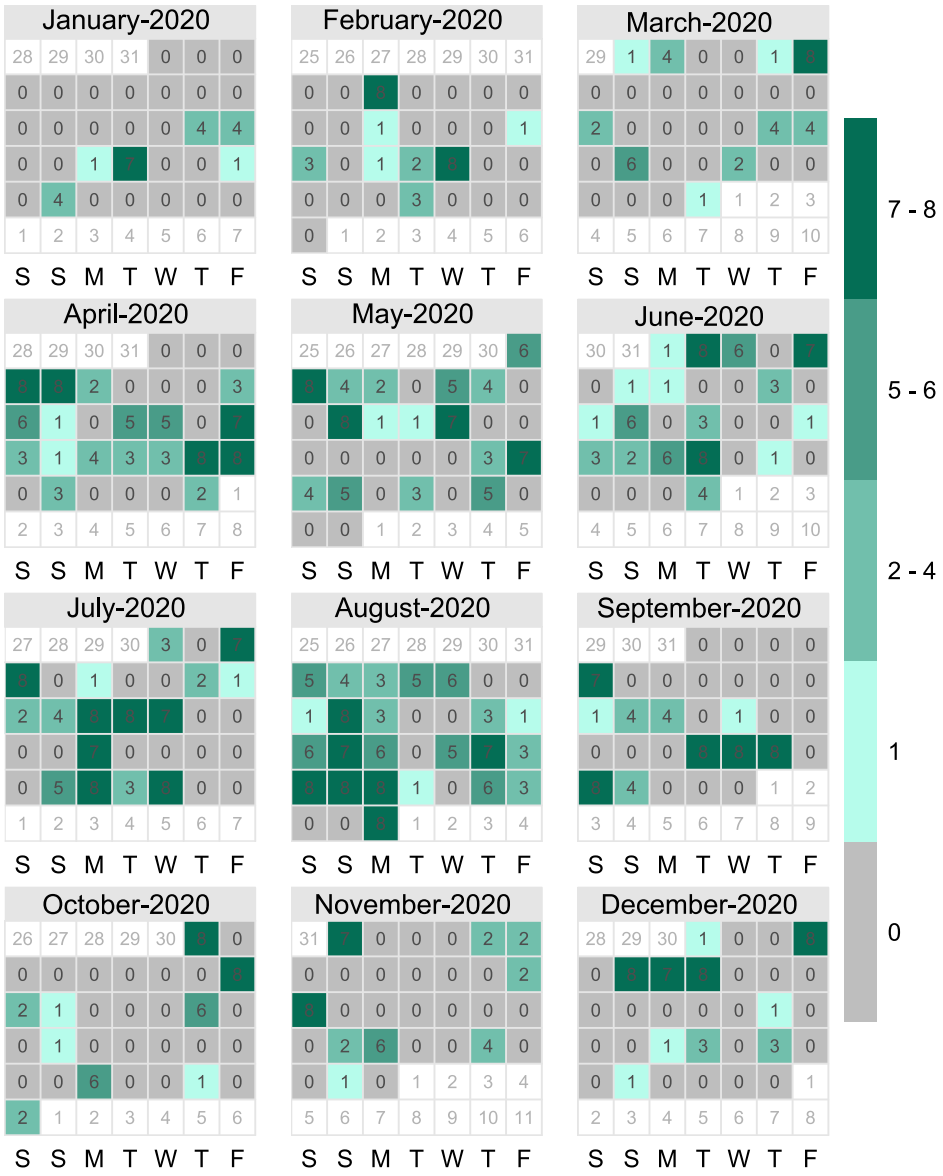


FIGURE 8-25 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF PREFERRED METEOROLOGICAL CONDITIONS BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET

TABLE 8-1 NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

Month	Hour of Blast							
	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm
January	1	2	5	4	4	2	1	2
February	6	4	4	3	3	2	2	3
March	3	4	3	3	5	5	5	5
April	13	13	12	8	10	9	9	6
May	13	11	11	11	8	8	6	5
June	11	10	9	7	6	5	7	7
July	9	11	13	11	11	10	10	7
August	10	13	18	18	16	14	14	12
September	7	8	7	7	8	6	6	4
October	6	4	4	4	4	4	4	5
November	3	6	4	5	5	3	4	4
December	5	4	5	5	4	4	6	8

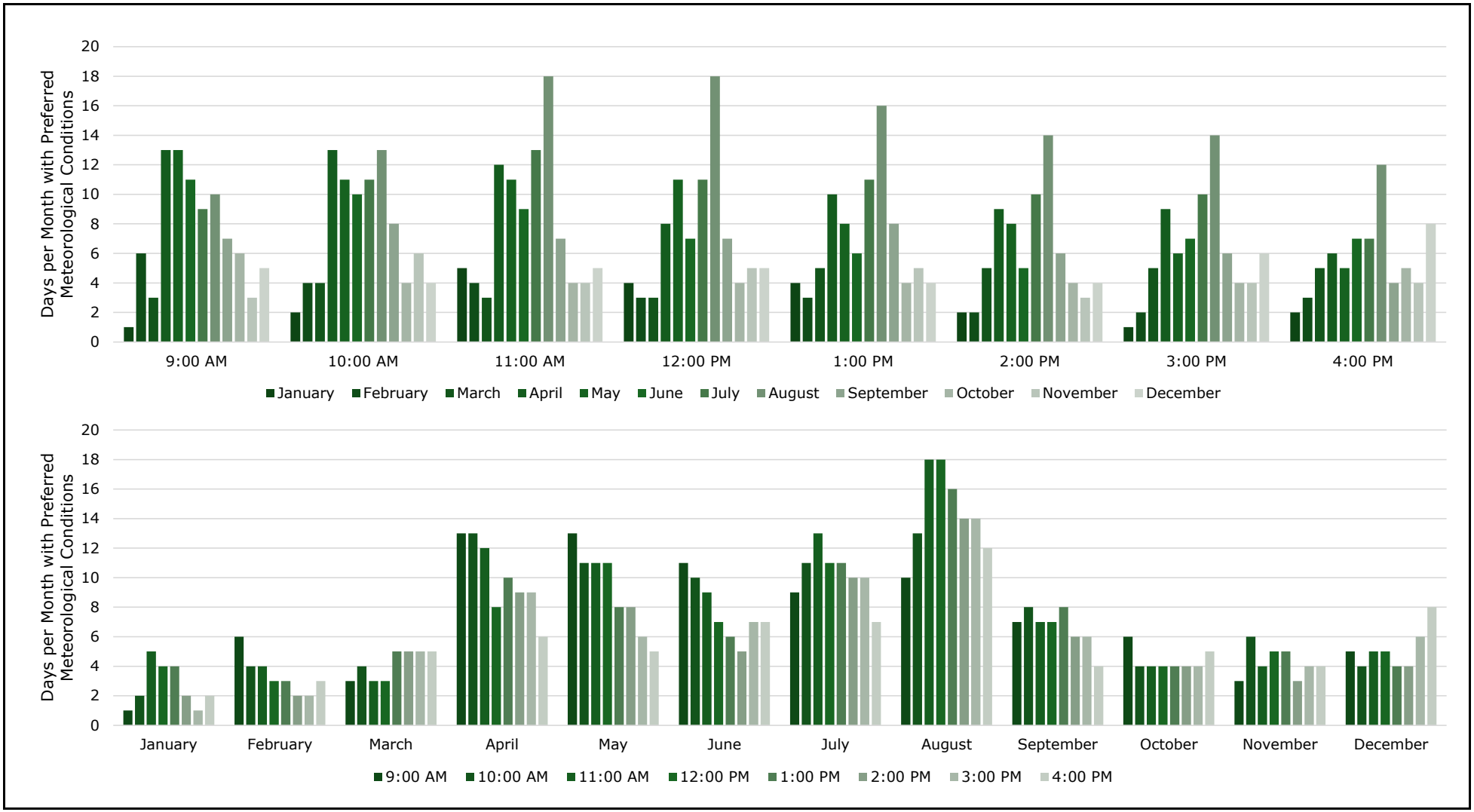


FIGURE 8-26 NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

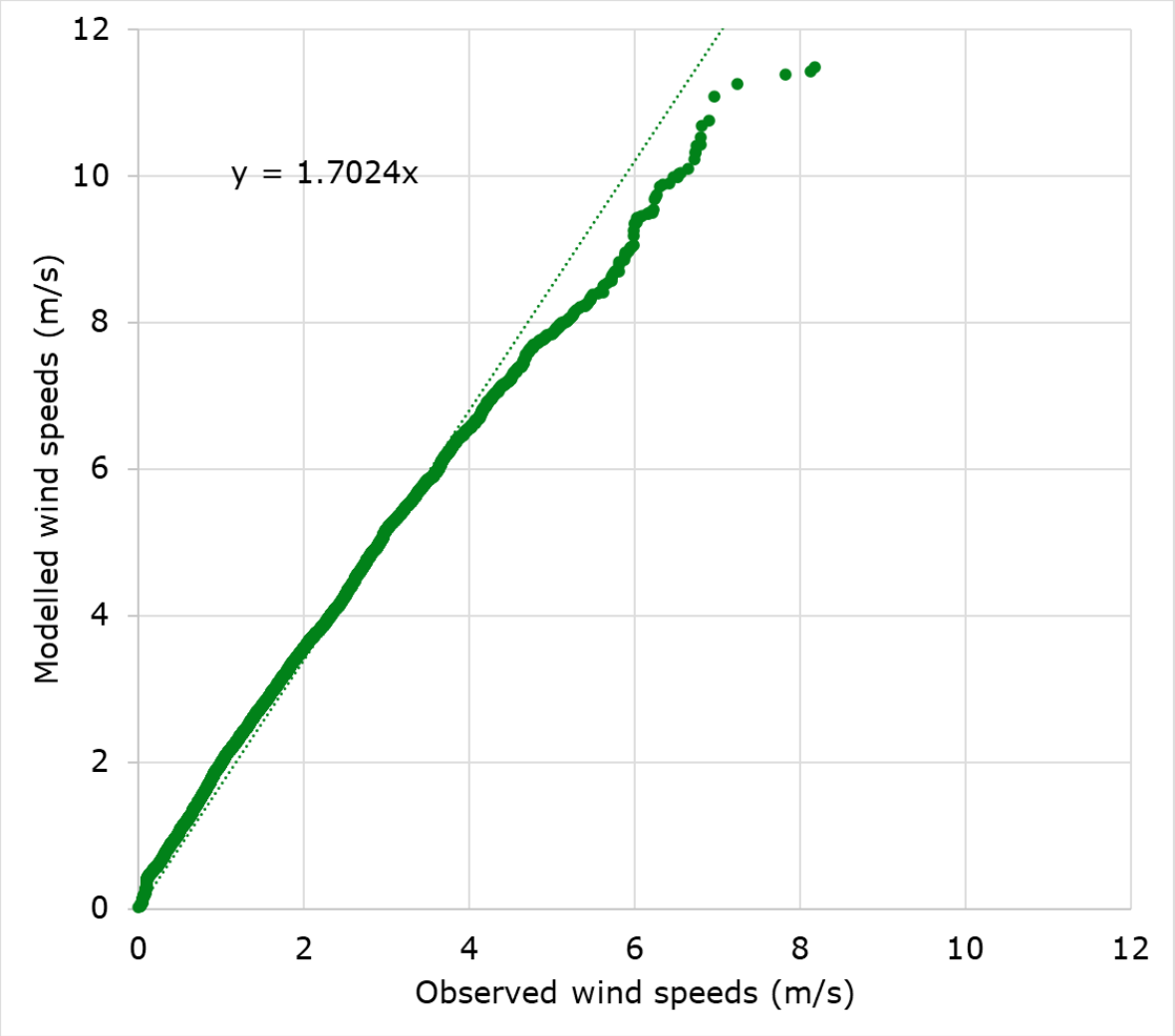


FIGURE 8-27 QQ PLOT COMPARING FREQUENCY DISTRIBUTION OF OBSERVED AND MODELLED WINDS

8.2 SOUTHEASTERLY WINDS

For this scenario, model predictions at receptor locations have firstly been filtered to include only results that corresponded to blasting during an hour with wind directions between 101° and 169°, which reflects winds from the south-southeast, southeast and east-southeast. Remaining model results were reviewed to understand the behaviour of model predictions with variations in wind speed and time of day. The potential to minimise dust impacts during blasting when winds are from southeasterly directions is considered in Sections 8.2.1.1 to 8.2.1.4, and the outcomes of this analysis are compared further to the preferred conditions scenario in Section 8.3.

8.2.1 CHIMNEY STACK DEMOLITION

8.2.1.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-28 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting during southeasterly winds. Key observations include:

- Highest particulate predictions occur under lighter wind conditions. This is typically the case, as stronger winds promote dispersion.
- Particulate predictions vary somewhat throughout the day, with a general increase in the highest predictions from blasting each hour as the day progresses with the maximum prediction occurring between 4-5pm, which may be due to reductions in wind speed and poorer dispersion later in the afternoon.

Based on the above analysis, a wind speed threshold of 3 m/s was identified as being likely to minimise particulate concentrations. This reduces maximum predictions by approximately 80% across the infrastructure area. This reduction in maximum predictions due to blasting during hours with wind speeds greater than 3 m/s can be seen in Figure 8-29. Based on Figure 8-28, selection of a higher wind speed threshold (e.g. 4 m/s) would provide minimal additional benefit (this is discussed further in Section 8.2.3).

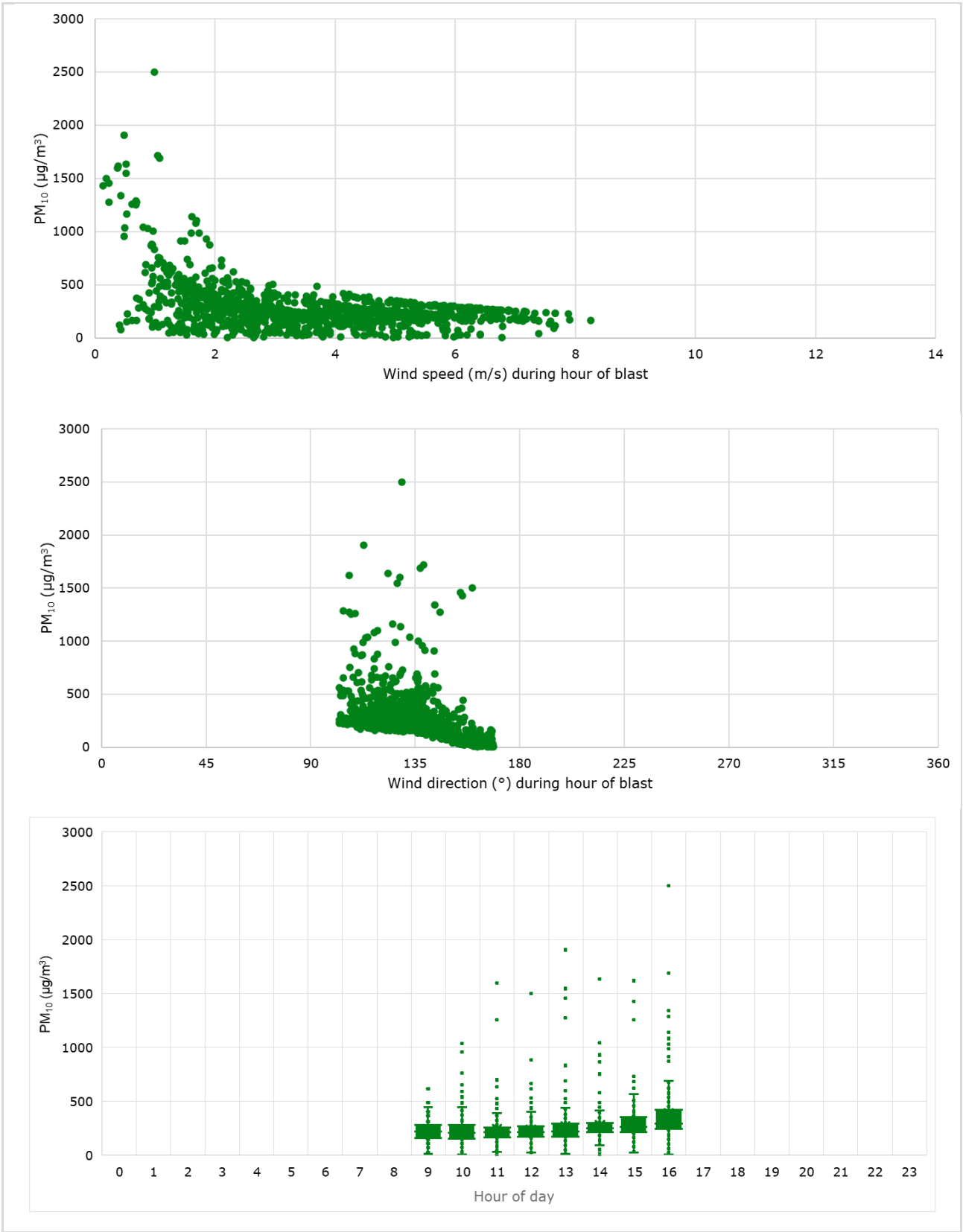


FIGURE 8-28 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

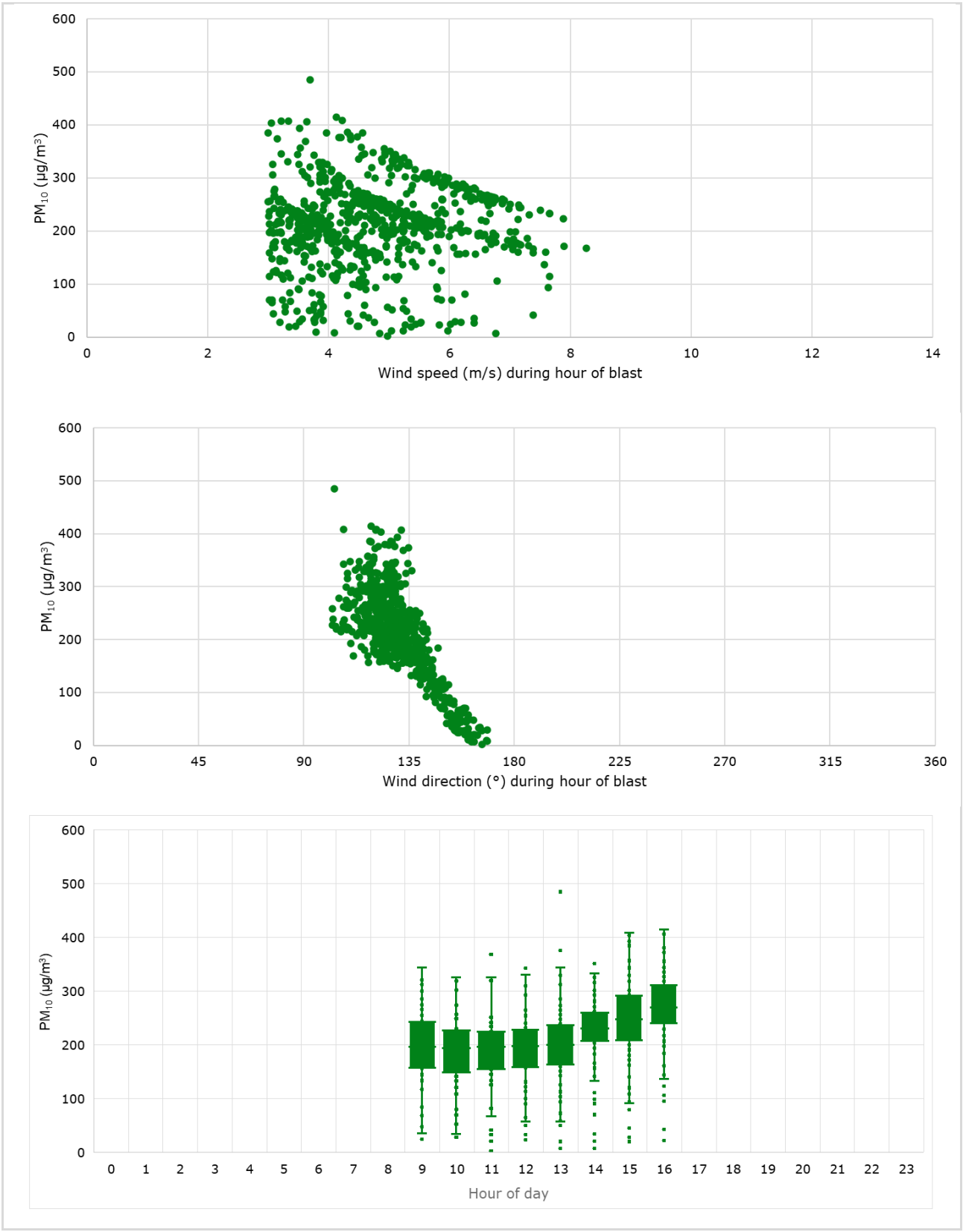


FIGURE 8-29 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.1.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-30 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. A cluster of high maximum 1-hour predictions is seen for blasting during light wind speeds, and later in the day (4-5pm). Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-31 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during hours with preferred meteorological conditions. This reduces the maximum dust concentrations by an order of magnitude and the resulting concentrations are similar in magnitude to those at the screening receptors due to blasting during preferred meteorological conditions.

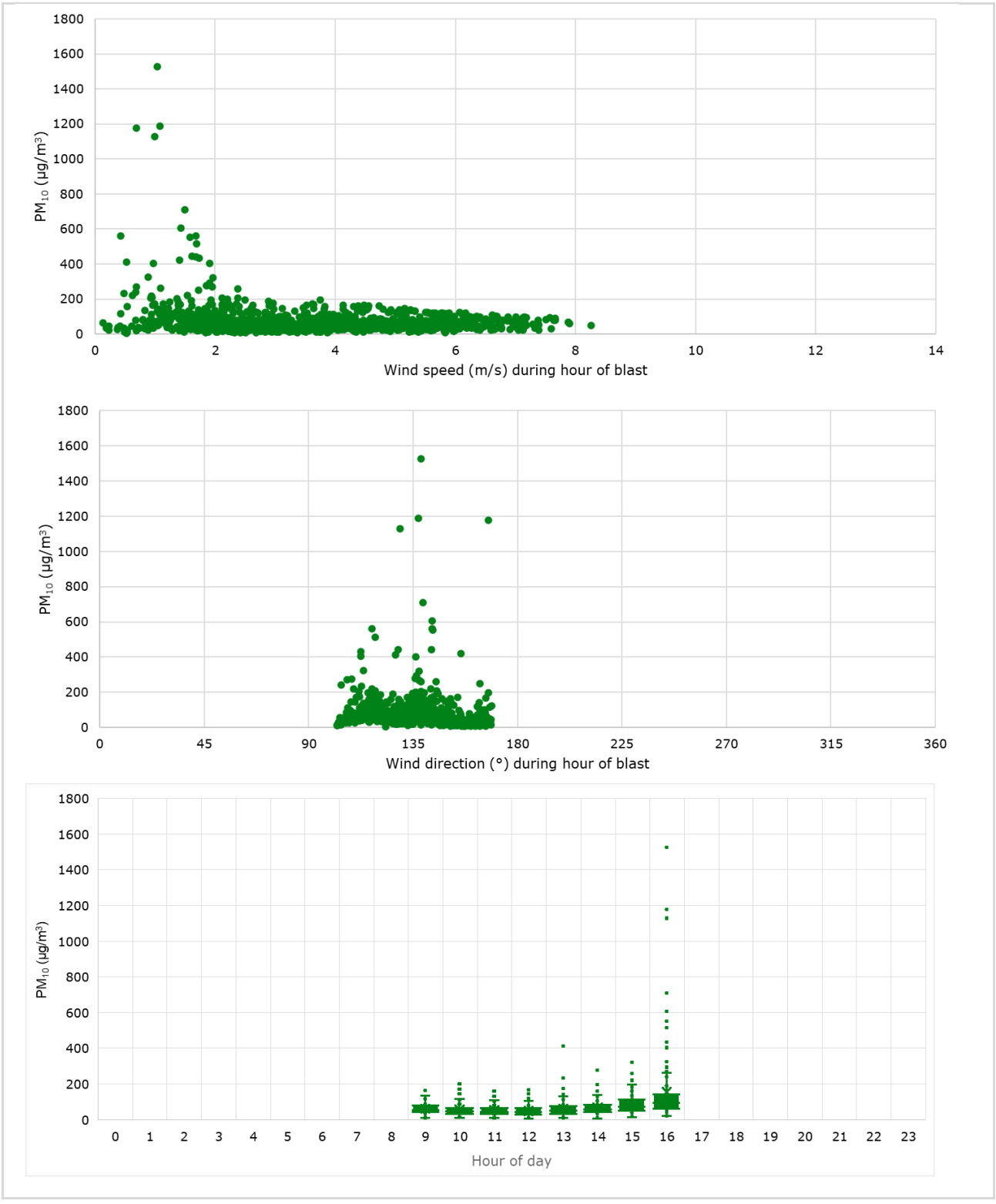


FIGURE 8-30 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

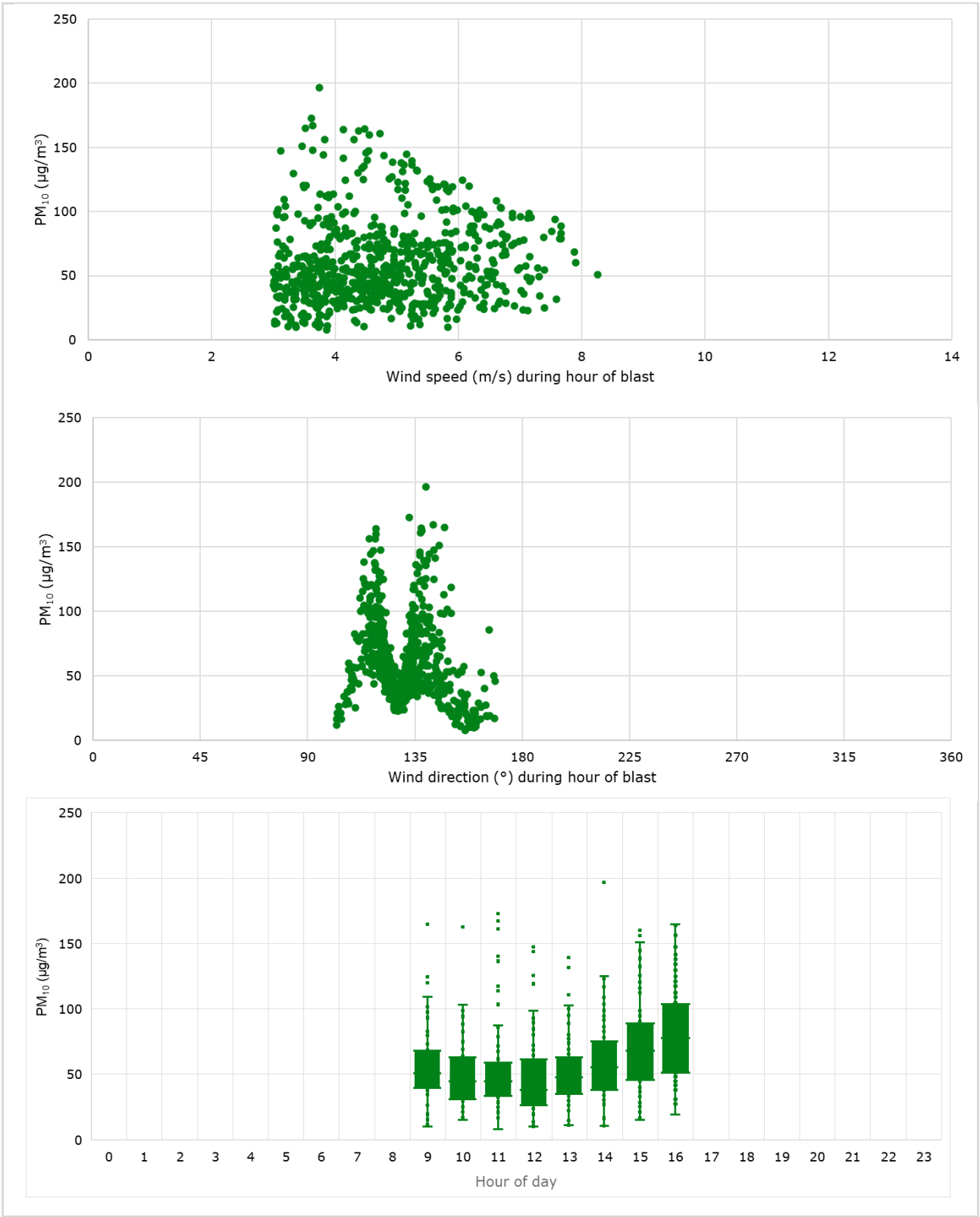


FIGURE 8-31 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.1.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-32 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. These show:

- The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts may occur under a wide range of wind speeds
- A gradual increase in deposition rates with time of day.

Figure 8-33 presents the maximum deposition rates if blasting occurred only during hours with wind speeds greater than 3 m/s. There is a minor reduction only in predicted maximum deposition rates, as in contrast to predicted particulate concentrations, deposition rates remain or in fact increase with increasing wind speeds.

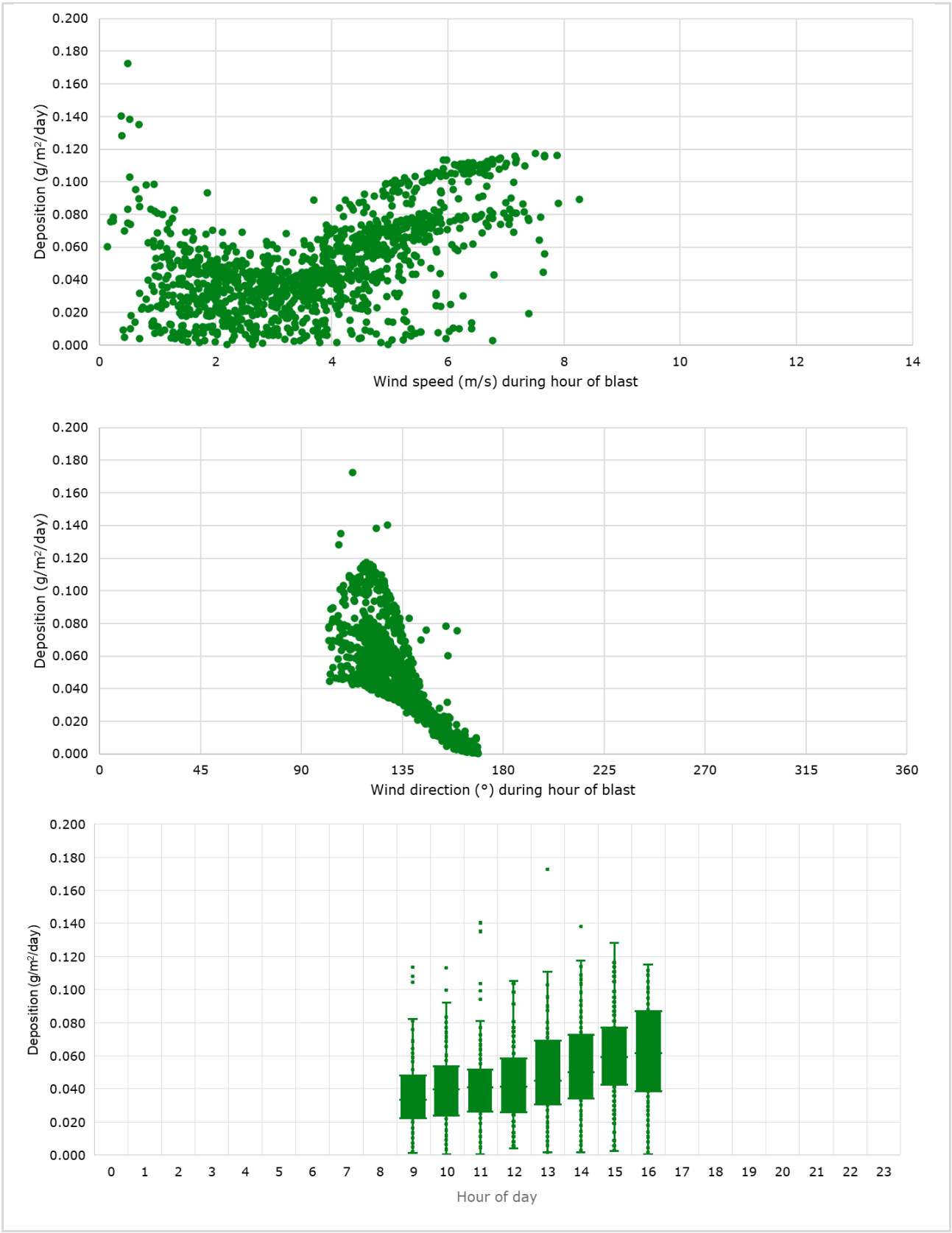


FIGURE 8-32 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

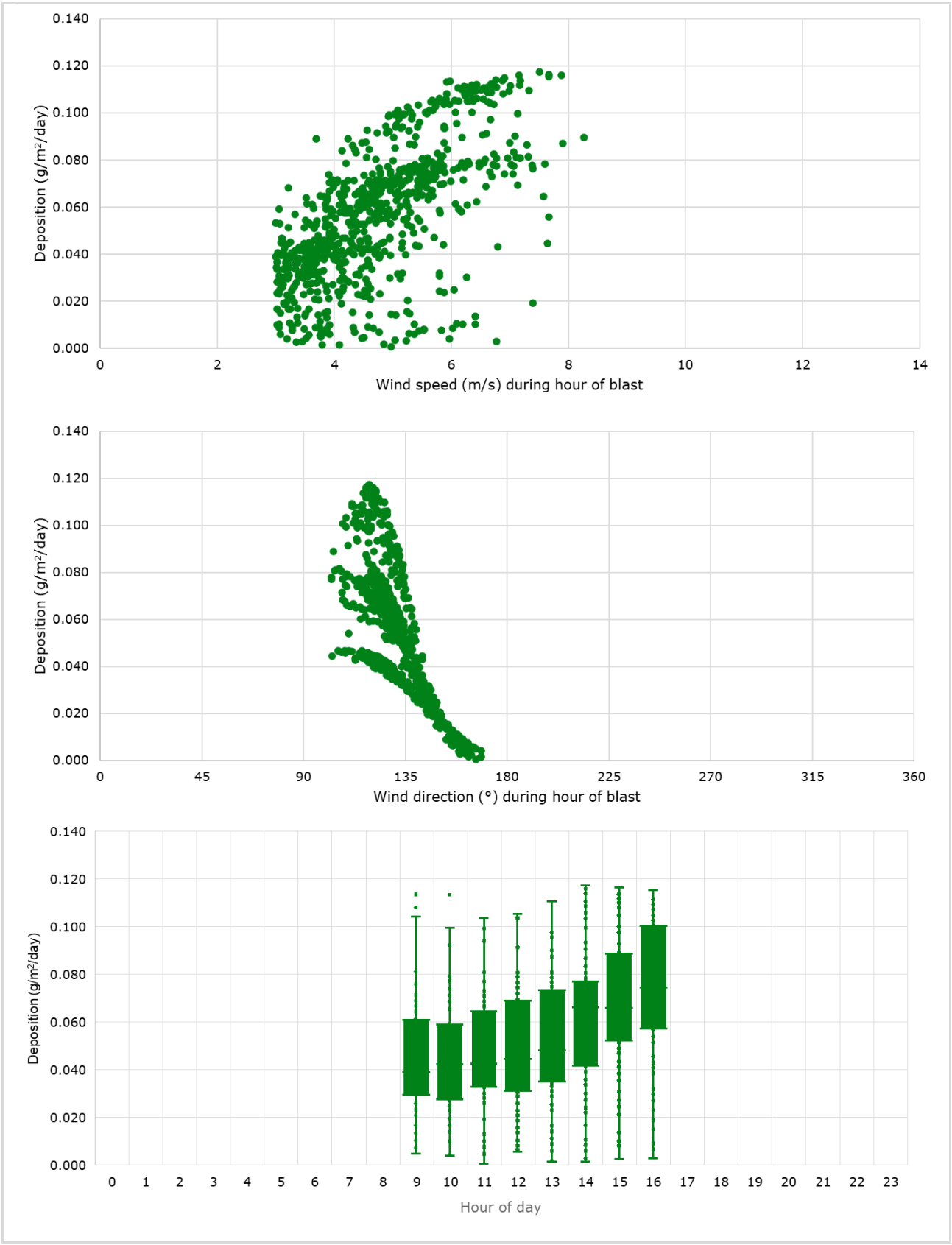


FIGURE 8-33 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.1.4 DEPOSITION RATES ACROSS THE WIDER DOMAIN

Figure 8-34 illustrates variations in predicted deposition rates at the selected receptors in the wider area with wind speed, direction and hour of day during southeasterly winds. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area;
- Minimal variation with wind speed;
- Minimal variation with hour of day.

Figure 8-35 presents the predicted deposition rates at these locations due to blasting occurring only during hours with wind speed greater than 3 m/s. This does not reduce maximum predicted deposition rates at the screening receptors, as these primarily occur during stronger wind directions.

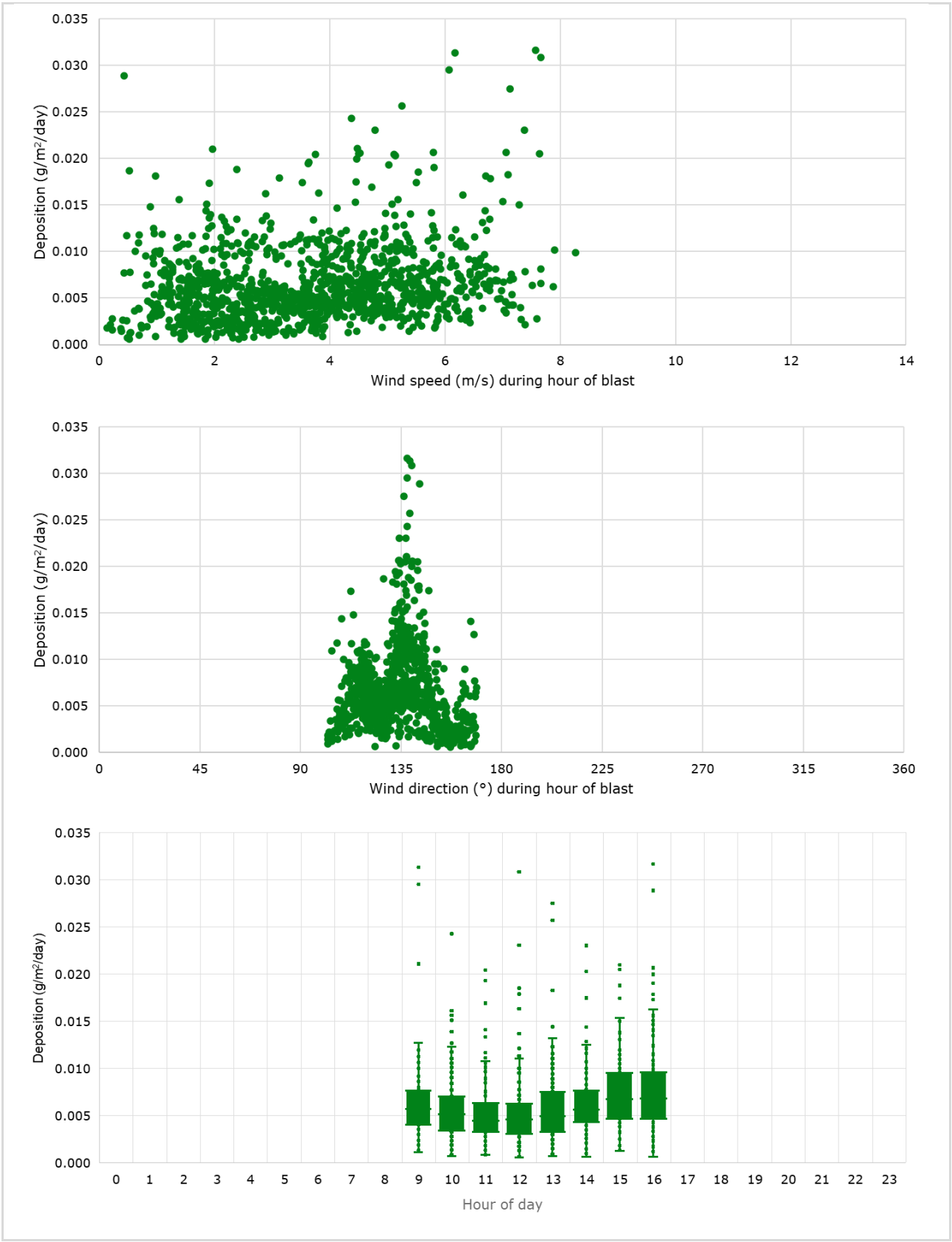


FIGURE 8-34 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

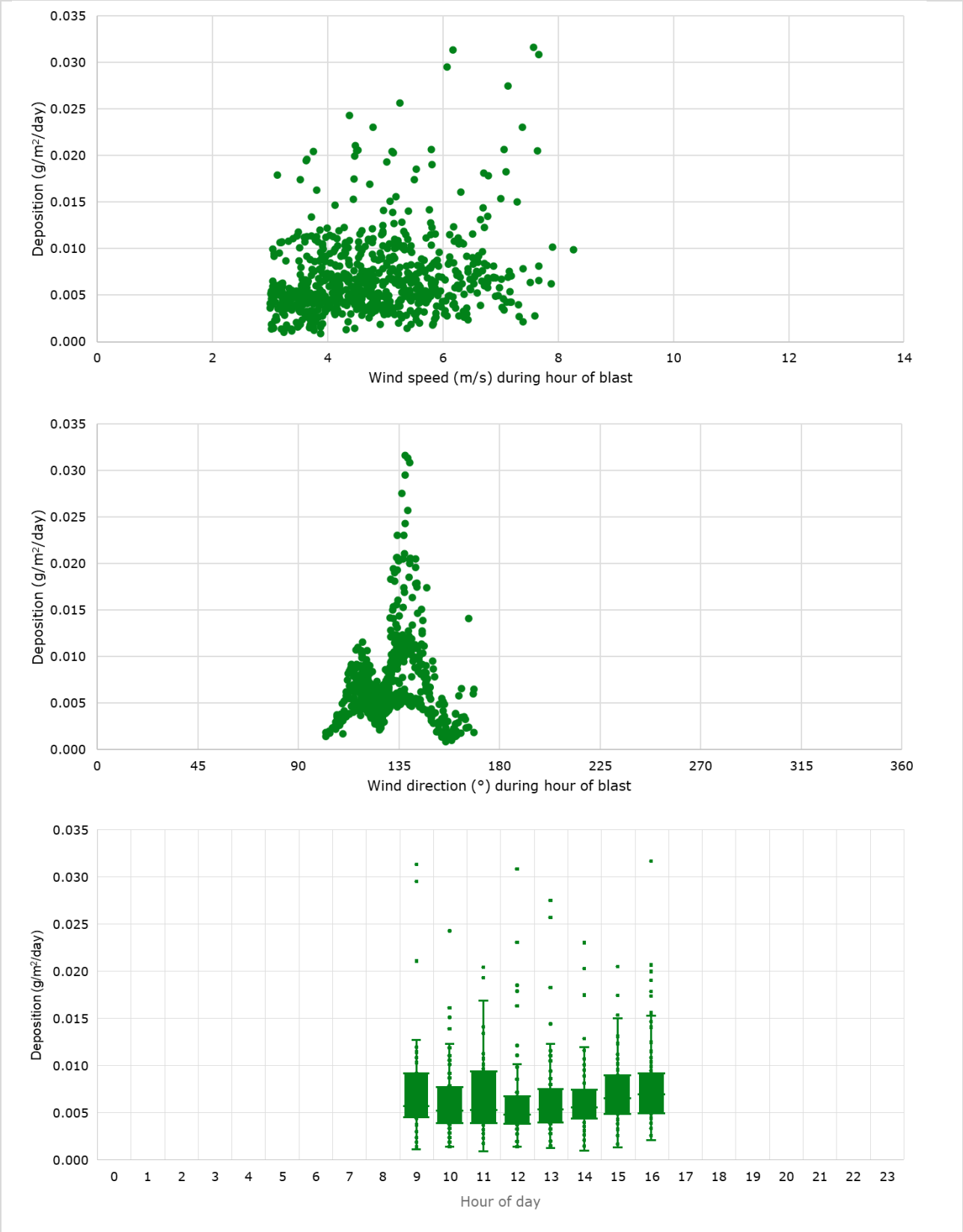


FIGURE 8-35 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.2 BOILER HOUSE DEMOLITION

8.2.2.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-36 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting during southeasterly winds. The most obvious trend is with wind speed, with particulate predictions generally reducing with wind speed, though the reduction becomes smaller in magnitude as wind speed increases.

Adopting the wind speed threshold of 3 m/s reduces maximum predictions due to blasting by more than 50% (see Figure 8-37). As with the chimney demolition, Figure 8-36Figure 8-28 indicates that selection of a higher wind speed threshold (e.g. 4 m/s) would provide minimal additional reduction in particulate concentrations (this is discussed further in Section 8.3).

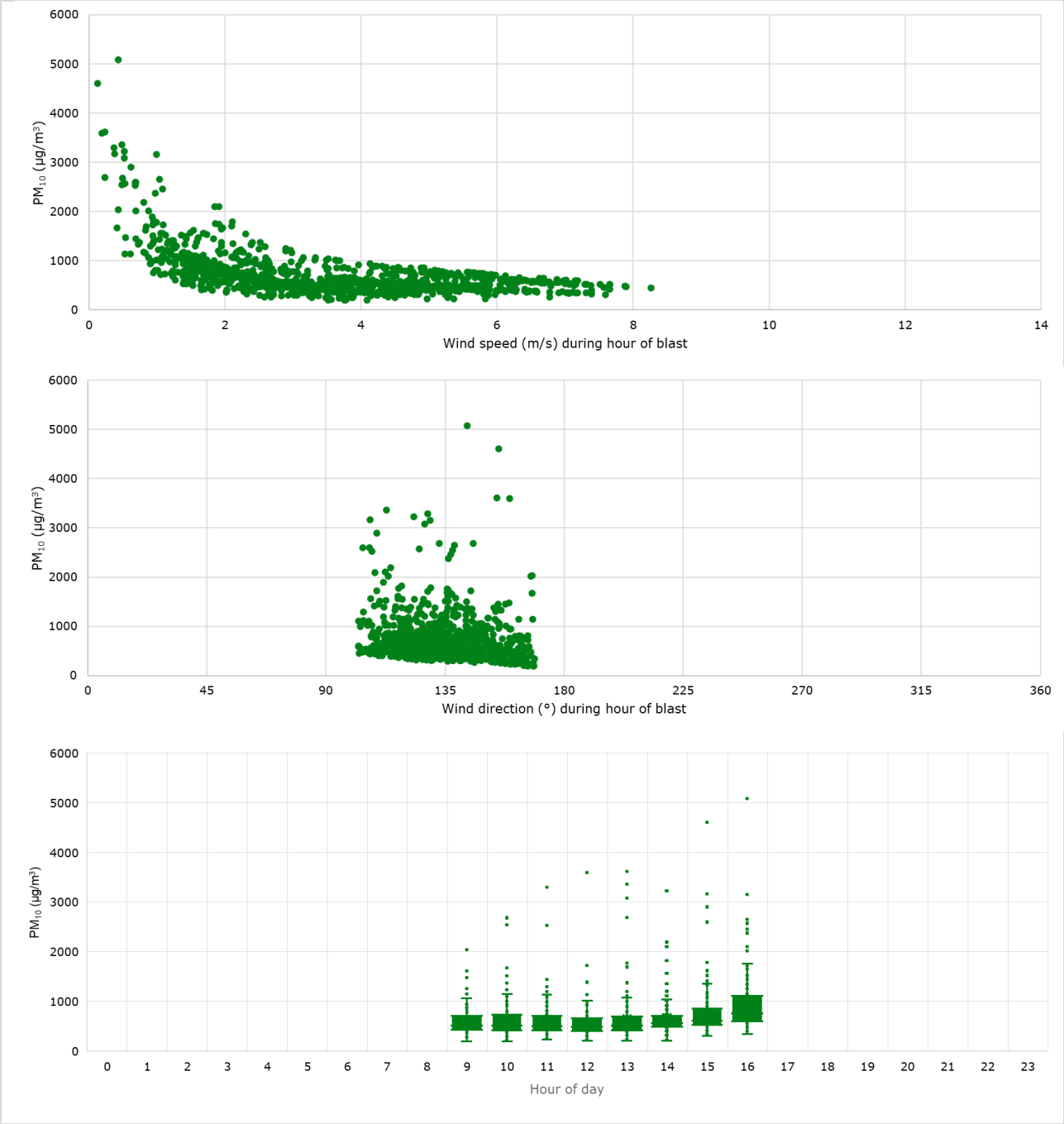


FIGURE 8-36 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

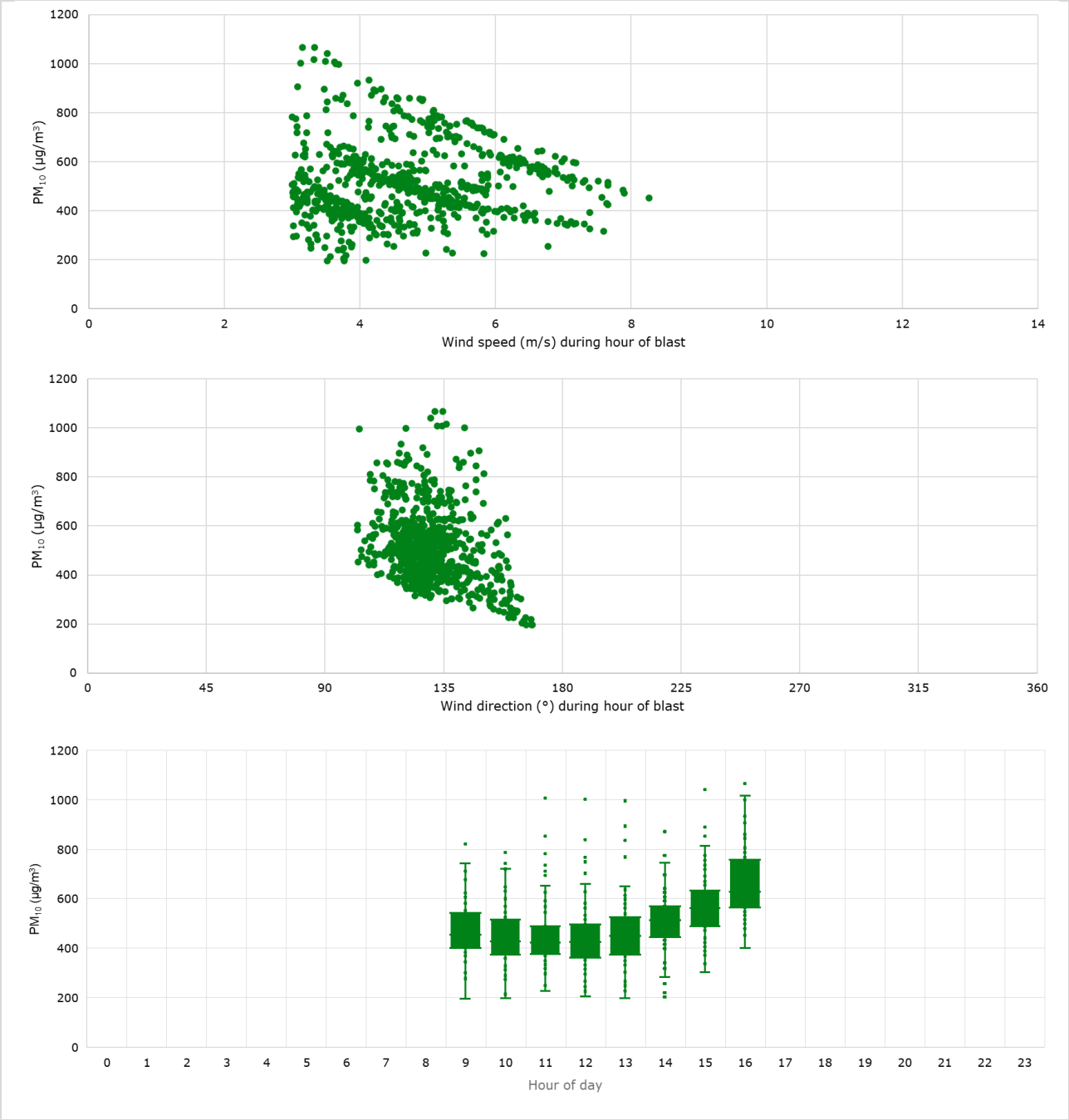


FIGURE 8-37 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.2.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-38 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. A cluster of high maximum 1-hour predictions is seen for blasting during light wind speeds, and later in the day (4-5pm). Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-39 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during southeasterly winds greater than 3 m/s. This reduces the maximum dust concentrations by an order of magnitude and the resulting concentrations are similar in magnitude to those at the screening receptors due to blasting during preferred meteorological conditions.

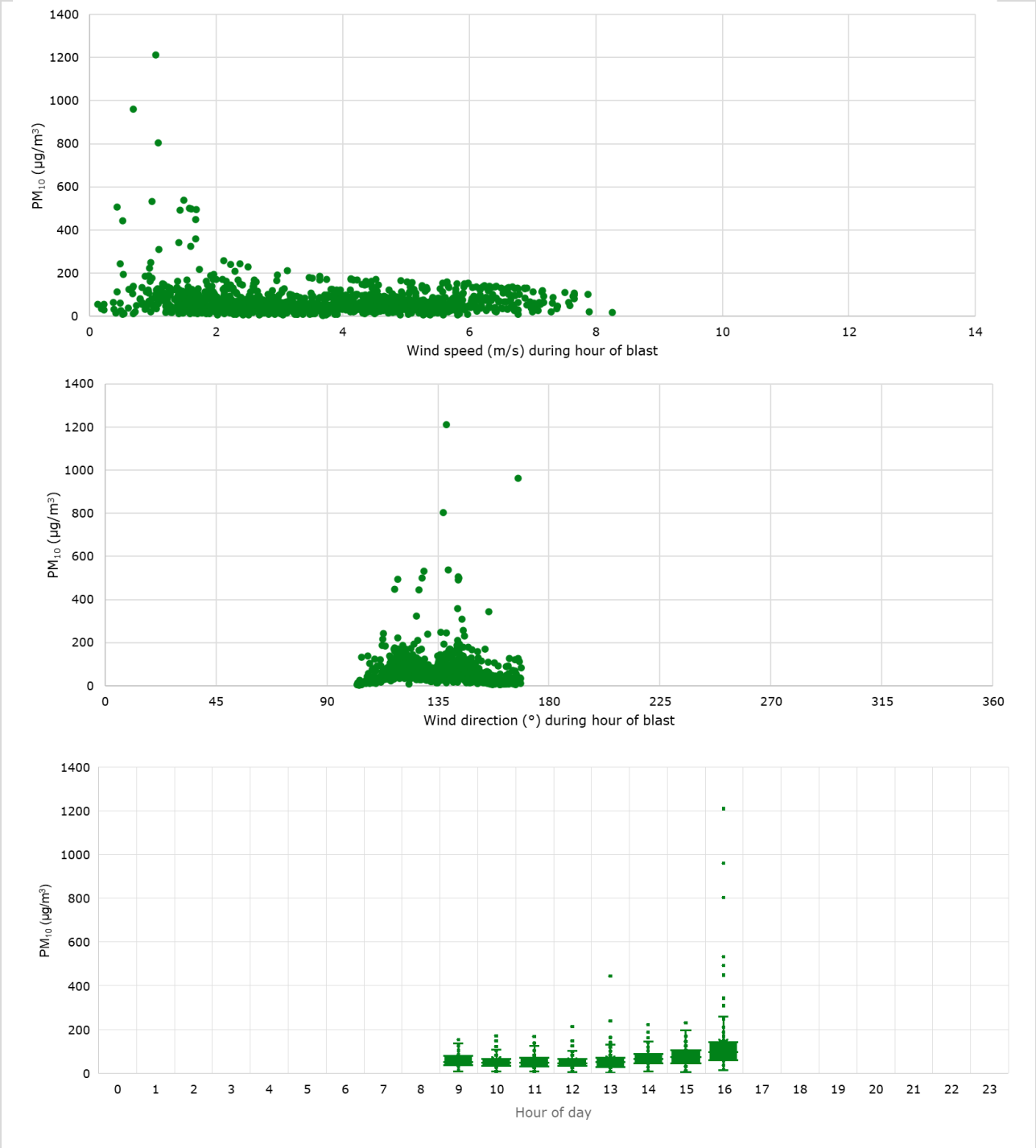


FIGURE 8-38 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

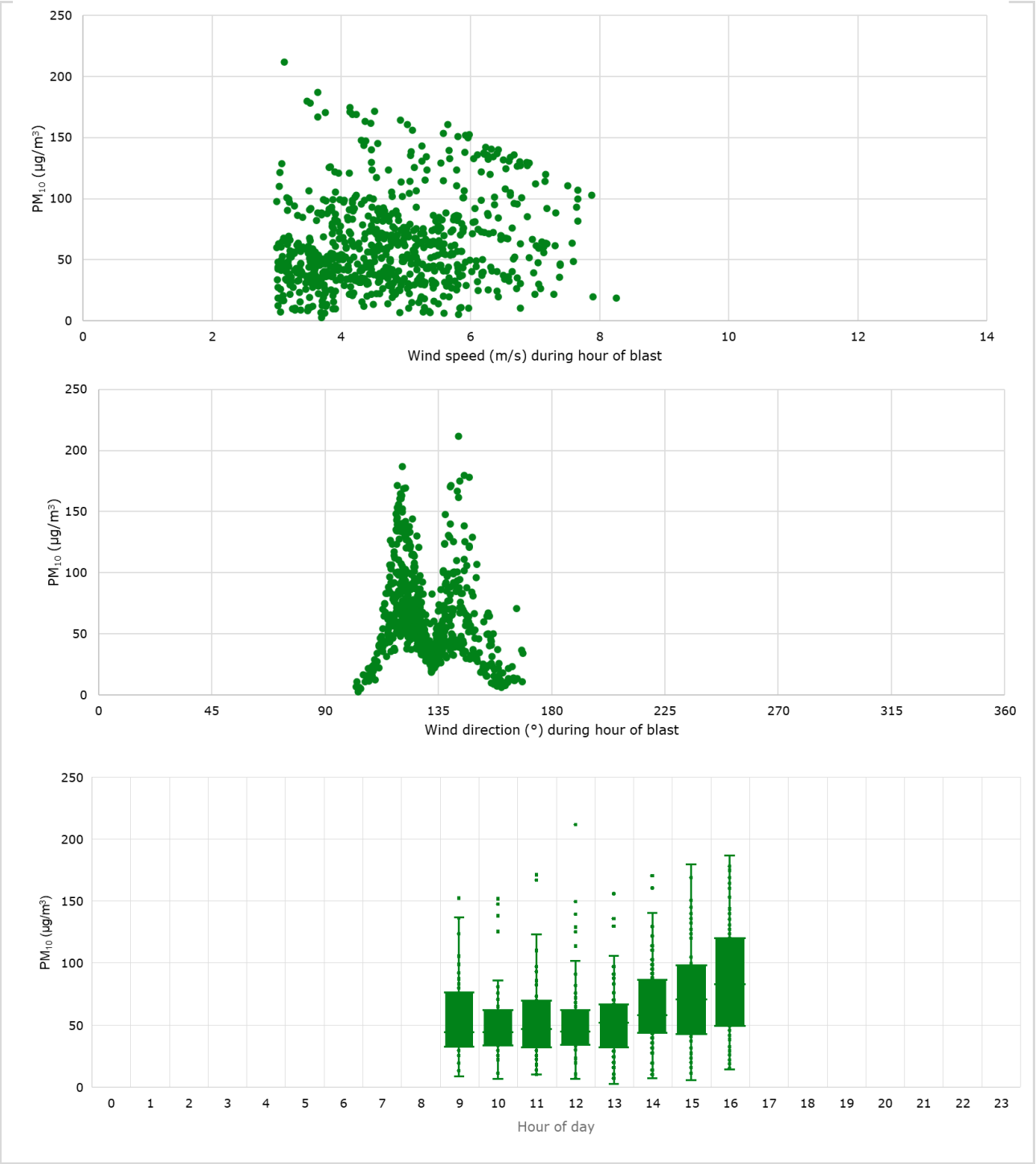


FIGURE 8-39 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.2.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-40 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts may occur under a wide range of wind speeds

Figure 8-41 presents the maximum deposition rates if blasting occurred only during hours with wind speeds greater than 3 m/s. There is a minor reduction only in predicted maximum deposition rates, as in contrast to predicted particulate concentrations, deposition rates remain or in fact increase with increasing wind speeds.

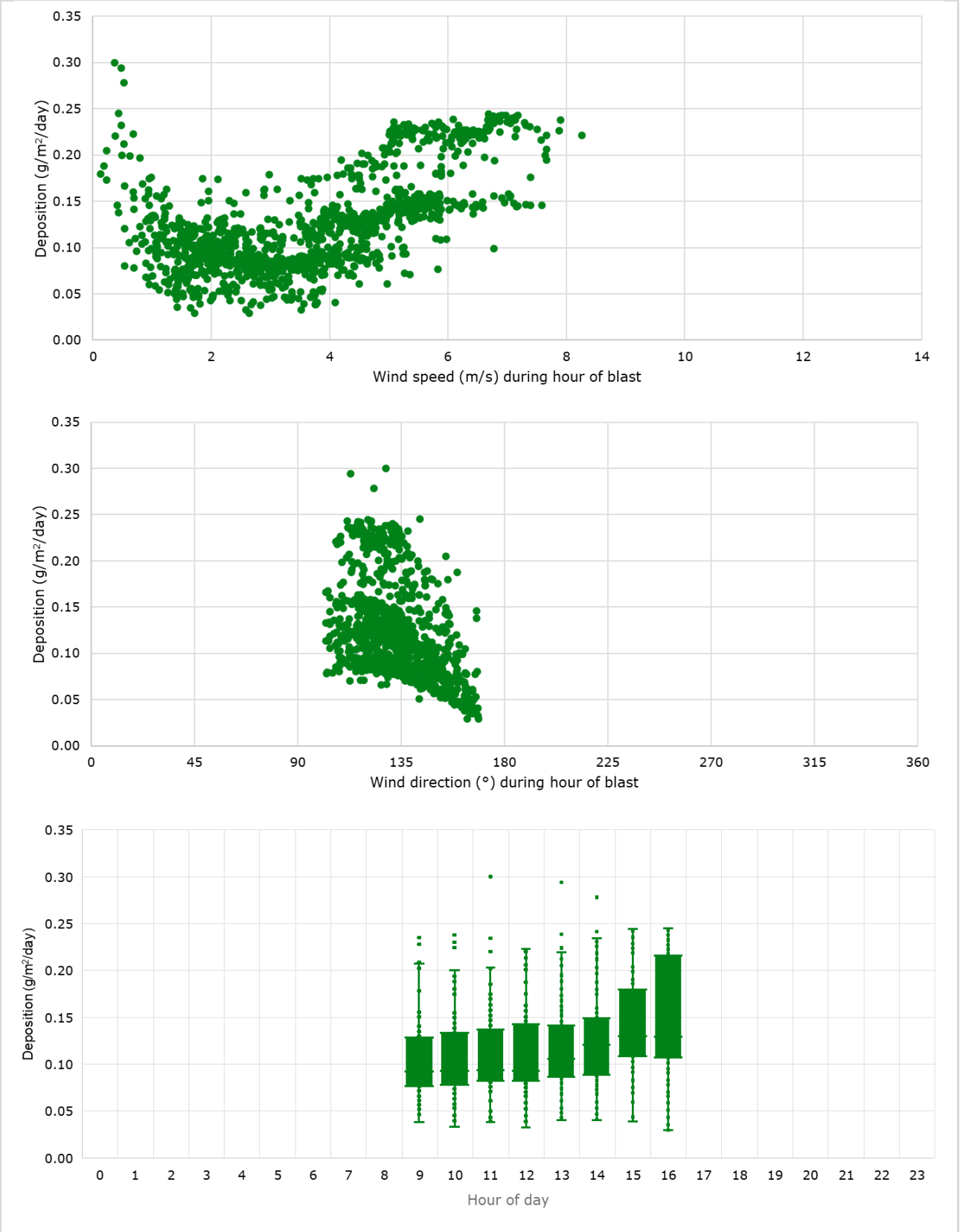


FIGURE 8-40 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

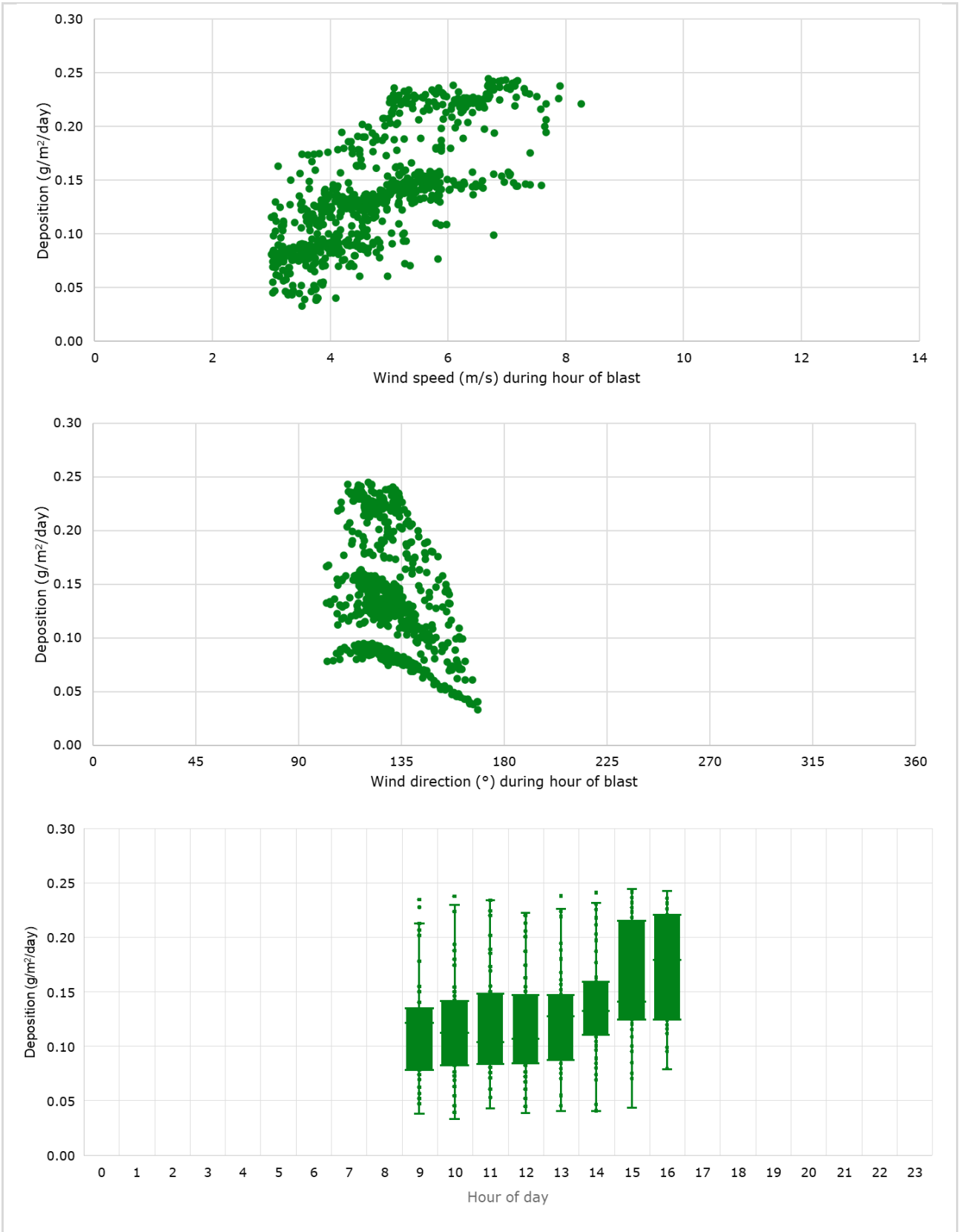


FIGURE 8-41 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.2.4 DEPOSITION RATES ACROSS THE WIDER DOMAIN

Figure 8-42 illustrates variations in predicted deposition rates at the screening receptors in the wider area with wind speed, direction and hour of day during southeasterly winds. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area;
- Minimal variation with wind speed;
- Minimal variation with hour of day.

Figure 8-43 presents the predicted deposition rates at these locations due to blasting occurring only during hours with wind speed greater than 3 m/s. This does not reduce maximum predicted deposition rates at the screening receptors, as these primarily occur during stronger wind directions.

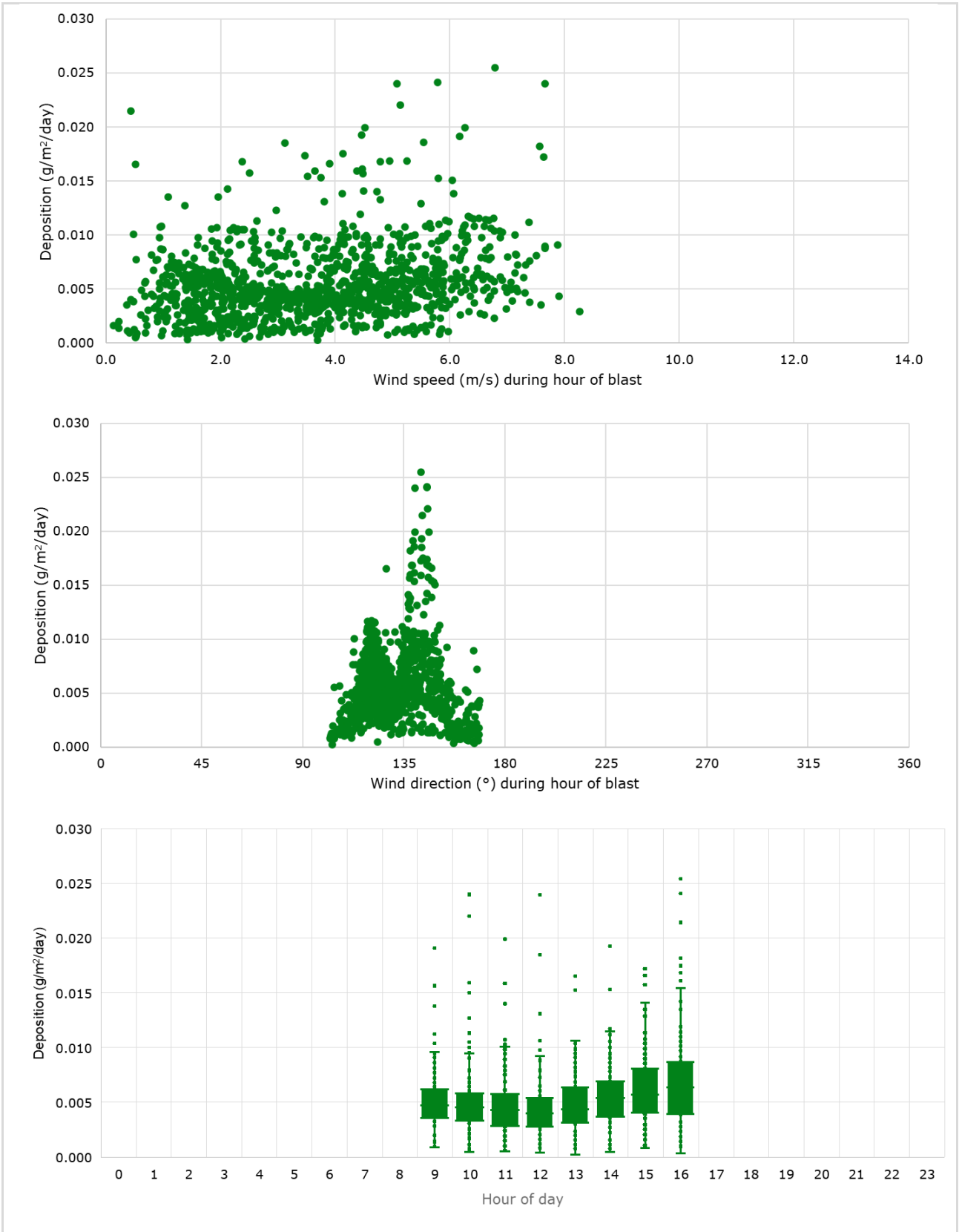


FIGURE 8-42 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

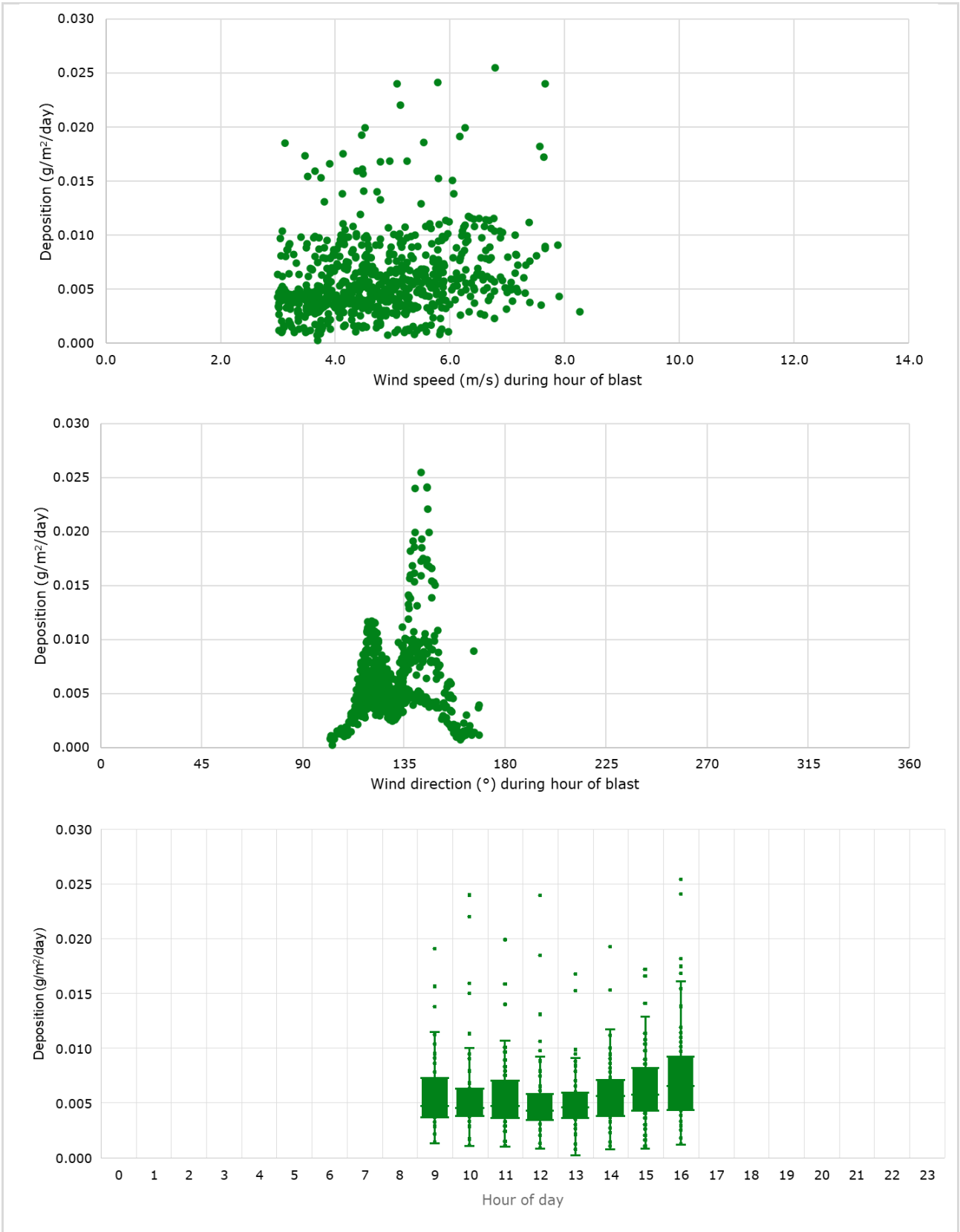


FIGURE 8-43 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.3 SUMMARY AND FREQUENCY OF SOUTHEASTERLY WINDS

Figure 8-44 presents the number of hours per day during 2020 that southeasterly winds greater than 3 m/s occurred within the modelling dataset. The frequency of preferred conditions is higher during the spring and summer months through to March, with far fewer between April and August.

Table 8-2 presents the number of days each month during which southeasterly winds greater than 3 m/s occur for each blast hour. Figure 8-46 presents this data visually. The number of days per month is noticeably higher between September and March. There is a slight increase in the number of days per month for blasting near the middle of the day, however, the variation by blast hour is not as significant as the variation across months of the year. The highest frequency of southeasterly winds >3 m/s per month occur during March between 1pm and 3pm.

The additional considerations regarding blast planning discussed in Section 8.1.3 also apply to blasting during southeasterly winds.

The suitability of a 3 m/s wind speed threshold has been considered. Figure 8-45 illustrates how the percentage reduction in maximum 1-hour particulate concentration across infrastructure receptors would vary depending on the wind speed threshold used during southeasterly winds. As previously mentioned, blasting when the 1-hour average wind speed is greater than 3 m/s reduces predicted 1-hr particulate concentrations by approximately 80% across the infrastructure area. In general, increasing the wind speed reduces the predicted maximum concentrations, however, the reduction is smaller with higher wind speeds. For example, a lower wind speed threshold, e.g. 2 m/s, would reduce maximum concentrations by approximately 70%, whereas a wind speed threshold of 5 m/s only provides a further 5% reduction (approximately) compared to 3 m/s.

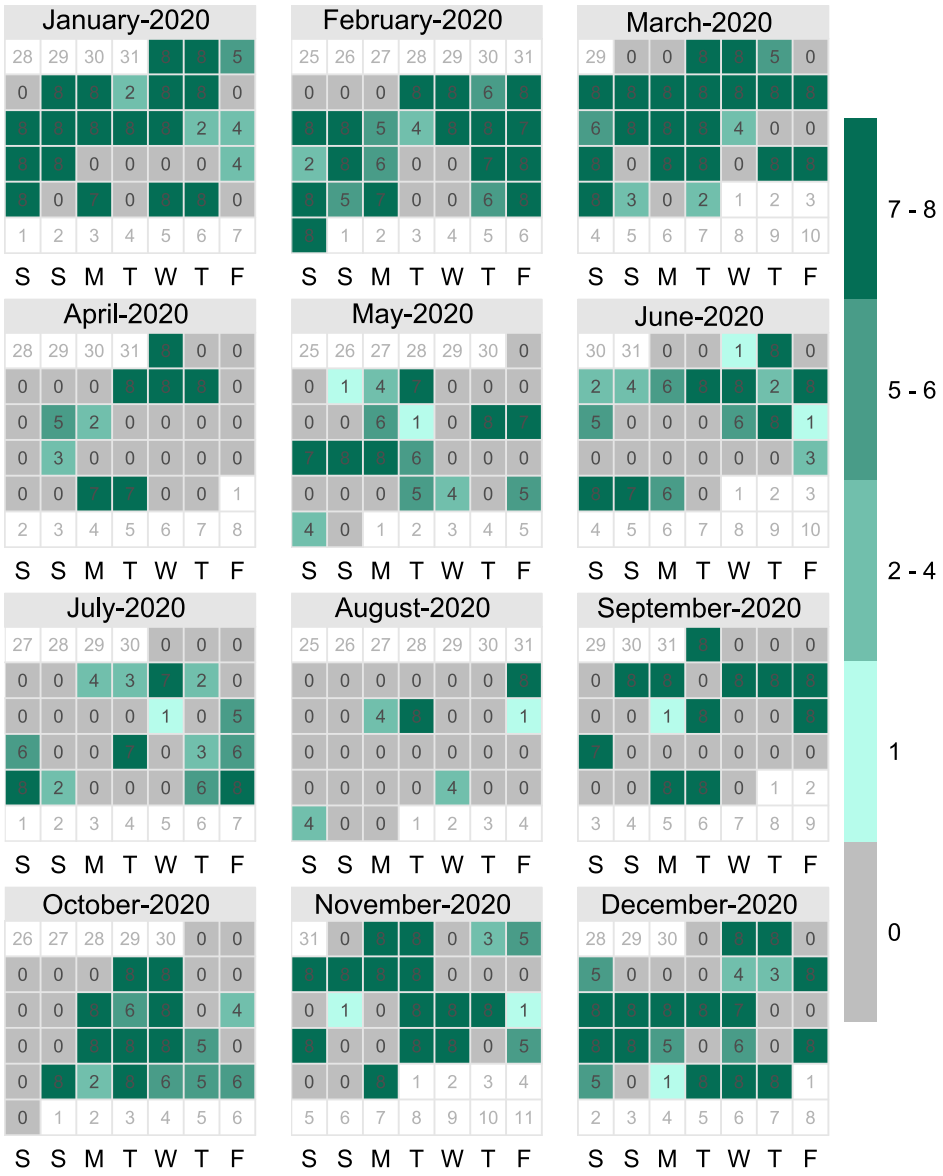


FIGURE 8-44 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF SOUTHEASTERLY WINDS > 3 m/s BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET

TABLE 8-2 NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 m/s FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

Month	Hour of Blast							
	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm
January	19	18	18	19	19	18	21	20
February	16	20	20	19	21	19	17	19
March	20	20	19	20	22	21	22	20
April	5	5	6	7	8	8	8	9
May	3	6	8	10	13	13	13	15
June	6	8	10	11	12	13	15	16
July	3	5	7	8	9	11	12	13
August	2	3	3	2	4	5	6	4
September	11	11	11	11	11	11	11	11
October	11	13	13	14	14	15	14	12
November	14	14	16	15	15	15	15	15
December	17	18	19	19	17	15	17	18

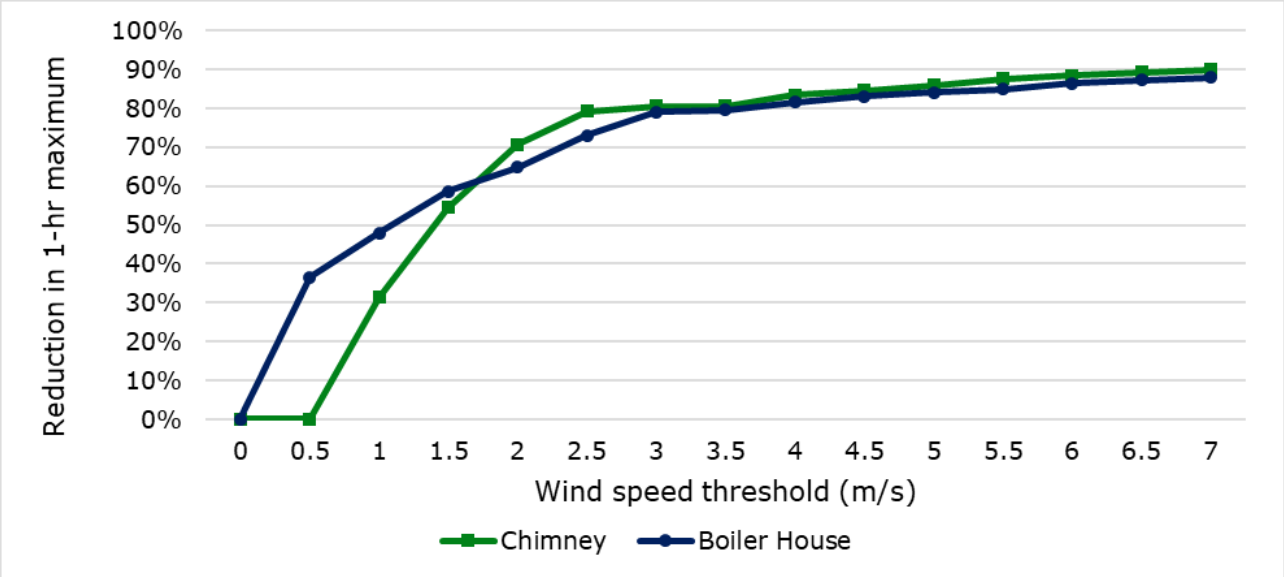


FIGURE 8-45 REDUCTION IN 1-HOUR MAXIMUM PREDICTION ACROSS INFRASTRUCTURE RECEPTORS DUE TO APPLICATION OF A WIND SPEED THRESHOLD

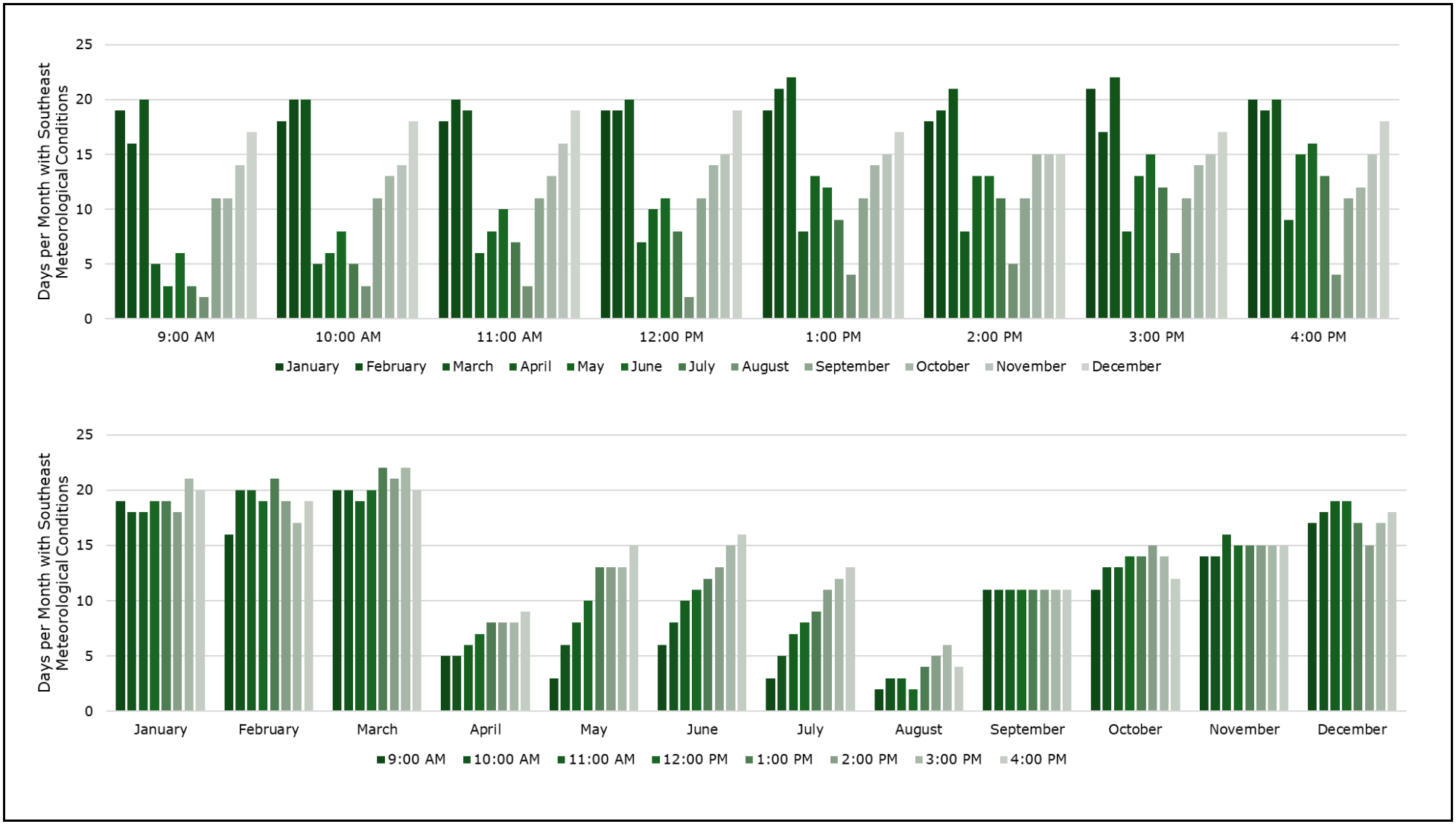


FIGURE 8-46 NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 m/s FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

8.3 COMPARISON OF PREFERRED CONDITIONS AND SOUTHEASTERLY WINDS

Figure 8-47 to Figure 8-50 present contour plots of 1-hour average and 24-hour average PM_{10} and $PM_{2.5}$ across the model domain, for blasting during preferred conditions only, and also for blasting during southeasterly winds when the wind speed is greater than 3 m/s.

These comparisons show:

- Predicted concentrations near screening receptors are generally the same order of magnitude under both sets of meteorological conditions, however, are slightly higher under preferred conditions. Twenty-four hour average PM_{10} concentrations at screening receptors are approximately 5-10 µg/m^3. For comparison, the typical ambient air quality assessment criteria for 24-hour average PM_{10} concentrations is 50 µg/m^3 which is used to assess the total concentration inclusive of contributions from all dust sources in an airshed. This report is not a compliance assessment, however, the predicted model results indicate that blasting during favourable wind conditions can assist in significantly reducing the contribution that blasting has on the airshed.
- Predicted concentrations across the Transgrid switchyard differ significantly between the two scenarios, as the southeasterly winds disperse dust from the blast area directly towards this infrastructure, whereas preferred conditions disperse dust to the northeast across the lake. For example, blasting during southeasterly winds only when wind speed is greater than 3 m/s reduces maximum 1-hour predictions to below 600 µg/m^3 across industry receptors, compared with reductions to less than 50 µg/m^3 with blasting during the preferred conditions.
- As discussed in earlier sections, deposition rates across the infrastructure area and at screening receptors can be reduced significantly by blasting during preferred conditions. Blasting during southeasterlies even with a wind speed threshold of 3 m/s does not provide a material reduction in deposition rates across the infrastructure area (notably the Transgrid switchyard) or at screening receptors.
- The Transgrid switchyard is directly downwind of the blast sites during southeasterly winds and the impact that may arise due to dust from blasting under these meteorological conditions should be considered during blast planning (potential hazards, damage or interruption to normal operations).

Figure 8-51 to Figure 8-54 present contour plots of 1-hour average and 24-hour average PM_{10} and $PM_{2.5}$ across the model domain, for demolition of the boiler house during preferred conditions only, and also during southeasterly winds when the wind speed is greater than 3 m/s. Findings from the comparison of modelling scenarios for the boiler house demolition are consistent with the above findings from the stack demolition modelling.

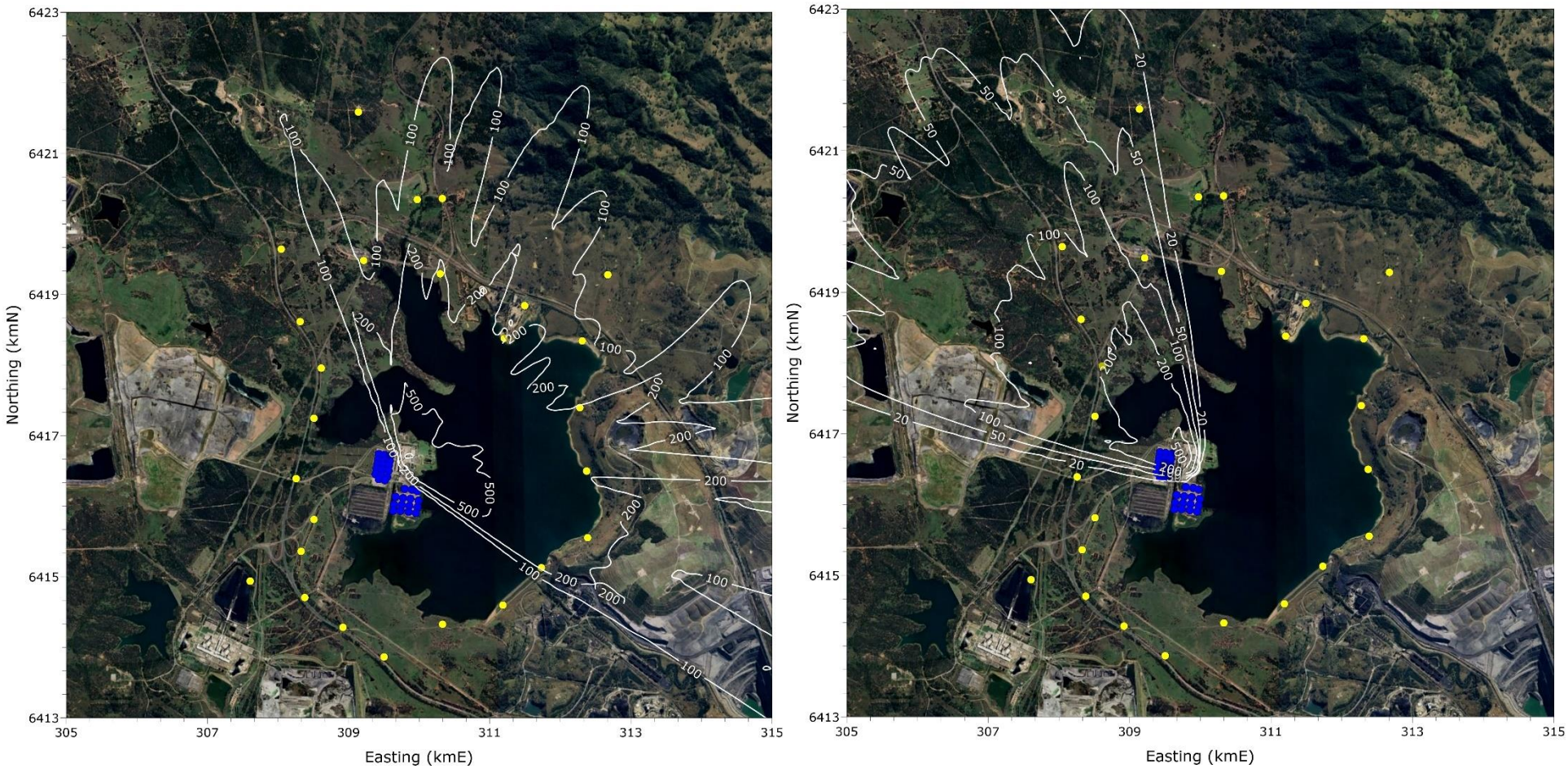


FIGURE 8-47 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

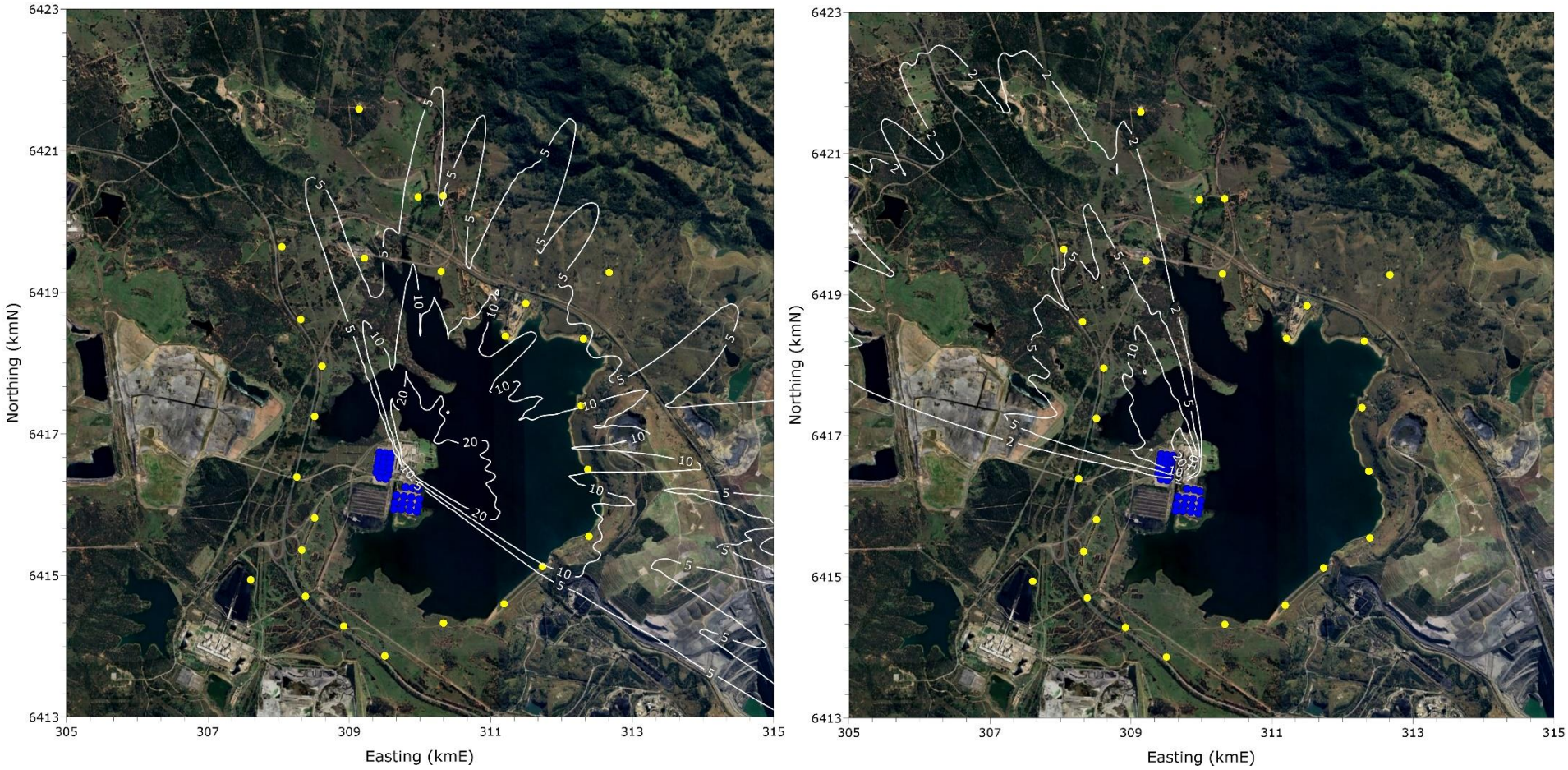


FIGURE 8-48 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

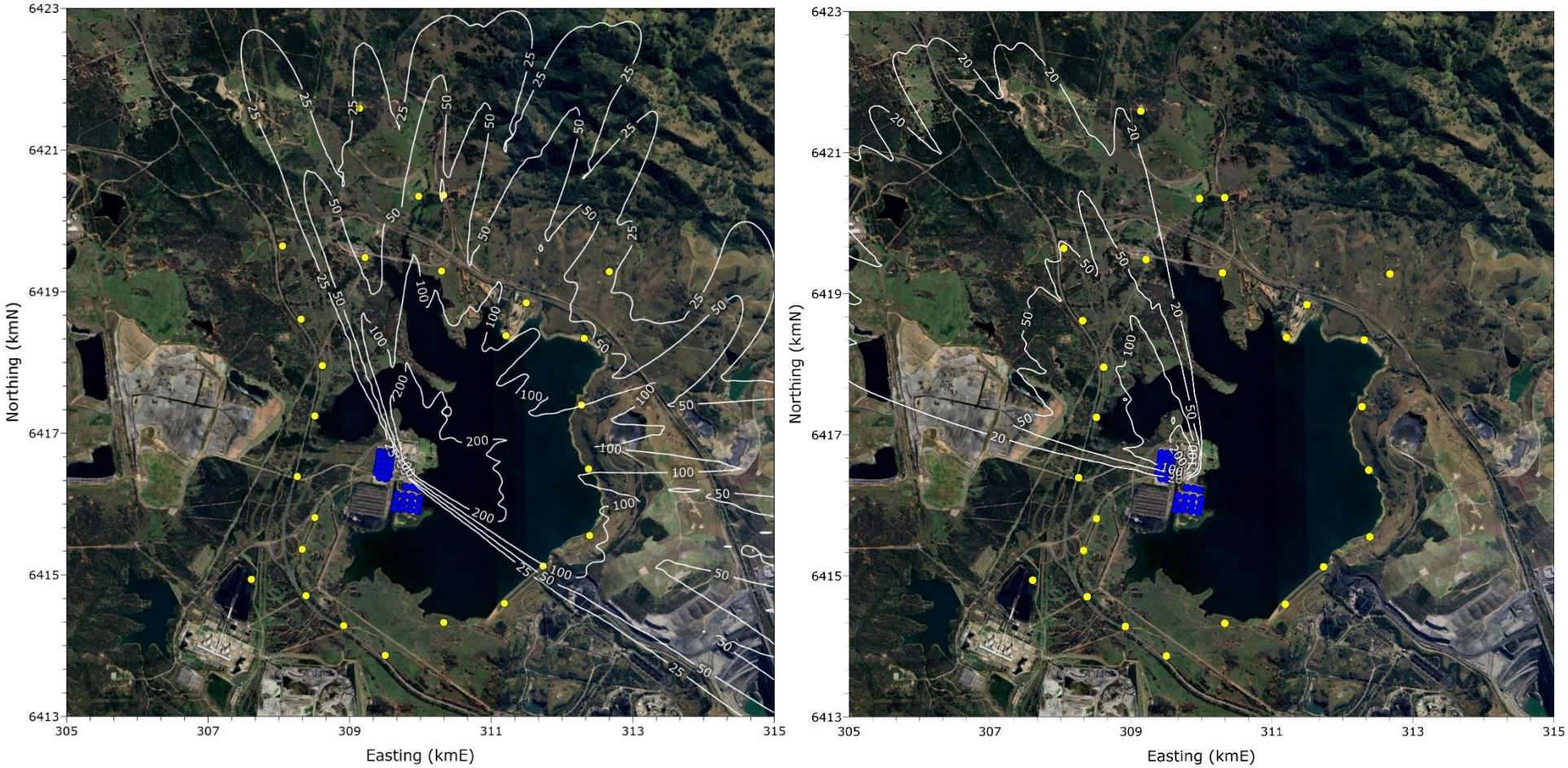


FIGURE 8-49 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

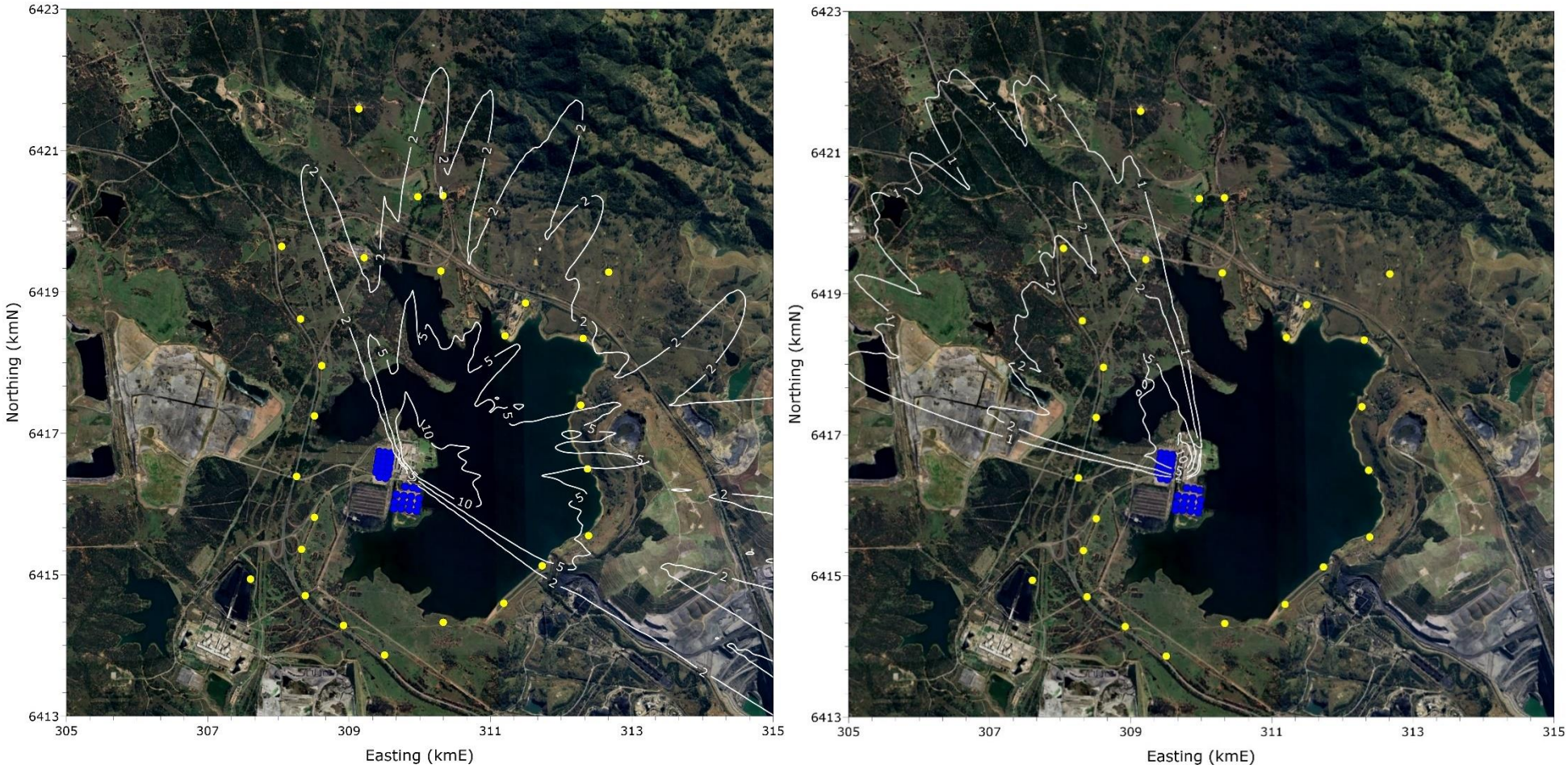


FIGURE 8-50 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

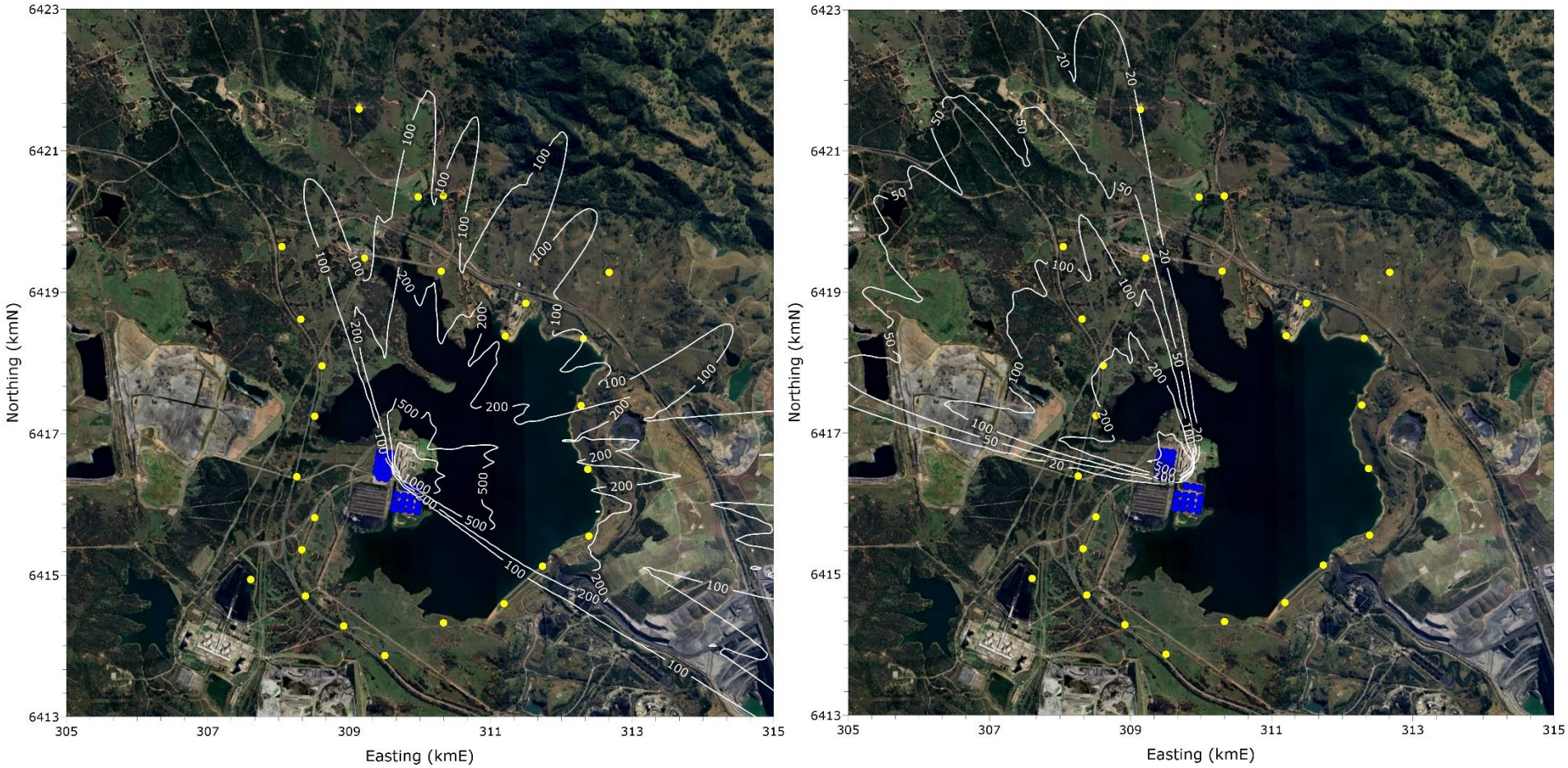


FIGURE 8-51 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

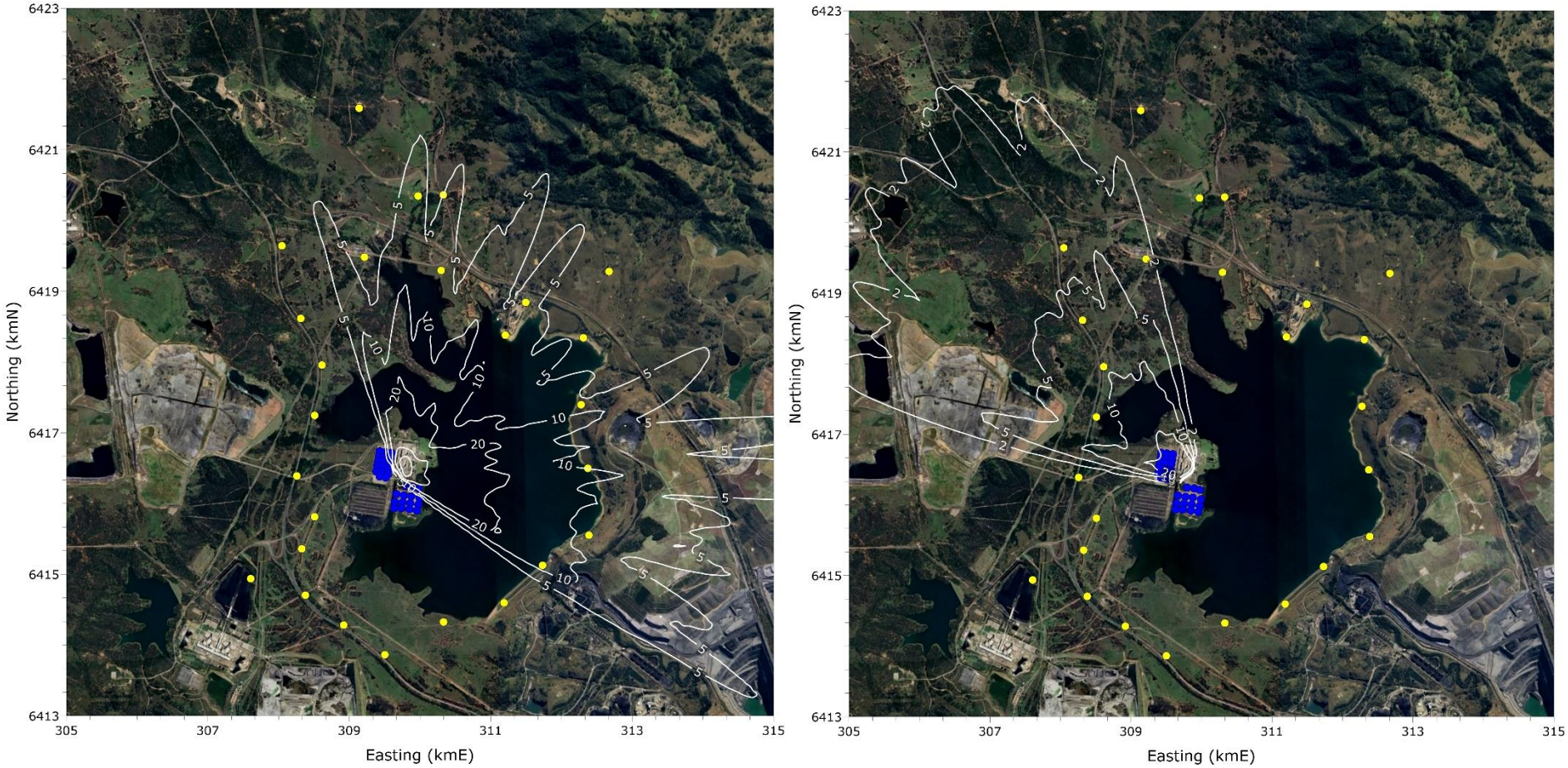


FIGURE 8-52 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

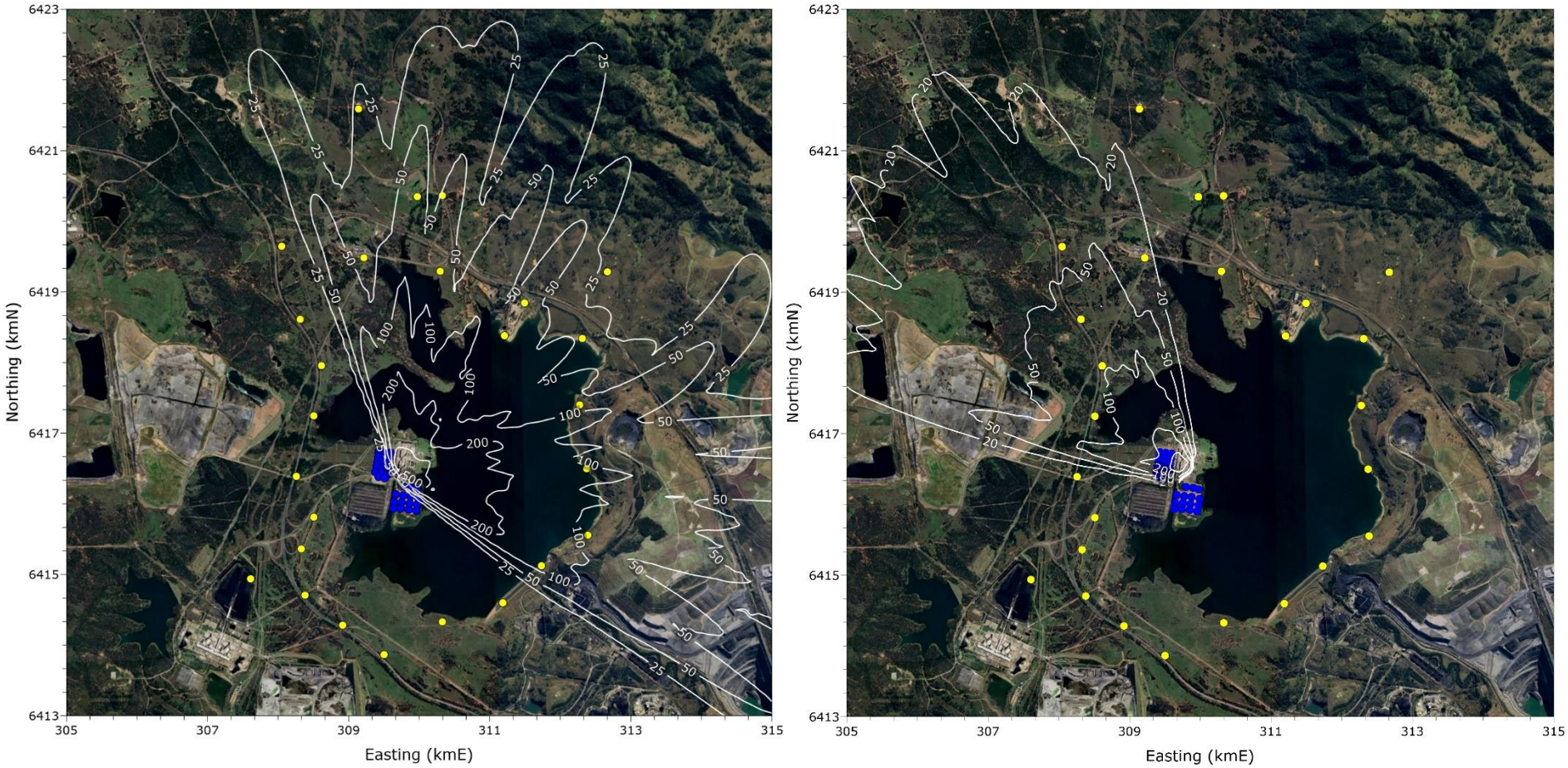


FIGURE 8-53 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

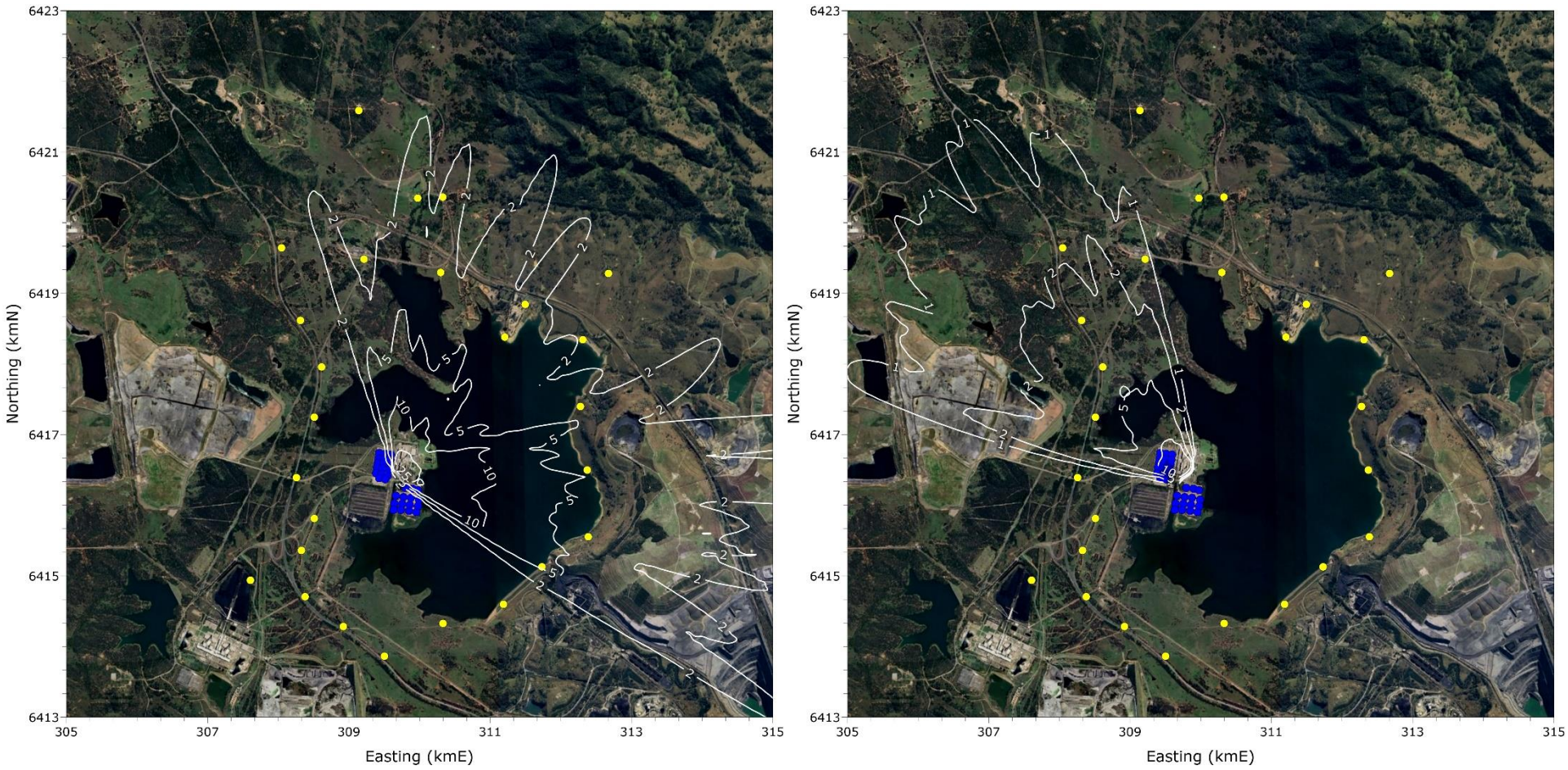


FIGURE 8-54 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

9. ASSUMPTIONS AND UNCERTAINTIES

In addition to those discussed above, the following assumptions and uncertainties for the study were identified and should be considered when interpreting model results:

- Hourly meteorological data from the AGL on-site meteorological station was only available for the period September 2024 to August 2025. As such, an hour-by-hour validation of the WRF meteorological model was not possible. However, a general comparison of seasonal and diurnal changes in wind patterns was undertaken;
- The dispersion modelling study incorporates blast emissions released over 1 minute, however the meteorological data used to drive the model is on a 1-hour resolution. Shorter time frame variations in wind speeds and/or directions are not accounted for. Planning of the blasting for a period of unchanging meteorological conditions will minimise the influence of this uncertainty.
- Emission estimates were based on monitoring during demolition of stacks, not boiler houses, and this was from demolition activities at one site only. It should be noted that:
    - The applicability to boiler house structures or varying stack constructions has not been tested.
    - The emission factors adopted were based on monitoring of specific particle size fractions during a stack demolition. The extent to which blasting may generate larger particles that were not measured but still released, is not known.
    - The adoption of these emission factors assumes that dust control measures in place during the Kurri Kurri demolition are somewhat consistent with those proposed to be implemented at Liddell.
- The CALPUFF dispersion model is not a computational fluid dynamics (CFD) model and as such, does not account for highly localized changes in wind fields and dispersion due to wind flow around solid structures and may not be as accurate as a CFD model in the near-field.
- The study has been limited to modelling of one boiler house demolition event. It is recommended that modelling be conducted for the second boiler house to check if the preferred conditions identified here remain consistent.
- Data input into the model has been based on information provided by CMA (where available). It is assumed that this information remains correct and accurate at the time of modelling.

10. CONCLUSIONS

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by CMA Contracting Pty Ltd (CMA) to undertake a pre-demolition air quality analysis for the proposed demolition of the two chimney stacks and boiler houses at the AGL Liddell Power Station (the Site) in the Hunter Valley Region of New South Wales (NSW). CMA has been engaged by AGL to demolish the power station. ERM understands that there are no formal environmental approval conditions to be met with regard to off-site air emissions from the demolition activities. This work is being undertaken voluntarily by CMA to inform the blast risk management plan.

The objective of the analysis was to understand the relative magnitude of potential air quality impacts for various blast windows to inform blast managing planning.

A dispersion modelling approach was used given the location of the AGL Liddell Power Station in an area of complex terrain and variability in local meteorological conditions. Dust emissions from stack felling and boiler house demolition were estimated using an existing methodology that was applied for the Engie Hazelwood stack and boiler house demolitions, as well as the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019; 2020). Modelling predictions were prepared for two sets of receptors:

- 'Infrastructure receptors' which were designated at locations around the adjacent TransGrid switchyard and AGL battery energy storage system (BESS), (currently under construction) as this infrastructure may be sensitive to dust.
- 'Screening receptors' which were designated at areas surrounding the Site for the purposes of providing a generic understanding of the scale of potential impacts in the broader area. Locations generally following the boundary of Lake Liddell to the east and the New England Highway to the west were selected, inclusive of known sensitive receptor locations (residences and a recreation area).

The meteorological and dispersion model configurations were developed with reference to the New South Wales EPA *Approved Methods for the Modelling and Assessment of Pollutants in New South Wales* (2022). For the purposes of this study, relative magnitudes of pollutants at receptor locations have been focused on, rather than assessing predictions against impact assessment criteria as this study is not for compliance purposes but is a planning tool.

Analysis of the modelling results found that predicted dust concentrations and deposition rates vary significantly with wind speed, wind direction and time of day. There is considerable opportunity to minimise air quality impacts across both dust sensitive infrastructure and across the wider area including at sensitive receptor locations by planning blast events with these factors in mind.

The following meteorological conditions are suggested as preferred conditions to be met during blasting to minimise air quality impacts across dust sensitive infrastructure areas and at sensitive receptor locations:

- Hourly average wind speeds greater than 2 m/s (~4 knots); and
- Wind directions from the south through to the west northwest (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure area.

Whilst these preferred wind directions to not generally align with predominant winds, they do occur and with greater frequency during the autumn and winter months. In addition, blasting should be conducted during periods of forecast persistent meteorological conditions, to avoid changes in wind speeds or directions after blasting that may alter or slow dispersion.

CMA also requested analysis of blasting during predominant southeasterly wind directions. This analysis identified that particulate concentrations could be minimised by blasting during southeasterly winds when the hourly average wind speed was greater than 3 m/s (~6 knots).

A comparison of preferred conditions and southeasterly winds has shown:

- Preferred conditions and southeasterly winds greater than 3 m/s may result in particulate concentrations at screening receptors that are comparable in magnitude. However, particulate concentrations across infrastructure receptors during southeasterly winds greater than 3 m/s are significantly higher than those predicted during preferred conditions (>2 m/s winds from southwest directions).
- Deposition rates across infrastructure receptors due to blasting during southeasterly wind directions cannot be materially reduced by blasting when winds are above a certain speed or during certain hours of day. The Transgrid switchyard is directly downwind of the blast sites during southeasterly winds and the types of hazards and/or damage that may arise due to dust from blasting under these meteorological conditions should be considered during blast planning.

This study focused on PM_{10} and dust deposition, however contour plots for $PM_{2.5}$ have also been produced. In this study, $PM_{2.5}$ will behave in the same fashion as PM_{10} with respect to wind direction and wind speed given that PM_{10} was modelled as a tracer gas, i.e. without accounting for deposition. Contour plots for $PM_{2.5}$ have been produced for the chimney felling and boiler house demolition scenarios to provide an understanding of the reduction in predictions due to blasting during preferred wind directions. $PM_{2.5}$ concentrations have been calculated from PM_{10} concentrations by multiplying by 0.44 which is the ratio of the $PM_{2.5}$ and PM_{10} emission factors developed for blasting in the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019).Consideration should be given to the wind speed threshold after determining what meteorological data source will be used to inform blast planning given the differences between the observed and modelled wind speeds.

Model predictions due to the boiler house demolition are generally higher than those due to the stack felling. To further minimise air quality impacts due to the boiler house demolition, the preferred range of wind directions could be further narrowed. Whilst boiler house 1/2 was selected for modelling due to its closer proximity to infrastructure receptors, it is recommended that boiler house 3/4 be modelled to identify any further refinements to preferred conditions.

11. STATEMENT OF LIMITATIONS

1. This report is based solely on the scope of work described in Proposal and performed by Environmental Resources Management Australia Pty Ltd (ERM) for the CMA Contracting (the Client). The Scope of Work was governed by a contract between ERM and the Client (Contract).
2. No limitation, qualification or caveat set out below is intended to derogate from the rights and obligations of ERM and the Client under the Contract.
3. The findings of this report are solely based on, and the information provided in this report is strictly limited to that required by, the Scope of Work. Except to the extent stated otherwise, in preparing this report ERM has not considered any question, nor provides any information beyond that required by the Scope of Work.
4. This report was prepared in October 2025 and is based on conditions encountered and information reviewed at the time of preparation. The report does not, and cannot, take into account changes in law, factual circumstances, applicable regulatory instruments or any other future matter. ERM does not, and will not, provide any on-going advice on the impact of any future matters unless it has agreed with the Client to amend the Scope of Work or has entered into a new engagement to provide a further report.
5. Unless this report expressly states to the contrary, ERM's Scope of Work was limited strictly to identifying typical environmental conditions associated with the subject site(s) and does not evaluate the condition of any structure on the subject site nor any other issues. Although normal standards of professional practice have been applied, the absence of any identified hazardous or toxic materials or any identified impacted soil or groundwater on the site(s) should not be interpreted as a guarantee that such materials or impacts do not exist.
6. Although the data that has been used in compiling this report is generally based on actual circumstances, if the report refers to hypothetical examples those examples may, or may not, represent actual existing circumstances.
7. Only the environmental conditions and or potential contaminants specifically referred to in this report have been considered. To the extent permitted by law and except as is specifically stated in this report, ERM makes no warranty or representation about:
   a. the suitability of the site(s) for any purpose or the permissibility of any use;
   b. the presence, absence or otherwise of any environmental conditions or contaminants at the site(s) or elsewhere; or
   c. the presence, absence or otherwise of asbestos, asbestos containing materials or any hazardous materials on the site(s).
8. Emissions of asbestos or other hazardous materials is not within the scope of this study;
9. This analysis has not incorporated an assessment of dust impacts to personnel located within the area bound by the boundary receptors. It is assumed the potential dust impacts to these personnel will be managed under an occupational exposure framework;
10. Use of the site for any purpose may require planning and other approvals and, in some cases, environmental regulator and accredited site auditor approvals. ERM offers no opinion as to the likelihood of obtaining any such approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works.

11. The ongoing use of the site or use of the site for a different purpose may require the management of or remediation of site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this report.
12. This report should be read in full and no excerpts are to be taken as representative of the whole report. To ensure its contextual integrity, the report is not to be copied, distributed or referred to in part only. No responsibility or liability is accepted by ERM for use of any part of this report in any other context.
13. Except to the extent that ERM has agreed otherwise with the Client in the Scope of Work or the Contract, this report:
    a. has been prepared and is intended only for the exclusive use of the Client;
    b. must not to be relied upon or used by any other party;
    c. has not been prepared nor is intended for the purpose of advertising, sales, promoting or endorsing any Client interests including raising investment capital, recommending investment decisions, or other publicity purposes;
    d. does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in or in relation to the site(s); and
14. does not purport to provide, nor should it be construed as, legal advice.

12. REFERENCES

ERM. 2019. Kurri Kurri Stack Demolition, Air Quality Services. Delta Group.

ERM. 2020. Hazelwood Stack Demolition Air Quality Assessment. ENGIE.

GHD. 2023. Liddell Future Land Use & Enabling Works Air Quality Assessment Report.

NSW Environment Protection Authority. 2022. Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.

Wellanbah Industrial. 2025. Liddell Power Station Chimney Structures – Demolition. Blast Management Sub-Plan. WI-BMP-W057-001-REV1.

APPENDIX A METEOROLOGICAL DATA

A. SELECTION OF REPRESENTATIVE YEAR

A statistical evaluation of the previous 5 years of meteorological data has been undertaken to select a representative meteorological year for dispersion modelling. Specifically, the 5-year mean frequency and standard deviation has been calculated for each of 96 wind speed / wind direction combinations (wind data 'bins'). The representativeness of each individual year has then been considered based on the average variance from the 5-year mean, where a lower average standard deviation is indicative of a meteorological year that is more consistent with the 5-year mean.

Table A 1 presents a summary of this analysis for the BoM Muswellbrook NW AWS and Singleton South AQMS, respectively. As shown in this data:

- 2022 is identified as the least representative year for both sites; and
- Best performing years are more varied between the sites and include 2020 and 2021.

The calendar year 2020 has been selected as a suitably representative year given the general consistency with the 5-year mean and presence in best performing year for all winds.

TABLE A 1 REVIEW OF ANNUAL VARIABILITY IN WINDS

Calendar Year	Avg. Wind Speed (m/s)	Frequency of calms (%)	Avg. Standard Deviation from 5-Year Mean	
			All Winds	Top 10% of Winds
Muswellbrook NW				
2020	2.56	4.8	0.69	0.48 (Best Performing)
2021	2.45	5.0	0.52 (Best Performing)	0.53
2022	2.36	5.3	0.81 (Worst Performing)	1.09 (Worst Performing)
2023	2.44	4.8	0.72	0.96
2024	2.28	5.0	0.59	0.59
Average	2.42	5.0	-	-
Singleton South				
2020	2.83	10.9	0.63 (Best Performing)	0.68
2021	2.70	11.3	0.67	0.70
2022	2.86	9.6	0.71	1.00 (Worst Performing)
2023	2.73	12.1	0.80 (Worst Performing)	0.54 (Best Performing)
2024	2.75	9.4	0.79	0.97
Average	2.77	10.6	-	-

B. WRF MODEL CONFIGURATION

WRF meteorological modelling has been conducted for 2023. The process of developing the WRF datasets involved a nested approach centred on the location of interest. The resolution and extent of each grid is outlined in Table A-2. The WRF prognostic model, incorporated available observational data from surrounding observation stations down to a resolution of 3 km, after which the NDOWN program has been executed to increase the modelled resolution to 1km. The output from the prognostic modelling has been processed through CALWRF to obtain the necessary inputs to provide to the CALMET model.

TABLE A 2 WRF MODELLING DOMAIN CHARACTERISTICS

Grid – Domain ID	Horizontal resolution	Extent
1 – d01	27 km	2700 km X 2700 km
2 – d02	9 km	1080 km X 1080 km
3 – d03	3 km	216 km X 216 km

C. INITIALISATION DATASETS

A WRF meteorological dataset has been developed for the period January to December 2020 inclusive using data from the European Centre for Medium Weather Forecasts (ECMWF) global reanalysis dataset, known as ERA5. Data from the ERA5 dataset is available for the globe once every 3 hours on a 31 km grid.

The ERA5 dataset provides information both for the surface conditions and 137 mandatory vertical levels. There are over 25 different variables including geopotential height, temperature, relative humidity, wind components, etc.

The ERA5 dataset assimilates a great deal of observational data, including surface pressure, sea level pressure, geopotential height, temperature, sea surface temperature, soil values, ice cover, relative humidity, u and v wind components, vertical motion, vorticity, winds and in-situ data such as moisture from radiosondes and pressure from surface observations. Also included in these datasets are additional precipitation data, profiler data, dropsondes, pilot balloons, aircraft temperatures and winds, land surface and moisture data and cloud drift winds from geostationary satellites. To assist in improving the performance of the WRF simulation, the ERA5 dataset has been provided to the WRF Pre-processing System (WPS) stage to provide WRF with more initial guess data both spatially and temporally at the start of the simulation.

A.2.2 GEOSPATIAL WRF INPUTS FOR THE 36/12 KM GRIDS

WRF geospatial inputs are available from the US NCAR with default sets of static data for terrain, vegetation/land use and soil type. NCAR distributes various resolutions of global terrain and land-use data bases to support WRF simulations. The data bases are:

- 5-minute (about 9.25 km in mid-latitudes);
- 2-minute (about 4.00 km in mid-latitudes);
- 30-sec (about 0.900 km in mid-latitudes); and
- 15-sec (about 0.450 km in mid-latitudes), which is only available for MODIS land use categories.

These data were assigned to ERM's WRF simulations based on the resolution of the simulation domain.

In addition to the above inputs, finer resolution inputs were derived for land use and terrain using local datasets to provide better representation of land use to the model.

A.2.3 GEOSPATIAL WRF INPUTS FOR FINER GRIDS

The conventional approach among the air quality modelling community is that WRF's highest resolution simulations are performed at 1 km gridded resolution with terrain and land use datasets at 30 arc seconds (approx. 900 m) resolution.

WRF simulations are not conventionally performed at less than 1 km gridded resolution because of the difficulty in utilizing higher resolution datasets in WRF.

A.2.4 LAND USE AND TERRAIN

For this study, an approach to utilise locally sourced land use at 1 km resolution for grids 2, 3 and 4 (10 km, 3 km and 1 km). Land use inputs to the WRF model were obtained from Australian Collaborative Land Use and Management Program (ACLUMP). These land use datasets were then translated into the MODIS 21 category as required by WRF. For terrain, SRTM data at a resolution of 90 m has been used for grids 2, 3 and 4.

A.2.5 WRF OPTIONS

In addition to the domain-wide characteristics noted above, the following discussion describes the physical schemes available within the WRF system and how they were adapted for use by ERM in the modelling analysis. The WRF model user has the choice of numerous options for running the model and its pre-processors. Table A 3 provides a listing of the primary options and includes notes detailing the reasoning behind selecting each option.

TABLE A 3 WRF SET UP OPTIONS

WRF Treatment	Option Selected	Reason & Notes
Microphysics	Thompson	A new bulk microphysical parameterization (BMP) has been developed for use with WRF. Compared to earlier single-moment BMPs, the new scheme incorporates a large number of improvements to both physical processes and employs numerous techniques found in far more sophisticated spectral/bin schemes using look-up tables. This scheme is a new scheme with ice, snow and graupel processes suitable for high-resolution simulations.

WRF Treatment	Option Selected	Reason & Notes
Shortwave & Longwave Radiation	Rapid Radiation Transfer Model (RRTMG)	This a recent version of RRTM with random cloud overlap. RRTMG provides more sophisticated cloud treatment and better suited for climate applications than RRTM (option 1). RRTMG also handles cloud fraction whereas RRTM is 1/0. Based on available guidance, this scheme is considered to be highly accurate and efficient method. This scheme also incorporates the effects of the comprehensive absorption spectrum taking water vapour, carbon dioxide and ozone into account. This scheme handles better cloud interactions with Thompson MP scheme.
Land Surface Model	NOAH	To incorporate the air-soil interaction in the WRF simulation, the Noah Land-Surface Model (LSM) was chosen. Seasonally varying vegetation and soil type are used in the model to handle evapotranspiration. The LSM model also has the effects such as soil conductivity and gravitational flux of moisture. The land-surface model is capable of predicting soil moisture and temperature in four layers (10, 30, 60 and 100 cm thick), as well as canopy moisture and water-equivalent snow depth.
Planetary Boundary Layer (PBL)	Yonsei University (YSU)	This scheme has the enhanced stable boundary layer diffusion algorithm is also devised that allows deeper mixing in windier conditions. It has the ability to predict & simulates vertical mixing. This scheme also seems to show better performance during stable conditions. This scheme was used for WRF analyses with resolutions less than 1.33 km grid resolution.
Cumulus Parameterization	Kain-Fritsch in 36 km, 12 km, 4km	This scheme generally focuses on column moisture, temperature tendencies and surface convective rainfall. It is recommended that cumulus parameterization should not be used at grid sizes < 5-10 km, as the smaller grid size is sufficient to resolve updrafts and downdrafts. Therefore, this scheme was used for WRF analyses with resolutions less than 4 km grid resolution.

WRF Treatment	Option Selected	Reason & Notes
Four-dimensional Data Assimilation (FDDA)	Analysis nudging was applied to winds, temperature & moisture in the 36 & 12 km domains; Temp & moisture nudging was turned off within the PBL; Obs-nudging was used for the 4-km resolution WRF analysis.	FDDA is a method of performing WRF simulations with the full-physics model while blending local observations. By doing so, model equations maintain dynamic consistency while at the same time restraining the model's solutions from deviating too strongly from observations or from a gridded analysis and make up for errors and gaps in the initial analysis and deficiencies in model physics. There are two types of nudging in WRF: ▪ Analysis nudging – gently forces the model solution toward gridded fields and also make use of three-dimensional analyses and surface analyses. ▪ Observation nudging ("obs nudging") - gently forces the model solution toward individual observations, with the influence of the observations spread in space and time.

A.2.6 OBSERVED METEOROLOGICAL DATA

Meteorological observations from both upper air and surface were included in the WRF FDDA simulation. Data from the global dataset, which incorporates all available observations into the WRF run to nudge the model towards the measured value.

Upper Air Observational Weather Data are composed of weather reports from radiosondes, pibals and aircraft reports from the Global Telecommunications System (GTS) and satellite data from the National Environmental Satellite Data and Information Service (NESDIS) (UCAR, 2018). This dataset includes pressure, geopotential height, air temperature, dew point temperature, wind direction and speed. Data may be available at up to 20 mandatory levels from 1000 hPa to 1 hPa, plus a few significant levels. Report intervals range from hourly to every twelve hours.

Surface meteorological data (UCAR, 2018) include variables like pressure, air temperature, dew point temperature, wind direction and speed at the ground level. Report intervals range from hourly to every three hours.

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APPENDIX Z – ASBESTOS CONTROL PLAN – LIDDELL STACK FELLING(PRENSA)

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22nd April 2026

Todd Solomon

CMA Contracting Pty Ltd

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Dear Todd,

Asbestos Control Plan and Procedure - Liddell Power Station Stack Fell

1 Introduction

This version supersedes the previously issued version with minor updates to the monitoring locations indicated in Appendix A & B

CMA Contracting Pty Ltd (CMA) has been engaged by AGL to demolish the coal fired Liddell Power Station located in the Upper Hunter Valley of NSW (the Site). Prensa is engaged by CMA as an independent Occupational Hygienist to advise on Health, Safety and Environment (HSE) related risks associated with the works and provide hazardous materials hygiene services during the demolition. Following a Comparative Risk Assessment of the demolition methods for the two chimney stacks at the Site, developed by CMA (Ref: *Demolition of Chimney Structures Comparative Risk Assessment Report Liddell Power Station Demolition Project Rev 0 Dated 27 June 2025*) it has been proposed that the chimneys are to be demolished via explosive felling with the ACM to remain in-situ.

As such, CMA has requested Prensa provide this Asbestos Control Plan and Procedure relating to the Chimney Fell Program in order to satisfy the requirements under the Work Health and Safety Regulation 2025 (NSW), and achieve the following objectives:

- **Airborne Asbestos Fibre Monitoring (Air monitoring)**
  - Validate the asbestos control measures used by CMA; and
  - Confirm that Site work areas are safe for re-occupation by unprotected personnel following the demolition of the chimney structures.
- **Provide Onsite Asbestos Advice and Guidance** for personnel directly involved in the fell, such as the blasting contractor (Wallanbah) shot firer, emergency services, CMA and AGL personnel, as

well as surrounding stackholders such as Transgrid, and the Liddell Battery Project (BESS) in the unlikely event of a misfire, stand-up or incident/accident;

- **Dust Sampling** to investigate the composition of dust depositions located outside the chimney felling exclusion zone as a result of the fell; and
- **Soil Sampling** to validate that asbestos contamination of the surface soil located within the direct path of the dust plume has not occurred as a result of the fell.

2 Emission Plume Modelling

Prensa has been provided with a modelling report (*0799289_Liddell Stack and Boiler House Demolition_Dispersion Modelling Analysis*, authored by Environmental Resource Management Australia Pty Ltd, **Attachment C**) that examines the expected environmental conditions at Site during the blasting event. The reports objectives were to identify meteorological conditions which are conducive to the effective dispersion of demolition emissions and minimisation of potential impacts to nearby infrastructure receptors.

The modelling report focuses on the dispersion and deposition of particulate matter smaller than 10 micrometres (PM10), using emission factors derived from previous studies of similar concrete stack demolition (Kurri Kurri Aluminium Smelter). While asbestos content & locations of asbestos materials within the Liddell Stacks were not considered within the modelling report, the report provides of PM10 and PM2.5 dust particle size fraction airborne concentrations and deposition levels which can be seen as analogous with potential asbestos contamination stemming from the felling event.

It is noted that due to the small concentration of asbestos containing materials within the Stacks (0.02% of the overall mass), expected concentrations of airborne asbestos fibre emissions would be significantly reduced compared to the modelled concentrations and depositions of PM10 and PM2.5 size fractions.

2.1 Preferred Environmental conditions

The following conditions are identified by the modelling report as the preferred conditions that minimise risk of harm to dust sensitive infrastructure and sensitive receptor locations:

- Periods of forecasted persistent meteorological stability, to avoid potential changes in wind speed or direction immediately before or after blasting that may alter the direction or speed of dispersion;
- Hourly average wind speeds greater than 2 m/s
- Wind directions from the south, through to the west-north-west (167° - 304°)

2.2 Likely Environmental Conditions

It is noted within the modelling report, that the preferred environmental conditions are less likely to occur during the window currently considered for the stack felling event (March-April 26), with the predominant winds being from the north-west and south-east. These predominant wind directions have the potential to impact dust sensitive infrastructure, being the Transgrid Switchyard (winds from the south-east), and BESS Project (winds from the north-west).

2.3 Environmental Conditions that may Delay Blasting

From the modelled results, the following environmental conditions should trigger a re-evaluation of the timing of the planned event, the controls in place and potentially delay blasting of the stacks, to avoid unacceptable outcomes for infrastructure receptors:

- Periods of forecasted meteorological instability, such as inversions of the dominant weather system;
- Hourly average wind speeds of less than 2 m/s;
- Wind directions from the north west, through to the south east (310° - 135°)

3 Exclusion Zones

A number of exclusion zones are to be set up for the purposes of the fell. Prensa has provided with details of the main blast exclusion zone, however, proposes the following asbestos hygiene exclusion zones, which have been colour coded to help with clarity:

Main blast exclusion zone

- To be determined by CMA and their blasting contractor Wellanbah, understood to be 600m from the base of each chimney in all directions; and
- No one will be allowed to enter this exclusion zone until all clear is given by the shot firer.

Red – Asbestos removal exclusion zone;

- The initial extent of the exclusion zone will be as indicated within **Attachment A**;
- Following visual assessment of the resulting rubble pile, two asbestos exclusion zones will be delineated, based on the visual inspection undertaken by the LAA. Generally, these will be seen to encompass, the lower quarter (~50m) of the rubble pile, and the upper 20m of the rubble pile to include the ACM know to be in situ during the blast; and
- This exclusion zone will remain as an asbestos removal zone until all chimney rubble and associated debris is removed and a clearance certificate is issued.

Orange – Primary asbestos hygiene exclusion zone:

- This will be a hard barrier and will surround the turbine hall, boiler house, and auxiliary buildings to the east of the chimneys;
- Anyone entering this zone immediately following the fell will be required to wear full PPE and RPE (Category 5/6, Type 3 Tyvek suits and minimum P2 half face respirator);
- If air monitoring results are returned as < 0.01 fibres/mL of air, this exclusion zone will be removed; and
- Decontamination areas will be provided at the entry points located to the south of this exclusion zone.

Blue – Secondary asbestos hygiene exclusion zone:

- This will follow the Liddell Power Station boundary, and include the Transgrid & AGL Switchyards, as well as the BESS Project. It will have the same restrictions as the Orange exclusion zone;
- This will be the first area required to be cleared to allow for normal works to continue the following day;
- Occupied areas (CMA/Transgrid/BESS Project Site Offices, CMA Non-Ferrous Work Areas, CMA Weighbridge Office) within this exclusion zone should be made safe prior to blasting, to protect

areas from potential adverse impacts of dust concentrations and deposition. Depending on the proximity to the blast this may include:

  - Removal of critical equipment from external areas, where possible, or coverage of equipment with plastic sheeting;
  - Blast protection (plywood, netting, etc.) over windows to protect from debris;
  - Closing of doors and windows;
  - Stoppage of HVAC systems drawing external fresh air into internal areas;
  - Sealing over vents and other similar penetrations into occupied spaces;

- Decontamination areas will be provided at the entry points located to the north and south of this exclusion zone; and
- If air monitoring results are returned as < 0.01 fibres/mL of air, this exclusion zone will be removed, and make safe materials removed from Site offices..

Refer to **Attachment A** for the provisional proposed exclusion zones.

Access around the blast and asbestos exclusion zones will be clearly delineated with appropriate barriers and signage. Prensa will enter and exit any asbestos zones wearing the appropriate PPE/RPE to conduct their tasks and decontaminate accordingly.

4 Prensa Laboratory

Prensa will use their NATA accredited laboratory on Site provided that safe access to the building can be gained. An airlock will be placed over the main entrance and decontamination facilities also provided to allow for access.

In the unlikely scenario of safe access not being achievable to the Site laboratory, a second standby location will be mobilised at a location within Muswellbrook.

Prensa will ensure that any equipment that may need to be transported from the Sydney laboratory is prepared prior to the chimney fell.

From this location, Prensa will undertake the following activities:

- Airborne asbestos fibre monitoring (air monitoring) in accordance with the *Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition* [NOHSC:3003(2005)]; and,
- Bulk Asbestos Sample Analysis for dust and soils (bulk analysis) in accordance with AS 5370:2024 *Sampling and qualitative identification of asbestos in bulk materials (ISO22262-1:2012, MOD)*, which replaces the now-withdrawn AS 4964-2004.

5 Pre and Post Fell Site Inspection

Prensa and Wallanbah staff will conduct a walkthrough of the Site prior to the chimney fell to gain an understanding of areas where ACM may be at risk of disturbance due to blasting activities from the chimney fell.

Following the chimney fell another walkthrough of the Site will be conducted to delineate asbestos exclusion zones to be maintained post felling for processing. Secondarily, all other work areas and other surrounding areas will be inspected to show that these are free from hazards or hazardous materials resulting from the chimney fell.

6 Air Monitoring

Prensa will undertake air monitoring prior to, during, and following the chimney fell with the purpose of validating the asbestos control measures used by CMA and to confirm that Site work areas are safe for re-occupation by unprotected personnel following the demolition.

6.1 Air monitoring Prior to Fell

Control and clearance air monitoring is currently being undertaken at the Site around asbestos work areas, with the air monitoring results being provided to CMA on the day of the monitoring. Air monitoring will also be undertaken on the Site and around the outer boundary of the blast exclusion zone.

6.2 Air monitoring During Fell

During the fell, air sampling monitors will be placed within the dust plume pathway. Additional monitoring will be undertaken in sensitive internal and external locations, such as the blast control point, sentry locations, TransGrid and AGL Switchyards and BESS Project. The approximate proposed monitoring locations are depicted in **Attachments A** and outlined below.

6.2.1 Dust Plume path

During the preferred environmental conditions, the predicted path of the dust plume would be in an north eastly direction across Lake Liddell. As such airborne asbestos fibre monitoring opportunities are reduced, with the proposed locations to follow the coast of the landform in this direction, as well as several locations on the east of Lake Liddell.

Due to the likely conditions during the event, additional airborne asbestos fibre monitoring locations have been proposed in the north west of the site, on AGL owned land between Lake Liddell and the New England Highway

Additional monitors will be placed in additional locations of concern 1000-5000m from the Chimney fell exclusion zone. These include the following:

- Liddell Cooling Water Dam;
- Lake Liddell Recreational Area;
- Liddell PS gatehouse; and
- Additional locations on the eastern side of Lake Liddell.

6.2.2 Primary and Secondary Hygiene Zones monitoring locations

The following locations will be included in Prensa's air monitoring program due to their sensitivity and ongoing occupation by contractors involved in the Liddell Power Station demolition, as well as by adjacent business stakeholders. These locations include:

- Liddell Power Station break rooms and Site offices;
- Liddell Power Station turbine hall, and boiler house (multiple levels);
- Additional Liddell Power Station active work areas;
- Locations of the sentries and shot firers;
- TransGrid & AGL switchyards; and
- South elevation Battery Energy Storage System (BESS) and Transformers.

These sampling locations will be predetermined and designated prior to the fell event. A number of these air monitoring locations will fall inside the exclusion zones and will be collected by Prensa staff wearing full PPE and RPE.

6.3 Clearance Air Monitoring Post Fell

Short-duration clearance air monitoring will be completed during Prensa's entry to the asbestos removal exclusion zone following clearance from the shot-firer. The purpose of this monitoring is to determine the immediate airborne concentration of asbestos fibres in the most likely locations for these materials, and if further applications of water misting / PVA spray is required, to make safe materials. The asbestos removal exclusion zone will remain regardless of the results of these initial clearance air monitoring, and will only be altered following detail investigations of the resulting rubble for asbestos contamination

Following the unlikely event of air monitoring results exceeding 0.01 fibres/mL of air, controls will be put in place, and further monitoring will be undertaken until the concentrations return to normal levels.

7 Dust Monitoring

Prensa will mobilise to the Site dust monitoring equipment for airborne particulate (PM_{10} & $PM_{2.5}$) using calibrated data logging, light scattering and integrating photometer devices. These devices can upload data directly to a web-based data portal, or store data internally for retrieval (up to one week of continuous data).

Data collected during the monitoring period will be compared to the modelling report, to validate the effectiveness of dust controls implemented during the stack fell event by CMA.

The locations of the Dust Monitoring equipment have been indicated in **Attachment A.** These monitoring locations will be mobilised several days ahead of the stack fell event to ensure background data can be collected and received.

8 Onsite Asbestos Advice and Guidance

Prensa will designate two (2) hygienists to provide advice and guidance to the incident event management team and the emergency response team respectively. This includes, but is not limited to CMA management, staff and other specific personnel on-site on the day of the felling. Designated decontamination areas will be established for access to the chimneys or other locations on the Site should the need be required.

9 Dust Sampling

Prensa will conduct dust sampling adjacent the fell exclusion zone, and on strategic locations in the path of the dust plume. Additional dust sampling will be undertaken within the TransGrid and AGL switchyards, as well as on the upper surfaces of the newly installed batteries in the south elevation BESS Project. This will determine if any asbestos-containing dust was released from the fell event beyond the predetermined fell exclusion zone. It is Prensa's understanding that dust deposits will be homogenous in composition owing to the structure of the chimneys and the proposed demolition method. As such, dusts will be collected on plastic sheeting which will be laid down a short time before the chimney blast. Should no appreciable quantities of dust be deposited on the plastic sheeting,

making it impractical to obtain the required sampling quantity, then no dust samples will be collected from these locations. Refer to **Attachment B** for the preliminary proposed dust sampling locations.

Prensa understands that the fell exclusion zone will become an asbestos removal work area. As such, any dust which remains within the fell exclusion zone will be within the asbestos removal work area and will not be the focus of the sampling.

10 Soil Sampling

Prior to the fell event Prensa will sample surface soil at strategic locations in the path of the dust plume, as well as in the BESS Project, TransGrid and AGL switch yards. This will give an understanding of any potential asbestos-contamination within the soil prior to the fell.

Following the fell event Prensa will return to the sampling locations and collect soil samples from the adjacent area. The results of the samples will then be compared to assess if the control measures taken by CMA for the fell were effective and did not result in asbestos contamination of the surface soil located within the direct path of the dust plume. Refer to **Attachment B** for proposed soil sampling locations.

11 Prensa Post Fell Priorities

- Analysis of the site wide air monitoring samples;
- Dust and soil sampling as outlined above;
- Reporting of soil, dust and air monitoring results; and
- Issuing of a letter for reoccupation to allow for works to continue the following day.

The Prensa team will have a predetermined and scheduled list of tasks, based on the fell event. They will communicate and liaise on the day through a single coordinator. Following placement of air monitors in the morning, the team will mobilised to their pre-determined positions for the fell event.

Following the fell event, the above tasks will be undertaken and results obtained in a time efficient manner. Multiple asbestos bulk ID analysts and hygienists will be available to ensure a quick turnaround of results.

Should you have any questions regarding this report, please do not hesitate to contact the undersigned on (02) 8968 2500.Yours sincerely,





Sam du Feu
Associate HSE Consultant (Author)
Prensa Pty Ltd

Jack Wearne (LAA001469 (NSW))
Managing HSE Consultant (Reviewer)
Prensa Pty Ltd

Attachments

A – LPS Chimney Stack Felling Internal Air Monitoring Locations and Asbestos Exclusion Zones

B – LPS Chimney Stack Felling Dust and Soil Sampling Locations

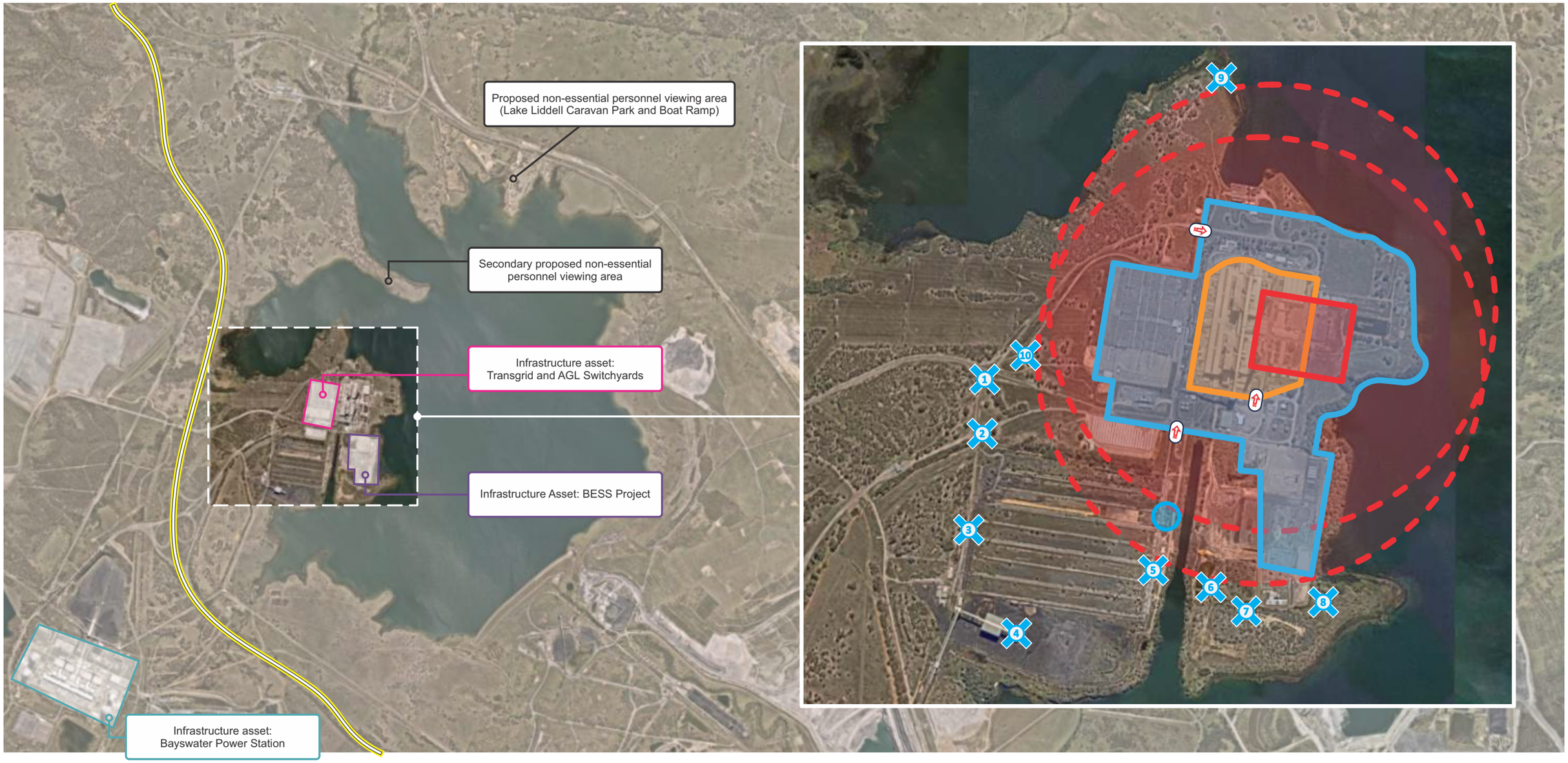
C – Dispersion Modelling Analysis Report

D – Statement of Limitations

Attachment A: LPS Chimney Stack Felling Internal Air Monitoring Locations and Asbestos Exclusion Zones

CHIMNEY STACK FELLING PLANS

Sentry Locations and Significant Assets



Not to scale - All locations are approximate

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Client:	CMA Contracting Pty Ltd		
Project:	Liddell Power Station - Hygiene Program		
Address:	Liddell Power Station, Muswellbrook NSW 2333		

Legend:

- Proposed Sentry Locations
- Proposed Shotfirer Crew
- Blast Exclusion Zone
- Primary hygiene exclusion zone
- Secondary hygiene exclusion zone
- Asbestos removal exclusion zone
- Access point and decontamination area
- New England Highway

N

File Name: 130240S Chimney Stack Felling Plans			Version: 2
Drawn By: IAI	Checked By: JXW	Date: 15/04/2026	Figure number: 1

Attachment B: LPS Chimney Stack Felling Dust and Soil Sampling Locations

CHIMNEY STACK FELLING PLANS

Airborne Asbestos Fibre Monitoring and Real-Time Dust Monitoring Locations



Not to scale - All locations are approximate

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Client:	CMA Contracting Pty Ltd		
Project:	Liddell Power Station - Hygiene Program		
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Legend:

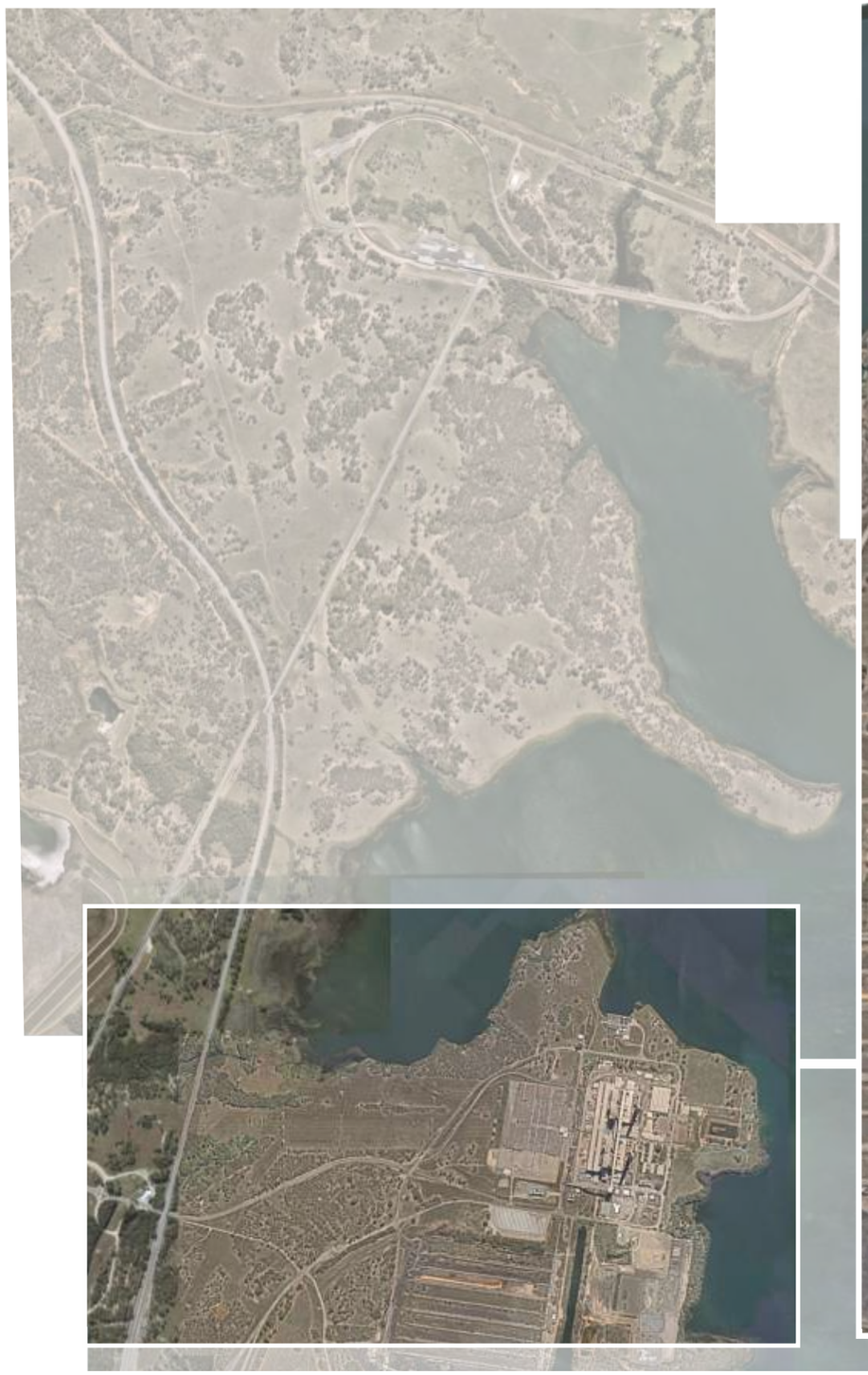
- Air Monitoring locations
- Asbestos Clearance Air Monitoring Locations
- Real-Time Dust (PM_{10} & $PM_{2.5}$) Monitoring Locations

N

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CHIMNEY STACK FELLING PLANS

Dust and Soil Sampling Locations





Not to scale - All locations are approximate

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Client: CMA Contracting Pty Ltd

Project: Liddell Power Station - Hygiene Program

Address: Liddell Power Station,
Muswellbrook NSW 2333

Legend:

- Proposed Dust and Soil Sampling Locations (Transgrid Switch Yard)
- Proposed Dust and Soil Sampling Locations (AGL 330kV Switch Yard)
- Proposed Dust and Soil Sampling Locations (Liddell Battery Energy Storage Systems BESS)
- Plume dust and soil sampling points

N

File Name:			Version:
130240S Chimney Stack Felling Plans			2
Drawn By:	Checked By:	Date:	Figure number:
IAI	JXW	15/04/2026	3

Attachment C: Emission Plume Modelling Report

Liddell Stack and Boiler House Demolition

Air Quality Management Support

PREPARED FOR
CMA Contracting Pty Ltd

DATE
October 2025

REFERENCE
0799289



DOCUMENT DETAILS

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SIGNATURE PAGE

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CONTENTS

EXECUTIVE SUMMARY 1

1. INTRODUCTION 1

1.1 SCOPE OF WORKS 1

2. STRUCTURES PROPOSED FOR DEMOLITION 2

3. SITE AND SURROUNDS 5

3.1 SITE LOCATION 5
3.2 TOPOGRAPHY 5
3.3 MODEL RECEPTORS 8

4. CLIMATE AND LOCAL METEOROLOGY 11

4.1 CLIMATIC CONDITIONS 11
4.2 WIND FIELD 14

5. ESTIMATED EMISSIONS FROM BLASTING 18

6. MODEL CONFIGURATION 20

6.1 SOURCE CONFIGURATION 20
6.2 PARTICLE SIZE DISTRIBUTION 20
6.3 MODELLING METHODOLOGY 20
6.3.1 METEOROLOGICAL MODELLING 20
6.3.2 CALPUFF MODEL DOMAIN AND CONFIGURATION 21

7. DISPERSION METEOROLOGY 22

7.1 WIND FIELD 22
7.2 MIXING HEIGHT 25
7.3 ATMOSPHERIC STABILITY 26

8. DISPERSION MODELLING RESULTS 29

8.1 PREFERRED CONDITIONS 29
8.1.1 CHIMNEY STACK DEMOLITION 29
8.1.2 BOILER HOUSE DEMOLITION 46
8.1.3 PREFERRED METEOROLOGICAL CONDITIONS FOR DEMOLITION 62
8.2 SOUTHEASTERLY WINDS 67
8.2.1 Chimney Stack demolition 67
8.2.2 BOILER HOUSE DEMOLITION 80
8.2.3 Summary and frequency of Southeasterly Winds 91
8.3 COMPARISON OF PREFERRED CONDITIONS AND SOUTHEASTERLY WINDS 95

9. ASSUMPTIONS AND UNCERTAINTIES 104

10. CONCLUSIONS 105

11. STATEMENT OF LIMITATIONS 107

12. REFERENCES 109

APPENDIX A METEOROLOGICAL DATA

A. Selection of Representative Year
B. WRF Model Configureation
C. Initialisation Datasets

LIST OF TABLES

TABLE 3-1	SENSITIVE AND DISCRETE RECEPTORS SURROUNDING THE PROJECT SITE	8
TABLE 4-1	SUMMARY OF CLIMATE STATISTICS FOR SINGLETON DEFENCE AWS FOR THE PERIOD 1969 - 1990	11
TABLE 4-2	SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS	12
TABLE 5-1	LOCATION AND KEY DIMENSIONS FOR THE CHIMNEY STACKS	18
TABLE 5-2	LOCATION AND KEY DIMENSIONS FOR THE BOILER HOUSE	18
TABLE 5-3	EMISSION FACTORS FOR TONNE OF CONCRETE	19
TABLE 5-4	CALCULATED EMISSION RATES	19
TABLE 6-1	SOURCE CONFIGURATION IN MODEL	20
TABLE 7-1	PASQUILL GIFFORD STABILITY CLASSIFICATION	27
TABLE 8-1	NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)	65
TABLE 8-2	NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 M/S FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)	93

LIST OF FIGURES

FIGURE 2-1	LOCATION OF INFRASTRUCTURE FOR DEMOLITION	2
FIGURE 2-2	PLANNED FELL DIRECTION OF THE CHIMNEYS	4
FIGURE 3-1	LOCATION OF THE LIDELL POWER STATION	6
FIGURE 3-2	TOPOGRAPHY SURROUNDING THE PROJECT	7
FIGURE 3-3	SENSITIVE RECEPTORS SURROUNDING THE PROJECT	10
FIGURE 4-1	LOCATION OF SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS	13
FIGURE 4-2	ANNUAL AVERAGE WIND ROSES FOR 2020 TO 2024 (NSW DCCEEW) AND 2024 TO 2025 (AGL)	15
FIGURE 4-3	DIURNAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025	16
FIGURE 4-4	SEASONAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025	17
FIGURE 7-1	COMPARISON OF MODELLED VERSUS OBSERVED ANNUAL WIND FIELD AT AGL FOR 2020 (MODELLED) AND SEPTEMBER 2024 – AUGUST 2025 (OBSERVED)	23
FIGURE 7-2	MODELLED DIURNAL WIND ROSES FOR AGL FOR 2020	24
FIGURE 7-3	MODELLED SEASONAL WIND ROSES FOR AGL FOR 2020	25
FIGURE 7-4	DIURNAL DISTRIBUTION OF MIXING HEIGHTS	26
FIGURE 7-5	FREQUENCY OF ATMOSPHERIC STABILITY CATEGORIES	28
FIGURE 8-1	STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)	31
FIGURE 8-2	STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)	32
FIGURE 8-3	STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)	34
FIGURE 8-4	STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)	35

FIGURE 8-5 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu G/M^3$) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 36
FIGURE 8-6 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 37
FIGURE 8-7 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 38
FIGURE 8-8 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT) 39
FIGURE 8-9 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 41
FIGURE 8-10 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 42
FIGURE 8-11 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 44
FIGURE 8-12 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 45
FIGURE 8-13 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 47
FIGURE 8-14 BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS) 48
FIGURE 8-15 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 50
FIGURE 8-16 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS) 51
FIGURE 8-17 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 52
FIGURE 8-18 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 53
FIGURE 8-19 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 54
FIGURE 8-20 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu G/M^3$) 55
FIGURE 8-21 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 57
FIGURE 8-22 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 58
FIGURE 8-23 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 60
FIGURE 8-24 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS) 61
FIGURE 8-25 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF PREFERRED METEOROLOGICAL CONDITIONS BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET 64
FIGURE 8-26 NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET) 66
FIGURE 8-27 QQ PLOT COMPARING FREQUENCY DISTRIBUTION OF OBSERVED AND MODELLED WINDS 67
FIGURE 8-28 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 69
FIGURE 8-29 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 70
FIGURE 8-30 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 72
FIGURE 8-31 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 73
FIGURE 8-32 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 75

FIGURE 8-33 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 76
FIGURE 8-34 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 78
FIGURE 8-35 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 79
FIGURE 8-36 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 81
FIGURE 8-37 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 82
FIGURE 8-38 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS) 83
FIGURE 8-39 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3M/S WIND SPEEDS) 84
FIGURE 8-40 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 86
FIGURE 8-41 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 87
FIGURE 8-42 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS) 89
FIGURE 8-43 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3M/S WIND SPEEDS) 90
FIGURE 8-44 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF SOUTHEASTERLY WINDS > 3 M/S BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET 92
FIGURE 8-45 REDUCTION IN 1-HOUR MAXIMUM PREDICTION ACROSS INFRASTRUCTURE RECEPTORS DUE TO APPLICATION OF A WIND SPEED THRESHOLD 93
FIGURE 8-46 NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 M/S FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET) 94
FIGURE 8-47 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 96
FIGURE 8-48 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 97
FIGURE 8-49 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 98
FIGURE 8-50 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 99
FIGURE 8-51 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 100
FIGURE 8-52 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 101
FIGURE 8-53 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 102
FIGURE 8-54 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ ($\mu G/M^3$) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3M/S (RIGHT) 103

ACRONYMS AND ABBREVIATIONS

Acronym	Description
AQMS	Air Quality Monitoring Station
AWS	Automatic Weather Station
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
DCCEEW	Department of Climate Change, Energy, the Environment and Water
ERM	Environmental Resources Management Australia Pty Ltd
GLC	Ground Level Concentrations
LGA	Local Government Area
NSW	New South Wales
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 µm
POEA	Protection of the Environment Operations Act 1997
TSP	Total Suspended Particulates
WRF	Weather Research and Forecasting

EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by CMA Contracting Pty Ltd (CMA) to undertake a pre-demolition air quality analysis for the proposed demolition of the two chimney stacks and boiler houses at the AGL Liddell Power Station (the Site) in the Hunter Valley Region of New South Wales (NSW).

CMA has been engaged by AGL to demolish the power station. ERM understands that there are no formal environmental approval conditions to be met with regard to off-site air emissions from the demolition activities. This work is being undertaken voluntarily by CMA to inform the blast risk management plan.

The analysis was completed with the objective of understanding the relative magnitude of potential air quality impacts (focusing on the concentration of particulates in air and deposited dust) for various potential blast windows in order to identify meteorological conditions that are conducive to effective dispersion to inform the selection of blast windows to minimise risk of harm from air emissions so far as reasonably practicable. The study has aimed to provide information to minimise risk of harm at on-site infrastructure as well as across the wider area.

A review of local meteorological data was completed, which indicated that predominant winds occur from the north-westerly and south-easterly sectors. It is noted that terrain in the wider area is complex, and large-scale wind patterns are altered by smaller-scale terrain features scattered throughout the valley.

The subsequent analysis involved the preparation of a site-specific atmospheric dispersion model, incorporating a 1-year long hourly meteorological dataset using the US National Center for Atmospheric Research (NCAR) Weather Research and Forecasting (WRF) meteorological model, in conjunction with the CALMET meteorological processor.

Emissions from stack felling and boiler house demolition were estimated using an existing methodology that was applied for the Engie Hazelwood stack and boiler house demolitions, as well as the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019; 2020). Modelling predictions were prepared for two sets of receptors:

- 'Infrastructure receptors' which were designated at locations around the adjacent TransGrid switchyard and AGL battery energy storage system (BESS), (currently under construction).
- 'Screening receptors' which were designated at areas surrounding the Site for the purposes of providing a generic understanding of the scale of potential impacts in the broader area. Locations generally following the boundary of Lake Liddell to the east and the New England Highway to the west were selected, inclusive of known sensitive receptor locations (residences and a recreation area).

The meteorological and dispersion model configurations were developed with reference to the New South Wales EPA *Approved Methods for the Modelling and Assessment of Pollutants in New South Wales* (2022). For the purposes of this study, relative magnitudes of pollutants at receptor locations have been focused on, rather than assessing predictions against impact assessment criteria as this study is not for compliance purposes but is a planning tool.

The modelling predictions were analysed to identify meteorological conditions which are conducive to effective dispersion of demolition emissions and minimisation of potential impacts on infrastructure receptors.

The modelling predictions vary significantly with wind speed, wind direction and time of day. Based on these predictions, the following meteorological conditions are suggested as preferred conditions for completion of blasting to minimise risk of harm to dust sensitive infrastructure areas and at sensitive receptor locations so far as reasonably practicable:

- Hourly average wind speeds greater than 2 m/s (~4 knots); and
- Wind directions from the south through to the west-north-west (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure areas.

The preferred wind directions do not generally align with the predominant winds, however, they do occur and with greater frequency during the autumn and winter months.

CMA also requested analysis of blasting during predominant southeasterly wind directions. This analysis identified that particulate concentrations could be minimised by blasting during southeasterly winds when the hourly average wind speed was greater than 3 m/s (~6 knots).

A comparison of preferred conditions and southeasterly winds has shown:

- Preferred conditions and southeasterly winds greater than 3 m/s may result in particulate concentrations at screening receptors that are comparable in magnitude. However, particulate concentrations across infrastructure receptors during southeasterly winds greater than 3 m/s are significantly higher than those predicted during preferred conditions (>2 m/s winds from southwest directions).
- Deposition rates across infrastructure receptors due to blasting during southeasterly wind directions cannot be materially reduced by blasting when winds are above a certain speed or during certain hours of day. The Transgrid switchyard is directly downwind of the blast sites during southeasterly winds and the types of hazards and/or damage that may arise due to dust from blasting under these meteorological conditions should be considered during blast planning.

This study focused on PM_{10} and dust deposition, however contour plots for $PM_{2.5}$ have also been produced. In this study, $PM_{2.5}$ will behave in the same fashion as PM_{10} with respect to wind direction and wind speed given that PM_{10} was modelled as a tracer gas, i.e. without accounting for deposition. Contour plots for $PM_{2.5}$ have been produced for the chimney felling and boiler house demolition scenarios to provide an understanding of the reduction in predictions due to blasting during preferred wind directions. $PM_{2.5}$ concentrations have been calculated from PM_{10} concentrations by multiplying by 0.44 which is the ratio of the $PM_{2.5}$ and PM_{10} emission factors developed for blasting in the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019).It is also recommended that blasting be conducted during periods of forecast persistent meteorological conditions, to avoid potential changes in wind speeds or directions immediately before or after blasting that may alter the direction or speed of dispersion.

It is noted that the AGL on-site weather station records lower wind speeds than those generated by the WRF meteorological model and used in the dispersion modelling study. Should the AGL on-site weather station be used to inform blasting decisions, further consideration of the siting influences would be required.

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was appointed by CMA Contracting Pty Ltd (CMA) to undertake a dispersion modelling study of potential dust emissions associated with the proposed demolition of the two chimney stacks and boiler houses at the AGL Liddell Power Station in the Hunter Region of New South Wales (NSW).

Liddell Power Station ceased operations in 2023 and is in the process of transitioning into an industrial renewable energy hub, known as the Hunter Energy Hub. As part of this, a new 500 MW Battery Energy Storage System (BESS) and 330/33 kV Transition Switchyard are being constructed to the south-west of the site and it is understood that this new infrastructure is sensitive to dust. There is also an existing TransGrid 330 kV Switchyard to the immediate west of the site. There is also an existing TransGrid 330 kV Switchyard to the immediate west of the site that has been identified as sensitive to dust. Sensitive receptors are also located to the east and north of Lake Liddell.

CMA has been engaged by AGL to demolish the power station. ERM understands that there are no formal environmental approval conditions to be met with regard to off-site air emissions from the demolition activities. This work is being undertaken voluntarily by CMA to inform the last risk management plan.

This dispersion modelling study aims to understand the relative potential air quality impacts for various potential blast windows. This information will be used to inform blast risk management practices. The study has considered potential air quality impacts on dust-sensitive infrastructure located on-site as well as at key sensitive receptor locations further afield. The study is not intended for compliance purposes and has focused on identifying meteorological conditions that will minimise the risk of harm associated with air emissions from blasting so far as reasonably practicable. It is anticipated that blasting of the chimneys will take place from February to May 2026 and the boiler house later in the year. Blasting is likely to occur during the daytime between 09:00 and 17:00. The intended blast time is to be 13:30 although this is dependent upon the prevailing weather conditions and site requirements (WI, 2025).

1.1 SCOPE OF WORKS

The following scope of works has been completed as part of this study:

- Perform meteorological modelling using the Weather Research and Forecasting (WRF) meteorological model for a representative calendar year;
- Review demolition parameters and define an emission source term for inclusion in the atmospheric dispersion modelling, inclusive of physical parameters and emission quantities of dust and particulate matter;
- Conduct air dispersion modelling using CALPUFF model with generation of contour plots showing the spatial variability of downwind dust and particulate matter concentrations. Modelling has been conducted for one boiler house only; and
- Assess the predicted dust and particulate matter concentrations against the applicable impact assessment criteria on an incremental basis.

2. STRUCTURES PROPOSED FOR DEMOLITION

As part of the Project, two chimney stacks with a total height of 169 metres (m) each and two boiler houses are proposed to be demolished via blasting (Figure 2-1).

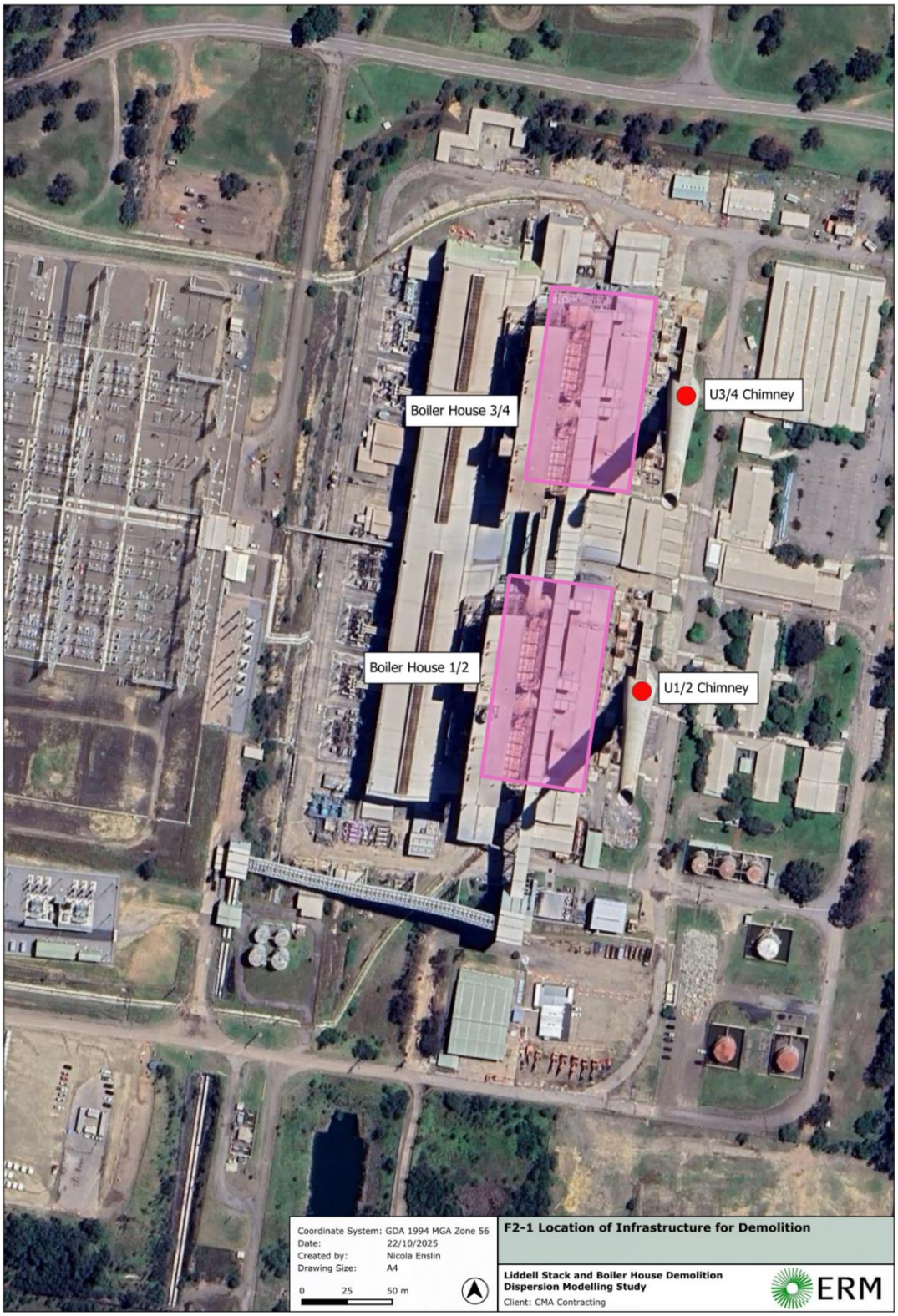


FIGURE 2-1 LOCATION OF INFRASTRUCTURE FOR DEMOLITION

The demolition of the two chimney structures will be achieved via an explosive-induced collapse. This process includes:

- 200 mm core holes drilled at termination points of front portion (bird's mouth);
- Triangular/trapezoidal portion of chimney removed between 200mm core hole and start of charge pattern;
- 28 mm holes drilled in the front face of the chimney (fell direction side) in accordance with blast design;
- Rear portion of chimney saw cut to extents provided in the blast design;
- Holes packed with explosive charges;
- Explosives detonated to remove front portion (bird's mouth) of the chimney base and induce the collapse of the structures crossing over on an alignment which is 20° from a site north to south orientation; and
- Excavators are to be used for processing and loadout of materials.

The chimneys are positioned on the eastern side of the site, between the boiler houses and Lake Liddell. The direction of collapse has been selected to fall away from the switchyard and other infrastructure (Figure 2-2).

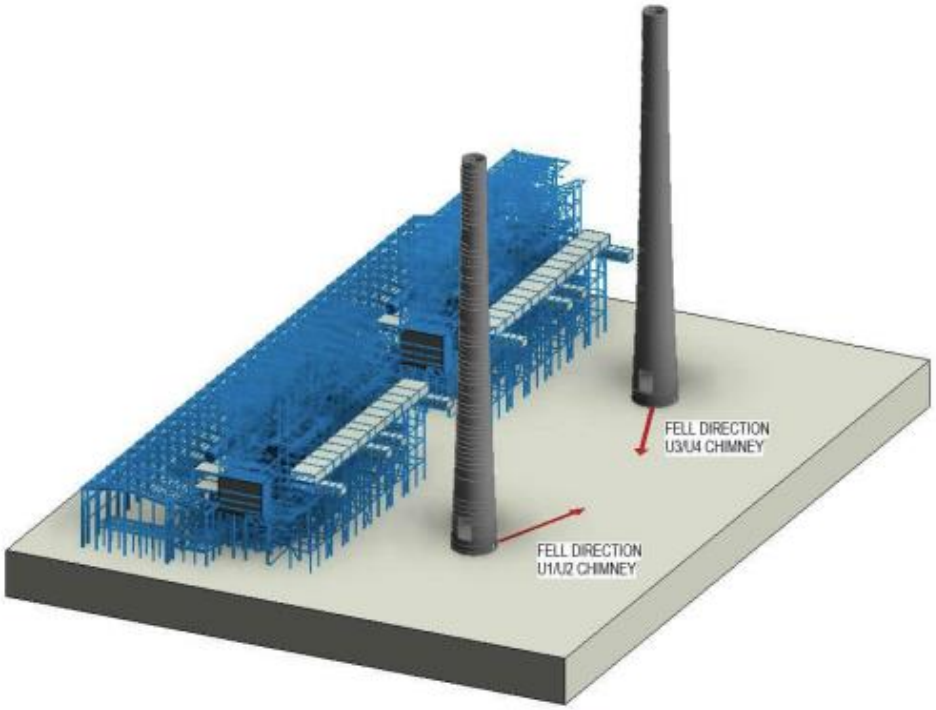


FIGURE 9 – FELL DIRECTION FOR CHIMNEYS

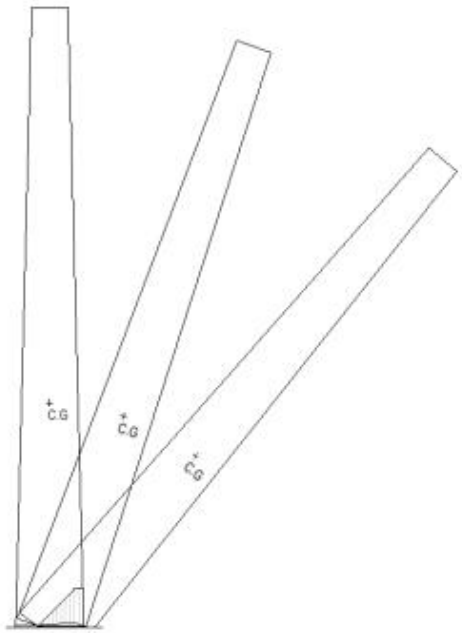


FIGURE 2-2 PLANNED FELL DIRECTION OF THE CHIMNEYS

3. SITE AND SURROUNDS

3.1 SITE LOCATION

The site is situated in the Muswellbrook Local Government Area (LGA), located approximately 15 kilometers (km) southeast of Muswellbrook, 25 km northwest of Singleton and 165 km north-west of Sydney (Figure 3-1). Lake Liddell is located to the immediate east of the site with Bayswater Power Station located approximately 3 km to the south-west of the site. The New England highway runs to the west of the site.

3.2 TOPOGRAPHY

The site is located in the undulating low hills of the Upper Hunter Valley (Figure 3-2). Elevation at the site ranges from approximately 130 to 160 metres above sea level (mAHD). Elevation peaks to the north-east of the site at approximately 674 mAHD. The terrain in the area results in complex meteorological patterns, with valley flows likely to be altered by the smaller scale terrain features scattered throughout the region.

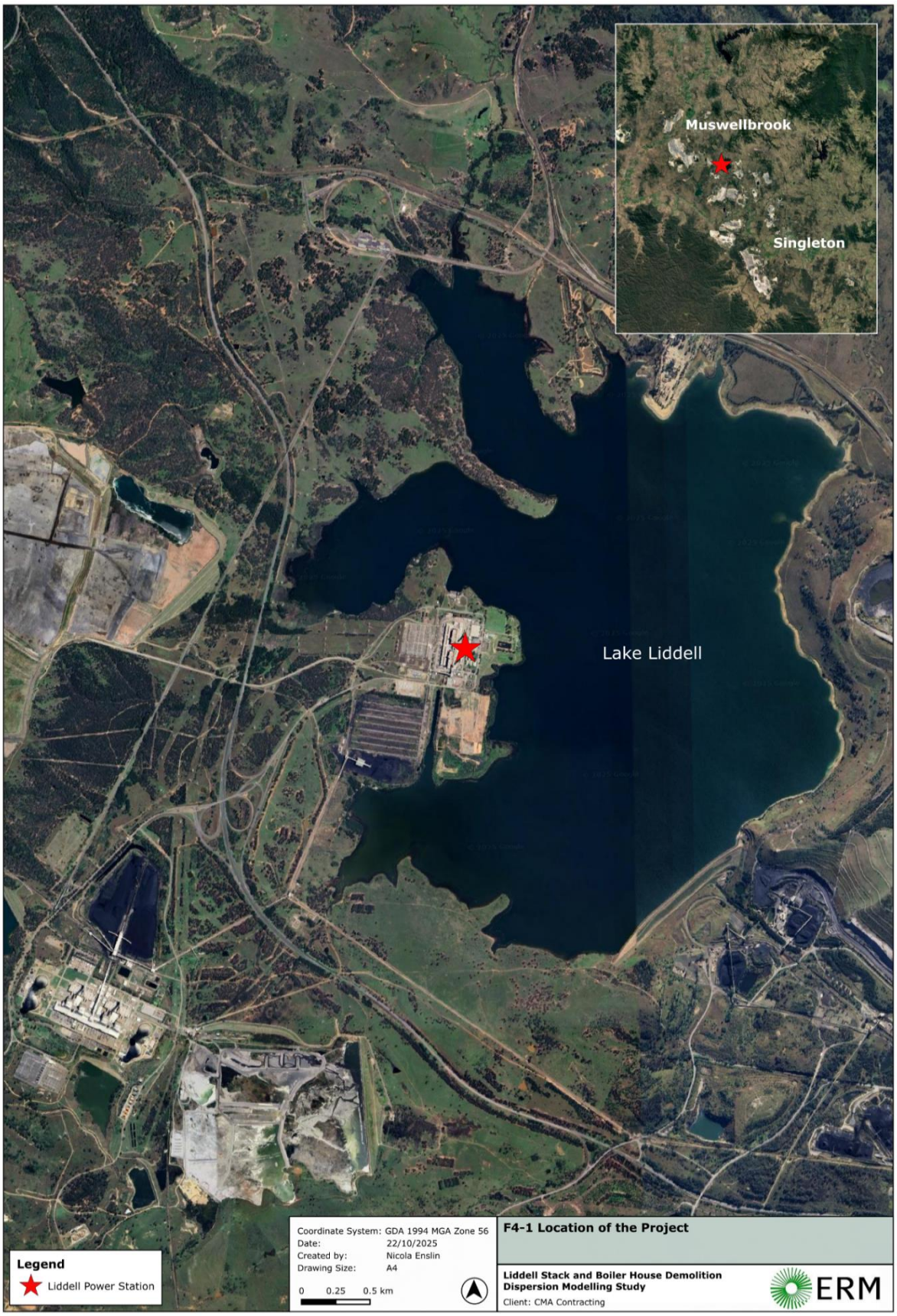


FIGURE 3-1 LOCATION OF THE LIDELL POWER STATION

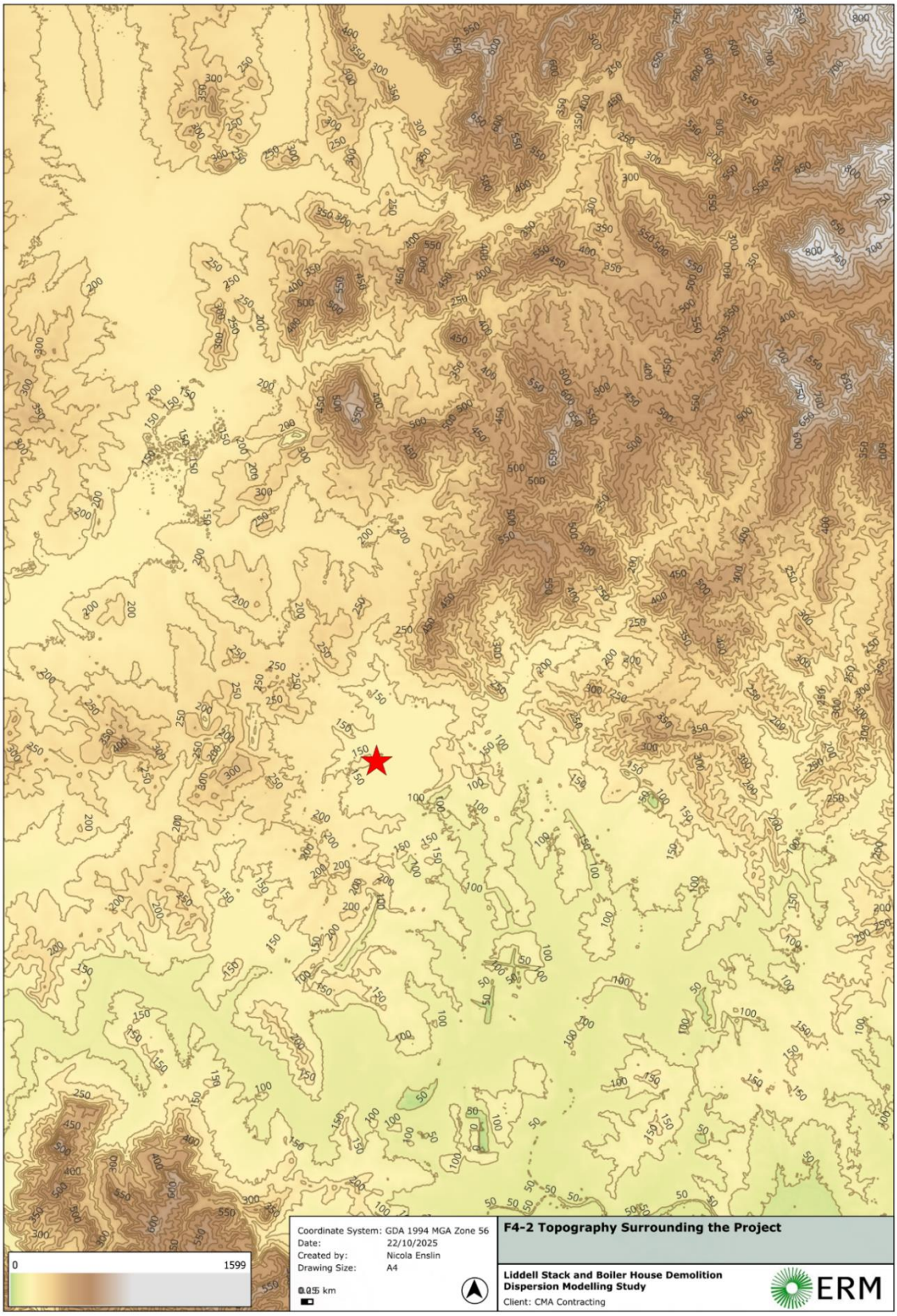


FIGURE 3-2 TOPOGRAPHY SURROUNDING THE PROJECT

3.3 MODEL RECEPTORS

Sensitive receptors applicable to the study were obtained from the Liddell Future Land Use & Enabling Works Air Quality Assessment Report (GHD, 2023) and the Blast Management Sub-Plan for the Liddel Power Station Chimney Structures - Demolition (Wellanbah Industrial, 2025). These comprised five locations on the north and eastern side of Lake Liddell that are recreational or residential locations.

To examine the potential variations in air quality impacts of various blast windows on dust-sensitive infrastructure, a grid of discrete receptors spaced approximately 100m apart across the switchyard and BESS areas have been incorporated into the model.

Boundary receptors have also been included to examine potential variations in air quality impacts in the wider region. Whilst it is acknowledged that AGL own a significant portion of land in the vicinity, it is understood that no other land closures are planned outside the 600 m radius exclusion zone. A ring of discrete receptors generally following the boundary of Lake Liddell to the east and the New England Highway to the west has been included in the model as boundary receptors. It should be noted that these locations are generic and have been selected to enhance the understanding of dispersion across the area. Whilst modelling predictions have also been provided across a 100 m resolution receptor grid, this analysis has not incorporated an assessment of dust impacts to workers located within the area bound by the boundary receptors. It is assumed the potential dust impacts to these personnel will be managed under an occupational exposure framework.

The locations of the discrete receptors included in the dispersion modelling study are shown in Table 3-1 and Figure 3-3.

TABLE 3-1 SENSITIVE AND DISCRETE RECEPTORS SURROUNDING THE PROJECT SITE

Receptor ID	Receptor Name	Receptor Type	Distance and Direction from Site	Easting (m)	Northing (m)
SR1	Lake Liddell Sports and Recreation Area	Recreational	2.2 km North-northeast	311,495	6,418,844
SR2	Residence	Residential	3.5 km North	309,974	6,420,346
SR3	Residence	Residential	3.6 km North	310,329	6,420,362
SR4	Residence	Residential	3.6 km North	312,671	6,419,281
SR5	Residence	Residential	5.0 km North-east	309,139	6,421,587
SR6	Bayswater Power Station	Power Station	2.5 km West-southwest	307,607	6,414,937

Receptor ID	Receptor Name	Receptor Type	Distance and Direction from Site	Easting (m)	Northing (m)
IR1 – 15	TransGrid 330 kV Switchyard	Infrastructure	230 m West	309,575	6,416,596
IR16 - 17	Transition 330/33kV Substation	Infrastructure	330 m South-west	309,455	6,416,302
IR 18 – 32	Battery Energy Storage System	Infrastructure	220 m South	309,848	6,416,237
BR1 – 20	Boundary Receptors	Site Boundary	Various	Various	Various

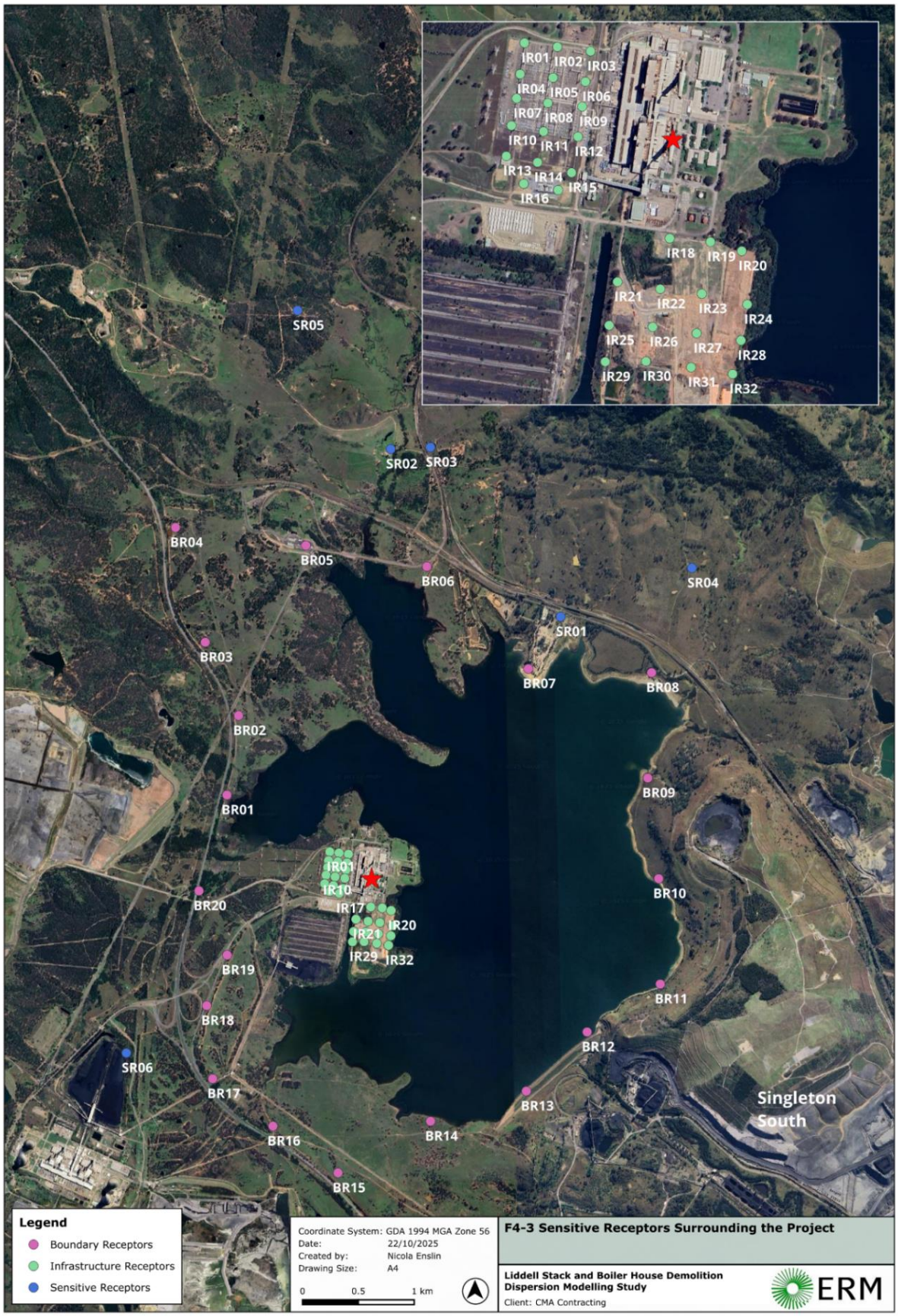


FIGURE 3-3 SENSITIVE RECEPTORS SURROUNDING THE PROJECT

4. CLIMATE AND LOCAL METEOROLOGY

4.1 CLIMATIC CONDITIONS

The Hunter Valley region experiences a temperate climate, characterised by warm to hot summers and mild winters, with most rainfall occurring during the warmer months. Meteorological conditions in the region are influenced by both coastal and inland weather patterns, resulting in variable wind directions and wind speeds throughout the year. The region is prone to atmospheric stability, particularly during the cooler winter months and under calm, clear conditions which are conducive to the formation of temperature inversions. These inversions inhibit vertical atmospheric mixing which can trap pollutants close to the ground, increasing the potential for elevated pollutant concentrations.

A summary of the climate statistics recorded at the Bureau of Meteorology (BoM) Singleton Defence Automatic Weather Station (AWS), the nearest BoM weather station to the site, is given in Table 4-1. This station is located approximately 40 km to the south-east of the site.

The local climate at Singleton Defence AWS is characterised by:

- A mean maximum temperature of 30.6 °C in January (summer) and a mean minimum temperature of 5.4 °C in July (winter); and
- Mean highest rainfall during the summer and early autumn months (January - March) with 94.3 mm recorded in January.

TABLE 4-1 SUMMARY OF CLIMATE STATISTICS FOR SINGLETON DEFENCE AWS FOR THE PERIOD 1969 - 1990

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily Mean Temperature												
Maximum (°C)	30.6	29.6	28.1	24.8	21.0	17.7	17.1	19.2	22.2	25.4	27.4	30.2
Minimum (°C)	17.6	17.8	16.0	12.8	9.7	6.8	5.4	6.3	8.8	11.8	14.1	16.6
Rainfall												
Mean (mm)	94.3	88.9	72.7	58.4	59.7	37.9	28.2	37.1	45.3	69.1	68.5	63.0
Mean days of rain	8.0	7.7	7.7	6.3	6.3	5.4	4.9	5.1	5.7	7.1	7.8	6.5
Mean 9am conditions												
Temperature (°C)	22.6	22.0	21.1	17.7	13.8	10.6	9.6	11.4	15.5	19.1	19.8	22.5
Wind speed (km/hr)	5.6	5.6	6.4	6.3	6.3	6.7	7.9	7.0	7.6	7.7	6.8	6.7
Mean 3pm conditions												
Temperature (°C)	28.6	27.7	26.5	23.4	19.8	16.7	16.2	18.3	21.1	24.1	25.4	28.5
Wind speed (km/hr)	11.2	11.6	10.2	9.1	8.3	8.1	9.7	9.7	9.7	11.2	11.9	12.1

The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) operates a network of ambient air quality and meteorological monitoring stations (AQMS) in the Upper Hunter Valley region. Meteorological data was obtained from the nearest NSW DCCEEW stations to the site for the period January 2020 – December 2024. Liddell Power Station also operates an on-site meteorological monitoring station, located approximately 1.3 km to the west-southwest of the site. Meteorological data was obtained from this station for the period September 2024 – August 2025.

The location of the ambient air quality and meteorological monitoring stations surrounding the site are given in Table 4-2 and shown in Figure 4-1.

TABLE 4-2 SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS

Station Name	Parameters Measured	Easting (m)	Northing (m)
AGL			
AGL Met Station	Wind direction, wind speed, temperature, relative humidity and solar radiation	308268	6416161
NSW DCCEEW			
Camberwell	Wind direction, wind speed, temperature, relative humidity and rain	320690	6405617
Jerry's Plains	Wind direction, wind speed, temperature and relative humidity	300779	6404717
Maison Dieu	Wind direction, wind speed, temperature and relative humidity	317976	6399745
Muswellbrook NW	Wind direction, wind speed, temperature and relative humidity	300418	6429514
Singleton South	Wind direction, wind speed, temperature and relative humidity	331895	6393088

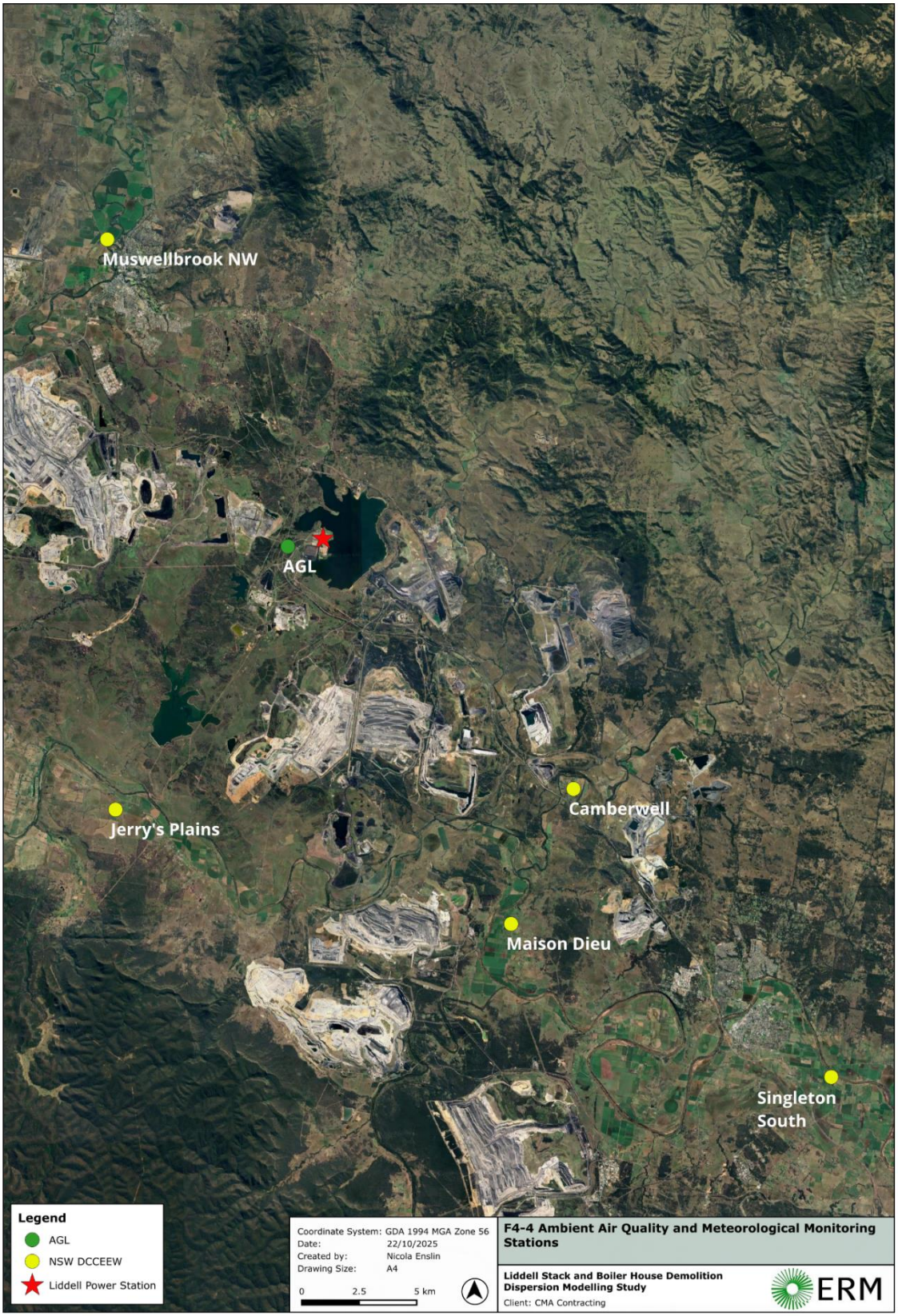


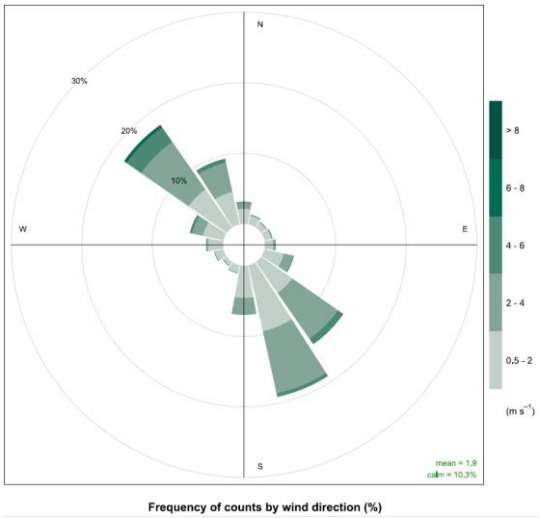
FIGURE 4-1 LOCATION OF SURROUNDING AMBIENT AIR QUALITY AND METEOROLOGICAL MONITORING STATIONS

4.2 WIND FIELD

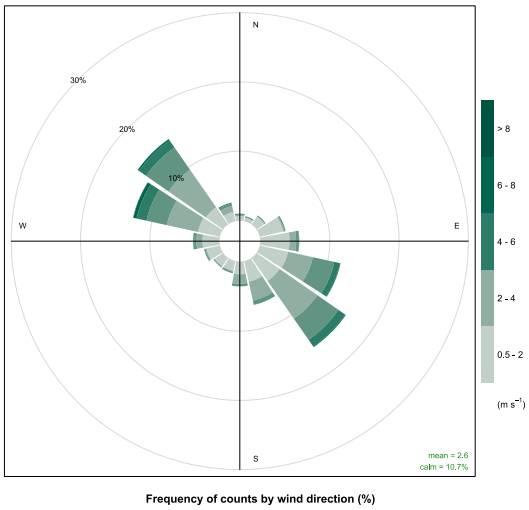
An overview of the prevailing wind field in the region is given in the section below. Annual average wind roses for the NSW DCCEEW Camberwell, Jerry's Plains, Maison Dieu, Muswellbrook NW and Singleton South AQMS for the period January 2020 – December 2024 are shown in . Annual, diurnal and seasonal wind roses for AGL's on-site meteorological station for the period September 2024 to August 2025 are shown in Figure 4-2 to Figure 4-4.

Based on the available meteorological data:

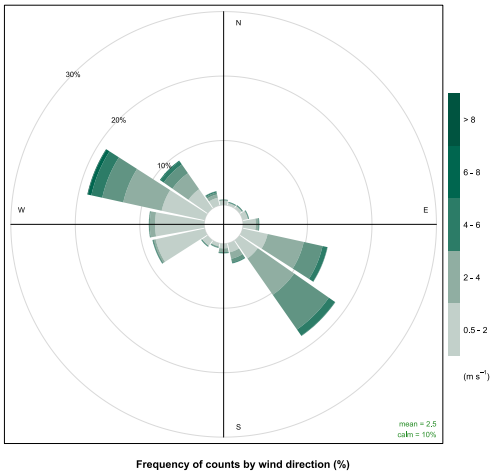
- Winds in the region originate predominantly from the north-westerly and south-easterly sectors at most stations, reflecting the combined influence of local channelling within the Upper Hunter Valley and regional land and sea breezes characteristic of coastal environments. The AGL on-site meteorological station shows a similar signature with winds originating predominantly from the north-west, north-northwest, south-southeast and southeast; A slight variation in the wind field at the Muswellbrook NW station is observed, with predominant winds from the north-east rather than the north-west. This additional north-easterly component is also seen at the Maison Dieu station. The observed differences in the wind field at Muswellbrook NW and Maison Dieu are likely due to localised terrain influences;
- A consistent diurnal wind pattern is observed at the AGL on-site meteorological station, with prevailing winds from the north-westerly and south-easterly sectors over all time periods. Changes in wind speed are observed. During the early morning (00:00 – 06:00), predominant winds are light and increase in strength during the late morning (06:00 – 12:00) and into the afternoon (12:00 – 18:00), before reducing during the evening (18:00 – 24:00). A slight shift in southerly wind directions is also observed, from frequent south-southwesterlies overnight to higher frequencies of southeasterly winds during the day;
- Seasonal winds at the AGL on-site meteorological station are predominantly from the north-westerly and south-easterly sectors during spring (September, October and November). During summer (December, January and February) winds from the north-west are reduced with moderate to strong winds originating predominantly from the south-east and south-southeast. A similar wind field is seen during the autumn months (March, April and May) while during winter (June, July and August), winds shift to the north-west and north-northwest;
- Winds are generally slow to moderate at all stations with mean wind speeds ranging from 1.7 - 2.9 m/s; and
- Calm conditions, which are defined as wind speeds less than 0.5 m/s, are variable and range from 4 to 14.6% of time across the stations. Calm conditions were observed to be much more frequent during the autumn (14.2%) and winter (14.6%) months at the AGL on-site meteorological station compared with spring and summer months (approximately 6%).



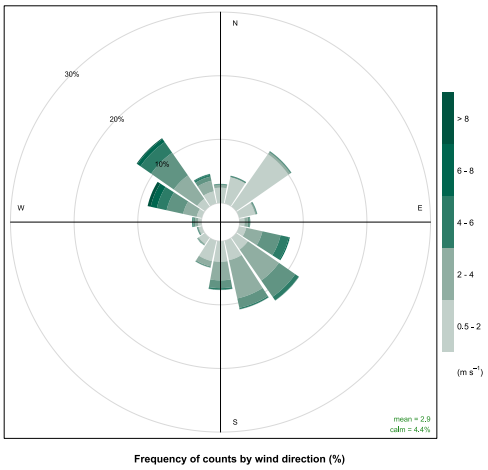
AGL On-site



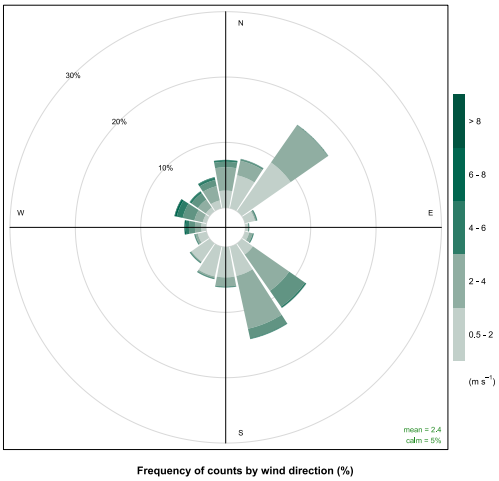
Camberwell



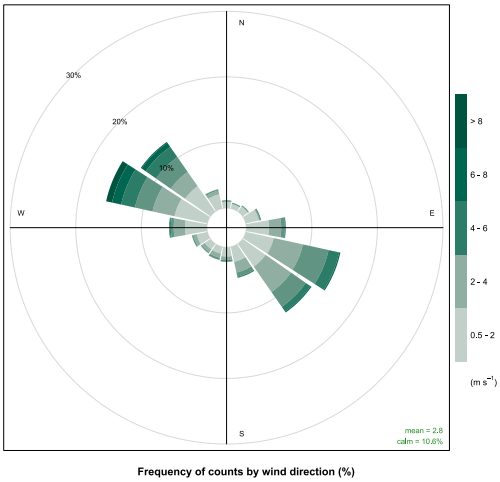
Jerry's Plain



Maison Dieu



Muswellbrooke NW



Singleton South

FIGURE 4-2 ANNUAL AVERAGE WIND ROSES FOR 2020 TO 2024 (NSW DCCEEW) AND 2024 TO 2025 (AGL)

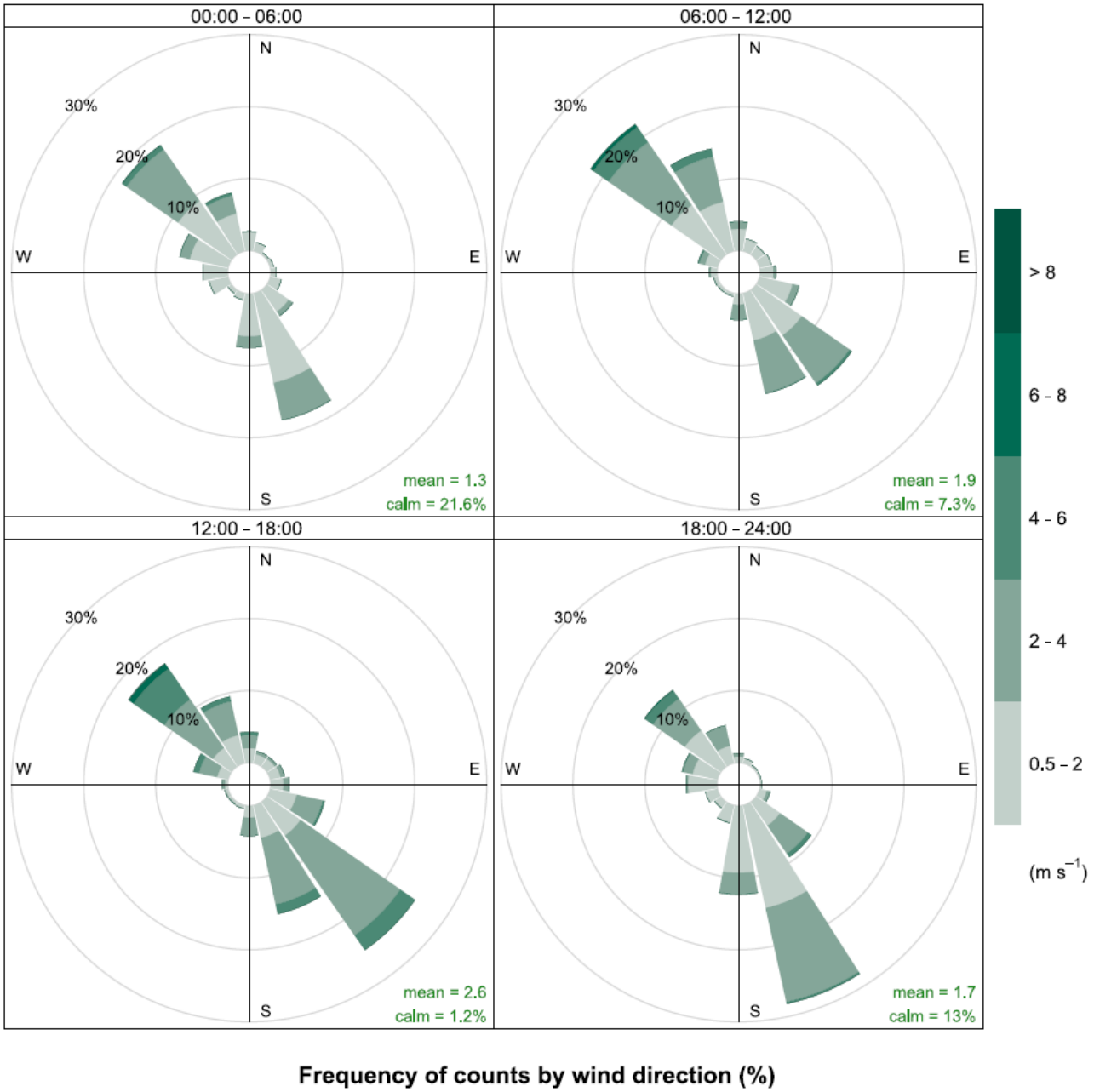


FIGURE 4-3 DIURNAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025

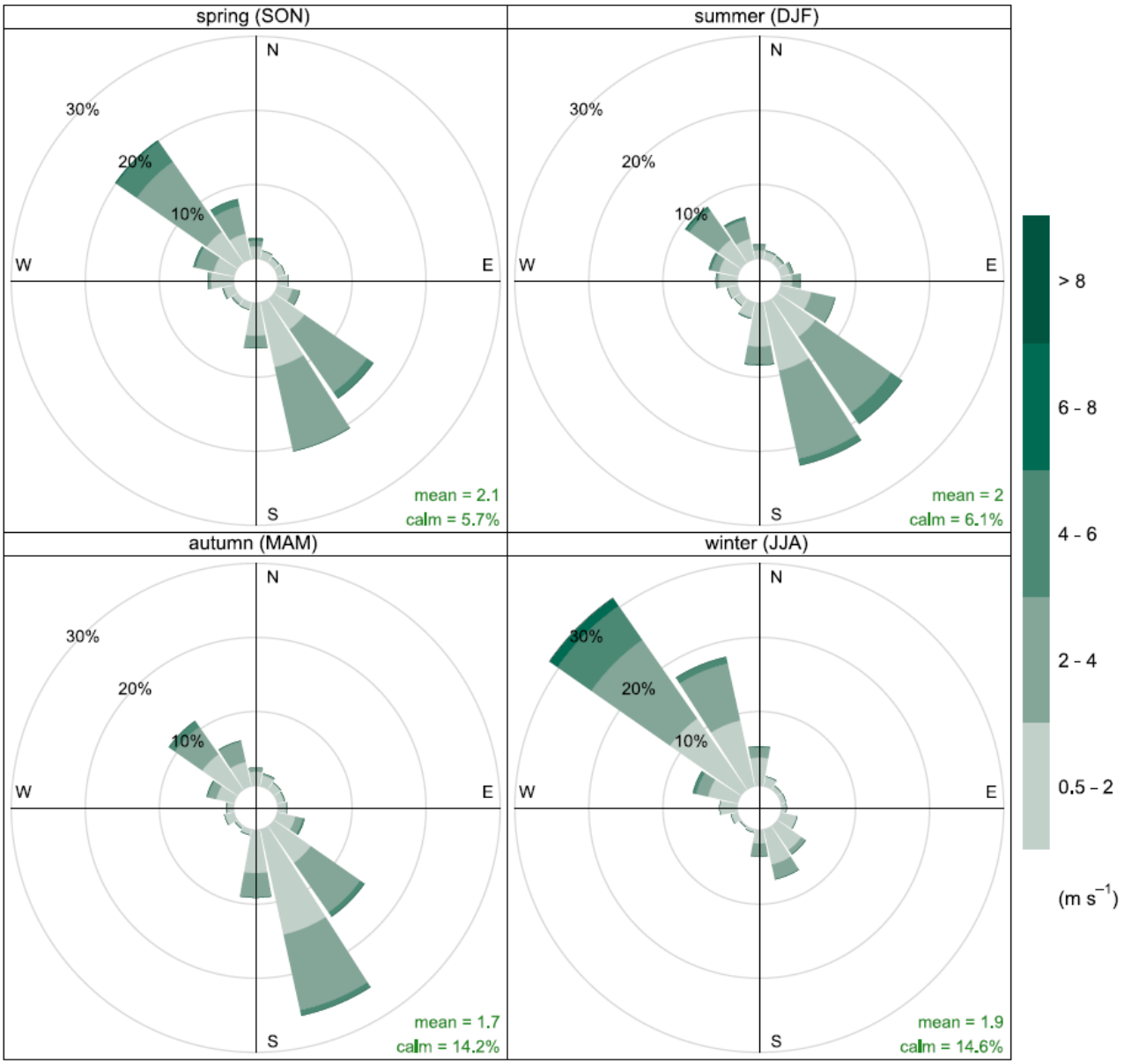


FIGURE 4-4 SEASONAL WIND ROSES FOR THE AGL ON-SITE METEOROLOGICAL STATION FOR 2024 - 2025

5. ESTIMATED EMISSIONS FROM BLASTING

Particulate matter and dust are the main sources of emission associated with demolition activities. Source parameters for the chimney stacks and boiler houses are given in Table 5-1 and Table 5-2, respectively. Dimensions for the chimney stacks were sourced the Blast Management Sub-Plan (WI, 2025) which identifies the stacks as being primarily constructed from reinforced concrete. Dimensions and construction details for the boiler houses were provided by CMA. The boiler houses are comprised of steel (used for the main frame, equipment and walkways), concrete (foundations, slabs and firewalls) and metal sheeting (roof and wall cladding), It is understood that Boiler House 3/4 will be demolished first followed by Boiler House 1/2. However, for the purposes of this study, the impact of dust emissions from Boiler House 1/2 has been evaluated as it is located closest to the BESS and other on-site infrastructure which has been identified as sensitive to dust.

TABLE 5-1 LOCATION AND KEY DIMENSIONS FOR THE CHIMNEY STACKS

Parameter	Source	
	Stack U1/2	Stack U3/4
Easting (m)	309,825	309,802
Northing (m)	6,416,656	6,416,494
Stack Height (m)	169	169
Stack diameter at base (m)	18.6	18.6
Stack diameter at top (m)	9.8	9.8
Wall thickness at base (m)	0.61	0.61

TABLE 5-2 LOCATION AND KEY DIMENSIONS FOR THE BOILER HOUSE

Parameter	Boiler House 1/2
Easting (m)	309,691
Northing (m)	6,416,414
Building Height (m)	26
Building Width (m)	58
Building Length (m)	110
Quantity of concrete (tonnes)	12,000

Emission factors adopted for this study were obtained from the Kurri Kurri Stack Demolition (ERM, 2019) (Table 5-3) which were derived from the measurement and modelling of particulate matter during a stack demolition project at the former Kurri Kurri Aluminum Smelter in 2019.

TABLE 5-3 EMISSION FACTORS FOR TONNE OF CONCRETE

Size Fraction	Emissions (g/t of concrete/event)
TSP	12.8
PM_{10}	11.9
$PM_{2.5}$	5.2

The calculated TSP, PM_{10} and $PM_{2.5}$ emission rates for demolition of the two stacks and boiler house are given in Table 5-4. These have been calculated assuming that the total quantity of dust released from each blast event is emitted over one minute. No mitigation measures were included in this modelling, therefore the modelled emission rates are considered to be conservative.

This study has focused on PM_{10} concentration as this is the key particulate size fraction relevant to emissions from mechanical processes such as demolition, while TSP has been included for the purpose of generating deposition predictions.

$PM_{2.5}$ comprises a smaller component of total particulate emissions (40%) and will behave in the same fashion as PM_{10} with respect to wind direction and wind speed given that PM_{10} was modelled as a tracer gas, i.e. without accounting for deposition. Whilst the analysis has focused on $PM_{2.5}$, contour plots have been produced for the chimney felling and boiler house demolition scenarios to provide an understanding of the reduction in predictions due to blasting during preferred wind directions. $PM_{2.5}$ concentrations have been calculated from PM_{10} concentrations by multiplying by the $PM_{2.5}/PM_{10}$ emission factor ratio of 0.44.

TABLE 5-4 CALCULATED EMISSION RATES

Source	Emission rates (g/s)		
	TSP	PM_{10}	$PM_{2.5}$
U1/2	1,595	1,483	648
U3/4	1,595	1,483	648
Boiler House 1/2	2,560	2,380	1,040

6. MODEL CONFIGURATION

Dispersion modelling has been conducted for two scenarios:

- Preferred conditions: Dispersion modelling for blasting of the chimney and boiler house between 9am and 5pm throughout the entire year have been analysed to determine meteorological conditions that would minimise air quality impacts at infrastructure and across the wider domain; and
- South-easterly winds: CMA requested this scenario that limits blasting to south-easterly winds given that these are frequent. Model results have been analysed to determine options for minimising air quality impacts due to blasting during these wind directions.

6.1 SOURCE CONFIGURATION

For both model scenarios, the chimney stacks and boiler house were modelled as a series of volume sources. The chimney stacks were modelled as six volume sources along the length of the stack with the boiler house also represented by six angled volume sources. Configuration of the sources in the model are given in Table 6-1. The boiler house was modelled as six volume sources (two lines of three, to represent its rectangular shape).

TABLE 6-1 SOURCE CONFIGURATION IN MODEL

Parameter	Stacks	Boiler House 1/2
Source type	Volume	Volume
Initial length of plume (m)	1.5 × stack height = 253.5	1.72 × building height = 99.8
Initial width of plume (m)	7 × stack base = 130.2	1.72 × building base = 189.2
Effective Height (m)	37.2	13
Sigma Y (m)	60.6	6.1
Sigma Z (m)	17.3	29.3

6.2 PARTICLE SIZE DISTRIBUTION

For the evaluation of deposition, the particle size distribution was adopted from the air quality monitoring conducted for the Kurri Kurri Aluminum Smelter stacks (ERM, 2019), which derived a geometric mass mean diameter of 4.76 µm and geometric standard deviation of 3.22 µm. PM_{10} was modelled as a tracer gas.

$PM_{2.5}$ results were determined from the PM_{10} results as described in Section 5 using the ratio of $PM_{2.5}$ and PM_{10} emission factors from Kurri Kurri Aluminum Smelter stacks (ERM, 2019). This means that both PM_{10} and $PM_{2.5}$ concentrations have been predicted in this study without accounting for losses due to deposition.

6.3 MODELLING METHODOLOGY

6.3.1 METEOROLOGICAL MODELLING

Long-term hourly observational data from the AGL on-site meteorological monitoring station was not available. The nearest long-term observational datasets that were available are those collected by the NSW DCCEEW, which has a network of ambient air quality and meteorological monitoring stations in the region. Meteorological data from Muswellbrook NW and Singleton

South AQMS for the last 5 years has been reviewed, with nomination of the calendar year 2020 as a year that contains meteorological patterns that are consistent with long-term trends. Meteorological modelling using WRF has been conducted to obtain representative upper-air meteorological fields for the 2020 calendar year. Further details of this process can be found in Appendix A. This is generally consistent with guidance in the Approved Methods for selection of meteorological data for use in dispersion modelling.

6.3.2 CALPUFF MODEL DOMAIN AND CONFIGURATION

CALMET is a meteorological pre-processor that provides the meteorological inputs required to run the CALPUFF dispersion model (Exponent, 2011). CALMET creates a three-dimensional meteorological field and includes a wind field generator that considers slope flows, terrain effects and terrain blocking effects. CALMET produces fields of wind components, air temperature, relative humidity, mixing height and other micro-meteorological variables for each hour of the modelling period.

CALMET was configured with reference to the NSW EPA guidelines, entitled: "Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia'.

Key parameters used in the CALMET configuration include:

- Outer domain of 121 x 121 grid cells at 250 m spacing, with a south-west coordinate of 294,425 m and 3,401,975 m (UTM zone 56 S);
- Inner domain of 121 x 121 grid cells at 100 m spacing, with a south-west coordinate of 303,950 m and 6,410,950 m (UTM zone 56 S);
- No-obs mode driven by meteorological data generated by prognostic model WRF used as the initial guess field;
- Froude number adjustments and slope flow effects; and
- Radius of influence of terrain features of 2 km.

The dispersion model was configured with blasting occurring between 9 am and 5 pm. Separate runs were used for blasting during each hour, to avoid any potential cumulative impacts from more than one blast in any given hour. Blasting was modelled as occurring every day of the year in order to provide an understanding of potential variation in impacts during the full range of meteorological conditions included in the calendar year selected.

It should be noted that the modelling was conducted in local standard time, and does not include adjustments in operations due to daylight savings.

7. DISPERSION METEOROLOGY

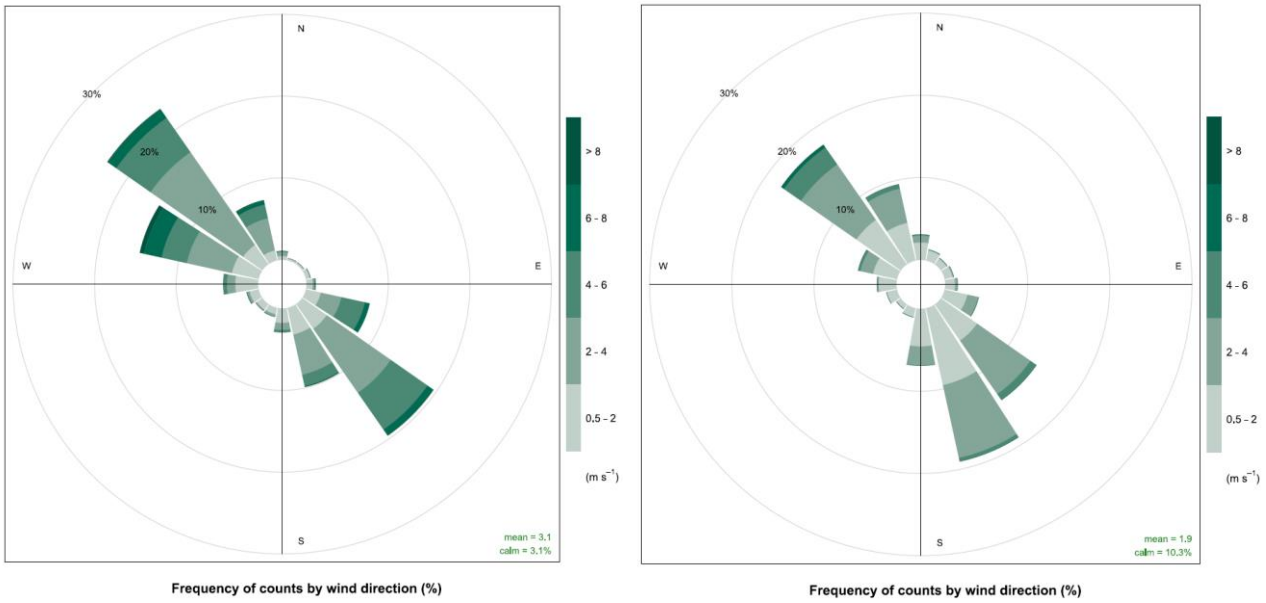
The output from the coupled WRF and CALMET meteorological model is summarised in the section below. This data has been used to drive the CALPUFF dispersion model.

7.1 WIND FIELD

Annual, diurnal and seasonal wind roses for the AGL on-site meteorological station as compared to the modelled CALMET meteorological data for the site are shown in Figure 7-1 to Figure 7-3. Good agreement is seen between the modelled and observed annual wind field with the model having reproduced the predominant north-westerly and south-easterly wind field. However, some variation is seen in the modelled wind speeds as higher wind speeds are predicted (a mean speed of 3.1 m/s) compared to the observed data (a mean speed of 1.9 m/s). This is also reflected in the lower percentage of calm conditions seen in the modelled dataset.

Modelled daytime (06:00 – 18:00) and night-time (18:00 – 06:00) winds also show generally good agreement with the observed data although there is some variability in the frequency of the night-time winds, especially during the early morning (00:00 – 06:00). Modelled seasonal winds have predicted the predominant wind directions for the spring, summer and winter months although autumn shows a slight discrepancy with predominant winds from the north-west (as compared to south-southwest in the observed dataset).

It is normal to observe some deviation between CALMET results and observational data as CALMET blends multiple meteorological inputs (e.g. surface and upper air observations, or gridded field from meteorological models such as WRF) and adjusts them to ensure consistency with local terrain, land-use and flow features (e.g., sea breezes, slow flows). As a diagnostic model, its primary goal is to generate a spatially and physically consistent three-dimensional wind field rather than to replicate each observation exactly. If CALMET successfully captures the dominant flow patterns, wind direction frequencies and temporal trends, its performance can be considered good.



Modelled Observed

FIGURE 7-1 COMPARISON OF MODELLED VERSUS OBSERVED ANNUAL WIND FIELD AT AGL FOR 2020 (MODELLED) AND SEPTEMBER 2024 – AUGUST 2025 (OBSERVED)

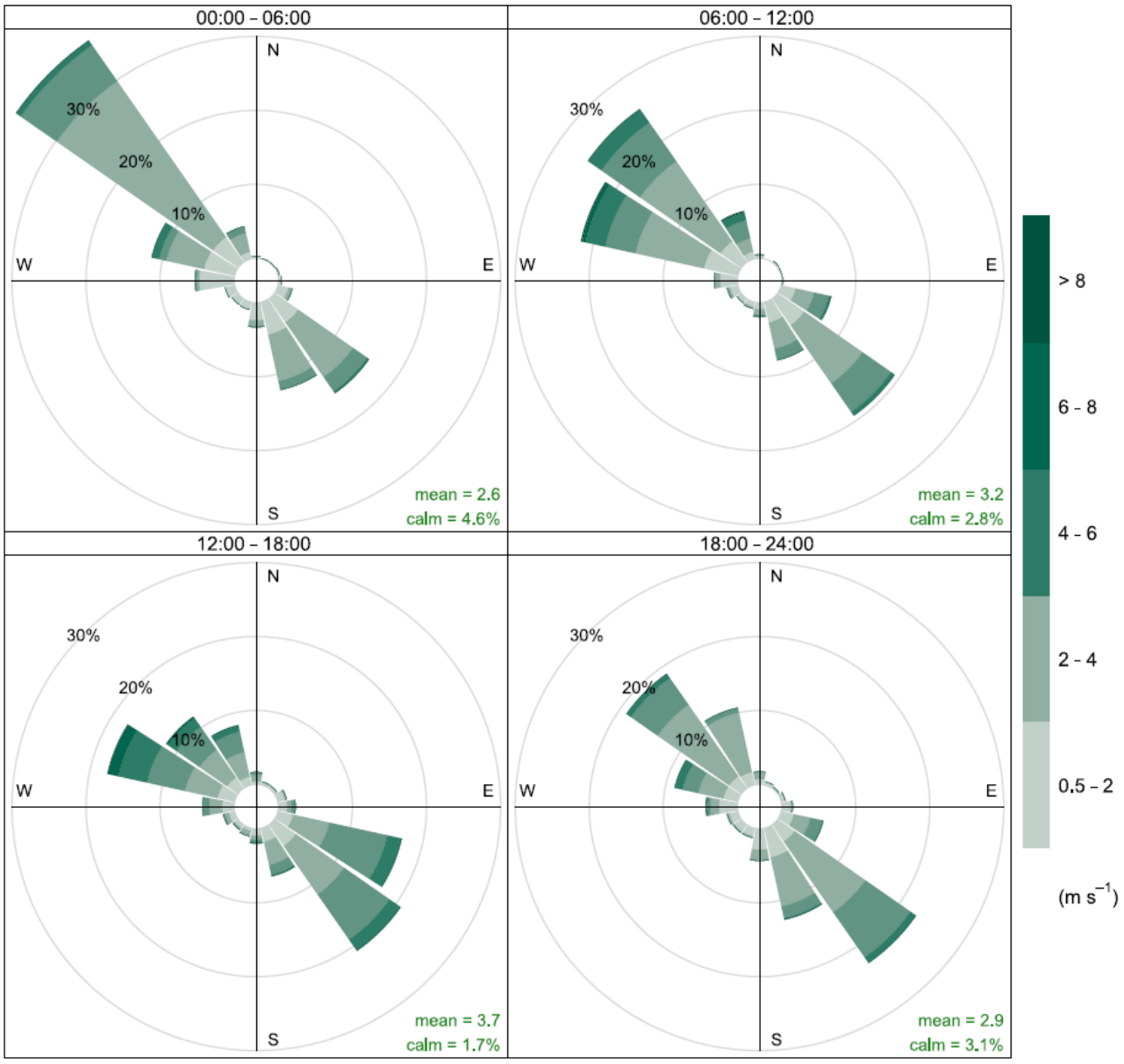


FIGURE 7-2 MODELLED DIURNAL WIND ROSES FOR AGL FOR 2020

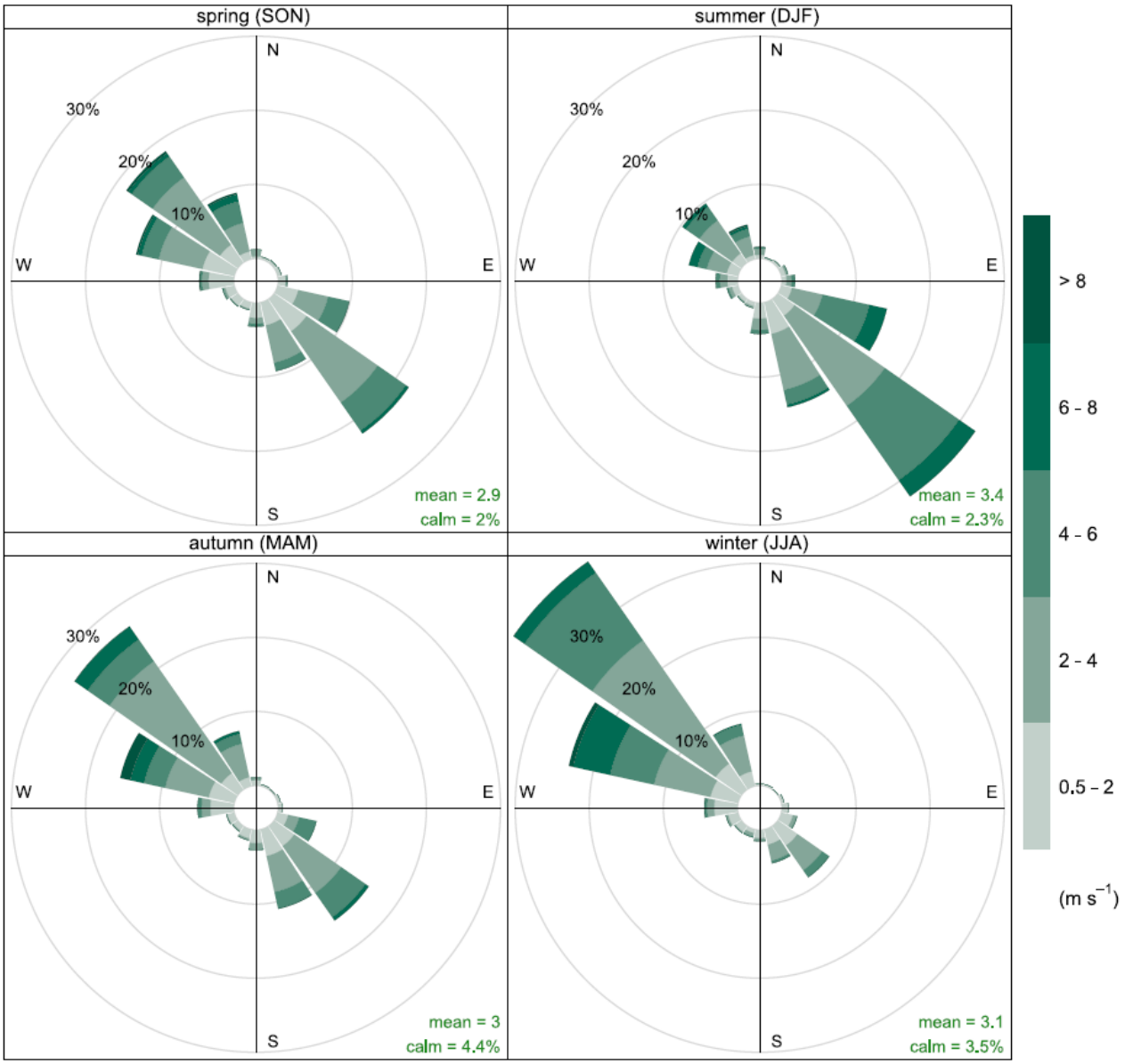


FIGURE 7-3 MODELLED SEASONAL WIND ROSES FOR AGL FOR 2020

7.2 MIXING HEIGHT

The mixing height defines the vertical extent of the turbulent layer of the atmosphere within which pollutants are mixed and dispersed. When the mixing height is high, pollutants are more effectively dispersed and diluted in the atmosphere, resulting in lower ground-level concentrations and improved air quality. Conversely, when the mixing height is shallow, pollutants can become trapped beneath temperature inversions which limit vertical mixing and lead to poor dispersion and elevated ground-level pollutant concentrations.

The predicted mixing height for the site is shown in Figure 7-4. The modelled mixing height exhibits a typical diurnal cycle with low mixing heights during the early morning hours when conditions are stable. After sunrise, surface heating promotes convective activity, leading to a gradual increase in the mixing height, which typically peaks in the early afternoon around 1,300m. Following sunset, as surface cooling produces stable conditions and the mixing height decreases steadily through the late evening and night-time period.

This diurnal pattern is consistent with expected boundary layer behaviour under typical daytime convective and night-time stable conditions. This indicates that CALMET has realistically captured the temporal evolution of the mixing layer at the site.

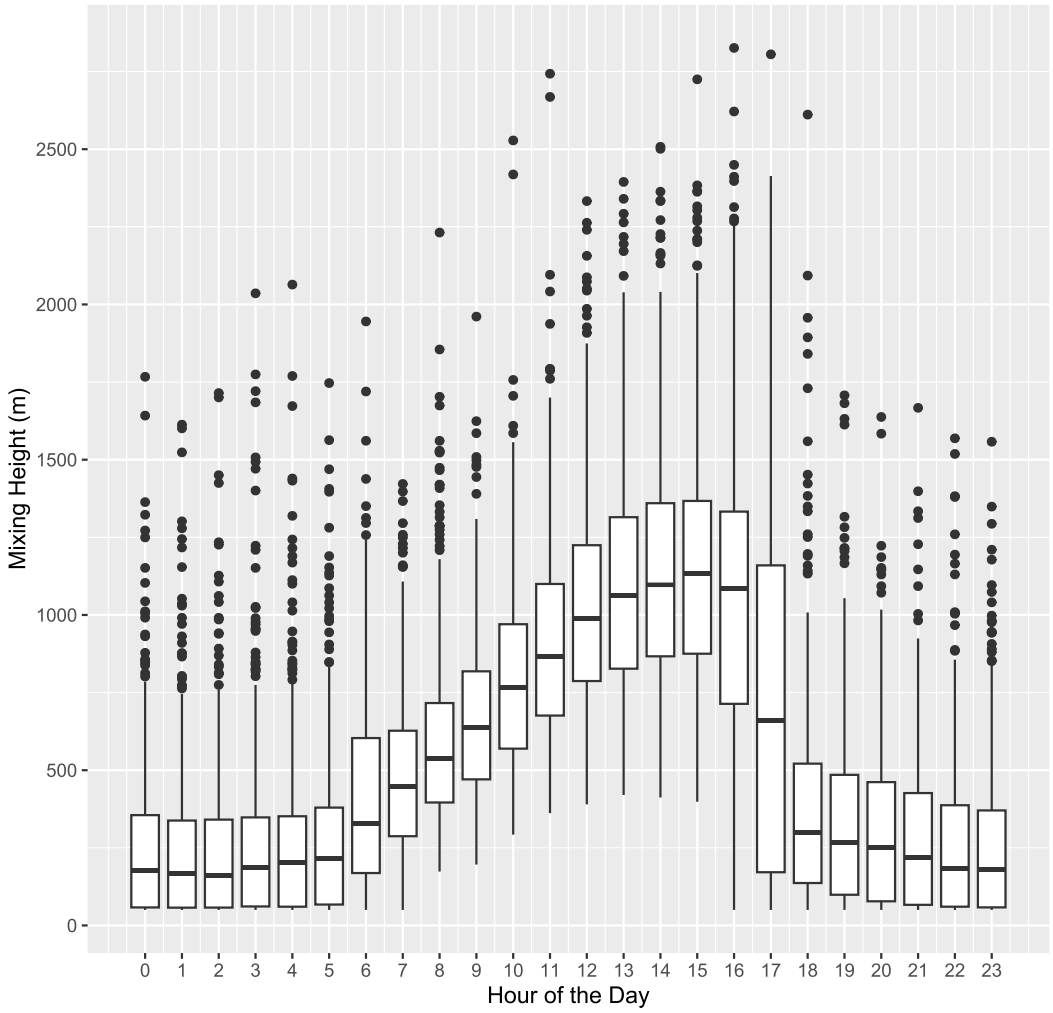


FIGURE 7-4 DIURNAL DISTRIBUTION OF MIXING HEIGHTS

7.3 ATMOSPHERIC STABILITY

Atmospheric stability is one of the key parameters that affects dispersion and dilution of emissions away from source. In essence it describes the degree of thermal and mechanical mixing of the atmosphere that occurs due to wind and thermal heating.

Atmospheric stability is described by the Pasquill-Gifford classification (Table 7-1). Unstable conditions (classes A – C) promote vertical mixing which is good for dispersion and less ground-level impacts. Neutral conditions (class D), common under overcast skies or strong winds, promote moderate dispersion while stable conditions (classes E – F) suppress mixing, resulting in poor dispersion conditions and higher ground-level concentrations.

TABLE 7-1 PASQUILL GIFFORD STABILITY CLASSIFICATION

Class	Description	Conditions	Stability Type
A (1)	Very Unstable	Strong sunshine, light wind	Maximum mixing
B (2)	Unstable	Sunny, moderate wind	Strong mixing
C (3)	Slightly Unstable	Slightly cloudy, moderate wind	Moderate mixing
D (4)	Neutral	Overcast or windy, day or night	Neutral mixing
E (5)	Slightly Stable	Clear skies, light wind (evening)	Limited mixing

The predicted frequency distribution of atmospheric stability categories for the site is shown in Figure 7-5. The site is characterized by stable atmospheric conditions during the night-time period (18:00 – 06:00) (Categories E and F), which are typically associated with clear and calm conditions. During the daytime, conditions are generally neutral (Category D). Moderately unstable conditions (Categories B and C), indicative of sunny weather and moderate wind speeds, also occur frequently throughout the day. In contrast, very unstable conditions (Category A), associated with very sunny and light winds, are infrequent and generally limited to late morning and early afternoon (10:00 – 13:00).

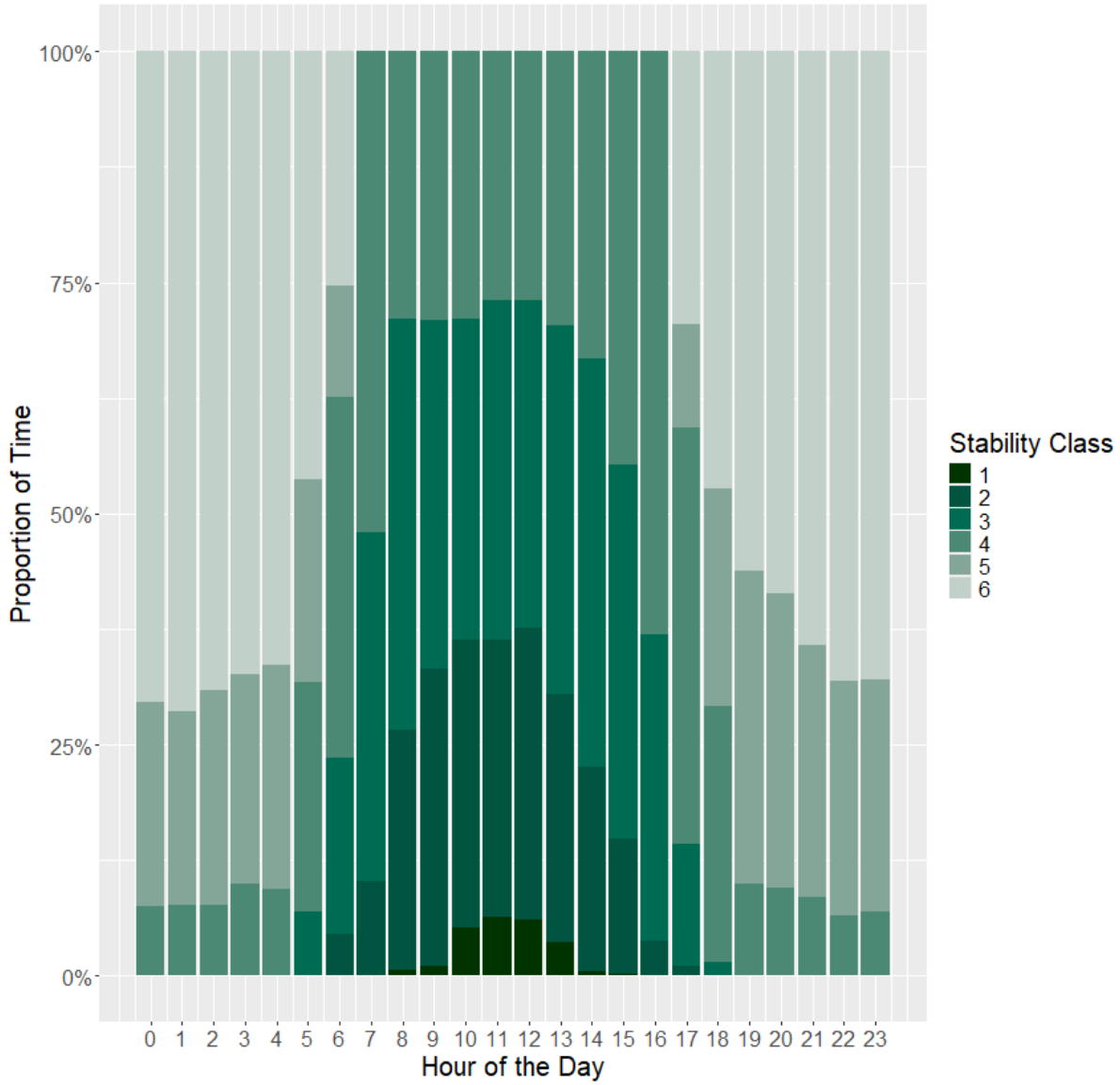


FIGURE 7-5 FREQUENCY OF ATMOSPHERIC STABILITY CATEGORIES

8. DISPERSION MODELLING RESULTS

Dust and particulate matter concentrations have been predicted at the nearest sensitive receptors and across the modelled domain.

Dispersion modelling results for the chimney blast and boiler house blast have been analysed in a similar manner. For both scenarios, model predictions at the dust-sensitive infrastructure have been considered first to understand how they vary with wind speed, wind direction and the hour of day in which blasting occurs.

To do this, time series were extracted from the separate model runs conducted for blasting during each hour of day between 9am and 5pm at the location of each receptor. Model results indicated that dust generally dispersed during the hour in which blasting occurred. To include maximum model predictions in the analysis, the maximum 1-hour concentration predicted at each receptor during each day was calculated and assigned to the hour of blasting. A single time series was then generated of the maximum of these 1-hr concentrations across all industrial receptor locations.

The resulting time series has then been examined using scatter plots to understand how concentrations vary with wind speed, direction and hour of day.

From this analysis, a set of preferred conditions has been identified to be met during the blasting hour in order to minimise potential dust impacts across these sensitive infrastructure areas. Following this, the model results at the nominated off-site receptor locations have been analysed to understand how impacts at these locations would vary if these preferred blasting conditions were met. Finally, the frequency of these preferred blasting conditions has been determined for each month of the year to provide context that may assist blast scheduling.

TSP and $PM_{2.5}$ have not been analysed separately, as these concentrations will proportional to PM_{10} and will therefore show the same trends with wind speed, direction and hour of day.

8.1 PREFERRED CONDITIONS

8.1.1 CHIMNEY STACK DEMOLITION

8.1.1.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-1 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting. Key observations include:

- Highest particulate predictions occur under lighter wind conditions. This is typically the case, with stronger winds promoting dispersion.
- High particulate predictions occur under a range of wind directions, with the highest occurring under northerly winds, and winds from easterly and north-northwest directions also of note. During these wind directions, areas of the on-site infrastructure would be downwind of the blast site.
- Particulate predictions vary somewhat throughout the day, with the highest predictions occurring between 9 and 10am, and 4 to 5pm. This reflects typical diurnal variations in dispersion, with conditions overnight often being poorer than during the day as wind speeds typically strengthen during the day, stability reduces and inversion conditions, if present, subside.

Based on the above analysis, the following meteorological conditions ('preferred conditions') have been nominated that would remove the most significant particle concentrations:

- Wind speeds greater than 2 m/s (~4 knots); and
- Wind directions from the south through to the west north-west (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure area.

Figure 8-2 illustrates that completion of the blasting under the preferred conditions reduces the maximum 1-hour average particulate predictions by several orders of magnitude across the infrastructure areas.

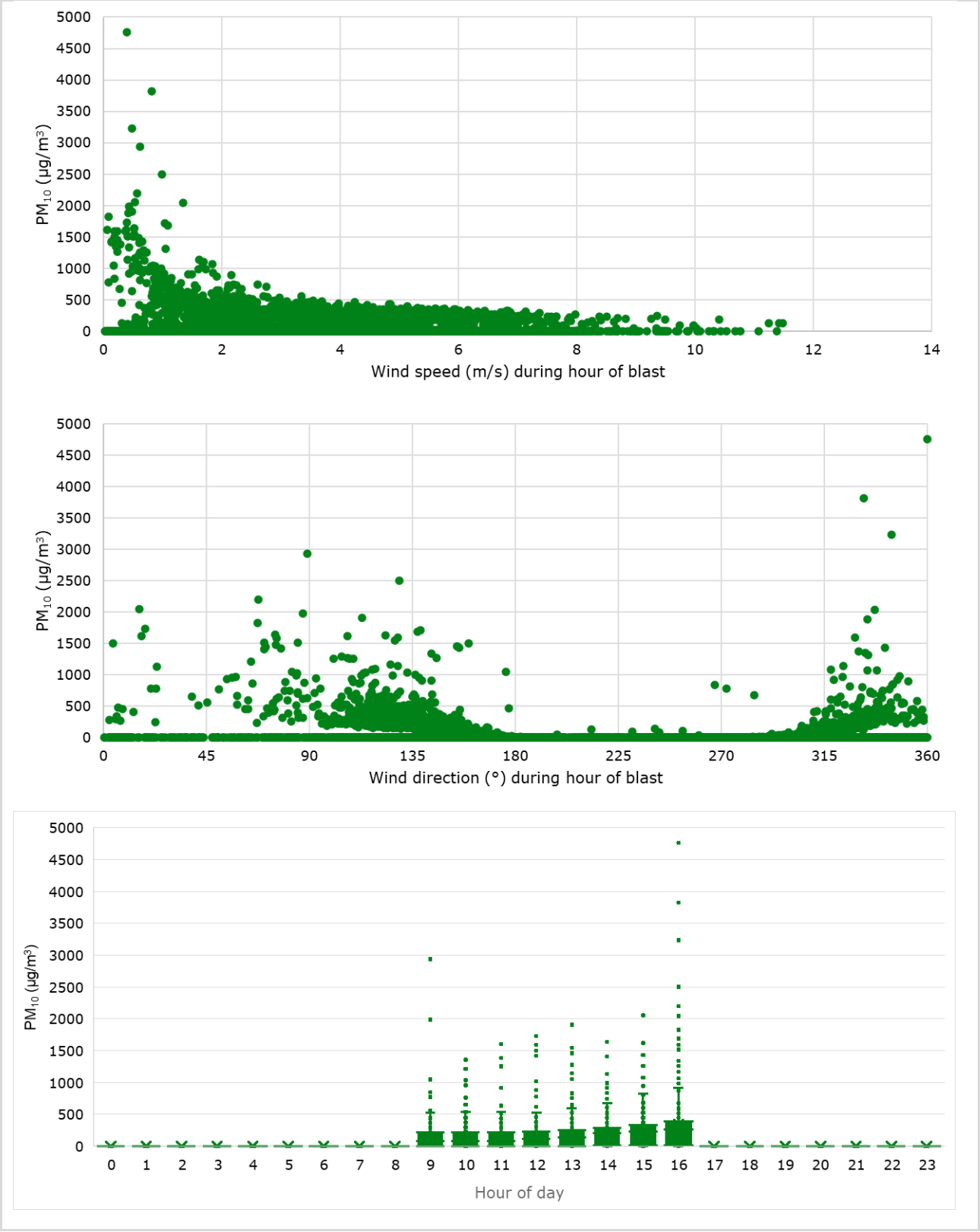


FIGURE 8-1 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

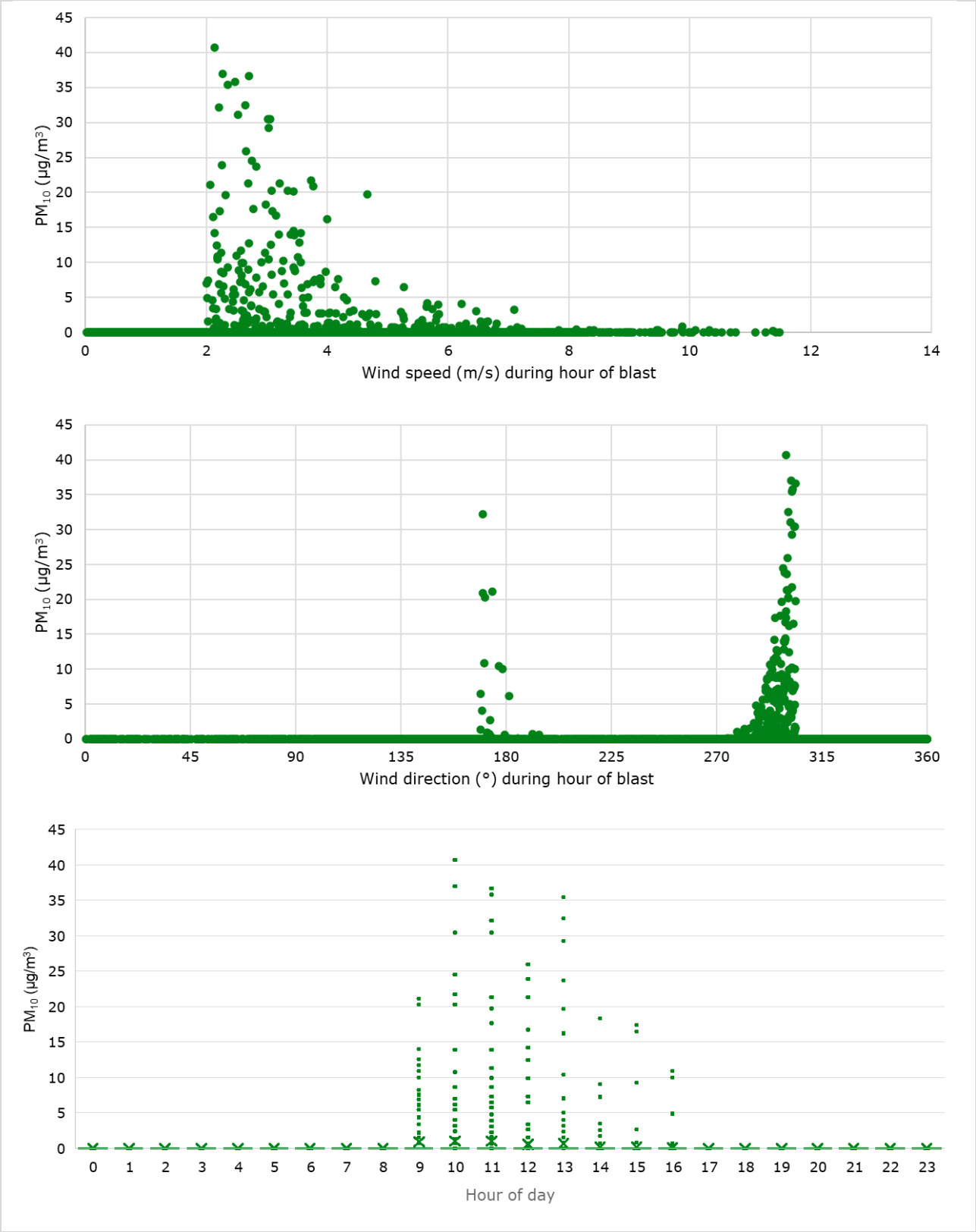


FIGURE 8-2 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

8.1.1.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-3 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. Particulate predictions are more scattered, with preferred wind directions less apparent. Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-4 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during hours with preferred meteorological conditions. This reduces the maximum dust concentrations by an order of magnitude.

Figure 8-5 to Figure 8-8 illustrate the maximum 1-hour and 24-hour average predicted PM_{10} and $PM_{2.5}$ concentrations across the model domain, for blasting occurring any hour between 9am and 5pm and for blasting only during hours with preferred meteorological conditions. Maximum 24-hour average PM_{10} concentrations at the off-site sensitive receptor locations to the north and east of Lake Liddell are approximately 5-10 µg/m^3 during preferred conditions. For comparison, the typical ambient air quality assessment criteria for 24-hour average PM_{10} concentrations is 50 µg/m^3 which is used to assess the total concentration inclusive of contributions from all dust sources in an airshed. This report is not a compliance assessment, however, the predicted model results indicate that suitable dust management measures during blasting will assist in significantly reducing the contribution that blasting has on the airshed.

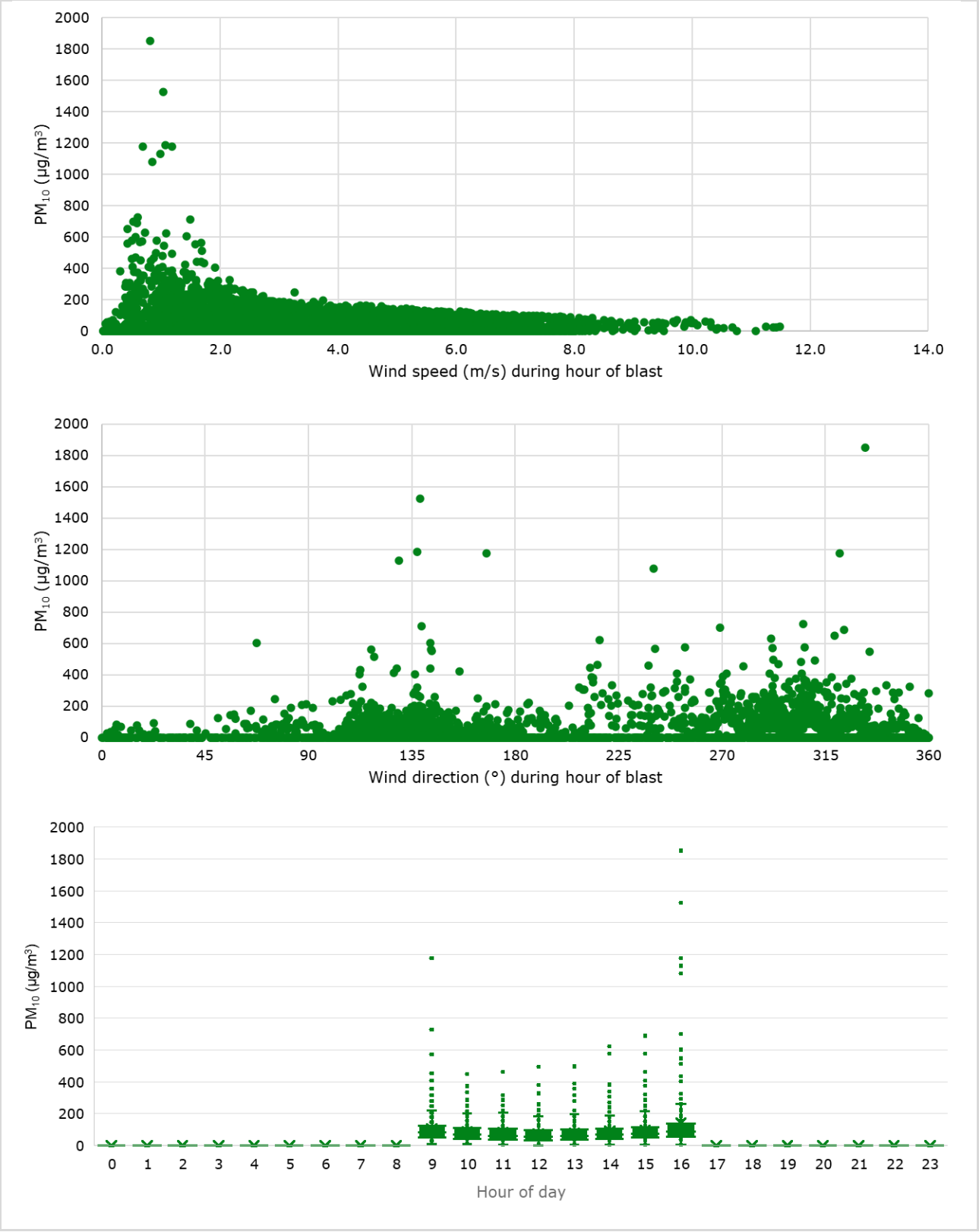


FIGURE 8-3 STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)



FIGURE 8-4 STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

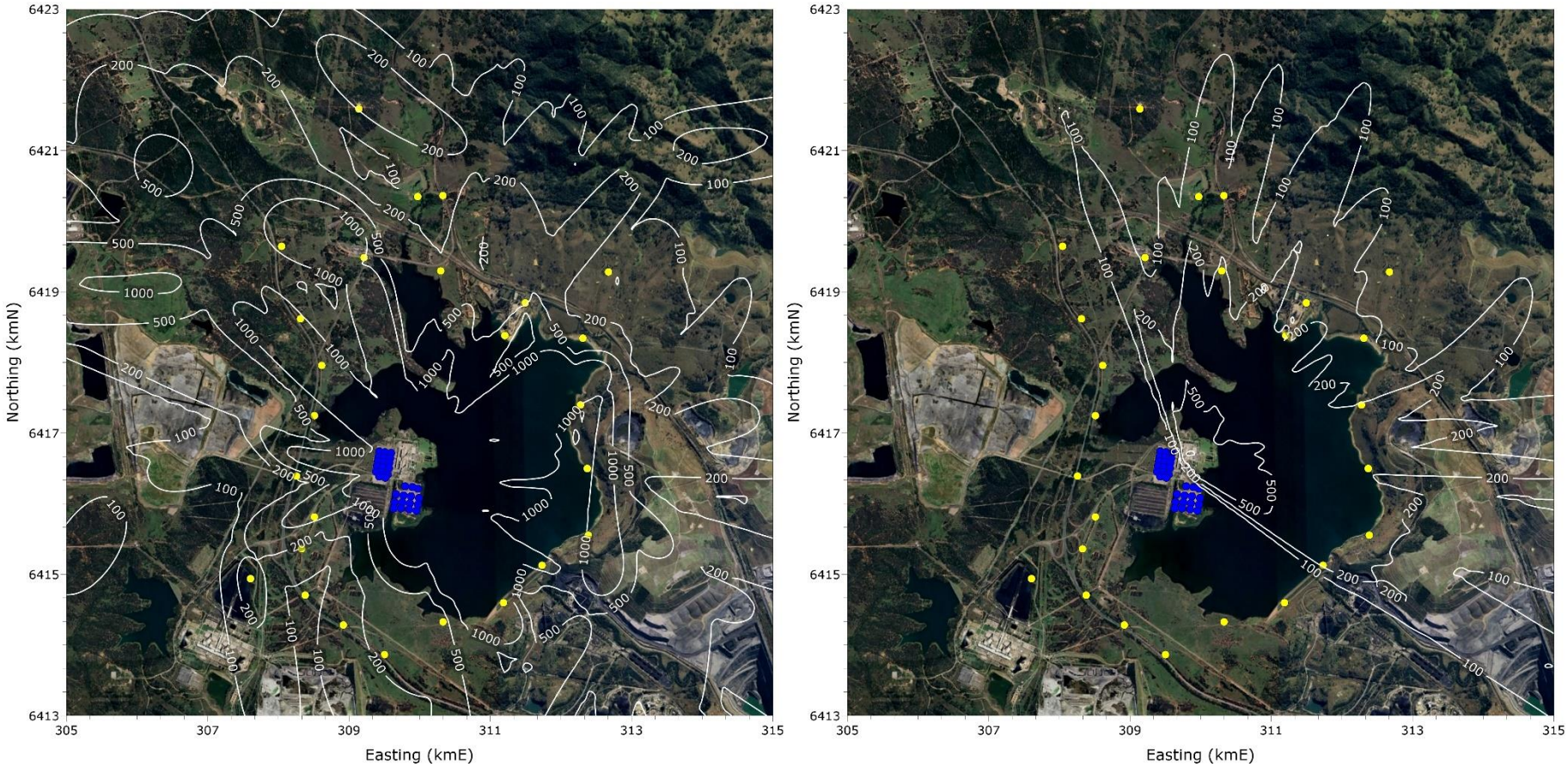


FIGURE 8-5 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} ($\mu g/m^3$) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

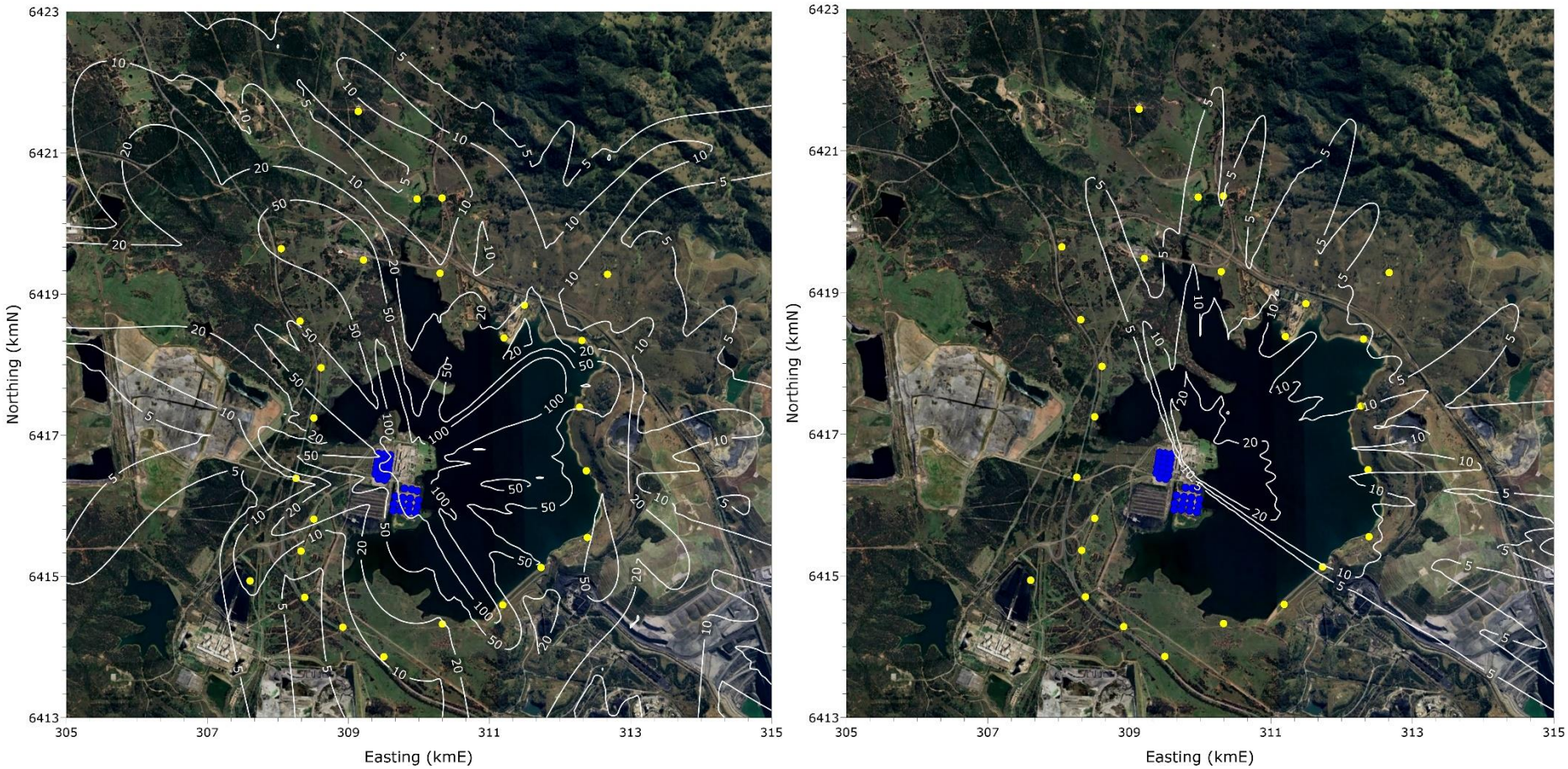


FIGURE 8-6 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} (µg/m^3) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

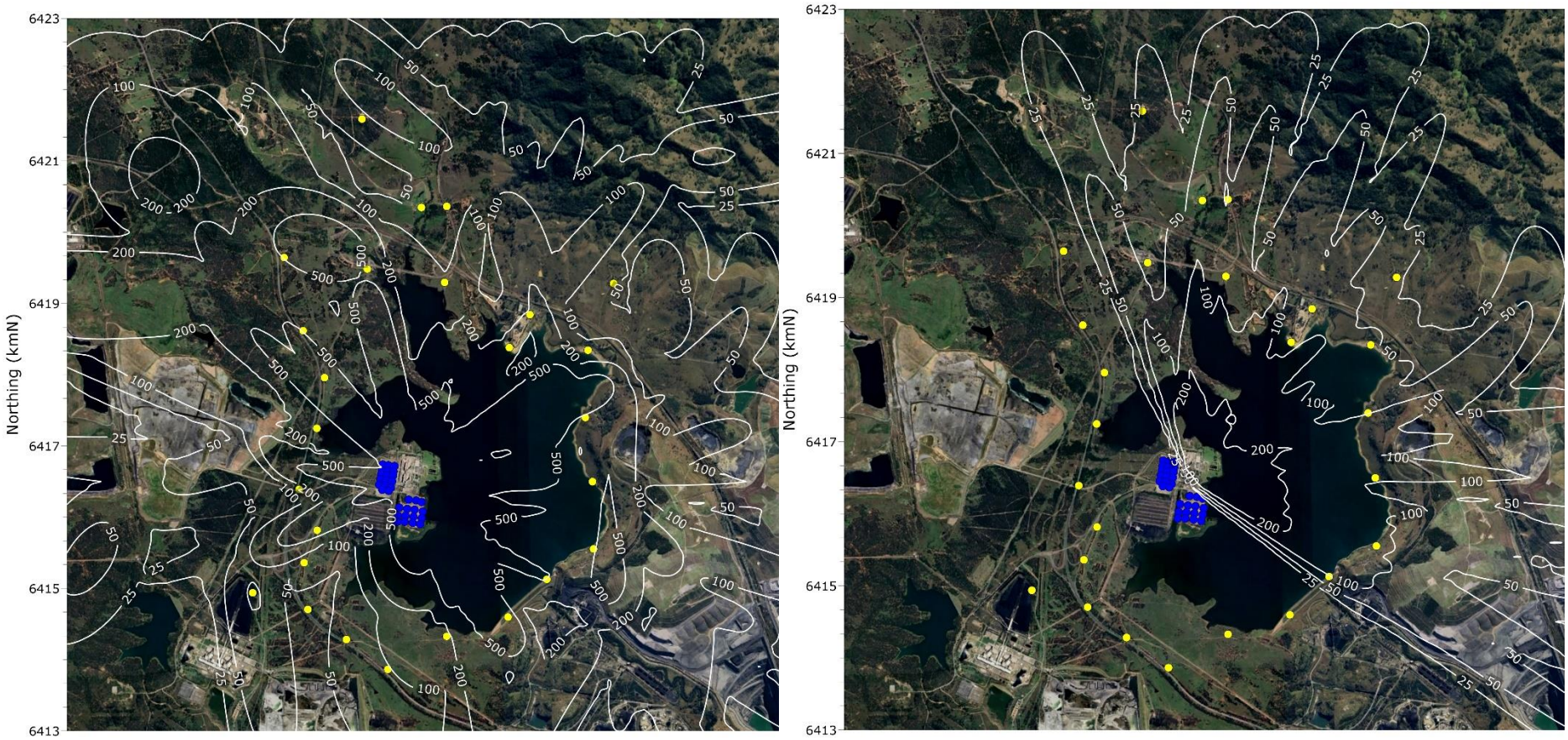


FIGURE 8-7 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) - ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

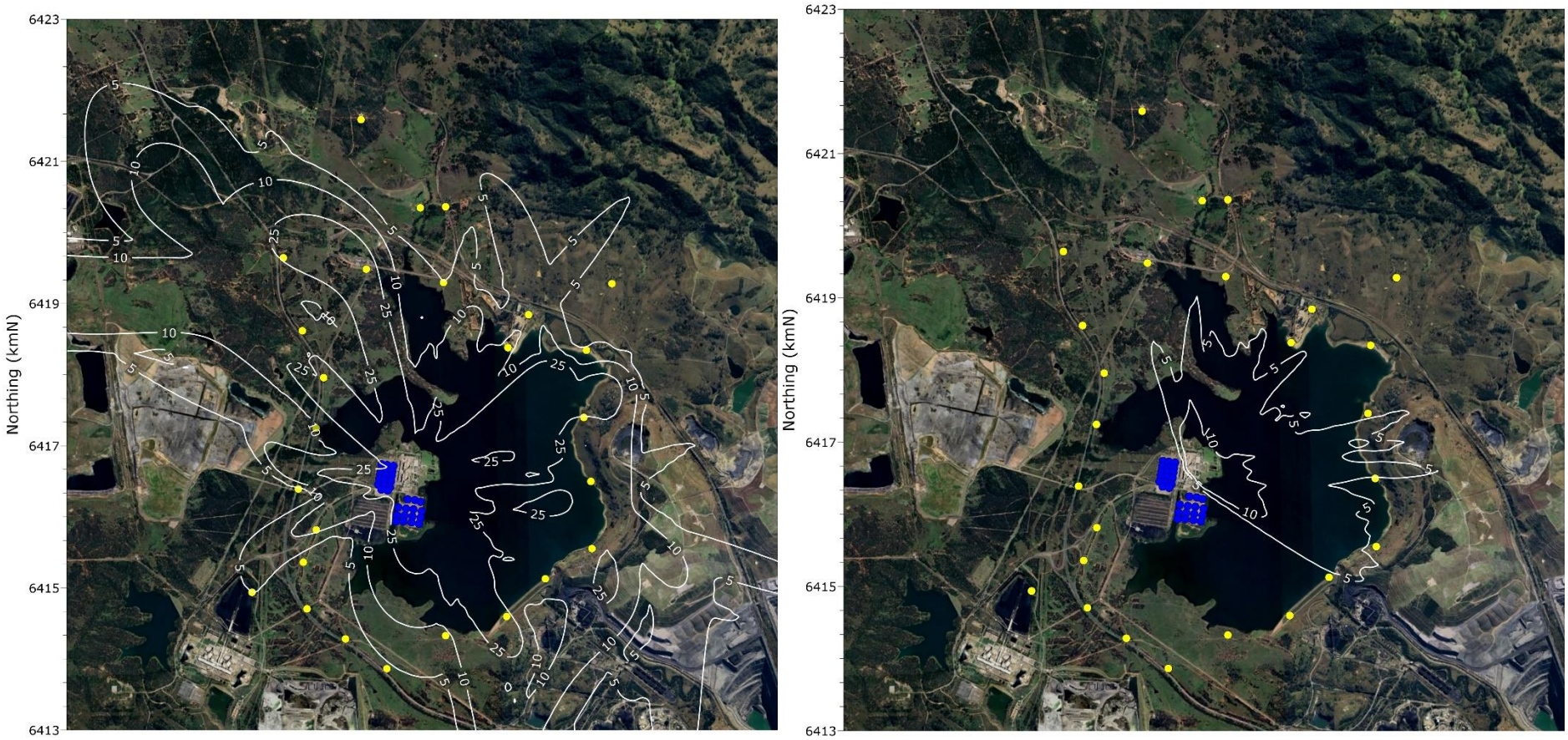


FIGURE 8-8 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – ALL BLAST HOURS (LEFT) AND PREFERRED CONDITIONS (RIGHT)

8.1.1.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-9 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. These show:

- The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts may occur under a wide range of wind speeds
- There is a clear variation with wind direction, with southeasterly and northwest to northerly directions resulting in higher deposition rates.
- A gradual increase in deposition rates with time of day.

Figure 8-10 presents the maximum deposition rates if blasting occurred only during hours with the previously identified preferred meteorological conditions. This illustrates that despite deposition rates showing a different behaviour with respect to wind speed compared with particulate concentrations, applying the wind speed and direction restrictions significantly reduces the predicted deposition rates. Based on these preferred conditions, the highest deposition rates are predicted to occur under south-southeasterly winds.

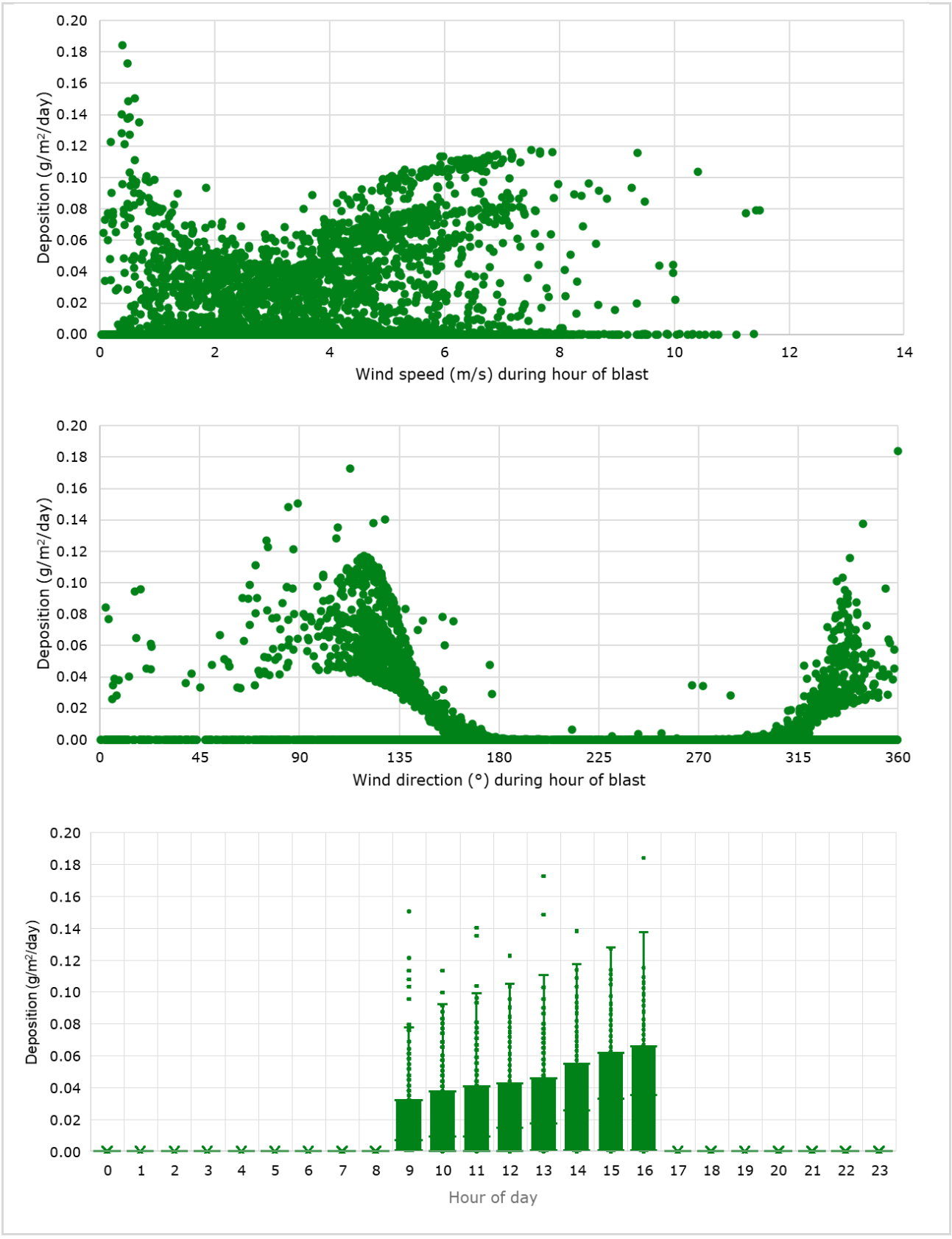


FIGURE 8-9 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

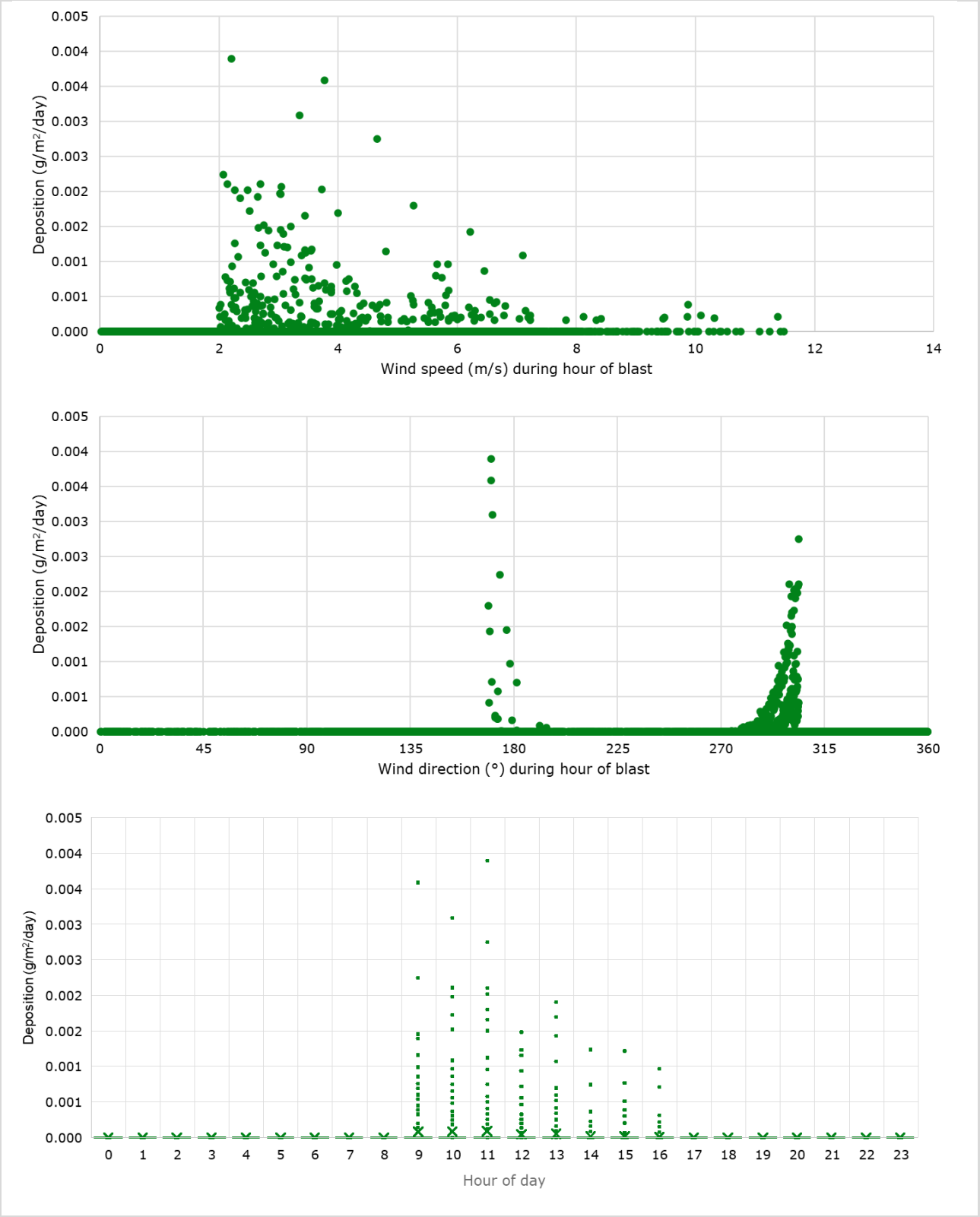


FIGURE 8-10 STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.1.4 DEPOSITION RATES ACROSS THE WIDER DOMAIN

Figure 8-11 illustrates variations in predicted deposition rates at the selected receptors in the wider area with wind speed, direction and hour of day. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area;
- Minimal variation with wind speed;
- Higher deposition rates during some southeasterly winds, and north-northwesterlies, however the wind direction dependence is not as strong as at on-site receptor locations
- Minimal variation with hour of day.

Figure 8-12 presents the predicted deposition rates at these locations due to blasting occurring only during hours when the preferred meteorological conditions occur. As with the infrastructure receptors, this removes some of the highest predicted deposition rates at the discrete receptor locations further afield. Predicted deposition rates at the selected sensitive receptors are higher than predictions at the infrastructure receptors during preferred conditions.

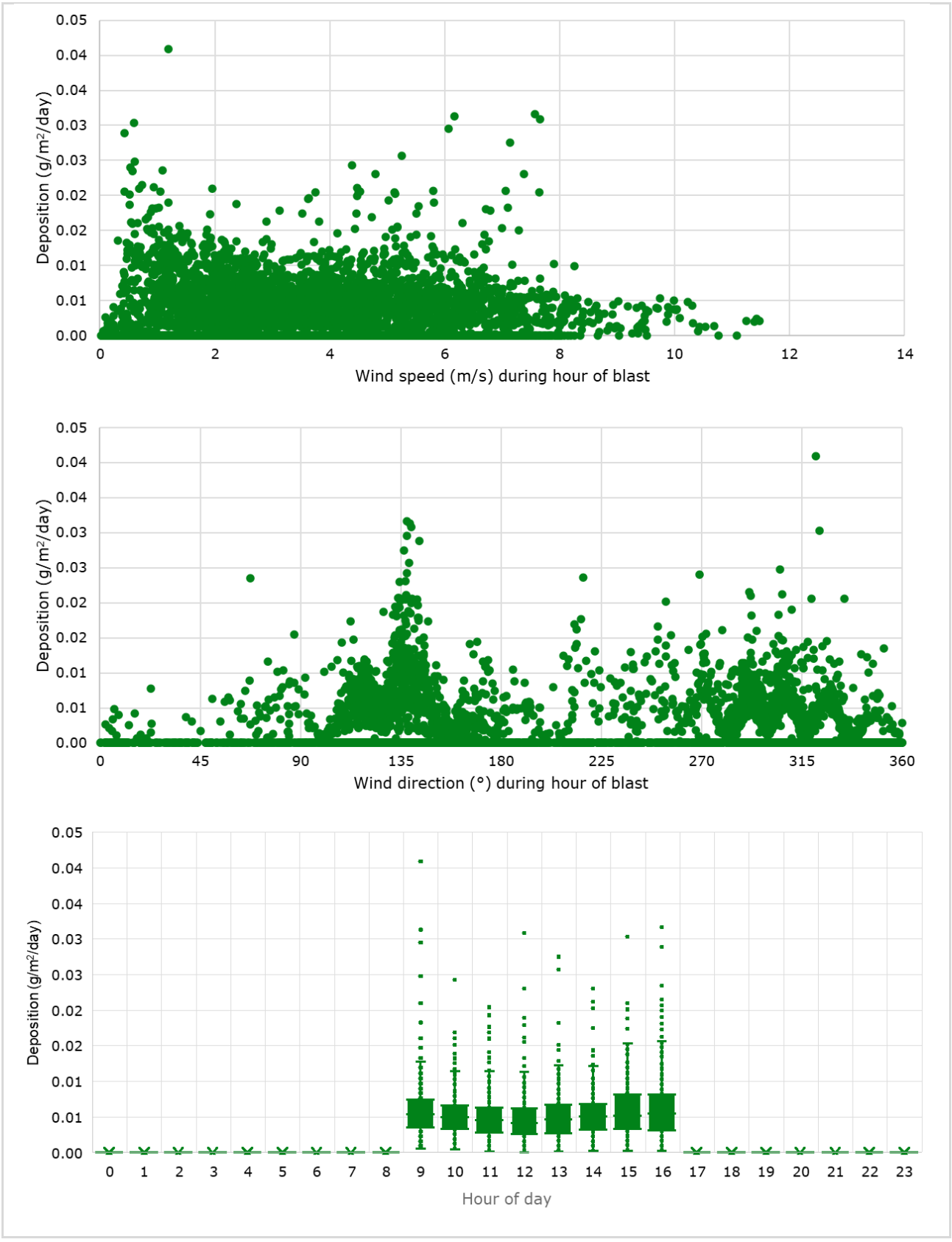


FIGURE 8-11 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

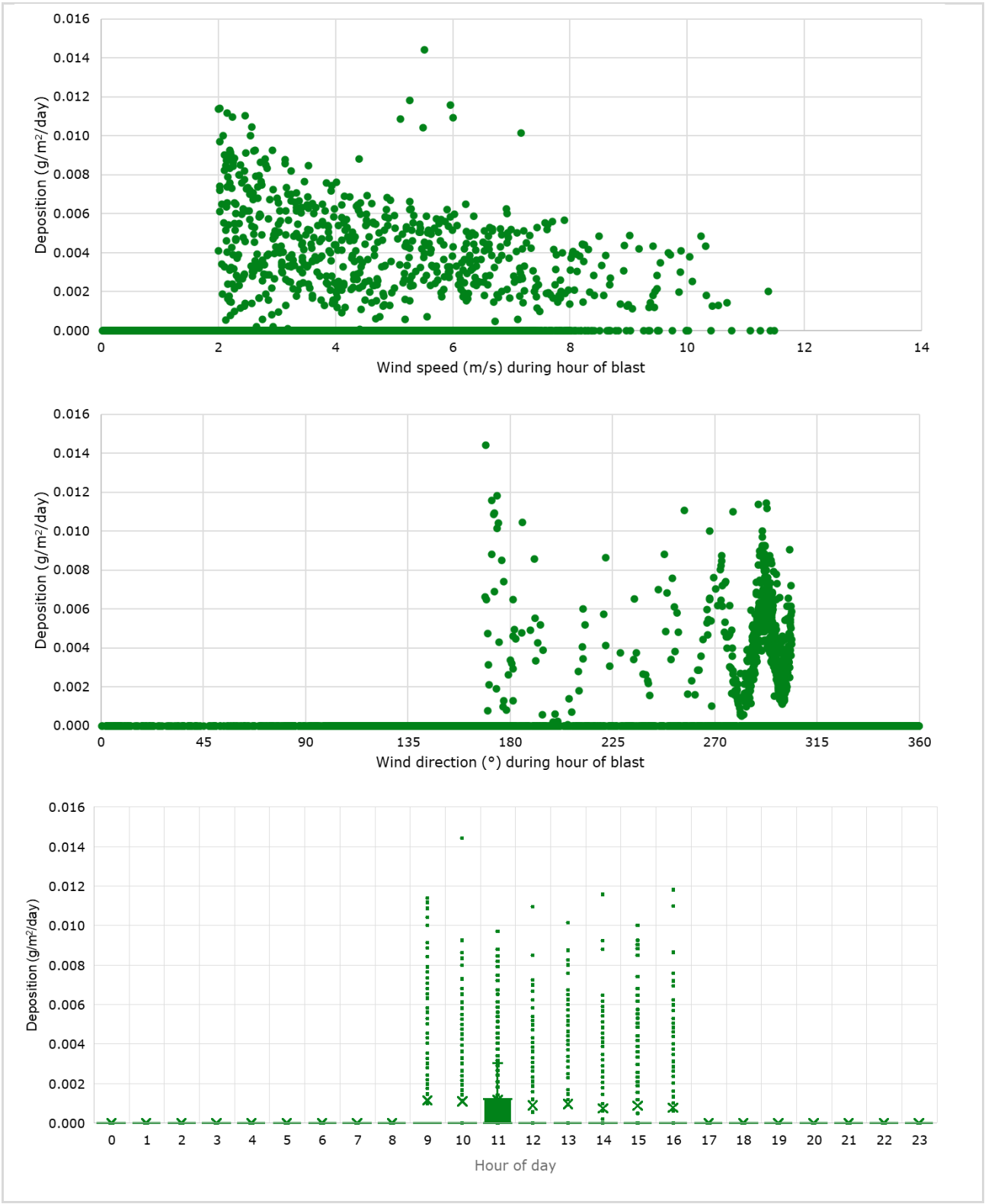


FIGURE 8-12 STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.2 BOILER HOUSE DEMOLITION

8.1.2.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-13 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting for the boiler house demolition modelling. Key observations align with those for the chimney stack demolition, i.e.:

- Highest particulate predictions occur under lighter wind conditions;
- High particulate predictions occur under a range of wind directions, with the highest occurring under northerly winds, and winds from easterly and north-northwest directions also of note. During these wind directions, areas of the on-site infrastructure would be downwind of the blast site.
- Particulate predictions vary somewhat throughout the day, with the highest predictions occurring between 9 and 10am, and 4 to 5pm.

It is noted that particulate predictions due to the boiler house demolition are higher overall than those predicted for the chimney demolition, and remain comparatively high over a range of wind speeds.

Figure 8-14 illustrates that completion of the blasting under the preferred conditions identified in Section 8.1 reduces the maximum 1-hour average particulate predictions at the infrastructure receptors considerably, but not to the same extent as was seen in the stack demolition modelling. To further minimise potential dust impacts, preferred wind directions could be narrowed further.

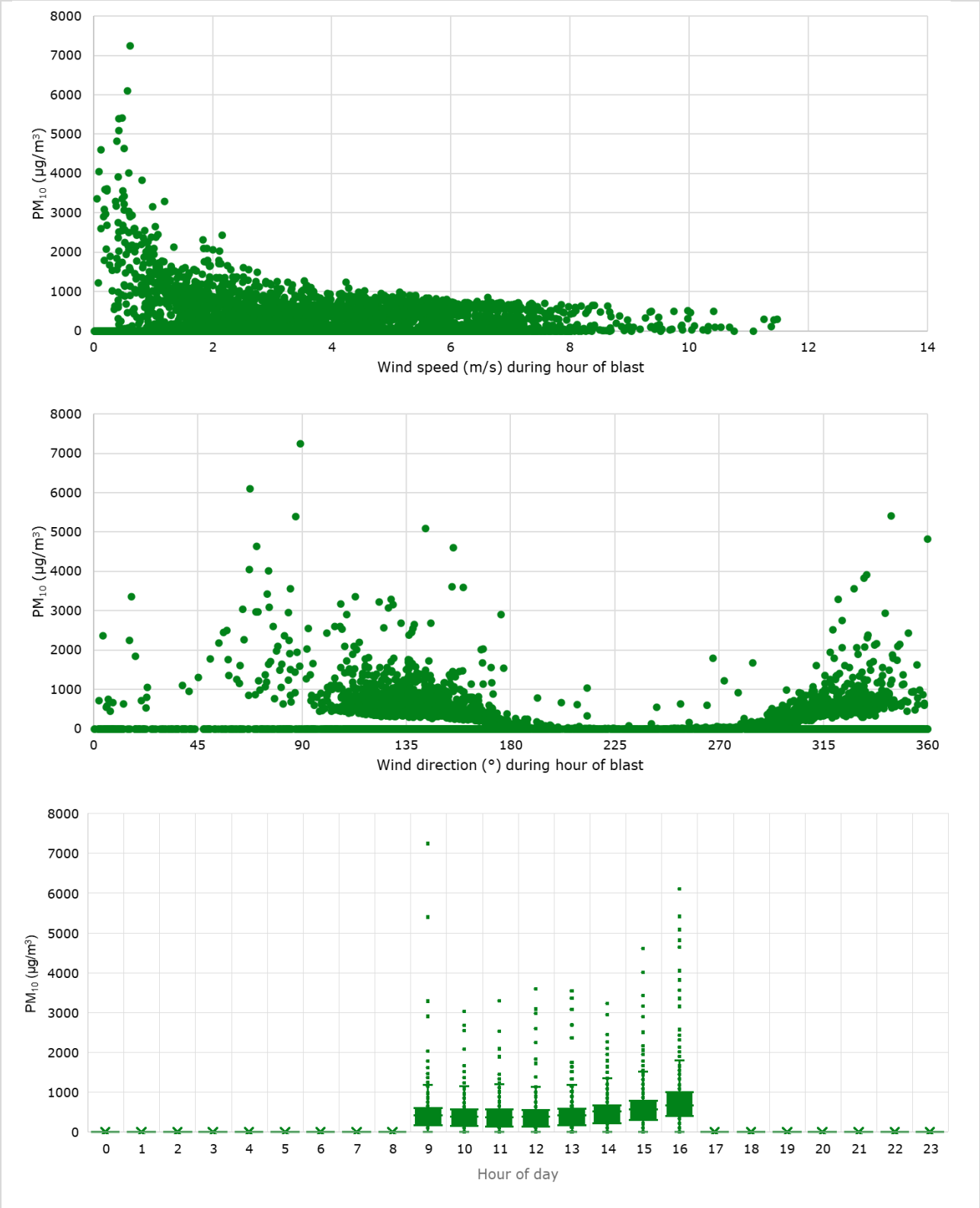


FIGURE 8-13 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

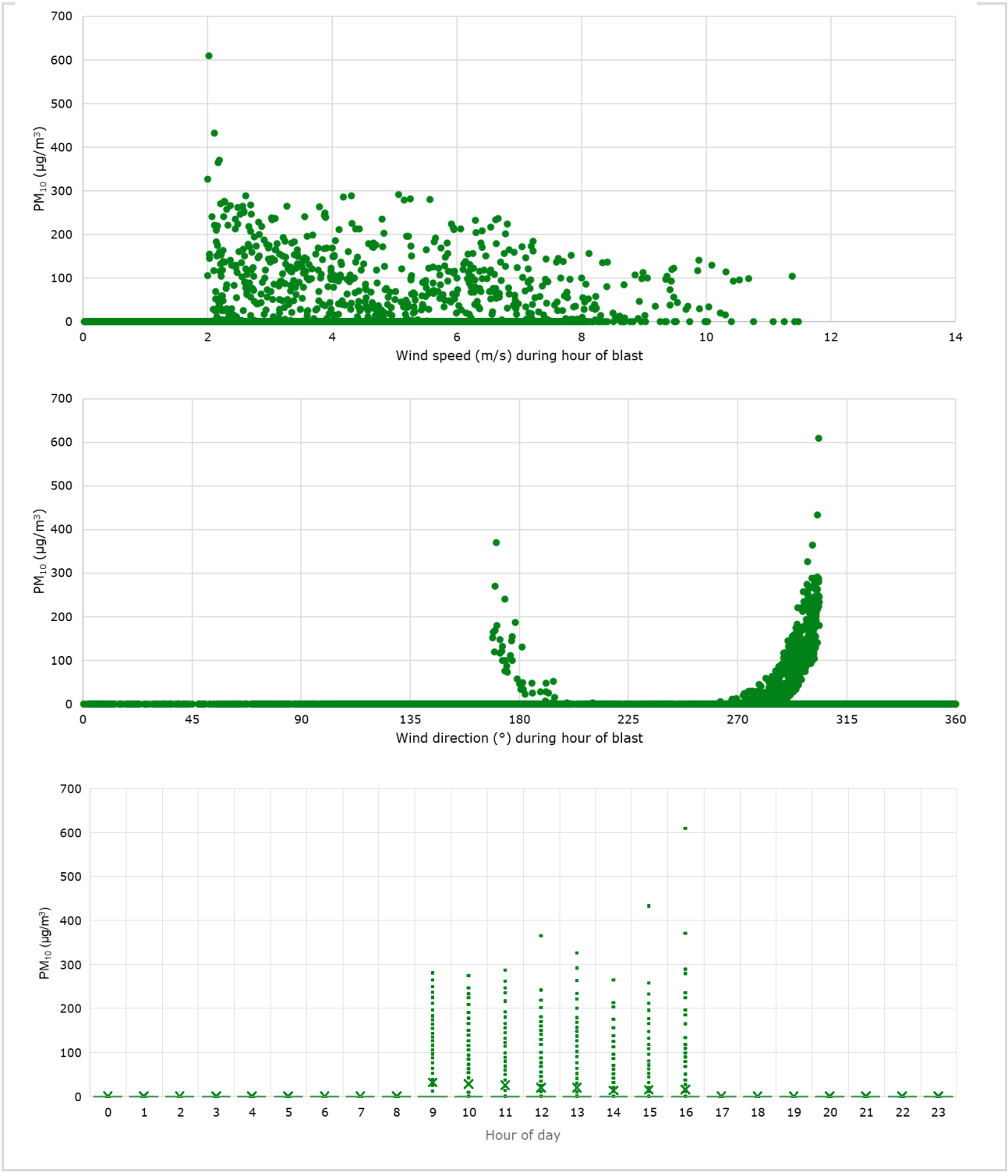


FIGURE 8-14 BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

8.1.2.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-15 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. As for the chimney stack demolition modelling, particulate predictions are more scattered compared with predictions at the infrastructure receptors, with preferred wind directions less apparent. Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-16 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during hours with preferred meteorological conditions. This reduces the maximum dust concentrations by an order of magnitude.

Figure 8-17 to Figure 8-20 illustrate the maximum 1-hour and 24-hour average predicted PM_{10} and $PM_{2.5}$ concentrations across the model domain, for blasting occurring any hour between 9am and 5pm and for blasting only during hours with preferred meteorological conditions. Maximum predictions at sensitive receptor locations on the north and eastern side of Lake Liddell reduce somewhat, however, predictions across the infrastructure area are reduced significantly.

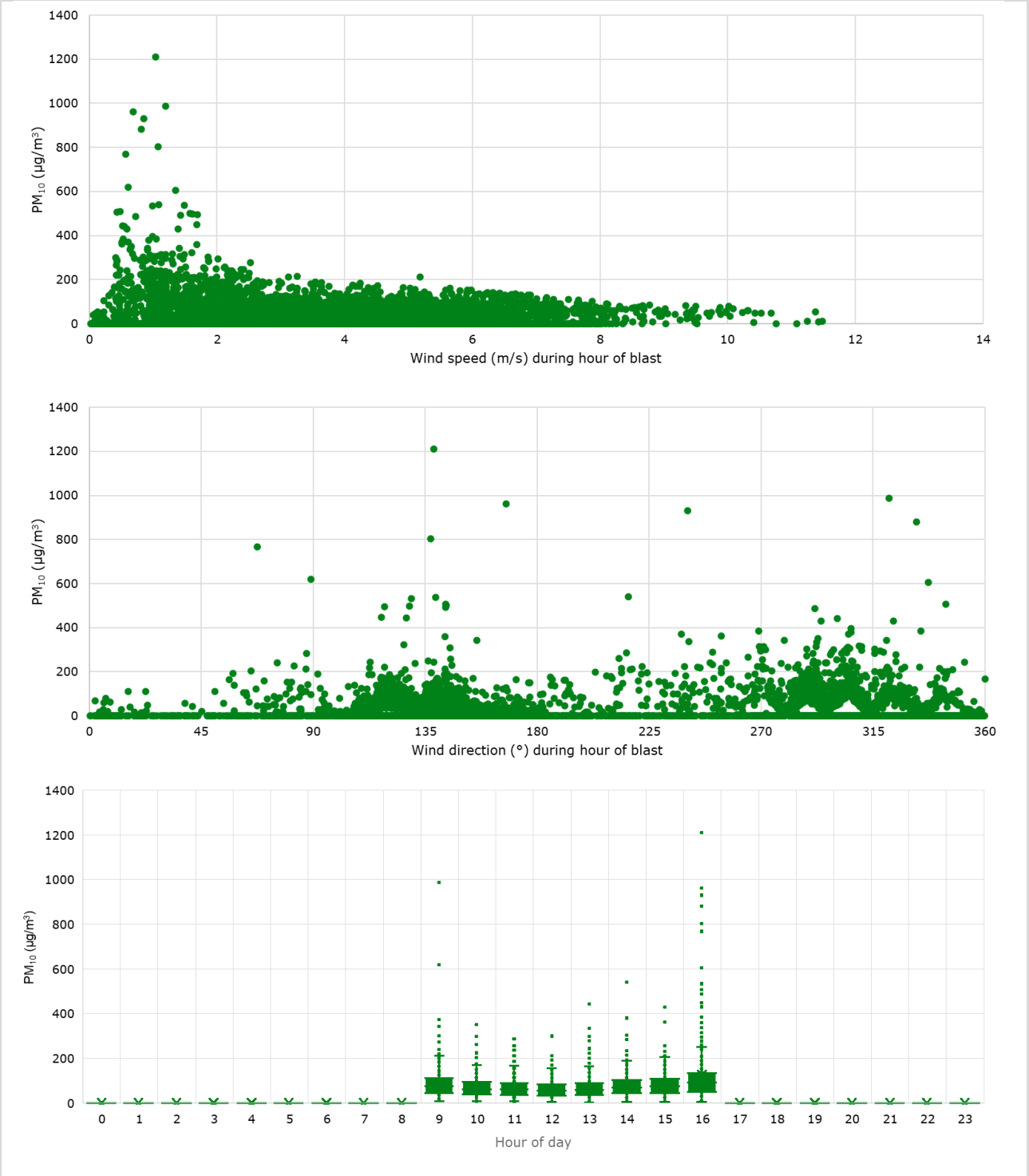


FIGURE 8-15 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)



FIGURE 8-16 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (PREFERRED CONDITIONS)

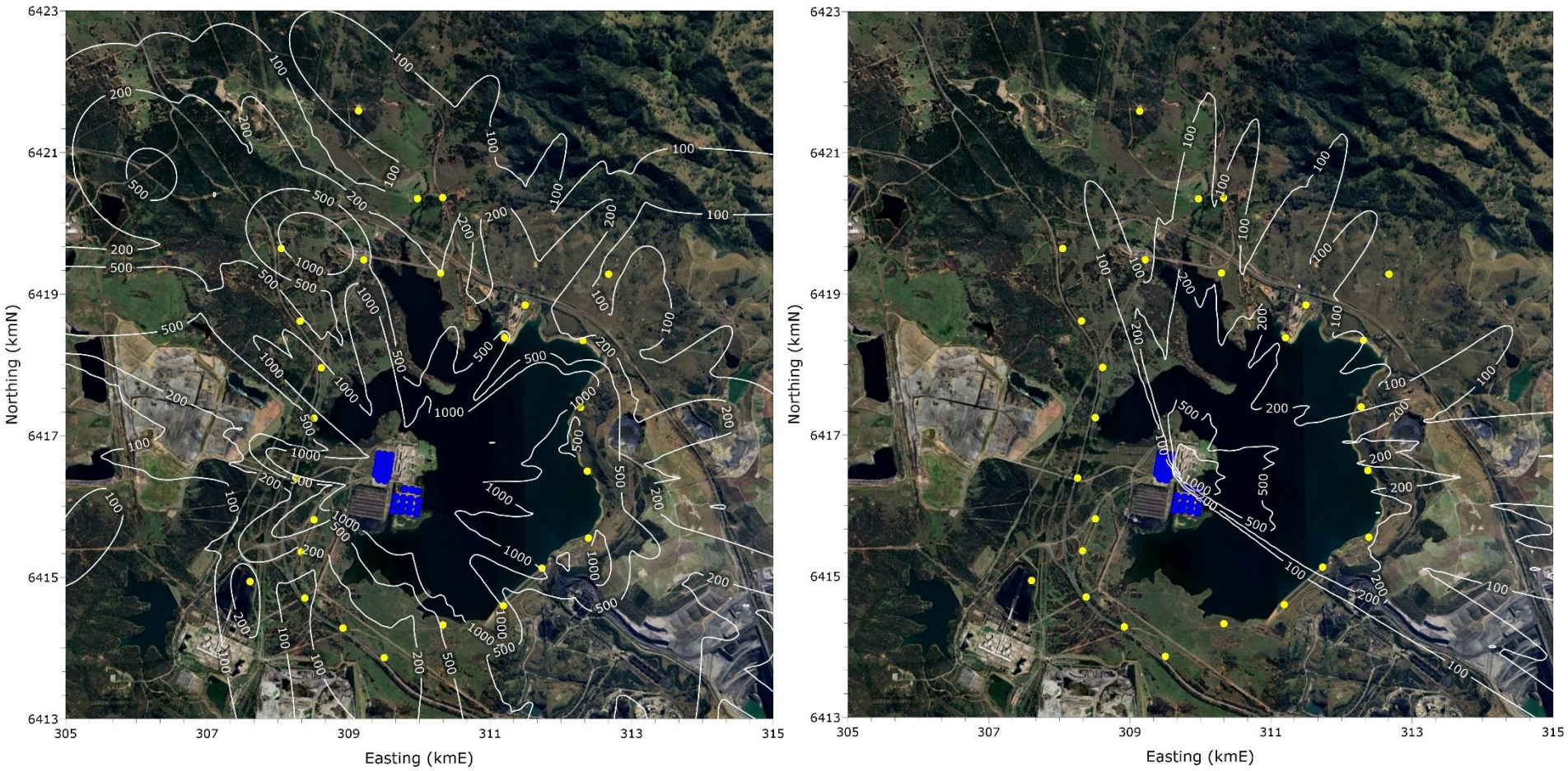


FIGURE 8-17 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

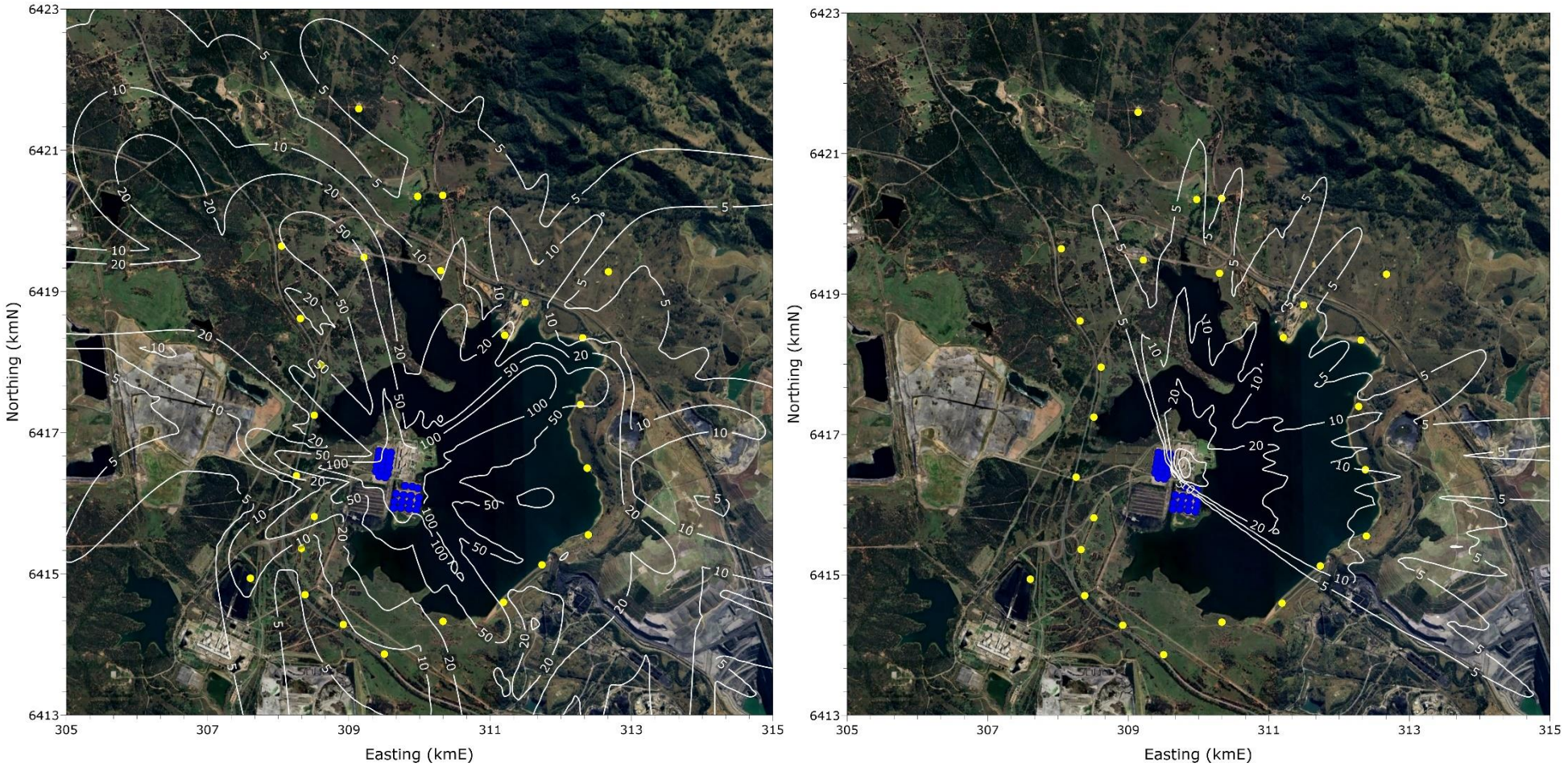


FIGURE 8-18 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

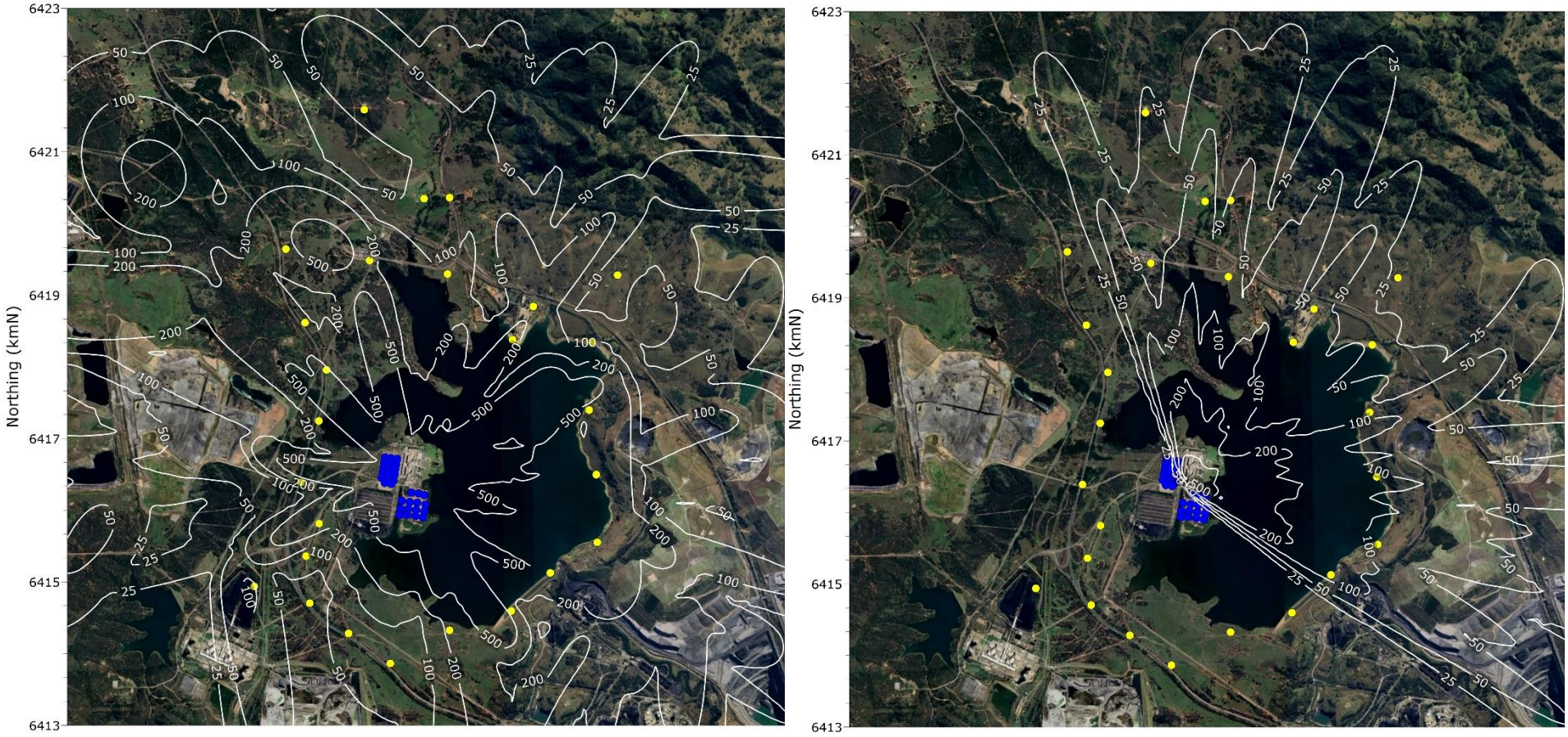


FIGURE 8-19 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

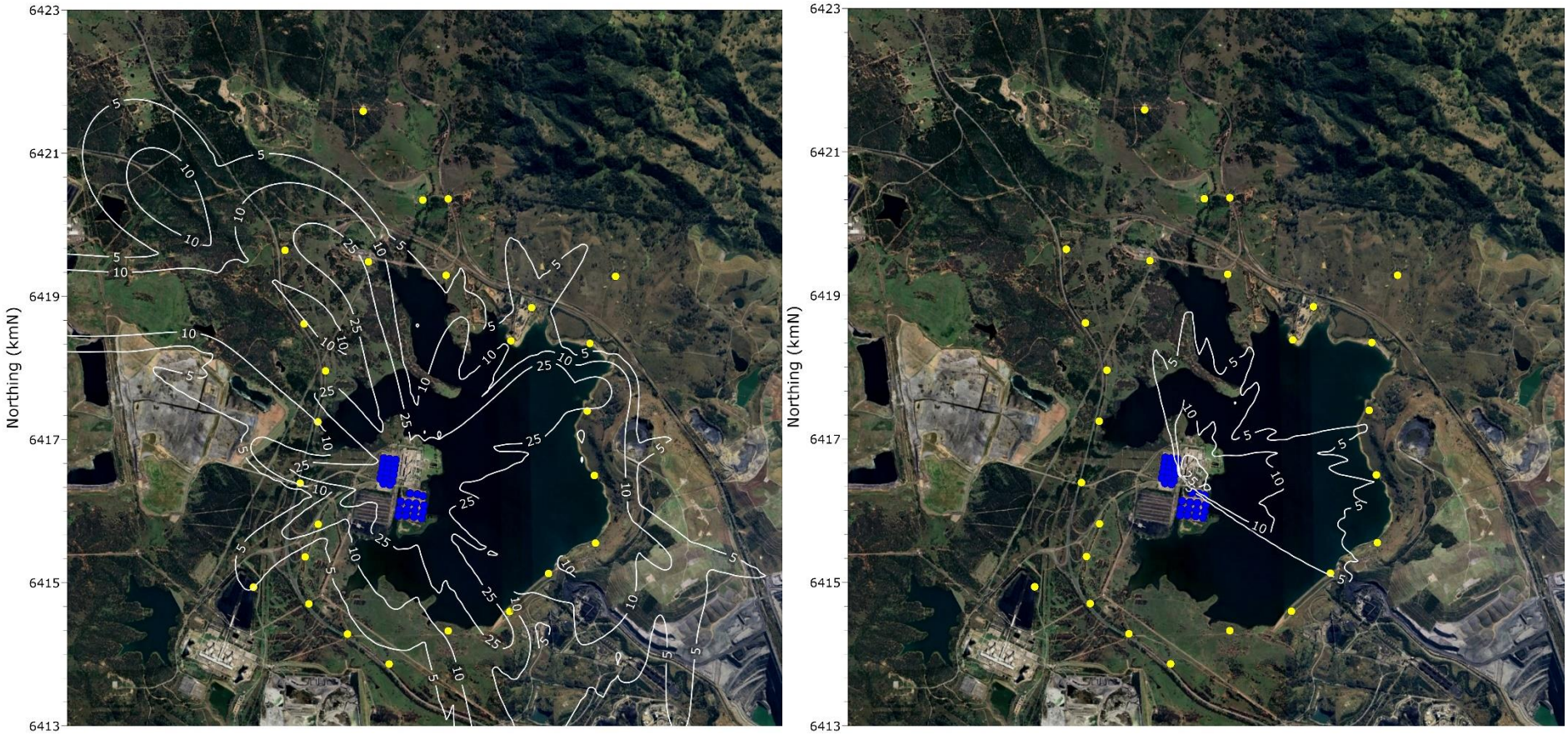


FIGURE 8-20 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ – ALL BLAST HOURS (LEFT), PREFERRED CONDITIONS (RIGHT) ($\mu g/m^3$)

8.1.2.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-21 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. These show:

- The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts occur under a wide range of wind speeds
- There is a clear variation with wind direction, with southeasterly and northwest to northerly directions resulting in higher deposition rates.
- A gradual increase in deposition rates with time of day.

Figure 8-22 presents the maximum deposition rates if blasting occurred only during hours with the previously identified preferred meteorological conditions. This illustrates that despite deposition rates showing a different behaviour with respect to wind speed compared with particulate concentrations, applying the wind speed and direction restrictions significantly reduces the predicted deposition rates by an order of magnitude. To further minimise dust deposition across the infrastructure area, the preferred wind direction range could be further narrowed.



FIGURE 8-21 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

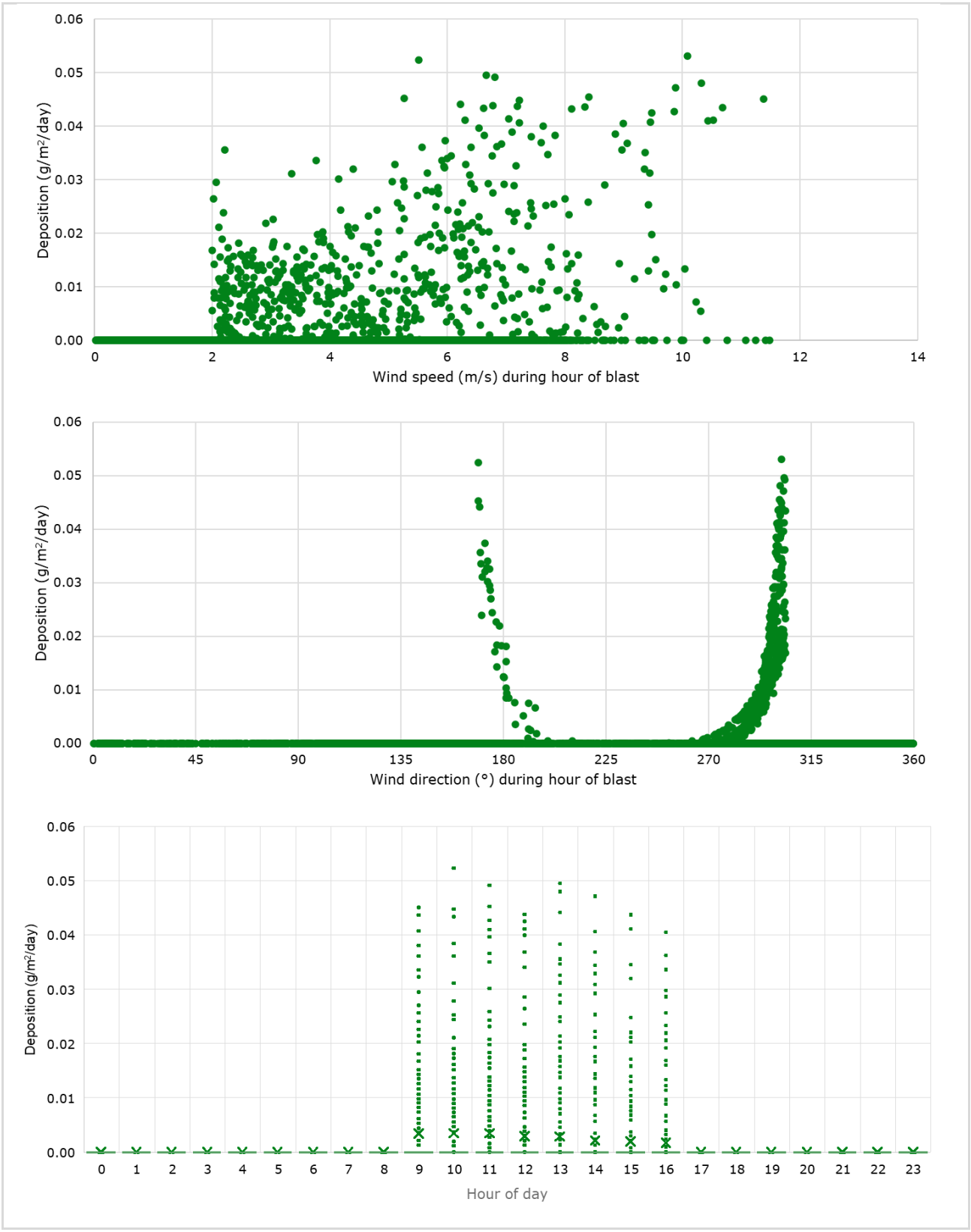


FIGURE 8-22 BOILER HOUSE DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.2.4 DEPOSITION RATES ACROSS THE WIDER AREA

Figure 8-23 illustrates variations in predicted deposition rates at the selected receptors in the wider area with wind speed, direction and hour of day. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area; and
- Minimal variation with wind speed, wind direction or hour of day.

Figure 8-24 presents the predicted deposition rates at these locations due to blasting occurring only during hours when the preferred meteorological conditions occur. As with the infrastructure receptors, this removes some of the highest predicted deposition rates at the discrete receptor locations further afield.

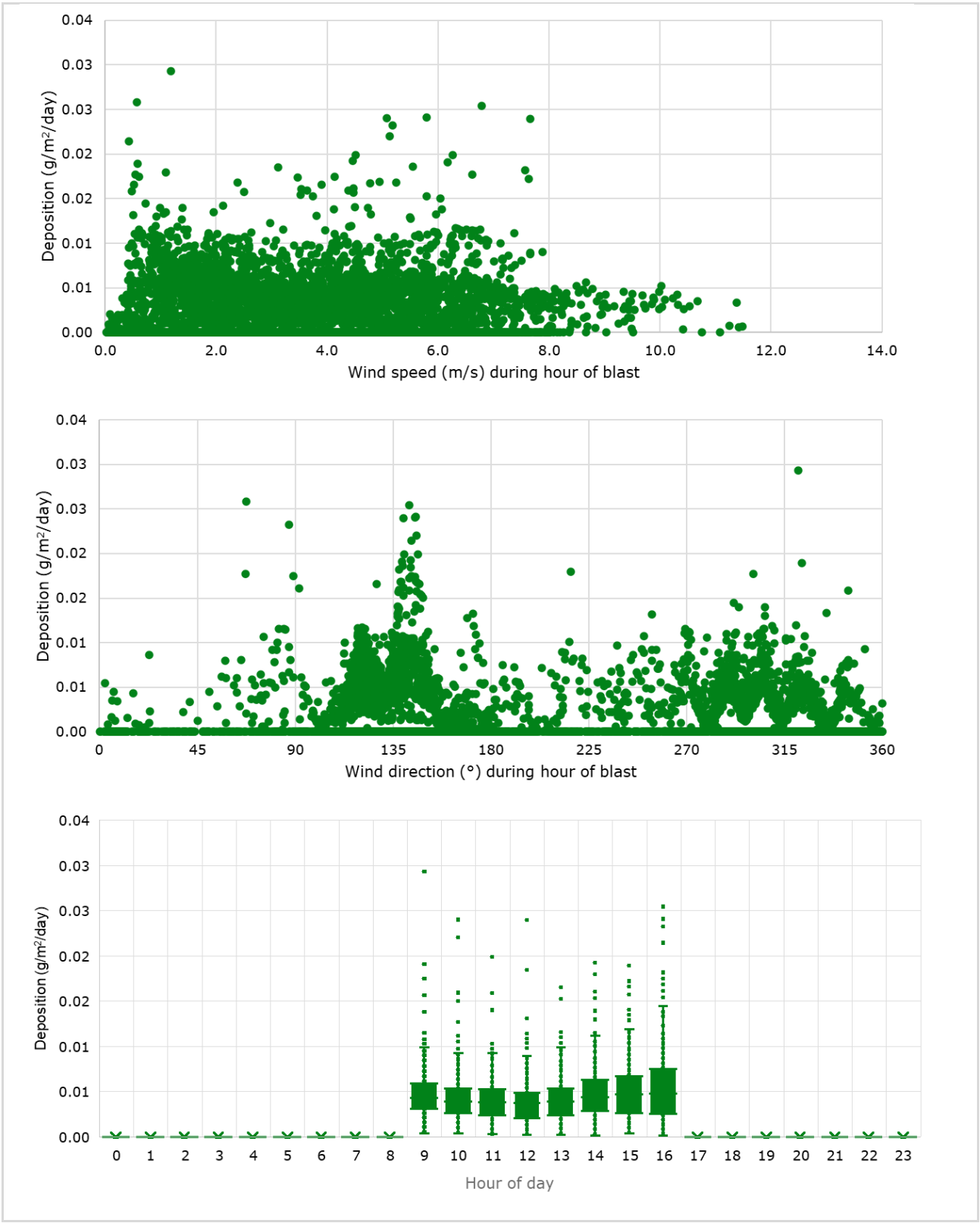


FIGURE 8-23 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)



FIGURE 8-24 BOILER HOUSE DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (PREFERRED CONDITIONS)

8.1.3 PREFERRED METEOROLOGICAL CONDITIONS FOR DEMOLITION

It is anticipated that blasting of the chimneys will take place between February and May 2026 with blasting of the boiler houses to occur later in the year. The intended blast time is to be 13:30 although this is dependent upon the prevailing weather conditions and site requirements (WI, 2025).

Based on the dispersion modelling analysis, demolition activities are recommended to be conducted when winds are greater than 2 m/s and originate from the southerly and westerly sectors, specifically for winds from the:

- South;
- South-southwest;
- South-west;
- West-southwest;
- West; and
- West-northwest.

Winds from these directions will promote the dispersion of dust emissions towards the north and east, over Lake Liddell and away from sensitive receptors including on-site infrastructure.

Figure 8-25 presents the number of hours per day during 2020 that these preferred meteorological conditions were predicted within the modelling dataset. The frequency of preferred conditions is higher during the autumn and winter months, with fewer occasions present in spring and summer.

Table 8-1 presents the number of days each month on which preferred conditions were predicted for each blast hour. Figure 8-26 presents this data visually. Frequencies of preferred conditions are generally higher during the months of April to August, and reduce slightly in the late afternoon. The highest frequency of preferred conditions per month occur during August between 11am and 1pm. April to June have a slightly higher frequency of preferred conditions for blasting between 9am to 11am.

Additional considerations for blast planning include:

- Dispersion modelling results for blasting at 9am and 4pm indicate that dust from blasting disperses within one hour. However, it would be prudent to plan blasting for a time when preferred meteorological conditions are expected to remain and shifts in wind speed or direction are not likely for a few hours after blasting.
- It is also suggested that whilst a wind speed threshold has been defined, it may also be prudent to aim to blast during the middle hours of the day to assist in avoiding periods of poor dispersion in the early morning or evening such as stable conditions or inversions.
- Selection of wind speed trigger:
    - Evaluation of the meteorological field generated by WRF/CALMET identified that while there was general consistency between the modelled meteorological patterns and those observed at the AGL on-site weather station, modelled wind speeds were on average, higher than those observed. The QQ-plot in Figure 8-27 illustrates this difference, with modelled wind speeds, on average, 1.7 times higher than observed.
    - This may need to be considered during the implementation of blast planning so that an appropriate wind speed threshold is selected.

- It is noted that based on aerial imagery, the AGL on-site weather station is sited with trees approximately 15-20m away in most directions. The Australian Standard AS/NZS 3580.14:2014 for Meteorological monitoring for ambient air quality monitoring applications notes that an anemometer should be distance from any obstruction by at least 10 times the height of the obstruction. This separation distance does not appear to be met, and is expected to produce a reduction in wind speeds in the vicinity of the weather station compared to those experienced in the wider area.
- Should the AGL on-site weather station be used to inform blasting decisions, further consideration of the siting influences would be required.

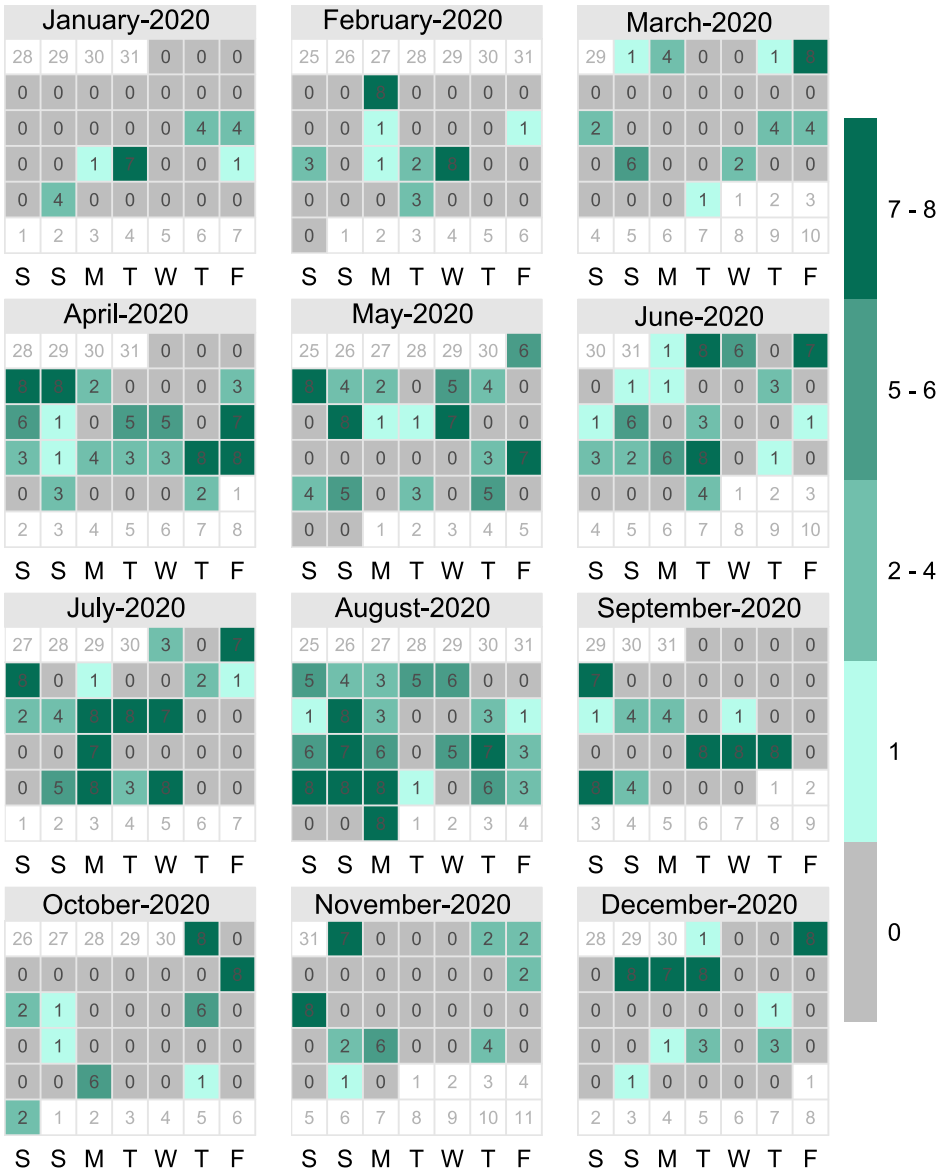


FIGURE 8-25 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF PREFERRED METEOROLOGICAL CONDITIONS BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET

TABLE 8-1 NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

Month	Hour of Blast							
	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm
January	1	2	5	4	4	2	1	2
February	6	4	4	3	3	2	2	3
March	3	4	3	3	5	5	5	5
April	13	13	12	8	10	9	9	6
May	13	11	11	11	8	8	6	5
June	11	10	9	7	6	5	7	7
July	9	11	13	11	11	10	10	7
August	10	13	18	18	16	14	14	12
September	7	8	7	7	8	6	6	4
October	6	4	4	4	4	4	4	5
November	3	6	4	5	5	3	4	4
December	5	4	5	5	4	4	6	8

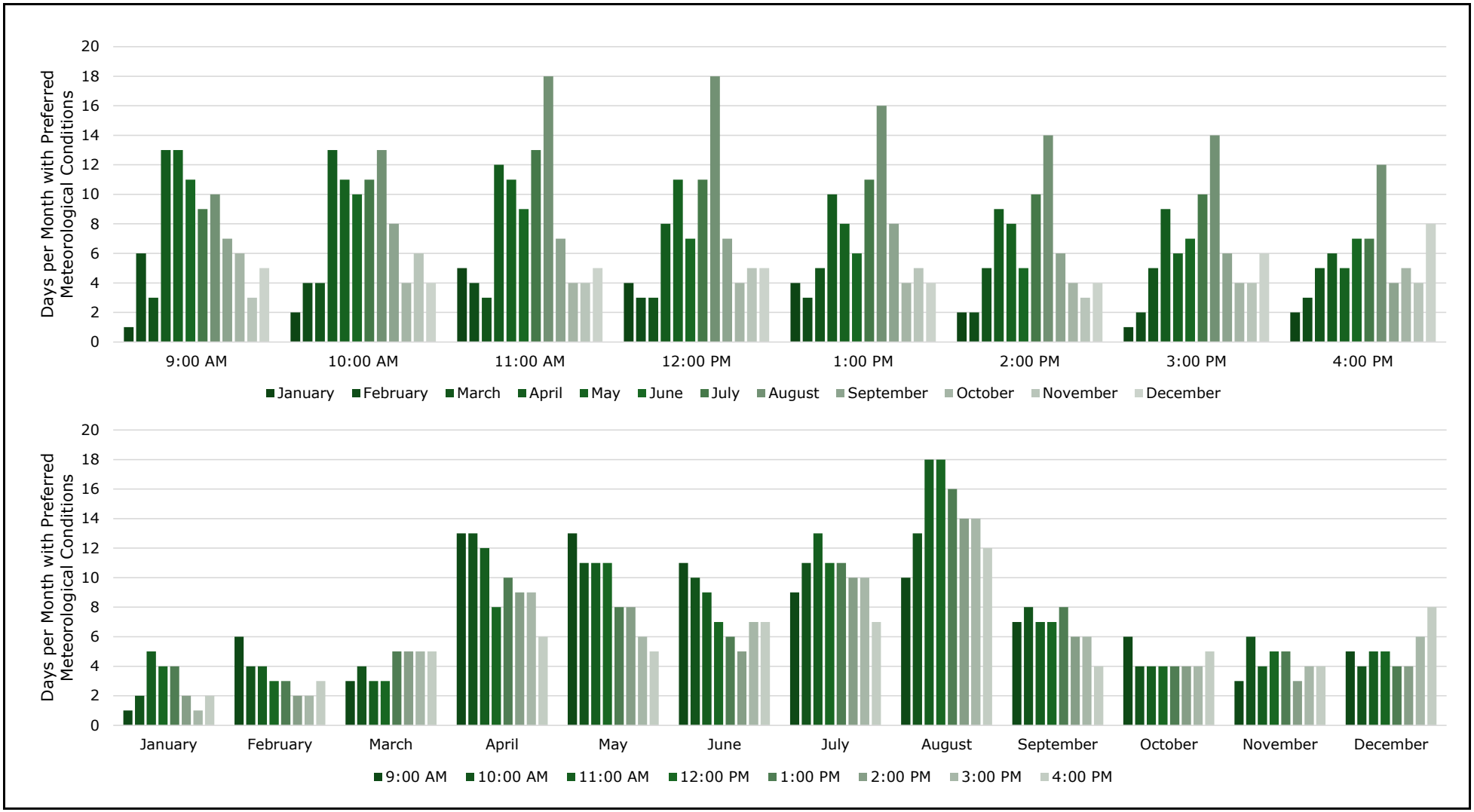


FIGURE 8-26 NUMBER OF DAYS PER MONTH WITH PREFERRED METEOROLOGICAL CONDITIONS FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

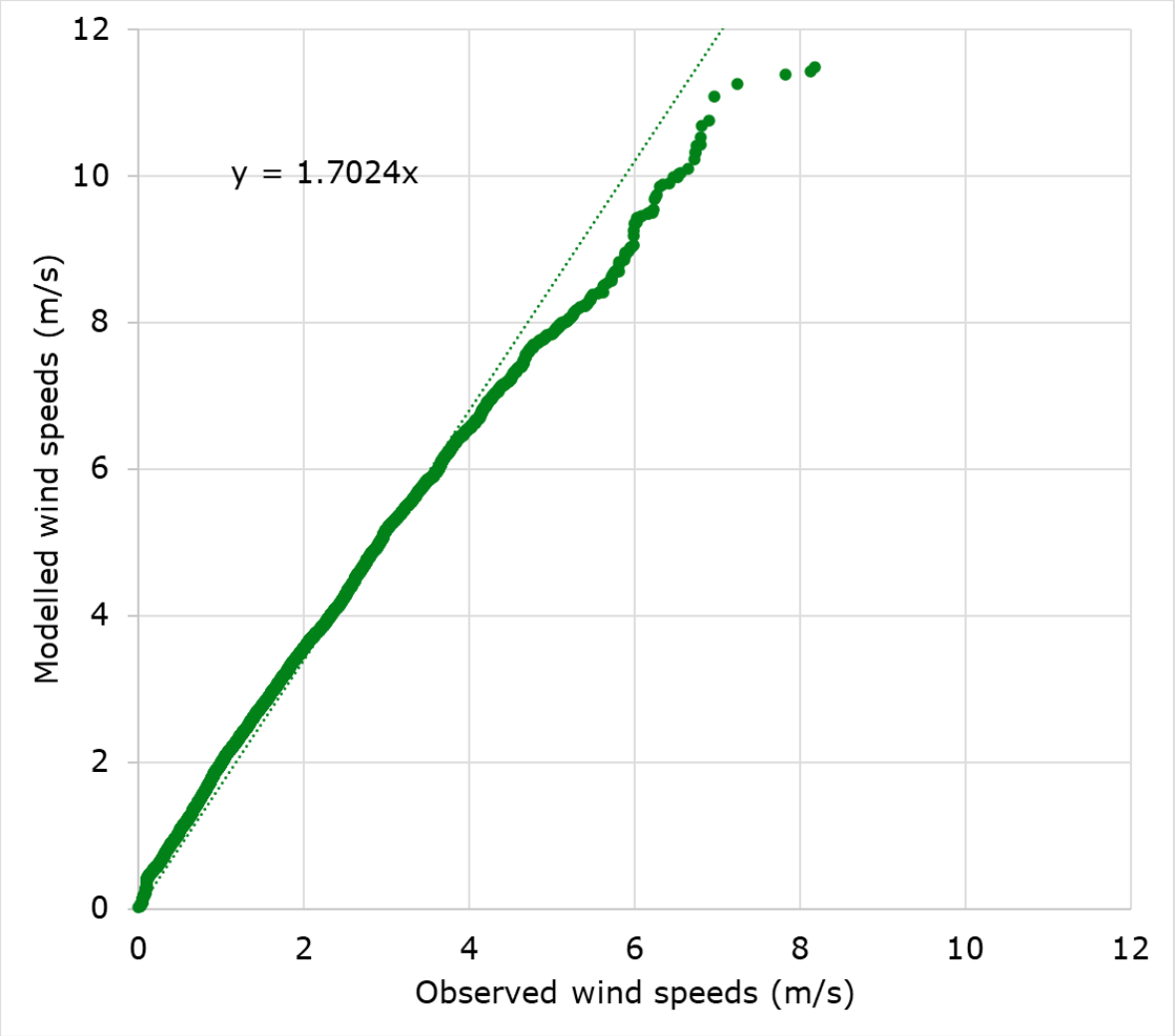


FIGURE 8-27 QQ PLOT COMPARING FREQUENCY DISTRIBUTION OF OBSERVED AND MODELLED WINDS

8.2 SOUTHEASTERLY WINDS

For this scenario, model predictions at receptor locations have firstly been filtered to include only results that corresponded to blasting during an hour with wind directions between 101° and 169°, which reflects winds from the south-southeast, southeast and east-southeast. Remaining model results were reviewed to understand the behaviour of model predictions with variations in wind speed and time of day. The potential to minimise dust impacts during blasting when winds are from southeasterly directions is considered in Sections 8.2.1.1 to 8.2.1.4, and the outcomes of this analysis are compared further to the preferred conditions scenario in Section 8.3.

8.2.1 CHIMNEY STACK DEMOLITION

8.2.1.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-28 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting during southeasterly winds. Key observations include:

- Highest particulate predictions occur under lighter wind conditions. This is typically the case, as stronger winds promote dispersion.
- Particulate predictions vary somewhat throughout the day, with a general increase in the highest predictions from blasting each hour as the day progresses with the maximum prediction occurring between 4-5pm, which may be due to reductions in wind speed and poorer dispersion later in the afternoon.

Based on the above analysis, a wind speed threshold of 3 m/s was identified as being likely to minimise particulate concentrations. This reduces maximum predictions by approximately 80% across the infrastructure area. This reduction in maximum predictions due to blasting during hours with wind speeds greater than 3 m/s can be seen in Figure 8-29. Based on Figure 8-28, selection of a higher wind speed threshold (e.g. 4 m/s) would provide minimal additional benefit (this is discussed further in Section 8.2.3).

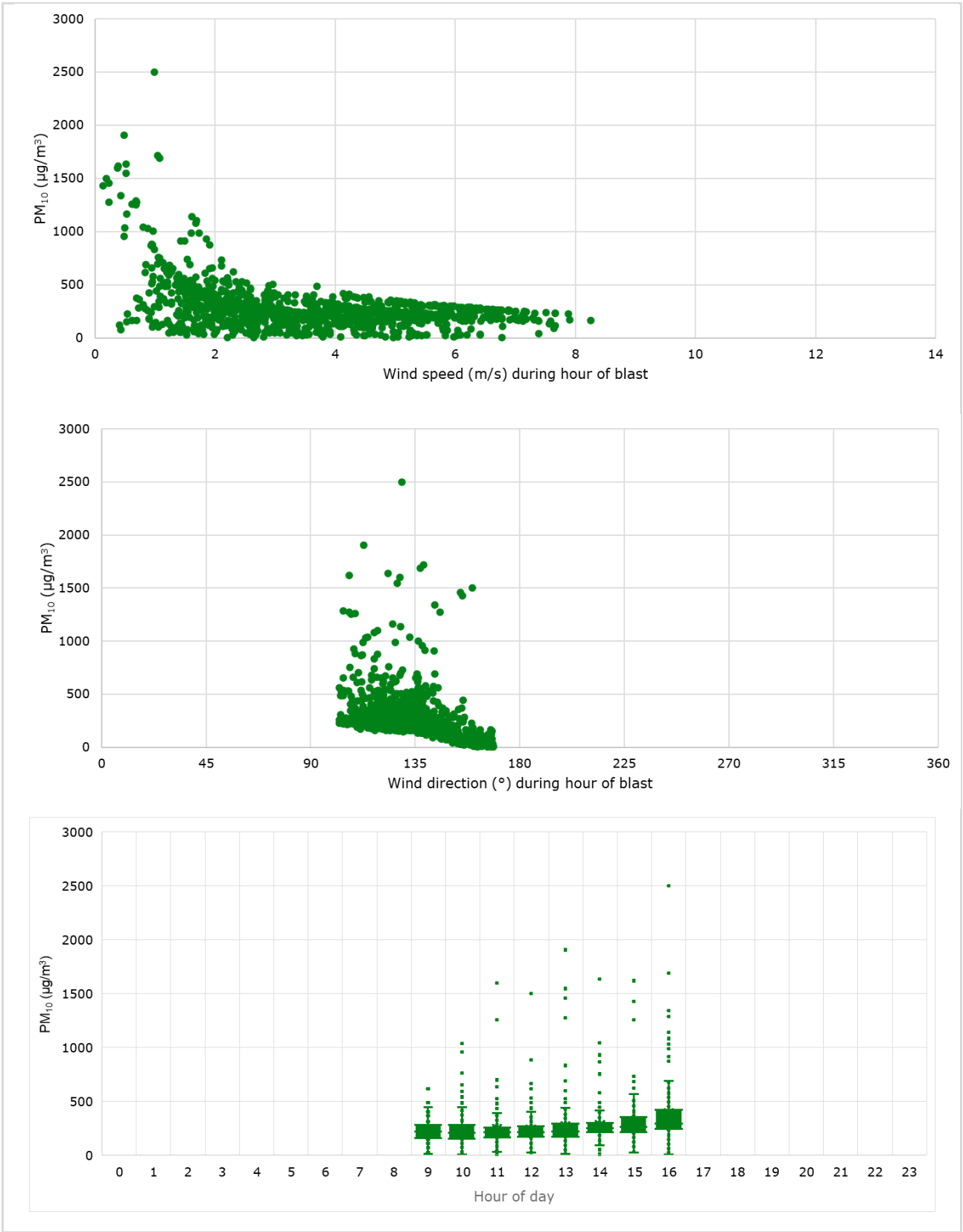


FIGURE 8-28 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

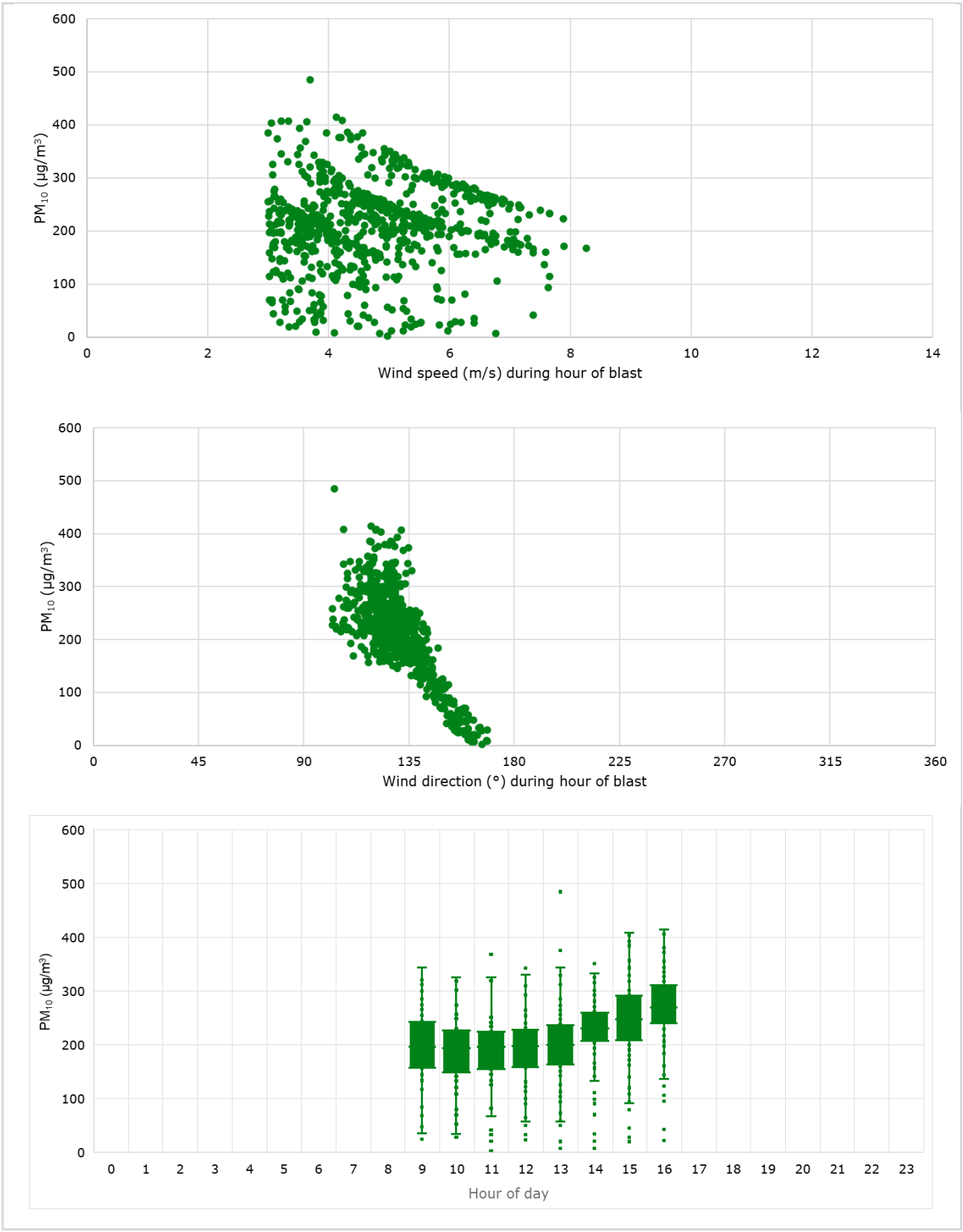


FIGURE 8-29 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.1.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-30 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. A cluster of high maximum 1-hour predictions is seen for blasting during light wind speeds, and later in the day (4-5pm). Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-31 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during hours with preferred meteorological conditions. This reduces the maximum dust concentrations by an order of magnitude and the resulting concentrations are similar in magnitude to those at the screening receptors due to blasting during preferred meteorological conditions.

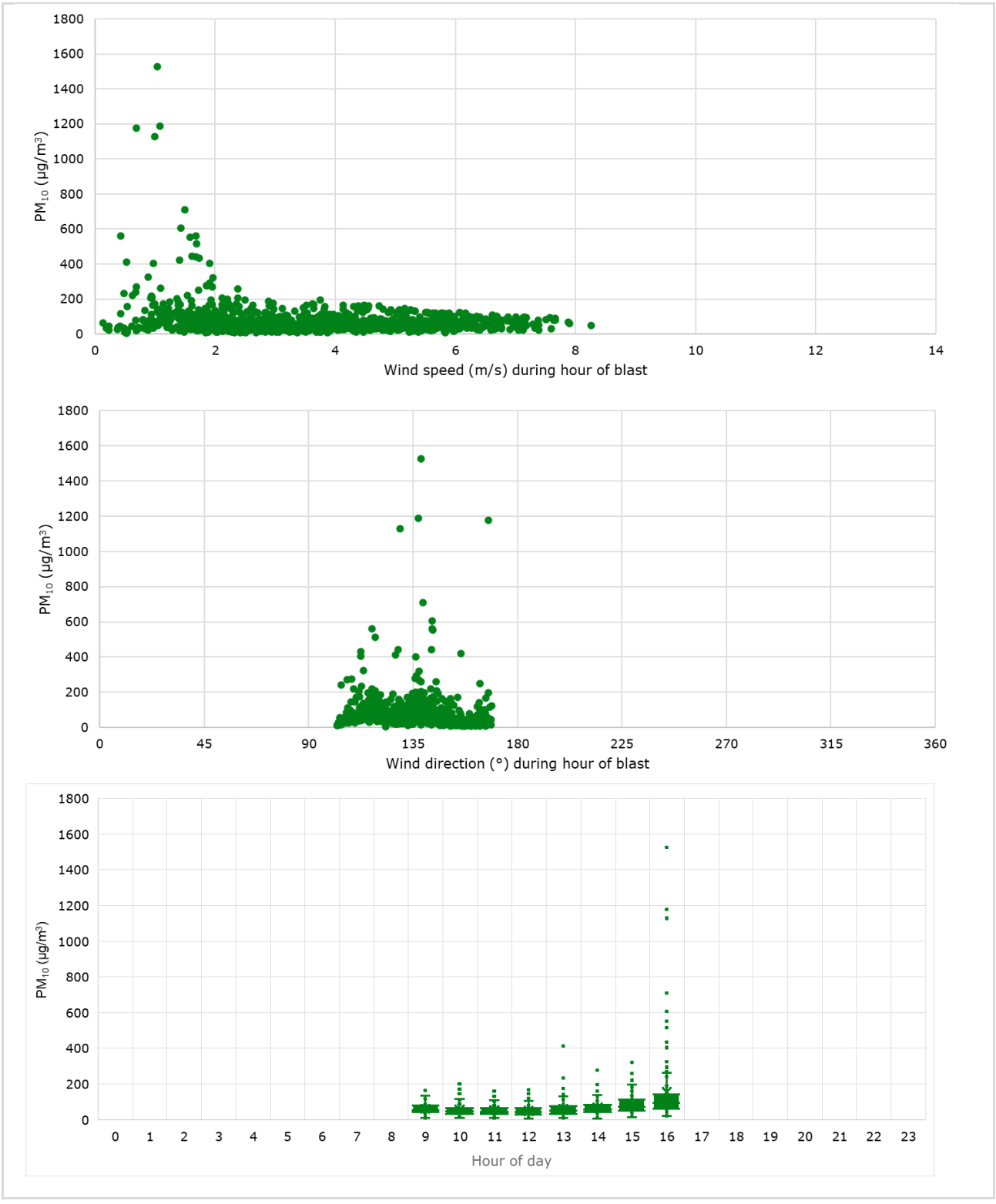


FIGURE 8-30 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

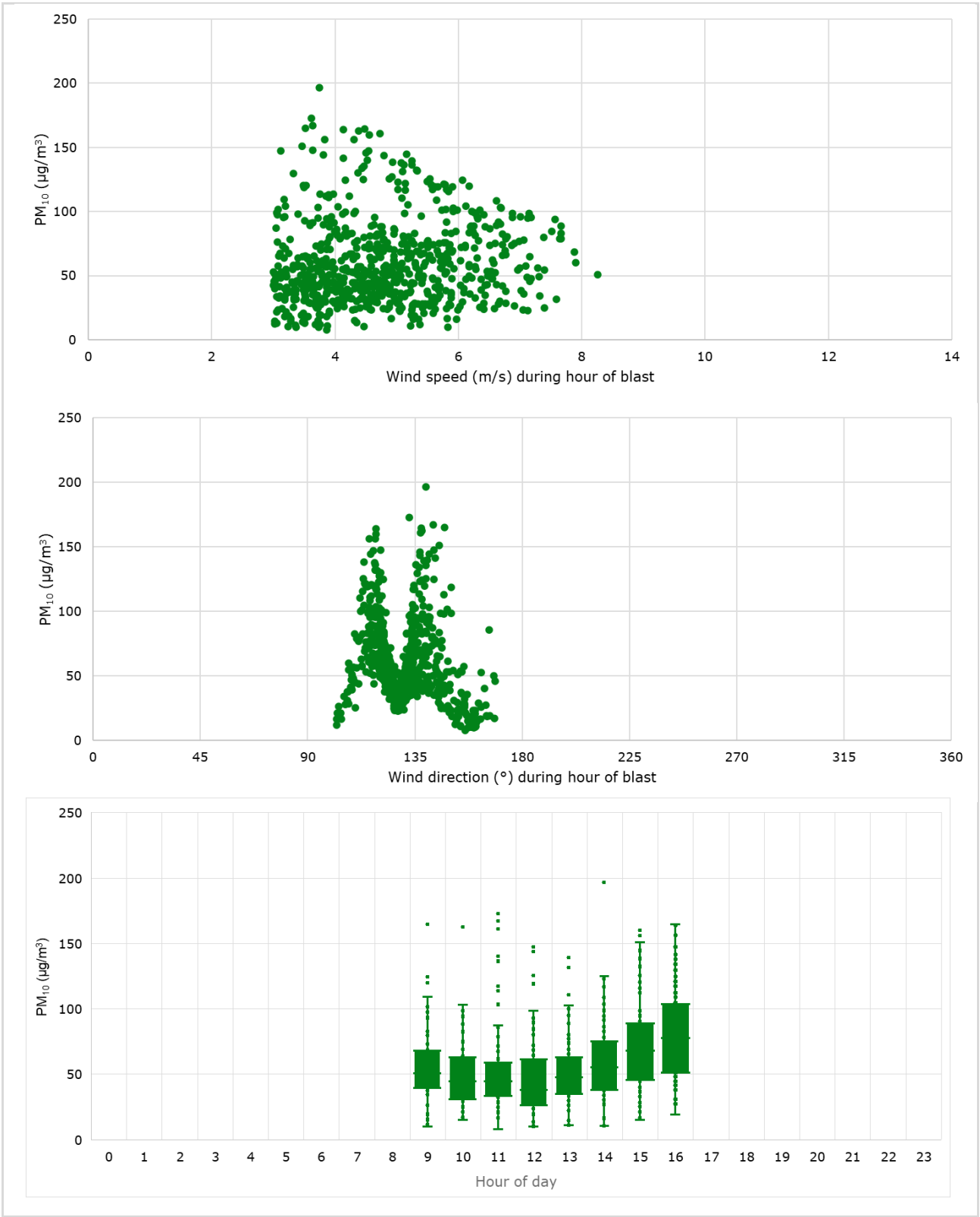


FIGURE 8-31 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.1.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-32 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. These show:

- The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts may occur under a wide range of wind speeds
- A gradual increase in deposition rates with time of day.

Figure 8-33 presents the maximum deposition rates if blasting occurred only during hours with wind speeds greater than 3 m/s. There is a minor reduction only in predicted maximum deposition rates, as in contrast to predicted particulate concentrations, deposition rates remain or in fact increase with increasing wind speeds.

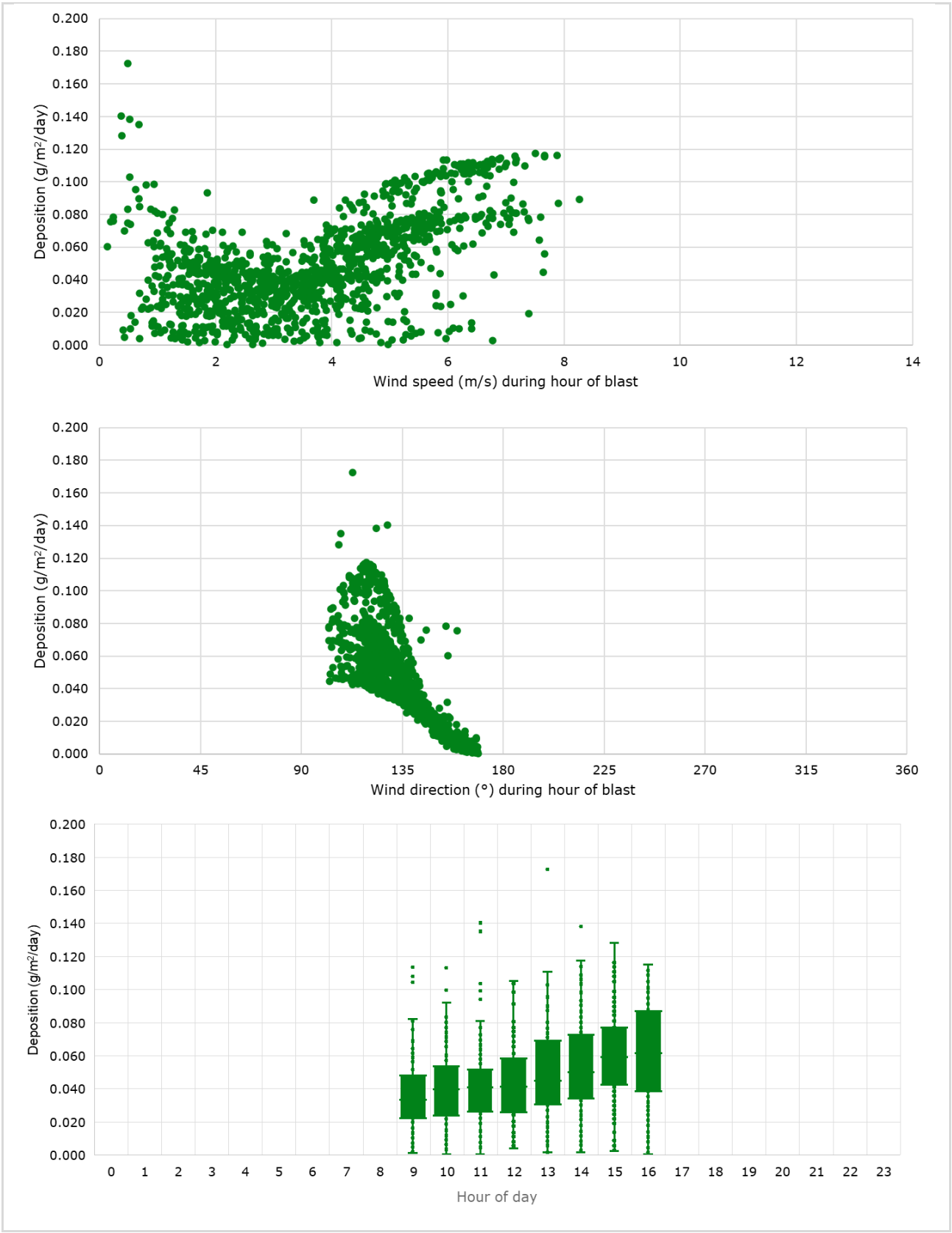


FIGURE 8-32 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

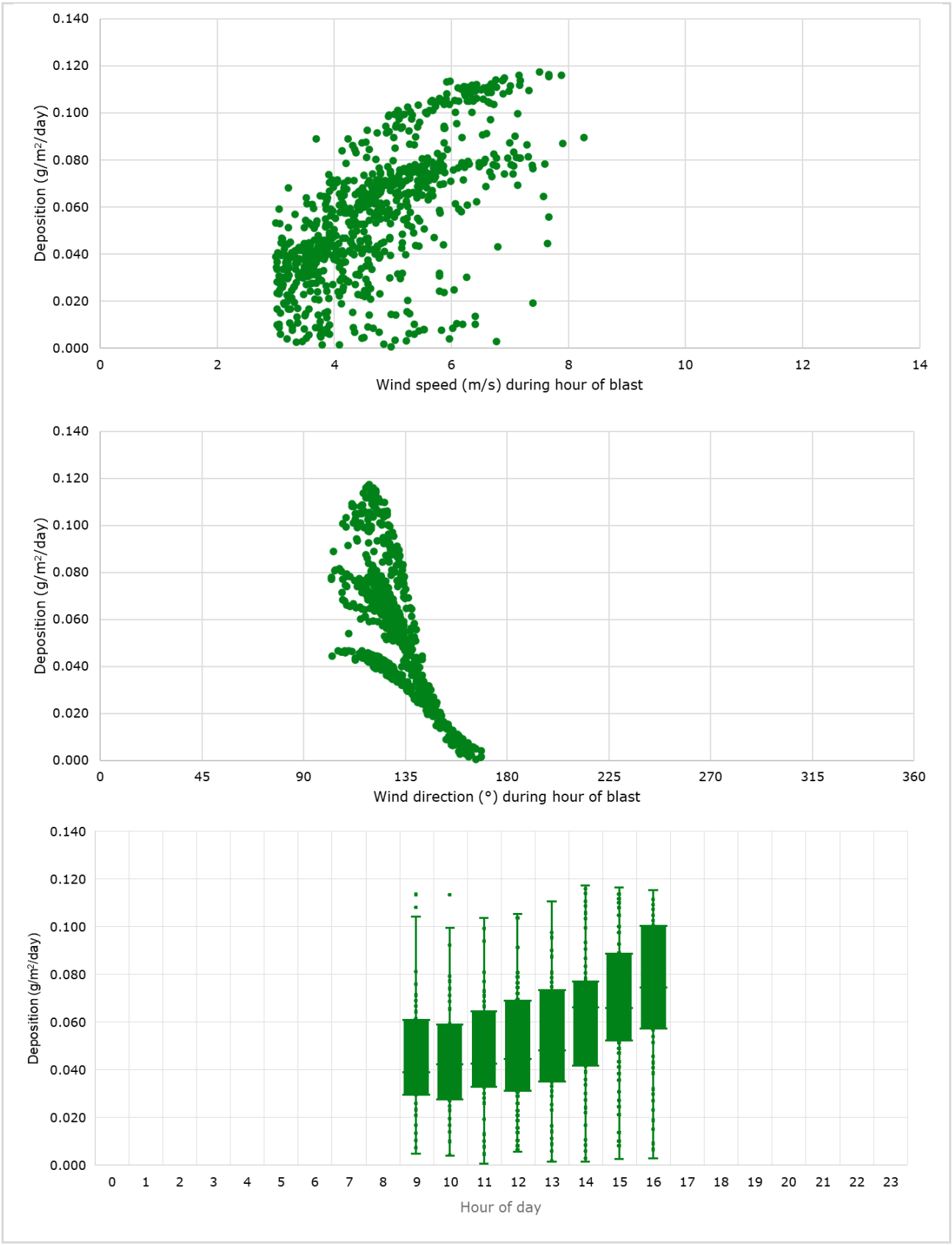


FIGURE 8-33 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.1.4 DEPOSITION RATES ACROSS THE WIDER DOMAIN

Figure 8-34 illustrates variations in predicted deposition rates at the selected receptors in the wider area with wind speed, direction and hour of day during southeasterly winds. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area;
- Minimal variation with wind speed;
- Minimal variation with hour of day.

Figure 8-35 presents the predicted deposition rates at these locations due to blasting occurring only during hours with wind speed greater than 3 m/s. This does not reduce maximum predicted deposition rates at the screening receptors, as these primarily occur during stronger wind directions.

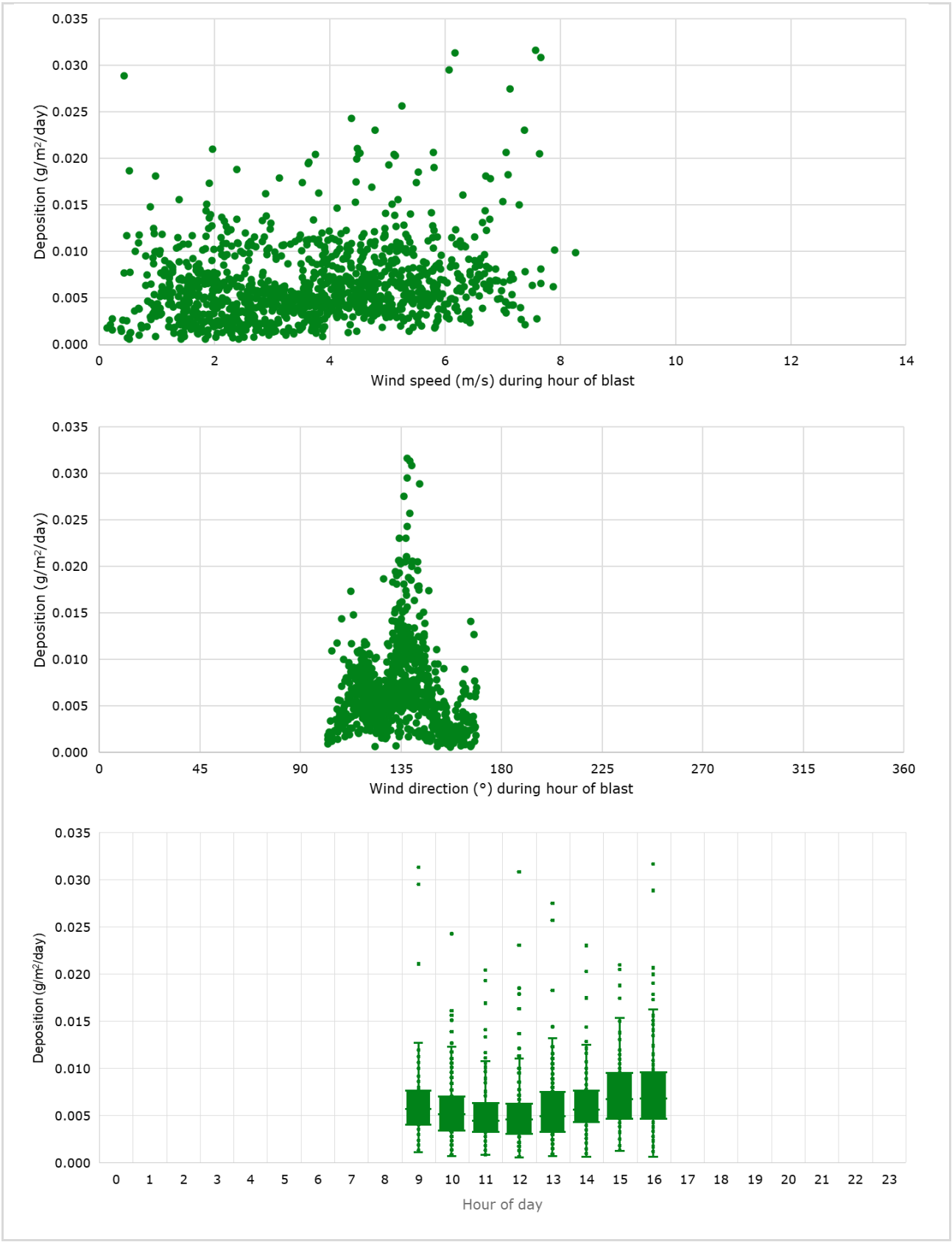


FIGURE 8-34 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

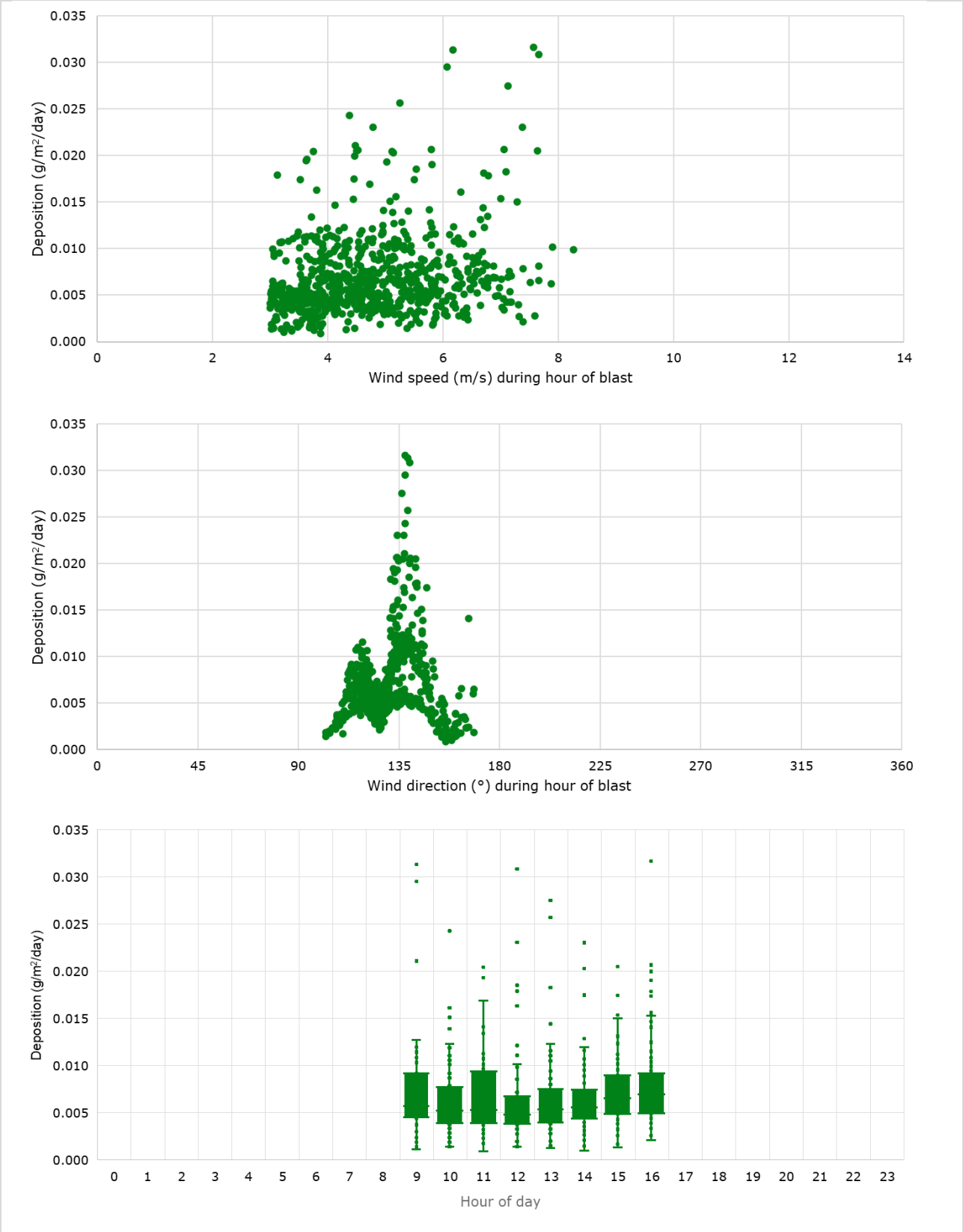


FIGURE 8-35 SOUTHEASTERLY WINDS: STACK DEMOLITION PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.2 BOILER HOUSE DEMOLITION

8.2.2.1 PARTICULATE CONCENTRATIONS AT INFRASTRUCTURE RECEPTORS

Figure 8-36 presents the maximum 1-hour average PM_{10} predictions across the network of industrial receptors and the wind speeds per hour of blasting during southeasterly winds. The most obvious trend is with wind speed, with particulate predictions generally reducing with wind speed, though the reduction becomes smaller in magnitude as wind speed increases.

Adopting the wind speed threshold of 3 m/s reduces maximum predictions due to blasting by more than 50% (see Figure 8-37). As with the chimney demolition, Figure 8-36Figure 8-28 indicates that selection of a higher wind speed threshold (e.g. 4 m/s) would provide minimal additional reduction in particulate concentrations (this is discussed further in Section 8.3).

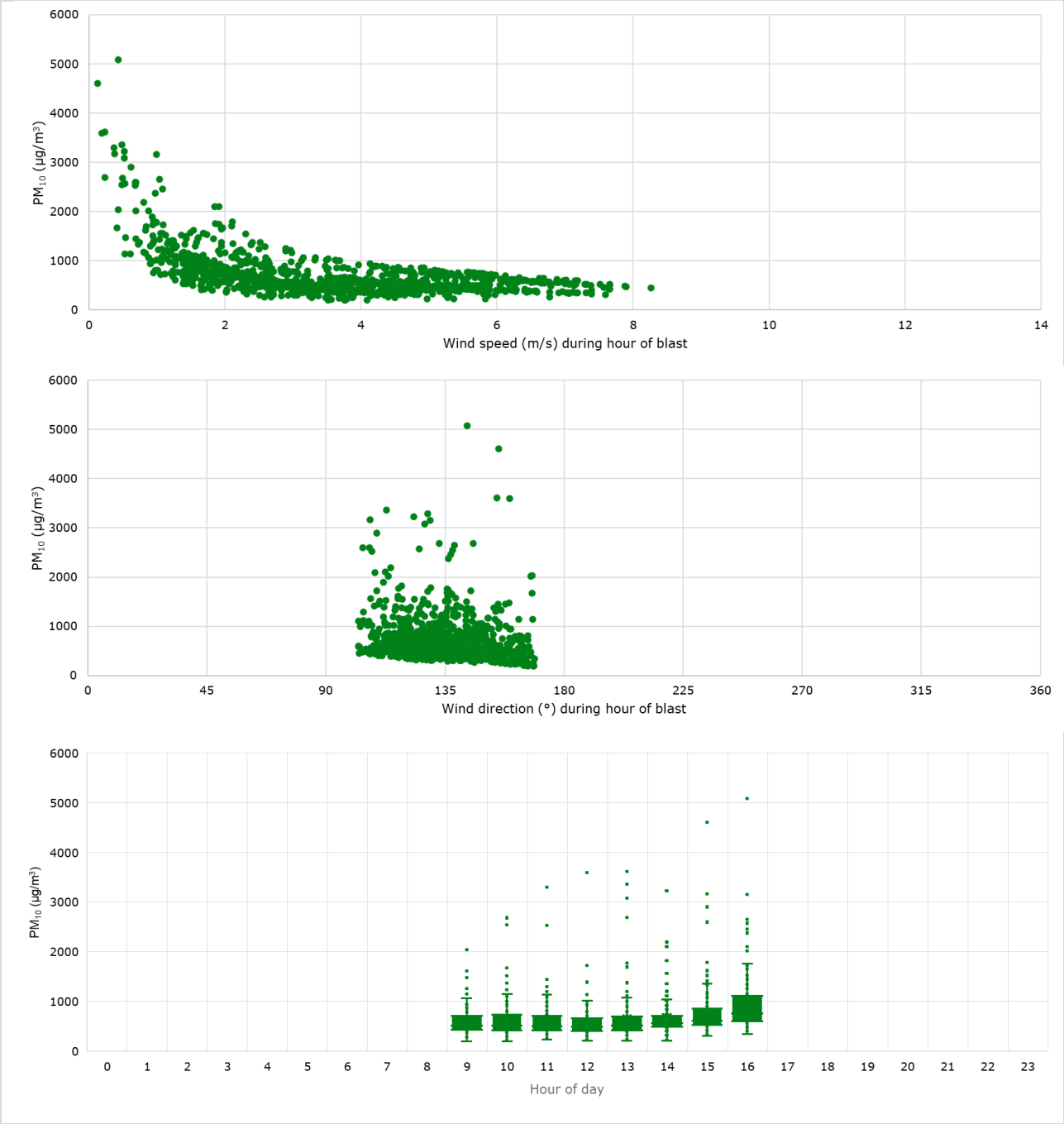


FIGURE 8-36 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

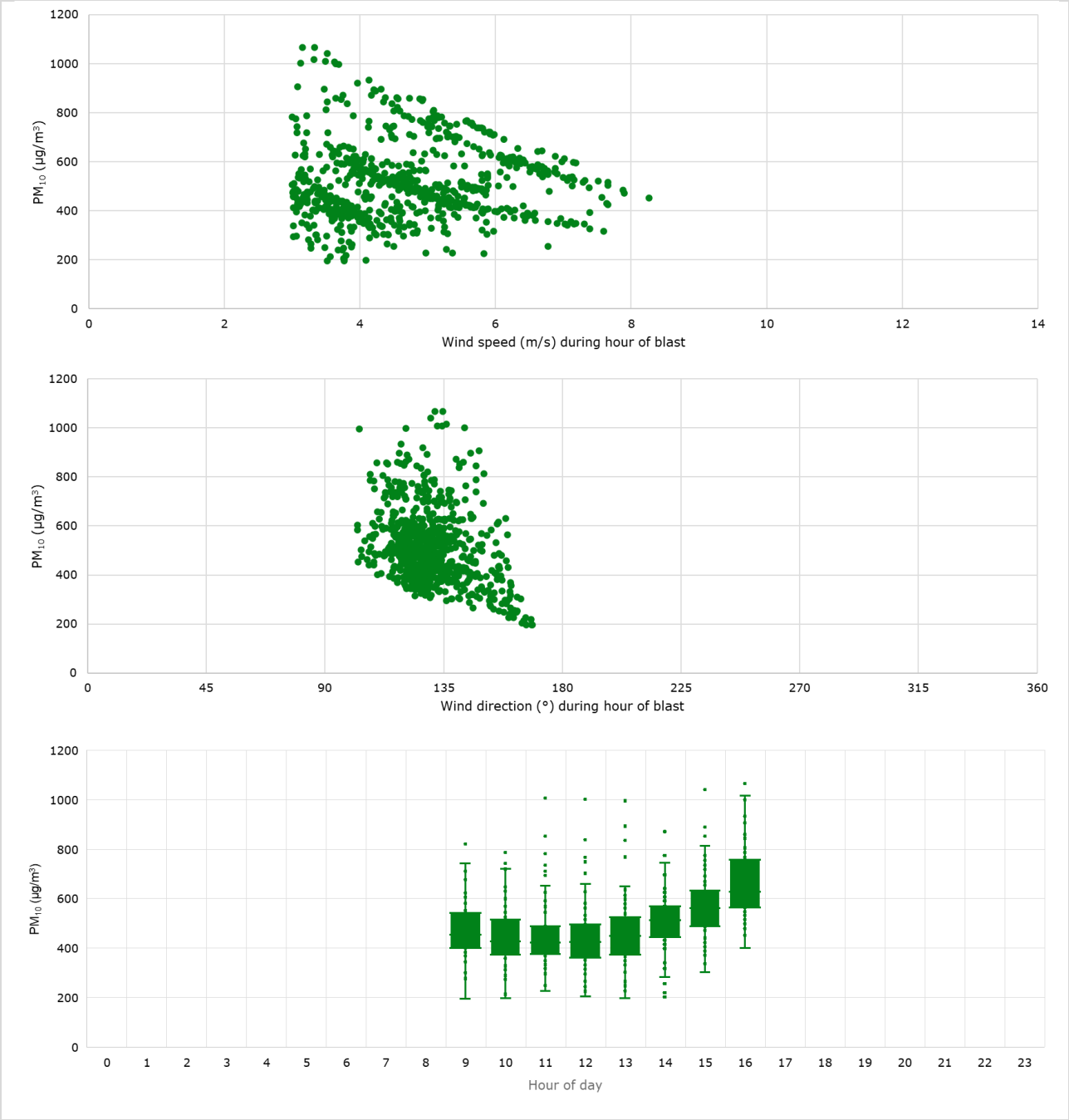


FIGURE 8-37 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.2.2 PARTICULATE CONCENTRATIONS ACROSS THE WIDER DOMAIN

Figure 8-38 illustrates the maximum 1-hour predictions at each discrete receptor location in the wider domain. A cluster of high maximum 1-hour predictions is seen for blasting during light wind speeds, and later in the day (4-5pm). Overall, the highest predictions are lower than the highest predictions across the infrastructure area, which is expected given the additional distance between the blast and these discrete receptors which allows for further dispersion.

Figure 8-39 presents the maximum 1-hour concentrations at each discrete receptor location in the wider domain for blasting only during southeasterly winds greater than 3 m/s. This reduces the maximum dust concentrations by an order of magnitude and the resulting concentrations are similar in magnitude to those at the screening receptors due to blasting during preferred meteorological conditions.

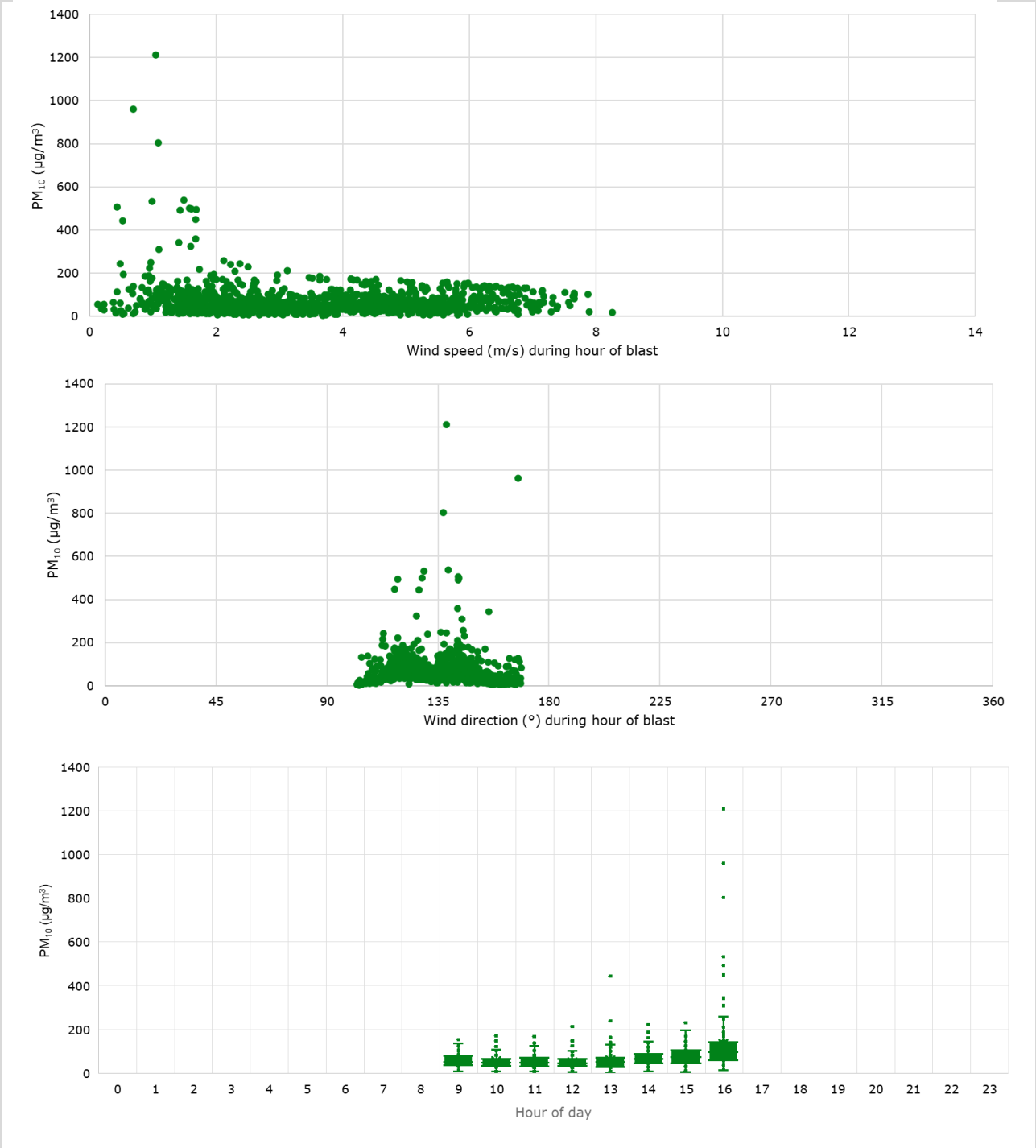


FIGURE 8-38 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (ALL POTENTIAL BLAST HOURS)

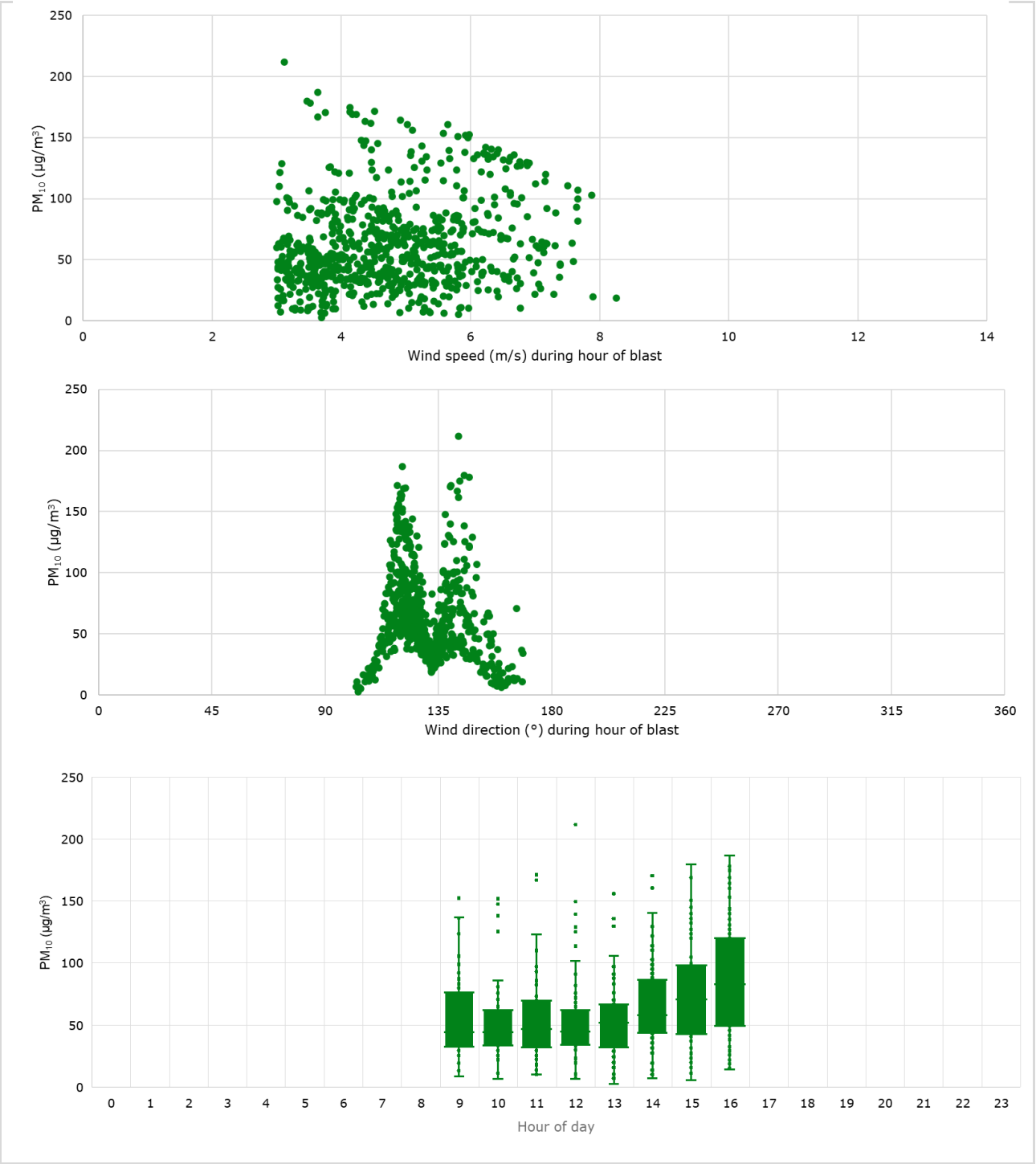


FIGURE 8-39 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS WIDER AREA: 1-HOUR AVERAGE PM_{10} (>3m/s WIND SPEEDS)

8.2.2.3 DEPOSITION RATES AT INFRASTRUCTURE RECEPTORS

Figure 8-40 presents the maximum hourly deposition rates vs wind speed, wind direction and hour of day. The highest deposition rates are predicted to occur during low wind speeds, however, deposition impacts may occur under a wide range of wind speeds

Figure 8-41 presents the maximum deposition rates if blasting occurred only during hours with wind speeds greater than 3 m/s. There is a minor reduction only in predicted maximum deposition rates, as in contrast to predicted particulate concentrations, deposition rates remain or in fact increase with increasing wind speeds.

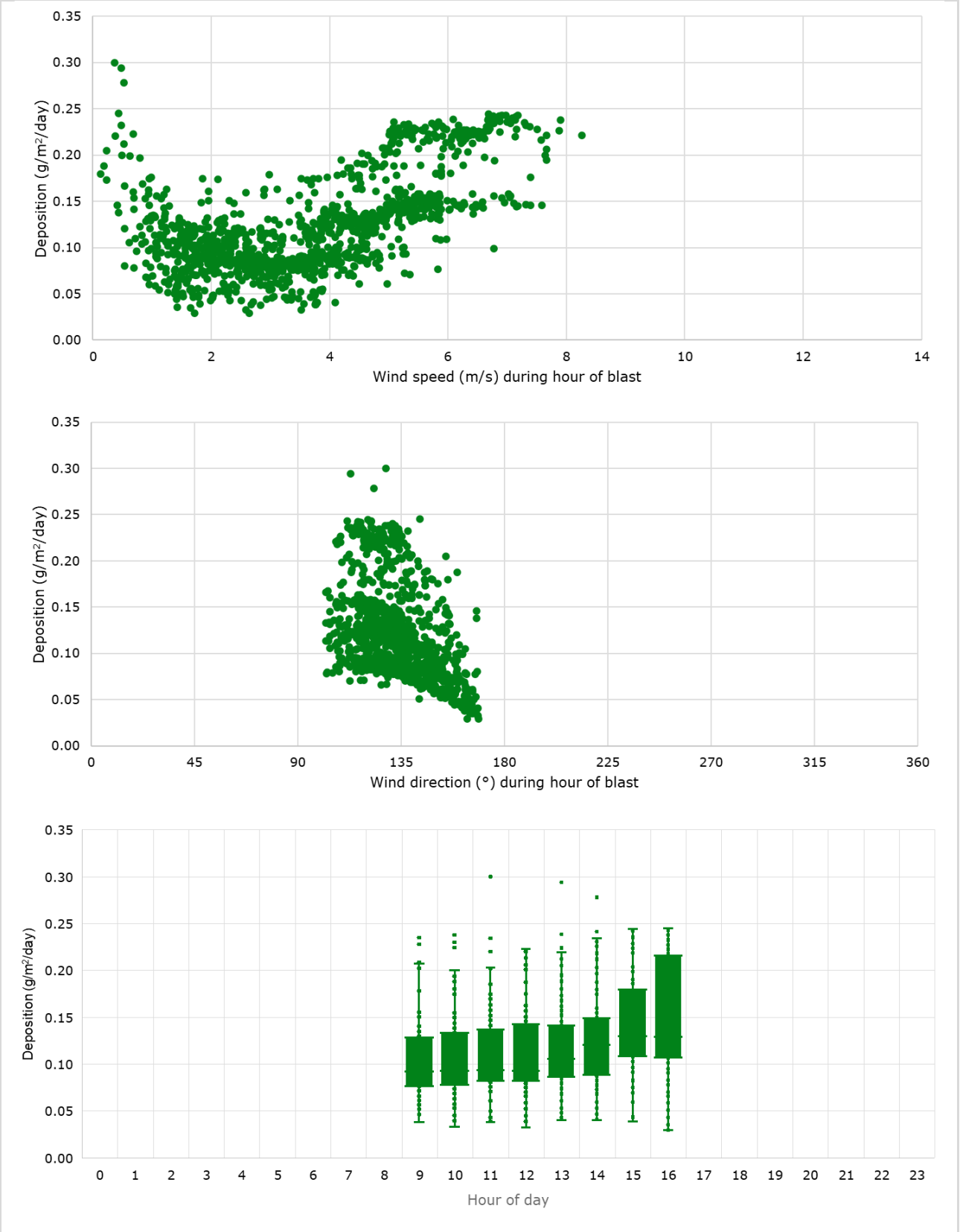


FIGURE 8-40 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

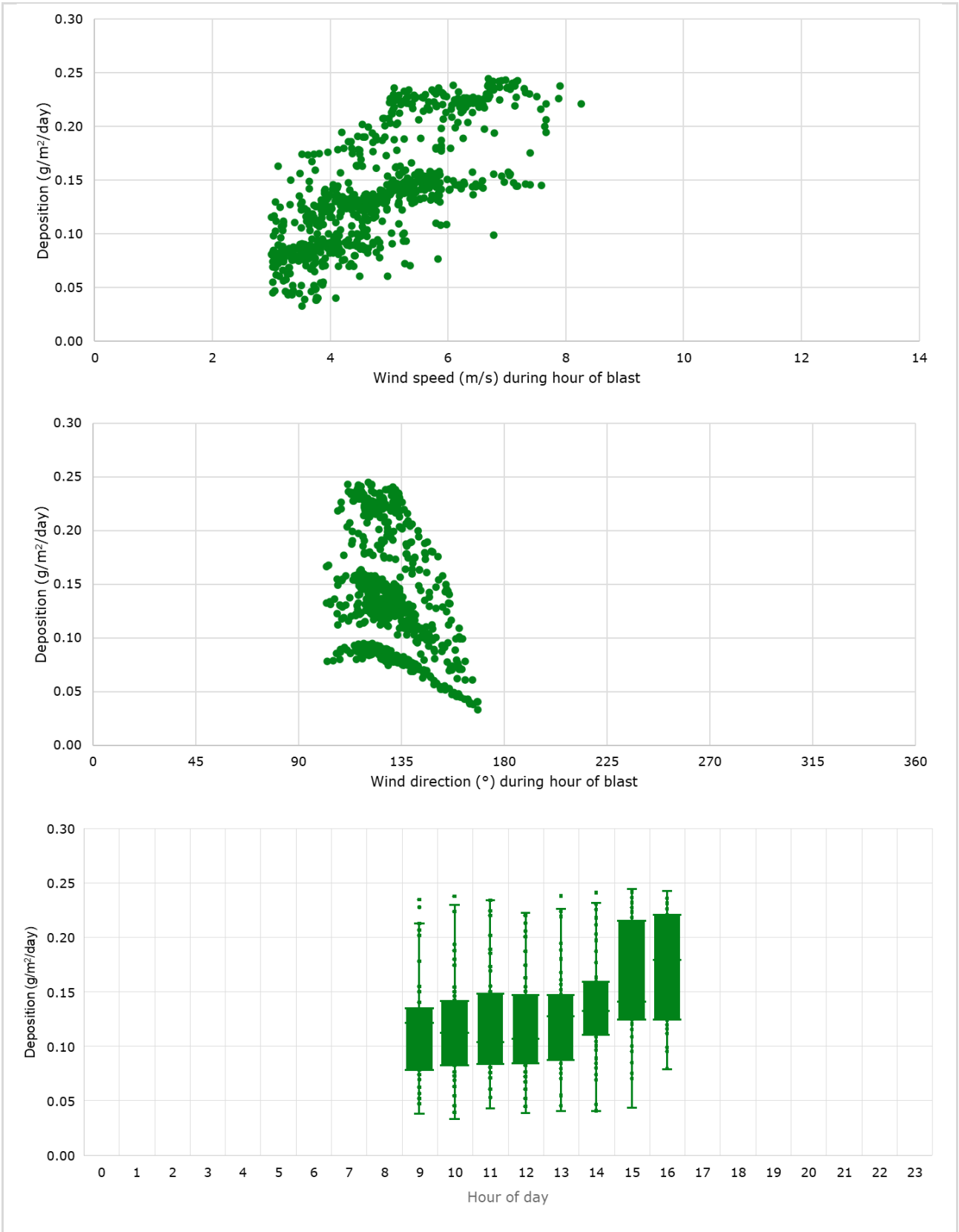


FIGURE 8-41 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS AT INFRASTRUCTURE RECEPTORS: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.2.4 DEPOSITION RATES ACROSS THE WIDER DOMAIN

Figure 8-42 illustrates variations in predicted deposition rates at the screening receptors in the wider area with wind speed, direction and hour of day during southeasterly winds. These show:

- Deposition rates at these selected locations are considerably lower than those predicted across the infrastructure area;
- Minimal variation with wind speed;
- Minimal variation with hour of day.

Figure 8-43 presents the predicted deposition rates at these locations due to blasting occurring only during hours with wind speed greater than 3 m/s. This does not reduce maximum predicted deposition rates at the screening receptors, as these primarily occur during stronger wind directions.

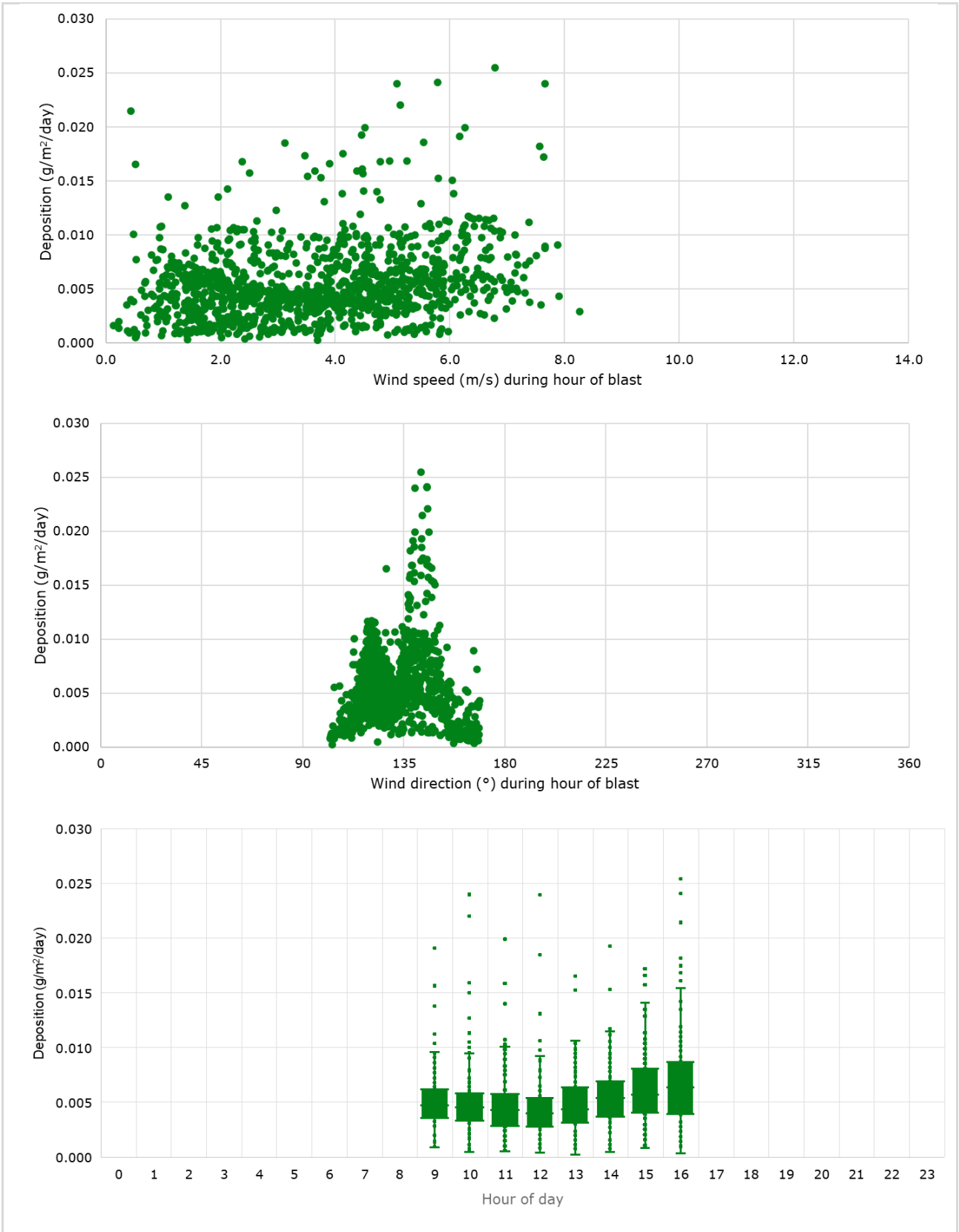


FIGURE 8-42 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (ALL BLAST HOURS)

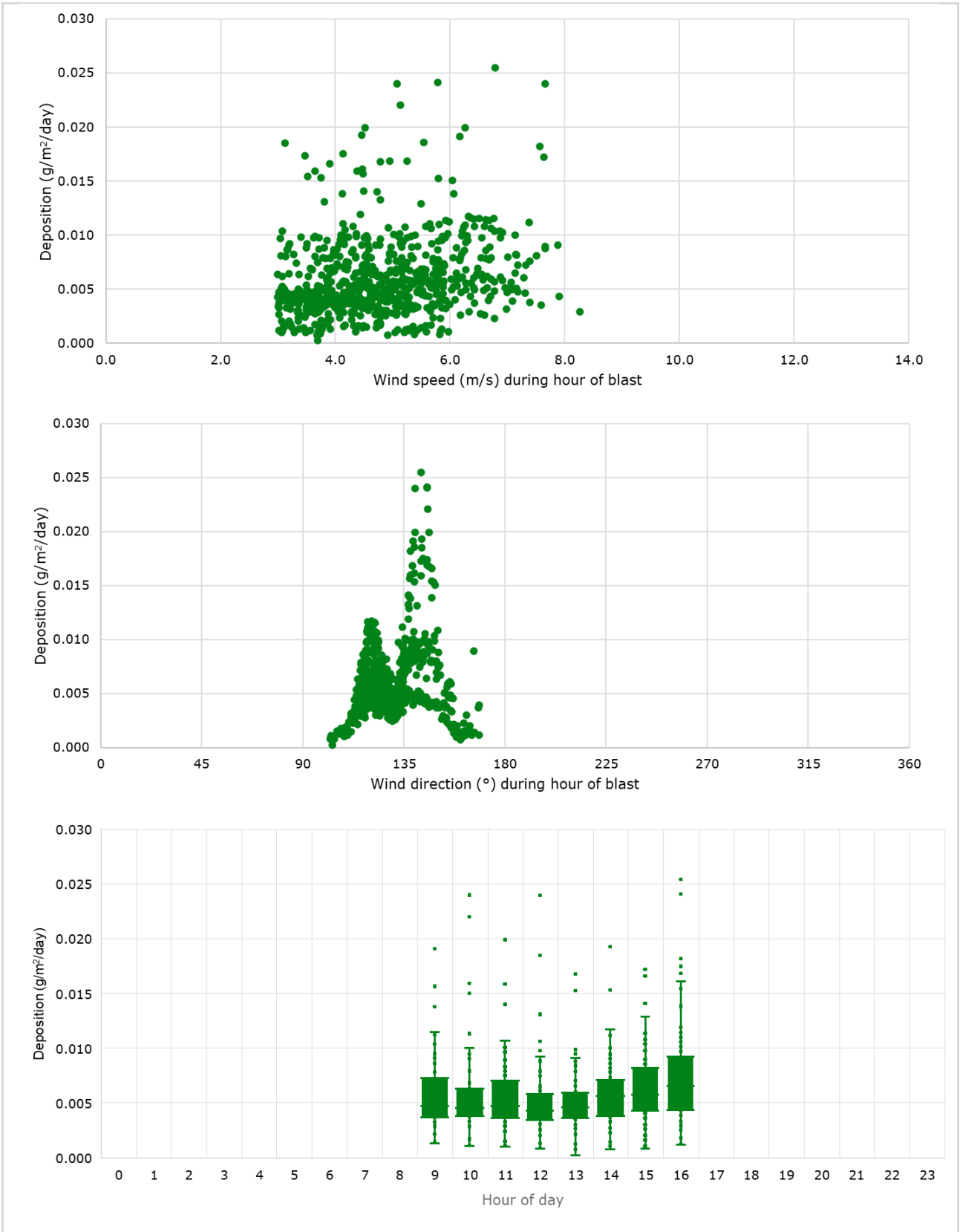


FIGURE 8-43 SOUTHEASTERLY WINDS: BOILER HOUSE PREDICTIONS ACROSS THE WIDER AREA: 1-HOUR AVERAGE DUST DEPOSITION (>3m/s WIND SPEEDS)

8.2.3 SUMMARY AND FREQUENCY OF SOUTHEASTERLY WINDS

Figure 8-44 presents the number of hours per day during 2020 that southeasterly winds greater than 3 m/s occurred within the modelling dataset. The frequency of preferred conditions is higher during the spring and summer months through to March, with far fewer between April and August.

Table 8-2 presents the number of days each month during which southeasterly winds greater than 3 m/s occur for each blast hour. Figure 8-46 presents this data visually. The number of days per month is noticeably higher between September and March. There is a slight increase in the number of days per month for blasting near the middle of the day, however, the variation by blast hour is not as significant as the variation across months of the year. The highest frequency of southeasterly winds >3 m/s per month occur during March between 1pm and 3pm.

The additional considerations regarding blast planning discussed in Section 8.1.3 also apply to blasting during southeasterly winds.

The suitability of a 3 m/s wind speed threshold has been considered. Figure 8-45 illustrates how the percentage reduction in maximum 1-hour particulate concentration across infrastructure receptors would vary depending on the wind speed threshold used during southeasterly winds. As previously mentioned, blasting when the 1-hour average wind speed is greater than 3 m/s reduces predicted 1-hr particulate concentrations by approximately 80% across the infrastructure area. In general, increasing the wind speed reduces the predicted maximum concentrations, however, the reduction is smaller with higher wind speeds. For example, a lower wind speed threshold, e.g. 2 m/s, would reduce maximum concentrations by approximately 70%, whereas a wind speed threshold of 5 m/s only provides a further 5% reduction (approximately) compared to 3 m/s.

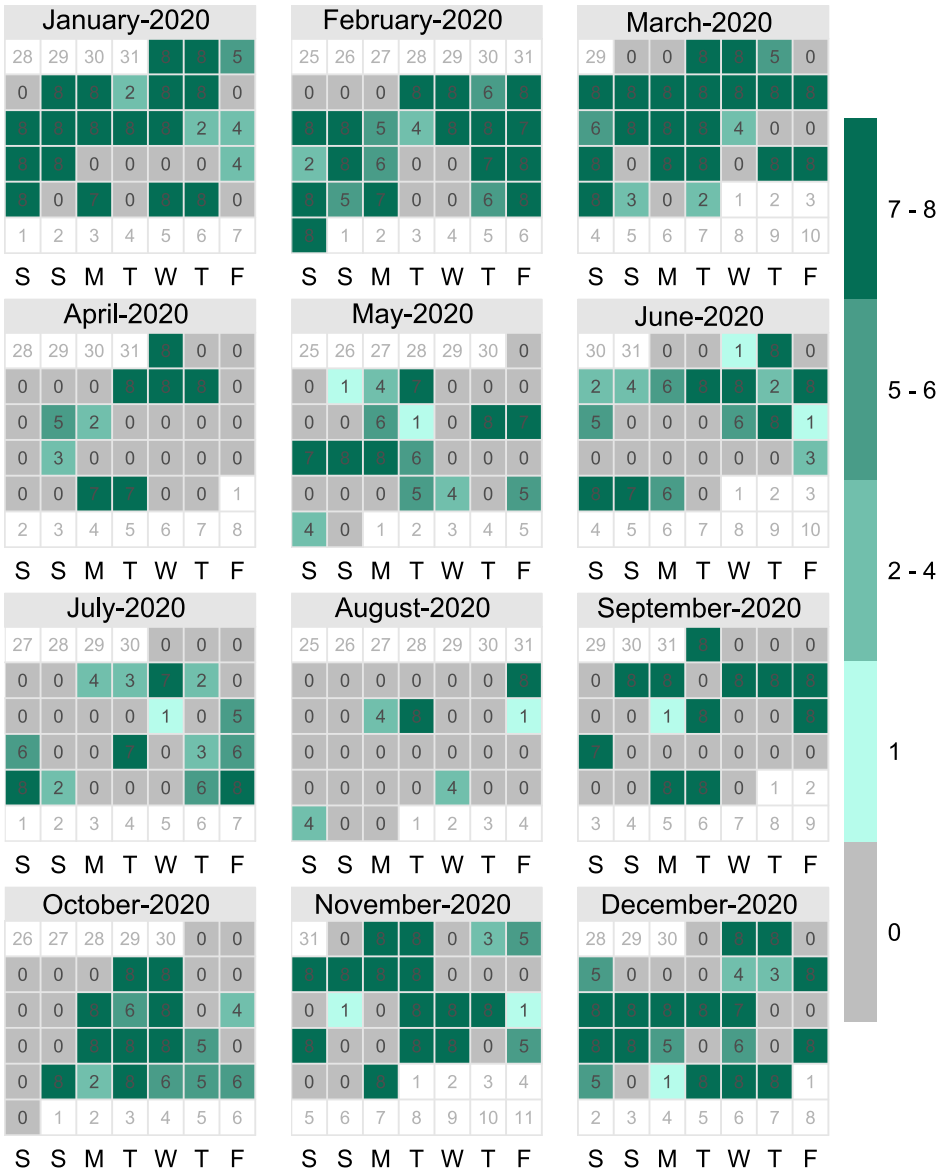


FIGURE 8-44 CALENDAR PLOT SHOWING NUMBER OF HOURS PER DAY OF SOUTHEASTERLY WINDS > 3 m/s BASED ON 2020 MODEL-GENERATED METEOROLOGICAL DATASET

TABLE 8-2 NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 m/s FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

Month	Hour of Blast							
	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm
January	19	18	18	19	19	18	21	20
February	16	20	20	19	21	19	17	19
March	20	20	19	20	22	21	22	20
April	5	5	6	7	8	8	8	9
May	3	6	8	10	13	13	13	15
June	6	8	10	11	12	13	15	16
July	3	5	7	8	9	11	12	13
August	2	3	3	2	4	5	6	4
September	11	11	11	11	11	11	11	11
October	11	13	13	14	14	15	14	12
November	14	14	16	15	15	15	15	15
December	17	18	19	19	17	15	17	18

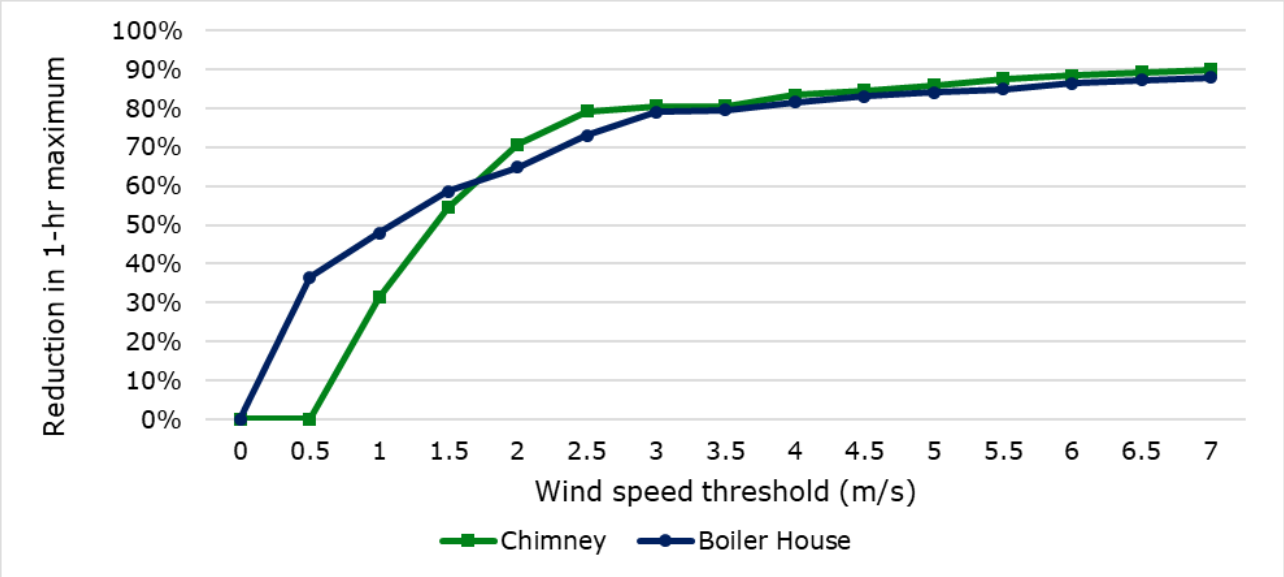


FIGURE 8-45 REDUCTION IN 1-HOUR MAXIMUM PREDICTION ACROSS INFRASTRUCTURE RECEPTORS DUE TO APPLICATION OF A WIND SPEED THRESHOLD

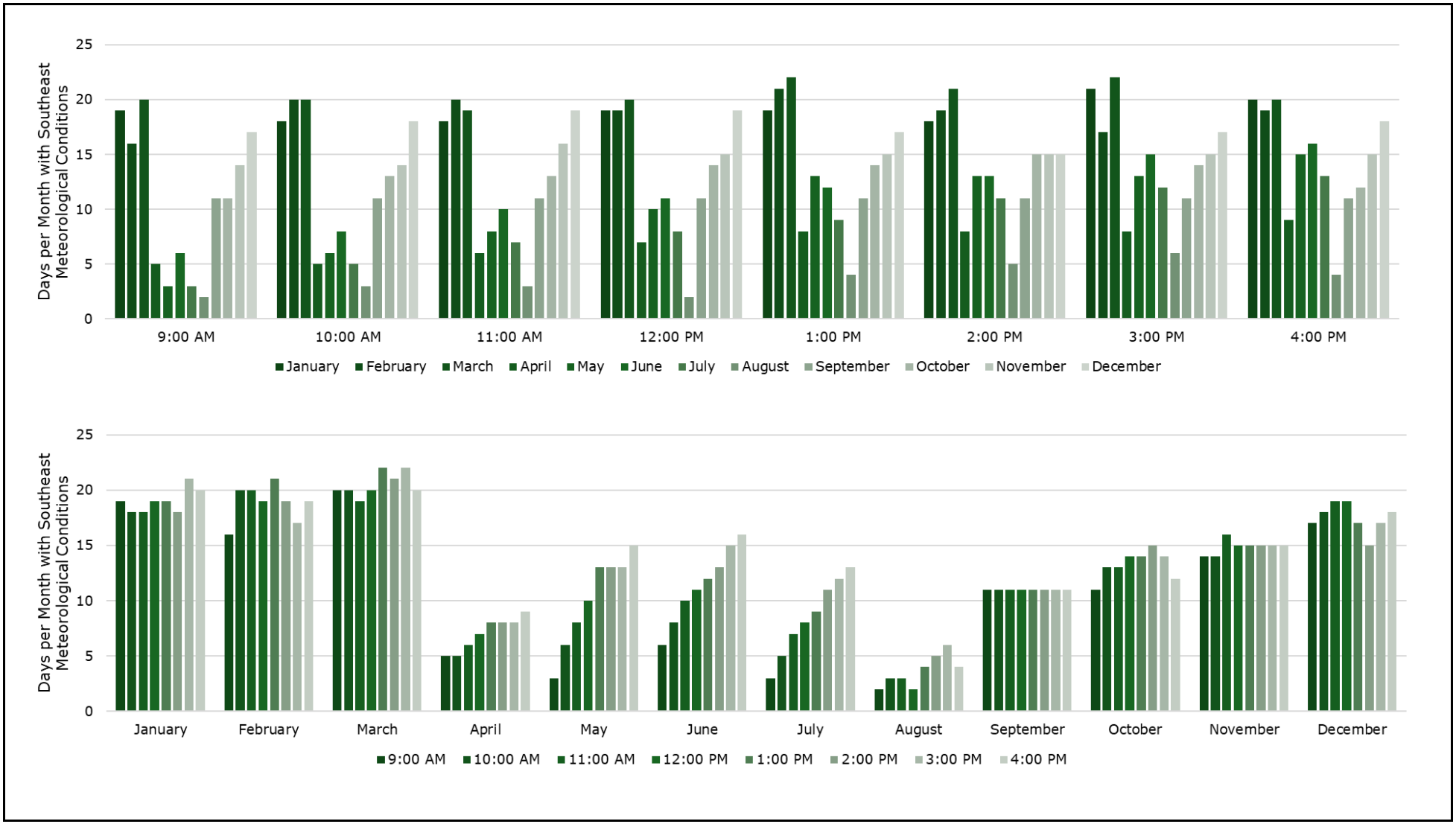


FIGURE 8-46 NUMBER OF DAYS PER MONTH WITH SOUTHEASTERLY WINDS >3 m/s FOR BLASTING AT EACH HOUR OF DAY (2020 MODEL-GENERATED METEOROLOGICAL DATASET)

8.3 COMPARISON OF PREFERRED CONDITIONS AND SOUTHEASTERLY WINDS

Figure 8-47 to Figure 8-50 present contour plots of 1-hour average and 24-hour average PM_{10} and $PM_{2.5}$ across the model domain, for blasting during preferred conditions only, and also for blasting during southeasterly winds when the wind speed is greater than 3 m/s.

These comparisons show:

- Predicted concentrations near screening receptors are generally the same order of magnitude under both sets of meteorological conditions, however, are slightly higher under preferred conditions. Twenty-four hour average PM_{10} concentrations at screening receptors are approximately 5-10 µg/m^3. For comparison, the typical ambient air quality assessment criteria for 24-hour average PM_{10} concentrations is 50 µg/m^3 which is used to assess the total concentration inclusive of contributions from all dust sources in an airshed. This report is not a compliance assessment, however, the predicted model results indicate that blasting during favourable wind conditions can assist in significantly reducing the contribution that blasting has on the airshed.
- Predicted concentrations across the Transgrid switchyard differ significantly between the two scenarios, as the southeasterly winds disperse dust from the blast area directly towards this infrastructure, whereas preferred conditions disperse dust to the northeast across the lake. For example, blasting during southeasterly winds only when wind speed is greater than 3 m/s reduces maximum 1-hour predictions to below 600 µg/m^3 across industry receptors, compared with reductions to less than 50 µg/m^3 with blasting during the preferred conditions.
- As discussed in earlier sections, deposition rates across the infrastructure area and at screening receptors can be reduced significantly by blasting during preferred conditions. Blasting during southeasterlies even with a wind speed threshold of 3 m/s does not provide a material reduction in deposition rates across the infrastructure area (notably the Transgrid switchyard) or at screening receptors.
- The Transgrid switchyard is directly downwind of the blast sites during southeasterly winds and the impact that may arise due to dust from blasting under these meteorological conditions should be considered during blast planning (potential hazards, damage or interruption to normal operations).

Figure 8-51 to Figure 8-54 present contour plots of 1-hour average and 24-hour average PM_{10} and $PM_{2.5}$ across the model domain, for demolition of the boiler house during preferred conditions only, and also during southeasterly winds when the wind speed is greater than 3 m/s. Findings from the comparison of modelling scenarios for the boiler house demolition are consistent with the above findings from the stack demolition modelling.

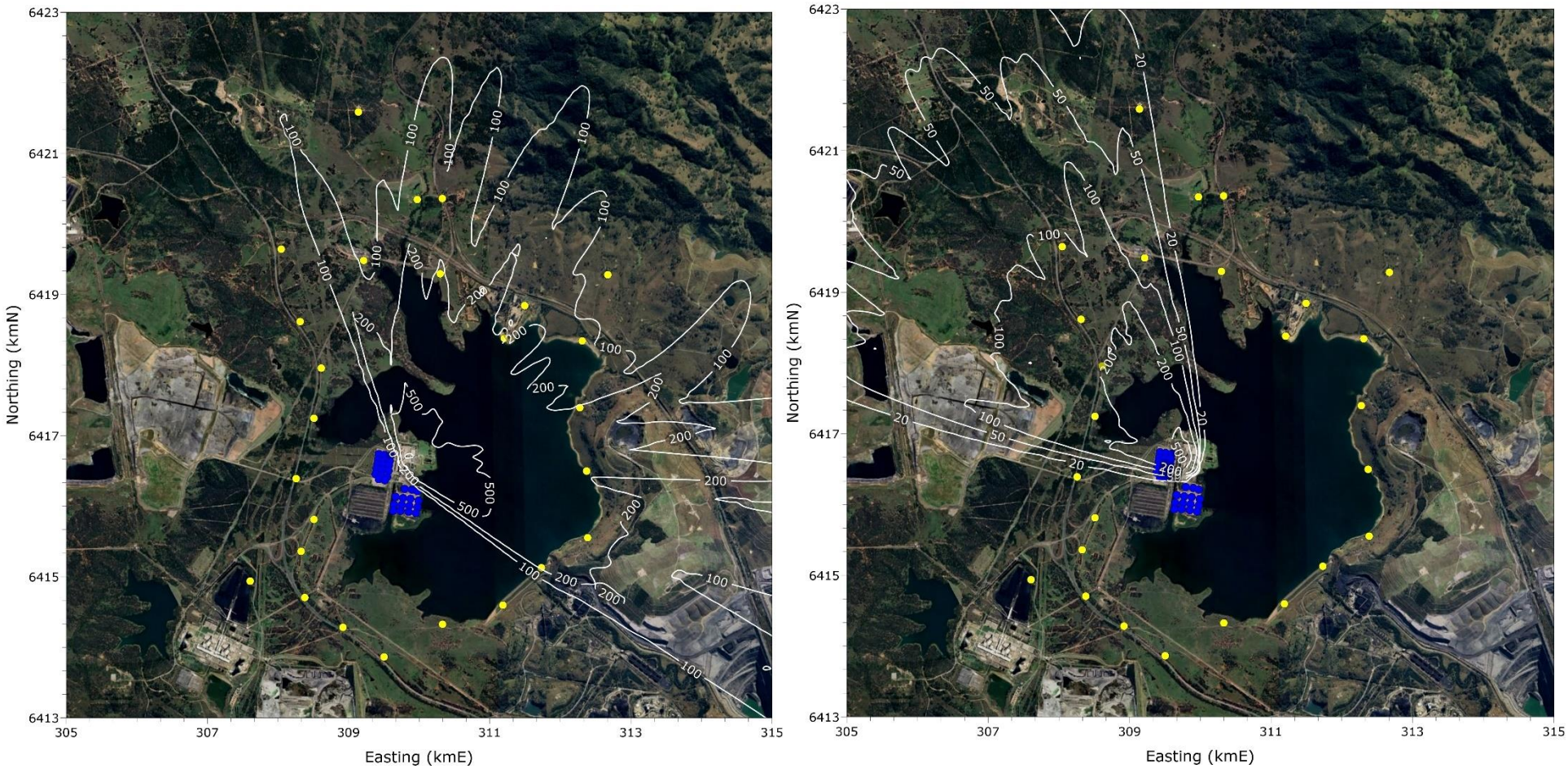


FIGURE 8-47 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

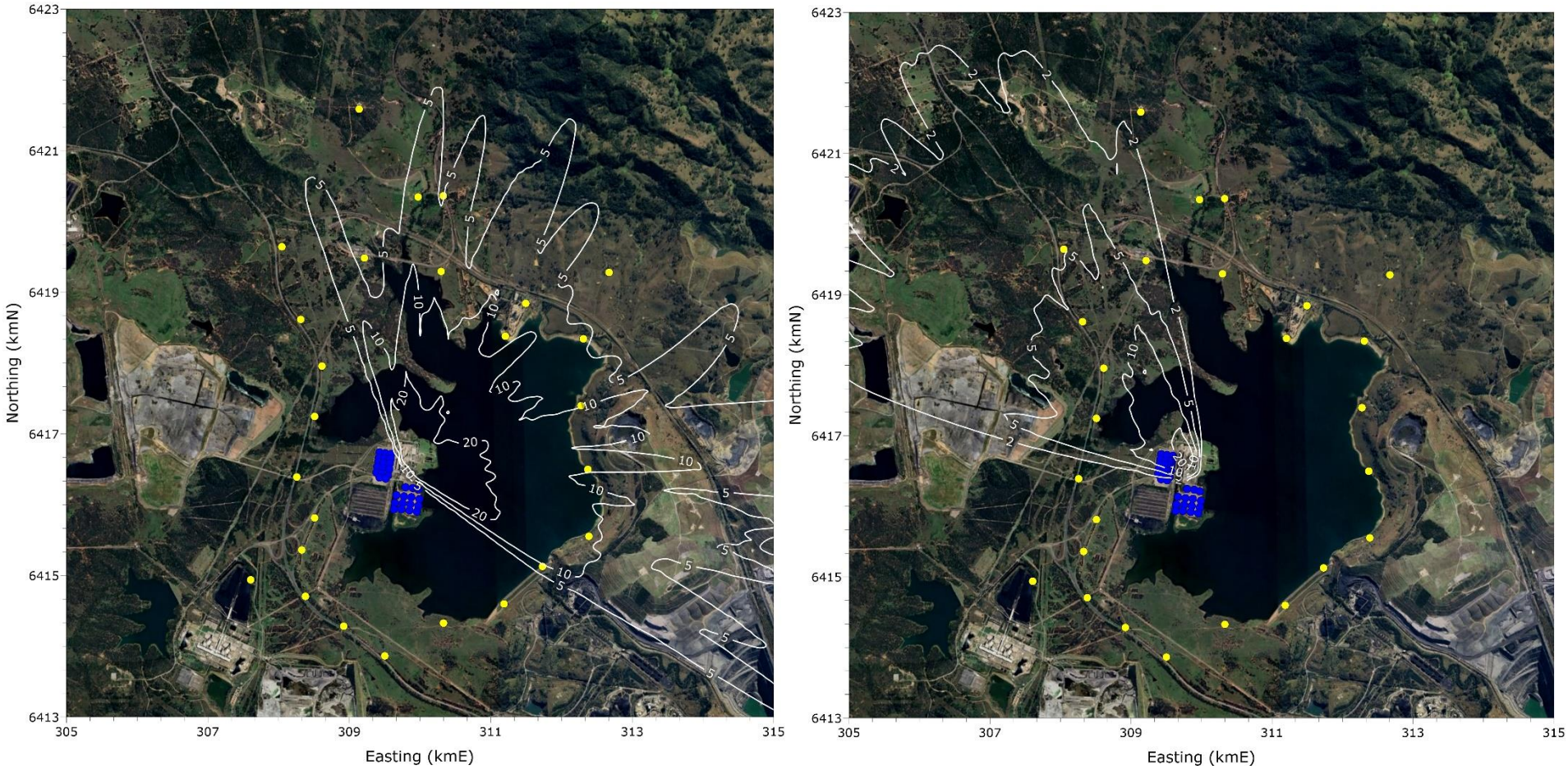


FIGURE 8-48 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

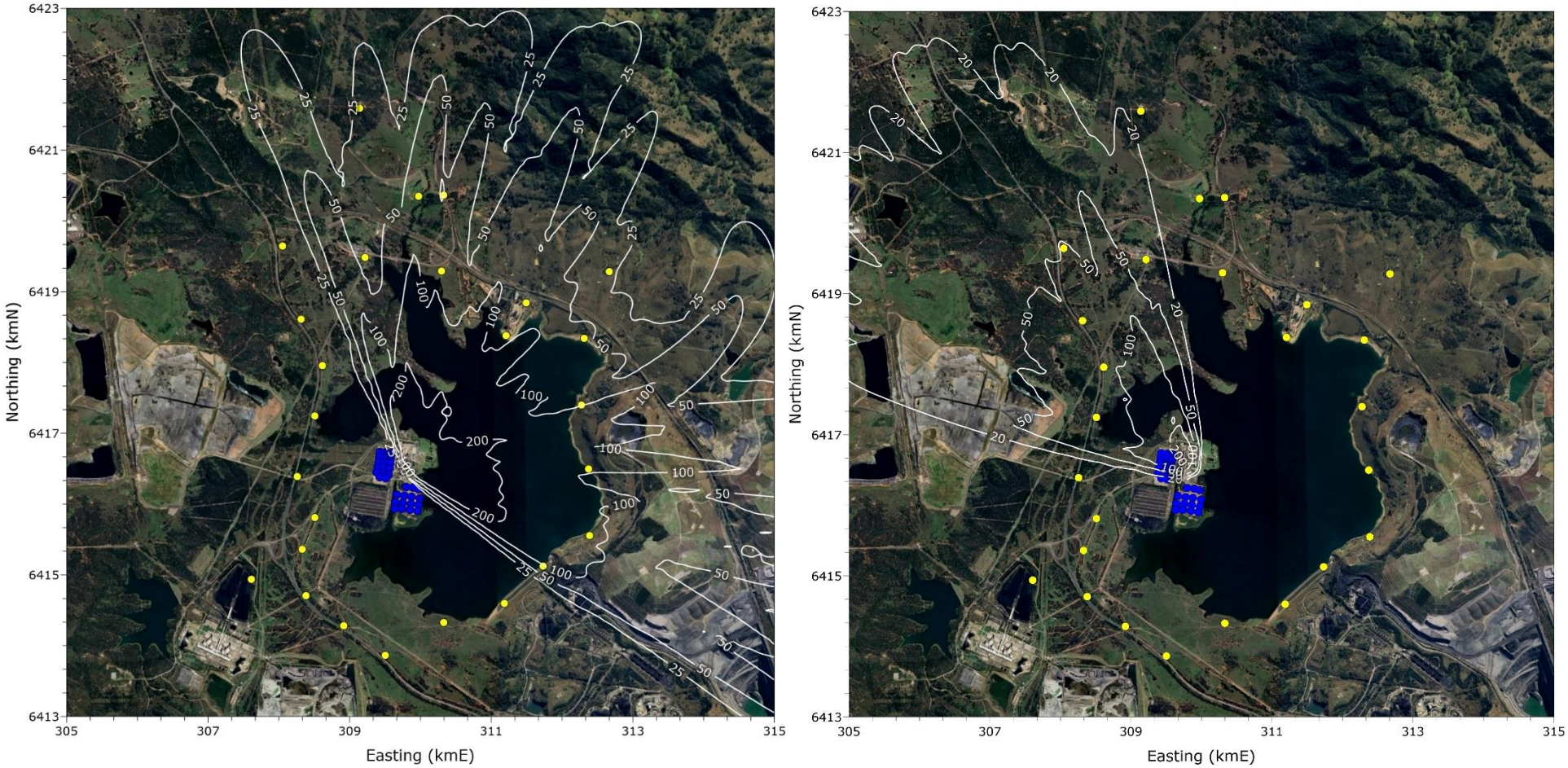


FIGURE 8-49 STACK DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

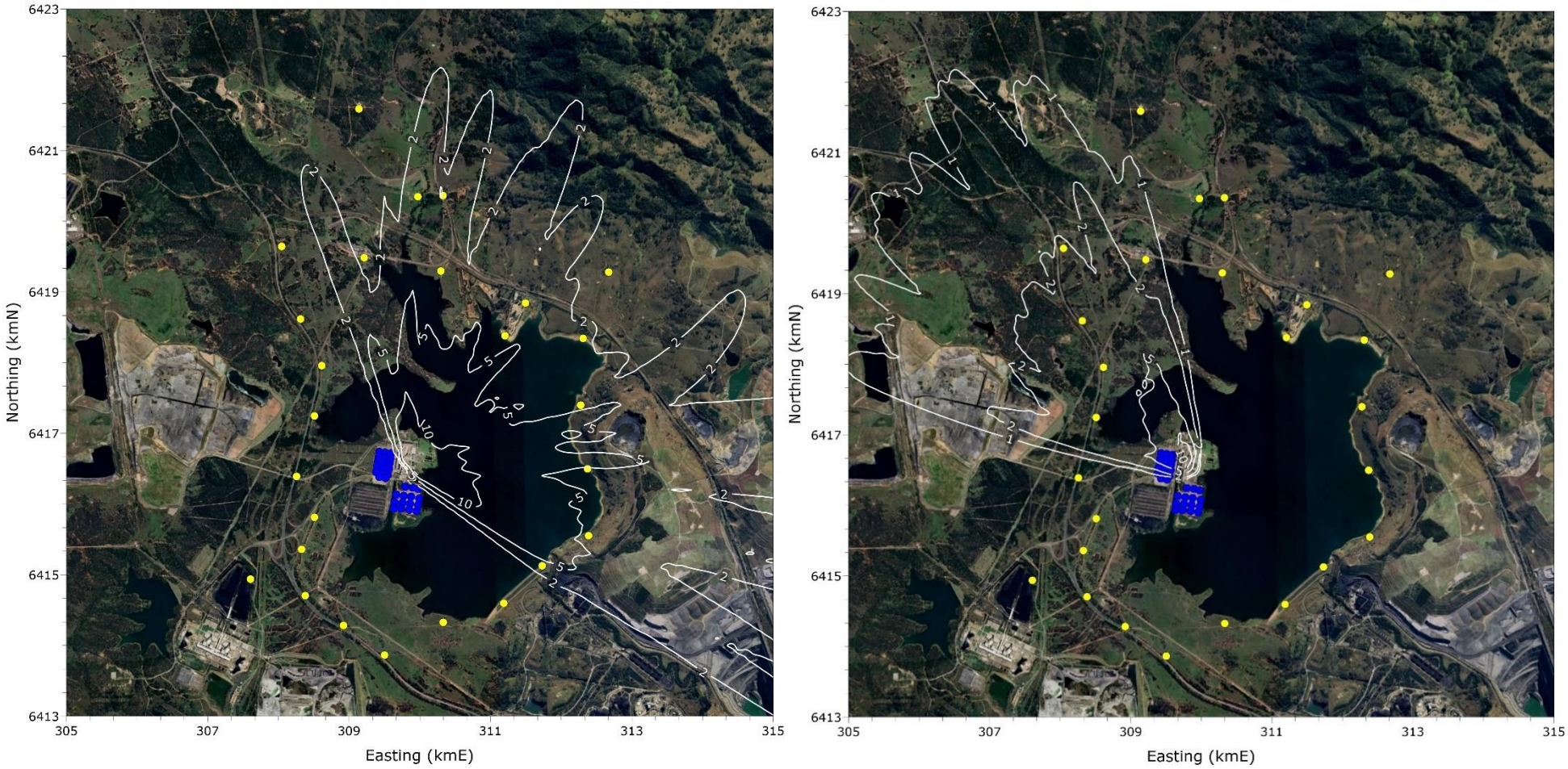


FIGURE 8-50 STACK DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

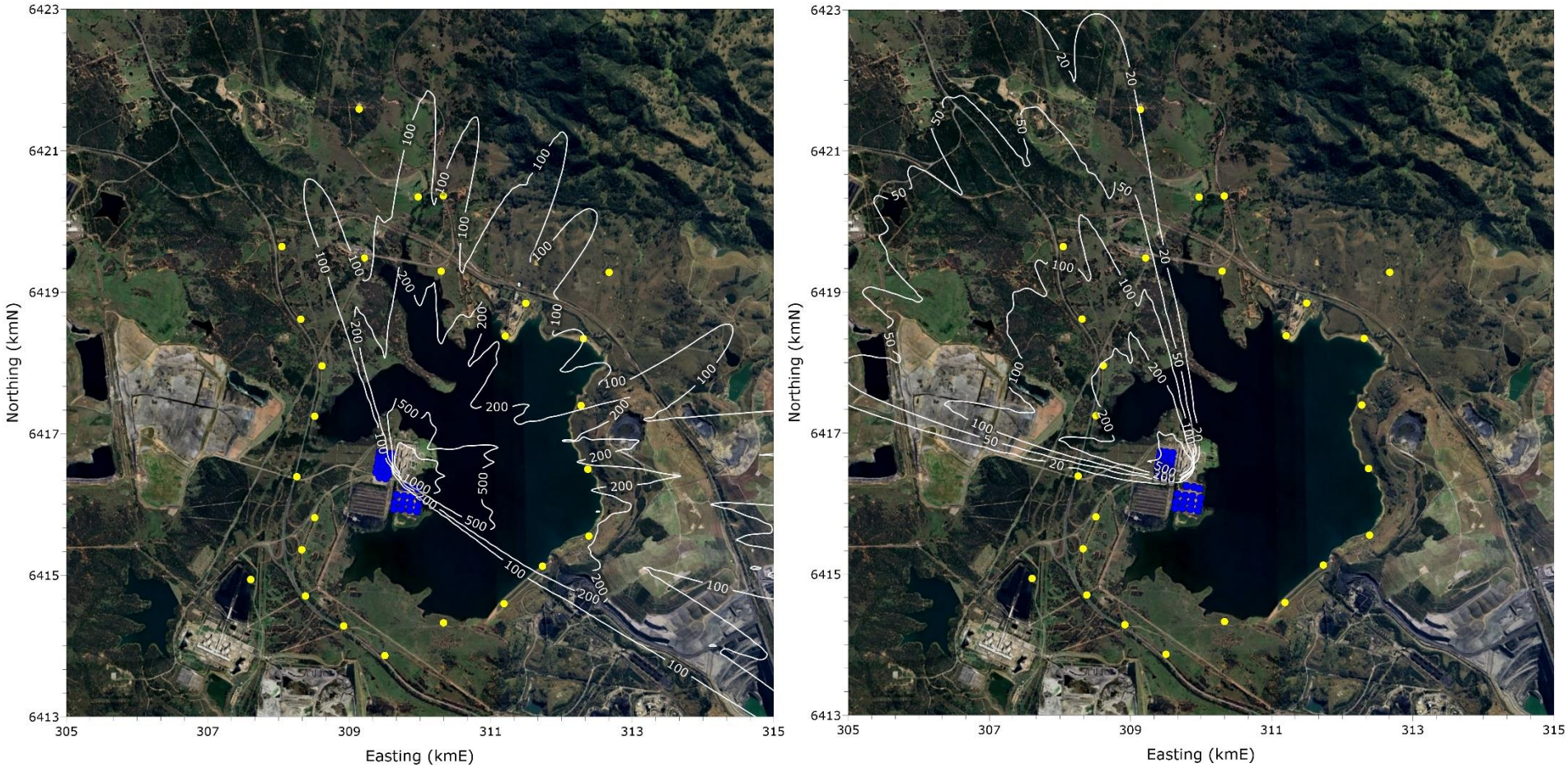


FIGURE 8-51 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

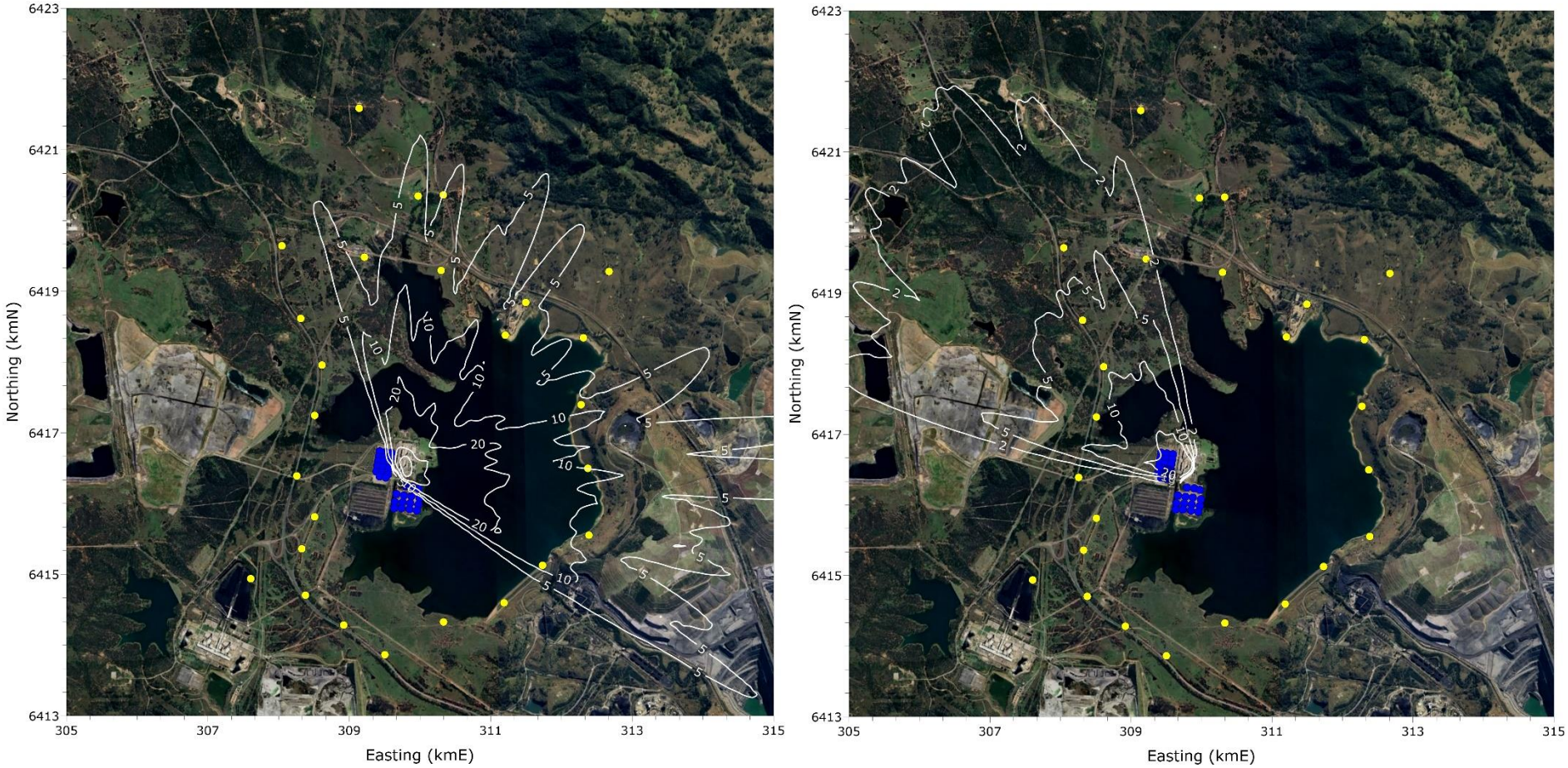


FIGURE 8-52 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE PM_{10} (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

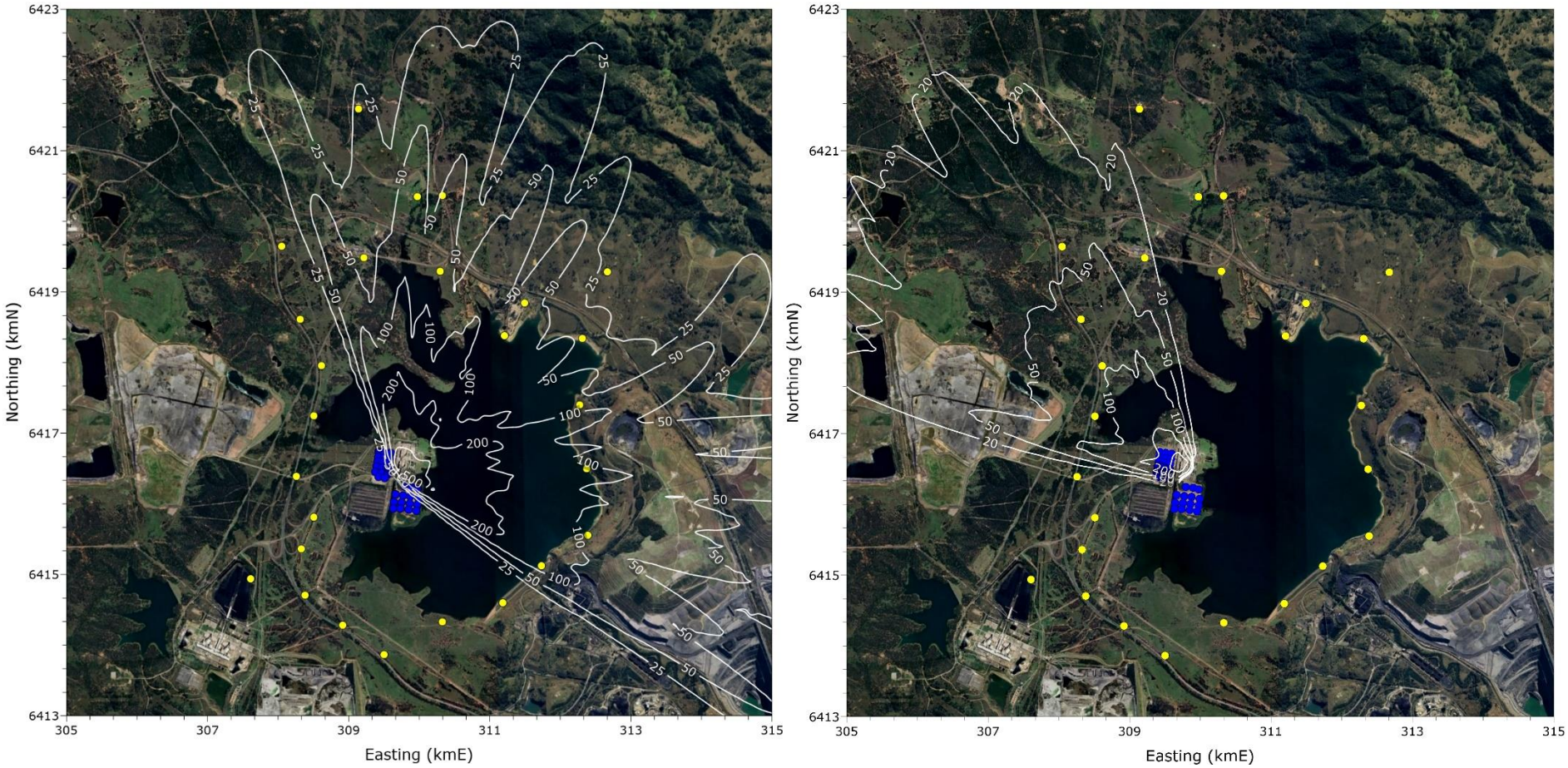


FIGURE 8-53 BOILER HOUSE DEMOLITION PREDICTIONS: 1-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

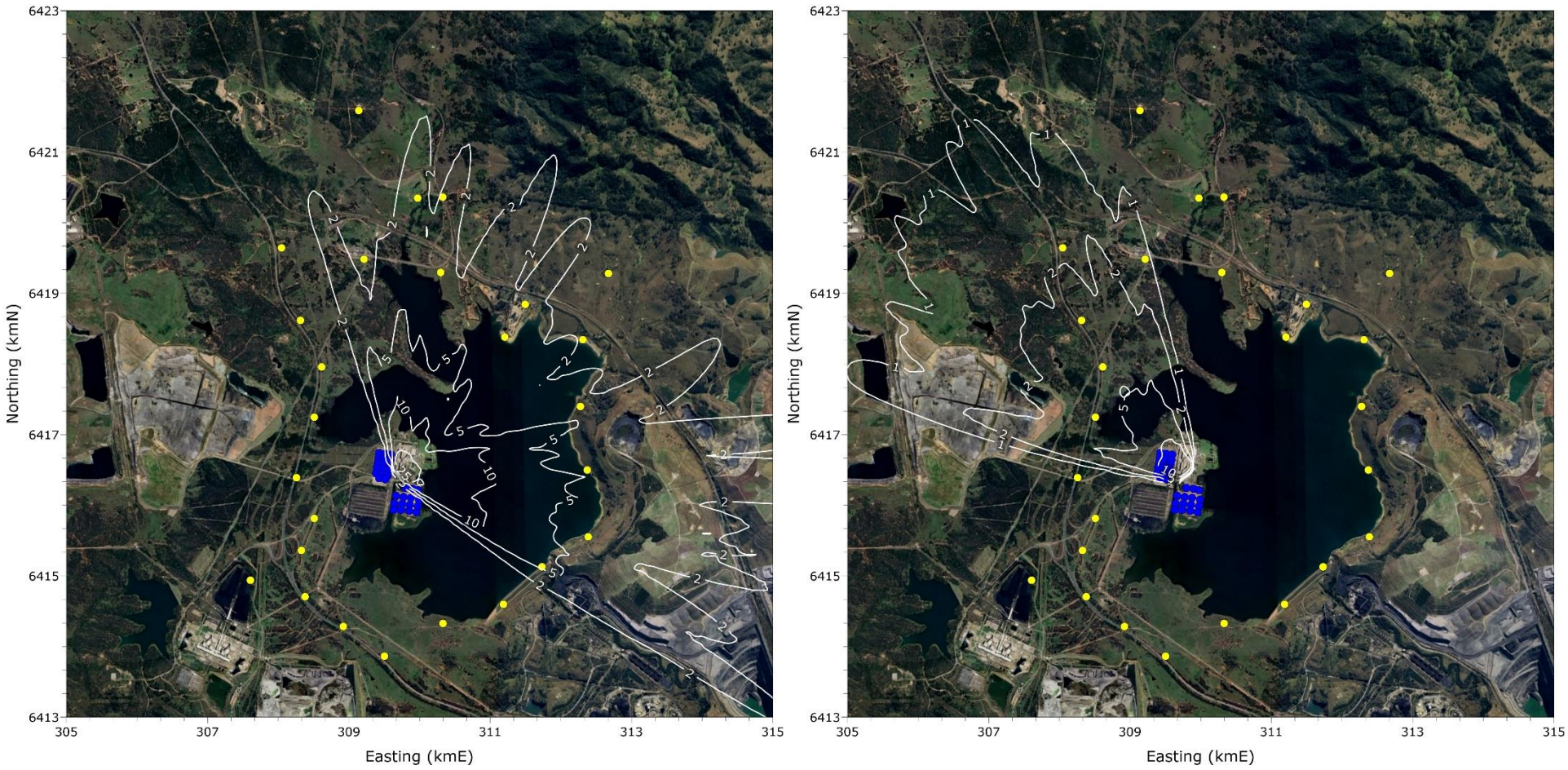


FIGURE 8-54 BOILER HOUSE DEMOLITION PREDICTIONS: 24-HOUR AVERAGE $PM_{2.5}$ (µg/m^3) – PREFERRED CONDITIONS (LEFT) AND SOUTHEASTERLY WINDS > 3m/s (RIGHT)

9. ASSUMPTIONS AND UNCERTAINTIES

In addition to those discussed above, the following assumptions and uncertainties for the study were identified and should be considered when interpreting model results:

- Hourly meteorological data from the AGL on-site meteorological station was only available for the period September 2024 to August 2025. As such, an hour-by-hour validation of the WRF meteorological model was not possible. However, a general comparison of seasonal and diurnal changes in wind patterns was undertaken;
- The dispersion modelling study incorporates blast emissions released over 1 minute, however the meteorological data used to drive the model is on a 1-hour resolution. Shorter time frame variations in wind speeds and/or directions are not accounted for. Planning of the blasting for a period of unchanging meteorological conditions will minimise the influence of this uncertainty.
- Emission estimates were based on monitoring during demolition of stacks, not boiler houses, and this was from demolition activities at one site only. It should be noted that:
    - The applicability to boiler house structures or varying stack constructions has not been tested.
    - The emission factors adopted were based on monitoring of specific particle size fractions during a stack demolition. The extent to which blasting may generate larger particles that were not measured but still released, is not known.
    - The adoption of these emission factors assumes that dust control measures in place during the Kurri Kurri demolition are somewhat consistent with those proposed to be implemented at Liddell.
- The CALPUFF dispersion model is not a computational fluid dynamics (CFD) model and as such, does not account for highly localized changes in wind fields and dispersion due to wind flow around solid structures and may not be as accurate as a CFD model in the near-field.
- The study has been limited to modelling of one boiler house demolition event. It is recommended that modelling be conducted for the second boiler house to check if the preferred conditions identified here remain consistent.
- Data input into the model has been based on information provided by CMA (where available). It is assumed that this information remains correct and accurate at the time of modelling.

10. CONCLUSIONS

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by CMA Contracting Pty Ltd (CMA) to undertake a pre-demolition air quality analysis for the proposed demolition of the two chimney stacks and boiler houses at the AGL Liddell Power Station (the Site) in the Hunter Valley Region of New South Wales (NSW). CMA has been engaged by AGL to demolish the power station. ERM understands that there are no formal environmental approval conditions to be met with regard to off-site air emissions from the demolition activities. This work is being undertaken voluntarily by CMA to inform the blast risk management plan.

The objective of the analysis was to understand the relative magnitude of potential air quality impacts for various blast windows to inform blast managing planning.

A dispersion modelling approach was used given the location of the AGL Liddell Power Station in an area of complex terrain and variability in local meteorological conditions. Dust emissions from stack felling and boiler house demolition were estimated using an existing methodology that was applied for the Engie Hazelwood stack and boiler house demolitions, as well as the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019; 2020). Modelling predictions were prepared for two sets of receptors:

- 'Infrastructure receptors' which were designated at locations around the adjacent TransGrid switchyard and AGL battery energy storage system (BESS), (currently under construction) as this infrastructure may be sensitive to dust.
- 'Screening receptors' which were designated at areas surrounding the Site for the purposes of providing a generic understanding of the scale of potential impacts in the broader area. Locations generally following the boundary of Lake Liddell to the east and the New England Highway to the west were selected, inclusive of known sensitive receptor locations (residences and a recreation area).

The meteorological and dispersion model configurations were developed with reference to the New South Wales EPA *Approved Methods for the Modelling and Assessment of Pollutants in New South Wales* (2022). For the purposes of this study, relative magnitudes of pollutants at receptor locations have been focused on, rather than assessing predictions against impact assessment criteria as this study is not for compliance purposes but is a planning tool.

Analysis of the modelling results found that predicted dust concentrations and deposition rates vary significantly with wind speed, wind direction and time of day. There is considerable opportunity to minimise air quality impacts across both dust sensitive infrastructure and across the wider area including at sensitive receptor locations by planning blast events with these factors in mind.

The following meteorological conditions are suggested as preferred conditions to be met during blasting to minimise air quality impacts across dust sensitive infrastructure areas and at sensitive receptor locations:

- Hourly average wind speeds greater than 2 m/s (~4 knots); and
- Wind directions from the south through to the west northwest (167° to 304°), which would blow dust emissions across Lake Liddell, away from the infrastructure area.

Whilst these preferred wind directions to not generally align with predominant winds, they do occur and with greater frequency during the autumn and winter months. In addition, blasting should be conducted during periods of forecast persistent meteorological conditions, to avoid changes in wind speeds or directions after blasting that may alter or slow dispersion.

CMA also requested analysis of blasting during predominant southeasterly wind directions. This analysis identified that particulate concentrations could be minimised by blasting during southeasterly winds when the hourly average wind speed was greater than 3 m/s (~6 knots).

A comparison of preferred conditions and southeasterly winds has shown:

- Preferred conditions and southeasterly winds greater than 3 m/s may result in particulate concentrations at screening receptors that are comparable in magnitude. However, particulate concentrations across infrastructure receptors during southeasterly winds greater than 3 m/s are significantly higher than those predicted during preferred conditions (>2 m/s winds from southwest directions).
- Deposition rates across infrastructure receptors due to blasting during southeasterly wind directions cannot be materially reduced by blasting when winds are above a certain speed or during certain hours of day. The Transgrid switchyard is directly downwind of the blast sites during southeasterly winds and the types of hazards and/or damage that may arise due to dust from blasting under these meteorological conditions should be considered during blast planning.

This study focused on PM_{10} and dust deposition, however contour plots for $PM_{2.5}$ have also been produced. In this study, $PM_{2.5}$ will behave in the same fashion as PM_{10} with respect to wind direction and wind speed given that PM_{10} was modelled as a tracer gas, i.e. without accounting for deposition. Contour plots for $PM_{2.5}$ have been produced for the chimney felling and boiler house demolition scenarios to provide an understanding of the reduction in predictions due to blasting during preferred wind directions. $PM_{2.5}$ concentrations have been calculated from PM_{10} concentrations by multiplying by 0.44 which is the ratio of the $PM_{2.5}$ and PM_{10} emission factors developed for blasting in the Kurri Kurri Hydro Aluminium stack demolition (ERM, 2019).Consideration should be given to the wind speed threshold after determining what meteorological data source will be used to inform blast planning given the differences between the observed and modelled wind speeds.

Model predictions due to the boiler house demolition are generally higher than those due to the stack felling. To further minimise air quality impacts due to the boiler house demolition, the preferred range of wind directions could be further narrowed. Whilst boiler house 1/2 was selected for modelling due to its closer proximity to infrastructure receptors, it is recommended that boiler house 3/4 be modelled to identify any further refinements to preferred conditions.

11. STATEMENT OF LIMITATIONS

1. This report is based solely on the scope of work described in Proposal and performed by Environmental Resources Management Australia Pty Ltd (ERM) for the CMA Contracting (the Client). The Scope of Work was governed by a contract between ERM and the Client (Contract).
2. No limitation, qualification or caveat set out below is intended to derogate from the rights and obligations of ERM and the Client under the Contract.
3. The findings of this report are solely based on, and the information provided in this report is strictly limited to that required by, the Scope of Work. Except to the extent stated otherwise, in preparing this report ERM has not considered any question, nor provides any information beyond that required by the Scope of Work.
4. This report was prepared in October 2025 and is based on conditions encountered and information reviewed at the time of preparation. The report does not, and cannot, take into account changes in law, factual circumstances, applicable regulatory instruments or any other future matter. ERM does not, and will not, provide any on-going advice on the impact of any future matters unless it has agreed with the Client to amend the Scope of Work or has entered into a new engagement to provide a further report.
5. Unless this report expressly states to the contrary, ERM's Scope of Work was limited strictly to identifying typical environmental conditions associated with the subject site(s) and does not evaluate the condition of any structure on the subject site nor any other issues. Although normal standards of professional practice have been applied, the absence of any identified hazardous or toxic materials or any identified impacted soil or groundwater on the site(s) should not be interpreted as a guarantee that such materials or impacts do not exist.
6. Although the data that has been used in compiling this report is generally based on actual circumstances, if the report refers to hypothetical examples those examples may, or may not, represent actual existing circumstances.
7. Only the environmental conditions and or potential contaminants specifically referred to in this report have been considered. To the extent permitted by law and except as is specifically stated in this report, ERM makes no warranty or representation about:
   a. the suitability of the site(s) for any purpose or the permissibility of any use;
   b. the presence, absence or otherwise of any environmental conditions or contaminants at the site(s) or elsewhere; or
   c. the presence, absence or otherwise of asbestos, asbestos containing materials or any hazardous materials on the site(s).
8. Emissions of asbestos or other hazardous materials is not within the scope of this study;
9. This analysis has not incorporated an assessment of dust impacts to personnel located within the area bound by the boundary receptors. It is assumed the potential dust impacts to these personnel will be managed under an occupational exposure framework;
10. Use of the site for any purpose may require planning and other approvals and, in some cases, environmental regulator and accredited site auditor approvals. ERM offers no opinion as to the likelihood of obtaining any such approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works.

11. The ongoing use of the site or use of the site for a different purpose may require the management of or remediation of site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this report.
12. This report should be read in full and no excerpts are to be taken as representative of the whole report. To ensure its contextual integrity, the report is not to be copied, distributed or referred to in part only. No responsibility or liability is accepted by ERM for use of any part of this report in any other context.
13. Except to the extent that ERM has agreed otherwise with the Client in the Scope of Work or the Contract, this report:
    a. has been prepared and is intended only for the exclusive use of the Client;
    b. must not to be relied upon or used by any other party;
    c. has not been prepared nor is intended for the purpose of advertising, sales, promoting or endorsing any Client interests including raising investment capital, recommending investment decisions, or other publicity purposes;
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14. does not purport to provide, nor should it be construed as, legal advice.

12. REFERENCES

ERM. 2019. Kurri Kurri Stack Demolition, Air Quality Services. Delta Group.

ERM. 2020. Hazelwood Stack Demolition Air Quality Assessment. ENGIE.

GHD. 2023. Liddell Future Land Use & Enabling Works Air Quality Assessment Report.

NSW Environment Protection Authority. 2022. Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.

Wellanbah Industrial. 2025. Liddell Power Station Chimney Structures – Demolition. Blast Management Sub-Plan. WI-BMP-W057-001-REV1.

APPENDIX A METEOROLOGICAL DATA

A. SELECTION OF REPRESENTATIVE YEAR

A statistical evaluation of the previous 5 years of meteorological data has been undertaken to select a representative meteorological year for dispersion modelling. Specifically, the 5-year mean frequency and standard deviation has been calculated for each of 96 wind speed / wind direction combinations (wind data 'bins'). The representativeness of each individual year has then been considered based on the average variance from the 5-year mean, where a lower average standard deviation is indicative of a meteorological year that is more consistent with the 5-year mean.

Table A 1 presents a summary of this analysis for the BoM Muswellbrook NW AWS and Singleton South AQMS, respectively. As shown in this data:

- 2022 is identified as the least representative year for both sites; and
- Best performing years are more varied between the sites and include 2020 and 2021.

The calendar year 2020 has been selected as a suitably representative year given the general consistency with the 5-year mean and presence in best performing year for all winds.

TABLE A 1 REVIEW OF ANNUAL VARIABILITY IN WINDS

Calendar Year	Avg. Wind Speed (m/s)	Frequency of calms (%)	Avg. Standard Deviation from 5-Year Mean	
			All Winds	Top 10% of Winds
Muswellbrook NW				
2020	2.56	4.8	0.69	0.48 (Best Performing)
2021	2.45	5.0	0.52 (Best Performing)	0.53
2022	2.36	5.3	0.81 (Worst Performing)	1.09 (Worst Performing)
2023	2.44	4.8	0.72	0.96
2024	2.28	5.0	0.59	0.59
Average	2.42	5.0	-	-
Singleton South				
2020	2.83	10.9	0.63 (Best Performing)	0.68
2021	2.70	11.3	0.67	0.70
2022	2.86	9.6	0.71	1.00 (Worst Performing)
2023	2.73	12.1	0.80 (Worst Performing)	0.54 (Best Performing)
2024	2.75	9.4	0.79	0.97
Average	2.77	10.6	-	-

B. WRF MODEL CONFIGURATION

WRF meteorological modelling has been conducted for 2023. The process of developing the WRF datasets involved a nested approach centred on the location of interest. The resolution and extent of each grid is outlined in Table A-2. The WRF prognostic model, incorporated available observational data from surrounding observation stations down to a resolution of 3 km, after which the NDOWN program has been executed to increase the modelled resolution to 1km. The output from the prognostic modelling has been processed through CALWRF to obtain the necessary inputs to provide to the CALMET model.

TABLE A 2 WRF MODELLING DOMAIN CHARACTERISTICS

Grid – Domain ID	Horizontal resolution	Extent
1 – d01	27 km	2700 km X 2700 km
2 – d02	9 km	1080 km X 1080 km
3 – d03	3 km	216 km X 216 km

C. INITIALISATION DATASETS

A WRF meteorological dataset has been developed for the period January to December 2020 inclusive using data from the European Centre for Medium Weather Forecasts (ECMWF) global reanalysis dataset, known as ERA5. Data from the ERA5 dataset is available for the globe once every 3 hours on a 31 km grid.

The ERA5 dataset provides information both for the surface conditions and 137 mandatory vertical levels. There are over 25 different variables including geopotential height, temperature, relative humidity, wind components, etc.

The ERA5 dataset assimilates a great deal of observational data, including surface pressure, sea level pressure, geopotential height, temperature, sea surface temperature, soil values, ice cover, relative humidity, u and v wind components, vertical motion, vorticity, winds and in-situ data such as moisture from radiosondes and pressure from surface observations. Also included in these datasets are additional precipitation data, profiler data, dropsondes, pilot balloons, aircraft temperatures and winds, land surface and moisture data and cloud drift winds from geostationary satellites. To assist in improving the performance of the WRF simulation, the ERA5 dataset has been provided to the WRF Pre-processing System (WPS) stage to provide WRF with more initial guess data both spatially and temporally at the start of the simulation.

A.2.2 GEOSPATIAL WRF INPUTS FOR THE 36/12 KM GRIDS

WRF geospatial inputs are available from the US NCAR with default sets of static data for terrain, vegetation/land use and soil type. NCAR distributes various resolutions of global terrain and land-use data bases to support WRF simulations. The data bases are:

- 5-minute (about 9.25 km in mid-latitudes);
- 2-minute (about 4.00 km in mid-latitudes);
- 30-sec (about 0.900 km in mid-latitudes); and
- 15-sec (about 0.450 km in mid-latitudes), which is only available for MODIS land use categories.

These data were assigned to ERM's WRF simulations based on the resolution of the simulation domain.

In addition to the above inputs, finer resolution inputs were derived for land use and terrain using local datasets to provide better representation of land use to the model.

A.2.3 GEOSPATIAL WRF INPUTS FOR FINER GRIDS

The conventional approach among the air quality modelling community is that WRF's highest resolution simulations are performed at 1 km gridded resolution with terrain and land use datasets at 30 arc seconds (approx. 900 m) resolution.

WRF simulations are not conventionally performed at less than 1 km gridded resolution because of the difficulty in utilizing higher resolution datasets in WRF.

A.2.4 LAND USE AND TERRAIN

For this study, an approach to utilise locally sourced land use at 1 km resolution for grids 2, 3 and 4 (10 km, 3 km and 1 km). Land use inputs to the WRF model were obtained from Australian Collaborative Land Use and Management Program (ACLUMP). These land use datasets were then translated into the MODIS 21 category as required by WRF. For terrain, SRTM data at a resolution of 90 m has been used for grids 2, 3 and 4.

A.2.5 WRF OPTIONS

In addition to the domain-wide characteristics noted above, the following discussion describes the physical schemes available within the WRF system and how they were adapted for use by ERM in the modelling analysis. The WRF model user has the choice of numerous options for running the model and its pre-processors. Table A 3 provides a listing of the primary options and includes notes detailing the reasoning behind selecting each option.

TABLE A 3 WRF SET UP OPTIONS

WRF Treatment	Option Selected	Reason & Notes
Microphysics	Thompson	A new bulk microphysical parameterization (BMP) has been developed for use with WRF. Compared to earlier single-moment BMPs, the new scheme incorporates a large number of improvements to both physical processes and employs numerous techniques found in far more sophisticated spectral/bin schemes using look-up tables. This scheme is a new scheme with ice, snow and graupel processes suitable for high-resolution simulations.

WRF Treatment	Option Selected	Reason & Notes
Shortwave & Longwave Radiation	Rapid Radiation Transfer Model (RRTMG)	This a recent version of RRTM with random cloud overlap. RRTMG provides more sophisticated cloud treatment and better suited for climate applications than RRTM (option 1). RRTMG also handles cloud fraction whereas RRTM is 1/0. Based on available guidance, this scheme is considered to be highly accurate and efficient method. This scheme also incorporates the effects of the comprehensive absorption spectrum taking water vapour, carbon dioxide and ozone into account. This scheme handles better cloud interactions with Thompson MP scheme.
Land Surface Model	NOAH	To incorporate the air-soil interaction in the WRF simulation, the Noah Land-Surface Model (LSM) was chosen. Seasonally varying vegetation and soil type are used in the model to handle evapotranspiration. The LSM model also has the effects such as soil conductivity and gravitational flux of moisture. The land-surface model is capable of predicting soil moisture and temperature in four layers (10, 30, 60 and 100 cm thick), as well as canopy moisture and water-equivalent snow depth.
Planetary Boundary Layer (PBL)	Yonsei University (YSU)	This scheme has the enhanced stable boundary layer diffusion algorithm is also devised that allows deeper mixing in windier conditions. It has the ability to predict & simulates vertical mixing. This scheme also seems to show better performance during stable conditions. This scheme was used for WRF analyses with resolutions less than 1.33 km grid resolution.
Cumulus Parameterization	Kain-Fritsch in 36 km, 12 km, 4km	This scheme generally focuses on column moisture, temperature tendencies and surface convective rainfall. It is recommended that cumulus parameterization should not be used at grid sizes < 5-10 km, as the smaller grid size is sufficient to resolve updrafts and downdrafts. Therefore, this scheme was used for WRF analyses with resolutions less than 4 km grid resolution.

WRF Treatment	Option Selected	Reason & Notes
Four-dimensional Data Assimilation (FDDA)	Analysis nudging was applied to winds, temperature & moisture in the 36 & 12 km domains; Temp & moisture nudging was turned off within the PBL; Obs-nudging was used for the 4-km resolution WRF analysis.	FDDA is a method of performing WRF simulations with the full-physics model while blending local observations. By doing so, model equations maintain dynamic consistency while at the same time restraining the model's solutions from deviating too strongly from observations or from a gridded analysis and make up for errors and gaps in the initial analysis and deficiencies in model physics. There are two types of nudging in WRF: ▪ Analysis nudging – gently forces the model solution toward gridded fields and also make use of three-dimensional analyses and surface analyses. ▪ Observation nudging ("obs nudging") - gently forces the model solution toward individual observations, with the influence of the observations spread in space and time.

A.2.6 OBSERVED METEOROLOGICAL DATA

Meteorological observations from both upper air and surface were included in the WRF FDDA simulation. Data from the global dataset, which incorporates all available observations into the WRF run to nudge the model towards the measured value.

Upper Air Observational Weather Data are composed of weather reports from radiosondes, pibals and aircraft reports from the Global Telecommunications System (GTS) and satellite data from the National Environmental Satellite Data and Information Service (NESDIS) (UCAR, 2018). This dataset includes pressure, geopotential height, air temperature, dew point temperature, wind direction and speed. Data may be available at up to 20 mandatory levels from 1000 hPa to 1 hPa, plus a few significant levels. Report intervals range from hourly to every twelve hours.

Surface meteorological data (UCAR, 2018) include variables like pressure, air temperature, dew point temperature, wind direction and speed at the ground level. Report intervals range from hourly to every three hours.

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Attachment D: Statement of Limitations

Statement of Limitations

This document has been prepared in response to specific instructions from CMA Contracting Pty Ltd to whom the report has been addressed. The work has been undertaken with the usual care and thoroughness of the consulting profession. The work is based on generally accepted standards, practices of the time the work was undertaken. No other warranty, expressed or implied, is made as to the professional advice included in this report.

The report has been prepared for the use by CMA Contracting Pty Ltd and the use of this report by other parties may lead to misinterpretation of the issues contained in this report. To avoid misuse of this report, Prensa advise that the report should only be relied upon by CMA Contracting Pty Ltd and those parties expressly referred to in the introduction of the report. The report should not be separated or reproduced in part and Prensa should be retained to assist other professionals who may be affected by the issues addressed in this report to ensure the report is not misused in any way.

Prensa is not a professional quantity surveyor (QS) organisation. Any areas, volumes, tonnages or any other quantities noted in this report are indicative estimates only. The services of a professional QS organisation should be engaged if quantities are to be relied upon.

Reliance on Information Provided by Others

Prensa notes that where information has been provided by other parties in order for the works to be undertaken, Prensa cannot guarantee the accuracy or completeness of this information. CMA Contracting Pty Ltd therefore waives any claim against the company and agrees to indemnify Prensa for any loss, claim or liability arising from inaccuracies or omissions in information provided to Prensa by third parties. No indications were found during our investigations that information contained in this report, as provided to Prensa, is false.

APPENDIX AA – CONSULTATION RECORDS

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Liddell Power Station Demolition – stakeholder engagement and communication schedule

Date	What	Stakeholder	Method	Responsibility	Issues Raised	How Addressed	Status
14/10/25	Update on progress for demolition planning	Lake Liddell Rec Area	In-person	PY/RC	Nil	N/A	Closed
16/10/25	Project update and case study from West Burton Power Station, highlighting sensitive receiver modelling and actual blast overpressure results from the turbine fell	Transgrid	Online Presentation	JC	Nil	N/A	Closed
23/10/25	Update regarding test blast	Lidell BESS	Email	CD	Nil	N/A	Closed
18/11/25	Update on progress for demolition planning & Lake Liddell study status	Lake Liddell Rec Area	In-person	PY/RC/BW/MP	Nil	N/A	Closed
20/11/25	Project update	AGLM Community Consultative Committee	In-person/online	JC	Nil	N/A	Closed
20/11/25	Site visit and project update including blasting	NSW EPA	In-person	MP	Nil	Nil	Closed
28/11/25	Site visit and presentation During the briefing, we covered key topics including: • Air Overpressure • Vibration • Dust Management • Several case studies presenting typical air overpressure readings • Review of predictive modelling for the Liddell Chimney Stack blast • Recap of the day and next steps	Transgrid/Fluence	In-person	JC	Request for AGL to share presentation	Presentation shared with Transgrid and Fluence via email 4/12/25	Closed
9/12/25	Notification of Chimney Test Blast	Lake Liddell Rec Area	Phone call	PY	Nil	Nil	Closed
		Liddell BESS	Email	JC	Nil	Nil	Closed
		Transgrid	Email	JC	Nil	Nil	Closed
		Employees	Site Comms	PY	Nil	Nil	Closed
11/12/25	Update regarding the Chimney Blast	NSW EPA	Email	MP	EPA indicated that they will add	Nil	Closed

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					standard blasting conditions to the EPL		
15/01/26	Issue of draft licence conditions on EPL	NSW EPA	Email	MP	AGL to review draft conditions	AGL to provide comments on the draft conditions to EPA	Closed
19/01/26	Planning session • NSW Police advised AGL to engage a traffic control specialist to assist in the development and implementation of traffic controls required for the blast	Transport NSW/Emergency Services	In-person/online	JC	Request for AGL to engage traffic management company	AGL engaged Altus to prepare TMP	Closed
2/02/26	Notification regarding second test blast	Lake Liddell Rec Area	Phone call/Email	PY/	Nil	N/A	Closed
		Liddell BESS	Email	CD	Nil	N/A	
		Transgrid	Email/meeting	CD	Nil	N/A	
		NSW Police	Phone call	PY	Nil	N/A	
		Employees	Site Comms	PY	Nil	N/A	
2/02/26	AGL provided initial response to the draft EPL conditions with a specific query regarding increasing the airblast over pressure limit to 125 dBL	NSW EPA	Email	MP	Airblast over pressure limit	EPA to discuss with their technical team	Closed
16/02/26	Initial meeting with comms rep	TfNSW	Online	PY/RC	Nil	N/A	Closed
16/02/26	Updated draft conditions provided by EPA	NSW EPA	Email	MP	Nil	AGL to provide review comments on updated conditions	Closed
23/02/26	AGL provided response to updated draft blasting conditions	NSW EPA	Email	MP	Airblast over pressure and ground vibration limits	AGL provided response to EPA with suggested amendments on 23/02/26	Closed

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24/02/26	EPA provided response to AGL's comments on the draft blast conditions and confirmed that the suggest changes are acceptable to the EPA	NSW EPA	Email	MP	EPA raised a question about stakeholder engagement and requested a meeting with AGL's Stakeholder Team	AGL arranged a meeting between the EPA and AGL Project Stakeholder Team on 10/03/26	Closed
26/2/2026	Project update	AGLM Community Consultative Committee	In-person/online	PY/JC	Nil	N/A	Closed
3/3/2026	High-level briefing	Dave Layzell	In-person	PY	Nil	N/A	Closed
10/3/2026	Overview of comms & engagement	NSW EPA	Online	PY	Nil	N/A	Closed
13/3/2026	Demolition update meeting (fortnightly ongoing meeting)	Transgrid	Online	JC	Transgrid isolation and resourcing requirements for blast day and liability related to blasting.	Transgrid to develop recoverable works agreement. (agreement developed and under final review by AGL and Transgrid.)	Open
11/3/2026	Briefing on progress	SafeWork	Site visit	AF	Nil	N/A	Closed
8/4/2026	Demolition update	Bayswater Town Hall	In-person/online	JC	Nil	N/A	Closed
9/4/2026	TMP Review and discussion with TfNSW prior to submission of ROL	Altus Traffic Control, TfNSW, AGL,	Teams session	JC	Nil	N/A	Closed
10/4/2026	Traffic Management Weekly progress meeting • Review of TMP, TGS • Application of Police resourcing • Road closures -ROL New England Highway	Altus Traffic Control, TfNSW, AGL, CMA and NSW Police	Teams session	JC	Nil	N/A	Closed
13/4/2026	Briefing on road closure plans	Mbk Council Traffic Management Committee	In-person/online	JC	AGL to submit Section 138	AGL to amend TMP to include Scrumlo road as a control point.	Closed

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14/04/26	Updated draft conditions issued by EPA	NSW EPA	Email	MP	Nil	AGL provided a response confirming no comments	Closed
14/4/2026	Briefing on 'Live Site' for former employees	Steve Lanesbury Glenn Pyne	In person	PY/JF	Nil	N/A	Closed
15/4/2026	Brief on demo plans & understand neighbour needs in regards to communications	Neighbour – Patrick & Reggie Wild	Phone call	PY	Nil	N/A	Closed
15/4/2026	Briefing on asbestos awareness training & dust management	Transgrid	Online	JC	CMA to conducted training session for Transgrid and BESS	Training session conducted 4/5/26	Closed
17/4/2026	Traffic Management Weekly progress meeting • Review of TMP, TGS • Application of Police resourcing • Road closures -ROL New England Highway	Altus Traffic Control, TfNSW, AGL, CMA and NSW Police	Teams session	JC	Altus to share ROL when received	Shared at next weekly meeting	Closed
22/4/2026	Emergency Services Briefing.	• FRNSW • ANSW • RFSNSW	In Person	CD/ AF/SB	Nil	N/A	Closed
24/4/2026	Traffic Management Weekly progress meeting • Review of TMP, TGS • Application of Police resourcing • Road closures -ROL New England Highway ROL received by Altus and shared with all stakeholders during meeting	Altus Traffic Control, TfNSW, AGL, CMA and NSW Police	Teams session	JC	Key leaders to be nominated.	Inspector Todd Hobson nominated as lead (Police NSW) Peter Ingram (Altus) nominated traffic control lead Kylie Skinner nominated lead (TfNSW)	Closed
28/4/2026	Update on demo plans and media zone site inspection	Neighbour – Ged Elphinstone	In person	PY	Nil	N/A	Closed

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29/4/2026	Overview of plans for demolition and road closures	Neighbour – Greg Sneddon	Phone call	RC	Nil	N/A	Closed
29/4/2026	Overview of plans for stack demo	Muswellbrook Council Mayor Jeff Drayton	Email	PY	Nil	N/A	Closed
1/5/2026	Traffic Management Weekly progress meeting • Review of TMP, TGS • Application of Police resourcing • Road closures -ROL New England Highway	Altus Traffic Control, TfNSW, AGL, CMA and NSW Police	Teams session	JC	TfNSW advised they would like attendance of two members to review the implementation of Traffic controls – Approved	Invitation to be issued.	Closed
4/5/2026	Briefing on road closure plans	Mbk Council Traffic Management Committee	Email	JC	AGL to submit Section 138 and updated control plan	AGL submitted S138 and TMP	Closed
5/5/2026	Road closure information loaded on LiveTraffic	TfNSW	Online	PY	Nil	N/A	Closed
6/05/2026	Discussion regarding placing monitoring equipment for blast at sensitive receiver RO3	Greg Sneddon (resident at sensitive receiver)	Phone call	RZ	Nil	Nil	Closed
7/05/26	Section 138	Muswellbrook Council	Phone call	JC	Section 138 verbally approved by Muswellbrook Council	Payment to be made by AGL and Section 138 permit to be issued by Muswellbrook Council.	Open

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CMA Consultation with SafeWork NSW

Date	Description	SafeWork NSW Attendees	CMA Attendees	AGL Attendees	Others
11 March 2025	**Site inspection** with SafeWork NSW onsite to for CMA to introduce the demolition team and the demolition works to be undertaken on the site	Jason Wall (SafeWork NSW) Daniel Massey	Todd Solomon Adam Zielecki Ruan Zaayman Andrew Woolnough Lincoln Tucker	Anthony Flintham Chris Druery Simon Bradley	**WIED** Daniel Healy **Prensa** Jack Wearne Cameron Hunter
11 March 2025	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) dated 11/3/25 providing presentation slides from site inspection and meeting that morning	NA	NA	NA	NA
18 March 2025	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) following on from site inspection on 11/3/25	NA	NA	NA	NA
1 April 2025	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) providing chimney Stack drawings	NA	NA	NA	NA
30 June 2025	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) providing a copy of the CMA Comparative Risk Assessment report for discussion in the presentation on 7/7/25.	NA	NA	NA	NA
1 July 2025	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) providing missing information from the CMA Comparative Risk Assessment report for discussion in the presentation on 7/7/25.	NA	NA	NA	NA
7 July 2025	**Meeting (Onsite & MS Teams)** for CMA to present Comparative Risk Assessment of the Chimney Stacks to SafeWork NSW.	Jason Wall Daniel Massey Scott Middleton Gail Moss	Todd Solomon Adam Zielecki Ruan Zaayman Steve Young Andrew Woolnough Lincoln Tucker Bartek Kogutowski Oliver Easingwood Marina James	Anthony Flintham James Coventry Chris Druery Simon Bradley	**WIED** Daniel Healy **Prensa** Jack Wearne
18 July 2025	**Email** from Jason Wall (SafeWork NSW) to Todd Solomon (CMA) providing a letter dated 18/7/25 with SafeWork NSW in response to CMA's submission of CRA and associated presentation	NA	NA	NA	NA
5 August 2025	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) responding to letter issued on 18 July 2025.	NA	NA	NA	NA
1 September 2025	**Site Inspection** by SafeWork NSW to review other asbestos to remain in-situ during demolition works (non-friable gaskets, friable gaskets to large duct, and AC conduit in slabs)	Jason Wall Scott Middleton Gail Moss	Todd Solomon Sam On E Adam Zielecki Ruan Zaayman	Anthony Flintham	**Prensa** Jack Wearne
28 October 2025	**Meeting (MS Teams)** to discuss status of insulation removal after completion of South duct to Southern stack. *In principle agreement reached by all parties that Blasting was the preferred demolition method and that all insulation to be removed as far as reasonably practical without internal chimney access (~99% able to be achieved).*	Jason Wall Scott Middleton Gail Moss	Todd Solomon Ruan Zaayman Oliver Easingwood	Chris Druery Simon Bradley	**Prensa** Jack Wearne
10 November 2025	**Site Inspection** by SafeWork NSW to inspect the process of constructing the enclosure prior to commencement of the magnesia removal to Northern Stack and general site inspection of other works in progress	Jason Wall Scott Middleton Jessica Williams Rachael Dowling	Sam On E Ruan Zaayman Adam Zielecki	Anthony Flintham	**Prensa** Jack Wearne
12 March 2026	**Meeting (MS Teams)** to discuss approach to close out the Chimney CRA	Jason Wall Gail Moss	Todd Solomon	NA	**Prensa** Jack Wearne
7 April 2026	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) providing final response to SafeWork NSW correspondence dated 18 July 2025 to close out all comments				
30 April 2026	**Email** from Jason Wall (SafeWork NSW) to Todd Solomon (CMA) providing confirmation that SafeWork NSW agrees with CMA's assessment of asbestos containing materials that are deemed not reasonably practicable to remove prior to felling of the Chimney Stacks and agreeing with CMA's proposed controls	NA	NA	NA	NA

	to minimise exposure to asbestos during explosive demolition and requesting further information on general dust monitoring to be implemented.				
30 April 2026	**Email** from Todd Solomon (CMA) to Jason Wall (SafeWork NSW) providing further information on general dust monitoring to be implemented during the felling of the chimney stacks.	NA	NA	NA	NA
7 May 2026	**Email** from Jason Wall (SafeWork NSW) to Todd Solomon (CMA) providing confirmation that SafeWork NSW is satisfied the comparative risk assessment and associated Blast Management Plan/s entail sufficient detail with regards to general dust monitoring.	NA	NA	NA	NA

Department of Planning, Housing and Infrastructure

Reference:

SSD-24937520-PA-54

Matthew Parkinson
Manager Environment and Approvals
AGL MACQUARIE PTY LIMITED
New England Highway
Muswellbrook, NSW, 2333

05/05/2026

Liddell Future Landuse Project - Chimney Stack Blast Subplan

Dear Mr. Parkinson

Thank you for submitting the Chimney Stack Blast Subplan as required by Schedule 2, Condition C20 of DDD-24937520 as modified (the consent) to the NSW Department of Planning, Housing and Infrastructure (the Department).

The Department has reviewed the Chimney Stack Blast Subplan and considers more information is required to satisfy the condition of consent. Under the provisions of Schedule 2, Condition A3 of the consent, I, as nominee of the Planning Secretary, request that an amended Chimney Stack Subplan be submitted as a response to this request for information (RFI-120631738) addressing the comments attached in the Post Approval Review Table by no later than 5:00pm on 29 May 2026 (or as otherwise agreed by the Planning Secretary).

Should you wish to discuss the matter further, please contact Charissa Pillay, (Senior Planning Officer) on 02 9995 5944 or email charissa.pillay@planning.nsw.gov.au

Yours sincerely

W Jones

Wayne Jones
Team Leader - Post Approval
Resource Assessments

As nominee of the Planning Secretary

Documents: "Chimney Stack Sub-plan Plan"
Revision: Rev 4 / April 2026
Reviewed: Charissa Pillay in May 2026
Schedule

Schedule	**Sufficient (Yes/No/ Partial)**	**Document reference and comment**	**Action Required**	**Company Response**	**DPHI Response**
Schedule 2					
C20					
A blast management sub-plan must be prepared as part of the demolition environmental management plan. The plan must:					
(a) be prepared by a suitably qualified and experienced person/s;	Yes	Section 1 and Section 7.5 of BMSP & Appendix E addresses the requirement.	-		
(b) include: (i) an assessment of blasting impacts at sensitive receivers and infrastructure, including the Liddell Ash Dam. The assessment must include predicted airblast overpressure and ground vibration;	Yes	Section 7.18 and Appendix I & J addresses the requirement.	-		
(ii) consultation with the relevant private landowners or infrastructure owners if the assessment predicts blasting by the development will impact sensitive receivers; and	No	Section 7.26 discusses the consultation requirement but there is no summary on the outcomes. Table 8 identified potential peak sound pressure levels to exceed the generic recommended limits. What was the outcome from the consultation undertaken?	Provide a summary on the consultation outcomes specifically address the peak sound pressure levels of Transgrid Switchyard, Battery Storage Facility and Transition Substation.	Section 8 updated to include details regarding consultation and outcomes for Transgrid Switchyard, Battery Storage Facility and Transition Substation consultation. Appendix AA also added to BMSP which includes summary of consultation process.	

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(iii) a strategy to monitor, assess, mitigate or compensate for the effects of blasting at sensitive receivers identified by the assessment required by condition C20(b)(i);	No	The condition requires the project to have a strategy in place to monitor, assess, mitigate or compensate for the effects of blasting at sensitive receivers identified by the assessment required by condition C20(b)(i);	Provide a summary on how the project will address the effects of blasting at sensitive receivers identified by the assessment	As per the assessment in Section 7.18, no sensitive receivers will be effected by the blast. However, Section 7.19 lists controls that will be in place to further mitigate potential blasting effects, and Section 7.20 provides details on monitoring to be implemented. Sections 7.19 and 7.20 have been updated for clarity.	
(c) describe the mitigation measures that will be implemented to:					
(i) comply with the conditions of this consent;	Yes	Section 1.1 address the requirement.	-		
(ii) manage the risks identified in the environmental risk assessment required by condition B1; and	No	(ii) 7.18, 7.19 7.20, 8, Appendix C and Appendix G does not discuss the risk identified nor how the risks will be managed.	Include the risks identified in blasting the chimney stacks and how the project will manage the risk during the blast. Consider including a table with the risks identified specially to address the chimney stack blast.	Section 7.19 updated to include table with relevant blast risks as identified in the environmental risk assessment. The full environmental risk assessment has been included in Appendix AB	
(iii) manage blast generated dust and fumes, protect public safety and manage road closures;	No	Section 7.18, 7.35 and 7.23 I is unclear on the	Include a section on the consultation	Consultation has been complete	

		consultation undertaken and refers to the TMP. During the chimney stack blast which roads are proposed to be closed? Has council been consulted, NSW Police and TfNSW? When? What was the outcome?	undertaken for road closures, roads affected and actions to be implemented.	with NSW Police, TfNSW, and Muswellbrook council in relation to road closures and a Road Occupation License has been granted. Section 8.3 added to BMSP and consultation record provided in Appendix AA.	
(d) include a monitoring, evaluation and reporting program that uses an approach that is consistent with the environmental management strategy required by condition B1.	No	Sections 7.18, 7.19 & 7.20 of BMSP Appendix H does not include a monitoring and evaluation program.	Demonstrate how the project will evaluate and report that the approach to manage the blast is consistent with condition B1. Discuss the risks associated with the planned blast, the controls in place, and the reporting of the outcome	Further details added to Section 7.20of BMSP to provide procedure for evaluating the monitoring results against allowable limits and how the results are to be reported. Risks/controls have been added to Section 7.19.	
Part D					
Compliance **Non-compliance notification**					
D4. Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must:					

Documents: "Chimney Stack Sub-plan Plan"
Revision: Rev 4 / April 2026
Reviewed: Charissa Pillay in May 2026
Schedule

(a) be in writing; (b) submitted via the NSW planning portal (Major Projects); (c) identify the development (including the development application number and name); (d) set out the condition of this consent that the development is non-compliant with; (e) why it does not comply; (f) the reasons for the non-compliance (if known); and (g) what actions have been undertaken, or will be undertaken; and when, to address the non-compliance	No	The plan does not include the condition	Include condition D4	Condition included in Section 9.1 of BMSP	
Incident notification					
D5. The Applicant must notify the Department within 24 hours of becoming aware of an incident. The notification must be made via the NSW planning portal (Major Projects) and address details of the incident including:	No	The plan does not include the condition.	Include condition D5	Condition included in Section 9.2 of BMSP	
(a) date, time and location; (b) a brief description of what occurred and why it has been classified as an incident; © a description of what immediate steps were taken in relation to the incident; and (d) identifying a contact person for further communication regarding the incident.					
D6. The Applicant must provide the Department with a subsequent incident report in accordance with Appendix 6 (Incident Notification and Reporting Requirements).				Condition included in Section 9.2 of BMSP	
Revision of environmental management documents D7. Within three months of the following events: (a) the submission of an incident report under conditions D5 or D6; (b) the submission of a compliance report under condition D3; (c) the submission of an Independent Environmental Audit under condition D1; (d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or	No	The plan does not include the condition.	Include condition D7	Condition included in Section 9.3 of BMSP	

Documents: “Chimney Stack Sub-plan Plan”
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Schedule

(e) notification of a change in the development phase under condition A10; The suitability of the existing environmental management documents required under this consent must be reviewed. If the review concludes an update to an environmental management document is required, or to comply with a directive, the relevant environmental management document must be revised and submitted to the Planning Secretary for approval within three months of the review.					
Other Agency Comments	***Action Required***		***Company Response***	***Company Response (XX/XX/XX)***	

APPENDIX AB – ENVIRONMENTAL RISK ASSESSMENT

FY 25 Liddell Stage 1 Environmental Risk Assessment

Risk Event	Statutory Requirements	Performance Criteria / Limits / Criteria	Risk Owner	Cause(s)	Consequence(s)	Controls	Residual Risk Rating	Residual Consequence	Residual Likelihood	Residual Score	Relevant Management Plan
Unauthorised discharge to surface water	SSD24937520: Conditions B13, B14, B15 EPL2122: Conditions L1.1, L3.4, M2, O1,	SSD24937520 Table 3 - Performance Measures. EPL2122: L3 - Limit Conditions, M2 - Requirement to monitor concentration of pollution discharged. Table 10 of the Environmental Management Strategy (EMS): No adverse impacts or environmental consequences to groundwater, surface water and aquatic ecosystems as a result of the development outside those predicted in the environmental assessment documents listed in condition A2(c) of the consent. No complaints related to water quality. Refer to the Water Management Plan, and Demolition Environmental Management Plan (DEMP) for specific performance criteria against the objectives.	AGLM	Overflow of sediment basin or containment area - less than adequate (LTA) basin sizing, LTA pumping, sediment build up, extreme weather event. Potential hydrocarbon or chemical spill. Overflow/seepage of ash dam. Chemical and hydrocarbon bunding/storage doesn't meet the requirements. LTA inspections and maintenance. LTA spill response.	Environmental incident from spill, overflow or seepage. Regulatory non-compliance (including penalty infringement notice (PIN)).	Removing unnecessary chemicals and hydrocarbons from site (to de-risk); secondary control basins (ie Oil and Grit Trap) to capture spill material before release to environment; Ash Dam seepage - pollution reduction study on the licence reducing requirement for regulatory involvement; EPL 2122 - authorised discharges in line with approved EPL criteria. Appropriate sizing, inspections and maintenance of sediment basins. Appropriate storage and bunding of chemicals and hydrocarbons in accordance with substance SDS Management plans and procedures (e.g. Erosion and sediment control plans).	High	Level 3	Possible	14	EMS, Water Management Plan (WMP), DEMP (Soil&Water MsP), Erosion & Sediment Control Plan (ESCP).
Unauthorised discharge to ground water	SSD24937520: Conditions B13, B14, B15 EPL2122: Conditions L1.1, L3.4, M2, O1,	SSD24937520 Table 3 - Performance Measures. EPL2122: L3 - Limit Conditions, M2 - Requirement to monitor concentration of pollution discharged. Table 10 of the Environmental Management Strategy (EMS): No adverse impacts or environmental consequences to groundwater, surface water and aquatic ecosystems as a result of the development outside those predicted in the environmental assessment documents listed in condition A2(c) of the consent. No complaints related to water quality. Refer to the Water Management Plan, and Demolition Environmental Management Plan (DEMP) for specific performance criteria against the objectives.	AGLM	Overflow of sediment basin or containment area - less than adequate (LTA) basin sizing, LTA pumping, sediment build up, extreme weather event. Potential hydrocarbon or chemical spill. Overflow/seepage of ash dam. Chemical and hydrocarbon bunding/storage doesn't meet the requirements. LTA inspections and maintenance. LTA spill response.	Environmental incident from spill, overflow or seepage. Regulatory non-compliance (PIN).	Removing unnecessary chemicals and hydrocarbons from site (to de-risk); secondary control basins (ie Oil and Grit Trap) to capture spill material before release to environment; Ash Dam seepage - pollution reduction study on the licence reducing requirement for regulatory involvement; EPL 2122 - authorised discharges in line with approved EPL criteria. Appropriate sizing, inspections and maintenance of sediment basins. Appropriate storage and bunding of chemicals and hydrocarbons in accordance with substance SDS Management plans and procedures (e.g. Erosion and sediment control plans). GDVA process.	Moderate	Level 3	Unlikely	11	EMS, WMP, DEMP (S&W MsP), ESCP.
Authorised discharges exceed discharge criteria (technical non-conformance)	SSD24937520: Conditions B13, B14, B15 EPL2122: Conditions L1.1, L3.4, M2, O1	SSD24937520 Table 3 - Performance Measures. EPL2122: L3 - Limit Conditions, M2 - Requirement to monitor concentration of pollution discharged. Table 10 of the Environmental Management Strategy (EMS): No adverse impacts or environmental consequences to groundwater, surface water and aquatic ecosystems as a result of the development outside those predicted in the environmental assessment documents listed in condition A2(c) of the consent. No complaints related to water quality. Refer to the Water Management Plan, and Demolition Environmental Management Plan (DEMP) for specific performance criteria against the objectives.	AGLM	Analytes (e.g pH, electrical conductivity etc.) less than or greater than approval criteria limits.	Regulatory non-compliance (PIN). Impact on localised/operation environmental area.	Chemical/hydrocarbon storage will be compliant with the requirements of the site and product SDS; removing unnecessary chemicals and hydrocarbons from site (to de-risk). Approvals with discharge limits and criteria. Monitoring and reporting.	Moderate	Level 3	Unlikely	11	EMS, WMP, DEMP (S&W MsP), ESCP.
Emissions to the air (dust & air quality)	SSD24937520: Conditions B6, B7, B22 EPL2122: Conditions L2.2, L5, O1, O3	EPL2122: L5.1 - Potentially offensive odour Table 10 of the EMS: Development undertaken generally in accordance with the predictions specified in the environmental assessment documents listed in condition A2(c) of the consent.	AGLM	Fugitive dust from surfaces, e.g. dust generation from vehicle/plant movements. Emissions from combustion engines (eg. diesel fumes, etc). LTA air quality and dust controls when crushing rock in borrow pit, or when mechanical and blast felling.	Regulatory non compliance (PIN). Human health & ecological risk. Reputation damage to AGL as community stakeholder or around technical expertise. Directors/officers found individually liable for regulatory breaches.	Site entry and exit controls including wheel washes and rumble grids as required; water carts and manual sprays in place to dampen and minimise dust generation on roadways and surfaces; operating of machinery and equipment in a proper and efficient manner; carrying out routine maintenance on plant and vehicles; reduce and/or cease operations in adverse weather; weather forecasting tool (4 day lookahead) to prepare for adverse weather/dust events; real time dust monitoring and early warning alarm system. Adequate assessment of goods and services under AGL Procurement policies and procedures. Pre use inspections. Daily inspections. SWMS for	High	Level 3	Possible	14	EMS, DEMP (Dust Management sub plan (DMP).
Unauthorised acceptance of waste, and/or disposal or storage of waste on site	SSD24937520: Conditions B23, B24, B25, B26, B27 EPL2122: Conditions L4, O1, O4, O6, O7	EPL2122: L4.1 - Waste, L4.3 -Waste Table 10 of the EMS: No incidents, non-compliances or complaints related to waste, hazardous materials or asbestos. Also refer to the DEMP for additional performance criteria against the objectives.	AGLM	Material/waste brought to site by contractors. organics for rehab contain unauthorised material/waste. Other materials brought to site. Unauthorised/illegal dumping on site. Absence of consent and/or EPL approval to accept material/waste.	Regulatory action (PIN). Harm to the environment. Contamination of site.	Stringent procurement processes to award reputable and licensed contractors & include relevant contract clauses; project waste tracking; Site security protocols, including cameras and physical barriers (fences, gates); Site induction and training regarding expectations and obligations regarding waste (and enviro generally); Development consent and EPL	Moderate	Level 3	Unlikely	11	EMS, DEMP.
Unauthorised removal of waste from site (classification/disposal method)	SSD24937520: Conditions B23, B24, B25, B26, B27 EPL2122: Conditions L4, O1, O4, O6, O7	EPL2122: L4.1 - Waste, L4.3 -Waste Table 10 of the EMS: No incidents, non-compliances or complaints related to waste, hazardous materials or asbestos. Also refer to the DEMP for additional performance criteria against the objectives.	AGLM	Lack of ID of waste. Lack of tracking of waste. Lack of appropriate licences to remove waste from site / accept waste at the correct disposal facility.	Regulatory action (PIN). Harm to the environment. Human health impacts (eg. exposure to hazardous materials).	Stringent procurement processes to award reputable and licensed contractors & include relevant contract clauses; project waste tracking; Site induction and training regarding expectations and obligations regarding waste (and enviro generally); Hazardous materials audit; EPL approval to remove specified waste from site, where and how.	Moderate	Level 3	Unlikely	11	EMS, DEMP.
Unauthorised impact to biodiversity (BCD & EPBC) - non-approved disturbance or impact, or, disturbance and impacts to areas approved for disturbance without appropriate controls.	SSD24937520: Conditions B28, B29, B30, B31, B32, B33, B34 EPBC 2022/09330	Table 10 of the EMS: Credits retired as specified. No incidents, non-compliances or complaints related to biodiversity. Refer to the Biodiversity Management Plan for specific performance criteria against the objectives.	AGLM	Unauthorised clearing of vegetation. Lack of appropriate clearing. Failure to delineate limits of clearing. Direct and indirect project impacts. Deliberate/negligent non-approved disturbance and/or impact. Failure to conduct or poorly conducted pre clearance surveys.	Regulatory action (PIN). Harm to the environment.	Obtaining consent to disturb/impact vegetation and/or fauna; Survey and delineate limits of clearing for each project; Site induction and training regarding Enviro & Reg expectations and obligations; Relevant policies and site-specific procedures; Site mapping regarding biodiversity classification; Engaging suitably qualified experts to undertake due diligence assessments; Ground and vegetation disturbance approval (GVDA) permitting process; Communications plan to formalise and	Moderate	Level 3	Unlikely	11	Biodiversity MP (BioMP) including Microbat Managemet Plan (MMP) and Habitat Relocation Plan (HRP). EMS inc Traffic Management Plan (TMP). DEMP.
Unauthorised impact to cultural heritage Aboriginal objects AHIMS 37-2-6560 and 37-2-6559 or AHIMS 37-2-6561 and 37-2-6284.	SSD24937520: Conditions B4, B5	Table 10 of the EMS: No incidents, non-compliances or complaints related to Aboriginal heritage and non-Aboriginal (Historic) Heritage.	AGLM	Unauthorised disturbance of indigenous heritage items. Failure to delineate limits of disturbance. Surveys fail to identify artifcacts and cultural sites. Deliberate/negligent non-approved disturbance and/or impact. Direct and indirect project impacts. Significant incident on site (e.g. dam failure, uncontrolled fire).	Regulatory action (PIN). Reputation impact (damage to local indigenous relationships).	Site induction and training regarding Enviro & Reg expectations and obligations; Cultural heritage assessments and surveys; Consultation with Registered Aboriginal Parties (RAPs) for each project (undertaken in the EIS phase and ACHMP preparation); Conduct works in accordance with the Cultural Heritage Code of Practice; Appointment of suitably qualified consultant to conduct due diligence assessments; Demarcation of approved disturbance areas; Cultural Heritage Management Plan approved for development. Demarcation of areas with known Aboriginal objects AHIMS 37-2-6560 and 37-2-6559. Unexpected finds protocols. Prior to disturbance, salvage AHIMS 37-2-6561 and 37-2-6284.	Moderate	Level 3	Unlikely	11	EMS, Aboriginal Cultural Heritage MP (ACHMP).
Non-compliance with Biosecurity Act (feral pests, noxious weeds, veg management)	SSD24937520: Conditions B28, B29, B30, B31, B32, B33, B34 EPBC 2022/09330	Table 10 of the EMS: No incidents, non-compliances or complaints related to biodiversity. Refer to the Biodiversity Management Plan for specific performance criteria against the objectives.	AGLM	Inherited areas with priority weed infestations. Infestation with lack of access to manage priority weeds. Failure to manage priority weed infestations. Business concerns with potential health & safety impacts from glyphosate use. Limited approved methods for management of priority weed infestations. Non-compliance with development consent requiring management of weed spread. Inadequate pest control. Lack of adequate maintenance of rehab areas. Failure to meet rehab closure criteria. Importing a pest species during project works (e.g. in material). Personnel interaction with feral	Regulatory action under applicable legislation (PIN). Health & safety impacts. Reworks to damaged rehab areas.	Current rehab and veg management plans; Site induction and training regarding Enviro & Reg expectations and obligations; Pampas grass and general weeds management plan; contractor engaged to manually remove pampas grass and weeds in general; Pest management contractors; Rehab monitoring and surveys (identifies weeds and pests); Application assessment report to identify potential pests in organic materials.	Moderate	Level 3	Unlikely	11	EMS, BioMP. Vegetation Management Strategy (VMS).

Changes to legislation & regulations (Coal Ash/DSNSW/CLM Regs/EPL/etc) that in turn will impact personnel understanding and fulfilment of obligations relating to current project works.	SSD24937520: Conditions (All) EPL2122: Conditions (All) EPBC 2022/09330: Conditions (All)	Table 10 if the EMS: Nil non compliances.	AGLM	Missing a change in conditions. Lack of assurance to determine if works remain compliant. Project scope increases significantly to adapt to changes. Carry out works not in accordance to changed legislation or failure in communication chain (staff turnover or changes to roles).	Regulatory action (PIN). Reputational damage. Financial/commercial impact.	Subscriptions to regulatory communications (Sai Global, etc); Corporate teams (legal) providing enterprise wide comms; Environmental compliance uplift; regulatory engagement. Communication of changes to team members and contractors during meetings and other forums.	Moderate	Level 3	Unlikely	11	EMS.
Failure to comply with licence, consent and permit conditions	SSD24937520: Conditions (All) EPL2122: Conditions (All) EPBC 2022/09330: Conditions (All)	Table 10 if the EMS: Nil non compliances.	AGLM	Operating in a non efficient manner as per EPL / SSD requirement. LTA understanding of licence, consent and permit requirements. Inadequate storage and/or handling of chemicals, hazardous materials and dangerous goods. Spills/release of oils, fuels, etc from plant/storage during operations.	Reputation damage. HSE Event. Environmental impact. Regulatory action (PIN).	Removal of non-essential chemicals and hydrocarbons from site (to de-risk); Site induction and training regarding Enviro & Reg expectations and obligations; Work method statements and risk assessments; Management plans developed and implemented; Monitoring programs implemented and ongoing; Procurement process in line with contract requirements; Relevant environmental management plans. Audits, inspections, monitoring and reporting. GVDA.	Moderate	Level 3	Unlikely	11	EMS.
Unauthorised works completed on non-AGL land (roads, easements, agreements, consents, licences), or off site approval boundaries.	SSD24937520: Condition A23	Table 10 if the EMS: Nil non compliances.	AGLM	Failure to identifiy non-AGL owned parcels of land during project. Failure to communicate aquistion or inaccurate mapping of AGL owned or aquired land. Deliberate or negligent action. Failure to obtain agreements to access non-AGL owned land.	Reputation damage. HSE Event. Environmental impact. Regulatory action (PIN).	Current mapping of AGL owned land and approval boundaries and non AGL owned land - geospacial database; Agreement with TFNSW covering AGL assests on TFNSW land; Ongoing consultation with Maxwell and other stakeholders. Land access agreements. Notifications. Site survey for SSD project area and boundary delination. GVDA.	High	Level 3	Possible	14	Community and Stakeholder Engagement Strategy (CSES), EMS.
Failure to meet community expectations	SSD24937520: Conditions A9, B1 EPL2122: Conditions M6, M7	Table 10 of the EMS: Nil complaints received by community Nil adverse impact to surrounding private properties	AGLM	Inadequate stakeholder consult, exceedance of criteria (AQ, N&V), nuisance but within criteria AQ and N&V).	Reputation damage. Increase in complaints.	CCC/working groups, community newsletters, adequate enquiries/complaint management, regular internal communication (AGL monthly updates, bi-weekly SIMOPs meetings), regular regulatory engagement, website, monitoring, approvals (criteria).	Moderate	Level 2	Possible	9	CSES, EMS.
Noise and vibration exceed limits.	SSD24937520: Conditions B8, B9, B10, B11, B12 EPL2122: Condition M9	SSD24937520 Condition B8: 40dB, at meteorological conditions as per B9. SSD24937520 Condition B10: 40dB + 5dB at other meteorological conditions not outlined in B9. SSD24937520 Condition B11: outside of hours noise levels; 5dB above the rating background level. EPL2122: M9 - Noise monitoring. Table 10 of the EMS: No exceedance of operational noise generated by the development at R21 and R28. Development undertaken generally in accordance with the predictions specified in the environmental assessment documents listed in condition A2(c) of the consent	AGLM	Failure to monitor / meet criteria conditions, including notification requirements; inadeqaute modelling; inadeqaute methodology or timing of crushing of rock/concrete; blast felling of stacks non-compliant with the limitations and criteria outlined.	Reputation damage. Regulatory action (PIN). HSE Event.	Engineering studies; monitoring; sound power level testing; following notification protocols; blast design; 3rd party engineering review; exclusion zones; SWMS for crushing activities. Out of Hours work Protocol	Moderate	Level 2	Possible	9	EMS - Noise and Vibration Management Plan (NVMP), DEMP.
Impact to non indigenous heritage (fence posts outside disturbance area to the north of the site).	SSD24937520: Condition C16	Table 10 of the EMS: No incidents, non-compliances or complaints related to Aboriginal heritage and non-Aboriginal (Historic) Heritage.	AGLM	Failure to identify, demark and protect non indigenous heritage.	Reputation damage. Regulatory action (PIN). HSE Event.	GVDA. Clearly identifying, demarking and where necessary protecting items in the field. Area outside disturbance area. Mapping and archival photography, unexpected finds protocol.	Low	Level 2	Rare	4	EMS, DEMP.
Impacts caused by increase in traffic.	SSD24937520: Conditions B20, B21	Table 10 if the EMS: Nil non compliances.	AGLM	Increase in light and heavy vehicle movement for demolition and construction activities: site vehicle	Reputation damage. Regulatory action (NSW police). HSE Event.	Traffic Management Plan; Site Access protocols, VOC/Training for vehicle operators; Site induction and training	High	Level 3	Possible	14	EMS - TTMP. DEMP - Onsite TMP. Bio MP.
Impact or damage to public infrastructure.	SSD24937520: Condition A23	Table 10 if the EMS: Nil non compliances.	AGLM	Less than adequate engineering, design, modelling. Failure to monitor.	Reputation damage. Regulatory action (PIN). HSE Event.	Engineering designs, monitoring and reporting, SWMS, competent contractors, stakeholder engagement.	Moderate	Level 3	Unlikely	11	EMS. DEMP.
Increased use and impact to local amenities (e.g. accommodation).	SSD24937520: Conditions B1 EPL2122: Conditions M6, M7	Table 10 of the EMS: Nil complaints received by community	AGLM	Significant increase in workers for project activities or major demolition or construction events.	Reputation damage.	Utilise local workforce/personnel where possible; Additional workforce not anticipated to be large. The use or hire of temporary site services to minimise impact.	Low	Level 1	Unlikely	2	CSES.