

Preliminary Site Investigation

Proposed Residential Subdivision
3 Memory Avenue, Crookwell NSW

Final Report

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Glossary of Terms

ACM	Asbestos containing material
AEC	Area of environmental concern
ASS	Acid sulfate soil
AST	Above ground storage tank
BGL	Below ground level
BoM	Bureau of Meteorology
BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene
CLM	Contaminated land management
COPC	Contaminants of potential concern
CSM	Conceptual site model
DA	Development application
DCP	Development control plan
DCS	Department of Customer Service (NSW)
DEC	Department of Environment and Conservation (NSW)
DECC	Department of Environment and Climate Change (NSW)
DECCW	Department of Environment, Climate Change and Water (NSW)
DP	Deposited plan
DPE	Department of Planning and Environment (NSW)
DPI	Department of Primary Industry (NSW)
DSI	Detailed Site Investigation
DUAP	Department Urban Affairs and Planning (NSW)
EPA	Environmental Protection Authority (NSW)
GDE	Groundwater dependent ecosystem
GW	Groundwater
HAPE	Historical aerial photo enhancement
HEPA	Heads of EPAs Australia and New Zealand
HM	Heavy metals
IA	Investigation area
LEP	Local environmental plan
LGA	Local government area
MA	Martens & Associates Pty Ltd
mAHD	Metres Australian Height Datum
MW	Monitoring well
NEMP	National Environmental Management Plan
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
OCP	Organochlorine pesticides
OEH	NSW Office of Environment and Heritage
OPP	Organophosphorus pesticides
PACM	Potential asbestos containing material
PCB	Polychlorinated biphenyl
PFAS	Per- and polyfluoroalkyl substances
POEO	Protection of the Environment Operations
PSI	Preliminary Site Investigation
RL	Reduced level
SEED	Search engine for environmental data
SEPP	State Environmental Planning Policy
SIX	Spatial information exchange
SWL	Standing water level
UXO	Unexploded ordnance
UPSS	Underground petroleum storage system
UST	Underground storage tank

1 Introduction

1.1 Overview

Martens and Associates (MA) has been engaged by BlueSox Pty Ltd (the Client) to undertake a Preliminary Site Investigation (PSI) of land located at 3 Memory Avenue, Crookwell NSW. MA understand the PSI is required to assess potential land contamination risk in support of a Development Application (DA) to Upper Lachlan Shire Council for a proposed 20 lot residential subdivision.

One of these Lots is proposed for the development of a childcare centre, which is understood to form part of a separate DA. However, this PSI reported includes consideration of the entire Site area, including the proposed childcare centre Lot.

The investigation area (IA) adopted for this PSI comprises the entire Site area shown in Appendix A (Map 01).

1.2 Proposed Subdivision Work

It is understood that the site will be subdivided into 20 lots across two stages:

- Stage 1 – Establishment of four lots, including the proposed childcare centre.
- Stage 2 – Establishment of the remaining 16 lots.

A subdivision layout plan (MA, 2025) and a survey plan (SDG, 2024) are provided in Appendix B.

1.3 Objectives

Investigation objectives include:

- Identify historical and current activities and uses on the Site and adjacent land which could potentially result in land contamination.
- Establish areas of environmental concern (AEC) and associated contaminants of potential concern (COPC) to assist with the development of a conceptual site model (CSM) for the Site.
- Assess the suitability of the Site for the proposed land use, and where required, make recommendations for additional investigation.

1.4 Scope of Works

The scope of works adopted for the investigation included:

- Review of available online mapping resources.
- Review of available online hydrogeological and groundwater information.

- A desktop study, including review of historical aerial photography, historical Council records, information available on relevant regulatory and government databases for the Site.
- Inspection of the Site to confirm desktop study findings and make observations of land use and activities on the Site and surrounding land.
- Preparation of a report in accordance with the relevant contaminated land guidelines.

1.5 Regulatory Guidance Documents

The following regulatory guidelines have been considered for the preparation of this report:

- NSW DUAP (1998) Managing Land Contamination: Planning Guidelines.
- NEPC (2013) Schedule B2 Guideline on Site Characterisation.
- NSW EPA (2017) Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme.
- NSW EPA (2020) Contaminated Land Guidelines: Consultants Reporting on Contaminated Land.
- HEPA (2020) PFAS National Environmental Management Plan, Version 2.0.
- State Environmental Planning Policy (Resilience and Hazards) 2021.
- Upper Lachlan Development Control Plan 2010
- Upper Lachlan Local Environmental Plan 2010

2 Site Setting

2.1 Site Identification

Site identification details and general descriptions are summarised in Table 1. The location of the Site and surrounding land is shown in Appendix A (Map 01).

Table 1: Site identification information.

Item	Detail
Site address	3 Memory Avenue, Crookwell NSW 2583
Legal identification	Lot 2 DP 702788
Approximate investigation area	Approximately 2.1 ha (By calculation – SIX Maps)
Geographic site coordinates	Northeast corner of Site (datum GDA2020 – MGA55): <ul style="list-style-type: none"> Easting: 727783 Northing: 6185378 (Source: SIX Maps)
Local government area	Upper Lachlan Shire Council
Zoning	R2 – Low Density Residential (Upper Lachlan Local Environmental Plan 2010)
Current land use(s)	Rural / Residential
Proposed land use(s)	Residential with a single lot to be developed for childcare centre use.
Surrounding land use	<ul style="list-style-type: none"> North – low density residential and rural residential land use. East – Crookwell Cemetery followed by rural residential and agricultural land use. South – low density residential rural land use. West – low density residential, general industrial and public recreational land use.

2.2 Environmental Setting

Information relating to the environmental setting of the site is presented in Table 2.

Table 2: Environmental setting information.

Item	Detail
Topography	<p>The topography of the surrounding landscape is characterised by plateaux or valleys of gently undulating to undulating rises. Slope gradients are usually between 2 to 15% and local relief ranges between 5 to 40 m.</p> <p>Elevation of the Site ranges from approximately 910.5 mAHD in the southwest portion and 922 mAHD in the eastern portion of the Site.</p> <p>A topographic map of the Site is provided in Appendix A (Map 02).</p>

Item	Detail
Geology	<p>The eSPADE (NSW DPE, 2024) platform indicates the following geology is mapped within the Site:</p> <ul style="list-style-type: none"> • Crookwell Basalt of Tertiary lava flows with irregular basalt surface indicative of valley fills. Soils have formed in situ and from alluvial-colluvial material derived from the parent rock. <p>Geological mapping produced by the NSW Geological Survey (A.J. Johnston, et al., 2013) as provided on the web platform MinView (GSNSW, 2024a), indicates geology at the Site consists of:</p> <ul style="list-style-type: none"> • Crookwell Basalt - unconsolidated to semi-lithified, poorly sorted, fine to medium grained, quartzose sand to pebble to boulder sized, polymictic gravels, silica, iron and sandstone and conglomerate, minor clay horizons. <p>Mapping for NSW relating to areas where naturally occurring asbestos is known to occur, or has the potential to occur, in geological units was reviewed on the NSW SEED spatial viewer (NSW DPIE, 2024). Mapping did not identify geological units with known or potential naturally occurring asbestos within (or adjacent to) the Site.</p> <p>A geology map of the Site is provided in Appendix A (Map 03).</p>
Soil landscapes	<p>The eSPADE (NSW DPE, 2024) platform indicates the following soil landscape is mapped within the Site:</p> <ul style="list-style-type: none"> • Taralga Soil Landscape – Krasnozems and Xanthozem are found on crests. On sideslopes, friable to slightly hardsetting, acid, texture-contrast soils similar to Chocolate Soils predominate. Prairie Soils are common on footslopes, with alluvial soils and wiesenbodens in drainage lines. <p>A soil landscape map of the Site is provided in Appendix A (Map 04).</p>
Acid sulfate soils	<p>Acid sulfate soils (ASS) risk mapping associated with the Upper Lachlan Local Environmental Plan 2010 indicates the Site is mapped beyond Class 5 area indicating no ASS risk associated with the Site.</p>
Surface hydrology	<p>Drainage is likely to occur by a combination of direct soil infiltration and overland flow.</p>
Nearest surface waterbody	<p>Tributary located 500m southeast leads to Kiamma Creek followed by Crookwell River.</p>
Heritage	<p>Crookwell Cemetery located directly to the east of the Site is mapped as a heritage item.</p> <p>(Upper Lachlan Local Environmental Plan 2010)</p>

2.3 Hydrogeology and Groundwater Use

As specified in NSW DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*, preliminary assessment to identify hydrogeological conditions and groundwater receptors has been completed to assist with conceptual site model (CSM) development. Finding of this preliminary assessment is provided in the following subsections.

2.3.1 Hydrogeological Setting

The Bureau of Meteorology Australian Groundwater Insight database (BoM, 2024) indicates the principal hydrogeology of the Crookwell area consists of fractured or

fissured, extensive aquifers of low to moderate productivity. Aquifers comprise an upper aquifer in basalt.

2.3.2 Groundwater Use and Environmental Receptors

The WaterNSW Real-time Water Database was reviewed to identify local groundwater uses within 500 m of the Site. A summary of available bore records is provided in Table 3. A map of surrounding groundwater bores and their records is provided in Appendix C.

Table 3: Groundwater bore records summary.

Bore Identification	Registered Use	Distance and Direction from Site	Groundwater Depth (mBGL)	Water bearing Zone Information
GW702814	Domestic	23 m, west	9.00	Shale – 7.0 to 20.0 mBGL, yield 3.791 L/s.
GW703243	Domestic	284 m, northwest	12.00	Shale – 8.0 to 24.0 mBGL.
GW058774	Domestic	427 m, south	Unknown	Unknown
GW053590	Irrigation	465 m, northwest	21.30	Basalt decomposed - fractured – 15.2 to 22.3 mBGL, yield 2.53 L/s.
GW702705	Domestic	494 m, northwest	3.00	Basalt – 1.5 to 6.0 mBGL, yield 3.375 L/s.

The Groundwater Dependant Ecosystem (GDE) Atlas (BoM, 2024) was reviewed to identify potential environmental receptors within 500 m of the Site. The review identified no aquatic GDE within surrounding area of the site. No ecosystem analysis has occurred for terrestrial or subterranean GDE. However, the Site and surrounding may contain inflow dependent ecosystems (IDE).

Beneficial groundwater extraction was not identified within the Site, but extraction for domestic and irrigation purposes occurs on surrounding land to the northwest and south. Beneficial reuse of groundwater is not expected as part of the future land use.

3 Desktop Study

3.1 Historical Aerial Photography

Historical aerial photography covering the Site and surrounding land for the period 1962 to 2024 have been reviewed. Observations are summarised in Table 4, with copies of historical aerial photographs provided in Appendix D.

Table 4: Historical aerial photography observations for the period 1962 to 2024.

Year (Source)	Site Observations	Surrounding Land Observations
1962 (HAPE)	The Site appears to be agricultural land. Due to poor image quality, definitive land use cannot be determined, but cropping is likely within the Site boundary.	Agricultural land use including cropping is evident on land directly to the north, south and west. Crookwell Cemetery is present directly east of the Site.
1973 ¹ (HAPE)	Generally, no change from previous image.	Little to no change from previous image.
1982 (HAPE)	Generally, no change from previous image. Potential cropping still appears evident onsite.	Increased residential development is visible to the northwest. The cemetery appears to have expanded. Otherwise, little to no change from the previous image.
1994 ¹ (HAPE)	Image quality is poor, but previous cropping may have ceased. The Site appears generally cleared, with grass-covered open space.	Further residential development has increased to the northwest, along with cemetery expansion.
2000 (HAPE)	A residential dwelling has been established in the eastern portion of the Site in a similar position to the existing dwelling onsite. The remainder of the Site remains grass covered open space.	Little to no change from previous image.
2015 ¹ (SIX map)	The dwelling has been extended, and several small structures have been erected east of the dwelling. Some mature trees are visible, but the Site remains predominantly grass covered.	Little to no change from previous image.
2025 (Nearmap)	A slight increase in vegetation density is observed, but overall, little to no change from the previous image.	New residential developments are visible in most direction surrounding the Site. The roads surrounding the Site have been upgraded.

¹ Denotes poor image quality

3.2 Council Development Records

Upper Lachlan Shire Council development records available on Council's Development Registers website, noting that only determined applications (4.59 Notices) records between 2020 to 2025 are provided, were reviewed for the investigation. No determined

applications for the Site were identified on Councils development register, shown in Appendix E. An informal Government Information Public Access (GIPA) access application was undertaken with Council. However, a response has not been received prior to the release of this PSI.

3.3 Government Register Records

A review of available government register records was completed for the investigation using the following online resources:

- Records of public notices of contaminated land under Section 58 of the *Contaminated Land Management Act 1997* (CLM Act).
- Records relating to contaminated land notified to NSW EPA under Section 60 of the CLM Act.
- Records relating to licensed activities, applications, notices, and audits under the *Protection of the Environment Operation Act 1997* (POEO Act).
- Records relating to sites listed under the NSW EPA per-and polyfluoroalkyl substances (PFAS) investigation program.
- Records relating to site being investigated and or managed by the Department of Defence for PFAS contamination.
- Records managed by Department of Defence relating to land affected, or suspected of being affected, by unexploded ordinance (UXO).

A summary of information relating to the Site is provided below in Table 5. Applicable records are provided in Appendix F.

Table 5: Summary of government register records.

Record	Onsite	Surrounding Land
Notices under Section 58 of the CLM Act 1997 ¹	No record	No record ≤500 m
Duty to Report Contamination under Section 60 of the CLM Act 1997 ²	No record	No record ≤500 m
Records relating to licensed activities, applications, notices, and audits under the Protection of the Environment Operation Act 1997 (POEO Act) ³	No record	No record ≤500 m
NSW EPA PFAS investigation program ⁴	No record	No record ≤500 m
Department of Defence PFAS management and investigation program ⁵	No record	No record ≤500 m
Department of Defence records relating to sites suspected or affected by unexploded ordinance (UXO) ⁶	No record	No record ≤500 m

Notes.

1. Records available at: <https://apps.epa.nsw.gov.au/prclmapp/searchregister.aspx>.
2. Records available at: <https://www.epa.nsw.gov.au/your-environment/contaminated-land/notified-and-regulated-contaminated-land/list-of-notified-sites>.
3. Records available at: <https://apps.epa.nsw.gov.au/prpoeoapp/>.
4. Records available at: <https://www.epa.nsw.gov.au/Your-environment/Contaminated-land/nsw-government-pfas-investigation-program>.
5. Records available at: <https://www.defence.gov.au/about/locations-property/pfas/pfas-management-sites>.
6. Records available at: <https://uxo-map.defence.gov.au/>.

3.4 Potential Contaminating Activities and Land Uses – Offsite

Review of online mapping and business services registers relating to potential contaminating businesses and activities (e.g., service stations, fire stations, mechanics, dry cleaners, airports, etc.) located ≤500 m of the Site was conducted.

Two potential contaminating activities were identified, as summarised in Table 6.

Table 6: Summary of potential contaminating activities and land uses ≤500 m of the Site.

Business / Activity	Location	Distance and Direction from Site	Inferred Hydraulic Position to Site
Fuel Station	115 Laggan Rd, Crookwell NSW 2583	65 m, northwest	Down gradient
Industrial Land Use - Electrical	30 McIntosh Rd, Crookwell NSW 2583	460 m, west	Down gradient

Due to their distance, direction and inferred hydraulic position, these activities are unlikely to pose a contamination risk to the Site.

3.5 PFAS Screening Assessment

Potential risk posed by PFAS contamination at the Site has been evaluated by using available desktop study information, in combination with the preliminary screening assessment developed by EnRiskS (2016). The preliminary PFAS screening assessment for the Site is presented in Table 7.

Table 7: Preliminary PFAS screening assessment.

Preliminary Screening	Probability ¹	Justification
Did fire training occur on-site?	L	Historical aerial photography suggests that fire training activities have not occurred on the Site.
Is an airport or fire station on the Site, or located hydraulically upgradient or adjacent to the Site? ²	L	No airport or fire station are present onsite or within the surrounding area.
Have “fuel” fires ever occurred onsite? (e.g., solvent, petrol, diesel, kerosene)	L	No available information indicates historical fuel fires on-site.
Have PFAS been used in manufacturing or stored onsite? ³	L	The Site’s historical land use is not consistent with the manufacturing of PFAS compounds. No evidence of PFAS storage was identified.

Notes:

1. L = Low, M = Medium, H = High.
2. Runoff from fire training areas may impact surface water, sediment, and groundwater.

3. PFAS is used in a wide range of industrial processes and consumer products, with further information of potential sources provided in Appendix B of the HEPA (2020) *PFAS National Environmental Management Plan*, Version 2.0.

The screening assessment indicates a low probability for PFAS contaminants to be present at the Site. Based on this assessment, no further PFAS assessment or testing is considered necessary.

4 Site Inspection

An initial site inspection was conducted by an experienced MA Environmental Consultant on 6 December 2024, with a supplementary inspection performed on 27 February 2025. Observations made during the inspections are provided in Table 8.

Table 8: Site inspection observations

Item	Observation
Buildings and structures	<p>A single storey residential dwelling was observed in the northeast portion of the Site.</p> <p>A small shed structure observed adjacent to the southeast corner of the dwelling.</p> <p>Several trailers were observed to the north and east of the dwelling.</p> <p>Refer to Plate 2 to 9.</p>
Ground surfaces and pavements	<p>The majority of the Site was grass covered.</p> <p>Land surrounding the dwelling consisted of maintained grass with gravel driveway. The maintained grass area was separated from the remainder of the Site by a wire fence.</p> <p>Land outside of the fenced area considered of dense grass with some mature vegetation.</p> <p>Refer to Plate 1 to 7.</p>
Fill material and stockpiles	<p>Evidence of fill material was not observed during the inspection.</p> <p>Two separate small stockpiles of wood and rock boulders were observed to the east of the dwelling.</p> <p>Several small stockpiles of building debris were observed in the December 2024 walkover. However, most were no longer present in the February 2025 walkover.</p> <p>Refer to Plate 2 to 5 and 7.</p>
Historic structures	<p>A small shed observed in the December 2024 inspection was no longer present in the February 2025 inspection.</p> <p>Refer to Plate 2 to 7.</p>
Chemical storage	No evidence of chemical storage was observed during the inspection.
UPSS, USTs and ASTs ¹	No evidence of UPSS, USTs, and ASTs was observed.
Waste materials and storage	No waste materials or designated storage areas were observed.
Odours and staining	No significant odours or staining were observed.
Hazardous building materials	No evidence of hazardous buildings materials was observed.
Electrical substation kiosks	No electrical substation kiosks were observed on the Site or adjacent land.
Vegetation and phytotoxicity	<p>Vegetation on-site consisted mainly of grass, sparse shrubs, and trees. A maintained grass area was present within the fenced portion surrounding the existing dwelling.</p> <p>Vegetation appeared to be in good condition, with no evidence of phytotoxicity effects.</p>

Notes:

- ¹. Underground petroleum storage systems (UPSS), underground storage tanks (USTs), and aboveground storage tanks (ASTs).

A selection of photographic images obtained during the site inspection are provided in Appendix G.

5 Conceptual Site Model

5.1 Areas of Environmental Concern

An assessment of potential areas of environmental concern (AEC) and contaminants of potential concern (COPC) has been made for the Site on the basis on desktop study, and Site inspection observations. The outcome of this appraisal is provided in Table 9.

Table 9: Potential contamination sources and contaminants of potential concern.

AEC	Potential for Contamination	COPC
AEC A Former agriculture land use / Possible cropping	Due to the Site's historical agricultural land use, including possible cropping, the application of horticultural/agricultural chemicals and pesticides for pest control may have occurred.	Heavy Metals (HM), organochlorine pesticides (OCPs) / organophosphate pesticides (OPP).
AEC B Existing and former structures	Pesticides and heavy metals may have been used beneath existing and former structures for pest control. Structures may have included potential asbestos containing material (PACM), zinc treated (galvanised) metals and lead based paints. Former structures (sheds) were removed sometime between 2015 to 2025.	HM, OCP / OPP and asbestos.

5.2 Source – Exposure Pathway – Receptor Linkages

A conceptual site model (CSM) outlining *source – exposure pathway – receptor* linkages has been developed from information gathered by the PSI and is presented in Table 10.

Table 10: Conceptual site model *source – exposure pathway – receptor* linkages.

Item	Description
Potential media affected by AECs and mechanism of contamination	<p>Soil is considered a media of interest due to identification of several potential sources of contamination at the Site.</p> <p>The mechanisms of contamination may involve:</p> <ul style="list-style-type: none"> • Application of agricultural chemicals and pesticides to surface soils. • Leaching and mobility of contaminants in subsurface soils. • Deposition of contaminants from past structural materials. <p>Potentially impacted soils include surface, near surface, and deeper soils (including natural soils), depending on the volume of contamination release and contaminant mobility.</p> <p>Groundwater is not considered to be a media of interest as no extensive excavations are proposed and thus interception with groundwater is unlikely to occur.</p>
Potential exposure pathways	Potential anthropogenic exposure pathways include ingestion, dermal absorption, inhalation (of dust and / or vapours). Potential ecological exposure pathways include biota uptake and intake.

Item	Description
Potential receptors	<p>Potential human receptors include future Site users and visitors (adults and children) as well as construction and maintenance work during proposed development works and ongoing maintenance.</p> <p>Potential ecological receptors include flora and fauna within the Site and surrounding environment.</p>

5.3 Data Gaps Summary

A summary of information or data which has not been obtained or considered for inclusion in the PSI is discussed in Table 11.

Table 11: Information data gap summary.

Data Gap	Commentary
Land title records	Land title records were not reviewed as part of this PSI. This is unlikely to affect the findings of the investigation as sufficient historical information relating to former site activities was obtained from historical aerial photography interpretation and inspection of the Site.
Safework NSW dangerous goods records	There is no historical evidence of large volume storage of petroleum hydrocarbons in the Site, nor of past site uses likely to have required such storage. As such, a search of SafeWork NSW dangerous goods records was not obtained for the investigation.
Section 10.7 planning certificate	Section 10.7 planning certificates were not obtained for review as part of the PSI. It is considered information provided in the planning certificate is unlikely to change the conclusions or recommendations of this report as sufficient historical information relating to former site activities was obtained from historical aerial photography interpretation and inspection of the Site.
Sampling and analysis of media	Sampling and laboratory analysis of media of concern (soil) identified by the CSM was beyond the investigation scope of works and was not undertaken for the PSI. Recommendations have been provided to address this data gap in Section 6 of the report.

5.4 Conceptual Site Model Discussion

The proposed subdivision will result in residential land use, including the use of one lot for a childcare centre, which is classified as 'residential' from a contaminated land assessment perspective.

Based on the *source – exposure pathway – receptor* linkages outlined in Section 5.2, the following AECs could contain contamination with potential to result in receptor exposure:

- Former agriculture use / Potential cropping.
- Existing and former structures.

Given soil has been identified as potential media of concern, various contamination mechanisms and exposure pathways exist that could potentially result in exposure for future receptors.

Further investigation and characterisation of soil is required to understand potential risks posed by contamination and sources.

6 Conclusions and Recommendations

This PSI has been completed by MA to evaluate land contamination at 3 Memory Avenue, Crookwell NSW in support of a proposed 20 lot residential subdivision with one Lot designated for use as a childcare centre.

The PSI was completed for the Site using information obtained from a desktop study, site inspection observations and a review of a historical aerial photography. Key findings included:

- Historical aerial imagery suggests that some amount of cropping is likely to have occurred on-site between at least 1963 and 1994. However, poor image quality makes it difficult to confirm definitively.
- Between 1994 and 2015, the Site transitioned to residential land use, with the construction of a dwelling and shed structures in the eastern portion.
- Several shed structures appear to have been removed between 2015 and 2025.
- No evidence of fill material was observed during Site inspection, and the widespread presence of fill material is considered unlikely. However, minor stockpiles of wood, rock boulders, and small amounts of building debris were identified during the December 2024 site walkover, but most were no longer present in the February 2025 inspection. These materials are not considered to present a major contamination risk.
- The Site is not listed on any government register of contaminated land or hazardous industries.
- No surrounding land use presents a contamination risk to the Site.

The following AECs were identified:

- Former agriculture land / Potential cropping
- Existing and former structures

Overall, the contamination risk at the Site is generally considered low. However, as a conservative measure, it is recommended that a Detailed Site Investigation (DSI) be conducted at the Site to assess identified AECs and quantify COPC in media, as identified by the CSM. This should include an adequate program of field investigation, sampling, and laboratory analysis of Site soils.

Some testing locations (i.e., beneath existing structures) will only become accessible following demolition. It is recommended that testing in these areas be conducted once structures are removed.

7 Limitation Statement

This Preliminary Site Investigation (PSI) was undertaken in accordance with current industry standards. However, it is important to note that no site contamination assessment can be considered a complete and exhaustive characterization of a site, nor does it guarantee the identification of all areas of potential contamination or all past potentially contaminating land uses. Martens & Associates Pty Ltd recommends that further site investigations be conducted to fully characterize site contamination; therefore, this report should not be interpreted as a guarantee of the absence of contamination on the site.

Further, this report does not address radiation risks associated with former mineral sand mining activities at the site. Martens & Associates Pty Ltd recommends that a separate radiation investigation be undertaken.

This assessment was undertaken by Martens & Associates Pty Ltd for the purpose of the current development proposal. This report should not be relied upon for any other investigation or proposal. Martens & Associates Pty Ltd accepts no responsibility and provides no guarantee regarding the characteristics of areas of the site not specifically studied in this investigation.

8 References

- SDG (2024), Detail and Level Survey of Lot 2 in DP702788, 3 Memory Ave Crookwell, SDG Pty Ltd, Reference 9293, Issue C, Survey Date 17 December 2024.
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Appendix A – Maps



Map Title / Figure:
Overview



0 10 20 30 40 50 m

1:1500 @ A3
Viewport A
Notes:
- Aerial from Nearmap (2025).
- Cadastre and site boundary from NSW Spatial Services Clip and Ship (2025).
- Contours from ELVIS Lidar (2009).

Map Title / Figure:
Topography

Map	Map 02
Site	3 Memory Avenue, Crookwell, NSW
Project	Lot Subdivision
Sub-Project	Preliminary Site Investigation
Client	Bluesox
Date	21/03/2025



0 10 20 30 40 50 m

1:1500 @ A3

Viewport A

Notes:
- Aerial from Nearmap (2025).
- Cadastre and site boundary from NSW Spatial Services Clip and Ship (2025).
- Geology from NSW Seamless (2025).

Map Title / Figure:

Geology

Map 03
3 Memory Avenue, Crookwell, NSW
Lot Subdivision
Preliminary Site Investigation
Bluesox
21/03/2025

Map
Site
Project
Sub-Project
Client
Date



Legend

Site Boundary

Cadastre

Soil Landscapes

Taralga

0 10 20 30 40 50 m

1:1500 @ A3

Viewport A

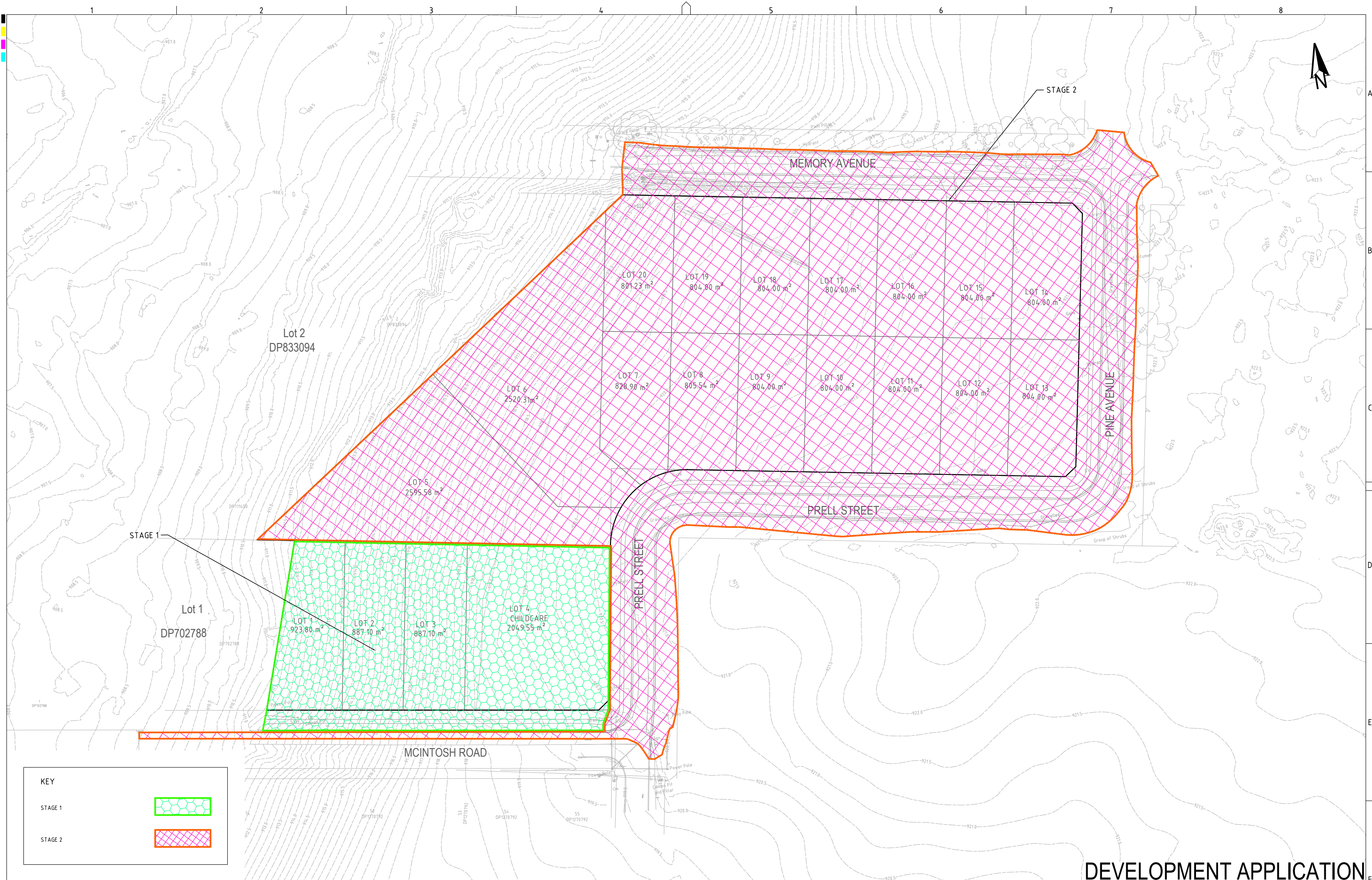
Notes:

- Aerial from Nearmap (2025).
- Cadastre and site boundary from NSW Spatial Services Clip and Ship (2025).
- Soil Landscapes from NSW SEED Portal (2025).

Map Title / Figure:
Soil Landscapes

Map 04		Map
3 Memory Avenue, Crookwell, NSW		Site
Lot Subdivision		Project
Preliminary Site Investigation		Sub-Project
Bluesox		Client
21/03/2025		Date

Appendix B – Subdivision Layout Plan and Survey Plan



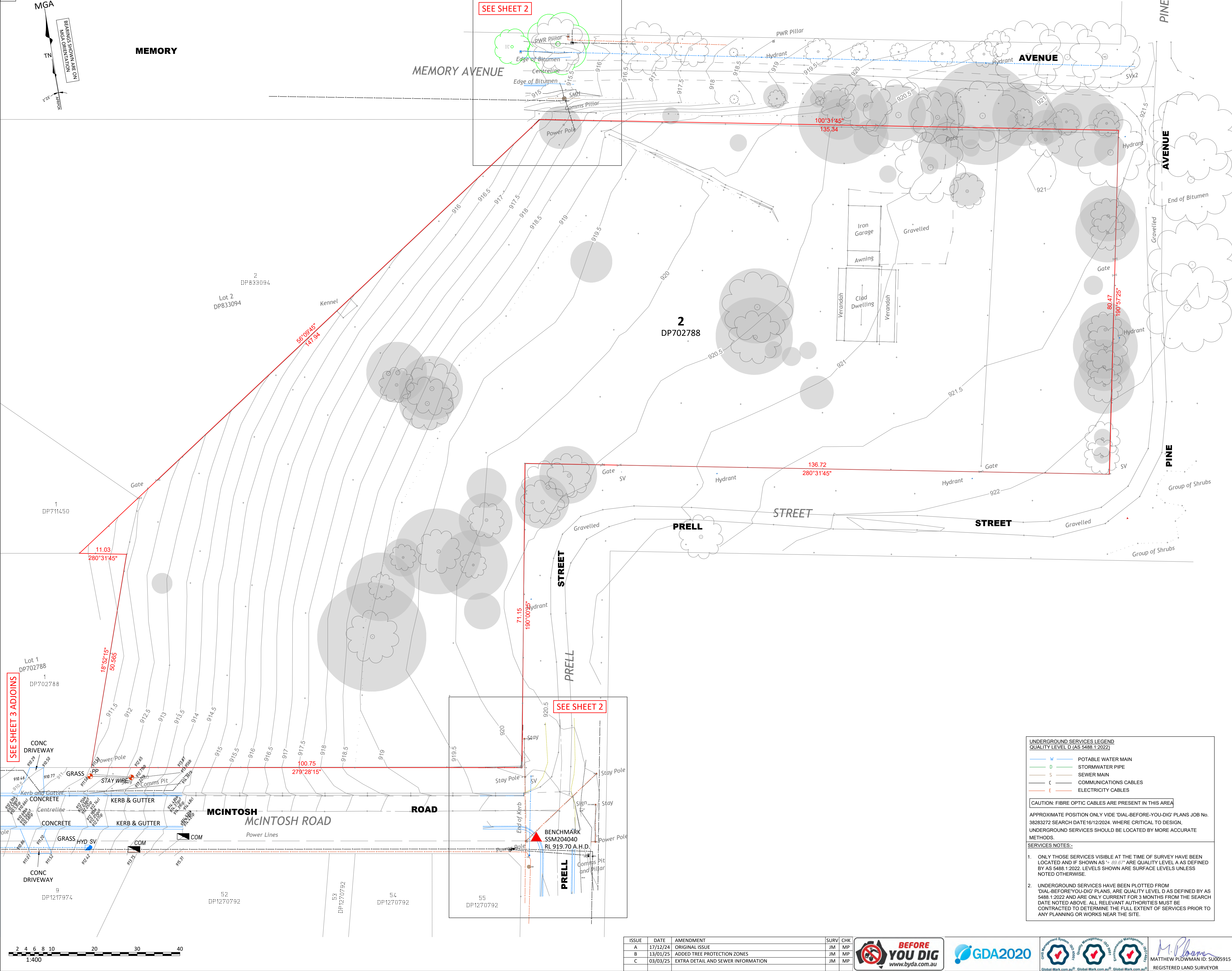
KEY

STAGE 1

STAGE 2

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD	SCALE	GRID	DATUM	PROJECT MANAGER	CLIENT	Consulting Engineers				DRAWING TITLE	
C	MINOR AMENDMENTS	20/03/2025	SSH	RL	AVG	GT	 A1 (A3) 1:500 (1:1,000) METRES	MGA	mAHD	GT	BLUE SOX DEVELOPMENTS	 Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8787 Email: mail@martens.com.au Internet: www.martens.com.au	Environment Water Geotechnical Civil	STAGING PLAN			
B	MINOR AMENDMENTS	11/03/2025	SSH	RL/PC	AVG	GT		DISCLAIMER & COPYRIGHT This plan must not be used for construction unless signed as approved by principal certifying authority. All measurements in millimetres unless otherwise specified. This drawing must not be reproduced in whole or part without prior written consent of Martens & Associates Pty Ltd. (C) Copyright Martens & Associates Pty Ltd		PROJECT NAME/PLANSET TITLE							
A	INITIAL RELEASE	25/02/2025	SSH	RL	AVG	GT		PROPOSED 20 LOT SUBDIVISION CONCEPT CIVIL ENGINEERING PLANS									
								3 MEMORY AVE CROOKWELL NSW 2583									
A1 / A3 LANDSCAPE (A3_LC_02.0.0)													PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
													P2410601	PS01	R03	PS01-B100	C
													DRAWING ID: P2410601-PS01-R03-B100				

A1



GENERAL NOTES

THE OVERALL SURVEY OF LOT 2 DP702788 SHOWN IS FROM A SURVEY BY SOUTHERN CROSS CONSULTING SURVEYORS DATED 25/11/2022 REF 24884C.

SDG HAS SURVEYED THE AREAS WITHIN DIAGRAMS A AND B AND THE DRAINAGE INFORMATION SHOWN ALONG MCINTOSH ROAD ONLY.

THE ORIGINAL 3D DTM MESH BY SOUTHERN CROSS CONSULTING SURVEYORS WITHIN THE AREAS OF DIAGRAMS A AND B HAS BEEN DELETED AND THE SDG 3D MESH HAS BEEN SPLICED IN.

SDG HAS NOT CHECKED THE OVERALL SURVEY BY SOUTHERN CROSS CONSULTING SURVEYORS.

ONLY TREES GREATER THAN 3.5 METRES IN HEIGHT ARE SHOWN ON THIS PLAN AND THEIR POSITIONS ARE DIAGRAMMATIC ONLY AND MAY REQUIRE ADDITIONAL SURVEY WHERE CRITICAL TO DESIGN.

CONTOURS ARE INDICATIVE AT GROUND FORM ONLY. SPOT LEVELS ONLY SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.

LEVELS ARE ON AUSTRALIAN HEIGHT DATUM (AHD).

ALL SETOUT LEVELS MUST BE REFERRED TO THE BENCH MARK SHOWN ON THIS PLAN.

BOUNDARY NOTES

A BASIC BOUNDARY SURVEY HAS BEEN DONE SUITABLE FOR DA LODGEMENT PURPOSES.

BOUNDARIES HAVE NOT BEEN MARKED.

SURVEY INFORMATION NOTES

THE ORIGIN OF COORDINATES COMES FROM PM35953 E727183.306 N6185234.235 CLASS B POSITIONAL UNCERTAINTY (PU) 0.02 (MGA2020) ADOPTED FROM SCIMS DATED 19/12/2024.

THE ORIGIN OF LEVELS COMES FROM PM35953 RL904.891 CLASS LB POSITIONAL UNCERTAINTY (PU) 0.41 ADOPTED FROM SCIMS DATED 19/12/2024.

THE ORIENTATION OF THIS PLAN IS MGA NORTH WHICH HAS BEEN DETERMINED BY A COORDINATE JOIN BETWEEN PM35953 AND PM61189.

CERTIFICATE OF TITLE NOTES

THE FOLLOWING INFORMATION RELATES TO THE RESPECTIVE CERTIFICATE OF TITLE OF EACH LOTS:

- LOT 2 IN DP702788 (CT EDITION 14 DATED 17/04/2024 SEARCH DATE 06/01/2025)
- AFFECTED BY:
 - EASEMENT FOR WATER SUPPLY APPURTANANT TO THE LAND DESCRIBED (DP614271)
 - COVENANT (V236534)

COVENANTS AND RESTRICTIONS NOTED ON THE TITLE HAVE NOT BEEN INVESTIGATED. THESE SHOULD BE INVESTIGATED PRIOR TO DESIGN TO ENSURE ANY FUTURE DEVELOPMENT COMPLIES.

SERVICES NOTES

ONLY THOSE SERVICES VISIBLE AT THE TIME OF SURVEY HAVE BEEN LOCATED AND ARE QUALITY LEVEL A AS DEFINED BY AS 5488.1:2022.

UNDERGROUND SERVICES HAVE BEEN PLOTTED WITHIN THE AREAS OF DIAGRAMS A AND B ONLY FROM 'DIAL-BEFORE-YOU-DIG' PLANS, ARE QUALITY LEVEL D AS DEFINED BY AS 5488.1:2022 AND ARE ONLY CURRENT AT THE DATE OF SEARCH.

ALL RELEVANT AUTHORITIES MUST BE CONTACTED TO DETERMINE THE FULL EXTENT OF SERVICES PRIOR TO ANY PLANNING OR WORKS NEAR THE SITE.

WATER AND SEWER UNDERGROUND SERVICES FOR THIS AREA ARE NOT AVAILABLE ON DBYD AND HAVE NOT BEEN SHOWN ON THE PLAN.

ENQUIRIES TO THE LOCAL COUNCIL AUTHORITY WOULD NEED TO BE UNDERTAKEN TO OBTAIN UNDERGROUND SERVICE DIAGRAMS FOR WATER AND SEWER SERVICES.

LEGEND

TAG	DESCRIPTION
BB	BOTTOM OF BANK
BK	BACK OF KERB
CL	CENTERLINE OF ROAD
COM	COMMUNICATIONS PIT
CPIL	COMMUNICATIONS PILLAR
D.S.H	DIAMETER, SPREAD, HEIGHT
EB	EDGE OF BITUMENT
ELP	ELECTRICITY PILLAR
EOG	EDGE OF GRAVEL
GUT	GUTTER OF KERB
HYD	HYDRANT
LIP	LIP OF KERB
PP	POWER POLE
SMH	SEWER MANHOLE
SS	STREET SIGN
SV	STOP VALVE
TB	TOP OF BANK

TPZ (FILE PROVIDED BY ABEL ECOLOGY)

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PROJECT:

DETAIL AND LEVEL SURVEY OF LOT 2 IN DP702788

3 MEMORY AVENUE CROOKWELL

CLIENT: OLIVER WEHBE

FILE: 9293-Detail-Issue C-3 Memory Avenue Crookwell.dwg

LGA: UPPER LACHLAN SHIRE

REF: 9293	CONTOURS: 0.5m
ISSUE: C	DATUM: AHD
SURVEY DATE: 17/12/2024	AZIMUTH: MGA2020
SCALE: 1:400	SHEET 1 OF 3 SHEETS



SDG Pty Ltd
abn 85 213 523 621
Suite 1, 3 Railway Street, Baulkham Hills NSW 2153
t: (02) 9630 7955 w: sdg.net.au
Liability limited by a scheme approved under Professional Standards Legislation

UNDERGROUND SERVICES LEGEND
QUALITY LEVEL D (AS 5488.1:2022)

W	POTABLE WATER MAIN
D	STORMWATER PIPE
S	SEWER MAIN
C	COMMUNICATIONS CABLES
E	ELECTRICITY CABLES

CAUTION: FIBRE OPTIC CABLES ARE PRESENT IN THIS AREA

APPROXIMATE POSITION ONLY VIDE 'DIAL-BEFORE-YOU-DIG' PLANS JOB No. 38283272 SEARCH DATE 16/12/2024. WHERE CRITICAL TO DESIGN, UNDERGROUND SERVICES SHOULD BE LOCATED BY MORE ACCURATE METHODS.

METHODS:

SERVICES NOTES:

- ONLY THOSE SERVICES VISIBLE AT THE TIME OF SURVEY HAVE BEEN LOCATED AND IF SHOWN AS 'A-BEFORE-YOU-DIG' ARE QUALITY LEVEL A AS DEFINED BY AS 5488.1:2022. LEVELS SHOWN ARE SURFACE LEVELS UNLESS NOTED OTHERWISE.
- UNDERGROUND SERVICES HAVE BEEN PLOTTED FROM 'DIAL-BEFORE-YOU-DIG' PLANS, ARE QUALITY LEVEL D AS DEFINED BY AS 5488.1:2022 AND ARE ONLY CURRENT FOR 3 MONTHS FROM THE SEARCH DATE NOTED ABOVE. ALL RELEVANT AUTHORITIES MUST BE CONTRACTED TO DETERMINE THE FULL EXTENT OF SERVICES PRIOR TO ANY PLANNING OR WORKS NEAR THE SITE.

ISSUE	DATE	AMENDMENT	SURV	CHK
A	17/12/24	ORIGINAL ISSUE	JM	MP
B	13/01/25	ADDED TREE PROTECTION ZONES	JM	MP
C	03/03/25	EXTRA DETAIL AND SEWER INFORMATION	JM	MP



M. PLOWMAN
MATTHEW PLOWMAN ID: SU005915
REGISTERED LAND SURVEYOR

Appendix C – Groundwater Bore Information



Australian Groundwater Insight

About

FAQ

Feedback



Hydrogeology - Principal hydrogeology



Overview



Bore information



Hydrogeology



Summary



Principal hydrogeology



Aquifer boundaries



Water table salinity



Groundwater entitlement



Groundwater management



Groundwater level status



Groundwater level trend



Groundwater salinity



Principal hydrogeology

- Fractured low - moderate productivity
- Fractured high productivity
- Local aquifers low productivity
- Porous low - moderate productivity
- Porous high productivity

Hydrogeology

Location Crookwell

Principal hydrogeology Fractured or fissured, extensive aquifers of low to moderate productivity

Water table salinity (fresh/saline) Non-Saline (<3000mg/L)

Upper aquifer

Basalt

Middle aquifer

N/A

Lower aquifer

State Overview

State Overview

Rivers and Streams

[favourites](#) [search](#) [download sites](#) [find a site](#)

[Real Time Data - Rivers And Streams](#)

Daily River Reports

[Daily River Reports](#)

Dams

[favourites](#) [search](#) [download sites](#) [find a site](#)

[Real Time Data - Major Dams](#)

Groundwater (Telemetered data)

[favourites](#) [search](#) [download sites](#) [find a site](#)

[Real Time Data - Bores](#)

All Groundwater Site details

[search](#) [download sites](#) [find a site](#)

[search by licence](#)

[All Groundwater Map](#)

Meteorology

[favourites](#) [search](#) [download sites](#) [find a site](#)

[Real Time Data - Weather Stations](#)

Hunter River Salinity Trading Scheme

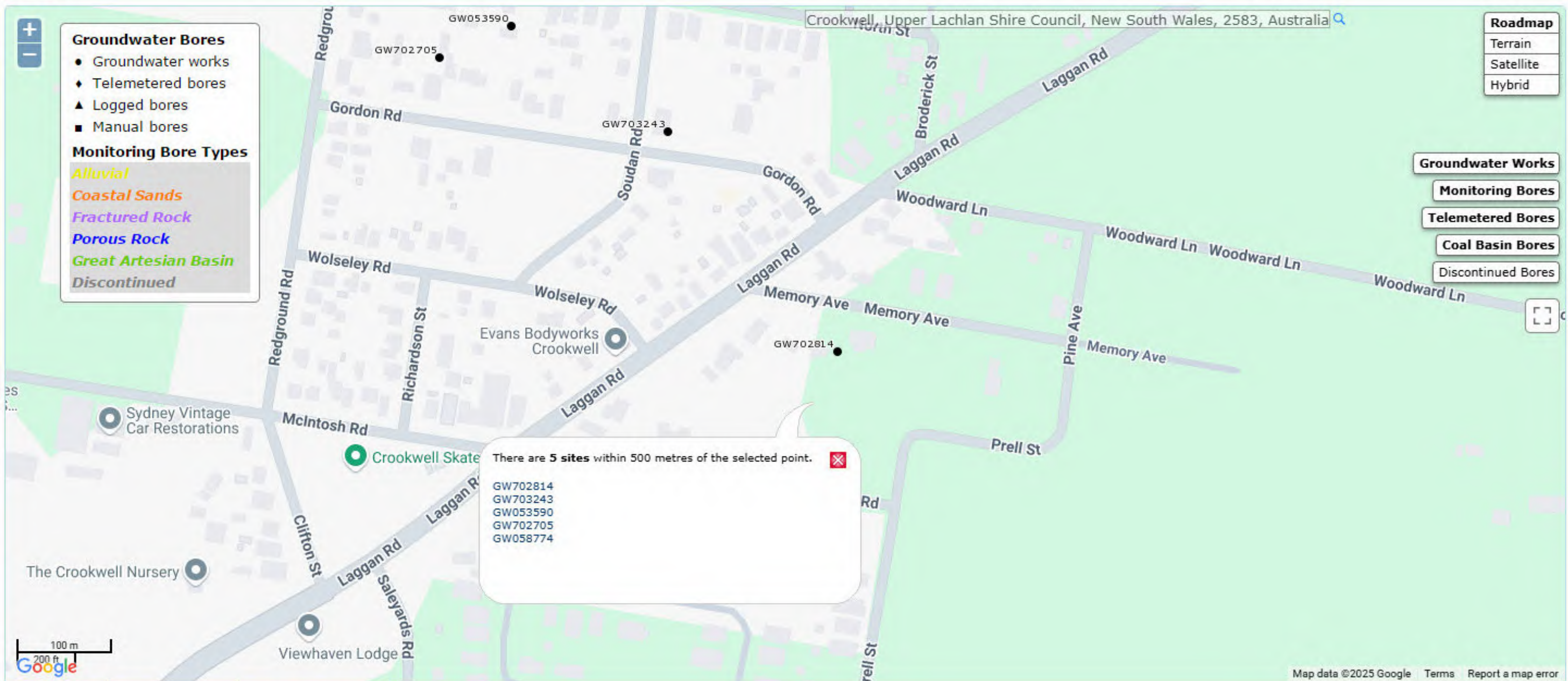
Hunter River Salinity Trading Scheme

All Groundwater Site Details

ALL GROUNDWATER MAP

All data times are Eastern Standard Time

Map Info



WaterNSW

Work Summary

GW702705

Licence: 70BL231195

Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Rotary Air

Owner Type: Private

Commenced Date:
Completion Date: 04/07/2006

Final Depth: 30.00 m
Drilled Depth: 30.00 m

Contractor Name: Bungendore Water Bores

Driller: Daniel Robert Hill

Assistant Driller: Gerrard Hill

Property: LOT 9 Gordon St CROOKWELL
2583 NSW

GWMA:
GW Zone:

Standing Water Level 3.000
(m):
Salinity Description:
Yield (L/s): 3.375

Site Details

Site Chosen By:

County
Form A: GEORGIANA
Licensed: GEORGIAN

Parish
KIAMMA
KIAMMA

Cadastre
9/4/1809
Whole Lot 9/4/1809

Region: 70 - Lachlan
River Basin: 412 - LACHLAN RIVER
Area/District:

CMA Map: 8729-S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6185655.000
Easting: 727226.000

Latitude: 34°26'44.3"S
Longitude: 149°28'23.7"E

GS Map: -

MGA Zone: 55

Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	30.00	200			Rotary Air
1		Annulus	Waterworn/Rounded	0.00	30.00	200	160		Graded, Q:1.000m3, PL:Pour
1	1	Casing	Pvc Class 9	-0.40	30.00	160	152		Driven into Hole, Screwed and Glued, S: 24.00-30.00m
1	1	Opening	Slots - Vertical	12.00	30.00	160		0	Sawn, PVC Class 9, Screwed and Glued, SL: 120.0mm, A: 2.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
12.00	14.00	2.00	Unknown	3.00		0.12		00:15:00	
16.00	18.00	2.00	Unknown	3.00		0.50		00:15:00	
22.00	24.00	2.00	Unknown	3.00		2.75		01:30:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
----------	--------	---------------	----------------------	---------------------	----------

0.00	1.50	1.50	Soil & Clay, light brown	Soil	
1.50	6.00	4.50	Basalt, hard, black	Basalt	
6.00	12.00	6.00	Basalt, light brown, soft	Basalt	
12.00	30.00	18.00	Volcanic, blue, ironstone bands, brown	Volcanic	

Remarks

04/07/2006: Form A Remarks:
Nat Carling, 18-Aug-2006.

*** End of GW702705 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW702814

Licence: 70WA609251

Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC,STOCK
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: New Bore

Construct.Method: Rotary Air

Owner Type: Private

Commenced Date:
Completion Date: 02/12/2006

Final Depth: 49.00 m
Drilled Depth: 49.00 m

Contractor Name: Watermin Drillers Pty Ltd

Driller: Allan Ross Jones

Assistant Driller:

Property: N/A 2 Memory Ave CROOKWELL
2583 NSW

Standing Water Level 9.000
(m):

GWMA:
GW Zone:

Salinity Description:
Yield (L/s): 3.791

Site Details

Site Chosen By:

County
Form A: GEORGIANA
Licensed: GEORGIAN

Parish
KIAMMA
KIAMMA

Cadastre
2/833094
Whole Lot 2//833094

Region: 70 - Lachlan

CMA Map:

River Basin: - Unknown
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6185382.000
Easting: 727581.000

Latitude: 34°26'52.9"S
Longitude: 149°28'37.9"E

GS Map: -

MGA Zone: 55

Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	49.00	150			Rotary Air
1		Annulus	Waterworn/Rounded	0.00	49.00				Graded
1	1	Casing	Pvc Class 9	-0.30	49.00	140	131		Seated on Bottom, Glued
1	1	Opening	Slots - Horizontal	21.00	22.00	140		0	Casing - Machine Slotted, Aluminium, Glued, SL: 60.0mm, A: 2.00mm
1	1	Opening	Slots - Horizontal	30.00	31.00	140		0	Casing - Machine Slotted, Aluminium, Glued, SL: 60.0mm, A: 2.00mm
1	1	Opening	Slots - Horizontal	40.00	42.00	140		0	Casing - Machine Slotted, Aluminium, Glued, SL: 60.0mm, A: 2.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
21.00	21.50	0.50	Unknown	9.00		0.19			
30.00	31.50	1.50	Unknown			0.44			
41.00	42.00	1.00	Unknown			3.16			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	topsoil	Topsoil	
1.00	7.00	6.00	clay	Clay	
7.00	20.00	13.00	soft shale	Invalid Code	
20.00	25.00	5.00	basalt	Basalt	
25.00	32.00	7.00	clay	Clay	
32.00	49.00	17.00	basalt	Basalt	

*** End of GW702814 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW703243

Licence: 70BL231550

Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Rotary Air

Owner Type: Private

Commenced Date:
Completion Date: 18/02/2007

Final Depth: 65.00 m
Drilled Depth: 65.00 m

Contractor Name: Watermin Drillers Pty Ltd

Driller: Allan Ross Jones

Assistant Driller: E. Dixon

Property: LOT 20 Gordon Rd CROOKWELL
2583 NSW

GWMA:
GW Zone:

Standing Water Level 12.000
(m):

Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

County
Form A: GEORGIANA
Licensed: GEORGIAN

Parish
KIAMMA
KIAMMA

Cadastre
20/3/1809
Whole Lot 20/3/1809

Region: 70 - Lachlan

River Basin: - Unknown
Area/District:

CMA Map:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6185584.000
Easting: 727432.000

Latitude: 34°26'46.5"S
Longitude: 149°28'31.9"E

GS Map: -

MGA Zone: 55

Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	65.00	160			Rotary Air
1		Annulus	Waterworn/Rounded	0.00	65.00	160	140		Graded
1	1	Casing	Pvc Class 9	-0.30	65.00	140	129		Seated on Bottom, Glued
1	1	Opening	Slots - Horizontal	25.00	51.00	140		0	Casing - Machine Slotted, PVC Class 9, Glued, SL: 60.0mm, A: 2.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
25.00	25.10	0.10	Unknown	12.00					
48.00	48.10	0.10	Unknown						
50.00	51.00	1.00	Unknown			2.27			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	topsoil	Topsoil	

1.00	8.00	7.00	clay	Clay	
8.00	24.00	16.00	soft shale	Shale	
24.00	65.00	41.00	basalt	Basalt	

Remarks

18/02/2007: Form A Remarks:
Entered by H. Lester

*** End of GW703243 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW053590

Licence: 70WA608043

Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC,STOCK
Intended Purpose(s): IRRIGATION

Work Type: Bore

Work Status:

Construct.Method: Rotary Air

Owner Type: Private

Commenced Date:
Completion Date: 01/06/1981

Final Depth: 22.30 m
Drilled Depth: 22.30 m

Contractor Name: (None)

Driller:

Assistant Driller:

Property: N/A NSW

GWMA:
GW Zone:

Standing Water Level
(m):
Salinity Description: Good
Yield (L/s):

Site Details

Site Chosen By:

County
Form A: GEORGIANA
Licensed: GEORGIAN

Parish
KIAMMA
KIAMMA

Cadastre
L12 (SEC 4)
Whole Lot 23/4/1809

Region: 70 - Lachlan
River Basin: 412 - LACHLAN RIVER
Area/District:

CMA Map: 8729-S
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6185683.000
Easting: 727292.000

Latitude: 34°26'43.4"S
Longitude: 149°28'26.3"E

GS Map: -

MGA Zone: 55

Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Welded Steel	-0.30	22.30	165			Seated on Bottom
1	1	Opening	Slots - Vertical	16.20	22.30	165		1	Oxy-Acetylene Slotted, A: 2.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
21.30	21.60	0.30	Fractured			2.53			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.30	0.30	Topsoil	Topsoil	
0.30	3.00	2.70	Clay	Clay	
3.00	15.20	12.20	Basalt	Basalt	
15.20	22.30	7.10	Basalt Decomposed	Basalt	

Remarks

01/11/1983: LOT 12 SECTION 4 CROOKWELL

***** End of GW053590 *****

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW058774

Licence: 70BL123928

Licence Status: CONVERTED

Authorised Purpose(s): DOMESTIC,STOCK
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Rotary

Owner Type: Private

Commenced Date:
Completion Date: 01/02/1983

Final Depth: 30.50 m
Drilled Depth:

Contractor Name: (None)

Driller:

Assistant Driller:

Property: KILOREN NSW

GWMA:
GW Zone:

Standing Water Level
(m):
Salinity Description: Domestic
Yield (L/s):

Site Details

Site Chosen By:

County
Form A: GEORGIANA
Licensed: GEORGIAN

Parish
KIAMMA
KIAMMA

Cadastre
173
Whole Lot

Region: 70 - Lachlan

River Basin: 412 - LACHLAN RIVER
Area/District:

CMA Map: 8729-S

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6184845.000
Easting: 727501.000

Latitude: 34°27'10.4"S
Longitude: 149°28'35.3"E

GS Map: -

MGA Zone: 55

Coordinate Source: GD.,ACC.MAP

*** End of GW058774 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Appendix D – Historical Aerial Photography



Legend

Site Boundary

0 10 20 30 40 50 m

1:1500 @ A3
Viewport A

Notes:

- Aerial from NSW Spatial Services HAPE (1962).
- Site Boundary from NSW Spatial Services Clip and Ship (2025).

Map Title / Figure:
Historical Aerial: 1962

Map 05	Map
3 Memory Avenue, Crookwell, NSW	Site
Lot Subdivision	Project
Preliminary Site Investigation	Sub-Project
Bluesox	Client
21/03/2025	Date



Legend

Site Boundary

0 10 20 30 40 50 m

1:1500 @ A3
Viewport A

Notes:

- Aerial from NSW Spatial Services HAPE (1973).
- Site Boundary from NSW Spatial Services Clip and Ship (2025).

Map Title / Figure:
Historical Aerial: 1973

Map 06	Map
3 Memory Avenue, Crookwell, NSW	Site
Lot Subdivision	Project
Preliminary Site Investigation	Sub-Project
Bluesox	Client
21/03/2025	Date



Legend

Site Boundary

0 10 20 30 40 50 m

1:1500 @ A3
Viewport A

Notes:

- Aerial from NSW Spatial Services HAPE (1982).
- Site Boundary from NSW Spatial Services Clip and Ship (2025).

Map Title / Figure:
Historical Aerial: 1982

Map 07	Map
3 Memory Avenue, Crookwell, NSW	Site
Lot Subdivision	Project
Preliminary Site Investigation	Sub-Project
Bluesox	Client
21/03/2025	Date

Legend

Site Boundary



0 10 20 30 40 50 m

1:1500 @ A3

Viewport A

Notes:
- Aerial from NSW Spatial Services HAPE (1994).
- Site Boundary from NSW Spatial Services Clip and Ship (2025).

Map Title / Figure:
Historical Aerial: 1994

Map 08
3 Memory Avenue, Crookwell, NSW
Lot Subdivision
Preliminary Site Investigation
Bluesox
21/03/2025

Map
Site
Project
Sub-Project
Client
Date



0 10 20 30 40 50 m

1:1500 @ A3

Viewport A

Notes:
- Aerial from NSW Spatial Services HAPE (2000).
- Site Boundary from NSW Spatial Services Clip and Ship (2025).

Map Title / Figure:
Historical Aerial: 2000

Map 09	Map
3 Memory Avenue, Crookwell, NSW	Site
Lot Subdivision	Project
Preliminary Site Investigation	Sub-Project
Bluesox	Client
21/03/2025	Date

Legend

Site Boundary



0 10 20 30 40 50 m

1:1500 @ A3

Viewport A

Notes:
- Aerial from NSW Spatial Services Sixmap (2015).
- Site Boundary from NSW Spatial Services Clip and Ship (2025).

Map Title / Figure:
Historical Aerial: 2015

Map 10
3 Memory Avenue, Crookwell, NSW
Lot Subdivision
Preliminary Site Investigation
Bluesox
21/03/2025

Map
Site
Project
Sub-Project
Client
Date



0 10 20 30 40 50 m

1:1500 @ A3

Viewport A

Notes:
- Aerial from Nearmap (2025).
- Site Boundary from NSW Spatial Services Clip and Ship (2025).

Map Title / Figure:
Historical Aerial: 2025

Map	Map 11
Site	3 Memory Avenue, Crookwell, NSW
Project	Lot Subdivision
Sub-Project	Preliminary Site Investigation
Client	Bluesox
Date	21/03/2025

Appendix E – Council Development Records



Home > Development > Development Registers

DEVELOPMENT REGISTERS

Development Registers	>
Development	>
Do I Need Approval?	>
On-Site Sewage Management System	>
Other Approvals and Permits	>
Planning Your Event	>
Pre-lodgement	>
Request a Copy of Building Plans	>
The Subdivision Process	>
The DA Process	>

Determined Applications (4.59 Notices)

2025	^
Determinations Issued 1 to 29 February 2025	
Determinations Issued 1 December 2023 and 31 January 2025	
2024	v
2023	v
2022	v
2021	v
2020	v

Planning Agreement Register

Planning Agreements (VPAs)	v
----------------------------	---

Appendix F – Government Register Records

- + POEO Public Register
- Contaminated land record of notices

[About the record of notices](#)[List of notified sites](#)[Tips for searching](#)[Disclaimer](#)[Dangerous goods licences](#)[Pesticide licences](#)[Radiation licences](#)

Search results

Your search for: Suburb: CROOKWELL

did not find any records in our database.

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the [planning process](#).

More information about particular sites may be available from:

- The [POEO public register](#)
- The appropriate planning authority: for example, on a planning certificate issued by the local council under [section 149 of the Environmental Planning and Assessment Act](#).

See [What's in the record and What's not in the record](#).

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.

This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register. [POEO public register](#)

[Search Again](#)[Refine Search](#)

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

... [more search tips](#)

Search results

Your search for: **General Search** with the following criteria**Suburb - Crookwell**

returned 43 results

[Export to excel](#)

1 of 3 Pages

[Search Again](#)

Number	Name	Location	Type	Status	Issued date
1514613	VIRBAC (AUSTRALIA) PTY LTD	18- 22 DENISON STREET, CROOKWELL, NSW 2583	Compliance Audit	Complete	30 May 2013
1567244	UPPER LACHLAN SHIRE COUNCIL	MCINTOSH ROAD, CROOKWELL, NSW 2583	Mandatory Environmental Audit	Complete	14 Feb 2020
1938	UPPER LACHLAN SHIRE COUNCIL	MCINTOSH ROAD, CROOKWELL, NSW 2583	POEO licence	Issued	19 Apr 2000
6054	UPPER LACHLAN SHIRE COUNCIL	GRABBen GULLEN ROAD, CROOKWELL, NSW 2583	POEO licence	Issued	17 Jan 2001
11473	VIRBAC (AUSTRALIA) PTY LTD	18- 22 DENISON STREET, CROOKWELL, NSW 2583	POEO licence	Issued	10 Mar 2003
20911	CROOKWELL DEVELOPMENT PTY LTD	2975-2976 Crookwell Road, CROOKWELL, NSW 2583	POEO licence	Issued	07 Apr 2017
1002925	CROOKWELL SHIRE COUNCIL	MCINTOSH ROAD, CROOKWELL, NSW 2583	s.58 Licence Variation	Issued	31 May 2002

[Licences, applications and notices search](#)[Penalty notices search](#)[Enforceable undertakings search](#)[Enforceable undertakings media releases](#)[Exemptions and approvals search](#)[Prosecutions or civil proceedings search](#)[Terms of use: POEO public register](#)[Licensing FAQs](#)[List of licences](#)[Unlicensed premises regulated by the EPA](#)[+ Contaminated land record of notices](#)[Dangerous goods licences](#)[Pesticide licences](#)

- POEO Public Register

[Licences, applications and notices search](#)[Penalty notices search](#)[Enforceable undertakings search](#)[Enforceable undertakings media releases](#)[Exemptions and approvals search](#)[Prosecutions or civil proceedings search](#)[Terms of use: POEO public register](#)[Licensing FAQs](#)[List of licences](#)[Unlicensed premises regulated by the EPA](#)[+ Contaminated land record of notices](#)[Dangerous goods licences](#)[Pesticide licences](#)[Radiation licences](#)

Licence summary

[Search Again](#)[Return to Previous Page](#)

Summary Licence No: 1938

[View this licence](#) (PDF document 223 kb)**Licence holder:** UPPER LACHLAN SHIRE COUNCIL**Premises:** CROOKWELL TOWN SEWAGE TREATMENT WORKS
MCINTOSH ROAD, CROOKWELL, NSW, 2583**LGA:** UPPER LACHLAN SHIRE **Catchment:** Lachlan**Administrative fee:** \$3,825.00**Licence status:** Issued**Activity type:** Sewage treatment processing by small plants**Licence review:** Complete date 17 May 2023

Complete date 29 Jul 2018

Complete date 29 Jul 2013

Complete date 18 May 2010

Complete date 18 May 2005

Complete date 31 May 2002

Due date 17 May 2028

Pollution incident management**plan:** Last tested 08 Jun 2024**Current Environmental Risk Level:** Level 1

Applications

Number	Application type	Current status	Date received
143385	s.55 Licence Transfer	Approved	03 Sep 2004
1613840	s.58 Licence Variation	Issued	25 Oct 2021
1620748	s.58 Licence Variation	Issued	15 Jul 2022

Notices

The NSW Government PFAS Investigation Program

View a map of the sites in NSW that may be contaminated with PFAS, learn how to reduce your exposure to these dangerous chemicals, and read about our investigation of the issue.

The EPA is leading an investigation program to assess the legacy of PFAS use across NSW. With the assistance of the NSW PFAS Technical Advisory Group, which includes NSW Health, Department of Primary Industries and the Office of Environment and Heritage, we provide impacted residents with tailored, precautionary dietary advice to help them reduce any exposure to PFAS.

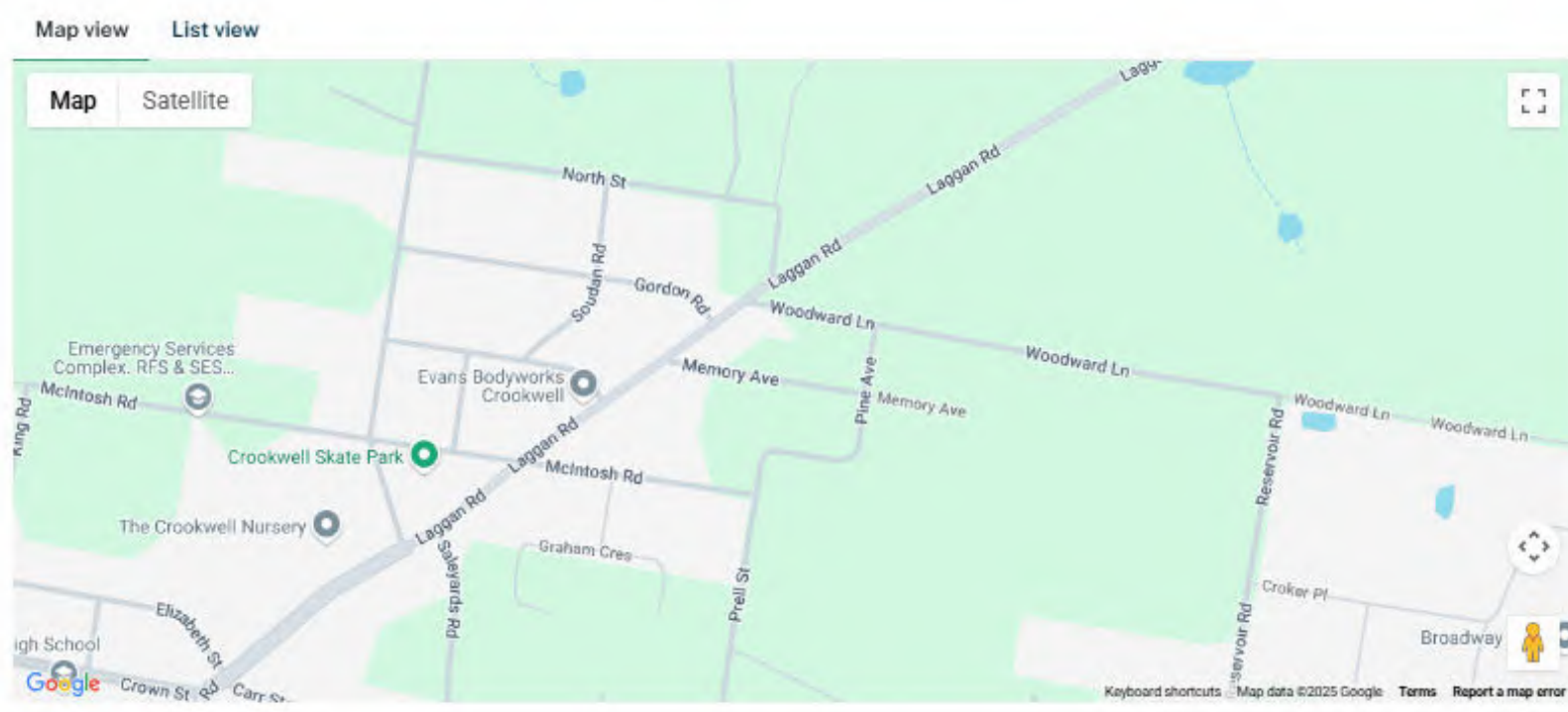
Current investigations are focused on sites where it is likely that large quantities of PFAS have been used. The EPA is currently investigating PFAS at these sites:

Search by Postcode

Organisation

Select filter

Search





PFAS INVESTIGATION AND MANAGEMENT PROGRAM SNAPSHOT – October 2024

REMEDIATION ACTIVITIES

Remediation works targeting contaminated water, soil and other materials are underway or completed at Swartz Barracks, HMAS *Cerberus*, Jervis Bay Range Facility and RAAF Bases East Sale, Williamtown, Edinburgh, Richmond, Tindal, Wagga, Darwin, Pearce and Townsville.

Remediation works are scheduled to commence in the coming months at HMAS *Albatross*, Blamey Barracks, Lavarack Barracks, Bandiana Military Area and RAAF Bases Darwin and Amberley.

COMMUNITY EVENTS

Defence has held 183 information sessions to keep communities informed.

Recent events

- 16 October 2024 – RAAF Base Tindal
- 15 October 2024 – RAAF Base Darwin
- 6 August 2024 – RAAF Base Amberley
- 19 June 2024 – HMAS *Cerberus*
- 18 June 2024 – Bandiana Military Area

Upcoming events

- Latest information is available on the Defence website.

KEY STATISTICS

Properties connected to town water **378**

160 rainwater tanks provided to **117** properties

Community engagement events conducted **183**

869 properties have water assistance extended from 6 to 8 years

REMEDIATION

Treated or removed over **160,000** tonnes of contaminated soil

Installed **11** water treatment plants

Treated over **11.5** billion litres of water

FINANCIAL FACTS

\$807m invested to manage, remediate and conduct research

INCLUDING

provided to **\$27m** other government agencies for research into health and remediation

\$165.4m allocated in 2024-2025 to manage and remediate PFAS

ONGOING MONITORING

Defence regularly monitors for PFAS on and around impacted sites. Monitoring results help Defence understand how PFAS is moving in the environment. This information also guides Defence's remediation and management actions.

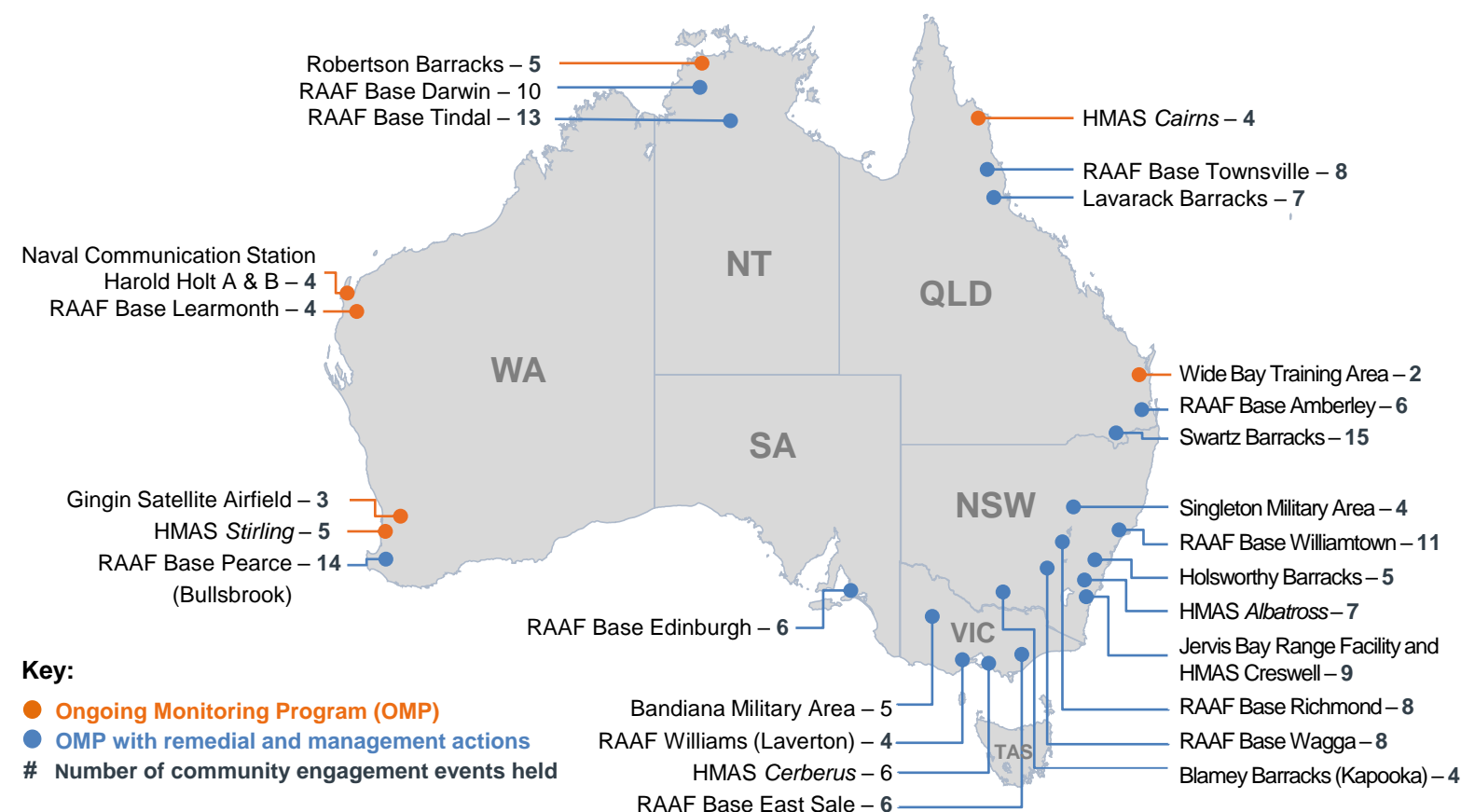
RESEARCH ACTIVITIES

Defence collaborates internationally to share its learnings and to ensure the best remedial actions are implemented on its PFAS impacted bases.

Since 2016, Defence has supported trials of new remediation technologies. Trials such as soil stabilisation form part of Defence's remediation approach on some bases.

RESEARCH FUNDING

- Defence has provided approximately \$26 million in funding for 21 research and technology programs to support PFAS investigation and remediation activities.
- Defence provided over \$27 million in additional funding to other government agencies to support PFAS-related health and remediation research.



Legend

Lat: -34.4501, Lng: 149.4792

● Decimal Degrees (latitude, longitude)

○ Degrees Minutes Seconds

○ MGA

Substantial Potential

Slight Potential

Remote Potential

Information

Other

Sea Dumping of Depth Charges

Other Sea Dumping Sites

Defence Controlled Area

Property Cadastral Area

A map of a coastal area, likely in Australia, showing a network of roads and various potential zones. The map is oriented with North at the top. The coastline is on the left, with the ocean area shaded in light blue. The land area is divided into several colored regions: a large pink area in the center and right, a green area on the left, and a light green area at the bottom. Roads are shown in grey, with labels such as Laggan Rd, North St, Soudan Rd, Gordon Rd, Woodward Ln, Memory Ave, Pine Ave, McIntosh Rd, Clifton St, King Rd, Elizabeth St, Carr St, Oram St, Hay St, and Crookwell Rd. Water bodies, including Licking Hole Creek and several ponds, are shown in light blue. A legend in the bottom-left corner provides information on map coordinates and potential zones. The map is displayed in a web browser interface with a search bar at the top and navigation controls on the right.

Keyboard shortcuts Map data ©2025 Google 100 m Terms Report a map error

Appendix G – Site Photographs



Plate 1: View adjacent to the southeast corner of the Site, facing north. Wire fence along southern and eastern boundaries. Grass, shrubs and trees indicative of majority of the Site. Dated 27 January 2025.



Plate 2: View adjacent to eastern corner of the southern boundary of the Site, facing northwest. Residential building with gravel driveway, trailers, shed, debris and stone pile. Dated 6 December 2024.



Plate 3: View adjacent to southern side of residential building, facing east. Debris and stone pile. Dated 6 December 2024.



Plate 4: View in the centre of the eastern half of the Site, east of the residential building, facing northwest. Gravel driveway, debris and trailers. Dated 6 December 2024.



Plate 5: View adjacent to southern side of residential building, facing north. Residential building, shed and trailer. Dated 27 January 2025.



Plate 6: View adjacent to southern side of residential building, facing east. Trailer. Dated 27 January 2025.



Plate 7: View adjacent to the southeast corner of the gravel driveway in the northeast of the Site. Wood pile and expose soil (formerly debris pile). Dated 27 January 2025.



Plate 8: View within shed east of the southeast corner of the residential building on the Site. Dated 27 January 2025.



Plate 9: View within shed east of the southeast corner of the residential building on the Site. Dated 27 January 2025.