

# Bowdens Silver Project

## Planning Focus Meeting

6 February 2013

(Note: This presentation incorporates preliminary and conceptual plans and information which are to be reviewed/updated for incorporation in the Environmental Impact Statement for the Bowdens Silver Project)

- **Major Components**
  - An open cut pit
  - Two waste rock emplacements comprising a separate northern and southeastern waste rock emplacement
  - Low-grade ore stockpile within western portion of northern waste rock emplacements
  - Processing plant and related infrastructure
  - Tailings storage facility
- **Recoverable Mineralised Resource**
  - Currently 46 million tonnes of silver, lead and zinc ore
- **Processing Plant Production**
  - 4 million tonnes per year
- **Products / Product Transportation**
  - Silver/lead concentrate and zinc concentrate transported by road from processing plant to off-site processing facility
- **Planned Employment**
  - Construction ~ 300
  - Operation ~ 200
- **Capital Cost**
  - Approximately \$350 million
- **Project Life**
  - 15+ years

# Project Team – Proven Track Record

Duane Woodbury – Chief Financial Officer

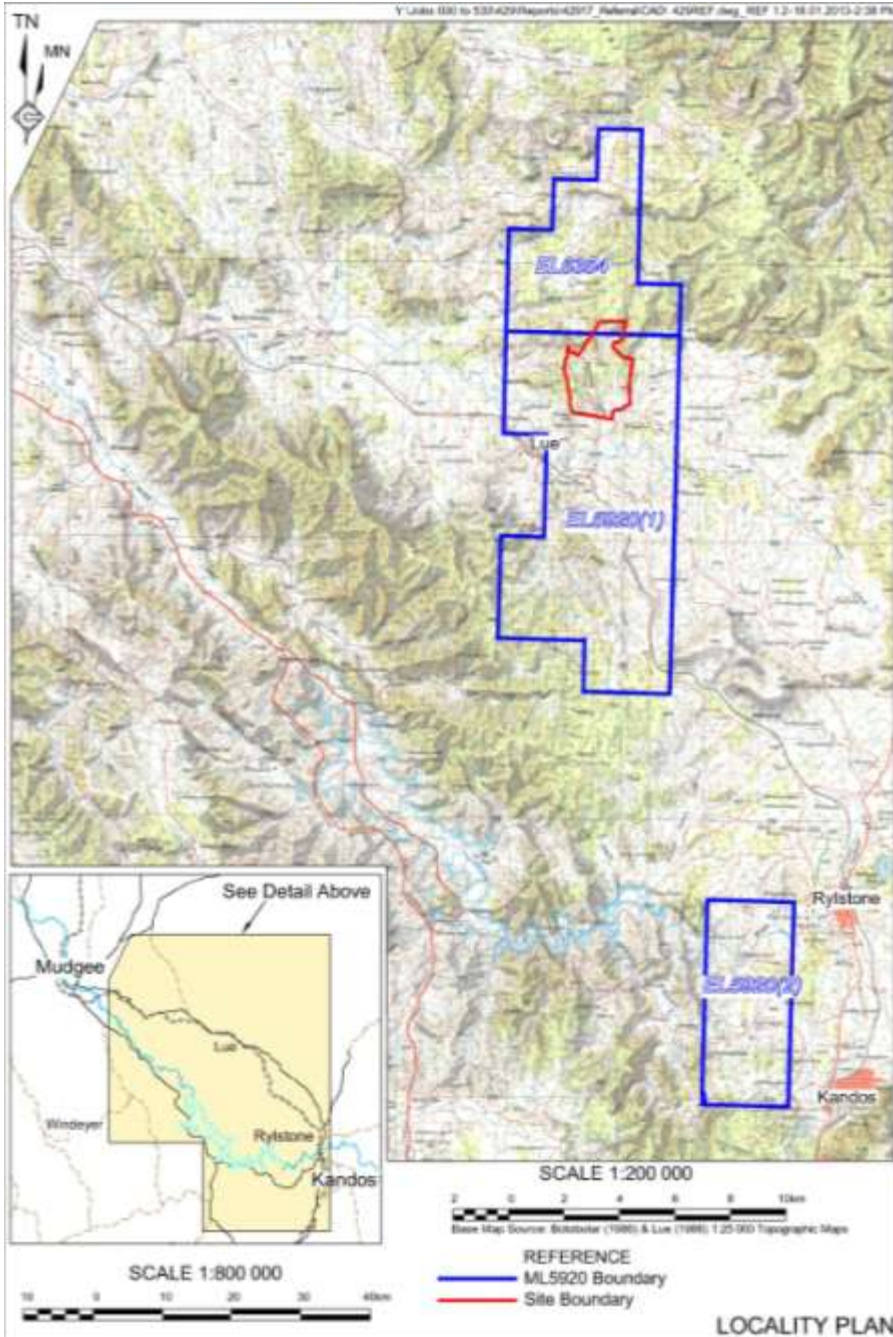
Bob Markovich – Project Director

RW Corkery & Co – EIS Coordination

Ausenco – Engineering Design

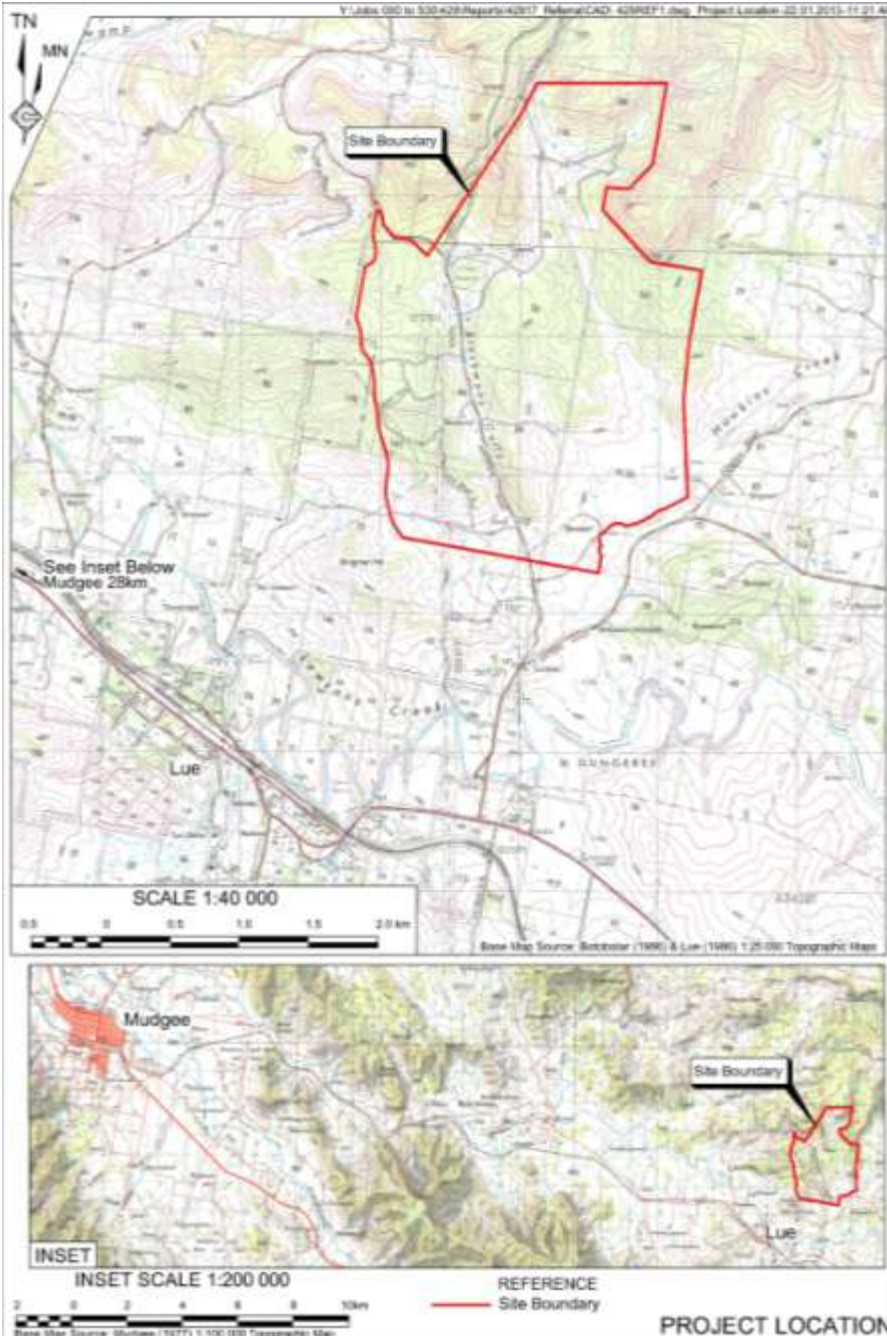
# EL Locations

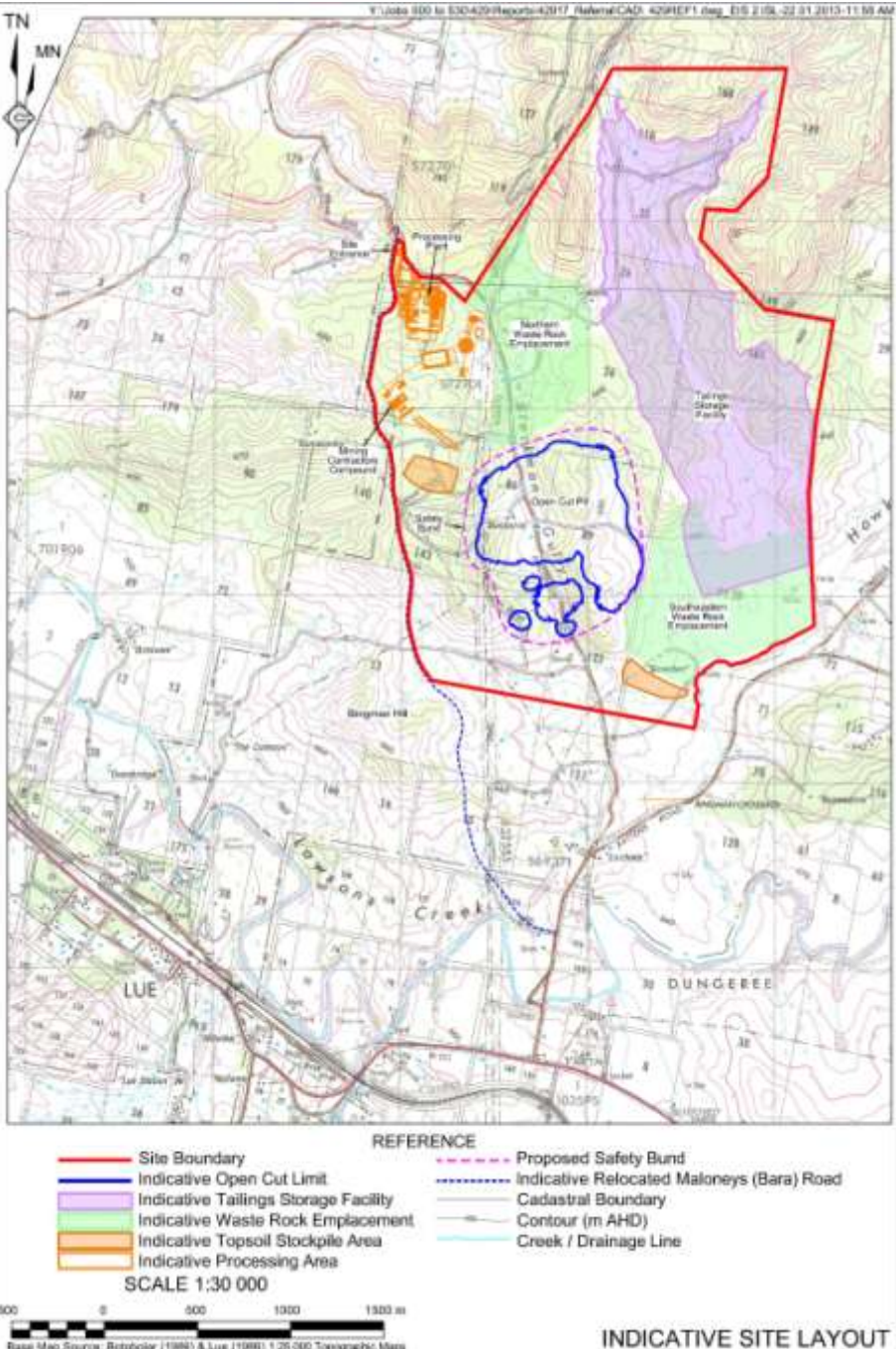
- The Site is located wholly within EL 5920(1) and within a minor section of EL 6354.
- Other ELs held
  - 5920(2)
- Exploration Programs
  - Current Exploration Drilling Program (not yet completed)



# Project Location

- Regional Location
  - 185km west of Sydney
  - 26km east of Mudgee
  - 17km northwest of Rylstone
  - 2km to 5.8km northeast from the Lue Village to closest disturbance area





# Project Location



- Local Setting
  - Open cut pit – 2.6km to Lue Village
  - Processing plant – 2.8km to Lue Village
  - Tailings storage facility – 3.5km to Lue Village



- REFERENCE
- Site Boundary
  - Geological Reference - Lue Area
  - Qa Quaternary Alluvium
  - Tb Tertiary Basalt
  - Ma Mesozoic Igneous Rocks
  - Rn Narrabeen Group
  - Pr Rylstone Volcanics
  - Pr(b) Rylstone Volcanics (volcanic breccias and conglomerate)
  - Ps Shoalhaven Group
  - Cd Coomber Formation

SCALE 1:100 000 (A4)

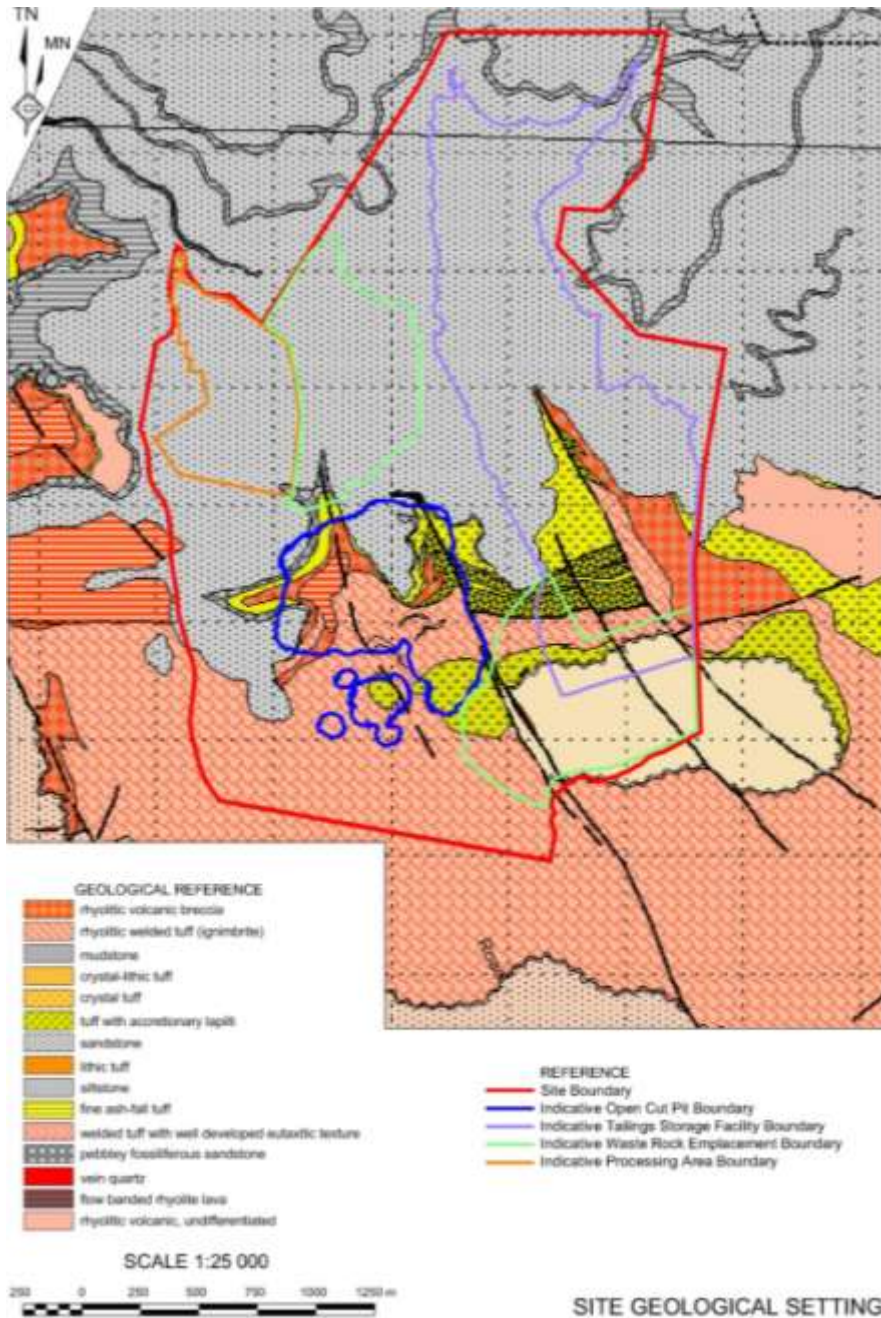


REGIONAL GEOLOGICAL SETTING

# Regional Geology

- Situated within the Lachlan Fold Belt on the western margin of the Sydney Basin
- Mineralisation occurs within the Permian Rylstone Volcanics

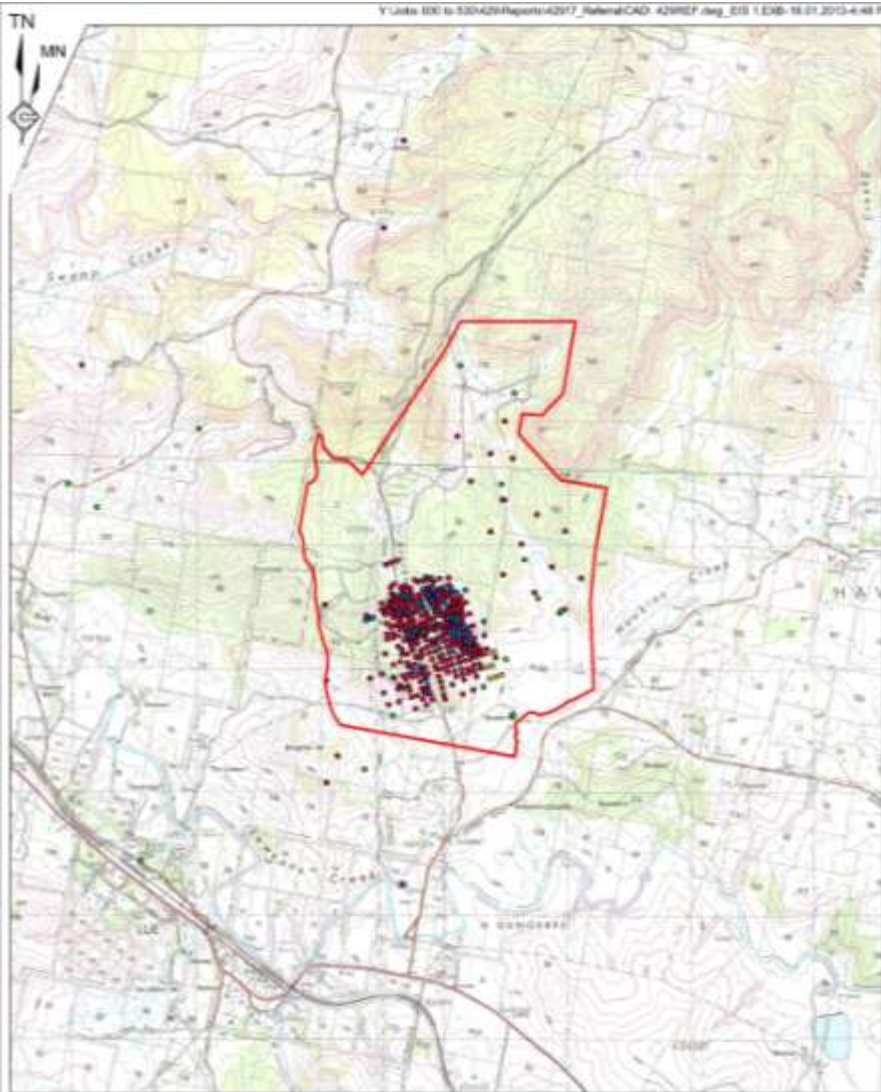
# Prospect Scale Geology



- Primary mineralisation occurs in Pb/Zn sulphides with Fe/As being a secondary component.
- Silver mineralisation occurs as flat lying zones sourced from steeply dipping fracture zones.
- Bulk of the mineralisation occurs as a thick, surface / near surface deposit to 200m vertical depth.
- Mineralisation confined to veins in, or disseminated through
  - 1 Volcanic breccia
  - 2 Ignimbrite
  - 3 Crystal tuff



# Drilling Programs



REFERENCE  
 Site Boundary  
 Completed Drillholes

SCALE 1:45 000 (A4)

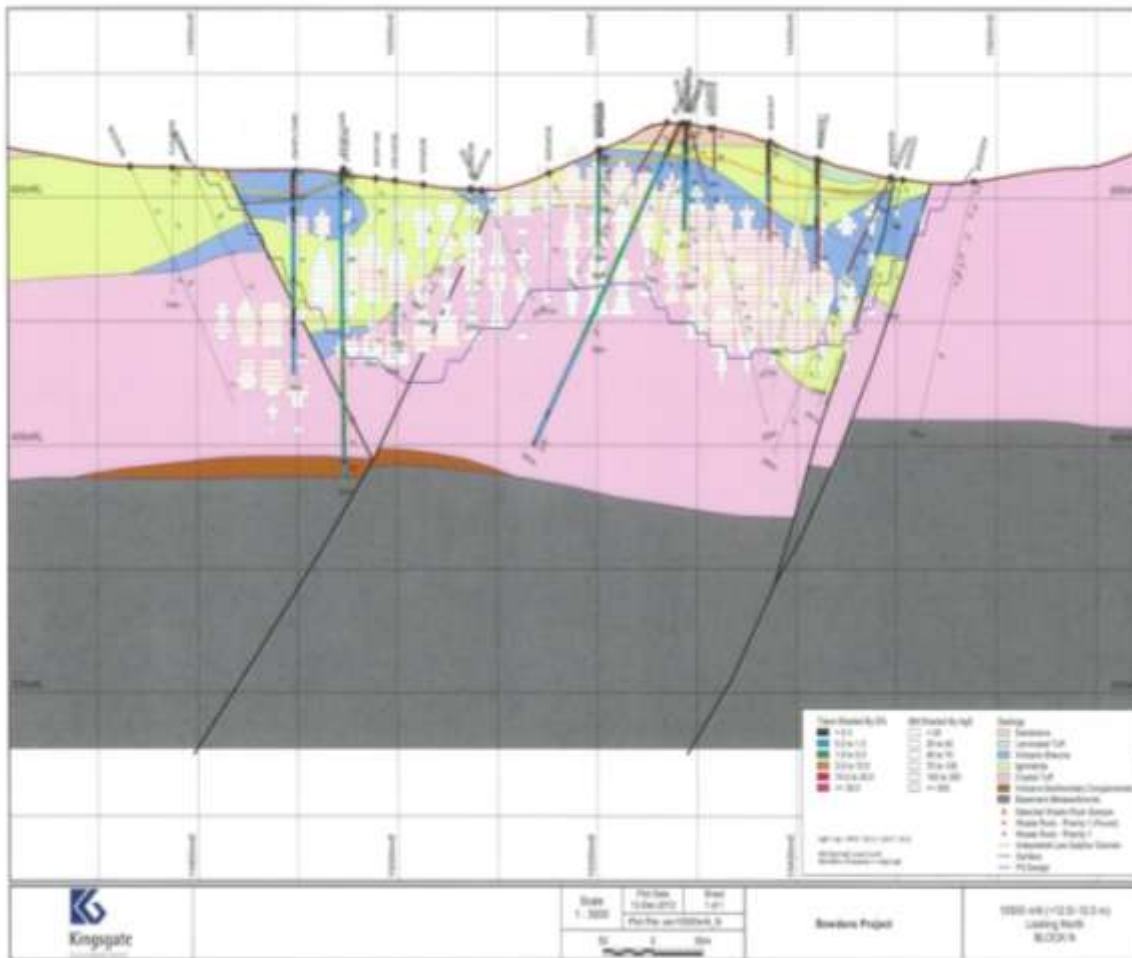
0 200 400 600 800 1000 m

Base Map Source: Bobstler (1990) & Lee (1990) 1:25 000 Topographic Maps

PREVIOUS DRILLING PROGRAMS

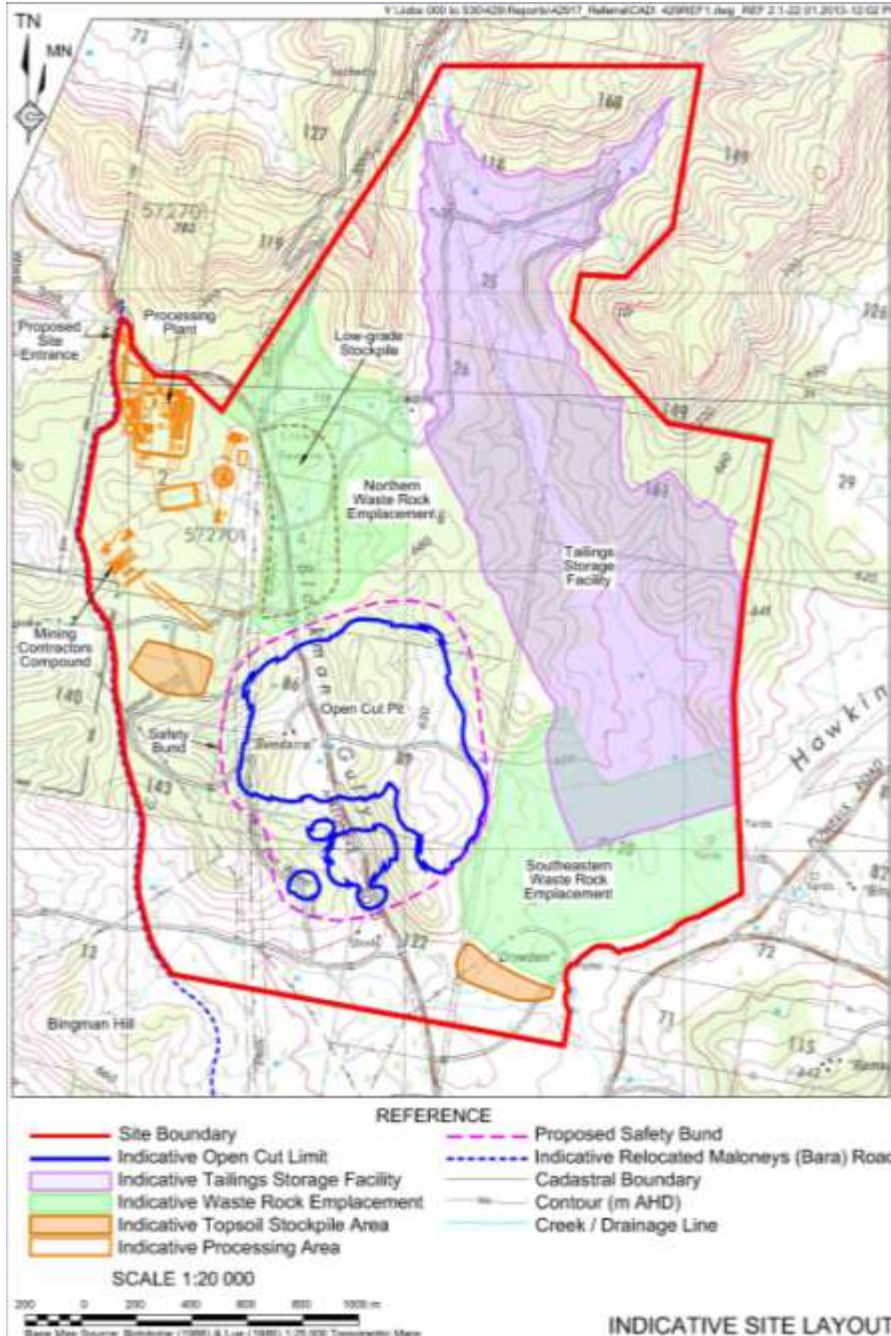
- **Historic**
  - Early exploration undertaken by CRA Exploration, Golden Shamrock Mineral Exploration and Silver Standard for a total of 395 holes resulting in 43 000m.
- **Current**
  - Exploration Drilling Program – approved 172 holes for approximately 20 000m of drilling.
  - 143 holes completed to date

# Geological Model



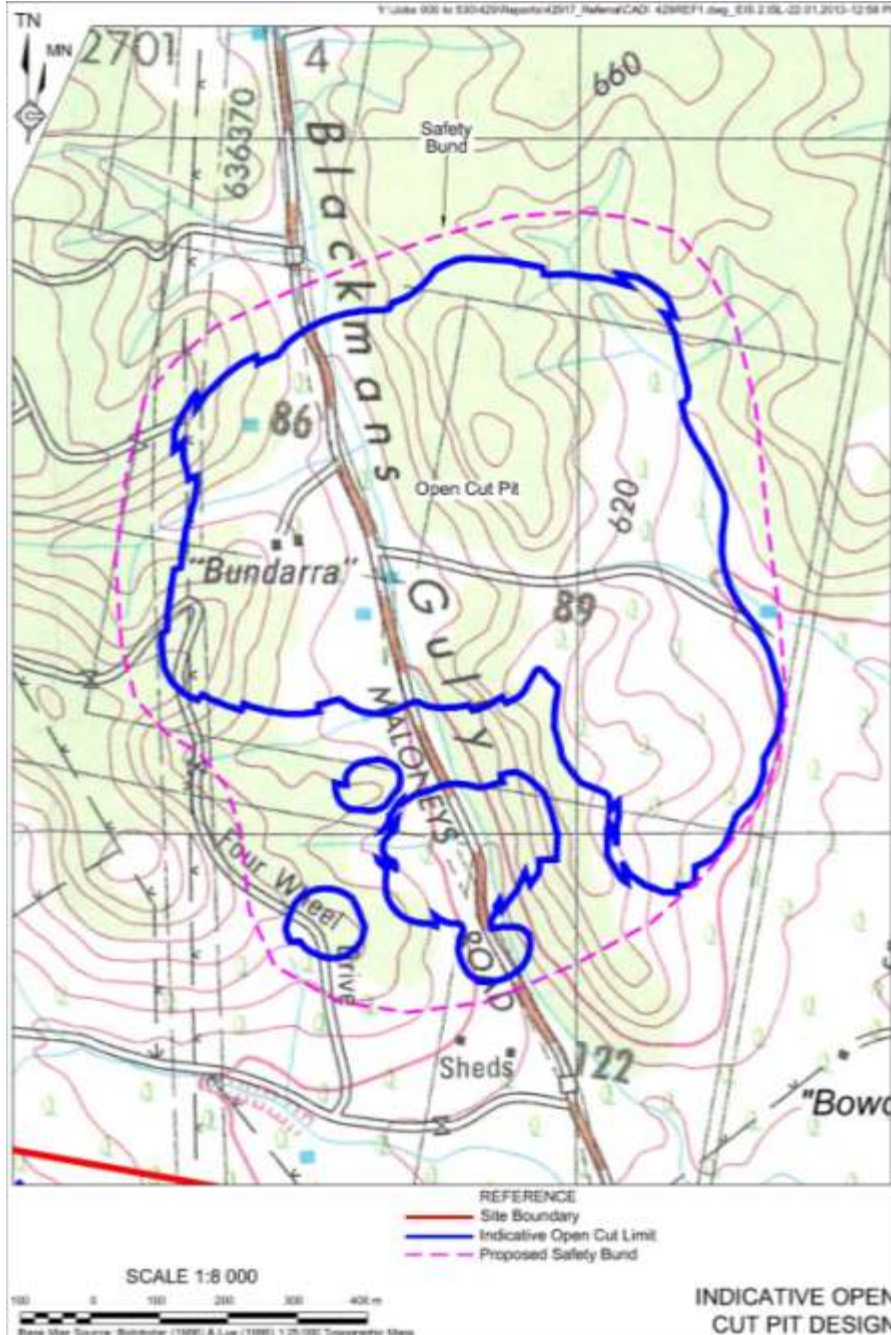
- Current drilling program has increased the resource by 40 per cent
- Mineralisation extends to a depth of at least 200m.
- Depth of weathering 0m to 20m.
- Mineralization is mainly structurally controlled.

# Indicative Site Layout



- Site ~ 610ha
- Key Components
  - Open cut pit ~ 86ha
  - Waste rock emplacements and “low grade” stockpile ~ 108ha
  - Processing plant and associated infrastructure area ~ 40ha
  - Tailings storage facility ~ 170ha
  - Miscellaneous Areas 25ha
- Total Site Disturbance ~ 430ha

# Indicative Open Cut Pit Design

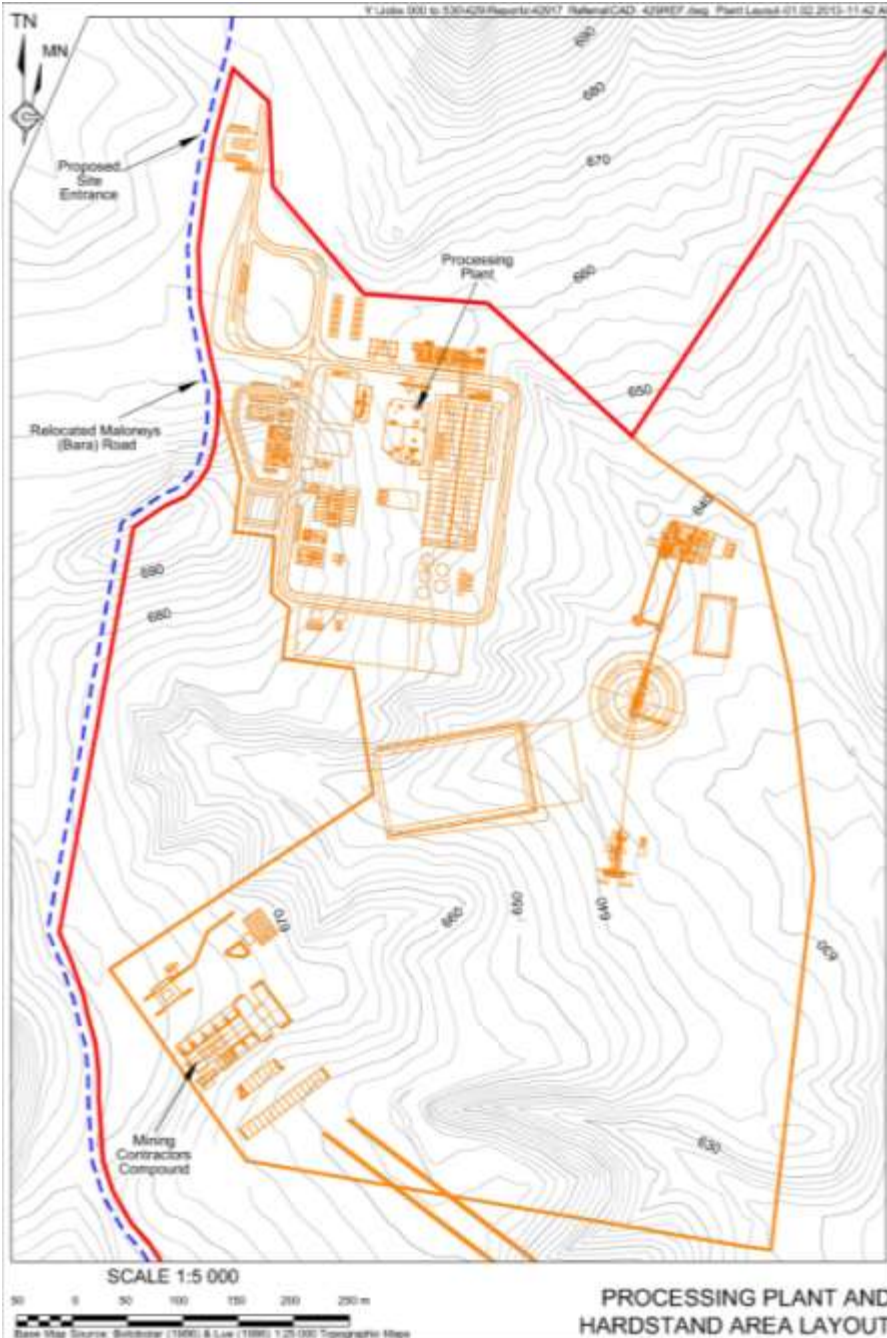


- Key Considerations
  - Area ~ 86ha (including pit safety bunds)
  - Approximately 46Mt ore
  - Approximately 50Mt overburden
  - Approximate depth ~ 200m below surface level
- Benches
  - Designed using standard slope design criteria
    - 20m vertical height
    - Face angles to range between 45° in the weathered zone to 75° in the fresh zone
    - 10m – 12m catch berms
  - To be refined following further detailed designs

# Overburden/Tailings Management

- Overburden to be used for TSF and Processing Plant Area and selectively placed within the two out-of-pit waste rock emplacements
- Overburden Characteristics
  - Comprises:
    - Potentially Acid Forming (PAF) material present
    - Studies are ongoing to determine the volumes of Non-Acid Forming (NAF) available for encapsulation
- Processing residue (tailings) to be pumped to the tailings storage facility
- Tailings Characteristics
  - Diluted tailings from the flotation circuits to be thickened into a ‘slurry’ with a solid density between 55% and 60% w/w
  - Water to be recycled via decant structure for recycling and re-use via a process water dam

# Processing Plant and Hardstand Area

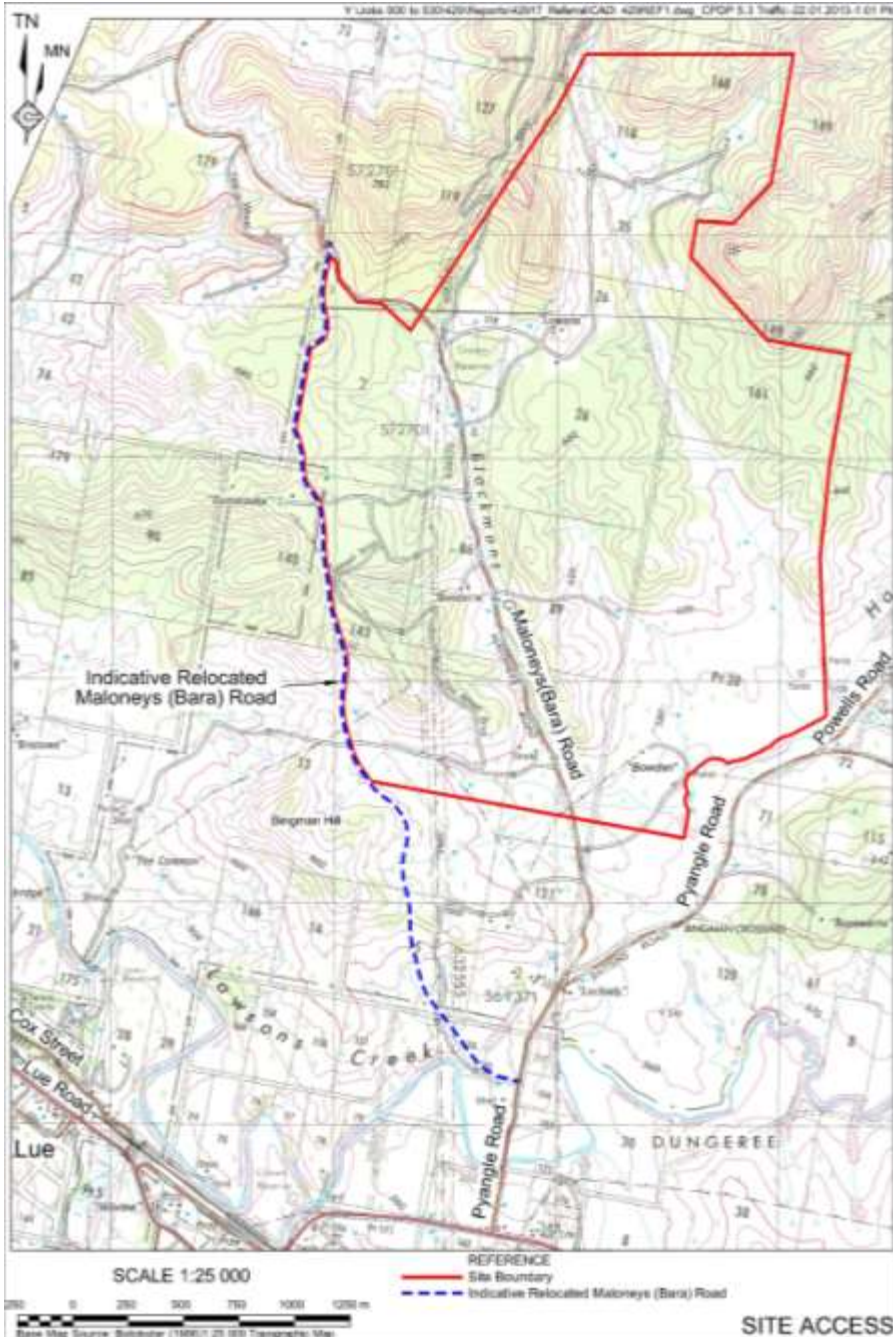


- Area to include
  - All processing plant activities (including run of mine (ROM) pad)
  - Mining contractor's compound
  - Area to also include workshop, switchyard and mine administration offices

# Processing Plant Operations

- Nominal capacity of 4Mtpa producing 20 000t - 30 000t of product concentrate per annum
- Proposed hours of operation – 24hrs/7days
- Proposed operations comprising:
  - Crushing circuit
  - Grinding circuit
  - Flotation circuits

# Site Access



- The local area is serviced by the regional road, Lue Road and smaller feeder roads connecting Rylstone to the east and Mudgee to the west.
- Limited upgrade works on local roads will be required.
- Access currently to the Site from Lue Road, Rylstone Road and Pyangle Road.
- Proposed access to the Site will involve the relocation and construction of Maloneys (Bara) Road for access to the Site via the Processing Plant area only.



- **Power**
  - Predicted annual requirement ~ 150GW Hours
  - 132 kV power supply options and available easements under consideration
- **Water**
  - Daily requirement ~ 6ML
  - Water supply options and pipeline easements currently being investigated.
  - Harvestable rights and groundwater pit inflows to be utilised with the remaining water to be sourced through water entitlement purchasing (from Windamere Dam outflows)
  - Water pipeline to transport purchased water will require a take-off point and construction – potentially along the power line easement

# Hours of Operation

<b>Construction</b>	7:00am – 6:00pm / 7 days (all activities)
	6:00pm – 7:00am / 7 days (inaudible activities)
<b>Mining</b>	7:00am – 10:00pm / 7 days (Restricted operations due to noise)
	10:00pm – 7:00am / 7 days (Operation at restricted depths to satisfy noise criteria)
<b>Processing</b>	24hrs/7 days

# Other Approved/ Proposed Activities



- Cumulative Impacts with other operations/projects
  - Loue Motox Track (4.5km SSW of Site)
  - Local Dolomite Quarry (7km NW of Site)
- Regional operations / projects
  - Charbon Coal Mine (30km SSE of Site)
  - Ulan Coal Mine (42km NNE of Site)
  - Moolarben Coal Mine (30km NNW of Site)
  - Wipinjong Coal Mine (46km NNE of Site)



# Consultation

## In this Issue:

Exploration Update	1
Baseline Environmental Monitoring	1
Community	2
Employment at Bowdens Silver Project	2

## Exploration Update

Kingsgate submitted a Review of Environmental Factors (REF) draft document to the NSW Department of Primary Industries in November 2011, with a final document submission in December. An application to explore on EL5920 was approved by the NSW Government in December 2011. Exploration drilling commenced in late January, 2012. Delays due to unusually high rainfall over summer may extend activities past the planned four-month duration.

Diamond drilling to verify mineral intercepts from previous holes and to collect fresh rock cores for metallurgical test work was completed in mid-March. The objectives for the on-going drilling program are:

- To test for potential depth extensions of the mineralised envelope.
- To "infill" drill in areas previously drilled in order to better define the mineralisation.
- To provide geotechnical data for open pit mine design.
- To test areas and ensure that there is no further mineralisation around the potential open pit where associated infrastructure may be located.

## Baseline Environmental Monitoring

Mining at the Bowdens Silver deposit could increase ambient dust levels by activities such as: traffic on unsealed surfaces, wind action on waste rock piles and blasting. The ore at Bowdens contains, along with silver, the recoverable metals lead and zinc.

Kingsgate will implement an Air Quality Management Plan as an integral part of its comprehensive Environmental Management Plan. Dust minimisation techniques may include watering of traffic and mining surfaces, revegetation of bare surfaces as soon as practicable, use of dust-suppression chemicals and dust management systems in processing areas. The program will be designed to meet the stringent air quality conditions of the approvals for Bowdens.

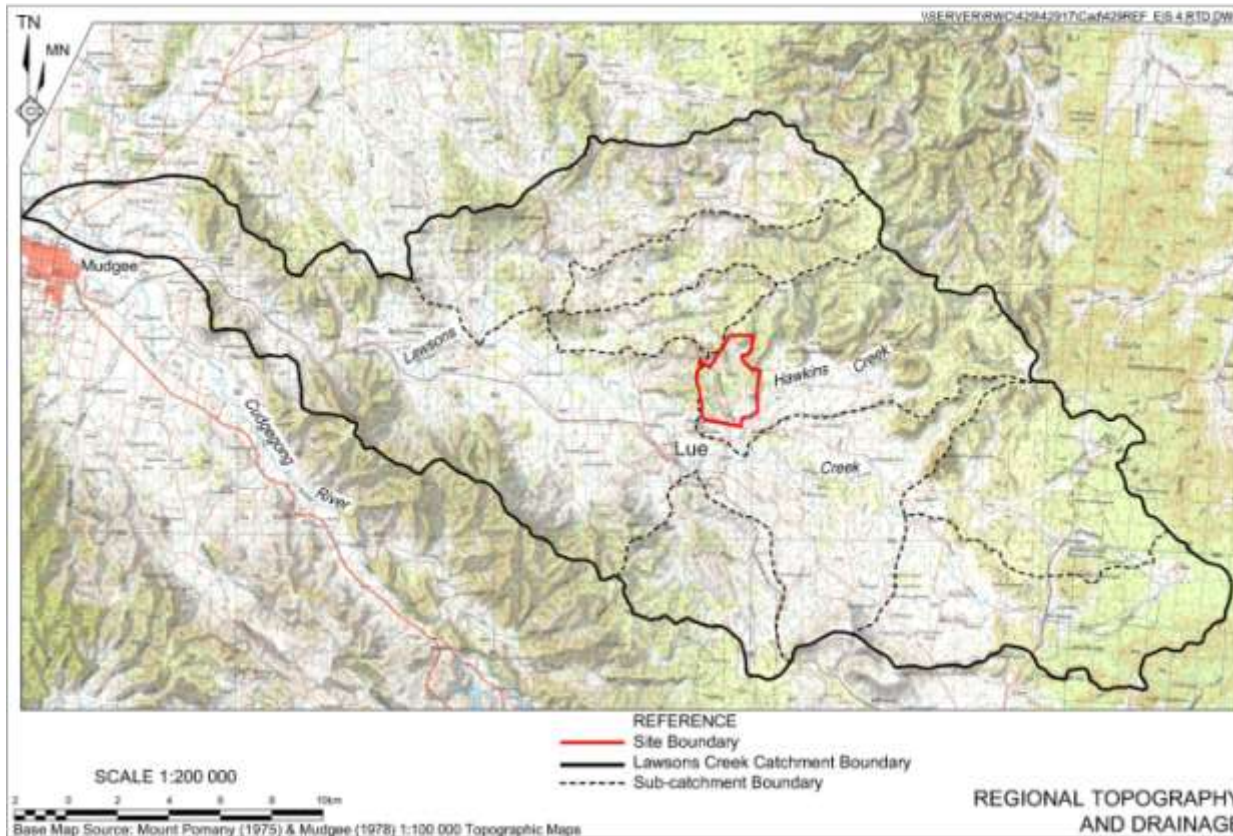
The Air Quality Management Plan will include monitoring of dust around the project, monitoring of surface and ground water quality and deposited dust in rainwater tanks. To provide baseline dust and lead levels, Kingsgate commenced a comprehensive survey of sampling and analysis of ground and surface water and drinking water in tanks within a radius of ~2 kilometres from the proposed mine site.

Kingsgate is distributing results to each of the survey participants. As expected, the results for the target metals have been very low and within the Australian Drinking Water Guidelines (ADWG). Zinc is present, as expected, but at levels below the ADWG and is contributed by galvanised iron roofing and guttering.

- Community Liaison Group (CLG) established in early 2012
  - 3 meetings to date
- Project website
  - <http://www.kingsgate.com.au/australia/bowdens.htm>
    - Activities
    - Exploration Activities and Documents
    - Proposed Operations
    - Newsletters
    - CLG Meeting Minutes

# Existing Environmental Setting

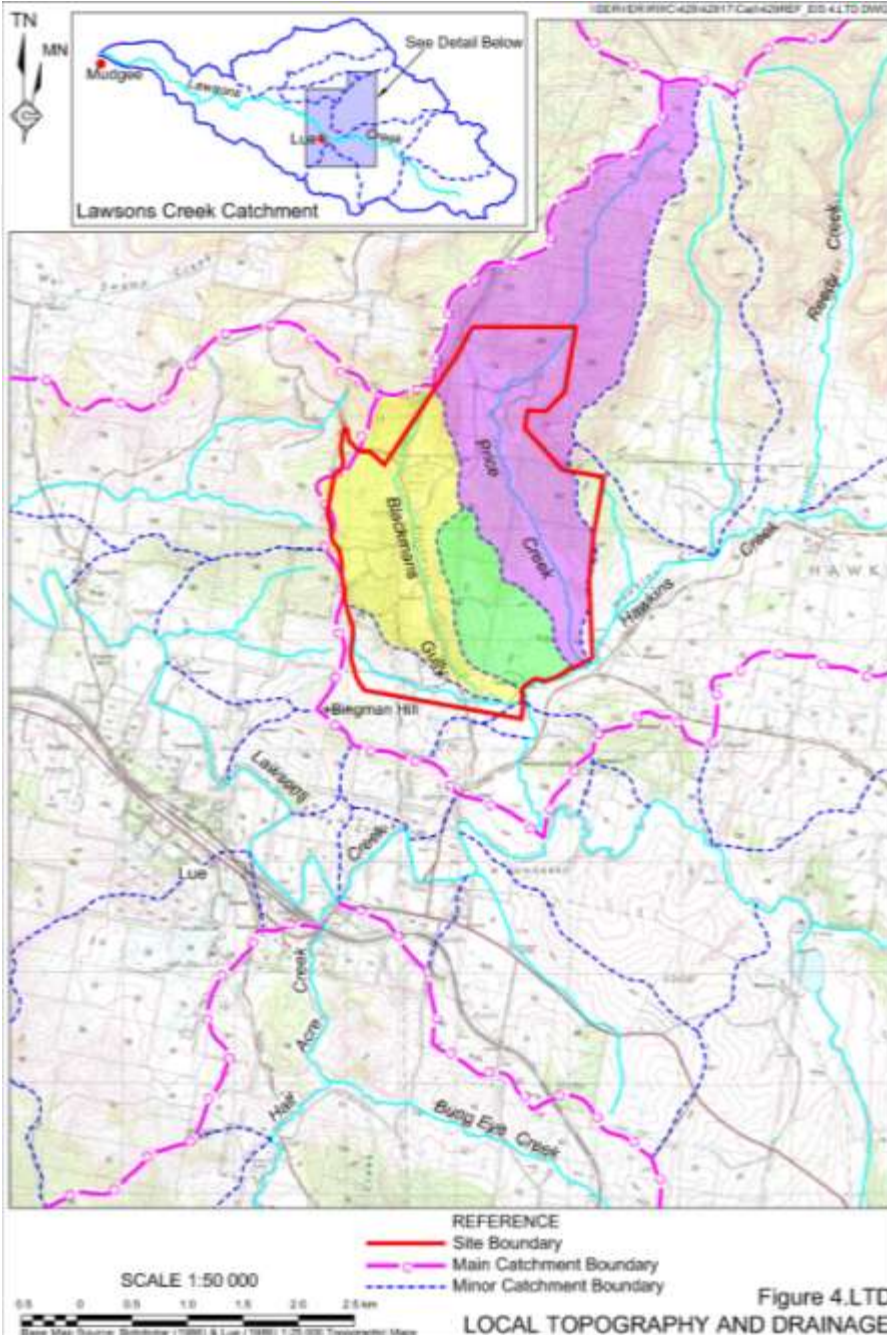




- Regional

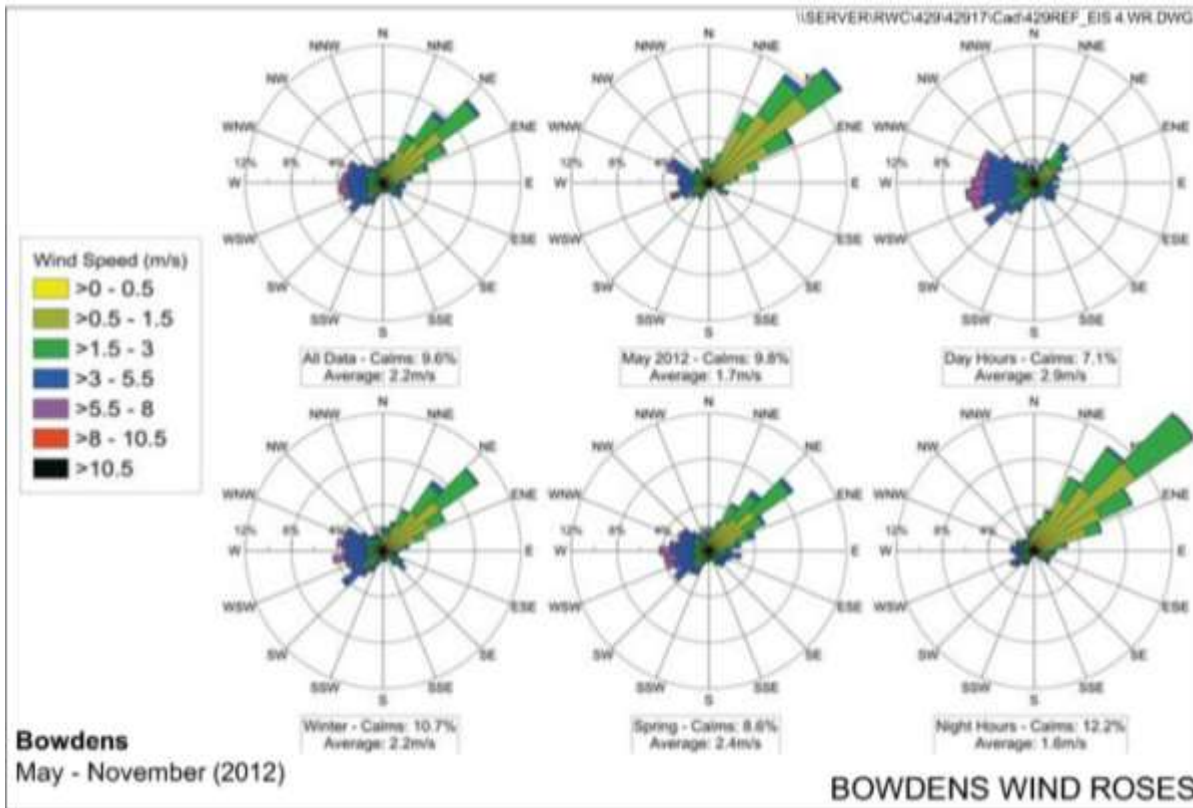
- Situated on the western flanks of the Great Dividing Range
- Dominated by elevated rocky ridges (15-45°) and broad, flat alluvial valleys (<5°)
- Two main creek systems within the regional catchment – Hawkins Creek and Lawsons Creek

# Topography and Drainage



- Site

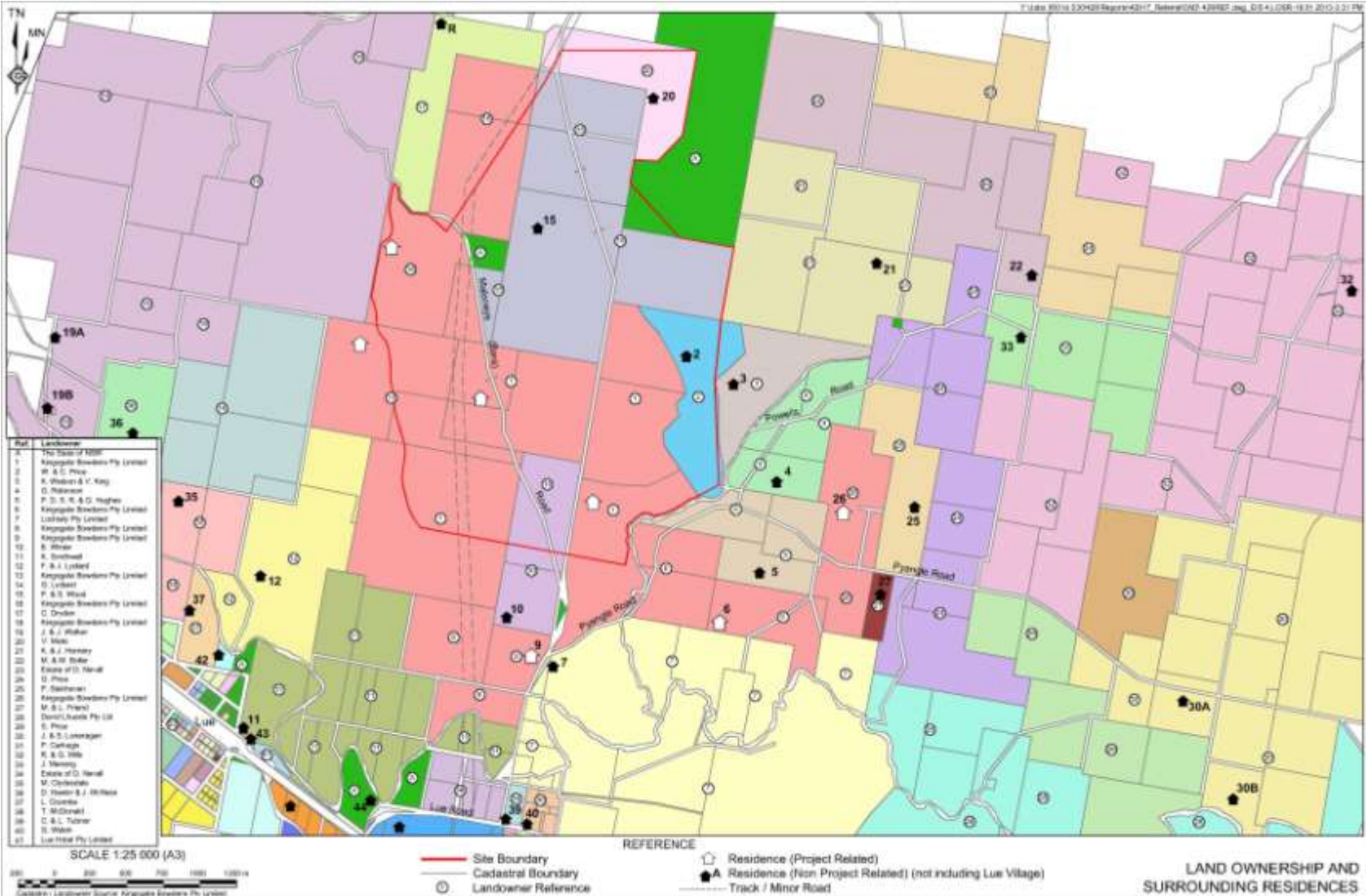
- Primarily influenced by three north-south trending spurs (770m AHD – 670m AHD) interspersed with small valleys (~600m) AHD resulting in a broad alluvial flat valley in the south (580m AHD).
- All drainage lines within the Site (Blackmans Gully, Price Creek) drain to the south into Hawkins Creek
- A small ephemeral, unnamed catchment lies in the southern/central area of the Site
- Bingman Hill (670mAHD) lies between the Site and Lue Village



- Climate data collected from Windamere Dam, Mudgee Airport and Lue Bureau of Meteorology stations
- On-site weather station installed in May 2012
- Temperature
  - Mean max 14.3°C – 30.5°C
  - Mean min 1.3°C – 15.7°C
- Rainfall and evaporation
  - Mean annual rainfall - 615mm
  - Mean annual evap. ~ 1400mm
- Wind direction and speed
  - Dominant annual winds from north - northeasterly
  - Average wind speed 2m/s
  - 10% calm



# Land Ownership



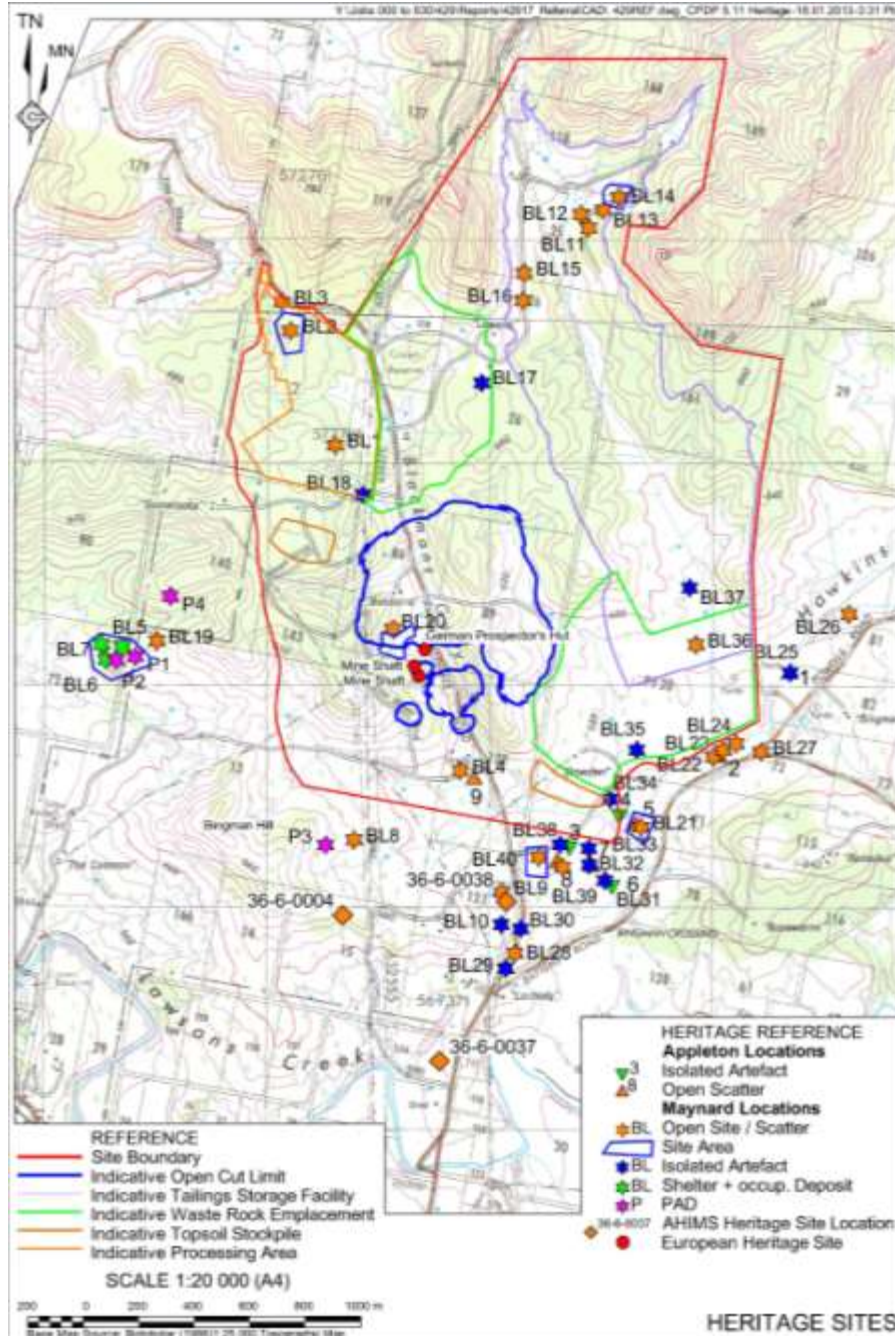
# Land Ownership

- Majority of the land within the Site is owned by Kingsgate, under option to purchase or is currently in a sale negotiation process
- Surrounding properties are either agricultural or rural lifestyle
- Lue Village is located approximately 2km to 5.8km southwest of the closest proposed disturbance within the Site

## The following environmental aspects are discussed further in the presentation

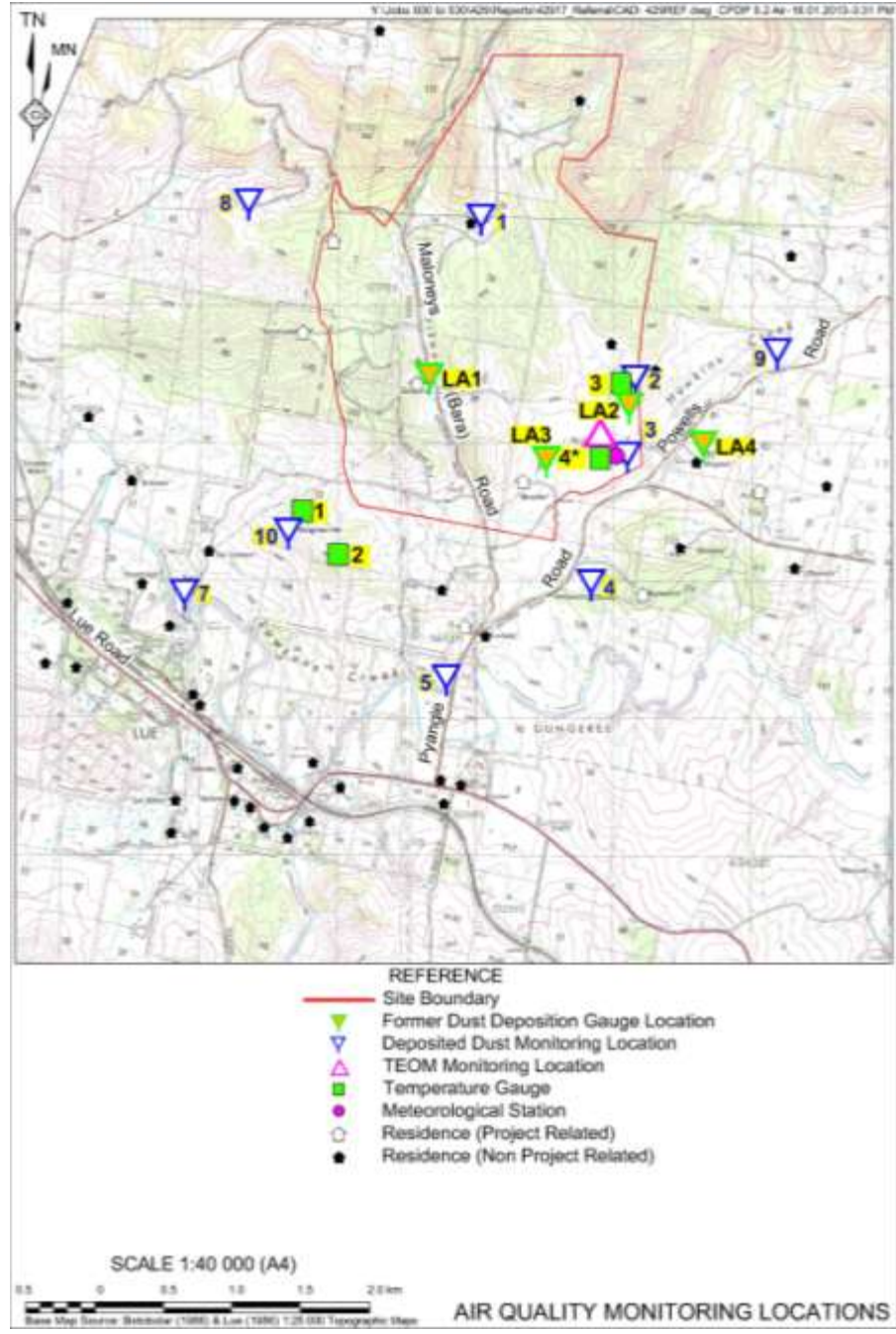
- Aboriginal & European Heritage
- Air Quality & Greenhouse Gases (including lead)
- Aquatic Ecology
- Terrestrial Ecology
- Soil Resources / Land Capability / Agricultural Productivity
- Groundwater
- Surface Water
- Noise
- Socio-economic
- Transportation
- Waste Materials Characterisation
- Visibility

# Aboriginal and European Heritage



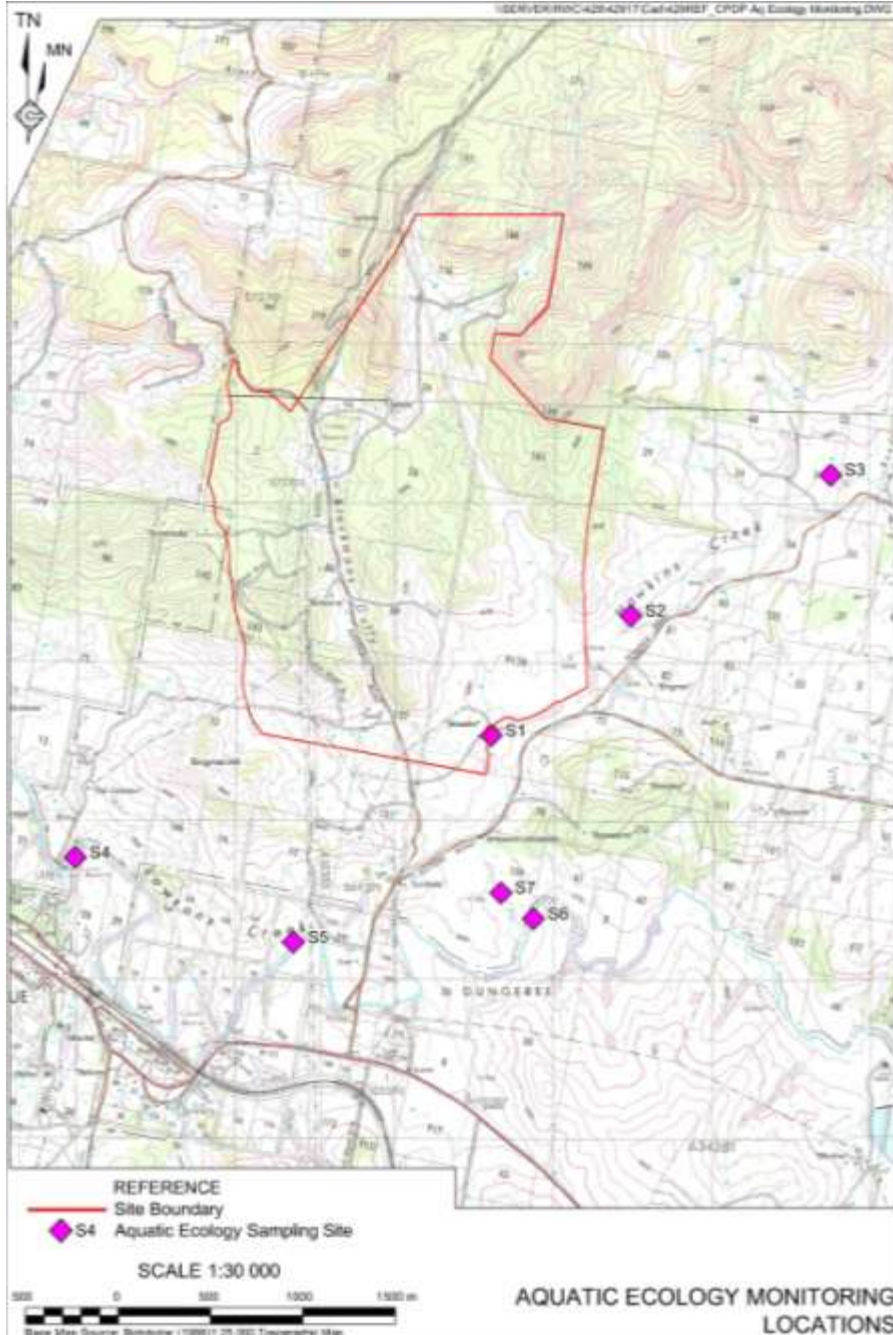
- Managed by Landskape
- 25 Aboriginal sites and 3 European sites identified from numerous surveys (2003-2012)
  - Conducted field surveys undertaken in accordance with DECCW 2010 Guidelines
  - Follow-up Aboriginal stakeholder consultation planned in 2013
  - AHIP process currently underway for the removal/relocation of BL20 and BL2 to allow further exploration activities

# Air Quality and Greenhouse Gases



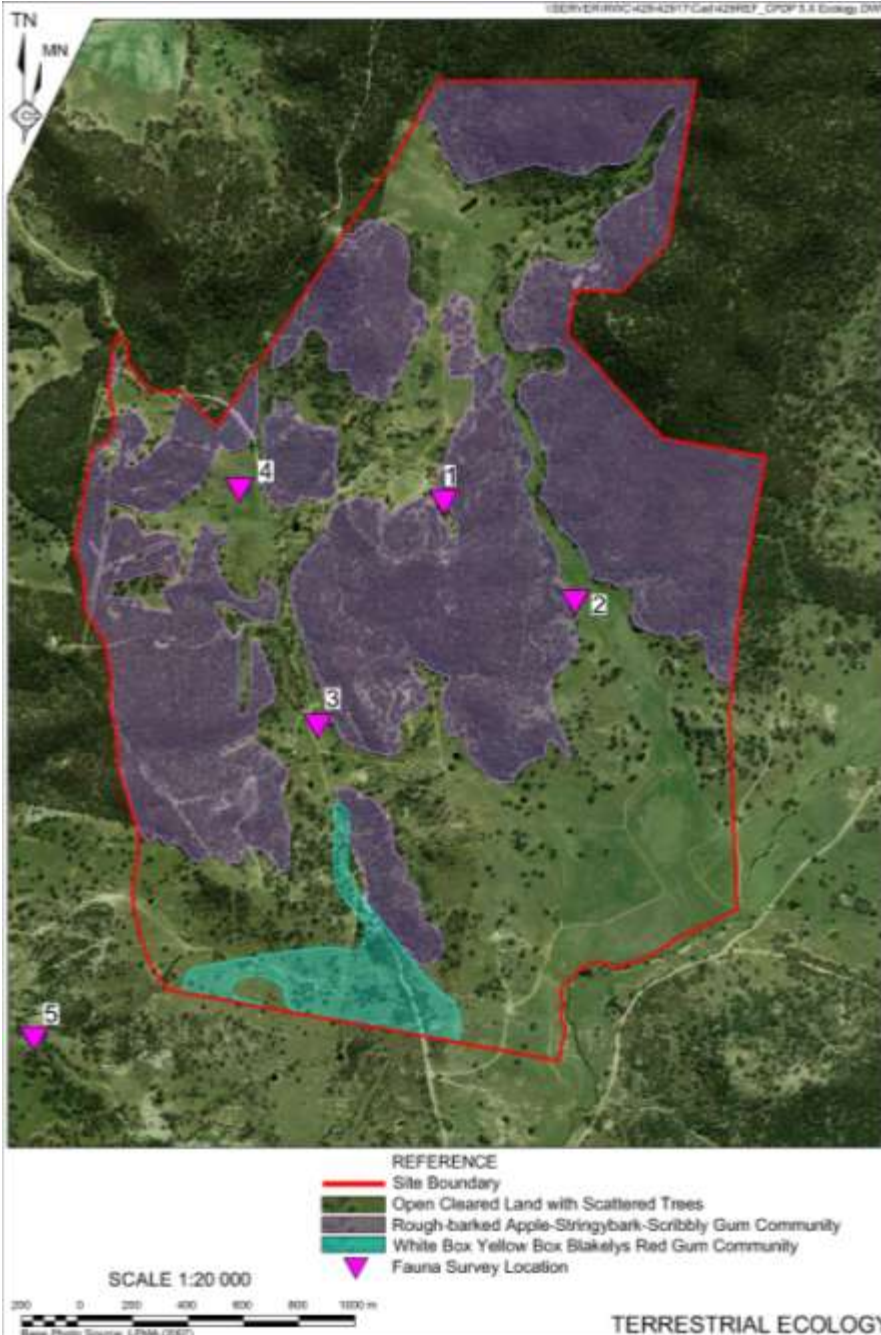
- Managed by ENVIRON
  - Background Monitoring
    - Deposited dust (7 sites from March 2012 – mean 0.7g/m<sup>2</sup>/month)
    - PM<sub>10</sub> (1 High Vol. sampler since May 2012 – mean 9µg/m<sup>3</sup>)
    - 1 TEOM installed May 2012 - PM<sub>10</sub>
  - Further baseline monitoring planned in Lue
  - Air quality modelling to include multiple operational scenarios
  - Include discussion of the potential of lead to be dispersed in deposited and airborne dust
  - Scope 1, 2, 3 Greenhouse Gas Assessment

# Aquatic Ecology



- Managed by Cardno Ecology Lab
  - 7 aquatic fauna survey sites
  - 7 planned stygofauna sampling sites
  - Planned inspection of potential GDEs
  - Riparian and in-stream habitats substantially degraded
  - Aquatic plants and fauna dominated by pollution tolerant taxa
  - No threatened species identified or likely to occur

# Terrestrial Ecology



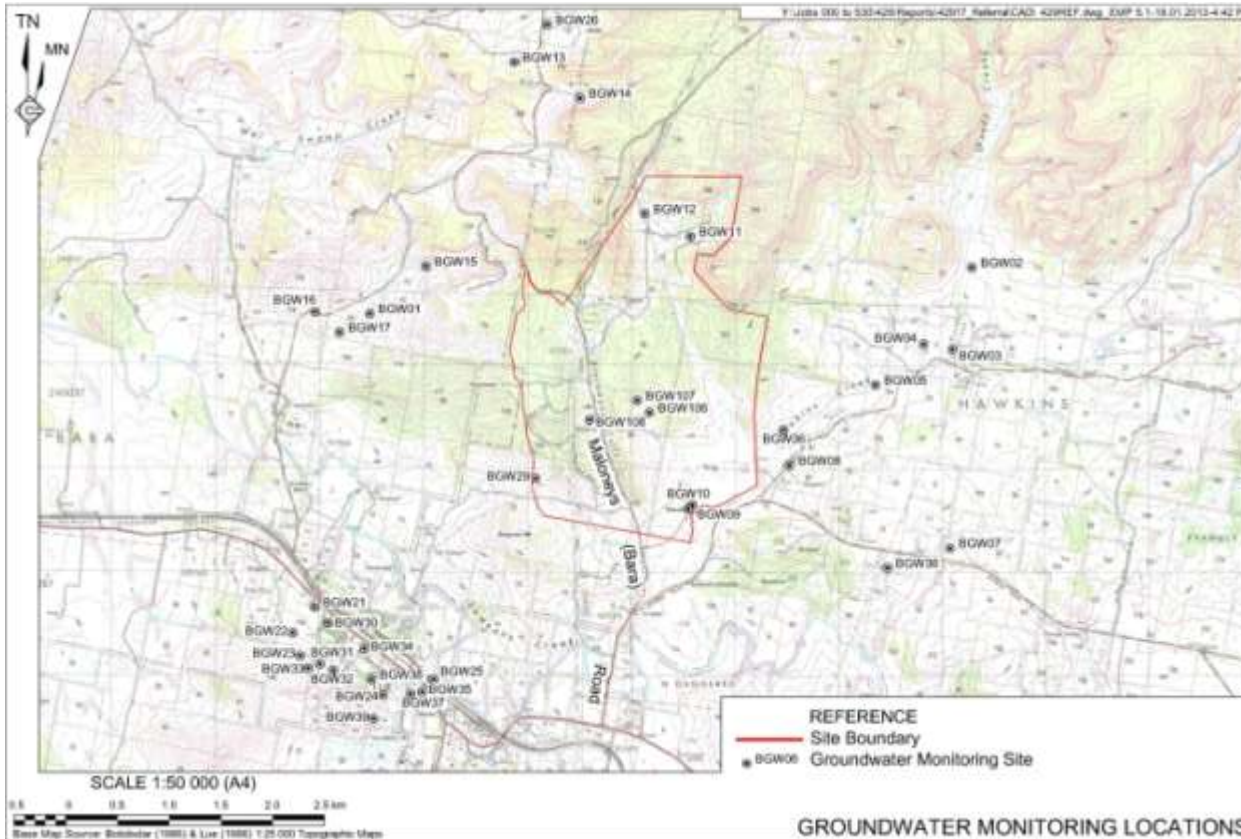
- Flora and Fauna managed by Geoff Cunningham Natural Resource Consultants and Biodiversity Monitoring Services respectively
  - Flora
    - Three dominant vegetation types
    - One Endangered Ecological Community
  - Fauna
    - Four fauna habitats comprising
      - 22 native mammals
      - 9 introduced mammals
      - 104 birds
      - 13 reptiles
      - 5 amphibian species
    - Total of 12 threatened species
  - Total clearing of native vegetation approximately 160ha (subject to further detailed studies)

# Soil Resources / Land Capability / Agricultural Productivity



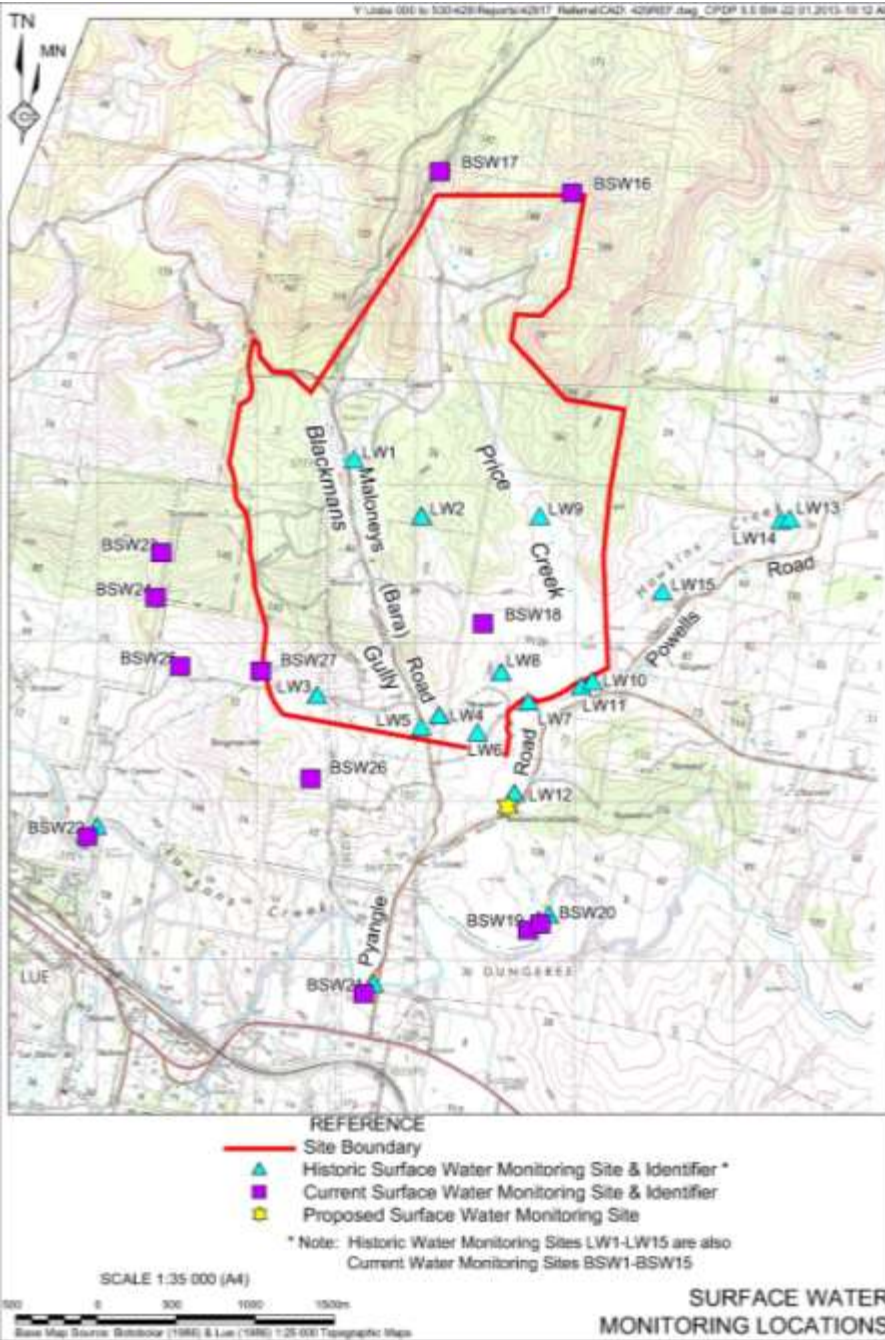
- Managed by Geoff Cunningham  
Natural Resource Consultants
  - Five distinct soil landscapes occur within the Site. Detailed investigations have commenced
  - Stripping of all topsoil and nominated subsoils for rehabilitation as per recommendations
  - Preferential direct replacement
  - Studies on land capability and agricultural suitability/productivity also underway
  - Agricultural Impact Statement (AIS) to incorporate soils information to be included in EIS





- Managed by SKM
- Three aquifer systems
  - Alluvial/colluvial Quaternary aquifer system
  - Murray Darling Basin Fractured Rock Aquifer (Rylstone Volcanics)
  - Murray Darling Basin Porous Rock Aquifer (Sydney Basin)
- 27 monitoring bores installed in October 2012 with an additional 31 stock and domestic bores monitored since July 2012
- Minimum monthly samples
- Results to date indicate relatively good groundwater quality with elevations in salinity and sulfate concentrations

# Surface Water



- Managed by SKM
  - Hawkins Creek / Lawsons Creek / Blackmans Gully / Price Creek / ephemeral drainage lines
  - Intermittent monitoring at 15 surface water sites between late 1990s and 2004 (LW1- LW15); additional 12 sites since April 2012 (BSW16 – BSW 27)
  - Streamflow monitoring equipment to be installed in Hawkins Creek
  - Monitoring indicates a number of analytes already exceed Water Quality Objectives
  - Studies will include a detailed Site Erosion and Sediment Control Plan and include discussions on potential lead contamination



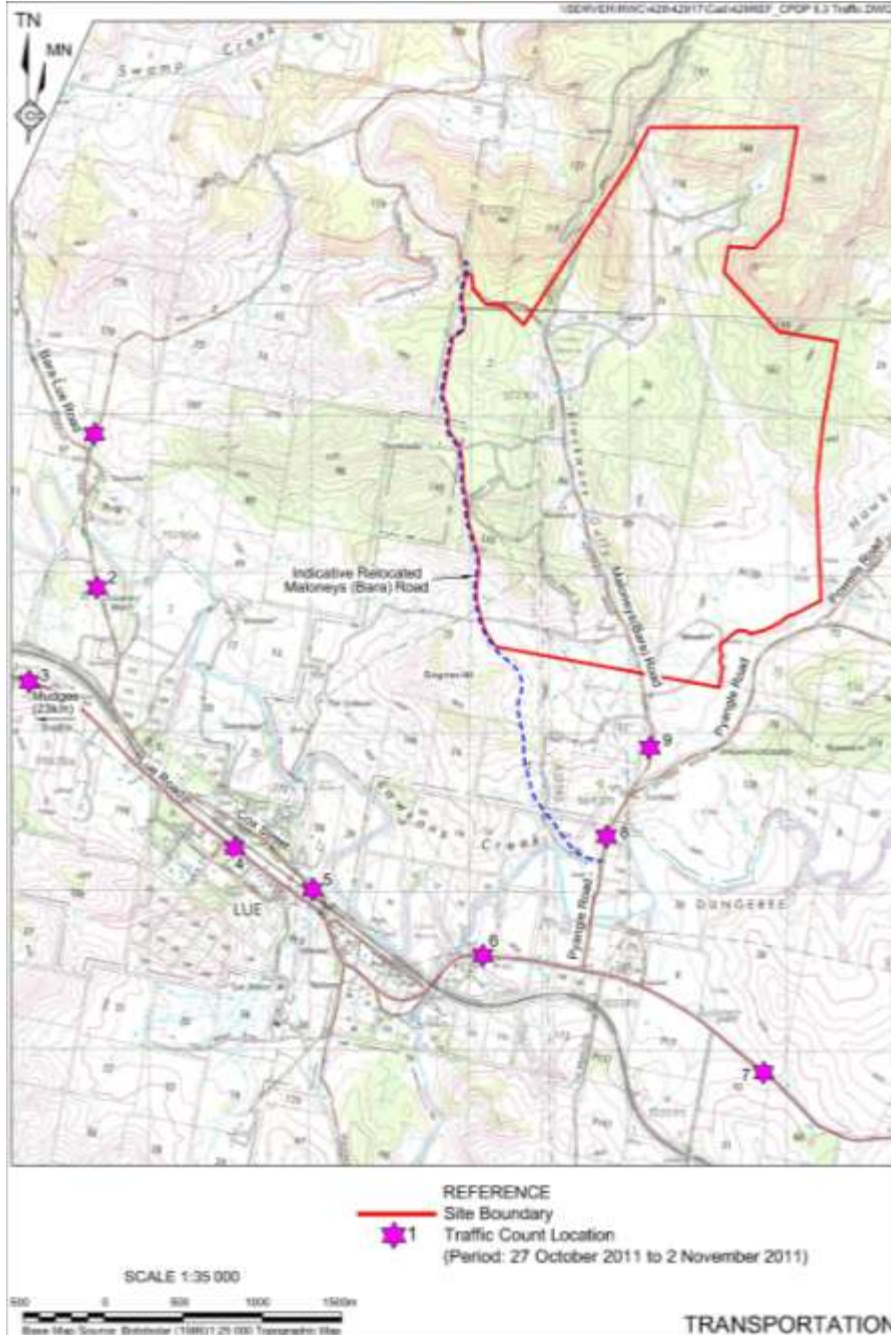
- **Managed by SLR Consulting**

- Background noise monitoring conducted at 8 locations
- Background noise generally low – RBL~30dB(A) consistent with rural areas
- Project specific noise level~35dB(A) at most residences for most assessment periods; sleep disturbance criterion~45dB(A)
- Project design reflects potential noise impacts e.g. use of barriers; day, evening and night operations
- Noise modeling to assess operational scenarios
- Additional operational safeguards to reduce noise to be implemented as part of detailed design following modelling

- Managed by HillPDA
- Lue Village located 2km to 5.8km from the closest disturbance area within the Site
- Regionally significant town is Mudgee located 26km west of the Site
- Rural location with primary industry being the dominant employer sector
- Unchanged population growth in Lue since 2001, with median weekly household income 17% higher than the surrounding rural townships and villages and is comparable to both Mudgee and regional NSW
- Socio-economic assessment will involve data analysis and qualitative research undertaken within the community

# Transportation

- Managed by GTA Consultants
- Site currently accessed from Lue Road via Pyangle Road and Maloneys (Bara) Road
- Permanent relocation of sections of Maloneys (Bara) Road required (relocated road to be sealed)
- Preliminary road relocation engineering studies completed
- Upgrades and maintenance of the local roads will be undertaken as recommended
- Traffic counting surveys on the surrounding road network established that Lue Road accounts for the majority of traffic (617 – 726 journeys per day) with Pyangle and Maloneys (Bara) Road displaying traffic levels of 78 and 32 journeys per day respectively



## Waste Rock Characterisation



- Managed By Graeme Campbell and Associates
- Waste rock to be separated into overburden and 'low grade ore'
- Studies currently underway to determine mineralised cut-off grades
- Potentially Acid-Forming (PAF) sulphide material to be preferentially placed and encapsulated with Non-Acid Forming (NAF) material within the waste rock emplacements
- Waste rock emplacements to be shaped to blend in with the surrounding environment as much as possible.



- Specialist Consultant to be selected
- Existing visual landscape consists of rocky hills and ridges and broad flat alluvial valleys - moderate scenic quality
- Majority of the Site from Lue is visually protected by Bingmans Hill
- Main visual exposure is from Pyangle Road and Powells Road and private views
- Consideration of visibility is central to mine design – various mine components, progressive rehabilitation, sympathetic final landform

# Project Timeframe

Key Project Milestones	Forecast Date
Submission of Request for DGRs to the Department of Planning and Infrastructure	21 December 2012
Department of Planning and Infrastructure issues DGRs for EIS	End February 2013
Lodgement of Mining Lease Application	June 2013
Submission of EIS to Department of Planning and Infrastructure for adequacy assessment	Mid August 2013
Public exhibition of EIS and supporting documents	October/November
Project approval issued by Planning Assessment Commission	June 2014
Granting of Mining Lease & other approvals/permits	August 2014
Commencement of Site Operations	September 2014
First Product Concentrate Despatch	Early 2016



- The Bowdens Silver Project will:
  - be professionally designed to reflect the sensitivities of the local area
  - employ best practice to ensure any potential negative impacts are minimized and satisfy all Government guidelines and reasonable community expectations
  - be managed and operated in a manner which is recognised as an accepted and valued contributor to the future of Lue and the surrounding areas
  - be undertaken by a project team that is experienced in developing and metalliferous mines in partnership with the local community