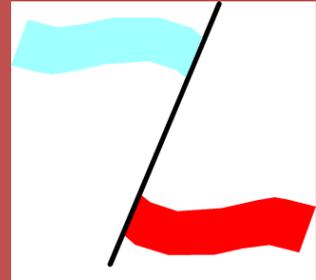




LEMONT

Conventional Hot Rock Geopower in Tasmania



Geological Prognosis
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KUTh Energy Limited
ABN: 33 125 694 920



POWER DOWN UNDER

INTRODUCTION

A comprehensive surface exploration program conducted by KUTH Energy Limited between 2007 and 2011 across its 100% owned tenement SEL 26/2005 in eastern Tasmania indicates the presence of a potentially significant thermal anomaly at Lemont in the central Midlands (Figure 1). Data from shallow heat flow drilling, MT and potential field surveys reveal that this feature coincides with a major zone of electrical conductivity and lineaments interpreted as large, potentially permeable fractured zones. Further exploration at this location now requires the sinking of a deep borehole to test models of temperature prediction at depth and to investigate the possibility, as indicated by the available geophysical data, of natural fluid permeability at depth.

Recognising the relatively high exploration risk still vested in this project, the proposed drilling at Lemont is intended as a deep exploratory phase for the purposes of data gathering and model validation only and is not expected to result in the construction of permanent structures for use in production.

The purpose of this document is to provide a summary of the available geological data and to define drilling targets and objectives ahead of detailed drill planning and engineering.

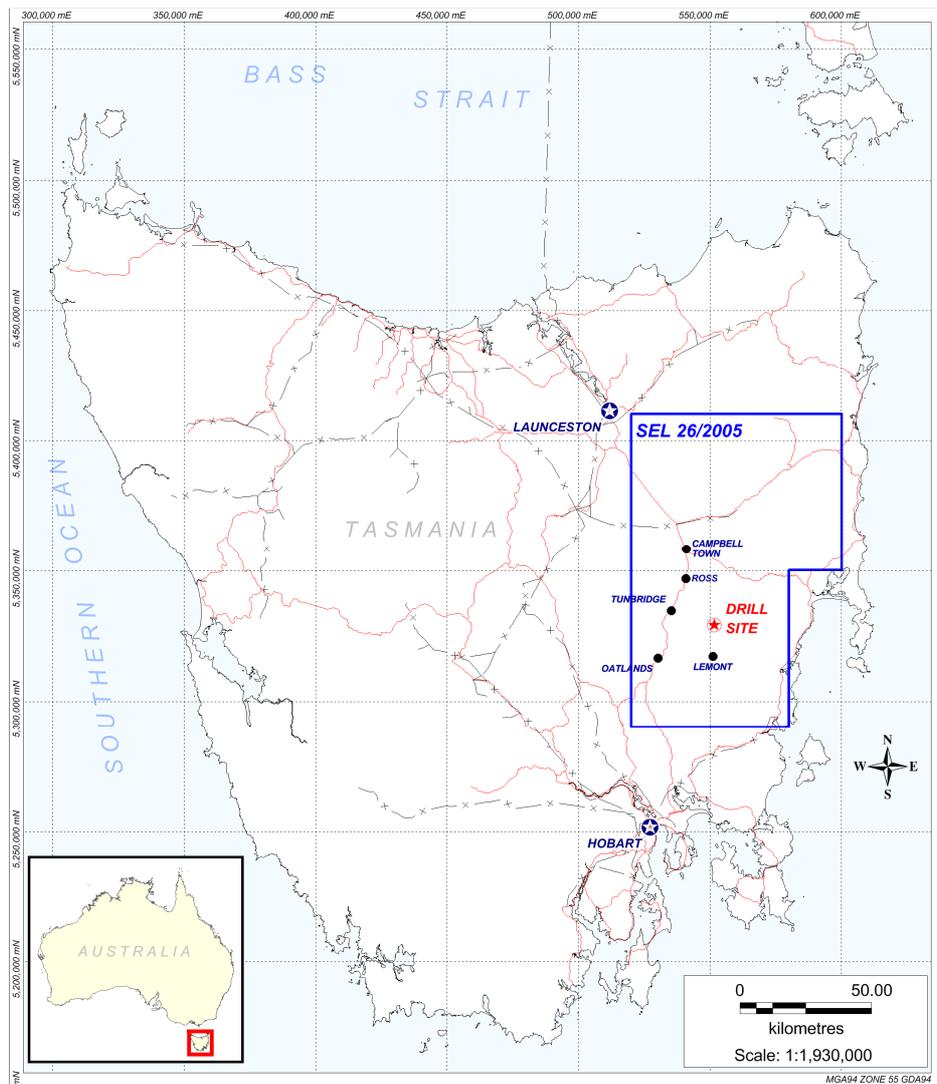


FIGURE 1: LOCATION OF THE LEMONT RESOURCE IN SEL 26/2005

BASIC WELL DATA

This hole will be referred to as Lemont 1.

Location information for Lemont 1 is provided in Table 1 and illustrated in Figure 2. This location has been determined on the basis of a geological/geophysical target and subsequently refined by preliminary landholder consultation. Final site location may vary slightly depending upon further landholder, engineering and regulatory requirements.

The Lemont 1 site is relatively flat and lies within developed pasture and farmland (Figure 3). Access to the site will be via established roads including the Midlands Highway and Tooms Lake Road. Site location is adjacent to Tooms Lake Road and requires relatively few access tracks be cut in order to facilitate rig access. The nearest available water source is the Macquarie River, less than 200m from the nominal site. Due to the proximity of the river a flood risk assessment is recommended prior to site finalisation.

Lemont 1 will be drilled as a vertical hole. The maximum target depth is 3km. Casing requirements are yet to be determined.

Name	Lemont 1
Northing	5,329,014 m
Easting	551,568 m
RL	235 m
Total Depth	3000 m
Dip	90°
Azimuth	0
Datum	MGA Zone 55 (GDA 94)

TABLE 1: COORDINATES FOR LEMONT 1 DRILL SITE.

FIGURE 3 (RIGHT): SATELLITE IMAGE OF THE LEMONT 1 DRILL SITE (SOURCE GOOGLE EARTH)



DRILL OBJECTIVES

Lemont 1 is an exploration well. Major goals of the drilling are to test the commercial potential of the Lemont resource, to demonstrate the presence of a fracture permeable conventional hot rock play and to prove the efficacy of KUTH's surface exploration techniques. Following on from these, the primary objectives of the hole are:

1. Drill and measure the deep temperature gradient
2. Drill and intersect the conductive MT anomaly
3. Identify, record and evaluate deep fracture permeability
4. Identify, record and evaluate the deep geology

Additional objectives to be considered as optional if warranted and practical are:

5. Collect and analyse fluid samples
6. Flow test permeable structures
7. Small-scale fracture or stress testing
8. Long-term emplacement of deep seismic monitoring instruments

The hole is required to reach a TD of 3000 mTVD to provide the greatest chance of target intersection. Failure to reach this depth will not necessarily compromise the primary objective (temperature measurement) but may impact upon subsequent objectives, most particularly those relating to intersection of the MT anomaly.

GEOLOGY

Central eastern Tasmania is currently underexplored and very little information exists confirming the nature of the deep geology in the Lemont area. The surface geology is dominated by flat-lying sedimentary cover sequences of the Tasmania Basin (Upper and Lower Parmeener Group) and major exposures of dolerite, an intrusive rock which occurs as thick horizontal sills within the sedimentary horizons. There are no exposures of basement within the vicinity of the Lemont target. Probable basement sequences at Lemont 1 include Ordovician-Silurian Mathinna Group, Devonian Granite and/or Precambrian metasediment.

The drill coverage in and around Lemont 1 is extremely limited and no stratigraphic hole penetrates below 1000 m in this region. A summary of significant regional boreholes and their recorded intersections is provided in Figure 4 together with the mapped surface geology. With the exception of the Tunbridge well, which apparently intersected Precambrian metasediment at 908m, no hole has yet penetrated through the surficial sequences in the areas immediately around Lemont.

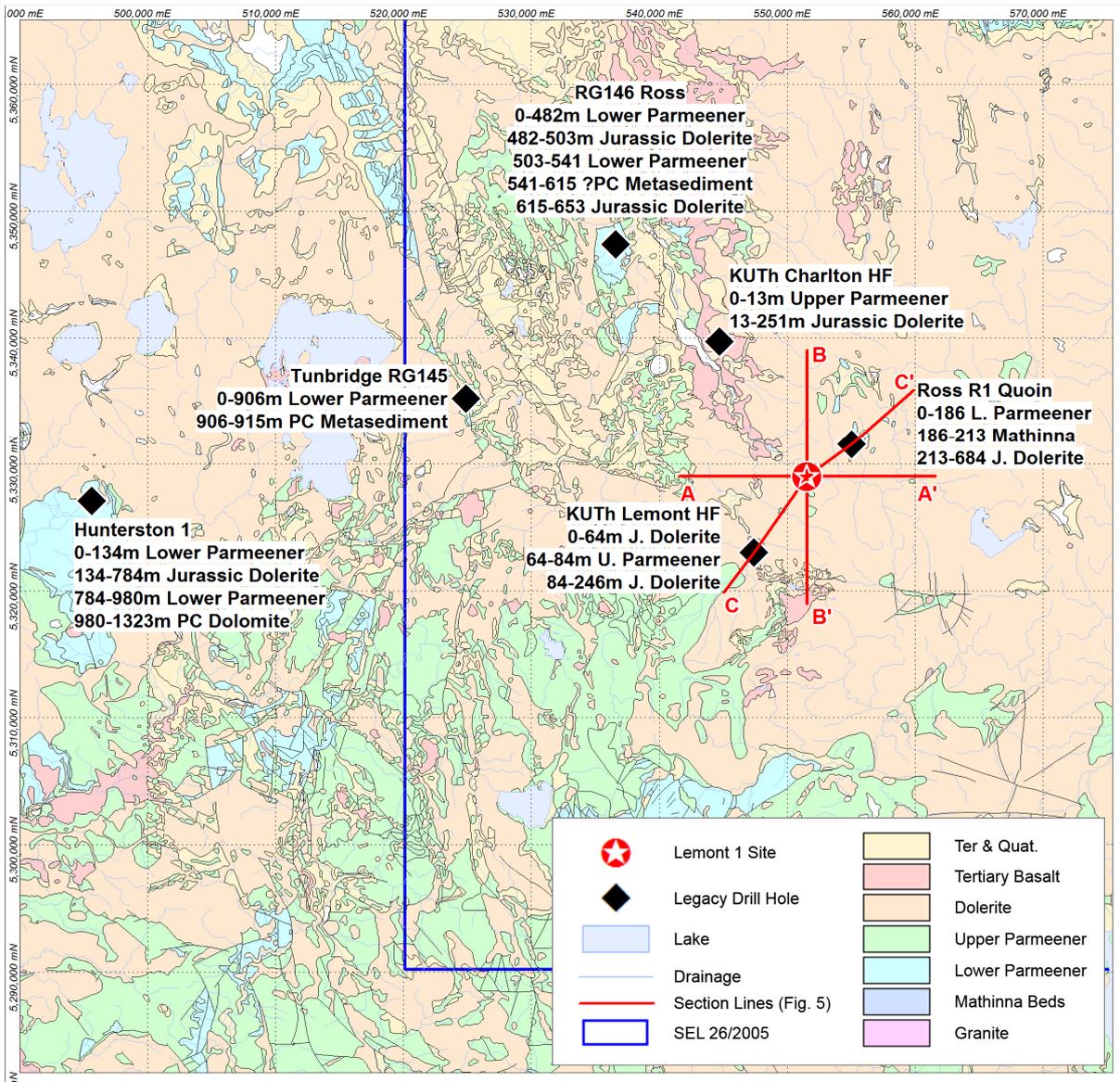


FIGURE 4: SURFACE GEOLOGY OF THE LEMONT REGION SHOWING SIGNIFICANT DRILL HOLE INTERSECTIONS AND SECTION LINE LOCATIONS (REF. FIGURE 5).

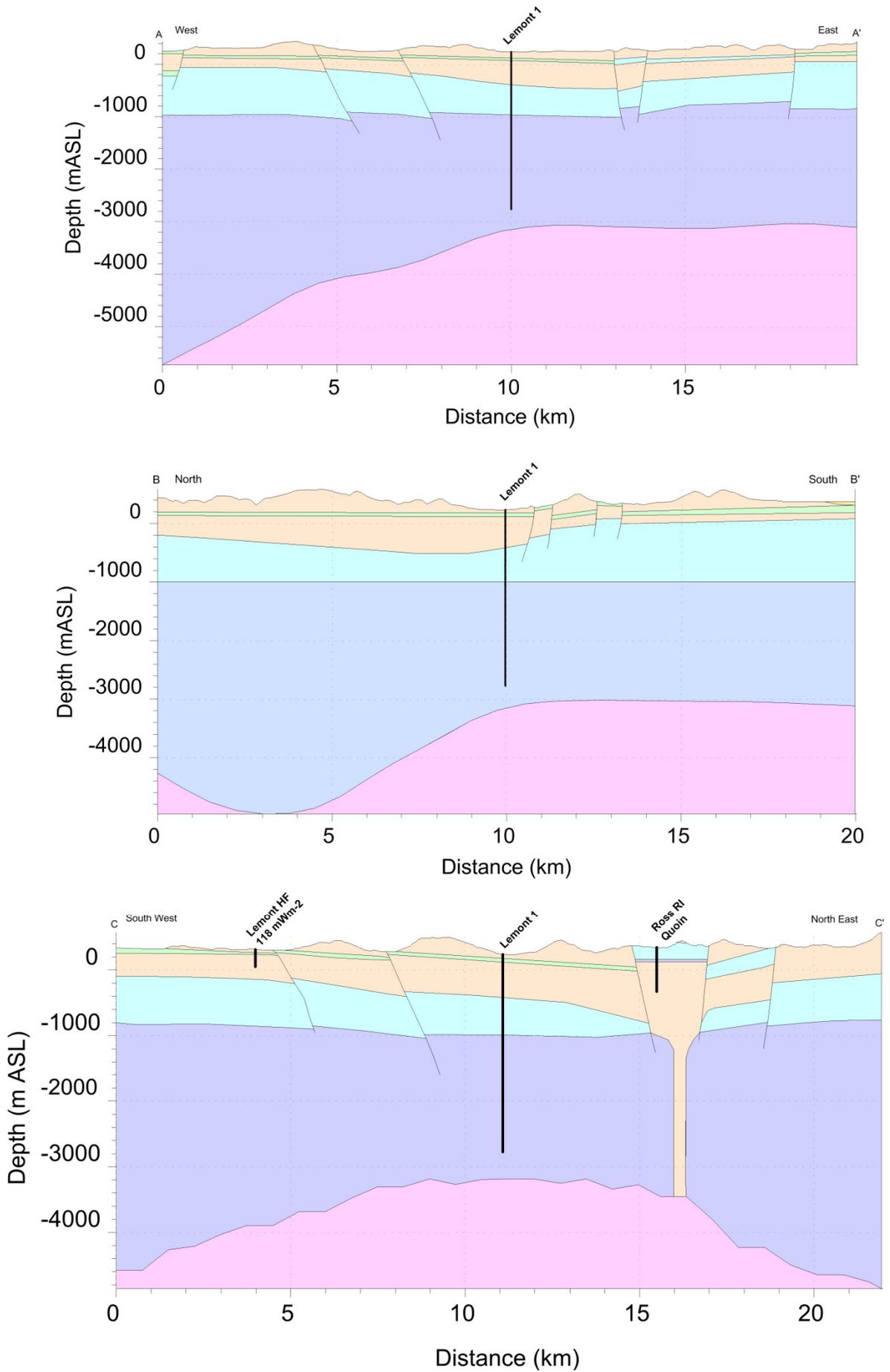


FIGURE 5: SCHEMATIC CROSS SECTIONS ILLUSTRATING GEOLOGICAL RELATIONSHIPS IN AND AROUND LEMONT 1 DRILL SITE

A schematic illustration of the regional geological relationships based upon existing geological and geophysical data is provided as cross sections through the proposed Lemont 1 drill site in Figure 5. Following is a summary of the main geological units expected to be encountered during drilling:

TASMANIA DOLERITE

Jurassic dolerite intrusions form large-scale horizontal sill structures within the sediments of the Tasmania Basin. Whilst major sill features are generally conformable with the sedimentary bedding layers complex intrusive patterns do occur with dykes, veins and other features. Emplacement of the dolerite is generally considered to have occurred via discrete vertical dykes or feeder zones. Gravity and magnetic data appear to indicate that these are typically small in diameter, however, large flower structures hosting significant thicknesses of dolerite are interpreted locally around some feeder zones (e.g. hole RG 146 at Ross). Individual sill thicknesses are typically 300-400m but may be up to 800m. Intrusion usually occurs as a single layer although multiple (stacked) sills have been observed.

The dolerite is a fine-medium grained mafic igneous rock (Figure 6a). It is hard, resistant to weathering and generally very competent. Where exposed at surface it is effectively fresh and unaltered. The porosity/permeability of the dolerite rock matrix is very low however discrete fault/rubble zones do occur. Where observed in KUTh's existing drill holes these zones are typically <5m in width and are strongly oxidized. The dolerite is known to be host to fracture-permeable aquifer systems and it is likely that observed fault structures are associated with these. Limited data are available regarding engineering properties of the dolerite (which is commonly used as a road base), these are provided in Appendix 1.

TASMANIA BASIN

The thickness of cover sequences (Dolerite + Tasmania Basin sediments) across Eastern Tasmania is usually assumed to be around 1000m based upon seismic, drill and geophysical data. Local variations in unit thicknesses are poorly constrained due to the lack of drill intersection data.

UPPER PARMEENER GROUP

The predominantly Triassic Upper Parmeener (UP) Group is comprised mainly of mixed fluvial and lacustrine sediment. No formal stratigraphy has been defined for this group which is informally classed into four Units comprising interbedded lithic sandstone, shale and coal sequences which sandwich a distinct quartz sandstone horizon. Although undeformed, UP coaly and shale sequences are often friable whereas sands (both lithic and quartz) are generally competent (Figure 6b). Whilst the presence of the UP cannot be ruled out at Lemont, indications from surface geology and existing drilling are that thicknesses of this unit are unlikely to be locally significant.

LOWER PARMEENER GROUP

The Permian Lower Parmeener Group is dominated by shallow marine sediments with occasional minor fluvial and coaliferous layers. The majority of the Group comprises medium to fine-grained siltstone/mudstone which is commonly fossil bearing and calcareous. The base of the sequence is marked by a distinctive angular and very coarse grained glacial till which unconformably overlies basement. Where observed in core, Lower Parmeener Units are generally competent with low observed porosity (Figure 6c). Evidence from regional stratigraphic holes (e.g. Tunbridge) indicates that a near-complete Lower Parmeener sequence, up to 900m thick, may be present at Lemont.

Near surface aquifer systems identified in the Lower Parmeener rocks are typically classified as fracture-permeable and there is little visual porosity apparent in LP core recovered from the Tunbridge stratigraphic hole. Core recovered from drilling at the Hunterston well further west, however, includes highly porous mudstone sequences, a result of the selective dissolution of carbonate clasts (drop stones) within these rocks.



FIGURE 6: (A) JURASSIC DOLERITE (KUTH LEMONT 1); (B) UPPER PARMEENER (KUTH FINGAL 1); (C) LOWER PARMEENER (TUNBRIDGE RG145 482 – 490M); (D) MATHINNA, FOLIATED CARBONACEOUS MUDSTONE (KUTH WEYMOUTH 1); (E) MATHINNA, GRADED SANDSTONE (KUTH Mt NICHOLAS 1); (F) PRECAMBRIAN METASEDIMENT (TUNBRIDGE RG145).

Such observations leave open the possibility of porous sedimentary aquifers within the LP sequence at Lemont.

MATHINNA GROUP

Early Palaeozoic (Ordovician – Devonian) metasediment of the Mathinna Group (MG) are observed to form basement to the Tasmania Basin in the north-east of the state. Most likely comprised of large west-directed thrust-stacked units, the MG is dominated variably by carbonaceous shales and mudstones (Figure 6d) and graded turbiditic sand/silt/mud sequences (Figure 6e) and is lithologically and temporally equivalent to the Palaeozoic Tasmanides of the Thompson and Lachlan Fold Belts of mainland Eastern Australia. The deep marine origin, age and structural grain of the MG distinguish these rocks from Precambrian metasediments and Palaeozoic shelf-derived marine sediments to the west.

MG sediments have been subject to regional low grade (sub-greenschist) burial metamorphism. Bedding planes are generally preserved but are affected by multiple deformations with up to three episodes of folding and cleavage development described in various locations. Development of intense shear foliation has been observed in MG black shales from KUTH drilling located in the far north-west of the known exposure. Rocks of the MG generally have a low visual porosity and aquifer development is limited to fracture-permeable systems. Quartz-carbonate veining and small scale fractures are common.

DEVONIAN GRANITE

Intrusion of Devonian-aged granite into basement sequences (Mathinna Group) occurs across much of eastern Tasmania. Granite is exposed in the north-east and east and is predicted from geophysical data to extend at depth beneath much of central and southern east Tasmania. Whilst the granite is currently predicted to lie below the maximum drill depth it should be noted that considerable uncertainty (+/- 1km) exists in the prediction of the absolute depth of occurrence of buried granite bodies due to the non-unique nature of geophysical modelling.

Whilst variable in composition, the Devonian granites are essentially coarse-grained quartz-bearing felsic igneous rocks. They form large, homogenous bodies of hard, impermeable material at depth. Alteration halos produced by high-temperature contact metamorphism of the surrounding country rock (Mathinna Group) are commonly observed in outcrop. Exposures of granite at surface also display typical orthogonal jointing patterns. No information is currently available regarding the potential fracture permeability of these rocks at depth.

OTHER UNITS

Additional units that may be present at depth within the Lemont region (and not shown in Figure 3) include:

PRECAMBRIAN METASEDIMENTS

Observations from the available drill coverage indicate that the basement west of Lemont comprises highly deformed Precambrian (PC) metasediment comprising dolomite and shale/silt/sand sequences. Basement exposures are not observed in surface outcrop for a considerable distance, however, and given the limited drill coverage it is not possible to determine the precise eastern boundary of these rocks. It is also possible that older PC sequences may underlie the Mathinna at drillable depth in the Lemont area.

Physically, PC metasediments intersected in the Tunbridge hole appear very similar to Mathinna units and the two may be difficult to discriminate in cuttings. The PC rocks are fine-grained, altered, highly deformed and veined and have no visual porosity (Figure 4f). Alternatively, PC dolomite encountered further to the west has

potential for significant dissolution porosity and hence the possibility of permeable PC strata cannot be ruled out.

ULTRAMAFIC/SERPENTINITE

Aeromagnetic data and regional geological relationships suggest that bodies of ultramafic rock may be present at depth along the boundaries of major thrust slices. If present, these units are likely to be highly magnetic and will be soft, clay-rich and almost certainly strongly deformed.

STRUCTURE

The geology of central eastern Tasmania records a long and complex tectonic history with multiple episodes of deformation and structure development. The majority of surficial features are post-Jurassic in age and are interpreted as the result of a Tertiary rifting event along the NNW trending Tamar Valley. Deformation related to this event is restricted largely to brittle block faulting and rocks of the Tasmania Basin and Jurassic Dolerite remain relatively undeformed with horizontal bedding merely offset at fault boundaries.

Regionally, the structural grain of Tertiary faulting is observed to alter direction from NNW to EW within the vicinity of the Lemont area. These major Tertiary trends are clearly visible in the topographic data (refer to DEM, Figure 8e) and are believed to have formed as a result of the influence of pre-existing basement structure. Evidence from geophysical data supports the interpretation of Tertiary structure as the result of reactivations of older, deeper basement features.

Evidence from legacy seismic data and regional mapping of surface basement exposures reveal distinct differences in the structural grain of areas west and east of Lemont. To the west, basement rocks are characterized by major east-directed basement thrusts (low angle faulting) which converge on a detachment around ca. 8 – 9km depth (Figure 7). Seismic interpretations imply a geometry that indicates long history of reactivation along fault lines with evidence for both convergent and divergent regional tectonics including the Tertiary reactivation previously discussed.

East of Lemont, surface mapping of the Mathinna indicates basement structures comprise west-directed thrusts. These separate major packages of Mathinna sediment which are distinguishable both in age and lithology (e.g. Ordovician Turquoise Bluff Slate). Analysis of earthquake source data from the Lemont region further indicates the possible presence of deep, shallow-dipping E or NE trending fault structures. It is possible that these features may coincide with the western boundary of the highly competent granite batholiths.

The convergence of the Eastern west-directed and Western east-directed basement thrust systems apparently occurs along the axis of the Tamar Valley and is entirely obscured beneath cover sequences. It is likely that Lemont 1 will drill into this region of structural convergence.

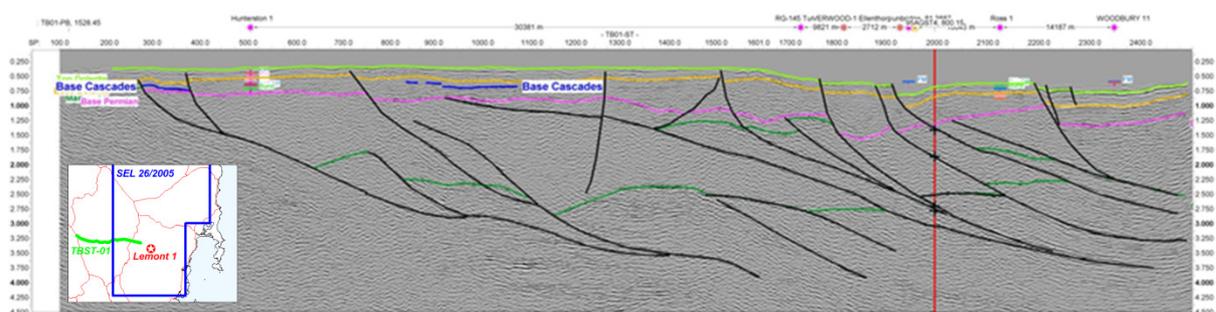


FIGURE 7: RE-INTERPRETATION OF LEGACY SEISMIC REFLECTION LINE TB01-ST. THE LINE LOCATION IS WEST OF LEMONT 1, ILLUSTRATED BY THE GREEN LINE SHOWN IN THE INSET MAP.

GEOPHYSICS

KUTh has undertaken a significant program of surface geophysics improving upon a relatively sparse legacy dataset. This work includes the collection of 1230 new gravity data stations in two campaigns (2007, 2010), 4084 line km of aeromagnetic data (2009), and 297 magnetotelluric stations (2008, 2009, 2010). The results of this work, and its interpretations, are summarised in Figure 8.

POTENTIAL FIELD DATA

Modelling of gravity data suggests the presence of granite bodies beneath much of eastern Tasmania (Figure 8a, 8b) including beneath Lemont. In the absence of deep control data estimations of vertical depth to granite remain uncertain (+/- 1km). Regardless, it appears likely that granite is present at drillable depth (<5 km) within the vicinity of Lemont.

Interpretation of aeromagnetic data (Figure 8c, 8d) indicates the presence of a number of major lineaments within the Lemont area that are likely to be the signature of fault or fracture systems. Regionally, magnetic structure is dominated by a large, arcuate feature extending from the northwest to the eastern side of the survey area. This feature is evident in both gravity data and digital elevation models and is most likely to be a major fracture zone (Figures 8a, 8e). The presence of this trend in both gravity and upward continued magnetic data supports the suggestion that it is a relatively major feature, penetrating to depth in basement. Its appearance in the DEM implies that it is likely to have been reactivated during regional Tertiary rifting.

MAGNETOTELLURIC DATA

Legacy studies of magnetotelluric (MT) field data identifying a possible conductive anomaly in northeastern Tasmania date back to the mid-1970's. Results consistently indicated the presence of a broad zone of anomalously high electrical conductivity, the *Tamar Conductivity Zone* or *TCZ*, lying approximately parallel to the NW trending axis of the northern Tamar Valley, and extending for some distance to the south. The TCZ was observed at depth beneath Mesozoic cover but no direct information was available regarding the nature or detailed structure of the geology associated with it. However, it was concluded that 'the most likely cause of the anomaly was a combination of the presence of high conducting fluids and graphite in pores, cracks, and or fractured rocks' implying the potential for fracture permeability associated with this feature (Hermanto, 1992).

KUTh's program of new MT data acquisition has now not only confirmed the existence of the TCZ but extended its known occurrence. Large east- and west-dipping electrically-conductive basement features identified in the northern-most section line are now traced south into the Lemont area. Visualised in 3D, the southern extension of the TCZ appears to be an east-dipping NW/SE striking planar structure which diverges sharply to strike EW beneath Lemont (Figure 9). Two planar EW striking structures are observed, a shallowly north-dipping anomaly in the north and a moderately southerly-dipping anomaly in the south. Vertical sections through these features indicate an inverted v-shaped electrically-conductive anomaly that is laterally extensive beneath this area. The location and geometry of these zones show an excellent spatial correlation with lineaments previously identified in the gravity/magnetics and DEM data (Figure 8f).

SEISMIC DATA

KUTh has not undertaken any active seismic surveys across its tenement area. A re-interpretation of existing 2D-seismic reflection data is provided as part of the discussion of regional structure, above. A 3D velocity structure of the Lemont area, derived from an ambient seismic tomographic survey, is currently ambiguous with respect to the results of the potential field and electrical geophysics discussed above. Further information is required to provide depth control and validate the results of this relatively novel technique prior to consolidation of these data into the broader picture at Lemont.

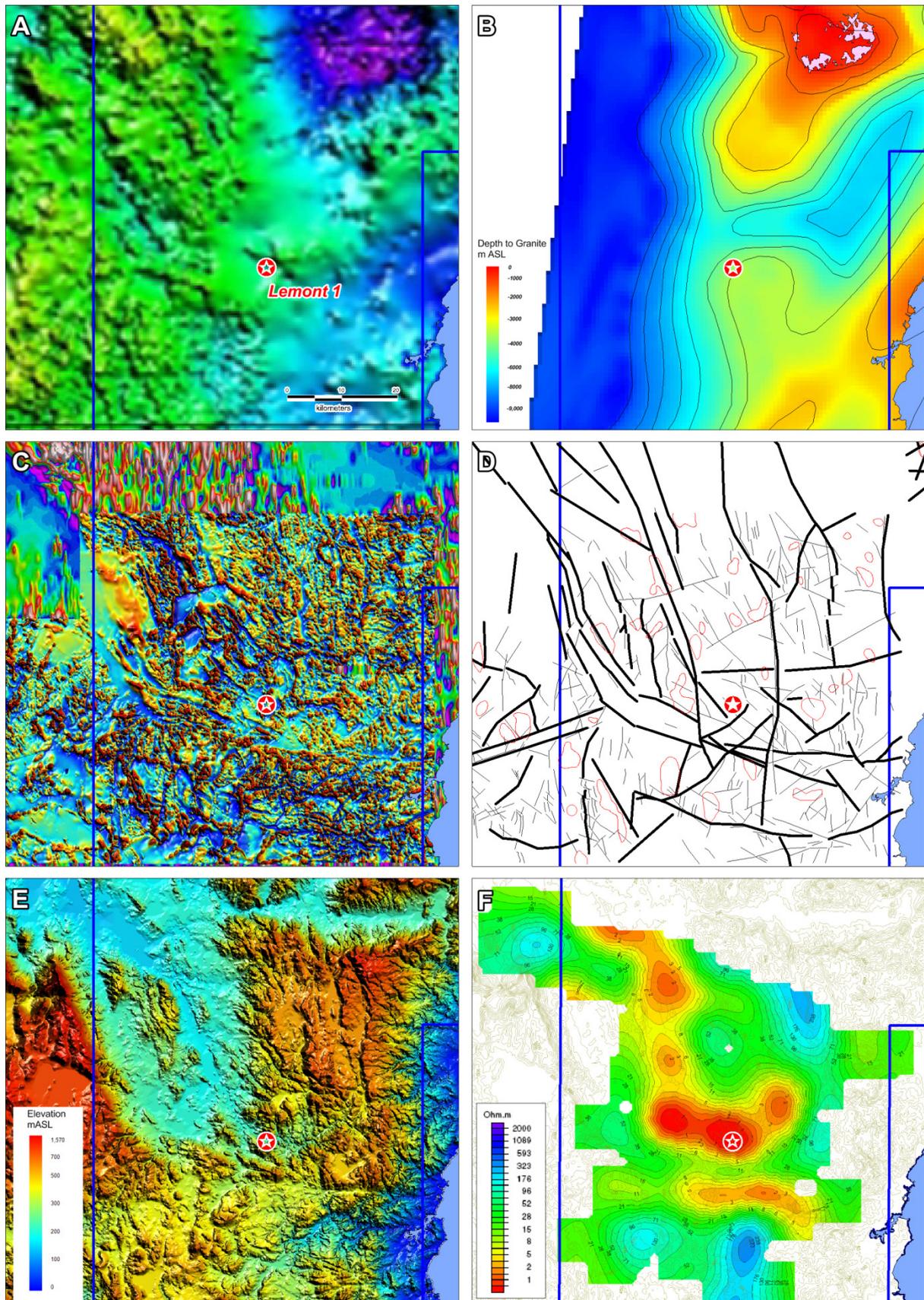


FIGURE 8: GEOPHYSICAL DATA SUMMARY (A) BOUGER GRAVITY IMAGE 2011, (B) DEPTH TO GRANITE INTERPRETATION BASED ON GRAVITY DATA; (C) TMI AEROMAGNETIC IMAGE; (D) MAGNETIC INTERPRETATION LINEAMENTS (BLACK) AND POSSIBLE DOLERITE FEEDERS (RED); (E) DIGITAL ELEVATION MODEL IMAGE; (F) 2010 MAGNETOTELLURIC MODEL -3000M ASL PLAN SLICE.

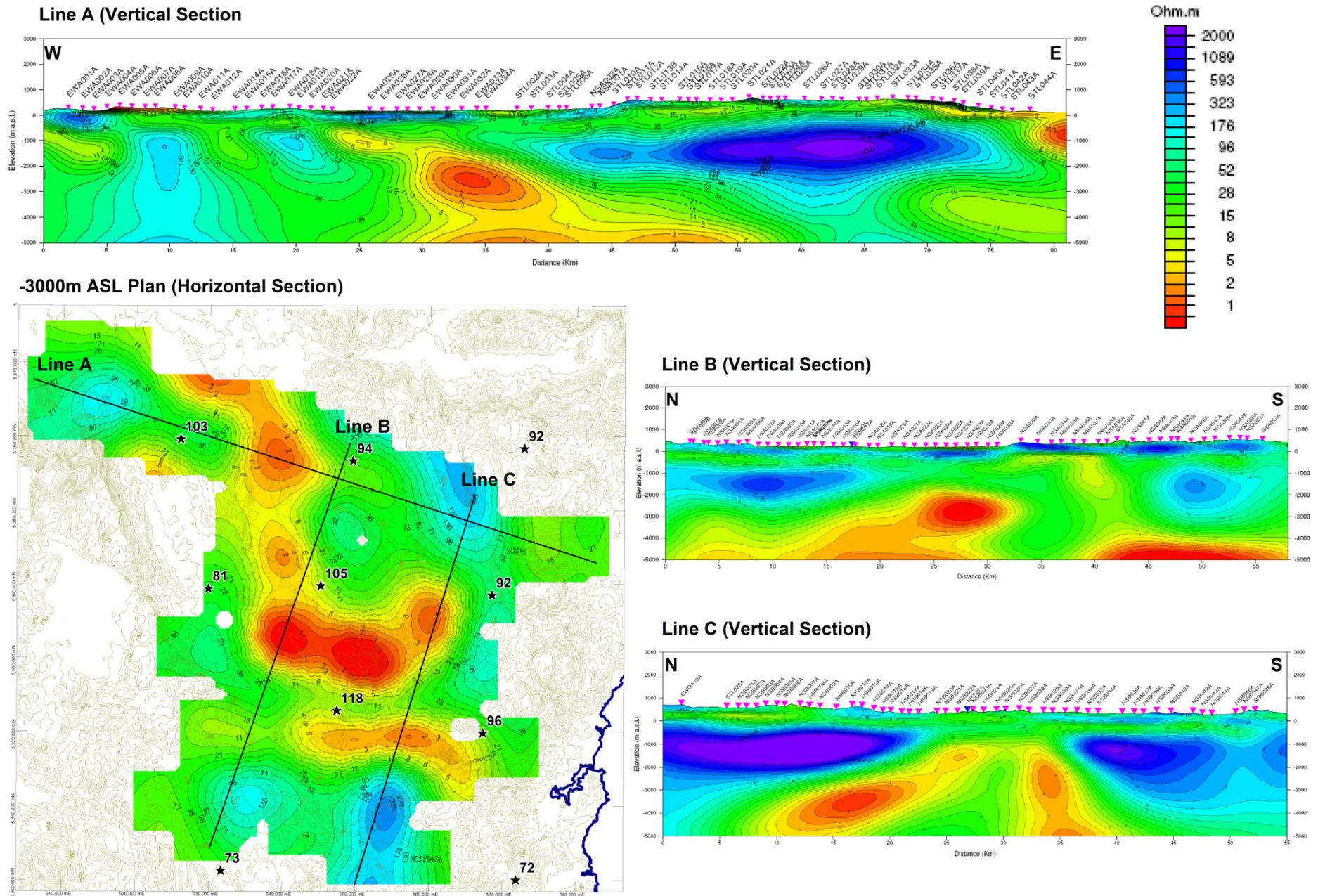


FIGURE 9: SELECTED RESULTS FROM THE 3D MAGNETOTELLURIC SURVEY PRESENTED AS RESISTIVITY IMAGES. ALL IMAGES SHARE THE SAME SCALE (SHOWN). VERTICAL SECTION LINES ARE AS LOCATED ON THE -3000M ASL PLAN. VERTICAL EXAGGERATION OF THESE SECTIONS IS 2:1. THE LOCATION OF SURFACE HEAT FLOW VALUES (MWM-2) FROM KUTH'S SHALLOW HEAT FLOW PROGRAM ARE SHOWN ON THE PLAN AS BLACK STARS.

GEOHERMAL DATA

Legacy heat flow data available in Eastern Tasmania comprise two values, both derived from areas of granite outcrop, at Coles Bay on the coast and Storeys Creek in the Fingal Valley (Figure 10). Both values are in excess of 100mWm^{-2} and therefore support the premise that the local granites include high heat-production components. However, the quality of these measurements is uncertain; in particular the high value at Storeys Creek may be influenced by local effects including known uranium mineralisation.

Between 2007 and 2009 KUTh undertook a program of shallow drilling to enable systematic estimation of surface heat flow across its then tenement area. Shallow heat flow holes (RC collar to 100m, diamond tail to ca. 200m TD) were successfully drilled at 36 locations on a roughly 20 x 20 km grid. Heat flow modelling was undertaken using precision temperature logs and divided bar thermal conductivity determinations derived from selected core. This work resulted in the identification of several significant thermal anomalies (defined as areas where heat flow is $>90\text{mWm}^{-2}$) that display a good spatial correlation with the predicted location of buried granite (Figure 10). The largest observed anomaly extends $\sim 4000\text{km}^2$ across the central portion of SEL 26/2005 and includes three zones of very high heat flow ($>100\text{mWm}^{-2}$) at Lemont and Macquarie in the Midlands and at Fingal in the far north-east. The largest and strongest of the detected anomalies is that observed at the Lemont site.

RESOURCE ESTIMATION

Following on from surface heat flow determination, three-dimensional (3D) conductive thermal modelling of the Lemont area was undertaken in 2009 using a combination of legacy and newly acquired geological and geophysical data. The results of this work inferred a total contained heat resource of around $260,000\text{PJ}_{\text{th}}$ within a 1019km^3 reservoir located between 3 – 5km depth in the Lemont area (Figure 10). Temperatures predicted within the resource area are up to 200°C at 5km depth. Geothermal plays initially identified at Lemont included a granite-related Hot Dry Rock target in the east and a less well defined but slightly hotter target in the west. Significantly, the conductive model inversion was found to be unable to account for the presence of extreme heat flow values in these western resource areas without the addition of a previously unrecognised geological unit. A non-unique conductive solution comprising an additional body of rock of either high heat production or high thermal conductivity (termed 'Unit A' in the model) was required in this area to enable model fit. This feature may represent a previously unrecognised lithology (e.g. granitoid) or structure (highly foliated sediment). Alternatively, the additional heat flow into the western resource area could be the result of heat advection by fluids along localised permeable pathways. Subsequent recognition of the spatial association between high heat flow and the large conductive MT anomaly appears to support the latter model, leading to the development of the permeable "conventional" hot rock play model for Lemont (Figure 11).

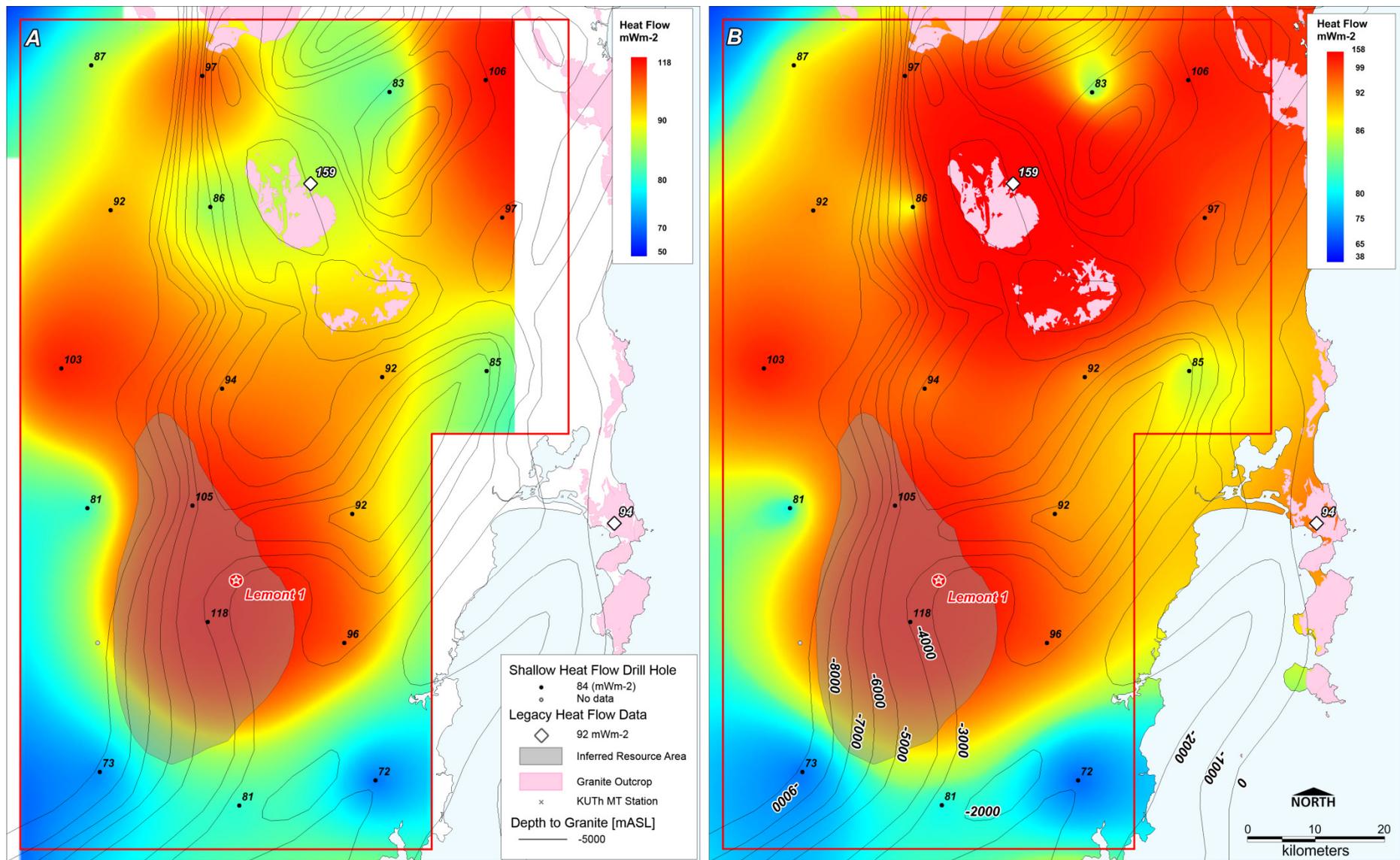


FIGURE 10: SURFACE HEAT FLOW GRIDS DERIVED FROM (A) KUTH DATA ONLY; (B) KUTH DATA AND AVAILABLE LEGACY DATA. RESULTS CONSISTENTLY INDICATE A STRONG ANOMALY ASSOCIATED WITH GRANITE, BOTH BURIED AND OUTCROPPING. ALSO ILLUSTRATED IS THE OUTLINE OF THE INFERRED RESOURCE AREA AT LEMONT.

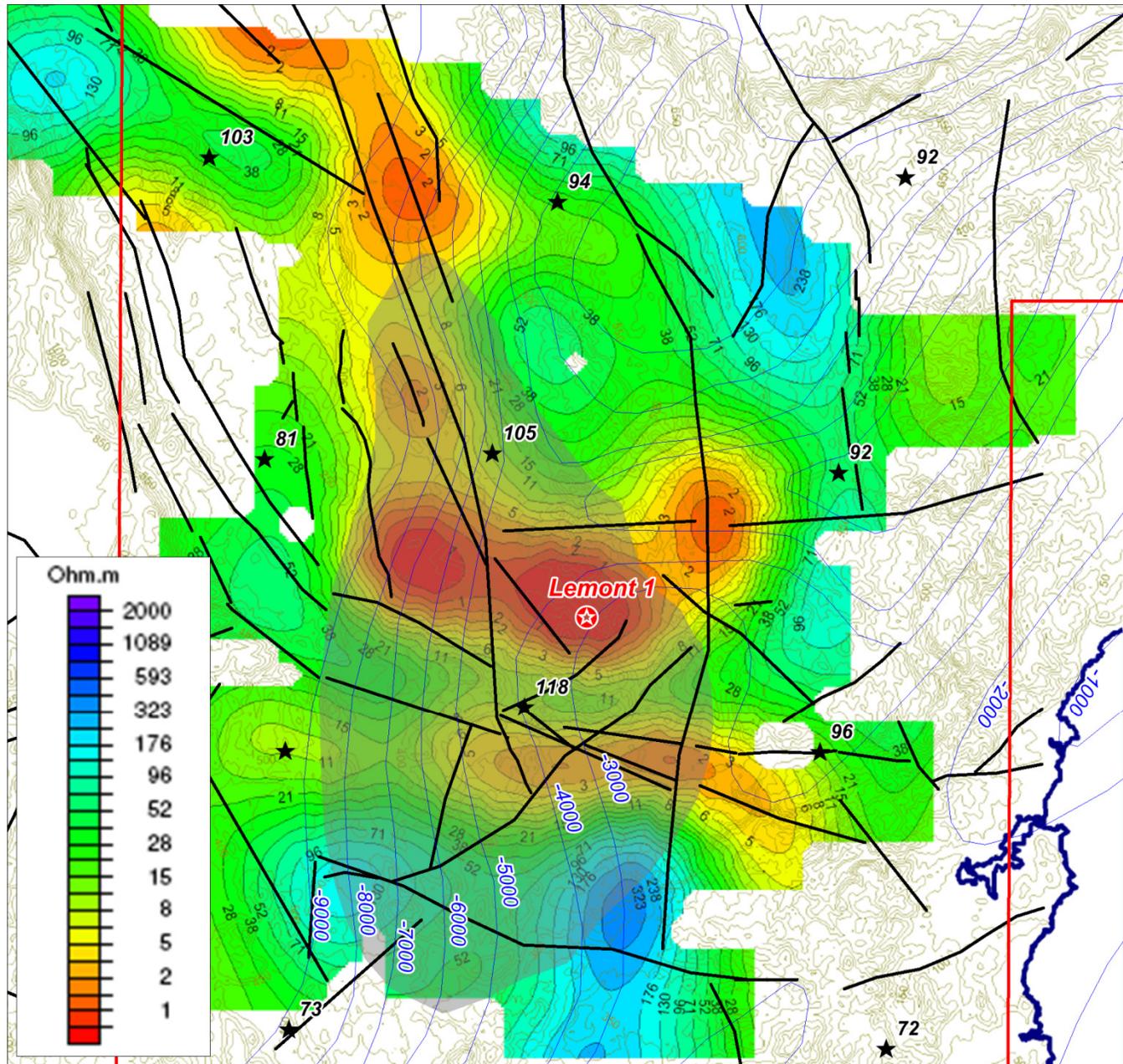


FIGURE 11: OUTLINE OF THE LEMONT INFERRED RESOURCE AREA (GREY) PROJECTED ATOP THE -3000M ASL RESISTIVITY IMAGE DERIVED FROM 3D MT MODEL. ALSO SHOWN ARE DEPTH TO GRANITE CONTOURS (BLUE; MASL) AND KUTH SURFACE HEAT FLOW RESULTS (BLACK STARS; MWM^{-2}).

DRILL TARGETING

The striking spatial coincidence of deep fractured zones (from gravity and aeromagnetic data), electrically conductive MT anomalies and anomalously high heat flow within the Lemont region has led to the development of a new conceptual play model for this area. Originally conceived as a relatively high temperature, low permeability Hot Rock prospect, Lemont now appears to host what may be a 'Conventional' (naturally permeable) Hot Rock play with warm/hot fluids at depth along zones of fracture permeability. 2D numerical fault stress-state modelling undertaken across Lemont in 2011 and based upon geophysical models combined with stress data (derived from an earthquake focal mechanism determined on a local earthquake in 2010) confirm the potential for permeable fracture systems at depth in this area

Key questions following the completion of the surface exploration program include the resource prospectivity (the temperature at depth), the nature of the thermal regime (conductive vs. advective), the MT anomaly (permeable fracture or fossil alteration) and the deep geology (to validate and improve geophysical models). Whilst the results to date are encouraging, Lemont remains a relatively high risk prospect and a low-cost slim-hole exploration drill hole is now considered to be the most efficient and effective method of acquiring data and advancing the project.

Placement of the Lemont 1 hole is designed to target the conductive MT anomaly within the immediate vicinity of the known high heat flow. The conductive zones form discrete and clearly defined targets comprising two sub-parallel shallow-dipping east-west trending planes located within basement at >1000 m depth. Sufficient data are available from the MT surveys to confidently locate the drilling, however, it should be noted that smoothing errors are likely to be present in the model. Expert advice suggests that a resistivity of >5 ohm.m should be adequate for targeting. However, to insure against locational error, Lemont 1 has been located and designed to intersect the strongest part of the anomaly (<1ohm.m) and therefore requires a minimum total depth of 3000 m (Figure 12). Vertical drilling has been selected as the most practical and efficient means of reaching this depth, minimising drill complexity and risk to the hole.

Based upon current gravity modelling, a total depth of 3000 m at the Lemont 1 site will bring the end of hole to within <500 m of the underlying granitic body (Figure 12). Despite this, extension of the planned total depth of the hole is not suggested due to the large uncertainty (± 1000 m) in predicted top granite, the significantly increased drill cost and risk of hole failure. Further, the potential for fracture permeability is predicted to be highest in rocks marginal to the relatively strong granite massive, not in the granite itself. Options for low risk hole extension may be considered further in the following drill planning and design phase but should not be considered a key objective of this hole.

The dips of the two Lemont conductive zones oppose one another, trending to the north in the north and to the south in the south, forming a large inverted v-shaped structure the apogee of which lies beneath the Lemont heat flow hole (Figure 9). This observation has led to an alternative model where the conductive zones are interpreted not as fracture zones but as clay-filled alteration halos surrounding a central non-conductive fracture zone. Were this to be the case then it may imply that fracture permeability, if present, is best sought in the non-conductive area. Unfortunately, the scale of the anomalies is such that it is not practical to intersect both conductive and non-conductive areas in a single hole. For this reason, and because the non-conductive zone may also represent an undeformed granite body, it has been determined most prudent to test the nature of the targetable conductive zones first. Should sufficient temperature be detected at depth in this area then information derived from this hole may guide further exploratory drilling, including of the central non-conductive zone.

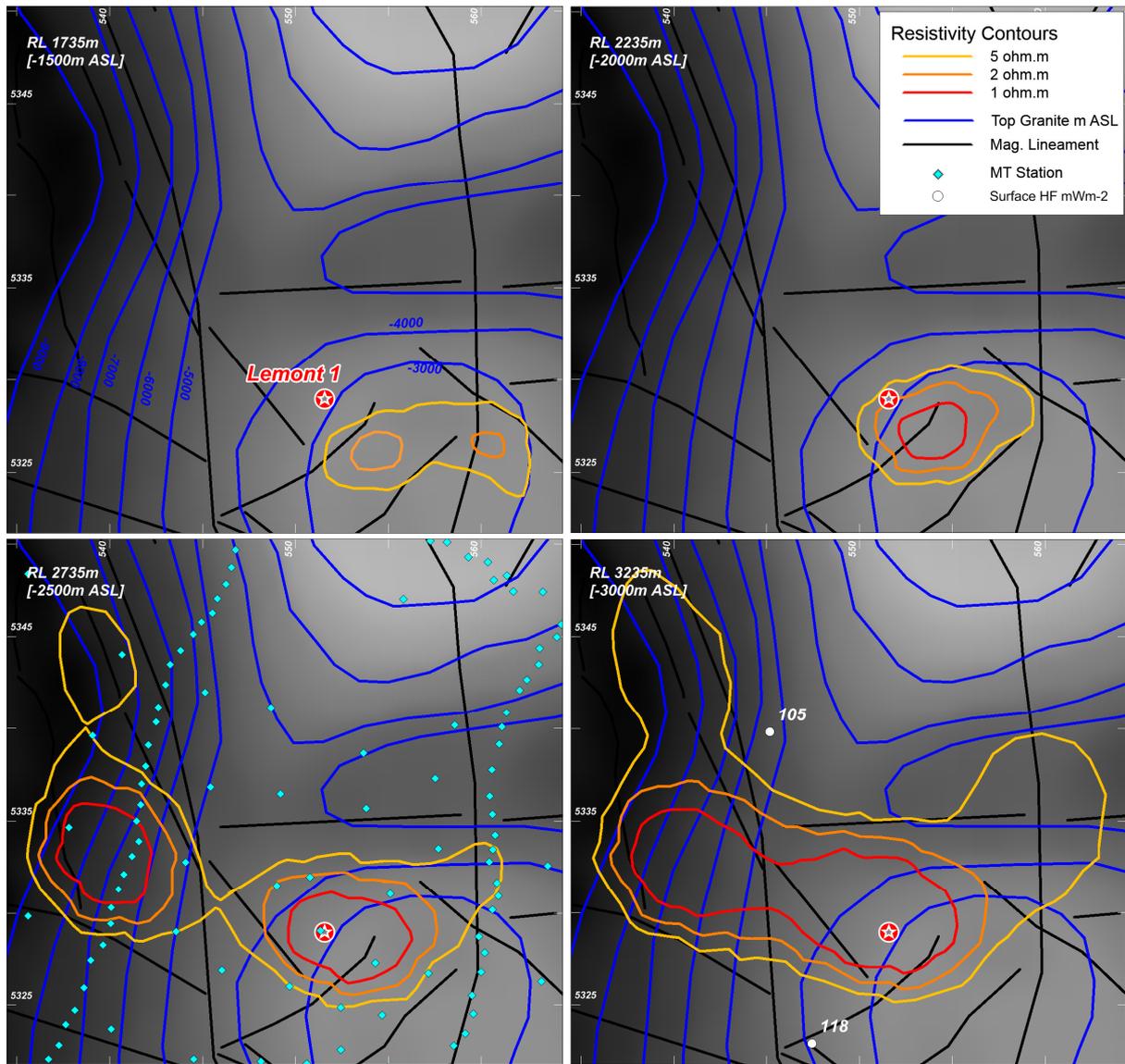


FIGURE 12: LEMONT 1 DRILL TARGETING SHOWING RESISTIVITY CONTOURS AT NOMINATED RLS, TOP GRANITE, MAGNETIC LINEAMENTS, AVAILABLE SURFACE HEAT FLOW AND MT STATION LOCATIONS.

WELL GEOLOGICAL PROGNOSIS

The lack of available knowledge regarding the deep stratigraphy implies that there is considerable uncertainty regarding the nature and location of geological units at depth in the Lemont area. A best estimate geological prognosis for the well is provided in Figure 13.

The interpretation of the conductive MT anomaly (drill target) as a fluid-filled fracture zone, together with the location of Lemont along a zone of implied structural convergence, means that the well may intersect significant fault or fracture zones at depth. The confirmation of the existence and nature of such zones will be one of the main aims of this hole.

						Geology				Drill Conditions		Data Requirements	Logging						Testing				
Graphic Column	Depth From (m)	Depth To (m)	Interval Top (m ASL)	Interval Base (m ASL)	Resistivity/100m	Age	Stratigraphic Unit	Lithology	Notes				Geological log	PTS log	Density log	Gamma log	Resistivity Log	Image Log	Sonic V***	Core	Stress test	Flow testing	Seismometer
	0	100			24																		
	100	200			28																		
	200	300	235	-265	24	Jurassic	Dolerite	Intrusive dolerite sill. Hard, crystalline rock. Interval may include one or more sections of Upper and/or Lower Parmeener Sediment.	Hard rock from surface. Core samples available from shallow KUTH holes.	Hard, homogenous and stable. Expect loss/inflow along discrete fractures.	Thermal gradient, lithology												
	300	400			21																		
	400	500			31																		
	500	600			39																		
	600	700			54																		
	700	800	-265	-765	64	Permian	Lower Parmeener	Flat-lying mudstone/siltstone with basal sand/Conglomerate Undeformed.	Core samples available from shallow KUTH holes and other previous drilling at MRT. Additional dolerite intrusions may occur throughout this sequence.	Moderate hardness. Expect loss/inflow along discrete fractures.	Thermal gradient, lithology												
	800	900			72																		
	900	1000			76																		
	1000	1100			74																		
	1100	1200			66																		
	1200	1300			56																		
	1300	1400			44																		
	1400	1500			33																		
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	1800	1900			9																		
	1900	2000			6																		
	2000	2100	-765	-2765	4	Siluro - Devonian	Mathinna Group	Interbedded Siltstone/Sand Metasediments. Sedimentary structures still visible including graded bedding. Relatively hard rock, deformed, folded & cleaved with quartz veining, low grade metamorphism increasing with proximity to granite contact. A fracture permeable, clay-rich zone is expected in deeper sections associated with low resistivity values (<5 ohm.m)	Bedding dips are expected to vary with depth. Shallow core samples are available from KUTH holes and previous drilling in adjacent areas from MRT. Electrically conductive zone may indicate presence of an extensive fractured zone. This zone may be permeable and may contain and flow fluids.	Hard to moderate rock, variable lithologies but should be stable hole conditions where unfractured. Expect loss/inflow along discrete fractures in upper sections. Conductive zone (>2000mD) is potentially clay rich, fractured and unstable and may host significant losses/inflow.	Thermal Gradient, lithology, thermal conductivity, density, fracture orientation, fluid flow, in-situ stress												
	2100	2200			3																		
	2200	2300			2																		
	2300	2400			2																		
	2400	2500			1																		
	2500	2600			1																		
	2600	2700			1																		
	2700	2800			1																		
	2800	2900			1																		
T.D 3000m	2900	3000			1																		
	3000	3100			1																		
	3100	3200			1																		
	3200	3300			1																		
	3300	3400			1	Devonian	Granite*	Hard, massive, coarse grained, crystalline, high quartz content.	Core samples of analagous rock available from MRT	Hard, homogenous and stable. Expect loss/inflow along discrete fractures.	Thermal gradient, lithology, thermal conductivity, density,heat production, fractures, in-situ stress												
	3400	3500			1																		

* Granite contact may lie between 2 - 4km depth

FIGURE 13: LEMONT 1 WELL PROGNOSIS AND RECOMMENDED EVALUATION/TEST SCHEDULE.

RESERVOIR CONDITIONS

TEMPERATURE

Three-dimensional conductive temperature modelling of the Lemont hole predicts temperatures of around 200°C at approximately 5km depth (Figure 14). Relying upon relatively shallow heat flow measurements and an assumed geology, temperatures predicted by this model at a depth of 3km are around 130°C rising to around 160°C at 4km. Should an advective geothermal system (associated with the movement of warm or hot waters on fractures) be present at depth it is expected that the geothermal gradient may be increased above the flowing zone and drop off significantly below it. Whilst this would result in higher temperatures at shallower depth than those predicted by the conductive model, the absence of a high-temperature volcanic environment still implies that, irrespective of the gradient and temperature distribution, it is unlikely that temperatures above 200°C will be present at 3km in this area. It is therefore recommended that a maximum design temperature of 200°C be adopted as a reasonable margin of safety for this well.

PRESSURE

No information is currently available regarding the likely pressure gradient at Lemont. Given that the area is not known to be host to significant petroleum resources, overpressured formations or high temperature steam systems, it is probable that pressure will increase following a hydrostatic gradient (Figure 14). However, the potential effects of fluid-filled fracture zones should be considered in the well design phase.

CHEMISTRY

No information is presently available on the likely composition of potential geothermal fluids at Lemont. Given that this region is not host to a volcanic environment it is reasonable to assume that any *in situ* reservoir fluids will be relatively benign.

CASING CONSIDERATIONS

A casing design has not yet been produced for the Lemont hole. Considerations likely to be of relevance to the production of a casing plan include:

1. State regulatory requirements (the hole may be required to comply with petroleum regulations)
2. The protection of shallow fracture-permeable aquifer systems in the surficial sequences
3. The potential ongoing use of the hole for deep seismic instrument emplacement
4. The potential for intervals of fractured or unstable ground at depth
5. The status of the well as an exploration/appraisal hole (not a production hole)

SAMPLING & WELL EVALUATION

Primary data collection within the hole will comprise geological and wireline logging. The feasibility of stress and flow testing will be considered as part of the well design.

The style of drilling to be used at Lemont 1 has yet to be finally determined and will depend largely upon engineering considerations. Geological logging of the well is imperative regardless of the nature of the sample return (core or cuttings). Should the well produce cuttings, then these should be logged on site to a minimum interval of 3m by an experienced site geologist. Logging should focus on determining the original lithologies, along with the distribution, mineralogy and intensity of alteration and veining which may be associated with fracture zones. Descriptions of the core/cuttings will be included in daily geological reports and collated into a composite formation description log. Cuttings and/or core samples will be stored for possible future

reference. Laboratory analysis of selected samples may be undertaken to assist in the geochemical characterization of the well intersection.

Should the well be drilled primarily as rotary (cuttings) then it is still possible that some core may be cut to help characterise the main formations. The decision to cut cores will be at the discretion of the rig geologist with the approval of the KUTH manager and the drill supervisor. Selected samples of core (if cut) may be prepared as thin sections and subject to petrological analysis. All core will be sub-sampled to provide discs for thermal conductivity analysis. Core may also be divided for bulk geochemical analysis if deemed appropriate by the rig geologist.

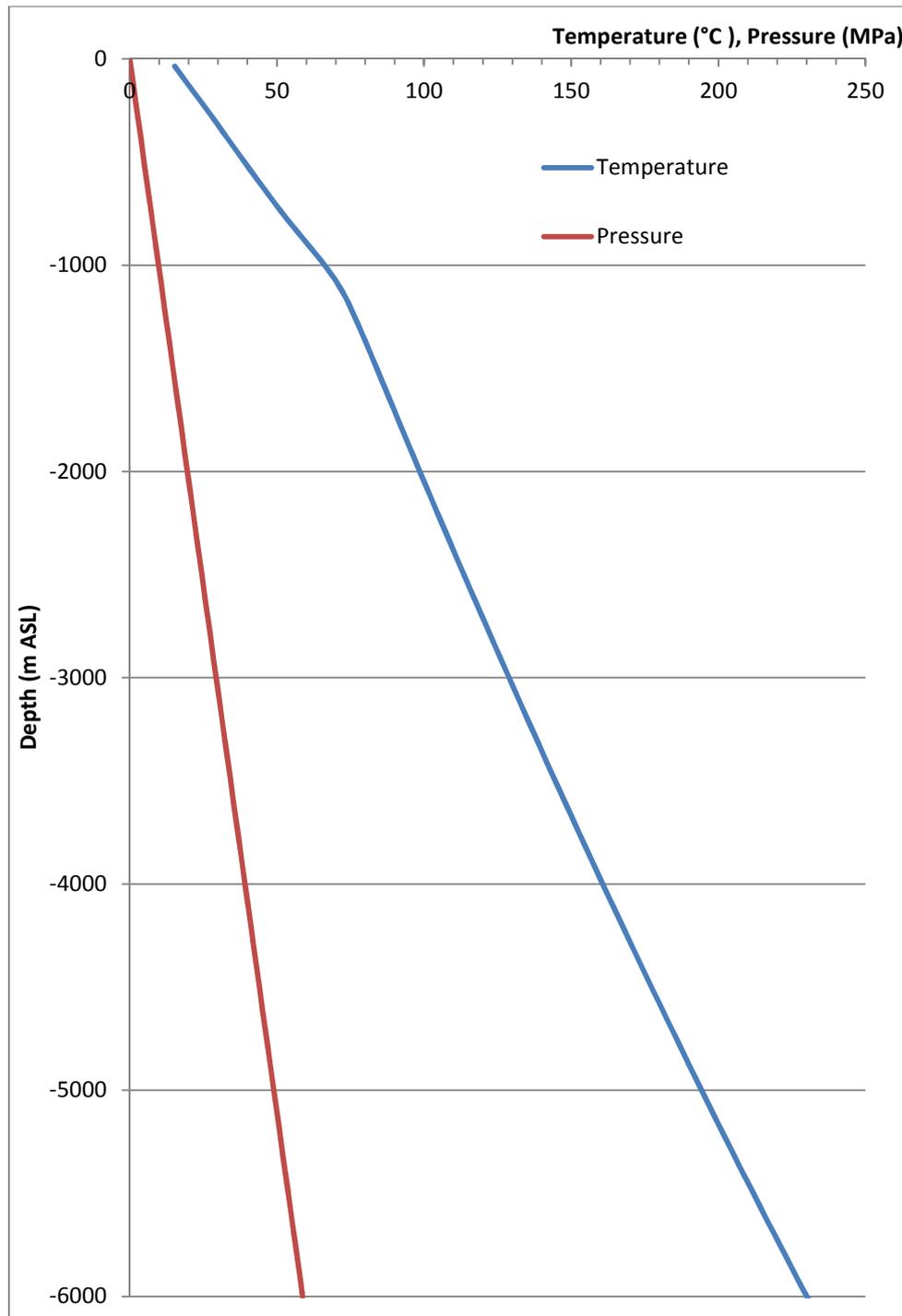


FIGURE 14: PREDICTED TEMPERATURE AND PRESSURE WITH DEPTH, LEMONT 1

Regardless of the nature of the sample return a comprehensive program of wireline logging is desirable to characterize the well intersection, provide data for input into geophysical models and to test the performance of logging tools. Figure 13 includes an ideal well evaluation program. The purpose of the various logs listed in this figure would be as follows:

1. PTS: provide information on pressure, temperature and flow in the well
2. Density: provide control data for gravity modelling
3. Resistivity: provide control data for Magnetotelluric modelling
4. Gamma: provide data to discriminate and distinguish individual lithologies
5. Sonic velocity: provide input data for calibration of seismic models (including 3D ambient survey)
6. Image: acoustic log to provide a map of fracture distribution in any possible reservoir zones

Ideally, PTS logging would be run at intermediate depths during natural breaks in the drilling process to test the predicted increase of temperature with depth and ensure the viability of continued drilling.

Depending upon the success of the well, options such as downhole stress and flow testing may be utilised at selected intervals. The requirements of these techniques should be considered in the well design process.

POTENTIAL RESEARCH COLLABORATION

The cutting of a deep drill hole in eastern Tasmania provides a unique opportunity for research and data acquisition in a previously under-explored and little understood area. Through strategic research collaborations this project has the potential to produce benefits which extend far beyond the commercial imperatives of KUTh. Scientific investigations in and around this hole will combine KUTh's existing database with data collection for the benefit not only of future geothermal understandings but also broader stratigraphic, geodynamic and economic goals. The needs of potential collaborative partners should be assessed and considered as part of the well design process.

CONTACT INFORMATION

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APPENDIX 1

Engineering Properties of the Tasmania Dolerite