

## **Stratigraphy Prognoses**

Stratigraphy prognoses for well sites are based on data gathered from existing and recent papers. In addition to and reports from different formations on each region with regard to the expectation of finding hydrocarbons, the prognoses are based on the suggested petroleum systems. Two petroleum system models are suggested for Tasmania basin (Gondwanan and Larapintine), which show potential development for sources, reservoirs and seals in different formations.

In the Gondwanan system; source rocks have been identified in Unit 1 (Permian) as Upper Parmeener Supergroup, Liffey Group (Faulkner Group in south), Macrae Mudstone, Woody Island Formation (Quamby Formation in south) and Tasmanite Oil Shale (Permian, Lower Parmeener Supergroup).

Reservoirs are recognized in Eocene-Oligocene (Cainozoic); Unit 2 (Triassic); Unit 1, Palmer Sandstone (Risdon Sandstone in the South), Garcia Sandstone (Mini Point and Deep Bay formations in the South) and Liffey Group (Faulkner Group in the South, Permian). In some cases highly fractured dolerite could be assumed to be a good underground reservoir for oil or gas.

Seal formations that have been identified include the diabasic dolerite (Jurassic), and the latest formation of the Bogan Gap Group (Fernree Mudstone in the South, Permian). Liffey Group, Cascade Group clay and marginal marine siltstone may also act as seals locally (Burrett and Reid 2004).

In the Larapintine system; source rock is identified in Upper Limestone Member (Gordon Group).

Reservoirs are recognized in Crotty Quartzite (Eldon Group), Palaoakarst, Upper Limestone Member and Lower Limestone Member of Gordon Group.

Seal formations are identified as Bell Shale impure Limestone and thinly bedded fine-grained quartz siltstone of Eldon Group and fossiliferous, subtidal micrite with shallowing upward cycle of biocalcarenite of upper Limestone Member also act as seals.

The thickness of each formation have been calculated by measuring the Two Way Time on the seismic section of the particular line close to the drill sites, with respect to seismic velocities proposed by Burrett (2002) and Stacy (2004). Plus using known thicknesses from field observations.

Stratigraphical columns listed below are in order of volume ranking, proposed by GSLM for the future drilling activities.

Bellevue Anticline BV#1D

Thunderbolt Anticline # 1

Bracknell Dome # 1

Derwent Bridge Anticline # 1

Interlaken Anticline# 1

Nile River Fault Block#1

Butler Rise Fault Block #1

Cressy Anticline #1

Hummocky Hills Fault B# 1

Cressy Anticline #2

Macquarie R. Anticline # 1

Stockwell Fault Block # 1

Scotts Tier Fault Block # 1

Lonnavale # 2

Steppes Anticline # 1

Quamby Fault Block # 1

**Bellevue Lake Echo (BV#1)- Predicted- Section AMG 66- Coordinates: 465 660mE, 5 338 904mN**

Depth(m)	Lithology	Age	Unit	Lithological Description	
100		Jurassic	Dolerite	Dolerite (diabase). (seal)	
200					
300					
400					
500		Triassic ?	UPSG UFS	Hornfels Contact Metamorphism	
600				Unit 2: Well sorted quartz sandstone and lutite. (reservoir) ?	
700				Unit 1: Carbonaceous shales, coal measure, sandstone. (source, reservoir)	
800		Late Permian	Lower Permian Sequence L.F.S. Upper Marine Seq.	Bogan Gap Group (30 -180 m): Mudstone and siltstone. (seal)	
900				Palmer Sandstone: Poorly sorted & unfossiliferous sandstone. (reservoir)	
1000		Early Permian		Springmount Mudstone: Mudstone, siltstone & sandstone.	
1100				Garcia Sandstone: Sandstone and conglomerate within siltstone. (reservoir)	
1200		Late Carboniferous - Early Permian		Poatina Group (0 - 180 m): Poorly sorted siltstone, fossiliferous sandstone and pebbly sandstone.	
1300				Liffey Group: Freshwater sandstone, siltstone & mudstone. (reservoir)	
1400				Mudstone with some coal measures. (source)	
1500				Macrae Mudstone: Mudstone, siltstone & carbonaceous rocks. (source)	
1600		Late Carboniferous - Early Permian		Golden Valley G. (70-80 m): Fossiliferous siltstone, sandstone&micrite.	
1700				Quamby Formation (~100 m): Dark massive-bedded pyritic and carbonaceous siltstone, rare marine fossils. (source)	
1800				Tasmanite oil shale (~2 m). (source)	
1900				Stockers Tillite (210-300 m): Lithified boulder clay, glaciolacustrine and conglomerate.	
2000				Unconformity	
2100		Silurian - Early Devonian	Eldon Group	Bell Shale (0-420 m): Impure limestone, mudstone and thinly bedded fine-grained quartz sandstone, siltstone. (seal)	
2200				Florence Quartzite (0-490 m): Fine-grained quartz sandstone with minor mudstone interbeds.	
2300				Keel Quartzite (0-120 m): Fine grained quartz sandstone.	
2400				Amber Slate (0-240 m): Interbedded mudstone, siltstone and fine-grained sandstone.	
2500				Crotty Quartzite (0- 490 m): Quartz sandstone, conglomerate and mudstone. (reservoir)	
2600					
2700		Ordovician	Gordon Group	Upper Limestone Member (~ 700 m): Coralline and stromatoporoid biocalcarenes. (reservoir)	
2800				Mainly fossiliferous, subtidal micrite with shallowing upward cycle, some biocalcarenes. (source)	
2900					

All thicknesses are approximate and are based on preliminary seismic data interpretation or extrapolation from fieldwork. Sources, reservoirs and seals are predicted from field work and laboratory data.



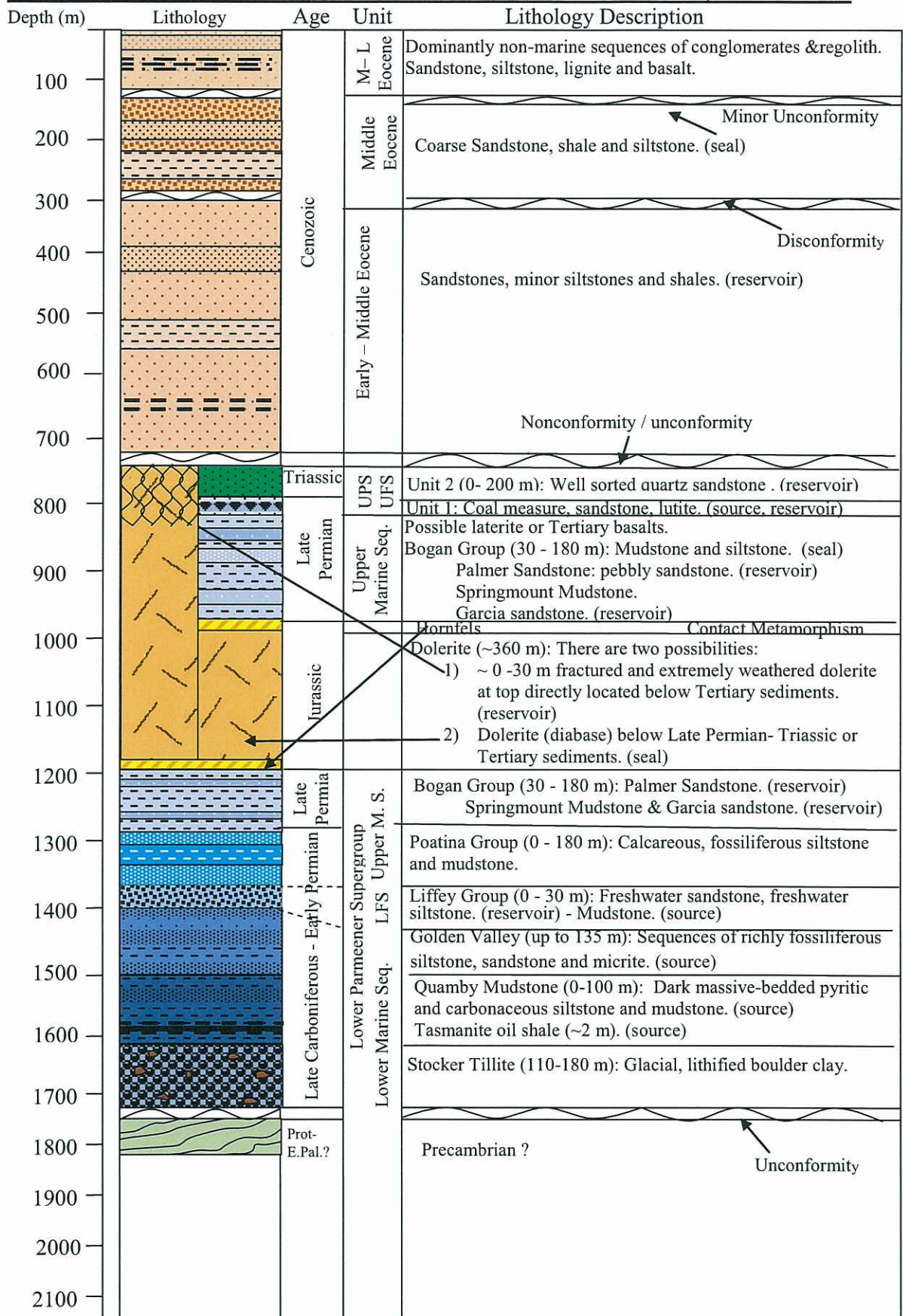
**Thunderbolt (TB #1)- Predicted Section AMG 66 Coordinates:465 931 mE, 5 287 859 mN**

Depth (m)	Lithology	Age	Unit	Lithological Description
100		Jurassic	Dolerite	Dolerite (diabase). (seal)
200				
300				
400				
500		Triassic	Upper P.S. U. Freshwater S.	Hornfels Contact Metamorphism
600				Knocklofty Formation (~ 185 m): Well-sorted cross-bedded sandstone, quartz sandstones and dominantly lutite sandstone . (reservoir)
700				
800				Cygnets Coal Measures: Carbonaceous rocks, coal measure. (source & reservoir)
900		Late Permian	Upper M. S.	Ferntree Formation (30-180 m): Massive, grey mudstone with bioturbation and dropstones. Massive grey-cream mudstone and sandstone. (seal)
1000				
1100				Malbina Formation: Grey mudstone, siltstone and sandstone.
1200				Cascades Group: Poorly sorted sandstone.
1300		Late Carboniferous - Early Permian	Lower Permian Seq.	Faulkner Group: Fine grained dark grey micaceous siltstone, sandstone with some coal measures. (source & reservoir).
1400				Bundella Formation: Alternating sequences of fossiliferous siltstone & sandstone. Minor limestone.
1500				Woody Island Formation: Well sorted dark grey siltstone. Dark massive bedded pyritic and carbonaceous siltstone. (source)
1600				Tasmanite oil shale (~2 m). (source)
1700		Late Carboniferous - Early Permian	Lower Permian Seq.	Truro Formation: Lower glaciomarine sequences of mudstone, pebbly mudstone, pebbly sandstone and poorly sorted lithified boulder clay with quartzite clasts in basal tillite.
1800				
1900				Paleokarst ( reservoir) Unconformity
2000		Ordovician	Gordon Group	Upper Limestone Member (~700 m): Coralline and stromatoporoid biocalcarenes. (reservoir)
2100				
2200				Mainly fossiliferous, subtidal micrite with shallowing upward cycle some biocalcarenes. (source)
2300				
2400		Ordovician	Gordon Group	Lords Siltstone: Fossiliferous siltstone
2500				
2600				Lower Limestone Member (~390m): Mainly dolomitic, fossiliferous, micritics with minor bioclastic grainstone beds. Upward shallowing cycles. (source, reservoir)
2700				
2800		Ordovician	Gordon Group	Unfossiliferous, cherty limestone.
2900				
3000				Cashion Creek Limestone (~ 150 m): Silicified fossils, oncolitic dolomitic limestone.
3100				
3200		Ordovician	Gordon Group	
3300				

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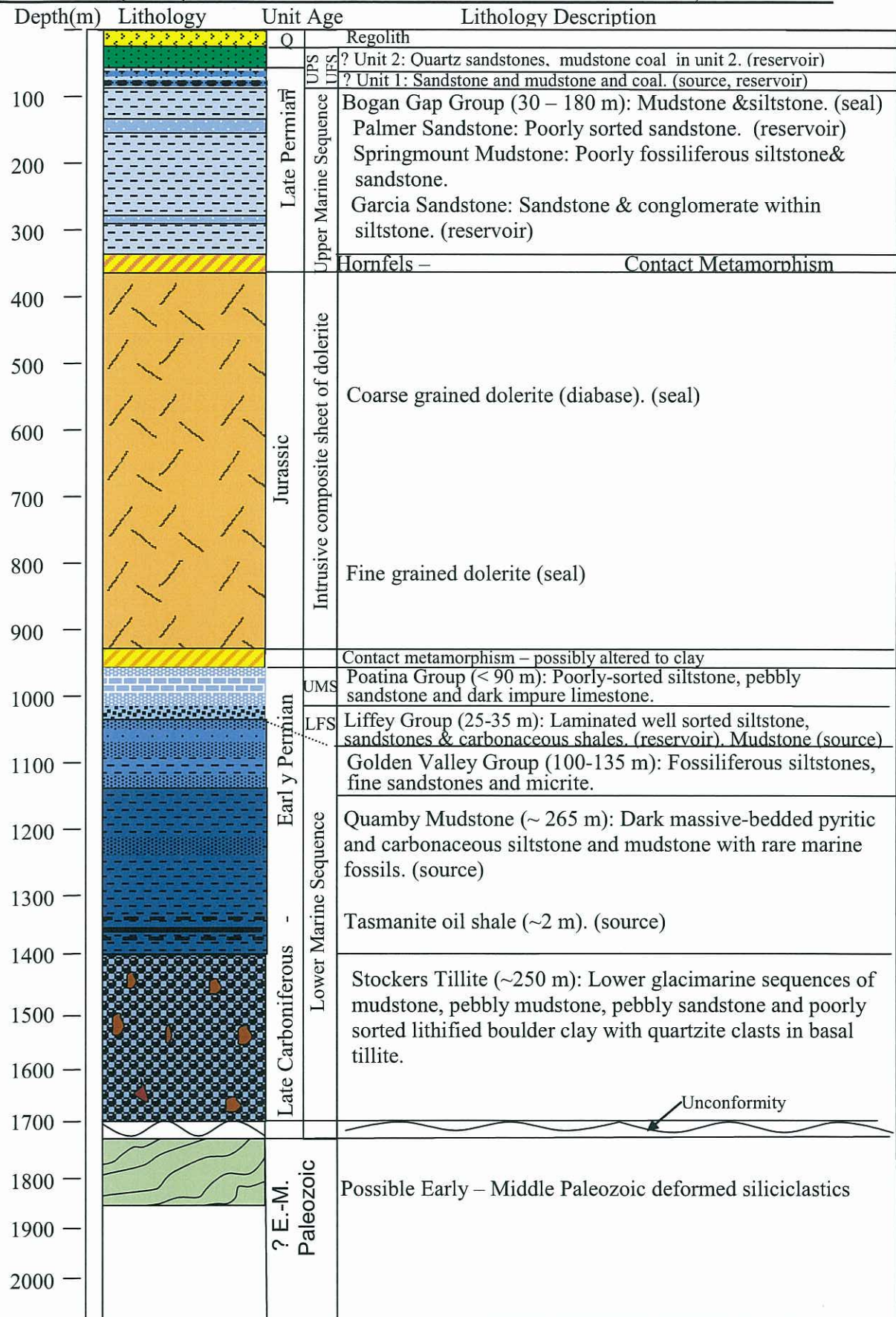


**Bracknell (BN#1)- Predicted- Section AMG 66- Coordinates: 497 915 mE, 5 388 924 mN**



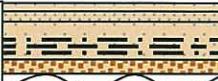
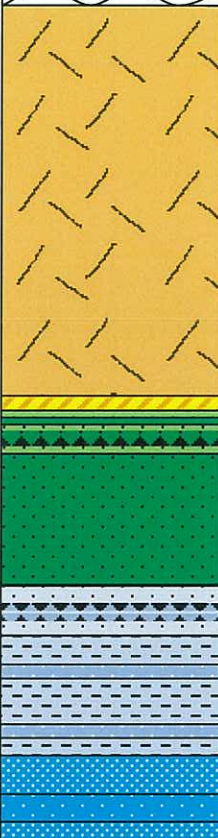

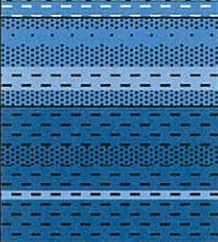

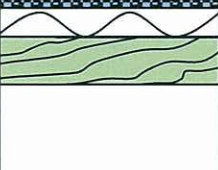

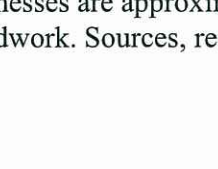



**Butlers Rise (BR#1)– Predicted Section-AMG66 Coordinates:537 627 mE, 5 334 856 mN**



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**Cressy 1(CR#1)– Predicted Section AMG66 Coordinates: 512 450 mE, 5 387 021 mN**

Depth(m)	Lithology	Age	Unit	Lithology Description
100		Ceno.	Eocene	Dominantly non-marine sequences of conglomerate and regolith. Coarse sandstone, siltstone, lignite and basalt.
200		Jurassic		Base Tertiary non-conformity
300				Dolerite (diabase). (seal)
400				
500				Base dolerite
600				Hornfels Contact Metamorphism
700		Triassic	Upper P. S. Upper F. S.	? Unit 3 (0-80 m): Quartz rich sandstone, lutite and coal measure.
800				Unit 2 (0-200 m): Sequences of well-sorted quartz sandstone, feldspathic sandstone and lutite sandstone. (reservoir)
900		Late Permian	Upper M.S.	Unit 1: Carbonaceous rocks, coal measure, sandstone. (source & reservoir)
1000				Bogan Gap Group (30 – 180 m): Mudstone & siltstone. (seal)
1100				Palmer Sandstone: Thin layer of pebbly sandstone. (reservoir)
1200				Springmount Mudstone.
1300				Garcia Sandstone: Coarse-grained pebbly sandstone.(reservoir)
1400				Poatina Group (0 - 180 m): Calcareous fossiliferous siltstone & sandstone.
1500				Liffey Group: Freshwater sandstone, siltstone & mudstone. (source and reservoir).
1600				Macrae Mudstone: Mudstone, siltstone & carbonaceous rocks. (source)
1700				Golden Valley Group (0 - 135 m): Richly fossiliferous siltstone & sandstone and mudstone with some limestone.
1800				Quamby Mudstone: (~260 m): Dark massive-bedded pyritic mudstone, carbonaceous siltstone and abundant glendonites and rare marine fossils. (source)
1900				Tasmanite oil shale (~2 m). (source)
2000				Stockers Tillite (~ 180 m): Glacial, lithified boulder clay, arkosic sandstone and conglomerate.
				Unconformity
		? E.-M. Paleozoic		Possible Early – Middle Paleozoic deformed.

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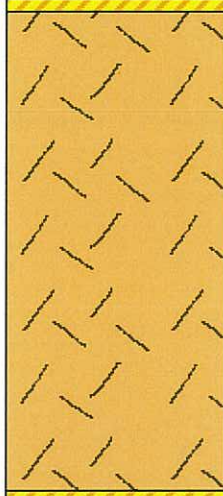

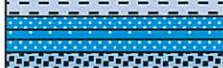







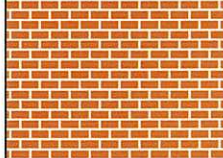
**Cressy 2 (CR#2) – Predicted Section AMG66 Coordinates:510 311 mE, 5 385 678**

Depth(m)	Lithology	Unit	Age	Lithology Description
0				Marine glacial, fluvioglacial and associated sediments.
100				Dominantly non-marine sequences of conglomerate and regolith.
200				Base Tertiary non-conformity
300				
400				Dolerite (diabase). (seal)
500				Base dolerite
600				Hornfels Contact Metamorphism
700				Unit 3: Undifferentiated fluviolacustrine sequences of sandstone, siltstone and mudstone.
800				Unit 2 :Dominantly quartz sandstone. (reservoir)
900				Unit 1: Carbonaceous rocks, coal measure, sandstone. (source & reservoir)
1000				Bogan Gap Group:
1100				Palmer Sandstone: Thin layer of pebbly sandstone. (reservoir)
1200				Springmount Mudstone. (source)
1300				Garcia Sandstone: Coarse-grained pebbly sandstone. (reservoir) )
1400				Poatina Group: Calcareous, fossiliferous siltstone.
1500				Liffey Group : Freshwater and paralic sandstone, freshwater siltstone. (reservoir)- Mudstone with some coal measures. (source)
1600				Macrae Mudstone: Mudstone, siltstone & carbonaceous rocks. (source)
1700				Golden Valley Group (up to 135 m): Richly fossiliferous siltstone & sandstone and mudstone with some lonestone.
1800				Quamby Formation (~ 260 m): Dark massive-bedded pyritic mudstone, carbonatious siltstone and abundant glendonites and rare marine fossils.
1900				Tasmanite oil shale (~2 m). (source).
2000				Stockers Tillite (~ 180 m): Glacial, lithified boulder clay, arkosic sandstone and conglomerate.
2100				Unconformity
2200				Possible Early – Middle Paleozoic deformed siliciclastics

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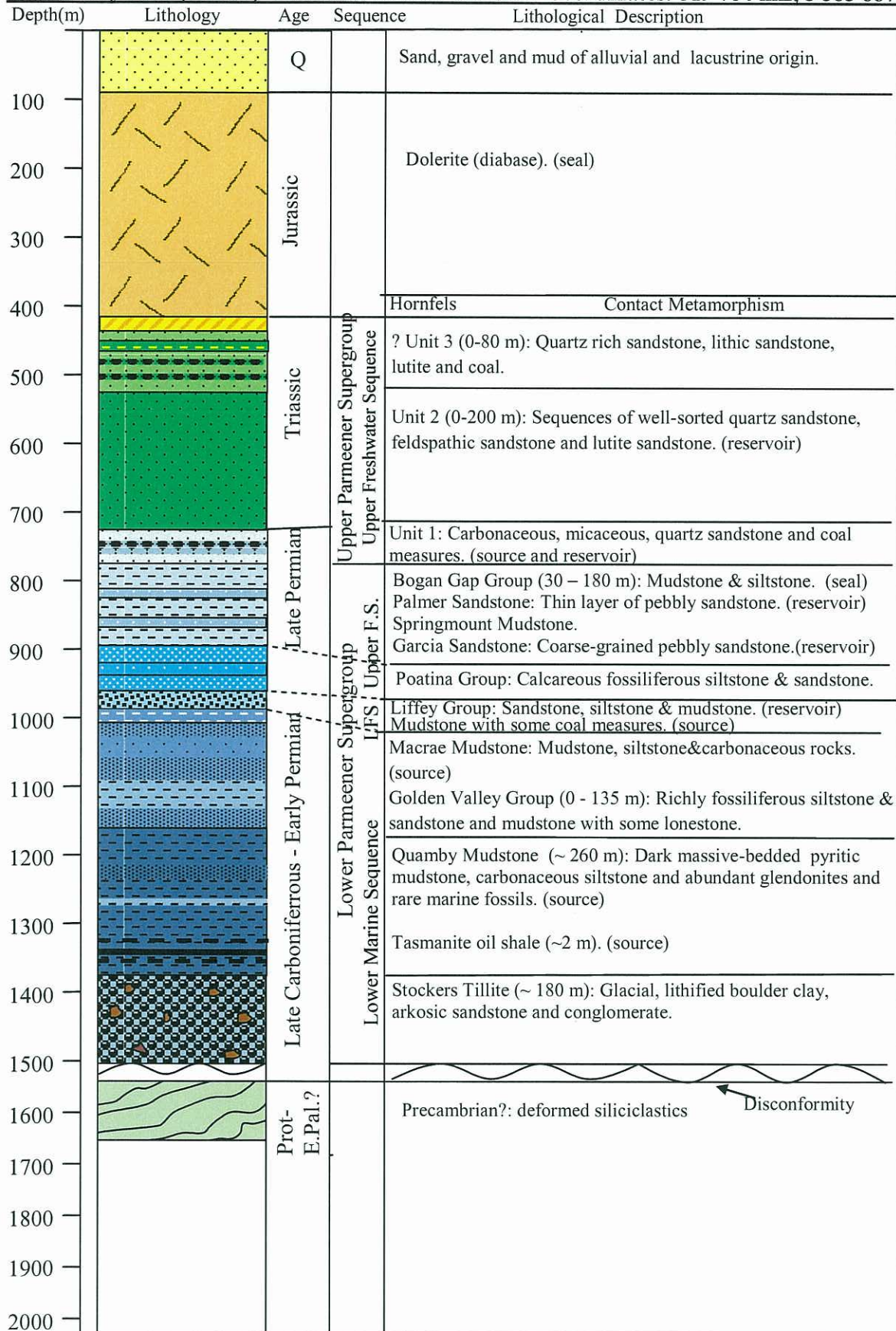


**Derwent Bridge (DB#1)- Predicted Section AMG66 Coordinates: 435 186 mE, 5 333 351 mN**

Depth(m)	Lithology	Age Unit	Lithological Description
		Q	Some Quaternary deposits (dolerite boulders).
100		Triassic	Unit 2 (0-200 m): Sequences of well-sorted quartz sandstone, feldspathic sandstone and lutite sandstone. (reservoir) <span style="float: right;">Unconformity</span>
200		Permian	Unit 1: Carbonaceous rocks, coal measure, sandstone. (source & reservoir)
300		Late Permian	Bogan Gap Group: Mudstone and siltstone (seal) Palmer Sandstone. (reservoir)
400		Jurassic	Hornfels <span style="float: right;">Contact Metamorphism</span>  Massive dolerite (diabase). (seal)
900		Permian	Hornfels <span style="float: right;">Contact Metamorphism</span>
1000		Late Permian	Bogan Gap Group: Mudstone and siltstone. (seal) Palmer Sandstone: Poorly sorted sandstone. (reservoir), Springmount Mudstone: Mudstone, siltstone, Garcia Sandstone: Coarse-grained pebbly sandstone. (reservoir)
1100		Late Permian	Poatina Group: Poorly sorted siltstone, fossiliferous & pebbly sandstone.
1200		Late Permian	Liffey Group: Sandstone & siltstone . (reservoir)- Mudstone. (source)
1300		Late Permian	Macrae Mudstone: Mudstone, siltstone & carbonaceous rocks. (source)
1400		Late Permian	Golden Valley G. (70-80 m): Fossiliferous siltstone, sandstone & micrite.
1500		Late Permian	Quamby Mudstone: dark massive-bedded mudstone and carbonaceous siltstone with some marine fossils. (source)
1600		Late Permian	Tasmanite oil shale (~2 m). (source)
1700		Late Permian	Stockers Tillite (~140 m): Clastic detritus derived from granitic and foliated quartzite terrains.
1800		Ordovician	Paleokarst ( reservoir) <span style="float: right;">Unconformity</span>  Upper Limestone Member: Coralline and stromatoporoid biocalcarenes. ( reservoir) Mainly fossiliferous, subtidal micrite. (Source)

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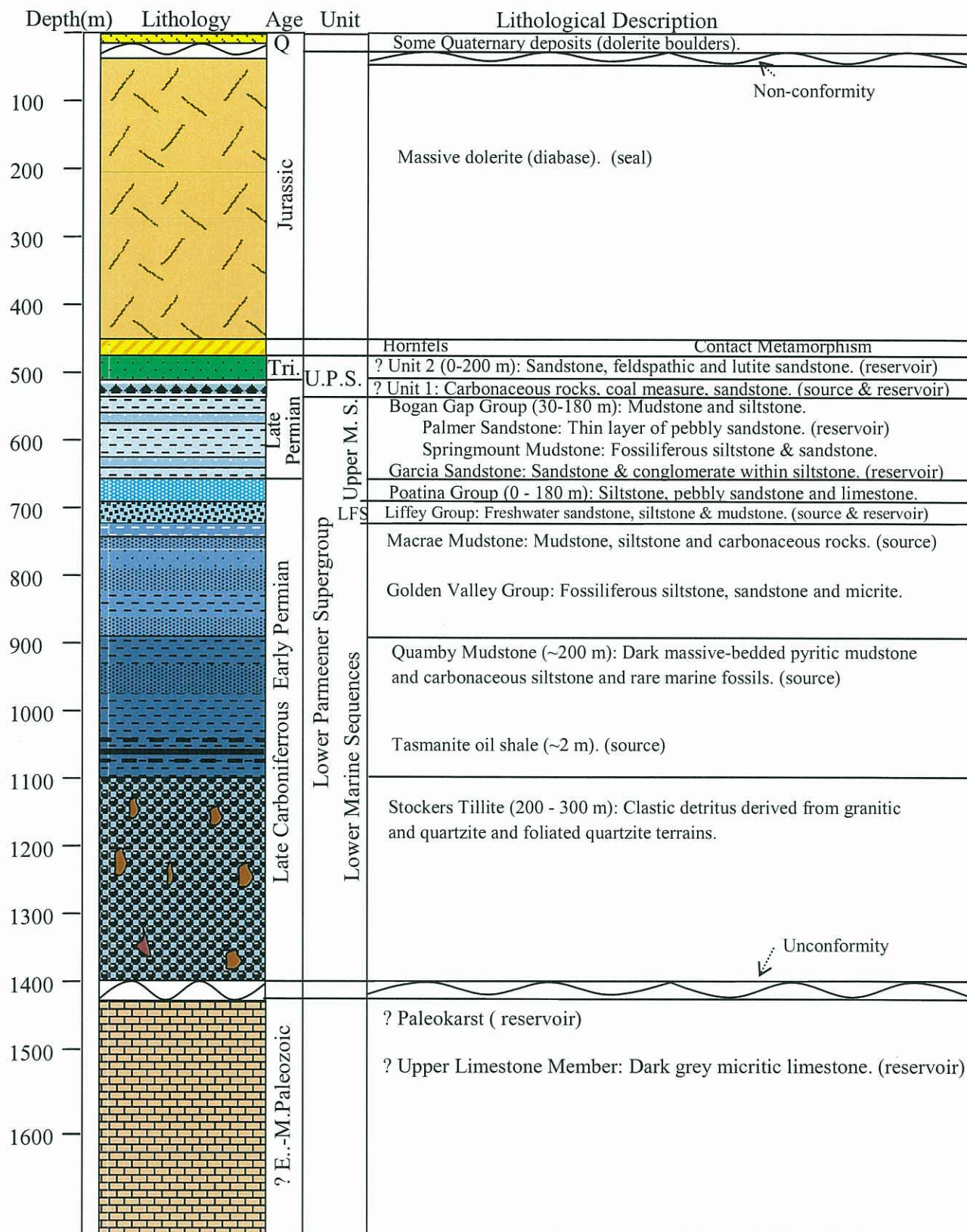
# **Hummocky Hills (HH #1)- Predicted Section AMG66 Coordinates: 519 784 mE, 5 383 887 mN**



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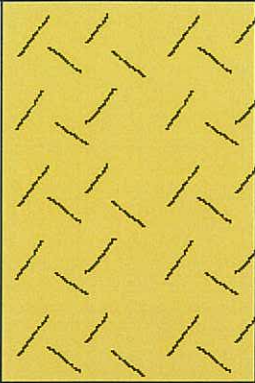

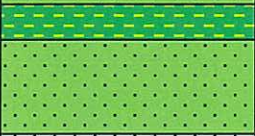



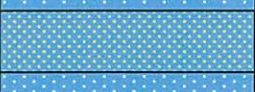





**Interlaken (IL #1)- Predicted Section AMG 66 Coordinates: 519 456 mE, 5 335 869 mN**



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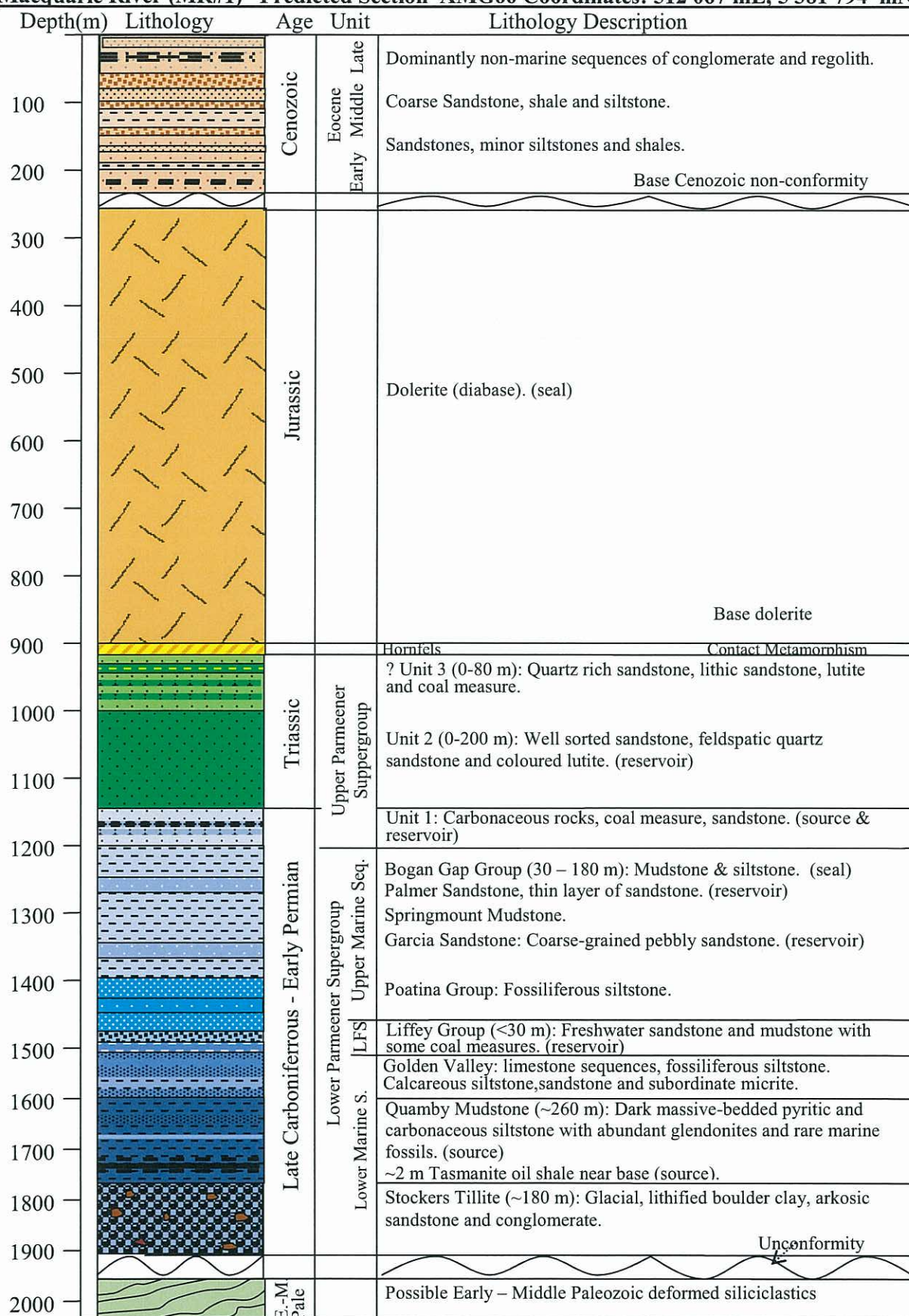
**Lonnavale # 2 (LV #2) Predicted Section AMG66 Coordinates: 482 665mE, 5 247 967 mN**

Depth(m)	Lithology	Unit Age	Lithology Description
100		Jurassic	Fractured dolerite with joints infilled with zeolites. (seal)
200			Finely crystalline dolerite
300		Triassic	Hornfels
400			Contact Metamorphism
500		Triassic	Unit 2 (~185 m): Sandstone, interval with various proportions of lenticular lutite.
600			Top of the sequence is predominantly lutite. (reservoir)
700		Late Permian	Unit 1 (~35 m): Shale, grey to dark coal measures lutite, well sorted sandstone, graphite & siderite. (source & reservoir)
800			Abels Bay Formation: Siltstone alternating with fine poorly sorted sandstone. Some coarse sandstone and conglomerate. Fossils rare.
900		Permian	Risdon Formation: Poorly sorted sandstone
1000			Minnie Point Formation: Alternating fossiliferous siltstone and fine sandstone. (reservoir)
1100		Permian	Deep Bay Formation: Richly fossiliferous siltstone with minor fine-grained sandstone.
1200			Cascades Group: Sandstone, calcareous siltstone, micritic limestone and dropstones.
1300		Permian	? Faulkner Group: Freshwater sandstone, siltstone & mudstone. (reservoir), Mudstone with some coal measures. (source)
1400			Bundella Formation: Fossiliferous shaley mudstone and siltstone.
1500		Early Permian	Woody Island Formation: Shale conglomerate with minor dropstones. (source)
1600			Tasmanite oil shale near base (~2 m). (source)
1700		Early Permian	Truro Formation (0-450 m): Glacial tillite, very poorly sorted with some large (>1m) clasts set in a clay matrix. Dark grey pebbly diamictite with mudstone and lithified boulder clay.
1800			
1900		Prot.-	Unconformity
2000			Deformed Early Palaeozoic or Proterozoic. limestone, quartzite or dolomite.

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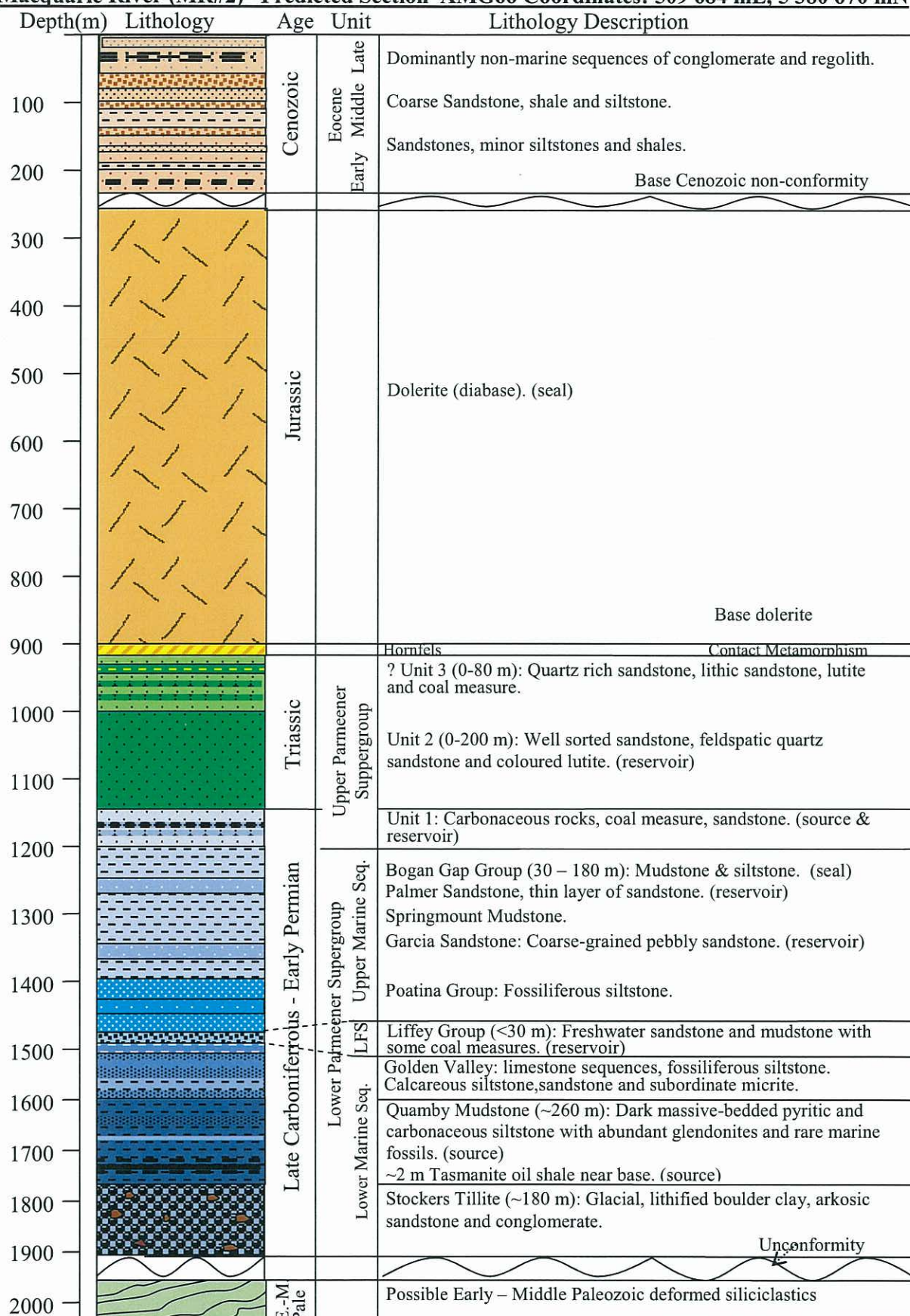


**Macquarie River (MR#1)– Predicted Section AMG66 Coordinates: 512 067 mE, 5 381 794 mN**



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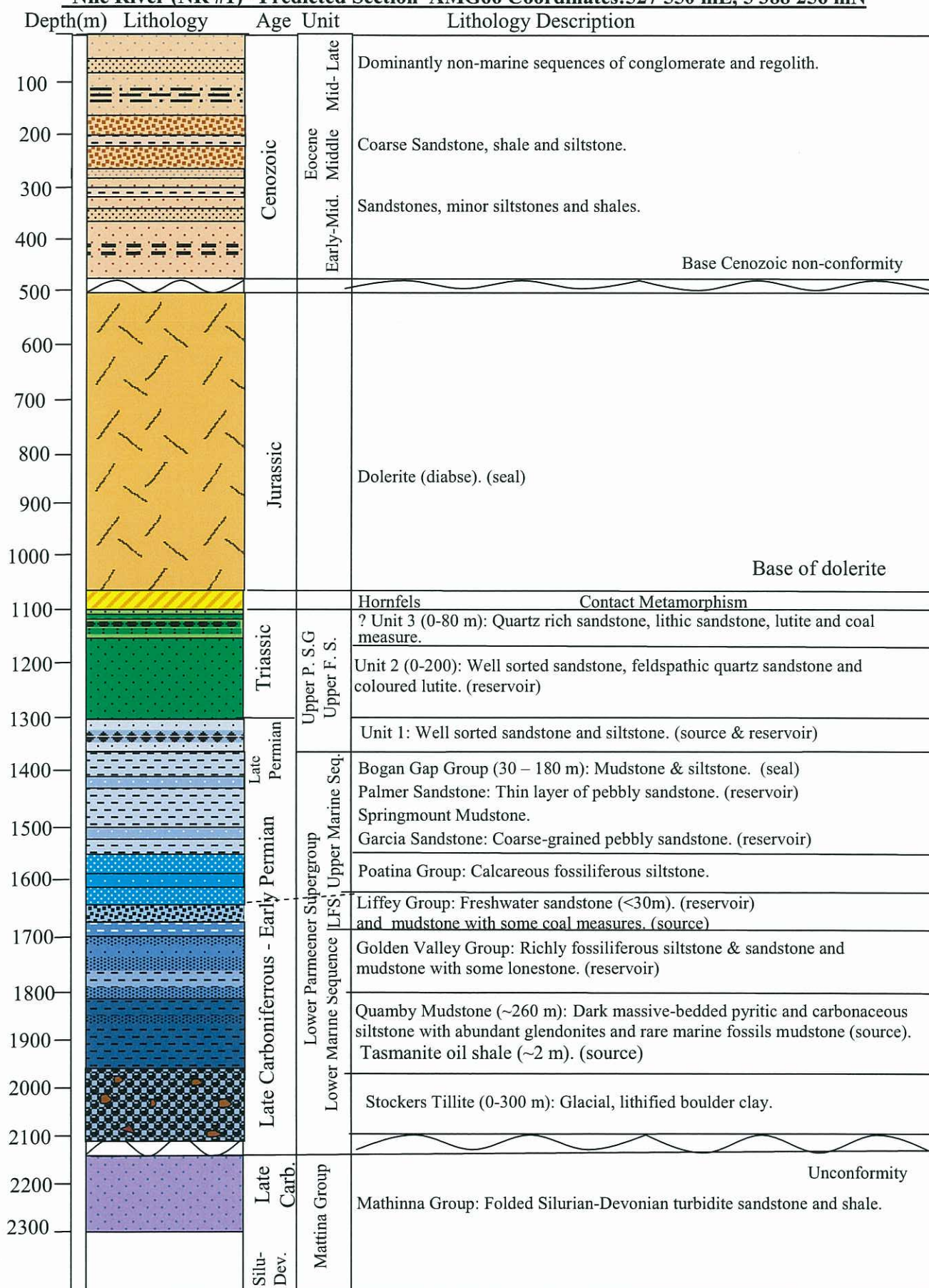
**Macquarie River (MR#2)– Predicted Section AMG66 Coordinates: 509 684 mE, 5 380 670 mN**



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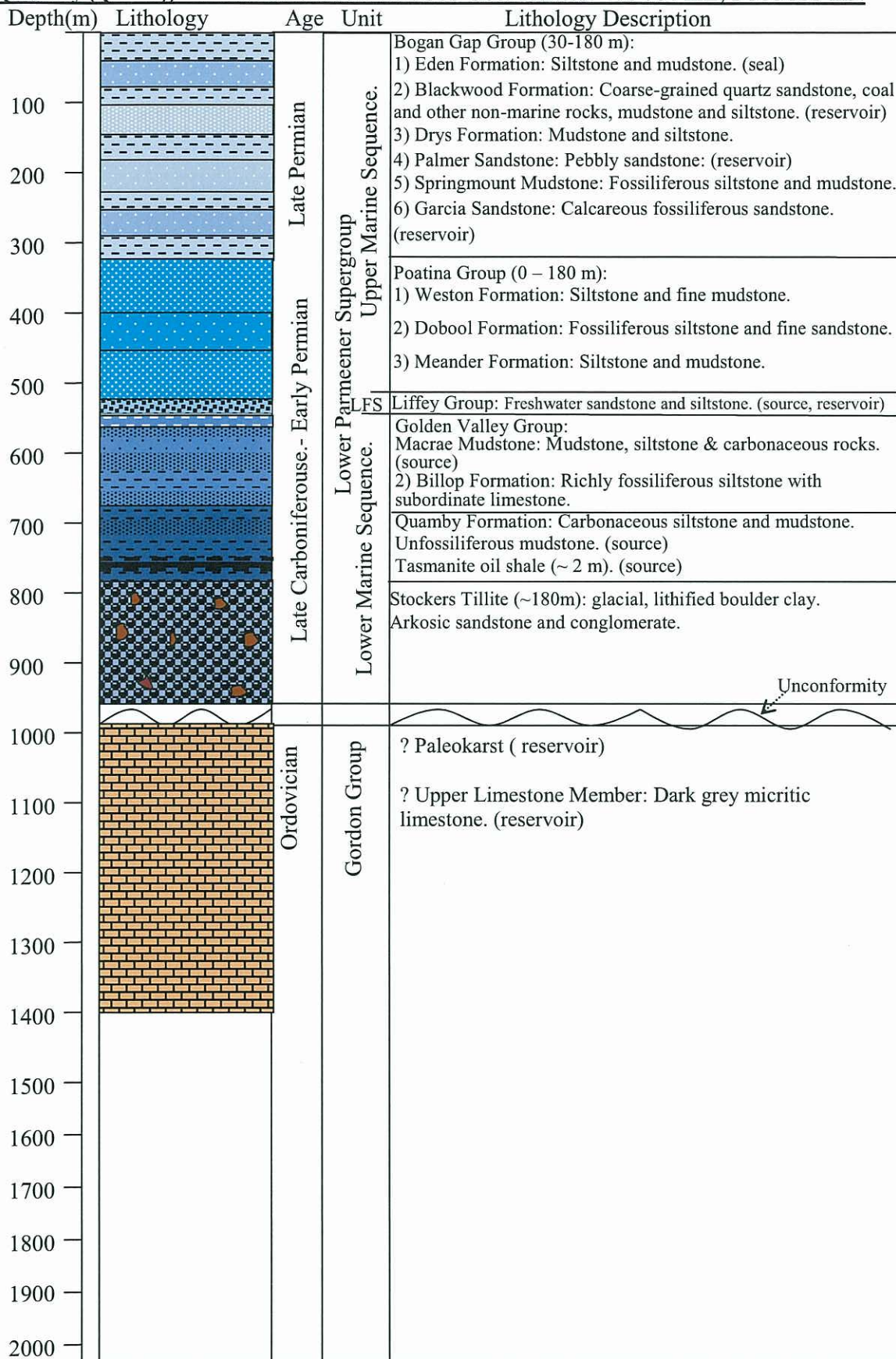


**Nile River (NR #1)– Predicted Section AMG66 Coordinates:527 550 mE, 5 388 256 mN**



All thicknesses are approximate and are based on preliminary seismic data interpretation

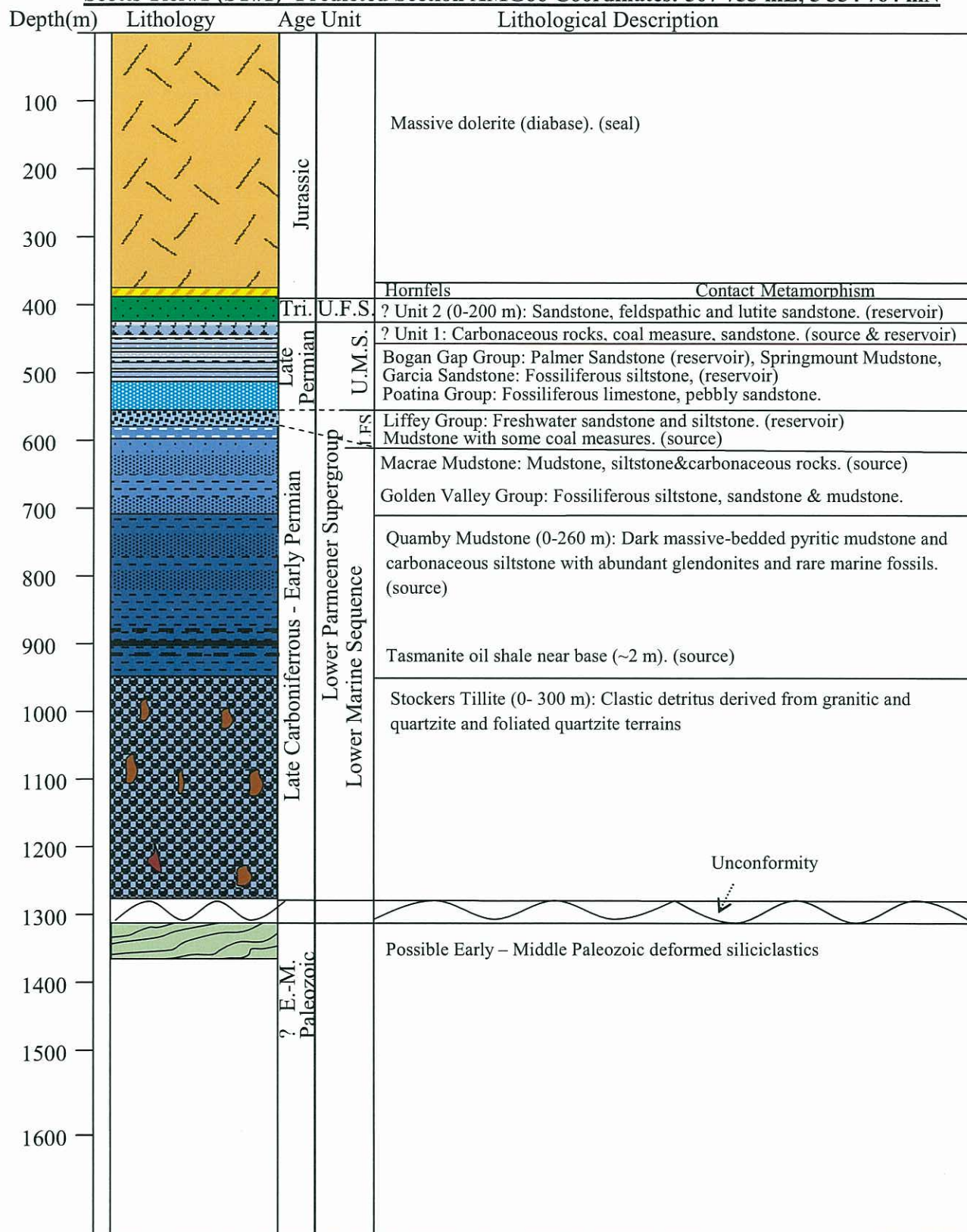
**Quamby (QY #1)– Predicted Section AMG66 Coordinates: 476 764 mE, 5 388 335 mN**



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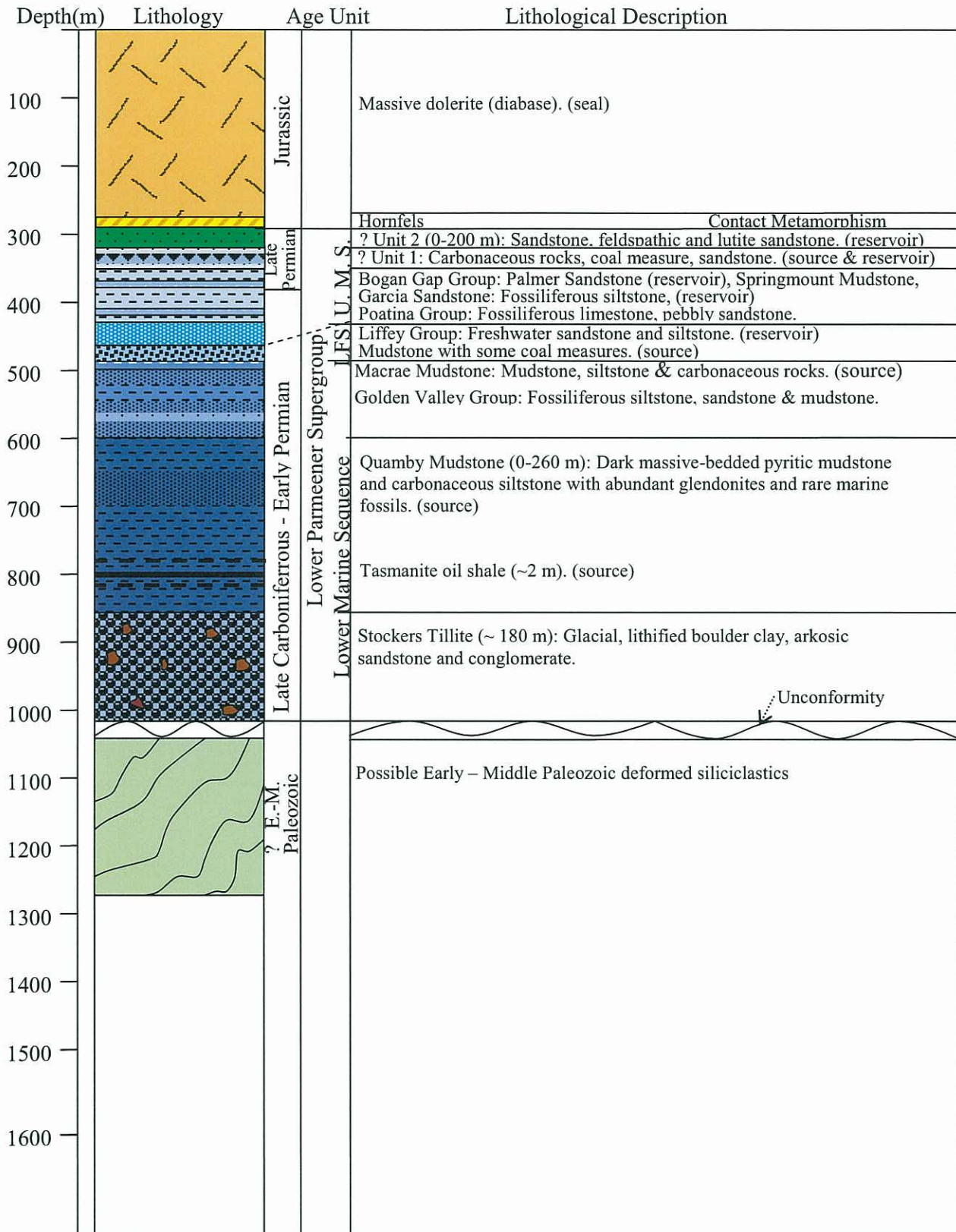


**Scotts Tier#1 (ST#1)- Predicted Section AMG66 Coordinates: 507 753 mE, 5 334 764 mN**



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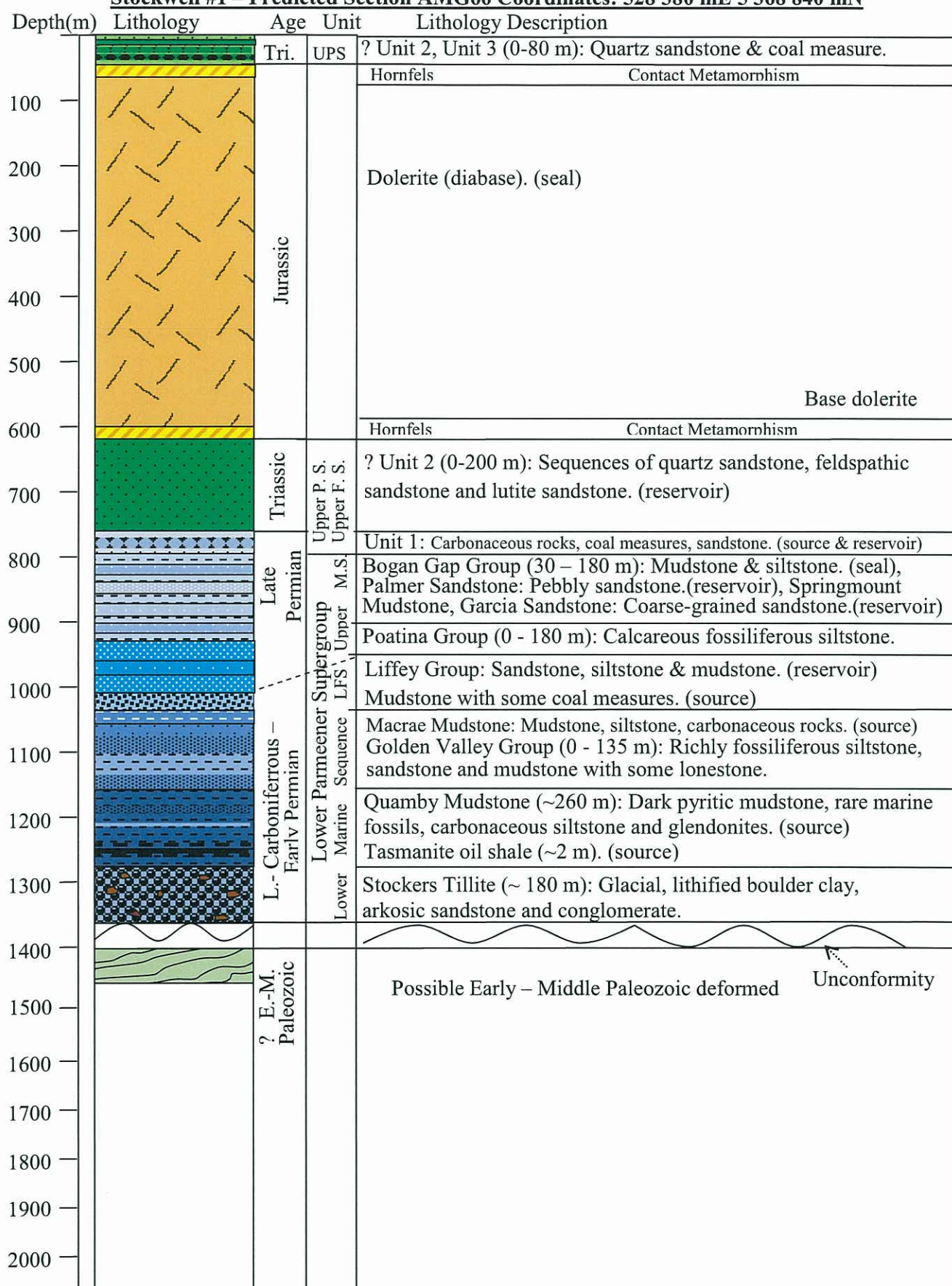
**Steppes (SP#1)- Predicted Section AMG66 Coordinates: 490 155 mE, 5 339 552 mN**



All thicknesses are approximate and are based on preliminary seismic data interpretation or extrapolation from fieldwork. Sources, reservoirs and seals are predicted from field work and laboratory data.



**Stockwell #1 – Predicted Section AMG66 Coordinates: 528 380 mE 5 368 840 mN**



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