Title of Proposal - Glendell Continued Operations Project (refer to Figure 1)

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Mining

1.2 Provide a detailed description of the proposed action, including all proposed activities.

Glendell Tenements Pty Limited (Proponent) are proposing to extend the mining operations at the Glendell Mine within the Mount Owen Complex. The Glendell Mine is located in the Upper Hunter Valley of New South Wales (NSW), approximately 20 kilometres (km) north-west of Singleton, 24 km south-east of Muswellbrook and to the north of Camberwell (refer to Figure 1). In addition to the Glendell Mine, the Mount Owen Complex comprises mining operations at the Mount Owen Mine and Ravensworth East Mine. The Mount Owen Complex also includes a coal handling and preparation plant (CHPP) and coal handling and transport infrastructure (refer to Figure 2).

The Glendell Continued Operations Project (the Project) proposes the extension of mining at Glendell Mine to the north of the current Glendell Pit. Mining operations would extend the existing open cut operations to the north with mining down to the Hebden Seam (Glendell Pit Extension). Estimated ROM coal resources in the proposed mining area are approximately 135 Mt.

Maximum annual production from the Glendell Pit Extension would be capped at 10 Mtpa ROM coal. Truck and excavator mining methods will be used in the Glendell Pit Extension. Blasting will be undertaken on a regular basis for both overburden removal and coal extraction.

What is included in the Proposed Action

Aspects of the Project which form part of the Proposed Action are set out below. Further details of the Project and Proposed Action are set out in the Attachment ‘Detailed Description of the Proposed Action’.

The Proposed Action consists of:

- The Project Work Area, where development will be undertaken, will occupy approximately 1,510 hectares, including a mixture of new disturbance, re-disturbance and work within previously disturbed areas and areas approved for future disturbance

- Within the Work Area, the Proposed Action will impact on approximately 1,090 hectares of vegetation that is either outside the approved disturbance areas under existing approvals or is in various stages of rehabilitation following past disturbance comprising approximately 860 hectares of new disturbance outside existing approved disturbance areas; and 230 hectares of

re-disturbance of approved disturbance areas which have been previously disturbed and rehabilitation (revegetation) has commenced in accordance with rehabilitation commitments under existing approvals

- Rehabilitation of areas disturbed by mining activities, including overburden emplacement areas

- Mining of all seams down to and including the Hebden Seam (Glendell Mine currently approved to mine down to a depth of approximately 200 m)

- Emplacement of overburden in the following areas: in pit and on existing emplacement areas at Glendell Mine, on areas previously disturbed as part of the former Ravensworth East Mine, and out-of-pit to assist final landform and drainage

- Development of the final landform at Glendell and Ravensworth East up to approximately 200 mAHD (approximately 40 m higher than existing approved operations) and retention of a final void in the northern end of the proposed Glendell Pit Extension. This also includes modification of parts of the current Mount Owen Complex landform and drainage to provide integration with the final landform developed as part of the Proposed Action

- Full integration with Mount Owen Complex WMS, including ongoing integration with Greater Ravensworth Area Water and Tailings Scheme (GRAWTS)

- Realignment of a section of Hebden Road

- Realignment of a section of Yorks Creek

- Construction of replacement Mine Infrastructure Area

- Construction of a Heavy Vehicle Access Road

What is not included in the Proposed Action

As discussed in Section 1.15 and 1.16, the Project includes interactions with existing approved operations. Aspects of those interactions do not form part of the Proposed Action are detailed below.

The Proposed Action specifically excludes components of the Project that form part of the existing and approved operations at the Mount Owen Complex (including any approved land disturbance activities within the Referral Area) including, but not limited to, the following activities/operations:

- Mount Owen Continued Operations Project (covered by the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) development consent SSD-5850 and EPBC Act approvals 2004/1369 and 2013/6978

- Mount Owen Continued Operations Project - Modification 2 (declared not to be a Controlled Action 2017/8083)

- Glendell Mine (EP&A Act development consent DA 80/952)

- Narama Water Pipeline (GRAWTS)

- the Liddell Coal Operations (EP&A Act development consent DA 305-11-01 and EPBC Act approval 2013/6908)

- Integra Underground Mine (EP&A Act development consent 08_0101 and EPBC Act approval 2017/8105), and

- works associated with rehabilitation and future closure activities in mining lease areas associated with the Ravensworth East Mine, and former Swamp Creek Mine.

The extension of the life of the Mine Infrastructure Area at Mount Owen and utilisation of North Pit as a water storage for mining operations and tailings in cells also do not for part of the Proposed Action. Consistent with current approved operations, the Bayswater North Pit will be used as a water storage and potentially as a tailings storage and coarse rejects emplacement facility following cessation of mining in the pit. No additional mining or disturbance of areas not already approved for disturbance is required as a result of this utilisation of the Mount Owen infrastructure and former mining area.

This referral does not relate to any works which are currently authorised by existing approvals nor any modifications to these approvals including the current Glendell Modification (No.4) application. Should any future modifications of the existing approvals trigger a requirement to refer an action for consideration under the EPBC Act, a separate referral will cover these works.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
Referral Area	1	-32.393974321882	151.08912845461
Referral Area	2	-32.393966368054	151.08908095329
Referral Area	3	-32.393975427315	151.08910241096
Referral Area	4	-32.393850116501	151.08912654546
Referral Area	5	-32.40466057911	151.08691640523
Referral Area	6	-32.407993930834	151.08743138936
Referral Area	7	-32.415058780208	151.09026380208
Referral Area	8	-32.421948173888	151.09141178754
Referral Area	9	-32.418343633563	151.09602518705
Referral Area	10	-32.419593465364	151.09654017118
Referral Area	11	-32.420770827309	151.09692640928
Referral Area	12	-32.421549689074	151.09709807065
Referral Area	13	-32.422690799981	151.0972911897
Referral Area	14	-32.423922459047	151.09748430875
Referral Area	15	-32.42502731537	151.09765597013
Referral Area	16	-32.426729854355	151.09795637754

Area	Point	Latitude	Longitude
Referral Area	17	-32.428305579884	151.09823532728
Referral Area	18	-32.430098613377	151.09857865003
Referral Area	19	-32.43207272013	151.09887905744
Referral Area	20	-32.433394804159	151.09907217649
Referral Area	21	-32.434599151504	151.0992545667
Referral Area	22	-32.435405059164	151.09947987226
Referral Area	23	-32.436890083626	151.10003777174
Referral Area	24	-32.438465631617	151.10061712888
Referral Area	25	-32.439805731225	151.10113211301
Referral Area	26	-32.441779625446	151.10181875852
Referral Area	27	-32.443608608114	151.10246248868
Referral Area	28	-32.445980797674	151.10338516859
Referral Area	29	-32.446777549626	151.10366411832
Referral Area	30	-32.447483755695	151.10379286436
Referral Area	31	-32.448081310353	151.10385723737
Referral Area	32	-32.448570215763	151.10387869504
Referral Area	33	-32.449203978087	151.10385723737
Referral Area	34	-32.449710984737	151.10366411832
Referral Area	35	-32.450181774072	151.10349245695
Referral Area	36	-32.450598239511	151.10321350721
Referral Area	37	-32.450978488882	151.10284872678
Referral Area	38	-32.451358736649	151.1025268617
Referral Area	39	-32.451684662029	151.10226936964
Referral Area	40	-32.452137334212	151.10190458921
Referral Area	41	-32.45260811087	151.10149689344
Referral Area	42	-32.453024565094	151.10126085905
Referral Area	43	-32.453368591044	151.10108919767
Referral Area	44	-32.453766935241	151.10093899396
Referral Area	45	-32.454400661014	151.10076733259
Referral Area	46	-32.454925744707	151.10066004423
Referral Area	47	-32.455668099188	151.10070295957
Referral Area	48	-32.456301811589	151.10087462095
Referral Area	49	-32.456953625408	151.10111065534
Referral Area	50	-32.457370059545	151.10128231672
Referral Area	51	-32.457786491757	151.10153980878
Referral Area	52	-32.458202922044	151.10188313154
Referral Area	53	-32.458619350406	151.10224791196
Referral Area	54	-32.459071987747	151.10287018446
Referral Area	55	-32.459669465553	151.10351391462
Referral Area	56	-32.459379779839	151.10284872678
Referral Area	57	-32.459071987747	151.10211916593
Referral Area	58	-32.458746089091	151.10119648603
Referral Area	59	-32.458619350406	151.10066004423
Referral Area	60	-32.458402083675	151.10003777174
Referral Area	61	-32.458257238896	151.0993725839
Referral Area	62	-32.458148605159	151.0988361421
Referral Area	63	-32.457949442968	151.09789200452
Referral Area	64	-32.457768386049	151.09703369764

Area	Point	Latitude	Longitude
Referral Area	65	-32.457587328765	151.09591789869
Referral Area	66	-32.457406271118	151.09443731931
Referral Area	67	-32.457370059545	151.09334297803
Referral Area	68	-32.457370059545	151.09248467115
Referral Area	69	-32.457315742158	151.09164782194
Referral Area	70	-32.457297636355	151.09102554945
Referral Area	71	-32.457333847957	151.09029598859
Referral Area	72	-32.457569223017	151.08776398328
Referral Area	73	-32.457750280337	151.08671255735
Referral Area	74	-32.457913231613	151.08585425046
Referral Area	75	-32.458130499524	151.08471699384
Referral Area	76	-32.458239133282	151.08407326368
Referral Area	77	-32.458420189256	151.08330078748
Referral Area	78	-32.458727983575	151.08199186948
Referral Area	79	-32.458909038566	151.08102627424
Referral Area	80	-32.459108198636	151.07986755994
Referral Area	81	-32.459271147456	151.07896633771
Referral Area	82	-32.459325463664	151.07748575834
Referral Area	83	-32.459289252862	151.07658453611
Referral Area	84	-32.459234936632	151.07570477155
Referral Area	85	-32.459162514942	151.07495375303
Referral Area	86	-32.459053882297	151.07392378477
Referral Area	87	-32.458945249521	151.07340880063
Referral Area	88	-32.458673667007	151.07240029005
Referral Area	89	-32.458438294833	151.07173510221
Referral Area	90	-32.458076182595	151.07070513395
Referral Area	91	-32.45784080886	151.07016869214
Referral Area	92	-32.457569223017	151.06952496198
Referral Area	93	-32.457207107286	151.06868811277
Referral Area	94	-32.456645825025	151.06776543287
Referral Area	95	-32.456338023592	151.06725044874
Referral Area	96	-32.455975902911	151.06671400693
Referral Area	97	-32.455197338519	151.06600590375
Referral Area	98	-32.454617937396	151.06546946195
Referral Area	99	-32.453694509154	151.06465407041
Referral Area	100	-32.45278917816	151.06401034025
Referral Area	101	-32.451720875887	151.06328077939
Referral Area	102	-32.450761203723	151.06272287992
Referral Area	103	-32.449113440885	151.06164999631
Referral Area	104	-32.44780969509	151.06079168943
Referral Area	105	-32.446687009986	151.06006212858
Referral Area	106	-32.445781608586	151.0595042291
Referral Area	107	-32.444514031344	151.0587317529
Referral Area	108	-32.443101567132	151.05817385343
Referral Area	109	-32.442123694327	151.05787344602
Referral Area	110	-32.440240353847	151.05731554654
Referral Area	111	-32.437379049742	151.05667181638
Referral Area	112	-32.434590096321	151.05613537458

Area	Point	Latitude	Longitude
Referral Area	113	-32.432905816434	151.05589934019
Referral Area	114	-32.431130949822	151.0555774751
Referral Area	115	-32.429881277882	151.05534144071
Referral Area	116	-32.429011930667	151.05506249097
Referral Area	117	-32.428323691512	151.05482645658
Referral Area	118	-32.42732754659	151.05446167615
Referral Area	119	-32.426204606394	151.05386086133
Referral Area	120	-32.425425784822	151.05343170789
Referral Area	121	-32.424773742984	151.05306692747
Referral Area	122	-32.42385000898	151.05240173963
Referral Area	123	-32.42310739243	151.05180092481
Referral Area	124	-32.42200251259	151.05081387189
Referral Area	125	-32.420951958552	151.04974098829
Referral Area	126	-32.419792712311	151.0483462396
Referral Area	127	-32.418524769679	151.04637213376
Referral Area	128	-32.417256809227	151.04452677396
Referral Area	129	-32.416659050262	151.04377575544
Referral Area	130	-32.416171310549	151.04305883257
Referral Area	131	-32.415704872145	151.04256530612
Referral Area	132	-32.414853502627	151.04172309248
Referral Area	133	-32.414328185513	151.04122956603
Referral Area	134	-32.413739464424	151.04074140399
Referral Area	135	-32.412956006555	151.04016741126
Referral Area	136	-32.412177070602	151.03963633387
Referral Area	137	-32.411429829212	151.03917499392
Referral Area	138	-32.410605592138	151.03873511164
Referral Area	139	-32.409899097226	151.03840251772
Referral Area	140	-32.408907277729	151.03800018637
Referral Area	141	-32.407847513346	151.03757103293
Referral Area	142	-32.406692627733	151.03709896414
Referral Area	143	-32.405836644155	151.03674491255
Referral Area	144	-32.398721249577	151.04853053896
Referral Area	145	-32.398721249577	151.04895969241
Referral Area	146	-32.398866190007	151.04908843844
Referral Area	147	-32.399011130205	151.05063339083
Referral Area	148	-32.398540073711	151.05217834322
Referral Area	149	-32.399445949404	151.06028934329
Referral Area	150	-32.398503838494	151.06033225863
Referral Area	151	-32.397597953349	151.06037517397
Referral Area	152	-32.396981946259	151.06063266604
Referral Area	153	-32.396112282036	151.06149097292
Referral Area	154	-32.395133899773	151.06252094119
Referral Area	155	-32.394445402196	151.06346507876
Referral Area	156	-32.39375689937	151.06432338564
Referral Area	157	-32.392995916456	151.06492420046
Referral Area	158	-32.392669778958	151.06518169253
Referral Area	159	-32.392234927128	151.06518169253
Referral Area	160	-32.391981262594	151.06518169253

Area	Point	Latitude	Longitude
Referral Area	161	-32.391836311112	151.06522460787
Referral Area	162	-32.391582645458	151.06522460787
Referral Area	163	-32.390966597333	151.06496711581
Referral Area	164	-32.390386783494	151.06475253909
Referral Area	165	-32.38984320464	151.06462379305
Referral Area	166	-32.38937210032	151.06453796237
Referral Area	167	-32.388828515358	151.06436630099
Referral Area	168	-32.388647319644	151.06582542269
Referral Area	169	-32.392271164861	151.07535262911
Referral Area	170	-32.393974321882	151.08912845461

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The Glendell Mine is located within the Mount Owen Complex. The Mount Owen Complex is located within the Hunter Coalfields in the Upper Hunter Valley of New South Wales (NSW), approximately 20 kilometres (km) north-west of Singleton, 24 km south-east of Muswellbrook and to the north of Camberwell. Camberwell is located approximately 7 km from the southern boundary of the Referral Area. The majority of the existing residences within Camberwell are mine owned or have acquisition rights under approved mining development consents.

There are a number of rural localities within proximity to the Referral Area including Hedben to the north, Goorangoola to the north-east, Falbrook and Middle Falbrook to the east and south-east.

Figure 1 shows the general locality in which the Mount Owen Complex and Project is located.

The area surrounding the Referral Area is dominated by established and approved mining operations within 10 km including:

- Mount Owen Complex operations

- Liddell Coal Operations to the north-west

- Ravensworth Surface Operations and former underground mine to the south-west

- Integra Underground Mine, Rix’s Creek North and Rix’s Creek to the south-east, and

- Ashton Mine (underground) and the approved Ashton South East Open Cut to the south.

Ravensworth State Forest and a number of existing Biodiversity Offset Areas are located to the north and northeast of the Mount Owen Complex. Other land uses within the surrounding area

include other mining operations, grazing and rural residential holdings, the Hebden and Wild Quarries and the Bayswater and Liddell Power Stations.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

Referral Area: 2915 Ha, Work Area: 1,510 Ha, Biodiversity Impact Assessment Area: 1,090 Ha

1.7 Is the proposed action a street address or lot?

Street Address

Hebden Road
Ravensworth NSW 2330
Australia

1.8 Primary Jurisdiction.

New South Wales

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

No

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 01/2021

End date 12/2045

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

NSW Approval Process

The Project is State Significant Development (SSD) as defined under State Environmental Planning Policy (State and Regional Development) *2011* (SRD SEPP) and will require development consent under the *Environmental Planning and Assessment Act 1979* (EP&A Act). The new development consent being sought for the Project will include the continuation of the current approved mining operations at the Glendell Mine and therefore the existing Glendell Consent (DA 80/952) will be surrendered should approval be granted for the Project. In accordance with the EP&A Act, the consent authority is not required to re-assess the likely

impact of the continued development to the extent that it could have been carried out under DA 80/952 but for the surrender of the consent.

The precise location of the development application area for the Project is yet to be defined however it is likely to at least partly overlap with the development consent areas for the existing consents associated with the Mount Owen Continued Operations, Liddell Coal Operations and Ravensworth Operations (refer to **Figure 2**).

In addition to overlapping with consent areas, the Project will interact with operations regulated by a number of different development consents including:

the Project will extend the life of the Mount Owen CHPP beyond its current approval and will utilise the Bayswater North Pit and North Pit voids (refer to **Figure 2**) for water storage and potentially tailings and coarse rejects disposal once approved mining has ceased in those mining areascontinued tailings and water management linkages with other mining operations through the GRAWTS including the use of open cut voids for future tailings disposal

It is noted that the Project does not propose any change to the timing or location of approved (and proposed) mining activities at either Liddell Coal Operations, or either Bayswater North Pit or North Pit at the Mount Owen Complex.

To the extent that the Project alters approved operations at Liddell Coal Operations or Mount Owen, these consents may require modification to cover the interactions between operations.

An Environmental Impact Statement (EIS) will be prepared for the Project, to support the development application process under the EP&A Act. The EIS prepared for the Project will necessarily address the impacts associated with the interactions with these other operations and applications to modify these approvals where necessary.

A Preliminary Environmental Assessment (PEA) has been prepared for the Project and was submitted to the NSW Department of Planning & Environment (DPE). The Secretary's Environmental Assessment Requirements (SEARs) have been issued for the Project and can be viewed via the NSW Government's Major Projects website: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9349

The relevant contact at DPE is:

Name: Megan Dawson

Phone: 02 9274 6391

Email: megan.dawson@planning.nsw.gov.au

In addition to approval under the EP&A Act the Project also requires approval under a number of other NSW Acts. The State legislation and policies under which approvals are required, or considered against, are presented below.

NSW Legislation – Acts

Protection of the Environment Operations Act 1997 (POEO Act)

The POEO Act requires scheduled activities, including the mining of coal and coal works, to hold an Environment Protection Licence (EPL) to regulate pollution to the environment.

There are currently three EPLs for mining of coal and coal works in relation to each of the Glendell, Ravensworth East and Mount Owen Mines. These EPLs will be varied as required to provide for the Project.

Mining Act 1992

Under the Mining Act 1992, a Mining Lease (ML) is required before any mining operations can take place. A Mining Operations Plan (MOP) is required to be submitted to the NSW Department of Resources and Geoscience for approval prior to the commencement of mining.

There are a number of mining authorities (mining leases, exploration licences and assessment leases) over the existing operations and the Additional Disturbance Area.

Some parts of the Referral Area which are currently covered by exploration licences and a mining purposes lease will require mining leases under the Mining Act to enable mining operations and certain mining related activities to be undertaken.

Crown Land Management Act 2016 (Crown Lands Act)

Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the Crown Land Management Act 2016.

Crown Lands Act approval for works and mining in Crown roads and Crown land within the Referral Area will be sought as required.

Water Management Act 2000 (WM Act)

This Act regulates the taking, interception, storage and use of surface water and groundwater within areas subject to water sharing plans. The water sharing plans regulate the permissible take from the water sources to provide for sustainable use of the State's water resources.

Licences may be required under the Act for water take from the water sources relevant to the Project.

It is noted that Glencore currently holds various licences under the WM Act for the existing mining operations.

Roads Act 1993

The Roads Act 1993 is administered by the Roads and Maritime Service (RMS), local council or the Department of Lands. The Act requires that applications for the closure of Crown roads be made to the Minister. A consent under Section 138 of the Roads Act is required in order to

undertake works on a public road and to connect to a public road.

The Project will require approval for works associated with the realignment of a portion of Hebden Road and applications under Part 4 of the Roads Act for closure of roads. Singleton Council is the roads authority for Hebden Road.

Coal Mine Subsidence Compensation Act 2017

Approval is required under section 21 of the Coal Mine Subsidence Compensation Act 2017 for certain development works in Mine Subsidence districts. The Project is located in the Patrick Plains Mine Subsidence District.

Dam Safety Act 2015

Approval is required under the Dams Safety Act 2015 for any mining within the Notification Areas of Prescribed Dams.

NSW Gateway Process

Part 4AA of the NSW *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP) together with Clause 50A of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provides for the implementation of the NSW Government's Strategic Regional Land Use Plans (SRLUPs). The 'gateway process' applies to mining projects located on biophysical strategic agricultural land (BSAL) and critical industry cluster (CIC) land (as defined by the regional mapping presented in the Mining SEPP) outside of existing mining lease areas. A project that triggers the gateway process must obtain a Gateway Certificate to inform the SEARs.

The Project includes areas of land where there are currently no mining leases but where a mining lease may be required (Verification Area). An area within the Verification Area has been identified on regional mapping of 'Strategic Agricultural Land' as being BSAL. There is no CIC land within the Referral Area. Detailed soil surveys have identified that there is an area of BSAL where components of the Project requiring a mining lease may be located.

A Gateway Application for relevant parts of the Project triggering the Gateway Application requirements will be lodged in early 2019. This application will be referred to the Independent Expert Scientific Committee (IESC) for advice.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders.

A comprehensive Stakeholder Engagement Strategy has been developed for the Project having regard to the *Social impact assessment guidelines for State significant mining, petroleum production and extractive industry development* (NSW DPE, September 2017) (SIA Guidelines). The strategy identifies the potentially impacted people or groups and other stakeholders relevant to the Project, the methods of engagement to be used to most effectively engage with these stakeholders, the timing of consultation and the feedback mechanisms required. The engagement strategy builds upon the existing community engagement programs undertaken by

Glencore and the Mount Owen Complex, including those associated with current and recent approval processes.

In consulting with stakeholders, the Proponent aims to:

- be proactive in its engagement with the community

- be transparent and honest in dealings with the community

- utilise a range of consultation methods to ensure all stakeholder interests are considered and addressed in a timely manner.

The stakeholders relevant to the Project will continue to evolve as the Project and assessment process progress, with some of the key initial stakeholders to be involved including:

- local residents and landholders

- internal stakeholders – including employees and suppliers

- Aboriginal groups including Registered Aboriginal Parties (RAPs) and Knowledge Holder groups

- wider community individuals and groups – including tenants on mine owned land, interested residents in the wider community and the Mount Owen Complex Community Consultative Committee (CCC)

- business and industry – including customers, business chambers, other nearby proposed or active major developments such as coal minespublic infrastructure owners (e.g. roads, powerlines etc.).

The consultation process for the Project will be undertaken in stages which align with the key milestones of the environmental assessment process. The key stages of the consultation process for the Project are outlined below:

Stage 1 – PEA Stage. This stage is complete and involved preliminary contact with the local community via a briefing to the Mount Owen Complex CCC, phone calls and face to face meetings with nearby land owners, and the distribution of a Project Community Information Sheet providing an overview of the Project and an information day held in December 2017 at Mount Owen. In addition to regular ongoing engagement by Mount Owen, approximately 40 face to face meetings with landholders have occurred specifically related to the Project. Face to face meetings were also held with relevant NSW government agencies and Singleton Council.

Stage 2 – EIS & Social Impact Assessment (SIA) Development. This stage will involve engagement during the refinement of the conceptual mine plan and the preparation of the EIS for the Project. There are two main purposes of this stage. The first is to continue to build on the engagement commenced within Stage 1 as part of a thorough Social Impact Assessment, including face to face meetings with community and agency stakeholders as necessary and

provision of updated project information as it is available via mechanisms such as the Mount Owen Complex website, additional Community Information Sheets and open days. The second main purpose is to commence engagement with relevant Aboriginal stakeholder groups as part of the Aboriginal Cultural Heritage Assessment process.

Stage 3 - Submission and assessment. This is the final stage of consultation prior to determination of the development application for the Project and will involve consultation during the EIS public exhibition phase and subsequent assessment and approval process. The main purpose of this stage of consultation will be to respond to issues raised during the public exhibition phase. Note that if approved, engagement will continue into operations in accordance with current site procedures, taking into consideration any outcomes of the assessment process.

A comprehensive Aboriginal Cultural Heritage Assessment (ACHA) will be prepared to support the EIS for the Project in collaboration with Aboriginal stakeholder groups to assess the Aboriginal cultural heritage values impacted by the Project. This assessment will include a survey of the Additional Disturbance Area which will include participation by Aboriginal stakeholders. The survey methodology for the fieldwork was provided to Aboriginal stakeholders for review and the field survey of the Additional Disturbance Area was completed in April and May 2018. Following a review of the preliminary findings of fieldwork, a test excavation program was completed in September 2018 to improve the archaeological understanding of the area. Two rounds of cultural values workshops with knowledge holders were also held in July, August and September 2018 to obtain an understanding of cultural heritage values in relation to the Referral Area and the landscape context. The information for the archaeological surveys and cultural heritage assessment will supplement the existing knowledge of Aboriginal cultural heritage values obtained through past Aboriginal Cultural Heritage Assessments of projects in the area.

A copy of the Preliminary Environmental Assessment (PEA) for the Project is provided as an Attachment (See attachment '**Preliminary Environmental Assessment**') which includes a summary of the consultation that has been undertaken to date.

Since lodgement of the PEA, consultation in relation to the Project has continued with local residents, particularly those in the Hebden area. Engagement with stakeholders regarding the potential impacts on Ravensworth Homestead has also continued including meetings with the NSW Heritage Council. In addition, Aboriginal parties who have registered an interest in the Project in accordance with the NSW Aboriginal cultural heritage assessment process have been involved in the archaeological survey of the Additional Disturbance Area and have been consulted on the Project's potential impacts on cultural values.

The NSW Office of Environment and Heritage (OEH) was briefed on potential biodiversity impacts on 24 January 2019.

An additional briefing on the Project was also provided to the Department of Environment and Energy on 23 October 2018 in Canberra.

Ongoing engagement with stakeholders will continue as the results of assessments are available.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project.

The Project is State Significant Development as defined under the NSW *State Environmental Planning Policy (State and Regional Development) 2011* and will require development consent under Part 4 of the NSW EP&A Act.

An Environmental Impact Statement (EIS) is being prepared for the Project in accordance with the requirements for State Significant Development under the EP&A Act and the EP&A Regulation. The EIS will address the environmental assessment requirements issued by the Planning Secretary (SEARs). The SEARs are issued following a formal request. This request for SEARs was lodged in May and is accompanied by the PEA (refer to **Attachment 'Preliminary Environmental Assessment'**). The PEA for the Project identifies potential impacts of the Project and informs the Secretary's development of SEARs. The EIS must also address any assessment requirements contained in a conditional Gateway Certificate issued by the Gateway Panel, being a subcommittee of the Independent Planning Commission (IPC). The SEARs for the Project have been issued and can be accessed via the NSW Government's Major Projects website:
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=9349

Once the EIS is prepared and the development application is lodged with the Planning Secretary, the EIS will be placed on public exhibition for a minimum of 28 days. The public will have the opportunity to make submissions on the Project as part of the public exhibition process.

1.15 Is this action part of a staged development (or a component of a larger project)?

Yes

1.15.1 Provide information about the larger action and details of any interdependency between the stages/components and the larger action.

The Proposed Action is a component of the Project, being a continuation and extension of the existing approved Glendell Mine including associated infrastructure. The Proposed Action constitutes those aspects of the Project where the activities are not already the subject of an approval under existing State and/or Commonwealth approvals (where required). The Proposed Glendell Modification will extend part of the currently approved Glendell Pit by approximately 250 metres. This minor extension and associated activities contemplated by the Proposed Glendell Modification does not form part of the Proposed Action. The Project, of which the Proposed Action is a component, will also extend the life of the CHPP and associated coal handling and transport infrastructure associated with the Mount Owen Continued Operations Project and may utilise mine infrastructure areas at the Mount Owen Complex; the Project will also utilise voids within aspects of the Mount Owen Complex approved under EPBC 2013/6978 and SSD–5850.

The water management system associated with the Project will be integrated with the existing Mount Owen Complex water management system. The Mount Owen Complex is an integral

part of the Greater Ravensworth Area Water and Tailings Scheme (GRAWTS). The GRAWTS allows greater flexibility in mine water management by the Mount Owen Complex by allowing water to be transferred from sites with excess water to sites with storage capacity and/or higher usage demands or discharge opportunities.

As detailed in **Section 1.2**, the Proposed Action specifically excludes all existing and approved mining operations including the existing and approved Mount Owen Continued Operations Project (covered by the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) development consent SSD-5850 and EPBC Act approvals 2004/1369 and 2013/6978), the Mount Owen Continued Operations - Modification 2 (declared not to be a Controlled Action -2017/8083), the existing and approved Glendell Mine (EP&A Act development consent DA 80/952) and the Proposed Glendell Modification.

1.16 Is the proposed action related to other actions or proposals in the region?

Yes

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation).

The Project is not part of a staged development but is a continuation of the existing approved Glendell Mine and utilisation of existing approved infrastructure associated with the Mount Owen Complex. The Project will also utilise voids with aspects of the Mount Owen Complex approved under EPBC 2013/6978 and SSD–5850.

The Glendell Mine was originally approved under development consent DA 80/952 granted on 2 May 1983 prior to the commencement of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The current operations are undertaken in accordance with revised mine plans approved in a modification to DA 80/952 in February 2008. The modifications to the Glendell development consent approved in February 2008 did not relate to any of the matters of the national environmental significance prescribed by the EPBC Act, and therefore the modification was not required to be referred to the Minister under the EPBC Act. The processing of coal mined from the Glendell Pit is regulated by development consent SSD-5850 (Mount Owen Continued Operations Consent) which also regulates mining at the Mount Owen and Ravensworth East Mines, and associated activities. The proposed Glendell Continued Operations Project's interactions with existing approved operations is discussed further in Section 1.15.

A separate minor extension to the approved Glendell Pit is currently under assessment by the NSW Department of Planning and Environment with only insignificant impacts, which will provide an additional approximately 8 months of mining within the currently approved mine life of the Glendell Mine (Proposed Glendell Modification). This pit extension is located entirely within the originally approved pit footprint approved in 1983. NSW State development approval for this minor modification was sought in 2018. As a result of the minor nature of the Proposed Glendell Modification, which is not expected to have any significant impacts on matters of national environmental significance, the modification is not required to be referred to the Minister under the EPBC Act.

The water management system associated with the Project will be integrated with the existing Mount Owen Complex water management system. The Mount Owen Complex is an integral part of the Greater Ravensworth Area Water and Tailings Scheme (GRAWTS). The GRAWTS allows greater flexibility in mine water management by the Mount Owen Complex by allowing water to be transferred from sites with excess water to sites with storage capacity and/or higher usage demands or discharge opportunities.

As detailed in **Section 1.2**, the Proposed Action specifically excludes the existing and approved mining operations including Mount Owen Continued Operations Project (covered by the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) development consent SSD-5850 and EPBC Act approvals 2004/1369 and 2013/6978), the Mount Owen Continued Operations - Modification 2 (declared not to be a Controlled Action -2017/8083) and the existing and approved Glendell Mine (EP&A Act development consent DA 80/952) and the Proposed Glendell Modification.

Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

• Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;

• Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;

• Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

No

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

No

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

No

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Species	Impact
Central Hunter Valley Eucalypt Forest and Woodland	Likely significant impact - Recorded within the Biodiversity Impact Assessment Area and surrounds. The clearance of this community

Species	Impact
	results in the removal of all species components including habitats for local fauna species that occupy this habitat. It is likely that the Proposed Action will affect the species composition, including causing a decline or loss of functionally important species locally within the Biodiversity Impact Assessment Area. It is considered that the Proposed Action is likely to result in a significant impact on Central Hunter Valley Eucalypt Forest and Woodland CEEC due to the removal of up to approximately 166 hectares of this community. Refer to Assessment of Significance in Attachment 'Ecological Matters of National Environmental Significance Report'.
green and golden bell frog Litoria aurea	Unlikely to be significantly impacted - This species has not been recorded in the Biodiversity Impact Assessment Area and has not been positively recorded within the wider Mount Owen Complex since 1999, despite extensive targeted annual monitoring undertaken by recognised experts in the identification and ecology of the species. Furthermore, the species has not been positively recorded in the Upper Hunter Valley since 2009. It is considered highly likely that the precipitous state of the Upper Hunter population is directly due to the impact of disease rather than habitat loss or other ecological factors (Forest Fauna Surveys and Newcastle Innovation 2013). A number of the aquatic habitats in the Biodiversity Impact Assessment Area do not consistently hold water year round or contain suitable fringing riparian vegetation or shelter habitat usually required for the species presence. A small area (approximately 3 hectares) of suitable potential habitat is available in the Biodiversity Impact Assessment Area. As the species is not known to occur within the Biodiversity Impact Assessment Area and the persistence of the species in the Biodiversity Impact Assessment Area is expected to be limited due to infection by chytrid fungus, the loss of habitat from the Biodiversity Impact Assessment Area is not considered likely to lead to a long term decrease in the size of an important population of the species. The Proposed Action is not

Species	Impact
	expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
regent honeyeater Anthochaera phrygia	Unlikely to be significantly impacted - The Proposed Action is unlikely to result in a significant impact on the population of the regent honeyeater. Although the Biodiversity Impact Assessment Area provides potential foraging habitat for this species, the area potentially disturbed is minimal (approximately 3 hectares). The majority of the key feed species are planted, fragmented and reasonably young with limited large trees which are a more valuable feeding resource for the regent honeyeater. This vegetation also contains large aggressive nectar feeders such as noisy minors and red wattlebirds. Despite extensive surveys during key potential foraging periods, the regent honeyeater has not been recorded utilising the potential habitat within the Biodiversity Impact Assessment Area or in the immediate surrounds. The Proposed Action is not expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
swift parrot Lathamus discolor	Unlikely to be significantly impacted - The Proposed Action is unlikely to result in a significant impact on the population of the swift parrot. Although the Biodiversity Impact Assessment Area provides potential foraging habitat for this species, the area proposed to be disturbed is minimal (approximately 14 hectares), fragmented and reasonably young with limited areas containing larger trees which provide a better foraging resource for swift parrots. Despite extensive surveys being completed, the swift parrot has not been recorded utilising the potential habitat within the Biodiversity Impact Assessment Area. The Proposed Action is not expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
Australian painted snipe Rostratula australis	Unlikely to be significantly impacted - This species has been previously recorded along Bowmans Creek, however it has not been

Species	Impact
	recorded within the Biodiversity Impact Assessment Area which is considered to have only marginal, disturbed habitat for this species. This species is likely to move throughout the area as part of migratory patterns and as such, if the species were to occur in the Biodiversity Impact Assessment Area it would likely only be moving between areas of more appropriate habitat. The Biodiversity Impact Assessment Area is considered to be degraded, with 13 farm dams with limited fringing vegetation and limited patches of dense ground cover within the riparian corridors of Bowmans, Yorks, Swamp and Bettys Creeks. The Proposed Action is not expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
large-eared pied bat Chalinolobus dwyeri	Unlikely to be significantly impacted - This species was recorded adjacent to (<100 m away) the Biodiversity Impact Assessment Area in 2014 and also tentatively recorded in the wider Mount Owen Complex during annual monitoring surveys from call echolocation. The 2014 record occurs from the echolocation surveys undertaken for the Upper Hunter Strategic Assessment (UHSA) near the Hebden Road bridge over Bowmans Creek in Ravensworth. The Biodiversity Impact Assessment Area contains small areas of suitable foraging habitat for the species, but will not disturb any potential roosting habitat. The Proposed Action is not expected to result in a significant impact upon an important population of large-eared pied bat as the Biodiversity Impact Assessment Area is not considered to support an important population of this species or contain habitat considered to be critical to the survival of the species according to the National Recovery Plan (DERM 2011). The Proposed Action is not expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
spotted-tailed quoll Dasyurus maculatus maculatus	Unlikely to be significantly impacted - This species has been recorded in the Biodiversity Impact Assessment Area during remote camera surveys in 2017 and 2018 and previously in

Species	Impact
	2009, 2010 and 2013. Also recorded throughout the wider Mount Owen Complex with a known local population of this species occurring within and around Ravensworth State Forest and along Bowmans Creek to the north. The Biodiversity Impact Assessment Area contains suitable foraging and dispersal habitat for the species. While the Proposed Action may impact habitat connectivity for individuals in the local population utilising the habitats around the Mount Owen, Bowmans Creek and Liddell Coal Operations areas, the Proposed Action is unlikely to result in a significant impact on the Barrington tops regional population of the spotted-tailed quoll or the species as a whole. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
koala Phascolarctos cinereus	Unlikely to be significantly impacted – The Biodiversity Impact Assessment Area includes approximately 156 hectares of vegetation containing forest red gum (Eucalyptus tereticornis) and grey box (Eucalyptus moluccana). However, given the very low abundance of one primary koala feed tree (approximately 5 per cent forest red gum – Eucalyptus tereticornis) and one secondary food tree (grey box (Eucalyptus moluccana)) present within the Biodiversity Impact Assessment Area and the low number of recent records of the koala in the local region, the Proposed Action is considered unlikely to result in a significant impact on the koala. Furthermore, this species was not recorded as part of targeted surveys undertaken for this assessment or any previous extensive surveys in the wider Mount Owen Complex. The Proposed Action is not expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
New Holland mouse Pseudomys novaehollandiae	Unlikely to be significantly impacted - The New Holland mouse has not been recorded in the Biodiversity Impact Assessment Area however some regenerating habitats within these areas may provide potential habitat for the species (approximately 64 hectares). The species has been recorded during five of the last 18 years of

Species	Impact
	fauna monitoring in the adjoining Mount Owen Complex in areas of rehabilitation in the North Pit and Ravensworth State Forest. Established woodland and grassland habitats in the Biodiversity Impact Assessment Area do not conform to the preferred habitat types in which the species is typically located however, there is potential that this successional species will utilise limited habitats within the Biodiversity Impact Assessment Area when conditions are optimal, followed by the decline of the species. The Proposed Action is not expected to lead to a long-term decrease in an important population of the species since it has not been recorded in or immediately adjacent to the Biodiversity Impact Assessment Area. The Proposed Action is not expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.
grey-headed flying-fox Pteropus poliocephalus	Unlikely to be significantly impacted - The grey-headed flying-fox has been previously recorded on seven occasions during monitoring of the adjacent Mount Owen Complex. It was noted during May 2016 annual monitoring spotlighting surveys that several thousand individuals of the grey-headed flying-fox were present around the more mature and productive habitats of Ravensworth State Forest. The two nearest substantial camp sites of the grey-headed flying-fox to the Biodiversity Impact Assessment Area are at Burdekin Park, Singleton (approximately 16 km) and at Muswellbrook (approximately 25 km). The Biodiversity Impact Assessment Area is considered to comprise a small area of suitable foraging habitat for this species but is unlikely to contain significant breeding and roosting habitat necessary for maintaining genetic diversity. The Biodiversity Impact Assessment Area is also not near the limit of the known range of this species. The Biodiversity Impact Assessment Area is unlikely to contain an important population of the grey-headed flying-fox and the Proposed Action is not expected to significantly impact this species. Refer to Assessment of Significance in Attachment ‘Ecological Matters of National Environmental Significance Report’.

2.4.2 Do you consider this impact to be significant?

Yes

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No

2.7 Is the proposed action to be taken on or near Commonwealth land?

No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

Yes

2.9.1 Impact table

Water Resource	Impact
Groundwater Resources	The Proposed Action, being a large scale open cut coal mining operation, will result in interception of groundwater and changes to the existing surface water environment. To assess the potential impacts of the Proposed Action on water resources, detailed groundwater and surface water studies are being undertaken. These issues are discussed in further detail below. The two main hydrogeological features occurring within and surrounding the Mount Owen Complex and areas potentially impacted by the Proposed Action, are: • The alluvial aquifers along the creek lines – the area within and broadly surrounding the Referral Area contains Bettys Creek, Swamp Creek and Yorks Creek, (tributaries of Bowmans Creek); Bowmans Creek itself, and Main Creek, a

Water Resource	Impact
	tributary of Glennies Creek. Both Bowmans and Glennies Creeks are tributaries of the Hunter River. Swamp Creek and Yorks Creek will be directly impacted by the proposed Glendell Pit Extension. Flood plains occur along the alignment of the creek systems that have deposited a relatively thin sequence of alluvial sediments generally less than ten metres comprised of sand, silt and clay. Studies are being undertaken to accurately define the extent of the alluvial sediments using a variety of datasets including LIDAR imagery, CSIRO and other public data, test pits and drilling. The Proposed Action may induce drawdown in the Bowmans Creek, Swamp Creek and Bettys Creek alluvium but is likely to have only a negligible impact on the alluvial aquifers associated with Main Creek and Glennies Creek. • Deeper hard rock aquifers that contain the coal measures are semi-confined and contain sandstones, siltstones and coal seams. Water yields from the hard rock aquifers within the Mount Owen Complex are low and have limited ability to transmit groundwater. There has been extensive depressurisation of these hard rock aquifers within and surrounding the Mount Owen Complex, as a result of previous and current approved mining operations. The Proposed Action involves continued mining at depth (down to and including the Hebden Seam) to obtain approximately an additional 135 Mt of ROM coal. Groundwater Resources – Predicted Impacts The Proposed Action will extract the same sequence of coal seams that are currently being mined at Glendell Mine to the south with the addition of the deeper Hebden Seam. The coal seams occur within the Permian Vane subgroup and include the Bayswater, Lemington, Pikes Gully, Arties, Liddell, Barrett and Hebden Seams. An anticline runs through the proposed Glendell Pit Extension in an approximate north-south alignment resulting in the coal seams dipping away to the east and to the west at the boundaries of the Referral Area. Yorks Creek, Bowmans Creek, Bettys Creek and Swamp Creek pass through the Referral Area and join with Bowmans Creek downstream of the Work

Water Resource	Impact
	Area. Flood plains occur along the alignment of the creek systems that have deposited a relatively thin sequence of alluvial sediments generally less than ten metres comprised of sand, silt and clay. The proposed Glendell Pit Extension will depressurise the geological strata directly intersected by the mining activities. This will create a zone of drawdown around the mining activity where groundwater levels will decline during the life of the Project. The depressurisation will also create an area of low pressure within the groundwater system centred on the proposed Glendell Pit Extension that will encourage groundwater to flow towards the mining area drawing groundwater from the adjacent water sources. The seams intersected by the proposed mining do not directly subcrop under Bowmans Creek or Bowmans Creek alluvium and induced drawdown impacts on the alluvial aquifers associated with Bowmans Creek are expected to be minimal; this is supported by preliminary modelling results. The Glendell Pit Extension will mine through Swamp Creek and Yorks Creeks alluvium. This will have localised impacts on the water table in saturated areas of the alluvium immediately adjacent to the pit. Monitoring indicates that saturated zones of alluvium in these areas are of limited depth with water quality ranging from brackish to saline in these areas. Preliminary modelling indicates hardrock depressurisation effects associated with the Proposed Action are unlikely to significant impact on baseflows. Proposed Assessment of Groundwater Impacts The current numerical groundwater flow model used for recent groundwater impact assessments at the Mount Owen, Integra and Liddell operations have been refined to estimate the extent of the zone of influence and the volume of groundwater take associated with the Proposed Action from the affected water sources. The numerical model is being calibrated using water level records collected from the baseline monitoring network installed for the Project and from adjacent surrounding mining operations. A significant network of monitoring bores exists both within the Referral Area and at adjacent mining operations and

Water Resource	Impact
	surrounding area. The model will also be calibrated to estimates of groundwater ingress into surrounding mining areas to reduce uncertainty. The numerical model will include cumulative impacts from the Liddell Coal Operations, Mount Owen, Integra Underground, Rix's Creek, Ravensworth Operations, Ashton and HVO mines. The numerical model will be used to determine if the depressurisation due to the Proposed Action will significantly reduce the flow of Permian groundwater to the alluvial aquifers during mining. This depressurisation of the bedrock will potentially result in some lowering of groundwater levels within areas of the Quaternary alluvium. The potential for riparian vegetation occurring along the creek lines to depend on groundwater and whether they may be affected by any drawdown will be determined and discussed as part of the assessment. Potential impacts on stygofauna and hyporheic fauna will also be considered as part of the assessment.
Groundwater Users	There have been no private registered bores or water supply works identified within proximity to the Proposed Action to date. The numerical modelling will be used to determine any potential impacts on Groundwater Users. Preliminary results indicate no significant impacts on current or potential Groundwater Users.
Groundwater Quality	Post mining, the rainfall, runoff and groundwater will slowly flood the residual void. The groundwater and surface water assessments will include predictions of pit lake recovery and potential impacts on groundwater quality. The groundwater assessment will include a review of the geochemistry and the potential for any interconnection between aquifers to assess if there is a risk of changes to the groundwater quality that would impact on the beneficial uses of the aquifer systems.
Groundwater Dependent Ecological Assets	The Proposed Action has the potential to lower water tables in the weathered rock zone and alluvial and colluvial material. Vegetation growing in areas where groundwater levels may be impacted has the potential to be impacted if dependant (or partially dependant) on groundwater resources. Impacts on baseflows

Water Resource	Impact
	have the potential to affect aquatic fauna and flora species which rely on persistent pools in the ephemeral creeks in the area. A Stygofauna Assessment is being undertaken as part of the assessment of the Project. Stygofauna sampling undertaken for the Mount Owen Continued Operations Modification 2 (EPBC/2017/8033) included sampling from groundwater systems potentially impacted by the Proposed Action. Five taxa of stygofauna were collected (Notobathynella sp, Cyclopoida, Ostracoda, Hydrobiidae sp. (a snail), Carabhydrus stephanieae (a subterranean diving beetle)). These taxa were collected from the alluvial aquifers of York Creek, Swamp Creek, and Glennies Creek. All of the taxa collected are known from elsewhere in the Hunter Valley and generally have a widespread distribution along alluvial aquifers of the Hunter and Pages Rivers. No stygofauna were found in samples taken from the Main Creek and Bettys Creek alluvium, nor from the coal and rock aquifers. Further sampling will be undertaken to supplement previous surveys and assess the potential impacts of the Proposed Action on stygofauna. The results of the numerical modelling will be used to identify potential impacts on groundwater dependent ecosystems. This assessment will include consideration of stygofauna, hyporheic fauna, aquatic fauna and riparian vegetation communities and other vegetation communities that may be dependent on groundwater.
Surface Water Catchments	The Proposed Action has the potential to impact on existing surface water resources through alterations to existing catchments mainly through the further development of open cut mining and overburden emplacement areas. The Proposed Action also includes the diversion of a section of Yorks Creek and the removal of a section of Swamp Creek. The Proposed Action will include works within the flood plain of Bowmans Creek. The Proposed Action (including the Yorks Creek realignment) has been designed to minimise impacts on surface water resources. The design of the Yorks Creek diversion includes specific consideration of geomorphology of the existing

Water Resource	Impact
	and proposed creek line and potential impacts associated with changes to the point of confluence with Bowmans Creek. The potential surface water impacts that will be considered in the EIS for the Project include impacts on the following creek systems and their associated catchment areas: • Bowmans Creek (a tributary of the Hunter River) • Yorks Creek (a tributary of Bowmans Creek) • Swamp Creek (a tributary of Bowmans Creek) • Bettys Creek (a tributary of Bowmans Creek) • Hunter River.
Surface Water Management System (WMS)	The Mount Owen Complex has an extensive existing water management system (WMS). The WMS is an integrated system, where water from the Mount Owen, Ravensworth East and Glendell Mines are managed together within the integrated WMS. Additionally, the Mount Owen Complex is part of the Greater Ravensworth Area Water and Tailings Scheme (GRAWTS) with Glencore's Ravensworth Operations, Integra Underground and Liddell Coal Operations mining operations. The GRAWTS is designed to improve the efficiency of water extraction, use and discharge across the operations within the requirements of the relevant approvals and other NSW and Commonwealth regulatory requirements. The GRAWTS provides for water sharing between the Mount Owen Complex and the other Glencore operations, to minimise water extraction from off-site sources (such as Glennies Creek and the Hunter River), and to maximise the recycling of water between the operations within regulatory requirements. The key components of the approved Mount Owen Complex WMS are shown on Figure 5 and include the following: • diversion of clean water around mining operations to minimise capture of upslope runoff and separate clean water runoff from mining activities; • segregating mine impacted water and runoff from undisturbed and revegetated areas with better water quality to minimise the volume of mine impacted water that requires reuse; • reuse of mine impacted water within the WMS and within the GRAWTS to reduce reliance on raw/clean water (e.g. extraction from Glennies Creek and the Hunter River); • minimising adverse effects on

Water Resource	Impact
	downstream waterways (i.e. hydraulic and water quality impacts); and • reducing the discharge of pollutants from the mine to the environment. As mining progresses, runoff from disturbed areas will be managed within the WMS and reused. When runoff water quality from rehabilitated areas meets required guidelines, the runoff will be released, where practical, to downstream waterways. The existing approved WMS for the Mount Owen Complex will be extended to manage the additional disturbance required for the Proposed Action. This will include the design and installation of water management infrastructure within the Work Area. This will be developed as part of the detailed surface water impact assessment being prepared to support the Project. The extension of the WMS will not alter the linkages or current design objectives with the GRAWTS.
Surface Water Flows and Flooding	The Proposed Action includes the diversion of the lower reaches of Yorks Creek. The diversion of Yorks Creek will result in the confluence of Yorks Creek and Bowmans Creek being moved upstream of the existing confluence. The Proposed Action will also mine through a section of Swamp Creek. No Diversion of Swamp Creek is proposed as the reach of Swamp Creek above the area directly impacted by the Proposed Action is already within the Mount Owen Complex WMS catchment area. The final landform will alter the catchments of Yorks Creek, Swamp Creek and Bettys Creek relative to pre-mining and existing approved landforms. The realignment of Hebden Road and the MIA Heavy Vehicle Access Road include sections within the Bowmans Creek floodplain. The new Glendell MIA is also located within the Bowmans Creek floodplain. These infrastructure items will be designed to avoid inundation in large flood events and the design will have regard to potential impacts on flood flows in Bowmans Creek. A detailed surface water assessment will be undertaken as part of the EIS to understand potential impacts on surface water flows associated with the Project.
Water Licencing	Water is supplied to the Mount Owen Complex

Water Resource	Impact
	from both the GRAWTS and from extractions from Glennies Creek (via Water Access Licences (WALs)). High and General Security Entitlement WALs under the Water Sharing Plan (WSP) for the Hunter Regulated River 2004 are currently held for extraction of water from Glennies Creek. Mount Owen hold licenses to extract groundwater from the Jerrys Water Source which is regulated under the WSP for the Hunter Unregulated and Alluvial Water Sources 2009. Licences are also held under the WSP for the North Coast Fractured and Porous Rock 2016 to extract water from the deeper hard rock aquifers. A detailed review of water licence requirements will be undertaken as part of the surface and groundwater impacts assessments in the EIS to support the Project to ensure that sufficient water licence allocations are held for each stage of the operations or further entitlements are obtained if required. Preliminary modelling results indicates that net groundwater take associated with the Proposed Action is minimal. The predicted cumulative impacts from mining at Glendell (historical and proposed) on alluvial groundwater take is predicted to be less than 20 ML/year with a significant component of this associated with existing approved operations. Predicted take from alluvial systems associated with mining at Glendell will peak late in the life of the Proposed Action and then decline over time with no predicted take beyond 2200.

2.9.2 Do you consider this impact to be significant?

Yes

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

2.13 Is the proposed action likely to have ANY direct or indirect impact on any part of the environment in the Commonwealth marine area?

No

Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

Flora of the Biodiversity Impact Assessment Area:

Flora species within the Biodiversity Impact Assessment Area have been recorded from two major vascular plant classes, being: ferns and flowering plants and included trees, shrubs, forbs, grasses, sedges, rushes, reeds, ferns, lithophytes, epiphytes, mistletoes, vines and twiners. The vast majority of the Biodiversity Impact Assessment Area is covered by areas of native or exotic grasslands previously cleared and disturbed for agricultural purposes. The extant woodland is regrowth vegetation dominated by box-ironbark and/or bulloak (*Allocasuarina luehmannii*) associations. Riparian zones are generally dominated by either swamp oak (*Casuarina glauca*) or river oak (*Casuarina cunninghamiana*).

Commonly recorded native grass and forb species include common couch (*Cynodon dactylon*), purple wiregrass (*Aristida ramosa*) common everlasting (*Chrysocephalum apiculatum*), barbed wire grass (*Cymbopogon refractus*) and threeawn speargrass (*Aristida vagans*). The mid and shrub layers are usually sparse and commonly contain native species such as mat rushes (*Lomandra* spp.), gorse bitter pea (*Daviesia ulicifolia*) or blackthorn (*Bursaria spinosa*). Common overstorey species include narrow-leaved ironbark (*Eucalyptus crebra*), bulloak (*Allocasuarina luehmannii*), swamp oak (*Casuarina glauca*) and grey box (*Eucalyptus moluccana*)

Commonly recorded introduced species recorded include typical pasture weeds such as lambs tongues (*Plantago lanceolata*), mother of millions (*Bryophyllum delagoense*), Rhodes grass (*Chloris gayana*), cobblers pegs (*Bidens pilosa*), Paddys lucerne (*Sida rhombifolia*) and fireweed (*Senecio madagascariensis*). Noxious weeds include tiger pear (*Opuntia aurantiaca*), prickly pear (*Opuntia stricta* var. *stricta*) African olive (*Olea europaea* subsp. *cuspidata*), lantana (*Lantana camara*), and African boxthorn (*Lycium ferocissimum*).

Locally endemic as well and non-endemic eucalypt species of various ages dominate rehabilitated mining areas along with a range of exotic and native grassland species. Preliminary mapping of the vegetation within the Biodiversity Impact Assessment Area is shown in Figure 6.

Fauna of the Biodiversity Impact Assessment Area:

A wide range of fauna species have been recorded within and surrounding the Mount Owen Complex recorded as part of extensive ecological surveys associated with more than 20 years of annual fauna monitoring and targeted surveys for development applications and approvals.

Up to 170 bird, 51 mammal, 27 reptile and 16 amphibian species have been recorded in the wider Mount Owen Complex (Forest Fauna Survey 2018) utilising a wide range of habitats.

The Biodiversity Impact Assessment Area represents the western portion of the wider Mount Owen Complex, with fauna habitats generally restricted to grasslands (including grassland areas in rehabilitated areas in the Re-disturbance Area) and small areas of fragmented forest and woodland, as well as areas of rehabilitated re-established grassland and woodland of various ages and succession stages. Areas of open grassland provide a foraging resource for macropods and a hunting resource for owls and micro-bats. Small mammals such as *Antechinus* sp. are provided foraging habitat as well as refuge habitat within the grass layers. Occasional isolated paddock trees and fragmented woodlands function as corridors for mobile species, particularly those willing to cross expanses of cleared land, such as the spotted-tailed quoll (*Dasyurus maculatus maculatus*). Commonly recorded native species include eastern grey kangaroo (*Macropus giganteus*), red-necked wallaby (*Macropus rufogriseus*) nankeen kestrel (*Falco cenchroides*), eastern rosella (*Platycercus eximius*), galah (*Eolophus roseicapilla*), noisy miner (*Manorina melanocephala*), common brush-tailed possum (*Trichosurus vulpecula*), lace monitor (*Varanus varius*), common eastern froglet (*Crinia signifera*) and spotted grass frog (*Limnodynastes tasmaniensis*). In addition to the native species, a number of pest species are commonly recorded and include rabbit (*Oryctolagus cuniculus*), brown hare (*Lepus capensis*), fox (*Vulpes vulpes*), fallow deer (*Dama dama*) and wild dog (*Canis lupus familiaris*).

3.2 Describe the hydrology relevant to the project area (including water flows).

Drainage and Catchment Areas

The Referral Area includes areas within the Bowmans Creek catchment and is adjacent to areas within the Glennies Creek catchment, both of which are tributaries to the Hunter River. The Work Area is located entirely within the Bowmans Creek catchment. Areas associated with the alluvial plains of Bowmans Creek, Yorks Creek, Swamp Creek and Bettys Creek are generally flat to gently sloping.

The Proposed Action will not have any direct impacts on the Glennies Creek catchment.

The proposed Glendell Pit Extension is primarily within two sub-catchments of Bowmans Creek, namely Yorks Creek and Swamp Creek. The Proposed Action includes the diversion of the lower reaches of Yorks Creek and the removal of a section of Swamp Creek.

The Proposed Action will result in changes to the approved final landform which will also have different impacts on Bettys Creek relative to the existing approved operations.

Downstream Catchment

The Proposed Action is located in the Bowmans Creek Catchment which is a tributary of the Hunter River.

The Proposed Action occurs within the broader catchment of one listed wetland of international

importance, the Hunter Estuary Wetlands which is listed as a Ramsar wetland. The Hunter Estuary Wetlands are located on the lower estuarine reaches of the Hunter River, approximately 74 km from the Referral Area (straight line distance) and a substantially greater distance following the meandering drainage system. The Proposed Action will not result in any direct impact on this Ramsar site with the only potential for impact relating to far-field effects on the water regime. At this distance it is not considered that there is a significant risk of the Proposed Action resulting in far field effects on the water regime of the wetland.

The Proposed Action will not result in any areas of the Hunter Estuary Wetlands being destroyed or substantially modified and the Proposed Action is unlikely to have any measurable change in the hydrological regime of the Hunter Estuary Wetlands.

The Proposed Action will not result in a substantial or measurable change in the water quality of the Hunter Estuary Wetlands.

Hydrogeology

The two main hydrogeological features occurring within and surrounding the Mount Owen Complex and areas potentially impacted by the Proposed Action are:

- The alluvial aquifers along the creek lines – the area within and broadly surrounding the Referral Area contains Bettys Creek, Swamp Creek and Yorks Creek, (tributaries of Bowmans Creek); Bowmans Creek itself, and Main Creek, a tributary of Glennies Creek. Both Bowmans and Glennies Creeks are tributaries of the Hunter River. The alluvial aquifers associated with these systems are shallow unconfined aquifers of limited extent with unconsolidated alluvium. The alluvial aquifers directly applicable to mining within the Glendell Pit Extension are those associated with Yorks Creek, Swamp Creek and Bowmans Creek. The Proposed Action may induce drawdown in the Bowmans Creek, Swamp Creek and Bettys Creek alluvium. The Proposed Action is likely to have only negligible impacts on alluvial aquifers associated with the Main Creek and Glennies Creek.

- Deeper hard rock aquifers that contain the coal measures are semi-confined and contain sandstones, siltstones and coal seams. The coal seams form low transmissivity groundwater systems and are separated by low permeability interburden that forms an intervening aquitard. Water yields from the hard rock aquifers within the Referral Area are low and have slow groundwater movement. There has been extensive depressurisation of these hard rock aquifers within and surrounding the Mount Owen Complex, as a result of previous and current mining operations.

The Proposed Action will extract coal seams that occur within the Permian Vane subgroup and include the Lemington, Pikes Gully, Arties, Liddell, Barrett and Hebden Seams. An anticline runs through the existing Glendell Pit and the Glendell Pit Extension in an approximate north-south alignment resulting in the coal seams dipping away to the east and to the west. Yorks Creek and Swamp Creek pass through the Glendell Pit Extension and join with Bowmans Creek west of the proposed mining area. Flood plains occur along the alignment of the creek systems that have deposited a relatively thin sequence of alluvial sediments generally less than ten metres. The alluvial sediments are primarily comprised of sand, silt and clay. A program of works has

been designed, including the use of a variety of datasets including LIDAR imagery, CSIRO and other public data as well as test pits and drilling, to accurately define the extent of the alluvial sediments in Bowmans Creek, Yorks Creek and Swamp Creek. Work to define the extent of the Main Creek and Bettys Creek alluvium has been undertaken for the assessment of impacts associated with the Mount Owen Continued Operations Project Modification 2

3.3 Describe the soil and vegetation characteristics relevant to the project area.

Soil Characteristics:

Detailed soil surveys of the Additional Disturbance Area have been undertaken.

The distribution of the identified soils in the Additional Disturbance Area is shown in Figure 7. Sodosol is the dominant soil order in the Additional Disturbance Area, taking up almost 80% of the area. Tenosols cover approximately 13% of the area, while Chromosols can be found in approximately 2% of the Additional Disturbance Area. The other soil types (Rudosol, Kandosol and Dermosol) each occupy approximately 1% or less of the Additional Disturbance Area. The soils associated with the Bowmans Creek, Yorks Creek and Swamp Creek alluvium (Chromosols, Tenosols and Dermasols) are the more fertile soils in the Additional Disturbance Area. These represent approximately 16% of the Additional Disturbance Area.

Vegetation Characteristics:

The vast majority of the Biodiversity Impact Assessment Area is covered by areas of native or exotic grasslands previously cleared and disturbed for agricultural purposes. The extant woodland in the Biodiversity Impact Assessment Area is regrowth vegetation occurring in patches within the previously cleared grassland areas. This vegetation mainly consists of narrow-leaved ironbark (*Eucalyptus crebra*), spotted gum (*Corymbia maculata*) and/or bulloak (*Allocasuarina luehmannii*) dominated communities surrounded by native and exotic grasslands and pasture.

Riparian vegetation associated with Bowmans Creek, Yorks Creek and Swamp Creek represent the oldest vegetation in the Biodiversity Impact Assessment Area, in some areas pre-dating aerial photos from 1958. These riparian zones are generally dominated by either swamp oak (*Casuarina glauca*) or river oak (*Casuarina cunninghamiana*) vegetation communities that have been disturbed by previous and ongoing grazing uses.

Surveys of the remnant vegetation within the Biodiversity Impact Assessment Area identified six vegetation communities across a range of condition classes. The vegetation communities are subject to ongoing data analysis and refinement as part of the assessment for the Project using the NSW Biodiversity Assessment Methodology (BAM) under the *Biodiversity Conservation Act 2017* and include the following:

- Floodplain Grassland Community (approximately 137hectares)

- River Oak Riparian Woodland - *Moderate to Good (approximately 2hectares)*

- Narrow-leaved Ironbark - Bull Oak - Grey Box - Open Forest

- *Moderate to Good* (approximately 29 hectares) (all of which conforms to Central Hunter Valley Eucalypt Forest and Woodland CEEC)

- *Regeneration* (approximately 53 hectares) (approximately 52hectares conforming to Central Hunter Valley Eucalypt Forest and Woodland CEEC)

- *Derived Native Grassland* (approximately 453hectares) (approximately 15 hectares conforming to Central Hunter Valley Eucalypt Forest and Woodland CEEC)

- Narrow-Leaved Ironbark - Grey Box - Spotted Gum - Woodland

- *Derived Native Grassland* (approximately 1hectare)

- Bull Oak Grassy Woodland

- *Moderate to Good* (approximately 18hectares) (approximately 18 hectares conforming to Central Hunter Valley Eucalypt Forest and Woodland CEEC)

- *Regeneration* (approximately 11 hectares) (approximately 10 hectares conforming to Central Hunter Valley Eucalypt Forest and Woodland CEEC)

- Swamp Oak Riparian Forest

- *Moderate to Good* (approximately 45hectares)

Other vegetation in the Biodiversity Impact Assessment Areais comprised of non-native or non-naturally occurring vegetation.

This includes:

- Mixed plantation (approximately 8 hectares)

- Mixed Eucalypt plantation (approximately 81hectares) (approximately 43 hectares conforming to Central Hunter Valley Eucalypt Forest and Woodland CEEC)

- Exotic grassland/pasture (approximately 12 hectares)

- Rehabilitated grassland (approximately 167 hectares).

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area.

Not applicable

3.5 Describe the status of native vegetation relevant to the project area.

The dominant vegetation community present within the Biodiversity Impact Assessment Area is primarily treeless derived native grasslands that have been historically cleared for agricultural purposes and provide limited habitat for relevant MNES. The majority of the existing woodland and forest vegetation within and surrounding the Mount Owen Complex and Referral Area exists as a result of extensive re-growth over the past 30 years (Umwelt 2014). The extant forest and woodland in the Biodiversity Impact Assessment Area is regrowth, that is, it has been previously cleared and its present extent is based entirely on natural regeneration or on targeted planting of canopy species. Areas along Yorks Creek and Bowmans Creek are less disturbed than surrounding hill sides and alluvial terraces however the prevalence of swamp oak (*Casuarina glauca*) along Yorks Creek and Swamp Creek is likely to be higher than was the case pre-European settlement.

All vegetation in the Re-disturbance Area has been planted within the past 20 years with some areas of rehabilitation less than 1 year old.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The topography of the Referral Area is characterised by an undulating and hilly landscape extending to lower areas associated with the creek lines that traverse the Referral Area. Elevations range between 70 mAHD in the south and 160 mAHD in the eastern parts of the Referral Area within the existing Ravensworth East and Glendell emplacement areas. The Glendell Pit Extension will affect previously unmined land with elevations of between approximately 75 mAHD and 130 mAHD, and will affect areas of the existing Ravensworth East and Glendell emplacement areas around 160 mAHD). The topography across the majority of the Referral Area is generally flat to gently undulating with 0 to 5 degree slopes with the exception of the terrain to the immediate north of Swamps Creek and the steeper slopes created by the existing approved mining operations and mine rehabilitation areas. While the Additional Disturbance Area is largely unaffected by past mining, the areas within the approved mining disturbance areas to the immediate north, south and east include engineered landforms associated with historical and active overburden emplacement, both in pit and out of pit.

Existing approved operations at Glendell and Mount Owen include active pit excavations and final voids to approximately 200 m and 380 m below ground level. The approved Glendell Pit and Bayswater North Pit final voids are both located within the Referral Area. The Bayswater North Pit final void is approved for operational purposes such as overburden, tailings or rejects emplacement or as a water storage.

The topography and key drainage lines in the Referral Area are shown in **Figure 8**.

3.7 Describe the current condition of the environment relevant to the project area.

The dominant vegetation community present within the Biodiversity Impact Assessment Area is treeless derived native grasslands that have been historically cleared for agricultural purposes and provide limited habitat for relevant MNES other than for movement between foraging,

denning and breeding areas. The majority of the native vegetation within and surrounding the Biodiversity Impact Assessment Area exists as either a highly disturbed remnant or re-growth from extensive historical clearing for agriculture. The Referral Area has a long history of agricultural use, including crops and more recently cattle grazing. As such, the grasslands are generally either pasture improved or the quality of the native grasslands has been reduced by grazing. The higher quality vegetation occurs in the steeper areas north west of the Mount Owen Complex in Ravensworth State Forest however most of this area still exhibits some form of modification, either from timber collection or past cattle grazing; this area of higher quality vegetation will be unaffected by the Proposed Action.

The rehabilitated areas impacted by the Proposed Action (Re-disturbance Area) include exotic and mixed exotic/native grasslands as well as areas of rehabilitating woodland communities. The rehabilitation ranges in age from less than one year post establishment to approximately 20 years post establishment. The oldest areas of woodland vegetation largely comprise non-indigenous eucalypt species. More recently established woodland communities are still in early successional stages.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area.

In order to identify if any places with heritage values are located within the Referral Area, desktop searches were conducted of the Australian Heritage Database (including Commonwealth and National Heritage lists and the Register of the National Estate), NSW State Heritage Register and State Heritage Inventory, and local planning instruments. No Commonwealth Heritage Places were identified in the Referral Area.

Based on existing knowledge of the area and the current layout of the Project, the key known heritage feature that will be impacted by the Proposed Action is the Ravensworth Homestead (refer to Figure 9), which was constructed circa 1828. The Ravensworth Homestead is listed as a local heritage item under the Singleton Local Environmental Plan (2013). Ravensworth Homestead is a collection of buildings constructed in the 1800s and is currently unoccupied. The Ravensworth Homestead is also of potential importance to the local Aboriginal community due to its association with early conflict with the Aboriginal people of the area. A number of other known heritage structures occur in the vicinity of the Referral Area but will not be directly impacted by the Project, including the former Chain of Ponds Inn and Ravensworth Public School.

The Project includes the removal and potential relocation of the Ravensworth Homestead to a location yet to be confirmed. The relocation of the Ravensworth Homestead does not form part of the Proposed Action.

Vibration and overpressure impacts from blasting associated with mining and road and creek diversion activities has potential to impact on other heritage items in the area. The management of blast related impacts is well understood and blasting is currently managed on site to avoid impacts on all known heritage items. Similar management controls will be implemented for the Project.

3.9 Describe any Indigenous heritage values relevant to the project area.

The Mount Owen Complex has been subject to extensive archaeological investigation and survey in relation to previous approvals. The Proposed Action will result in disturbance of some previously undisturbed areas, including areas known to contain Aboriginal sites. **Figure 10** shows the location of previously recorded Aboriginal sites in the local area, including sites salvaged or destroyed as part of past approved mining activities.

A detailed consultation, engagement and survey process has been undertaken with the Aboriginal community to identify the cultural significance of the Referral Area. The process will be undertaken in accordance with the SEAR's that have been issued for the Project to facilitate the development of an Aboriginal Cultural Heritage Assessment Report (ACHAR).

The preparation of the ACHAR will also include an Aboriginal archaeological values assessment for inclusion in the EIS.

The Proposed Action has the potential to impact both known Aboriginal sites and unidentified Aboriginal sites and areas of cultural heritage value. Potential impacts will be identified and addressed as part of the Aboriginal archaeological and cultural heritage assessments, in consultation with the Registered Aboriginal Parties (RAPs) for the Project. RAPs and Knowledge Holder groups are identified in accordance with NSW government guidelines.

As part of the archaeological and cultural heritage study, a comprehensive field survey has been completed by archaeologists, including with field assistance by RAPs and Knowledge Holder groups.

The ACHAR will be compiled with detailed input from RAPs and Knowledge Holder groups. The assessment will outline areas and places of cultural significance in addition to any potential impacts associated with the Project. The archaeological assessment report will be integrated with the cultural heritage assessment report, both of which will outline mitigation and management measures proposed to be implemented, in addition to a consideration of cultural heritage conservation outcomes. Any sensitive information identified by the Knowledge Holders will be provided as separate confidential information with distribution restricted to Glendell and relevant government agencies.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area.

The land within the Referral Area is owned by Glencore or associated entities with the exception of a parcel of Crown land and various road reserves including Hebden Road (for which Singleton Council is the Roads Authority). A claim under the *Aboriginal Land Rights Act 1983* has been lodged over the parcel of Crown Land. Land Ownership in the area is shown in **Figure 11.**

3.11 Describe any existing or any proposed uses relevant to the project area.

The land uses within the Referral Area and surrounds is dominated by mining operations (refer

to Figure 12). Glencore operates the Mount Owen Complex, Integra Underground operations to the south-east, Liddell Coal Operations to the north-west and Ravensworth Operations to the south-west (refer to Figure 2). Ashton Coal Mine is located to the south of the Referral Area while Rix's Creek North is located to the south-east of the Referral Area (refer to Figure 2). AGL Macquarie Pty Limited own land associated with former mining areas located between the New England Highway and Ravensworth Operations to the west of the Referral Area.

The Proposed Action will include impacts in approximately 630 hectares of land that are approved for disturbance under existing approvals. Approximately 230 hectares within these existing approved disturbance areas have been partly rehabilitated (Re-disturbance area) and the remaining approximately 400 hectares within existing approved disturbance areas remain part of the active mining operations or may be impacted by future approved mining activities.

Parts of the Work Area are currently approved for disturbance for current operations. Approximately 860 hectares of the approximately 1,510 hectare Work Area (i.e. the area directly impacted by the Proposed Action) are outside areas identified as being part of the approved disturbance area under existing consents and this area is referred to in this Referral as the "Additional Disturbance Area". Most of the 'Additional Disturbance Area' is currently used for extensive agriculture (grazing) with the lower alluvial flats periodically cropped primarily for fodder (grazing and hay). Hill slopes on lower quality soils have been heavily eroded in the past as a result of past clearing and agricultural practices. Much of these degraded areas are regenerating as eucalypt woodland and Bulloak communities. Grazing and associated agriculture practices will continue in the Additional Disturbance Area in the absence of the Proposed Action. Parts of the Additional Disturbance Area have also been previously disturbed by lawful mining related activities. Pipeline infrastructure associated with the GRAWTS and a conveyor between Ravensworth East and Liddell Coal Operations also pass through the Additional Disturbance Area. The current alignment of Hebden Road is also located within the Additional Disturbance Area.

Other land uses within the surrounding area include grazing and rural residential holdings and the Hebden and Wild Quarries to the north-west of the Referral Area. The Bayswater and Liddell Power Stations and associated infrastructure, including Lake Liddell, are located further to the west of the Referral Area. With a variety of landscapes and climates, the Upper Hunter region supports a diverse range of agricultural industries. Similarly, Singleton and Muswellbrook LGAs have a long history of agricultural land use, particularly in regard to cropping and grazing.

Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

Changes to Avoid and Minimise Impacts

The Proponent has sought to avoid and minimise potential impacts on the ecological values throughout the project design process. This included targeted avoidance and minimisation of disturbance of key vegetation communities through designing the Project to maximise use of existing mining facilities.

The majority of the Biodiversity Impact Assessment Area comprises disturbed and low quality vegetation in the form of derived native grasslands. Native forest, woodland and plantation areas comprise less than 20 per cent of the Biodiversity Impact Assessment Area and the larger and higher quality remnant patches of native forest and woodland have been avoided. The areas of rehabilitation in the Re-disturbance Area generally have low ecological value due to the early successional stage of the rehabilitation.

Biodiversity Impact Mitigation Measures

The Proponent has committed to the design and implementation of a comprehensive biodiversity mitigation strategy to mitigate the unavoidable impacts of the Proposed Action. The following specific control measures, as detailed in the existing approved Mount Owen Complex Biodiversity and Offset Management Plan (prepared under SSD-5850 and DA80/952 and Commonwealth EPBC Act Approval EPBC 2013/6978), are considered to be integral to the mitigation of impacts on the biodiversity features of the Biodiversity Impact Assessment Area:

- landform and rehabilitation establishment- salvage of biodiversity features, including habitat resources (e.g. hollow logs, tree hollows, fallen timber and rocks/boulders), threatened flora species and material for rehabilitation (e.g. seed collection, and topsoil) for mine rehabilitation

- boundaries of disturbance and clearance activities clearly demarcated to prevent unnecessary disturbance and accidental clearance

- a pre-clearing procedure will be implemented to minimise the potential for impacts on native fauna species (focusing on threatened species) as a result of the clearing of hollow-bearing trees. The pre-clearing procedure is designed to minimise impacts to hollow-dependent and

ground-dwelling fauna. In addition to this, a Ground Disturbance Permit will identify of any specific ecology requirements, such as wildlife spotter/catcher requirements prior to clearing being permitted to commence on-site

- clearing activities will be timed to occur as close to the time when the area is required to be used for the Project; this ensures that the biodiversity values of vegetation within the Work Area are maintained as long as possible

- disturbed areas will be rehabilitated as soon as final landforms are established. This rehabilitation will occur progressively to assist in the timely recreation of communities that have biodiversity values similar to those impacted by the Project

- weed management

- pest animal control

- fencing and access control

- bushfire management

- riparian zone management

- erosion and sedimentation control

- providing appropriate environmental management measures as part of the mining operations to minimise the potential for indirect impacts including;

- water management systems that seek to minimise the potential for damage to flora and fauna and their habitats from erosion, sedimentation and unnatural flooding events

- noise control systems to minimise noise impacts

- dust control measures to minimise dust impacts

- lighting controls to minimise night time light impacts and

- blasting controls to minimise blast overpressure and vibration impacts.

- employee education and training.

Each of these control measures will contribute to the maintenance of habitat quality across the Referral Area.

Should the Project be approved, Glendell will review and revise the existing approved Mount Owen Complex Biodiversity and Offset Management Plan in accordance with any additional development consent requirements. The revised Biodiversity and Offset Management Plan will guide the implementation of the mitigation steps and will be reviewed and adapted in response to new information.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

Biodiversity

The majority of the Biodiversity Impact Assessment Area comprises disturbed and low quality vegetation in the form of derived native grasslands. Native forest, woodland and plantation areas comprise less than 20 per cent of the Biodiversity Impact Assessment Area and the larger and higher quality remnant patches of native forest and woodland have been avoided.

A range of avoidance, mitigation and offsetting measures have been proposed to minimise and compensate for these losses in biodiversity (refer to **Attachment 'Ecological Matters of National Environmental Significance Report'**). The table below outlines a range of environmental outcomes from these measures and why they are beneficial for the MNES relevant to the Proposed Action. These measures are currently included in the Mount Owen Complex Biodiversity and Offset Management Plan (prepared under SSD-5850 and DA80/952 and Commonwealth EPBC Act Approval EPBC 2013/6978) and have been designed based on the detailed ecological data collected for the site and the outcomes of the ecological impact assessment process.

Measures to be implemented will include:

- clearly defined disturbance areas to avoid impact on areas outside of proposed disturbance areas

- pre-clearance surveys and detailed tree felling procedure to minimise fauna death and injury as a result of vegetation clearance

- targeted weed control programs to minimise weed spread into native vegetation communities and habitats

- targeted feral animal control programs to reduce predation and competition for resources with native species

- mine rehabilitation to re-establish native vegetation communities and fauna habitats.

These measures will be detailed in the management plans for the Mount Owen Complex and include environmental outcomes that will be detailed with reference to the SMART (specific, measureable, achievable, relevant and time-bound) criteria as outlined in the Outcomes-based Conditions Policy 2016 and Outcomes-based Conditions Guidance 2015 (DoE 2015).

Water Resources

The design of the Yorks Creek diversion will have regard to fish (and other aquatic fauna) passage. The design will also include consideration of morphological considerations, including long terms stability of the diversion, sediment movement within the diversion and impacts associated with changed drainage patters at the new confluence with Bowmans Creek.

The Water Management System to be implemented for the Project will have regard to the management of pollution risks associated with sediment laden runoff and water which comes into contact with coal or other potential contaminants consistent with the existing operations (refer to Table 2.9.1). Where practical and feasible, run-off from undisturbed catchments will be diverted away from disturbed areas and the WMS.

Integration with the GRAWTS will enable efficient allocation and use of water through the transfer between the connected mining operations.

The design of the final landform will have regard to potential impacts on downstream catchments.

Detailed studies on potential impacts to water resources are still being undertaken. The results of these studies will be used to identify appropriate additional mitigation measures to be implemented for the Project.

Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

Listed threatened species and communities - Yes

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

A water resource, in relation to coal seam gas development and large coal mining development - Yes

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

Not applicable

Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

Yes. While the Proponent has not previously operated any projects, the Proposed Action will form part of the broader operations at the Mount Owen Complex.

The Mount Owen Complex operates under a comprehensive Environmental Management System (EMS) and seeks to provide accurate information to all stakeholders including the surrounding community. This is demonstrated through the Annual Environmental Management Reports and independent audits available on the Mount Owen Complex website (www.mtowencomplex.com.au).

The EMS provides a framework for dealing with environmental management issues at the Mount Owen Complex in a systematic way. Within the framework of the EMS are comprehensive standards, procedures, objectives and targets which help Mount Owen maintain and continually improve environmental performance. Routine inspections and regular environmental audits are undertaken to assess performance against the objectives and targets to identify opportunities for improvement.

The Mount Owen Complex is committed to maintaining responsible environmental management practices that meet or exceed industry best practice. Environmental management is an integral part of every stage of the mining process to ensure that environmental impacts are minimised.

The EMS covers the design, development, production, maintenance and rehabilitation of the operation and its infrastructure. The principal objectives of the EMS are to ensure that the company adopts a continuous improvement approach to environmental management issues at the site and wherever practical and economic, implement best practice environmental management. The EMS also serves to ensure that activities at the operations are controlled, such that the company either prevents or minimises any environmental impacts associated with the operation.

An environmental training program is in place to ensure that all employees and contractors who work at the Mount Owen Complex are fully aware of their obligations in regards to the environment. This program covers all important aspects of the mine's activities and highlights the systems in place to minimise environmental impacts.

Continuous monitoring of meteorological conditions, air quality, water quality, noise levels, blasting operations, flora and fauna and rehabilitation areas is undertaken. This provides the mine with the information required to minimise environmental impacts, and evaluate the

effectiveness of the environmental management process and rehabilitation efforts.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

There are no past or present proceedings related to the Proponent.

The Ravensworth East and Glendell Mine components of the Mount Owen Complex are currently operated by Mt Owen Pty Limited (Mount Owen).

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

Refer to Attachment –' **Glencore Coal Assets Australia Standard – 11.0 Environment**' (GCAA 2018).

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

No

Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Aboriginal Cultural Heritage Assessment Mount Owen Continued Operations Project, ACHM 2014	Environmental Assessment Document for the Mount Owen Continued Operations Project	N/A
Aboriginal Archaeology Test Excavation Methodology – Glendell Continued Operations Project, OzArk EHM, 2018	Environmental Assessment Document for the Project	N/A
Aboriginal Archaeological Values Assessment Mount Owen Continued Operations Project, OzArk EHM 2014	Environmental Assessment Document for the Mount Owen Continued Operations Project	N/A
Aboriginal Cultural Heritage Survey Methodology – Glendell Continued Operations Project, OzArk EHM, 2018	Environmental Assessment Document for the Project	N/A
Department of the Environment (DoE) (2013). Matters of National Environmental Significance. Significant Impact Guidelines 1.1. Department of the Environment	Australian Government – Department of the Environment Guideline	N/A
Managing Urban Stormwater – Soils and Construction, Volume 1, 4th Edition, Landcom 2004.	NSW Government Guideline	N/A
Department of Environment and Climate Change (DECC) 2008. Managing Urban Stormwater – Soils and Construction, Volume 2E – Mines and Quarries.	NSW Government Guideline	N/A
Department of the Environment and Energy (DoEE) (2017a) Protected Matters Search Tool, accessed July 2017	Australian Government – Department of the Environment Assessment tool	N/A
Department of Primary Industries, Office of Water (2012) Aquifer Interference	NSW Government Guideline	N/A

Reference Source	Reliability	Uncertainties
Policy, 2012		
Ecological Assessment, Mount Owen Continued Operations Project, Umwelt 2014	Environmental Assessment Document for the Mount Owen Continued Operations Project	N/A
Landcom 2004. Managing Urban Stormwater – Soils and Construction, Volume 1, 4th Edition	NSW Government Guideline	N/A
Mount Owen Continued Operations Project Environmental Impact Statement, Umwelt, 2015	Environmental Assessment Document for the Mount Owen Continued Operations Project	N/A
Mount Owen Continued Operations Project, Response to Department of the Environment Submission Report B, Umwelt 2015	Environmental Assessment Document for the Mount Owen Continued Operations Project	N/A
Mount Owen Continued Operations Project Modification 2, Ecological Matters of National Environmental Significance Report, Umwelt, 2017	Environmental Assessment Document for the Project	N/A
Mount Owen Complex, Water Management Plan, 2018	Management Plan currently under review by relevant government agencies	N/A
Significant impact guidelines 1.3: Coal Seam Gas and Large Coal Mining Developments – impacts on water resources, 2013	Australian Government – Department of the Environment Guideline	N/A
Mount Owen Complex, Biodiversity and Offset Management Plan, 2018	Approved Management Plan implemented at Mount Owen Complex	N/A

Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

The Proponent has considered a number of alternative mine and infrastructure plans. The primary objective of these studies was to maximise efficient resource recovery while minimising environmental and social impacts related to the Project. The proposed mine plan represents the result of an ongoing iterative mine plan design, review and refinement process. No feasible alternatives were identified.

The EIS for the Project will include a detailed discussion on the mine plan and final landform development process and the options considered throughout the planning and assessment process.

8.1 Select the relevant alternatives related to your proposed action.

8.27 Do you have another alternative?

No

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

Director of Finance

9.2.2 First Name

Patrick

9.2.3 Last Name

Wilkes

9.2.4 E-mail

Patrick.Wilkes@glencore.com.au

9.2.5 Postal Address

Private Mail Bag 8
Singleton NSW 2330
Australia

9.2.6 ABN/ACN

ACN

056693175 - GLENDELL TENEMENTS PTY. LIMITED

9.2.7 Organisation Telephone

0265702416

9.2.8 Organisation E-mail

Patrick.Wilkes@glencore.com.au

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:..... Date: .....

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Person proposing the action - Declaration

I, Patrick Wilkes, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature..... Date: 09 APRIL 2019

I, _____, the person proposing the action, consent to the designation of _____ as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature:..... Date: .....

9.3 Is the Proposed Designated Proponent an Organisation or Individual?

Organisation

9.5 Organisation

9.5.1 Job Title

Director of Finance

9.5.2 First Name

Patrick

9.5.3 Last Name

Wilkes

9.5.4 E-mail

Patrick.Wilkes@glencore.com.au

9.5.5 Postal Address

Private Mail Bag 8
Singleton NSW 2330
Australia

9.5.6 ABN/ACN

ACN

056693175 - GLENDELL TENEMENTS PTY. LIMITED

9.5.7 Organisation Telephone

0265702416

9.5.8 Organisation E-mail

Patrick.Wilkes@glencore.com.au

Proposed designated proponent - Declaration

I, Patrick Wilkes, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature: ..... Date: 05/04/19

9.6 Is the Referring Party an Organisation or Individual?

Organisation

9.8 Organisation

9.8.1 Job Title

Approvals Manager

9.8.2 First Name

Bradly

9.8.3 Last Name

Snedden

9.8.4 E-mail

bradly.snedden@glencore.com.au

9.8.5 Postal Address

Private Mail Bag 8
Singleton NSW 2330
Australia

9.8.6 ABN/ACN

ACN

056693175 - GLENDELL TENEMENTS PTY. LIMITED

9.8.7 Organisation Telephone

0265202686

9.8.8 Organisation E-mail

bradly.snedden@glencore.com.au

Referring Party - Declaration

I, Bradly Snedden, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature:..... Date: 5.4.19

Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. 4166_R01_V5 Final_Part 1.pdf
2. 4166_R01_V5 Final_Part 2.pdf
3. 4166_R01_V5 Final_Part 3.pdf
4. 4166_R01_V5 Final_Part 4.pdf
5. 4166_R01_V5 Final_Part 5.pdf
6. 4166_R01_V5 Final_Part 6.pdf
7. 4166_R01_V5 Final_Part 7.pdf
8. 4166_R01_V5 Final_Part 8.pdf
9. Attachment 3_MNES Report_FINAL.pdf
10. Attachment 4_ Glencore Environment Standard.pdf
11. DA 80-952.pdf
12. Detailed Description of the Proposed Action.pdf
13. EPBC 2004-1369 Referral Decision.pdf
14. EPBC 2004-1369.pdf
15. EPBC 2013-6978 Referral Decision.pdf
16. EPBC 2013-6978.pdf
17. EPBC 2017-8083 Referral Decision.pdf
18. EPBC 2017-8083.pdf
19. Ecological Matters of National Environmental Significance Report.pdf
20. GIS Files_Glendell Continued Ops_EPBC Referral.zip
21. Glencore Coal Assets Australia Standard - 11.0 Environment.pdf
22. Glendell-Mine-Mod-3-Consolidated-Consent-Dec-2016.pdf
23. Glendell Continued Ops_EPBC_Figures.pdf
24. Preliminary Environmental Assessment_Part 1 of 8.pdf
25. Preliminary Environmental Assessment_Part 2 of 8.pdf
26. Preliminary Environmental Assessment_Part 3 of 8.pdf
27. Preliminary Environmental Assessment_Part 4 of 8.pdf
28. Preliminary Environmental Assessment_Part 5 of 8.pdf
29. Preliminary Environmental Assessment_Part 6 of 8.pdf
30. Preliminary Environmental Assessment_Part 7 of 8.pdf
31. Preliminary Environmental Assessment_Part 8 of 8.pdf