

Environmental Protection Authority

Form for the referral of a proposal to the Environmental Protection Authority under Section 38 of the *Environmental Protection Act 1986*

Referrer info	ormation							
				□ Proponent				
BHP Billiton Nickel West Pty Ltd		☐ Decision-making authority						
			☐ Commun	ity memb	er/third party			
Name Chris Sto	ne		Signature	Signature				
Position	General Manager	NOR	Organisatio	Organisation Nickel West				
Email	Christopher.Stone	e@bhpbillite	on.com			myr Cranifolia		
Address	125		St Georges	Tce				
	Perth	WA				6000		
Date	03/05/2017							
Does the referrer request that the EPA treat any part of the proposal information in the referral as confidential? Provide confidential information in a separate attachment. Referral declaration for organisations, proponents are of BHP billitar New and further declare the not misleading.			nents and dec	am autho	rised to refer this	s proposal on behalf his form is true and		
Part A: Propo	onent and propo	sal descr	iption					
Proponent info	rmation					Harris and the state of the sta		
Name of the proponent/s (including Trading Name if relevant)				BHP Billiton Nickel West Pty Ltd				
Australian Com		004 184 598						
Australian Busir	ness Number(s)			1/2 11 - 5 :	1.1/			
Contact for the proposal (if different from the ref					Georges Tce VA 6000			

Does the proponent have the legal access required for the	⊠ Yes □ No
implementation of all aspects of the proposal? If yes, provide details of legal access authorisations / agreements / tenure. If no, what authorisations / agreements / tenure is required	BHP Billiton Nickel West Pty Ltd and BHP Billiton Yakabindie Nickel Pty Ltd hold all tenure required for the project to be implemented.
and from whom?	Mining tenure M36/399, M36/206, M36/246, L36/677, M36/658, M53/217 and M53/218 are held by BHP Billiton Nickel West Pty Ltd.
ysaurung galijan nouung 20	M36/288, M36/286, M36/285, M36/185, M36/184, M36/183 and M36/422 are held by BHP Billiton Yakabindie Nickel Pty Ltd, a wholly owned subsidiary of BHP Billiton Nickel West Pty Ltd.
yangigithe ethical yang member of the graphy	This tenure occupies an area of 6977ha.
andensis (See attached Section 38 Referral Supporting Document (Figure 2 and Appendix 1: Table 1: Tenure Detail).
Proposal type	
What type of proposal is being referred?	⊠ significant – new proposal
For a change to an approved proposal please state the Ministerial Statement number/s (MS No./s) of the	significant – change to approved proposal (MS No./s:)
approved proposal	proposal under an assessed planning scheme
For a derived proposal please state the Ministerial Statement number (MS No.) of the associated strategic proposal	□ strategic □ derived (Strategic MS No.:)
For a significant proposal:	The Proposal may have a significant effect on
Why do you consider the proposal may have a significant effect on the environment and warrant referral to the EPA?	the environment warranting referral of the Proposal to the EPA and requires consideration of:
estructure griffer notitos but riprose	clearing of up to 842 ha within a Development Envelope of 1242 ha of native vegetation,
training the same attraction of the field parties and included to	dewatering of mine pits and removal of groundwater resource,
	potential impact to subterranean fauna habitat.
For a proposal under an assessed planning scheme, provide the following details:	NA CONTRACTOR OF THE PROPERTY
Scheme name and number	and the strong and the strong in
For the Responsible Authority:	
 What new environmental issues are raised by the proposal that were not assessed during the assessment of the planning scheme? 	Odročnice veceno Japanovice 90
How does the proposal not comply with the assessed scheme and/or the environmental conditions in the assessed planning scheme?	Described by a legislation and reserved by the content of the content for the page of the content of the conten
Outs and other Novel accused	ora province in all the normal provinces and a second contract of the

Proposal description	
Title of the proposal	Mt Keith Satellite Project
Name of the Local Government Authority in which the proposal is located.	The Mt Keith Satellite Project (the Proposal) is located in the Shire of Leonora. The existing Mt Keith Operations, located 20 km to the north, are within the Shire of Wiluna
	See attached Section 38 Referral Supporting Document (Figure 1).
 Location: a) street address, lot number, suburb, and nearest road intersection; or b) if remote the nearest town and distance and direction 	The nearest town is Leinster 80 km south along the Goldfields Hwy. See attached Section 38 Referral Supporting Document (Figure 1).
from that town to the proposal site.	
Proposal description – including the key characteristics of the proposal Provide as an attachment to the form	The Proposal is a satellite operation to the existing Mount Keith Mining Operations. The Proposal includes two open pits (216ha), a Waste Rock Landform (592ha) and a transport corridor. Minor ancillary infrastructure to support the mining process will be located at the satellite operation. The ore mined will be processed at the existing Mount Keith Operations located 22km to the north and which do not form part of this proposal. See attached Section 38 Referral Supporting Document for further detail (Figures 2 and 3).
Have you provided electronic spatial data, maps and figure	⊠ Yes □ No
in the appropriate format? Refer to instructions at the front of the form	Files provided in GIS: polygons representing all activities and named; datum: GDA94, MGA zone 51.
What is the current land use on the property, and the extent (area in hectares) of the property?	The current land use on the property is pastoral activities*, minerals exploration, planned mine development activities (e.g. geotechnical investigations, water investigations).
	*BHP Billiton holds the Pastoral Leases overlying the property, portions of which are sublet to a third party for the conduct of pastoral activities.
	The tenure associated with the proposal occupies an area of 6977ha
Have you had pre-referral discussions with the OEPA? If so, quote the reference number and/or the OEPA contact.	OEPA:
	October 27 th Robert Hughes & Richard Sutherland.
	November 27 th Robert Hughes & Richard Sutherland.
	December 28 th Robert Hughes & Helen Butterworth
	February 7 th Robert Hughes, Gretta Lee & Helen Butterworth

		February 14 th Robert Hughes, Helen Butterworth, Frances Hopkins February 20 th Robert Hughes, Helen
		Butterworth, Claire Stevenson See attached Section 38 Referral Supporting Document for further detail.
Part B: Environmental impacts		
Environmental factors		
What are the likely significant environmental factors for this proposal?	☐ Ben	thic Communities and Habitat
actors for this proposar:	□ Coa	stal Processes
	□Ma	rine Environmental Quality
	□Ma	rine Fauna
	⊠ Flo	ra and Vegetation
	☐ Lan	dforms
	⊠ Sub	oterranean Fauna
	□Ter	restrial Environmental Quality
	□Ter	restrial Fauna
	⊠ нус	drological Processes
	□ Inla	nd Waters Environmental Quality
	□ Air	Quality
	□ Soc	ial Surroundings
	□ Hur	man Health
For the environmental factors identified above, in a supplementary report. Please be sure to cor		

1	EPA Factor	Flora and Vegetation			
2		Objective - To protect flora and vegetation so that biological diversity and ecological integrity are maintained.			
		The relevant policy and guidelines for Flora and Vegetation are:			
		 Environmental Factor Guideline – Flora and vegetation (EPA 2016a) 			
		Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016b) Key aspects considered:			
	EPA policy and guidance -	Key aspects considered:			
	What have you considered and how have you applied them in relation to this factor?	 Survey requirements particularly related to vegetation mapping and PEC presence, Factor objectives, 			
		 Assessment of values and significance. 			
		Survey work was completed as per the requirements of a Detailed Survey as described in the Technical Guidance (EPA 2016b). Survey work was conducted within the Proposed Study Area (See attached Section 38 Referral Supporting Document: Figure 2) to assess the environmental impacts associated with the Development Envelope and associated Disturbance Footprint (See attached Section 38 Referral Supporting Document: Figure 3).			
3	Consultation – Outline the outcomes of consultation in relation to the potential environmental impacts	Pre-referral discussions covering scope of flora and vegetation studies were undertaken with the Department of Parks and Wildlife (Parks and Wildlife) Ecosystem Management Branch in November 2016. Parks and Wildlife indicated that they were satisfied with the scope for further Flora and Vegetation assessments planned for 2016. No further concerns were raised by Parks and Wildlife. Parks and Wildlife stated that they did not require further consultation regarding the Flora and vegetation Factor prior to Nickel West submitting a referral			
		The existing access to the Wanjarri Nature Reserve is via tracks within the Proposed Study Area. Consultation with Parks and Wildlife regarding alternative public access to the Wanjarri Nature Reserve was undertaken in November 2016.			
		Ongoing consultation, if required, will be undertaken with Parks and Wildlife, OEPA and other relevant stakeholders regarding potential Flora and Vegetation impacts.			

4 Receiving environment Describe the current condition
of the receiving environment
in relation to this factor.

Extensive baseline surveys have been completed, within the Proposal Study Area and across the broader region, to address the Flora and Vegetation Factor. In 2016, 5422 ha, encompassing the Proposal Study Area was re-mapped at a higher resolution and further survey work completed to ensure the assemblages recorded met with a Detailed Survey as described in the Technical Guidance (EPA, 2016b). Flora and vegetation studies have identified that the Proposal Study Area supports 393 native vascular flora taxa from 140 genera and 51 families.

The dominant Land System in the Proposal Study Area is the Bevon Land System (1,785.9 ha, 518.9 ha of which occurs within the Development Envelope), characterised by irregular low ironstone hills with stony lower slopes supporting mulga shrublands. The other dominant Land System is the Sherwood Land System characterised by Archaean granite breakaways, kaolinised footslopes and extensive gently sloping plains on granite supporting mulga shrublands and minor halophytic shrublands (1,089.4 ha within the Proposal Study Area , but only 1.9 ha within the Development Envelope).

The extent of the landsystems within the 5422 ha Proposal Study Area is a very minor component of their overall extent and represent 0.75% and 0.07%, respectively, of their respective regional area of occupancy in the north-eastern Goldfields. (See attached Section 38 Referral Supporting Document: Figure 5)

The Proposal Study Area and immediate surrounds has been extensively surveyed for conservation significant flora. Ten priority listed flora species have previously been recorded, including an additional seven species considered to be flora of "other" significance (i.e. range extension, taxa with anomalous features), while no Threatened (Declared Rare) Flora listed under Section 23F of the Wildlife Conservation Act 1950 (WC Act) occur within the Proposal Study Area .

A Priority Ecological Community (PEC) – BIF Violet Range; covers the southern portion of the Development Envelope and associated Disturbance Footprint and extends approximately 50km to the south towards Lake Miranda (See attached Section 38 Referral Supporting Document: Figure 6). Clearing within the PEC will be limited to 8% of the 19 256 ha extent (i.e. 1547.6 Ha).

The Flora and Vegetation within the Proposal Study Area is located within BHP Billiton Pastoral Leases and adjacent to Wanjarri Nature Reserve. Despite the land use and grazing pressure the vegetation is in good condition with minimal weeds located across the Proposal Study Area.

Proposal activities – Describe the proposal activities that have the potential to impact the environment

Disturbance of up to 842 ha of flora and vegetation within a Development Envelope of 1242 ha.

6	Mitigation - Describe the measures proposed to manage and mitigate the potential environmental impacts.	BHP Billiton Nickel West has developed a suite of control measures for managing potential impacts to biodiversity based on extensive operating experience in the region. The controls are applied in a manner consistent with the outcome-based objective of maintaining the representation, diversity, viability and ecological function of flora and vegetation at species, population and community level and in accordance with the BHP Billiton Nickel West's mitigation hierarchy (avoid, mitigate, rehabilitate and, where there are significant residual impacts, offset). Avoid: Design of the Disturbance Footprint and associated Development Envelope to reduce disturbance of conservation significant flora. Minimise: Rationalisation of the Disturbance Footprint and associated Development Envelope to reduce overall clearing requirements. Exclusion or buffer areas placed around the Jones Creek riparian
		 vegetation (100 m buffer, excluding creek crossing points) and conservation significant flora outside the Disturbance Footprint and associated Development Envelope (50 m buffer). Internal disturbance approvals process required prior to land clearance (Environment and Heritage Impact Assessment process). Rehabilitate The Disturbance Footprint, including the Waste Rock Landform, will be rehabilitated in accordance with closure planning requirements.
		Based on the expectation that the clearing will not have a significant impact on local land systems or vegetation communities no offsets are proposed.
7	Impacts - Assess the impacts of the proposal and review the residual impacts against the EPA objective.	 Disturbance of up to 842 ha of flora and vegetation within a Development Envelope of 1242 ha in vegetation units expected to be widespread in the area. Minor clearing of vegetation units associated with the Violet Range PEC. Minor clearing of Priority 3 and Priority 4 species. Possible spread or introduction of weeds due to movement of mining related vehicles. It is considered likely that any residual impacts associated with the clearing of native vegetation will meet the EPA objective for the Flora and Vegetation factor.
8	Assumptions - Describe any assumptions critical to your assessment e.g. particular mitigation measures or regulatory conditions.	

Poten	tial environmental impacts	No Hours are drive excessions.
1	EPA Factor	Hydrological Processes
2	Sammer Sammer	To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected.
	EPA policy and	The relevant policy for Hydrological processes is:
		 Environmental Factor Guideline - Hydrological Processes (EPA 2016c).
		Key aspects considered:
	guidance - What have	Factor objectives
	you considered and	Assessment of value of processes and significance.
	how have you applied them in relation to this factor?	Baseline assessments have been completed for Proposed Study Area (Figure 2; Supporting Document) to assess the potential environmental impacts associated with the Disturbance Footprint and associated Development Envelope (Figure 3; Supporting Document) and meet the Hydrological Processes Factor Technical Guidance (EPA, 2016b).
		A water balance was developed to ensure water supplies are available to support mining operations and water resources within the Proposed Study Area are only impacted in the short term, where possible.
3	Consultation – Outline the outcomes of consultation in relation	Pre-referral discussions have been undertaken with the OEPA and the Parks and Wildlife regarding the Proposal scope and the proposed preliminary key factors.
	to the potential environmental impacts	The outcomes of this consultation were positive, with Parks and Wildlife indicating that they did not have any concerns regarding the Hydrological Processes Factor at this stage.
	te de la literativa de la composition della comp	Ongoing consultation will be undertaken with the OEPA and DoW regarding the proposed dewatering of groundwater associated with the Proposal.

Potenti	al environmental impacts	et negret et de la transport d
4	Receiving environment - Describe the current condition of the receiving environment in relation to this factor.	Baseline hydrological (and/or ecohydrological) assessments have been completed for the Proposed Study Area across multiple seasons and years. Groundwater in the Proposed Study Area and local region occurs predominately in unconfined shallow aquifers of less than 100 m deep that are not well defined (BHP Billiton Nickel West, 2017). The groundwaters are mostly associated with alluvial and/or colluvial deposits, that represent transported or weathered regolith horizons created by erosional and depositional processes, that have formed over the dunite ultramafic caprock aquitard that hosts the nickel deposits (BHP Billiton Nickel West 2017). The overall static water levels across the Proposed Study Area are relatively flat with a slight hydraulic gradient running south down Jones Creek away from the Disturbance Footprint (BHP Billiton Nickel West, 2011). This indicates that there is minimal groundwater flow in the area. No extensive aquifer has been found associated with the Goliath orebody. In the bed of Jones Creek the depth to water is at least 16-17 meters. Outside of the creek beds the depth to the water table is typically in the range 25-35 meters. At such depths, it is considered that groundwater does not sustain surface vegetation. Due to the depth to water table and limited recharge potential, natural groundwater level fluctuations are likely to be minor and not relevant to the dewatering and impact assessment. Water salinity is brackish but varies between sample locations within the range 3000 – 8000 mg/L TDS.
5	Proposal activities – Describe the proposal activities that have the potential to impact the environment	Dewatering of the water table from approximately 25m – 45m bgl to enable mining activities up to 410m bgl. Dewatering will be achieved with abstraction at an average rate of 14 L/sec over 4 years (0.45 GL/a. The extent of the 5 m drawdown cone is predicted to extend 500-700 m from the pit crest along strike and 300-500 m across strike. (See attached Section 38 Referral Supporting Document: Figure 7)
6	Mitigation - Describe the measures proposed to manage and mitigate the potential environmental impacts.	 Groundwater drawdown cannot be avoided. Minimise: The mining process consists of mining Goliath Pit to a depth of approximately 410 mbgl, drawdown will remove the full extent of the resource. Six Mile Well Pit will be mined to approximately 270 mbgl, resulting in the dewatering of approximately 50% of the resource, recharging in 50 years. The final stage of mining is the completion of Goliath Pit with waste rock to be placed in the Six Mile Well Pit which will assist groundwater recharge of the resource associated with the Six Mile Well pit. Mitigate: Groundwater levels and quality monitoring to minimise impacts. Groundwater from dewatering is planned to be used as dust suppression, and shortfall in water requirements is planned to be met through existing licenced borefields. Offset: No offset is proposed.

Potential environmental impacts Dewatering will result in groundwater drawdown in the immediate Impacts - Assess the (<1km) vicinity of the Six Mile Well and Goliath mine pits. Groundwater impacts of the proposal is associated directly with each of the ore bodies and groundwater and review the residual dependent ecosystems in the area are restricted to Subterranean impacts against the Fauna. The drawdown has the potential to affect subterranean fauna EPA objective. habitat (described in the Subterranean fauna factor below). Currently no groundwater users are located within the drawdown boundary and are therefore not affected by the proposed groundwater drawdown. Groundwater drawdown at the Goliath resource results in the removal of the Goliath groundwater resource. A pit lake will form in the Goliath Pit at closure. The water level gradually stabilises at less than 140 m AHD, which is nearly 400 meters below the pit crest. The pit lake is expected to be up to approximately 40 m deep. Evaporation is the dominant process in controlling changes in water level with the pit acting as a groundwater sink (i.e. no flow of from the pit into the groundwater). Based on the limited porosity of the surrounding geology the formation of a pit lake is not expected to substantially affect hydrological process in the area. Lake water quality will initially reflect the chemistry of groundwater, being brackish and with low levels of trace components except for slightly elevated boron. The long-term increase in the concentrations of all dissolved constituents and notably increased salinity. Trace element concentrations are unlikely to affect the pit lake water quality categorisation or constrain water use at any time, since increasing salinity will be the dominant constraint. This change is not considered sufficient to require assessment under the Inland Waters Environmental Quality factor and can be adequately managed in accordance with Closure Plan requirements. The recharge of the Six Mile Well groundwater resource after closure may result in potential reduction in salinity due to freshwater ingress through the backfilled Six Mile Well pit shell. Further hydrological sampling work is currently being completed during the drilling of stygofauna wells. This work will enable Nickel West to better understand the extent of the resource in the north end of the Six Mile Well pit and this detail will be presented in the Environment Review document. Based on the above discussion the key impact associated with the changes to hydrological processes from mining and dewatering is the potential for it to affect subterranean habitat. 8 Assumptions - Describe any assumptions critical to your assessment e.g. particular mitigation measures or regulatory

conditions.

1	EPA Factor	Subterranean Fauna - Stygofauna			
2		To protect subterranean fauna so that biological diversity and ecological integrity are maintained.			
		The relevant policy and guidelines for Subterranean Fauna are:			
	EPA policy and guidance - What have you considered and how have you applied them in relation to this factor?	 Environmental Factor Guideline – Subterranean Fauna (EPA 2016d) Technical Guidance – Subterranean Fauna survey (EPA, 2016e) Key aspects considered: Sampling program guidelines, Borehole construction, Assessment of value and significance. Further sampling work has commenced within the Proposed Study Area (See attached Section 38 Referral Supporting Document: Figur 7) to better understand impacts to potential stygofauna assemblages associated with the Disturbance Footprint and meet the requirements of the Technical Guidance (EPA, 2016). Consideration was given to the potential for abstracting additional 			
		water from the Six Mile Well water resource to meet water balance requirements for mining operations and dust suppression. This option would likely result in further impact to potential stygofauna habitat, so alternative options have been identified. A regional stygofauna habitat assessment is to be completed to assess the occurrence of stygofauna along the perseverance-greenstone belt outside the Disturbance Footprint. Regionally, the geological and hydrological conditions associated with potential stygofauna habitat within the Disturbance Footprint stretches along this belt.			
3	Consultation – Outline the outcomes of consultation in relation to the potential	Pre-referral discussions have been undertaken with the OEPA and the Parks and Wildlife regarding the study scope and the proposed preliminary key factors.			
	environmental impacts	No advice has been offered in relation to stygofauna at this stage due to additional sampling work being undertaken. The OEPA were advised that an additional peer review had been completed and the reviewer will be engaged going forward.			
		Ongoing consultation will be undertaken with the OEPA and DoW regarding the proposed dewatering of groundwater and stygofauna associated with the Proposal.			

Po	Potential environmental impacts						
4	Receiving environment - Describe the current condition of the receiving environment in relation to this factor.	Previous desktop and reconnaissance baseline assessments have been completed for the Proposed Study Area. No troglofauna have been identified within the indicative pit boundaries. 75 stygofauna specimens, representing at least seven species (potentially eight) from four higher level taxonomic groups (Amphipoda, Bathynellacea, Oligochaeta, and Ostracoda) were collected from six of the 21 bores sampled in the Proposed Study Area between 2006 and 2011. The specimens collected across this timeframe were from three sampling rounds and aimed to provide reconnaissance for the desktop assessment completed in 2006. Recorded groundwater quality parameters across the Proposed Study Area during the 2010/11 surveys were suitable for stygofauna habitation. Salinity ranged from fresh (280 parts per million [ppm]) to hyposaline (7,730 ppm), and was particularly variable within the area of the Goliath Pit. There was seasonal variation in salinity among bores, with the lower salinity levels recorded corresponding with recharge from winter rainfall and the higher concentrations occurring in the drier months of March and June. See hydrological processes for more detail regarding habitat.					
5	Proposal activities – Describe the proposal activities that have the potential to impact the environment	Dewatering of the water table from 25m – 45m bgl to enable mining activities up to 410m bgl. Dewatering will be achieved with					
6	Mitigation - Describe the measures proposed to manage and mitigate the potential environmental impacts.	 Direct impacts cannot be avoided. Minimise: Design of mine pits has been minimised to avoid unnecessary disturbance. Mitigate: A sampling program is currently underway to better describe the potential stygofauna assemblages present within the indicative groundwater drawdown extent. Habitat assessment and DNA analysis of specimens will contribute to better understanding and management outcomes. Groundwater dewatering abstraction limits. Groundwater level and quality monitoring to monitor impacts. Dewatering water is to be used for dust suppression. Shortfall in water requirements will be met through existing, licenced borefields. This reduces overall abstraction volumes and aims to reduce impacts on potential stygofauna habitat. Offset: No offsets are proposed. 					

7	Impacts - Assess the impacts of the proposal and review the residual impacts against the EPA objective.	 Removal of habitat through excavation of the proposed mining pits, Goliath and Six-Mile Well, Potential drying out of habitat through the lowering of the groundwater table associated with mine pit dewatering, Potential loss of species/ populations at the local level.
8	Assumptions - Describe any assumptions critical to your assessment e.g. particular mitigation measures or regulatory conditions.	

Part C: Other approvals and regulation								
State and Local Government approvals								
Is rezoning of any land required before the proposal can be implemented?				□ Yes ⊠ No				
	en referred by a decision ral(s) are required from		NA	A				
Proposal activities	Land tenure/access	Type of approva			Legislat activity	ion regul	ating the	9
e.g. clearing, dewatering, mining, processing, dredging,	dewatering, mining,			tion				
Commonwealth Gover	rnment approvals							
	olve an action that may be comment Protection and be (EPBC Act)?		ed		Yes		No	
	on been referred? If yes, he reference number (EF				Yes	\boxtimes	No	
referred and what is th	e reference number (Er	be No.j:		Date		_		
				EPBC No.:				
action is a controlled a	on been made on whet ction? If 'yes', check the			□ Yes ⊠ No				
and provide the decision	on in an attachment.			☐ Decision – controlled action				
				☐ Decision – not a controlled action				action
Do you request that this proposal be assessed under the bilateral					Yes - I	Bilateral		No
agreement or as an accredited assessment?					Yes - /	Accredite	d	
	om other Commonweal	th Government/s			Yes		No	
for any part of the prop If yes, describe.	Josair			Appr	oval:			