25 March 2020

Ms Sally Stromayr
A/Director Onshore Petroleum
Environment Division |
Department of Environment and Natural Resources
Level 1, Arnhemica House, 16 Parap Road, Parap NT 0820

Attention: Damian Ogburn

Dear Sally Stromayr

Modification of an Environmental Management Plan: Beetaloo Basin[1] Groundwater Monitoring Bore Installation Program- Velkerri 76

Origin is writing to the department of Environment and Natural Resources (DENR) to request an amendment to the Beetaloo Basin1 Groundwater Monitoring Bore Installation Program- Velkerri 76 Environmental Management Plan NT-2050-15-MP-0017 (referred to herein as the "EMP").

Origin is proposing to modify Table 2 of the EMP, to increase the approved disturbance limits for gravel extraction. This modification is required to access additional gravel to perform ongoing access track forming, maintenance and repair activities. The original gravel estimates for the access track were insufficient, as the soils encountered require significantly more gravel to be applied to ensure they are maintained in an operatable condition. The use of this gravel will ultimately reduce dust generation, increase safety and reduce the risk of vehicle accident.

This modification proposes to:

- increase the disturbance of gravel pit 4 and 7 from one (1) hectare to three (3) hectares each;
- add an additional 3 hectare gravel pit (gravel pit 12); and
- remove gravel pit 5 and gravel pit 6 (including their associated access track disturbance) from the authorised activities. Gravel pit 5 and 6 have not been disturbed and do not contain material quantities of gravel.

A map of the proposed additional minor scope modification is provided in Attachment 1.

The proposed modification will result in a minor increase in project disturbance of 3.4 hectares, with the total disturbance for the gravel pits increased from 7 hectares to 10.4 hectares.

A summary of the existing approved and proposed gravel pits, as well as anticipated pit dimensions and gravel extraction volumes are provided in Attachment 2.

[1] Now referred to as the Beetaloo sub-basin

An overview of the typical gravel pit schematic is provided in Attachment 3.

The spatial layer of this proposed modification is provided with this submission.

Existing Environment
The area of the gravel 4 is characterised by *Acacia shirleyi* forest/open forest and *Macropteranthes kekwickii* open shrubland open shrubland over low open tussock grassland. This vegetation community is considered regionally extensive and not subjected to extensive clearing. A land condition assessment summary of the site is provided in Attachment 4- Table 3

The area of gravel pit 7 is characterised by Eucalyptus low woodland/Eucalyptus (mixed) low open woodland/Iseilema (mixed) tussock grassland. This vegetation community is considered regionally extensive and not subjected to extensive clearing. A land condition assessment summary of the site is provided in Attachment 4- Table 4.

The new Gravel Pit 12 is located within the existing AAPA cleared area. The area is located within *Corymbia* spp open woodland shrubland over low tussock grassland (*Triodia bitextura*) and *Acacia shirleyi (Lancewood) forest.* This vegetation community is considered regionally extensive and not subjected to extensive clearing. The sparse vegetation within this area, as illustrated in Attachment 4- Table 4, demonstrates that this location is extremely suitable for a gravel pit, with minimal vegetation clearing will be required to access the resource. A land condition assessment summary of the site is provided in Attachment 4- Table 5.

The following information regarding the environmental, cultural and pastoralist aspects have been provided for your consideration.

Modification risk and impact summary

Environment

- A copy of the risk assessment is provided in Attachment 5
- The amendment of the gravel pit locations within the EMP does not result in any material increases the level of clearing for gravel pits from 7 hectares to 10.4 hectares.
- The new activity is not anticipated to result in a material risk to threatened flora and fauna, with a risk profile consistent with the existing activities within the approved EMP.
- The increased use of gravel will be used to improve the condition of the road to prevent the build-up of bull dust. This will reduce dust generation and the risk of traffic accident.
- The vegetation communities proposed to be cleared are regionally extensive and not threatened.
- This area was inspected in the recent weed survey and therefore has been baselined.
- The risk mitigation controls outlined in the existing EMP are identical and will not require any amendment to accommodate the additional scope.
- The activities are covered under the existing erosion and sediment control plan, weed management plan and emergency response plan
- The additional minor scope is sufficiently covered under the existing security titled agreement: Groundwater Monitoring Program Rehabilitation Provisions- Eight Groundwater monitoring bores located across EP 76, 98 and 117 as outlined in NT-2050-15-MP-0014, NT-2050-15-MP-0017 and NT-2050-15-MP-0018. This security provision is extremely conservative and has allowed for approximately $2.2million for water bore associated disturbances: including access tracks, water bore lease pads and gravel pits

Cultural Heritage:

- The proposed gravel pit location is covered by Origin's current AAPA Certificate C2020/03, with the appropriate NLC clearances obtained.

Stakeholder engagement:

- Stakeholder engagement regarding the additional Gravel pit disturbance has been undertaken with no questions on the pit size increases raised. The taking of gravel is covered under the existing land access approval.

Summary of change:

It is proposed that the existing Table 2 within the Beetaloo Basin Groundwater Monitoring Bore Installation Program- Velkerri 76 EMP is updated to reflect Table 1 of this proposed modification.

Table 1 Proposed modified Table 2 of the Kyalla 117 N2 Groundwater Monitoring Bore EMP

Exploration Permit	Gravel Pit	Station	Zone*	Approx Easting	Approx Northing	Disturbance Area (ha)
EP117	Gravel Pit 4	Amungee Mungee	53	397906	8136039	3
EP117	Gravel pit 4 access track	Amungee Mungee	53	398444	8135134	1.4
EP117	Gravel Pit 7	Amungee Mungee	53	435749	8135306	3
EP117	Gravel Pit 12	Amungee Mungee	53	433019	8135263	3
Total Gravel Pit Disturbance Area for the activity (Ha)						**10.4**

If you require any further information, please do not hesitate to call me on 0467700565.

Kind Regards

Matt Kernke

Matt Kernke
Approvals Lead, Beetaloo and Growth Assets

Attachment 1 Map of proposed gravel pit modification

400,000 410,000 420,000 430,000

8,140,000

8,130,000

INSET A

Grave Pit 4 - Existing Approved Area 1Ha

Gravel Pit 4 - Additional Proposed Disturbance Area 2Ha

NT Por 1079 AMUNGEE MUNGEE

0 50 100 200 Metres

NT Por 1079 AMUNGEE MUNGEE

INSET B

NT Por 1079 AMUNGEE MUNGEE

Gravel Pit 12 - Additional Proposed Disturbance Area 3Ha

NT Por 702 BEETALOO STATION

0 50 100 200 Metres

INSET C

NT Por 1079 AMUNGEE MUNGEE

Gravel Pit 7 - Additional Proposed Disturbance Area 2Ha

Grave Pit 7 - Existing Approved Area 1Ha

0 50 100 200 Metres

NT Por 702 BEETALOO STATION

Velkerri 76 S2

Refer Inset A

Refer Inset B

Refer Inset C

NT Por 702 BEETALOO STATION

Legend

- Well
- Access Track
- Layout Design
- Approved Gravel Pit Area
- Proposed Additional Gravel Pit Area
- Tenure
- AAPA NT Certificate Area
- Cadastre

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Velkerri 76 S2

Name	Existing Approved Disturbance (Ha)	Current Cleared Area (Ha)	Additional Proposed Disturbance Area (Ha)	New Proposed Total Disturbance Area (Ha)	Easting	Northing
Gravel Pit 4	1	0	2	3	397906	8136039
Gravel Pit 7	1	0.9ha	2	3	435614	8135296
Gravel Pit 12	0	0	3	3	432834	8135292

Darwin

N

Scale 1:100,000 (at A3)

0 1 2 4 Kilometres

Coordinate System: GDA 1994 MGA Zone 53

Rev	Description	Drawn	Check	QA	Approved	Date
A	Issued For Information Only	MLM	PT	DJ		25/03/2020

origin

Proposed Gravel Pit Disturbance Map

Velkerri 76 S2

Date: 25 March 2020

Map Number: 1 of 1

Doc No:

Map ID: RITM_113139_RevA_Velkerri76

Rev: A

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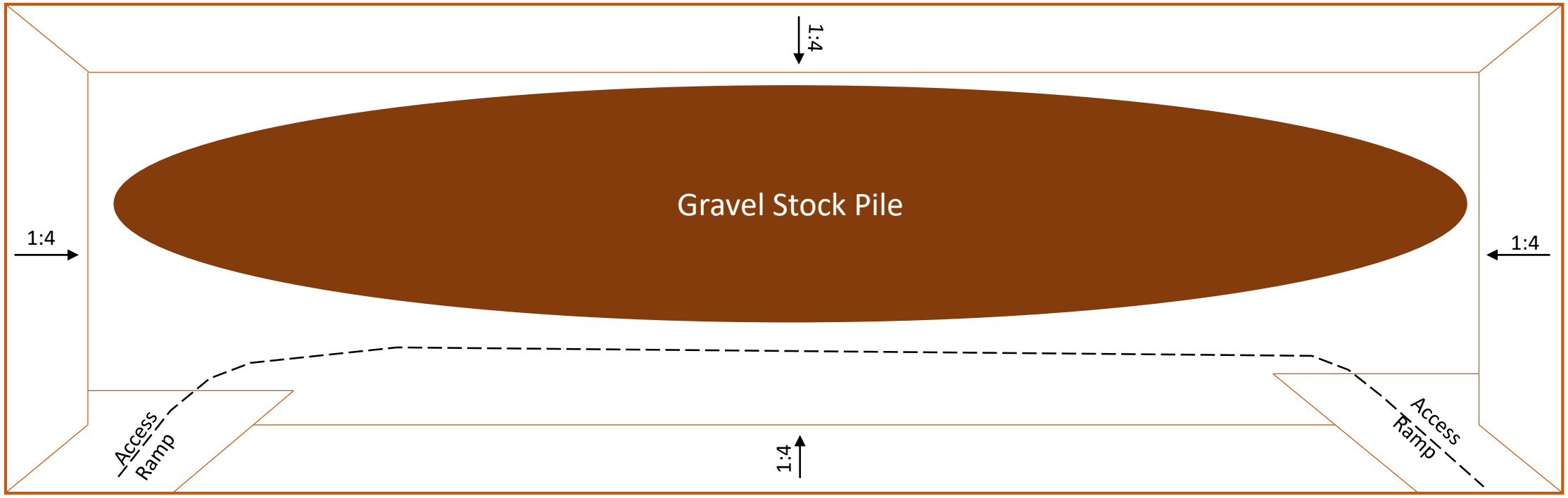
Attachment 2 Gravel pit summary

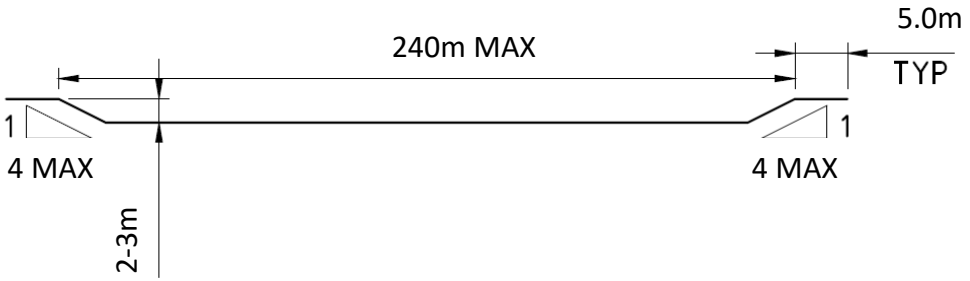
Table 2- Summary of existing and proposed gravel pits

Exploration Permit	Gravel Pit	Station	Zone*	Approx Easting	Approx Northing	Existing approved disturbance area (ha)	Proposed total new disturbance area	Proposed dimensions	Approximate gravel extraction volumes
EP117	Gravel Pit 4	Amungee Mungee	53	397906	8136039	1	3	200x100m	25,000m3
EP117	Gravel pit 4 access track	Amungee Mungee	53	398444	8135134	1.4	1.4	1.4kmx10m	N/A
EP117	Gravel pit 5	Amungee Mungee	53	403386	8135809	1	0 – To be removed		
EP117	Gravel pit 5 access track	Amungee Mungee	53	403431	8135150	0.7	0 – To be removed 0		
EP117	Gravel pit 6	Amungee Mungee	53	406249	8135276	1	0 – To be removed		
EP117	Gravel pit 6 access track	Amungee Mungee	53	405210	8135124	0.9	0 – To be removed		
EP76	Gravel Pit 7	Amungee Mungee	53	435749	8135306	1	3	200x100m	25,000m3
EP76	Gravel Pit 12	Amungee Mungee	53	433019	8135263	0	3	100x200m	25,000m3
Total Gravel Pit Disturbance Area for the activity (Ha)						**7.0**	**10.4**		

Attachment 3- Typical gravel pit schematic



Gravel Pit Plan View NTS



Typical Cross Section
*Depth Pending Gravel Source

Attachment 4- Land Condition Assessment

Table 3 LCA summary for Gravel Pit 4

Site ID	Gravel Pit 4	Habitat photos at central point of survey site (June 2019)
Location	-16°51'23.22”S, 134°2'28.71”E	 
Landform and soil	Lateritic plains and gently undulating rises. Gravelly lithosols,some shallow red and yellow earths; well drained.	
Habitat type	*Corymbia* (mixed) open woodland and *Acacia shirleyi* forest / open forest	
Vegetation Community	*Acacia shirleyi* forest/open forest and *Macropteranthes kekwickii* open shrubland open shrubland over low open tussock grassland.	
Dominant flora species	Canopy dominated by a *Acacia sherleyi* (10%), *Macropteranthes kekwickii (6%)* and *Corymbia dichromophloia* (4%). Shrub layer including *Eucalyptus/Corymbia* regrowth, *Terminalia canescens*, *Acacia neprima,* Ground layer dominated by *Triodia bitextura.*	 
Habitat condition	Habitat disturbed through evidence of recent grazing and fire. Some decomposing logs across the ground. The habitat contained moderate refuge opportunities with the Bullwaddy stands, although disturbed. Large patch of Lancewood/Bullwaddy community. No evidence of weeds or feral animals during inspection.	**Additional Habitat Photos across survey site (June 2019)**

Site ID	Gravel Pit 4	Habitat photos at central point of survey site (June 2019)
Potential Listed Threatened Species	Grey Falcon, Northern Crested Shrike-tit, Gouldian Finch, Painted Honeyeater, Yellow-spotted Monitor. Consider low risk due to the proposed size of the disturbance and the condition of the surrounding habitat.	 

Table 4 LCA summary for Gravel Pit 7

Site ID	Gravel Pit 7	Habitat photos at central point of survey site (August 2018)	
Location	-16°51'50.87”S, 134°23'45.44”E		
Landform and soil	Plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils, some gravels.		
Habitat type	Eucalyptus low woodland		
Vegetation Community	Eucalyptus low woodland/Eucalyptus (mixed) low open woodland/Iseilema (mixed) tussock grassland, close proximity to Lancewood/Bullwaddy vegetation community.		
Dominant flora species	Canopy dominated by *Corymbia dichromophloia, Bauhinia cunninghamii.* Shrub layer including *Acacia lysiphloia, Hakea arborescens, Terminalia canescens.* Ground layer species include *Aristida latifolia, Heteropogon contortus.*		

Site ID	Gravel Pit 7	Habitat photos at central point of survey site (August 2018)
Habitat condition	Habitat in good condition with some evidence of recent grazing (5-25% growth removed). Scattered hollow bearing trees and logs. Contained abundant refuge opportunities in the form of dense grass cover in areas, woody debris and scattered leaf litter. Good continuous cover adjoining adjacent woodland habitat. No evidence of weeds or feral animals.	  **Additional Habitat Photos across survey site (August 2018)**   
Potential Listed Threatened Species	Grey Falcon, Northern Shrike-tit, Plains Death Adder, Gouldian Finch. Consider low risk due to the proposed size of the disturbance and the condition of the surrounding habitat.	

Table 5 LCA summary for Gravel Pit 12

Site ID	Gravel Pit 12	Habitat photos at central point of survey site (Feb 2020)
Location	-16°51'51.85”S, 134°22'10.19”E	 
Landform and soil	Lateritic plains and gently undulating rises. Gravelly lithosols,some shallow red and yellow earths; well drained.	
Habitat type	*Corymbia* spp open woodland and *Acacia shirleyi (Lancewood) forest*.	
Vegetation Community	*Corymbia* spp open woodland shrubland over low tussock grassland (*Triodia bitextura*) and *Acacia shirleyi (Lancewood) forest.*	

Site ID	Gravel Pit 12	Habitat photos at central point of survey site (Feb 2020)
Dominant flora species	Canopy dominated by a *Corymbia dichromophloia* (10%),. Shrub layer including *Eucalyptus/Corymbia* regrowth, *Acacia lysiphloia* (Turpentine), *Terminalia canescens* and ground layer dominated by *Triodia bitextura.*	 
Habitat condition	Habitat disturbed through evidence of recent grazing. Low numbers of hollow bearing trees and logs. The habitat contained low refuge opportunities due to the disturbed nature of the area. Scattered Lancewood (*Acacia shirleyi*) is located through centre of the gravel pit. No evidence of weeds, fire or feral animal impacts.	**Additional Habitat Photos across survey site (Feb 2020)**
Potential Listed Threatened Species	Grey Falcon, Northern Crested Shrike-tit, Gouldian Finch, Painted Honeyeater, Yellow-spotted Monitor and Plains Death Adder. Consider low risk due to the proposed size of the disturbance and the condition of the surrounding habitat.	  

Attachment 5- Risk assessment

Environmental Factor	Risk Description	Risk Source	Unmitigated consequence (COP implemented)	Risk mitigation Measures		Residual Risk Rating			Risk justification statement
				Codes of Practice	Site specific risk mitigation measures	Consequence	Likelihood	Risk Rating	
Terrestrial Ecology	Additional clearing causes material impact to the quality and viability of terrestrial ecosystems of the area	Increased in Gravel pit disturbance from 4 hectares to 9 hectares.	Low	A.3.5	• Ecological scouting has been completed on all areas •All areas of proposed clearing are regionally extensive, are unlikely to contain threatened flora and fauna • The disturbance area requested has been minimised • Pits located to avoid clearing vegetation (where possible) • The area will be rehabilitated	1	1	Low	The risk rating of low is reflective of the small scale of the increased disturbance level, with all vegetation to be cleared regionally extensive and not threatened. The additional 3.4 hectares is small, representing 0.00018% of the broader OE 1,8500,000 hectare tenure area. The availability of habitat in the area means the loss through clearing is unlikely to have a material impacts on ecological function.
	Cumulative impact of increased disturbance on regional ecosystems	Total OE disturbance from Kyalla 117 N2 and Velkerri 76 S2 increased from 26.18 to 35.94 hectares (includes Kyalla 117 N2 and Velkerri 76 S2 additional gravel request)	Low	A.3.6	• Gravelling and forming access tracks will reduce dust emissions- decreasing disturbance on adjacent vegetation communities through dust generation • All areas of proposed clearing are regionally extensive, are unlikely to contain threatened flora and fauna • The broader area has (relative to the total area) a small amount of existing clearing- largely restricted to fencelines and firebreaks (no broad scale clearing	1	1	Low	The risk rating of low is reflective of the small scale of the increased disturbance level, with all vegetation to be cleared regionally extensive and not threatened. The additional 3.4 hectares is small, representing 0.00018% of the broader OE 1,8500,000 hectare tenure area. Broad clearing in the area is low, with clearing restricted to fence lines and fire breaks for pastoral activities. The availability of habitat in the area means the loss through clearing is unlikely to have a material impacts on ecological function

Environmental Factor	Risk Description	Risk Source	Unmitigated consequence (COP implemented)	Risk mitigation Measures		Residual Risk Rating			Risk justification statement
				Codes of Practice	Site specific risk mitigation measures	Consequence	Likelihood	Risk Rating	
Soils	Erosion and sediment releases	Clearing results in increased erosion and sediment release	Low	A3.4	•Pits are designed and constructed to allow water to flow inwards (into the pit)- reducing the potential for erosion and offsite releases of sediment •Existing erosion and sediment control plan in place with •Erosion and sediment controls to be deployed including using cleared vegetation to reduce runoff velocity and stabilise areas surrounding pit	1	3	Low	Gravel pits invariably involve the removal of material to create a working pit. Topsoil will be stripped and place around the pit with cleared veg
Cultural Heritage	Impacts on cultural Heritage	Clear for gravel extraction impacts a sacred site	Low	PER	All proposed activities are covered under the existing AAPA certificate 2020/003- with disturbance approved up to 6.25 hectares for each gravel pit.	1	1	Low	All proposed activities are covered under the existing AAPA certificate 2020/003- with disturbance approved up to 6.25 hectares for each gravel pit. The AAPA certificate indemnifies OE form any impacts to sacred sites within cleared areas.