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Reference: Revised Troglofauna (Projapygidae OES2) Impact Assessment for Corunna Downs Project

1. PURPOSE

This memo presents a revised impact assessment for the troglofauna species Projapygidae OES2 recorded during sampling for the Corunna Downs Project (the Project). Atlas Iron Pty Ltd (Atlas) requested additional habitat characterization for the taxon, to support the Western Australian Environmental Protection Authority (EPA) referral of the Project.

2. BACKGROUND

Atlas is proposing to develop the Corunna Downs Project (the Project), located 25 kilometres (km) south of Marble Bar, in the Pilbara region of Western Australia. Stantec (formerly MWH Australia Pty Ltd that had previously merged with Outback Ecology) undertook a Level 1 subterranean fauna assessment (desktop review and pilot survey) of the Project Study Area (Study Area) in 2014 (Outback Ecology 2014). While no stygofauna were collected during the survey, a low diversity of troglofauna were recorded, prompting a comprehensive Level 2 troglofauna baseline survey in 2016 (MWH 2016). Thirteen troglofauna species were documented during the survey. Of these, three species were recorded from the proposed impact areas only and were subsequently identified as being of potential conservation concern. Two of these species, Curculionidae OES11 and *Prosopodesmus* OES8, were recorded from within multiple pit boundaries only and were further addressed in a subsequent document (MWH 2017). This memorandum focuses on the third species, the dipluran Projapygidae OES2. This species was recorded as a singleton from bore CRD0028 (formerly CDRC0521) during the 2016 survey, with no demonstrated distribution beyond the modelled groundwater drawdown contours (MWH 2016).

3. METHODS

The revised impact assessment for Projapygidae OES2 is based on an updated drawdown model developed by Stantec during hydrogeological investigations in 2018 (Stantec 2018). Please note, this modelling is preliminary only, with additional hydrological investigations and revised drawdown modelling scheduled for completion in coming months. Additional geological and hydrogeological information sourced from reports, bore logs and mapping has also informed the revised impact assessment.

4. INFORMATION REVIEW

Habitat characterisation

Projapygidae OES2 was collected from bore CRD0028, a camp borefield site within the Coongan River catchment drainage area (**Figure 1**). The borehole log for CRD0028 indicated colluvium, weathered basalt and ironstone to four metres, underlain by 18 m of weathered basalt. On the date of collection, static water level (SWL) within the bore was 6.9 metres below ground level (mbgl), indicating that Projapygidae OES2 was associated with colluvium and/or the unsaturated portion of weathered basalt. The log of an adjacent bore, CRD0075, showed alluvium with weathered basalt and angular clasts, consistent with

colluvial origin. The log of an additional local bore, CDRC0520, located 800 m north northeast of CRD0028, indicated colluvium fill to four metres underlain by weathered basalt, with SWL of 12.2 mbgl. The recorded depths to groundwater corresponds with other bores in the relatively low-lying camp area, with recorded levels ranging from 3 to 10 mbgl.

Based on geological mapping, CRD0028 occurs within the footprint of the Mt Roe basalt. Borehole logs indicate that this unit is overlain with alluvial / colluvial detritals. The footprint of the Mt Roe basalt forms a continuous band extending in a north-westerly to northern direction relative to CRD0028. The footprint also extends to the south and eastwards, with the eastern expanse continuing outside the modelled 0.5 m groundwater drawdown contour. Using available information, it is inferred that the detrital cover is continuous across the boundary of the Mt Roe basalt footprint and mapped colluvium, the latter shown as a 4 km expanse, extending in a northerly direction. The mapping and borehole logs indicate that suitable habitat for Projapygidae OES2, whether detrital, weathered basalt or both, is prevalent across the area and continues beyond the modelled drawdown contours.

Distribution

Diplurans are largely unpigmented and lack eyes, relying on specialized antennae to sense their environment. The majority of species are soil-dwelling, often under stones or logs, and are typically associated with mesic environments (Condé and Pagés 1991, Harvey and Yen 1997). In Western Australia, work on this group had previously focused on the south-western region. More recent surveys, primarily associated with mining exploration, have broadened knowledge of diplurans within the arid and semi-arid regions (Koch 2009).

Dedicated subterranean fauna assessments have collected diplurans from various geological units including alluvium, colluvium, calcrete (Outback Ecology 2011, Phoenix 2011, Subterranean Ecology 2011), banded ironstone (BIF) and weathered/fractured rock units (Subterranean Ecology 2008, MWH 2016). Determining the level of affinity to subterranean habitat (troglobitic or soil-dwelling), is generally difficult on account of the blind and typically pale morphology of all diplurans. It is likely that the majority are soil-dwelling, with a taxonomic specialist noting that that few diplurans in Western Australia are troglobitic (Sendra pers comm. in (Subterranean Ecology 2011)). However, information remains limited. Species from both ecological niches could potentially be short-range endemics (SREs), although it is probable that troglobitic species would have smaller distributions comparative to soil-dwelling species.

The dipluran Projapygidae OES2 was collected as a single specimen within the Study area, occurring with colluvium and/or weathered basalt. It has been categorised as troglofauna during this assessment, following the precautionary approach used for the 2016 report. Dipluran taxa recorded from subterranean fauna surveys are generally collected in low abundances, often as singletons, making their likely extent of distribution and habitat requirements difficult to reliably determine (Subterranean Ecology 2010, Outback Ecology 2011, Subterranean Ecology 2011, Outback Ecology 2014). Where two or more specimens of a species have been collected, linear distributions have ranged from 3.6 km, in colluvial geology overlying fractured and weathered bedrock (Outback Ecology 2014a), to 13.4 km occurring across an extensive calcrete system (Subterranean Ecology 2011b).

In the absence of additional specimens, the use of habitat as a physical surrogate has been recognised by the EPA as a tool to infer distribution for potentially restricted taxa (EPA 2016). Projapygidae OES2 has been mapped on the border of the Mt Roe basalt footprint and a mapped colluvium expanse to the east. The borehole log from CRD0028 specifies colluvium, weathered basalt and ironstone in the upper strata, with underlying weathered basalt, unsaturated in part. The bore lithology, in conjunction with the SWL denote colluvium and/or

weathered basalt as the probable habitat for Projapygidae OES2. The broad extent of these units implies continuity of habitat within the area, extending beyond the modelled drawdown contours. In addition, records from other studies indicate that diplurans do inhabit a relatively broad range of geological habitats, including alluvium, colluvium, calcrete, BIF, and weathered/fractured rock units. Therefore, the broader expanse of suitable and contiguous habitat would be expected to correlate with a wider distribution of Projapygidae OES2 to beyond the proposed groundwater drawdown extent.

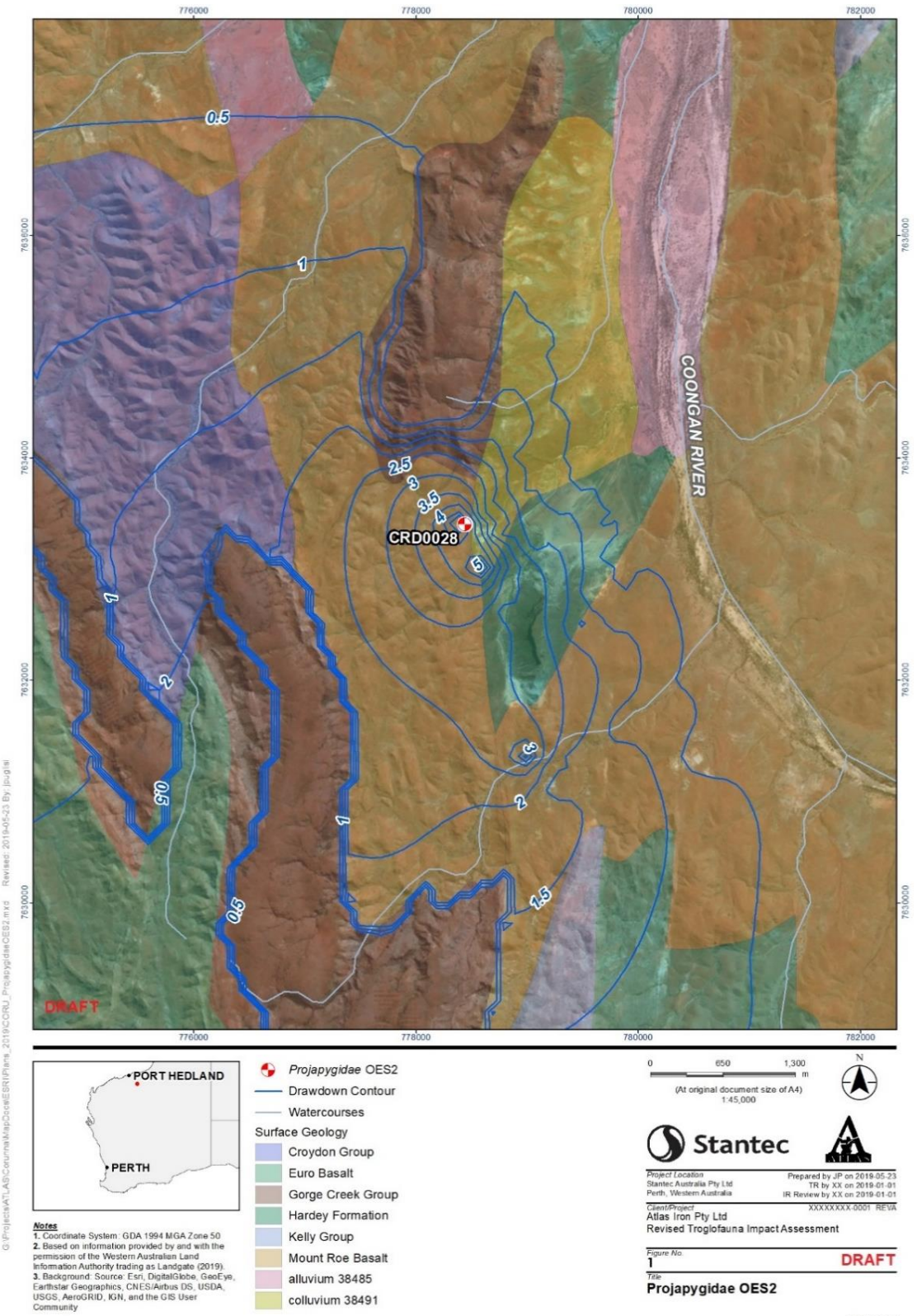
5. IMPACT ASSESSMENT SUMMARY

During the 2016 subterranean fauna assessment, Projapygidae OES2 was designated as a species of potential conservation concern due to proposed groundwater drawdown impacts. Groundwater modelling at the time placed the species within the modelled 7.5 to 8 metres below standing groundwater level (mbSWL). Based on the updated groundwater modelling (Stantec 2018), Projapygidae OES2 occurs within a reduced vertical drawdown contour of 5 mbSWL. However, the lateral extent of drawdown has increased, with the proposed operation of additional production bores.

The potential reliance of troglofauna on stable and relatively humid conditions could make them susceptible to changing water tables (EPA 2016). However, the impacts in relation to groundwater drawdown are poorly understood. Based on current knowledge, it is considered that a drawdown in the order of tens to hundreds of metres over an extensive area would likely cause a significant impact. A drawdown whereby the lower part of the inhabited strata remained saturated and/or was not over an extensive area of the aquifer system would not be considered to represent a significant impact to the persistence of troglofauna.

In this context, the groundwater drawdown, both vertical and lateral, proposed by the updated modelling is not considered to be of sufficient magnitude to pose a long-term conservation risk to Projapygidae OES2. The lowering of the water table may instead create additional habitat for the taxon, dependent on the porosity of the underlying strata. Troglofauna can migrate downwards to avoid uninhabitable conditions, provided suitable habitable voids are available for colonisation. It is considered highly likely that troglofauna habitat would remain beyond the modelled groundwater drawdown of 5 mbSWL (i.e. within the 0.5 to 5 mbSWL drawdown), and possibly even within the 5 mbSWL. In addition, the continuity of potential habitat in the area, namely colluvium and weathered basalt, implies that Projapygidae OES2 is very likely to be distributed beyond the modelled 0.5 mbSWL drawdown contour. These findings are consistent with the 2016 assessment and indicate that the groundwater drawdown for the Project is unlikely to present a conservation risk to Projapygidae OES2.

The findings of this memorandum are based on groundwater modelling updated in 2018 and are specific to Projapygidae OES2. Further investigation will be required to assess the subterranean fauna of the Project area against the framework of additional hydrogeological work and revised groundwater modelling, due for completion in coming months.



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Figure 1: Distribution of Projapygidae OES2 relative to modelled groundwater drawdown contours

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