



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9611/1
Permit Holder:	Water Corporation
Duration of Permit:	From 17 February 2023 to 18 February 2033

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

PART I – CLEARING AUTHORISED

1. Clearing authorised

The permit holder is authorised to clear *native vegetation* for the purpose of remediation of contaminated sites.

2. Land on which clearing is to be done

Lot 350 on Deposited Plan 55290 (Crown Reserve 22800), Ghooli
Lot 1355 on Deposited Plan 11670, Ghooli
Lot 1356 on Deposited Plan 161171, Ghooli
Unallocated Crown Land (PIN: 626438), Ghooli
Great Eastern Highway Road reserve (PIN: 1174620, 11714621, 1176425 and 1194594), Ghooli
Unnamed Road reserve (PIN: 11714621), Ghooli
Unnamed Road reserve (PIN: 11714471), Ghooli

3. Clearing authorised

The permit holder must not clear more than 25 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 17 February 2028.

PART II – MANAGEMENT CONDITIONS

5. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of *native vegetation*;
- (b) minimise the amount of *native vegetation* to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

6. Weed management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared;
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

7. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner towards adjacent *native vegetation* to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

8. Revegetation and rehabilitation

The permit holder must:

- (a) retain the vegetative material and topsoil removed by clearing authorised under this permit and stockpile the vegetative material and topsoil in an area that has already been cleared;
- (b) at an *optimal time* and within 24 months following clearing authorised under this permit, *revegetate* and *rehabilitate* the area(s) that are no longer required for remediation of contaminated sites by:
 - (i) re-shaping the surface of the land so that it is consistent with the surrounding five metres of uncleared land;
 - (ii) ripping the ground on the contour to remove soil compaction;
 - (iii) laying the vegetative material and topsoil retained under condition 8(a) on the cleared area(s);
 - (iv) undertake *weed* control activities on an ‘as needed’ basis to reduce *weed* cover within the cleared areas to no greater than the *weed* cover within the surrounding five metres of uncleared land; and
 - (v) ensure no occurrences of **Opuntia stricta* (Prickly Pear) occur within the area *revegetated* and *rehabilitated*.

- (c) within 24 months of laying the vegetative material and topsoil on the cleared area in accordance with condition 8(b) of this permit:
- (i) engage an *environmental specialist* to determine the species composition, structure and density of the area *revegetated* and *rehabilitated*; and
 - (ii) where, in the opinion of an *environmental specialist*, the composition structure and density determined under condition 8(c)(i) of this permit will not result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, *revegetate* the area by deliberately *planting* and/or *direct seeding* native vegetation that will result in a similar species composition, structure and density of native vegetation to pre-clearing vegetation types in that area and ensuring only *local provenance* seeds and propagating material are used.
 - (iii) within 24 months of undertaking the activities described under condition 8(c)(ii), inspect the area *revegetated* and *rehabilitated* in accordance with condition 8(c)(i).

PART III - RECORD KEEPING AND REPORTING

9. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> (a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; (f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> in accordance with condition 6; and (g) actions taken to undertake slow directional clearing in accordance with condition 7
2.	In relation to <i>revegetation</i> and <i>rehabilitation</i> management pursuant to condition 8	<ul style="list-style-type: none"> (a) the location of any areas <i>revegetated</i> and <i>rehabilitated</i>, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical

No.	Relevant matter	Specifications
		coordinates in Eastings and Northings or decimal degrees; (b) a description of the <i>revegetation</i> and <i>rehabilitation</i> activities undertaken; (c) the size of the area <i>revegetated</i> and <i>rehabilitated</i> (in hectares); (d) the species composition, structure and density of <i>revegetation</i> and <i>rehabilitation</i> , (e) any remedial actions undertaken in accordance with condition 8(c)(ii); and (f) a copy of the <i>environmental specialist's</i> report.

10. Reporting

The permit holder must provide to the *CEO* the records required under condition 9 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species;
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the CEO as a suitable environmental specialist.
fill	means material used to increase the ground level, or to fill a depression.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared.

Term	Definition
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
optimal time	means the period from May to June; for undertaking <i>direct seeding</i> , and the period from June to July for undertaking <i>planting</i> ;
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species;
rehabilitate/ed/ion	means actively managing an area containing native vegetation in order to improve the ecological function of that area;
revegetate/ed/ion	means the re-establishment of a cover of <i>local provenance</i> native vegetation in an area using methods such as natural <i>regeneration</i> , <i>direct seeding</i> and/or <i>planting</i> , so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
weeds	means any plant – <ul style="list-style-type: none"> (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i>; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

24 January 2023

Schedule 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1).

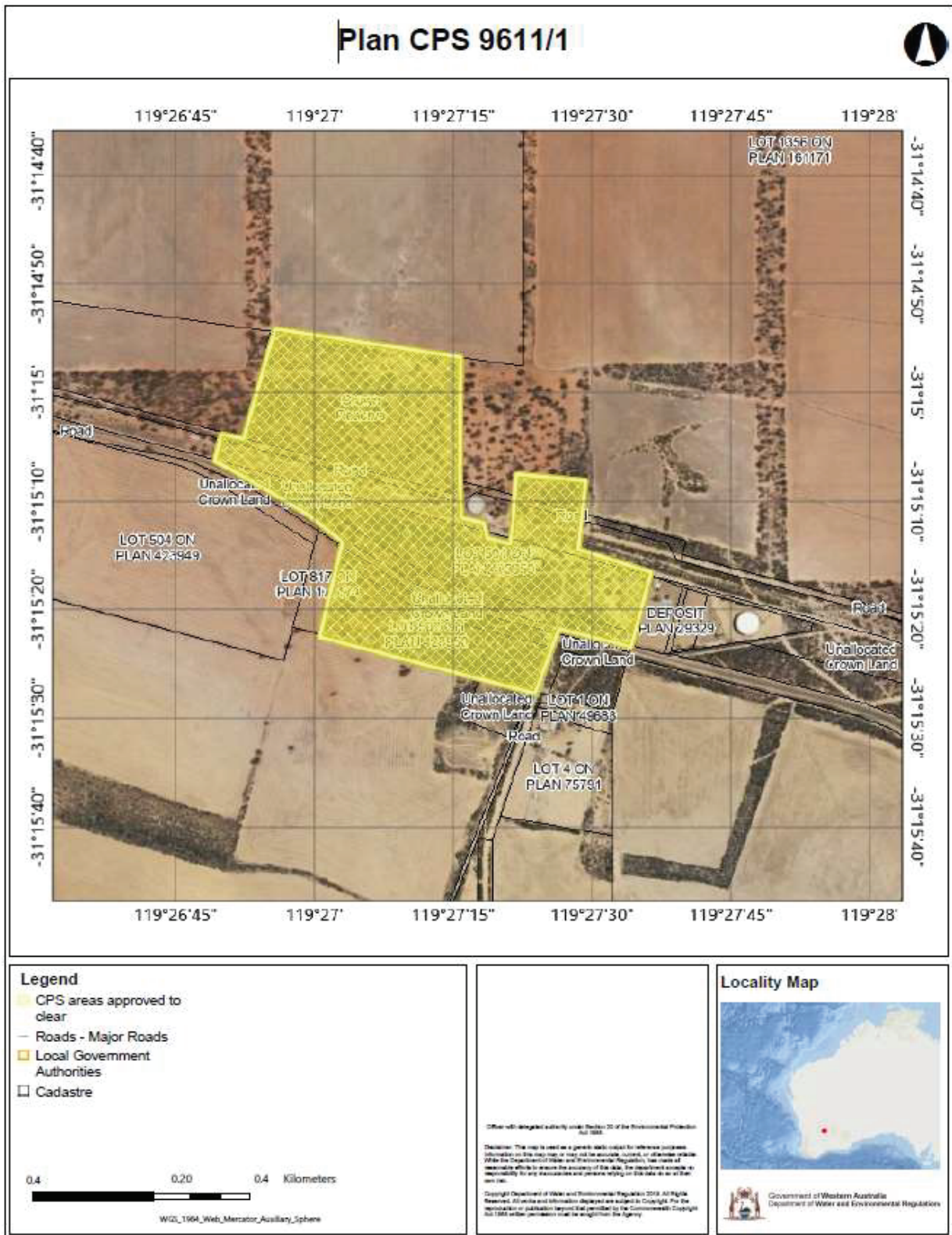


Figure 1: Map of the boundary of the area within which clearing may occur



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9611/1
Permit type:	Purpose permit
Applicant name:	Water Corporation
Application received:	16 February 2022
Application area:	25 hectares (ha) of native vegetation within 64.2 ha clearing footprint
Purpose of clearing:	Remediation of contaminated sites
Method of clearing:	Mechanical
Property:	Lot 350 on Deposited Plan 55290 (Crown Reserve 22800) Lot 1355 on Deposited Plan 11670 Lot 1356 on Deposited Plan 161171 Unallocated Crown Land (PIN: 626438) Great Eastern Highway Road reserve (PIN: 1174620, 1174621, 1176425 and 1194594) Unnamed Road reserve (PIN: 11714621) Unnamed Road reserve (PIN: 11714471)
Location (LGA area/s):	Shire of Yilgarn
Localities (suburb/s):	Ghooli

1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within a single contiguous area (see Figure 1, Section 1.5). The application is to clear up to 25 hectares within a 64.2 hectares footprint. The proposed clearing is required to undertake remediation works to remove contaminated material and to construct two containment cells.

1.3. Decision on application

Decision:	Granted
Decision date:	24 January 2023
Decision area:	25 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and one submission was received. Consideration of matters raised in the public submission is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix G.1), and the findings of two flora, vegetation and fauna surveys (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the temporary purpose of remediation for a contaminated site.

The assessment identified that the proposed clearing will result in:

- the loss of native vegetation that is suitable habitat for conservation significant fauna and provides an ecological corridor for local fauna between remnant vegetation and conservation areas; and
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to have long-term adverse impacts on fauna habitat and remnant vegetation and can be minimised and managed to unlikely lead to an unacceptable risk to environmental values. The applicant will be required to rehabilitate the area post clearing activities. The applicant has suitably demonstrated avoidance and minimisation measures.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- retain cleared vegetation and topsoil and respread this on cleared areas post remediation works to ensure vegetation and fauna habitat is not permanently lost.

1.5. Site map

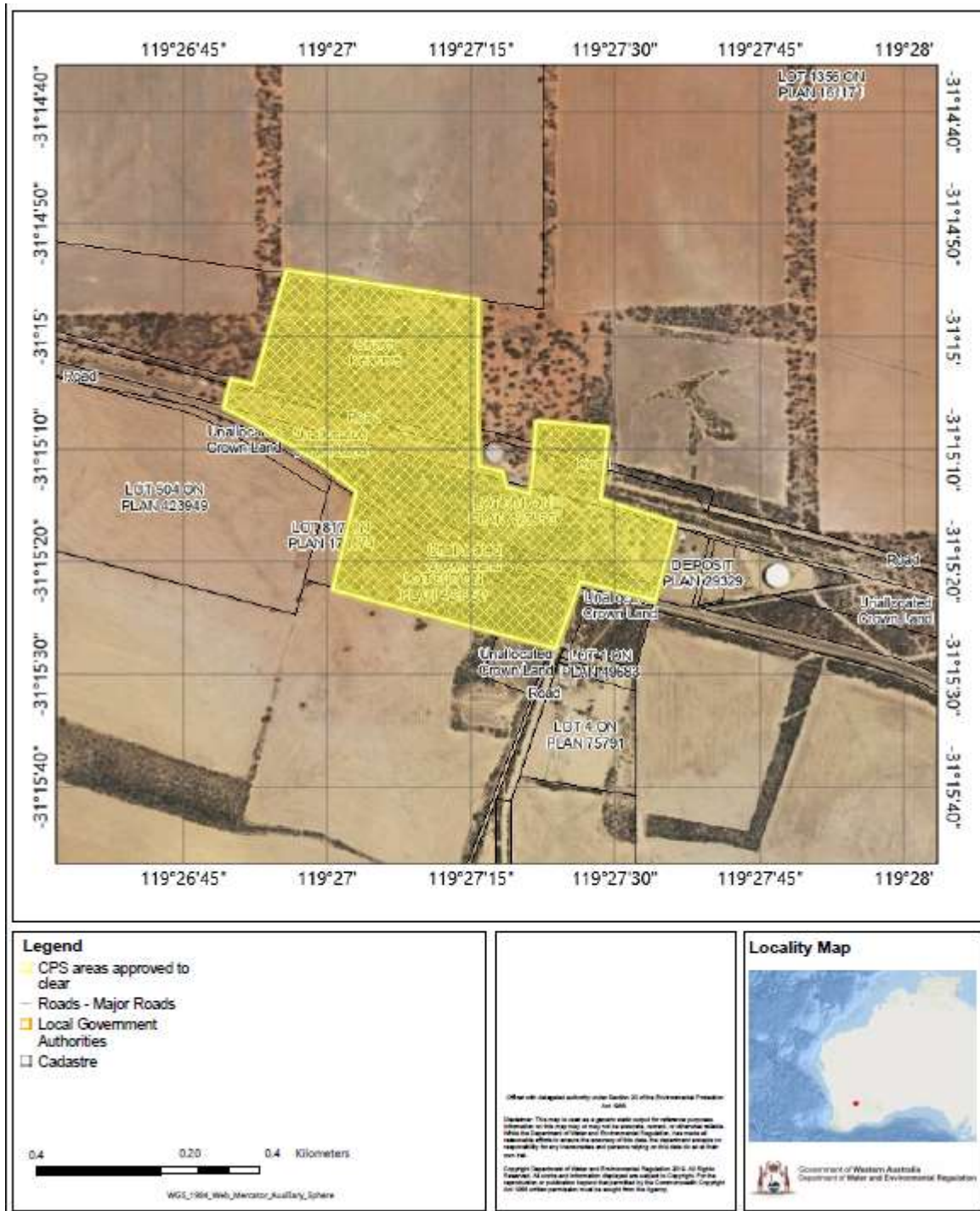


Figure 1. Map of the application area

The area crosshatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity

- the polluter pays principle
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Contaminated Sites Act 2003*
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The applicant advised that the location and size of clearing could not be avoided due to the requirement to remove all present asbestos. However, areas assessed as not contaminated will not be cleared unless it is within the proposed location of the containment cells. It is expected the actual clearing area will be significantly smaller than the proposed clearing area (Water Corporation, 2022a).

The applicant advised that prior to vegetation clearing or grubbing, the contractor shall survey and mark out the extent of the approved clearing area. Once the approved clearing footprint is demarcated, the contractor will locate the asbestos and will clear and grub the minimum amount of vegetation required to adequately remove the asbestos from the site (Water Corporation, 2022a).

Any trees or large shrubs required to be removed within the proposed area of clearing for the construction of the containment cells will be stockpiled in an area determined to be uncontaminated. The vegetation will then be chipped onsite and spread over the uncontaminated area to encourage regeneration. Vegetation that has been in contact with ash material will be felled/ grubbed and placed within the containment cells (Water Corporation, 2022a).

The applicant provided a revegetation plan to ensure regeneration of native vegetation post remediation works (Water Corporation, 2022b).

On 5 December 2022, the applicant provided additional information on its avoidance and mitigation measures including justification as to why specific laydown and containment cell locations were chosen as follows (Water Corporation, 2022c):

Northern Containment Cell and Laydown Area

Water Corporation considered using an existing 'borrow pit' present on the eastern boundary of Lot 350 for the northern containment cell during preliminary design work to minimise the need for additional clearing, as shown in Figure 2. This site was later discounted due to the proximity (approx. 75 m) to neighbouring residents and the stakeholders concern regarding friable asbestos being transported close to their property. This borrow pit was also dismissed for use as a containment cell due to an increased understanding of the volume of material requiring containment that would have resulted in clearing a greater area than the borrow pit provided (Water Corporation, 2022c).

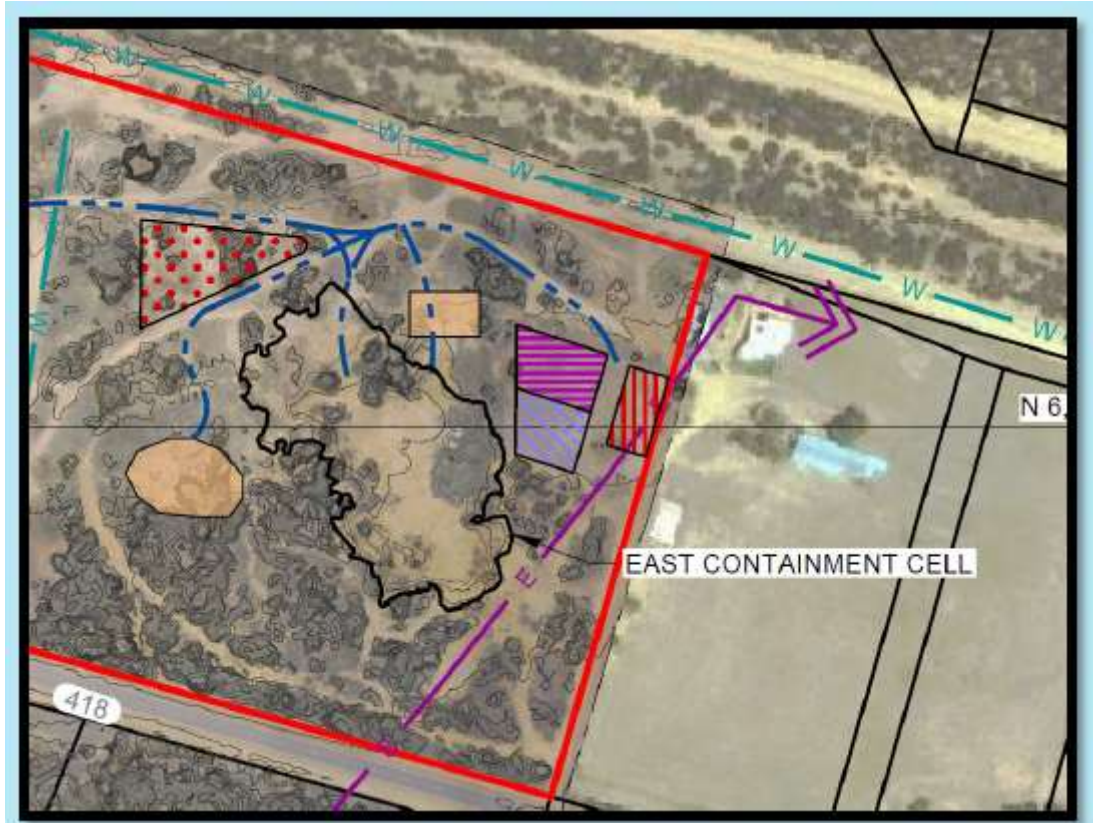


Figure 2: Preliminary design drawing indicating potential containment cell location (Water Corporation, 2022c).

The final northern containment cell location was chosen as this will utilise areas already occupied by derelict former worker cottages containing asbestos containing material (ACM) that are proposed to be removed during the works. This is illustrated in Figure 3 (Water Corporation, 2022c).

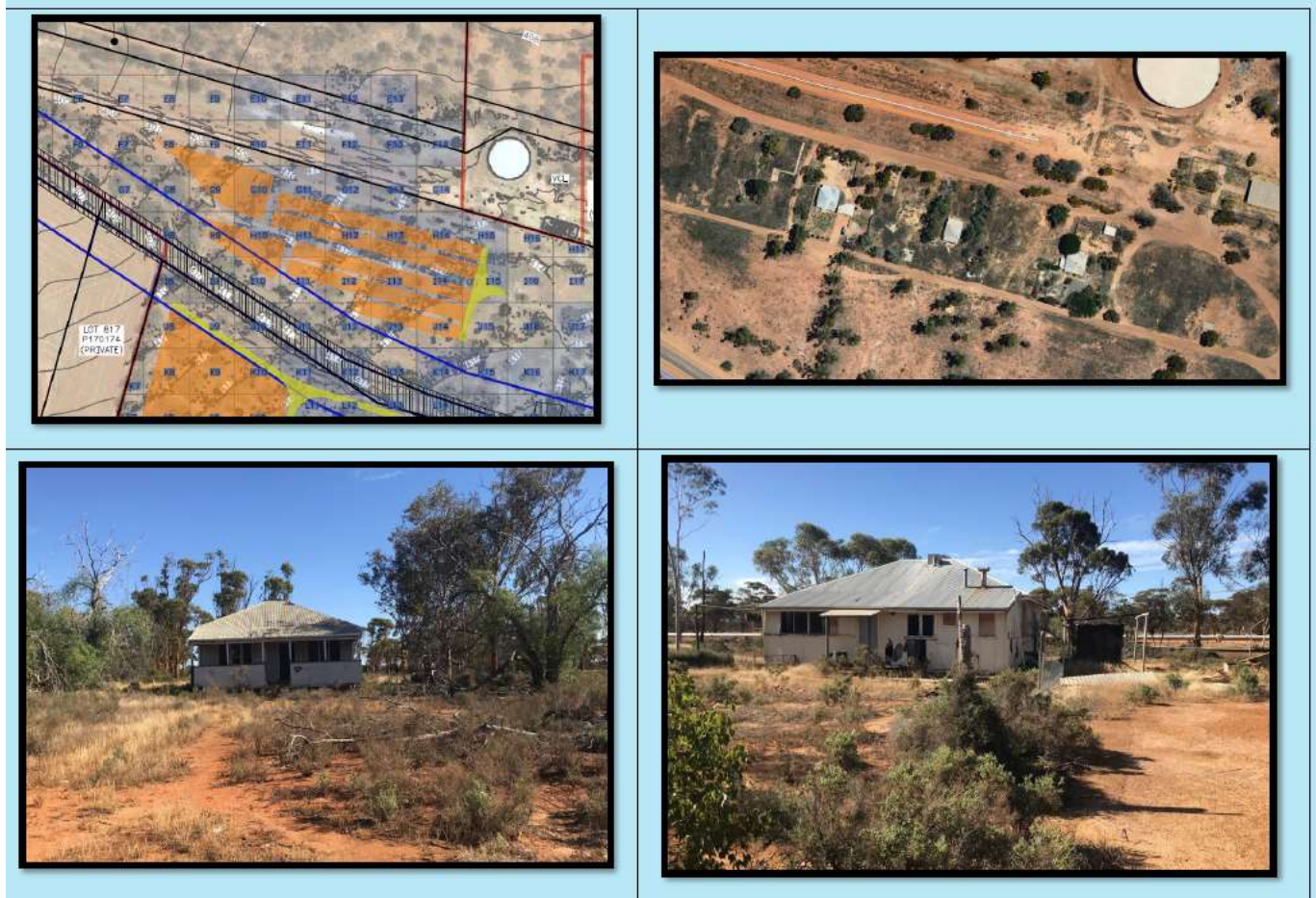


Figure 3: Northern containment cell location and ACM cottages currently present in area (Water Corporation, 2022c).

Southern Containment Cell and Laydown Area

The location of the southern containment cells and laydown area was constrained due to the proximity of Great Eastern Highway (GEH) and Ghooli South Road. Water Corporation has been working closely with Main Roads (MRWA) due to their proposed road widening project for GEH in this area. This required the containment cell, laydown and stockpiling areas to be outside the extents of this project (Water Corporation, 2022c).

Another key constraint for the southern containment cell and laydown area relates to the transport of friable asbestos impacted material across GEH or along Ghooli South Road. This could potentially result in the contamination of these roads and due to its significant traffic volumes, presents a hazard for haul trucks regularly crossing to access a containment cell on the northern side of GEH. To reduce these constraints Water Corporation selected the proposed location on the southern side of GEH (Water Corporation, 2022c).

Water Corporation has been working closely with nearby stakeholders to the east of Ghooli South Road (Lot 1 on DP 049683). Given their concerns regarding friable asbestos the selected location of the containment cell and laydown area was chosen to reduce concerns regarding the containment of friable asbestos material in proximity to their premises (Water Corporation, 2022c).

Proposed clearing of Lot 1355

The proposed remediation of Lot 1355 is limited to the area surrounding former houses that has significant ACM material scattered across the surrounding area as shown in Figure 4. The area proposed is approximately 3 hectares (Water Corporation, 2022c).

The entirety of Lot 1355 was included in the footprint, although still constrained by the 25 ha overall limit, as during the remediation works it may become apparent that further asbestos or general waste may be present in other areas of Lot 1355. Water Corporation has aligned with the DPLH (Proprietor of Lot 1355) aim to remove all contamination liability associated with this through achieving a 'decontaminated' endpoint under the CS Act. Should additional material within this lot be encountered the entire lot has been included in the vegetation clearance permit to enable

this to be completed as part of this works. It should be noted that the works will be closely supervised through administration of the remediation contract. Clearing will only occur on site once the approved clearing area and validation grid cells are clearly demarcated and approved by Water Corporation. The remediation contractor must demonstrate that clearing is both necessary and does not cumulatively exceed the total area approved to be cleared (Water Corporation, 2022c).

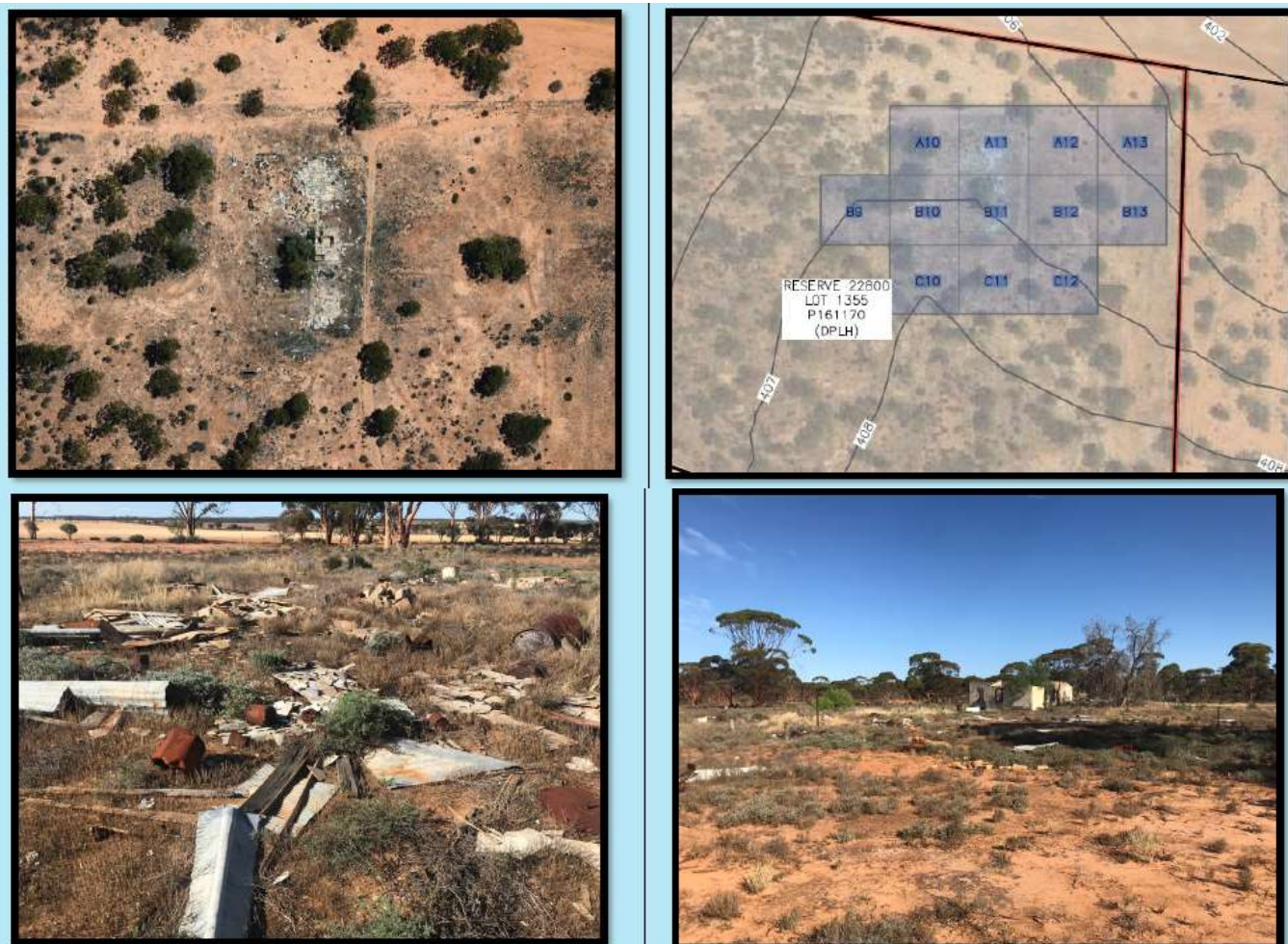


Figure 4: Lot 1355 proposed extent of clearing and photographs showing area proposed for clearing (Water Corporation, 2022c)

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix C) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see **Error! Reference source not found.**) identified that the impacts of the proposed clearing present a risk to biological values (fauna and adjacent flora and vegetation). The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (flora and vegetation) - Clearing Principle (a)

Assessment

According to available databases, nine flora of conservation significance have been recorded within the local area, comprising one Priority 1, one Priority 2 and seven Priority 3 flora taxa. Two Priority 3 flora species have been previously recorded within the application area being *Balaustion grandibracteatum* subsp. *grandibracteatum* and *Acacia desertorum* var. *nudipes* with additional records recorded nearby the application area. *Verticordia mitodes* (P3) and *Stylidium choreanthum* (P3) have also been recorded approximately 0.8 km north east and 1.3 km south east of the application area respectively.

A flora, vegetation and fauna assessment was undertaken by GHD over a portion of the application area (GHD, 2017). This survey was completed from 9 – 11 August 2017 and included the area proposed to be cleared located south of great eastern highway (Figure 5). The flora, vegetation and fauna assessment did not identify any threatened or priority flora or any priority or threatened ecological communities within the application area.

GHD (2017) noted that a likelihood of occurrence assessment post field survey concluded that five taxa may possibly occur within the application area including *Goodenia heatheriana* (P1), *Millotia newbeyi* (P1), *Rinzia fimbriolata* (P1), *Teucrium* sp. dwarf (R. Davis 8813) (P1) and *Stylidium choreanthum* (P3). GHD (2017) noted that these flora can be cryptic species and the field survey was undertaken outside of the reported flowering periods for all of the species. Given this, and that the entire application area had not been surveyed, as well as the survey being undertaken over five years ago, DWER requested an additional targeted flora survey be completed over the entire application area.

An additional field survey was undertaken by GHD between 19 to 20 September 2022 (GHD, 2022). This survey involved a detailed flora and vegetation assessment, basic fauna survey and black cockatoo habitat assessment within the proposed clearing area that was not previously surveyed (Figure 8). A targeted flora search within the entire application area was also undertaken (Figure 9).

No EPBC Act, BC Act or Department of Biodiversity Conservation and Attractions (DBCA) listed flora were recorded within the survey area (GHD, 2022). The updated likelihood of occurrence assessment identified 16 significant species. Post field survey, 14 species were considered unlikely to occur, and two species were considered highly unlikely to occur. This assessment took into account survey efficacy, optimal flowering times, previous records and habitat requirements through desktop assessment and vegetation observed in the field.

No TECs as listed under the EPBC Act or BC Act or Priority Ecological Communities (PEC) listed by DBCA were identified as occurring within either of the survey areas (GHD, 2017 and GHD, 2022).

The area surveyed north of GEH comprised of vegetation in a very good to degraded condition, with 14.26 hectares (62%) mapped as Very Good condition. Sixty-six flora taxa (including subspecies and varieties) representing 26 families and 48 genera were recorded from the survey area during the field survey. This total comprised of 59 native taxa and seven introduced flora taxa. One introduced species, *Opuntia stricta*, is listed as a Declared Pest under the *Biosecurity and Management Act 2007* (BAM Act) and as a Weed of National Significance (WoNS) (GHD, 2022).

The area surveyed south of GEH comprised of vegetation in an excellent to completely degraded (Keighery, 1994) condition (GHD, 2017). Approximately 14.8 ha (33%) is mapped as excellent (Keighery, 1994) condition. One hundred and seventeen (117) flora taxa representing 35 families and 77 genera were recorded from the Ghooli survey area during the field survey. This total comprised 93 native taxa and 24 introduced taxa (GHD, 2017).

Conclusion

Surveys of application area did not identify any conservation flora or communities within the application area. The proposed clearing has the potential to impact adjacent vegetation in very good to excellent condition through the spread of weeds. Weed management practices will minimise the risk of the introduction and spread of weeds.

Conditions

To address the above impacts, weed management practices will be conditioned on the clearing permit.

3.2.2. Biological values (fauna) - Clearing Principle (b)

Assessment

According to available databases, four conservation significant fauna species have been recorded within the local area comprising *Leipoa ocellata* (malleefowl; threatened), *Dasyurus geoffroyi* (chuditch; threatened), *Aganippe castellum* (tree-stem trapdoor spider; Priority 4) and *Aspidites ramsayi* (woma; Priority 1). The chuditch and woma have been previously recorded within application area.

Tree-stem trapdoor spider prefer habitats in flood-prone depressions and flats that support myrtaceous shrub communities, in particular those areas supporting Broombush (*Melaleuca uncinata*) and Sheoaks (such as *Allocasuarina acutivalvis*) in sandy loam soils (Avon Catchment Council, 2007). Suitable habitat is patchy within the application area. No individuals were identified in either survey undertaken within the application area (GHD, 2017 and GHD, 2022). Significant habitat for this species is not likely to be present within the application area.

Malleefowl are found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias (Benshemesh, 2007). A very small amount of shrubland is present within the application area and no malleefowl mounds were identified during either fauna survey (GHD, 2022 and GHD, 2017). Given this, the malleefowl may visit the application area occasionally, however significant habitat for this species is not likely to be impacted by the proposed clearing. Fauna management practices will ensure no direct impacts occur to this species if present during clearing.

The application area may provide habitat for woma, however given suitable habitat will remain within and adjacent to the footprint of the application area, the proposed clearing is not likely to impact upon significant habitat for this species. Fauna management practices will ensure no direct impacts occur to this species if present during clearing.

Chuditch inhabit eucalypt forest (especially Jarrah, *Eucalyptus marginata*), dry woodland and mallee shrublands. In Jarrah forest, chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. Suitable habitat for this species is patchy and the application area is not likely to comprise significant habitat for this species (Department of Environment and Conservation, 2012)

A fauna assessment undertaken within application area south of GEH recorded no conservation significant fauna species during the survey. A likelihood of occurrence assessment post-field survey concluded two species (rainbow bee-eater and peregrine falcon) are likely to occur within the application area (GHD, 2017).

GHD (2017) noted that although the Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) was considered unlikely to occur within the application area, in very good years this species may utilise the application area. The survey did identify feeding evidence for the Major Mitchell's cockatoo and Red-tailed Black cockatoo (Wheatbelt race). Suitable breeding habitat was also recorded (GHD, 2017).

An additional biological survey was undertaken within the application area north of GEH in September 2022 (GHD, 2022). Two broad fauna habitat types were identified within the application area being Salmon Gum woodland and *Allocasuarina* Shrubland (GHD, 2022). These habitats provide food resources, breeding habitat, shelter and habitat linkage for largely birds, reptiles and mammal species. Fallen logs and branches, leaf litter and tree hollows provide a variety of micro habitats for fauna species. The fauna habitats are generally in very good condition but have been impacted by a number of anthropogenic disturbances including historical clearing and infrastructure (buildings, tracks, fencing), waste, grazing, weed invasion and introduced fauna. The biological survey area is considered to provide areas of high habitat value for fauna in the region given the highly modified landscape of the surrounding area (largely cleared for agriculture) (GHD, 2017 and GHD, 2022).

A fauna assessment undertaken within the area north of GEH recorded 36 fauna species, consisting of 29 birds, four reptiles and three mammals were recorded from the biological survey area. The species recorded during the survey are typical for the habitats they were found in and are generally well represented in the region (GHD, 2022). One fauna species of significance was recorded during the survey, with one individual Carnaby's Cockatoo (*Zanda latirostris*) was observed flying over the biological survey area. No evidence of any other significant fauna was observed during the survey.

Suitable habitat for two additional significant fauna, Peregrine Falcon (*Falco peregrinus*) and Western Spiny-tailed Skink (*Egernia stokesii badia*) was identified within the application area (GHD, 2022).

A survey previously undertaken by GHD in the application area south of Great Eastern Highway (GHD 2017) recorded the presence of Red-tailed Black Cockatoo (*Calyptorhynchus banksii samueli*) and Major Mitchell Cockatoo (*Lephocroa leadbeateri*) within the Ghooli survey area. Although these species are not listed under the state or federal law, they are considered to be regionally significant. No evidence of their presence were recorded during the recent survey (GHD, 2022).

The habitat for the peregrine falcon and rainbow bee-eater are widespread and varied and the proposed clearing is not likely to have an impact on significant habitat for this species.

The western spiny tailed skink have been recorded in York Gum (*Eucalyptus loxophleba*) woodland with some records in Gimlet (*E. salubris*) and Salmon Gum (*E. salmonophloia*) woodland (Department of the Environment, 2023). The Salmon Gum woodland habitat will provide habitat for this species. The proposed clearing will impact upon habitat for this species however suitable habitat will remain within the larger footprint area and adjacent to the application area. The applicant intends to revegetate cleared areas post extraction works and therefore no long term loss of suitable habitat is expected.

Black cockatoo assessment

The application area is located just outside the eastern extent of the modelled distribution for Carnaby's Cockatoo. The biological survey undertaken by GHD (GHD, 2022 and GHD, 2017) identified this species as likely to occur and suitable habitat is present. Carnaby's Cockatoo is listed as Endangered under the EPBC Act and the BC Act.

The field survey was carried out during the breeding season of Carnaby's cockatoo. Only the one individual was observed flying over the survey area. No evidence of breeding, foraging or roosting was observed within the survey area. The closest known breeding tree for Carnaby's cockatoo have been recorded over 150 km south and south west of the survey area.

No evidence of foraging was observed during the survey (GHD, 2017 and GHD, 2022). Suitable foraging species present within the survey area consist of primarily *Eucalyptus salmonophloia* (Salmon Gum) and *E. salubris* (Gimlet). These species are restricted to the Salmon Gum woodland habitat type (22.13 ha). Given that the closest known breeding and roosting locations are over 100km from the application area and that the application area occurs outside of the modelled distribution of this species (DAWE, 2022), the vegetation proposed to be cleared is not considered to be significant habitat for the Carnaby cockatoo. It is considered Carnaby's Cockatoo may utilise the survey area opportunistically.

Fauna connectivity

The vegetation within the biological survey area forms part of a habitat corridor, along the GEH, which links to surrounding remnant patches of vegetation and conservation reserves through a series of narrow vegetated corridors to the north, south, east and west through areas largely cleared for agriculture (GHD, 2022).

Historical disturbances such as grazing, clearing, weed invasion and introduced fauna has impacted on the natural state and condition of the remnant vegetation however much of it remains in very good condition. The survey area and the surrounding remnant vegetation of which it is a part of, provide an important refuge for native fauna in a region that is largely cleared and fragmented (GHD, 2022).

Given the above, the application area may provide habitat for conservation and locally significant fauna. However, given the proposed clearing of 25 ha occurs in a larger footprint of 64.2 hectares and that the applicant will revegetate cleared areas post remediation, no long term loss of significant habitat is considered to occur. Fauna management practices will mitigate direct impacts to fauna present within the application area during clearing activities.

Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing can be managed by taking steps to undertake slow directional clearing, revegetate temporary cleared areas and minimise the risk of the introduction and spread of weeds. Conservation significant fauna may utilise the application area opportunity, however the habitat being cleared are not considered significant for fauna.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Undertake slow directional clearing
- Minimised the spread of weeds
- Revegetate temporary cleared areas

3.3. Relevant planning instruments and other matters

The DWER (2022) has advised that the land at Lot 350 was classified under the CS Act as *contaminated – remediation required* on 31 March 2021 and a memorial (reference number N614696 ML) was placed on the certificate of title.

The classification was based on the presence of ACM fragments and free asbestos fibres in soil in the vicinity of the decommissioned water pump station in the north central portion of the site. A detailed site Investigation was undertaken in December 2016 which found asbestos was present in soils at quantities exceeding Health Investigation Levels for public open space, parklands and recreational areas as specified in 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (Department of Health, May 2009). The investigation also found some metal and hydrocarbon contamination present in soils at concentrations exceeding relevant Ecological levels. Based on the findings of the investigation the site is required to be remediated to reduce the risk to human health and the environment.

As the site is an active pump station with associated infrastructure, the site needs to remain open and as such a Site Management Plan (SMP) is in place for any activities undertaken at the site that may disturb the asbestos-impacted soil. A heritage listed pump station also exists on the site that is a tourist attraction accommodating for tourist parking and picnic areas. As such the site requires remediation to remove unacceptable risks of exposure to asbestos to future land users. The DWER understands the site is currently closed to public access.

The DWER understand that a remediation action plan (RAP) is being prepared for the site and will be submitted to DWER prior to commencement of remediation works. The RAP will outline management measures including procedures to prevent the spread of asbestos or potentially impacted soil, to protect the health of on-site workers, and for handling and disposal of asbestos or potentially impacted soil (or other potentially impacted material such as vegetative material cleared from the site) in accordance with the 'Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia' (Department of Health, 2021). Provided the RAP is prepared and implemented, and includes appropriate management of the proposed vegetation clearing, DWER has no objection to the proposed clearing of native vegetation (DWER, 2022).

No Aboriginal sites of significance have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972 (WA)* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

The Shire of Yilgarn has advised that it is understood that clearing of vegetation is required for the purpose of remediation within sections of road reserves Landgate PIN 11714625 and Parcel 74577 (Shire of Yilgarn, 2021). The Shier of Yilgarn authorises Water Corporation to undertake clearing within these areas for the purpose of remediating contaminated land (Shire of Yilgarn, 2021).

Due to the avoidance and mitigation measures implemented by the applicant (Section 3.1), the significance and proportion of impacts to conservation significant flora, communities and fauna (Section 3.2), and the conditions placed on the permit to manage and mitigate these impacts, the application did not require referral to DBCA.

Appendix A. Additional information provided by applicant

Summary	Reference
Clarification and justification provided regarding the location of the containment cells and laydown areas including providing details of alternate locations considered.	Water Corporation provided additional avoidance and minimisation measures, see section 3.1 (Water corporation, 2022b; received 8 June 2022).
Provision of a revised flora, vegetation and fauna survey report provided	An additional biological survey was undertaken within the application area north of GEH in September 2022 (GHD, 2022; received 6 December 2022).

Appendix B. Details of public submissions

The application was advertised on the DWER website for a 21 Day public comment period on 17 March 2022. One public submission was received in relation to this application and is summarised within the table below.

Summary of comments	Consideration of comment
The applicant has not demonstrated that they have attempted to mitigate impacts including providing justification for the location of laydown areas or containment cells including providing alternative locations.	On 8 June 2022, the applicant provided additional information regarding avoidance and mitigation practices as well as further justification for the location of the laydown areas and containment areas. This information is summarised in Section 3.1.
The revegetation plan is inadequate	A condition has been placed on the permit requiring all temporary cleared areas be revegetated post remediation. The DWER considers the revegetation plan to be adequate given the temporary nature of the proposed clearing.
An Environmental Management Register should be provided to ensure no additional impact on flora and vegetation occur including minimising the spread of weeds to adjacent vegetation	On 6 December 2022, the applicant provided an additional flora, vegetation and fauna assessment to ensure no threatened or priority flora would be impacted. The applicant will be required to undertake weed management practices.

Appendix C. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

C.1. Site characteristics

Characteristic	Details
Local context	<p>The area proposed to be cleared is part of a patch of remnant native vegetation in the extensive land use zone of Western Australia. It is adjacent to GEH and cleared farming land. The Great Western Woodlands occurs approximately four kilometres of the application area.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 52 per cent of the original native vegetation cover.</p>
Ecological linkage	The application area occurs within an ecological linkage that runs from west to east along great eastern highway.

Characteristic	Details
Conservation areas	An unnamed nature reserve and Yellowdine Nature Reserve are located 14km west and 14.5 kilometres east of the application area respectively.
Vegetation description	<p>Two vegetation surveys (GHD, 2017 and GHD, 2022) undertaken within the application area indicate the vegetation within the proposed clearing area consists of the following vegetation types:</p> <ul style="list-style-type: none"> • <i>Eucalyptus salmonophloia</i> tall woodland (Es Woodland) (GHD, 2022) • <i>Allocasuarina corniculata</i> tall shrubland (Ac Shrubland) (GHD, 2022) • <i>Eucalyptus</i> woodland (GHD, 2017) • <i>Allocasuarina</i> and <i>Acacia</i> shrubland (GHD, 2017) <p>The full survey descriptions and maps are available in Appendix F.</p> <p>This is consistent with the mapped vegetation types:</p> <ul style="list-style-type: none"> • Beard vegetation association 141, which is described as medium woodland; York gum, salmon gum and gimlet (Shepherd et al., 2001); and • Beard vegetation association 1413, which is described as shrublands; acacia, casuarina and melaleuca thicket (Shepherd et al., 2001) <p>The mapped vegetation types retain approximately 97 and 98 per cent of their original extent (Government of Western Australia, 2019).</p>
Vegetation condition	<p>The two vegetation surveys (GHD, 2017 and GHD, 2022) undertaken within the application area indicate the vegetation within the proposed clearing area is in completely degraded to excellent (Keighery, 1994) condition.</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix E.</p> <p>The full survey descriptions and mapping are available in Appendix F.</p>
Climate and landform	<p>The climate of the application area is warm and temperate. The annual average rainfall is approximately 400 millimetres. Evapotranspiration over the application area is approximately 400 millimetres.</p> <p>The geology mapped over the application area is characterised by granite and gneiss. The groundwater salinity within the application area typically ranges from approximately 1400-35000 milligrams per litre total dissolved solids.</p>
Soil description	<p>The soil types mapped over the application area include the following:</p> <ul style="list-style-type: none"> • Buladagie 3 Undifferentiated Phase (261Bd_3u), described as Undifferentiated • Buladagie 2 Sandplain Subsystem (261Bd_2), described as gently undulating yellow lateritic sandplain interspersed with red alkaline duplexes.
Land degradation risk	The soil types mapped within the application area have a high variability of risk. Both soils have a high to moderate wind erosion risk and a high susceptibility to subsurface acidification (Refer to section B.5.)
Waterbodies	No watercourses or wetlands are located within the vicinity of the application area. The closest mapped wetland is recorded approximately 2.3 kilometres from the application area.
Hydrogeography	The application area is located within Goldfields Groundwater Area proclaimed under the <i>Rights in Water Irrigation Act 1914</i> .
Flora	According to available databases, nine flora of conservation significance have been recorded within the local area, comprising one Priority 1, One Priority 2 and seven Priority 3 flora taxa. Two flora and vegetation surveys have been undertaken within the application area and no threatened or priority flora were recorded within the application area.

Characteristic	Details
Ecological communities	No threatened or priority ecological communities have been recorded within the local area. Two flora surveys undertaken within the application did not identify any priority or threatened ecological communities located within the application area.
Fauna	According to available database, four conservation significant species have been recorded within the local area comprising, Two listed as vulnerable, on Priority 1 and on Priority 4 species.

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Coolgardie	12,912,204.35	12,648,491.39	97.96	2,114,349.37	16.37
Vegetation complex					
Beard vegetation association 141	883,085.75	858,525.10	97.22	47.39	46
Beard vegetation association 1413	1,061,212.28	1,042,553.77	98.24	18.5	18
Local area					
10km radius	-	-	52	-	-

*Government of Western Australia (2019)

C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
<i>Goodenia heatheriana</i>	1	Y	7	Y
<i>Leucopogon</i> sp. <i>Yellowdine</i> (M. Hislop & F. Hort MH 3194)	2	N	5	Y
<i>Balaustion grandibracteatum</i> subsp. <i>grandibracteatum</i>	2		0	
<i>Acacia ancistrophylla</i> var. <i>perarcuata</i>	3	Y	8.1	Y
<i>Acacia desertorum</i> var. <i>nudipes</i>	3	Y	0	Y
<i>Acacia fillifolia</i>	3	Y	6.7	Y
<i>Prostanthera nanophylla</i>	3	Y	2.5	Y
<i>Stylidium choreanthum</i>	3	Y	1.3	Y

Species name	Conservation status	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
<i>Verticordia mitodes</i>	3	Y	0.8	Y
<i>Verticordia stenopetala</i>	3	Y	10	Y

C.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
<i>Aganippe castellum</i> (tree-stem trapdoor spider)	P4	Y	Y	8.4	Y
<i>Dasyurus geoffroyi</i> (chuditch)	Vulnerable	Y	Y	0	Y
<i>Leipoa ocellata</i> (malleefowl)	Vulnerable	Y	Y	7.5	Y
<i>Aspidites ramsayi</i> (woma)	P1	Y	Y	0	Y

C.5. Land degradation risk table

Risk categories	261Bd_2	261Bd_3u
Wind erosion	30-50% of map unit has a high to extreme wind erosion risk	30-50% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk	<3% of map unit has a high to extreme water erosion risk
Salinity	3-10% of the map unit has a moderate or high hazard or is presently saline	3-10% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid	50-70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high hazard	<3% of the map unit has a moderate to high hazard
Water logging	<3% of map unit has a moderate to very high waterlogging risk	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	<3% of map unit has a high to extreme phosphorus export risk	<3% of map unit has a high to extreme phosphorus export risk

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>Two flora and vegetation surveys undertaken within the application area did not identify any threatened or priority flora or threatened or priority ecological communities within the application area.</p> <p>The area proposed to be cleared comprises suitable habitat for conservation significant fauna and provides an ecological corridor between remnant vegetation and conservation areas in the local area.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared comprises suitable habitat for conservation significant fauna and provides an ecological corridor between remnant vegetation and conservation areas in the local area.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>Two flora and vegetation surveys undertaken within the application area did not identify any threatened flora.</p>	Not likely to be at variance	No
<p><u>Principle (d):</u> <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain species that can indicate a threatened ecological community (TEC). No TECs have been recorded within the local area.</p>	Not likely to be at variance	No.
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation types and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia.</p> <p>The vegetation proposed to be cleared is considered to be part of a significant ecological linkage in the local area. However, given the vegetation representation in the local area, the proposed clearing is not likely to be considered a significant remnant within an extensively cleared landscape. Rehabilitating the application area post clearing will reduce the long term impact of the clearing.</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of any conservation areas.</p>	Not likely to be at variance	No
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>Given no water courses or wetlands are recorded within two kilometres of the application area, the proposed clearing is unlikely to impact on- or off-site hydrology and water quality.</p>	Not likely to be at variance	No
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>The mapped soils are moderately susceptible to wind erosion and subsurface acidification. Noting the extent of the proposed clearing within a larger footprint and that areas will be revegetated post remediation works, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	No
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u></p> <p>Given no water courses or wetlands are recorded within close proximity of the application area, the proposed clearing is unlikely to impact surface water quality.</p> <p>The clearing of up to 25 ha of native vegetation within a 64.2 ha footprint for the temporary purpose of remediation for contaminated sites is not likely to impact upon ground water quality.</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p>	Not likely to be at variance	No

Appendix E. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from:

Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix F. Biological survey information excerpts

F.1. Flora and vegetation survey (GHD, 2017)

Overview

GHD Pty Ltd (GHD) was commissioned by the Water Corporation to undertake a biological assessment of the survey area.

The survey determined that the application area comprised two vegetation associations. All vegetation associations were well represented in areas adjacent to the survey area as well as in the local and broader areas. The vegetation associations are not considered representative of any Federal or State listed TECs or PECs, other significant vegetation as defined by the EPA (2016a) nor considered to be growing in association with watercourses or wetlands. The vegetation condition within the survey area was rated from excellent to completely Degraded.

No EPBC Act, WC Act or DBCA Priority-listed flora were recorded within the survey areas. A likelihood of occurrence assessment post-field survey concluded that no taxa are likely to occur, six taxa may possibly occur and the remaining 38 taxa are unlikely to occur within the survey areas. The six taxa that may possibly occur (*Goodenia heatheriana* (P1), *Millotia newbeyi* (P1), *Rinzia fimbriolata* (P1), *Teucrium* sp. dwarf (R. Davis 8813) (P1) and *Stylidium choreanthum* (P3) within the Ghooli survey area and *Gompholobium cinereum* (P3) within the Dedari survey area) have been recorded within the study areas, can be cryptic species and field survey was undertaken outside of the reported flowering periods for all of the species.

Flora and vegetation

The survey area comprises two vegetation associations. vegetation associations were well represented in areas adjacent to the survey area as well as in the local and broader areas. The vegetation associations are not considered representative of any Federal or State listed TECs or PECs, other significant vegetation as defined by

the EPA (2016a) nor considered to be growing in association with watercourses or wetlands. The vegetation condition within the survey area was rated from excellent to completely degraded.

No EPBC Act, WC Act or DBCA Priority-listed flora were recorded within the survey areas. A likelihood of occurrence assessment post-field survey concluded that no taxa are likely to occur, five taxa may possibly occur and the remaining 38 taxa are unlikely to occur within the survey areas. The five taxa that may possibly occur (*Goodenia heatheriana* (P1), *Millotia newbeyi* (P1), *Rinzia fimbriolata* (P1), *Teucrium* sp. dwarf (R. Davis 8813) (P1) and *Stylidium choreanthum* (P3) have been recorded within the study areas, can be cryptic species and field survey was undertaken outside of the reported flowering periods for all of the species.

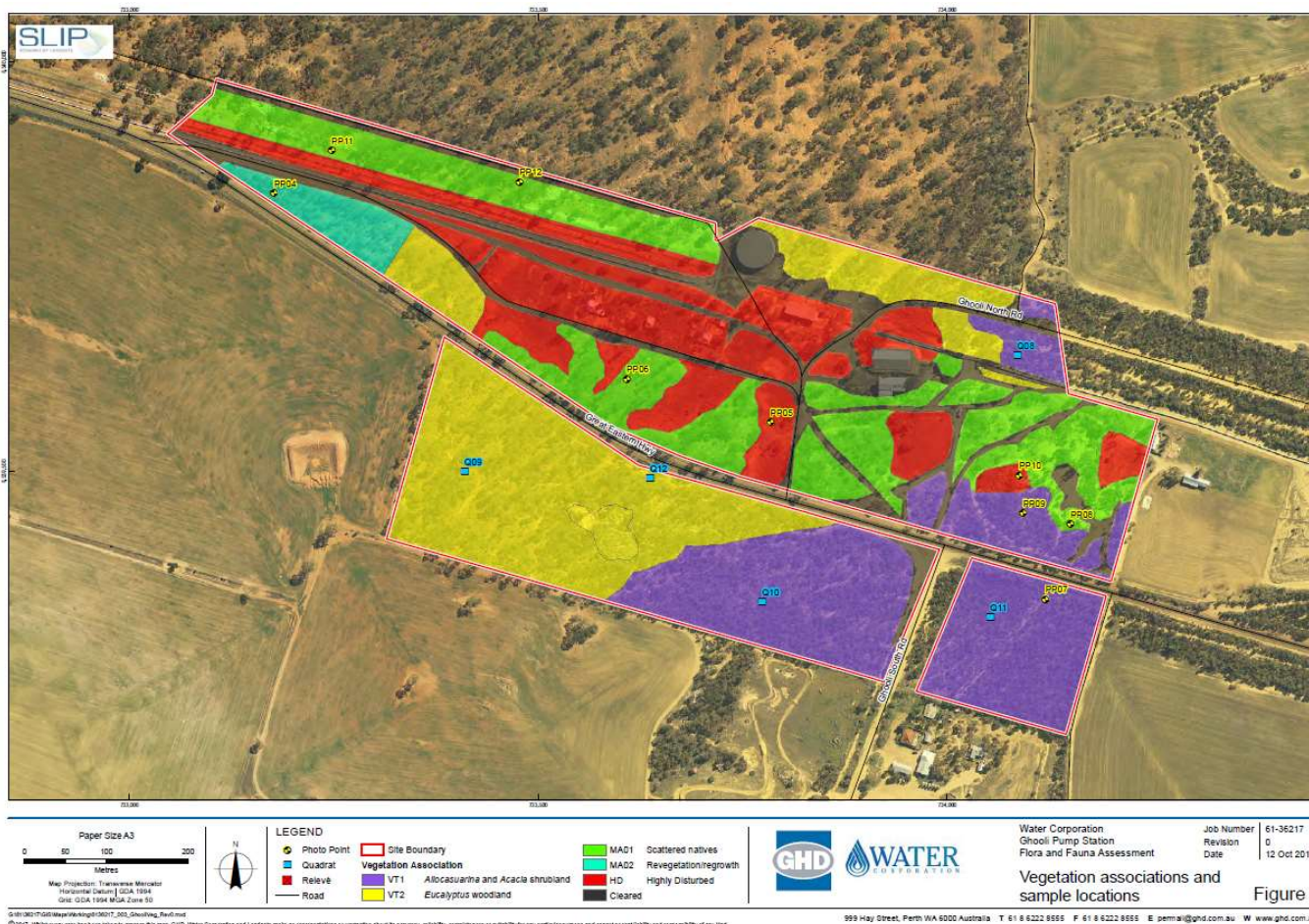


Figure 5: Vegetation associations and sample locations (GHD, 2017).

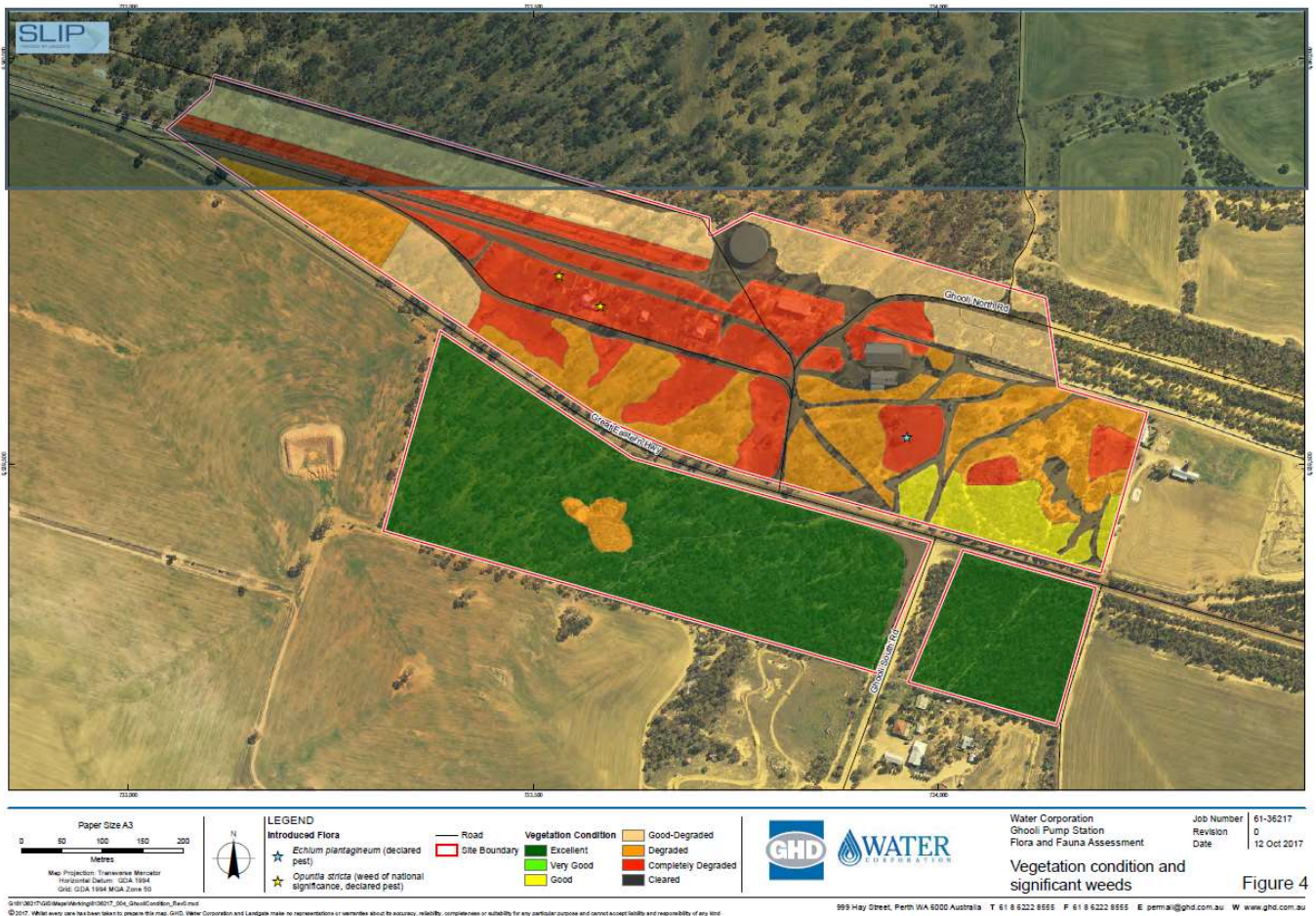


Figure 6: vegetation condition and significant weeds

Fauna

Five broad fauna habitat types were identified within the survey areas during the field survey, all of which are well represented at a local and regional scale.

No conservation significant fauna species were recorded during the survey. A likelihood of occurrence assessment post-field survey concluded two species (Rainbow Bee-eater and Peregrine Falcon) are likely to occur in Ghooli survey area. The Rainbow Bee-eater and Peregrine Falcon are widespread species that are unlikely to solely rely on the habitats present within the survey areas.

It should be noted that although the Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) was considered unlikely to occur in Ghooli and Dedari, in very good years the species may opportunistically utilise the Ghooli area, however these event would be rare and the habitat in the Ghooli survey area would not support a population of this species long term.

The survey did identify feeding evidence for the Major Mitchell's Cockatoo and Red-tailed Black Cockatoo (Wheatbelt race) within both survey areas, and breeding habitat was recorded at Ghooli. Although these species are not listed as species of conservation significance, they are considered regionally significant and wherever possible their habitat should be protected, in particular large breeding trees. Six breeding trees were identified in the Ghooli survey area to have large hollows with chews present.

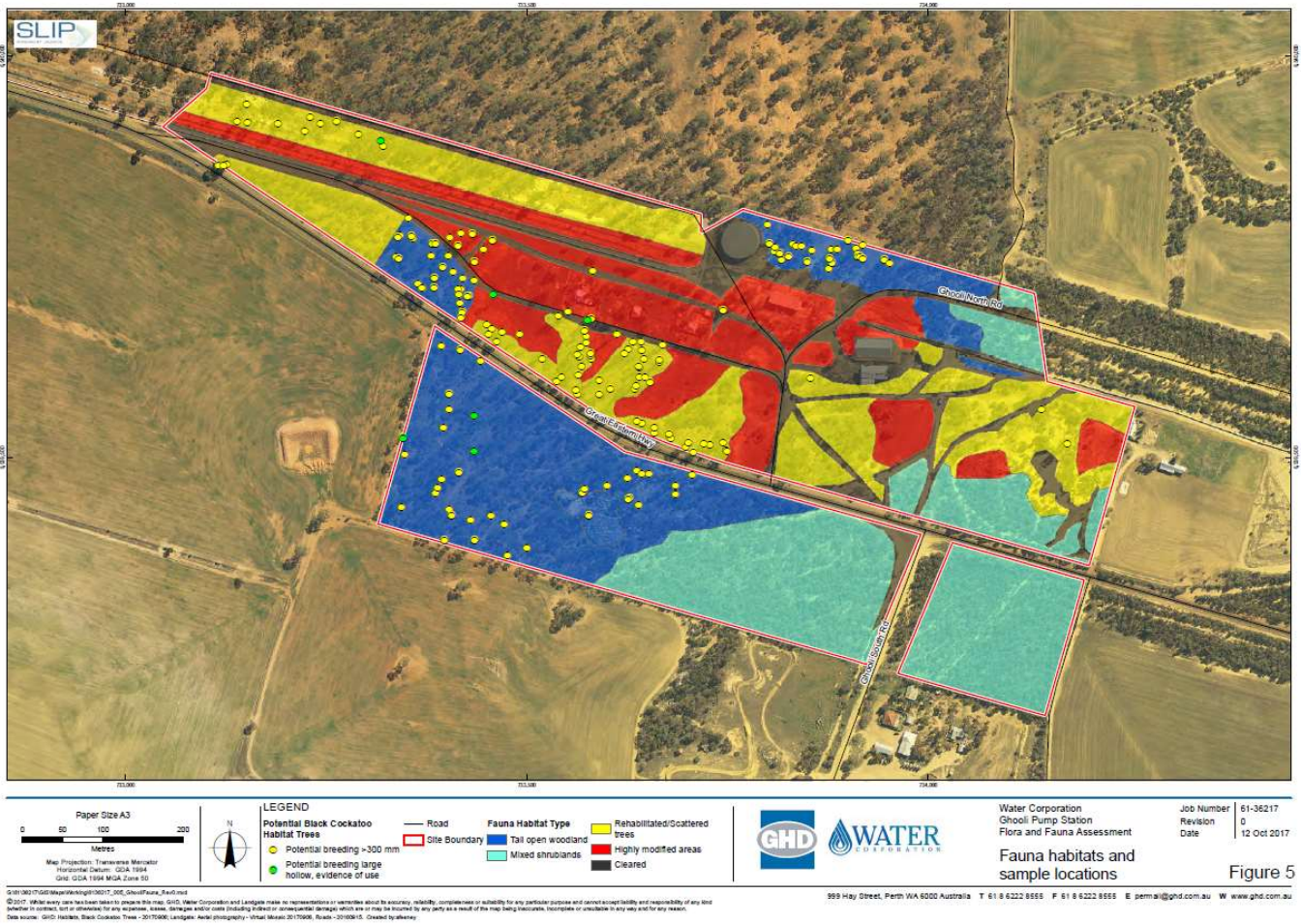


Figure 7: Fauna habitat and sample locations

F.2. Flora and vegetation survey (GHD, 2022)

Flora and vegetation

Two vegetation types and cleared areas were mapped within the biological survey area. The dominant vegetation type was Es Woodland (*Eucalyptus salmonophloia* tall woodland) with 22.13 ha (97%) of the biological survey area. One Threatened Ecological Community (TEC) was identified in the desktop search *Eucalypt Woodlands of the Western Australian Wheatbelt*. No TECs as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *Biodiversity Conservation Act 2016* (BC Act) or Priority Ecological Communities (PEC) listed by Department of Biodiversity Conservation and Attractions (DBCA) were identified as occurring within the biological survey area. The vegetation in the biological survey area ranged from Very Good to Degraded condition with 14.26 ha (62%) mapped as Very Good condition.

Sixty-six flora taxa (including subspecies and varieties) representing 26 families and 48 genera were recorded from the survey area during the field survey. This total comprised of 59 native taxa and seven introduced flora taxa. One introduced species, *Opuntia stricta*, is listed as a Declared Pest under the *Biosecurity and Management Act 2007* (BAM Act) and as a Weed of National Significance (WoNS). No EPBC Act, BC Act or DBCA listed flora were recorded within the survey area. The updated likelihood of occurrence assessment identified 16 significant species. Post field survey 14 species were considered unlikely to occur, and two species were considered highly unlikely to occur. This assessment took into account survey efficacy, optimal flowering times, previous records and habitat requirements through desktop assessment and vegetation observed in the field.

Fauna

Two broad fauna habitat types were identified within the survey area, consisting of Salmon Gum (*Eucalyptus salmonophloia*) woodland and *Allocasuarina* shrubland. The fauna habitats within the survey area are generally in very good condition but have been impacted by a number of anthropogenic disturbances including historical clearing and infrastructure, grazing, weeds and introduced fauna.

Thirty-six fauna species, including 29 birds, four reptiles and three mammals were recorded during the survey. Of these, two species are introduced: Red Fox (*Vulpes vulpes*) and Rabbit (*Oryctolagus cuniculus*).

One individual Carnaby's Cockatoo (*Zanda latirostris*), listed as Endangered under the EPBC Act and BC Act, was observed flying over the biological survey area during the survey. A likelihood of occurrence assessment for significant fauna concluded two species are considered likely to utilise the habitat present in the survey area, these being the Peregrine Falcon (*Falco peregrinus*) and Western Spiny-tailed Skink (*Egernia stokesii badia*).



Fauna habitat type	Habitat Type Description	Extent (ha) and proportion of survey area (%)	Photograph
Salmon Gum Woodland	<p>A tall woodland dominated by Salmon Gum (<i>Eucalyptus salmonophloia</i>) with scattered Gimlet (<i>E. salubris</i>) and <i>Melaleuca sheathiana</i> over an open low shrubland of <i>Eremophila</i> and halophytic shrubs on a clayey/sandy plain.</p> <p>This habitat type is well represented in the Ghooli survey area as well as in the local and broader areas (in surrounding nature reserves).</p> <p><u>Significant fauna</u></p> <p>The Peregrine Falcon may utilise this habitat for foraging and breeding (large trees with hollows). Salmon gum and gimlet trees provide suitable foraging habitat and potential breeding habitat (large trees with hollows) for Carnaby's Cockatoo.</p>	22.13 ha (96.2%)	
<i>Allocasuarina</i> Shrubland	<p>Tall shrubland of <i>Allocasuarina corniculata</i> over an open shrubland of <i>Acacia</i>, <i>Melaleuca</i> and <i>Eremophila</i> species over a grassland of <i>Monachather paradoxus</i> on clay hardpan.</p> <p>The shrubland provides high value habitat for birds, with foraging opportunities and refuge areas. Only a small patch of this habitat type occurs within the survey area, however it is considered to be well represented in the broader region (in nearby conservation reserves).</p> <p><u>Significant fauna</u></p> <p>The Peregrine Falcon may utilise this habitat type for foraging.</p>	0.59 ha (2.6%)	
Cleared	Dirt tracks	0.28 ha (1.2%)	

Figure 8: Fauna habitat types identified within the survey area

Black Cockatoo habitat assessment

One individual Carnaby's Cockatoo was observed flying over during the survey, however no evidence of breeding, foraging or roosting was observed within the biological survey area.

Suitable foraging species present within the survey area for Carnaby's Cockatoo consist primarily of *Eucalyptus salmonophloia*) and *E. salubris* (Gimlet) which occur within the Salmon Gum woodland habitat type. There is 22.13 ha of Salmon Gum woodland within the survey area, which is considered to be low to moderate quality foraging habitat.

A total of 242 potential habitat trees were recorded within the biological survey area, of which 240 are Salmon Gum (DBH >300 mm) and two are Gimlet (DBH >500 mm). Five of the trees recorded contained one or more hollows ranging from small (<9 cm) to medium sized (10-20 cm). One tree contained hollows that were of a suitable size to currently provide nesting opportunities for Carnaby's Cockatoo (hollows with an entrance diameter greater than 20 cm). Observations from ground level indicated this hollow is not currently being utilised.

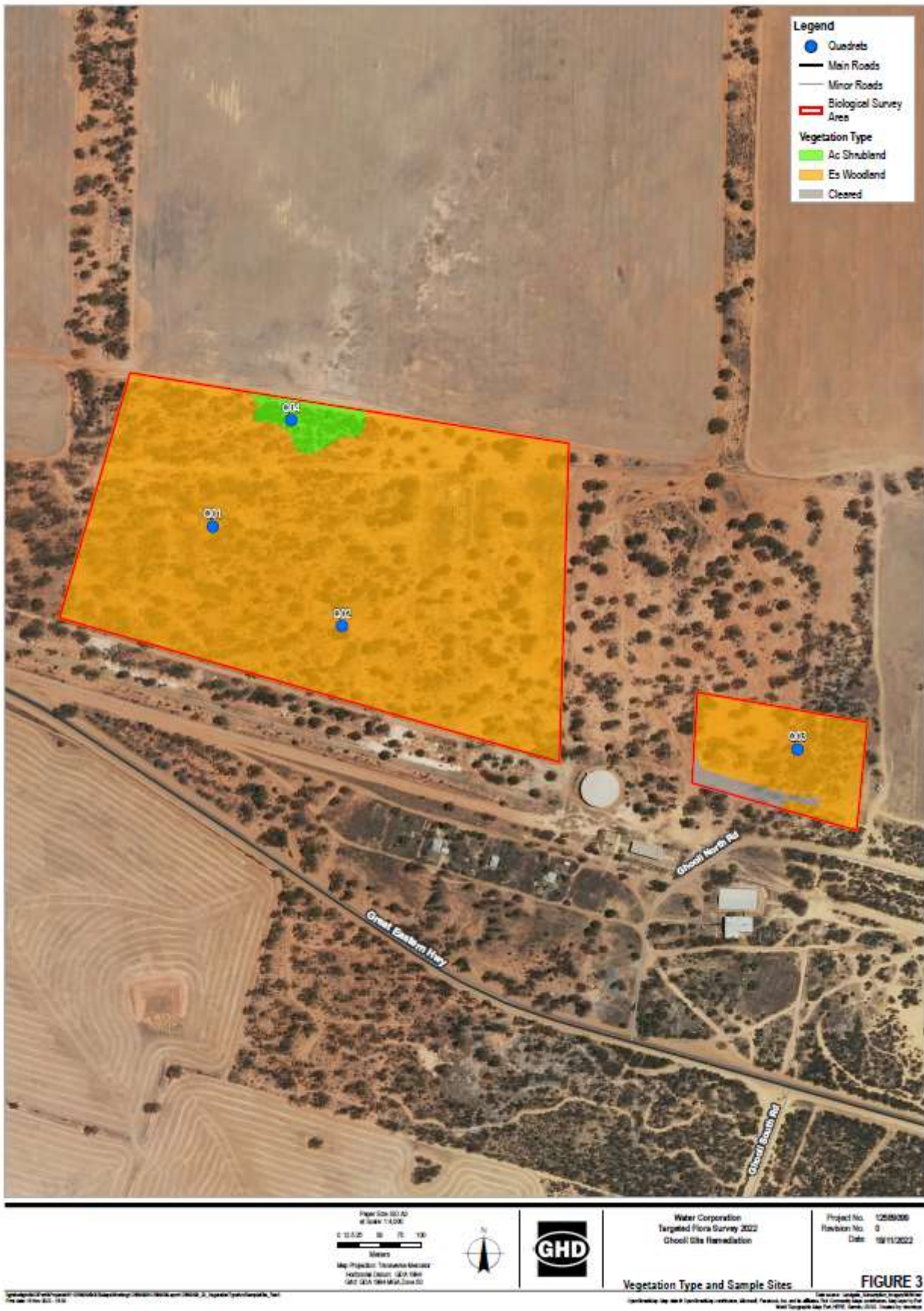


Figure 8: Vegetation Type and Sample Sites

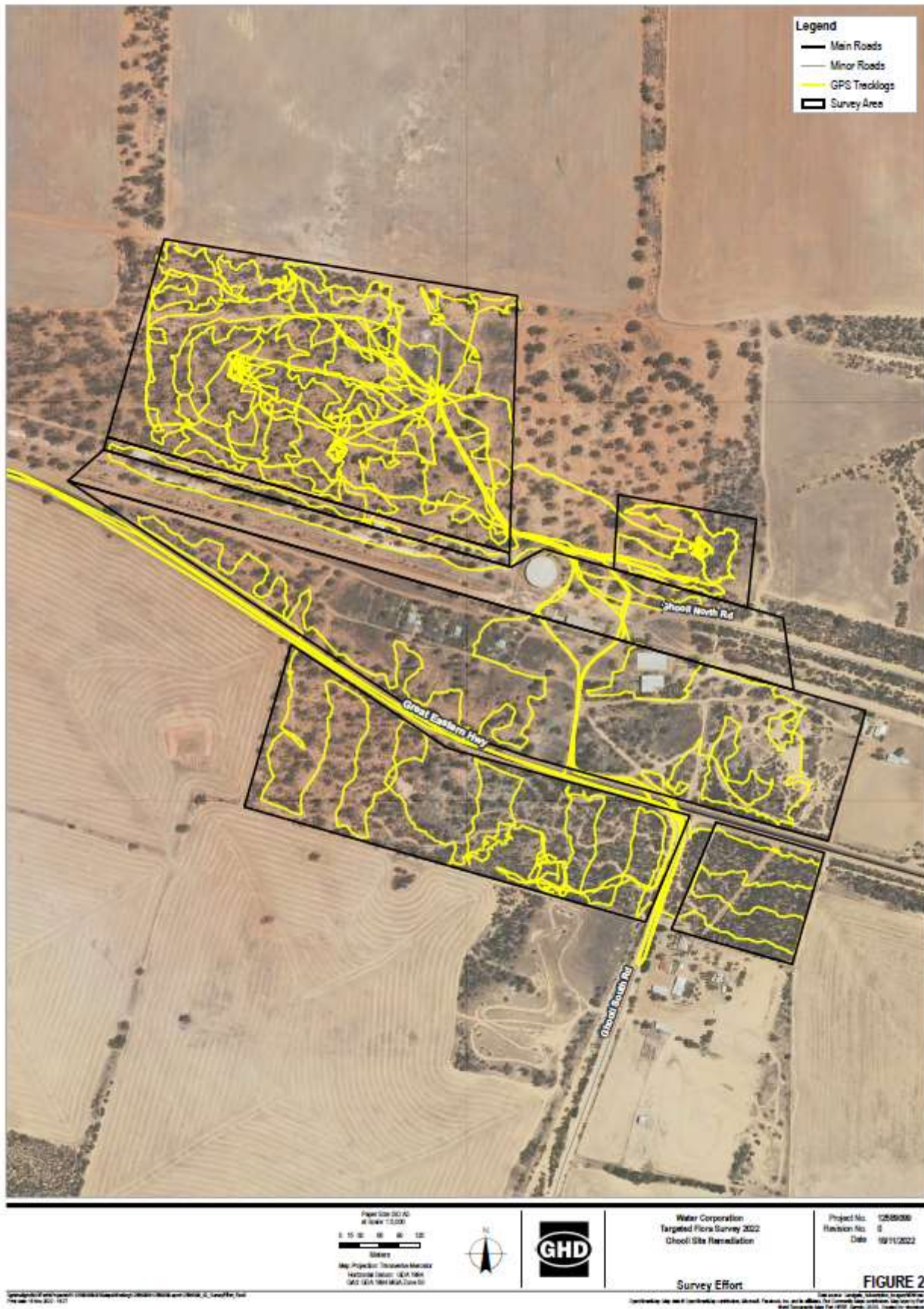


Figure 9: Survey Effort (GHD, 2022)

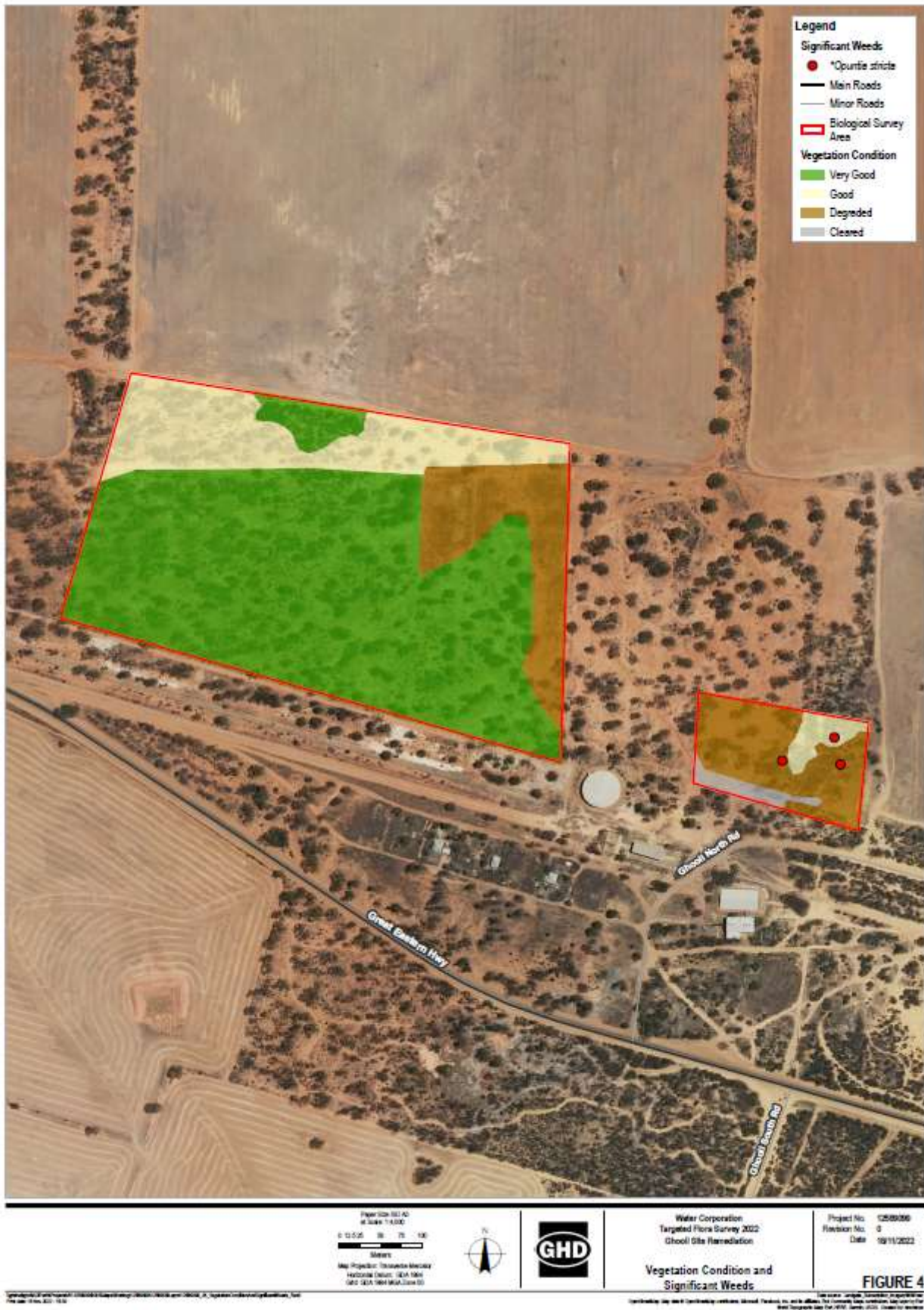


Figure 10: Vegetation Condition and Significant Weeds (GHD, 2022)

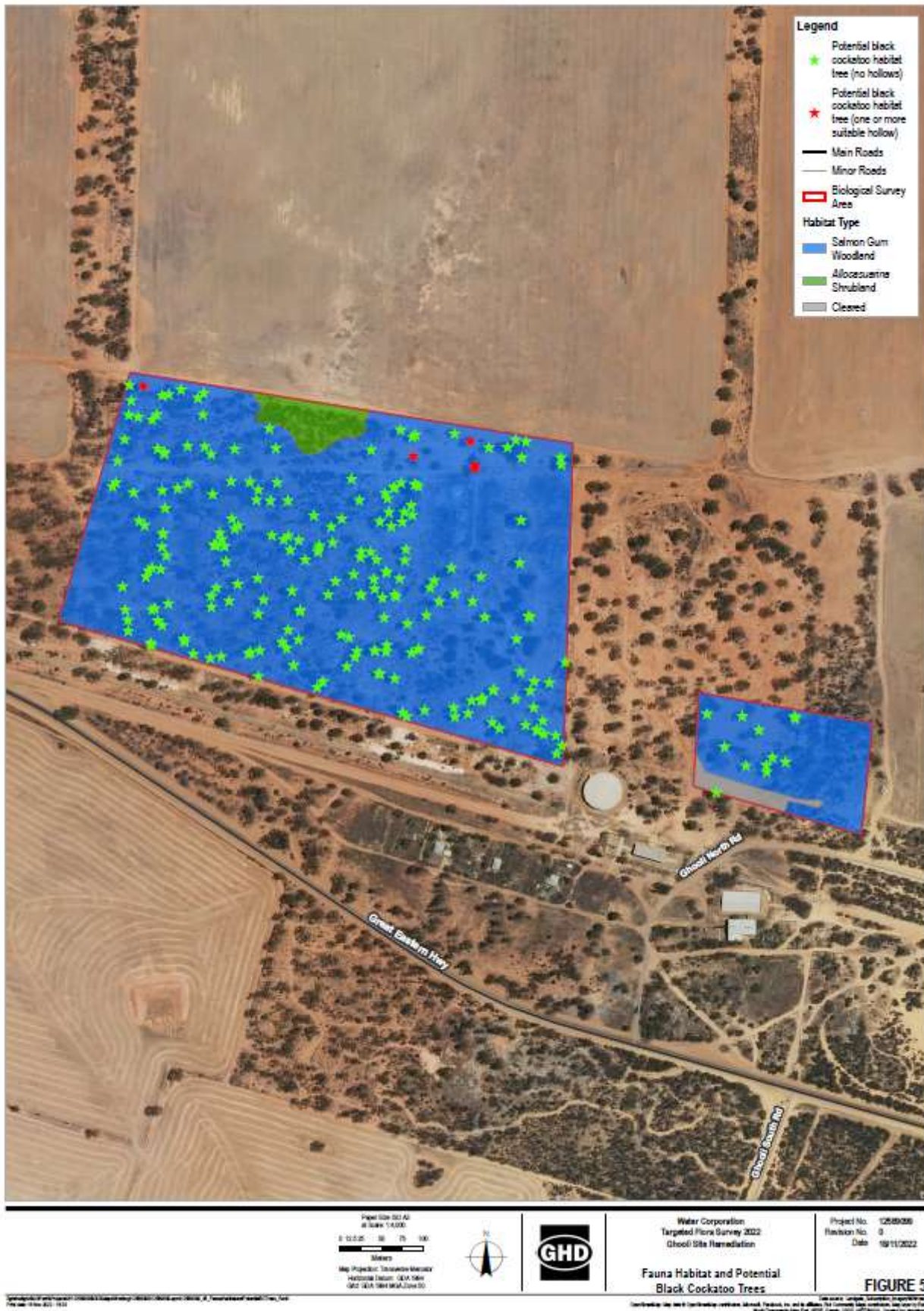


Figure 11: Fauna Habitat and Potential Black Cockatoo Trees (GHD, 2022)

Appendix G. Sources of information

G.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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