



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8953/2
Permit Holder:	BHP Iron Ore Pty Ltd
Duration of Permit:	28 November 2020 to 28 July 2028

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

- 1. Purpose for which clearing may be done**
Clearing for the purposes of geotechnical investigations and baseline surveys.
- 2. Land on which clearing is to be done**
Unallocated Crown Land (PIN 11455504), Newman
Lot 1563 on Deposited Plan 67603, Juna Downs
Lot 1580 on Deposited Plan 72910, Newman
- 3. Area of clearing**
The Permit Holder must not clear more than 30 hectares of native vegetation within the area cross-hatched yellow on attached Plan 8953/2(a).
- 4. Period during which clearing is authorised**
The Permit Holder must not clear any native vegetation after 21 June 2023.
- 5. Application**
This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

PART II – MANAGEMENT CONDITIONS

- 6. Avoid, minimise and reduce the impacts and extent of clearing**
In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in 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.
- 7. Weed control**
When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the 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; and
 - (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

8. Vegetation management – clearing not allowed

The Permit Holder must ensure that no clearing of native vegetation occurs within the areas cross-hatched red on attached Plan 8953/2(b) with the exception of minor access tracks only.

9. Vegetation management - watercourses

The Permit Holder must ensure that:

- (a) no clearing of *riparian vegetation* of any *watercourse* or *wetland* occurs within the drainage line habitat areas cross-hatched red on attached Plan 8953/2(c) with the exception of minor access tracks only.
- (b) no clearing of *riparian vegetation* occurs within 10 metres of the 13 waterbody locations listed in the attached Schedule 1 (waterbodies).

10. Fauna management – rocky ridge habitat

The Permit Holder must ensure that:

- (a) no clearing of native vegetation occurs within the gorge-gully and breakaway-cliff habitat areas cross-hatched red on attached Plan 8953/2(d) with the exception of minor access tracks only within the less precipitous inclines.
- (b) no clearing of native vegetation occurs within 10 metres of the six cave locations listed in the attached Schedule 2 (caves).

11. Fauna management – avoidance of priority fauna

The Permit Holder must ensure that:

- (a) No clearing of native vegetation to occur within 10 metres of the known locations of the Western Pebble-mound Mouse (*Pseudomys chapmani*) listed in the attached Schedule 3 (western pebble-mound mouse), unless unavoidable.
- (b) Where unavoidable, clearing of no more than 20 per cent of Western Pebble-mound Mouse (*Pseudomys chapmani*) mounds listed in the attached Schedule 3 (western pebble-mound mouse) is to occur.

12. Fauna management - backfilling

The Permit Holder must:

- (a) cover all boreholes at the end of each day and backfill upon completion; and
- (b) backfill all test pits on the day of drilling/excavating with excavated material.

13. Fauna management – time of clearing

The Permit Holder must undertake all activities authorised under this Permit during day time hours; i.e. between 6 am and 6 pm.

14. Flora management – avoidance of priority flora

The Permit Holder must ensure that:

- (a) No clearing of native vegetation to occur within 10 metres of the known locations of the three Priority flora taxa listed in the attached Schedule 4 (priority flora), unless unavoidable.
- (b) Where unavoidable, clearing of:
 - (i) no more than 20 per cent of individual *Goodenia nuda* plants from each of the known locations listed in the attached Schedule 4 (priority flora) is to occur;
 - (ii) no more than 20 per cent of individual *Rostellularia adscendens* var. *latifolia* plants from each of the known locations listed in the attached Schedule 4 (priority flora) is to occur; and
 - (iii) no more than 20 per cent of individual *Sida* sp. Barlee Range (S. van Leeuwen 1642) plants from each of the known locations listed in the attached Schedule 4 (priority flora) is to occur.

15. Retain vegetative material and topsoil, and rehabilitation

- (a) The Permit Holder must 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) The Permit Holder must within 6 months of undertaking the clearing authorised under this Permit, *revegetate* and *rehabilitate* the areas that are no longer required for the purpose for which they were cleared under this Permit by:
 - (i) re-shaping the surface of the land so that it is consistent with the surrounding 5 metres of uncleared land;
 - (ii) ripping the ground on the contour of boreholes and test pits to remove soil compaction; and
 - (iii) laying the vegetative material and topsoil retained under Condition 15(a) on the cleared area.
- (c) The Permit Holder must following the first wet season of laying the vegetative material and topsoil on the cleared area in accordance with condition 15(b) of this Permit:
 - (i) engage an *environmental specialist* to determine the species composition, structure and density of the vegetation of area revegetated and rehabilitated; and
 - (ii) engage an *environmental specialist* to make a determination as to whether the composition, structure and density determined under condition 15(c)(i) of this Permit will, without further revegetation, result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area.
- (d) if the determination made by the *environmental specialist* under condition 15(c)(ii) is that the species composition, structure, and density determined under condition 15(c)(i) will not, without further *revegetation*, result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, the Permit Holder must *revegetate* the area by deliberately *planting* and/or *direct seeding* native vegetation seeds that will result in a similar species composition, structure, and density of native vegetation to pre-clearing vegetation types in that area.
- (e) where additional *planting* or *direct seeding* of native vegetation is undertaken in accordance with condition 15(d), the Permit Holder must repeat the activities required by condition 15(c) and 15(d) within 12 months of undertaking the additional *planting* or *direct seeding* of native vegetation.
- (f) Where a determination is made by an *environmental specialist* under condition 15(c)(ii) that the composition, structure and density within areas *revegetated* and *rehabilitated* will result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, that determination shall be submitted to the *CEO* within three months of the determination being made by the *environmental specialist*.
- (g) During the next *optimal time* occurring after receiving notice from the *CEO*:
 - (i) stating that the *CEO* disagrees with the determination submitted under condition 15(f); and
 - (ii) specifying the required further *planting* of *local provenance* propagating material and/or *direct seeding* of *local provenance* seeds that in the *CEO's* reasonable opinion are necessary to ensure that the native vegetation will result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, the Permit Holder must carry out the further *planting* and/or *direct seeding* specified in the notice.

PART III - RECORD KEEPING AND REPORTING

16. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

- (a) In relation to the clearing of native vegetation authorised under this Permit:
 - (i) the species composition, structure and density of the cleared area;
 - (ii) 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;
 - (iii) the date that the area was cleared;
 - (iv) the times of day that the clearing was undertaken;
 - (v) the direction in which clearing was undertaken;
 - (vi) the size of the area cleared (in hectares);
 - (vii) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 6 of the Permit;
 - (viii) actions taken to minimise the risk of the introduction and spread of *weeds* in accordance with condition 7 of this Permit;

- (ix) evidence of backfilling all boreholes and test pits on the day of drilling/excavating in accordance with condition 12 of this Permit; and
- (b) In relation to the avoidance of priority fauna pursuant to condition 11 of this Permit:
 - (i) the date Pebble-mound Mouse (*Pseudomys chapmani*) mounds were cleared;
 - (ii) the number Pebble-mound Mouse (*Pseudomys chapmani*) mounds cleared;
 - (iii) the location of Pebble-mound Mouse (*Pseudomys chapmani*) mounds cleared recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; and
 - (iv) the reason that the clearing of Pebble-mound Mouse (*Pseudomys chapmani*) mounds was unavoidable.
- (c) In relation to the avoidance of priority flora pursuant to condition 14 of this Permit:
 - (i) the date Priority flora were cleared;
 - (ii) the Priority flora taxa and number of individuals cleared;
 - (iii) the location of Priority flora taxa cleared recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; and
 - (iv) the reason that the clearing of Priority flora taxa was unavoidable.
- (d) In relation to the revegetation and rehabilitation of areas pursuant to condition 15 of this Permit:
 - (i) the location of any areas revegetated and rehabilitated, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (ii) a description of the revegetation and rehabilitation activities undertaken; and
 - (iii) the size of the area revegetated and rehabilitated (in hectares).

17. Reporting

- (a) The Permit Holder must provide to the *CEO* on or before 01 October of each year, a written report:
 - (i) of records required under condition 16 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 July to 30 June of the preceding financial year.
- (b) If no clearing authorised under this Permit was undertaken between 1 July to 30 June of the preceding financial year, a written report confirming that no clearing under this permit has been carried out must be provided to the *CEO* on or before 01 October of each year.
- (c) Prior to 28 August 2027, the Permit Holder must provide to the *CEO* a written report of records required under condition 16 of this Permit where these records have not already been provided under condition 17(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

CEO means the Chief Executive Officer of the Department responsible for administering the clearing provisions under the *Environmental Protection Act 1986*;

direct seeding means a method of re-establishing vegetation through 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 fill a hollow;

local provenance means native vegetation seeds and propagating material from natural sources within 100 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared;

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;

optimal time means the period from November to December for undertaking direct seeding, and no planting without irrigation for undertaking planting;

planting means the re-establishment of vegetation by creating 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 local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area;

riparian vegetation has the meaning given to it in Regulation 3 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*;

watercourse has the meaning given to it in section 3 of the *Rights in Water and Irrigation Act 1914*;
wetland/s means an area of seasonally, intermittently or permanently waterlogged or inundated land, whether natural or otherwise, and includes a lake, swamp, marsh, spring, dampland, tidal flat or estuary;

weed/s means any plant -

- (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or
- (b) published in a Department of Biodiversity, Conservation and Attractions Regional Weed Rankings Summary, regardless of ranking; or
- (c) not indigenous to the area concerned;

wetland/s means an area of seasonally, intermittently or permanently waterlogged or inundated land, whether natural or otherwise, and includes a lake, swamp, marsh, spring, dampland, tidal flat or estuary.



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

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

3 September 2021

SCHEDULE 1 (waterbodies)

Biologic (2018) Ministers North to Yandi Corridor Two Phase Targeted Fauna Survey BHP WAIO
October 2018.

Waterbodies

Site	Lat	Long
MNY-WB-01	-22.8112	119.1134
MNY-WB-02	-22.7683	119.0433
MNY-WB-03	-22.7824	119.0643
MNY-WB-04	-22.8109	119.1148
MNY-WB-05	-22.8105	119.115
MNY-WB-06	-22.7815	119.0636
MNY-WB-07	-22.7822	119.0644
MNY-WB-08	-22.7825	119.0655
MNY-WB-09	-22.7824	119.0642
MNY-WB-10	-22.8133	119.1162
MNY-WB-11	-22.8126	119.1161
MNY-WB-12	-22.8133	119.1161
MNY-WB-13	-22.8111	119.1163

SCHEDULE 2 (caves)

Biologic (2018) Ministers North to Yandi Corridor Two Phase Targeted Fauna Survey BHP WAIO
October 2018.

Caves

Site	Lat	Long
MNY.01	-22.8117	119.1236
MNY.02	-22.7925	119.1180
MNY.03	22.7916	119.1001
MNY.04	-22.7959	119.0976
MNY.05	-22.8086	119.1138
MNY.06	-22.8080	119.1099

SCHEDULE 3 (western pebble-mound mouse)

Biologic (2018) Ministers North to Yandi Corridor Two Phase Targeted Fauna Survey BHP WAIO
October 2018.

Western Pebble-mound Mouse

Taxon	x coord	y coord
<i>Pseudomys chapmani</i>	715491.3	7477944.3
<i>Pseudomys chapmani</i>	715508.7	7477952.7
<i>Pseudomys chapmani</i>	713163.9	7479900.1
<i>Pseudomys chapmani</i>	713171.3	7479994.9
<i>Pseudomys chapmani</i>	710239.5	7481673.2
<i>Pseudomys chapmani</i>	715426.1	7477935.1
<i>Pseudomys chapmani</i>	715503.5	7477924.3
<i>Pseudomys chapmani</i>	715499.5	7477925.0
<i>Pseudomys chapmani</i>	710855.3	7479901.8
<i>Pseudomys chapmani</i>	718043.9	7476920.2
<i>Pseudomys chapmani</i>	713175.0	7479967.5
<i>Pseudomys chapmani</i>	715427.8	7477939.0
<i>Pseudomys chapmani</i>	710324.2	7481568.9
<i>Pseudomys chapmani</i>	715843.4	7478324.4
<i>Pseudomys chapmani</i>	716112.8	7477284.7

SCHEDULE 4 (priority flora):

Onshore Environmental (2018) Ministers North to Yandi Corridor Flora and Vegetation Survey
Prepared for BHP Western Australia Iron Ore 13 December 2018.

Priority Flora Taxa

Taxon	Site	No.	x coord	y coord
<i>Goodenia nuda</i>	2MNY-131	10	714171.1	7479395.0
<i>Goodenia nuda</i>	2MNY-129	11	714148.5	7479491.4
<i>Goodenia nuda</i>	2MNY-133	2	714098.7	7479361.0
<i>Goodenia nuda</i>	2MNY-132	3	714150.2	7479369.5
<i>Goodenia nuda</i>	2MNY-143	5	713185.0	7478810.0
<i>Goodenia nuda</i>	2MNY-142	7	713216.5	7478830.6
<i>Goodenia nuda</i>	2MNY-146	3	713121.7	7478665.8
<i>Goodenia nuda</i>	2MNY-144	2	713157.7	7478789.0
<i>Goodenia nuda</i>	MNY-06	3	714406.0	7479846.0
<i>Goodenia nuda</i>	MNY-14	2	717883.0	7477255.0
<i>Goodenia nuda</i>	MNY-08	2	712812.0	7478642.0
<i>Goodenia nuda</i>	2MNY-126	5	714186.3	7479621.9
<i>Goodenia nuda</i>	PO-1032	31	712782.6	7478530.3
<i>Goodenia nuda</i>	2MNY-128	25	714165.0	7479530.0
<i>Goodenia nuda</i>	2MNY-127	8	714152.0	7479525.0
<i>Goodenia nuda</i>	2MNY-157	15	712786.8	7478581.9
<i>Goodenia nuda</i>	2MNY-156	2	712786.8	7478581.9
<i>Goodenia nuda</i>	2MNY-159	3	712569.3	7478459.4
<i>Goodenia nuda</i>	2MNY-158	12	712569.3	7478459.4
<i>Goodenia nuda</i>	2MNY-161	5	712634.7	7478606.2
<i>Goodenia nuda</i>	2MNY-160	37	712634.7	7478606.2
<i>Goodenia nuda</i>	2MNY-163	5	712703.7	7478644.0
<i>Goodenia nuda</i>	2MNY-162	23	712703.7	7478644.0
<i>Goodenia nuda</i>	2MNY-149	11	712989.4	7478628.9
<i>Goodenia nuda</i>	2MNY-148	7	712989.4	7478628.9
<i>Goodenia nuda</i>	2MNY-151	2	712917.3	7478611.4
<i>Goodenia nuda</i>	2MNY-150	15	712917.3	7478611.4
<i>Goodenia nuda</i>	2MNY-153	7	712876.3	7478619.4
<i>Goodenia nuda</i>	2MNY-152	8	712876.3	7478619.4
<i>Goodenia nuda</i>	2MNY-155	2	712836.9	7478616.3
<i>Goodenia nuda</i>	2MNY-154	2	712836.9	7478616.3
<i>Goodenia nuda</i>	2MNY-184	1	714473.5	7479475.7
<i>Goodenia nuda</i>	2MNY-182	5	714675.6	7479720.2
<i>Goodenia nuda</i>	2MNY-186	4	714473.0	7479495.0
<i>Goodenia nuda</i>	2MNY-185	4	714473.0	7479475.0
<i>Goodenia nuda</i>	2MNY-189	1	714472.0	7479585.0
<i>Goodenia nuda</i>	2MNY-188	6	714473.0	7479525.0
<i>Goodenia nuda</i>	2MNY-191	6	714472.0	7479625.0
<i>Goodenia nuda</i>	2MNY-190	3	714472.0	7479610.0
<i>Goodenia nuda</i>	2MNY-170	32	712745.4	7478805.9
<i>Goodenia nuda</i>	2MNY-168	14	712729.9	7478800.5
<i>Goodenia nuda</i>	2MNY-175	2	713731.7	7478950.8
<i>Goodenia nuda</i>	2MNY-174	13	713731.7	7478950.8
<i>Goodenia nuda</i>	2MNY-178	3	713745.6	7478963.5
<i>Goodenia nuda</i>	2MNY-177	2	713745.6	7478963.5
<i>Goodenia nuda</i>	2MNY-181	3	714675.6	7479720.2
<i>Goodenia nuda</i>	2MNY-180	6	713971.1	7479172.6
<i>Goodenia nuda</i>	2MNY-194	9	714472.5	7479643.7
<i>Goodenia nuda</i>	2MNY-192	4	714472.0	7479643.0
<i>Goodenia nuda</i>	2MNY-198	11	717617.2	7477003.2
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	MNY-11	50	716600.0	7477636.0
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	MNY-08	12	712812.0	7478642.0
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	RMN-07	70	713460.0	7478888.0

Taxon	Site	No.	x coord	y coord
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	RMN-05	50	713802.0	7479188.0
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-137	1	713746.9	7479177.6
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-136	2	713781.3	7479188.2
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-169	25	712729.9	7478800.5
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-138	3	713655.2	7479110.6
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-93	5	709693.4	7481671.1
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-171	15	712745.4	7478805.9
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-102	4	709822.7	7481244.7
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-100	7	709703.2	7481264.8
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-104	1	709841.3	7481227.8
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-103	1	709822.7	7481244.7
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-118	2	709817.7	7481124.7
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-117	9	709776.4	7481114.2
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-135	15	713805.3	7479193.4
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	2MNY-120	5	709681.8	7481578.9
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	MNY-07	3	713498.0	7478928.0
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-09	2	717124.1	7475915.4
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	RMN-10	1	716584.0	7477616.0
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-11	3	717226.0	7475864.1
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-10	2	717178.7	7475907.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-13	6	717179.0	7475803.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-12	7	717213.5	7475825.5
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-19	4	717035.9	7475855.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-18	1	717056.5	7475857.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	MNY-26	8	715586.0	7476095.0
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	MNY-15	40	716475.0	7475875.0
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-32	2	716759.9	7475944.7
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-30	2	716849.3	7475969.2
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-34	8	716684.1	7475907.0
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-33	2	716682.7	7475927.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-36	1	716675.3	7475888.6
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-35	6	716666.1	7475850.0
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-38	4	716673.8	7476025.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-37	8	716653.7	7475936.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-22	3	716982.7	7475845.5
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-21	8	716984.4	7475839.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-24	4	716949.9	7475827.5
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-23	2	716958.6	7475836.6
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-27	5	716923.2	7475872.2
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-26	10	716928.2	7475864.7
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-29	1	716887.0	7475970.5
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-28	8	716909.5	7475872.4
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-51	4	715583.3	7476129.4
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-50	3	715574.4	7476105.6
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-53	7	715583.9	7476171.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-52	3	715585.3	7476149.7
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-55	2	715583.9	7476171.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-54	2	715583.9	7476171.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-62	2	715517.1	7475929.1
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-57	600	715641.0	7476575.4
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-40	2	716685.6	7476015.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-39	2	716680.6	7476023.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-43	3	715257.0	7475932.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-41	1	716699.2	7476010.1
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-46	5	715522.9	7475978.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-45	5	715515.9	7475964.2
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-48	2	715542.4	7476019.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-47	6	715533.5	7475999.1
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-74	1	716505.2	7475966.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-73	10	716505.2	7475966.8

Taxon	Site	No.	x coord	y coord
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-76	2	716503.6	7475974.2
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-75	8	716503.6	7475974.2
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-78	5	716487.6	7475931.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-77	20	716486.6	7475979.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-80	1	716502.8	7475916.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-79	35	716478.2	7475991.1
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-66	1	716583.5	7475937.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-65	1	716583.5	7475937.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-68	3	716569.8	7475936.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-67	10	716569.8	7475936.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-70	5	716537.5	7475947.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-69	8	716537.5	7475947.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-72	8	716517.0	7475951.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-71	12	716517.0	7475951.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-90	2	716460.6	7475836.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-89	3	716470.5	7475934.0
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-92	6	716504.7	7475929.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-91	2	716516.8	7475937.1
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-82	5	716492.2	7475894.9
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-81	25	716463.0	7476004.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-84	4	716485.1	7475874.7
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-83	6	716449.5	7476021.1
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-86	2	716472.9	7475858.3
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-85	6	716432.7	7476039.8
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-88	18	716465.8	7475845.5
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	2MNY-87	4	716453.4	7475932.4

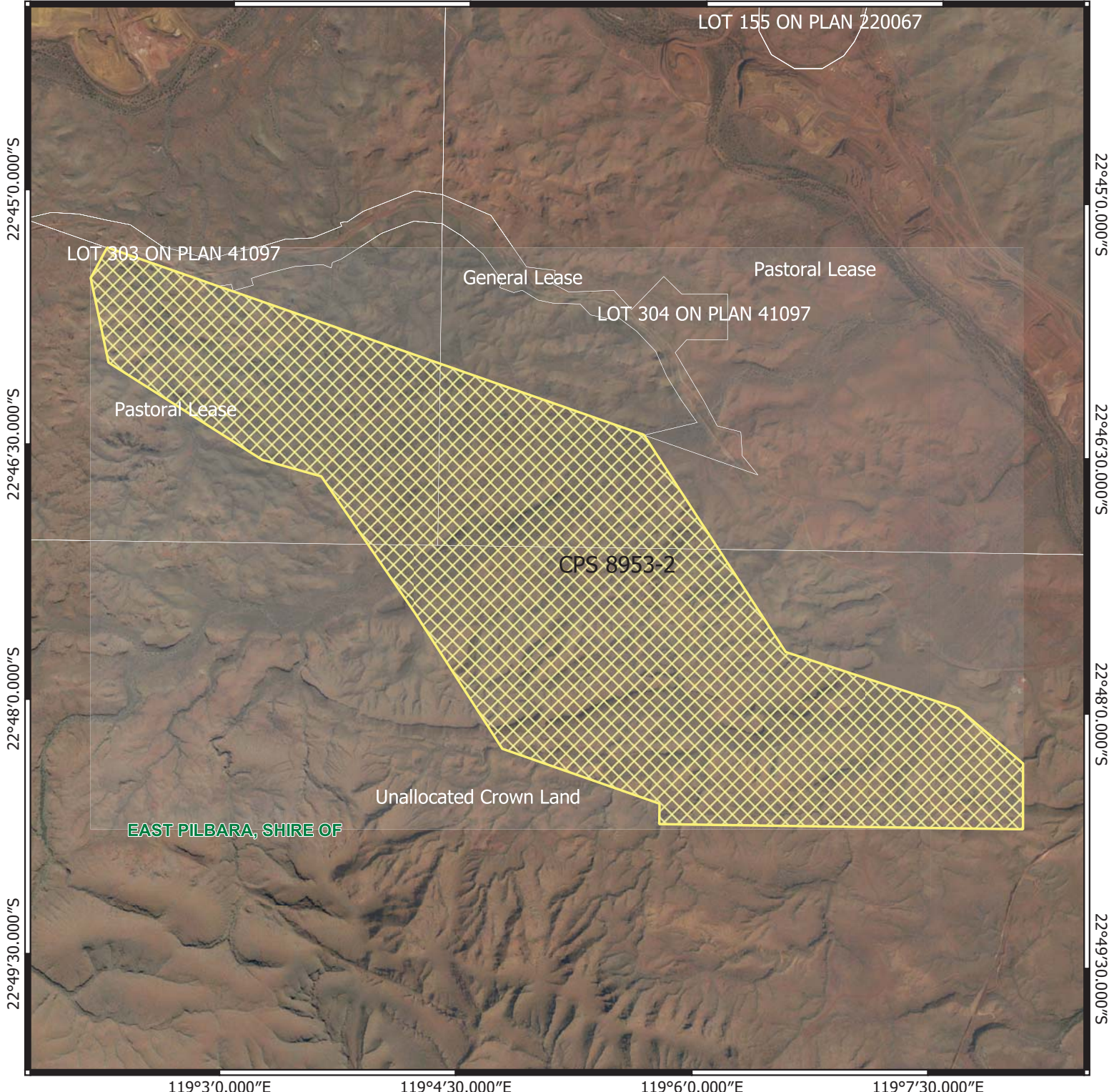
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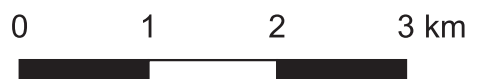
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Legend

-  CPS 8953-2
-  Cadastre - LGATE 218
-  Local Government Authority




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Officer delegated under section 20 of the
Environmental Protection Act 1986



MGA Zone 50
Geocentric Datum of Australia 1994

Plan 8953/2(b)

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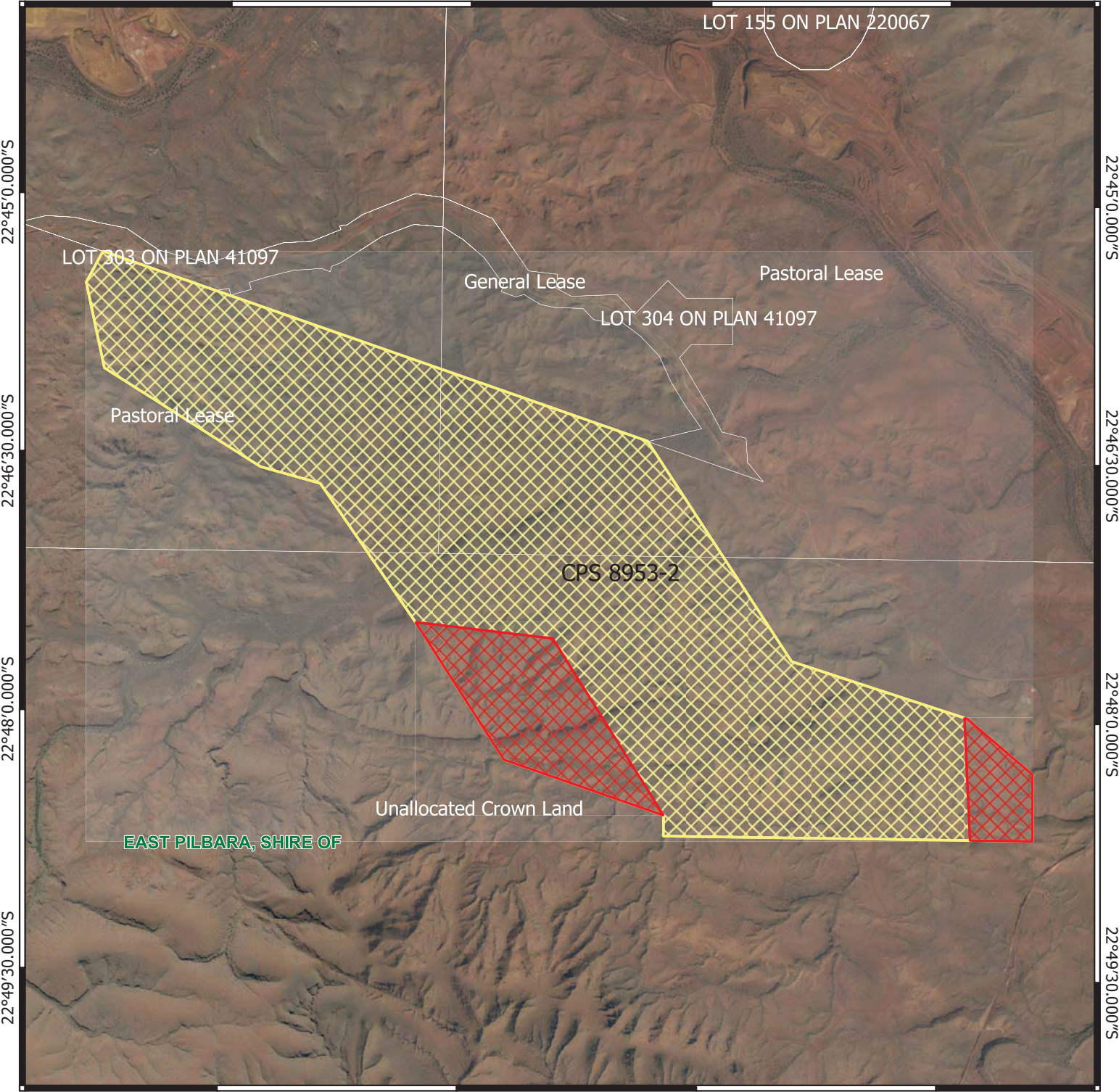
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EAST PILBARA, SHIRE OF

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Legend

 CPS 8953-2

 CPS 8953-2 - Unsurveyed Areas

Cadastre - LGATE 218

 Local Government Authority



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Environmental Protection Act 1986



GOVERNMENT OF
WESTERN AUSTRALIA

MGA Zone 50
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General Lease

LOT 303 ON PLAN 41097

General Lease

Pastoral Lease

Pastoral Lease

LOT 304 ON PLAN 41097


CPS 8953-2

Unallocated Crown Land

EAST PILBARA, SHIRE OF

Legend

 CPS 8953-2

 CPS 8953-2 - Major Drainage

Cadastre - LGATE 218

 Local Government Authority



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Environmental Protection Act 1986



GOVERNMENT OF
WESTERN AUSTRALIA

MGA Zone 50
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Plan 8953/2(d)

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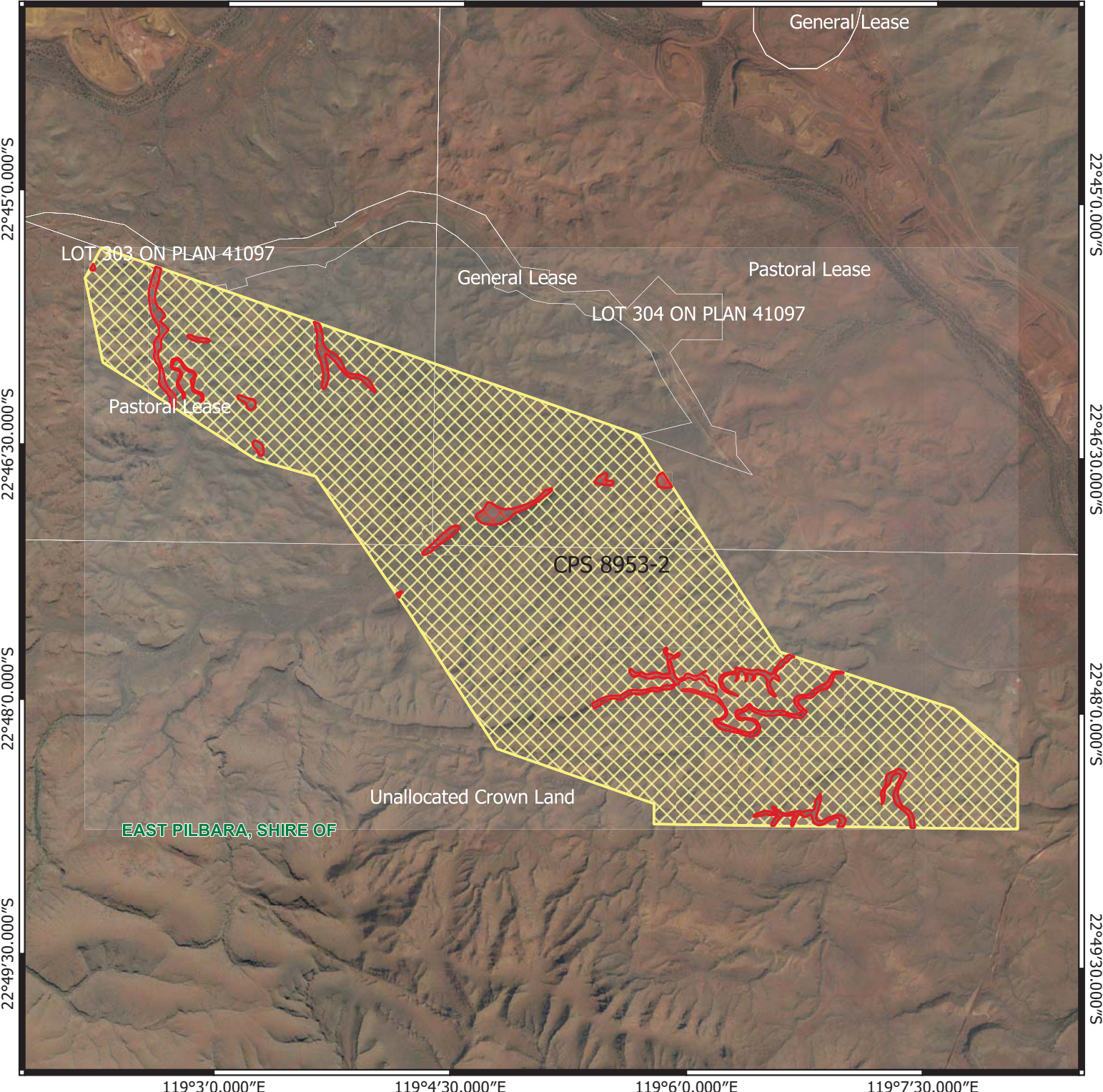
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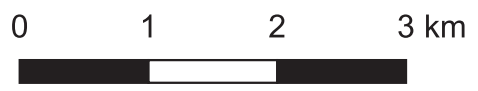
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EAST PILBARA, SHIRE OF

Legend

-  CPS 8953-2
-  CPS 8953-2 - Rocky Ridge-Breakaways
-  Cadastre - LGATE 218
-  Local Government Authority




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Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 8953/2
Permit type:	Purpose permit
Applicant name:	BHP Iron Ore Pty Ltd
Application received:	20 August 2021
Application area:	30 hectares of native vegetation
Purpose of clearing:	Geotechnical investigations
Method of clearing:	Mechanical removal
Property:	Unallocated Crown Land (PIN 11455504), Newman Lot 1563 on Deposited Plan 67603, Juna Downs Lot 1580 on Deposited Plan 72910, Newman
Location (LGA area/s):	Shire of East Pilbara
Localities (suburb/s):	Newman

1.2. Description of clearing activities

BHP Iron Ore Pty Ltd (BHP) has identified the need to undertake geotechnical and baseline surveys within a corridor area between the Yandi Mine Site tenement and the Ministers North tenement. The application area is located directly south of BHP's existing Yandi mining operations. BHP is seeking to clear up to 30 hectares within a 2,363 hectare application area. The proposed clearing consists of the formation of access tracks and drill pads or excavation areas required for geotechnical survey.

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	3 September 2021
Decision area:	30 hectares of native vegetation as depicted in Section 1.5, below.

1.4. Reasons for decision

On 5 November 2020, Purpose Permit CPS 8953/1 was granted to BHP Iron Ore Pty Ltd to clear 30 hectares of native vegetation within a 2,363 hectare application area within Lot 1563 on Deposited Plan 67603, Juna Downs, Lot 1580 on Deposited Plan 72910 and Unallocated Crown Land (PIN 11455504), Newman, for the purpose of undertaking geotechnical investigations.

One appeal was lodged against the conditions of Purpose Permit CPS 8953/1. This clearing permit amendment gives effect to the determination of the Western Australian Minister for Environment (Minister) that the decision to grant the permit was justified, but to allow the appeal to the extent that conditions be amended so that:

- Condition 11 be clarified that "not more than 20% of Western pebble-mound mouse mounds be cleared";
- Condition 14 be amended to authorise clearing of not more than 20% of individual plants for each Priority flora species as listed in Schedule 4; and that
- additional record-keeping and reporting condition to capture impacts and reasons for unavoidable impacts to Priority species.

During the intervening period a name change has occurred whereby the name BHP Billiton Iron Ore Pty Ltd has been changed to BHP Iron Ore Pty Ltd (with no change to the associated Australian Company Number). This amendment also gives effect to company name change.

Given the above, the Delegated Officer decided to grant a clearing permit to reflect the Minister's determination, and to update the revised company name on relevant documents. The change of company name and amended and additional conditions have been imposed on the permit to reflect this. The assessment has not changed since the assessment for CPS 8953/1.

1.5. Site map

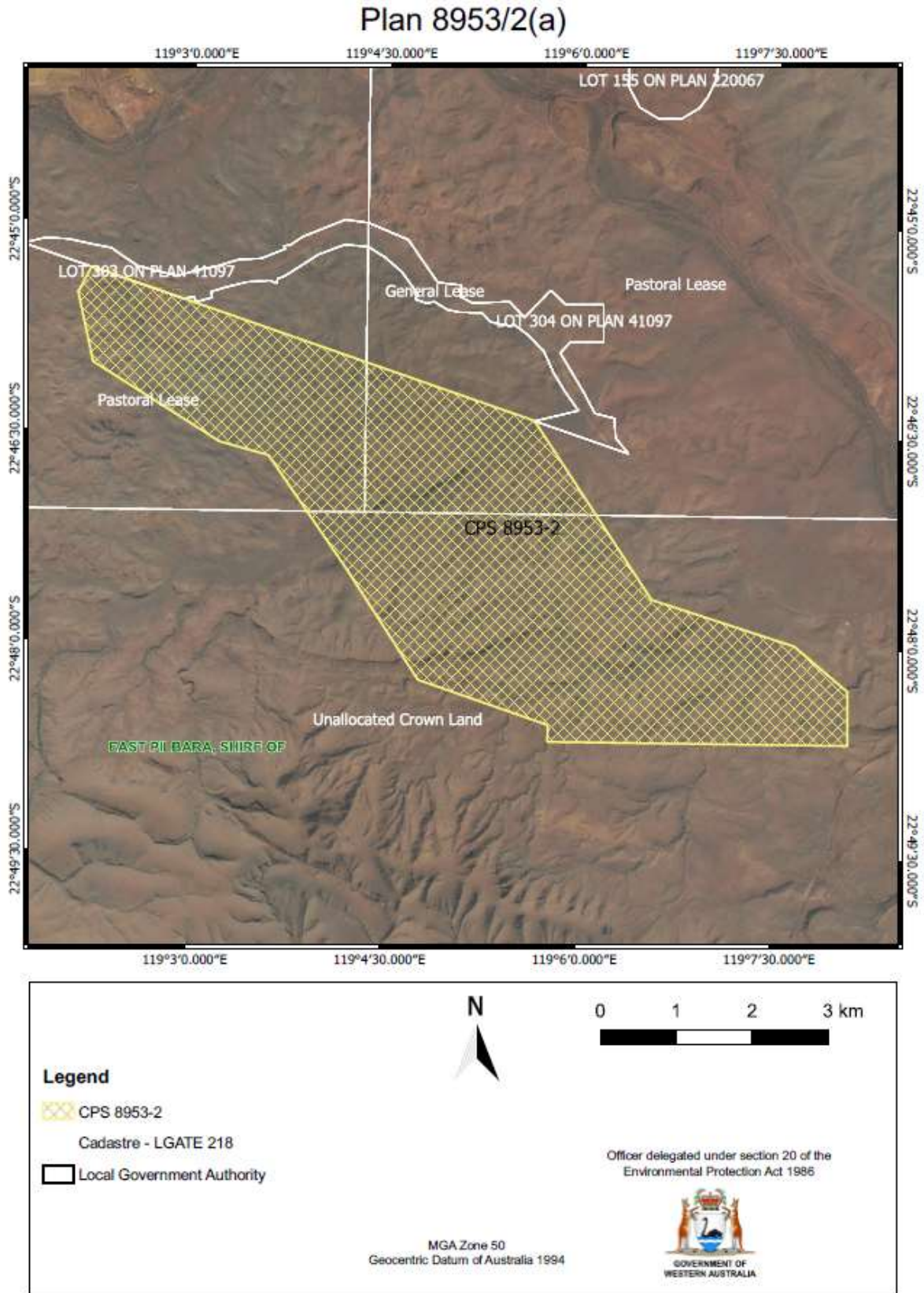


Figure 1. Map of the application area. The area cross-hatched yellow indicates the area within which conditional authorised clearing can occur under the granted clearing permit.

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 1.3), 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; and
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Biodiversity Conservation Act 2016* (BC Act);
- *Rights in Water and Irrigation Act 1914* (RIWI Act); and
- *Land Administration Act 1997* (LAA).

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER December 2014);
- *Procedure: Native vegetation clearing permits* (DWER October 2019);
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a); and
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA 2016b).

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

Evidence was submitted by the applicant demonstrating the recognition and avoidance of key habitat features and species locations within the application area (BHP 2020a).

Over 88 per cent of the application area has been surveyed (2,090 hectares) (Biologic 2018; Onshore Environmental 2018). No disturbance will occur in unsurveyed areas, other than that required for the construction of access tracks to allow for additional surveys to be undertaken. Identified locations of Priority flora species will be avoided with a 10 metre buffer wherever practicable. Similarly, active mounds of the Priority 4 Western Pebble-mound Mouse will also be avoided with a 10 metre buffer wherever practicable.

No caves will be disturbed and disturbance to Gorge–Gully habitat and Breakaway–Cliff habitat will be avoided and only considered for the purpose of access tracks. If no other alternatives are available, clearing for access tracks will be restricted to the less precipitous areas of these habitat types and avoid breakaways and caves. Disturbance to Major Drainage Line habitat will be minimised and will only be for the purpose of access tracks, and identified semi-permanent waterbodies will be avoided with a 10 metre buffer. Where crossings of Major Drainage Line habitat are unavoidable, clearing will be kept to a minimum with crossings constructed level to the surface to maintain natural surface flows (BHP 2020a).

Control of weed populations will be undertaken according to specific BHP management procedures and revegetation of all cleared areas will be undertaken upon conclusion of the purpose of the clearing (BHP 2020a).

Information provided by the applicant adequately demonstrates that all reasonable efforts have been taken to avoid and minimise potential impacts of the clearing on environmental values.

3.2. Assessment of environmental impacts

In assessing the application in accordance with section 51O of the EP Act, the Delegated Officer has examined the application and site characteristics (Appendix B), and considered whether the clearing poses a risk to environmental values. The assessment against the Clearing Principles is contained in Appendix C.

This assessment identified that the clearing may pose a risk to the environmental values of Priority flora and fauna, fauna habitats, and riparian vegetation and that these required further consideration. The detailed consideration and assessment of the clearing impacts against the specific environmental values is provided below. Where the assessment found that the clearing presents a risk to environmental values, conditions aimed at controlling and/or ameliorating the impacts have been imposed under sections 51H and 51I of the EP Act. These are also identified below.

3.2.1. Environmental value: biological values (flora) – Clearing Principles (a) to (d)

Assessment: Detailed flora and vegetation surveys over a large component of the application area were undertaken by Onshore Environmental in October 2017 and May 2018 (Onshore Environmental 2018). Twelve vegetation associations, classified into seven broad floristic formations, were described and mapped (see Appendix B1 and Appendix E1). Six of the 12 vegetation associations constituted *Triodia* Hummock Grasslands thereby forming the seven broad floristic formations. Vegetation condition was rated as Excellent across 97 per cent of the area surveyed by Onshore Environmental (2018), with a smaller area along the major drainage lines rated as Very Good. Very minor areas of exploration access tracks in the south-east corner of the application area were rated as completely degraded.

None of the vegetation associations identified by Onshore Environmental (2018) were aligned with any Federally-listed Threatened Ecological Communities (TECs), or those communities endorsed by the Western Australian Minister for Environment. Six state-listed Priority Ecological Communities (PECs) occur within 50 kilometres of the application area, with the closest being the Weeli Wolli Spring Community (P1). None of the vegetation associations were aligned with any of these PECs, or any other PEC, and all vegetation associations described were well-represented regionally.

Onshore Environmental (2018) considered one of the 12 vegetation associations to have an elevated local significance as it supports groundwater dependent species. That is, the Open Forest of *Eucalyptus camaldulensis* and *Eucalyptus victrix* over Sedges of *Cyperus vaginatus* and Open Tussock Grassland of *Sorghum plumosum*, *Themeda triandra* and *Eulalia aurea* on brown sand on major drainage lines. This association occurs over just 1.47 hectares (or 0.07 per cent of the application area) in one area in the south-western end of the application area.

Three Threatened flora taxa occur within the Pilbara bioregion: *Aluta quadrata* (EN), *Pityrodia* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) (EN) and *Thryptomene wittweri* (VU) (WAH 1998-). None of these species have been recorded within 50 kilometres of the application area and no Threatened flora taxa were recorded by the surveys of Onshore Environmental (2018).

Thirty-one Priority flora taxa have been recorded within a 50 kilometre radius of the application area. None of the 31 Priority flora species had previously been recorded within the application area. Three Priority flora taxa were recorded within the application area (see Appendix B2 and Appendix E3) by the surveys of Onshore Environmental (2018):

- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 3);
- *Rostellularia adscendens* var. *latifolia* (Priority 3); and
- *Goodenia nuda* (Priority 4).

An additional five Priority taxa were considered likely to occur by Onshore Environmental (2018): *Eremophila* sp. Hamersley Range (K. Walker KW 136) (P1), *Aristida lazaridis* (P2), *Ipomoea racemigera* (P2), *Amaranthus centralis* (P3), and *Lepidium catapycnon* (P4). None of the plant taxa recorded from the study area were considered to be range extensions (Onshore Environmental 2018).

Many of the Priority flora records occur within, or adjacent to, the three large un-named drainage lines in the north-west, central, and south-east areas of the application area (Appendix E3). BHP have provided avoidance and minimisation measures (section 3.1). Known Priority flora locations will be avoided wherever possible, and disturbance to Gorge-Gully habitat and Major Drainage Line habitats will be minimised.

Proposed clearing area does not represent a significant impact to conservation flora, and the applicant's commitment to undertake avoidance, minimisation and revegetation strategies will result in no long-term impacts to native vegetation, ecological communities or Threatened or Priority flora taxa.

Outcome: Based on the above assessment, and the avoidance and mitigation measures provided by BHP (Section 3.1), the Delegated Officer has determined that the proposed clearing requires management conditions in relation to this environmental value.

Conditions: To address the above impacts, the following conditions will be added to the permit:

- No clearing of native vegetation within unsurveyed areas, other than for the construction of access tracks to allow for additional ecological surveys to be undertaken.
- Avoidance of all known Priority flora locations wherever practicable.
- Where unavoidable, clearing of no more than 20 per cent of the known locations within the application area of any of the three known Priority flora taxa.
- Avoidance and minimisation of impacts to Gorge-Gully habitat and Breakaway-Cliff habitat, with any clearing restricted to the formation of access tracks only in the less precipitous areas.
- Avoidance and minimisation of impacts to Major Drainage Line habitat, with any clearing restricted to the formation of access tracks only.
- Avoidance of identified semi-permanent waterbodies.
- The implementation of weed management strategies.

- Revegetation of all cleared areas upon conclusion of the purpose of the proposed clearing.

3.2.2. **Environmental value: biological values (fauna) – Clearing Principle (b)**

Assessment: Available fauna data sets and relevant reports were reviewed by Biologic (2018) to determine vertebrates of conservation significance occurring within the vicinity of the application area. Eight mammals, 16 birds, and four reptiles were assessed as to their likelihood of occurrence within the habitats of the application area. Of these, two were recorded (Appendix B2 and Appendix E6):

- Western Pebble-mound Mouse (*Pseudomys chapmani*) (P4); and
- Peregrine Falcon (*Falco peregrinus*) (OS).

Three vertebrates of conservation significance were considered likely to occur:

- Pilbara Olive Python (*Liasis olivaceus barroni*) (VU);
- Pilbara Flat-headed Blindsnake (*Anilius ganei*) (P1); and
- Pilbara Barking Gecko (*Underwoodisaurus seorsus*) (P2).

The 'locally-significant' Chocolate Wattled Bat (*Chalinolobus morio*) was also assessed as likely to occur (Biologic 2018).

An additional four mammals and two birds were considered to possibly occur (Biologic 2018):

- Northern Quoll (*Dasyurus hallucatus*) (EN);
- Pilbara Leaf-nosed Bat (*Rhinonictoris aurantia*) (VU);
- Ghost Bat (*Macroderma gigas*) (VU);
- Short-tailed Mouse (*Leggadina lakedownensis*) (P4);
- Grey Falcon (*Falco hypoleucos*) (VU); and
- Osprey (*Pandion haliaetus*) (Mi).

Seven fauna habitat types were identified by Biologic (2018); including Basalt Outcrop, Breakaway-Cliff, Gorge-Gully, Hillcrest-Hillslope, Major Drainage Line, Minor Drainage Line and Drainage Area-Floodplain (Appendix E4). The application area predominantly consists of Hillcrest-Hillslopes habitat, representing over 76 per cent of the area surveyed by Biologic (2018), with Major Drainage Lines incorporating less than two per cent. The rocky outcrop habitats of Gorge-Gully and Breakaway-Cliff also incorporated less than two per cent of the area surveyed by Biologic (2018) (Appendix E4).

The most significant fauna habitat types over the application area are the Gorge-Gully and Major Drainage Line habitats as these are the most likely to support species of conservation significance (Biologic 2018) including; Pilbara Olive Python, Northern Quoll, Peregrine Falcon, Pilbara Barking Gecko, and all three bat species of conservation significance. Thirteen water features and six caves were also identified by Biologic (2018) that potentially support significant fauna species.

BHP have provided avoidance and minimisation measures (section 3.1). All caves, water features, and significant breakaway overhangs will be avoided and disturbance to Gorge-Gully and Major Drainage Line habitats minimised.

Proposed clearing area does not represent a significant loss of potential habitat to vertebrate species of conservation significance. The applicant's commitment to undertake avoidance, minimisation and revegetation strategies will result in no long-term impacts to native vegetation and habitat for Threatened and Priority fauna species.

Outcome: Based on the above assessment, and the avoidance and mitigation measures provided by BHP (Section 3.1), the Delegated Officer has determined that the proposed clearing requires management conditions in relation to this environmental value.

Conditions: To address the above impacts, the following conditions will be added to the permit:

- No clearing of native vegetation within unsurveyed areas, other than for the construction of access tracks to allow for additional surveys to be undertaken.
- Avoidance and minimisation of impacts to Gorge-Gully habitat and Breakaway-Cliff habitat with any clearing restricted to the formation of access tracks only in less precipitous areas, and avoidance of breakaways and caves.
- Avoidance of identified semi-permanent waterbodies.
- Avoidance and minimisation of impacts to Major Drainage Line habitat, with any clearing restricted to the formation of access tracks only.
- Avoidance of identified active Western Pebble-mound Mouse mounds.
- The implementation of weed management strategies.
- Revegetation of all cleared areas upon conclusion of the purpose of the proposed clearing.

3.2.3. Environmental value: land and water resources – Clearing Principles (f), (g), (i), and (j).

Assessment: Rainfall in the region is highly variable often resulting from heavy downpours from cyclonic events and localised thunderstorms (van Vreeswyk *et al.*, 2004). Whilst temporary localised flooding can occur following heavy rainfall events, the proposed clearing is not likely to increase the incidence or intensity of natural flooding events. However, due to the topography that includes ironstone mesa crests that fringe the major drainage lines, and cliff lines and breakaways, the construction of access tracks over the steeper sections of the application area has the potential to cause localised land degradation via water erosion. The appropriate placement of access tracks coupled with the installation of table drains can ameliorate this potential impact.

The application area is dissected by three un-named large watercourses with numerous smaller ephemeral tributaries draining into these watercourses. Thirteen water features were recorded during the surveys of Biologic (2017 and 2018) and two significant semi-permanent waterbodies in particular have been identified. Riparian vegetation is associated with these watercourses, including *Eucalyptus camaldulensis* and *Eucalyptus victrix*.

Due to the purpose of the clearing, any deterioration in the quality of groundwater is unlikely. The three un-named large watercourses, with numerous smaller ephemeral tributaries over the application area are potentially impacted by clearing, as is the riparian vegetation associated with the watercourses. The commitment of the applicant to minimise disturbance to Major Drainage Line habitat and avoid all semi-permanent waterbodies will minimise impacts.

Outcome: Based on the above assessment, and the avoidance and mitigation measures provided by BHP (Section 3.1), the Delegated Officer has determined that the proposed clearing requires management conditions in relation to this environmental value.

Conditions: To address the above impacts, the following conditions will be added to the permit:

- No clearing of native vegetation within unsurveyed areas, other than for the construction of access tracks to allow for additional ecological surveys to be undertaken.
- Avoidance and minimisation of impacts to Major Drainage Line habitat with any clearing restricted to the formation of access tracks only.
- Avoidance of identified semi-permanent waterbodies.
- Revegetation of all cleared areas upon conclusion of the purpose of the proposed clearing.

3.3. Relevant planning instruments and other matters

Tenure over the application area was applied for under a section 91 (s91) licence application under the *Land Administration Act 1997* (Department of Planning, Lands and Heritage [DPLH] Case 2001263). The application area is located within:

- Marillana Pastoral Station N050368 held by Pilbara Pastoral Company Pty Limited, BHP Billiton Minerals Pty Ltd, Itochu Minerals and Energy of Australia Pty Ltd and Mitsui-Itochu Iron Pty Ltd;
- Juna Downs Pastoral Station N050471 held by Juna Station Pty Ltd;
- Mining Lease 274SA held by Hamersley Iron - Yandi Pty Limited;
- Unallocated Crown Land.

A s91 licence under the *Land Administration Act 1997* was issued to BHP on 30 October 2020 (Licence: 00202/2020 A 11019679). The s91 licence has a 12 month term, with an additional term option of 12 months (BHP 2020b). The duration of clearing will be set at 24 months on the clearing permit to align with the s91 licence.

The application area is located within the EPA's Ministerial boundary for BHP's Pilbara Expansion Strategic Proposal (Ministerial Statement 1105) that identifies and assesses how impacts to the environment at a landscape scale will be managed. A portion of the application area in the east also intersects the EPA's Ministerial boundary for *Hamersley Iron Pty Ltd Yandicoogina Iron Ore Project - Expansion to include Junction South West and Oxbow Deposits* (Ministerial Statement 914). Access to this portion of the land by BHP for the purpose of undertaking geotechnical investigations has been negotiated through the s91 Licence under the *Land Administration Act 1997*.

The application area is located within the Pilbara Surface Water Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). Due to the presence of multiple drainage lines a Permit to interfere with the bed and banks of a watercourse has been submitted to DWER by BHP (application number is 036590). No issues preventing the issuing of a Permit have been identified (DWER 2020). Necessary approvals from DWER under the RIWI Act are required prior to undertaking the proposed clearing.

The application area is located within the registered area of interest of the Banjima People (WAD6096/1998) (Banjima Native Title Aboriginal Corporation RNTBC), and includes the Initial Indigenous Land Use Agreement (ILUA) - Banjima and BHP Billiton Comprehensive Agreement (Bdy Corp) Banjima Native Title Aboriginal Corporation RNTBC, and the Banjima and Rio Tinto Participation Agreement ILUA (Body Corporate Agreement). Under section 24LA of the

Native Title Act 1993 (Cth), DWER has provided Banjima Native Title Aboriginal Corporation RNTBC an opportunity to comment on clearing permit application CPS 8952/1. No comments were received.

A large number of Aboriginal Heritage places and Sites of Significance occur over the application area. These include: Yandi 12/13; Yandi 14; Yandi 15; Yandi 16; Yandi 17; Yandi 18; Yandi 19; Yandi 73; Yandi 74; Yandi Rail Corridor 40; Yandi Rail Corridor 69; Y98-02; Y98-03; Y98-04; and Y98-05. BHP will ensure that all activities are undertaken in accordance with BHP Iron Ore Pty Ltd's Project Environmental Aboriginal Heritage Review Procedure; WIN-ENV-PEAHR-001 (or subsequent revisions). It is the Permit Holder's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Appendix A – Information provided by applicant

Summary	Reference
Supporting Information for clearing permit application CPS 8953/1 was provided to DWER by BHP.	BHP (2020a)
Additional supporting information for clearing permit application CPS 8953/1 including a section 91 licence to authorise access to the application area.	BHP (2020b)
A single phase level 2 fauna and detailed flora and vegetation survey was undertaken over a large portion of the application area during October 2017. Biologic Environmental undertook the fauna component, and Onshore Environmental undertook the flora and vegetation component. One report combined the results.	Biologic (2017)
Additional two phase targeted fauna surveys were undertaken over a large portion of the application area by Biologic Environmental during 2018. The survey report of Biologic (2018) combines 2017 data and 2018 data.	Biologic (2018)
An additional detailed flora and vegetation survey was undertaken over a large portion of the application area during May 2018. The survey report of Onshore Environmental (2018) combines 2017 data and 2018 data.	Onshore Environmental (2018)

Appendix B – 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 C.

1. Site characteristics

Site characteristic	Details				
Local context	The application area is located within the Shire of East Pilbara, partly on Marillana and Juna Downs stations. It is approximately four kilometres south of BHP's existing Yandi mining operations and approximately 90 kilometres north-west of the town of Newman.				
Vegetation description	Twelve vegetation associations classified into seven broad floristic formations were described and mapped over the application area by Onshore Environmental (2018) (see below and Appendix E1). Vegetation condition was rated as excellent across 97 per cent of the application area, with a smaller area along the major drainage lines rated as very good. Very minor areas of exploration access tracks in the southeast corner were rated as completely degraded (See Appendix E2).				
	Code	Broad Floristic Formation	Letter Code	Vegetation Association	Condition
	1	<i>Eucalyptus</i> Open Forest	MA EcEv Cyv SoplTtEua	Open Forest of <i>Eucalyptus camaldulensis</i> and <i>Eucalyptus victrix</i> over Sedges of <i>Cyperus vaginatus</i> and Open Tussock Grassland of <i>Sorghum plumosum</i> , <i>Themeda triandra</i> and <i>Eulalia aurea</i> on brown sand on major drainage lines	Very Good
	2	<i>Corymbia</i> Low Woodland	GG CfEII AtpAnI TtErmuCyA	Low Woodland of <i>Corymbia ferritcola</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over High Open Shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>Androcalva luteiflora</i> over Open Tussock Grassland of <i>Themeda triandra</i> , <i>Eriachne mucronata</i> and <i>Cymbopogon ambiguus</i> on brown silty loam in gorges	Excellent
	3	<i>Eucalyptus</i> Low Woodland	MA Ev TefcCocrApy TtSoplCyA	Low Woodland of <i>Eucalyptus victrix</i> over Low Shrubland of <i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186), <i>Corchorus crozophorifolius</i> and <i>Acacia pyrifolia</i> over Open Tussock Grassland of <i>Themeda triandra</i> , <i>Sorghum plumosum</i> and <i>Cymbopogon ambiguus</i> on brown sand on major drainage lines	Very Good
4	<i>Acacia</i> Open Scrub	MI AmAmaGoro TtCyaPamu ChEII	Open Scrub of <i>Acacia monticola</i> , <i>Acacia maitlandii</i> and <i>Gossypium robinsonii</i> with Open Tussock Grassland of <i>Themeda triandra</i> , <i>Cymbopogon ambiguus</i> and <i>Paraneurachne muelleri</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Eucalyptus</i>	Very Good	

Site characteristic	Details				
				<i>leucophloia</i> subsp. <i>leucophloia</i> on brown sandy loam on minor drainage lines	
	5a	<i>Triodia</i> Hummock Grassland	HC Tw Ell AbAanc	Hummock Grassland of <i>Triodia wiseana</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> with Scattered Tall Shrubs of <i>Acacia bivenosa</i> and <i>Acacia ancistrocarpa</i> on brown sandy loam on ironstone mesa crests	Excellent
	5b	<i>Triodia</i> Hummock Grassland	HS TwTbr Ai Inr	Hummock Grassland of <i>Triodia wiseana</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia inaequilatera</i> and Low Open Shrubland of <i>Indigofera rugosa</i> on brown sandy loam on dolerite hillslopes	Excellent
	5c	<i>Triodia</i> Hummock Grassland	FP Tp ChHallEv TefcApy	Open Hummock Grassland of <i>Triodia pungens</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Eucalyptus victrix</i> over Low Open Shrubland of <i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186) and <i>Acacia pyrifolia</i> on brown sandy loam on floodplains and drainage lines	Excellent
	5d	<i>Triodia</i> Hummock Grassland	HC TsTw Ell Grwh	Hummock Grassland of <i>Triodia vanleeuwenii</i> and <i>Triodia wiseana</i> with Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and High Open Shrubland of <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> on brown sandy loam on hillcrests and upper slopes	Excellent
	5e	<i>Triodia</i> Hummock Grassland	HC Tp AprEll ErlGrwh	Hummock Grassland of <i>Triodia pungens</i> with Low Open Woodland of <i>Acacia pruinocarpa</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> with Scattered Shrubs of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> on brown sandy loam on mesa crests	Excellent
	5f	<i>Triodia</i> Hummock Grassland	SP Tw AiAtenAads Ch	Hummock Grassland of <i>Triodia wiseana</i> with High Open Shrubland of <i>Acacia inaequilatera</i> , <i>Acacia tenuissima</i> and <i>Acacia adsurgens</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> on brown sandy loam on stony plains	Excellent
	6	<i>Eriachne</i> Open Tussock Grassland	HC ErmuCyaTt CfEll Tw	Open Tussock Grassland of <i>Eriachne mucronata</i> , <i>Cymbopogon ambiguus</i> and <i>Themeda triandra</i> with Low Open Woodland of <i>Corymbia ferritcola</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and	Excellent

Site characteristic	Details				
				Very Open Hummock Grassland of <i>Triodia wiseana</i> on brown sandy loam on clifflines	
	7	<i>Themeda</i> Open Tussock Grassland	ME TtCyaEnl Cyv AcpEvCh	Open Tussock Grassland of <i>Themeda triandra</i> , <i>Cymbopogon ambiguus</i> and <i>Enneapogon lindleyanus</i> with Open Sedges of <i>Cyperus vaginatus</i> with Low Open Woodland of <i>Acacia coriacea</i> subsp. <i>pendens</i> , <i>Eucalyptus victrix</i> and <i>Corymbia hamersleyana</i> on brown silty loam on medium drainage lines	Excellent
Vegetation condition	Vegetation of the application area ranged for Very Good to Excellent.				
Soil description	<p>The soils of the application area are mapped by DPIRD (2017) as the Fa13 unit. These soils are frequently stony and shallow and there are extensive areas without soil cover. The chief soils are shallow stony earthy loams (Um5.51) along with some Uc5.11 soils on the steeper slopes. Associated are Dr2.33, and Dr2.32 soils on the limited areas of dissected pediments, while Um5.52 and Uf6.71 soils occur on the valley plains.</p> <p>Tille (2006) described one soil unit over the application area, the 285 Hamersley Plateaux Zone, located in the Fortescue Province. This is described as ‘Hills and dissected plateaux (with some stony plains and hardpan wash plains) on sedimentary and volcanic rocks of the Hamersley Basin (Ophthalmia Fold Belt). Stony soils with red shallow loams and some red/brown non-cracking clays and red loamy earths.’</p> <p>Extensive hills and ridges occurring within the application area support areas with poorly formed skeletal soils or in some cases a complete lack of soil cover (where surface expression of the Robe pisolite are found). The hill slopes support uniform medium or fine textured soils consisting of loams and sands that are generally shallow, stony and lack nutrients. There are small areas of stony plains where the soils are better developed and deeper, represented most commonly as hard alkaline red-brown loams. The soils in the major drainage lines are alluvial sands and gravels with banks formed by a combination of alluvial sediments and duplex soils (Tille 2006).</p>				
Landforms and land degradation risk	<p>The application area is located within the Hamersley sub-region (PIL2) of the Pilbara Bioregion of Thackway and Cresswell (1995) described as a “mountainous area of Proterozoic sedimentary ranges and plateaux, dissected by gorges of basalt, shale and dolerite” (Kendrick 2003).</p> <p>The application area is located within the central Hamersley Ranges, which, together with the Ophthalmia Ranges, comprise the majority of the Hamersley Plateau. The dominant landform features are rocky hills with scree slopes and minor outcropping and rolling stony plains (Tille, 2006). The topography of the application area is variable with a series of hills, breakaways, plateaux, and strike ridges dissected by gullies and drainage lines (Biologic 2018).</p> <p>The application area is dominated by dolerite hills dissected by three large un-named drainage lines in the north-west, central, and south-east areas. The surface water flows are in an easterly direction into Yandicoogina Creek, then Marillana Creek and Weeli Wollie Creek, and eventually northwards into the Fortescue Marsh. Ironstone mesa crests fringe the major drainage lines in the northern and central parts of the application area, with distinctive cliff lines present in the central and southern parts. Floodplains and stony plains are prominent features in the central and southern sectors of the application area, with isolated gorges restricted to southern parts (Onshore Environmental 2018).</p>				

Site characteristic	Details										
	<p>Four Land Systems have been mapped over the application area:</p> <table border="1" data-bbox="444 289 1403 642"> <thead> <tr> <th data-bbox="444 289 591 321">Name</th> <th data-bbox="591 289 1403 321">Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="444 321 591 422">McKay System</td> <td data-bbox="591 321 1403 422">Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with acacias and occasional eucalypts.</td> </tr> <tr> <td data-bbox="444 422 591 495">Newman System</td> <td data-bbox="591 422 1403 495">Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.</td> </tr> <tr> <td data-bbox="444 495 591 569">Boolgeeda System</td> <td data-bbox="591 495 1403 569">Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.</td> </tr> <tr> <td data-bbox="444 569 591 642">Robe System</td> <td data-bbox="591 569 1403 642">Low plateaux, mesas and buttes of limonite supporting soft spinifex and occasionally hard spinifex grasslands.</td> </tr> </tbody> </table> <p>Clearing will be minimal and not expected to result in an increased risk of changes to pH, water-logging, or increased salinity or spread of weeds. It is not anticipated that the removal of vegetation will contribute to increased amounts of wind or water erosion in adjacent areas. Localised erosion can occur from the creation of tracks in any of the landsystems. but particularly over the ironstone mesa crests that fringe the major drainage lines and the distinctive cliff lines within the application area.</p>	Name	Description	McKay System	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with acacias and occasional eucalypts.	Newman System	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.	Boolgeeda System	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.	Robe System	Low plateaux, mesas and buttes of limonite supporting soft spinifex and occasionally hard spinifex grasslands.
Name	Description										
McKay System	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands with acacias and occasional eucalypts.										
Newman System	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.										
Boolgeeda System	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.										
Robe System	Low plateaux, mesas and buttes of limonite supporting soft spinifex and occasionally hard spinifex grasslands.										
Waterbodies	<p>The application area is located in the Fortescue River Upper Catchment, and is dissected by three large un-named drainage lines in the north-west, central, and south-east areas. Numerous smaller ephemeral drainage lines flow into these three un-named water-courses. Surface water flow is in an easterly direction into Yandicoogina Creek, then Marillana Creek and Weeli Wolli Creek, and eventually northwards into the Fortescue Marsh (Onshore Environmental 2018).</p> <p>Thirteen water features were recorded during the surveys of Biologic (2017 and 2018), most of which were recorded during the second survey after a large rainfall event (83 mm recorded seven days prior). Two semi-permanent waterbodies in particular have been identified that may support significant species. Feature MNY-WB02 measured 3 metres wide, 15 metres long and 1 metre deep, and was fringed with <i>Typha</i> spp.</p> <p>Wetlands listed in the Directory of Important Wetlands include the permanent pools of Millstream and Karijini National Parks (WA067) located approximately 32 kilometres to the north of the application area, and the Fortescue Marsh (DRAFT Proposed Ramsar Addition) is located approximately 33 kilometres north of the application area.</p>										
Conservation areas	<p>Conservation lands amount to less than ten percent of the total area of the Pilbara bioregion, with the major reserves being Karijini and Millstream-Chichester National Parks. These parks are supplemented by lesser conservation estates such as Cane River and Meentheena Conservation Parks. The application area is not within or adjacent to any gazetted conservation reserves. Karijini National Park is located approximately 42 kilometres west of the application area. Unallocated Crown Land (former Juna Downs Station leasehold) and proposed for conservation (2015 excision) is located approximately 21 kilometres north-west of the application area.</p>										
Climate	<p>The climate of the Pilbara is semi-desert tropical with the region experiencing two distinct seasons; a hot summer from October to April, and a mild winter from May to September with the majority of rainfall received during the hot summer months (Sudemeyer 2016). The annual rainfall for the closest town of Newman is approximately 324 millimetres (BOM 2020).</p>										

2. Ecosystem, flora, and fauna analysis

With consideration for the site characteristics set out above, relevant datasets (see Appendix F), and biological survey information (Biologic 2017, Biologic 2018, BHP 2020a, Onshore Environmental 2018), the following conservation significant ecological communities, flora taxa, and fauna species have been identified within 50 kilometres of the application area, and their likelihood of occurrence assessed. Surveys were adequate to assess likelihood of occurrence.

2(a) Ecological Communities

Priority Ecological Communities	Status	Distance of closest record to application area (approx. kilometres)	Suitable vegetation type?	Likelihood of occurrence
Weeli Wolli Spring Community	Priority 1	12.8	No	Unlikely
Fortescue Valley Sand Dunes	Priority 3iii	24.4	No	Unlikely
Fortescue Marsh	Priority 1	30.5	No	Unlikely
Brockman Iron cracking clay communities	Priority 1	58.1	No	Unlikely
Coolibah-Lignum Flats	Priority 1 Priority 3iii	34.5	No	Unlikely
West Angelas Cracking Clays	Priority 1	46.1	No	Unlikely
Freshwater Claypans of the Fortescue Valley	Priority 1	43.6	No	Unlikely

Code	Broad Floristic Formation	Letter Code	Vegetation Association	Location	Local Significance
1	<i>Eucalyptus</i> Open Forest	MA EcEv Cyv SoplTtEua	Open Forest of <i>Eucalyptus camaldulensis</i> and <i>Eucalyptus victrix</i> over Sedges of <i>Cyperus vaginatus</i> and Open Tussock Grassland of <i>Sorghum plumosum</i> , <i>Themeda triandra</i> and <i>Eulalia aurea</i> on brown sand on major drainage lines.	Major drainage lines in the north-western and central sectors	Supports groundwater dependent species

2(b) Significant Flora (Onshore Environmental 2018)

Threatened flora database searches identified 31 Priority flora taxa as potentially occurring within a 50 kilometre radius of the application area (Table below). None of these Priority flora species had previously been recorded within the application area.

No plant taxon gazetted as Threatened Flora (T) pursuant to the BC Act or listed under the EPBC Act was recorded from the application area by the surveys of Onshore Environmental (2018).

Three Priority taxa, as defined by DBCA, were recorded from the application area by the surveys of Onshore Environmental (2018) (See Appendix E3):

- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (Priority 3);
- *Rostellularia adscendens* var. *latifolia* (Priority 3); and
- *Goodenia nuda* (Priority 4).

An additional five Priority taxa were considered likely to occur: *Eremophila* sp. Hamersley Range (K. Walker KW 136) (P1), *Aristida lazaridis* (P2), *Ipomoea racemigera* (P2), *Amaranthus centralis* (P3), and *Lepidium catapycnon* (P4). None of the plant taxa recorded from the study area are considered to be range extensions.

Taxon	Cons. Code	Life Form	Habitat Preference	Suitable Habitat Present	Likelihood in the Study Area
<i>Acacia bromilowiana</i>	4	Perennial	Rocky hills, breakaways, scree slopes, gorges, creek beds.	Yes	Possible
<i>Acacia effusa</i>	3	Perennial	Scree slopes of low ranges	Yes	Possible
<i>Acacia subtiliformis</i>	3	Perennial	Rocky calcrete plateau.	No	Unlikely
<i>Amaranthus centralis</i>	3	Perennial	River beds	Yes	Likely
<i>Aristida lazaridis</i>	2	Perennial	Drainage areas	Yes	Likely
<i>Calotis squamigera</i>	1	Annual	Mulga plains	No	Unlikely
<i>Dampiera metallorum</i>	3	Perennial	Skeletal red-brown gravelly soil over banded ironstone. Steep slopes, summits of hills.	No	Unlikely
<i>Eremophila magnifica</i> subsp. <i>magnifica</i>	4	Perennial	Skeletal soils over ironstone. Rocky screes.	Yes	Possible
<i>Eremophila</i> sp. Hamersley Range (K. Walker KW 136)	1	Perennial	Unknown	Unknown	Likely
<i>Eremophila spongiocarpa</i>	1	Perennial	Weakly saline alluvial plain on margins of marsh.	No	Unlikely
<i>Euphorbia australis</i> var. <i>glabra</i>	2	Annual	Unknown	Unknown	Possible
<i>Fimbristylis sieberiana</i>	3	Perennial	Mud, skeletal soil pockets. Pool edges, sandstone cliffs.	No	Unlikely
<i>Gompholobium karjini</i>	2	Perennial	Unknown	Unknown	Possible
<i>Goodenia nuda</i>	4	Annual	Floodplains	Yes	Likely
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	3	Annual	Low undulating calcrete plain, swampy plains	No	Unlikely
<i>Grevillea saxicola</i>	3	Perennial	Scree slopes with mulga	No	Unlikely

Taxon	Cons. Code	Life Form	Habitat Preference	Suitable Habitat Present	Likelihood in the Study Area
<i>Gymnanthera cunninghamii</i>	3	Perennial	River beds	Yes	Possible
<i>Hibiscus</i> sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	2	Perennial	Unknown	Unknown	Possible
<i>Ipomoea racemigera</i>	2	Annual	River beds	Yes	Likely
<i>Isotropis parviflora</i>	2	Annual	Valley slope of ironstone plateau	Yes	Possible
<i>Lepidium catapycnon</i>	4	Perennial	Skeletal soils. Hillsides	Yes	Likely
<i>Polymeria distigma</i>	3	Annual	Sandy soils.	Yes	Possible
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	3	Perennial	Plains with mulga	No	Unlikely
<i>Rhynchosia bungarensis</i>	4	Perennial	Banks of flow line in the mouth of a gully in a valley wall.	Yes	Possible
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	3	Annual /Perennial	Ironstone soils. Near creeks, rocky hills	Yes	Possible
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	3	Perennial	Cliff walls	Yes	Likely
<i>Stylidium weeliwoilli</i>	3	Annual	Edge of watercourses.	No	Unlikely
<i>Synostemon hamersleyensis</i>	1	Perennial	Gullies, cliffs and breakaways	Yes	Possible
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	3	Perennial	Clay pan, grass plain.	No	Unlikely
<i>Triodia</i> sp. Mt Ella (M.E. Trudgen 12739)	3	Perennial	Amongst rocks & outcrops, gully slopes	Yes	Possible
<i>Vittadinia</i> sp. Coondewanna Flats (S. van Leeuwen 4684)	1	Perennial	Plains	Yes	Possible

2(c) Significant Fauna (Biologic 2018)

Available data sets and relevant reports were reviewed by Biologic (2018) to determine vertebrates of conservation significance occurring within the vicinity of the application area. Eight mammals, 16 birds, and four reptiles were assessed as to their likelihood of occurrence within the habitats of the application area. Of these:

- Two were recorded: Western Pebble-mound Mouse (P4) and Peregrine Falcon (OS) (see Appendix E6); and
- Three were considered likely to occur: Pilbara Olive Python (VU), Pilbara Flat-headed Blindsnake (P1) and Pilbara Barking Gecko (P2).

The locally-significant Chocolate Wattled Bat was also assessed as likely to occur. An additional four mammals and two birds were considered to possibly occur: Northern Quoll (EN), Pilbara Leaf-nosed Bat (VU), Ghost Bat (VU), Short-tailed Mouse (P4) Grey Falcon (VU) and Eastern Osprey (Mi).

2(c) Significant Fauna (Onshore Environmental 2018) ('highly unlikely' records removed)

Name	Conservation listing	Known habitat	Records within or within the vicinity of the study area	Potential habitats within the study area	Likelihood of occurrence
Mammals					
Northern Quoll <i>Dasyurus hallucatus</i>	EPBC Act Endangered WC Act Schedule 2 IUCN Endangered	Northern Quolls favour rocky areas such as ranges, escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines and treed creek lines, as well as structurally diverse woodland or forest areas containing large diameter trees, termite mounds or hollow logs (DoE, 2016). Dens are made in rock crevices, tree holes or occasionally termite mounds (Oakwood, 2002). The Northern Quoll has been recorded in numerous land systems which comprise sandstone and dolomite hills and ridges, shrublands, sandy plains, clay plans and tussock grasslands and coastal fringes including dunes islands and beaches (DBCA, 2017a).	Northern Quoll (<i>Dasyurus hallucatus</i>) has been recorded from Yandi Mine (~1.5 km north) on two occasions: once on motion-camera during a survey (Biologic, 2018b) and once as road kill (Morgan O'Connell, pers. obs.) Furthermore, numerous records have been documented by DBCA (2017b) more than 19km north of the Study Area. Three records were also documented 18.7 km south of the Study Area DBCA (2017b).	Suitable denning habitat exists in the Gorge/ Gully habitat, while the Major Drainage Line provide potential dispersal habitat. Given that Northern Quoll was not picked up on motion camera and no scats were observed, it would be unlikely that a permanent population occurs within the Study Area. Dispersing males may occasionally pass through from the north west, suggesting that if a number of consecutive good rainfall years improved habitat productivity then a population could be established.	Possible
Pilbara Leaf-nosed Bat <i>Rhinonicteris aurantia</i>	EPBC Act Vulnerable WC Act Schedule 3	Pilbara Leaf-nosed Bat roosts within caves and abandoned Mines with high humidity (95%) and temperature (32 °C) (Armstrong, 2001). This Species forages in caves and along waterbodies with fringing vegetation (TSSC, 2016).	One record of Pilbara Leaf-nosed Bat has been documented by DBCA (2017b) approximately 10 km north-west of the Study Area. This species was also recorded during Area C West to Yandi Level 2 Vertebrate Fauna Survey (Biota, 2013). A further 175 records have been documented by DBCA (2017b) more than 18 km north of the Study Area. Only one record has been documented south of the Study Area (20 km) (DBCA, 2017b).	The species may forage across numerous habitats within the Study Area including Gorge/ Gully, Hillcrest/ Hillslope and low hills. The Breakaway/ Cliff habitat is patchy in the north-west, around the Major Drainage Line (runs north-east to south-west in the central portion of the Study Area) and floodplain area in the south-eastern portion of the Study Area; however, it is considered likely that this species would only occur in the Study Area very occasionally when dispersing or foraging through the landscape given that no roosting caves were recorded during this survey and known roosts are up to 25 km away.	Possible
Ghost Bat <i>Macroderma gigas</i>	EPBC Act Vulnerable WC Act Schedule 3 IUCN Vulnerable	Ghost Bats roost in deep, complex caves beneath bluffs of low, rounded hills, granite rock piles and abandoned mines (Armstrong & Anstee, 2000). These features often occur within habitat types including Gorge/ Gully, Hillcrest/ Hillslope and low hills (Armstrong & Anstee, 2000).	Biologic (2011b) recorded Ghost Bat scats ~7km south of the Study Area within a cave in the Area C to Yandi Study Area. Another record of Ghost Bat exists approximately 10 km south of the Study Area (DBCA, 2017b) and a further 28 records have been documented <25 km south of the Study Area. The species is known to occur within the region and may forage across most of the Study Area.	The Breakaway/ Cliff, Gorge/ Gully, Major Drainage Line and drainage floodplain habitats throughout the Study Area provide suitable foraging habitat for the species; however, it is considered likely that this species would only occur in the Study Area occasionally when dispersing or foraging through the landscape given that no deep caves were recorded during this survey.	Possible
Greater Bilby <i>Macrotis lagotis</i>	EPBC Act Vulnerable WC Act Schedule 3 IUCN Vulnerable	Variety of habitats including spinifex hummock grassland and <i>Acacia</i> shrubland, on soft soils (Burrows <i>et al.</i> , 2012). In the Pilbara often associated with major drainage line sandy terraces (Dziminski & Carpenter, 2016; How <i>et al.</i> , 1991; Marlow <i>et al.</i> , 2011).	There are a number of records to the north of the Study Area the closest of which are ~27 km away from 2013 and 2014 (DBCA, 2017a).	The Greater Bilby typically inhabits sandy plains and thus is unlikely to occur in the Study Area. Furthermore, its current distribution does not include the Hamersley Range.	Unlikely
Short-tailed Mouse <i>Leggadina lakedownensis</i>	DBCA Priority 4	This species is endemic to northern Australia, where it occurs from Cape York in the east to the Pilbara, in Western Australia, although the distribution is discontinuous (Moro & Kutt, 2008). There are populations present on Thevenard Island and Serruria Island (the latter is a translocated population – intentionally introduced for conservation purposes), both in Western Australia (Lee, 1995; Moro & Kutt, 2008). It is a nocturnal species found in areas of open tussock and hummock grassland, <i>acacia</i> shrubland, and savanna woodland, on alluvial clay or sandy soils (Lee, 1995; Moro & Kutt, 2008). Generally restricted to cracking clays in the region (Gibson & McKenzie, 2009).	Biologic (2011c) recorded this species at Tandanya in the cracking clay habitat and surrounds (approximately 30 km to the south west. A Western Australian Museum record also exists near to Boundary Ridge (DBCA, 2017a), approximately 25 km to the south west.	This species is generally recorded in cracking clay habitat (not present in the Study Area) (Biologic, 2011c), however it has also been recorded in stony plain habitat and broad drainage areas (Gibson & McKenzie, 2009). Therefore, this species may occur in the Study Area within Drainage Area/ Floodplain habitat type.	Possible

Name	Conservation listing	Known habitat	Records within or within the vicinity of the study area	Potential habitats within the study area	Likelihood of occurrence
Western Pebble-mound Mouse <i>Pseudomys chapmani</i>	DBCA Priority 4	The Western Pebble -mouse occupies rocky hummock grassland areas with little or no soil. The habitat is usually vegetated with an open to mid-dense <i>Triodia basedowii</i> hummock grassland and scattered emergent <i>Cassia</i> , <i>Acacia</i> and <i>Ptilotus</i> spp. (Start <i>et al.</i> , 2000). They have also known to occupy, at lower densities, on the ridges and outcrops where there was hummock grassland of <i>T. wiseana</i> with many emergent <i>Eucalyptus</i> and <i>Acacia</i> spp. (Dunlop & Pound, 1981; Start <i>et al.</i> , 2000). They more commonly inhabit lower land slopes where weathering produces pebbles of the preferred size (average 3.5 grams) (Start <i>et al.</i> , 2000). The prevalence of mounds is not necessarily a reliable indicator of abundance or even presence, as mounds are often used by successive generations (Anstee, 1996; Ford & Johnson, 2007) and may persist in the landscape for many years. Moreover, mice utilise several mounds in the course of a night, this included the primary mound (mound used as daytime refuge) and one or two mounds within their home range (Anstee, 1996).	Active mounds belonging to this species were recorded at 14 locations, nine of which were within the Study Area. A further four recently inactive mounds were recorded, one of which was within the Study Area. Finally, inactive mounds were recorded at ten locations, seven of which were within the Study Area (Figure 4.1). Previous reports assessed as part of the desktop assessment all recorded the Pebble-mound Mouse (DBCA, 2017b). Two records (secondary evidence) of the species within the Study Area near the southern border and a further 44 within 10 km of the Study Area (DBCA, 2017b).	All mounds recorded during the survey were within the Hillcrest/Hillslope habitat. This habitat type was the most common and widespread habitat type occurring across the Study Area. The remaining habitat types are unlikely to provide important habitat for the species.	Confirmed
Brush-tailed Mulgara <i>Dasyercus blythi</i>	DBCA Priority 4	Prefers spinifex <i>Triodia</i> spp. grasslands on sand plains and the swales between low dunes (Pavey <i>et al.</i> , 2012; Woolley, 2006). Mature spinifex hummocks appear to be important for protection from introduced predators (Körtner <i>et al.</i> , 2007).	Mulgara has been recorded at Marillana, approximately 20km to the north east (Biologic, 2011a). There are also three records ~18km west of the Study Area from 2014 (DBCA, 2017b).	No sandy substrates exist in the Study Area (Sand Plain).	Unlikely
Chocolate Wattled Bat <i>Chalinolobus morio</i>	Locally significant	This species has a restricted distribution in the southern part of Western Australia (Churchill, 2008). Weeli Woll Spring and Marillana Creek represent the only two locations in the Pilbara where this species has been recorded and are the most northern records for this species (McKenzie & Bullen, 2009). Given its geographic separation from the main population in Western Australia, the Pilbara population may be genetically distinct.	The species was not recorded during the current survey. The species is known from multiple records <1km north-wets of the Study Area (2014-2015) along Marillana Creek and ~15 km south of the Study Area at Weeli Woll Creek (DBCA, 2017a). The species was recorded on two occasions by Biologic (2017) approximately 3 km south of the Study Area.	The Major Drainage Line which intersects the Study Area is a tributary of Marillana Creek – a known flyway for the species. As such the species may frequent the Study Area while foraging. However, no suitable roosting habitat is located within the Study Area.	Likely

Birds					
Curlew Sandpiper <i>Calidris ferruginea</i>	EPBC Act Critically Endangered/ Migratory, WC Act Schedule 3/ Schedule 5	The Curlew Sandpiper inhabits intertidal mudflats in sheltered coastal areas (i.e. estuaries, bays, inlets and lagoons). This rare species generally roosts on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands (DoEE, 2017b).	The nearest record is approximately 100 km south east of the Study Area from 2005 (DBCA, 2017a).	The species is rarely recorded within the region (DBCA, 2017a) and no highly suitable habitat exists in the Study Area.	Unlikely
Night Parrot <i>Pezoporus occidentalis</i>	EPBC Act Endangered WC Act Schedule 1 IUCN Endangered	The Night Parrot prefers sandy/stony plain habitat with old-growth spinifex (<i>Triodia</i>) for roosting and nesting in conjunction with native grasses, herbs and chenopods for foraging (DPaW, 2017)	The nearest record is approximately 52 km north of the Study Area from 2005 (DBCA, 2017a).	No stony/sandy plains were documented during the current survey. It wasn't identified from the SM4 recordings.	Unlikely
Australian Painted Snipe <i>Rostratula australis</i>	EPBC Act Endangered WC Act Schedule 2	The Australian Painted Snipe generally occupies shallow terrestrial freshwater wetlands (i.e. temporary and permanent lakes, swamps and claypans) with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire (Garnett <i>et al.</i> , 2011). The Australian Painted Snipe breeding habitat requirements are quite specific; they require shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby (Garnett <i>et al.</i> , 2011).	The nearest record is approximately 55 km east of the Study Area from 2012 (DBCA, 2017b). However the species rarely recorded within the region (Knuckey <i>et al.</i> , 2013), and such records are located around the Fortescue Marsh and or coastal areas. The species is generally uncommon at inland waters of Western Australia.	This species requires suitable wetland areas even in drought conditions (DoEE, 2017b), which are not present within the Study Area.	Unlikely

Name	Conservation listing	Known habitat	Records within or within the vicinity of the study area	Potential habitats within the study area	Likelihood of occurrence
Grey Falcon <i>Falco hypoleucos</i>	WC Act Schedule 3 IUCN Vulnerable	This species appears to have a distribution centred on ephemeral or permanent drainage lines (Garnett & Crowley, 2000) with numerous records from the Fortescue Marsh region. Grey Falcons prefer sparsely-treed, open plains and drainage lines for hunting (Slater <i>et al.</i> , 2009). It favours timbered lowland plains, particularly <i>acacia</i> shrublands that are crossed by tree-lined watercourses but frequents other grassland and woodland habitats. It hunts birds, insects, and mammals, and will also feed on carrion. They nest in the abandoned nest of a raptor or corvid (Slater <i>et al.</i> , 2009) in trees or man-made structures.	Grey Falcon is mostly known from around the Fortescue Marsh, nesting in tall infrastructure such as repeater stations and powerlines (Biologic, 2011c). One record exists ~26km north of the Study Area at Koodaideri Springs from 2014 (DBCA, 2017b).	The Study Area may provide foraging habitat for this species. In particular, the Major Drainage Line and Drainage Area/ Floodplain habitats. The tall trees in Major Drainage Line habitat may provide some opportunity for nesting.	Possible
Peregrine Falcon <i>Falco peregrinus</i>	DBCA Other specially protected fauna. WC Act Schedule 7	The Peregrine Falcon is considered rare over much of its range, including the Pilbara. In arid areas, it is most often encountered along cliffs above rivers, ranges and wooded watercourses where it hunts birds (Johnstone & Storr, 1998). It typically nests on rocky ledges occurring on tall, vertical cliff faces and occasionally within tall trees occurring along Major Drainage Lines (Olsen & Olsen, 1989).	This species was observed within the Study Area during the targeted survey. A single peregrine Falcon was observed perched in a tree above a gorge. There are also two occurrences in the database search approximately 14 km WNW of the Study Area. There are 10 records that exits from 2011, 2012 and 2014 from 14 to 26km north west/ north of the Study Area (DBCA, 2017b).	The Study Area provides foraging habitat and Breakaway/ Cliff habitat type may provide suitable nesting locations for the species. The Breakaway/ Cliff habitat is patchy in the north-west, around the Major Drainage Line (runs north-east to south-west in the central portion of the Study Area).	Confirmed
Name	Conservation listing	Known habitat	Records within or within the vicinity of the study area	Potential habitats within the study area	Likelihood of occurrence
Fork-tailed Swift <i>Apus pacificus</i>	EPBC Act Migratory WC Act Schedule 3	A migratory species that breeds in north-east and east Asia, wintering in Australia and southern New Guinea (Johnstone & Storr, 1998). The species is known to be entirely aerial within the Pilbara region and does not utilise the terrestrial surface. It would be reasonably likely to occur in the skies above the Study Area and the wider local area occasionally, possibly being attracted to thunderstorms and cyclonic systems (Johnstone & Storr, 1998).	This species has been observed flying over Marillana Camp in 2011 (Biologic, 2011d). One record (with a count of 9 individuals) has been documented 16.7 km E of the Study Area along with one record 22.6 SE of the Study Area (DBCA, 2017b).	As this species is almost entirely aerial, it is possible to occur temporarily in any part of the Study Area.	Rarely
Eastern Osprey <i>Pandion haliaetus</i>	EPBC Act Migratory WC Act Schedule 5	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (Johnstone & Storr, 1998). They are known to travel large distances inland following drainage lines before returning to the coast.	An Osprey was recorded at Weell Wollli springs (~15 km south) and remained in the area for a number of months (G. Swann, <i>pers. obs</i>)	Major Drainage Line habitat may be suitable for this species.	Possible
Common Greenshank <i>Tringa nebularia</i>	EPBC Act Migratory WC Act Schedule 5	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity (BirdLife International, 2009).	Biota (2013) Recorded this species around Marillana Creek ~8km north west of the Study Area. A further two records exist around Area C West, ~8km west of the Study Area from 2011 (DBCA, 2017b).	The species may irregularly visit Major Drainage Line habitats within the Study Area, during periods of inundation, although would not be reliant on such habitats.	Rarely

Name	Conservation listing	Known habitat	Records within or within the vicinity of the study area	Potential habitats within the study area	Likelihood of occurrence
Common Sandpiper <i>Actitis hypoleucos</i>	EPBC Act Migratory, WC Act Schedule 5	The Common sandpiper inhabits estuaries and deltas of streams, as well as banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans. The muddy margins utilised by the species are often narrow and may be steep. The species often utilises mangroves as roost sites (DoEE, 2017b).	May occur within the Study Area or within the vicinity of the Study Area (<10 km) according to DoEE (2017a). Was recorded during Yandi Mine survey (Maunsell, 2003) 2 km north of the Study Area.	The species could possibly occur as an irregularly visitor within the Major Drainage Line habitats within the Study Area during periods of inundation.	Rarely
Sharp-tailed Sandpiper <i>Calidris acuminata</i>	EPBC Act Migratory, WC Act Schedule 5	The Sharp-tailed Sandpiper is a migratory wader that frequents the Western Australian north-west during the monsoonal wet season (Johnstone <i>et al.</i> , 2013).	The nearest record is ~76 km north east of the Study Area from 2003 (DBCA, 2017a).	The species could possibly occur as an irregularly visitor within the Major Drainage Line habitats within the Study Area during periods of inundation.	Rarely
Pectoral Sandpiper <i>Calidris melanotos</i>	EPBC Act Migratory, WC Act Schedule 5	The Pectoral Sandpiper inhabits coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. It prefers wetlands with open fringing mudflats and low, emergent or fringing vegetation. Furthermore, they forage in shallow water or soft mud at the edge of wetlands (DoEE, 2017b).	The nearest record is ~95 km south east of the Study Area from 1981 (DBCA, 2017a).	The species is rarely recorded within the region (DBCA, 2017a) and no highly suitable habitat exists in the Study Area.	Unlikely

Reptiles					
Name	Conservation listing	Known habitat	Records within or within the vicinity of the study area	Potential habitats within the study area	Likelihood of occurrence
Pilbara Olive Python <i>Liasis olivaceus barroni</i>	EPBC Act Vulnerable WC Act Schedule 1	This species is primarily nocturnal and tends to shelter in small caves or under vegetation during the day, although it is occasionally active after sunrise, particularly in the warmer summer months (DSEWPac, 2013). In the winter months, adult pythons can sometimes be found basking in the morning sun (Pearson, 2001 in (DSEWPac, 2013)). The breeding season of the Pilbara Olive Python extends from June to August, when males will travel up three kilometres in search of a mate (DSEWPac, 2013).	Maunsell (2003) have recorded two scats belonging to Pilbara Olive Python, one ~3km north of the east portion of the Study Area and one ~4km north west of the eastern portion of the Study Area. Biologic (2011d) also recorded secondary evidence of this species approximately 3 km north east of the Study Area. According to DBCA (2017b) another twenty records exist within 25km of the Study Area., the nearest of which is 4.35 km north.	The Gorge/ Gully habitat and Breakaway/ Cliff habitat types may provide suitable habitat for the species, especially where water features are present. The Breakaway/ Cliff habitat is patchy in the north-west, around the Major Drainage Line (runs north-east to south-west in the central portion of the Study Area) and floodplain area in the south-eastern portion of the Study Area. Gorge/ Gully habitat is also present in the north-western and south-eastern sections of the Study.	Likely
Pilbara Flat-headed Blindsnake <i>Anilius ganei</i>	DBCA Priority 1	Given the Pilbara Flat-headed Blindsnake has a cryptic fossorial habit, this species is rarely encountered. Little is known of this species' ecology but like most other blind snakes, it is insectivorous, feeding on termites and their eggs, and larvae and pupae of ants (Wilson & Swan, 2014). The Pilbara Flat-headed Blindsnake is associated with moist gorges and gullies (Wilson & Swan, 2014), and potentially with a wide range of other stony habitats.	During the (Biologic, 2011c) survey it was recorded at two locations (17 km south of the study area), a very rocky slope below the vertical wall of a gully and also in Mulga woodland habitat, showing that the species is not necessarily restricted to gorges and gully systems. One record exists ~17 km south of the Study Area from 2006 (DBCA, 2017b).	May occur in all habitat types in the Study Area, in particular Gorge/ Gully and Hillcrest/ Hillslope.	Likely
Pilbara Barking Gecko <i>Underwoodisaurus seorsus</i>	DBCA Priority 2	Despite extensive survey effort within the region in recent years this species has only been found at a small number of sites. It has been encountered in rocky areas of the Hamersley Range. They have also been observed at the bottom of a rocky gorge with a low tree cover and in vegetation consisting of low sparse trees of <i>Eucalyptus leucophloia</i> , low shrubs of <i>Acacia</i>	According to DBCA (2017b), four records exist ~20 km south west of the Study area from 2004. A further two exist ~23km south of the Study Area from 2011 (DBCA, 2017b).	This species has the potential to occur in Gorge/ Gully and Breakaway/ Cliff Habitat within the Study Area. It is also likely to occur within the Hillcrest/ Hillslope habitat.	Likely
<i>Ctenotus uber</i> subsp. <i>johnstonei</i>	DBCA Priority 2	Little is known of this taxon, and its taxonomic status is uncertain. Specimens from the Pilbara may be grouped with <i>Ctenotus uber</i> subsp. <i>johnstonei</i> , or they may belong to an undescribed taxon, in which case they would have no official conservation status. As a precautionary approach, the Pilbara taxon is treated as the Priority 2 subspecies. Within the Pilbara, the taxon is known from <i>Triodia</i> on hillslopes, <i>Acacia xiphophylla</i> over chenopods, and <i>Acacia xiphophylla</i> scattered tall shrubs to high open shrubland (ENV 2004).	A number of records have been made at BHP's Dynasty tenement approximately 90km to the south (Biologic, 2018a).	Most of the records for this species in the south and central Pilbara occur within Mulga woodlands (Biologic, 2018a), which are not found within this Study Area.	Unlikely

3. Vegetation extent

Regional vegetation mapping

The major vegetation association occurring over the application area is (Shepherd *et al.* (2001) Hammersley 82 Hummock grasslands, low tree steppe; Snappy gum over *Triodia wiseana*. A minor occurrence in the west of the application area is (Shepherd *et al.* (2001) Hammersley 18 Low woodland; Mulga (*Acacia aneura*).

Regional Vegetation extent	Pre-European extent (ha)	Current extent (ha)	Remaining %	Current Extent Protected for Conservation (ha)	Current Extent Protected for Conservation %
Pilbara bioregion					
Pilbara bioregion	17,808,657	17,731,765	99.57	1,132,944	6.36
Hammersley (PIL03)	5,634,727	5,608,386	99.53	725,601	12.88
Vegetation association					
Hammersley 82	2,177,574	2,165,224	99.43	262,244	12.04
Hammersley 18	581,246	576,541	99.19	113,404	19.51

Remnant vegetation within 50 kilometres of the application area

	Hectares (ha)	Remaining %
Total Area (50 km radius)	915,434	
Remnant vegetation remaining	910,099	99.4 %

Appendix C – 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> “Native vegetation should not be cleared if it comprises a high level of biodiversity.”</p> <p><u>Assessment:</u> The proposed clearing area contains twelve vegetation associations and seven fauna habitat types (Appendix E). Three Priority flora taxa and two vertebrates of conservation significance have been recorded within the application area, with others considered likely to occur.</p>	May be at variance	Further consideration required, see section 3.2.1
<p><u>Principle (b):</u> “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.”</p> <p><u>Assessment:</u> The proposed clearing area represents habitat for Pilbara Olive Python (VU), Northern Quoll (EN) and Western Pebble-mound Mouse, as well as reptiles and bats of conservation significance.</p>	May be at variance	Further consideration required, see section 3.2.2
<p><u>Principle (c):</u> “Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</p> <p><u>Assessment:</u> No Threatened flora have been recorded within 50 kilometres of the application area and no Threatened flora taxa were recorded by Biologic (2018).</p>	Not at variance	Further consideration not required
<p><u>Principle (d):</u> “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.”</p> <p><u>Assessment:</u> No Threatened Ecological Communities (TECs) Endorsed by the Western Australian Minister for Environment have been recorded within 50 kilometres of the application area. The application area does not contain species assemblages analogous to any TEC’s.</p>	Not at variance	Further consideration not required.
Environmental values: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> “Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</p> <p><u>Assessment:</u> The major regional vegetation association occurring over the application area is Hammersley 82, with a minor occurrence of Hammersley 18. Both these vegetation associations retain over 99 per cent of their original cover. Within a 50 kilometre radius of the application area, a over 99 per cent of native vegetation is retained. Vegetation in the proposed clearing area is not considered to be part of a significant ecological linkage.</p>	Not at variance	Further consideration not required.
<p><u>Principle (h):</u> “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.”</p> <p><u>Assessment:</u> The application area is not within or adjacent to any gazetted conservation reserves. The closest DBCA lands managed for conservation is Karijini National Park located approximately 42 kilometres to the west of the application area.</p>	Not at variance	Further consideration not required.
Environmental values: land and water resources		

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<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> The application area is dissected by three large un-named drainage lines in the north-west, central, and south-east areas with numerous smaller ephemeral tributaries draining into these watercourses. Thirteen water features were recorded during the surveys of Biologic (2017 and 2018) and two significant semi-permanent waterbodies in particular have been identified.</p>	Is at variance	Further consideration required, see section 3.2.3
<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> Due to the presence of ironstone mesa crests that fringe the major drainage lines, and the cliff lines and breakaways present, localised erosion can potentially occur from the creation of tracks.</p>	May be at variance	Further consideration required, see section 3.2.3
<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> The application area is located within the Pilbara Surface Water Area, and Pilbara Groundwater Area proclaimed under the RIWI Act. Deterioration in the quality of groundwater is unlikely. Three un-named large watercourses, with numerous smaller ephemeral tributaries, occur within the application area. Surface water quality may be impacted by the proposed clearing, however likely to be minimal and short term.</p>	May be at variance	Further consideration required, see section 3.2.3
<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> Rainfall in this region is generally low and highly variable, typically resulting from cyclone events and localised thunderstorms (van Vreeswyk et al., 2004), with the annual rainfall for the closest town of Newman being approximately 324 millimetres (BOM 2020). Whilst temporary localised flooding can occur following heavy rainfall events, the proposed clearing is not likely to increase the incidence or intensity of natural flooding events.</p>	Not at variance	Further consideration not required.

Appendix D – 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.

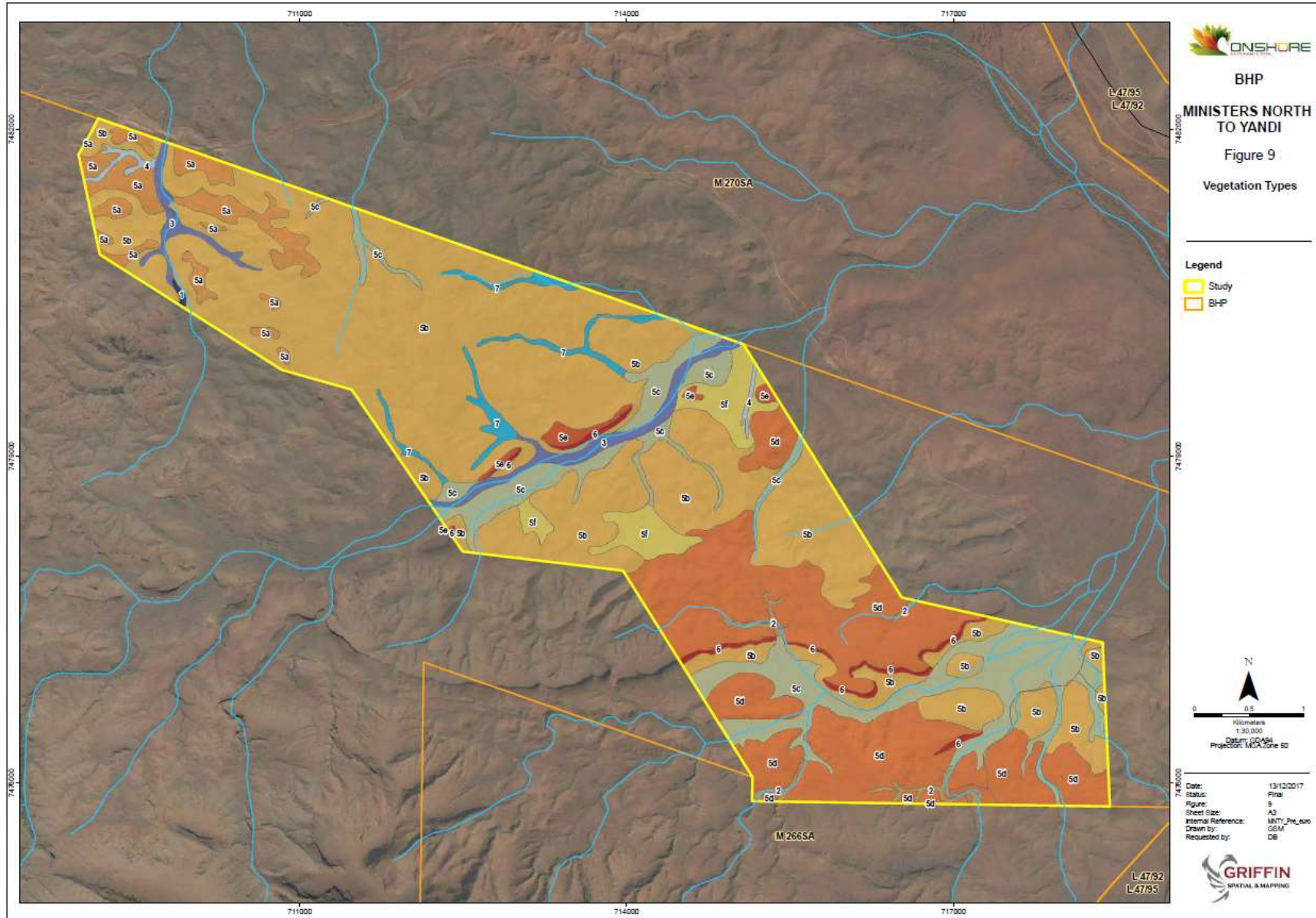
Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Code	Description
Excellent	1	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	2	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks cause by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	3	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	4	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	5	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	6	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

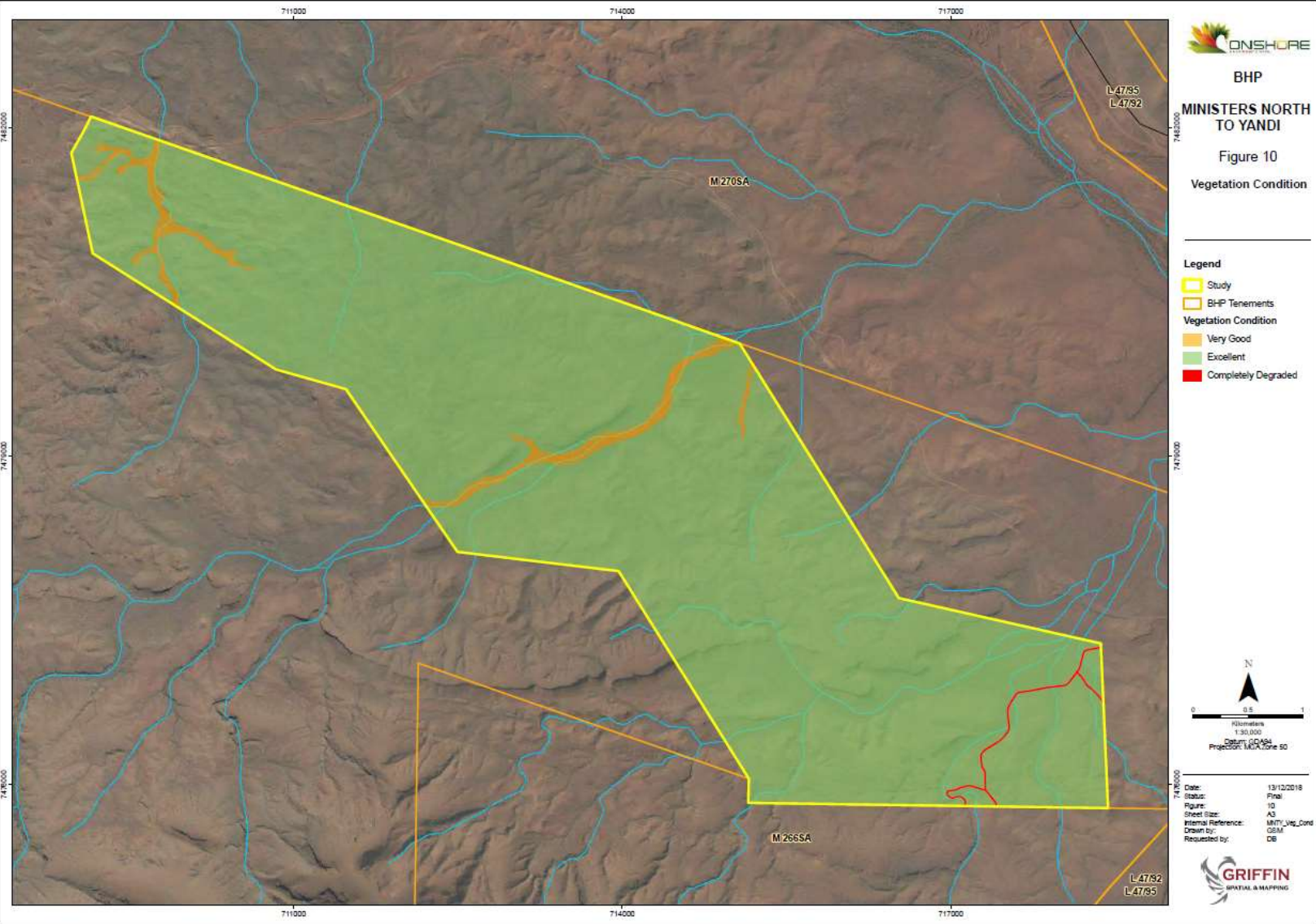
Appendix E – Biological survey information excerpts

(1) Vegetation and Flora: Legend and mapping (Onshore Environmental 2018)

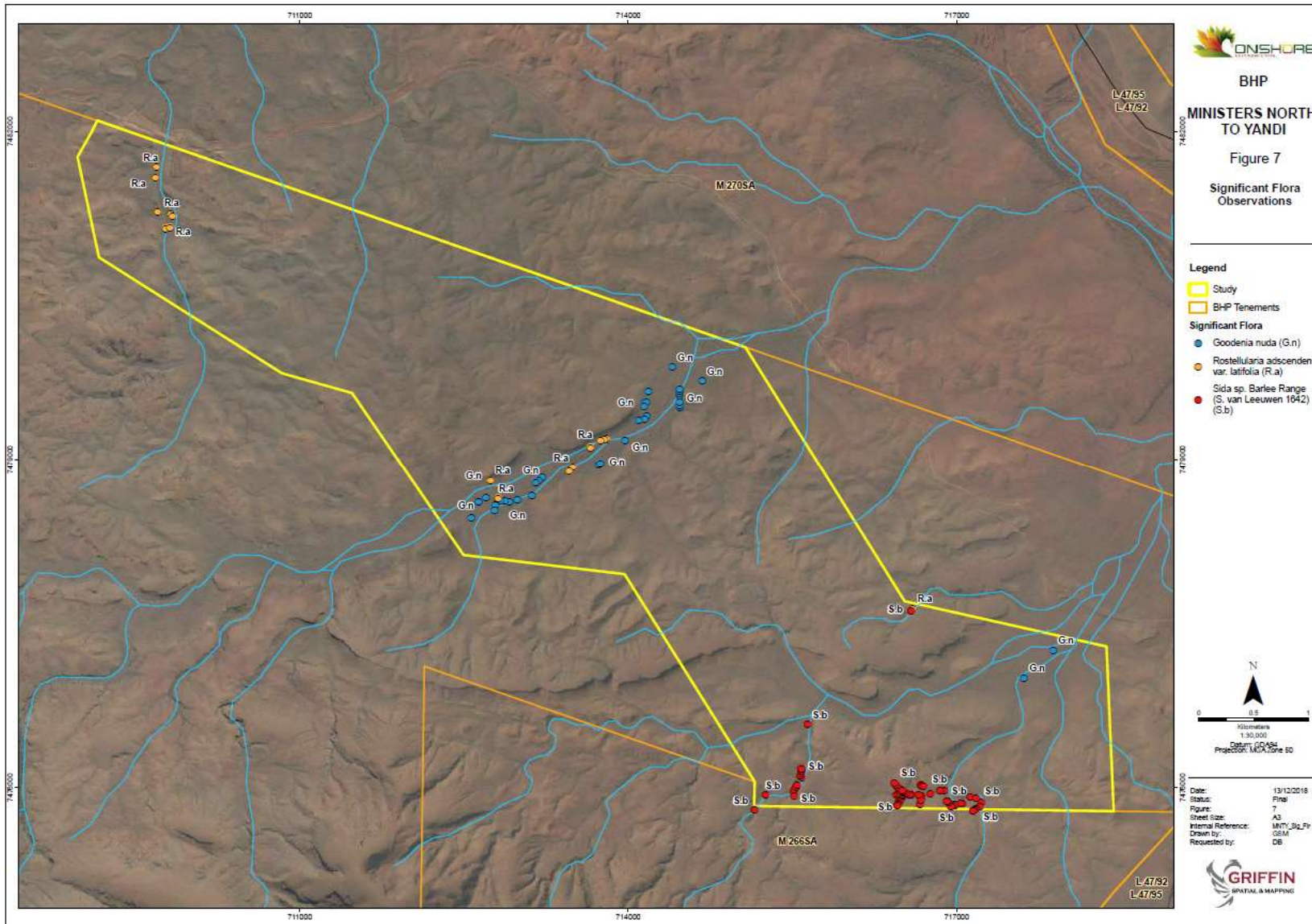
Legend	
	Study Area
Vegetation Types	
Hill Crest	
	HC EmuCyaTt CfEII Tw (6) <i>Open Tussock Grassland of Eriachne mucronata, Cymbopogon ambiguus and Themeda triandra with Low Open Woodland of Corymbia ferricola and Eucalyptus leucophloia subsp. leucophloia and Very Open Hummock Grassland of Triodia wiseana on brown sandy loam on cliffines</i>
	HC Tp AprEII ErtIGrwh (5e) <i>Hummock Grassland of Triodia pungens with Low Open Woodland of Acacia pruinocarpa and Eucalyptus leucophloia subsp. leucophloia with Scattered Shrubs of Eremophila latrobei subsp. latrobei and Grevillea wickhamii subsp. hispidula on brown sandy loam on mesa crests</i>
	HC TsTw EII Grwh (5d) <i>Hummock Grassland of Triodia sp. Shovelanna Hill (S. van Leeuwen 3835) and Triodia wiseana with Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia and High Open Shrubland of Grevillea wickhamii subsp. hispidula on brown sandy loam on hillcrests and upper slopes</i>
	HC Tw EII AbAanc (5a) <i>Hummock Grassland of Triodia wiseana with Low Open Woodland of Eucalyptus leucophloia subsp. leucophloia with Scattered Tall Shrubs of Acacia bivenosa and Acacia ancistrocarpa on brown sandy loam on ironstone mesa crests</i>
Hill Slope	
	HS TwTtr Ai Inr (5b) <i>Hummock Grassland of Triodia wiseana and Triodia brizoides with High Open Shrubland of Acacia inaequilatera and Low Open Shrubland of Indigofera rugosa on brown sandy loam on dolerite</i>
Stony Plain	
	SP Tw AiAenAads Ch (5f) <i>Hummock Grassland of Triodia wiseana with High Open Shrubland of Acacia inaequilatera, Acacia tenuissima and Acacia adsurgens with Low Open Woodland of Corymbia hamersleyana on brown sandy loam on stony plains</i>
Flood Plain	
	FP Tp ChHalEv TefcApy (5c) <i>Open Hummock Grassland of Triodia pungens with Low Open Woodland of Corymbia hamersleyana, Hakea lorea subsp. lorea and Eucalyptus victrix over Low Open Shrubland of Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186) and Acacia pyrifolia on brown sandy loam on floodplains and drainage lines</i>
Gorges / Gully	
	GG CfEII AtpAnI TtEmuCya (2) <i>Low Woodland of Corymbia ferricola and Eucalyptus leucophloia subsp. leucophloia over High Open Shrubland of Acacia tumida var. pilbarensis and Androcalva luteiflora over Open Tussock Grassland of Themeda triandra, Eriachne mucronata and Cymbopogon ambiguus on brown silty loam in gorges</i>
Major Drainage Line	
	MA EcEv Cyv SopTtEua (1) <i>Open Forest of Eucalyptus camaldulensis and Eucalyptus victrix over Sedges of Cyperus vaginatus and Open Tussock Grassland of Sorghum plumosum, Themeda triandra and Eulalia aurea on brown sand on major drainage lines</i>
	MA Ev TefcCoorApy TtSopCya (3) <i>Low Woodland of Eucalyptus victrix over Low Shrubland of Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186), Corchorus crozophorifolius and Acacia pyrifolia over Open Tussock Grassland of Themeda triandra, Sorghum plumosum and Cymbopogon ambiguus on brown sand on major drainage lines</i>
Medium Drainage Line	
	ME TtCyaEnI Cyv AcpEvCh (7) <i>Open Tussock Grassland of Themeda triandra, Cymbopogon ambiguus and Enneapogon lindleyanus with Open Sedges of Cyperus vaginatus with Low Open Woodland of Acacia coriacea subsp. pendens, Eucalyptus victrix and Corymbia hamersleyana on brown silty loam on medium drainage lines</i>
Minor Drainage Line	
	MI AmAmaGoro TtCyaPamu ChEII (4) <i>Open Scrub of Acacia monticola, Acacia maitlandii and Gossypium robinsonii with Open Tussock Grassland of Themeda triandra, Cymbopogon ambiguus and Paraneurachne muelleri with Low Open Woodland of Corymbia hamersleyana and Eucalyptus leucophloia subsp. leucophloia on brown sandy loam on minor drainage lines</i>
Other	
	Track





(2) Vegetation condition mapping (Onshore Environmental 2018)







(3) Significant flora locations (Onshore Environmental 2018)




(4) Fauna Habitats (Biologic 2018)

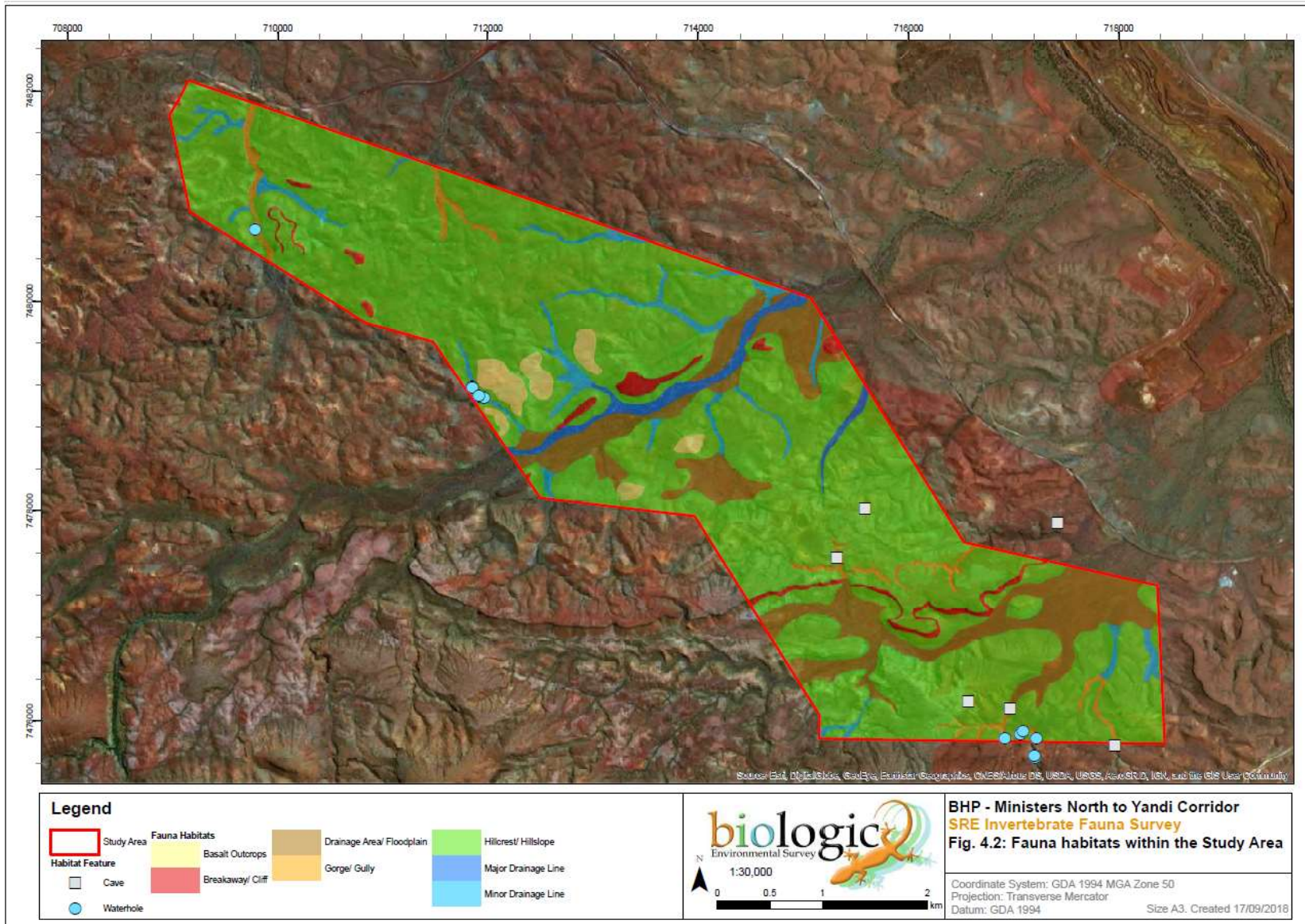
Habitat	Distinguishing habitat characteristics	Occurrence of the habitat within the Study Area	Extent of the habitat outside Study Area	Photo
<p>Hillcrests/ slopes</p> <p>1603 ha 76.66%</p>	<p>These fauna habitats tend to be more open and structurally simple than other fauna habitats and are dominated by varying species of spinifex. Common features of these habitats are rocky substrates, often with exposed bedrock, and skeletal red soils. This habitat is usually dominated by <i>Eucalyptus</i> woodlands, <i>Acacia</i> and <i>Grevillea</i> scrublands and <i>Triodia</i> low hummock grasslands.</p>	<p>Very extensive and widely distributed. The most common fauna habitat within the Study Area.</p>	<p>Very extensive in the region, occurring wherever there are ridges and low rises.</p>	
<p>Drainage Area/ Floodplain</p> <p>261 ha 12.50%</p>	<p>Drainage area/ Floodplain habitat tends to be associated with rivers and major drainage lines having wide valley floors. They usually have alluvial sands or clay loams supporting open to sparse low woodlands and shrublands over grasses. Often dominated by Buffel grass.</p>	<p>Moderately extensive within the south-eastern half of the Study Area associated with the major drainage line valleys, and accounting for a moderate proportion of the Study Area.</p>	<p>Moderately extensive along major rivers and creeks. The Fortescue Marsh is the most extensive form of this habitat within the wider region.</p>	

Habitat	Distinguishing habitat characteristics	Occurrence of the habitat within the Study Area	Extent of the habitat outside Study Area	Photo
<p>Minor Drainage Line</p> <p>72 ha 3.43%</p>	<p>Characterised by low and sparse vegetation compared to Major Drainage Lines. Consisted of <i>Acacia</i> low woodland sometimes with scattered <i>Eucalyptus xerothermica</i> and <i>Corymbia hamersleyana</i>. The understorey generally lack density and often consists solely of sparse tussock grassland, often of <i>*Cenchrus ciliaris</i> where it has been introduced. The substrate can be sandy in places but generally consists of a loam gravel or stone.</p>	<p>Minor Drainage Lines run throughout the Study Area, particularly through the central section. Represents a small proportion of the Study Area.</p>	<p>A common habitat in the Hamersley Range and adjacent to the Study Area.</p>	
<p>Basalt Outcrops</p> <p>41 ha 1.98%</p>	<p>This habitat occurs where the surrounding material has eroded, exposing large rock faces and boulders piles. The fine crystalline structure of basalt tends to fracture in straight plains providing excellent crevices and cracks for a wide range of reptile and mammal fauna. Vegetation is sparse through these areas due to the lack or paucity of soil availability.</p>	<p>Small proportion of this habitat occurs within the central portion of the Study Area associated with hillcrest and slopes.</p>	<p>A reasonably common habitat, patchily distributed through the Pilbara, more prevalent in the north. They tend to be isolated features in the landscape varying in size, height and connectivity thus some patches could be considered more important than others.</p>	

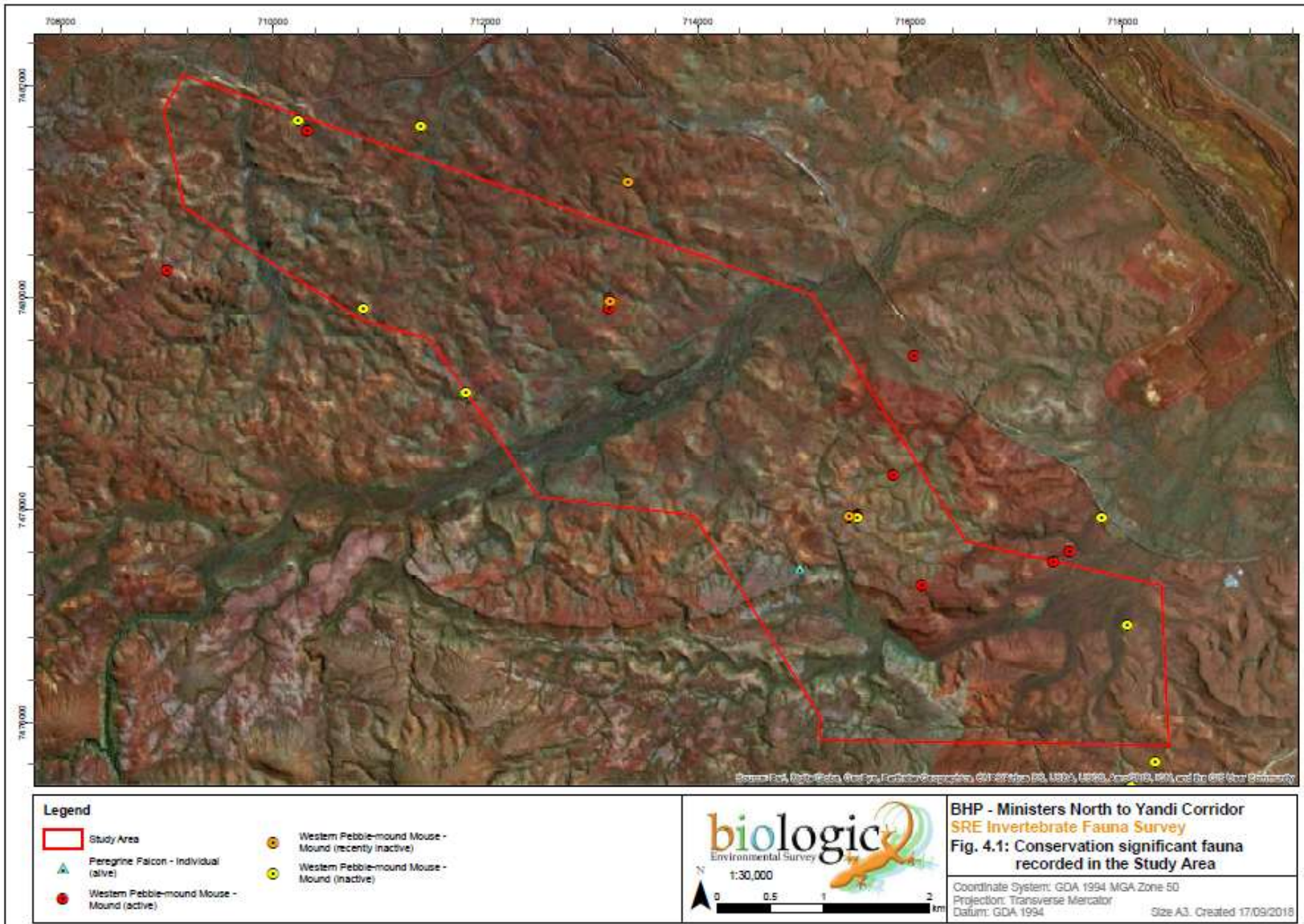
Habitat	Distinguishing habitat characteristics	Occurrence of the habitat within the Study Area	Extent of the habitat outside Study Area	Photo
<p>Gorge/ Gully</p> <p>40 ha 1.92%</p>	<p>Gorges and gullies are rugged, steep-sided valleys incised into the surrounding landscape. Gorges tend to be deeply incised, with vertical cliff faces, while gullies are more open (but not as open as Drainage Area or Valleys). Caves and rock pools are most often encountered in this habitat type. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred.</p>	<p>Run along Minor Drainage Lines within the north-west and south-east portions of the. Absent from the central portion dominated by a major drainage line which is a tributary of Yandi Creek. Representing a small proportion of the total land area of the Study Area.</p>	<p>These are minor/uncommon habitats associated with minor drainage lines.</p>	
<p>Major Drainage Line</p> <p>37 ha 1.78%</p>	<p>Major Drainage Lines comprise mature River Red Gums/ Coolabahs over dry river pools. Open, sandy or gravelly riverbeds characterise this habitat type. In non-grazed areas, the vegetation adjacent to the main channel or channels is denser, taller and more diverse than adjacent terrain.</p>	<p>The Major Drainage Line within the Study Area runs south-west to north-east bisecting the approximate centre of the Study Area. Covers a relatively small proportion.</p>	<p>Common habitat throughout the Pilbara and are generally associated with all major rivers in the Pilbara, such as the Fortescue, De Grey, Yule and Turner rivers. However, because they tend to be relatively narrow, linear features, they only represent a small proportion of the total land area. Water presence can be as episodic flows, temporary, or permanent pools.</p>	

Habitat	Distinguishing habitat characteristics	Occurrence of the habitat within the Study Area	Extent of the habitat outside Study Area	Photo
<p>Breakaway/ Cliff</p> <p>36 ha 1.73%</p>	<p>Breakaways and Cliffs tend to be more open and structurally simple due to their recent depositional history than other fauna habitats and are dominated by varying species of spinifex. A common feature of these habitats is a rocky substrate, often with exposed bedrock, and skeletal red soils. These are usually dominated by <i>Eucalyptus</i> woodlands, <i>Acacia</i> and <i>Grevillea</i> scrublands and <i>Triodia</i> spp. low hummock grasslands.</p>	<p>Uncommon, generally patchy and sparsely distributed in several areas throughout the Study Area associated with hillcrests.</p>	<p>Extensive areas of Crest/Slope habitat occur throughout the Hamersley Range Sub-bioregion, and wider the Pilbara.</p>	

(5) Fauna Habitat mapping (Biologic 2018)



(6) Significant fauna locations (Biologic 2018)



Appendix F – References and databases

1. References

- BHP (2020a) BHP Billiton Iron Ore Pty Ltd. Supporting information for clearing permit application CPS 8953/1. Received by DWER on 24 June 2020. (DWER Ref A1922055).
- BHP (2020b) BHP Billiton Iron Ore Pty Ltd. Additional supporting information for clearing permit application CPS 8953/1 including a section 91 licence. Received by DWER on 2 November 2020. (DWER Ref A1949152).
- Biologic (2017) Ministers North to Yandi Corridor Single Phase Level 2 Fauna and Detailed Flora/Vegetation Survey BHP Pty Ltd. December 2017. (DWER Ref A1922053).
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- Environmental Protection Authority (EPA) (2016b) Technical Guidance: Terrestrial Fauna Surveys (December 2016).
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- Sudmeyer, R (2016) 'Climate in the Pilbara', Bulletin 4873, Department of Agriculture and Food, Western Australia, Perth.
- Tille, P. (2006) Resource Management Technical Report 313. Soil-Landscapes of Western Australia's Rangelands and Arid Interior. Department of Agriculture and Food. Government of Western Australia.
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- Van Vreeswyk, A.M.E., Payne, A.L., Hennig, P., and Leighton, K.A. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia. Department of Agriculture, Western Australia.
- Western Australian Herbarium (1998-) FloraBase – the Western Australian Flora, [Online], Government of Western Australia, Available from: <http://florabase.dpaw.wa.gov.au/>. Accessed August 2020.

2. GIS datasets

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

- Aboriginal Heritage Places (DPLH-001)
- 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)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available

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)