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INTERIM MEMORANDUM OF TARGETED THREATENED AND PRIORITY FLORA SEARCHES 2024 AND OLD GROWTH ASSESSMENTS 2024

Introduction

The following details are provided in response to some queries raised for four threatened species during the environmental assessment of the flora and vegetation values of the South32 expansion areas near Boddington.

The following is a summary of information as available to the end of January 2025 and as such supplements the information as collated by Mattice Consulting (20201) and South32 Environmental Review Document (ERD) reports. For all projects, data is continually collected as there will be shifts regularly in local and regional datasets. This extends to the currency of available data from State and Federal datasets which are regularly updated and reviewed. The targeted survey effort highlighted in this memorandum are primarily based on work undertaken by Mattice Consulting between August and December 2024.

1. Regional Context

South32 operates a bauxite mine on the eastern fringes of the northern Jarrah forest and as such at times the flora and vegetation values reflect the lower rainfalls and local variation in landforms and soils. As large expanses of native vegetation in the Western Australian Wheatbelt has been cleared for agricultural activities this appears to have influenced the resulting flora values with some of the conservation flora species occurring as locally geographically restricted species or western extensions of the former Wheatbelt populations.

These significant trends from west to east have been addressed in the regional studies undertaken by Heddlé et al (1980), Mattice and Havel (1998) and Havel (2000). In relation to the South32 Boddington areas a major summary was submitted by Mattice Consulting (2020) for the operational areas.

Mattice Consulting has assisted South32 in undertaking regular rehabilitation and analogue site assessments in the spring months each year from 1987. As a result of both baseline and rehabilitation studies South32 has been able to maintain a significant flora database over these decades. Several other factors have influenced the current understanding of the conservation significant species, including:

- . Improved knowledge of the flora and site preferences of the flora in the Boddington area;
- . Changes in conservation status of some species, for example the priority status of *Acacia gemina*, *Templetonia drummondii* and *Calothamnus planifolius* since the earlier work in the Boddington area; and
- . Some taxonomic changes in nomenclature since the mid 1980's.

2. Survey Effort and Methodology

Targeted flora searches rely on the collation of potential species lists, an understanding of the lifeforms and appearances of the different species or taxa, specific search methodologies, an increased understanding of the site preferences of flora in relation to underlying landforms, soils and site conditions. In this context the depth of knowledge and field experience within the Mattiske ecologists assists South32 in this project. This knowledge has been built in the team since early 1980's when the original flora and vegetation studies were undertaken in the Boddington area.

Additional targeted flora searches over some 56 field days for South32 expansion areas near Boddington were undertaken by botanists from Mattiske Consulting between August and December 2024. Parallel foot traverses were undertaken on regular grid systems whilst recording location and number of plants. Initially transects were located at 20m apart and if any targeted species were recorded this was increased to 10m apart transects, Figure 1.

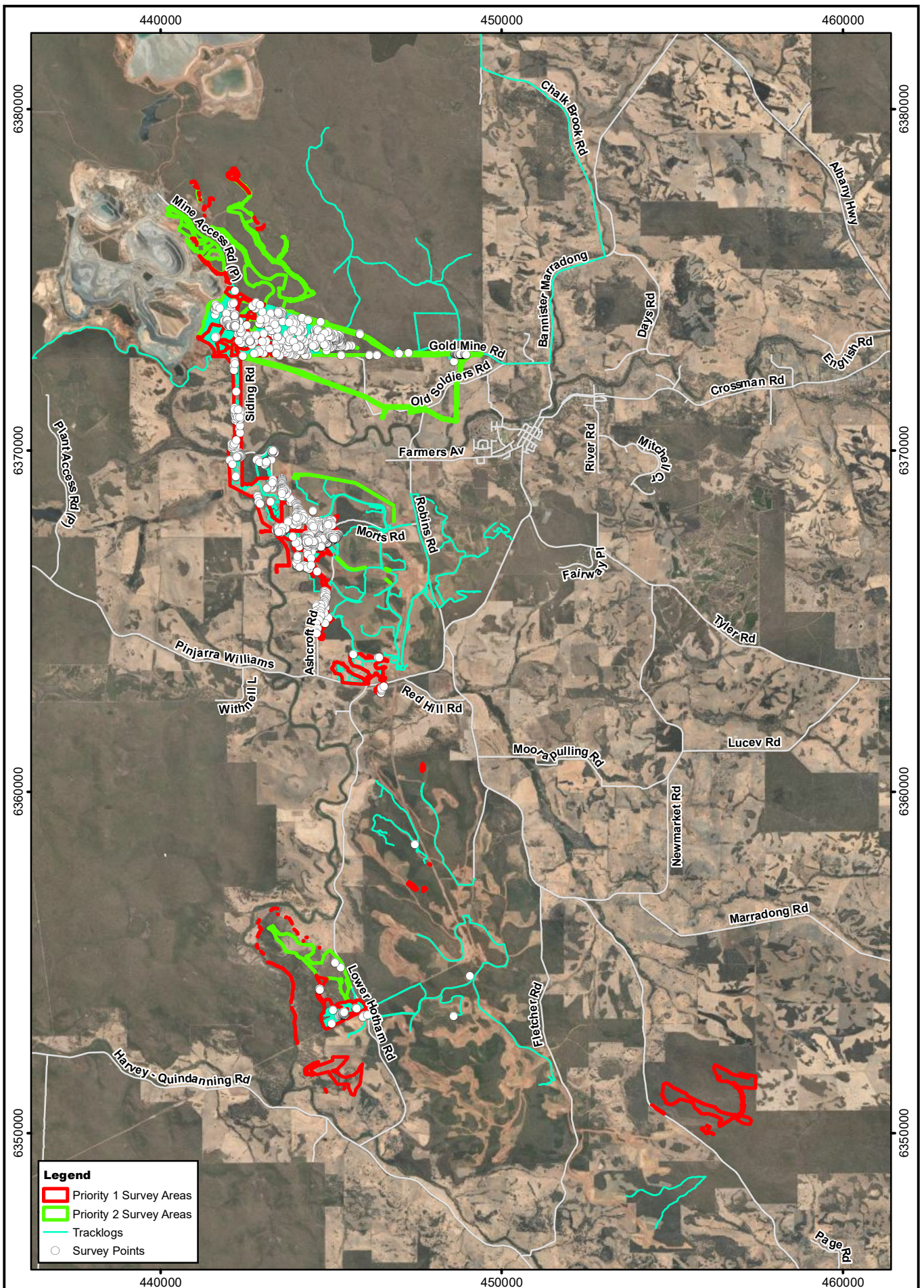
GPS locations were recorded along with number (or density categories), condition and reproductive state of the species. The likelihood of the threatened and priority flora species occurring in the survey areas was based on FloraBase (DBCA 2024a), extracted presence data from previous extensive gridding surveys, experience in the survey area by the authors and data collected over 40 years in the respective baseline and rehabilitation areas.

All plant specimens collected during the field survey were dried and processed in accordance with the requirements of the WAH. All plant specimens were identified through comparisons with pressed specimens at the Mattiske Consulting herbarium and WAH. Where appropriate, plant taxonomists with specialist skills were consulted.

The assessment of old growth values was based on the approach defined in the Department of Parks and Wildlife (2017) for the procedures associated with assessing old growth values. This included an assessment of the following:

- . Tenure and Reserve Status;
- . Phytophthora dieback occurrence (if present this excludes consideration as defined as a significant disturbance);
- . Other Disturbance including grazing, mining, and previous farming;
- . Types of forest types;
- . Harvest History (evident from logs, stumps and track disturbances);
- . Other clearing activities for infrastructure and historical railway, tracks and bridges; and
- . Fire history and mining history.

This survey effort was undertaken during the targeted flora survey on 20m part traverses or 10m apart traverses as defined above.



3. *Calytrix simplex* subsp. *simplex* (P1)

The following is a summary of information as available in February 2025 and as such supplements the information as collated by Mattiske Consulting (2020) and South32 Environmental Review Document (ERD) reports. For all projects, data is continually collected as there will be shifts regularly in local and regional datasets. This extends to the currency of available data from State and Federal datasets which are regularly updated and reviewed.

3.1 Conservation Status and State Herbarium Records

Calytrix simplex subsp. *simplex* (P1) is known from seven records at the Western Australian State Herbarium and as such occurs on the western fringes of the Darling Scarp near Armadale, Mt Cooke as well as the Marradong and Mount Saddleback areas.

This species occurs mainly in the heath communities and in shallow, sandy soils in the Jarrah Woodlands near Boddington. The associated site-vegetation type was not commonly encountered during this survey with no populations being recorded.

3.2 Regional and Local Background Knowledge

Two collections were recorded in 1901 by Morrison, A, and once in 1981 by Halford, D (WAH 1998-). *Calytrix simplex* subsp. *simplex* was most recently recorded in 2020 by Dharmarajan, R north of Mt Saddleback near Pinjarra-Williams Road (WAH 1998-). The main threats to *Calytrix simplex* subsp. *simplex* are habitat loss, fragmentation, invasive species, *Phytophthora* dieback and grazing activities by native fauna.

Calytrix simplex subsp. *simplex* (P1) was recorded at Mt Cooke by N Burrows in 2004 there is a high probability that there is an association with more shallow soils associated with granite areas and as such follows the pattern of occurring on the western, northern and eastern fringes of the Darling Ranges. Whilst the current records are concentrated near Armadale, Mt Cook and Mt Saddleback areas the latter may in fact reflect the wider survey efforts with more concentrated efforts in specific locations.

The individuals recorded near Forty Hollow Road have been recorded previously by Halford D in 1981 as part of the former Dames and Moore assessments during Worsley Alumina Pty Ltd Phase I (Dames and Moore 1982). Duplicates at the time were collected and sent to Canberra.

Additional collections were made by M. Swinburn and P. Bullock in January 2013 in heath and Jarrah woodland within the Mt Saddleback Timber Reserve, 1700 m NE of intersection of Lower Hotham Road and Worsley conveyor. Extends 450 m S from the Conveyor along both side of Hatfield Road to the SW Haul Road. Within Worsley Bauxite Mine SW6 Mining area. A total of 2000 or more plants were recorded in 2013.

3.3 Recent Survey Efforts

Additional targeted work in addition to the previous extensive survey and monitoring work was undertaken in recent years and a further 200 plus plants were recorded. This included an additional 36 plants in 15 locations in December 2020 and also over 200 plants in previous efforts by Mattiske Consulting and South32.

Mattiske Consulting Pty Ltd undertook additional searches for the priority species *Calytrix simplex* subsp. *simplex* (P1) within the Saddleback mine. A previous historical record of *Calytrix simplex* subsp. *simplex* (P1) was found 1km to the north-east of the additional search areas. The latter search was undertaken by an experienced botanist, Roger Dharmarajan, from Mattiske Consulting and the environmental specialist, Reghan Mann, at Boddington Bauxite mine on the 16th of December. Collections were taken utilising valid collection licences to collect flora for scientific purposes, issued under the *WC Act*. The vegetation community consists of low heathland with no trees (with exception of fringing Jarrah and Sheoak and the occasional *Persoonia longifolia*). The understorey species for the G3 vegetation community consists of an open heath of *Banksia squarrosa* subsp. *squarrosa*, *Hakea incrassata*, *Hakea undulata*, *Petrophile heterophylla* and *Petrophile serruriae* on shallow soils over granite outcrops on slopes with occasional emergent *Eucalyptus drummondii*. (Mattiske Consulting Pty Ltd, 2020).

Mattiske Consulting undertook additional targeted flora surveys for *Calytrix simplex* subsp. *simplex* between August and December 2024. No additional locations were recorded in the 2024 searches.

3.4 Limitations

Previous State Herbarium records do not delineate *Calytrix simplex* subsp. *simplex* population numbers as this is a recent introduction to data collection requirements. State Herbarium specimens of this species have been previously collected in shallow soils on flats and slopes of granite outcrops which has not been extensively encountered during the targeted search period.

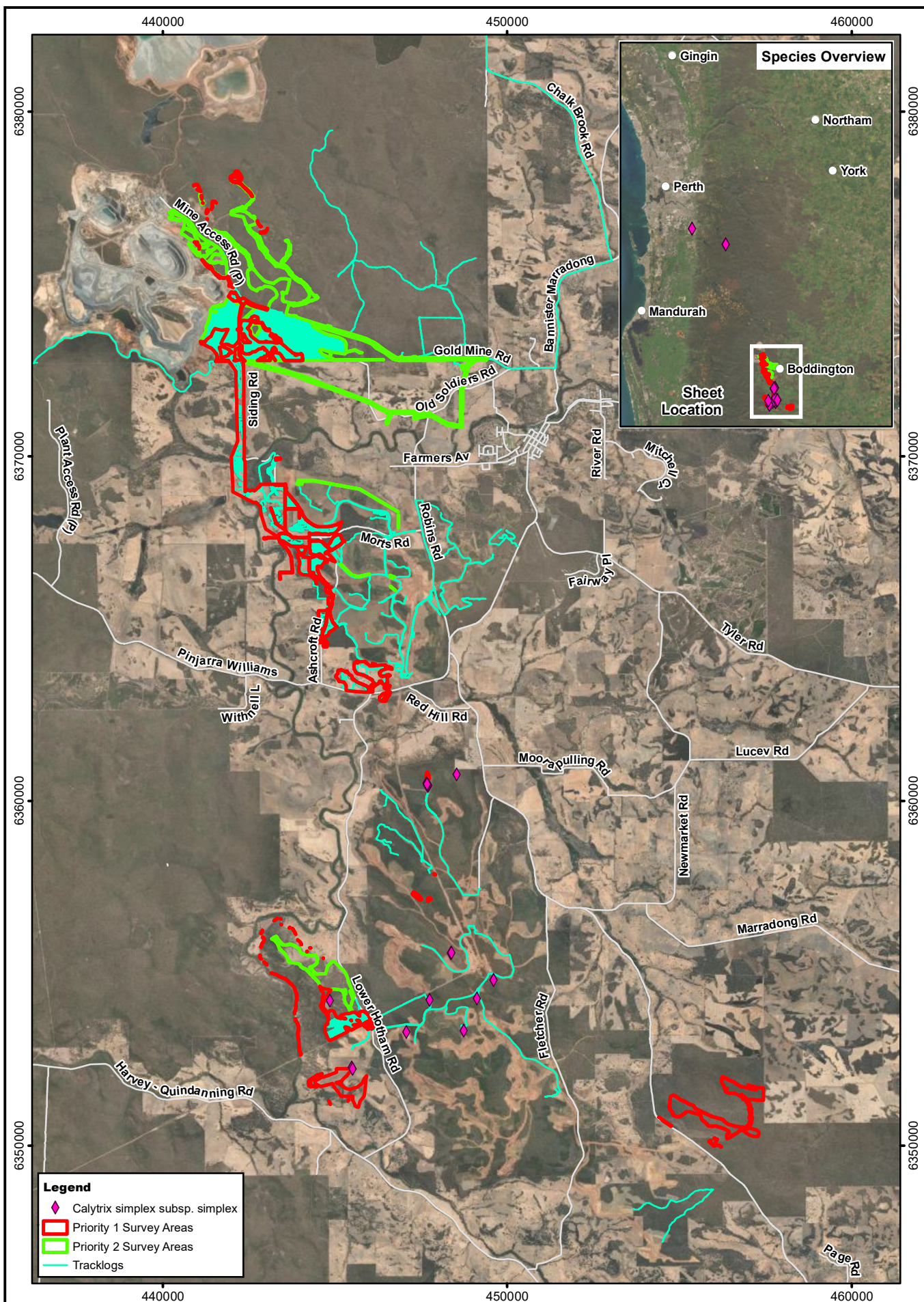
3.5 Site-Vegetation Types

Calytrix simplex subsp. *simplex* is primarily associated with the site-vegetation types G3, P, H, CL and rehabilitation areas.

Calytrix simplex subsp. *simplex* (P1) in the Boddington area has been recorded heath communities (G3) and the sandy gravel soil types that support Jarrah (*Eucalyptus marginata*) and Sheoak (*Allocasuarina fraseriana*) communities (P and H) with a range of species that tolerate the sandier soil conditions in the Mt Saddleback areas. The occurrence in the G3 community as defined by Mattiske Consulting aligns with the collection at Mt Cooke in heath areas (which is located within a conservation area). The nature of the communities at Armadale are less apparent from the State Herbarium records.

Table 1: GPS coordinates of records of *Calytrix simplex* subsp. *simplex* (P1) near Boddington

GPS Location (GDA94, Zone 50H)		Site	Population	Area (m)	Condition
447708	6360436	1	3	2x2	Healthy
447701	6360443	1	1	2x2	Healthy
447699	6360447	1	1	2x2	Healthy
447701	6360450	1	1	2x2	Healthy
447693	6360452	1	2	2x2	Healthy
447695	6360457	1	2	2x2	Healthy
447692	6360457	1	2	2x2	Healthy
447689	6360462	1	2	2x2	Healthy
447680	6360463	1	2	2x2	Healthy
447674	6360478	1	3	2x2	Healthy
447670	6360483	1	3	2x2	Healthy
447688	6360442	1	4	2x2	Healthy
447698	6360432	1	4	2x2	Healthy
449606	6354794	2	4	2x2	Healthy
449604	6354793	2	2	2x2	Healthy



4. *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) (P1)

The following is a summary of information as available in February 2025 and as such supplements the information as collated by Mattiske Consulting (2020) and South32 Environmental Review Document (ERD) reports. For all projects, data is continually collected as there will be shifts regularly in local and regional datasets. This extends to the currency of available data from State and Federal datasets which are regularly updated and reviewed.

4.1 Conservation Status and State Herbarium Records

Gastrolobium sp. Prostrate Boddington (M. Hislop 2130) (P1) is known from six records at the Western Australian State Herbarium and as such occurs mainly in the Boddington area near the Hotham River and north of the Newmont Boddington Gold mine camp (Mattiske Consulting Pty Ltd, WAH 1998-). The initial collection was made by M. Hislop on the Pinjarra-Williams Road in 2000, followed by several other collections submitted by Mattiske Consulting within the Camballing Reserve, near the Hotham River, Marradong and more recently in the South32 expansion areas near Boddington.

4.2 Regional and Local Background Knowledge

The six records of *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) have been collected over a period of 25 years.

Previously over 26,000 plants have been recorded in the Boddington area by the Mattiske ecologists, South 32 environmental scientists and other consultants; with the majority occurring near the Hotham River and north of the Newmont Boddington Gold Mine camp within the Wandoo Woodlands.

Additional specimens have been collected and primarily located in the seasonally moist soils of Wandoo Woodlands north of the Newmont Mine Camp and along the Hotham River (Mattiske Consulting Pty Ltd, WAH 1998-). The main threats to *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) are habitat loss, fragmentation, invasive species, Phytophthora dieback and grazing activities by native fauna.

4.3 Recent Survey Effort

Mattiske Consulting undertook targeted flora surveys for *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) between August and December 2024. As a result, 314 populations of the species were recorded in the project area (Table 2, Figure 3). This species occurs as prostrate, mat-forming shrubs in dense patches which appear to tolerate some disturbance as it occurs on several road verges. These targeted flora surveys are in addition to the surveys undertaken over 40 years in the respective areas within the South32 lease areas (Mattiske Consulting 2021). In this assessment, there was overlap of plant locations made previously near the fringes of the Hotham River. The vast majority of the plants occur in the offset area to the north of the Newmont Boddington Gold Mine camp area within the Wandoo woodlands, Figure 3. This wider area was mapped from a combined database managed by South32 and Newmont for conservation significant species.

4.4 Limitations

Previous State Herbarium records do not delineate *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) population numbers as this is a recent introduction to data collection requirements. There are few limitations associated with searching for this species as it is very easy to identify through its leaf morphology and prostrate habit. This perennial species flowers and sets seed in late spring and early summer but can be recorded at any time due to its persistence and resilience as a perennial species and its prostrate habit.

Seed has been collected from the main population areas to the north of the Boddington Gold Mine camp and lodged with the Seed Bank managed by DBCA.

4.5 Site-Vegetation Types

Gastrolobium sp. Prostrate Boddington (M. Hislop 2130) is primarily associated with the site-vegetation types D, M, P and Y as defined by Mattiske Consulting (2020). D site-vegetation type supports open woodlands of *Eucalyptus marginata* and *Corymbia calophylla* on clay-loams on low slopes. M site-vegetation type includes gravelly mid-upper slopes supporting *Eucalyptus wandoo* as well as clay-loam soils on lower slopes of Wandoo (Y site-vegetation type) with a mixture of *Eucalyptus marginata* and *Allocasuarina fraseriana* on sandy-loam gravel soils on slopes (P site-vegetation type).

Table 2: GPS coordinates of 2024 records of *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) (P1)

Site Veg Type	MGA East	MGA North	Population	Area	Condition
M	443491	6367683	12	2x2	Healthy
M	443404	6367687	6	2x2	Healthy
M	443398	6367684	3	2x2	Healthy
M	443432	6367702	10	2x2	Healthy
M	443453	6367704	8	2x2	Healthy
M	443473	6367704	3	2x2	Healthy
M	443508	6367702	7	2x2	Healthy
M	443471	6367725	1	2x2	Healthy
M	443545	6367615	1	2x2	Healthy
M	443439	6367708	6	2x2	Healthy
M	443488	6367671	6	2x2	Healthy
M	443474	6367674	8	2x2	Healthy
M	443447	6367675	8	2x2	Healthy
M	443435	6367667	3	2x2	Healthy
M	443446	6367666	8	2x2	Healthy
M	443463	6367664	8	2x2	Healthy
M	443454	6367664	8	2x2	Healthy
M	443489	6367665	6	2x2	Healthy
M	443476	6367663	6	2x2	Healthy
M	443513	6367669	6	2x2	Healthy
M	443496	6367669	6	2x2	Healthy
M	443548	6367666	7	2x2	Healthy
M	443506	6367658	2	2x2	Healthy
M	443476	6367656	6	2x2	Healthy
M	443467	6367656	6	2x2	Healthy
M	443439	6367642	3	2x2	Healthy
M	443457	6367644	3	2x2	Healthy
M	443476	6367644	6	2x2	Healthy
M	443482	6367644	6	2x2	Healthy
M	443496	6367644	3	2x2	Healthy
M	443506	6367645	3	2x2	Healthy
M	443598	6367643	3	2x2	Healthy
Z	443109	6369651	1	2x2	Healthy
Z	443107	6369665	1	2x2	Healthy
M	443270	6369932	5	2x2	Healthy
M	443277	6369946	5	2x2	Healthy
M	443267	6369945	5	2x2	Healthy
M	443287	6369956	1	2x2	Healthy
M	443262	6369975	3	2x2	Healthy
M	443304	6369984	3	2x2	Healthy
M	443293	6369984	3	2x2	Healthy
M	443313	6370006	1	2x2	Healthy
M	443303	6370004	1	2x2	Healthy
	448960	6372822	1	2x2	Healthy
	448973	6372821	8	2x2	Healthy
D	442301	6369905	25	2x2	Healthy
D	442322	6369905	20	2x2	Healthy
D	442334	6369901	20	2x2	Healthy

Site Veg Type	MGA East	MGA North	Population	Area	Condition
D	442323	6369874	10	2x2	Healthy
D	442304	6369879	20	2x2	Healthy
D	442292	6369879	15	2x2	Healthy
D	442282	6369872	25	2x2	Healthy
D	442270	6369876	1	2x2	Healthy
D	442260	6369877	3	2x2	Healthy
D	442258	6369875	3	2x2	Healthy
D	442243	6369877	3	2x2	Healthy
D	442245	6369845	4	2x2	Healthy
D	442257	6369846	20	2x2	Healthy
D	442270	6369840	20	2x2	Healthy
D	442294	6369844	6	2x2	Healthy
D	442306	6369847	12	2x2	Healthy
D	442318	6369847	40	2x2	Healthy
D	442324	6369846	30	2x2	Healthy
D	442336	6369846	6	2x2	Healthy
D	442346	6369844	20	2x2	Healthy
D	442381	6369842	10	2x2	Healthy
D	442339	6369809	1	2x2	Healthy
AX	442251	6369810	1	2x2	Healthy
CL	442242	6369815	2	2x2	Healthy
M	442214	6369239	1	2x2	Healthy
M	443577	6367691	15	2x2	Healthy
M	443522	6367700	7	2x2	Healthy
M	443492	6367690	2	2x2	Healthy
M	443474	6367695	5	2x2	Healthy
M	443464	6367692	2	2x2	Healthy
M	443450	6367684	5	2x2	Healthy
M	443435	6367691	10	2x2	Healthy
M	443432	6367717	1	2x2	Healthy
M	443440	6367712	10	2x2	Healthy
M	443531	6367718	1	2x2	Healthy
M	443458	6367734	5	2x2	Healthy
Z	444724	6367396	7	2x2	Healthy
Z	444732	6367393	15	2x2	Healthy
Z	444727	6367401	11	2x2	Healthy
Z	444715	6367403	1	2x2	Healthy
Z	444619	6367414	4	2x2	Healthy
Z	444651	6367416	1	2x2	Healthy
Z	444706	6367424	1	2x2	Healthy
Z	444691	6367426	5	2x2	Healthy
Z	444684	6367422	3	2x2	Healthy
Z	444670	6367426	2	2x2	Healthy
Z	444658	6367426	20	2x2	Healthy
Z	444647	6367424	2	2x2	Healthy
Z	444652	6367431	10	2x2	Healthy
Z	444668	6367437	30	2x2	Healthy
D	444691	6367436	32	2x2	Healthy
D	444685	6367443	25	2x2	Healthy
D	444677	6367443	39	2x2	Healthy
Z	444665	6367446	1	2x2	Healthy
D	444655	6367457	3	2x2	Healthy
D	444663	6367454	11	2x2	Healthy
D	444678	6367450	61	2x2	Healthy
D	444665	6367469	22	2x2	Healthy
D	444649	6367463	10	2x2	Healthy
Z	444636	6367464	2	2x2	Healthy
Z	444618	6367462	9	2x2	Healthy
Z	444624	6367474	33	2x2	Healthy
D	444640	6367472	25	2x2	Healthy

Site Veg Type	MGA East	MGA North	Population	Area	Condition
D	444648	6367476	40	2x2	Healthy
D	444643	6367483	52	2x2	Healthy
Z	444626	6367483	17	2x2	Healthy
Z	444614	6367482	25	2x2	Healthy
Z	444597	6367485	12	2x2	Healthy
Z	444594	6367489	2	2x2	Healthy
Z	444609	6367492	20	2x2	Healthy
Z	444617	6367495	10	2x2	Healthy
D	444626	6367495	12	2x2	Healthy
D	444637	6367497	25	2x2	Healthy
D	444631	6367505	2	2x2	Healthy
D	444626	6367503	2	2x2	Healthy
Z	444596	6367509	19	2x2	Healthy
D	444620	6367519	2	2x2	Healthy
D	444636	6367517	50	2x2	Healthy
D	444621	6367525	20	2x2	Healthy
D	444597	6367525	2	2x2	Healthy
Z	444581	6367524	8	2x2	Healthy
Z	444528	6367534	10	2x2	Healthy
Z	444531	6367535	21	2x2	Healthy
Z	444523	6367546	6	2x2	Healthy
Z	444514	6367547	10	2x2	Healthy
Z	444493	6367544	1	2x2	Healthy
P	444307	6367436	2	2x2	Healthy
P	444302	6367422	2	2x2	Healthy
	448826	6372819	4	2x2	Healthy
	448900	6372817	4	2x2	Healthy
D	442305	6369916	5	2x2	Healthy
P	444595	6367774	16	2x2	Healthy
P	444680	6367759	3	2x2	Healthy
P	444278	6367442	22	2x2	Healthy
P	444316	6367446	5	2x2	Healthy
P	444333	6367446	3	2x2	Healthy
P	444296	6367454	8	2x2	Healthy
P	444284	6367455	3	2x2	Healthy
Z	444275	6367465	8	2x2	Healthy
Z	444285	6367465	2	2x2	Healthy
Z	444295	6367466	58	2x2	Healthy
Z	444308	6367464	40	2x2	Healthy
Z	444325	6367468	2	2x2	Healthy
Z	444303	6367476	32	2x2	Healthy
Z	444291	6367476	36	2x2	Healthy
Z	444283	6367476	40	2x2	Healthy
Z	444275	6367476	72	2x2	Healthy
Z	444276	6367485	130	2x2	Healthy
Z	444286	6367485	165	2x2	Healthy
Z	444298	6367484	82	2x2	Healthy
Z	444309	6367484	21	2x2	Healthy
Z	444318	6367484	34	2x2	Healthy
Z	444306	6367495	19	2x2	Healthy
Z	444295	6367495	59	2x2	Healthy
Z	444284	6367493	125	2x2	Healthy
Z	444274	6367495	54	2x2	Healthy
Z	444284	6367503	22	2x2	Healthy
Z	444297	6367507	43	2x2	Healthy
Z	444304	6367506	24	2x2	Healthy
Z	444314	6367505	3	2x2	Healthy
Z	444368	6367505	3	2x2	Healthy
Z	444375	6367505	11	2x2	Healthy
Z	444295	6367525	25	2x2	Healthy

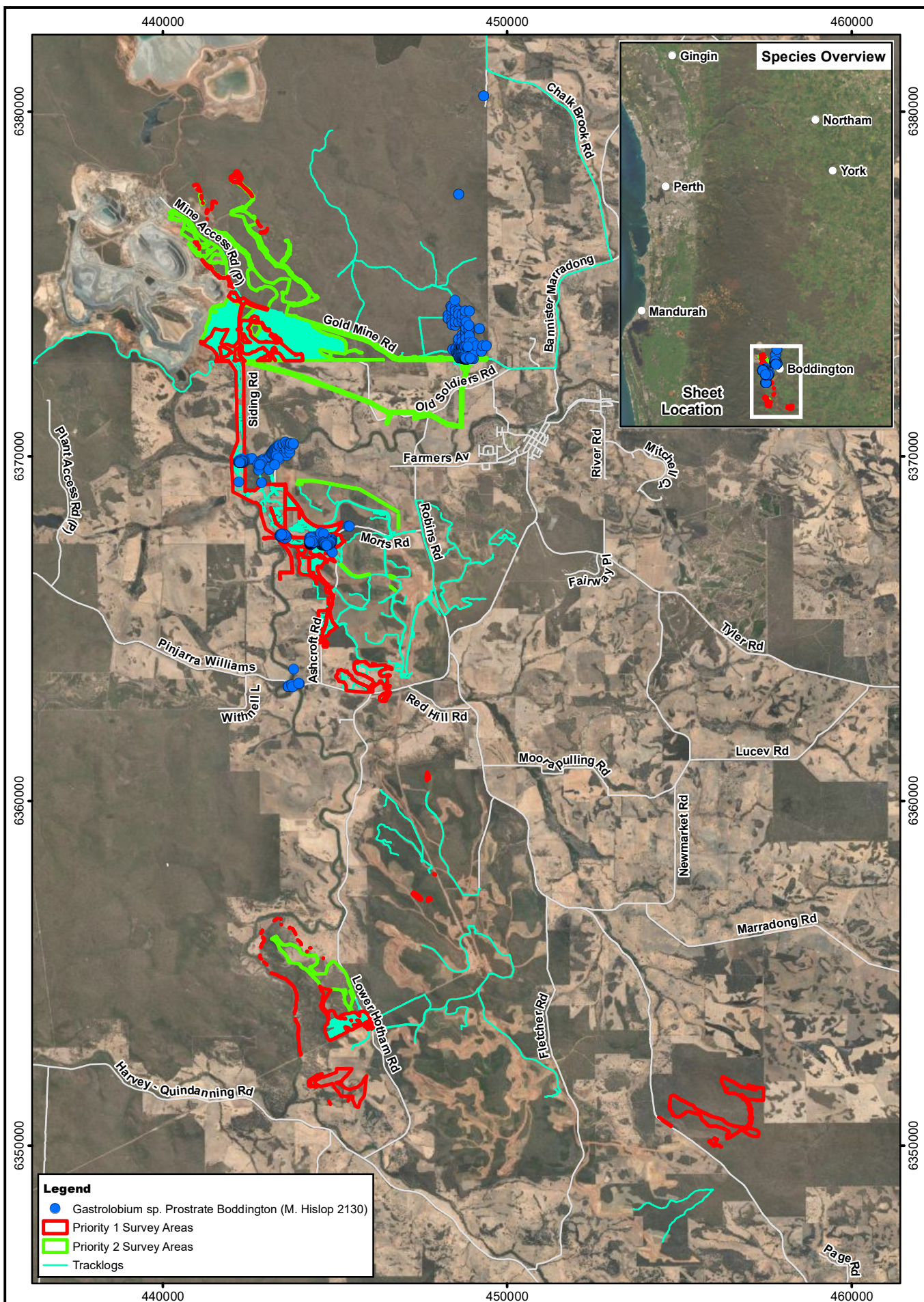
Site Veg Type	MGA East	MGA North	Population	Area	Condition
Z	444314	6367525	2	2x2	Healthy
Z	444334	6367525	4	2x2	Healthy
Z	444277	6367517	25	2x2	Healthy
M	443090	6369613	4	2x2	Healthy
	448628	6372847	8	2x2	Healthy
Y	448637	6372855	12	2x2	Healthy
Y	448644	6372856	6	2x2	Healthy
Y	448658	6372852	18	2x2	Healthy
	448678	6372839	2	2x2	Healthy
Y	448676	6372854	7	2x2	Healthy
	448692	6372841	8	2x2	Healthy
Y	448707	6372856	11	2x2	Healthy
	448705	6372841	5	2x2	Healthy
	448709	6372837	4	2x2	Healthy
	448714	6372844	4	2x2	Healthy
Y	448719	6372859	9	2x2	Healthy
	448724	6372840	18	2x2	Healthy
	448735	6372843	13	2x2	Healthy
Y	448737	6372856	14	2x2	Healthy
	448748	6372843	15	2x2	Healthy
Y	448755	6372855	6	2x2	Healthy
Y	448766	6372855	20	2x2	Healthy
	448765	6372843	6	2x2	Healthy
Y	448776	6372847	3	2x2	Healthy
Y	448777	6372856	9	2x2	Healthy
Y	448786	6372856	4	2x2	Healthy
	448792	6372844	6	2x2	Healthy
P	444909	6367583	13	2x2	Healthy
P	444906	6367573	13	2x2	Healthy
P	444905	6367566	14	2x2	Healthy
P	444917	6367576	9	2x2	Healthy
P	444925	6367563	4	2x2	Healthy
P	444916	6367567	14	2x2	Healthy
P	444897	6367552	8	2x2	Healthy
P	444908	6367555	4	2x2	Healthy
P	444914	6367553	7	2x2	Healthy
P	444904	6367545	5	2x2	Healthy
P	444895	6367543	9	2x2	Healthy
P	444897	6367536	14	2x2	Healthy
P	444905	6367535	7	2x2	Healthy
P	444922	6367535	2	2x2	Healthy
P	444906	6367527	4	2x2	Healthy
P	444894	6367525	12	2x2	Healthy
P	444884	6367527	6	2x2	Healthy
P	444885	6367519	7	2x2	Healthy
P	444897	6367517	15	2x2	Healthy
P	444905	6367513	3	2x2	Healthy
P	444914	6367514	5	2x2	Healthy
P	444906	6367503	3	2x2	Healthy
P	444897	6367505	7	2x2	Healthy
P	444885	6367506	11	2x2	Healthy
P	444878	6367504	9	2x2	Healthy
P	444885	6367496	19	2x2	Healthy
P	444894	6367493	11	2x2	Healthy
P	444884	6367484	12	2x2	Healthy
P	444863	6367482	12	2x2	Healthy
D	444654	6367517	17	2x2	Healthy
D	444664	6367503	22	2x2	Healthy
D	444668	6367495	14	2x2	Healthy
D	444675	6367480	8	2x2	Healthy

Site Veg Type	MGA East	MGA North	Population	Area	Condition
D	444689	6367467	13	2x2	Healthy
D	444700	6367455	4	2x2	Healthy
D	444709	6367445	9	2x2	Healthy
D	444718	6367436	7	2x2	Healthy
Z	444739	6367416	4	2x2	Healthy
Z	444761	6367396	6	2x2	Healthy
P	444840	6367425	8	2x2	Healthy
P	444813	6367427	16	2x2	Healthy
P	444805	6367420	13	2x2	Healthy
Z	444786	6367411	6	2x2	Healthy
Z	444775	6367403	8	2x2	Healthy
Z	444762	6367406	4	2x2	Healthy
M	443363	6369939	1	2x2	Healthy
P	443261	6369738	1	2x2	Healthy
L	442851	6369754	36	2x2	Healthy
L	442823	6369731	29	2x2	Healthy
D	442314	6369893	5	2x2	Healthy
D	442301	6369895	13	2x2	Healthy
D	442293	6369894	24	2x2	Healthy
D	442228	6369862	20	2x2	Healthy
D	442245	6369863	25	2x2	Healthy
D	442237	6369866	25	2x2	Healthy
D	442266	6369861	35	2x2	Healthy
D	442255	6369864	35	2x2	Healthy
D	442277	6369866	26	2x2	Healthy
D	442304	6369865	26	2x2	Healthy
D	442285	6369866	25	2x2	Healthy
D	442312	6369864	26	2x2	Healthy
D	442323	6369864	26	2x2	Healthy
D	442336	6369867	13	2x2	Healthy
D	442344	6369867	13	2x2	Healthy
D	442332	6369835	26	2x2	Healthy
D	442324	6369835	21	2x2	Healthy
D	442302	6369837	18	2x2	Healthy
D	442316	6369834	18	2x2	Healthy
D	442292	6369834	13	2x2	Healthy
D	442287	6369835	13	2x2	Healthy
D	442276	6369832	18	2x2	Healthy
D	442267	6369835	18	2x2	Healthy
CL	442245	6369834	35	2x2	Healthy
CL	442256	6369836	30	2x2	Healthy
CL	442234	6369838	26	2x2	Healthy
CL	442217	6369836	26	2x2	Healthy
CL	442224	6369838	26	2x2	Healthy
CL	442204	6369836	5	2x2	Healthy
D	442314	6369808	26	2x2	Healthy
D	442324	6369805	26	2x2	Healthy
D	442334	6369806	17	2x2	Healthy
D	442373	6369888	6	2x2	Healthy
D	442343	6369885	3	2x2	Healthy
D	442315	6369883	12	2x2	Healthy
D	442306	6369887	5	2x2	Healthy
D	442298	6369882	21	2x2	Healthy
D	442283	6369881	13	2x2	Healthy
D	442275	6369885	10	2x2	Healthy
D	442255	6369885	9	2x2	Healthy
D	442219	6369855	3	2x2	Healthy
D	442231	6369859	15	2x2	Healthy
D	442244	6369859	8	2x2	Healthy
D	442251	6369858	28	2x2	Healthy

Site Veg Type	MGA East	MGA North	Population	Area	Condition
D	442261	6369859	5	2x2	Healthy
D	442271	6369859	31	2x2	Healthy
D	442284	6369855	32	2x2	Healthy
D	442296	6369854	21	2x2	Healthy
D	442321	6369856	11	2x2	Healthy
D	442335	6369851	42	2x2	Healthy
D	442286	6369827	5	2x2	Healthy
D	442269	6369823	4	2x2	Healthy
CL	442249	6369828	31	2x2	Healthy
CL	442235	6369827	19	2x2	Healthy
M	443431	6367706	2	2x2	Healthy
M	443465	6367723	6	2x2	Healthy
	448869	6372844	3	2x2	Healthy
Y	448844	6372855	20	2x2	Healthy
Y	448833	6372853	15	2x2	Healthy
	448836	6372844	15	2x2	Healthy
	448825	6372843	17	2x2	Healthy
Y	448824	6372856	2	2x2	Healthy
Y	448814	6372853	1	2x2	Healthy
	448815	6372844	4	2x2	Healthy
	448805	6372843	21	2x2	Healthy
Y	448804	6372854	3	2x2	Healthy
Y	448797	6372851	11	2x2	Healthy
	448796	6372844	14	2x2	Healthy
	448924	6372842	4	2x2	Healthy
	448931	6372846	4	2x2	Healthy

4.6 Summary for *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130)

This species appears to be relatively restricted to the surrounding areas near Boddington with the majority of plants occurring within the Wandoo Woodlands north of the Boddington Gold Mine Camp and down near the Hotham River. This species demonstrates the capability to establish populations in areas of disturbance near roadside verges.



Legend

- Gastrolobium sp. Prostrate Boddington (M. Hislop 2130)
- Priority 1 Survey Areas
- Priority 2 Survey Areas
- Tracklogs



0 1 2 km
Scale: 1:150,000
MGA94 (Zone 50)



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South32 Survey Areas Gastrolobium sp. Prostrate Boddington (M. Hislop 2130)

Figure:

3

Page 2

5. *Halgania corymbosa* (P3)

The following is a summary of information as available in February 2025 and as such supplements the information as collated by Mattiske Consulting (2020) and South32 Environmental Review Document (ERD) reports. For all projects, data is continually collected as there will be shifts regularly in local and regional datasets. This extends to the currency of available data from State and Federal datasets which are regularly updated and reviewed.

5.1 Conservation Status and State Herbarium Records

Halgania corymbosa (P3) is known from 18 records at the Western Australian State Herbarium and as such occurs from the Darling Scarp on the eastern edge of the Swan Coastal Plain to areas in the Northern Jarrah Forest and the Wheatbelt.

5.2 Regional and Local Background Knowledge

The 18 records of *Halgania corymbosa* have been collected over a period of 120 years, with the first specimen having been collected by Anderson, C in 1902. Additional specimens have been collected primarily occurring North West of Mundaring State Forest (WAH 1998-) with several locations at the Mt Saddleback and Newmont Gold Mine areas. The main threats to *Halgania corymbosa* are habitat loss, fragmentation, invasive species, Phytophthora dieback and grazing activities by native fauna. One of the lodged specimens at the State Herbarium was collected by C. Reynolds during a survey for Newmont Boddington Gold Mine on the former Bunnings and Sotico areas which are now known as the Saddleback Tree Farm. The latter collection by Reynolds was in native forest areas well north of the South32 target areas in 2024. The other main locations near the access road to the Newmont gold mine was inspected in 2024 but with no plants being recorded.

5.3 Recent Survey Effort

Mattiske Consulting undertook targeted flora searches for *Halgania corymbosa* between August and December 2024. This species occurs as an erect shrub associated with clay-loam soils on valley floors or shallow sandy gravel slopes. As a result, no specimens of this species have been found, Figure 4. The extent of targeted work is illustrated in Figure 1.

The *Halgania cyanea* was recorded consistently in some areas south of the Hotham River. Collections of *Halgania cyanea* were confirmed at the State Herbarium.

5.4 Limitations

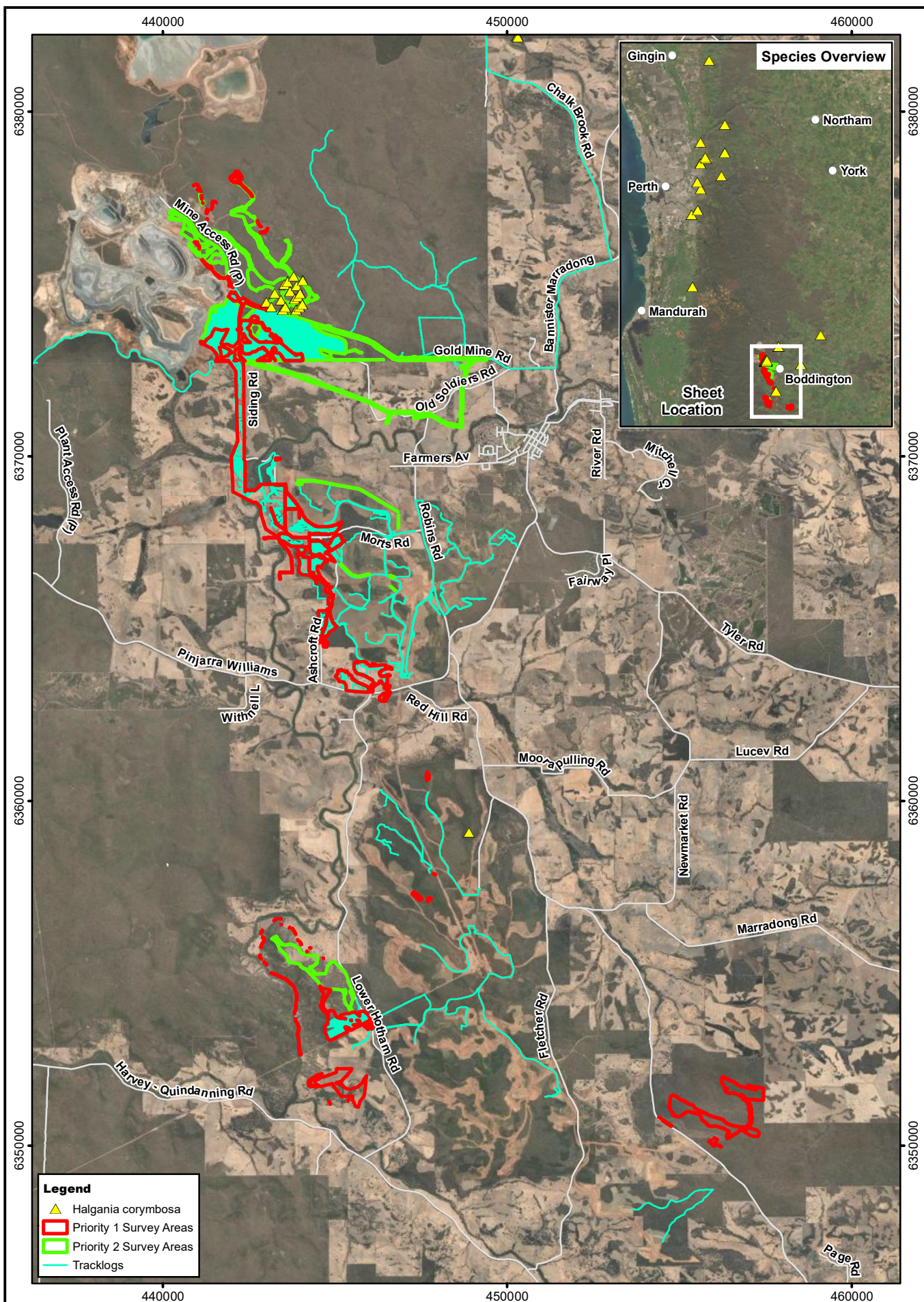
Previous State Herbarium records do not delineate *Halgania corymbosa* population numbers as this is a recent introduction to data collection requirements.

5.5 Site-Vegetation Types

Halgania corymbosa is primarily associated with the site-vegetation types AY, G1, H, PS and Y as defined by Mattiske Consulting (2020). AY site-vegetation types supports open woodlands of *Eucalyptus rudis* and *Eucalyptus wandoo* on clay-loams on valley floors. G1 site-vegetation types consist of open heathlands on shallow soils on slopes with a mixture of open woodlands of *Eucalyptus marginata* and *Corymbia calophylla* on sandy gravel slopes (H site-vegetation type) as well as occasional *Allocasuarina fraseriana* (PS) and Wandoo Woodlands on clay (Y site-vegetation type).

5.6 Summary for *Halgania corymbosa*

This species has been previously recorded near Boddington fringing along the slopes of Mt Saddleback and some areas north of the Hotham River as well as within the Saddleback Tree Farm. The main populations of this species occur near Armadale, Perth hills and north of the Great Eastern Highway.



6. *Hibbertia ambita* (P1)

The following is a summary of information as available in February 2025. This species was only recently defined by Thiele (2019) and as such was part of the *Hibbertia commutata* species that was split into 27 taxa. As a result there has been a need to re-assess the *Hibbertia* species in greater detail.

6.1 Conservation Status and State Herbarium Records

Hibbertia ambita (P1) is known from 17 records at the Western Australian State Herbarium.

6.2 Regional and Local Background Knowledge

The first initial record of *Hibbertia ambita* was in 1983 by J.R. Wheeler near Hotham Road within the boundary of the Worsley Alumina Mine (WAH, 1998). More recent collections by Mattiske E and Jones R in 2015 and 2019 were located within the South32 Boddington Mine as well as some rehabilitation areas, with further collections occurring near Pinjarra-Williams Road by Mattiske E in 2020. This species has been recorded on the fringes of Hotham Road, near Quindanning, south of Boddington and in forest and rehabilitation areas within the South32 lease areas at Mt Saddleback (Mattiske Consulting Pty Ltd, 2020). The main threats to this species are habitat loss, fragmentation, invasive species and grazing activities by native fauna.

6.3 Recent Survey Effort

Mattiske Consulting undertook targeted flora surveys for *Hibbertia ambita* between August and December 2024. This species occurs as an erect multi-stemmed shrub persistent on clay-loam slopes. Four populations were recorded in the recent survey areas (Table 3, Figure 5). A separate targeted flora survey conducted by Paul Bullock (South32) found additional specimens in the George Forest block, along the Karafil track and on private property adjacent to the Boddington Gold Mine (Table 3 and Figure 5).

Table 3: GPS coordinates of 2024 records of *Hibbertia ambita* (P1)

Site Veg Type	MGA East	MGA North	Population	Area (m2)	Condition
CL	444280	6366613	20	20	Healthy
MG	444347	6366586	20	20	Healthy
H	444066	6367185	30	10	Healthy
M	444002	6366644	15	10	Healthy
Rehab / Private property	444202	6369519	100+	100	Healthy
S / WJV land EX-Berry	449738	6356834	500+	100	Healthy
George Forest Block	439987	6359817	50+	30	Healthy
George Forest Block	439152	6359748	30+	10	Healthy
George Forest Block	440850	6360689	20+	10	Healthy
George Forest Block	441550	6361402	50+	20	Healthy
Rehab	446100	6359007	1000+	100	Healthy
Karafil Track	446605	6360054	1000+	100	Healthy

6.4 Limitations

Previous State Herbarium records do not delineate *Hibbertia ambita* population numbers as this is a recent introduction into data collection requirements. *Hibbertia commutata* is a dominant species in the Boddington baseline and rehabilitation areas. It is very difficult to identify *Hibbertia ambita* without flowering specimens. This proved to be a major constraint relating to the need to have full flowering material to separate this species in the later months of the survey with the majority of specimens having returned to their vegetative state. The seasonal conditions have been varying in recent years with drying climatic conditions and as a result timing of survey efforts is a more major constraint for this species than for other conservation species.

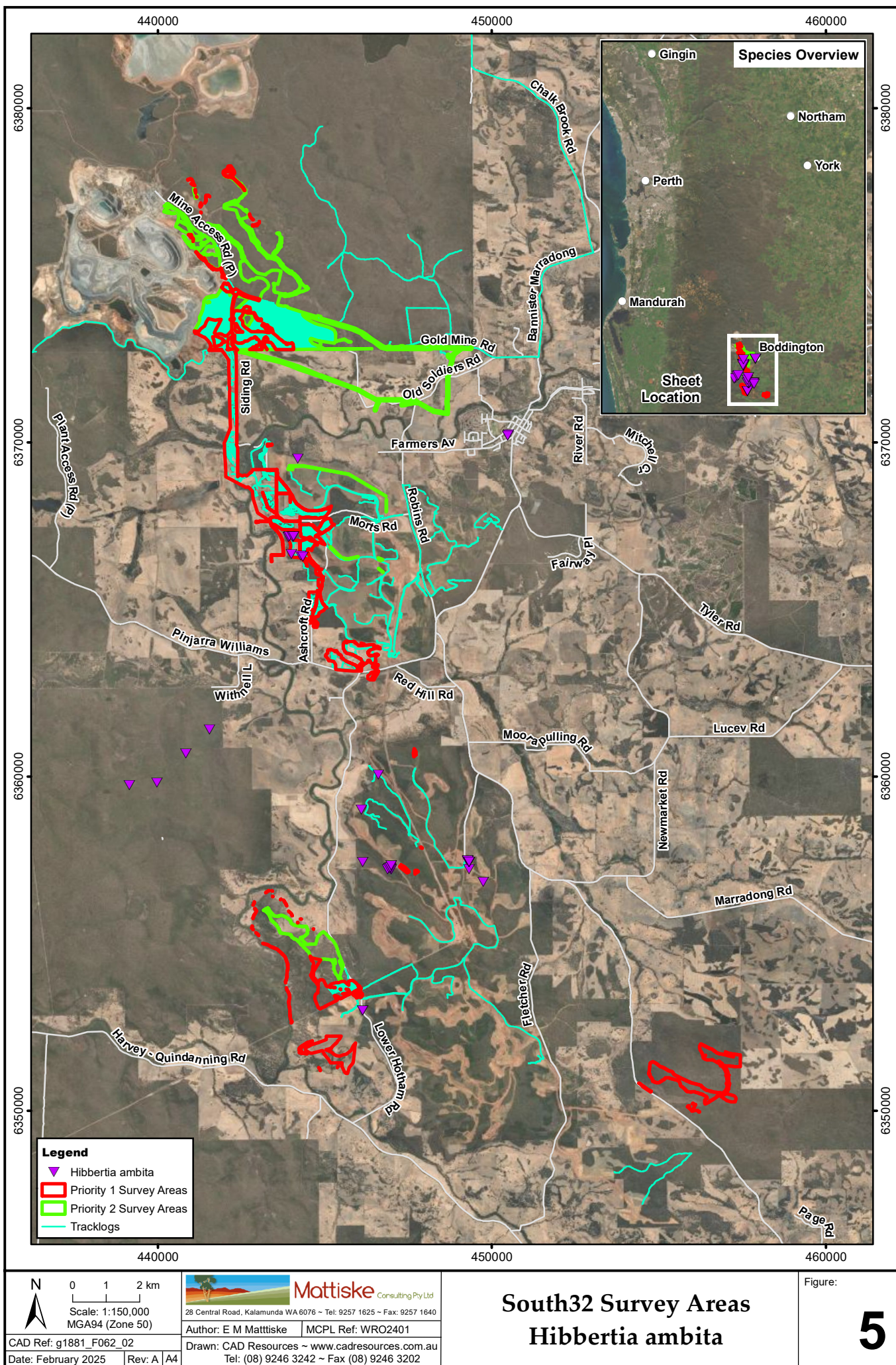
6.5 Site-Vegetation Types

Hibbertia ambita is primarily associated with site-vegetation types H, CL, MG, S and some rehabilitated areas as defined by Mattiske Consulting (2020).

H site-vegetation type supports open *Eucalyptus marginata* woodland on sandy-loam to sandy gravels on slopes as well as *Eucalyptus wandoo* on clay-loam on mid-upper slopes (M site-vegetation type). MG site-vegetation type is associated with Wandoo Woodland over shallow granite on mid-upper slopes along with a mixture of *Eucalyptus marginata*, *Corymbia calophylla* and *Allocasuarina fraseriana* (S site-vegetation type). Occasionally has been recorded in cleared areas or in rehabilitated areas.

6.6 Summary for *Hibbertia ambita*

This species has been recorded near Hotham Road, Quindanning, forest areas near Boddington as well as rehabilitation areas within the lease areas at Mt Saddleback. Due to the recent re-classification of the *Hibbertia commutata* species by (Thiele 2019), this proved to be a large constraint in differentiating between *Hibbertia ambita* as full flowering material is required for identification which was not possible in the later stages of the survey as the plants had returned to their vegetative stage.



0 1 2 km
Scale: 1:150,000
MGA94 (Zone 50)



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South32 Survey Areas Hibbertia ambita

Figure:

5

7. Old Growth Assessments

The assessment of old growth values was based on the approach defined in the Department of Parks and Wildlife (2017) for the procedures associated with assessing old growth values. This included an assessment of the following:

- . Tenure and Reserve Status;
- . Phytophthora dieback occurrence (if present this excludes consideration as defined as a significant disturbance);
- . Other Disturbance including grazing, mining, and previous farming;
- . Types of forest types;
- . Harvest History (evident from logs, stumps and track disturbances);
- . Other clearing activities for infrastructure and historical railway, tracks and bridges; and
- . Fire history and mining history.

This survey effort was undertaken during the targeted flora survey on 20m part traverses or 10m apart traverses as defined above.

7.1 Survey Effort

See summary of foot traverses on Figure 1 as it aligned with the targeted flora surveys. This recent work was undertaken between August and December 2024.

7.2 Findings on Old Growth

The areas as assessed varied between highly modified farmlands, infrastructure areas and areas adjacent to current mining operations (near Newmont operations in the north and South32 operations in the south).

To summarize the findings the targeted areas in 2024 have been subdivided into sub-areas:

- . the northern area to the north of the Hotham River. This area has largely been cleared historically for farming and plantations or it abuts the southern waste dump areas of the Newmont mining area. Within the Newmont mining area during the early phases of operation exploration tracks were cleared on a regular basis (from 25m apart to 100m apart and as such this resulted in canopy breaks and loss of trees along these alignments).
- . the areas adjacent to Hotham River supported farming and highly modified areas, a historic railway line that went from Dwellingup to Boddington (which indirectly supported the targeted *Gastrolobium* sp. Prostrate Boddington (M. Hislop 2130) on the old railway line infrastructure), to current farming areas.
- . the forested areas near the Marradong mining operations and southwards to the Pinjarra William Road were primarily disturbed with only a few regrowth stands on the steeper slopes. The remaining areas remain fragmented and in some areas support heaths and wandoo woodlands rather than Jarrah forests,
- . the areas within the current Mt Saddleback forested areas that were assessed remain as small remnants within largely mined landscapes and rehabilitation areas.
- . the southern area near the conveyor corridor to Collie is largely a former farm and as such the condition of the vegetation has been influenced historical activities.

7.3 Summary of Findings on Old Growth

In summary, the degree of disturbance in the majority of the areas and the resulting fragmentation restricted the potential for any old growth areas. The stands that still persist in the northern area abut Newmont mining operations (on the western side) and a road on the eastern side. The only other forested area of size is the elevated hill on the north-west section of the Marradong forest area that has not been mined or cleared for farming. As this area supported stumps and tracks with variable growth of forest trees it is not considered an old growth area.

8. References

Biodiversity Conservation Act 2016 (BC Act)

Craven, L. 1987. A taxonomic Revision of *Calytrix* Labill. (Myrtaceae). *Brunonia* 10, 1-138.

Department of Parks and Wildlife (2017). Procedures for the assessment, identification and demarcation of old-growth forest. Published by Department of Parks and Wildlife March 2017.

Mattiske Consulting Pty Ltd (2005). Assessment of Flora and Vegetation on Worlsey Mine Expansion Primary Assessment Area. Unpublished report prepared for Worsley Alumina Pty Ltd, 2021.

Mattiske Consulting Pty Ltd (2020). Targeted searches for Threatened and Priority Flora on the Collie lease areas. In preparation for South32 Worsley Alumina, 2020.

Mattiske Consulting Pty Ltd (2021). Assessment of Flora and Vegetation on Worlsey Mine Expansion Primary Assessment Area. Unpublished report prepared for South32 Worsley Alumina Pty Ltd, 2021.

Thiele, K.R. (2019). A revision of the *Hibbertia commutata* (Dilleniaceae) species group. Australian Systematic Botany 32(1), 71-109 (May 2019).

Western Australian Herbarium (1998-). *FloraBase – the Western Australian Flora*. Department of Parks and Wildlife. Available from: <https://florabase.dpaw.wa.gov.au>.

Wildlife Conservation Act 1999 (WC Act)