Appendix 3
Supporting Technical Studies

EARL GREY LITHIUM PROJECT

Banksia sphaerocarpa var. *dolichostyla* (T)

TARGETED SURVEY

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LIST OF ABBREVIATIONS

BAM Act:	*Biosecurity and Agriculture Management Act 2007* (WA)
BC Act:	*Biodiversity Conservation Act 2016* (WA)
Blueprint	Blueprint Environmental Strategies
Covalent	Covalent Lithium Pty Ltd
DBCA	Department of Biodiversity, Conservations and Attractions
DotEE:	Department of the Environment and Energy
EGLP	Earl Grey Lithium Project
EP Act:	*Environmental Protection Act 1986* (WA)
EPA:	Environmental Protection Authority
EPBC Act:	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
Kidman	Kidman Resources Ltd
Mattiske Consulting	Mattiske Consulting Pty Ltd
PEC:	Priority ecological community
TEC:	Threatened ecological community
WAH:	Western Australian Herbarium (PERTH)
WC Act:	*Wildlife Conservation Act 1950* (WA)

EXECUTIVE SUMMARY

The Earl Grey Lithium Project is owned by Covalent Lithium Pty Ltd. Covalent Lithium Pty Ltd is a joint venture between Kidman Resources Limited and Sociedad Quimica y Minera de Chile. In 2016 Kidman Resources Limited discovered a pegmatite-hosted lithium deposit at its Earl Grey Prospect, south of Southern Cross, near Mt Holland in Western Australia. Mattiske Consulting Pty Ltd completed a detailed flora and vegetation survey of the Earl Grey Lithium Project in September 2017. Mattiske Consulting Pty Ltd was commissioned in April 2018 by Western Australian Lithium Pty Ltd to undertake a survey of the threatened *Banksia sphaerocarpa* var. *dolichostyla* both within the Earl Grey Lithium Project area and in the broader region about the project area.

Eighteen discreet populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) were recorded during the present surveys. A total of 16,503 *Banksia sphaerocarpa* var. *dolichostyla* (T) were recorded across all the areas surveyed. When the estimated numbers are included, the total population is potentially 22,586 plants.

The impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T) were calculated from direct impacts associated with clearing all plants within the Earl Grey Lithium Project infrastructure footprint, and also by applying a 50 m buffer about the Earl Grey Lithium Project infrastructure footprint. In the case of the latter calculation, this was to take account of the requirement under Section 51B of the *Environment Protection Act 1986*, that no clearing of an environmentally sensitive area - declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* - shall take place where the area covered by vegetation within 50 m of a threatened flora, to the extent to which the vegetation is continuous with the vegetation in which the threatened flora is located. Based on recorded plants, clearing within the Earl Grey Lithium Project infrastructure footprint will result in 92 plants, representing 0.56% of the recorded population (0.41% of estimated population) being impacted. Within the 50 m buffer about the Earl Grey Lithium Project infrastructure footprint, there are 2,826 plants, representing 17.12% of the recorded population (12.92% of estimated population). Regionally, records of *Banksia sphaerocarpa* var. *dolichostyla* (T) exist in the Avon Wheatbelt (AW1), Southern Cross (COO2), and Western Mallee (MAL2) IBRA sub-regions. Data available from the Department of Environment and Energy demonstrates that several large numbers (2,050 plants) of *Banksia sphaerocarpa* var. *dolichostyla* (T) have been recorded outside the Mt Holland and Forrestania areas. The presently known number of discrete population of *Banksia sphaerocarpa* var. *dolichostyla* (T), together with the known number of plants, would indicate that the potential clearing of up to 92 individuals at the Earl Grey Lithium project is unlikely to have a significant impact on this taxon.

Summary of potential local and regional impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T)

			NUMBER OF PLANTS WHICH MAY BE IMPACTED AT THE EARL GREY LITHIUM PROJECT	
POPULATION	**ACTUAL / ESTIMATED**	**TOTAL PLANT NUMBERS**	**DIRECT (92 plants)**	**WITHIN 50 m BUFFER (2,826 plants)**
LOCAL	Actual	16,503	0.56%	17.12%
	Estimated	22,586	0.41%	12.51%
REGIONAL	Actual	18,553	0.50%	15.23%
	Estimated	24,636	0.37%	11.47%

Observation made in the field during the *Banksia sphaerocarpa* var. *dolichostyla* (T) surveys made by Mattiske Consulting Pty Ltd indicate that populations of this taxon are healthy, are recruiting juveniles, and in areas which have been subject to fires, have recovered rapidly. Given these factors, and the observation that *Banksia sphaerocarpa* var. *dolichostyla* (T) was growing in previously disturbed areas, it is likely that this taxon would be a good candidate for seeding in rehabilitation areas with suitable soils.

Based on desktop assessment work undertaken as part of the present surveys there is a likelihood additional populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) would be located external to the Earl Grey Lithium Project development envelope. The surveys completed by Mattiske Consulting in May and June of 2018 have validated the presence of 18 individual populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). Of these, four intersect the EGLP infrastructure footprint, potentially impacting 92 individual plants, which represent 0.56% of the recorded population. When the estimated potential population is taken into account the impact is reduced to 0.41%. Given that all plants which fall within the infrastructure footprint are situated on the edges of existing cleared areas, such as roads, it would be appropriate for the proponent to undertake a survey to determine if any of these plants will be cleared as part of the process of any modification or upgrading of existing infrastructure areas.

Aside from the direct impact to *Banksia sphaerocarpa* var. *dolichostyla* (T) as a result of clearing up to 92 individual plants, there are a number of potential indirect impacts to populations of this taxon. These include un-authorized access to and/or clearing of vegetation which supports *Banksia sphaerocarpa* var. *dolichostyla* (T); changes to hydrological regimes, natural and human induced fires, and the un-authorized dumping of waste. If not managed properly these may result in cumulative impacts over the life of the mine.

Whilst up to three *Banksia sphaerocarpa* var. *dolichostyla* (T) may be impacted by clearing within the proposed accommodation village and new airstrip areas, and up to 89 *Banksia sphaerocarpa* var. *dolichostyla* (T) may be impacted by clearing on the periphery of the proposed topsoil area (existing airstrip, these impacts can be avoided by minor site planning modifications. Based on the vegetation mapping and numerous field surveys, Mattiske Consulting does not consider that *Banksia sphaerocarpa* var. *dolichostyla* (T) would be located in other infrastructure footprint areas due to lack of suitable habitat for this species. The results of this survey indicates that infrastructure development associated with the Earl Grey Lithium Project is unlikely to adversely affect populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). An appropriately designed management program should be put into effect to ensure that indirect and cumulative impacts are monitored, and that the local workforce is educated on the values associated with the native vegetation in the area, and *Banksia sphaerocarpa* var. *dolichostyla* (T) specifically.

1. INTRODUCTION

The Earl Grey Lithium Project (EGLP) is owned by Covalent Lithium Pty Ltd (Covalent). Covalent is a joint venture between Kidman Resources Limited (Kidman) and Sociedad Quimica y Minera de Chile. In 2016 Kidman discovered a pegmatite-hosted lithium deposit at its Earl Grey Prospect, south of Southern Cross, near Mt Holland in Western Australia.

The Mt Holland area has been the subject of a number of flora and vegetation surveys, as follows:

- In 2006, Craig (2006) completed a rare and priority flora survey of the Bounty Mine area for Nickel Australia limited.
- In September 2016, Native Vegetation Solutions (2016a) completed a targeted threatened flora survey of the Earl Grey Prospect.
- Mattiske Consulting Pty Ltd (Mattiske Consulting) completed a reconnaissance flora and vegetation survey of Earl Grey Prospect in October and November 2016 (Mattiske Consulting 2017). In addition to the Earl Grey Prospect, the reconnaissance survey included the adjacent Irish Breakfast and Prince of Wales Prospects.
- In January 2017, Mattiske Consulting surveyed a range of vegetation in the broader area surrounding the Earl Grey Lithium Deposit as part of a vertebrate fauna survey (Western Wildlife 2017).
- In April 2017 Blueprint Environmental Strategies (Blueprint) completed a targeted survey for the threatened flora taxon *Banksia sphaerocarpa* var. *dolichostyla* (Blueprint 2017).
- Mattiske Consulting completed a detailed flora and vegetation survey of the Earl Grey Lithium Project (EGLP) in September 2017 (Mattiske Consulting 2018).
- Native Vegetation Solutions (2017) completed a targeted search of threatened flora in the Mt Holland area for Kidman.
- Mattiske Consulting was commissioned in April 2018 by Covalent to undertake a survey of the threatened *Banksia sphaerocarpa* var. *dolichostyla* both within the EGLP area and in the broader region about the project area.

1.1 Location and Scope of Project

The EGLP, which is located approximately 105 km southeast of the town of Southern Cross, is situated on the abandoned Mt Holland Mine Site (Figure 1). The EGLP occupies an area of 1,993.59 ha. The EGLP intersects exploration licenses E77/1400, E77/1775, E77/2099, E77/2143, E77/2167, E77/2345, E77/2349; general purpose leases G77/45, G77/47, G77/48, G77/49, G77/50, G77/68, G77/70, G77/71, G77/72, G77/73, G77/109, G77/110, G77/129, G77/130; miscellaneous licenses L77/59, L77/85, L77/96, L77/107, L77/176, L77/193, L77/194, L77/198, L77/199, L77/200, L77/205, L77/206, L77/207, L77/208, L77/271; and mining leases M77/216, M77/389, M77/549, M77/1065, M77/1066, M77/1080 (Figure 2).

The scope of the survey was to undertake a targeted survey for *Banksia sphaerocarpa* var. *dolichostyla* (T) both within the EGLP and in the broader region surrounding the EGLP.

1.2 Environmental Legislation and Guidelines

The following key Commonwealth (federal) legislation relevant to this survey is the:

- *Environment Protection and Biodiversity Conservation Act 1999.*

The following key Western Australian (state) legislation relevant to this survey include the:

- *Biodiversity Conservation Act 2016* (BC Act);
- *Biosecurity and Agriculture Management Act 2007* (BAM Act);
- *Environmental Protection Act 1986* (EP Act); and

- *Wildlife Conservation Act 1999* (WC Act).

Furthermore, key Western Australian guidelines relevant to this survey are the:

- *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority [EPA] 2016a); and
- *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016b).

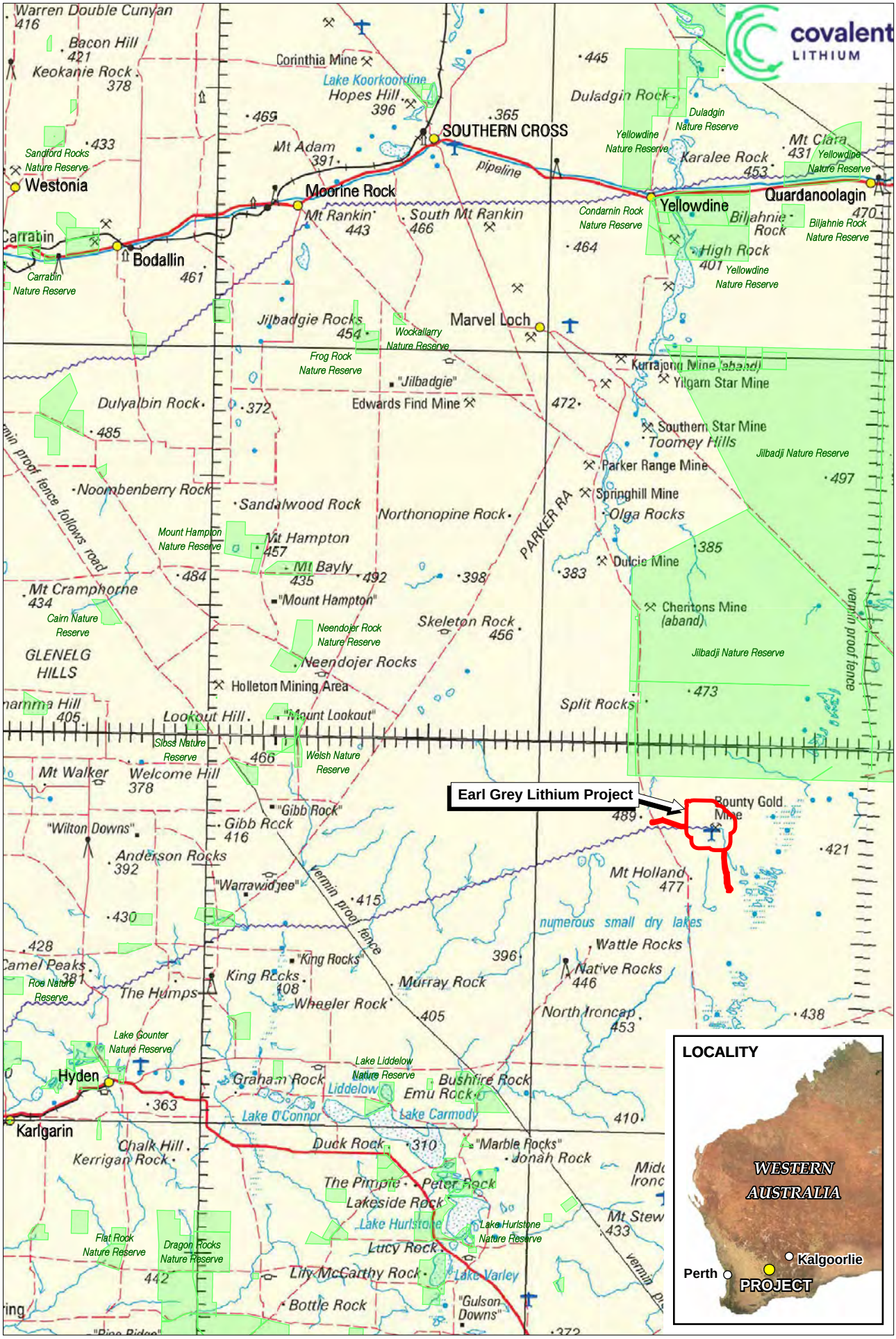
Definitions of flora and vegetation terminology commonly used throughout this report are provided in Appendices A1 and A2.

2. OBJECTIVES

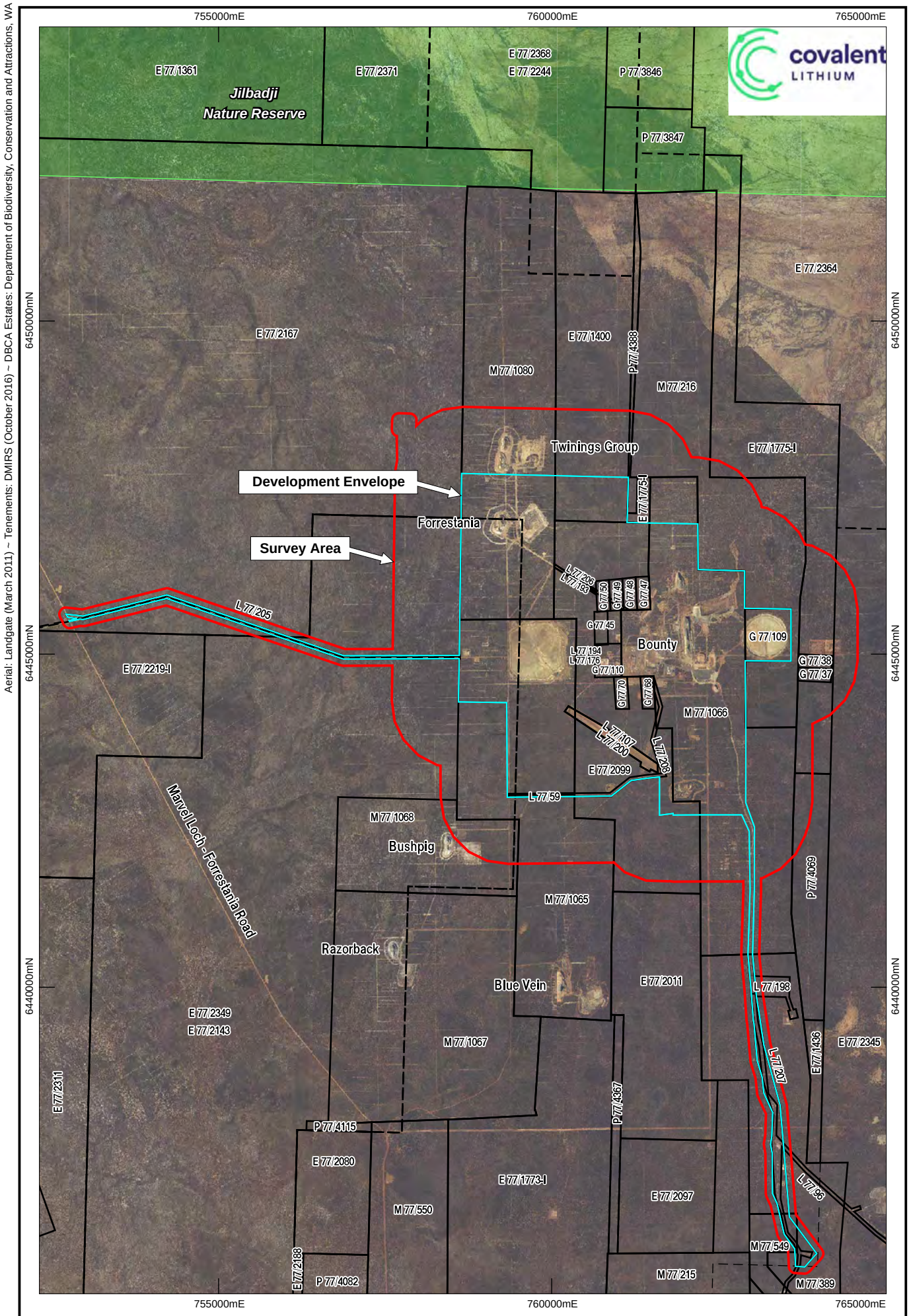
The aim of this survey was to complete a targeted search for the threatened taxon *Banksia sphaerocarpa* var. *dolichostyla* to determine the population and spatial distribution of the taxon both within the EGLP and in the broader area surrounding the EGLP. Specifically, the objectives included:

- Undertake a targeted survey for *Banksia sphaerocarpa* var. *dolichostyla* (T) to determine the spatial distribution and population of this taxon;
- Undertake a targeted survey for *Banksia sphaerocarpa* var. *dolichostyla* (T) within the EGLP development envelope which are proposed to be cleared. This search is to be restricted to landforms and vegetation communities which are likely to harbor populations of this taxon;
- Based on the most recently available data, provide an assessment of the impacts clearing will have on both the vegetation communities and populations of *Banksia sphaerocarpa* var. *dolichostyla* at the EGLP; and
- Prepare a report summarizing the findings.

DBCA Estates: Department of Biodiversity, Conservation and Attractions, WA



N	0 15km Scale 1:750,000 MGA94 (Zone 50) CAD Ref: g2445_R012_01 Date: Jan 2019 | Rev: B | A4	Mattiske Consulting Pty Ltd 28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640 Author: E M Mattiske | MCPL Ref: KID1801/010/18 Drawn: CAD Resources ~ www.cadresources.com.au Tel: (08) 9246 3242 ~ Fax: (08) 9246 3202	**Covalent Lithium Pty Ltd** **Earl Grey Lithium Project** **Locality**	Figure: **1**



Aerial: Landgate (March 2011) ~ Tenements: DMIRS (October 2016) ~ DBCA Estates: Department of Biodiversity, Conservation and Attractions, WA

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CAD Ref: g2445_R011_02
Date: Jan 2019 | Rev: B | A4

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Covalent Lithium Pty Ltd
Earl Grey Lithium Project
Tenements

Figure: **2**

3. METHODS

The EGLP occupies an area of 1,993.59 ha. The survey was completed to the standards set out in Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016b) and Environmental Factor Guideline: Flora and Vegetation (EPA 2016a). Table 1 sets out the flora and vegetation surveys undertaken by Mattiske which are associated with the EGLP.

Table 1: Record of Mattiske surveys associated with the EGLP

SURVEY [REPORT REFERENCE]	SURVEY DATES	NUMBER OF PERSONNEL	SURVEY EFFORT (PERSON DAYS)
Reconnaissance survey of the Earl Grey, Irish Breakfast and Prince of Wales Prospects [Mattiske 2017]	24/10/16 to 26/10/16	2	6
Reconnaissance survey of the Earl Grey, Irish Breakfast and Prince of Wales Prospects [Mattiske 2017]	9/11/16 to 10/11/16	2	4
Reconnaissance survey of the Van Uden Prospect [Mattiske 2016]	8/11/16	2	2
Reconnaissance regional survey of vegetation surrounding the EGLP	16/01/17 – 20/01/17	1	5
Detailed survey of the EGLP	6/9/17 to 14/9/17	4	36
Targeted survey of *Banksia sphaerocarpa* var. *dolichostyla* (T)	30/04/18 – 4/05/18	3	12
Targeted survey of *Banksia sphaerocarpa* var. *dolichostyla* (T) [this report]	12/06/18 – 18/06/18	4	24
		Total effort (person days)	89

3.1 Targeted Surveys of *Banksia sphaerocarpa* var. *dolichostyla* (T)

Surveys to define the distribution, boundaries and populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) within the EGLP vegetation survey area were based on known locations of populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) which had been identified during the course of previous vegetation surveys or which had been uncovered through a process of statistical identification of potential habitat location based on known landscape attributes associated with populations of this taxon. In the latter case, the analysis was undertaken by CAD Resources of Carine, Western Australia, using Esri ArcGIS software.

Broad preplanned search polygon boundaries were populated with transects spaced 20 m apart in a north-south orientation. These transects were used as guides for foot traverses of each polygon. The search for *Banksia sphaerocarpa* var. *dolichostyla* (T) was continued in both the north-south and east-west directions until a combination of factors indicated that further searching was not warranted. This included the lack of recording of the taxon, a change in the vegetation community in which the taxon is known to occur (including coexisting species), and a change in the soil type to one which does not support the habitat of the *Banksia sphaerocarpa* var. *dolichostyla* (T).

During the field surveys, botanists had access to all relevant data in the Esri iOS application, Collector for ArcGIS on Apple iPads (provided and maintained by CAD Resources). Data layers accessible in the field included the EGLP development envelope and EGLP vegetation survey boundaries (Figure 2), the boundaries of planned conservation significant flora search areas and associated 20m spaced search transect lines, boundaries of proposed infrastructure areas (infrastructure footprint), locations of all known conservation significant flora from both historical and contemporary surveys and aerial imagery

supplied by either Covalent or acquired by CAD Resources. The location of all individual *Banksia sphaerocarpa* var. *dolichostyla* (T) plants was recorded on hand held GPS devices.

3.2 Estimation of *Banksia sphaerocarpa* var. *dolichostyla* (T) Populations

In situations where it was not possible to record all individual plants within an identifiable population, an estimate of the total population was calculated using Esri ArcGIS. Polygons to define the boundaries of a *Banksia sphaerocarpa* var. *dolichostyla* (T) population were created using data recorded in the field and high resolution aerial imagery to accurately determine the boundary of the population. Estimations of total plant populations within a polygon were calculated by using the partially recorded population to estimate plant densities and numbers across the entire polygon to arrive at a total population estimate. This method was used when recorded data on plant populations had been acquired in the field over a large (greater than 50%) portion of a population of *Banksia sphaerocarpa* var. *dolichostyla* (T).

In the cases of newly uncovered populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) it was not appropriate to utilise the preceding method because partial plant population counts were not made in the field. In this situation, a conservative plant population boundary polygon was established using high resolution aerial imagery. An estimate of the potential plant population was calculated by applying an average population density figure from a separate recorded population to the unknown population polygon.

3.3 Estimation of *Banksia sphaerocarpa* var. *dolichostyla* (T) Impacts

Calculations of impacts to populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) as a consequence of clearing the EGLP infrastructure footprint were calculated using Esri ArcGIS. Spatial data for the EGLP infrastructure footprint was made available by Strategen Environmental in June 2018 and represented the most recent infrastructure footprint data available at the time of preparing this report. Two impact calculations were made. Firstly, the impacts strictly form the intersection of the infrastructure footprint with populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). The second impact calculation involved establishing a 50m buffer about all infrastructure footprint polygons prior to calculating impacts to populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). This was to factor in the statutory requirement (*Environmental Protection [Environmentally Sensitive Areas] Notice 2005*) to not clear with 50m of a known threatened taxon.

4. REVIEW OF PREVIOUS FLORA AND VEGETATION SURVEYS

4.1 *Banksia sphaerocarpa* var. *dolichostyla* (T) Description and Distribution

Banksia sphaerocarpa var. *dolichostyla* (T), commonly referred to as the Ironcaps *Banksia*, is a lignotuberous shrub to 3 m tall. It has bluish-green, narrowly linear, toothless, glaucous leaves. The flower heads are golden, erect and spherical. The styles are hooked just below the apex. The fruiting cones are spherical with up to 60, often crowded, follicles (*Brown et al*.1998, Collins *et al*. 2008, WAH 1998-). Plate 1 shows representative photographs of the habit and flowers of *Banksia sphaerocarpa* var. *dolichostyla* (T).

Banksia sphaerocarpa var. *dolichostyla* (T) is currently known to be distributed between Mt Holland and South Ironcap, east of Hyden, Western Australia. Its preferred habitat is lateritic gravel on hills and rises. It commonly grows in association with *Banksia* spp., *Allocasuarina* spp., and *Hakea* spp. (*Brown et al*. 1998, Collins *et al*. 2008, WAH 1998-). *Banksia sphaerocarpa* var. *dolichostyla* (T) is currently listed as a threatened species under Section 23F (2) of the WC Act (Department of Biodiversity, Conservation and Attractions [DBCA] 2018a), and is listed as Vulnerable under EPBC Act (Department of the Environment and Energy [DotEE] 2018a).

4.2 Previous Flora and Vegetation Surveys in the Vicinity of the EGLP

There have been a number of flora and vegetation surveys completed in the vicinity of the EGLP, some of which have recorded the presence of *Banksia sphaerocarpa* var. *dolichostyla* (T). Of the ten surveys summarized on the following pages, three were targeted surveys specifically for *Banksia sphaerocarpa* var. *dolichostyla* (T). The remaining seven were flora and vegetation surveys. A summary of the surveys which recorded *Banksia sphaerocarpa* var. *dolichostyla* (T) is set out below in Table 2.

Table 2: Summary of surveys which recorded *Banksia sphaerocarpa* var. *dolichostyla* (T)

Survey Author	Dates	Area	Summary
Thompson & Allen (2013)	22 September 2009 – 7 October 2009	Part of DEC flora and vegetation survey of the greenstone formations of the Yilgarn Craton	*Banksia sphaerocarpa* var. *dolichostyla* (T) recorded. No population data
Mattiske Consulting (2017)	24-26 October 2016 and 9-10 November 2016	Earl Grey, Irish Breakfast and Prince of Wales Prospects	*Banksia sphaerocarpa* subsp. *dolichostyla* (T) was recorded approximately 200 m from the eastern side of the Earl Grey prospect.
Blueprint Environmental Strategies (2017)	April 2017	Earl Grey Lithium Project	521 *Banksia sphaerocarpa* subsp. *dolichostyla* (T) from four discrete populations within proposed infrastructure areas.
Mattiske Consulting (2018)	6-14 September 2017	Earl Grey Lithium Project	279 *Banksia sphaerocarpa* subsp. *dolichostyla* (T) recorded across 14 survey quadrats and opportunistically.
Native Vegetation Solutions (2017)	28 & 29 September 2017	Access tracks both within and external to the Earl Grey Lithium Project	An estimated (maximum) of 9,500 *Banksia sphaerocarpa* subsp. *dolichostyla* (T) from 13 individual populations.

Plate 1: ***Banksia sphaerocarpa*** **var.** ***dolichostyla*** **(T) habit and inflorescence: a** habit; **b** inflorescence and old fruit cones; **c** inflorescence; **d** juvenile.
(photographs a & b by D. Angus, c & d by H. Gooding)

Craig, G.F. (2006). Bounty *JV - Tenements M77/1080, M77/1065, M77/1066, M77/1067, M77/1068 - Declared Rare and Priority Survey*. Unpublished report prepared for Nickel Australia Limited.

In 2006, Craig (2006) completed a threatened and priority flora survey for Nickel Australia Limited along a series of 30 drill lines at its Bounty mine site. Some of the drill lines surveyed were within Covalent's EGLP. No threatened floras pursuant to the WC Act and as listed by the DBAC (2018a) were recorded along any of the drill lines searched. Three taxa which were priority flora (WAH 1998-) at the time of the survey were recorded. These were: *Baeckea* sp. Forrestania (KR Newbey 1105) (P1) – a minimum of 160 plants recorded at 11 separate locations; *Daviesia newbeyi* (P3) – a single plant recorded at one location; and *Stenanthemum* aff. *poicilum* (P3) – a minimum of 110 plants recorded at 13 separate locations.

At the time of the 2006 survey, *Daviesia newbeyi* was listed as a Priority 2 taxon and *Stenanthemum poicilum* was listed as a Priority 2 taxon. *Stenanthemum poicilum* (P3) does not occur in the Forrestania area. Its distribution is restricted to the northern portion of the Avon Wheatbelt region at its boundary with the Yalgoo bioregion (WAH 1998-). At the time of the 2006 survey (Craig 2006), in a personal communication with Barbara Rye of the Western Australian Herbarium indicated that the specimens collected during the survey for Nickel Australia Limited differed from the typical *Stenanthemum poicilum* (P3), which grows in the Morawa – Mullewa district, some 600 km to the north-west. Due to its similarity to *Stenanthemum poicilum* (P3), it was attributed as *Stenanthemum* aff. *poicilum* (P3).

Thompson and Allen (2013). *Flora and vegetation of greenstone formations of the Yilgarn Craton: the northern Forrestania Greenstone Belt (Mt Holland area)*. Conservation Science W. Aust. 8(3): 277-294.

As part of the regional studies on Yilgarn Craton flora and vegetation studies were undertaken in the Mt Holland area. Fifty quadrats were established between North Ironcap and the Mt Holland area. Some of the quadrats established were within a few kilometers of the EGLP. The quadrat-based survey identified 305 taxa representing 47 families and 121 genera. Twelve taxa of conservation significance including the two threatened taxa (*Banksia sphaerocarpa* var. *dolichostyla* and *Eucalyptus steedmanii*) and three new taxa were identified (*Hibbertia* sp., *Labichea rossii* and *Austrostipa* sp.). Eight floristic community types were defined. These are summarized below.

Community type 1 occurred predominantly on upland basalt/laterite sites with gentle gradients. The structure was generally defined as *Allocasuarina acutivalvis* and *Acacia yorkrakinensis* over *Melaleuca calyptroides*, *Thryptomene kochii*, *Hibbertia exasperata* and *Drummondita hassellii*.

Community type 2 occurred on upland sites characterized by granular or banded ironstone coarse fragments. The structure was generally defined as *Allocasuarina campestris* over *Calothamnus quadrifidus* subsp. *seminudus*, *Hakea subsulcata* and *Melaleuca cordata* over *Stenanthemum stipulosum* and *Stylidium sejunctum*.

Community type 3 corresponded to upland laterite and weathered ironstone sites. The structure was generally defined as *Eucalyptus eremophila*, *Acacia castanostegia*, *Baeckea crispiflora*, *Beyeria sulcata*, *Hakea multilineata*, *Melaleuca hamata* and *Stenanthemum stipulosum* over *Phebalium filifolium* and *Platysace maxwellii* over *Lepidosperma* sp. A2 Inland Flat.

Community type 4 consisted of lateritic and basalt sites with gentle slopes. The community structure was *Eucalyptus flocktoniae* and *Allocasuarina acutivalvis* over *Dodonaea bursariifolia*, *Melaleuca acuminata* subsp. *acuminata*, *Melaleuca hamata*, *Melaleuca lateriflora* subsp. *lateriflora* and *Grevillea acuaria*.

Community type 5 was recorded on red-brown clay loam and sandy clay soils on upland sites. The community structure was generally *Eucalyptus salubris* over *Dodonaea stenozyga*, *Trymalium myrtillus* subsp. *myrtillus* and *Grevillea acuaria* with *Thysanotus patersonii*.

Community type 6 occurred on footslopes and pediments with little slope and soils consisting typically of red-brown sandy clay loams, with coarse rock fragments primarily of undifferentiated greenstones. The vegetation structure was generally *Eucalyptus calycogona* subsp. *calycogona*, *Exocarpos aphyllus* and *Santalum acuminatum* over *Dodonaea stenozyga*, *Grevillea acuaria* over *Acacia erinacea* and *Wilsonia humilis*.

Community type 7 was characterized by the presence of calcrete in the substrate. The soils had varied textures including loam, clay loam and sandy clay loam. The community structure was dominated by *Eucalyptus extensa* over *Acacia merrallii*, *Daviesia articulata* and *Dodonaea stenozyga* with *Wilsonia humilis*.

Community type 8 occurred on plains with little or no gradient consisting of red-brown sandy clay loams. The vegetation structure was dominated by *Eucalyptus salmonophloia* over *Santalum acuminatum* over *Acacia merrallii*, *Daviesia scoparia*, *Eremophila ionantha* and *Olearia muelleri* with *Austrostipa elegantissima*.

Native Vegetation Solutions (2014). *Level 1 Flora and Vegetation Survey of the Proposed Blue Vein Mine Mt. Holland Operation (Tenement M77/1065)*. Unpublished report prepared for Convergent Minerals Limited, September 2014.

Convergent Minerals Limited, as part of their proposal to recommence mining activities at their Blue Vein Mine, 4.5 km south-south-west of the EGLP, commissioned a Level 1 flora and vegetation survey of approximately 90 ha at their Blue Vein Mine. The area surveyed included existing pit and waste dump areas, as well as nearby bushland, some of which had been the subject of an intense fire in April of 2014 (Native Vegetation Solutions 2014). The Blue Vein mine is situated 4.5 km south of the EGLP.

The survey resulted in a total of 71 vascular plant taxa being recorded. No threatened flora pursuant to Schedule 1 of the *Wildlife Conservation Act 1950* and as listed by the DBCA (2018a) were recorded. No priority flora, as listed by the DBCA (WAH 1998-), were recorded within the survey area. Two major vegetation communities were defined within the survey area. One of these vegetation communities was a *Eucalyptus* mallee woodland over *Melaleuca* shrubland. The dominant species in this community were *Eucalyptus urna*, *Eucalyptus loxophleba* subsp. *lissophloia*, *Eucalyptus platycorys*, *Melaleuca pauperiflora* subsp. *pauperiflora*, *Melaleuca eleuterostachya*, *Melaleuca lateriflora*, *Melaleuca cucullata*, *Phebalium filifolium*, and *Phebalium tuberculosum*. The second major vegetation community defined was a *Eucalyptus* woodland over *Allocasuarina* shrubland. The dominant species in this vegetation community were *Eucalyptus livida*, *Eucalyptus loxophleba* subsp. *lissophloia*, *Allocasuarina acutivalvis* subsp. *acutivalvis*, *Allocasuarina campestris*, *Allocasuarina huegeliana*, *Hibbertia rostellata*, *Calothamnus quadrifidus* subsp. *semilunaris*, *Rinzia sessilis*, *Thryptomene kochii* and *Persoonia helix*. Native Vegetation Solutions (2014) delineated both burnt and unburnt area of both vegetation communities within the survey area.

Convergent Minerals Limited (2014). *Threatened Flora Management Plan for Banksia sphaerocarpa var. dolichostyla.* Mt. Holland Gold Project Blue Vein Operations DRAFT V2.0., October 2014.

Convergent Minerals Limited, as part of their proposal to recommence mining activities at their Blue Vein Mine, 4.5 km south-south-west of the Earl Grey Lithium Project, prepared a management plan to ensure existing populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) were not impacted from proposed mining activities in the project area. Whilst no *Banksia sphaerocarpa* var. *dolichostyla* (T) were recorded

within the proposed development areas (Native Vegetation Solutions 2014), *Banksia sphaerocarpa* var. *dolichostyla* (T) was recorded along existing roadside edges proposed to be utilised by light vehicles to access the camp and a separate existing haul road proposed to be utilised by haulage trucks. The objectives of the management plan (Convergent Minerals Limited 2014) were to prevent potential adverse impacts on *Banksia sphaerocarpa* var. *dolichostyla* (T) populations in, or adjacent to the Blue Vein Mine Project and its associated operations, and to raise awareness about *Banksia sphaerocarpa* var. *dolichostyla* (T). These objectives were to be met by documenting the distribution of the species in the vicinity of the Blue Vein Mine Project; providing detailed species and preferred habitat description; identifying threatening processes to the species arising from the implementation of mining operations; developing strategies to reduce avoidable adverse impacts on the species; outline a monitoring program that aims to detect a decline in the health of local *Banksia sphaerocarpa* var. *dolichostyla* (T) populations associated with the proposed mining activities; and allocate responsibilities for the implementation of the management plan.

Native Vegetation Solutions (2016b). *Level 1 Flora and Vegetation Survey of the Proposed Initial Cheritons and Texas Exploration Drill Lines - Jilbadji Nature Reserve Mt Holland Operation (Tenements E77/2111 & E77/2244).* Unpublished draft report prepared for Kidman Resources Limited, August 2016

Kidman commissioned Native Vegetation Solutions to undertake a Level 1 flora and vegetation survey of their Cheritons (exploration tenement E77/2111) and Texas (exploration tenement E77/2244) tenements, which form part of their Mt Holland project. Both tenements are situated within the Jilbadji Nature Reserve, and as such the flora and vegetation survey was an integral part of the process to develop a Conservation Management Plan. The Texas prospect is situated approximately 10 km north of the Mt Holland airstrip.

The survey resulted in a total of 151 species of vascular plants being recorded. No threatened flora pursuant to Schedule 1 of the *Wildlife Conservation Act 1950* and as listed by the DBAC (2018a) were recorded. Three priority flora, as listed by the DBAC (WAH 1998-), were recorded within the survey areas. The priority flora recorded were *Acacia undosa* (P3), *Grevillea lullfitzii* (P1) and *Microcorys* sp. Forrestania (V. English 2004) (P4). No introduced species were recorded within the surveyed area. Native Vegetation Solutions defined eight vegetation communities in the combined Cheritons/Texas project areas. These are summarised below.

Eucalyptus mallee woodland over *Melaleuca* shrubland and emergent *Callitris preissii*
The dominant species in this community were *Eucalyptus eremophila* subsp. *eremophila*, *Eucalyptus livida*, *Melaleuca pauperiflora* subsp. *pauperiflora*, *Melaleuca lateriflora*, *Melaleuca hamata*, *Phebalium tuberculosum* and *Cryptandra nutans*.

Eucalyptus mallee woodland (burnt)
The dominant species in this community were *Eucalyptus eremophila* subsp. *eremophila, Eucalyptus livida*, *Eucalyptus polita*, *Acacia fragilis*, *Gastrolobium spinosum*, *Melaleuca lateriflora*, *Thryptomene kochii*, *Grevillea acuaria*, *Dodonaea stenozyga* and *Hakea scoparia* subsp. *scoparia*.

Eucalyptus woodland over *Allocasuarina* shrubland
The dominant species in this community were *Eucalyptus livida*, *Eucalyptus polita*, *Allocasuarina campestris*, *Hakea scoparia* subsp. *scoparia*, *Cryptandra nutans*, *Acacia sphacelata* subsp. *sphacelata*, *Calothamnus quadrifidus* subsp. *seminudus* and *Beyeria sulcata* var. *brevipes*.

Sandplain mallee heath shrubland (burnt)
The dominant species in this community were *Persoonia helix*, *Persoonia coriacea*, *Melaleuca hamata*, *Hakea multilineata*, *Cyathostemon heterantherus*, *Hibbertia eatoniae*, *Melaleuca cordata, Gastrolobium spinosum*, *Bertya dimerostigma*, *Lepidosperma sanguinolentum* and *Gompholobium gompholobioides.*

Eucalyptus salmonophloia woodland
The dominant species in this community were *Eucalyptus salmonophloia*, *Alyxia buxifolia*, *Scaevola spinescens*, *Acacia colletioides*, *Acacia hemiteles*, *Westringia cephalantha* var. *cephalantha* and *Acacia acuminata*.

Eucalyptus salmonophloia woodland (burnt)
The dominant species in this community were *Eucalyptus salmonophloia*, *Alyxia buxifolia*, *Scaevola spinescens*, *Acacia colletioides*, *Acacia hemiteles*, *Westringia cephalantha* var. *cephalantha* and *Acacia acuminata*.

Eucalyptus urna woodland over *Melaleuca* shrubland
The dominant species in this community were *Eucalyptus urna*, *Eucalyptus salubris*, *Eucalyptus eremophila* subsp. *eremophila*, *Olearia muelleri*, *Melaleuca lateriflora*, *Phebalium tuberculosum* and *Melaleuca pauperiflora* subsp. *pauperiflora.*

Eucalyptus mallee woodland over *Acacia steedmanii*
The dominant species in this community were *Eucalyptus livida*, *Eucalyptus loxophleba* subsp. *lissophloia*, *Phebalium filifolium*, *Acacia hemiteles*, *Allocasuarina helmsii*, *Grevillea stenobotrya*, *Grevillea pterosperma*, *Melaleuca cordata*, *Leucopogon* sp. outer wheatbelt (M. Hislop 30), *Acacia neurophylla* subsp. *erugata* and *Acacia steedmanii* subsp. *steedmanii.*

Native Vegetation Solutions (2016a). *Threatened flora targeted survey for Kidman Resources Ltd – Mt Holland Gold project, Earl Grey Prospect*. Unpublished memorandum prepared for Kidman Resources Limited, 16th September 2016.

In September 2016, Native Vegetation Solutions was commissioned to undertake a targeted search to assess potential threatened flora within the Earl Grey prospect at the Mt Holland Gold Project (Native Vegetation Solutions 2016a). The result of the search was that no threatened flora pursuant to Schedule 1 of the *Wildlife Conservation Act 1950* and as listed by the DBCA (2018a) were recorded in the Earl Grey prospect. The majority of vegetation within the survey area comprised mallee woodland over *Melaleuca* shrubland, which was deemed not to be suitable habitat for *Banksia sphaerocarpa* var. *dolichostyla* (T), which is known to exist in the area about the Mt Holland Gold project area.

Blueprint Environmental Strategies (2017). *Targeted Surveys for Threatened Flora Species* - Banksia sphaerocarpa *var.* dolichostyla*. Summary Report. Earl Grey Lithium Project*. Unpublished report prepared for Kidman Resources Limited, May 2017.

A targeted flora survey for *Banksia sphaerocarpa* var. *dolichostyla* (T) was undertaken by Goldfields Landcare Services in April 2017. The purpose of the survey was to identify *Banksia sphaerocarpa* var. *dolichostyla* (T) in areas where clearing and/or disturbance are proposed within the development envelope for the EGLP. The outcome of this survey was summarized, together with the results from previous surveys for *Banksia sphaerocarpa* var. *dolichostyla* (T) in the vicinity of the EGLP (Native vegetation Solutions 2014, 2016a, MCPL 2017; Blueprint 2017).

The results from the combined surveys recorded 521 specimens of *Banksia sphaerocarpa* var. *dolichostyla* (T) from a number of locations, including adjacent to the existing landfill, various roads, the accommodation camp and a borrow pit. No specimens of the *Banksia sphaerocarpa* var. *dolichostyla* (T) occur in the proposed EGLP infrastructure footprint.

Mattiske Consulting Pty Ltd (2017). *Flora and Vegetation of the Earl Grey, Irish Breakfast and Prince of Wales Prospects, Mt Holland Project*. Unpublished report prepared for Kidman Resources Limited, April 2017.

Mattiske Consulting reported the results of a Level 1 flora and vegetation assessment of Kidman's Earl Grey, Irish Breakfast and Prince of Wales prospects. The survey resulted in a total of 184 vascular plants representing 86 genera and 45 families being recorded. A single *Banksia sphaerocarpa* var. *dolichostyla* (T) was recorded in vegetation approximately 200m to the east of the Earl Grey prospect. Ten vegetation communities were delineated across the three prospect. In broad terms these were *Eucalyptus* mallee woodlands over *Melaleuca* shrubland.

Native Vegetation Solutions (2017). *Targeted Search of Threatened Flora for Kidman Resources Limited – Mt Holland Gold Project*. Unpublished memorandum prepared for Kidman Resources Limited, 4th October 2017.

A targeted survey within areas identified as either supporting or which had the potential to support populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) was completed by Native Vegetation Solutions over the course of two days in September 2017 for Kidman. The survey identified 13 separate populations of *Banksia sphaerocarpa* var. *dolichostyla* (T), three of which were located within the EGLP. The largest population was located about the existing airstrip within the EGLP. Native Vegetation Solutions (2017) reported an estimated population of 9,500 plants across the 13 populations of *Banksia sphaerocarpa* var. *dolichostyla* (T), without providing any detail on the methodology used in the survey or how estimations of population numbers were determined.

Mattiske Consulting Pty Ltd (2018). *Flora and Vegetation Assessment – Earl Grey Lithium Project*. Unpublished report prepared for Kidman Resources Limited, March 2018.

Mattiske Consulting reported the results of a detailed flora and vegetation survey of the EGLP. This survey included a 1 km buffer area about the EGLP. The survey resulted in a total of 369 vascular plants representing 140 genera and 49 families being recorded. Apart from the populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) known to exist within the EGLP, Mattiske Consulting identified a large new population of the taxon external to the EGLP within the overall vegetation survey area. This population was situated to the south west of the EGLP. Mattiske Consulting recorded 279 *Banksia sphaerocarpa* var. *dolichostyla* (T) pants during the vegetation survey of the EGLP. This survey did not specifically include a targeted survey for this taxon. Additionally, the survey uncovered three new flora species. Two of these are new *Acacia* species (unnamed at the time of completing this report) and a new species of *Microcorys*. This has now been named as *Microcorys* sp. Mt Holland (D Angus DA2397) (P1). Two other unnamed taxa are under review as they may also represent new taxa; one is an *Eremophila* species, and the other a *Hibbertia* species. Twenty-six vegetation communities were described by Mattiske Consulting with the survey area. The total area surveyed was 4,417.83 ha, of which 1,993.59 ha was the EGLP. The vegetation communities described by Mattiske Consulting are summarized below. The dominant type of vegetation within the survey area was a mixed *Eucalyptus* (mallee) woodland:

H1 *Melaleuca cliffortioides*, *Allocasuarina campestris*, *Dodonaea adenophora* mid open heathland over *Grevillea lissopleura* (P1), *Trymalium myrtillus* subsp. *myrtillus* low sparse shrubland on rocky red-brown sandy clay soils on slopes.

S1 *Allocasuarina acutivalvis*, *Allocasuarina spinosissima* tall closed shrubland over *Hakea subsulcata*, *Melaleuca cordata*, *Micromyrtus erichsenii* mid sparse heathland on lateritic orange-red clay soils on flats and lower slopes.

S2 *Allocasuarina acutivalvis*, *Allocasuarina spinosissima*, *Eucalyptus burracoppinensis* tall open shrubland over *Thryptomene kochii*, *Persoonia helix*, *Micromyrtus erichsenii* mid sparse heathland over *Cyathostemon heterantherus*, *Hibbertia exasperata*, *Drummondita hassellii* low sparse shrubland on orange brown clayey sand soils on flats.

S3 *Allocasuarina acutivalvis*, *Eucalyptus burracoppinensis* tall sparse shrubland over *Banksia purdieana*, *Hakea subsulcata*, *Melaleuca cordata* mid sparse shrubland over *Micromyrtus erichsenii*, *Persoonia helix* low isolated shrubs on gravelly yellow brown to orange brown clay to clayey sand soils on flats.

MW6 *Eucalyptus burracoppinensis*, *Eucalyptus eremophila* mid open mallee woodland over *Thryptomene kochii*, *Melaleuca laxiflora*, *Acacia acuminata* mid open shrubland over *Drummondita hassellii*, *Microcybe ambigua* low sparse heathland on grey brown to orange brown clay to clayey sand on flats.

MW7 *Eucalyptus capillosa* subsp. *polyclada* mid open mallee woodland over *Allocasuarina spinosissima*, *Callitris canescens*, *Hakea minyma* mid tall sparse shrubland over *Phebalium megaphyllum* low sparse shrubland on orange brown clay soils on flats and slopes.

MW8 *Eucalyptus eremophila* low open mallee woodland over *Melaleuca hamata*, *Leptospermum erubescens*, *Melaleuca lateriflora* mid sparse shrubland over *Thomasia* sp. Salmon Gums (C.A. Gardner s.n. PERTH 02708639), *Darwinia* sp. Karonie (K. Newbey 8503) low sparse shrubland on orange brown clay in minor drainage channel.

W4 *Eucalyptus flocktoniae* subsp. *flocktoniae*, *Eucalyptus eremophila* low open mallee woodland over *Melaleuca depauperata*, *Callitris canescens*, *Melaleuca phoidophylla* mid-tall sparse shrubland over *Acacia tetraptera*, *Grevillea acuaria* low isolated heath shrubs on orange brown sandy clay soils with ironstone or quartz pebbles on flats and slopes.

W5 *Eucalyptus rigidula*, *Eucalyptus burracoppinensis* low open mallee woodland over *Micromyrtus erichsenii*, *Persoonia helix, Hakea erecta* mid sparse heathland over *Hibbertia rostellata*, *Hibbertia stowardii* low isolated shrubs on gravelly orange brown clayey sand soils on flats and slopes.

W6 *Eucalyptus burracoppinensis*, *Allocasuarina acutivalvis*, *Allocasuarina spinosissima* tall open mallee woodland over *Hakea erecta*, *Petrophile stricta*, *Banksia laevigata* subsp. *fuscolutea* mid sparse heathland over *Drummondita hassellii*, *Hibbertia exasperata*, *Psammomoya choretroides* low sparse shrubland on yellow brown sandy soils on flats.

W7 Burnt *Eucalyptus* spp. (*E. cylindriflora, E. flocktoniae subsp. flocktoniae, E. prolixa, E. salmonophloia, E. eremophila, E. capillosa subsp. polyclada*) low open woodland over *Melaleuca hamata*, *Melaleuca eleuterostachya* mid sparse shrubland over *Daviesia argillacea*, *Acacia hemiteles*, *Acacia deficiens* low sparse heathland on orange brown sandy clay soils on flats.

W8 *Eucalyptus prolixa*, *Eucalyptus salmonophloia*, *Eucalyptus urna* mid mallee woodland over *Santalum acuminatum*, *Daviesia argillacea*, *Melaleuca eleuterostachya* mid sparse heathland over *Acacia merrallii*, *Daviesia argillacea*, *Microcybe multiflora* subsp. *multiflora* low sparse shrubland on red brown sandy clay flats.

W9 *Eucalyptus urna*, *Eucalyptus ravida*, *Eucalyptus prolixa* low mallee woodland over *Melaleuca pauperiflora*, *Dodonaea stenozyga*, *Daviesia argillacea* mid sparse shrubland over *Acacia merrallii*, *Grevillea acuaria*, *Microcybe multiflora* subsp. *multiflora* low sparse shrubland.

W10 *Eucalyptus* spp. (*E. urna, E. cylindrocarpa, E. rigidula, E gracilis*) low mallee woodland over *Melaleuca pauperiflora*, *Daviesia scoparia* mid sparse shrubland over *Acacia merrallii*, *Grevillea huegelii*, *Olearia muelleri* low sparse shrubland on red clay soils on flats.

W11 *Eucalyptus eremophila*, *Eucalyptus rigidula*, *Eucalyptus flocktoniae* subsp. *flocktoniae* low mallee woodland over *Melaleuca lateriflora*, *Melaleuca eleuterostachya*, *Melaleuca acuminata* subsp. *acuminata* mid sparse shrubland over *Grevillea acuaria*, *Acacia hystrix* subsp. *hystrix*, *Microcybe ambigua* low sparse shrubland on orange brown clay soils on flats.

W12 *Eucalyptus cylindriflora*, *Eucalyptus cylindrocarpa*, *Eucalyptus prolixa* low open mallee woodland over *Melaleuca eleuterostachya*, *Melaleuca lateriflora*, *Daviesia argillacea* mid sparse shrubland over *Grevillea acuaria*, *Acacia merrallii*, *Acacia camptoclada* low sparse shrubland on yellow brown to red brown sandy clay soils on flats.

W13 *Callitris canescens*, *Eucalyptus rigidula* low open mallee woodland over *Micromyrtus erichsenii*, *Persoonia helix*, *Allocasuarina spinosissima* mid tall sparse shrubland over *Beyeria sulcata*, *Drummondita hassellii* low sparse shrubland on yellow brown to orange brown clayey sands on flats and slopes.

W14 Burnt *Eucalyptus salmonophloia*, *Eucalyptus eremophila* mid open woodland over *Santalum acuminatum*, *Senna artemisioides* subsp. *filifolia* mid sparse shrubland over *Acacia hemiteles*, *Olearia muelleri* low sparse shrubland on orange brown clay spoils on flats.

W15 Burnt *Allocasuarina acutivalvis*, *Eucalyptus* spp. (*E. cylindriflora, E. eremophila, E, gracilis, E. rigidula, E. burracoppinensis*) low open mallee woodland over *Hakea minyma*, *Melaleuca cordata*, *Melaleuca hamata* mid sparse shrubland over *Dampiera sacculata, Pimelea sulfurea, Hybanthus floribundus* subsp. *floribundus* low sparse forbland.

W16 Burnt *Eucalyptus* spp. (*E. cylindriflora, E. tenuis, E. burracoppinensis, E. eremophila*) low open mallee woodland over *Persoonia helix*, *Gastrolobium spinosum*, *Acacia assimilis* mid sparse shrubland over *Dampiera tenuicaulis* subsp. *curvula*, *Glischrocaryon aureum*, *Dampiera eriocephala* low sparse forbland on orange red gravelly sandy loam soils on flats.

W17 *Eucalyptus capillosa* subsp. *polyclada* low open mallee woodland over *Hakea pendens* (P3), *Beyeria sulcata*, *Santalum acuminatum* mid sparse shrubland over *Rinzia sessilis*, *Westringia cephalantha* subsp. *cephalantha*, *Hibbertia ancistrophylla* low sparse shrubland on lateritic red brown clayey sand on slopes and ridges.

W18 *Eucalyptus rigidula*. *Eucalyptus platycorys*, *Callitris canescens* low open mallee woodland over *Melaleuca hamata*, *Allocasuarina spinosissima*, *Hakea erecta* mid sparse shrubland over *Hibbertia gracilipes*, *Phebalium obovatum*, *Cyathostemon heterantherus* low sparse shrubland on yellow brown sandy soils on flats.

W19 *Eucalyptus prolixa* low open mallee woodland over *Daviesia argillacea*, *Santalum acuminatum* mid sparse shrubland over *Acacia merrallii*, *Microcybe ambigua*, *Grevillea acuaria* low sparse shrubland on orange-red brown sandy clay soils on flats.

W20 Burnt *Eucalyptus urna*, *Eucalyptus salmonophloia*, *Eucalyptus tenuis* mid open mallee woodland over *Melaleuca pauperiflora* mid sparse shrubland over *Acacia deficiens*, *Daviesia argillacea*, *Daviesia grahamii* low sparse shrubland on red brown clay soils on flats.

W21 *Eucalyptus eremophila*, *Eucalyptus flocktoniae* subsp. *flocktoniae* low open mallee woodland over *Melaleuca hamata* over *Acacia acanthoclada* subsp. *acanthoclada*, *Dampiera sacculata*, *Westringia cephalantha* subsp. *cephalantha* low sparse shrubland on grey brown clayey sand soils on flats and slopes.

W22 *Eucalyptus eremophila* low open mallee woodland over *Melaleuca hamata*, *Melaleuca eleuterostachya*, *Melaleuca laxiflora* mid sparse shrubland over *Hibbertia exasperata*, *Cyathostemon heterantherus*, *Acacia sphacelata* subsp. *sphacelata* low sparse shrubland on slightly gravelly yellow-orange brown clay soils on flats and slopes.

5. FIELD SURVEY RESULTS

Twenty individual search areas for *Banksia sphaerocarpa* var. *dolichostyla* (T), were surveyed with populations ranging from 3 to 6,349 plants. Not all individual plants in each population were counted.

5.1 Field Survey Coverage, Limitations and Constraints

The targeted survey for *Banksia sphaerocarpa* var. *dolichostyla* (T), based on tracks and foot traverses is illustrated in Appendix B. An assessment of the survey against a range of factors which may have had an impact on the outcomes of the present survey was prepared (Table 3). Based on this assessment, the survey for *Banksia sphaerocarpa* var. *dolichostyla* (T) may have a constraint in terms of whether sufficient populations and numbers of the taxon have been recorded to demonstrate that the impacts which may potentially occur as a result of mine development are minimized.

Table 3: Potential limitations of the *Banksia sphaerocarpa* var. *dolichostyla* (T) survey for the EGLP

POTENTIAL SURVEY LIMITATION	IMPACT ON SURVEY
Sources of information and availability of contextual information (i.e. pre-existing background versus new material).	**Not a constraint.** Several reports of surveys for *Banksia sphaerocarpa* var. *dolichostyla* (T) were available to provide data on the preferred habitat of this taxon. Selection of appropriate locations to search for *Banksia sphaerocarpa* var. *dolichostyla* (T) were based on this data together with an analysis, using Esri ArcGIS software, to analyse high resolution aerial imagery to identify areas surrounding the EGLP that had the greatest likelihood of providing a suitable habitat.
Scope (i.e. what life forms, etc., were sampled).	**Not a constraint.** *Banksia sphaerocarpa* var. *dolichostyla* (T) was the focus of the present survey. The taxon is readily identifiable in the field.
Proportion of flora collected and identified (based on sampling, timing and intensity).	**Potential constraint.** The survey for *Banksia sphaerocarpa* var. *dolichostyla* (T) was principally time dependent. Given that the purpose of the survey was to demonstrate that populations of this taxon were present external to the EGLP development envelope, and hence impacts within the development envelope would be minimal, the more time allocated to searching for new populations of this taxon may have demonstrated that such was the case. Notwithstanding this, the survey data recorded to date, together with an analysis of the potential impacts within the EGLP, indicates that a maximum of 92 plants, representing 0.56% of the recorded population of this taxon, have the potential to be impacted by mine development. Uncovering additional new populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) would assist in further reducing the potential impacts.
Completeness and further work which might be needed (i.e. was the relevant survey area fully surveyed).	**Potential constraint**. Should the calculated impacts to this taxon within the EGLP development envelope be acceptably low, then no further work, in terms of searching for additional populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) will be required.

POTENTIAL SURVEY LIMITATION	IMPACT ON SURVEY
Mapping reliability.	**Not a constraint**. The spatial distributions of the majority of the populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) investigated during this survey were accurately mapped. This is a result of a combination of the recording of the distribution of individual plants and the use of high resolution aerial imagery to map the population boundaries. Some previously unknown populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) were identified during the present survey. Due to time constraints it was not possible to undertake a thorough census of the populations at these locations, nor their spatial distribution.
Timing, weather, season, cycle.	**Not a constraint**. The EPA (2016a) recommends that flora and vegetation surveys in the Coolgardie region should be undertaken after the main rainfall period in the winter months. This was not a relevant factor for the present survey. *Banksia sphaerocarpa* var. *dolichostyla* (T) is readily identifiable in the field. Additionally, the present survey was completed during the main flowering period for this taxon, making identification in the field straightforward.
Disturbances (fire, flood, accidental human intervention, etc.).	**Not a constraint**. Parts of the EGLP and the surrounding area had been subjected to a fire in February 2015. This included areas which were the habitat for *Banksia sphaerocarpa* var. *dolichostyla* (T). At the time of the present survey, *Banksia sphaerocarpa* var. *dolichostyla* (T) had recovered from the fire due it being able to resprout from its lignotuber. Specimens of *Banksia sphaerocarpa* var. *dolichostyla* (T) within the fire burnt areas were readily identified because the foliage and old fruit were easily to identify. In addition, this taxon was one of the most rapidly recovered perennial shrubs within the fire burnt areas, rendering them easy to detect.
Intensity (in retrospect, was the intensity adequate).	**Not a constraint**. The intensity of the survey effort for *Banksia sphaerocarpa* var. *dolichostyla* (T) was considered to be good. The search for this taxon involved botanists walking along parallel 20 m wide search paths and recoding all plants encountered. *Banksia sphaerocarpa* var. *dolichostyla* (T) search paths and aerial imagery of the areas being surveyed were available in the field on hand held tablets, which were also used for recording of foot traverses.
Resources (i.e. were there adequate resources to complete the survey to the required standard).	**Not a constraint**. Resources, in terms of equipment, support and personnel were good.
Access problems (i.e. ability to access survey area).	**Not a constraint**. Vehicle access to the EGLP and the surrounding area was via a range of tracks. These provided excellent access to the areas to be surveyed.
Experience levels (e.g. degree of expertise in plant identification to taxon level).	**Not a constraint**. All botanists undertaking the survey were familiar with the identification of *Banksia sphaerocarpa* var. *dolichostyla* (T). Additionally, the majority of the botanists had also completed vegetation mapping within the EGLP.

5.2 *Banksia sphaerocarpa* var. *dolichostyla* (T) Distribution and Populations

The numbers of *Banksia sphaerocarpa* var. *dolichostyla* (T) were recorded (and in some cases estimated) across 20 search areas during the present survey. The locations of these search areas are shown in Figure 3. Detailed information on the number of plants recorded at each search area location, together with other relevant details concerning the survey of each is set out in Table 4. The 20 search areas comprised 18 discreet populations of *Banksia sphaerocarpa* var. *dolichostyla* (T), with search areas 2, 3 and 4 constituting a single population (Table 4). A total of 16,503 *Banksia sphaerocarpa* var. *dolichostyla* (T) were recorded across all the areas surveyed. When the estimated numbers are included, the total population is potentially 22,586 plants.

Of the 16,503 recorded *Banksia sphaerocarpa* var. *dolichostyla* (T), 5,220 or 31.63% are situated within the EGLP. Ninety-two plants, representing 0.56% of the total recorded population are likely to be impacted directly by clearing within the EGLP infrastructure footprint. When the potential population of *Banksia sphaerocarpa* var. *dolichostyla* (T) is used as the basis for calculation the 92 plants which would be impacted by clearing within the EGLP infrastructure footprint represent 0.41% of the potential population. When a 50 m buffer was applied to the EGLP infrastructure footprint, a total of 2,826 *Banksia sphaerocarpa* var. *dolichostyla* (T) plants, representing 17.12% (12.51% of the estimated total populations) were calculated to fall within this buffer area.

Time constraints precluded recording all plants in search area 18, which is situated to the west of the Forrestania Rd (Figure 3 and Appendix B18). The estimate of the population was based on the numbers recorded from several traverses of the population across its distribution. The population area was subdivided into areas of differing plant density to arrive at an estimate which would be more accurate.

Banksia sphaerocarpa var. *dolichostyla* (T) in search area 14 (Figure 3 and AppendixB14) was uncovered during the second field survey period. An estimate of the total population of *Banksia sphaerocarpa* var. *dolichostyla* (T) associated with search area 14 was made based on the density of plants at the nearby population 15.

Banksia sphaerocarpa var. *dolichostyla* (T) search area 20 (Figure 3 and Appendix B20) was uncovered during the second field survey period. An estimate of the total population of *Banksia sphaerocarpa* var. *dolichostyla* (T) associated with this area was made based on the density of plants at the nearby search area 19.

5.3 *Banksia sphaerocarpa* var. *dolichostyla* (T) within Infrastructure Footprint

Two areas within the infrastructure footprint were specifically searched for the presence of *Banksia sphaerocarpa* var. *dolichostyla* (T). These were the accommodation village and new airstrip areas (refer Appendix B00). These areas were searched because they are areas which are more likely be impacted by clearing associated with infrastructure development. Two *Banksia sphaerocarpa* var. *dolichostyla* (T) were recorded within the accommodation village area (Appendix B03) in remnant bushland. One *Banksia sphaerocarpa* var. *dolichostyla* (T) plant was recorded within the proposed new airstrip area, along the access track to the airstrip (Appendix B02). These three plants form part of the total of 92 *Banksia sphaerocarpa* var. *dolichostyla* (T) which have the potential to be impacted (Table 4).

5.4 *Banksia sphaerocarpa* var. *dolichostyla* (T) Regional Distribution

The regional distribution of *Banksia sphaerocarpa* var. *dolichostyla* (T) is shown in Figure 4. Regionally, records of *Banksia sphaerocarpa* var. *dolichostyla* (T) exist in the Avon Wheatbelt (AW1), Southern Cross (COO2), and Western Mallee (MAL2) IBRA sub-regions. Data available from the DotEE (2019) demonstrates that large populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) have been recorded outside the Mt Holland area (Table 5).

Table 5. Regional population data for *Banksia sphaerocarpa* var. *dolichostyla* (T)

POPULATION	LOCATION	SURVEY YEAR	NUMBER OF PLANTS
1	Mt Holland	1990	300
2	North of Lake Cronin	1989	50+
3	South of Lake Cronin	1989	400+
4	North Ironcap	1989	100+
5	Forrestania	1990	50+
6	South Ironcap	1990	1000+
7	SE of South Ironcap	1989	500+

If the populations for the Mt Holland and Forrestania areas (Table 4) are excluded, given that the present survey is likely to overlap these areas, the minimum regional population is 2,050. Table 6 summarizes the potential impacts at both the local and regional to populations of *Banksia sphaerocarpa* var. *dolichostyla* (T).

Table 6. Summary of potential local and regional impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T)

			NUMBER OF PLANTS WHICH MAY BE IMPACTED AT THE EARL GREY LITHIUM PROJECT	
POPULATION	**ACTUAL / ESTIMATED**	**TOTAL PLANT NUMBERS**	**DIRECT (92 plants)**	**WITHIN 50 m BUFFER (2,826 plants)**
LOCAL	Actual	16,503	0.56%	17.12%
	Estimated	22,586	0.41%	12.51%
REGIONAL	Actual	18,553	0.50%	15.23%
	Estimated	24,636	0.37%	11.47%

5.5 Condition of the Vegetation

The condition of *Banksia sphaerocarpa* var. *dolichostyla* (T) plants encountered during the survey was generally excellent (Plate 1a). This included plants growing in fire burnt areas (Plate 2). Plants ranged from juveniles (Plate 1d) though to large mature adult plants, often 2.5 to 3 m in height, with a similar spread.

b.

Plate 2: *Banksia sphaerocarpa* var. *dolichostyla* (T) regrowth in fire burnt areas: arrows indicate position of *Banksia sphaerocarpa* var. *dolichostyla* (T) plants. (photograph by D. Angus)

Table 4: Populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) recorded during the survey of the Earl Grey Lithium Project

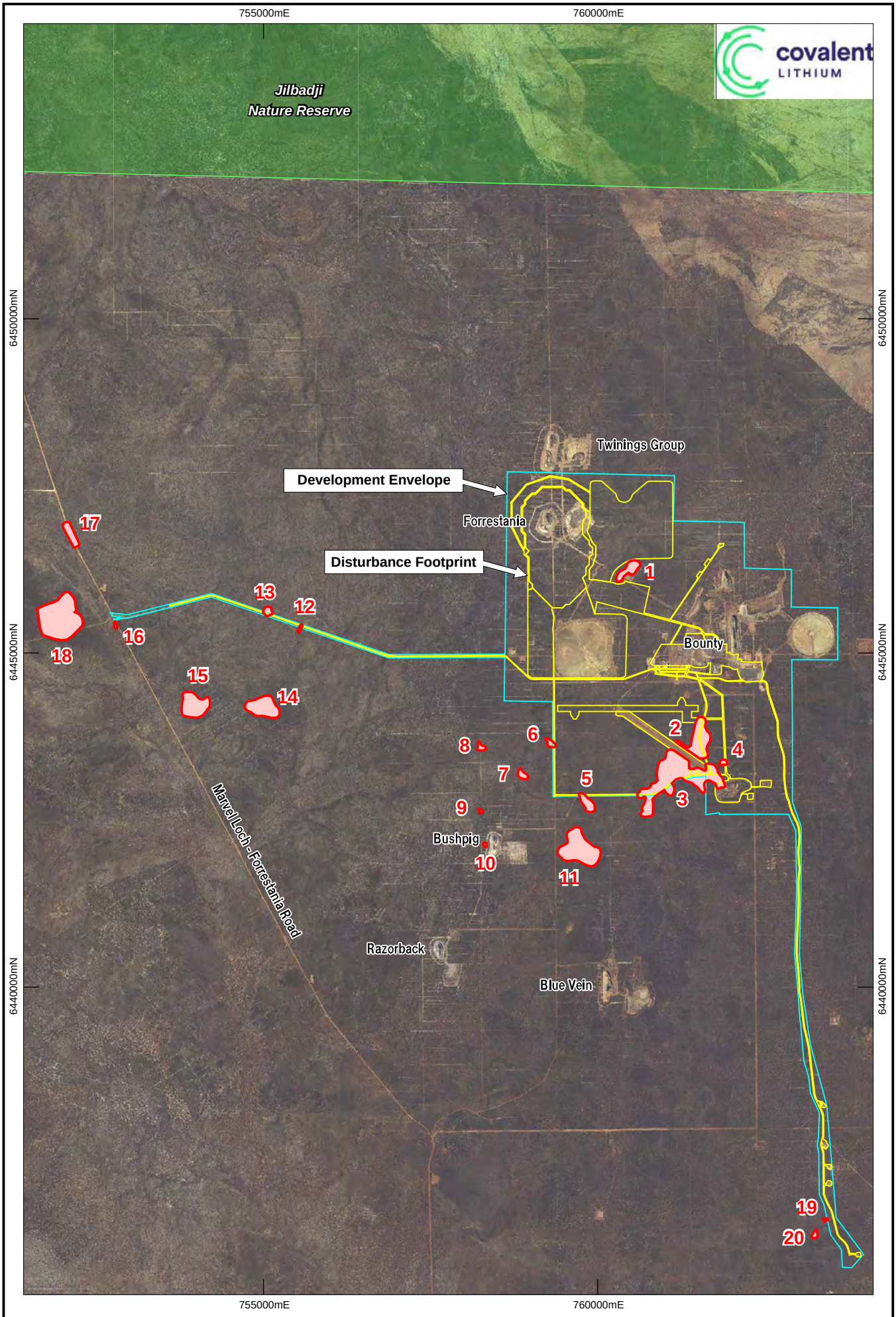
Search Area[1]	Area (ha)	*Banksia* Pop[n]	Number of Plants					Number of Plants Potentially Impacted by Clearing of Infrastructure Footprint		Comments
			Recorded	Estimated[2]	Recorded + Estimated	Inside EGLP DE[3]	Outside EGLP DE[3]	Unbuffered[4]	50 m Buffer[5]	
1	5.0201	1	221	0	221	221	0	0	5	
2	13.9528	2	733	0	733	733	0	1	515	Located within roads and utilities area
3	43.9524		6,349	0	6,349	4,221	2,128	89	2,283	Of the 89 plants located within the infrastructure footprint: 13 are situated within the roads/utilities area 2 are situated within the accommodation village area 74 are situated within the topsoil area, principally around the existing airstrip
4	0.7691		14	0	14	14	0	1	11	11 plants are associated with the roads and utilities
5	3.6974	3	396	0	396	3	393	0	9	
6	1.1918	4	78	0	78	6	72	0	50	
7	2.2114	5	37	0	37	0	37	0	0	
8	1.0596	6	51	0	51	0	51	0	0	
9	0.2750	7	12	0	12	0	12	0	0	
10	0.3156	8	18	0	18	0	18	0	0	
11	21.7910	9	2,330	0	2,330	0	2,330	0	0	
12	0.4271	10	5	0	5	1	4	0	1	Situated along access road to mine
13	1.4295	11	52	0	52	16	36	1	44	Situated along access road to mine

Table 4: Populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) recorded during the survey of the Earl Grey Lithium Project

Search Area[1]	Area (ha)	*Banksia* Pop[n]	Number of Plants					Number of Plants Potentially Impacted by Clearing of Infrastructure Footprint		Comments
			Recorded	Estimated[2]	Recorded + Estimated	Inside EGLP DE[3]	Outside EGLP DE[3]	Unbuffered[4]	50 m Buffer[5]	
14	11.9558	12	23	1706	1729	0	1706	0	0	Population estimated based on average density of adjacent population 15
15	12.3360	13	1,761	0	1,761	0	1,761	0	0	
16	0.3565	14	17	0	17	0	17	0	0	small population near edge of Forrestania Rd
17	4.2230	15	3	0	3	0	3	0	0	small population near edge of Forrestania Rd
18	33.4095	16	4,318	4,377	8,695	0	8,695	0	0	
19	0.1586	17	33	0	33	5	28	0	0	
20	0.7576	18	52	0	52	0	52	0	0	
Totals			16,503	6,083	22,586	5,220	17,343	92	2,918 [2]	92 plants comprise 0.56% of recorded total population and 0.41% of estimated total population

Notes: **1**. The search area corresponds to the population number shown in Figure 3; **2**. Where the population has been estimated, the method used is described in the Methods section; **3**. EGLP DE = Earl Grey Lithium Project Development Envelope – the figure indicated is for recorded plant population numbers; **4**. Unbuffered impacts are the number of plants which intersect the EGLP infrastructure footprint; **5**. Buffered impacts are the number of plants which intersect the EGLP infrastructure footprint when a 50 m buffer zone is applied.

2. There are 2,826 plants within the 50m buffer, excluding the 92 plants in the unbuffered zone.



Aerial: Landgate (March 2011) ~ DBCA Estates: Department of Biodiversity, Conservation and Attractions, WA

0 1km
Scale 1:75,000
MGA94 (Zone 50)
CAD Ref: g2445_R011_03
Date: Jan 2019 | Rev: B | A4

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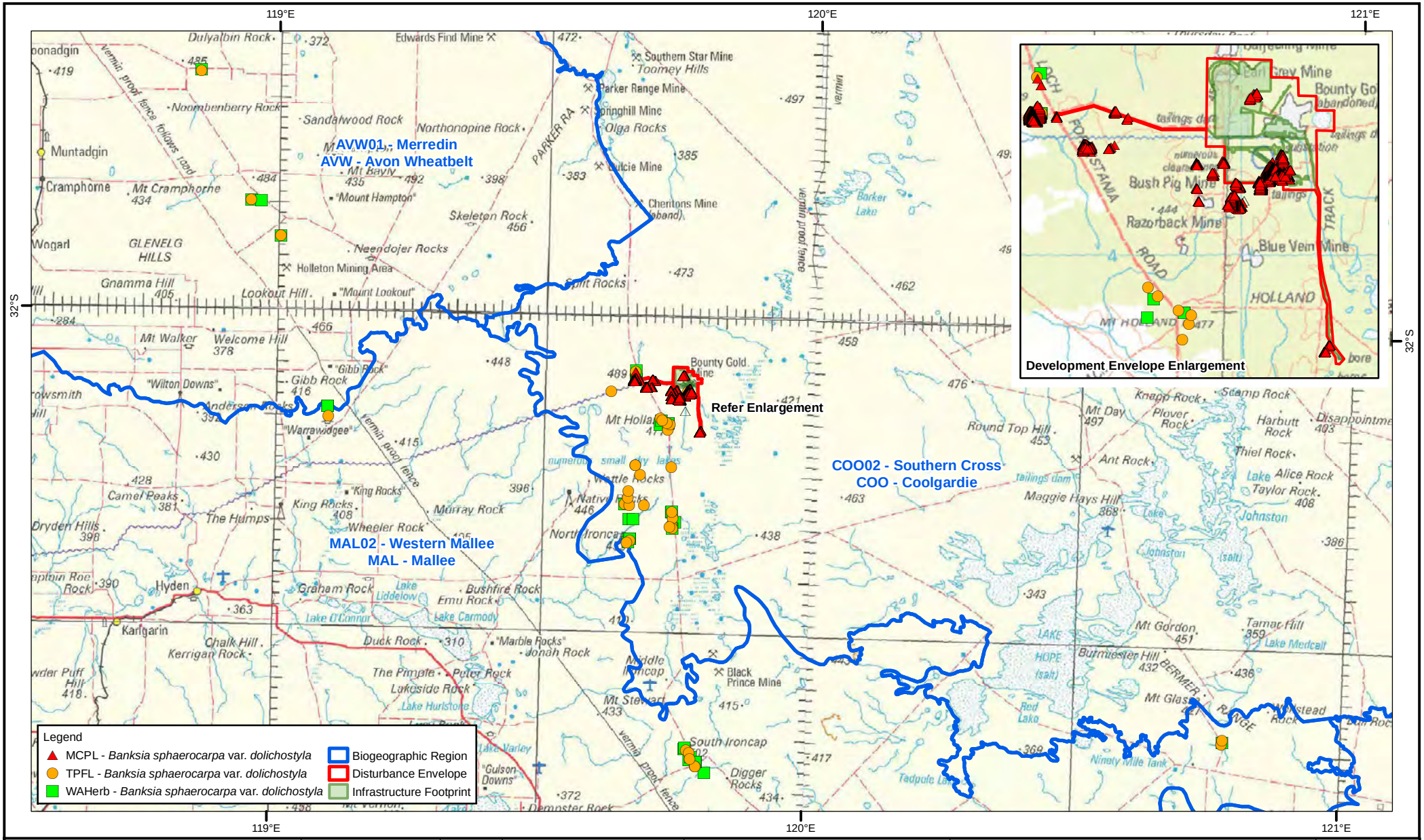
Covalent Lithium Pty Ltd
Earl Grey Lithium Project
***Banksia sphaerocarpa* var. *dolichostyla* (T) Populations**

Figure: **3**



Notes:
Background: GSA
TPFL and WA Herberium Flora: DBCA

Client: covalent LITHIUM

N

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Scale: 1:900,000
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CAD Ref: a2445_R012_04
Date: January 2019 | Rev: A | A4

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Covalent Lithium Pty Ltd
Earl Grey Lithium Project
Banksia sphaerocarpa var. *dolichostyla* Regional Distribution

Appendix 4

6. DISCUSSION

6.1 *Banksia sphaerocarpa* var. *dolichostyla* (T) Populations and Distribution

The survey for *Banksia sphaerocarpa* var. *dolichostyla* (T) completed over two separate field visits in May and June of 2018 identified 18 individual populations of this taxon. Of these, three represented populations uncovered during the present survey, and one was initially recorded during the 2017 flora and vegetation survey of the EGLP (Mattiske Consulting 2018).

A total of 16,503 *Banksia sphaerocarpa* var. *dolichostyla* (T) plants were recorded in the present survey across the 18 identified populations. Search areas 2, 3 and 4 (Table 4, Figure 3) were considered to comprise a single *Banksia sphaerocarpa* var. *dolichostyla* (T) population, as the plants in these three search areas are growing on the same landform which has been historically dissected by roads constructed as part of the old Bounty Mine development. All other search areas (Figure 3) were treated as comprising individual populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). This is justified on the basis that individual populations were spatially separated from each other by vegetation types which were of a different species composition and / or landform. This is most pronounced with the populations labelled 14, 15 and 18, which are located on gravelly/rocky hills separated from each other by sandy clay flats. In general, the identified populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) were associated with the S3 type vegetation community (Mattiske Consulting 2018). When the estimated plant numbers are included, a total of 22,586 *Banksia sphaerocarpa* var. *dolichostyla* (T) plants are potentially located across the 18 identified populations (Table 4). All *Banksia sphaerocarpa* var. *dolichostyla* (T) populations which occur within or intersect the EGLP development envelope were fully surveyed – no population estimates were made in these areas. Estimates were only undertaken on three populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) plants located externally to the EGLP. These were the search areas numbered 14, 18 and 20 (Figure 3). Areas 14 and 20 were uncovered during the present field survey. Estimates of the total number of plants associated with area 14 assumed a similar plant density as the nearby area 15, which was fully surveyed. Utilising the density of *Banksia sphaerocarpa* var. *dolichostyla* (T) plants within area 15 as the basis for estimating the size of the area 14 population was justified on the basis that both populations occur in similar vegetation on adjacent hills. In addition a conservative approach was taken when defining a population boundary for area 14. Estimates of the total number of plants associated with area 20 assumed a similar plant density as the nearby area 19 population, which was fully surveyed. The population of *Banksia sphaerocarpa* var. *dolichostyla* (T) plants within area 18 was substantially counted in the field, and this data was used as a basis for calculating the potential total population. Search area 18 occupied the greatest area (approximately 33 ha) and had the highest number of recorded plants (4,318). Search area 18 was estimated to have a potential 8,695 plants.

Past surveys for *Banksia sphaerocarpa* var. *dolichostyla* (T) have been associated with a mix of flora and vegetation surveys (Thompson & Allen 2013, Native Vegetation Solutions 2014, Native Vegetation Solutions 2016b, Mattiske Consulting 2017, Mattiske Consulting 2018) and surveys specifically targeting *Banksia sphaerocarpa* var. *dolichostyla* (T) (Craig 2006, Convergent Minerals Ltd 2014, Native Vegetation Solutions 2016a, Blueprint Environmental Strategies 2017, Native vegetation Solutions 2017). The two most recent surveys targeting populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) (Blueprint Environmental Strategies 2017, Native vegetation Solutions 2017) recorded 521 and an estimated 9,500 *Banksia sphaerocarpa* var. *dolichostyla* (T) individuals respectively. A review of these documents reveals that the methodology used in assessing the *Banksia sphaerocarpa* var. *dolichostyla* (T) populations is either poorly explained, or that the majority of the survey was completed by driving on tracks and recording plants in such locations. In the case of Native Vegetation Solutions (2017) no basis for estimating the populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) set out in the report is provided.

The present survey is the first survey to undertake a systematic approach to surveying the populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). Searches for and recording of individual plants was completed along predefined transects to ensure search areas were thoroughly covered. The methodology for estimating populations, where stated, is clearly defined. Should circumstances permit further survey work to be undertaken, a thorough field-based census of *Banksia sphaerocarpa* var. *dolichostyla* (T) associated with areas 14 and 20 should be undertaken.

The impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T) have been calculated from direct impacts associated with clearing all plants within the EGLP infrastructure footprint, and also by applying a 50 m buffer about the EGLP infrastructure footprint. In the case of the latter calculation, this was to take account of the requirement under Section 51B of the EP Act, that no clearing of an environmentally sensitive area - declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* - shall take place where the area covered by vegetation within 50 m of a threatened flora, to the extent to which the vegetation is continuous with the vegetation in which the threatened flora is located. Based strictly on recorded plants, clearing within the EGLP infrastructure footprint will result in 92 plants, representing 0.56% of the recorded population (0.41% of estimated population) being impacted. Within the 50 m buffer about the EGLP infrastructure footprint, there are 2,826 plants, representing 17.12% of the recorded population (12.51% of estimated population). Of the 92 plants with the potential to be impacted, 91 are associated with *Banksia sphaerocarpa* var. *dolichostyla* (T) population 2 (Table 4) which is situated around the existing airstrip, with the impacts affecting plants on the boundary of the infrastructure footprint. A single *Banksia sphaerocarpa* var. *dolichostyla* (T) is associated with population 11 (search area 13) located on the access road to the development envelope from the Forrestania Rd.

It is likely that further searches would uncover additional populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). This is based on a desktop assessment of potential *Banksia sphaerocarpa* var. *dolichostyla* (T) habitat locations based those which have been recorded, and which was described in the Methods section.

A number of these potential habitat areas have not been investigated. Observation made in the field during the *Banksia sphaerocarpa* var. *dolichostyla* (T) surveys made by Mattiske Consulting indicate that populations of this taxon are healthy, are recruiting juveniles, and in areas which have been subject to fires, have recovered rapidly. Given these factors, and the observation that *Banksia sphaerocarpa* var. *dolichostyla* (T) was growing in previously disturbed areas, it is likely that this taxon would be a good candidate for seeding in rehabilitation areas with suitable soils.

6.2 *Banksia sphaerocarpa* var. *dolichostyla* (T) within Infrastructure Footprint

A search for *Banksia sphaerocarpa* var. *dolichostyla* (T) within two of the infrastructure footprint areas was completed during the present survey. These areas were the accommodation village and proposed new airstrip (Appendix B00). These areas were searched because, based on the results of the vegetation mapping (Mattiske 2018), these were the only infrastructure footprint areas which would contain soils, topography and co-occurring species with the potential to support the presence of *Banksia sphaerocarpa* var. *dolichostyla* (T).

The proposed new airstrip was considered likely to have suitable habitat towards its eastern end. The majority of the proposed airstrip is covered in mixed *Eucalyptus* woodland with a *Melaleuca* understorey and is not a suitable habitat for *Banksia sphaerocarpa* var. *dolichostyla* (T). One specimen of *Banksia sphaerocarpa* var. *dolichostyla* (T) was recorded at the eastern end of the airstrip infrastructure footprint along the access track to the airstrip (Appendix B02). Given that the single *Banksia sphaerocarpa* var. *dolichostyla* (T) is situated on the edge of a proposed track, a minor revision of the tracks location would avoid impacting this specimen.

The accommodation village, which consists of cleared land from the old Bounty Mine accommodation village with patches of remnant vegetation, was considered more likely to support habitat suitable for *Banksia sphaerocarpa* var. *dolichostyla* (T). Two specimens of *Banksia sphaerocarpa* var. *dolichostyla* (T) were recorded within a single remnant vegetation area within the accommodation village area (Appendix B03). These plants are not likely to be impacted if the new accommodation village plans include the retention of this existing area of remnant vegetation.

A total of 92 *Banksia sphaerocarpa* var. *dolichostyla* (T) have been recorded within the current infrastructure footprint (Table 4). Three of these were located in either the accommodation village or proposed new airstrip areas. The remaining 89 plants are situated on the margins of roads adjacent to the old airstrip, the topsoil area (existing airstrip) and the access route from the Forrestania Rd. Impacts to plants on the periphery of the topsoil areas could be reduced by further refinement to the boundary of this area.

Based on the vegetation mapping (Mattiske 2018) and numerous field surveys, Mattiske Consulting does not consider that *Banksia sphaerocarpa* var. *dolichostyla* (T) would be located in other infrastructure footprint areas due to lack of suitable habitat for this species.

6.3 Direct, Indirect, and Cumulative Impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T)

On the basis of the current infrastructure footprint, direct impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T) will result in up to 92 individual plants being cleared. Indirect impacts which may degrade vegetation which supports populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) has the potential to occur for the following reasons:

- Changes to local hydrological conditions as a result of infrastructure construction on the edges of existing road (e.g. drainage channels);
- Changes to surface water flow patterns as a result of infrastructure construction;
- The dumping of waste material in undisturbed vegetation;
- Unauthorised access into areas of undisturbed vegetation;
- The potential increased risk of fires in the undisturbed vegetation as a result of human activities; and,
- The introduction and spread of introduced (weed) plants.

Cumulative impacts to populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) may occur where:

- Clearing of *Banksia sphaerocarpa* var. *dolichostyla* (T) occurs beyond that accepted as being required for infrastructure construction; and,
- A failure to manage direct impacts and the sources / causes of potential indirect impacts to the vegetation supporting populations of *Banksia sphaerocarpa* var. *dolichostyla* (T).

The implementation of a flora management and monitoring program, which should include the education of the local workforce in respect of the values of the local vegetation and flora of conservation significance is essential.

6.4 Local and Regional impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T)

The present survey represented the first systematic census of *Banksia sphaerocarpa* var. *dolichostyla* (T). All populations of this taxon described within this report should be considered as local. Regionally, records of *Banksia sphaerocarpa* var. *dolichostyla* (T) exist in the Avon Wheatbelt (AW1), Southern Cross (COO2), and Western Mallee (MAL2) IBRA sub-regions (Figure 4). Data available from

the DotEE (2019) demonstrates that large numbers (2,050 plants) of *Banksia sphaerocarpa* var. *dolichostyla* (T) have been recorded outside the Mt Holland and Forrestania areas. Based on the data presented in this report, only two of the 18 identified populations have the potential to be impacted. Of these two populations, only population 2 which is situated around the existing airstrip, is likely to be impacted. Impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T) in this area could be further reduced by modifications to the infrastructure footprint in the area about the topsoil area. At the local level the direct impacts to *Banksia sphaerocarpa* var. *dolichostyla* (T) amount to 0.41% of the estimated population, or 0.37% of the estimated population when regional population numbers are taken into account

7. CONCLUSION

The surveys completed by Mattiske Consulting in May and June of 2018 have validated the presence of 18 individual populations of *Banksia sphaerocarpa* var. *dolichostyla* (T). Of these, two intersect the EGLP infrastructure footprint, potentially impacting 92 individual plants, which represent 0.56% (0.50% at the regional level) of the recorded population. When the estimated potential population is taken into account the impact is reduced to 0.41% (0.37% at the regional level). *Banksia sphaerocarpa* var. *dolichostyla* (T) is distributed across three IBRA subregions (Coolgardie, Avon Wheatbelt and Mallee), in seven identified populations. Consequently, impacts to this taxon associated with infrastructure development at the EGLP, both in terms of the numbers of plants impacted, as well as to specific population is unlikely to be detrimental to the long term persistence of this species.

Given that all plants which fall within the infrastructure footprint are situated on the edges of existing cleared areas, such as roads, it would be appropriate for the proponent to undertake a survey to determine if any of these plants will be cleared as part of the process of any modification or upgrading of existing infrastructure areas. Whilst up to three *Banksia sphaerocarpa* var. *dolichostyla* (T) may be impacted by clearing within the proposed accommodation village and new airstrip areas, these impacts can be avoided by minor site planning modifications. Similarly, impacts to 89 other *Banksia sphaerocarpa* var. *dolichostyla* (T) could be reduced by refining parts of the infrastructure footprint associated with the topsoil area.

8. PERSONNEL

The following Mattiske Consulting Pty Ltd personnel were involved in this project:

NAME	POSITION	SURVEY INVOLVEMENT	FLORA COLLECTION PERMIT
Dr E. M. Mattiske	Managing Director & Principal Ecologist	planning, management & reporting	N/A
Mr D. Angus	Senior Botanist	fieldwork, data analysis, plant identifications, mapping, report preparation	SL012279 3-1617
Mr B. Ellery	Experienced Botanist / Taxonomist	fieldwork, plant identifications	SL012282 123-1718
Ms M. van Wees	Experienced Botanist	fieldwork	SL012357
Ms H. Gooding	Botanist	fieldwork	SL012312

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APPENDIX A1: THREATENED AND PRIORITY FLORA DEFINITIONS

Under section 179 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), threatened flora are categorised as extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent (Table A1.1).

Table A1.1 Federal definition of threatened flora species

Note: Adapted from section 179 of the EPBC Act.

CODE	CATEGORY	DEFINITION
Ex	Extinct	Species which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild	Species which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	Critically Endangered	Species which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	Endangered	Species which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	Vulnerable	Species which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependent	Species which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

The *Wildlife Conservation Act 1950* (WC Act) provides for (amongst other things) the protection of flora likely to become extinct or rare or otherwise in need of special protection in Western Australia under section 23F. Threatened (or rare) flora are listed in the *Wildlife Conservation (Rare Flora) Notice 2017* (under section 23F(2) of the WC Act; Department of Biodiversity, Conservation and Attractions 2018a) and are categorised under Schedules 1-4 as critically endangered, endangered, vulnerable or extinct, respectively. Threatened flora are defined as "likely to become extinct or is rare, or otherwise in need of special protection", pursuant to section 23F(2) of the WC Act. Threatened species are categorised as critically endangered, endangered, vulnerable and presumed extinct (Table A1.2).

Table A1.2 State definition of threatened flora species

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2018b).

CODE	CATEGORY	DEFINITION
CR	Critically endangered	Species considered to be facing an extremely high risk of becoming extinct in the wild (listed under Schedule 1 of the *Wildlife Conservation (Rare Flora) Notice 2017*).
EN	Endangered	Species considered to be facing a very high risk of becoming extinct in the wild (listed under Schedule 2 of the *Wildlife Conservation (Rare Flora) Notice 2017*).
VU	Vulnerable	Species considered to be facing a high risk of becoming extinct in the wild (listed under Schedule 3 of the *Wildlife Conservation (Rare Flora) Notice 2017*).
EX	Presumed extinct species	Species that have been adequately searched for and there is no reasonable doubt that the last individual has died (listed under Schedule 4 of the *Wildlife Conservation (Rare Flora) Notice 2017*).

Priority flora species are defined as "possibly threatened species that do not meet the survey criteria, or are otherwise data deficient; or are adequately known, are rare but not threatened, meet criteria for near threatened or have recently been removed from the threatened species list for other than taxonomic reasons" (Department of Biodiversity, Conservation and Attractions 2018b). Priority species are not afforded any protection under state or federal legislation, however are considered significant under the Environmental Protection Authority's *Environmental Factor Guideline: Flora and Vegetation*. The Department of Biodiversity, Conservation and Attractions categorises priority flora into four categories: Priority 1; Priority 2, Priority 3 and Priority 4 (Table A1.3).

Table A1.3: State definition of priority flora species

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2018b).

CODE	CATEGORY	DEFINITION
P1	Priority 1: Poorly-known species	Known from one or a few locations (< 5) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation; or are otherwise under threat of habitat destruction or degradation. In urgent need of further survey.
P2	Priority 2: Poorly-known species	Known from one or a few locations (< 5). Some occurrences are on lands managed primarily for nature conservation. In urgent need of further survey.
P3	Priority 3: Poorly-known species	Known from several locations and the species does not appear to be under imminent threat; or from few but widespread locations with either a large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. In need of further survey.
P4	Priority 4: Rare, Near Threatened, and other species in need of monitoring	a) Rare - Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. b) Near Threatened - Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. c) Other - Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

APPENDIX A2: THREATENED AND PRIORITY ECOLOGICAL COMMUNITY DEFINITIONS

Under section 181 of the EPBC Act, threatened ecological communities are categorised as critically endangered, endangered and vulnerable (Table A2.1).

Table A2.1 Federal definition of threatened ecological communities

Note: Adapted from section 181 and section 182 of the EPBC Act.

CATEGORY	DEFINITION
Critically Endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Currently there is no Western Australian legislation covering the conservation of state listed threatened ecological communities (TECs), however, a non-statutory process is in place, whereby the Department of Biodiversity, Conservation and Attractions have been identifying and informally listing TECs since 1994. Some of these TECs are endorsed by the Federal Minister as threatened, and some of these are also listed under the EPBC Act and therefore afforded legislative protection at the Commonwealth level.

Table A2.2 State definition of threatened ecological communities

Note: Adapted from Department of Environment and Conservation (2013).

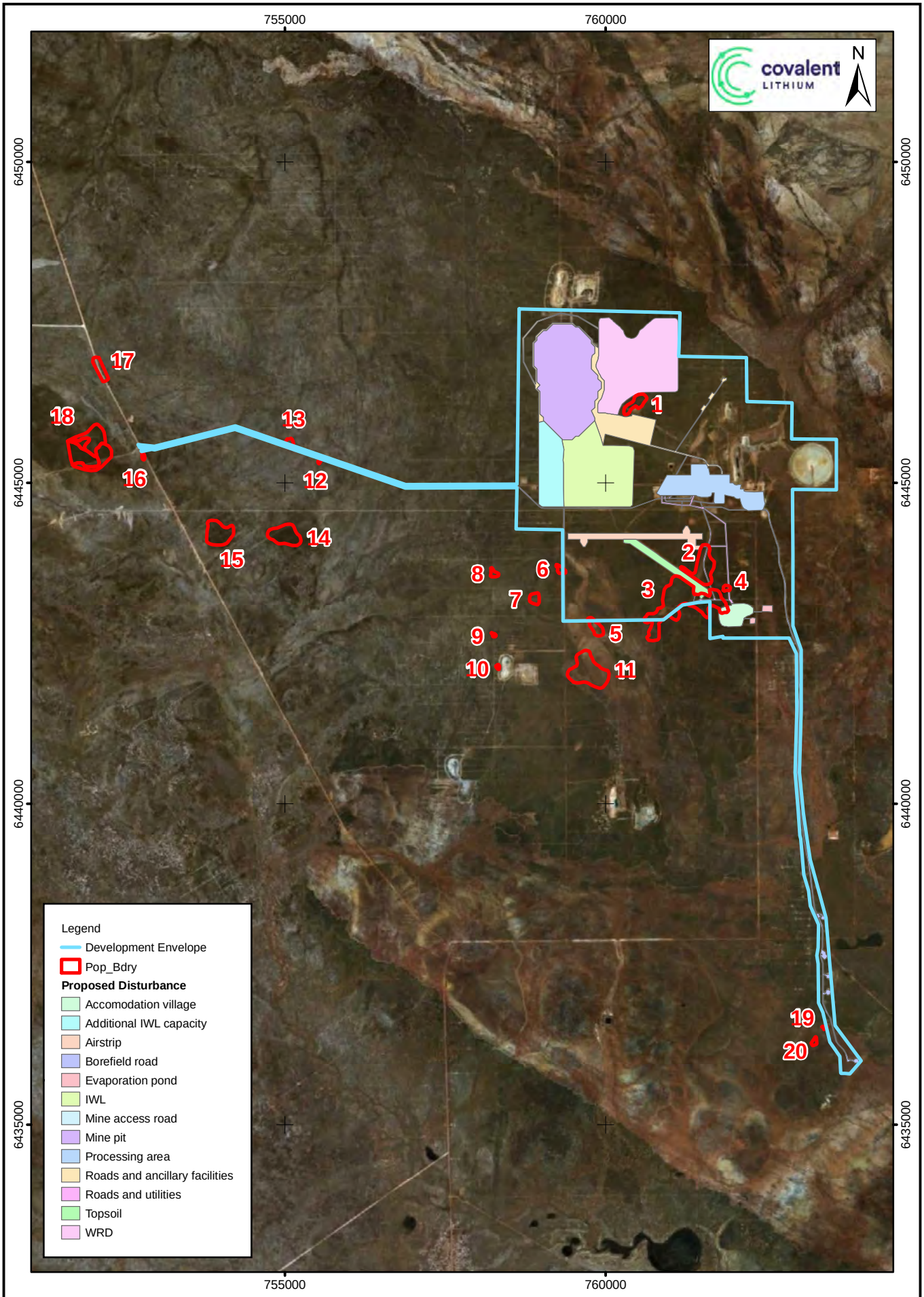
CODE	CATEGORY	DEFINITION
PD	Presumed Totally Destroyed	An ecological community will be listed as PD if there are no recent records of the community being extant and either of the following applies: 1. Records within the last 50 years have not been confirmed despite thorough searches or known likely habitats; or 2. All occurrences recorded within the last 50 years have since been destroyed.
CR	Critically Endangered	An ecological community will be listed as CR when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one or more of the following criteria: 1. The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification; 2. The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; or 3. The ecological community is highly modified with potential of being rehabilitated in the immediate future.
EN	Endangered	An ecological community will be listed as EN when it has been adequately surveyed and is not CR, but is facing a very high risk of total destruction in the near future. The ecological community must meet any one or more of the following criteria: 1. The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short term future, or is unlikely to be substantially rehabilitated in the short term future due to modification; 2. The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; or 3. The ecological community is highly modified with potential of being rehabilitated in the short term future.
VU	Vulnerable	An ecological community will be listed as VU when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one or more of the following criteria: 1. The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated; 2. The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution; or 3. The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.

Priority ecological communities (PECs) are defined as possible threatened ecological communities that do not meet the stringent survey criteria for the assessment of threatened ecological communities, and are listed by the Department of Biodiversity, Conservation and Attractions. Similarly to priority flora, PECs are not afforded legislative protection, however are considered significant under the Environmental Protection Authority's (2016a) *Environmental Factor Guideline: Flora and Vegetation*. The Department of Biodiversity, Conservation and Attractions categorises priority ecological communities into five categories: Priority 1; Priority 2, Priority 3, Priority 4 and Priority 5 (Table A2.3).

Table A2.3 State definition of priority ecological communities

Note: Adapted from Department of Environment and Conservation (2013).

CODE	CATEGORY	DEFINITION
P1	Priority 1 (Poorly known ecological communities)	Ecological communities that are known from very few, restricted occurrences (generally ≤ 5 occurrences or a total area of ≤ 100 ha). Most of these occurrences are not actively managed for conservation (e.g. located within agricultural or pastoral lands, urban areas, or active mineral leases) and for which immediate threats exist.
P2	Priority 2 (Poorly known ecological communities)	Communities that are known from few small occurrences (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation.
P3	Priority 3 (Poorly known ecological communities)	1. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation; 2. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat; or 3. Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	Priority 4 (Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring)	1. Rare – Communities known from few occurrences that are considered to have been adequately surveyed, sufficient knowledge is available, and are considered not to be currently threatened. 2. Near Threatened – Communities considered to have been adequately surveyed and do not qualify for Conservation Dependent, but are close to qualifying for Vulnerable. 3. Communities that have been removed from the list of threatened communities during the past five years.
P5	Priority 5 (Conservation Dependent ecological communities)	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.



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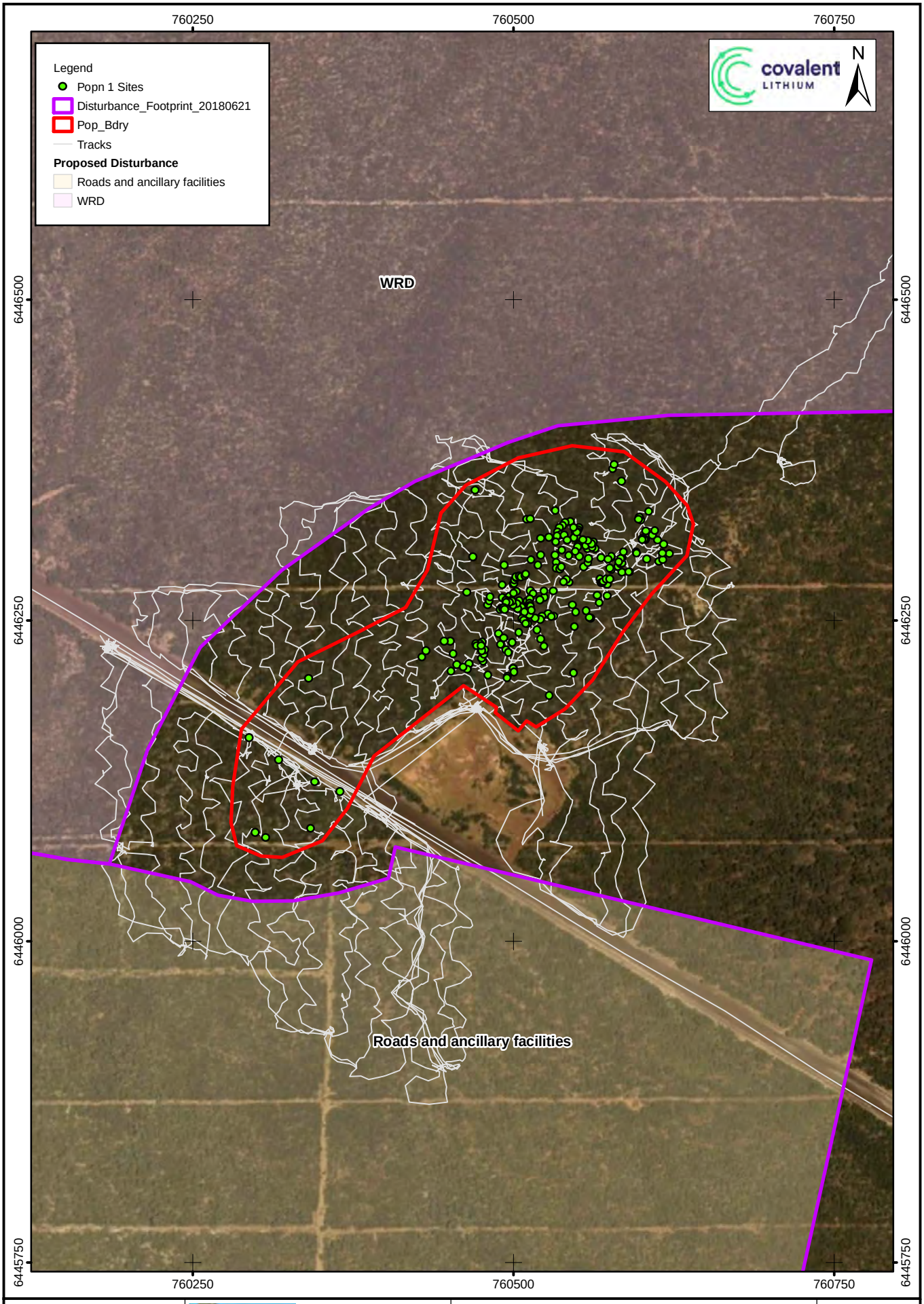
Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population Sites - Locality

Appendix

B00



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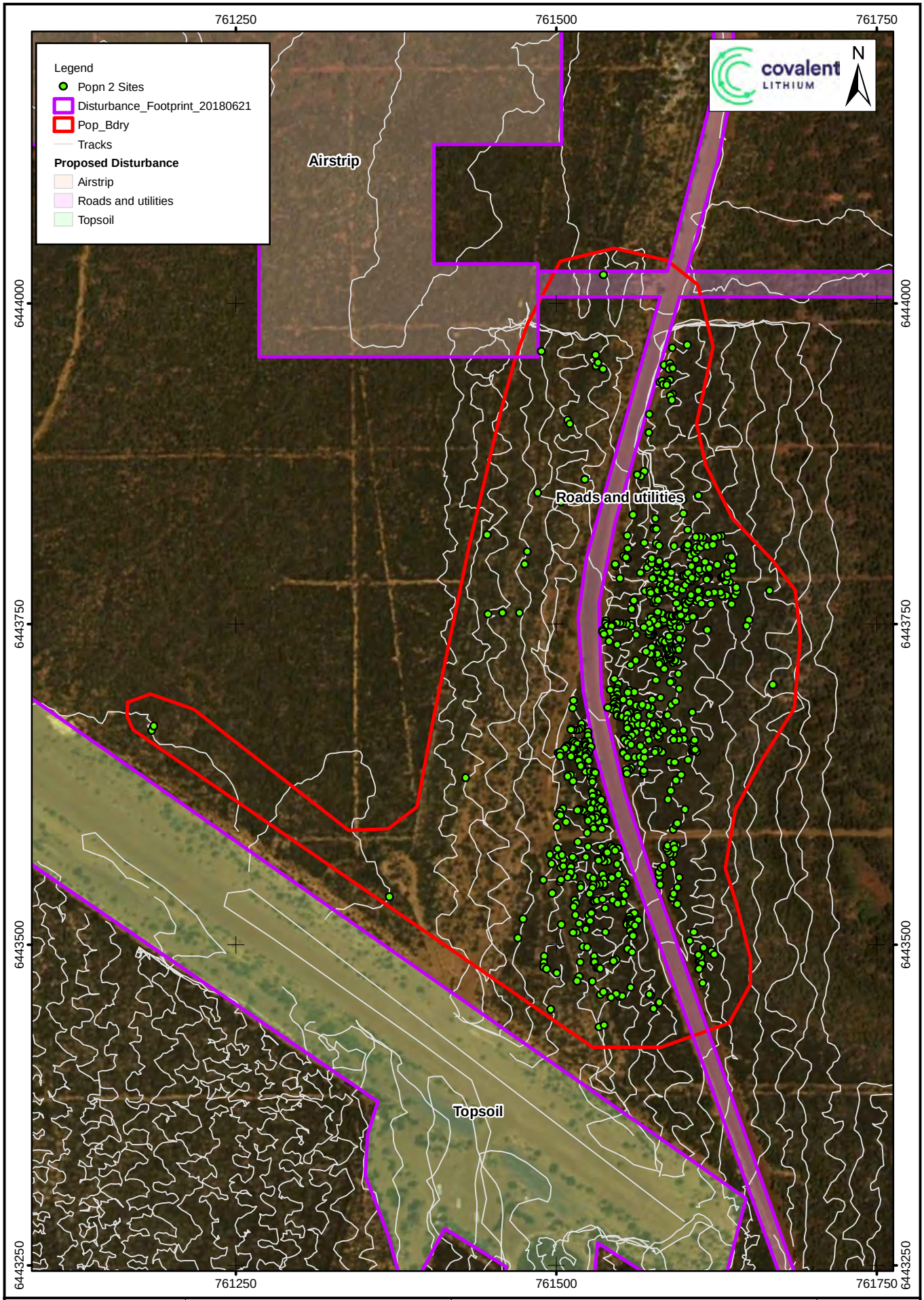
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 01 Sites & Foot Traverses

Appendix

B01



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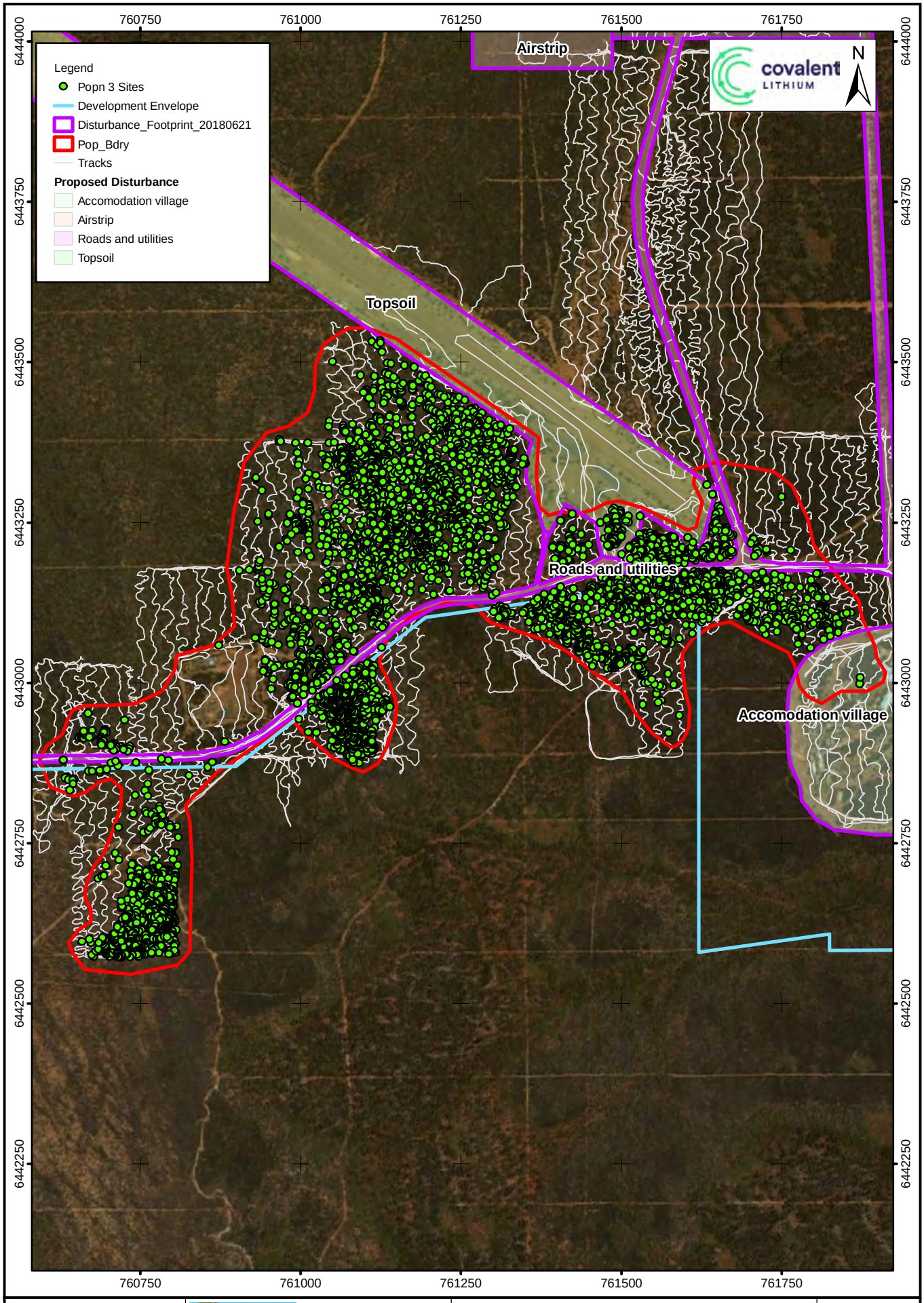
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 02 Sites & Foot Traverses

Appendix

B02



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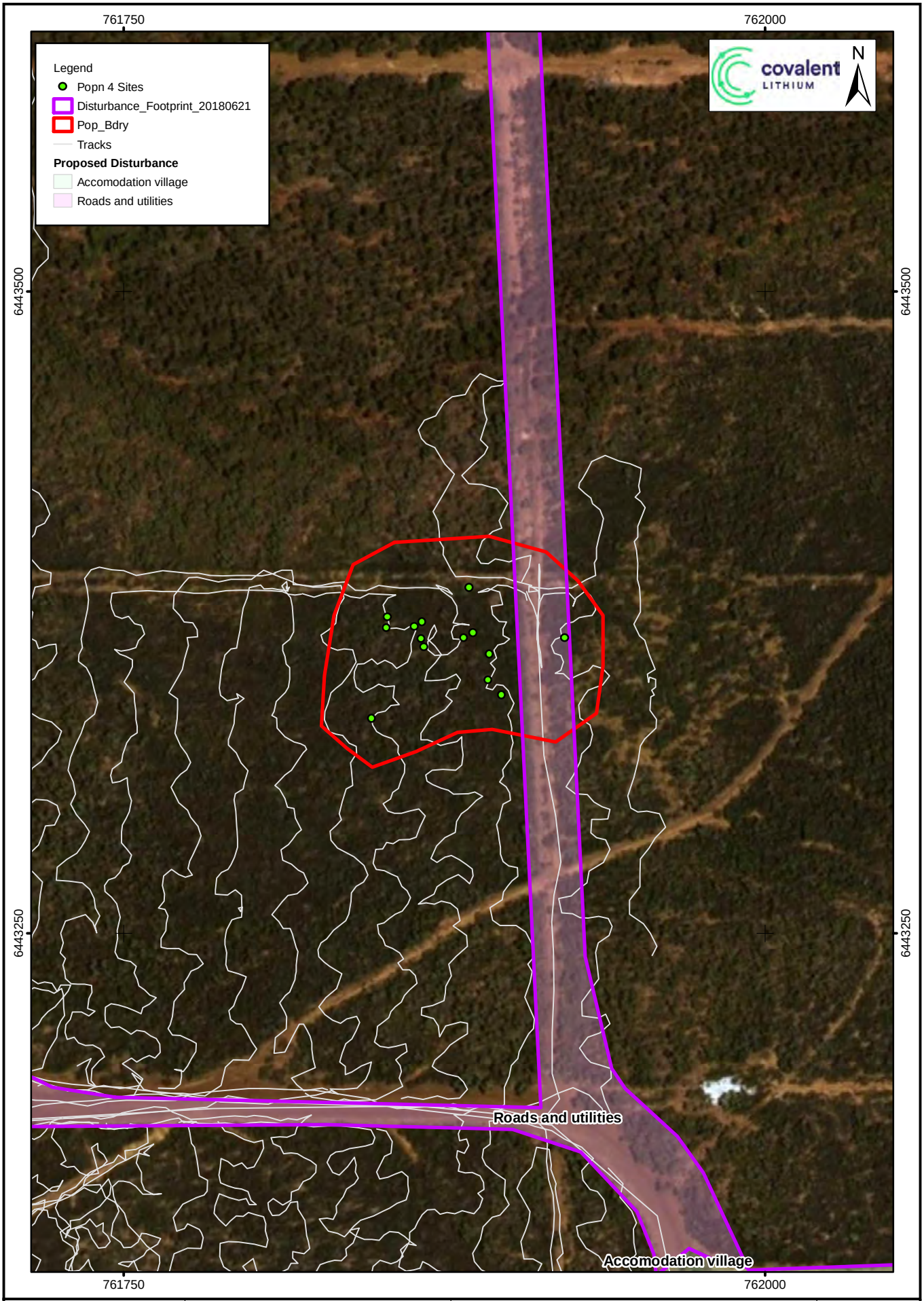
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 03 Sites & Foot Traverses

Appendix

B03



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Date: January 2019 | Rev: B | A4

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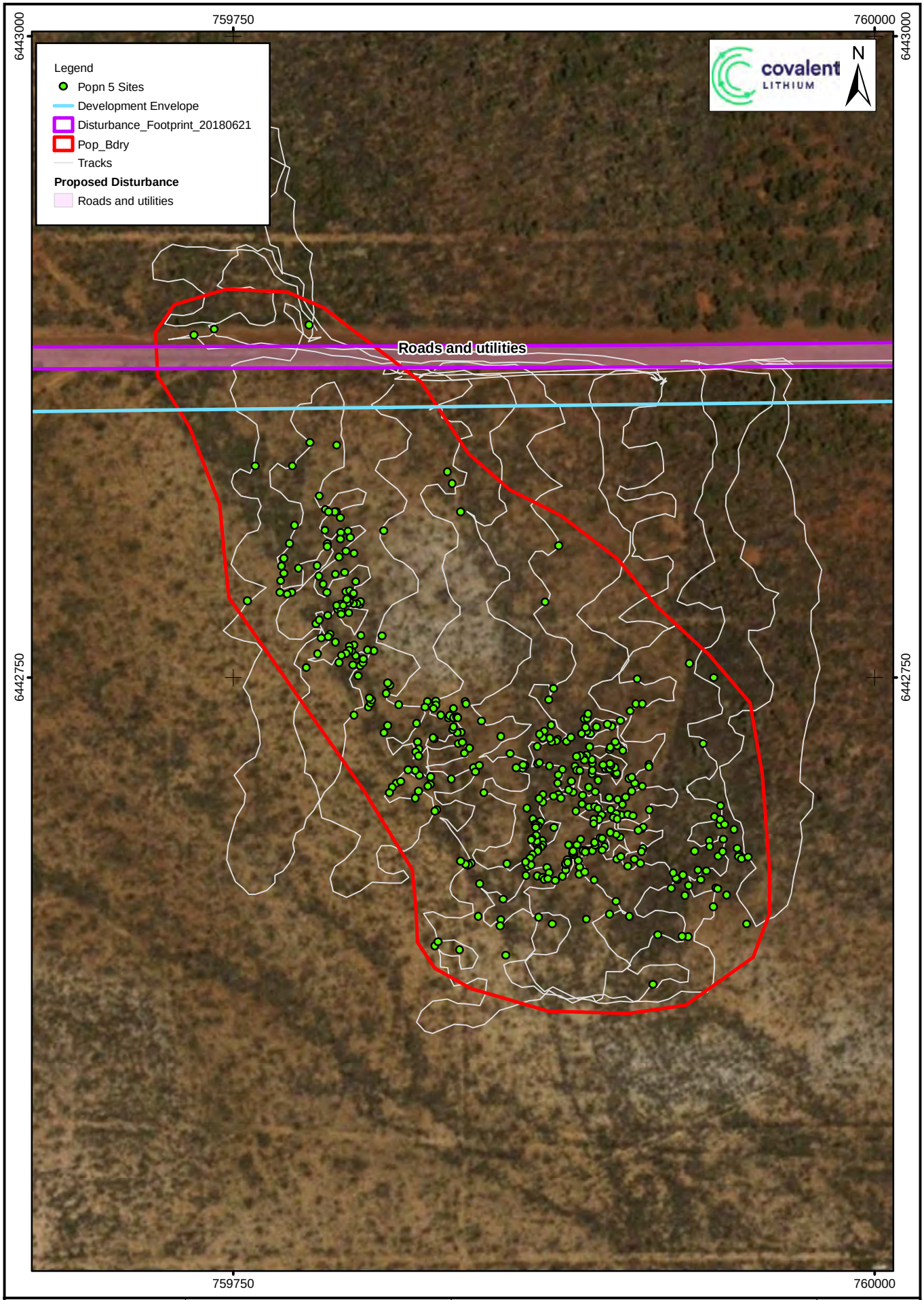
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 04 Sites & Foot Traverses

Appendix

B04



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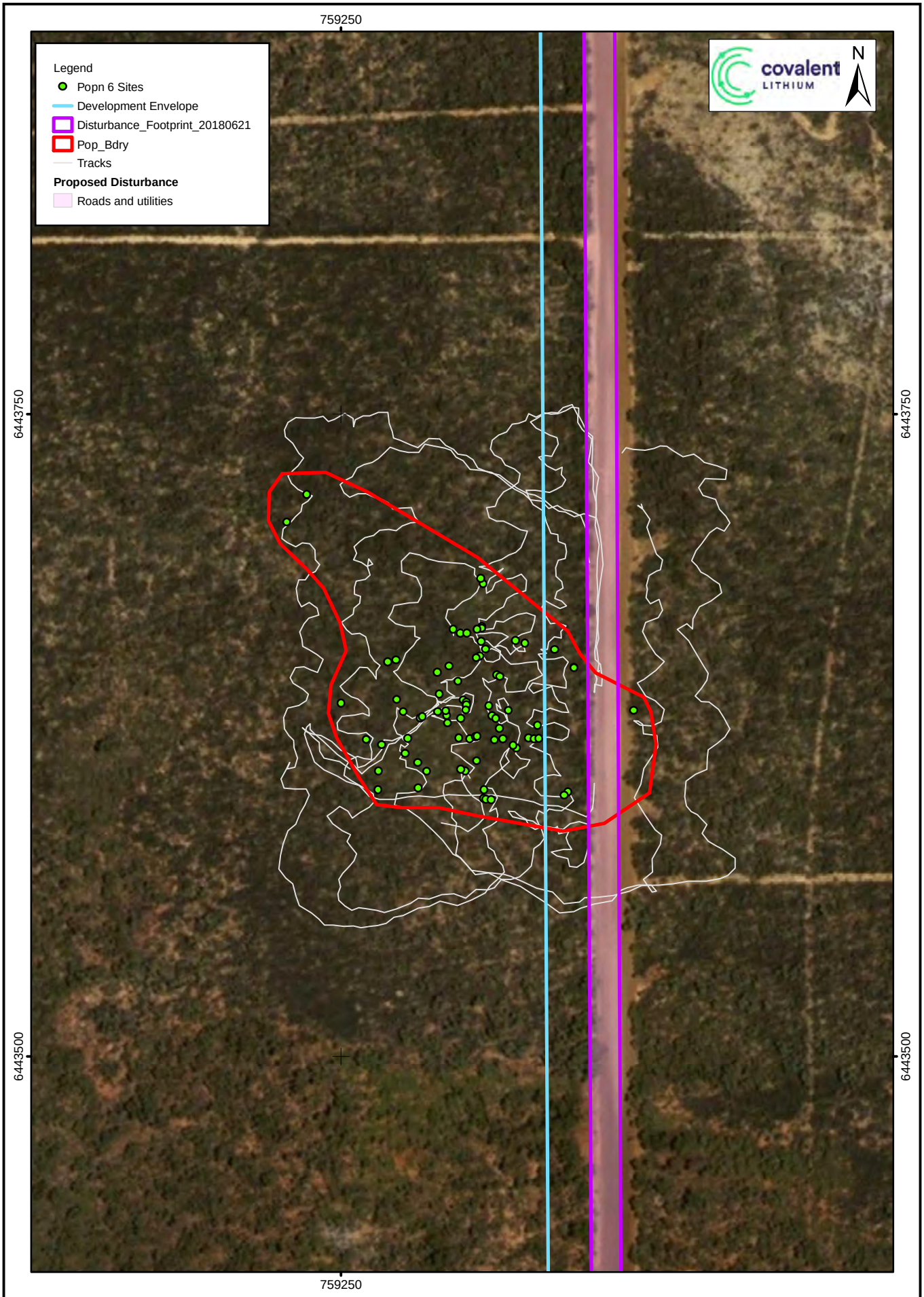
Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 05 Sites & Foot Traverses

Appendix

B05



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Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 06 Sites & Foot Traverses

Appendix

B06

Source: Image: Digital Globe (17/2/2016)

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Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 07 Sites & Foot Traverses

Appendix

B07

Source: Image: Digital Globe (17/2/2016)

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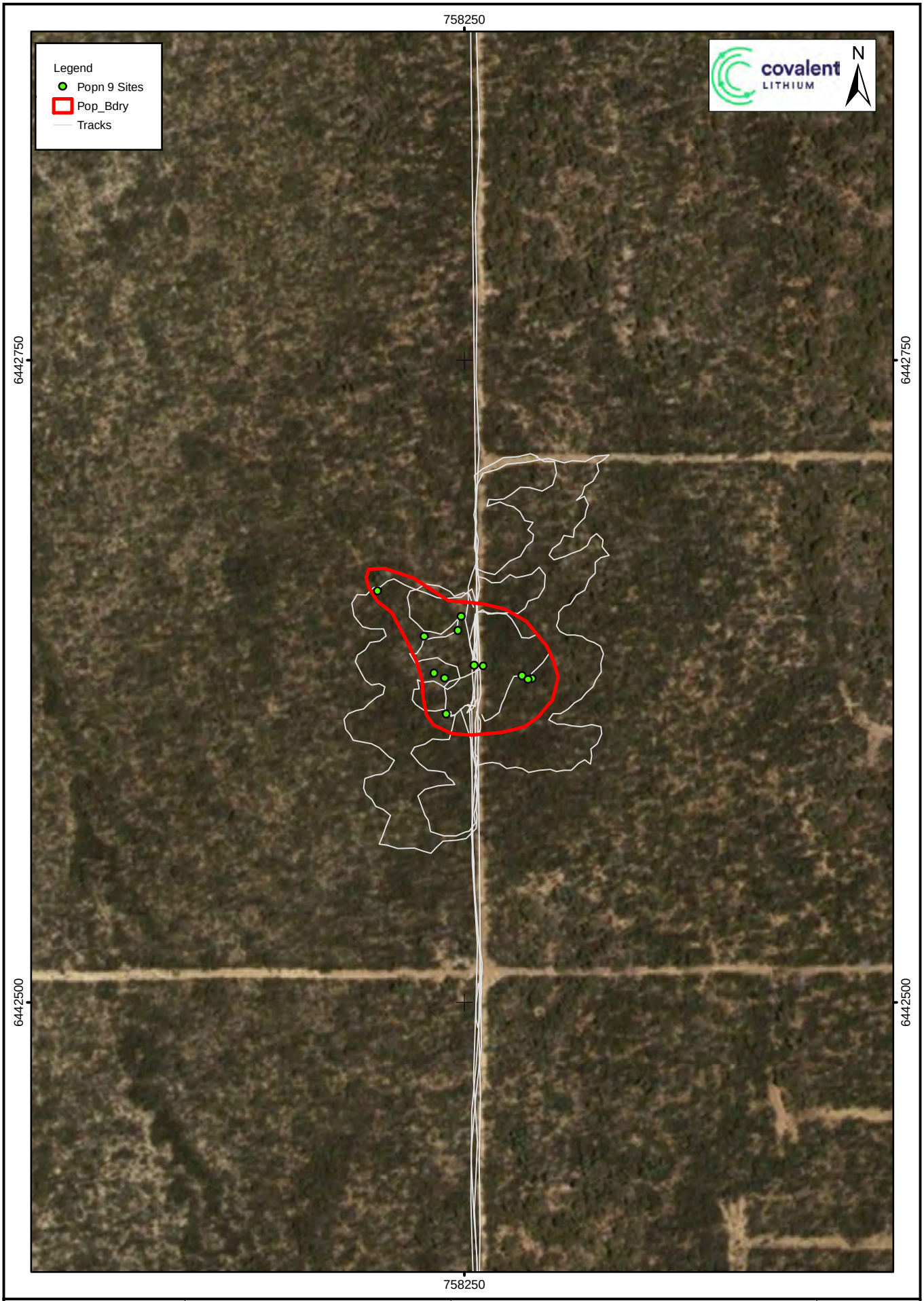
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 08 Sites & Foot Traverses

Appendix

B08



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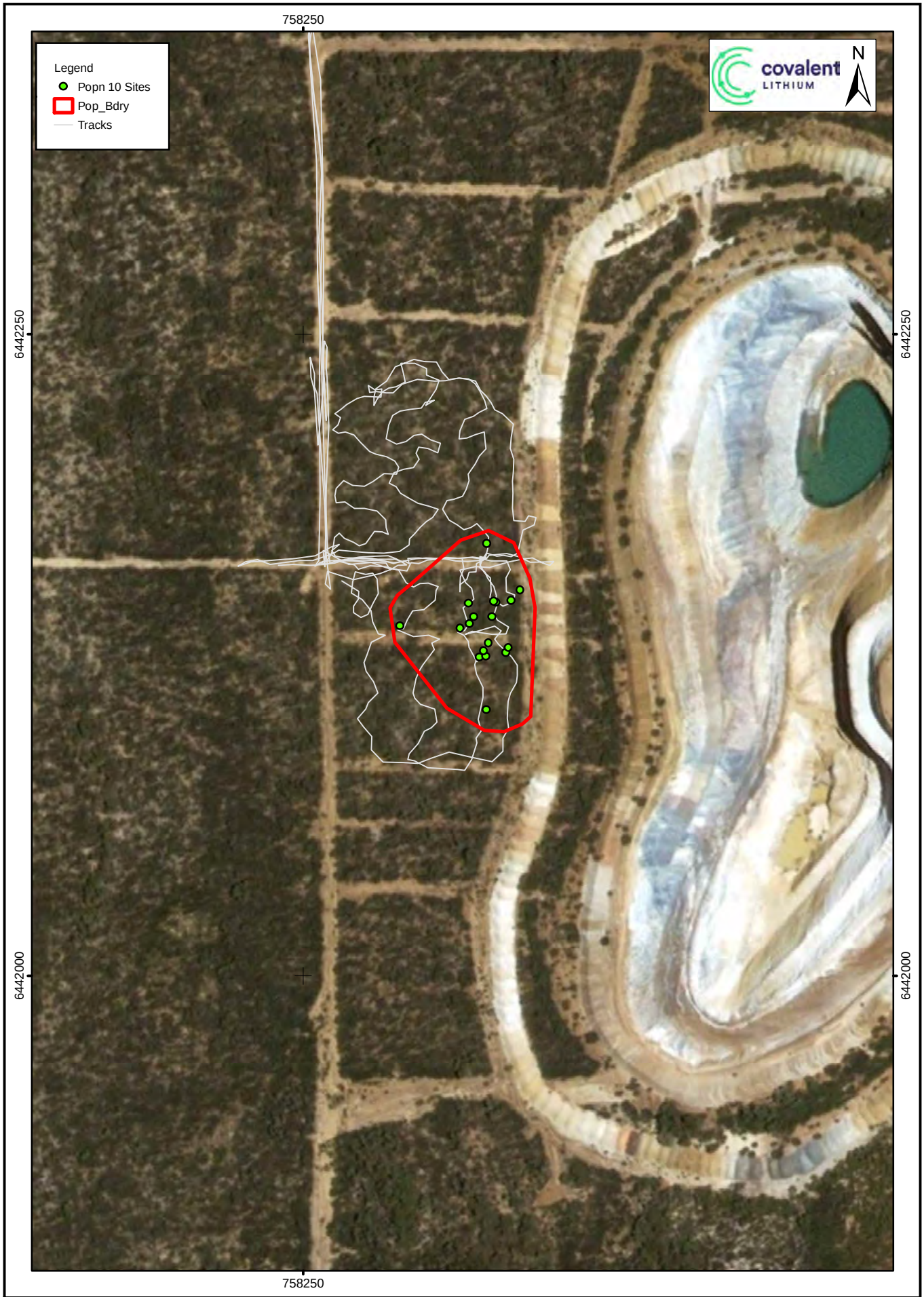
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 09 Sites & Foot Traverses

Appendix

B09



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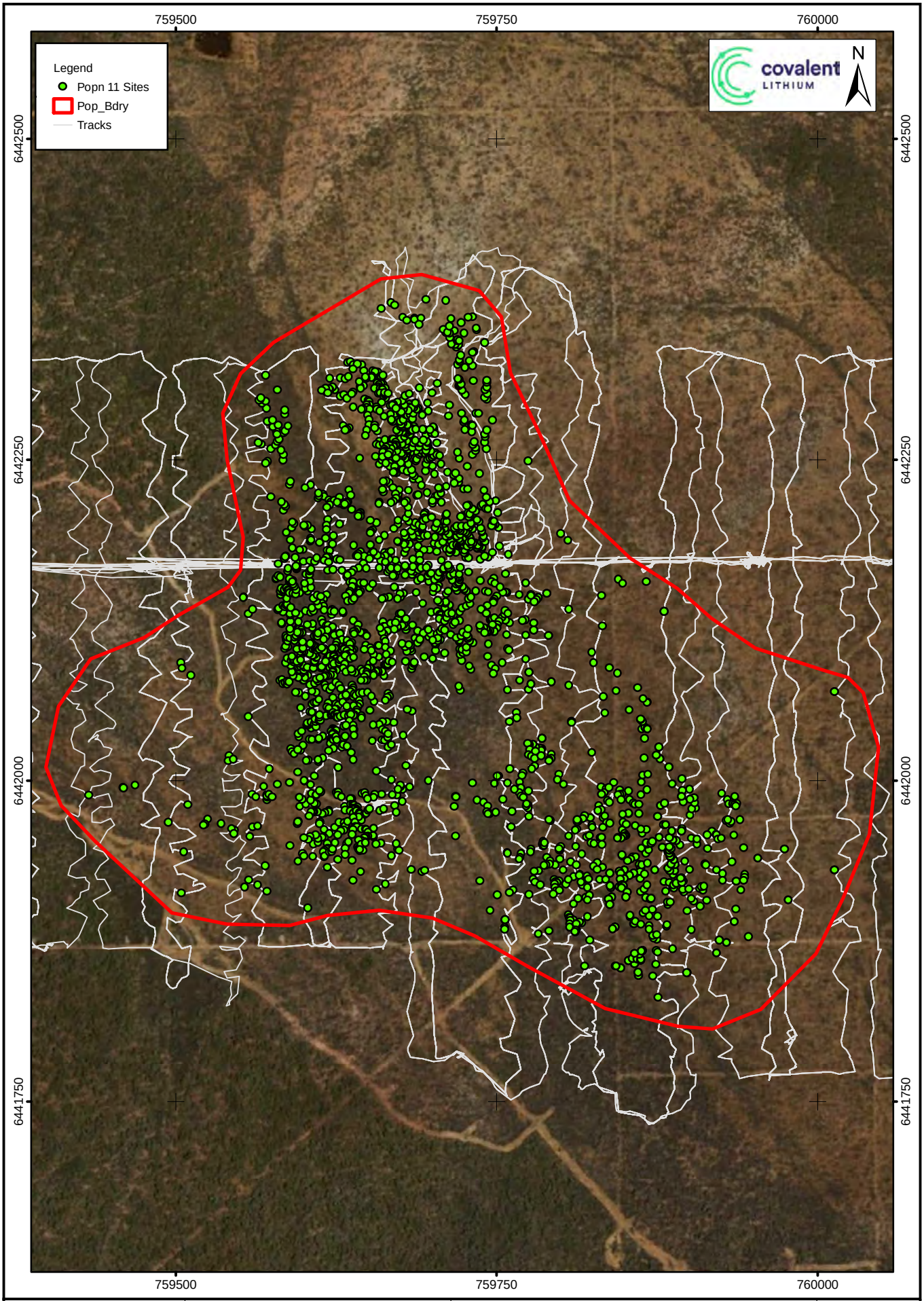
Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 10 Sites & Foot Traverses

Appendix

B10



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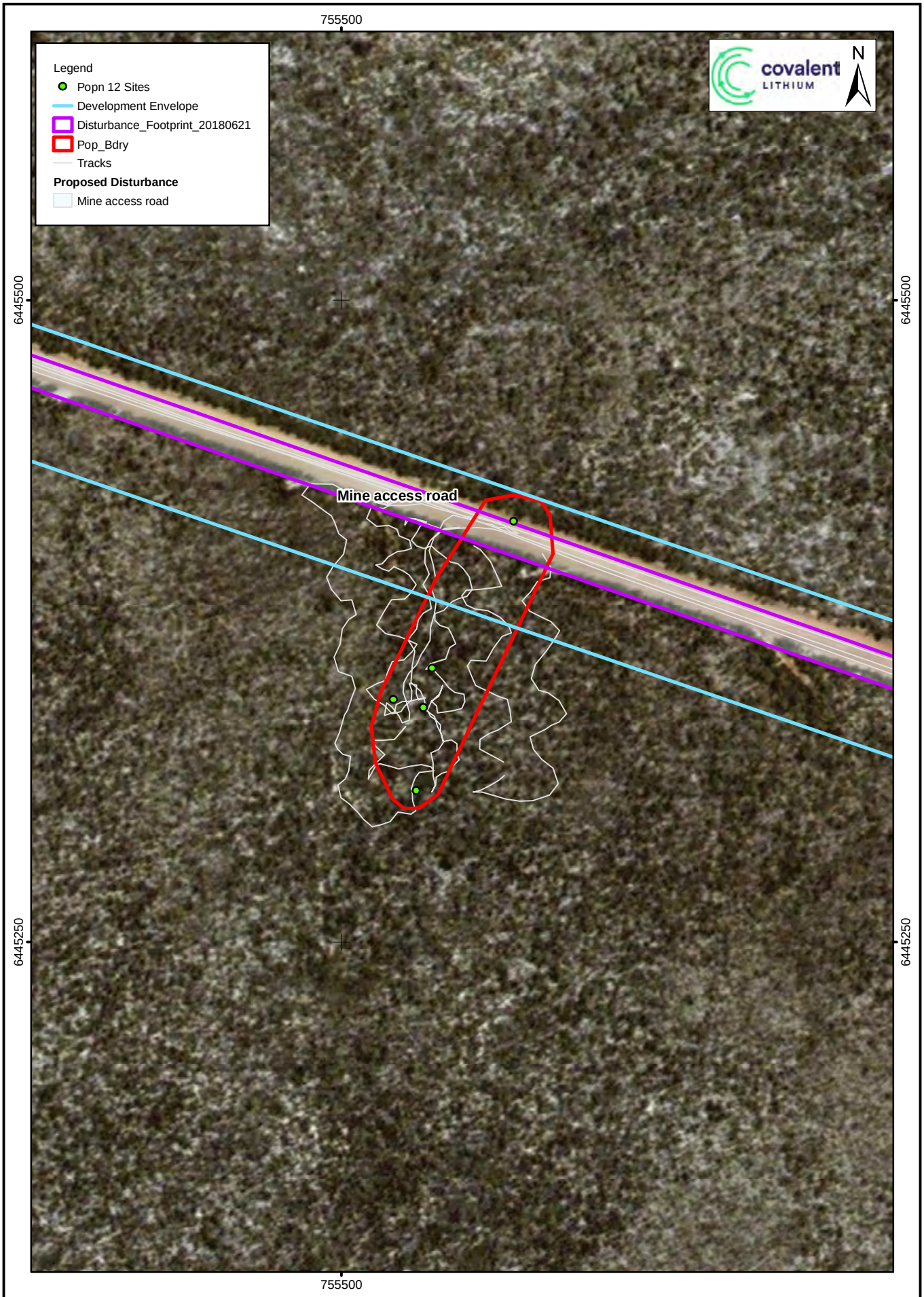
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 11 Sites & Foot Traverses

Appendix

B11



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Date: January 2019 | Rev: B | A4

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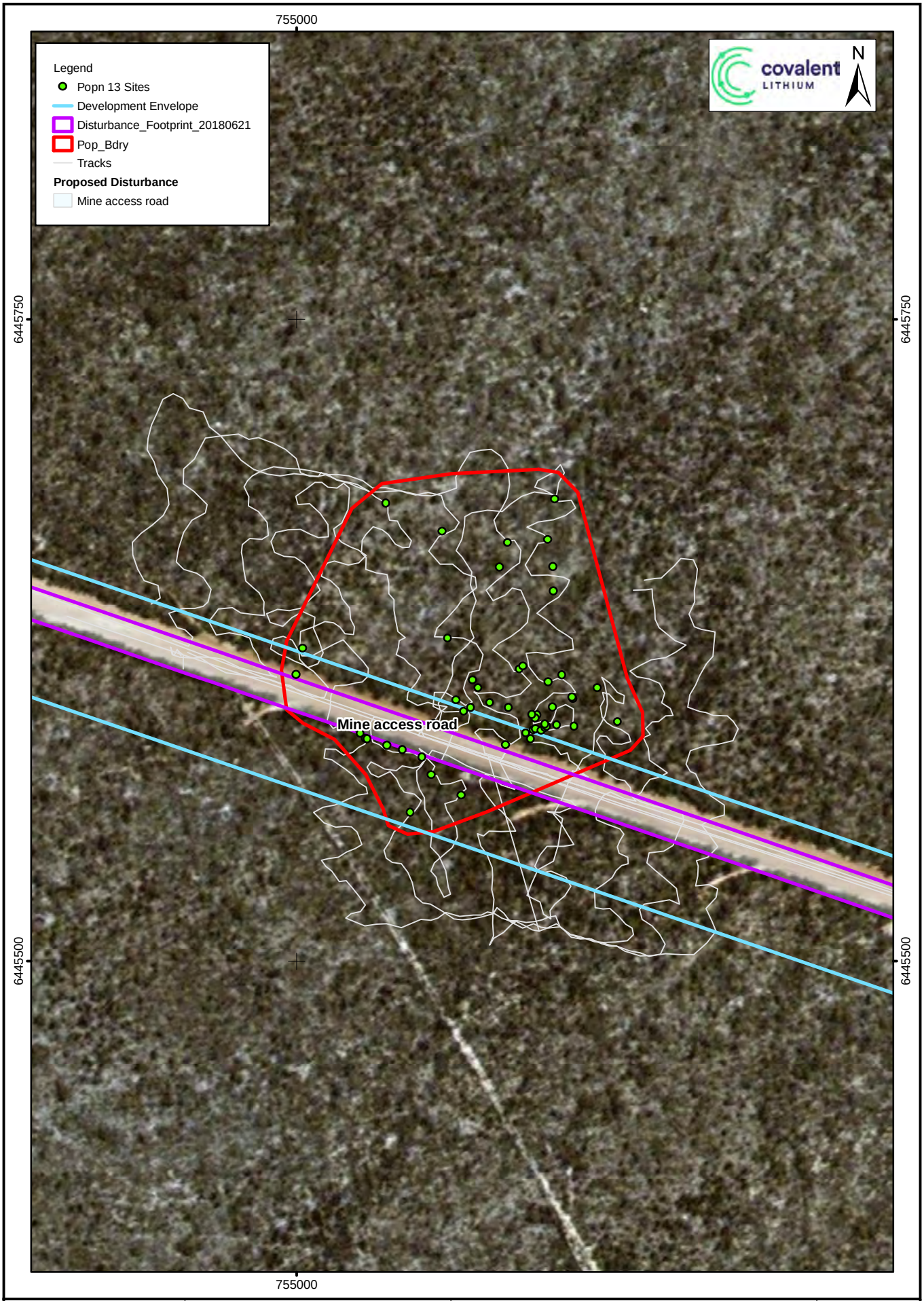
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 12 Sites & Foot Traverses

Appendix

B12



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MGA94 (Zone 50)

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Date: January 2019 | Rev: B | A4

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Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 13 Sites & Foot Traverses

Appendix

B13

Source: Image: Digital Globe (17/2/2016)

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Scale: 1:4,000
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CAD Ref: a2445_R012_B14

Date: January 2019 | Rev: B | A4

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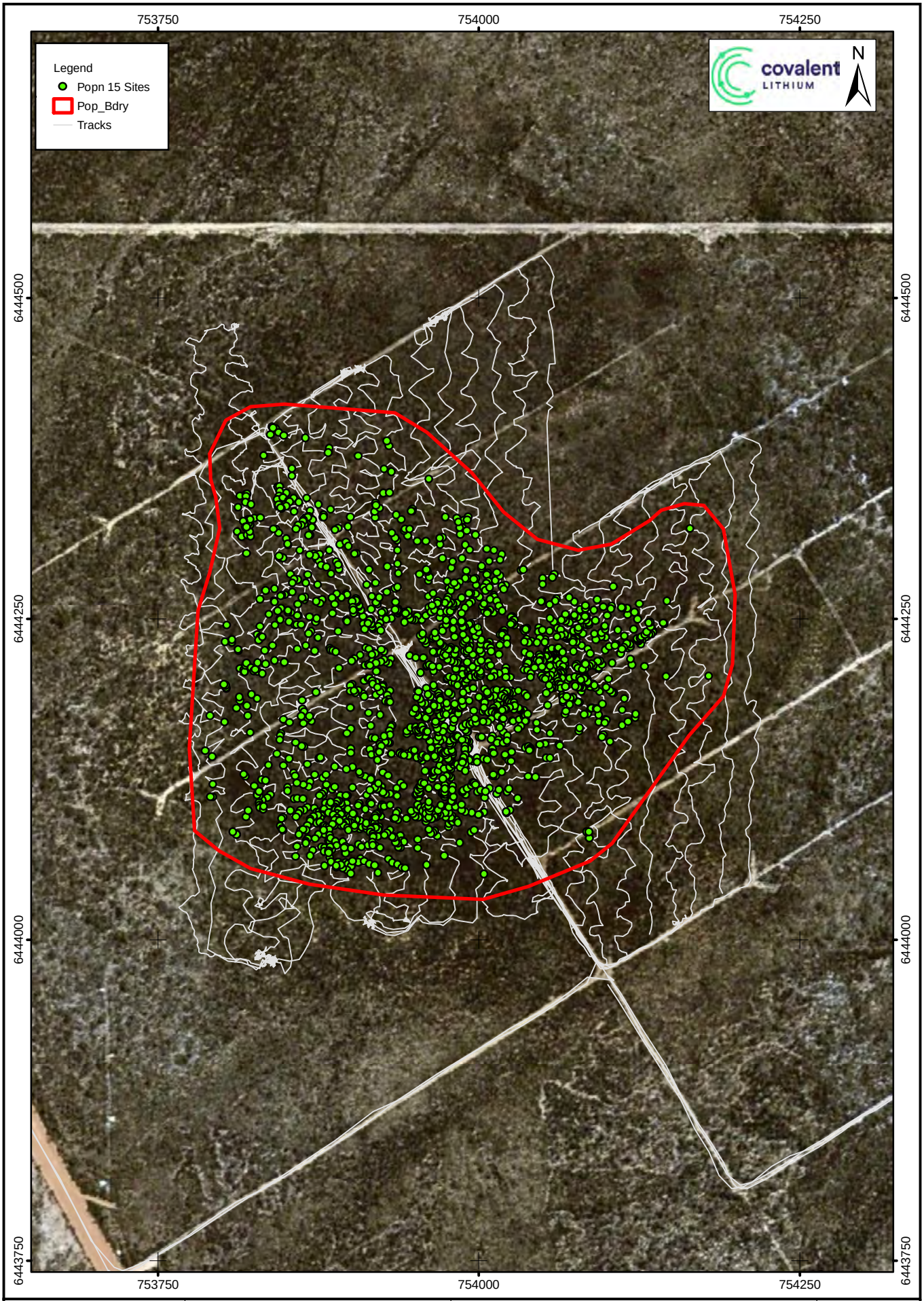
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 14 Sites & Foot Traverses

Appendix

B14



Source: Image: Digital Globe (17/2/2016)

0 40 80 m

Scale: 1:4,000
MGA94 (Zone 50)

CAD Ref: a2445_R012_B15

Date: January 2019 | Rev: C | A4

Mattiske Consulting Pty Ltd
28 Central Road, Kalamunda WA 6076 ~ Tel: 9257 1625 ~ Fax: 9257 1640
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Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 15 Sites & Foot Traverses

Appendix

B15

Source: Image: Digital Globe (17/2/2016)

0 20 40 m

Scale: 1:2,000
MGA94 (Zone 50)

CAD Ref: a2445_R012_B16

Date: January 2019 | Rev: B | A4

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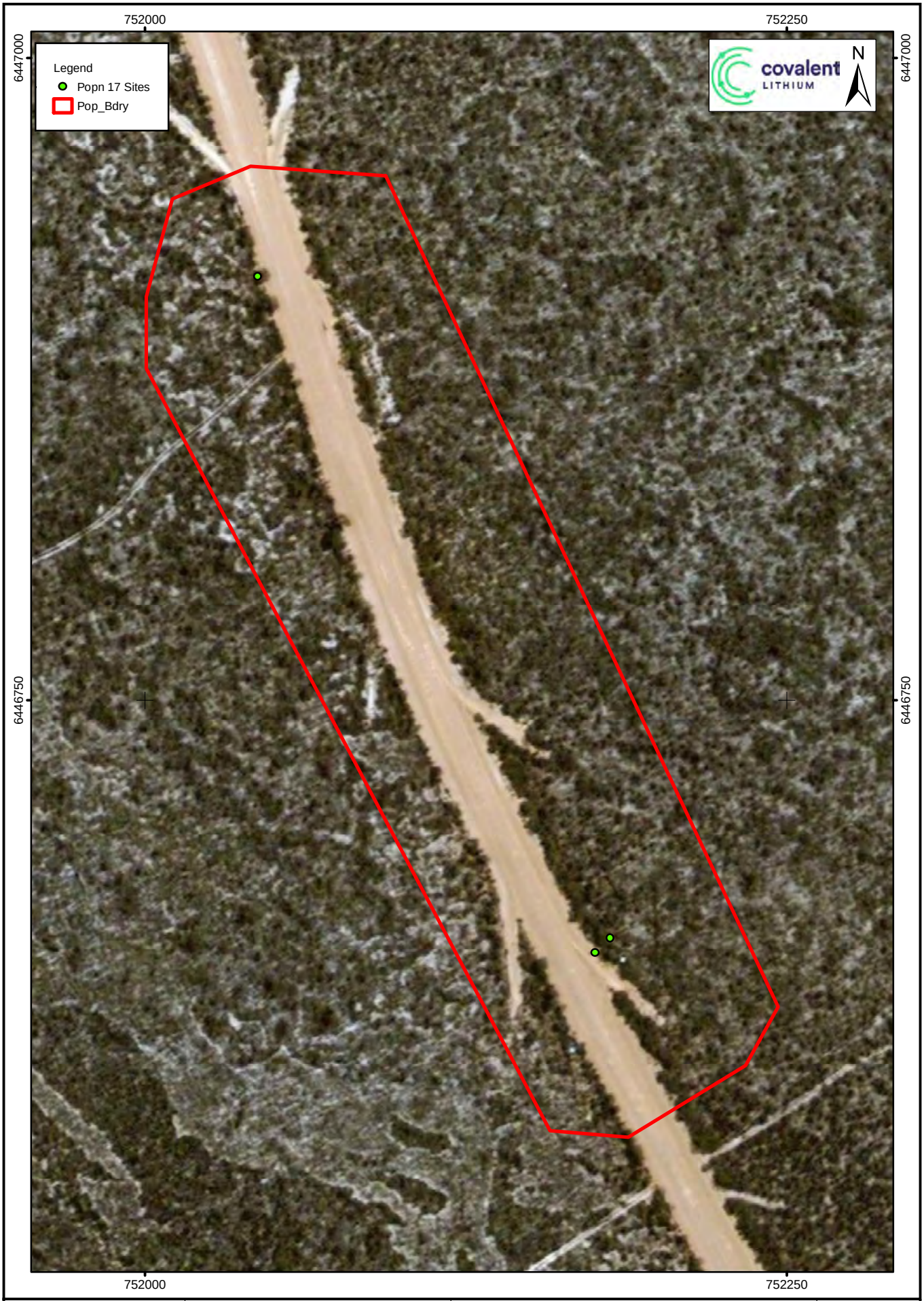
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 16 Sites & Foot Traverses

Appendix

B16



Source: Image: Digital Globe (17/2/2016)

0 20 40 m

Scale: 1:2,000
MGA94 (Zone 50)

CAD Ref: a2445_R012_B17

Date: January 2019 | Rev: B | A4

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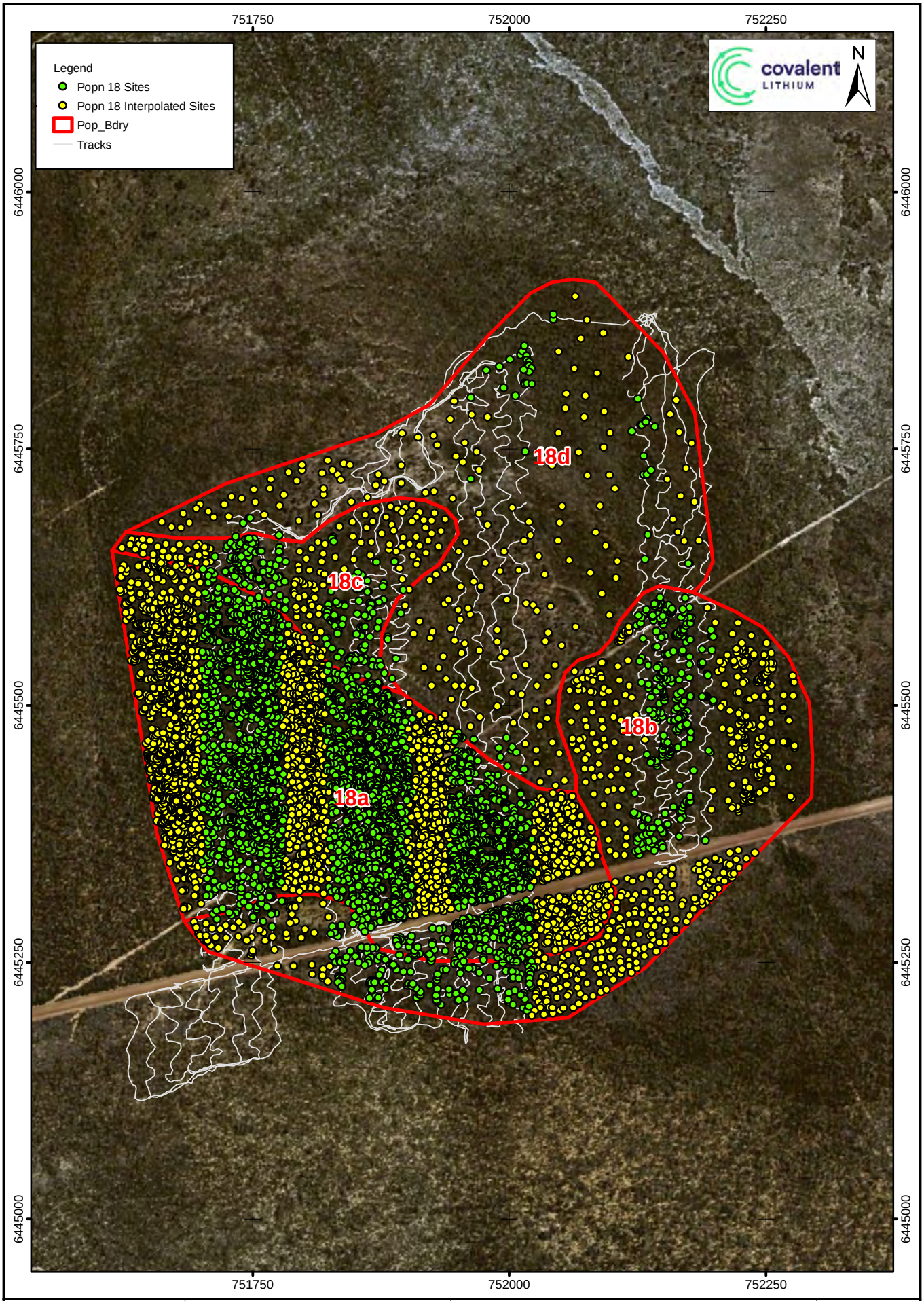
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 17 Sites & Foot Traverses

Appendix

B17



Source: Image: Digital Globe (17/2/2016)

0 50 100 m

Scale: 1:5,000
MGA94 (Zone 50)

CAD Ref: a2445_R012_B18

Date: January 2019 | Rev: B | A4

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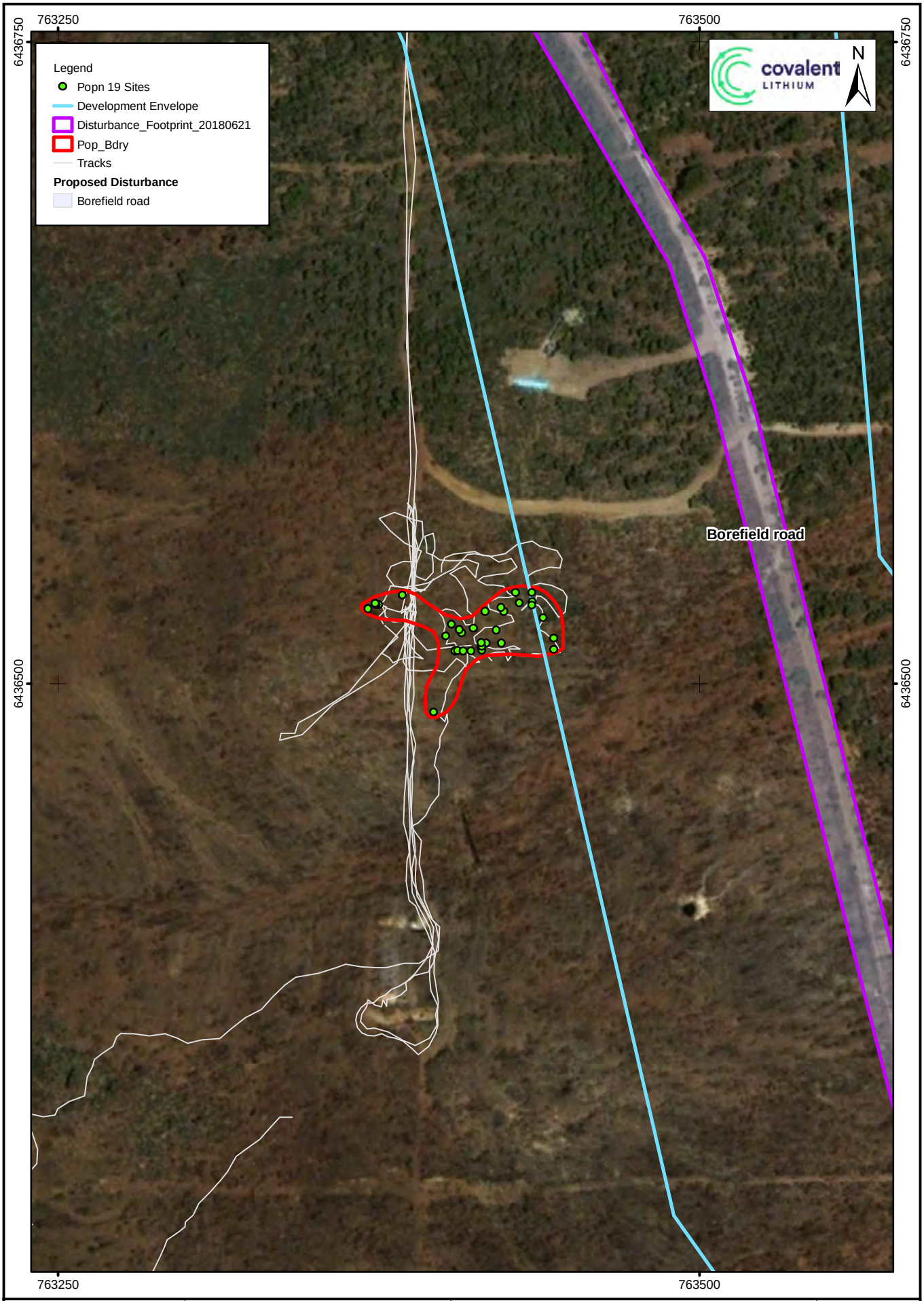
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 18 Sites & Foot Traverses

Appendix

B18



Source: Image: Digital Globe (17/2/2016)

0 20 40 m

Scale: 1:2,000
MGA94 (Zone 50)

CAD Ref: a2445_R012_B19

Date: January 2019 | Rev: B | A4

Mattiske Consulting Pty Ltd
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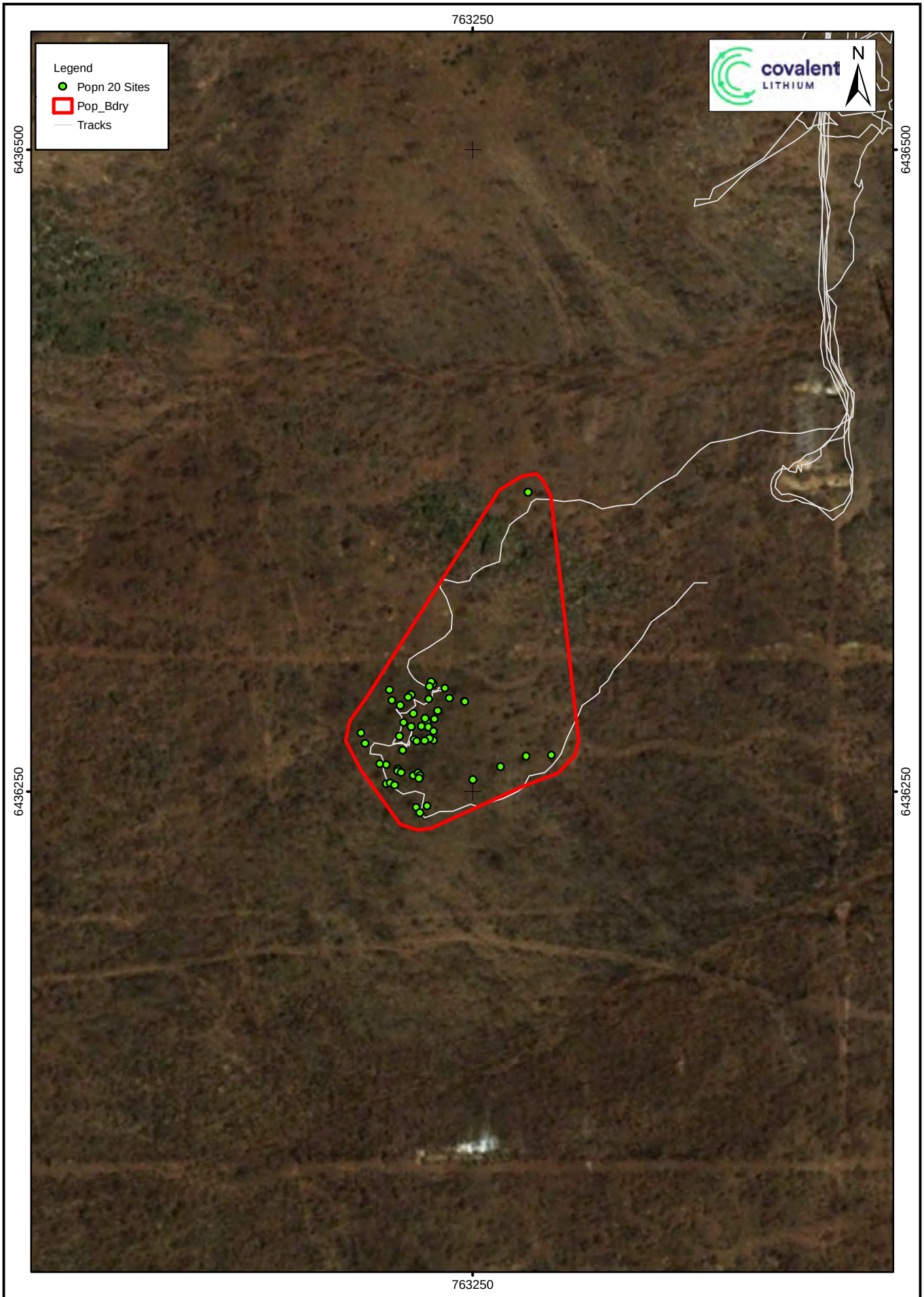
Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 19 Sites & Foot Traverses

Appendix

B19



Source: Image: Digital Globe (17/2/2016)

0 20 40 m

Scale: 1:2,000
MGA94 (Zone 50)

CAD Ref: a2445_R012_B20

Date: January 2019 | Rev: B | A4

Mattiske Consulting Pty Ltd
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Earl Grey Lithium Project

Banksia sphaerocarpa var. *dolichostyla* (T) Survey

Population 20 Sites & Foot Traverses

Appendix

B20

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at http://dpaw.wa.gov.au/ under *Standard Report Forms*

TAXON: Banksia sphaerocarpa var. dolichostyla **TPFL Pop. No:**

OBSERVATION DATE: 30/04/18-18/06/18 **CONSERVATION STATUS:** T New population ☒

OBSERVER/S: D. Angus/B.Ellery/M.van Wees/H.Gooding **PHONE:** 92571625

ROLE: Botanist **ORGANISATION:** Mattiske Consulting Pty Ltd

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place)**:**

370km East of Perth, 100km SSE of Southern Cross

Reserve No:

DBCA DISTRICT: Yilgarn **LGA:** Shire of Yilgarn Land manager present: ☐

DATUM:

GDA94 / MGA94 ☒
AGD84 / AMG84 ☐
WGS84 ☐
Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required)

DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: see attachment

Long / Easting: see attachment

ZONE: 50

METHOD USED:

GPS ☒ Differential GPS ☐ Map ☐

No. satellites: _____ Map used: _____

Boundary polygon captured: ☒ Map scale: _____

LAND TENURE:

Nature reserve ☐	Timber reserve ☐	Private property ☐	Rail reserve ☐	Shire road reserve ☐
National park ☐	State forest ☐	Pastoral lease ☐	MRWA road reserve ☐	Other Crown reserve ☐
Conservation park ☐	Water reserve ☐	UCL ☒	SLK/Pole _____ to _____	Specify other: Mine lease

AREA ASSESSMENT: Edge survey ☐ Partial survey ☐ Full survey ☒ Area observed (m²): _____

EFFORT: Time spent surveying (minutes): _____ No. of minutes spent / 100 m^2: _____

POP'N COUNT ACCURACY: Actual ☒ Extrapolation ☐ Estimate ☐ Count method: actual count
(Refer to field manual for list)

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:

	Mature:	Juveniles:	Seedlings:	Totals:
Alive	se attached			see attcahed
Dead				

Area of pop (m²): _____

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. _____ Size _____ Data attached ☐ Total area of quadrats (m²): _____

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☒ Flowerbud ☐ Flower ☒

Immature fruit ☐ Fruit ☒ Dehisced fruit ☐ Percentage in flower: _____%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	**Current impact (N-E)**	**Potential Impact (L-E)**	**Potential Threat Onset (S-L)**
• clearing for mining operations	L	L	M
•			

Please return completed form to **Species And Communities Branch** DBCA,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Entered in Database** ❑

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:
Crest ☐
Hill ☒
Ridge ☐
Outcrop ☐
Slope ☒
Flat ☐
Open depression ☐
Drainage line ☐
Closed depression ☐
Wetland ☐

ROCK TYPE:
Granite ☐
Dolerite ☐
Laterite ☒
Ironstone ☐
Limestone ☐
Quartz ☐
Specify other: _____

LOOSE ROCK:
(on soil surface; eg gravel, quartz fields)
0-10% ☐
10-30% ☒
30-50% ☐
50-100% ☐

SOIL TYPE:
Sand ☐
Sandy loam ☒
Loam ☐
Clay loam ☒
Light clay ☐
Peat ☐
Specify other: _____

SOIL COLOUR:
Red ☐
Brown ☒
Yellow ☐
White ☐
Grey ☐
Black ☐
Specify other: _____

DRAINAGE:
Well drained ☒
Seasonally inundated ☐
Permanently inundated ☐
Tidal ☐

Specific **Landform** Element: hill
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☐ Moist ☒ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:
Eg: **1**. Banksia woodland (B. attenuata, B. ilicifolia); **2**. Open shrubland (Hibbertia sp., Acacia spp.) ; **3**. Isolated clumps of sedges (Mesomelaena tetragona)

1. Allocasuarina woodland (A. acutivalvis, A. spinosisima)
2. Dense Banksia and Hakea shrubland (B. purdiana, H. subsulcata)
3.
4.

ASSOCIATED SPECIES:
Persoonia helix

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☒ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: Feb Year: 2015 **Fire Intensity:** High ☒ Medium ☐ Low ☐ No signs of fire ☐

FENCING: Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

DRF PERMIT/ LICENCE No: 3-1617, 123-1718 Note if only observing plants (i.e. no specimens or plant matieral is taken) then no permit/licence is required. For further information on permit and licening requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. ☐ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☐ Field notes ☐ Other: _____

COPY SENT TO: Regional Office ☐ District Office ☐ Other:

Submitter of Record: D. Angus Role: Botanist Signed: _____ Date: 9/07/2018

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by:_____ **Sheet No.:**_____ **Record Entered in Database** ❑

Threatened and Priority Flora report Form - Attachment – *Banksia sphaerocarpa var. dolichostyla* (T)

20 populations of *Banksia sphaerocarpa* var. *dolichostyla* (T) were assessed in May/June 2018. A figure is attached showing the locations of these populations, which are generally in the Mt Holland area.

The number of plants recorded at each population and their approximate center point is set out below.

Population number (refer attached figure)	Number of plants recorded	Center Point of population (GDA 94, Zone 50)	
		Easting (mE)	Northing (mN)
1	221	760500	6446250
2	733	761650	6443750
3	6,349	761250	6443250
4	14	761875	6443375
5	396	759875	6442750
6	78	759300	6443625
7	37	758850	643150
8	51	758250	6443600
9	12	758250	6442625
10	18	758300	6442125
11	2,330	759750	6442100
12	5	755500	6442375
13	52	755100	6445625
14	23 (partial count)	755000	6444200
15	1,761	754000	6444250
16	17	752800	6445350
17	3	752100	6446750
18	4,318 (partial count)	752000	6445500
19	33	763400	6436520
20	52 (partial count)	763250	6436300
Total	16,503		

Shapefiles are enclosed containing point data for all recorded *Banksia sphaerocarpa* var. *dolichostyla* (T) plants, together with polygons defining the boundaries of each population.

For further information or queries please contact David Angus at Mattiske Consulting Pty Ltd on 9257 1625 or email to admin@mattiske.com.au