St Ives Gold Mine

The Beyond 2018 Project

EPA Referral Supporting Document

Prepared for St Ives Gold Mining Company Pty Ltd

November 2016

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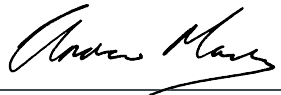

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Acronyms

Acronym	Meaning
ABN	Australian Business Number
ANZMEC	Australian and New Zealand Minerals and Energy Council and the Minerals Council of Australia
BC	Botanica Consulting
CCWA	Conservation Council of WA
DAA	Department of Aboriginal Affairs
DER	Department of Environment Regulation
DITR	Department of Industry, Tourism and Resources
DMA	Decision Making Authority
DMP	Department of Mines and Petroleum
DoW	Department of Water
DPaW	Department of Parks and Wildlife
EAG	Environmental Assessment Guideline
EMS	Environmental Management System
EPA	Environmental Protection Authority
GDA	Geocentric Datum of Australia
GFA	Gold Fields Australia Propriety Limited
GFL	Gold Fields Limited
GWL	Ground Water Level
ha	Hectares
ICMM	International Council on Mining and Metals
km	Kilometres
km2	Kilometres Squared
mbgl	Meters Below Ground Level
MCP	Mine Closure Plan
mg	Milligrams
mg/L	Milligrams per Litre
mm	Millimetres
mtpa	Million Tonnes per Annum
°C	Degrees Celsius
OEPA	Office of the Environmental Protection Authority
PEC	Priority Ecological Community
PER	Public Environmental Review
RL	Reduced Level

Acronym	Meaning
St Ives	St Ives Gold Mine
SIGM	St Ives Gold Mining Company Pty Ltd
SRE	Short Range Endemic
TEC	Threatened Ecological Community
WA	Western Australia
WMC	Western Mining Corporation
WQPN	Water Quality Protection Note
WSWA	Wilderness Society of WA

1 Background

St Ives Gold Mining Company Pty Ltd (SIGM), a subsidiary of Gold Fields Australia Proprietary Limited (GFA), currently operates both open pits and underground gold mines at the St Ives Gold Mine (St Ives). Mining operations are located on and adjacent to Lake Lefroy, approximately 20 kilometres (km) southeast of Kambalda in Western Australia (WA) (Figure 1). Gold-bearing ore is processed via a 4.8 megatonne per annum (mtpa) processing plant producing approximately 400,000 ounces of gold each year.

Both nickel and gold exploration and mining activities have been taking place on Lake Lefroy since the late 1800s. Western Mining Corporation Resources Limited (WMC) operated the St Ives site from 1981 to 2001 when it was purchased by Gold Fields who remain the current operator.

The operations are regulated through a number of statutory instruments, including both the Environmental Protection Act 1986 (EP Act) and the Mining Act 1978 (Mining Act). In relation to the EP Act, a proposal to continue operations (the Beyond 2010 Project) was considered by the Environmental Protection Authority (EPA) in 2010 pursuant to Part IV of the EP Act. This assessment was undertaken via a Public Environmental Review (PER) and resulted in the publication of EPA Report No. 1809 which recommended approval of the Beyond 2010 Project subject to a number of conditions. The Minister for the Environment published Ministerial Statement No. 879 (MS879) in November 2011 formally approving the Beyond 2010 Project subject to a number of binding conditions.

Under MS879, lake based mining, exploration and dewatering activities are permitted within delineated footprints.

In January 2014, SIGM requested a change to the Beyond 2010 proposal which was considered by the EPA pursuant to Section 45C of the EP Act to develop the Invincible Mine and subsequently expand the existing open-cut gold mining operation by 348 hectares (ha). Due to the demonstrated record of environmental management on site and that the environmental impacts associated with the operations could be appropriately managed through the existing conditions, this request was assessed favourably by the EPA and was accepted for implementation on 26 March 2014. MS879 was amended accordingly as a result of this change to include the Invincible Mine, with no changes to the existing conditions.

In June 2016, SIGM submitted another Change to Proposal application to amend MS879. This amendment included a number of new mining operations and associated infrastructure in order to keep the mine operational beyond the year 2016. The combined project was referred to as the Beyond 2016 Project. At the time of writing, the Beyond 2016 Project application is still in the process of being reviewed by the EPA.

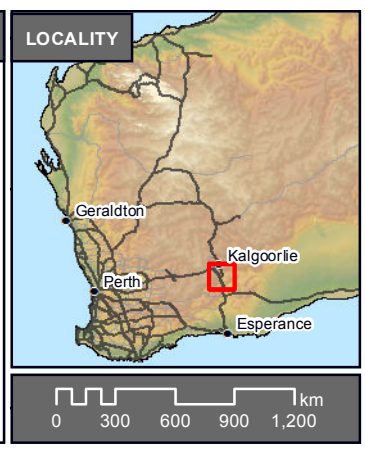
The Beyond 2016 Project provides for short term operational continuity for a period of approximately two years. Beyond this timeframe (i.e. post 2018) further operational areas are required to maintain operational continuity and the relevant approvals need to be sought.

The purpose of this document is to provide the information in support of a referral to the EPA for the Beyond 2018 Project (the B2018 Project) pursuant to Section 38 of the EP Act.

P: PO Box 454, Leederville WA 6903 | A: Level 1 660 Newcastle St, Leederville WA 6007 | T: 1300 251 070 | W: www.talisconsultants.com.au

LEGEND

- B2018 Study Area
- **DEC Estate**
- Nature Reserve
- Conservation Park
- Miscellaneous Reserve
- State Forest
- Timber Reserve
- Pastoral Land
- Main Road / Highways
- Population Centres



BEYOND 2018 PROJECT
REGIONAL SETTING
St Ives Gold Mine

N
km
0 4 8 12 16 20

Scale @ A3: 1:400,000
Coordinate System: GDA 1994 MGA Zone 51, Projection: Transverse Mercator, Datum: GDA 1994

Prepared:	H Dalla-Costa
Reviewed:	N King
Checked:	J Matthews
Project No:	TE16034
Revision:	B
Date:	17/11/2016

Figure 01

GOLD FIELDS

talis delivering solutions

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1.1 Project Summary

The primary objective of the B2018 Project is to ensure the continuation of the St Ives Gold Mine beyond 2018. This B2018 Project will require an expansion outside of the existing MS879 approved disturbance footprint with the aim to provide sufficient ore reserves to facilitate mining for a ten year period (i.e. to 2028). This continuation of operations is unlikely to require a change to the current mining or processing methods. Notwithstanding this, alternate methods for cost effective and safe mining are always under consideration and in the event that a substantive change is desired that would alter the impacts of the B2018 Project, this will be discussed with relevant regulators at the time.

1.2 Proponent Description and Details

The Proponent is St Ives Gold Mining Company Proprietary Limited (SIGM) (ABN 44 098 386 273), a wholly owned subsidiary of Gold Fields Australia Propriety Limited (GFA), which is in turn a wholly owned subsidiary of Gold Fields Limited (GFL).

The Primary contact for the B2018 Project is Mr Jarrad Donald, Superintendent: Environment. Proponent contact details are provided in Table 1-1 below.

Table 1-1: Proponent Contact Details

Aspect	Details
Physical Address	St Ives Gold Mine Durkin Road KAMBALDA WA 6442
Postal Address	St Ives Gold Mine PO Box 359 KAMBALDA WEST WA 6442
Telephone	(08) 9088 1823
Email	jarrad.donald@goldfields.com

1.3 Project Location and Tenements

GFA's SIGM tenements are located south of the town of Kambalda in the Goldfields region of WA and span approximately 60 km north to south. Access to site is via the Goldfields Highway (sealed) and the site access road (partially sealed). The tenements currently held by SIGM and proposed to be utilised for the B2018 Project are detailed in Table 1-2 below.

Table 1-2: B2018 Project tenements

Tenement Location	B2018 Project Tenements
Land based	E15/975; E15/976; E15/977; E15/978; E15/980; E15/1040; E15/1167; E15/1471; G15/0022; L15/145; L15/178; L15/250; M15/022; M15/027; M15/028; M15/029; M15/049; M15/063; M15/206; M15/366; M15/367; M15/452; M15/453; M15/474; M15/475; M15/476; M15/495; M15/883; M15/884; M15/925; M15/1226; M15/1495; M15/1496; M15/1500; M15/1501; M15/1502; M15/1503; M15/1504; M15/1506; M15/1507; M15/1508; M15/1511; M15/1512; M15/1515; M15/1516; M15/1517; M15/1518; M15/1525; M15/1526; M15/1527; M15/1528; M15/1529; M15/1530; M15/1531; M15/1532; M15/1539; M15/1540; M15/1543; M15/1544;

Tenement Location	B2018 Project Tenements
	M15/1545; M15/1546; M15/1547; M15/1548; M15/1549; M15/1550; M15/1551; M15/1552; M15/1553; M15/1554; M15/1555; M15/1556; M15/1557; M15/1558; M15/1559; M15/1560; M15/1561; M15/1563; M15/1565; M15/1566; M15/1567; M15/1568; M15/1569; M15/1570; M15/1571; M15/1572; M15/1573; M15/1574; M15/1575; M15/1576; M15/1577; M15/1578; M15/1579; M15/1580; M15/1581; M15/1582; M15/1583; M15/1584; M15/1585; M15/1586; M15/1587; M15/1588; M15/1589; M15/1590; M15/1591; M15/1592; M15/1593; M15/1594; M15/1595; M15/1596; M15/1621; M15/1622; M15/1623; M15/1624; M15/1625; M15/1626; M15/1627; M15/1632; M15/1633; M15/1634; M15/1635; M15/1636; M15/1637; M15/1638; M15/1639; M15/1640; M15/1641; M15/1642; M15/1643; M15/1644; M15/1645; M15/1646; M15/1647; M15/1648; M15/1649; M15/1650; M15/1651; M15/1652; M15/1653; M15/1654; M15/1666; M15/1667; M15/1668; M15/1669; M15/1670; M15/1671; M15/1672; M15/1673; M15/1674; M15/1675; M15/1676; M15/1702; M15/1705; M15/1706; M15/1707; M15/1710; M15/1711; M15/1712; M15/1713; M15/1714; M15/1715; M15/1716; M15/1761; M15/1762; M15/1763; M15/1802; M2600491; ML15/149; ML15/150; ML15/151; ML15/367; ML15/375; ML15/376; ML15/377; ML15/378; ML15/380; ML15/384; ML15/385; ML15/388; ML15/482; ML15/483; ML15/484; ML15/520; ML15/521; ML15/522; ML15/523; P15/4753; P15/4754; P15/4974; P26/3482
Lake based	E15/975; E15/976; E15/977; E15/978; E15/980; E15/1010; E15/1471; L15/145; L15/250; M15/27; M15/28; M15/29; M15/49; M15/63; M15/206; M15/366; M15/432; M15/452; M15/453; M15/474; M15/495; M15/882; M15/883; M15/884; M15/925; M15/1226; M15/1227; M15/1501; M15/1502; M15/1503; M15/1504; M15/1507; M15/1508; M15/1509; M15/1510; M15/1512; M15/1513; M15/1514; M15/1515; M15/1516; M15/1517; M15/1518; M15/1519; M15/1520; M15/1521; M15/1522; M15/1523; M15/1524; M15/1525; M15/1526; M15/1527; M15/1529; M15/1530; M15/1531; M15/1578; M15/1579; M15/1580; M15/1581; M15/1582; M15/1583; M15/1584; M15/1585; M15/1586; M15/1587; M15/1588; M15/1589; M15/1597; M15/1598; M15/1599; M15/1600; M15/1601; M15/1602; M15/1603; M15/1604; M15/1605; M15/1606; M15/1607; M15/1608; M15/1609; M15/1610; M15/1611; M15/1612; M15/1613; M15/1614; M15/1615; M15/1616; M15/1617; M15/1618; M15/1619; M15/1620; M15/1621; M15/1622; M15/1625; M15/1626; M15/1628; M15/1629; M15/1654; M15/1655; M15/1656; M15/1657; M15/1658; M15/1659; M15/1660; M15/1661; M15/1662; M15/1663; M15/1664; M15/1665; M15/1666; M15/1667; M15/1669; M15/1670; M15/1671; M15/1674; M15/1675; M15/1676; M15/1677; M15/1678; M15/1679; M15/1680; M15/1681; M15/1682; M15/1683; M15/1684; M15/1685; M15/1686; M15/1687; M15/1688; M15/1689; M15/1690; M15/1691; M15/1692; M15/1693; M15/1694; M15/1695; M15/1696; M15/1697; M15/1698; M15/1699; M15/1700; M15/1701; M15/1702; M15/1703; M15/1704; M15/1705; M15/1708; M15/1709; M15/1761; M15/1762; M15/1763; M15/1802; M26/491; ML15/520; ML15/521; ML15/522; ML15/523;

Tenement Location	B2018 Project Tenements
	P15/4753; P15/4754; P15/4974; P15/5561; P15/5745; P15/5746; P15/5747; P15/5748; P26/3482

A consolidated summary of all SIGM tenure is shown in Table 1-3. The location of the proposed B2018 Project area in relation to Kambalda and the rest of the St Ives operation is shown in Figure 1 above.

Table 1-3: Gold Fields SIGM tenement summary

Tenement Type	No. of Tenements	Area (ha)
Exploration (E)	23	45,194
Freehold (F)	2	3,632
General (G)	1	89
Miscellaneous (L)	25	14,640
Mining (M)	378	74,995
Prospecting (P)	47	5,035
Total	476	143,585

2 Statutory Framework

2.1 The Beyond 2010 Project

2.1.1 Project Summary

The Beyond 2010 Project was referred to the EPA in August 2009 who advised that a PER process was required in order to appropriately assess the proposal pursuant to the provisions of the EP Act. SIGM submitted the PER in late 2010 and received authorisation to implement the proposal in November 2011 pursuant to the conditions stipulated in MS879.

The Beyond 2010 Project proposal was submitted to expand the existing open-cut and underground gold mining development within a defined area on the surface of Lake Lefroy and included the continued discharge of dewater to the lake's surface and the ongoing construction of associated mining infrastructure (including open pits and waste rock landforms). The approved Beyond 2010 Project included the following aspects:

- Existing lake-based mining operations that commenced between 2000 and 2010 (approved under the then MS548) and was increased to a final disturbance footprint of 1713 hectares (ha);
- New open cut and underground mining developments on Lake Lefroy (within the boundaries of the original disturbance footprint of 1713ha);
- Continuation of use of existing dewatering discharge points on Lake Lefroy (including the construction of the Santa Ana discharge point, permitted under DER Works Approval WA5077/2011); and
- An increase in mine dewatering discharge volume from 20 gigalitres (GL) per annum to a maximum of 30GL per annum.

2.1.2 Environmental Protection Authority Assessment

Prior to the issue of MS879, the EPA provided SIGM with a report and recommendations document (Report No. 1411). This document detailed the EPA assessment process and considerations, a summary of which is provided in Table 2-1 below.

Table 2-1: EPA's Consideration of the Environmental Factors Associated with the B2010 Project

Environmental Factor	EPA's Consideration (Report No. 1411)
Acid drainage	Not considered to be a key environmental factor. Considered to be managed by the Department of Mines and Petroleum (DMP) under the Mining Act 1978.
Surface water hydrology	Considered to be a relevant environmental factor, able to be managed effectively through the conditions outlined under section 6 – Surface Water Discharge in MS879.
Surface water quality	Considered to be a relevant environmental factor, able to be managed effectively through the conditions outlined under section 6 – Surface Water Discharge in MS879.
Groundwater	Not considered to be a key environmental factor. Considered to be managed by the Department of Water (DoW) under the *Rights in Water and Irrigation Act 1914 (RIWI Act)*.

Environmental Factor	EPA's Consideration (Report No. 1411)
Sediment quality	Not considered to be a key environmental factor. The impact of higher heavy metal concentrations in the surface water itself (i.e. before the metals settle out into the sediment) is considered to be a key environmental factor and managed effectively through the conditions outlined under section 6 – Surface Water Discharge in MS879.
Flora and vegetation	Considered to be a key environmental factor, but the effects of inundation of the riparian zone are considered to be managed effectively through the conditions outlined under section 6 – Surface Water Discharge in MS879.
Aquatic invertebrate fauna	Not considered to be a key environmental factor. The impacts from dewatering discharge on the aquatic invertebrate fauna communities in the clay pans surrounding Lake Lefroy are considered to be a key environmental factor and managed effectively through the conditions outlined under section 6 – Surface Water Discharge in MS879.
Terrestrial fauna	Not considered to be a key environmental factor.
Subterranean fauna	Not considered to be a key environmental factor.
Mine closure and rehabilitation	Considered to be a key environmental factor and managed effectively through the conditions outlined under 'Section 3.2 – Mine closure and rehabilitation' in MS879 and the DMP.
Noise and vibration	Not considered to be a key environmental factor. Considered to be managed under the *Environmental Protection (Noise) Regulations 1997*.
Contaminated sites	Not considered to be a key environmental factor. Considered to be managed under the *Contaminated Sites Act 2003* and through the draft mine closure plan.
Greenhouse Gas Emissions	Not considered to be a key environmental factor.
Air Quality	Not considered to be a key environmental factor. Considered to be managed under existing operational licenses under the EP Act.
Aboriginal Heritage	Not considered to be a key environmental factor. Considered to be managed under the *Aboriginal Heritage Act 1972*.
Tourism, Recreation and Surrounding Land Use	Not considered to be a key environmental factor.
Australian and European Heritage	Not considered to be a key environmental factor.
Public Health and Safety	Not considered to be a key environmental factor. Considered to be managed under the *Mines Safety and Inspection Act 1995*.
Visual Amenity	Not considered to be a key environmental factor.

Through undertaking the above assessment the EPA identified that there were two key environmental factors for the Beyond 2010 Project that required additional consideration:

- Surface water discharge; and
- Mine closure and rehabilitation.

2.1.3 Changes to MS879

Since the approval of the Beyond 2010 Project in 2011 there have been a number of approved changes to the original proposal to facilitate ongoing site operation and expansion. At the time of writing, the most recent change was the inclusion of the Invincible Project in MS879 in January 2014 which increased the approved disturbance footprint by 248 ha up to 2,061 ha.

2.2 The Beyond 2016 Project

The Beyond 2016 Project Change to Proposal application was submitted to the OEPA in mid-2016 and was required to realign the approved operational mine areas in order to extend the life of the SIGM operations. The Beyond 2016 Project Change to Proposal application included the following aspects:

- Four new mining operations;
- Two existing mine pit expansions;
- One expansion to a previously approved operation;
- Two existing Part IV boundary amendments;
- Four new mine dewatering discharge locations;
- One tip head establishment;
- The mining of up to 44 million tonnes of ore;
- The disposal of up to 239 million tonnes of waste rock; and
- The dewatering and discharge of up to 30GL of water per annum.

The Beyond 2016 Project proposes a number of new mining operations but the total approved area of disturbance remains within the 2,061 ha approved under MS879. A thorough review and assessment framework was prepared and implemented that identified and reviewed all relevant regulatory agency and SIGM documentation in order to identify any potential constraints to the suitability of the Beyond 2016 Project from an environmental perspective. Particular attention was given to the EPA Policies and Guidance documentation as they pertained to the Beyond 2016 Project and consideration of the factors identified in the Beyond 2010 Project was undertaken.

In light of this assessment a number of surveys were commissioned (surface water, desktop flora and fauna, noise and vibration modelling and Aboriginal heritage) to ensure that any areas of uncertainty were addressed. Through this process SIGM is confident that the Beyond 2016 Project does not pose any additional environmental impact to those already assessed and approved pursuant to MS879.

SIGM is expecting approval of this application by the end of 2016 with other statutory approvals to follow shortly after.

2.3 Other Regulatory Context

2.3.1 Prescribed Premises Categories

SIGM is classified as a Prescribed Premises according to Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations). Prescribed activities at St Ives as listed on Operating Licence L8485/2010/2 issued by the DER are shown in Table 2-2 below

Table 2-2: SIGM's DER Prescribed Activities

Category Number	Category Description	Category Production or Design Capacity	Premises Production or Design Capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	9,000,000 tonnes per year
6	Mine Dewatering: Premises on which water is abstracted and discharged into the environment to allow the mining of ore	50,000 tonnes or more per year	30 GL per Annum
7	Vat or in-situ leaching of ore	5,000 tonnes or more per year	3,000,000 tonnes per year
54	Sewage facility	100 cubic metres or more per day	Premises production, approximately 220 cubic metres per day
64	Class II putrescibles landfill site	20 tonnes or more per year	1,000 tonnes per year

Operations at St Ives are approved under Licence L8485/2010/2. Dewatering and discharge of up to 30GL per annum of this water is permitted under this Licence and SIGM is required to undertake a range of monitoring and management activities pursuant to the conditions of this licence.

2.3.2 Mining Proposal

Mining Proposals have been submitted to the DMP pursuant to Section 82 of the Mining Act for all existing mining operations. It is expected that the Mining Proposals for areas identified through the Beyond 2016 Project will be approved shortly after the Minister for the Environment approves the Beyond 2016 Project.

2.3.3 Other Relevant Approvals

SIGM currently holds two Groundwater Licences (GWL) under the RIWI Act. Licence number GWL62505(9) allocates ground water from the Goldfields Combined - Fractured Rock West and Fractured Rock aquifers for a total of 30 GL per annum. This Licence entitles abstraction for the purposes of mineral ore processing and other mining purposes, dewatering for mining purposes, dust suppression for mining purposes and product processing wash-down purposes between 21 February 2014 and 20 February 2024.

Licence number GWL171060(2) allocates ground water from the Mt Morgan Borefield for a total of 4.015GL per annum. This Licence entitles abstraction for the purposes of mineral ore processing and other mining purposes between 2 February 2016 and 1 February 2026.

3 Environmental Setting

The SIGM operating environment has been subject to a significant range of studies and is well understood. That understanding continues to be supplemented through ongoing monitoring and future surveys. A large number of studies have already been conducted to support previous approvals processes (many of which have had a primary focus on Lake Lefroy). A summary of the findings of these studies is provided in the section below. It should be noted that, for clarity, the B2018 Project is located within the 'study area' referred to from this point onwards.

3.1 Climate

SIGM is located in the arid to semi-arid climatic region of the Goldfields in Western Australia. The average daily temperature in the Kalgoorlie region is 25.3°C and the average daily minimum temperature is 11.7°C (BOM, 2016). The annual average rainfall for the region is 250 to 300 mm per annum with average annual evaporation ranging from 2,700mm to 3,000mm (BOM, 2016).

3.2 Geology

The SIGM operations are located within the Kambalda Domain of the Archaean Yilgarn Craton, and are bounded by the north-northwest trending Boulder-Lefroy Fault and the Zuleika Shear (SIGM, 2010). The Kambalda Domain is a subset of the Norseman-Wiluna Belt, a north-westerly trending Archaean greenstone belt comprising predominantly mafic and ultramafic rocks, with minor felsic porphyry and meta-sediments, granites and cross-cutting Proterozoic dolerite dykes. Most of the area is underlain by either the Lunnon Basalt (in the south) or the Paringa Basalt (in the north). These basalt units are bounded by structural shears, doleritic intrusions, or a combination of the two (SIGM, 2010).

3.3 Topography

Regional topography is gently undulating with occasional ranges of low hills. Regional geomorphology within and around the SIGM tenements consists of salt lakes and fringing saline plains, sandy plains and dunes with halophytic shrub lands (SIGM, 2010).

3.4 Flora & Vegetation

SIGM engaged Phoenix Environmental Services Pty Ltd (Phoenix) (2016) to undertake a database search and desktop assessment of the study area to compile a list of flora recorded within the vicinity of the study area and identify conservation significant species that may occur based on the proximity of previous records. This work will also guide the need and extent for further survey efforts and assessment.

Phoenix (2016) undertook the following database search within a 40km buffer around the study area:

- EPBC Act Protected Matters Search Tool (Department of the Environment 2016)
- DPaW Threatened Flora, Fauna and Ecological Communities database searches (DPaW 2016c)
- DPaW/WA Museum NatureMap database (DPaW 2016b)
- Shared Land Information Platform for Environmentally Sensitive Areas (ESAs) (Landgate 2016).

SIGM is aware that a survey effort is required. As such, at the time of this referral submission, additional site specific assessment works are being undertaken in accordance with best practice environmental standards for such work.

The following information summarises the extent of the desktop work completed by Phoenix at the time of writing.

3.4.1 Conservation Significant Flora

A total of 42 conservation significant flora species were identified from the database searches and literature review within the study area (Phoenix, 2016). These species included:

- two species listed under the EPBC Act (EN, and VU)
- one species listed under the WC Act (VU)
- 39 DPaW Priority species (P1 – 18 species, P2 – 3 species, P3 – 12 species, P4 – 6 species).

Of these, four DPaW Priority flora species have been recorded within B2018 study area (2 x P3; 2 x P4) to date (Phoenix, 2016).

3.4.2 Introduced flora

A total of 30 introduced flora species were identified in the desktop review. Three of these are declared pests, with one being C1 Prohibited (Nodding Thistle) and two with C3 status (Common Heliotrope and Mintweed) under the Biosecurity and Agriculture Management Act 2007 (Phoenix, 2016).

3.4.3 Regionally significant vegetation

The SIGM tenements listed in Table 1-3 are within the Coolgardie Botanical District, which forms a distinctive part of the Eremean Province (SIGM, 2010). The wider area occurs within the regionally significant Greater Western Woodlands (GWW) which is the largest remaining intact temperate woodland in the world extending from Southern Cross to Kalgoorlie and east to Balladonia, and south to near Ravensthorpe (Phoenix, 2016).

The GWW is one of the very few large, intact landscapes remaining in temperate Australia, and is of global significance. It contains over 3,000 vascular plant species, representing approximately 20% of Australia's floristic diversity. Land uses within the GWW include Unallocated Crown Land, conservation estate, pastoral leases, timber reserves and mineral exploration and extraction activities (Terratree 2016; Phoenix, 2016).

3.4.4 Threatened and Priority Ecological Communities

No Commonwealth or State listed TECs or any PECs intersect the study area.

3.5 Fauna

As with flora and vegetation, a desktop assessment was conducted by Phoenix for the study area incorporating both a database search and literature review.

- Phoenix (2016) undertook the following database searched within a 40km buffer around the study area:
- EPBC Act Protected Matters Search Tool (Department of the Environment 2016)
- DPaW Threatened Flora, Fauna and Ecological Communities database searches (DPaW 2016c)
- DPaW/WA Museum NatureMap database (DPaW 2016b)
- Birdlife Australia Birdata database (Birdlife Australia 2016).

SIGM is aware that a survey effort is required. As such, at the time of this referral submission, additional site specific assessment works are being undertaken in accordance with best practice environmental standards for such work.

3.5.1 Vertebrate Fauna

The Phoenix (2016) desktop review returned a total of 12 conservation significant vertebrate species that have been recorded in the wider area and thus may occur within the study area. However, only four of these species have been reported in St Ives tenements:

- Leipoa ocellata (Malleefowl);
- Merops ornatus (Rainbow Bee-eater);
- Thinornis rubricollis (Hooded Plover); and
- Falco peregrinus (Peregrine Falcon).

3.5.2 Short-range endemic invertebrates

The Phoenix (2016) desktop review identified 52 short-range endemic (SRE) invertebrate taxa. However, only 18 have been recorded within the B2018 study area, of which one taxa is a confirmed SRE while the remaining 17 taxa are considered potential SRE's. The one confirmed SRE is as follows:

- Tetralycosa baudinettei (wolf spider).

Further consideration of SREs is being progressed as part of the B2018 project work.

3.5.3 Aquatic Fauna

Aquatic flora and aquatic invertebrate fauna in Lake Lefroy has been found to be significantly lower than the diversity in surrounding salt lake environments (SIGM, 2010). This is primarily attributed to the high salinity, thick salt crust, lack of a hyposaline phase in water quality and the subsequent absence of valuable habitat (SIGM, 2010). As such, current evidence indicates that Lake Lefroy does not contain any aquatic vertebrate fauna.

A number of studies have been undertaken investigating the aquatic invertebrate communities of Lake Lefroy and the surrounding claypans. Over time, approximately 56 taxa have been identified, consisting mainly of crustaceans and insects (MWH, 2016). The highest diversity of aquatic invertebrates has been recorded during flooded conditions and associated with lower salinity claypans (MWH, 2016).

3.5.4 Subterranean Fauna

Phoenix (2016) undertook a desktop review of the study area that did not identify any records of stygofauna. Due to the hypersaline character of the groundwater in the Lake Lefroy area, it is unlikely that stygofauna is present in the B2018 study area (Outback Ecology, 2011; Subterranean Ecology 2010b; Phoenix, 2016).

The presence of troglofauna in the study area is dependent on the presence of suitable geologies and hydrological conditions (Phoenix, 2016). Overall, the Archaean geology of the region, which is exposed in many areas through the B2018 study area, is very complex but appears to have limited capacity to support troglofauna due to lack of 'vugginess' (Phoenix, 2016). Groundwater around the lake, in particular in the aquifer of the Lefroy Palaeochannel, is often found very close to the surface and in these intermittently fully saturated deposits troglofauna cannot persist (Phoenix, 2016).

Subterranean Ecology (2010a) identified a single geology, Quaternary transported sediments, as possible host of troglofauna (Phoenix, 2016).

A review of the surface geology shows, that Quaternary alluvial deposits occur mainly in the south-eastern parts of the B2018 study area (Griffin 1989), although Subterranean Ecology (2010a) considered some islands within Lake Lefroy as possible troglofauna habitat (Phoenix, 2016).

3.6 Hydrology

The proposed study area is on and adjacent to Lake Lefroy which is an arc shaped lake with an axial length of 59km and a maximum width of 16km (Clarke 1993) and occurs within the Lefroy Palaeodrainage (Dames and Moore, 1999). The lake has a surface area of ~554km2 with a catchment area of 4,528km2 (Clarke, 1993) and is part of a series of lakes that drain the eastern edge of the Great Western Plateau (Dames & More, 1999).

The presence of natural surface water in the lake is seasonal with the lake being dry for around 25% of the year (Clarke, 1993). Annually, the lake floods to less than 50% of its capacity with water depth generally not exceeding 30cm (Clark, 1993). Surface water in the lake is sourced from direct precipitation, surface runoff from surrounding catchments and minor inputs from groundwater inflow and mine water discharge (SIGM, 2015).

Water and sediment quality monitoring programs have been undertaken for a number of years. The findings of this monitoring have been consistent in nature, showing trends of localised, elevated salinity, nutrients and metals at discharge sites when compared to historic discharge and reference sites (MWH, 2016).

Surface water in the lake is hypersaline with levels up to 423,000mg/L TDS (MWH, 2016c). There has been some disruption to the natural movement of surface water due to exploration and mining activities however this is adequately managed through the installation of surface water management infrastructure e.g. culverts.

In light of best practice environmental management, at the time of this referral submission additional site specific hydrological impact assessment works are being undertaken.

3.7 Hydrogeology

The SIGM tenements are located within the Lefroy-Dundas Sub Area of the Goldfields Groundwater Management Area as defined by the Department of Water (DoW) (URS, 2004).

Three significant aquifer systems have been identified in the study area (Wallis, 2004):

- An aquifer associated with the fractured and/or weathered Archaean bedrock (which hosts the gold deposits). This aquifer system is considered to be hydraulically highly variable, with hydrogeological properties dependant on the degree of weathering and the structural nature of the basement rock.
- A sand aquifer (locally referred to as the Hampton Sandstone) associated with the Lefroy Palaeodrainage system and generally confined to channels. These aquifer units are generally high in permeability, and so require significant dewatering to reduce the water table.
- A superficial aquifer associated with the playa lake deposits. This aquifer unit generally expresses as inflows at the rims of pits adjacent to or within lake boundaries, usually to a depth of approximately 2m only.

The groundwater levels at the lake's bank are likely to be around 287 reduced level (RL) mAHD. The pre-mining water levels would have spread radially from the topographic highs in the centre of the SIGM operations towards Lake Lefroy, which has been one of the key natural outlets of groundwater flow.

Following the introduction of mining, the natural flow has been superimposed by the effects of dewatering ahead of and during mining operations. The flow is now directed generally towards the centres of dewatering, and/or, water recovery after the dewatering action has ceased.

Regionally the depth to groundwater varies from shallow (less than 5 metres below ground level (mbgl)), along the shores of Lake Lefroy, to approximately 40mbgl in the central part of the SIGM operations and even deeper close to the active mining pits (MWH, 2014).

In light of best practice environmental management, at the time of this referral submission additional site specific hydrogeological impact assessment works are being undertaken.

3.8 Cultural Heritage

3.8.1 Aboriginal Heritage

Within the SIGM operational area there are three aboriginal groups with an interest in the land in relation to aboriginal heritage - the Ngadju, Widji and the Kalamaia Kabu(d)n peoples. The Ngadju group are the determined native title holders over the majority of the SIGM operational areas (Tribunal file number: WCD2014/004).

Multiple archaeological and anthropological surveys have been conducted within the SIGM tenements and surrounds in accordance with the requirements of the Aboriginal Heritage Act 1972. These surveys suggest that the archaeological record for the region is extremely sparse for a suite of reasons, including the harsh environmental conditions and the destruction of sites due to historic pastoral activities (SIGM, 2010).

Aboriginal heritage (archaeological and ethnographic) surveys conducted on the surface of Lake Lefroy (Deep Woods Survey 2010a, 2010b) and the fringing areas of the lake (Deep Woods Survey 2011) together indicate that clearance has been provided for the entire Beyond 2010 lake based area. SIGM notes in the Beyond 2010 PER that, "…the EPA acknowledged that no ethnographic or archaeological sites of Aboriginal significance were identified from surveys in support of the original assessment [year 2000]. The Aboriginal Affairs Department [now DAA] indicated that the proponent had no obligations to fulfil under the Aboriginal Heritage Act 1972. Consequently, the EPA considered that the factor did not require further evaluation."

SIGM acknowledges that the key focus of the historical Aboriginal heritage surveys were primarily focussed on Lake Lefroy and its immediate surrounds. In keeping with this and as part of the B2018 Project, additional site specific assessment works are being undertaken.

3.8.2 European Heritage

Online searches were undertaken on the Heritage Council of Western Australia databases to identify any European Heritage Sites within the proposed study area (Heritage Council Inherit database, 2016). No sites of significance are located within the area.

4 Beyond 2018 Project

4.1 The Proposal

The primary objective of the B2018 Project is to ensure the continuation of the St Ives Gold Mine beyond 2018. The B2018 Project will require an expansion outside of the existing MS879 approved disturbance footprint (2,061 ha) to facilitate mining for a ten year period (i.e. to 2028). This continuation of operations is unlikely to require a change to the current mining or processing methods. Notwithstanding this, alternate methods for cost effective and safe mining are always under consideration and in the event that a substantive change is desired that would alter the impacts of the B2018 Project, this will be discussed with relevant regulators at the time.

SIGM proposes a delineated approach that would include both terrestrial and lake-based tenure with a set disturbance limit based on location. The maximum proposed disturbance is 5,000 ha which consists of the following:

- Lake based disturbance up to 200ha per year over a ten year period with a total maximum of 2,000 ha; and
- Land based disturbance up to 300ha per year over a ten year period with a total maximum of 3,000 ha.

These limits are seen as the upper thresholds for disturbance and may be reduced as studies are completed and where areas of particular environmental value are identified and determined to warrant protection through avoidance.

The B2018 Project comprises a number of indicative development envelopes. The study area and these envelopes are provided in Figure 2 below. Further footprint definition within these indicative development envelopes is in progress with a suite of surveys and investigations having been instigated to inform this process.

The key characteristics of the B2018 Project are summarised in the Table 4-1below.

Table 4-1: Summary of Key Proposal Characteristics of the B2018 Project

Element	Description of Mine Elements		
	Existing (MS879)	Proposed	Combined
Total area of disturbance	Up to 2,061 ha on a lake	Up to 5,000 ha over a 10 year period (2,000 ha on lake and 3,000 ha on land)	Up to 7,061 ha which consists of 4,061 ha of lake disturbance and 3,000 ha of land disturbance

Element	Description of Mine Elements		
	Existing (MS879)	Proposed	Combined
Mining method	Open pit and underground mining using conventional techniques.	Unlikely to change[1]	Unlikely to change
Dewatering volume and discharge to Lake Lefroy	Up to 30GL per annum whole of lake discharge	Unlikely to change[2]	Unlikely to change[1]

[1] Notwithstanding this, alternate methods for cost effective and safe mining are always under consideration and in the event that a substantive change is desired that would alter the impacts of the B2018 Project, this will be discussed with relevant regulators at the time.

[2] Subject to hydrological and hydrogeological studies currently being undertaken.

P: PO Box 454, Leederville WA 6903 | A: Level 1 660 Newcastle St, Leederville WA 6007 | T: 1300 251 070 | W: www.talisconsultants.com.au

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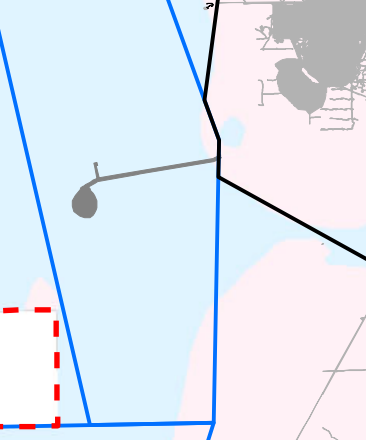
6550000 6545000 6540000 6535000 6530000 6525000 6520000 6515000

LEGEND

- B2018 Study Area
- **Indicative Development Envelope**
  - Lake-based Operations
  - Land-based Operations
- Existing Disturbance
- Beyond 2016 Project Application
- MS879 Footprint
- **Surface**
  - Lake Lefroy
  - Land

LOCALITY



0 300 600 900 1,200 km

B2018 STUDY AREA AND INDICATIVE DEVELOPMENT ENVELOPES

St Ives Gold Mine

0 1 2 3 4 5 km

Scale @ A3: 1:120,000
Coordinate System: GDA 1994 MGA Zone 51, Projection: Transverse Mercator, Datum: GDA 1994

Prepared:	H Dalla-Costa
Reviewed:	N King
Checked:	E Vuorenmaa
Project No:	TE16034
Revision:	F
Date:	30/11/2016

Figure 02

GOLD FIELDS

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4.2 Significance Test of Environmental Factors

SIGM has conducted a significance test for each of the potential significant environmental factors associated with the B2018 Project according to the EPA's *Environmental Assessment Guideline for the Application of a significance framework in the EIA process* (EAG 9).

An assessment of the current environmental setting, previous approval processes and the likely impacts associated with the B2018 Project determined that the following are considered to be the likely significant environmental factors for this proposal:

- Flora and Vegetation;
- Terrestrial Fauna;
- Hydrological Processes;
- Inland Waters Environmental Quality; and
- Rehabilitation and Decommissioning.

These factors primarily relate to the values of the Lake Lefroy system and the immediately surrounding area both during and post life of mine.

Given the suite of existing statutory processes regulated by various Decision Making Authorities (DMAs) and the likely impacts associated with the B2018 Project, a preliminary assessment of the risks suggests that there are no impacts that are unacceptable or cannot readily be managed appropriately via existing regulatory mechanisms and internal SIGM controls. Notwithstanding this, the factors identified above are further considered in Section 4.3 below as well as in Part B of the referral form.

4.3 Consideration of Environmental Factors

Pursuant to Section 4.2 above, SIGM has considered each of the environmental factors detailed in the EPA's EAG 9 and *Environmental Assessment Guideline for Environmental factors and objectives* (EAG 8) as they relate to the B2018 Project.

4.3.1 Flora and Vegetation

EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and community level.*

4.3.1.1 Existing Guidance Documentation

The following guidance documentation applies to the management of this factor with regard to the proposal:

- EPA Guidance Statement 51 - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia;
- EPA Guidance Statement 6 - Rehabilitation of Terrestrial Ecosystems;
- EPA Position Statement 2 - Environmental Protection of Native Vegetation in WA;
- EPA Position Statement 3 - Terrestrial Biological Surveys as an Element of Biodiversity Protection; and
- EPA & Department of Parks and Wildlife Technical Guide - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment.

4.3.1.2 Consultation

A suite of stakeholder consultation has taken place prior to the submission of this referral, details of which can be seen in Appendix A. At the time of writing, no stakeholders have raised any queries or concerns regarding the proposal.

SIGM commits to undertaking ongoing consultation with key stakeholders regarding flora and vegetation, potential impacts and the proposed mitigation thereof within the study area.

4.3.1.3 Baseline Information

Relevant baseline and existing environment information can be seen in Section 3.4 above.

4.3.1.4 Impacts and Mitigation

Implementation of the B2018 Project has the potential to result in clearing of up to 3,000 ha of native vegetation. The rest of the development envelopes are situated within un-vegetated parts of Lake Lefroy which is devoid of any vegetation. The extent of the impact to flora and vegetation will be determined based on the further survey work to be undertaken.

SIGM has a long history of operations within the study area and has a track record of appropriate management of the potential detrimental impacts to flora and vegetation. Notwithstanding this, SIGM has engaged specialist consultants to conduct a flora and vegetation survey over the study area to ensure that all potential impacts from the B2018 Project are understood and appropriately mitigated.

SIGM currently implements an Environmental Management System (EMS) which contains the following standard for the management of flora and vegetation:

- Flora and Fauna Management Standard (SIG-ENV-STD004) – provides a standard for the management of rare, endangered and vulnerable flora and fauna species.

As detailed above, further flora and vegetation survey work and assessment is scheduled to be undertaken and will be used to identify and define effective mitigation measures which may supplement the existing measures currently implemented by SIGM.

4.3.1.5 Residual Impacts

Further refinement of the B2018 Project design and associated investigations is required in order to fully ascertain the likelihood and longevity of impact resultant from the proposal.

It is however expected that such impacts can be avoided and/or managed appropriately to minimise the potential for any unacceptable residual impacts to occur.

4.3.1.6 Assumptions

The above section relies on the assumption that additional surveys and studies are required and will be undertaken.

4.3.2 Terrestrial Fauna

EPA Objective: *To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.*

4.3.2.1 Existing Guidance Documentation

The following guidance documentation applies to the management of this factor with regard to the proposal:

- EPA Guidance Statement 20 - Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia;
- EPA Guidance Statement 56 - Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia;
- EPA Position Statement 3 - Terrestrial Biological Surveys as an Element of Biodiversity Protection; and
- EPA & DEC Technical Guide - Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment.

4.3.2.2 Consultation

A suite of stakeholder consultation has taken place prior to the submission of this referral, detail of which can be seen in Appendix A. At the time of writing no stakeholders have raised any queries or concerns regarding the proposal.

SIGM commits to undertaking ongoing consultation with key stakeholders regarding terrestrial fauna, potential impacts and the proposed mitigation thereof within the study area.

4.3.2.3 Baseline Information

Relevant baseline and existing environment information can be seen in Section 3.5 above.

4.3.2.4 Impacts and Mitigation

Implementation of the B2018 Project has the potential to result in clearing of up to 3,000 ha of native vegetation which is potentially suitable fauna habitat for conservation significant species. The development of lake based operations and disturbance of up to 2,000 ha on the lake playa could affect fauna that use the Lake itself. The extent of the impact on terrestrial fauna will be determined based on the further survey work to be undertaken.

SIGM has a long history of operations within the study area and has a track record of appropriate management of the potential detrimental impacts to fauna. Notwithstanding this, SIGM has engaged specialist consultants to conduct a fauna survey over the study area to ensure that all potential impacts from the B2018 Project are understood and appropriately mitigated.

SIGM currently implements an Environmental Management System (EMS) which contains the following standard for the management of fauna:

- Flora and Fauna Management Standard (SIG-ENV-STD004) – provides a standard for the management of rare, endangered and vulnerable flora and fauna species.

As detailed above, further fauna survey work and assessment is scheduled to be undertaken and will be used to identify and define effective mitigation measures which may supplement the existing measures currently implemented by SIGM.

4.3.2.5 Residual Impacts

Further refinement of the B2018 Project design and associated investigations are required in order to fully ascertain the likelihood and longevity of impact resultant from the proposal.

It is however expected that such impacts can be avoided and/or managed appropriately to minimise the potential for any unacceptable residual impacts to occur.

4.3.2.6 Assumptions

The above section relies on the assumption that additional surveys and studies are required and will be undertaken.

4.3.3 Hydrological Processes (Hydrological & Hydrogeological Systems)

EPA Objective: To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.

4.3.3.1 Existing Guidance Documentation

The following existing guidance documentation applies to the management of this factor with regard to the proposal:

- DoW - Operational policy no. 1.02 - Policy on water conservation/efficiency plans, 2009;
- DoW - Operational policy no. 5.12 - Hydrogeological reporting associated with a groundwater well licence, 2009; and
- DoW - Western Australian water in mining guidelines, May 2013.

4.3.3.2 Consultation

A suite of stakeholder consultation has taken place prior to the submission of this referral, detail of which can be seen in Appendix A. At the time of writing no stakeholders have raised any queries or concerns regarding the proposal.

SIGM commits to undertaking ongoing consultation with key stakeholders regarding hydrological processes, potential impacts and the proposed mitigation thereof within the study area.

4.3.3.3 Baseline Information

Relevant baseline and existing environment information can be seen in Section 3.6 and 3.7 above.

4.3.3.4 Impacts and Mitigation

Implementation of the B2018 Project has the potential to result in changes in hydrological and hydrogeological regimes both in land and on the lake. Due to the location of the operations, SIGM is required to dewater the mines to maintain safe and dry conditions. Hydrogeological impact assessment is currently being undertaken to determine the anticipated dewatering discharge volume. The potential impacts of dewatering discharge on Lake Lefroy include inundation of the riparian zone

and changes in the water and sediment quality. Additional infrastructure may also impact movement of the surface water on land and lake surface.

SIGM has a long history of mine dewatering within the St Ives tenements with mine dewater discharge onto the lake surface. Notwithstanding this, SIGM has engaged specialist consultants to conduct a hydrological and hydrogeological impact assessment of the proposal on the study area.

SIGM currently implements an Environmental Management System (EMS) which contains the following standards and procedures for the management of hydrogeology:

- Water Monitoring Procedure (SIG-ENV-PR036) – provides a detailed procedure for monitoring on site; and
- Water Management Standard (SIG-ENV-STD–013) – outlines the process for water management including the monitoring of discharge water, settlement of sediments, control of discharge and reporting of activities.

St Ives is managed under a groundwater abstraction licence (GWL62505(9)), a key management tool of which is the operating strategy that supports this licence. The requirements under this groundwater abstraction licence provide a range of legal obligations to be reported to the DoW including:

- Abstraction data;
- Standing water level data;
- Water quality data; and
- An annual review of dewatering operations and the impact of abstraction on the regional hydrology.

SIGM acknowledge that the B2018 Project is likely to require an amendment to this licence to incorporate additional tenements as well as potentially increase the existing abstraction limit.

As detailed above, further hydrological assessments are scheduled to be undertaken and will be used to identify and define effective mitigation measures. Notwithstanding this, the existing reporting requirements and management measures are considered to be versatile and as such are able to provide a high level of assurance that hydrogeology will be appropriately managed in the study area.

4.3.3.5 Residual Impacts

Further refinement of the B2018 Project design and associated investigations are required in order to fully ascertain the likelihood and longevity of impact resultant from the proposal.

It is however expected that such impacts can be avoided and/or managed appropriately to minimise the potential for any unacceptable residual impacts to occur.

4.3.3.6 Assumptions

The above section relies on the assumption that additional surveys and studies are required and will be undertaken.

4.3.4 Inland Waters Environmental Quality

EPA Objective: To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.

4.3.4.1 Existing Guidance Documentation

The following existing guidance documentation applies to the management of this factor with regard to the proposal:

- EPA Position Statement 4 - Environmental Protection of Wetlands;
- DER - Identification and investigation of acid sulfate soils and acidic landscapes, Revised June 2015;
- DoW - Western Australian water in mining guideline, Report No 12, 2013;
- DoW - WQPN 15: Extractive industries near sensitive water resources;
- DoW - WQPN 44: Roads near sensitive water resources;
- DoW - WQPN 51: Industrial wastewater management and disposal;
- DoW - WQPN 52: Stormwater management at industrial sites;
- DoW - WQPN 81: Tracks and trails near sensitive water resources; and
- DoW - WQPN 83: Infrastructure corridors near sensitive water resources.

4.3.4.2 Consultation

A suite of stakeholder consultation has taken place prior to the submission of this referral, detail of which can be seen in Appendix A. At the time of writing no stakeholders have raised any queries or concerns regarding the proposal.

SIGM commits to undertaking ongoing consultation with key stakeholder regarding inland water quality, potential impacts and the proposed mitigation thereof within the study area.

4.3.4.3 Baseline Information

Relevant baseline and existing environment information can be seen in Section 3.6 above.

4.3.4.4 Impacts and Mitigation

Implementation of the B2018 Project has the potential to result in changes in surface water and sediment quality as a result of dewatering discharge. The extent of the impact will be determined based on the further survey work and hydrogeological and hydrological impact assessment currently being undertaken.

SIGM has a long history of operations in the study area and minimal impacts to inland waters have been observed to date. Notwithstanding this, the full extent of the potential impacts on inland water quality from the B2018 Project is not fully understood at the time of writing.

To this effect, SIGM has engaged specialist consultants to conduct hydrological and salt lake ecological impact assessments of the proposal on the study area. The subsequent reports will be utilised to determine the mitigation measures required to be implemented to ensure that the impact to inland water quality is as low as reasonably practicable.

4.3.4.5 Residual Impacts

As detailed above, further refinement of the B2018 Project design and associated investigations are required in order to fully ascertain the likelihood and longevity of impact resultant from the proposal.

It is however expected that such impacts can be avoided and/or managed appropriately to minimise the potential for any unacceptable residual impacts to occur.

4.3.4.6 Assumptions

The above section relies on the assumption that additional surveys and studies are required and will be undertaken.

4.3.5 Rehabilitation and Decommissioning

EPA Objective: To ensure that premises are closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses, and without unacceptable liability to the State.

4.3.5.1 Existing Guidance Documentation

The following existing guidance documentation applies to the management of this factor with regard to the proposal:

- DMP / EPA - Joint Guidelines for Preparing Mine Closure Plans, May 2015;
- EPA Guidance Statement No. 6 - Rehabilitation of Terrestrial Ecosystems;
- Environmental Protection Bulletin 19 - EPA involvement in mine closure;
- Strategic Framework for Mine Closure; Australian and New Zealand Minerals and Energy Council and the Minerals Council of Australia (ANZMEC/MCA 2000) - Mine Closure and Completion, Leading Practice Sustainable Development Program for the Mining Industry;
- Department of Industry, Tourism and Resources (DITR 2009b) - Mine Rehabilitation, Leading Practice Sustainable Development Program for the Mining Industry; Department of Industry, Tourism and Resources (DITR 2006);
- International Council on Mining and Metals (ICMM 2008) - Planning for Integrated Mine Closure: Toolkit; and
- Leading Practice Sustainable Development Program for the Mining Industry – Managing Acid and Metalliferous Drainage (DITR 2007).

4.3.5.2 Consultation

A suite of stakeholder consultation has taken place prior to the submission of this referral, detail of which can be seen in Appendix A. At the time of writing no stakeholders have raised any queries or concerns regarding the proposal.

SIGM commits to undertaking ongoing consultation with key stakeholder regarding rehabilitation and decommissioning, potential impacts and the proposed mitigation thereof within the study area.

4.3.5.3 Baseline Information

SIGM has an existing approved Mine Closure Plan (MCP) for its operations, prepared in accordance with the requirements of EPA MS879 and the Guidelines for Preparing Mine Closure Plans (DMP and EPA, 2011). A revised version of the MCP is in preparation and due for submission in December 2016. The revised version acknowledges many of the gaps identified as part of the 2013 MCP and proposes an improved site-wide strategy for closure.

Per discussions between SIGM and the DMP, the B2018 Project will be included in the next iterations of the MCP when the B2018 Project progresses. This approach is considered acceptable to the DMP, given that the B2018 Project is still in its infancy with regard to design and development.

4.3.5.4 Impacts and Mitigation

Further refinement of the B2018 Project design and associated investigations are required in order to fully ascertain the impacts and associated mitigation measures required for the proposal.

4.3.5.5 Residual Impacts

Further refinement of the B2018 Project design and associated investigations are required in order to fully ascertain the likelihood and longevity of any direct or indirect residual impacts of the proposal.

It is however expected that such impacts can be avoided and/or managed appropriately to minimise the potential for any unacceptable residual impacts to occur.

4.3.5.6 Assumptions

The above section relies on the assumption that additional surveys and studies are required and will be undertaken.

4.4 Regulatory Context and Considerations

4.5 Stakeholder Engagement

SIGM has taken a conservative and transparent approach to stakeholder engagement for the B2018 Project. The stakeholders identified as relevant to the proposed B2018 Project are outlined in Table 4-2.

Table 4-2: B2018 Project Key Stakeholders

Sector	Stakeholder
Indigenous Groups	Widji Traditional Owners
	Ngadju Traditional Owners (via Goldfields Land and Sea Council)
	Kalamaia Kabu(d)n Groups
State Government	Office of the Environmental Protection Authority (OEPA)
	Department of Aboriginal Affairs (DAA)
	Department of Mines and Petroleum (DMP)
	Department of Environment Regulation (DER)
	Department of Parks and Wildlife (DPaW)
	Department of Water (DoW)
Local Government	Shire of Coolgardie
Environmental Interest Groups	Conservation Council of WA (CCWA)
	Malleefowl Preservation Group
	National Malleefowl Recovery Team
	Wilderness Society of WA (WSWA)
	Wildflower Society of WA
Adjacent Landholders	ACH Nickel
	BHP Billiton Nickel West
	Mt Monger Station
	Madoonia Downs Station
	Woolibar Station

Sector	Stakeholder
	Salt Lake Mining
Other Stakeholders	Residents and businesses of Kambalda East & West
	Local Media
Recreational Clubs	Lake Lefroy Land Sailing Club
	Horse Riding Club

Most recently, stakeholder forums were advertised widely and held in Kambalda and Kalgoorlie on the 17 and 18 October respectively to introduce the B2018 Project and further consultation will form part of the environmental impact assessment process

A summary of the stakeholder engagement conducted for the B2018 Project is provided in Appendix A.

5 Summary

The above document provides further detail in support of the completed EPA referral form. SIGM wishes to emphasise that the specifics of the B2018 Project design are still in their infancy however the required studies are in the process of being organised and undertaken to provide further information for incorporation into the design.

SIGM remains committed to best practice environmental management and commits to maintaining open and transparent communication with the EPA to assist in facilitating an efficient and appropriate review of this referral.

As detailed in Section 4.5, a detailed stakeholder engagement process has commenced and will continue throughout the environmental impact assessment process. To date, there appears to be little concern in relation to what is proposed and Talis is of the view that this is unlikely to change. In this regard therefore, it is suggested that this raises the potential for assessment via the "Environmental Review – no public review" process as outlined in the EPA's new *Guidelines and Procedures Framework* and look forward to discussions with the EPA in relation to this process.

6 References

Botanica Consulting. 2011. Unpublished report prepared for St Ives Gold Mining Company Pty Limited.

Botanica Consulting. 2012a. Neptune Level 1 flora and vegetation survey. Tenements: M15/1579, M15/1622, M15/1578, M15/1634, M15/1623, M15/1540 and L15/242. Botanica Consulting Pty Ltd, Boulder, WA. Unpublished report prepared for Gold Fields Ltd.

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Appendix A: Stakeholder Register

A.1: Project Stakeholder Register as at 26 October 2016

Date	Stakeholder	Description of engagement	Outcome
27-Jul-16	EPA	Letter from Talis to EPA outlining the Beyond 2018 Strategic Advice Meeting agenda	General notification letter, no direct outcome.
28-Jul-16	EPA	Meeting with Talis, SIGM and the EPA regarding the Beyond 2018 Project	General alignment of all parties with approach
16-Sep-16	Shire of Coolgardie	Letter Informing of Project, notice of public meeting (Kambalda and Kalgoorlie) and invitation to participate	No direct outcome
19-Sep-16	Local Communities (incl. Kambalda, Kalgoorlie & Coolgardie)	Project information flyers and invitation to the public information sessions posted at/on the following: Kambalda Recreation Centre Kambalda Woolworths Kambalda Post Office Kambalda Chemist Kambalda Newspaper Coolgardie Shire Facebook Page	No direct outcome
19-Sep-16	Lake Lefroy Land Sailing Club (LLLSC)	Letter sent informing of the Project and invitation to the upcoming public information sessions	Advice provided from a representative on 10 October 2016 indicating that the primary interest of the LLLSC is that sufficient room is retained for sailing on the lake as well as sufficient room to safely avoid wet/soft areas on the near the island/s in the southern part of the lake.
19-Sep-16	BHP Billiton Nickel West	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Salt Lake Mining	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Woolibar Station	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome

Date	Stakeholder	Description of engagement	Outcome
19-Sep-16	Madoonia Downs Station	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Mt Monger Station	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Malleefowl Preservation Group	Letter sent to National Office (local chapter is closed) informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Wildflower Society	Letter sent informing of the Project and invitation to the upcoming public information sessions	Response received requesting a copy of the public information session presentation as representatives would be unable to attend.
19-Sep-16	Wilderness Society of WA	Letter sent informing of the Project and invitation to the upcoming public information sessions	Response received on 10 October 2016 requesting a copy of the public information session presentation as representatives would be unable to attend. Interest expressed with regard to the potential Project impact to the Greater Western Woodlands, groundwater quality and general land access.
19-Sep-16	Conservation Council of WA	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Department of Aboriginal Affairs	Letter sent informing of the Project and invitation to the upcoming public information sessions	Response from DAA received on 10 October 2016 requesting a copy of the public information session presentation as representatives would be unable to attend. Advice also provided to SIGM to invite the relevant Native Title parties.

Date	Stakeholder	Description of engagement	Outcome
19-Sep-16	Ngadju Native Title Claimant Group	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Kalamaia Kabu(d)n Traditional Owner Group	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
19-Sep-16	Widji Traditional Owner Group	Letter sent informing of the Project and invitation to the upcoming public information sessions	No direct outcome
27-Sep-16	OEPA	Meeting with OEPA to provide Project and referral update.	Overall alignment of parties, no direct outcome
3-Oct-16	National Malleefowl Recovery Team	Letter and email Informing of Project and invitation to participate in the upcoming public information session	No direct outcome
4-Oct-16	IGO - Long operations	Letter and email Informing of Project and invitation to participate in the upcoming public information session	No direct outcome
4-Oct-16	DOW	Letter and email Informing of Project and invitation to participate in the upcoming public information session	No direct outcome
4-Oct-16	DPaW	Letter and email Informing of Project and invitation to participate in the upcoming public information session	No direct outcome
4-Oct-16	DER	Letter and email Informing of Project and invitation to participate in the upcoming public information session	No direct outcome
4-Oct-16	DMP	Letter and email Informing of Project and invitation to participate in the upcoming public information session	No direct outcome
17-Oct-16	Kambalda & Coolgardie Community	Public Information Session at Kambalda Recreation centre	Nil community attendance

Date	Stakeholder	Description of engagement	Outcome
18-Oct-16	Kalgoorlie Community	Public Information Session at Kalgoorlie WMC Conference Centre	DMP and Mt Monger station representatives in attendance. No questions raised though DMP identified that the work being done by SIGM for closure is setting a benchmark for the industry. Expectation for the quality of ongoing Mining proposals is high
19-Oct-16	DER	Copy of Public Information Session presentation provided via email	No direct outcome
19-Oct-16	Department of Aboriginal Affairs	Copy of Public Information Session presentation provided via email	Response received on 21 October 2016 thanking SIGM for the information
19-Oct-16	Wilderness Society of WA	Copy of Public Information Session presentation provided via email	No direct outcome
19-Oct-16	National Malleefowl Recovery Team	Copy of Public Information Session presentation provided via email	No direct outcome
19-Oct-16	Wildflower Society	Copy of Public Information Session presentation provided via email	Response received on 21 October 2016 thanking SIGM for the information
19-Oct-16	Shire of Coolgardie	Copy of Public Information Session presentation provided via email	Response received on 21 October 2016 thanking SIGM for the information