



Northern
Territory
Government

WASTE DISCHARGE LICENCE

(Pursuant to section 74 of the *Water Act*)

Licensee	Vista Gold Australia Pty Ltd
Licence Number:	WDL178-07
Registered Business Address:	1/4 Manning Road DOUBLE BAY NSW 2028
ABN:	117 327 509
Premises Address:	Mount Todd Mine Edith Falls Road, Edith Falls 0852
Anniversary Date:	26 November
Commencement Date:	26 November 2019
Amendment Date:	September 2019
Expiry Date:	30 November 2020
Licensed Activity:	Controlled discharge of treated water, in accordance with the licence conditions, from Batman Pit through the authorised discharge point to the Edith River.

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INFORMATION ABOUT THIS LICENCE

Definitions of Terms

- A section on the definition of terms used in this licence can be found at the end of this licence.
- Terms used in the waste discharge licence which are defined in the *Water Act* (the Act) have the meaning given in that Act unless specifically indicated otherwise.

Responsibilities of Licensee

- It is an offence under the *Water Act*, if the holder of a waste discharge licence contravenes or fails to comply with the conditions of a waste discharge licence.
- Licensees must comply at all times with the requirements of these Acts and all other applicable laws.
- Except as expressly provided for in this licence, the licensee must not:
 - cause environmental harm either directly or indirectly;
 - allow waste to come into contact with water; or
 - allow water to be polluted.
- Without limiting the conditions of this licence, in conducting the activity, the licensee must do all things reasonable and practicable to:
 - prevent or minimise the likelihood of pollution occurring as a result of, or in connection with, the activity;
 - prevent or minimise the likelihood of environmental harm occurring as a result, or in connection with, the activity;
 - effectively respond to pollution and the risk of pollution occurring as a result of, or in connection with, the activity;
 - effectively respond to environmental harm and the risk of environmental harm occurring as a result of or in connection with the activity; and
 - apply the principles of ecologically sustainable development.

Duration of licence

- This licence will remain in force until its expiry date, it is surrendered by the licensee, or until it is suspended or revoked by the Controller of Water Resources.
- As set out in section 94 of the *Water Act*, the holder of a licence may, at any time, surrender the licence.

Amendment, Modification or Revocation of Licence (section 93 of the *Water Act*)

- As set out in section 93 of the *Water Act*, the Controller of Water Resources may, by notice:
 - amend or modify the terms and conditions of a licence;
 - revoke a licence; or

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- suspend a licence.

Public Register

- A copy of waste discharge licences and any plans for environmental management, reports, submissions or documents required as a condition of a waste discharge licence, will be placed on a register.
- A copy of the Annual Return will be placed on the register.
- The Administering Agency makes this register freely available from the Northern Territory Environment Protection Authority (NT EPA) website.

Beneficial Use Declaration (section 73 of the Water Act)

- Beneficial Use Declaration (BUD) is a legislated process that reduces the effects of water pollution and assists in the protection and management of water. The community decides how a particular water body should be used by choosing on one or more Beneficial Use categories.

Environmental Interests

- This section highlights the beneficial uses as declared under the *Water Act* and the sensitivity of the surrounding land use and environment associated with the location of the approved activity.
 - declared beneficial uses and or water quality objectives. Daly Roper Beetaloo Water Control District. Surface water from all natural waterways located in the Daly Roper Beetaloo Water Control District (the District), and all ground water located in the District, to be agriculture, aquaculture, public water supply, environment, cultural, industry and rural stock and domestic (Northern Territory Government Gazette: no. S057/2018);
 - sites of conservation significance (SOCS), Yinberrie Hills (SOCS Site Number 30); and
 - there are no Ramsar wetlands present.

Cultural Interests

- It is the licensee's responsibility to contact the Aboriginal Areas Protection Authority, appropriate land council or other governing body and ensure that any Authority Certificates required as a result of conducting the licenced activity are obtained and complied with.

RULES FOR INTERPRETING THE CONDITIONS OF THIS LICENCE

- Where there is a discrepancy between the conditions of this licence and any plan, standard, guideline or other document referred to in this licence, the conditions of this licence prevail to the extent of the inconsistency.
- Any reference to any standard (Australian or international) in this licence means the relevant parts of the current version of that standard.
- A reference to any guideline or code of practice (or to the relevant parts of any guideline or code of practice) in this licence means the current version of the guideline or code of practice.
- Under section 76 of the *Water Act*, any contravention of or failure to comply with this licence by the licensee may be an offence.
- In this licence, unless the contrary intention appears, words that are defined in the *Water Act* are intended to have the meaning given to them in that Act.

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LICENCE CONDITIONS

GENERAL

1. The licensee must ensure the contact details recorded with Administering Agency for this licence are correct at all times.
2. The licensee must at all times have a 24 hour emergency contact.
3. The licensee must notify the Administering Agency prior to making any operational change that will cause, or is likely to cause, an increase in the potential for environmental harm.
4. The licensee must cause clear and legible signage, in English, to be displayed in a prominent location at each public entrance to the premises that includes the following details:
 - 4.1. waste discharge licence number issued under the *Water Act*; and
 - 4.2. 24 hour emergency contact details.
5. The licensee must cause a copy of this licence to be available for inspection by any person, in hard copy form, at the premises.
6. The licensee must provide to the Administering Agency, within 10 business days of a request, a copy of any document, monitoring data or other information in relation to the activity, in the format requested by the Administering Agency.
7. All notices, reports, documents or other correspondence required to be provided as a condition of this licence, unless otherwise specified as a condition of this licence, must be provided in electronic form by emailing waste@nt.gov.au.
8. The licensee must maintain, implement and follow the documents listed in Table 1.

Table 1 Licence Documents

Document Title	Document Reference Number
Biological Monitoring Program: Chapter 4 – WDL178-05 Annual Report	DENR Ref: EN2010/0195-06-077~0025
Sediment Monitoring Program: Chapter 5 – WDL178-05 Annual Report	DENR Ref: EN2010/0195-06-077~0025
Ecotoxicology Plan: Chapter 6 – WDL178-05 Annual Report	DENR Ref: EN2010/0195-06-077~0025
Discharge Plan – Revision 6	DENR Ref: EN2010/0195-06-077~0026
Water Monitoring SOP	DENR Ref: EN2010/0195-06-077~0028

9. Within 10 business days of any amendment being made to a document listed in Table 1 the licensee must provide the amended document to the Administering Agency, along with:
 - 9.1. a tabulated summary of the amendment(s) with document references;
 - 9.2. reasons for the amendment(s); and
 - 9.3. an assessment of environmental risk associated with the amendment(s).
10. The Administering Agency may require the licensee to revise or amend and resubmit any document. Where the Administering Agency requires a document to be resubmitted, the licensee must submit it to the Administering Agency by the date specified by the Administering Agency.
11. The licensee must, for the duration of this licence, implement, maintain and follow a Consultation and Communication Plan which includes a strategy for communicating with persons who are likely to have a real interest in, or be affected by, the activity.
12. The licensee must operate and maintain a community feedback number.
13. The licensee must display the community feedback number:

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- 13.1. where the licensee has a website, in a prominent location on the licensee's website;
 - 13.2. in the Consultation and Communication Plan; and
 - 13.3. in other publicly available documents relating to the activity.
14. The licensee must maintain a Complaint Log for all complaints received by the licensee in relation to the activity.
15. The licensee must ensure that the Complaint Log includes, for each complaint received by the licensee, the following information:
- 15.1. the person to whom the complaint was made;
 - 15.2. the person responsible for managing the complaint;
 - 15.3. the date and time the complaint was reported;
 - 15.4. the date and time of the event(s) that led to the complaint;
 - 15.5. the contact details of the complainant if known, or where no details are provided a note to that effect;
 - 15.6. the nature of the complaint;
 - 15.7. the nature of event(s) giving rise to the complaint;
 - 15.8. prevailing weather conditions at the time (where relevant to the complaint);
 - 15.9. the action taken in relation to the complaint, including any follow-up contact with the complainant; and
 - 15.10. if no action was taken, why no action was taken.
16. The licensee must implement, maintain and follow an Emergency Response Plan that addresses procedures for responding to emergencies associated with the activity that may cause environmental harm.

EARLY SURRENDER OF LICENCE

17. Any reports, records or other information required or able to be provided by the licensee under this licence must be submitted to the Administering Agency prior to the licensee surrendering the licence. If the date on which a report, record or other information is required falls after the date the licensee requests to surrender this licence, the licensee must provide the report, record or information as far as possible using data available to the licensee up to and including the date the request to surrender the licence is made.

OPERATIONAL

18. The licensee must, without limiting any other condition of this licence, in conducting the activity do all things reasonable and practicable to ensure the activity does not adversely affect the Declared Beneficial Uses and Objectives as declared from time to time, including those applying to:
- *Declaration Beneficial Uses and Objectives Daly Roper Beetaloo Water Control District*
19. The licensee must ensure any plant and equipment used by the licensee in conducting the activity:
- 19.1. is reasonably fit for the purpose and use to which it is put;
 - 19.2. is maintained; and
 - 19.3. is operated by a person trained to use the plant and equipment.
20. No change, replacement or alteration of plant and equipment is permitted if the change, replacement or alteration increases the risk of environmental harm for the licenced activity, unless approved by the Administering Agency.

DISCHARGES

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21. This licence authorises the controlled discharge of treated water from the authorised discharge point as identified in Table 2.
22. The licensee must ensure that the controlled discharge of treated water from the authorised discharge point consist only of water from the source identified in Table 2.

Table 2 Authorised Discharge Point

Authorised Discharge Point	Source	Location
RP3	Treated water is pumped from Batman Pit to the authorised discharge point which is fitted with a diffuser to aid dispersion.	Latitude: -14.139117° Longitude: 132.111550°

Note: See Figure 1 for map showing locations.

23. The licensee must ensure that all discharge events at the authorised discharge point take place when there is sufficient flow in Edith River to meet the trigger values specified in Appendix 1.
24. The licensee must, for the authorised discharge point, install, operate and maintain a device to measure and record, for each discharge event:
 - 24.1. the time the discharge commenced and the duration of the discharge;
 - 24.2. the discharge rate of flow; and
 - 24.3. the discharge volume.
25. The licensee must, within 24 hours of commencing discharge from the authorised discharge point identified in Table 2, notify the Administering Agency by emailing waste@nt.gov.au.
26. The licensee must, within 24 hours of ceasing discharge from the authorised discharge point identified in Table 2, notify the Administering Agency by emailing waste@nt.gov.au.
27. The licensee must ensure that the discharge from all discharge events at each authorised discharge point does not:
 - 27.1. contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter;
 - 27.2. cause or generate odours which would adversely affect the use of surrounding waters;
 - 27.3. cause algal blooms in the receiving water;
 - 27.4. cause visible change in the behaviour of fish or other aquatic organisms in the receiving water;
 - 27.5. cause mortality of fish or other aquatic organisms; or
 - 27.6. cause adverse impacts on plants.
28. The licensee must, within 24 hours after first becoming aware of a non-compliance as described in condition 49:
 - 28.1. cease discharge of water from the authorised discharge point;
 - 28.2. notify and provide an investigation report to the Administering Agency in accordance with conditions of this licence;
 - 28.3. implement corrective actions to achieve the water quality objectives specified in condition 27, prior to recommencing discharge.

MONITORING

29. The licensee must conduct surface water monitoring in accordance with Appendix 1.
30. The licensee must assess the concentration of pollutants at the compliance point, SW4, against site specific trigger values specified in Appendix 1.

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31. The licensee must maintain continuous water quality monitoring equipment to ensure it is capable of undertaking continuous water quality monitoring at RP3 and SW4 for the duration of any month when a discharge occurs.
32. The licensee must ensure that the continuous water quality monitoring equipment:
 - 32.1. measures water flow rate, pH, electrical conductivity and temperature at intervals sufficient to detect a change relevant to the parameter being measured and the duration of discharge;
 - 32.2. measures, records and transmits measured data in real time to the Vista Gold data management system; and
 - 32.3. achieves greater than or equal to 90% valid data capture for all measurements.
33. The licensee must implement, maintain and follow the Biological Monitoring Program as specified in Table 1 for the life of this licence.
34. The licensee must implement, maintain and follow the Sediment Monitoring Program as specified in Table 1 for the life of this licence.
35. The licensee must implement, maintain and follow the Ecotoxicology Plan as specified in Table 1 for the life of this licence.
36. The licensee must revert back to the previously approved Ecotoxicological Plan if the results of the current Ecotoxicological Plan confirm the presence of toxicity at SW4.
37. The licensee must ensure that all samples and field environmental data are representative of the conditions at the time of sampling.
38. The licensee must ensure that all samples and field environmental data are collected in accordance with current recognised Australian Standards and guidelines (such as AS/NZS 5667, ANZECC/ARMCANZ)
39. The licensee must for all land based monitoring points specified in the licence:
 - 39.1. install and maintain appropriate identification signage so that they are reasonably identifiable at all times; and
 - 39.2. maintain safe access and egress, as is reasonable practicable.
40. The licensee must ensure that all monitoring samples are analysed at a laboratory with current NATA accreditation or equivalent, for the parameters to be measured.
41. The licensee must for all land based monitoring points specified in the Monitoring Plan:
 - 41.1. install and maintain appropriate identification signage so that they are reasonably identifiable at all times; and
 - 41.2. maintain safe access and egress, as is reasonably practicable.
42. The licensee must ensure any samples collected in accordance with this licence, are obtained by, or under the supervision of a qualified sampler.
43. The licensee must ensure that, for each sample collected in accordance with the Monitoring Plan or the activity the following information must be recorded and retained:
 - 43.1. the date on which the sample was collected;
 - 43.2. the time at which the sample was collected;
 - 43.3. the location at which the sample was collected;
 - 43.4. the name of the person who collected the sample;
 - 43.5. the chain of custody forms relating to the sample;
 - 43.6. the field measurements (if any) and analytical results (if any) relating to the sample; and
 - 43.7. laboratory quality assurance and quality control documentation.

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RECORDING AND REPORTING

44. The licensee must keep records of all non-compliances with this licence. These records must be adequate to enable the licensee to comply with the non-compliance notification conditions of this licence.
45. The licensee must notify the Administering Agency of any non-compliance with this licence by emailing waste@nt.gov.au, within 24 hours after first becoming aware of the non-compliance.
46. The licensee must include in the notification of non-compliance the following information:
 - 46.1. when the non-compliance was detected and by whom;
 - 46.2. the date and time of the non-compliance;
 - 46.3. the actual and potential causes and contributing factors to the non-compliance;
47. The licensee must, within 10 business days of the notifying the Administering Agency of the non-compliance provide an incident investigation report to the Administering Agency.
48. The licensee must ensure that the incident investigation report includes the following information:
 - 48.1. when the non-compliance was detected and by whom;
 - 48.2. the date and time of the non-compliance;
 - 48.3. the actual and potential causes and contributing factors to the non-compliance;
 - 48.4. the risk of environmental harm arising from the non-compliance;
 - 48.5. the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;
 - 48.6. corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur; and
 - 48.7. if no action was taken, why no action was taken.
49. A non-compliance with this licence includes:
 - 49.1. an exceedance of a SSTV at SW4, as specified in Appendix 1, on two consecutive sampling occasions;
 - 49.2. an exceedance of a SSTV at SW4, as specified in Appendix 1, of two times or more a trigger value on a single occasion; and
 - 49.3. subsequent consecutive exceedances of the SSTV from an exceedance described in condition 49.1 and 49.2.
50. The licensee must keep records of all exceedances of SSTVs specified in Appendix 1 of this licence.
51. The licensee must ensure that the records of the SSTV exceedance includes the following information:
 - 51.1. when the exceedance was detected and by whom;
 - 51.2. the date and time of the exceedance;
 - 51.3. the actual and potential causes and contributing factors to the exceedance;
 - 51.4. the risk of environmental harm arising from the exceedance;
 - 51.5. the action(s) that have or will be undertaken to address the exceedance and/or environmental harm; and
 - 51.6. if no action was taken, why no action was taken.
52. The licensee must submit to the Administering Agency a Monthly Discharge Report for any month when a discharge occurs via the authorised discharge point by emailing waste@nt.gov.au. The Monthly Discharge Report is due by the last business day of the following month and must include:

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- 52.1. tabulated water quality data for RP3 and SW4 for each day of the month where a discharge occurred. Data must be provided electronically in Microsoft Excel format;
 - 52.2. tabulated daily environmental field data, relating to the particular month, for SW4 and RP3 as required in Appendix 1. Data must be provided electronically in Microsoft Excel format;
 - 52.3. tabulated water quality data for all monitoring locations associated with this licence and specified in Appendix 1. Data must be provided electronically in Microsoft Excel format;
 - 52.4. surface water quality management actions taken in the event of trigger value exceedance measured at SW4;
 - 52.5. assessment of surface water monitoring results for SW4 against the SSTVs specified in Appendix 1;
 - 52.6. where SSTVs were exceeded an assessment of the environmental impact, resulting from the discharge activity and exceedances, on the receiving environment at SW4; and
 - 52.7. details of current water inventory on site.
53. The licensee must submit a completed Annual Return, by emailing waste@nt.gov.au, by 30 August, unless otherwise agreed, for each year of this licence, which report relates to the preceding 12 month period.
 54. The licensee must complete and provide to the Administering Agency a Monitoring Report, as prescribed by this licence by 30 August for each year of this licence, unless otherwise agreed, which report relates to the preceding 12 month period.
 55. The licensee must ensure that each Monitoring Report:
 - 55.1. is prepared in accordance with the requirements of the Administering Agency 'Guideline for Reporting on Environmental Monitoring';
 - 55.2. includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;
 - 55.3. includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format; and
 - 55.4. includes an assessment and determination of environmental impact determined by the Receiving Environment Monitoring Program specified in Table 1.

PERFORMANCE IMPROVEMENT

56. The licensee must provide to the Administering Agency, prior to commencing authorised discharge for the 2018/19 wet season, the final version of the Water Management Plan.
57. The licensee must implement, maintain and follow the approved final version of the Water Management Plan following the Administering Agency review for the life of this licence.
58. The licensee must provide to the Administering Agency an updated Receiving Environment Monitoring Plan, prior to commencing authorised discharge for the 2018/19 wet season, to include the following:
 - 58.1. in addition to edge habitat sampling, riffle habitat sampling must also be done;
 - 58.2. the Receiving Environment Monitoring Plan should be designed to detect impact through multivariate, ANOVA and other analyses. Hypotheses and the statistical test (and support design) should to be explicit in the document; and
 - 58.3. recommendations from the 2017/18 monitoring program.
59. The licensee must implement, maintain and follow the approved final version of the Receiving Environment Monitoring Plan following the Administering Agency review for the life of this licence.

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END OF LICENCE CONDITIONS

This licence is not valid unless signed below:



JOANNE TOWNSEND

Controller of Water Resources

Dated the 25 September 2019

END NOTES

This licence supersedes WDL178-06 which was issued 26 November 2018

WDL178-05 was issued on 16 January 2017

WDL178-4 was issued on 23 December 2014

WDL178-3 was issued on 26 November 2013

WDL178-2 was issued on 5 February 2013

WDL178-1 was issued on 9 March 2012

WDL178 was issued on 21 January 2011

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DEFINITIONS

In this licence, unless a contrary intention appears:

Term	Definition
24 hour emergency contact	the phone number of a person who can be contacted at any time and be capable of responding to and providing information about any incident associated with the activity.
Activity	the Licenced activity as described on the covering page of this licence.
Administering Agency	means the Department of Environment and Natural Resources, or if dissolved, another Government Department with responsibility for administering the Water Act.
Annual Return	an Administering Agency prescribed format for demonstrating and reporting compliance with the conditions of this licence.
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000: National Water Quality Management Strategy: <i>Australian Guidelines for Water Quality Monitoring and Reporting</i> .
Business days	a day not Saturday, Sunday or a public holiday, in the Northern Territory.
Community feedback number	a telephone number enabling members of the public to contact, at any time, a person or voice mail system that can accept, on behalf of the licensee, enquiries or complaints about the activity, and to which the licensee must respond.
Complaint Log	a register of complaints to be maintained by the Licensee that records the details of each complaint received in relation to the activity.
Consultation and Communication Plan	a written plan documenting proposed consultation and communications for the activity before, during and after the activity which includes a strategy for communicating with members of the public who are likely to have a real interest in, or be affected by, the activity.
Contact details	includes the 24 hour emergency contact, and name, position title and phone number of a representative of the licensee who can be contacted about the licence and activity.
Contaminant	a solid, liquid or gas or any combination of such substances and includes: <ul style="list-style-type: none">(a) noise, odour, heat and electromagnetic radiation;(b) a prescribed substance or prescribed class of substances; and(c) a substance having a prescribed property or prescribed class of properties.
Discharges	allow a liquid, gas or other substance to flow out from where it has been confined.
Emergency Response Plan	a written plan documenting the licensee's procedures for responding to emergencies caused by, resulting from or associated with the activity and that may cause environmental harm.
Environmental harm	any harm to or adverse effect on, or potential harm to or potential adverse effect on, the environment
incident	includes: <ul style="list-style-type: none">(a) an accident, emergency or malfunction; and(b) a deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred.

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Term	Definition
Land	includes water and air on, above or under land.
Maintain	kept in a manner that it does not present or cause a risk of environmental harm or a hazard to persons or property or, for the purposes of documents including plans, a process of reviewing and amending documentation to ensure it is relevant.
Material environmental harm	environmental harm that: <ul style="list-style-type: none">(a) is not trivial or negligible in nature;(b) results, or is likely to result, in not more than \$50,000 or prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the harm or rehabilitate the environment; or(c) results in actual or potential loss or damage to the value of not more than \$50,000.
NATA	National Association of Testing Authorities, Australia.
Non-compliance	failure or refusal to comply, whether by act or omission, with obligations or requirements and includes any exceedance of a licence limit.
Non-compliance notification	an Administering Agency prescribed format for notifying the Administering Agency of a non-compliance.
Plant and equipment	all material items used in association with the activity, including (but not limited to) storage vessels and containers, pipe work and hosing, vehicles (including vessels), tools, and measuring equipment.
Point source discharge	means any discernible, confined or discrete conveyance from which contaminants or waste are or may be discharged.
Pollute	in relation to water, means directly or indirectly to alter the physical, thermal, chemical, biological or radioactive properties of the water so as to render it less fit for a prescribed beneficial use for which it is or may reasonably be used, or to cause a condition which is hazardous or potentially hazardous to: <ul style="list-style-type: none">(a) public health, safety or welfare;(b) animals, birds, fish or aquatic life or other organisms; or(c) plants.
Pollution	<ul style="list-style-type: none">(a) a contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes; or(b) a contaminant or waste, effect or phenomenon, that is present in the environment as a consequence of an emission, discharge, deposition, escape or disturbance or a contaminant or waste.
Premises	the premises identified in this licence which includes equipment, plant and structures, whether stationary or portable, and the land on which premises are situated.
Public entrance	access to the premises that is utilised by the public.
Qualified person	a person registered under Section 68 of the WMPC Act.
Qualified sampler	a person who has training and experience in obtaining samples from the relevant environmental medium.
Serious environmental harm	environmental harm that is more serious than material environmental harm and includes environmental harm that: <ul style="list-style-type: none">(a) results or is likely to result in more than \$50,000 or prescribed amount (whichever is greater) being spent in taking appropriate

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Term	Definition
Trigger values	action to prevent or minimise the harm or rehabilitate the environment; (b) results in actual or potential loss or damage to the value of more than \$50,000; (c) damages an aspect of the environment that is of a high conservation value or of special significance; and (d) is irreversible or otherwise of a high impact or on a wide scale.
Waste	assigned value for each indicator used to assess the risk to an environmental value, a value that initiates some type of pre-defined management action.
Wastewater	Includes matter or a thing, whether wholly or partly in a solid, liquid or gaseous state, which, if added to water, may pollute the water.
Water	water that contains a contaminant or waste.
WMPC Act	means water, whether or not it contains impurities.
WMPC Act	the Northern Territory <i>Waste Management and Pollution Control Act</i> .

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APPENDIX 1: SURFACE WATER MONITORING PROGRAM

Parameter	Abbrev.	Units	Sample Type	SW2	SW13	SW3	SW10 ¹	RP3 (Batman Pit)	SW4 Online	SW4 Compliance	SSTV ³
Environmental Field Data											
Daily Site Rainfall	Rain	mm	Field measure	N/A	N/A	N/A	N/A	D	N/A	N/A	N/A
Daily Site Evaporation	Evap	mm	Field measure	N/A	N/A	N/A	N/A	D	N/A	N/A	N/A
Daily Maximum Air Temperature	T _{max}	°C	Field measure	N/A	N/A	N/A	N/A	D	N/A	N/A	N/A
Daily Minimum Air Temperature	T _{min}	°C	Field measure	N/A	N/A	N/A	N/A	D	N/A	N/A	N/A
Pumping Rate	Discharge	L/s	Field measure	N/A	N/A	N/A	N/A	D	N/A	N/A	N/A
Site Code											
Description	Non-Impacted Reference Site in Edith River										
Longitude	-14.17195°										
Latitude	132.11990°										
Sample Frequency				SW2	SW13	SW3	SW10 ¹	RP3 (Batman Pit)	SW4 Online	SW4 Compliance	SSTV ³
Sample Frequency				Non-Impacted Reference Site in Edith River	Non-Impacted Reference Site in Stow Creek	Impacted Information Site in Stow Creek	Impacted Downstream Information Site in Edith River	Wastewater Discharge Source Batman Pit	Continuous real-time in situ telemetry station in Edith River	Compliance Point in Edith River	
Sample Frequency				-14.17195°	-14.15605°	-14.16144°	-14.18464°	-14.14109°	-14.16925°	-14.17067°	
Sample Frequency				132.11990°	132.12989°	132.11851°	132.03037°	132.10322°	132.09835°	132.09835°	

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Site Code		SW2	SW13	SW3	SW10 ¹	RP3 (Batman Pit)	SW4 Online	SW4 Compliance
Cumulative Discharge Volume	Cum Discharge	m ³	Calculation	N/A	N/A	C	N/A	N/A
River Flow	Flow	m ³	Calculation	N/A	N/A	N/A	C	N/A
Water Level	Gauge height	m	Field measure	N/A	N/A	D	C	N/A
Dissolved Oxygen ⁴	DO	% saturation	Field measure	M	M	D	N/A	D
Water Temperature	T _{water}	°C	Field measure	M	M	D	C	D
Electrical conductivity ⁴	EC	µS/cm	Field & lab measure	M	M	D	N/A	D
Electrical conductivity ⁵	EC	µS/cm	Field measure	N/A	N/A	D	C	N/A
pH ⁴	pH	pH units	Field measure	M	M	D	N/A	D
pH ⁵	pH	pH units	Field measure	N/A	N/A	D	C	N/A
Metals and Metalloids								
Aluminium	Al	µg/L	Filtered	WF	M	M	WF	WF
Aluminium	Al	µg/L	Total	WF	M	M	WF	WF
Cadmium	Cd	µg/L	Filtered	WF	M	M	WF	WF
Cadmium	Cd	µg/L	Total	WF	M	M	WF	WF
Cobalt	Co	µg/L	Filtered	WF	M	M	WF	WF
								150
								N.D
								0.8
								N.D
								13 ¹⁰

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		Site Code							
		SW2	SW13	SW3	SW10 ¹	RP3 (Batman Pit)	SW4 Online	SW4 Compliance	
Copper	Cu	µg/L	Filtered	WF	M	M	N/A	WF	2.5
Copper	Cu	µg/L	Total	WF	M	M	N/A	WF	N.D
Chromium ⁶	Cr	µg/L	Filtered	WF	M	M	N/A	WF	N.D
Iron	Fe	µg/L	Filtered	WF	M	M	N/A	WF	350
Iron	Fe	µg/L	Total	WF	M	M	N/A	WF	N.D
Lead	Pb	µg/L	Filtered	WF	M	M	N/A	WF	9.4
Manganese	Mn	µg/L	Filtered	WF	M	M	N/A	WF	3,600
Nickel	Ni	µg/L	Filtered	WF	M	M	N/A	WF	17
Zinc	Zn	µg/L	Filtered	WF	M	M	N/A	WF	31
Nutrients									
Total Nitrogen ²	TN	µg/L	Total	WF	M	M	N/A	WF	N.D
Total phosphorus	TP	µg/L	Total	WF	M	M	N/A	WF	N.D
Organic carbon (total)	TOC	mg/L	Total	N/A	N/A	N/A	N/A	M	N.D
Major Ions									
Bicarbonate	HCO ₃	mg/L	Filtered	WF	M	M	N/A	WF	319
Calcium	Ca	mg/L	Filtered	WF	M	M	N/A	WF	N.D
Carbonate	CO ₃	mg/L	Filtered	WF	M	M	N/A	WF	N.D
Chloride	Cl	mg/L	Filtered	WF	M	M	N/A	WF	64
Sodium	Na	mg/L	Filtered	WF	M	M	N/A	WF	N.D
Magnesium	Mg	mg/L	Filtered	WF	M	M	N/A	WF	21 ⁹

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¹ The licensee is no longer required to monitor SW10. The licensee must resume monitoring of SW10, in accordance with this monitoring program, if at any time during the life of this licence, the licensee or the Administering Agency determine that the water quality at SW4 is deteriorating.

² The licensee must resume monitoring of NO₂, NO₃ and NH₃ at the same locations and frequency as total nitrogen if the concentration of total nitrogen increases for three monitoring rounds in succession or the licensee or administering agency identifies an increasing trend in total nitrogen.

³ SSTVs are derived from 80th percentile of reference site dataset at SW2, being the Edith River ambient water quality and default ANZECC values for 80% species protection. SSTVs only apply to SW4 as the Compliance Point. SSTVs do not apply to SW4 online data.

⁴ Field measurements must be taken using a properly maintained and calibrated hand-held field instrument and the reading compared to the SSTV. The laboratory measurement value is for information.

⁵ The online value measured is for operational control to provide warning that water quality has changed and to trigger operational corrective action, if required.

⁶ If total Chromium of the filtered sample returns a result greater than the practical quantification limit, the sample is to be reanalysed for speciated Chromium.

⁷ Calculated using residue remaining on filter with nominal pore size of 0.45 µm.

⁸ WAD Cyanide is required if Total Cyanide analysis (by APHA 4500-CN-C) is greater than 4 µg/L. WAD cyanide must then be conducted on the same day as the analysis for Total Cyanide.

⁹ The trigger value for Magnesium was derived by ERISS for protection of Magela Creek for 80% species protection.

¹⁰ The trigger value for Cobalt is a Canadian guideline adopted by ANZECC.

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FIGURE 1 – LOCATION OF WDL POINTS OF INTEREST

