Six Mile Creek Dam Safety Upgrade Project

Lighting Management Plan

Document No: LMDIP-05829-GNL-ENV-MPL-0004

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Definitions & Abbreviations

Term	Definition / Abbreviation
Appropriately qualified person / AQP	A person having the qualifications, experience or standing appropriate to undertake the work required.
CM	Construction Manager
CSM	Community & Stakeholder Manager
CGER	Coordinator-General Evaluation Report (2019)
CGCR	Coordinator-General's change report – Construction (2025)
DETSI	Department of Environment, Tourism, Science and Innovation
EMP	Environmental Management Plan
Eng	Engineer
EP Act	*Environmental Protection Act 1994* (Qld)
EPBC Act	*Environment Protection & Biodiversity Conservation Act 1999* (Cth)
ESM	Environment and Sustainability Manager
HSM	Healthy and Safety Manager
LED	Light emitting diode
MNES	Matters of national environmental significance
NC Act	*Nature Conservation Act 1992* (Qld)
OCG	Office of Coordinator General
PM	Project Manager
SEP	Site Environmental Plan
Sup	Supervisor

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1. Scope

The Lighting Management Plan (this Management Plan) is applicable to all construction phase works associated with the Lake Macdonald Dam Improvement Project (the Project). This Management Plan is to be read in conjunction with the:

- Site Environmental Management Plan (ref: LMDIP-05829-GNL-ENV-MPL-00001)
- Species Management Program/s (Ref: LMDIP-05327 -GNL-ENV-REP-00002 and LMDIP-05327-GNL-ENV-REP-00003)
- SMEC Impact Assessment Report incl. the Draft Environmental Management Plan (Ref: Appendix B of the SMEC Impact Assessment Report)

This Management Plan has been prepared to address the relevant imposed conditions outlined in the Coordinator-General's change report 2025 (CGCR) – Construction and recommendations (the addressable items).

1.1. Objectives

The objectives of this Lighting Management Plan are to:

- Minimise the impacts of construction light escape on local communities (nearby sensitive receivers) and nocturnal ecological processes
- Minimise impacts to neighbourhood amenity

1.2. Stakeholder Consultation

In preparing this Management Plan the following stakeholders were consulted and feedback considered in the development of management measures:

- The Office of Coordinator General (OCG) through the review of the draft Management Plans provided in May 2024

2. Specific Performance Measures

The specific performance measures relevant to the implementation of this Management Plan have been detailed in Table 1.

Table 1 Performance measures

Specific Performance Measure	Measurable Target(s)
Minimise any nuisance caused by construction lighting	No verified complaints or community concerns regarding light escape
	No observable light spillage beyond the construction footprint.
	All lights are directed downwards and internally
Minimise impacts on native fauna from construction lighting	No observable light spillage towards any light sensitive fauna habitat
	No observable impact on the nocturnal processes of light sensitive listed fauna species
	All lights are directed downwards and internally

3. Roles and Responsibilities

Roles and responsibilities applicable to the implementation of this Management Plan have been detailed in Table 2. These roles and responsibilities are in addition to those described in Table 9 of the SEMP.

Table 2 Roles and responsibilities

Role	Responsibility
Seqwater	• Manage the construction process as the Project proponent. • Allocate sufficient resources to prepare, review and update this Management Plan. • Ensure that the requirements of any statutory approvals, legislation and this Management Plan are included in the contract documentation and implemented. • Undertake audits of the contractor to verify compliance with any legislative requirements and this Management Plan.
Contractor Project Manager (PM)	• Maintain a master copy of this Management Plan, a record of the completion of management measures, monitoring records and reports. • Provide sufficient resources to ensure the effective implementation of this Management Plan. • Participate in any audits initiated by Seqwater. • Coordinate required monitoring. • Provide relevant and timely information about construction activities that may impact on the amenity of stakeholders.
Contractor Construction Manager (CM)	• Ensure all lighting is procured, installed and maintained in accordance with this Management Plan. • Report any incidents, non-compliances and complaints Contractor Project Manager. • Participate in any investigations of complaints or non-conformances. • Ensure all staff are trained/inducted to the Project.

Role	Responsibility
Contractor Environment and Sustainability Manager (ESM)	• Primary responsibility for implementation and compliance with this Management Plan, statutory approvals and legislation. • Undertake regular inspections of work activities to ensure adherence to this Management Plan. • Participate in toolbox talks as required to ensure staff are aware of key concerns associated with artificial lighting. • Report any incidents, non-compliances and complaints to Seqwater. • Lead any investigations of complaints or non-conformances and report any findings and corrective actions to Seqwater.
Healthy and Safety Manager (HSM)	• Liaise with the ESM to ensure lighting is sufficient for the workplace and meets minimum safety standards.
Community & Stakeholder Manager (CSM)	• Ensure community members are appropriately notified of project work requiring artificial lighting. • Manage the Project enquiries and responses. • Register and report community complaints and ensure adherence to the complaint's procedure.
Supervisors (Sup)	• Ensure that this Management Plan requirements are communicated to all personnel and are being fully implemented on site. • Undertake any rectifications as required by the Contractor Environment and Sustainability Manager.
All Project personnel (including Subcontractors)	• Comply with reasonable directions given by the Principal Contractor regarding environmental matters. • Comply with the requirements of this Management Plan as relevant to the subcontracted works. • Environmental incidents, non-conformances and near misses are to be reported to the Supervisor.

4. Receiving Environment

4.1. Sensitive Receptors

The Project area is bordered to the north by Tewantin National Park and otherwise surrounded by a semi-rural residential area (Lake Macdonald suburb), see Figure 1. The residential receptors along Lake Macdonald Drive near to the entrance to the site are identified as potentially the most light sensitive to any project night works in the immediate area. A detailed schedule of proposed 24-hour work periods based on the current construction schedule is presented in Table 3. 24-hour work periods will be undertaken in accordance with the Project approved construction hours outlined in Table 2 of the CEMP (LMDIP-05829-GNL-ENV-MPL-00001).

Table 3 Proposed 24-hour work periods

Activity	Period (CEMP program)	24-hour Works Duration	Potential Light Sources
Reservoir lowering	Lake drawdown (Mar-April 2025)	32 days	Minimal lighting – limited to illumination of pump and access areas
30m Notch & Sheetpiling	Cofferdam construction (Apr-Dec 2025)	12 days	Illumination of construction area and working platform Vehicles and machinery
Excavation	Decommissioning of spillway (Oct 2025–Mar 2026)	2 days	
Excavation & demolition		17 days	

Figure 1 Sensitive light receptors along Lake Macdonald Drive

4.2. Sensitive Fauna Receptors

The listed (i.e. species at risk of extinction) fauna species outlined in Table 4 have been identified as having the most potential to be affected by the Project's artificial light spill impacts.

Table 4 Listed fauna species with light sensitivity

Light sensitive species	Commonwealth Listing (EPBC Act)	State Listing (NC Act)	Notes
Platypus (*Ornithorhynchus anatinus)*		Special Least Concern	There are confirmed platypus records from Six Mile Creek downstream, within and upstream of the dam wall, including mid-area of Lake Macdonald and within impounded sections of both the Six Mile Creek and Cooroy Creek arms of Lake Macdonald. Platypus feeds predominantly on benthic invertebrates, with foraging typically occurring at night or dusk, with some individuals foraging during the day in winter.
Giant Barred Frog (*Mixophyes iteratus*)	Vulnerable	Vulnerable	Species was identified in two sites around the dam wall and is likely to be continuously distributed at low density in this habitat area. Changes in light patterns may impact on the ability of the species to forage and locations for breeding.
Mary River Turtle *(Elusor macrurus)*	Critically endangered	Critically endangered	Species is known to occur in the region, however no individuals were identified within and around Lake Macdonald in field surveys. As noted in the CGER 2019, Lake Macdonald provides limited suitable foraging habitat for the species; however, it is not considered suitable for breeding. Predation of eggs from nesting banks is the most critical threat to the survival of this species, causing a deficiency of immature turtles and very low recruitment rates in the species. Lighting impacts will be in a restricted area and will have almost no impact on the Mary River Turtle

5. Legislative and Other Compliance Requirements

5.1. CGCR Addressable Items

Details of the applicable CGCR addressable items and how these have been addressed in the Management Plan have been detailed below.

Table 5 CGCR addressable items relevant to this Management Plan

CGCR Reference	Type	Addressable Items	How addressed in this Management Plan
Coordinator-General (CG) Conditions			
Appendix A. Imposed Conditions, Schedule 1, Condition 1 (c) Site Environmental Management Plan (SEMP)	Imposed Condition	The SEMP must include the following construction EMPs: (C) Lighting Management Plan	This Lighting Management Plan is a construction environmental plan and sub-plan of the Site Environmental Management Plan

5.2. Legislation

Details of relevant legislation applicable to this Management Plan have been detailed below.

Table 6 Other legislation applicable to this Management Plan

Legislation	How it Applies to this Management Plan
Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act)	The Project was deemed a controlled action for impacts on matters of national environmental significance (MNES). Therefore, the Project has an EPBC Approval (ref EPBC 2017/8078) for impacts to Listed Threatened Species and Communities. There are two Commonwealth listed fauna species that might be impacted by light generation being the Giant Barred Frog and the Mary River Turtle. Under the EPBC Approval Seqwater must avoid, where possible, impact on threatened species listed under the EPBC Act. The Giant Barred Frog and Mary River Turtle are both listed fauna species that may be impacted by artificial light from the Project.
Environment Protection Act 1994 (EP Act)	Under the EP Act the Project must not cause an unreasonable nuisance to sensitive receptors. Artificial light if not managed, may impact on the amenity of surrounding sensitive receptors and consequently be a nuisance. Seqwater has an obligation to uphold their general environmental duty, duty to notify, and duty to restore the environment under the EP Act to prevent environmental harm, nuisance and contamination occurring from project activities.
Nature Conservation Act 1992 (NC Act)	The object of the NC Act is the conservation of nature while allowing for the involvement of Aboriginal peoples and Torres Strait Islander peoples. The NC Act lists threatened flora and fauna species, which are species that have been accessed being at risk of extinction. Three threatened fauna species listed under the NC Act have been identified on the Project and may also be impacted by artificial light used during construction.

Legislation	How it Applies to this Management Plan
Noosa Plan 2020	Under the *Noosa Plan 2020* the land around the Project is zoned as *Rural, Rural Residential* and *Environmental Management and Conservation.* Overall outcomes within these zones that apply to light management include: • *Environmental Management and Conservation Zone:* Development avoids and mitigates against adverse impacts on the values a nd processes within ecologically important areas • *Rural Zone*: Development is reflective of, and sensitively responds to, the environmental constraints of the land • *Rural Residential Zone*: The Rural residential zone provides a high level of amenity for permanent residents Light management measures proposed in this plan have been developed to protect the outcomes of the relevant zones.

6. Potential Impacts

The construction activities, aspects and potential impacts relevant to this Management Plan have been detailed in Table 7.

Table 7 Potential impacts - lighting

Construction Activity	Potential Impact No.	Potential Impact – Artificial Lighting
Artificial lighting during night works	PI1	Loss of amenity and nuisance caused at nearby sensitive receptors.
	PI2	Loss of foraging, breeding and nesting habitat.

7. Management Measures

The management measures that will be implemented to minimise the potential for impacts associated with light have been detailed in Table 8.

Table 8 Management measures

No.	Hold Point	Actions	Related Potential Impact	Staff Responsible	When
MM1	Y	Prepare a map of light sensitive areas including: • Sensitive receptor – primarily residential housing • Listed fauna species habitat – including suitable foraging, breeding and nesting habitat Identify areas where artificial lighting will be required and determine the direction of the lighting required to avoid light sensitive areas.	PI1-PI2	ESM	Workplace Planning
MM2	Y	• During the design and layout of the construction compound, including the location of temporary lighting and security lights, the design, type and orientation of lighting devices (particularly those required outside of normal working hours) shall be taken into account and actioned to minimise the potential for fugitive emissions of light to the light sensitive areas.	PI1-PI2	PM / ESM	Workplace Planning
MM3		All lights should be directed away from light sensitive areas in accordance with MM1.	PI1 -PI2	CSM/ESM	Project Delivery
MM4		Night works required adjacent (i.e. within 50 m) of listed fauna species potential habitat will be undertaken during times where breeding and nesting are not occurring	PI2	ESM/HSM	Project Delivery
MM5		Residents will be consulted with and notified of the suspected duration of impact on amenity	PI1	CSM/HSM	Project Delivery
MM6		As far as possible, position temporary structures and buildings (demountable) between light sources and a light sensitive receptor, to create a visual attenuation of potential light spillage	PI1- PI2	ESM/HSM	Project Delivery
MM7		Lights with reduced or filtered-out blue, violet and ultraviolet wavelengths must be used	PI1 – PI2	ESM/HSM	Project Delivery

No.	Hold Point	Actions	Related Potential Impact	Staff Responsible	When
MM8		Implement adaptive management measures to ensure only intended areas for planned works have lighting, to avoid light spill onto areas that are not required for the nights work.	PI1	ESM/HSM	Project Delivery
MM9	Y	Where works may result in lighting spillage and nuisance effects (including night works and works in non-standard hours), works cannot commence until: • Appropriate community consultation has been undertaken prior to works • Impacted residents are notified of the planned duration and extent of the lighting impact (with a minimum of 24 hours notice)	PI1	ESM/CSM	Project Delivery
MM10	Y	Where works may result in impacts to listed fauna species habitat (i.e. works are <50 m from the habitat), works cannot commence until an appropriately qualified person (AQP) (i.e. ecologist) undertakes a pre-commencement assessment of the nocturnal habits of the listed fauna species and also provides advise on any additional management measures required to protect the potential impacted species.	PI2	ESM	Project Delivery
MM11		Use only the minimum amount of lighting needed to ensure safety during night works	PI1-PI2	Sup/HSM	Project Delivery
MM12		Use motion sensor lights where practicable to only illuminate areas in use, such as around crib sheds and offices	PI1-PI2	Sup	Project Delivery
MM13		Light will be shielded and directed toward the ground, minimising light spill away from the construction footprint	PI1-PI2	Sup	Project Delivery
MM14		Avoid the use of naked bulbs and use narrow spectrum bulbs.	PI1-PI2	Sup	Project Delivery
MM15		Only utilise lighting that does not attract as many insects (e.g. yellow and “warm” light LEDs)	PI1-PI2	Sup	Project Delivery
MM16		Implement adaptive lighting controls for site-based lighting to manage light timing, intensity and colour	PI1-PI2	Sup	Project Delivery

8. Hold Points

The hold points that will be adopted for light management have been detailed in Table 9.

Table 9 Project hold points

Hold Point Number	Related Management Measure	What	When does it occur	Staff Responsible	Construction activities restricted until Hold Point completed
1	MM1	Prepare a map of light sensitive areas	During Project Planning	ESM	Night works or activation of any evening lighting
2	MM2	Prepare a SEP that details lighting controls, design and layout.	During Project Planning	PM/ESM	Night works or activation of any evening lighting
3	MM9	Community consultation with sensitive receptors	1 day prior to night works occurring or non-standard construction hours	ESM/CSM	Nightworks, where lighting may impact on a sensitive receptor
4	MM10	Engagement with an AQP regarding potential impacts on listed fauna species habitat	During delivery	ESM	Nightworks, where lighting may impact on the listed fauna species habitat

9. Monitoring

To verify this Management Plan is achieving its performance measures the following monitoring program has been proposed.

Table 10 Monitoring program

No.	What	Who	When / Frequency
1.	General observations for the daily management of lighting controls shall be documented in site diaries.	Sup	Daily during Project Delivery
2.	Inspection of lighting management measures shall be undertaken using the Weekly Environmental Management Inspection Checklist.	ESM	Weekly
3.	Effectiveness of lighting controls shall be regularly	ESM	Regularly during Project Delivery

No.	What	Who	When / Frequency
	reviewed for adequacy having regard for changing circumstances.		
4.	Appropriate monitoring and surveillance will be undertaken upon receipt of any lighting nuisance complaint or community concern.	ESM	On receipt of complaint or community concern
5.	Quarterly (internal) audits of this Management Plan.	ESM	Quarterly
6.	Where lighting will be required within 50 m of listed fauna species habitat conduct visual inspections to ensure lighting is limited to construction area only.	ESM / AQP	Monthly only during times where night works are adjacent to listed fauna species habitat
7.	Monitoring plan required for any increase in pest or predatory species as a result of project lighting	ESM	Only if project lighting is found to potentially increase predator or pest species presence across the site.

10. Corrective Actions

Corrective actions that will be implemented in the event that a performance measure has not been achieved, have been detailed in Table 11.

Table 11 Corrective action plan

Issue / Event	Event Response
Community concern or complaint received relating to light spill impacts	• All details and any subsequent correspondence with the relevant community member will be logged by the CSM • The CSM must reach out to the community member and determine the specifics of the complaint • Review the light directions on the site and determine whether any particular lights are the subject of the concern or complaint • Determine whether any corrective actions (e.g. further shielding, redirecting the light, changing the light type) can be adopted to mitigate impacts in the direction of the community member • Implement corrective actions identified prior to commencement of the next evening works • The CSM will notify the community member and advise of the corrective actions taken within 24 hours of the initial notification of the concern or complaint • The CSM will follow-up with the community member 48 hours after the initial notification to seek feedback on the suitability of the corrective actions • If corrective actions **have not** rectified the issue for the community member, determine whether further actions can be adopted and continue to liaise with the community member until the issue has been resolved • If corrective actions **are** suitable document the actions in an update of this Management Plan
Observable impact on the nocturnal processes of light sensitive listed fauna species	• ESM and an AQP (i.e. ecologist) undertake an incident investigation to determine the potential cause of the impact on the nocturnal process • Records of the incident investigation must be recorded on the Seqwater incident management system • If the cause of the impact is determined to as a result of light spillage from the construction activities, the AQP will provide appropriate corrective actions to rectify the impacts such as: - Change lighting direction - Providing additional screening for the light - Cease night works in the area • Should night works continue within 50 m in the area of impact, the AQP must monitor impacts on a weekly basis and report observations to the ESM • Document corrective actions in an update of this Management Plan
Non-conformance with this Management Plan	• Notify the supervisor responsible for the area of non-conformance • ESM will provide the supervisor instructions to resolve the non-conformance • ESM will check the non-conformance is rectified 24 hours after the instruction was given

11. Reporting

Reporting that will be undertaken in accordance with this Management Plan has been detailed in Table 12.

Table 12 Reporting plan

No.	Reporting Required	By Whom	By When	To Whom
1.	Details of field observations and any light audits shall be reported via the Weekly Environmental Inspection Checklist, and communicated during pre-starts, toolbox and team meetings as appropriate.	ESM	Project Delivery	All personnel
2.	All complaints / incidents regarding lighting nuisance shall be reported immediately.	All personnel / CSM	Within 1 hour of an incident/complaint	ESM / PM / Seqwater
3.	Notification of impacts to listed fauna species that may be caused by lighting.	ESM	Within 24 hours	Administrating Authority
4.	Results of complaint investigations and corrective actions	CSM / ESM	Within 24 hours of the complaint	Complainant / PM
5.	Impacted residents are notified of the planned duration and extent of the lighting impact.	CSM	48 hours prior to night works commencing	Impacted residents
6.	Results of monitoring undertaken by an AQP of impacts on the nocturnal processes of light sensitive listed fauna species	AQP	Weekly during monitoring events	ESM
7.	Monthly report to Seqwater that includes details of lighting related monitoring results, audits, non-conformance, training, and incidents.	ESM	Monthly	Seqwater
8.	Quarterly report to the CG as per the requirements of schedule 2, condition 2. Report will include: • An evaluation of compliance with the SEMP • Monitoring data required by the Imposed Conditions included in Schedule 2 of the CGCR (2025) for the period and an interpretation of the results • Details of any environmental incident during the reporting period, including a description of the incident, resulting effects, corrective actions (including site remediation activities), revised activity practices to prevent a recurrence, responsibility and timing The reports must be provided to the entity nominated as having jurisdiction for the relevant condition and also be made available on the Project website within 20 business days of the end of the three-month period to which the report relates and continue to be available on the project website for the duration of the Project	Seqwater	Quarterly	Coordinator-General

12. Training and Awareness

Site inductions will include the following specific components for light management:

- Light and associated light escape sources during construction, including traffic, construction lights, crib sheds and security lights
- Who and where the light sensitive receivers are
- Potential impacts of light escape on sensitive receivers
- The importance of managing lighting emissions at the source
- Light management measures and monitoring that will be carried out during the Project

13. Review and Continual Improvement

This Management Plan shall be reviewed within the first 3 months of site mobilisation to ensure the plan is fit for purpose and any identified incidents, issues or hazards are addressed in the Management Plan accordingly. Follow up reviews are to be undertaken annually during construction. This Management Plan shall be reviewed, out of the normal cycle, in the event of a legislative breach, incident, community complaint or when a new hazard or impact is discovered.