# Special Area Plan – Trenchless Waterway Crossings within the Stanwell-Gladstone Infrastructure Corridor State Development Area

## Fitzroy to Gladstone Pipeline Project

Gladstone Area Water Board (GAWB)

~~June 2023~~October~~August~~ 2024

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## Document Control

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## Document Issue

| Issue | Date | Prepared By | Reviewed/Approved By |
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| Rev A pre-contractor draft – For internal review | 22/11/2022 | Brandon Hourigan, Dr Craig Streatfeild | Philip Bradley |
| Rev B pre-contractor draft – For client review | 14/12/02022 | Dr Craig Streatfeild | Philip Bradley |
| Rev 0 pre-contractor final | 15/12/2022 | Dr Craig Streatfeild | Philip Bradley |
| Rev 1 – Update following contractor information | 04/04/2023 | Dr Craig Streatfeild | Simon Wakefield (GAWB) |
| Rev 2 – Addition of Marine Plants Monitoring | 09/05/2023 | Dr Craig Streatfeild | Simon Wakefield (GAWB) |
| Rev 3 – Update following MBJV review | 02/06/2023 | Dr Craig Streatfeild | Simon Wakefield (GAWB) |
| Rev 4 – Update following marine plants approval | 01/09/2023 | Dr Craig Streatfeild | Simon Wakefield (GAWB) |
| Rev 5 – Update to ensure consistency with SAP – Yellow chat habitat within SGIC SDA | 29/08/2024 | Dr Craig Streatfeild<br><br>Patrice Brown | Luke Stalley (GAWB) |
| Rev 6 – Response to comments from DCCEEW | 04/10/2024 | Dr Craig Streatfeild | Luke Stalley (GAWB) |

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Gladstone Area Water Board

# Special Area Plan – Trenchless Waterways within the Stanwell-Gladstone Infrastructure Corridor State Development Area (SGIC SDA) – DRAFT

## Special Area Plan Scope

This Special Area Plan (SAP) addresses trenchless construction activities at the following seven creek crossing locations associated with the Fitzroy to Gladstone Pipeline (FGP) project:

- Gavial Creek (Figure 1)
- Bob's Creek (Figure 2)
- Inkerman Creek (Figure 3)
- Twelve Mile Creek (Figure 4)
- Marble Creek (Figure 5)
- Horrigan Creek (Figure 6)
- Raglan Creek (Figure 7)

Under the *Fisheries Act 1992,* Gavial Creek, Bob's Creek and Twelve Mile Creek are classified as major risk (purple) waterways, Marble Creek is a high risk (red) waterway and Inkerman Creek, Horrigan Creek and Raglan Creek are tidal (grey) waterways.

Trenchless construction methods for the above-mentioned creek crossings will be underground micro-tunnels. Micro-tunnelling requires launch and receival/reception pits that are excavated on both sides of the crossing. From the launch pit, an enveloper pipe is pushed from the launch pit to the receival/reception pit. The carrier pipe is laid inside the enveloper pipe. The area between the enveloper and carrier pipes is then grouted.

This revised SAP (Rev ~~65~~) provides mitigation measures for potential impacts to the abovementioned creek crossings and the adjacent construction areas from the construction of the FGP. General mitigation measures for the FGP are outlined in the Construction Environment Management Plan (CEMP). This SAP should be read in conjunction with the CEMP and the SAP – Yellow chat habitat within the SGIC SDA (a subplan to the CEMP).

This SAP has been prepared to address the following Conditions of the Coordinator-General's Evaluation Report (CGER) on the Environmental Impact Statement (EIS) and recognises that Condition 1 requires the CEMP to include the SAP as a subplan:

- Condition 6(A): Gavial Creek, Bob's Creek, Inkerman Creek, Horrigan Creek and Raglan Cree~~)~~k
- Condition 6(C): Inkerman Creek, Horrigan Creek, Raglan Creek, Marble Creek and Twelve Mile Creek
- Condition 7: Raglan Creek

Note, the CGER refers only to marine plants occurring in the vicinity of Raglan Creek. However, ecological assessments undertaken in 2022 (GHD, 2022) and as outlined in the Operational Works for Disturbance to Marine Plants Development Applications, marine plants occur at three main locations:

- Inkerman Creek Casuarina Road (Figure 8a and 8b)
- Approximately 500 m west of Twelve Mile Creek (Figure 8c)
- Raglan Creek and the adjacent Horrigan Creek (Figure 8d and 8e)

## Construction

Construction activities will generally be limited to May to September (inclusive) as outlined in CGER approval condition for Inkerman Creek, Horrigan Creek, Raglan Creek, Marble Creek and Twelve Mile Creek. This excludes:

- ~~However, this does not include~~ Aaccess to and along the Right of Way (ROW)~~.; and~~
- Works required for the completion of the trenchless crossings. The intention is to complete works at the two closest locations to the Capricorn Yellow Chat (CYC) habitat which are Twelve Mile Creek and Marble Creek~~.~~. Both creeks are approximately 900 m from the closest CYC habitat.

Houston and Black (2024) confirmed that the proposed trenchless crossing works within the FGP corridor is far enough from all known CYC breeding areas to not present a risk to CYC habitat or breeding as a result of noise, traffic, dust etc. The installation of trenchless crossings will reduce the potential for sediment loss as a result of heavy rainfall during works and will not see a change in the hydrological processes in the waterways. As such the May to September limitation (noted in the CGER Condition 6(C)) is no longer required for the FGP. This revised SAP has been updated to remove this constraint from crossings so that construction at the trenchless crossings commenced in 2024 can continue until complete (i.e., post-30 September 2024) subject to all impact avoidance and mitigation measures outlined in the SAP that remain valid and are unchanged (although some additional measures have been added). This revision invokes Condition 8 of the EPBC approval #2007/3501 – Gladstone to Fitzroy Pipeline Project.

Construction activities will be undertaken every day between 6:30 am and 6:30 pm or as per approval conditions. If work is required outside of these hours, approval will be required from GAWB, accompanied by engagement with affected landholders.

Marble Creek and Twelve Mile Creek were initially proposed as trenched crossings in the EIS. As such, Condition 6(D) stated that works within riparian vegetation are not to exceed 15 m in width. However, following further design, these two creeks are now proposed as trenchless crossings.

For the purposes of this SAP, riparian vegetation is defined as vegetation immediately adjacent to the riparian zone, which is defined as the interface between terrestrial and aquatic ecosystems (i.e. top of the high banks (Pusey and Arthington, 2003)).

All personnel will be trained in the requirements of this SAP, the CEMP and other relevant environmental management plans.

## Review and Updates

This SAP will be reviewed and updated as required and following identification of any new information, receipt of relevant approval conditions and continual improvement initiatives.

This revised SAP (Rev ~~65~~) is the result of a review by CYC specialists W. Houston and R. Black July 2024, to ensure consistency with the updated CYC SAP (Rev 3) and to address comments from the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

## Erosion and Sediment Control

| Control Activities | Responsibility |
|---|---|
| – Works will be undertaken in accordance with the CEMP Erosion and Sediment Control Sub-plan and site-specific Erosion and Sediment Control Plans (ESCPs) that will comply with the International Erosion Control Association (IECA) guidelines and be certified by a registered professional engineer Queensland (RPEQ) or a Certified Professional in Erosion and Sediment Control (CPESC).<br>– All erosion and sediment control devices will be installed and maintained in accordance with the ESCPs and in place prior to the commencement of construction activities at each of the creek and marine plant locations shown on Figure 1 to Figure 8.<br>– Stormwater surface flows will be diverted around the construction areas as shown on Figure 1 to Figure 8.<br>– The area and duration of exposed soil within the high bank of the waterway and construction areas will be kept to the minimum during construction work ~~and no longer than the allowed construction timeframe of between May to September~~ for Inkerman Creek, Horrigan Creek, Raglan Creek, Marble Creek and Twelve Mile Creek.<br>– Weather Forecasts will be monitored daily, weekly and long term (14 day) to schedule trenchless crossing construction activities to avoid increasing potential risk to waterway environmental values<br>– Weekly inspection of the trenchless crossing works areas post-September 2024 will be conducted to record and report on erosion and sediment risk and implementation of measures to protect the environmental values of the waterway at the crossing locations.<br>– In the event of forecast wet weather heavy rainfall (greater than 25mm in a 24 hour period) wet weather preparedness activities will be undertaken to secure the site to protect the trenchless works from potential erosion and sediment or uncontrolled discharges<br>– If heavy rainfall (greater than 25mm in a 24 hour period) occurs at the trenchless crossing locations, works will cease until such time that the site dries sufficiently to avoid any increase to erosion and sediment risk.<br>– The construction areas and access routes will be clearly delineated and shown in the CEMP to prevent disturbance to areas outside the construction footprint.<br>– Excavated sediment will be stored in a designated disposal area within the construction areas shown on Figure 1 to Figure 8. The final disposal areas will be shown on the ESCPs.<br>– Sediment will be disposed of either onsite (i.e. same property) or disposed of at the nearest approved locations and generally by agreement with landowners or local council. Any onsite disposal areas and methods will be shown on the ESCPs. | McConnell Dowell BMD Joint Venture (MBJV) |

## Contaminated Land Management

| Control Activities | Responsibility |
|---|---|
| – No construction areas have been identified as contaminated land from desktop assessment (Environmental Management Register (EMR) and Contaminated Land Register (CLR). Although not identified on the CLR or EMR, land between Horrigan Creek and Raglan Creek has the potential for contamination from hydrocarbons and metals as outlined in the Preliminary Contamination Assessment Report (GHD, 2021).<br>– A contaminated land assessment will be undertaken, and construction activities will be undertaken at the construction areas in accordance with the CEMP Contaminated Land Control Plan.<br>– Unexpected finds will be managed in accordance with the CEMP Contaminated Land Control Plan for situations where indicators for contamination is identified. If an area within the construction zone is suspected of being potentially contaminated, works in that area are to cease until a site investigation can be completed, and the contamination identified and appropriately managed.<br>– Any contaminated material will be reported and managed in accordance with relevant legislation/guidelines and the CEMP Contaminated Land Control Plan. | MBJV |

## Acid Sulfate Soils Management

| Control Activities | Responsibility |
|---|---|
| – Raglan Creek and Inkerman Creek are mapped as high probability Acid Sulfate Soil (ASS) areas. All other creeks are in low to very low probability ASS areas.<br>– An ASS assessment will be undertaken, and if encountered, an ASS Management Plan (ASSMP) will be developed and implemented that will meet the requirements outlined in Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines (State of Queensland, 2014).<br>– If ASS is identified, the ASSMP will clearly identity actual and potential ASS on figures and construction drawings, and present clear management and mitigation measures.<br>– ASS will be handled and treated in accordance with the ASSMP and relevant legislation/guidelines. | MBJV |

## Flora Management

| Control Activities | Responsibility |
|---|---|
| – Construction activities will be undertaken in accordance with the CEMP Flora and Fauna Control Plans. | MBJV |

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| – Minimal vegetation removal is expected that is directly related to trenchless construction methods and will be limited to only that necessary for temporary construction infrastructure and constrained to the construction areas shown on Figure 1 to Figure 8.<br>– Pre-disturbance inspections of the areas to be cleared and/or disturbed, following demarcation by MBJV, will be undertaken by GAWB and MBJV representatives to confirm the clearing limits at all creek crossing locations shown on Figure 1 to Figure 8 are correct and clearly marked.<br>– No clearing of riparian vegetation is permitted at Gavial Creek, Inkerman Creek, Bob's Creek, Horrigan Creek and Raglan Creek. Clearing of riparian vegetation at Marble Creek and Twelve Mile Creek should be avoided and only permitted if GAWB and the relevant administering agency is notified, and all required approvals obtained and/or in accordance with exemption requirements.<br>– Prior to clearing activities and where possible, marine plants will be removed and relocated to a suitable area within the ROW or a suitable nursery with plant health monitored during daily inspections.<br>– During site inductions, all personnel will be briefed on waterway flora/vegetation values within the construction areas including vegetation to be avoided and retained along the riparian corridor.<br>– Safeguards will be put in place to ensure that there is no damage to growing trees, shrubs, and vegetation outside the construction areas, and to selected trees to be left standing in areas designated for clearing.<br>– A suitably qualified person (such as a qualified ecologist and/or licensed fauna spotter/catcher) will be engaged to undertake a pre-clearance survey to inspect vegetation to be removed.<br>– A suitably qualified person (ecologist and/or fauna spotter/catcher) will be present during vegetation clearing.<br>– If protected flora species are encountered during construction in areas where a Clearing Permit has not been obtained, works will cease, GAWB notified, and a Clearing Permit obtained (refer to the Flora Survey Guidelines – Protected Plants).<br>– Trees to be retained within the construction areas will be clearly flagged to prevent accidental removal.<br>– Where trees and vegetation cannot be preserved aboveground, stabilising root material will be undisturbed wherever possible.<br>– Cleared or trimmed vegetation will be stockpiled separately from topsoil. It will then be mulched and respread above highest astronomical tide (HAT) as part of Rehabilitation Plans or disposed of offsite at an approved location. | |

| Fauna Management (Surface) | |
|---|---|
| **Control Activities** | **Responsibility** |
| – Construction activities will be undertaken in accordance with the CEMP Flora and Fauna Control Plans and the approved Species Management Program (SMP).<br>– No clearing of fauna habitat directly related to trenchless construction methods is permitted outside of the construction areas shown on Figure 1 to Figure 8.<br>– Mature hollow-bearing trees will be identified, retained and protected wherever reasonably practicable. Where this cannot be achieved (outside of the riparian zone), hollow limbs and/or trunks should be left on the ground adjacent to the ROW (or relocated to within areas of remnant vegetation) to provide habitat for ground-dwelling fauna.<br>– Prior to vegetation clearing (within 24 hours), a suitably qualified person (e.g., ecologist and/or fauna spotter/catcher) will inspect the construction areas to identify fauna habitat and breeding places. Clearing will not occur until the fauna spotter has confirmed the construction areas have been inspected.<br>– The suitably qualified person (e.g., ecologist and/or fauna spotter/catcher) will be present during all clearing and will ensure any clearing is undertaken as per the requirements of the approved SMP and the separate ~~yellow chat~~CYC SAP.<br>– Prior to any works taking place during – October to April – a suitably qualified person, an ecologist and a fauna spotter catcher will conduct surveys of the works areas and of areas downstream of the works where applicable to identify possible nesting locations for weekly survey during works.<br>– If CYC nests are observed within 300 metres of the works during the breeding season works will cease until such time the suitably qualified person or an ecologist has confirmed that there are no breeding activities occurring. If breeding activities are observed the works will cease until such time the young have fledged from the nest.<br>– Any displaced fauna will be relocated to more suitable similar habitat within the surrounding area, as far as reasonably practicable.<br>– Logs and fallen vegetation will be used as a habitat feature post-construction.<br>– Fauna exclusion fences will be established to prevent relocated fauna inadvertently re-entering the construction areas, as far as reasonably practicable. | MBJV |

| Biosecurity | |
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| **Control Activities** | **Responsibility** |
| – Construction activities will be undertaken in accordance with the CEMP Biosecurity Control Plans that includes biosecurity management measures.<br>– Prior to commencement of construction, pre-clearance surveys will be undertaken to assess the presence of weeds and fauna pest species. These will be identified in the CEMP Flora and Fauna Control Plans and the CEMP Biosecurity Control Plans.<br>– All food wastes or waste that could attract animals, will be kept in designated containers/bins that do not allow the access of animals. Personnel will be trained with respect to weeds (e.g. colour photos, precautions, procedures, fact sheets). Biosecurity training will be included as part of the environmental induction to be completed by all personnel prior to commencement of work at site.<br>– Access roads will be identified in the CEMP and adhered to during construction to prevent transport of weeds from or to other areas.<br>– Vehicles and machinery will be subject to weed free certification and/or brush / wash-down prior to entering site in accordance with the requirements of the CEMP Biosecurity Control Plans. | |

| Water Quality | |
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| **Control Activities** | **Responsibility** |
| – The location of the trenchless crossing launch and receival/reception pits will be away from creeks banks, where possible, and within the designated construction areas shown on Figure 1 to Figure 8.<br>– Construction activities will be undertaken in accordance with the CEMP Water Resources and Water Quality Control Plan.<br>– Water quality will be managed and monitored in accordance with the CEMP Water Resources and Water Quality Control Plan and ESCPs including water quality requirements outlined in IECA, 2008.<br>– Stormwater will be diverted around the construction areas in accordance with the CEMP Water Resources and Water Quality Control Plan.<br>– Stormwater runoff from within the construction areas will be collected, tested, or allowed to evaporate prior to removal or discharge to an approved location.<br>– Storage of fuels and chemicals will occur within the construction areas in accordance with AS1940. Measures will be implemented for managing fuel and chemical handling, storage, distribution and spill response during construction.<br>– Daily visual inspections for obvious signs of fuel and/or oil slicks will be undertaken downstream of the works areas for all creeks included in this SAP. If identified, the environment manager will be notified, and appropriate actions implemented as per the water quality monitoring requirements of the CEMP Water Resources and Water Quality Control Plan. | MBJV |

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| – Creek water levels at Inkerman Creek, Horrigan Creek, Raglan Creek, Marble Creek and Twelve Mile Creek, which are in potential ~~yellow chat~~CYC habitat, will be monitored during construction to detect any changes to water levels.<br>– Groundwater quality monitoring, if required, will be conducted in accordance with approval conditions and the CEMP Water Resources and Water Quality Control Plan.<br>– Where the construction areas cannot be positioned outside of the top of the bank and excavation of the bank has occurred, rehabilitation including backfilling, compacting, grading to natural contours and providing vegetative cover will occur to avoid erosion.<br>– Any water bodies or water bores used for extraction of construction water will be monitored for water levels and water quality extraction will cease if unacceptable impacts are identified. The OSW/2020/5467 Exemption Requirements for constructing authorities for the take of water without a water entitlement (DRDMW, 2021) will be met.<br>– Pre- and post-construction work surveys will be undertaken at Inkerman Creek, Horrigan Creek, Raglan Creek, Marble Creek and Twelve Mile Creek to ensure creek profiles are restored, where disturbance has occurred. | |

| Air Environment | |
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| **Control Activities** | **Responsibility** |
| – Air quality will be managed in accordance with the CEMP Air Environment Control Plan.<br>– Nearby landowners will be informed of potential temporary dust generation prior to the commencement of construction activities with the potential to generate dust.<br>– Construction vehicles will be confined to designated access tracks, as far as reasonably practicable.<br>– Dust suppression will be undertaken as needed along access roads, tracks and exposed soils to minimise dust.<br>– Exposed ground surfaces will be mulched (above HAT) or revegetated as soon as reasonably practicable following construction activity and as per the ESCPs requirements, and the CEMP Rehabilitation and Revegetation Control Plan. | MBJV |

| Waste Management | |
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| **Control Activities** | **Responsibility** |
| – Waste will be managed in accordance with the CEMP Waste Management Control Plan.<br>– Wastewaters will be managed in accordance with the CEMP Water Resources and Water Quality Control Plan and includes the | MBJV |

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| management of wastewater and slurry from the trenchless construction methods.<br>– All waste receptacles will be coloured for waste streams and covered to prevent vermin being attached, water infiltration and wind from causing litter.<br>– Sorting and storage recyclable wastes (such as oils, timber, steel and plastic) will occur and transported by a licensed contractor to a licensed waste management facility.<br>– Regulated wastes will be transported by a licensed contractor to a licensed waste management facility able to accept the waste.<br>– Sewage waste from portable toilets will be managed through the use of mobile chemical treatment systems, approved septic systems or via connection with the municipal waste sewage infrastructure, depending on location of the site.<br>– All 'trackable wastes' under the *Environmental Protection Regulation 2019* (Qld) leaving the site will be recorded.<br>– Hazardous and regulated wastes will be managed as per any local government or legislative requirements, stored in bunded containers / areas in accordance with AS1940 and transported and disposed of by an appropriately licensed contractor.<br>– Depending on the quality of the material excavated, it may be practical to utilise excess material within the ROW. Excess spoil that cannot be reused within the construction areas will be disposed of at the nearest approved locations and generally by agreement with landowners or local council.<br>– All wastes will be removed and disposed of at a licensed waste management facility regularly during construction and when construction has been completed. | |

| Hydrotesting and Commissioning | |
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| **Control Activities** | **Responsibility** |
| – Hydrotesting will be undertaken in accordance with the CEMP Hydrotest and Commissioning Control Plan for discharge of water from pipelines in relation to hydrotesting.<br>– Any pipeline leaks identified during the commissioning process will be contained and cleaned up as soon as practical.<br>– No hydrotest water is to be disposed of in the waterways included in this SAP as shown on Figure 1 to Figure 8. | MBJV |

| Noise and Vibration Management | |
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| **Control Activities** | **Responsibility** |
| – Noise and vibration will be managed in accordance with the CEMP Noise and Vibration Control Plan.<br>– Although the nearest sensitive receptor is approximately 3 km to the west of the nearest construction area (related to these waterways), general noise mitigation strategies will be implemented in accordance with the CEMP Noise and Vibration Control Plan.<br>– Access along the ROW during October to April inclusive will be undertaken to minimise noise impacts such as reduced speeds in sensitive areas.<br>– All equipment and plant will be regularly maintained to manufacturers' specifications.<br>– Horns and reversing alarms will be at the minimum volume level as far as practicable without compromising safety requirements.<br>– A 24 hour contact number for the FGP will be implemented for the construction phase so that landholders always have an immediate point of contact when they have questions or concerns.<br>– All complaints received will be handled in accordance with the complaints / incidents procedure addressed in the CEMP.<br>– If required, noise and vibration monitoring will be undertaken in accordance with approval conditions. | |

| Transport and Access | |
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| **Control Activities** | **Responsibility** |
| – Traffic Management Plans (TMPs) will be developed prior to construction activities to address site access, signage and traffic control during construction and any temporary traffic control measures.<br>– Access to and from the construction areas will be via designated routes prescribed in the TMP and in the CEMP.<br>– No construction roads/access tracks are permitted to be constructed across the creeks included in this SAP.<br>– Roads, particularly unsealed roads and access tracks used during construction will be maintained by MBJV. | MBJV |

| Cultural Heritage | |
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| **Control Activities** | **Responsibility** |
| – Construction activities will be undertaken in accordance with the approved Cultural Heritage Management Plans (CHMPs) and the requirements of the CEMP Cultural Heritage Control Plan.<br>– A Cultural Heritage survey of the construction areas and the ROW will be undertaken in accordance with the requirements of the approved CHMPs and the status of the survey shown in a Notice to Proceed form as a traffic light approach (e.g. red = not surveyed, amber =. surveyed but not yet cleared and green = surveyed and cleared). The environmental induction will include a basic level of training for all personnel with regard to their obligations under the CHMP and the measures to be taken in the event of a historic or Aboriginal Cultural Heritage find. | MBJV |

| Dangerous and Hazardous Goods | |
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| **Control Activities** | **Responsibility** |
| – Dangerous and hazardous materials will be managed in accordance with the CEMP Handling and Storage of Dangerous and Hazardous Goods Control Plan.<br>– Hazardous wastes will be controlled as per local government or legislative requirements, emergency use of a spill kit, bunded and/or contained to avoid release and transported and disposed of by an appropriately licensed contractor.<br>– Any spills will be managed and cleaned up as soon as possible.<br>– Appropriately stocked spill kits will be located in each construction area. All personnel will receive an induction prior to commencing work in the handling and storage of dangerous goods and in spill containment procedures.<br>– A hazard identification and risk assessment process will be undertaken for the storage of dangerous goods in the construction corridor.<br>– The Safety Data Sheets (SDS) for all dangerous goods and hazardous materials will be kept on site.<br>– Where practicable, any refuelling undertaken at site will be undertaken in a designated refuelling area to reduce the risk of contamination to the environment.<br>– Where practicable, no hazardous materials will be stored on the eastern side of Twelve Mile Creek in the mapped essential fauna habitat (refer to Figure 4) and within the mapped essential fauna habitat between Horrigan Creek and Raglan Creek (refer to Figure 6 and Figure 7). Note, the mapped essential habitat is generalised habitat and is not specific to any particular fauna or flora species.<br>– Regulated wastes will be transported by a licensed contractor to a licensed waste management facility able to accept the waste. | MBJV |

| Landscape and Visual Amenity | |
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| **Control Activities** | **Responsibility** |
| – Landscape and Visual Amenity will be undertaken in accordance with the CEMP Landscape and Visual Amenity Control Plan.<br>– Upon completion of construction, all construction materials will be removed and transported to a suitable location.<br>– Appearance of other features such as signs and fencing for safety are considered as having minimal visual amenity impacts and removed following construction.<br>– Rehabilitation will be undertaken at the construction areas in accordance with the CEMP Rehabilitation and Revegetation Control Plan (refer below). | MBJV |

| General and Marine Plants Rehabilitation and Remediation | |
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| **Control Activities** | **Responsibility** |
| – Remediation activities at the construction areas, including the three areas with marine plants (refer to Figure 1 – Figure 8), will be undertaken in the accordance with the CEMP Rehabilitation and Revegetation Control Plan.<br>– The species impacted are location dependent and the marine plant species and number of individuals or each species and/or area to be impacted, will be determined during pre-clearance surveys. These details will be included in the CEMP Rehabilitation and Revegetation Control Plan following the pre-clearance surveys.<br>– Rehabilitation methods will include:<br>• Reinstatement, which is the process of bringing the landscape back to the original profile of the surrounding environment, including site stabilisation and riparian revegetation.<br>• Once landscape is returned to original profile, the soil will be ripped to 200 mm depth to mitigate the compaction that has occurred during construction.<br>• A foliar fertiliser may be applied to the topsoil to assist the marine plants in establishing and to further promote growth. Fertilisers are to be safe for use in the marine environment and not to be used below HAT.<br>• Rehabilitation which is the process of establishing marine plants back onto the site following reinstatement. Once rehabilitated areas may be temporarily flagged off to protect them during establishment.<br>• Ongoing management of rehabilitation areas to control pest species, minimise threats to rehabilitation success and rectify erosion and landform stability issues identified during monitoring (refer to Appendix A for the monitoring plan for marine plants, noting this will be updated as following pre-clearance surveys, and otherwise as required).<br>– Prior to clearing activities and where possible, marine plants will be removed and relocated to a suitable area within the ROW or a suitable nursery with plant health monitored during daily inspections.<br>– Following construction activities, surviving marine plants will be relocated back to the area they were removed from.<br>– Topsoil will be stripped, stockpiled away from waterways and separately to other cleared material and managed in accordance with the CEMP Rehabilitation and Revegetation Control Plan.<br>– Reinstatement will commence as soon as practicable after construction activities and | MBJV |

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| no later than one month after completion of works impacting marine plants.<br>– During reinstatement of impacted areas, soils will be replaced so that the topsoil depth is consistent with pre-clearance depths and profiles.<br>– Ground cover will then be established at disturbed sites following respreading of topsoil. Ground cover can include organic material, leaf litter, mulch, hydromulch, living or dead plant material, rocks, logs, other woody materials or erosion control materials.<br>– Disturbed areas may also be sown with a cover crop immediately following topsoil respreading in areas with high erosion potential.<br>– Rehabilitation will primarily rely on natural regeneration from the soil seed bank and reproductive plant material delivered by the tides as well as relocating the salvaged and surviving plants back to a local site.<br>– Where either natural regeneration or reinstatement of the relocated plants fails to meet the performance criteria outlined in the CEMP Rehabilitation and Revegetation Control Plan, assisted revegetation and direct planting will be undertaken in accordance with the Rehabilitation and Revegetation Control Plan and with a species mix and density that is consistent with the pre-clearance conditions. | |
| **Contact Details** | |
| Refer to the CEMP for contact details. | MBJV |
| **References** | |
| Pusey, BJ and Arthington, AH (2003). Importance of the riparian zone to the conservation and management of freshwater fish: a review. Marine and Freshwater Research, 54, 1-16. | |

INSERT FIGURES 1-8i

# APPENDIX A – DRAFT REHABILITATION MONITORING PLAN

# 1. Draft Monitoring Plan (Marine Plants)

## 1.1 Introduction

The Fitzroy to Gladstone Pipeline (FGP) Project intersects areas that support marine plants within the Rockhampton Regional Council (RCC) and Gladstone Regional Council (GRC) local government areas. As such, two development approvals are triggered for operational works for the removal, destruction or damage of marine plants permits.

As part of the operational works approval process, GAWB received an information request from the State Assessment and Referral Agency (SARA). The requests required clarification on the extent of impacts to marine plants and preparation of a remediation and monitoring plan. The McConnell Dowell BMD Joint Venture (MBJV) is in the process of developing a detailed Rehabilitation and Revegetation control plan (RRCP) that will support the Construction Environmental Management Plan (CEMP).

This Special Area Plan (SAP) provides management actions associated with rehabilitation and revegetation, including marine plants, whereas the CEMP Rehabilitation and Revegetation Control Plan will provide site specific information on rehabilitation objectives, performance criteria, species mix, planting densities, monitoring, triggers for further action and competition criteria.

This draft monitoring plan has been prepared to provide information on monitoring including current baseline data, a pre-clearance surveys, preliminary monitoring sites, preliminary performance criteria, monitoring actions and a preliminary monitoring schedule.

The monitoring plan and SAP has also considered the requirements and recommendations outlined in the Fish Habitat Guideline FHG 002 - Restoration of Fish Habitats (Hopkins et al, 1998).

## 1.2 Baseline Assessment

A detailed ecological survey was undertaken in 2008 and 2009 during development of the Environmental Impact Statement (EIS) and more recently in May 2022 (GHD, 2022). These assessments included marine plant surveys that were undertaken within and adjacent to tidal lands in the study area, at or below highest astronomical tide (HAT). Data collected included marine plant species present, extents and whether impacts would be of a temporary or permanent nature. Marine plants were identified at the three broadscale locations outlined in the SAP and as shown in Figures 8a-8e and comprised mangroves and/or saltmarsh grassland vegetation communities as outlined in the operational works development applications.

### 1.2.1 Pre-clearance Surveys

Before clearing activities are undertaken, pre-disturbed conditions will be further assessed during pre-clearance surveys. The aim of the pre-clearance surveys is to confirm the baseline condition as outlined in the GHD ecology report (GHD 2022) and to establish baseline data for areas where data from the 2022 baseline survey is lacking. In addition to the 2022 baseline assessment data, the pre-clearance survey will be used to establish the current marine plant species richness, vegetation condition and life form (e.g. juvenile, adult etc.), abundance, and area of coverage. Pre-clearance surveys will also record the presence and abundance of weeds, soil type, soil profile and where

relevant, confirmation of the intertidal zones as this is important to identify spatial and depositional changes over time that are likely to affect marine plant rehabilitation.

As the main objective of rehabilitation and revegetation is to restore the disturbed sites to pre-disturbance conditions within five years, determination of site-specific marine plant species richness, plant condition and abundance will inform planting densities, completion criteria and corrective actions.

The pre-clearance surveys will build on the baseline survey (GHD, 2022) that identified the current species mix at the marine plant impact sites as detailed in Table 1.

*Table 1 Baseline Marine Plant Types*

| Type | Primary Species | Baseline and Rehabilitation Density |
|---|---|---|
| Mangroves | *Avicennia marina, Acanthus ilicifolius, Excoecaria agallocha, Aegiceras corniculatum, Clerodendrum inerme, Xylocarpus granatum* | TBA during pre-clearance surveys |
| Succulents | *Enchylaena tomentosa, Sesuvium portulacastrum, Atriplex semibaccata, Tecticornia pergranulata, Tecticornia indica, Suaeda arbusculoides* | TBA during pre-clearance surveys |
| Grasses | *Sporobolus virginicus* | TBA during pre-clearance surveys |

### 1.2.2 Photo Monitoring Sites

Photo monitoring sites will be established at marine plant disturbance sites during pre-clearance surveys and prior to disturbance occurring. This will allow post-disturbance rehabilitation to be visually assessed and compared to pre-disturbance conditions. Photo monitoring sites will be permanent locations, with photos taken in a north, east, south and westerly direction from the centre point of the monitoring site. A permanent feature will be included within the photo frame to provide a fixed reference point. A record of the photos will be maintained, including GPS location, date, time, and direction at which the photograph was taken. Photos will be taken in accordance with a photo monitoring procedure (refer to Section 1.4.2 for further information).

## 1.3 Performance Criteria and Corrective Actions

The performance criteria will be informed by the results of the pre-clearance surveys and following confirmation of the species mix and densities at each of the impact sites as well as soil types and landform profile. Preliminary performance criteria are outlined in Table 2 and will be updated following the pre-clearance surveys and following receipt of approval conditions, where required.

The need for corrective actions will be determined during monitoring activities (refer to Section 1.4) Where required, corrective actions will be implemented and monitored until performance criteria is attained.

*Table 2 Preliminary Performance Criteria and Corrective Action*

| Item | Performance/ Completion Criteria | Interim Performance Targets | Monitoring | Trigger for Further Action | Corrective Action |
|---|---|---|---|---|---|
| Landform | Landform is stable, shows negligible movement and represents the pre-disturbance conditions. | No negligible movement during monitoring events. | Photo point monitoring and general visual inspections. | Monitoring indicates landform is unstable or has exhibited obvious movement of soil, organic matter etc. | • Review adherence to the CEMP and SAP.<br>• Investigate alternative stabilisation methods.<br>• Re-stabilise the landform in consultation with a suitably qualified person (engineer/ remediation specialist). |
| Soils | • The top layer of topsoil is reinstated.<br>• Topsoil is stabilised with negligible erosion/soil loss relative to pre-disturbance conditions.<br>• Any acid sulphate soils (ASS) are treated as per the CEMP and/or ASS Management Plan requirements. | No negligible soil loss during monitoring events. | Photo point monitoring and general visual inspections for soil profile. | Monitoring indicates obvious soil loss relative to pre-disturbance conditions. | • Review adherence to the CEMP and SAP<br>• Identify cause of soil loss.<br>• Reinstate topsoil in consultation with a suitably qualified soil scientist with remediation experience. |
| Erosion | • Disturbed and reinstated soils must be vegetated to minimise erosion.<br>• No obvious signs of erosion compared to pre-disturbance levels. | No obvious signs of erosion during monitoring events. | Photo point monitoring and general visual inspections. | • Obvious signs of erosion.<br>• Obvious signs of bare ground that was not reinstated effectively. | • Review adherence to the CEMP Erosion and Sediment Control Plan.<br>• Implement additional erosion and sediment controls as determined appropriate by a Certified Practicing Erosion and Sediment Control Professional.<br>• Reinstate vegetation groundcovers as per the requirements of the CEMP RRCP. |
| Weed presence and cover | • No new Restricted Invasive Plants listed under the *Biosecurity Act 2014* (Qld) are introduced to any of the rehabilitated areas.<br>• Presence of Restricted Invasive Plants are no greater that observed during baseline surveys and/or in surrounding undisturbed land. | Weed cover does not exceed 10% in years 1-3 (following establishment) and 5% in the in years 4-5. | Photo point monitoring and general visual inspections. | • An increase in percent weed cover from baseline and/or previous monitoring events.<br>• An outbreak of weed species not previously recorded in the disturbed areas or in surrounding undisturbed land.<br>• An increase in the presence of weeds as determined from photo monitoring. | • Review adherence to CEMP Biosecurity Control Plans including weed hygiene procedures to ensure compliance and to update restrictions.<br>• Review timing and frequency of weed management measures and implement alternative weed management timeframes. |

| Item | Performance/ Completion Criteria | Interim Performance Targets | Monitoring | Trigger for Further Action | Corrective Action |
|---|---|---|---|---|---|
| | | | | • Interim performance targets are not attained, or completion criterion is not attained and/or maintained. | • Investigate alternative weed management control actions (e.g. spot spraying and/or injection of herbicides) and implement.<br>• Undertake additional weed management measures until weed populations are reduced. |
| Regeneration of Marine Plants | • Vegetation composition represents pre-disturbance conditions.<br>• All disturbed land is reinstated to pre-disturbance profiles so that the spatial extent of mangroves represents pre-disturbance levels.<br>• Species richness, density and cover is representative of pre-disturbance conditions. | • Vegetation composition (species richness, density and cover) for all growth forms (mangroves, succulents and grasses) achieves the following annual values:<br>○ Year 1 (following establishment) – 20% of pre-disturbance conditions.<br>○ Year 2 – 40% of pre-disturbance conditions.<br>○ Year 3 – 60% of pre-disturbance conditions.<br>○ Year 4 – 80% of pre-disturbance conditions.<br>○ Year 5 – 100% of pre-disturbance conditions. | • Photo point monitoring and general visual inspections.<br>• Surveys to determine species richness, density and percent cover. | • Interim performance targets are not attained, or completion criterion is not attained and/or maintained.<br>• No decrease in species richness, density or cover from the preceding years values.<br>• Presence of weed species not identified in pre-disturbed areas or surrounding undisturbed lands. | • Review adherence to the CEMP Erosion and Sediment Control Plan.<br>• Review adherence to the CEMP RRCP and SAP<br>• Undertake revegetation for those species where regeneration is >20% behind the interim performance targets from year 3 onwards. |
| Revegetation of Marine Plants (implemented from year 3 onward if required) | • Vegetation composition represents pre-disturbance conditions. | • Vegetation composition (species richness, density and cover) for all growth forms (mangroves, succulents and grasses) achieves the following annual values:<br>○ Year 3 – 60% of pre-disturbance conditions.<br>○ Year 4 – 80% of pre-disturbance conditions.<br>○ Year 5 – 100% of pre-disturbance conditions. | • Photo point monitoring and general visual inspections.<br>• Habitat quality assessment to determine species richness, density and percent cover. | • Year 3, 4 and 5 interim performance targets are not attained, or completion criterion is not attained and/or maintained.<br>• No decrease in species richness, density or cover from the preceding years values.<br>• Presence of weed species not identified in pre-disturbed areas or surrounding undisturbed lands. | • Review adherence to the CEMP Erosion and Sediment Control Plan<br>• Review adherence to the CEMP Rehabilitation and RRCP and SAP<br>• Undertake additional supplemental planting. |

## 1.4 Monitoring

Monitoring will commence during construction and following the establishment phase (i.e. period where each disturbed site is stabilised to a final landform and rehabilitation completed) which is expected to occur within approximately the first 12 weeks, or as otherwise outlined in approval conditions or the CEMP RRCP.

Monitoring will generally be undertaken as outlined in the preliminary monitoring schedule shown in Table 3 at monitoring locations to be determined during the pre-clearance surveys and establishment of the photo monitoring sites. Monitoring will involve visual inspections, photo monitoring and floristic assessments and will assess the post rehabilitated landform, soil profiles, incidence of erosion and presence of weeds as well as regeneration progress and revegetation, if required.

### 1.4.1 Visual Inspections

General visual inspections will be undertaken during all monitoring events and will note general conditions of the rehabilitation areas including, but not limited to:

- Evidence of erosion or subsidence
- Condition of any fencing and signage condition, if specifically installed at any of the rehabilitated areas
- Evidence of disturbance or damage by livestock or human disturbance
- Damage and/or degradation resulting from pest animal activity
- New weed outbreaks
- Signs of fire
- Incidental fauna observations.

### 1.4.2 Photo Point Monitoring

As outlined in Section 1.2.2, photo point monitoring will initially be undertaken during the pre-clearance surveys. This information will enable before and after disturbance comparisons to be made with regard to the progress and success of rehabilitation. Photo monitoring will assess incidences of erosion, landform changes, presence of weeds, general disturbances, plant survival, plant growth etc.

To enable consistent and comparable photo monitoring to be undertaken, a photo monitoring procedure will be prepared prior to the baseline pre-clearance surveys being undertaken. The procedure should outline equipment required, recommendations on when photos should be taken, how photos should be taken and data file formats and management.

### 1.4.3 Floristic Assessments

Ongoing monitoring to assess the condition of the rehabilitated areas will be undertaken as per the monitoring schedule outlined in Table 3, or an alternate approved schedule. Success of rehabilitation activities can be assessed by measuring floristics such as species richness, cover, density, growth form etc. using a scientifically robust and repeatable method. One such method is that outlined in the Guide to determining terrestrial habitat quality V1.3 (DES, 2020). Although this method was primarily developed for assessing and determining offset requirements, the process can be used to assess the changes in the overall quality of vegetation communities over time and to assess specific

vegetation parameters such as richness, cover and density. Importantly, the method is a simple and repeatable process.

The method of assessing habitat quality utilises methodologies from the Queensland Herbarium's BioCondition Assessment Manual (Eyre, 2015) for assessing site-based attributes. Assessing the quality of the rehabilitated areas and progress towards the interim performance targets and performance/completion criteria can be done by measuring the vegetation parameters that have relevance to the works, comparing these across monitoring events and to the interim performance targets.

Alternate methods may be chosen provided they are scientifically robust, repeatable, simple and allows comparisons against the interim performance targets and performance/completion criteria to be made.

*Table 3 Monitoring Schedule*

| Rehabilitation Criteria | Monitoring Attributes | Monitoring Frequency | Monitoring Method | Monitoring Locations |
|---|---|---|---|---|
| Landform stability and erosion | Stability<br>Profile<br>Signs of erosion | Prior to and during site disturbance<br>Every two months during post-disturbance establishment phase and six monthly thereafter. | Photo points<br>Visual inspections | Permanent assessment sites will be determined during pre-clearance surveys. |
| Soils | Signs of erosion<br>Groundcover establishment<br>Soil profiles | Prior to site and during disturbance<br>Every two months during post-disturbance establishment phase and six monthly thereafter. | Photo points<br>Visual inspections | Permanent assessment sites will be determined during pre-clearance surveys. |
| Weeds | Presence of weeds<br>Control methods undertaken | Prior to and during site disturbance<br>Every two months during post-disturbance establishment phase and annually thereafter. | Photo points<br>Visual inspections<br>Floristic assessments | Permanent assessment sites will be determined during pre-clearance surveys. |
| Natural regeneration of marine plants | Species richness<br>Density<br>Cover<br>General plant health<br>General site disturbances | Prior to and during site disturbance<br>At the end of the establishment phase then annually thereafter. | Photo points<br>Visual inspections<br>Floristic assessments | Permanent assessment sites will be determined during pre-clearance surveys. |
| Revegetation (if required) of marine plants | Species richness<br>Density<br>Cover<br>General plant health<br>General site disturbances | Prior to and during site disturbance<br>Annually. | Photo points<br>Visual inspections<br>Floristic assessments | Permanent assessment sites will be determined during pre-clearance surveys. |

## 1.5 Data Management, Reporting, Auditing and Review

### 1.5.1 Data Management

GAWB as the approval holder and /or MBJV via contractual agreements, will be responsible for overseeing and managing monitoring activities as required by approval conditions and as outlined in this SAP and CEMP. This will include maintaining data records to confirm all activities associated with the rehabilitation have been undertaken as outlined in this SAP, the CEMP and/or any subsequent approval conditions. These records will be made available to the Department of Agriculture and Fisheries as required by approval conditions or upon request.

### 1.5.2 Reporting

GAWB and / or MBJV will report on the progress of rehabilitation and revegetation annually for the five years, or as required by approval conditions. The first annual report will cover the 12 months following the commencement of rehabilitation measures and the establishment period.

Annual reporting will present on the results of each year's monitoring activities and will include a brief commentary on how the management strategies are contributing to the required conservation outcome. The inclusions of the annual report will be determined by approval conditions but will generally include the following:

- Any raw data collected during the previous year
- Description of the outcome of the visual inspections
- Results of the floristic assessments and comparisons to pre-disturbance conditions and the interim performance targets
- Photo point results
- A description on any threats, exotic species, or other disturbances
- Recommendations for any corrective actions

### 1.5.3 Auditing and Review

Internal audits/reviews of management and monitoring activities will be undertaken in response to a trigger for further action (outlined in Table 2) being triggered and non-compliances with the CEMP and approval condition requirements. External auditing will be undertaken as required by the CGER (and other yet to be granted approval conditions if relevant) and will be published in compliance reports, as required. Reports will include details on the progress towards achieving the performance criteria and/or completion criteria once they have been finalised.

The effectiveness of rehabilitation will be reviewed annually and amended (if required) to incorporate changes identified through corrective actions as determined by monitoring activities. Changes may include amendments to management actions, identification of additional monitoring activities and responses to adaptive management triggers.

## 1.6 References

DES. (2020). Guide to determining terrestrial habitat quality. Methods for assessing habitat quality under the Queensland Environmental Offsets Policy. Version 1.3.

Eyre, T. K. (2015). A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Version 2.2. Brisbane: Department of Environment and Science, Queensland Government.

GHD (2022). Fitzroy to Gladstone baseline terrestrial and aquatic ecology assessment.

Hopkins, E., White, M. and Clarke, A. (1998) Restoration of Fish Habitats: Fisheries Guidelines for Marine Areas, Department of Primary Industries, Queensland, Fish Habitat Guideline FHG 002, 44 pp.