



TASMANIAN IRRIGATION – NORTHERN MIDLANDS IRRIGATION SCHEME

Swan Galaxias (*Galaxias fontanus*) Dairy Creek – crossing methodology

EPBC Act Reference: 2022/09295

Prepared for
Tasmanian Irrigation

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Signed:



Full name: Jacob Gerke

Organisation: Tasmanian Irrigation Pty Ltd

Date: 03/02/2025

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ABBREVIATIONS

EOI	Expression of Interest
IBRAa	Interim Biogeographic Regionalisation for Australia
NMIS	Northern Midlands Irrigation Scheme
ML	Megalitre
TI	Tasmanian Irrigation Pty Ltd
WC	Water Crossing
EPBC Act	Environment Protection and Biodiversity Conservation Act (1999)
BT	Balance Tank
SG	Swan Galaxias (<i>Galaxias fontanus</i>)

1 PROJECT BACKGROUND

1.1 Proposed Action, Location and Timing

Northern Midlands Irrigation Scheme (NMIS) is part of the Pipeline to Prosperity (Tranche 3) suite of schemes proposed by Tasmanian Irrigation Pty Ltd (TI). The scheme covers the regions of Cressy, Powranna, Barton, Conara, Epping Forest, the Lower Macquarie and Isis Rivers, Campbell Town, and Ross (**Figure 1**). The scheme will allow for irrigation water to be provided to the NMIS district, which covers an estimated area of 128,400 ha, noting that not all of this district area is irrigable land. The proposed scheme will service the majority of properties that submitted an Expression of Interest (EOI) and the infrastructure has a design lifespan of 100 years.

The NMIS is proposed to be gravity fed from the Poatina Tailrace, with an offtake channel to a small buffer dam adjacent to the tailrace. Water will be pumped from here to a balance tank (BT) located at a localised high point (Poatina BT). The balance tank then gravity feeds the ring main distribution network. Two additional pump stations (Valleyfield and Epping Forest) and several branch lines will further disperse water through the region. An additional balance tank will be constructed near Kirklands (Valleyfield BT). The pipeline network consists of approximately 138 km of large diameter (predominantly 1,000 mm) high-density polyethylene pipeline, with a design peak flow of 170 ML/day. The NMIS is proposed to distribute 25,500 ML of water annually to 40 landholders in the NMIS project area.

The pipeline alignment broadly follows the Macquarie River, with the main lines following Valleyfield and Macquarie Roads, with several additional branches distributing water along Barton Road, Mount Joy Road, Mona Vale Road, and the Isis River (**Figure 1**). The proposed construction corridor consists of 25.33 ha of native vegetation, and 420.06 ha of modified land (including 0.70 ha of permanent water). The construction corridor has been narrowed in places to avoid conservation significant values. The corridor is typically 30 m wide, with a 15 km section between Poatina and Quarry Rd at 40 m wide to accommodate dual pipelines.

The works proposed will require excavation along the route, as well as several aquatic crossing points. The work will occur largely through private land. Excavation in the form of trenching will occur only within the proposed construction corridor. Trenching width varies depending on the diameter of pipe required, ranging from 1 m to 5 m depending on whether it is a single trench or dual trench. The depth of the trench varies in depth, ranging from 1 m to 3.5 m, with an average depth of 1.5 m.

Where conditions permit, pipe crossings of permanent water courses will be installed using trenchless processes. This will be determined by the pipe size, type, and size of rock present if any, shape, and length of the crossing and other geotechnical considerations. Transient water course crossings will be conducted using a combination of trenched and trenchless processes to be selected by the construction contractor based on the time of year, presence of water, size of pipe and geotechnical considerations.

Condition 12 of EPBC approval 2022/09295 states that, to avoid impacts to the Swan Galaxias, the approval holder must not clear in, dig in, or cause the pipeline to cross any waterway containing running or open water with potential Swan Galaxias habitat unless the approval holder has had an aquatic fauna expert undertake an aquatic survey of the waterway and the aquatic fauna expert has determined that Swan Galaxias is absent from the waterway. If the presence of Swan Galaxias is detected in any waterway the approval holder must submit a proposed waterway crossing method to the department for approval. The approval holder must not clear in, dig in, or cause the pipeline to cross that waterway unless the Minister has approved the method of crossing that waterway. The approval holder must implement the approved waterway crossing methodology.

CROSSING METHODOLOGY

This plan has been prepared to address the requirements of condition 12. The water crossing methodology applies to Dairy Creek, specifically watercourse (WC) number 13 which is located at chainage 2850 on the N1a line (501763E 5373017N) and WC-14 which is located at chainage 3000 on the N1a line.

The crossing methodology and environmental management plan requirements are detailed in Section 2.

Table 1. summary of address to conditions of approval.

Condition	Condition requirement	Demonstration of how the plan addresses condition requirements and commitments made in the plan to address condition requirements
12 (EPBC 2022/09295)	to avoid impacts to the Swan Galaxias, the approval holder must not clear in, dig in, or cause the pipeline to cross any waterway containing running or open water with potential Swan Galaxias habitat unless the approval holder has had an aquatic fauna expert undertake an aquatic survey of the waterway and the aquatic fauna expert has determined that Swan Galaxias is absent from the waterway.	Surveys were conducted by an aquatic fauna expert to determine the presence of Swan Galaxias (<i>Galaxias fontanus</i>) in waterways proposed to be crossed. Electrofishing surveys of five sites with suitable habitat were completed on the 26th and 27th September 2024. Swan Galaxias (<i>Galaxias fontanus</i>) were identified in a tributary of Dairy Creek (shown as location 4b, Figure 2), which is located downstream of project watercourses WC-13 (CEP 7, N1a_2850, Coordinates: 501763, -5373017) and WC-14 (CEP 7, N1a_3000, Coordinates: 501784, -5372884). No Galaxiid species were identified in any other surveyed waterway. Horizontal directional drilling (HDD) at project watercourses connected to Dairy Creek was not considered a feasible method to avoid impact due to the availability of large pipe HDD contractors in Tasmania and potential impacts to project budget, and timeframes if drilling fails due to adverse ground conditions. A Dairy Creek Crossing methodology has subsequently been developed to address potential impacts to swan galaxias and minimises risks to the species during construction at project watercourses that are flowing and connected to Dairy Creek.
12 (EPBC 2022/09295)	If the presence of Swan Galaxias is detected in any waterway the approval holder must submit a proposed waterway crossing method to the department for approval.	This document details the water crossing methodology that applies to Dairy Creek, and any tributaries that contain flowing water. The water crossing methodology has been developed by an aquatic fauna specialist to avoid impacts to the population of Swan Galaxias identified in Dairy Creek. The crossing methodology includes specific requirements which are summarised below: • Restrictions on timing of works to avoid biologically sensitive or high risk periods. • Infrastructure installation specifications • Construction methodology requirements • Water quality management requirements • Risk avoidance protocols • Remediation and rehabilitation requirements • Monitoring and rectification requirements.

CROSSING METHODOLOGY

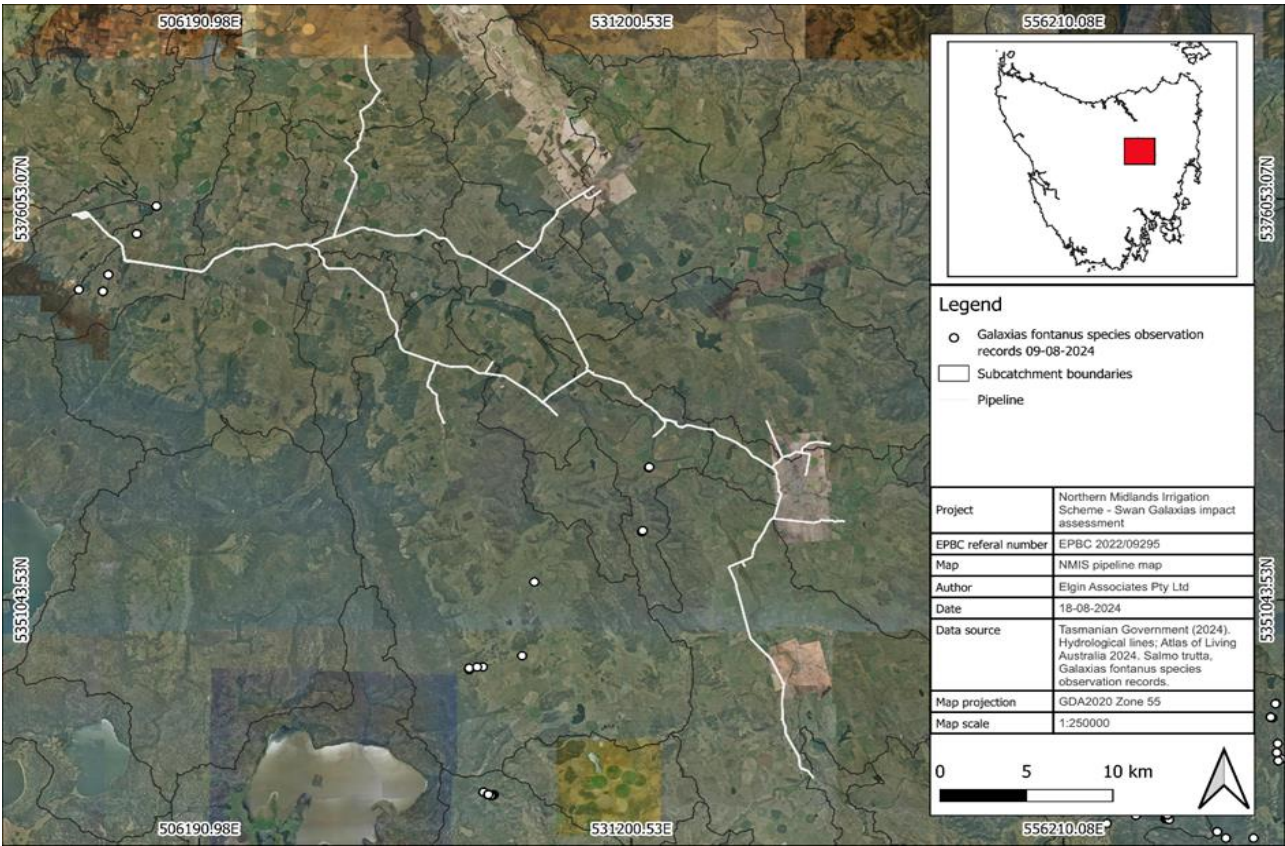


Figure 1: Proposed Northern Midlands irrigation scheme map (pipelines shown in white).

CROSSING METHODOLOGY

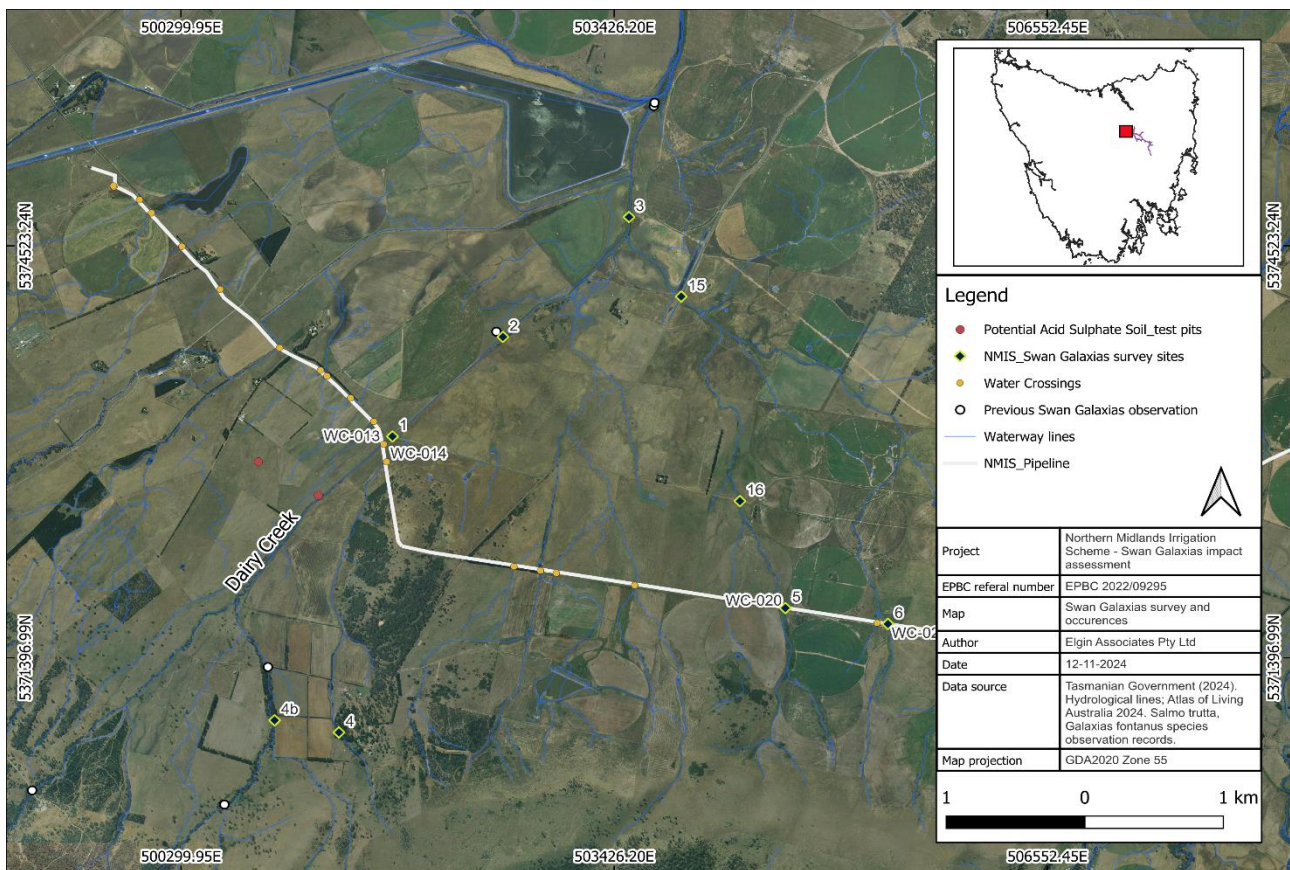


Figure 2: Dairy Creek pipeline crossing and Swan Galaxias occurrences.

1.2 Fish surveys and Swan Galaxias occurrence

Following prioritisation of potential habitat, 11 crossings were assessed using the on-ground verification and habitat inspections process described in Section 3.1 of the Tasmanian Irrigation Northern Midlands Irrigation Scheme Swan Galaxias (*Galaxias fontanus*) Prioritisation Study & Fish Survey Report (Elgin, 2024). Five sites were confirmed as having suitable habitat, requiring electrofishing surveys to determine the presence (or absence) of the species at each site. Electrofishing surveys of the five sites were completed on the 26th and 27th September 2024. Fish surveys were conducted in accordance with Survey guidelines for Australia's threatened fish: Guidelines for detecting fish listed as threatened under the EPBC Act (2011).

Swan Galaxias (*Galaxias fontanus*) were identified in a tributary of Dairy Creek (shown as location 4b, **Figure 2**), which is located downstream of project watercourses WC-13 and WC-14. No Galaxiid species were identified in any other surveyed waterway.

1.3 Crossing methodology

This plan was developed to meet Condition 12 of EPBC 2022/09295, which requires a crossing methodology be submitted to the Department if the presence of Swan Galaxias is detected in any waterway. The methodology applies specifically to project watercourses that are tributaries of Dairy Creek and have running or open water. At the time of reporting, WC-14 had no flow, therefore a standard crossing methodology can apply provided there is no flow at the time of construction. If flow occurs, the requirements in this crossing methodology will apply.

WC-13 was flowing at the time of the reporting. This watercourse crosses Dairy Creek proper which is believed to be spring fed with perennial flows.

CROSSING METHODOLOGY

Horizontal Tasmanian Irrigation assessed the use of horizontal directional drilling (HDD) at Dairy Creek and it was not considered a feasible option for avoiding impact for the following reasons:

1. Large diameter HDD contractors are not readily available in Tasmania and there is a possibility that the method could fail due to adverse ground conditions; and
2. If a specialist large diameter HDD drill rig is mobilised and fails to drill due to hard rock this could significantly impact project budget and completion timeframes.

1.4 Potential impacts

The key threat to Swan Galaxias as identified in *Conservation Advice Galaxias fontanus* Swan galaxias (Threatened Species Scientific Committee, 2016) and *Recovery Plan: Tasmanian Galaxiidae 2006-2010* (Threatened Species Section, 2006) is the introduction of exotic fish species. Competition with, and predation by introduced fish species is not relevant to the construction of the waterway crossing at Dairy Creek. This action will not remove any existing barriers preventing access by invasive fish species, and will not facilitate introduction of them into this waterway.

Potential impact pathways for this species in relation to the construction of waterway crossings are limited to the alteration of water flow, degradation of water quality, construction of barriers to fish passage, and the removal of streamside vegetation (which may alter water flow and quality), all of which will be mitigated with the appropriate controls for waterway crossings in accordance with condition 12 of EPBC 2022/09295.

The conversion of areas upstream from known populations to agriculture and/or silviculture is a possible impact pathway from operations in the district, which will be mitigated with the processes of the requisite Farm Water Access Plans (Farm WAPs) (in accordance with condition 17 of EPBC 2022/09295).

The construction of dams can be another potential impact pathway due to the effects on downstream populations and their habitats, however, no permanent dams will be constructed on Dairy Creek during this project.

The most likely and consequential impacts from the Dairy Creek crossing are related to construction works, rather than operational impacts. These include:

1. cessation or reductions in water flow,
2. degradation of water quality (sediment mobilisation, acidification, spillage or leakage of chemicals).
3. temporary barriers to fish passage
4. permanent changes to riverbed profiles and instream habitat
5. permanent damage to riparian vegetation.
6. direct entrainment and harm in works area

Each of these risks is rated and specified below according to the rating matrix and criteria in appendix 1. Risk ratings are determined by an approximate consequence of the impact and likelihood of occurrence with controls in place as specified in the methodology.

CROSSING METHODOLOGY

Life stage	Likelihood	Consequence	Pre-Control Risk rating	Consideration of Prescribed Controls	Post-control likelihood	Post-Control Risk rating
Cessation or reductions in water flow						
All life stages	Likely	Moderate	Medium	Assessed with relevant controls in place. Use of dewatering failsafe and inspection by fish passage specialist. (S2.5)	Unlikely	Low
Degradation of water quality						
All life stages	Highly likely	Moderate	High	Assessed with relevant controls in place. Use of sediment curtains and erosion and sediment controls. Inclusion of machinery inspections and restricted entry zone. Testing and treatment of potentially acid sulphate soils. Rehabilitation and revegetation of works area. (S2.4-2.8)	Unlikely	Low
Temporary barriers to fish passage						
All life stages	Unlikely	Minor	Low	Assessed with relevant controls in place. Limitation of works timeframe and timing of works relative to potential migration. (S2.2)(S2.2)	Highly unlikely	Low
Permanent changes to riverbed profiles and instream habitat						
All life stages	Likely	High	High	Assessed with relevant controls in place. Survey of original river bed composition and bathymetry, rehabilitation and reinstatement of bed composition and bathymetry. (S2.3, S2.4, S2.7)	Highly unlikely	Low
Permanent damage to riparian vegetation						
All life stages	Possible	High	Medium	Assessed with relevant controls in place. Rehabilitation and revegetation will improve riparian condition. (S2.7)(S2.7)	Highly unlikely	Low
Direct entrainment and harm in works area						
All life stages	Unlikely	Low	Low	Assessed with relevant controls in place. Specialist to survey and salvage any Swan Galaxias entrained in works area before works commencement. (S2.4)	Highly unlikely	Low

2 CROSSING METHODOLOGY AND ENVIRONMENTAL MANAGEMENT PLAN

2.1 Construction Method

Trenching

CROSSING METHODOLOGY

It is proposed that open trenching will be used to install the 1000mm diameter irrigation pipeline across Dairy Creek. The below methods and requirements are specified in accordance with best practice principles to ensure all impacts to Swan Galaxias are avoided.

The methodology detailed in this document is contingent on design and construction specifications provided by Tasmanian Irrigation at the time of inspection. Where specifications or construction methodology differs from this advice, environmental management requirements may need to be revised accordingly. Principally, the construction process as specified by Tasmanian Irrigation includes:

- Installation of two 1000mm diameter pipes, installed parallel at or below 1m depth below the existing bed level of Dairy creek at the crossing site.
- Use of a 40m wide construction corridor.
- A construction timeframe of up to 4 weeks.

2.2 Timing

- All works are to be conducted during low-flows between December and March.
- Works must be completed within 4 weeks of installation of sediment curtains.
- Rehabilitation of the site must be completed within 7 days of completion of construction works.
- Revegetation must be commenced in accordance with advice from a suitably qualified expert within 7 days of completion of rehabilitation works.

2.3 Infrastructure Specifications

- Pipelines must be installed an appropriate depth below the stream bed to prevent exposure of the pipe in the future as the streambed naturally erodes. Where the streambed geology is comprised of erosive material, a greater depth is necessary. The highest point of pipe or casement (or invert where a casement is not used) must be at least 1m below the existing bed level, and regraded bed level following installation.
- No infrastructure is permitted to be exposed to the watercourse during any flow conditions following completion of works.
 - To confirm this, an inspection of works will be conducted within 12 months of completion of construction works.

CROSSING METHODOLOGY

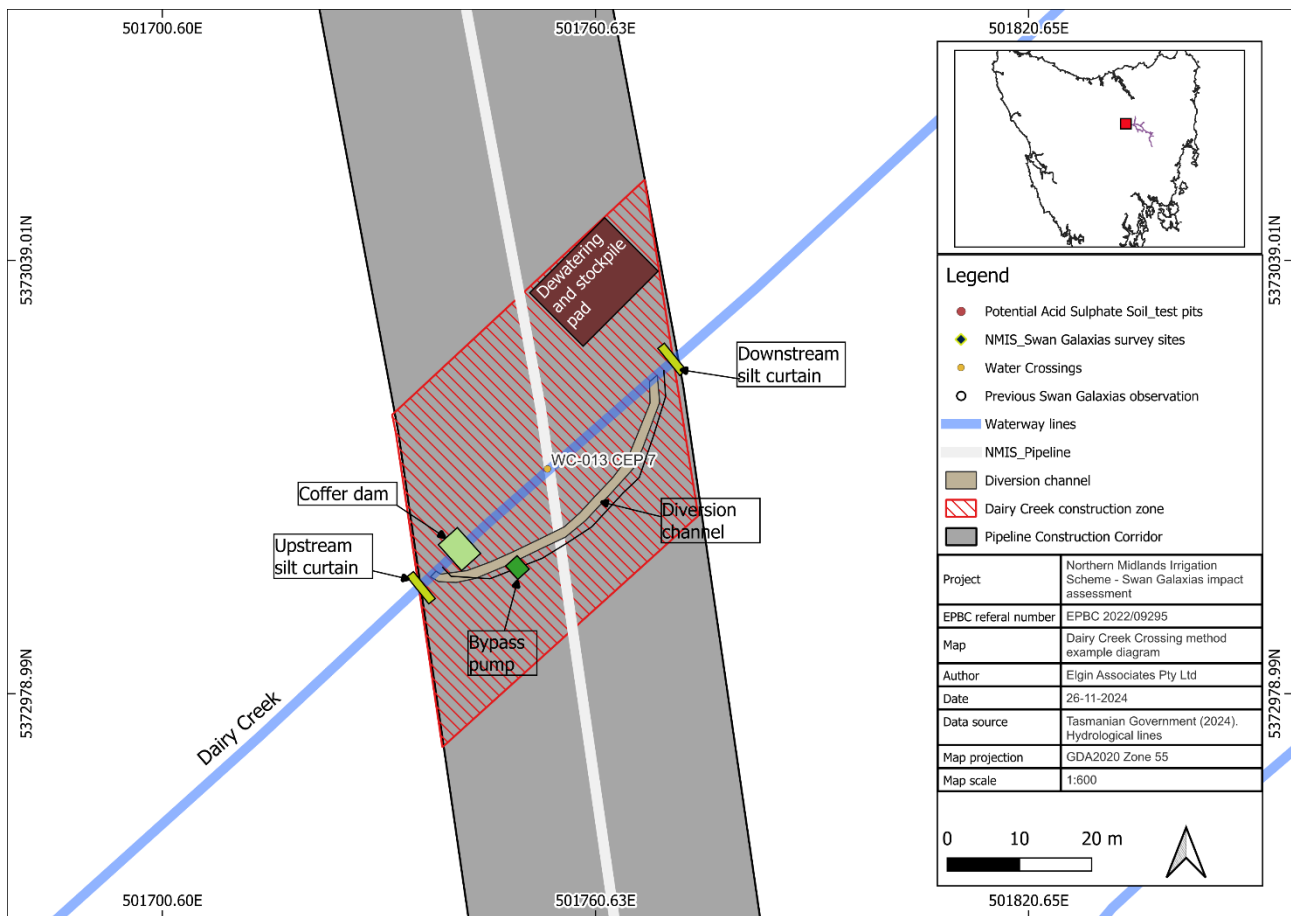


Figure 3: Dairy Creek pipeline crossing example construction diagram.

2.4 Construction Requirements

Before any operations commence:

- An acid-sulphate soil test must be completed and confirmed no potential acid-sulphate soils are present within the construction corridor, up to 20m from the waterway.
- A 40m wide construction corridor is proposed.
 - The construction zone includes a 40m stretch of waterway, and adjacent area 20m from each bank of the waterway (as demarcated in Figure 3).
 - No works are to occur within the waterway, or on the adjacent banks (20m distance from either bank of the waterway) outside of the construction corridor.
- Sediment curtains must be installed across the full width of the waterway (high bank to high bank) upstream and downstream of the construction corridor.
 - Installation of sediment curtains is to be no more than 5m upstream or downstream of the construction corridor.
 - A qualified freshwater fish ecologist must inspect installed sediment curtains.
- A qualified freshwater fish ecologist must survey and salvage any fish within the construction corridor following installation of sediment curtains.

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- Where salvage is required, the qualified freshwater fish ecologist is required to identify all species present before translocation.
 - Where Swan Galaxias are identified within the enclosed construction corridor, works are to cease immediately and further impact assessment conducted prior to recommencing works.
- The topographic profile of the streambed within the works area must be measured prior to commencement of works to ensure accurate reinstatement during remediation.
 - This may include at minimum measurement of streambed levels at 2m intervals along the 40m stretch of waterway.
- The current bed material composition is assessed prior to commencement of works to ensure reinstatement of same during remediation.
 - Analysis should determine the composition of streambed material up to a depth of 20cm, and whether composition varies along the 40m stretch of waterway.

2.5 Commencement of Works

- Following site clearance by the qualified freshwater fish ecologist,
- A coffer dam must be installed within the construction zone (construction corridor bounded by upstream and downstream sediment curtains).
 - Cofferdams must be constructed using an impermeable liner to ensure fill material does not come into contact with stream water.
- A pump, siphon, or lined diversion channel may be used to dewater the coffer dam.
 - Dewatering must ensure consistent flow of water is discharged into the main stream channel within the construction zone (upstream of the downstream sediment curtain) for the duration of construction.
 - The inlet of the pump or siphon must be covered by a minimum 5mm screen.
- A suitably qualified freshwater fish ecologist specialist must be present during installation of the coffer dam and commencement of dewatering.
- The coffer dam and pump/siphon/diversion channel operation must be inspected by a suitably qualified freshwater fish ecologist within 24hrs of installation.
- Any disturbance (e.g. pump stoppage, siphon stoppage) to dewatering must be immediately reported to a qualified freshwater fish ecologist.
- Water flow to the waterway downstream of the site must be adequately maintained throughout the construction period.
 - Discharge must be maintained at an equal rate to inflows from the upstream catchment.
 - Discharge must be monitored at all times to ensure flows do not cease.
 - Where cessation of flow is detected, immediate steps must be taken to reinstate flows.
- A fail-safe dewatering measure must be installed as a precaution for dewatering failure to allow overflow from the coffer dam to be redirected into the main stream channel within the construction zone (upstream of the downstream sediment curtain). (this may also act as a fail-safe for dewatering).
 - The fail-safe diversion measure must suitably dewater the coffer dam so that stream flows are maintained for the duration of the stoppage. This may include for example, a lined diversion channel.

2.6 Undertaking Works

- While undertaking works, all machinery used within the works area (40m construction zone) must be:

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- inspected daily to ensure no leakage of lubricants, fuels or other liquid chemicals are, or have the potential to occur during operation, or occur during storage;
 - Free from biological hazards including soil, plant material, seeds, or other hazards that may constitute a risk to fish or other aquatic flora and fauna.
- Machinery must not be stored within the 40m construction zone while not in operation.
- Stationary plant (e.g. generators) must be situated in a sufficiently bunded level surface as far as practicable from the waterway.
 - General bunding guidelines are 110% of the volume of the largest container or storage vessel or 25% of the total volume stored in the bund, whichever is greater.
- Refuelling and maintenance (where this relates to liquids, lubricants, coolants or other chemicals) of machinery must not occur within the 40m construction zone.
 - Liquids and fuels must not be stored within the 40m construction zone.
- Light vehicles are not permitted within the 40m construction zone unless required for emergencies, or where the vehicle has been inspected to confirm it complies with machinery requirements listed above.
- Removal of soil and vegetation from the works area must ensure no soil or vegetation material enters the waterway outside of the construction zone.
- Excavated bed material must be dewatered (if appropriate), isolated and retained on site for re-use during remediation.
- Excavated bank material must be isolated and retained on site for re-use during remediation.
- Excavated materials for re-use must be kept free from contamination by chemical or biological contaminants.
- Appropriate sediment and erosion control measures must be used throughout construction, and following construction.
 - Sediment and erosion control measures must be inspected by a suitably qualified person during construction and rectifications undertaken where required.
- All livestock must be prevented from accessing the works area or other parts of the waterway as a result of construction works.
- During construction, water quality monitoring must be undertaken by a suitably qualified person in accordance with the Construction Water Quality Management Plan.
- While undertaking works, precautions must be taken to mitigate impacts from potential flood events.
 - Procedures and requirements detailed in section 8 of the Construction Environmental Management Plan must be adhered to.
 - Sediment and erosion control measures must be suitably designed and implemented to ensure discharge of sediment into the waterway from the construction site is minimised during a flood event.
 - Cofferdam design must be adequate to ensure the structure does not become unstable, detached or allow for breaches to occur during flood events.
 - The diversion channel (or other fail-safe diversion measure) must be adequately designed to ensure additional flows during flood events are sufficiently diverted.
 - Ensure all construction materials or other equipment is secured and any other precautions are taken to ensure environmental harm is minimised during a flood event.

2.7 Remediation and rehabilitation

- The construction corridor must be remediated in accordance with the Rehabilitation and Reinstatement Plan.
- In addition to requirements detailed in the Rehabilitation and Reinstatement Plan, remediation must:

- be completed within 1 week following installation of infrastructure.
 - Remediation includes reinstatement of streambed and bank profiles and composition, removal of felled or excavated vegetation.
- ensure that streambed composition and profile are returned to pre-works conditions.
- ensure that any scour protection (such as rip rap or rock) installed in the bed of the waterway is installed at a minimum of 30cm below bed-level and covered with bed material that is naturally present within the waterway.
- ensure that any scour protection used on stream banks is covered with a minimum of 30cm of topsoil that replicates the original composition of the site.
- ensure that any engineered erosion control materials such as geotextile products are installed so that they will not be exposed to, or enter the waterway under extreme weather conditions or over time as a result of erosion.
- ensure that backfill material used within the bed and banks of a waterway are:
 - obtained from site and replicate material existing within the waterway (excluding rock scour protection).
 - be free of contamination including but not limited to acid sulphate soils, heavy metals, hydrocarbons, biological hazards.
- Exemptions to the Rehabilitation and Reinstatement Plan include:
 - Remediation of bed and banks within the works area should maintain the existing waterway profile as much as practicable.
 - Where banks exceed a gradient of 1:3, remedial works should be undertaken to ensure that grades are at least 1:3 (1H:3L).
- Where riparian vegetation is removed or disturbed, revegetation is conducted in accordance with the Rehabilitation and Reinstatement Plan.
- In addition to requirements specified in the Rehabilitation and Reinstatement Plan, revegetation must:
 - Be commenced within 1 week of completion of works
 - Complete establishment of native vegetation within 6 months of completion of works
 - Establish native vegetation that is representative of the local area and riparian habitat as advised by a suitably qualified expert (where existing vegetation is not representative native vegetation, seeding or planting is required).
 - Be maintained (including maintenance actions necessary to ensure successful establishment of vegetation) for a period of 18 months after completion of revegetation.
- Where revegetation is unsuccessful, further works must be undertaken as necessary to rectify this.

2.8 General Requirements

Work will be undertaken in accordance with the approved Construction Environmental Management Plan, Water Quality Management Plan, and Drainage, Erosion and Sediment Control Plan.

In addition to requirements detailed in the above plans, water quality management must include:

- Monitoring to be undertaken by a suitably qualified person and conducted in accordance with the following:
 - Daily readings start at least one day prior to construction commencing.
 - Minimum three upstream and downstream readings taken daily once construction has commenced:
 - Prior to the commencement of daily works
 - During daily works

CROSSING METHODOLOGY

- At the completion of daily works
- At any other time that there is a visible change in turbidity downstream resultant from site activities.
- Where parameters exceed those specified in the WQMP or CEMP, works must immediately be ceased, and appropriate remedial action taken until parameters meet the above requirements.
- Water quality monitoring must include monitoring of below parameters:
 - Water Temperature,
 - Dissolved oxygen,
 - Electrical conductivity,
 - pH,
 - Turbidity

Longer term controls

An inspection of the crossing must be carried out after at least 12 months, and within 24 months of completion of works during low-flow conditions by a suitably qualified aquatic ecologist to ensure that:

- Revegetation is likely to be successful
- No significant erosion of the bed and banks is occurring as a result of the works
- No infrastructure installed under or adjacent to the waterway has been exposed as a result of erosion.

Where works have resulted in a change to hydrology, an appropriately qualified specialist must be engaged and remedial works conducted (if appropriate) to ensure no ecological impacts that may impact Swan Galaxias occur.

2.9 Compliance Reporting and Auditing

Compliance with the Dairy Creek Methodology will be monitored and audited using a mixture of reports and checklists outlined in Table 2. Tasmanian Irrigation (TI) will conduct an audit upon completion of rehabilitation and review of the environmental compliance report. Maintenance and monitoring will be audited thereafter as part of contractor and TI CEMP audits (outlined in section 11 of the CEMP).

Table 2. Monitoring and Compliance Reporting Requirements for Dairy Creek Crossing (WC-13)

Requirements	Responsibility	Monitoring / Compliance Reporting
Pre-construction		
Complete an acid-sulphate soil test within the construction corridor, up to 20m from the waterway.	Suitably qualified consultant	Preliminary site investigation report
Measure topographic profile of the streambed.	Tasmanian Irrigation	Preliminary site investigation report
Assess material composition of streambed.	Suitably qualified consultant	Preliminary site investigation report
Design diversion channel (or other fail-safe diversion measure) in consultation with qualified freshwater fish	TI & suitably qualified freshwater fish ecologist	Environmental Compliance Report

CROSSING METHODOLOGY

ecologist, which accounts for additional flows during flood events.		
Install sediment curtains across the full width of the waterway (upstream and downstream).	Contractor	Daily site diary
Inspect sediment curtains and salvage any fish within the construction corridor following installation of the curtains.	Suitably qualified freshwater fish ecologist	Environmental Compliance Report Permit to take forms / notifications
Construction		
Monitor installation of coffer dam and diversion channel (or other fail-safe diversion measure), and commencement of dewatering.	Suitably qualified freshwater fish ecologist	Environmental Compliance Report.
Monitor and maintain downstream flows at an equal rate to inflows from the upstream catchment. Where cessation of flow is detected, immediate steps must be taken to reinstate flows.	Contractor	Daily Inspection Checklist Water Quality Monitoring Checklist (checks completed minimum three times daily)
Inspect coffer dam and diversion channel within 24 hours of installation.	Suitably qualified freshwater fish ecologist	Environmental Compliance Report
Daily inspections of the following: • Bypass pumps • Sediment and erosion controls (e.g., diversion channel, sediment curtains, coffer dam) • Fuel/chemical storage • Leaks/spills • Machine storage (not allowed within 20m either side of the watercourse while not in operation) • Light vehicle access • Signage (access, stockpiles) • Washdown bays • Refuelling • Stockpiles • Livestock access prevention measures	Contractor	Any disturbance (e.g. pump stoppage, siphon stoppage) to dewatering must be immediately reported to a qualified freshwater fish ecologist. Compliance will be monitored using the following checklists: • Daily Inspection Checklist • Vehicle and machinery pre-starts • HSE Weekly Site Checklist
Undertake water quality monitoring in accordance with the Construction Water Quality Management Plan.	Contractor	Water Quality Monitoring Checklist (checks completed minimum three times daily) Monthly report
Rehabilitation		
Reinstate the watercourse within 1 week of completing construction. This includes reinstating streambed and bank profiles and composition to pre-works conditions. Where banks exceed a gradient of 1:3, remedial works should be undertaken to ensure that grades are at least 1:3 (1H:3L).	Contractor	Daily Inspection Checklist Environmental Compliance Report

CROSSING METHODOLOGY

Revegetate the waterway in consultation with a suitably qualified expert (where riparian vegetation is removed or disturbed).	TI / suitably qualified consultant	Consultant Report
Scour protection used in the bed of the waterway (such as rip rap or rock) will be installed at a minimum of 30cm below bed-level and cover with bed material that is naturally present within the waterway.	Contractor	Daily Inspection Checklist Environmental Compliance Report
Scour protection used on stream banks must be covered with a minimum of 30cm of topsoil that replicates the original composition of the site.	Contractor	Daily Inspection Checklist Environmental Compliance Report
Erosion control materials (e.g. geotextile) will not be exposed to or enter the waterway under extreme weather conditions or over time as a result of erosion.	Contractor	Daily Inspection Checklist Environmental Compliance Report
Backfill material used within the bed and banks of a waterway will be obtained from site and replicate material existing within the waterway. It will also be free of contamination.	Contractor	Daily Inspection Checklist Environmental Compliance Report
Maintenance and Long-term Monitoring		
Maintain revegetated areas of the crossing for a period of 18 months upon completion of rehabilitation.	Contractor	HSE Weekly Checklist Monthly report Environmental audits
Inspect the crossing during low-flow conditions between 12-24 months after completion of works.	Suitably qualified freshwater fish ecologist	Dairy Creek Remediation Report
If works result in a change to hydrology, an appropriately qualified specialist will be engaged and remedial works conducted (if appropriate) to minimise risk of impacting swan galaxias.	TI	Consultant report (if applicable)

Non-compliances

If non-compliance is identified during works or site inspections, work must cease, and an assessment undertaken to confirm the appropriateness of controls and if additional controls are required. Any non-compliances with the permit (EPBC 2022/09295) must be reported in accordance with the CEMP.

Construction must also cease when swan galaxias are identified within the construction corridor and cannot recommence until an impact assessment is undertaken by a suitably qualified freshwater fish ecologist.

REFERENCES

3 REFERENCES

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4 LIMITATIONS

Elgin Associates Pty Ltd has prepared this report for the sole use of Tasmanian Irrigation in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the proposal.

The methodology adopted and sources of information used by Elgin Associates are outlined in this report. Elgin Associates has made no independent verification of this information beyond the agreed scope of works and Elgin Associates assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to Elgin Associates was false.

The works informing this study were completed between November 2024 and January 2025 and this report is based on the conditions encountered and information reviewed during that period up to the time of preparation. Elgin Associates disclaims responsibility for any changes that may have occurred after this time. Opinions and recommendations contained in this report are based upon information gained during desktop study and fieldwork and information provided from government authorities' records and other third parties. The information in this report is considered to be accurate at the date of issue and reflects at the site at the dates sampled. This document and the information contained herein should only be regarded as validly representing the site conditions at the time of the fieldwork unless otherwise explicitly stated in a preceding section of this report.

This report should be read in full together with all other reports referenced by this report. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

APPENDICES

5 APPENDIX 1

Table A 1. Risk rating matrix for impact assessment on Swan Galaxias (*G. fontanus*).

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely (>90%)	Medium	High	High	Severe	Severe
Likely (>70%)	Low	Medium	High	High	Severe
Possible (>50%)	Low	Medium	Medium	High	Severe
Unlikely (<30%)	Low	Low	Medium	High	High
Highly unlikely (<10%)	Low	Low	Low	Medium	High

Table A 2. Consequences of impacts to Swan Galaxias (*G. fontanus*) resulting from the Dairy Creek pipeline crossing.

Consequence rating	Implications for Swan Galaxias in Tasmania
Minor	Impacts are highly spatially and temporally restricted (within a localised part of a reach and occurs over days) – no individuals or small number of individuals impacted.
Moderate	Impacts are spatially and temporally restricted (within a reach and occurs within a single season) – single population and small number of individuals impacted.
High	1. Impacts are spatially dispersed throughout the ecosystem and will occur over multiple seasons – Multiple populations and moderate number of individuals impacted, or 2. Impacts are spatially restricted within the ecosystem but are long-term or permanent – few populations, many individuals impacted.
Major	Impacts are spatially dispersed throughout the ecosystem and will occur over multiple years – multiple populations and most individuals impacted.
Critical	Impacts are spatially widespread throughout the region encompassing multiple ecosystems and are permanent – all populations impacted.