Victorian Desalination Project

D&C Plant and General Area Environmental Management Plan

Attachment I10 – Waterways and Wetlands Sub Plan

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Definitions and Acronyms

The following Definitions and Acronyms are used in this document:

ANZECC	Australia and New Zealand Environment and Conservation Council
Class One Environmental Incident	Class One Environmental Incidents create permanent or long term damage to the environment. This damage will result in the environment taking 12 months or more to return to pre-existing conditions or costs in excess of $50,000 to remediate. (See AEMP Attachment K-1).
Class Two Environmental Incident	Class Two Environmental Incidents create short to medium term damage to the environment. This damage will result in the environment taking up to 12 months to return to pre-existing conditions or costs in excess of $10 000 but not exceeding $50,000 to remediate. (See AEMP Attachment K-1).
Class Three Environmental Incident	Class Three Environmental Incidents typically cause short term or nuisance damage. The damage is easily rectified usually within one day. Class 3 incidents do not cause medium or long term damage or costs less than $10 000 to remediate. (See AEMP Attachment K-1).
CMA	Catchment Management Authority
CWMS	Construction Work Method Statements
D&C	Design and Construct Phase of the VDP
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
EES	Environment Effects Statement
EIRP	Environmental Incident Response Plan
EPA	Victorian Environment Protection Authority
EP Act	*Environment Protection Act 1970*
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
Emergency Response Services	May, as appropriate, mean police, ambulance, fire brigades, state emergency services, hospitals or other specialist groups
EMP	Environmental Management Plan
EMR	Environmental Management Representative
EMS	Environmental Management System
EO	Environmental Officer
EPA	Victorian Environment Protection Authority
EP Act	*Environment Protection Act 1970*
EPBC Act	*Environment Protection & Biodiversity Conservation Act 1999*
EVC	Ecological Vegetation Class

FFG	*Flora and Fauna Guarantee Act 1988 (Vic.)*
GOV	Groundwaters of Victoria
JHA	Job Hazard Analysis
JSEA	Job Safety and Environmental Analysis
NEPM	National Environment Protection Measure
NVMF	Native Vegetation Management Framework
O&M	Operation and Maintenance Phase of the VDP
OHS	Occupational Health and Safety
Performance Criteria	The Performance Criteria outline the overarching requirements based on the environmental objective for each Subject Area of Schedule A of Appendix S3 of the Project Scope and Project Requirements
Plant site	Victorian Desalination Project Wonthaggi Plant site
PR	Performance Requirements
PS&PR	Project Scope and Project Requirements
Ramsar	Wetland listed under the international treaty for the conservation of wetlands
SEP	Site Environmental Plans
SEPP	State Environment Protection Policy
SEPP (WoV)	State Environment Protection Policy (Waters of Victoria)
SEWPAC	Department of the Sustainability, Environment, Water, Population and Communities *formally Department of Environment, Water, Heritage and the Arts (DEWHA)
sp.	Species (one species)
spp.	Species (more than one species)
TDJV	Thiess Degrémont Joint Venture
The State	The Minister for Water of the State of Victoria for and on behalf of the Crown in the Right of the State of Victoria
VDP	Victorian Desalination Project
WAP	Work Area Packages
WP	Work Packs

1 Purpose and scope

This Waterways and Wetlands Sub Plan describes the existing waterways and wetland conditions and the management measures required to mitigate the potential negative impacts to the flora, fauna and water quality from construction activities in these waterways and wetlands, associated with the following phases of the Victorian Desalination Project (VDP):

1. Design and Construction (D&C)
2. Construction Verification and Cleaning
3. Pre-commissioning and Commissioning

The D&C EMP Commissioning Environmental Sub Plan (CESP) includes the Commissioning Risk Assessment which is used to manage unique/specific environmental risks from first intake of seawater into the plant site onwards ('Wet Commissioning'). As outlined by the CESP Risk Assessment, where the activities or risks are common to both the D&C and Commissioning phases, the risks will be managed by this sub plan and associated control measures.

This sub plan must be read in conjunction with the Environmental Management System (EMS) Manual, D&C Environmental Management Plan (D&C EMP), the D&C Plant and General Area EMP and the Commissioning Environmental Sub Plan (CESP). This sub plan forms an attachment to the D&C Plant and General Area EMP and addresses requirements listed in the Environmental Compliance Tracker (TDV-0-EV-RP-0001-01), including licence conditions, Performance Requirements, Performance Criteria (PC) and other obligations which may influence waterways and wetlands.

Specific management measures from this and other environmental sub plans have been incorporated into Work Area Packages (WAP) and Work Packs (WP) which include Construction Work Method Statements (CWMS), Site Environmental Plans (SEP) and Job Safety and Environmental Analysis (JSEA's) where applicable.

This sub plan should be read in conjunction with the Water Quality & Erosion Management, Soil Management and Hazardous Materials sub plans for related control measures.

2 Objectives and Targets

The objective of this sub plan is to minimise and manage the impacts of construction on native species and ecological communities, particularly those listed as threatened under the Commonwealth EPBC Act and State FFG Act, and to ensure project objectives, targets and obligations, including PRs and associated criteria, are met.

Table 1 outlines the relevant waterways and wetlands objectives and targets nominated to be achieved during the D&C phase of the VDP. Numbered entries are applicable performance requirements taken from Schedule A of Appendix S3 of the Project Deed.

Table 1: Environmental objectives, targets and performance requirements

Issue	Objective/Performance Criteria	Target/Performance Requirement
Waterways and Wetlands	**Protect waterways and wetlands** Comply with the State Environment Protection Policy (Waters of Victoria) or ANZECC Guidelines (2000) (**PR#07060**)**D, C**.	Develop and implement construction methods and site rehabilitation plans that seek to protect the habitat values of waterways and wetlands including(**PR#07062**)**C**: • Developing appropriate construction methods to minimise environmental impacts for crossing sensitive waterways including: - Powlett River • Wherever practicable, where trenching of waterways is to occur, trench during dry conditions • Site specific construction methods to minimise environmental impacts on ecologically significant species and vegetation, as well as the risk of sedimentation, heightened flood risk, acid sulphate soils and impacts on downstream water users. • Reinstating and revegetating disturbed areas • Limiting impact on ecological processes such as fish movements and breeding Develop and implement monitoring and reporting on the effects of construction on waterways and wetlands. (**PR#07063**)**C**. Develop and implement methods and management systems to limit impacts on waterways and wetlands during operation. (**PR#07063-1**) Re-establishment of wetland (unnamed tributary of the Powlett River) on the Leased Area. (**PR#07064-1**)**D, C**.
	Maintain the environmental values of waterways and wetlands(**PR#07060**)**D, C**. Compliance with all relevant Government Agency and/or Water Authority requirements for waterway crossings (**PR#07060**)**D, C**. Avoid where practicable or minimise impacts in the designated areas presented under the EES (**PR#07060**)**D, C**.	

D = Design phase requirement; C= Construct phase requirement

All PRs from Project Deed Schedule A of Appendix S3 are contained within the D&C Plant EMP Attachment G – Environmental Obligations Register. The Environmental Compliance Tracker tracks conformance with these PRs and is updated regularly by the TDJV Environmental Manager and Area Environmental Managers.

3 Legal, regulatory, licence, permits and approval requirements

This sub plan has been developed in accordance with the following legislation:

- *Environment Protection and Biodiversity Conservation Act 1999* and subsequent Waterways Environmental Management Strategy, prepared as required by the EPBC Act Approval for the project.
- *Flora and Fauna Guarantee Act 1988*

- *Catchment and Land Protection Act 1994*
- *Environment Protection Act 1970*
  - State Environment Protection Policy – Groundwaters of Victoria
  - State Environment Protection Policy – Waters of Victoria (2003)
  - State Environment Protection Policy (Prevention and Management of Contamination of Land)National Environment Protection (Assessment Of Site Contamination) Measure, 1999, [NEPM] – Schedule A and Schedule B
- *Water Act 1989*

There are several guidelines and strategies that are used in Victoria to establish water quality objectives to assist in determining the level of management necessary to meet SEPP requirements. These include:

- Regional Catchment Strategies (Port Phillip and Western Port CMA and West Gippsland CMA)
- River Health Strategies:
  - Port Phillip and Westernport Regional River Health Strategy
  - West Gippsland River Health Strategy
- Bass Coast, Cardinia and Casey Planning Schemes – Land Subject to Inundation Overlays
- ANZECC and ARMCANZ, 2000. Australian and New Zealand Guidelines for Fresh and Marine Water Quality
- EPA (Vic) Publication 668: Hydrogeological Assessment (Groundwater Quality) Guidelines
- EPA (Vic) Publication 840: The Clean-up and Management of Polluted Groundwater
- EPA (Vic) Publication 669: Groundwater Sampling Guidelines
- EPA (Vic) Publication 441: A guide to the sampling and analysis of waters, wastewaters, soils.

Permits applicable to the Plant and General works are contained within the Environmental Licence, Permit and Approvals Register (Attachment F to the D&C Plant and General Area EMP). Permits applicable to the waterways and wetlands impacted by the Plant and General works include:

- Melbourne Water or West Gippsland CMA – Works on waterways
- DSE – Groundwater pumping for any dewatering in conjunction with desalination plant development
- DSE – Translocation of any Nationally and State-listed fish species
- Department of Primary Industries – Fish Surveys for Research Permit
- *EP Act 1970* – Permits to access groundwater and manage groundwater resources sustainably
- *EP Act 1970* – License to discharge water into waterways

The legislative and contractual requirements for the D & C Plant and General Area are summarised in:

- D&C Plant and General Area EMP – Attachment E – Environmental Legislation Register
- D&C Plant and General Area EMP – Attachment F – Environmental Licence, Permit and Approval Register

- D&C Plant and General Area EMP – Attachment G – Environmental Obligations Register.

The applicable PRs from Project Deed Schedule A of Appendix S3 are provided in Table 2.

Under the Project Deed the D&C EMP, all sub plans and any changes to these must be endorsed by the State, who may refer aspects to relevant agencies. Any changes to this sub plan need to be reviewed against the EPBC Waterways Environmental Management Strategy. If such changes are not consistent with the strategy, amendments to the EPBC Act approval must be sought through SEWPAC.

EPA and any other relevant agencies and stakeholders will be consulted with regard to any specific approval requirements in relation to this sub plan. The requirements of any permits, licences and approvals obtained will be placed in the Environmental Licence, Permit and Approval Register on receipt and updated in the Environmental Compliance Tracker.

4 Existing Conditions and Issues

4.1 Wetland

The Plant and General Area works study area covers an area of 264 hectares. The construction of the plant will be undertaken on sensitive habitat, given the presence of the wetland on the unnamed tributary of the Powlett River within the construction area. Re-establishment of this wetland is planned via a low 200mm bund with a penstock just upstream of Wonthaggi Drain, to create an open water body extending back towards the plant. This will be achieved through minimal earthworks and is likely to enhance the ecological value through the retaining of existing vegetation and adding new wetland plants to the area.

4.2 Waterways

Surface water is water that flows in streams and rivers and sits in natural lakes, wetlands and reservoirs. The Lower Powlett River and associated tributaries including channelised farm drains flow around the site. A slow flowing ephemeral tributary of the Lower Powlett River traverses the plant site and together with channelized farm drains enter the Powlett River close to the site. These channels are likely to drain water from the site to the Lower Powlett River during high flow events. Upstream of the plant site there are deeper pools that do not completely dry out. Various migratory and freshwater fish may use these pools for habitat during summer months.

The Powlett River mouth discharges to Bass Strait and is a seasonally influenced river with the bulk of flows occurring between late autumn to early spring. The plant site is adjacent to the Lower Powlett River's tidal zone.

4.3 Wetlands, dams, floodplains, salt marsh and swamps

Within the construction area, there is a single wetland on the unnamed tributary of Powlett River, as well as several small dams. Wetlands and dams are important in relation to ecological functions, including bird, fish and macro invertebrate habitat and breeding habitat. These also assist in dispersal of macro invertebrates and fish (during flood events). The water and sediment quality may vary at each of these sites, due to soil composition, terrestrial plants and land disturbance.

4.4 Western Port Bay

The Western Port Ramsar site is a large bay connected to Bass Strait by a wide channel between Flinders and Phillip Island and a narrow channel between San Remo and Phillip Island, draining an area of 3,200 square kilometres. French Island lies in the middle of Western Port Bay. The tidal range in Western Port Bay is the greatest for any location on the Victorian coast (up to three metres) and is characterised by a wide variety of marine habitats ranging from deep channels to extensive sea grass flats, mangroves, saltmarsh and wide tidal mudflats. Plant site activities are outside the area of impact for the Western Port Ramsar Site.

5 Environmental Risk

An environmental risk assessment has been carried out for the D & C D&C Plant and General Area works. This assessment is contained in the Environmental Risk Register, Attachment C of the D&C Plant and General Area EMP. Table 2summarises the potential hazards from project activities, potential impacts of these hazards and the risk of occurrence as rated by the environmental risk assessment.

Table 2: Summary of plant and general area risk assessment for Waterways and Wetlands

Activity posing hazard	Risk/ Potential Impact	Inherent Risk (before controls)	Control measure reference (Att I10.1)
Accidental contamination of a waterway and/or area of vegetation or significant habitat, through the incorrect disposal of ASS/PASS soils or rock.*	Negative impact to sensitive waterways such as loss of habitat, reduction in habitat quality from contamination.	Moderate	See Att I11 ASS Sub Plan
Accidental chemical spill within, or in the immediate vicinity of a waterway	localised harm to soil and local water quality	High	See AttI2 Hazardous Materials Sub Plan, sections 5 & 9
Waterway destabilisation if a pipe-jacking attempt on a waterway is compromised **	Sensitive waterway compromised as a result of de-stabilisation, there may be impacts on significant species.	High	#20
Construction verification and cleaning Activities, including hydrotesting, leak testing, pipe cleaning and pressure testing.	Potential out of specification discharge to waterway, loss of localised water quality, loss of local amenity, potential harm to aquatic species	High	#1-20

Activity posing hazard	Risk/ Potential Impact	Inherent Risk (before controls)	Control measure reference (Att I10.1)
Commissioning activities, including commissioning of SWLPS, Pre-Treatment, RO and Potabilisation Areas.	Potential out of specification discharge to waterway, loss of localised water quality, loss of local amenity, potential harm to aquatic species	High	#1-20

* Dealt with in the Acid Sulfate Soils Sub Plan.

** Pipe-jacking is not proposed on the plant site but is included from the risk assessment for completeness, should it be deemed necessary.

Attachment C of the D&C Utilities Area EMP and Attachment I.1 of the CESP should be consulted for a comprehensive assessment of these risks.

The following risks from project activities have been identified elsewhere in the risk assessment as potentially impacting on waterways and wetlands. They are addressed directly in other sub plans as follows:

- Sediment laden run off from erosion of soil, roads and earthworks spoil (Water Quality and Erosion Management Sub Plan)
- Run off from incorrect disposal of contaminated wastes (Soil Management Sub Plan).

6 Control, management and mitigation measures

Attachment I10.1 describes a range of mitigation and control measures to be used to minimise and manage potential impacts to flora, fauna and water quality of waterways and wetlands. Control measures implemented on site in response to potential and actual water quality impacts will be recorded in the Weekly Environmental Inspection Checklist (FM-TDV-EN-0-X-000-0006) and records retained on site.

The measures in Attachment I4.1 are designed to address potential impacts from the risks outlined in Section 5 as well as deliver on the objectives, targets and in particular the PRs listed in Section 2. They include requirements and responsibilities for design, construction, evaluating performance and reporting.

Attachment I4.1 also references Design Packages (DPs) in design-related control measures. PRs that relate to design are addressed in accordance with the Design Management Plan (PL-TDV-PM-0-X-000-0011-0-00).

Additional control measures relevant to waterways and wetlands are detailed under the Water Quality & Erosion Management, Soil Management and Hazardous Materials sub plans.

7 Site environmental plans

A single Site Environmental Plan (SEP) has been developed for the whole plant site that details environmental management measures such as permanent controls, No Go zones, property boundaries and significant flora and fauna species. These measures are to be implemented to minimise potential impacts of construction activity on the environment and community.

The information contained in the SEP is presented in pictorial and tabular drawing format. This is to make them easy to use by all site personnel, consultants and subcontractors. SEPs are updated to reflect operating practices on a regular basis.

The waterways and wetlands management controls set out in the SEP are drawn from this sub plan. Additional practical management measures are picked up and covered by the Weekly Environmental Checklist.

SEPs are held onsite by Area Environment Managers.

8 Evaluating performance and reporting

Environmental audits and site environmental inspections (SEIs) are scheduled to detect where PRs and other environmental requirements are not being met with appropriate corrective actions developed to address these issues as they arise. Schedules, responsibilities and reporting procedures for water quality monitoring, are set out in the Monitoring, inspection, audit and reporting schedule – Attachment L of the D&C Plant and General Area EMP.

Monitoring will be undertaken by appropriately qualified personnel, in accordance with the appropriate standards and guidelines as specified in Attachment L of the D&C Plant and General Area EMP. Monitoring equipment will be calibrated in accordance with relevant Australian Standards.

9 Contingency measures

Contingency measures have been developed and are summarised below. The control measures table (Attachment I10.1) focuses on preventative measures.

All environmental incidents will be responded to in accordance with the plant site Environmental Incident Response Plan (EIRP). The EIRP provides project specific details for the identification of and response to potential environmental related incidents at the plant site during the D&C phase of the VDP. It provides assistance in managing potential and actual incidents, as well as follow-up and reporting requirements.

The environmental risk assessment has identified the following circumstances which could occur outside normal operating conditions that may impact on waterways and wetlands:

- Hazardous Chemical Spill(s) (Refer to the Hazardous Material Sub Plan)
- ASS/PASS Contamination (Refer to the Acid Sulfate Soils Sub Plan)
- Waterway destabilisation (see below)

Other risks identified in other sub plans that could also impact on waterways and wetlands include:

- Erosion or Sedimentation (Refer to Water Quality and Erosion Management Sub Plan)
- Dust Event (Refer to the Air Quality Sub Plan)
- Fire (Refer to the Air Quality Sub Plan)

9.1 Waterway destabilisation

Pipe-jacking is not proposed on the plant site. However should such works on a waterway be required, a waterway de-stabilisation event would likely be the result if such an attempt is compromised. This may be due to unforseen complications with construction methodology, human error or waterway banks and/or bed of insufficient strength (geological and morphological inconsistencies) to sustain boring underneath it.

If these circumstances occur, the initial process of managing the waterway destabilisation as described in Figure 1 will be actioned.

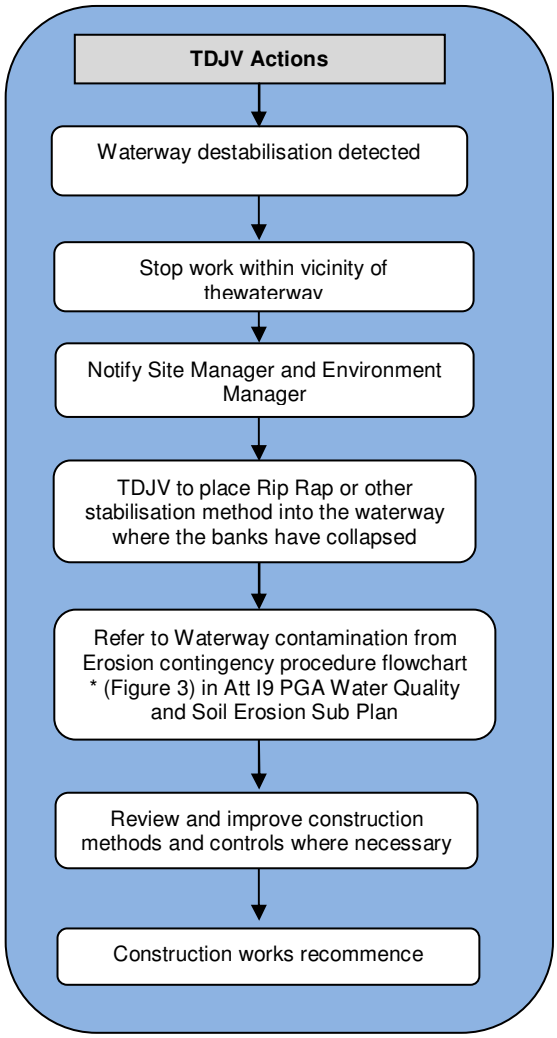

Figure 1: Waterway destabilisation – contingency procedure

* Waterway contamination from erosion contingency procedure flowchart (Figure 3 from Att I9 PGA Water Quality and Soil Erosion Sub Plan) is reproduced below (Figure 2) for convenience. Detailed notes relating to this flowchart are contained in Attachment I9 to the Plant and General Area EMP.

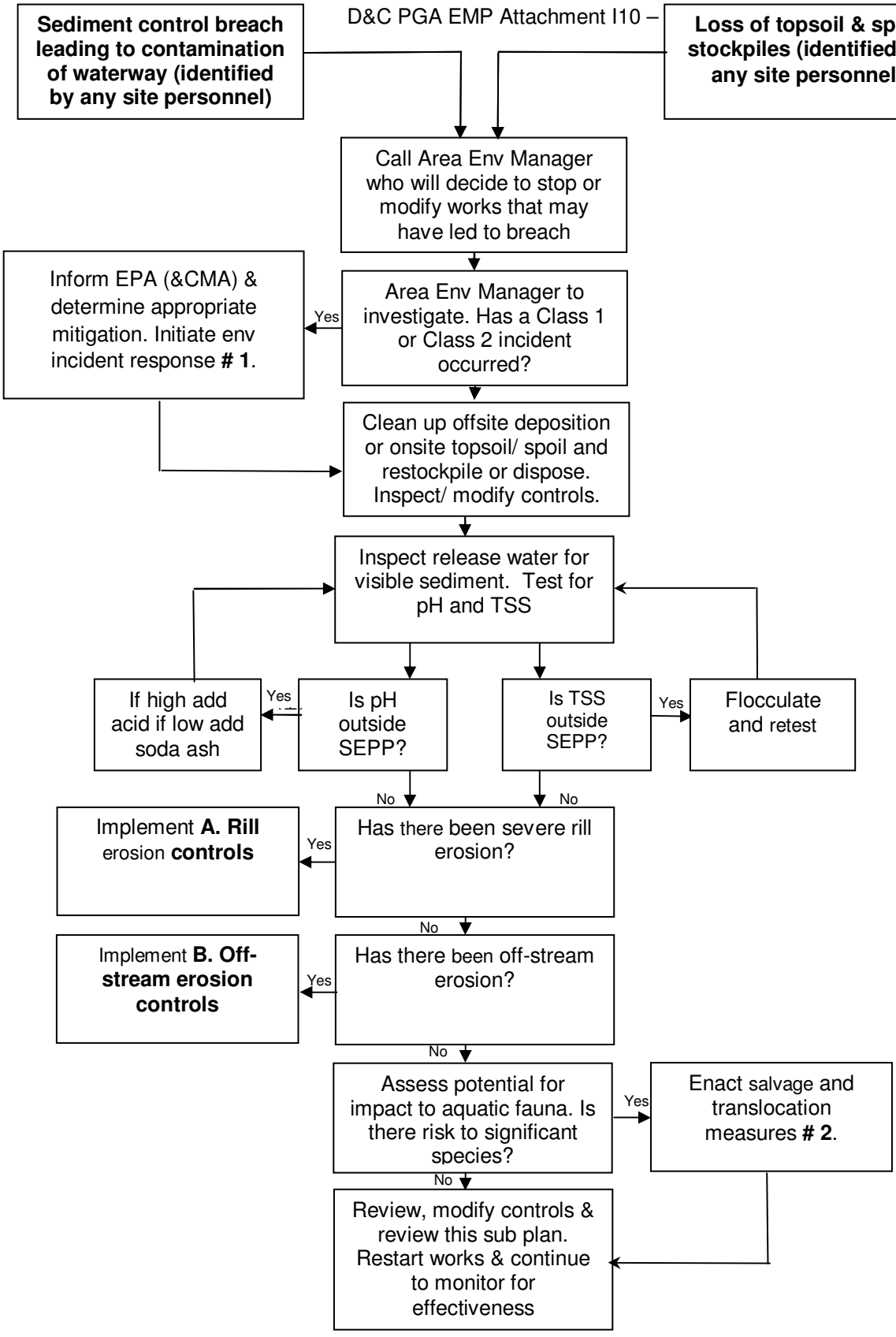

Figure 2: Waterway contamination from erosion – contingency procedure

Notes to Figure 2:

 # 1. See Environmental Incident Response Plan

 # 2. See Flora and Fauna sub plan Att I5.2Flora, Fauna &Significant Species Management Procedure

A. Rill erosion controls

In the case of severe or excessive rill erosion, the cause will be investigated, up-slope water movement will be controlled, the surface re-profiled, dispersive soils will be covered with a minimum 100mm layer of non-dispersive soil and stabilized with erosion control blankets and vegetation, as necessary.

B. Off-stream (or 'sheet') erosion controls

Where off-stream erosion occurs - rills will be filled, the area will be re-vegetated and velocity control measures will be installed. These include one or a number of the following, to be chosen depending on the circumstances of the event:

- Contour cultivation. All cultivation used to prepare the rehabilitation area will be on the contour. On steep slopes, this requires the land to be terraced or benched.
- Contour Deep Ripping or `Contour Furrowing'. These procedures will be used to relieve soil compaction and improve water infiltration only where the soil or spoil material is of low permeability. It is common to use these procedures where gypsum or lime soil amendments are being incorporated. The methods may also be used to increase infiltration in most soils.
- Contour/ Level Banks/ Earth mounds/ Swale Drains or similar structures are expected to be the most common physical control measures utilised. The size of these structures will be determined by the size of the catchment area. They will not be constructed out of dispersive or highly erodible materials.
- Absorption and Pondage Banks. These are banks similar in design to contour banks but laid out such that they pond water - thereby causing greater infiltration and less runoff. They will apply only on low slopes (less than 1%) and will be avoided in materials which become dispersive when saturated. They will not be used on spoil dumps containing toxic materials.
- Diversion Banks. These will be used to reduce or eliminate the catchment to the heads of gullies. They need to be located such that they spill water to stable areas - preferably away from the rehabilitation area.
- Spillways/Grassed Waterways. These structures will be used to confine runoff from any or all of the above structures into a stable vegetated flow path. Because these structures effectively take all excess runoff from a rehabilitation area, they are expected to be installed first and well vegetated prior to the actual construction of the diversion structures.
- Lined Waterways. Additional treatment and special precautions may be required to protect waterways from large-scale erosion. Available treatment measures include:
    - Jute mesh may be used to line channels of modest grade (up to 10%) where flow velocities do not consistently exceed 2.5 meters per second. This is laid after a

channel has been shaped to an even cross-section and seeded with a stabilising cover which will grow up through the mesh. It is held in place by staples pushed into the underlying soil.

- Rip-rap or stone pitching which involves the use of stone (generally of about 100 mm cross-section) will be placed by machine or by hand to line the shaped bed of a channel. In general the size of the rip rap is increased as the design velocity of flow of the waterway increases. Rip rap will be keyed into the underlying soil or the optimal approach is to lay it on a filter blanket of sand and gravel 150 mm thick.
- Gabions and mattresses are rock filled wire baskets useful for lining stream banks in particularly erodible sections. Again a gravel filter or a filter cloth beneath them can improve their effectiveness. They should always be well keyed in to the bed and banks of the treated stream or channel.

Where poor vegetation establishment/ growth or soil coverage on the plant site is found to have caused sediment contamination into a waterway, new vegetation will be planted, hydro-seeding and/or mulching will be undertaken, as required. It is noted that newly planted and previously planted areas may require supplementary watering and replanting to ensure adequate growth and minimize a re-event.

10 References

10.1 VDP documents

- Victorian Desalination Project Environmental Effects Statement, Technical Appendix 14; Biosis Research Pty Ltd (August 2008) Flora and Fauna Assessment: Desalination Plan Wonthaggi, Victoria – existing conditions and impact assessment. A report prepared for GHD

10.2 Technical / legislative documents

- ANZECC and ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
- DSE (2007). Advisory List of Threatened Vertebrate Fauna in Victoria – 2003. Department of Sustainability and Environment, Victoria.
- DSE (2008). Flora and Fauna Guarantee Threatened List (November 2008) Department of Sustainability and Environment, Victoria.
- DSE (2008). Flora and Fauna Guarantee Processes List November 2008 Department of Sustainability and Environment, Victoria.
- Environment Protection Authority, 1970: Environmental Protection Act. Act No. 8056/1970.
- EPA (1991). Construction Techniques for Sediment Pollution Control. Publication 275, Environment Protection Authority Victoria, Melbourne.
- EPA (1996). Environmental Guidelines for Major Construction Sites. Publication 480, Environment Protection Authority Victoria, Melbourne.
- Environment Protection Authority (1997). State Environment Protection Policy (Groundwaters of Victoria). Victorian Government Gazette No.S 160, Environment Protection Authority Victoria, Melbourne.

ATTACHMENT I10.1 Waterways and wetlands – Control measures table

ATTACHMENT I10.1 WATERWAYS AND WETLANDS – CONTROL MEASURES TABLE

#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
1	Induction	-	All staff and contractors to be trained and inducted in environmental management actions	Area Environment Manager	Construct	Training records	
2	Wetland removal	07062	Ensure that the re-established wetland design is consistent with the habitat values of the original wetland	Site designer, Rehabilitation Consultant	Design	WGCMA inspection/ approval/ sign-off	
3	Site Access	07063.1	Ensure that all waterways are fenced off to prevent access from unauthorised personnel and livestock	Site Manager	Construct	SEP and Site Inspection records	
4	Fish surveys	07064.1	All native fish species collected in the dam and wetland surveys to be translocated to the re-established wetland of the unnamed tributary of the Powlett River	Area Environment Manager to commission Ecologist	Construct	Ecologist reports	
5	Fish survey, salvage and translocation	07062, 07063.1	A minimum of one week prior to construction works through wetlands, dams and drainage lines the site Environment Officer and/or Site Officer are to assign an Aquatic Ecologist to conduct a survey and salvage and translocation program for all wetlands, dams and drainage lines	Area Environment Manager	Construct	Contract	
6	Fish salvage and translocation	07062, 07063	If water persists during the removal of the wetland, then a fish and amphibian salvage and translocation program using a combination of fish equipment (i.e. collapsible bait traps, fyke nets, backpack electrofishing, seine nets and dip nets) will be undertaken by suitably qualified aquatic ecologist for translocation to the re-established wetland	Area Environment Manager to commission Ecologist	Construct	Ecologist report	

#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
7	Fish surveys	07060, 07063	Prior to all fish surveys relevant permits to conduct fish surveys and to salvage and translocate species will be obtained (i.e. Department of Primary Industries Fisheries Research Permit, and DSE FFG Act Permit To Conduct Activities Relating To Protected Fish)	Area Environment Manager	Construct	Relevant Departmental Applications	
8	Monitoring - Fish Surveys	07063	Fish surveys using a combination of fish equipment (i.e. collapsible bait traps, fyke nets, backpack electrofishing, seine nets and dip nets) are conducted prior to the removal of the online wetland and dams, and filling of drains containing water able to support fish species, and salvage and translocation to the re-established wetland	Area Environment Manager to commission Ecologist	Construct	Fish survey results	
9	Monitoring - Macroinvertebrate monitoring	07063	Macroinvertebrate monitoring of the Powlett River and unnamed tributary of the Powlett River before construction in spring 2009 again in autumn 2010 and again in spring 2010 during construction works	Site Manager to commission Ecologist	Construct	Monitoring results	
10	Environmental impact	07062	Develop appropriate construction methods using a risk assessment approach to minimise environmental impacts on the sensitive waterways including: Powlett River, unnamed tributary of Powlett River, wetland on unnamed tributary of Powlett River.	Design Manager	Design, Construct	CWMS, SEPs and Asset Manager approvals for each waterway	
11	General Measures	07060, 07062	Develop and implement a CWMS for the removal of the wetland at the unnamed tributary of the Powlett River to ensure compliance with all procedures outlined in the Construction Techniques for Sediment Pollution Control (1991) and conducted during low flow.	Site Manager	Construct	CWMS, SEPs and Asset Manager approvals for each waterway	

#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
12	Rainfall	07060, 07062	Construction within drainage lines, especially the online wetland on the unnamed tributary of the Powlett River, will not be conducted during rainfall events. Long term forecast will be monitored.	Site Manager	Construct	Site diary	
13	Material storage	07062, 07063.1	All stockpiled material will be stored in bunded areas No stockpiles within 20 metres of waterways	Site Manager	Construct	Site plans and site environmental inspection records	
14	Site management	07062, 07063.1	It is a legal requirement that the creation and maintenance of designated construction equipment wash down and refuelling areas must be established outside the riparian zone of the waterway, with established bunding and contamination control measures in place	Site Manager	Construct	Site plans and site environmental inspection records	
15	Habitat conservation	07060	Minimise all disturbance to soil, vegetation and fauna habitat near waterways and wetlands as far as possible, by minimizing the construction footprint and protecting retained vegetation and habitat	Area Environment Manager/ Site Manager	Design, Construct	Site plans, SEIs and Site inspection records	
16	Site traffic management	07062, 07063.1	Vehicles and personnel to remain only on gravel roads and designated pathways	Site Manager	Construct	Site Plans and Site Inspection records	
17	Fish movement	07063.1	Impeding movement of fish downstream and upstream through the unnamed tributary of Powlett River will be mitigated by conducting construction during the summer (Dec-March)	Site Manager	Construct	Site Plans	
18	Reporting	07063	An annual summary (within 3 months of every 12 month anniversary) of the results of fish surveys and water quality monitoring will be conducted for a minimum of five years and sent to DSE. Ensure ongoing reporting obligation is handed over to the O&M phase of the project.	Area Environment Manager	Construct	Correspondence records	

#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
19	Reporting	07063	Relevant authorities will be informed of any significant findings resulting from the targeted surveys, salvage and translocation measures (if instigated), and post-construction monitoring and maintenance actions.	Area Environment Manager	Construct	Reports	
20	Pipe-jacking failure	07062	Appropriate mitigation to prevent such incidents will be inclusive of, but not limited to: ~ Suitably qualified specialist construction team will be employed to undertake pipe-jacking activities; ~ Construction team will be made aware of warning signs of bank/streambed de-stabilisation: i.e. - fissures, frags and bubbling along the stream bed; ~ Construction technique will be engineered in detail to minimize likelihood of waterway collapse under pipe-jacking or trenching activities; and, ~ All appropriate sediment controls will be in place (as per Water Quality and Erosion Management Sub-Plan) to ensure minimisation of sediment flow and erosion, should any de-stabilisation occur and some damage occurs to the waterway banks and/or stream bed.	Site Manager	Construct	Site plans and site environmental inspection records	

* The *Responsibilities* column refers in many cases to senior positions within the project organisation, due to the changing nature of project teams. In practice some responsibilities may be delegated by the person nominated.

E As required by EPBC Act Approval