

Appendix F Construction phase management

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F.1. Introduction

Accelerated erosion during construction works poses a significant threat to receiving water ecosystems and natural sediment balances across Tasmania. It has long been understood and widely published those construction activities failing to utilise sound soil and water management practices result in massive increases to sediment loads in stormwater runoff.

Crucial to the long-term success of any WSUD development is effective management of soil and water throughout the construction and establishment phases. Sediment and erosion control during development and construction activities is necessary in all construction works involving ground disturbance.

In the WSUD development, long term stormwater treatment WSUD elements may be utilised for construction-phase sediment control with care and planning. However, construction activities may also jeopardise the longevity and effectiveness of WSUD elements. For example, ponds could be used as sediment control basins during construction prior to vegetating, bordering etc. Conversely, high construction related sediment loads entering a bioretention system established too early would cause blocking of the filtration media rendering it ineffective from day one.

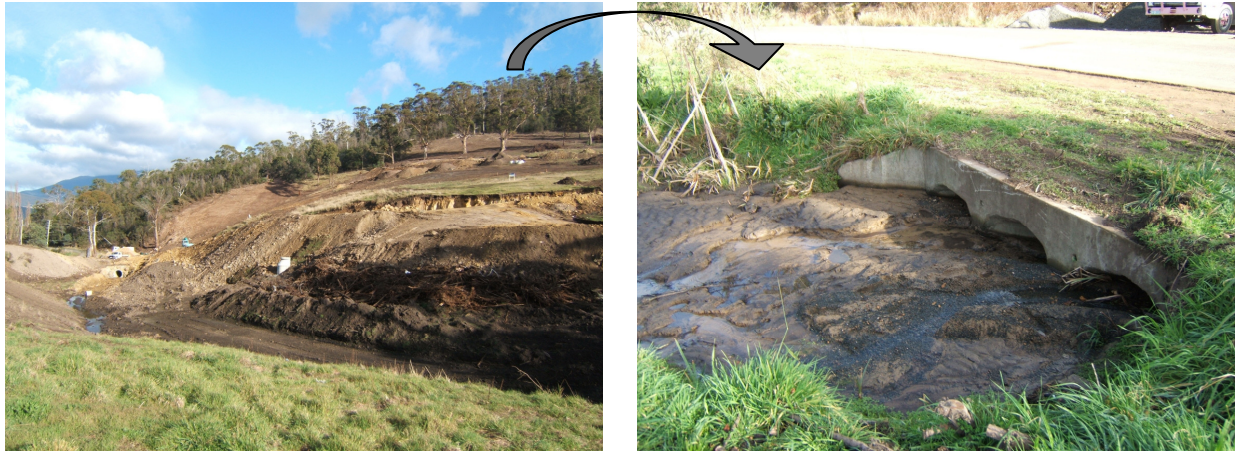


Figure F-1. Unmanaged runoff from this construction site has resulted in blocked stormwater infrastructure and heavy siltation in the nearby creek.

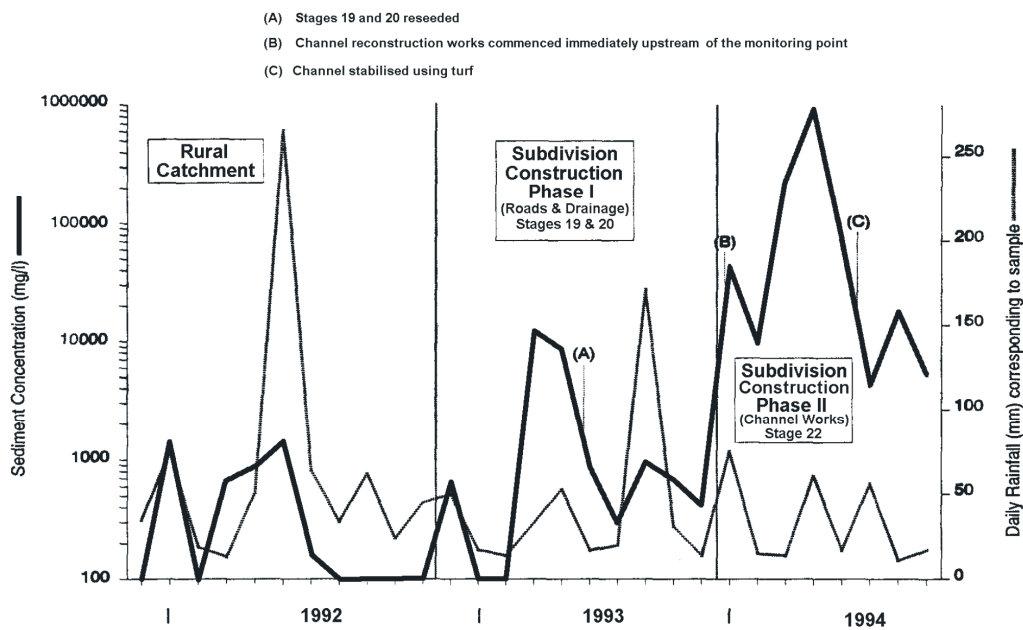


Figure F-2. Sediment concentrations and daily rainfall at a development [source: Goldrich & Armstrong, 1994; cited in Landcom, 2004]

F.2. Core principles of sediment and erosion control

F.2.1. Timing

- Minimise the duration and extent of disturbed soil surfaces
- Reinstate surfaces as soon as works in the immediate area are complete

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F.2.2. Materials

- Topsoil should be scraped from an area prior to earthworks and stockpiled so that it may be later used for more effective reinstatement and re-establishment of vegetative cover

F.2.3. Flow management

- Ensure no upslope runoff enters the site
- All stockpiled loose materials (e.g. soil, road base, etc) should be bunded around the circumference of the mound so that no runoff from upslope reaches the pile and material entrained by direct rainfall is not carried away from the pile
- Always consider flow paths from overtopping control measures and utilise natural depressions for runoff detention
- Always construct and maintain a control device (e.g. silt fence) at the point where runoff will leave the site

F.2.4. Sediment capture

- Some sediment control technique will always be required where runoff leaves the site (usually lowest point)
- Distributed or staged techniques around the site are more effective than one control structure at the end

F.2.5. Maintenance

- All management measures should be inspected at the commencement and completion of works each day
- Curb and gutter controls (e.g. 'filter socks') should be cleaned every day

F.3. Planning

Early planning is crucial to successful and cost-effective management of soil and water throughout the construction and establishment phase of a WSUD development. WSUD elements may be utilised in the construction phase for sediment and erosion control, however, partially constructed WSUD elements may also require protection to ensure their long-term viability.

Partially constructed ponds, wetlands and large bioretention basins may be used as sedimentation ponds during the construction of a WSUD development. This reduces excavation and earthworks costs for the development by reducing the need for additional sedimentation basin construction and should be sited in an appropriate location within the development, as a centralised WSUD feature would usually be located at the downstream point of the development site. This technique will require that the wetland/pond/bioretention is the first part of the site to be (partially) constructed and the last stage of the development to be completed.

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The level of planning required for sediment and erosion control during the construction phase of a project varies with the size of development and the duration of works. Small maintenance works on WSUD systems may only involve a visual on-site assessment and the installation of temporary sediment control measures such as sandbags/filter socks and/or silt fences. Large-scale projects, such as sub-divisions, will require a full sediment and erosion control plan (or soil and water management plan) to be prepared prior to commencement of works.

The State Policy on Water Quality Management 1997 stated that 'codes of practice' should be developed for the control of construction-related erosion. Soil and Water Management on Building and Construction Sites (2009) is a code of practice with current best practice sediment and erosion control measures that should be used. The Soil and Water Management on Building and Construction Sites (2009) states that soil and water management plans (SWMPs) should be prepared, and submitted for approval prior to any works, for any development covering greater than two hundred and fifty square meters. A range of other 'triggers' necessitating a SWMP are discussed, including: where a high pollution risk to receiving waters exists and where works are to be performed over an extended duration.

F.3.1. Soil & water management plans (SWMPs)

The Soil and Water Management on Building and Construction Sites (2009) states that a soil and water management plan should include the following information:

- Date and author.
- North point and scale.
- Property boundaries.
- General soil description.
- Location and amount of ground disturbance.
- Initial and final contours, location of watercourses, surface drainage and existing stormwater infrastructure.
- Stormwater discharge point, if proposed.
- Location of all proposed temporary drainage control measures.
- Construction details (e.g. building or subdivision layout).
- Location of vegetation to be retained and removed.
- Location of stabilised site access.
- Location of soil, sand or other material stockpiles.
- Location and details of all proposed erosion control measures.
- Location and details of all proposed sediment control measures.
- A statement of who is responsible for establishing and maintaining all erosion and sediment control measures.
- The installation sequence of the different sediment and erosion controls.
- The maintenance program of the sediment and erosion controls.
- The revegetation and rehabilitation program.

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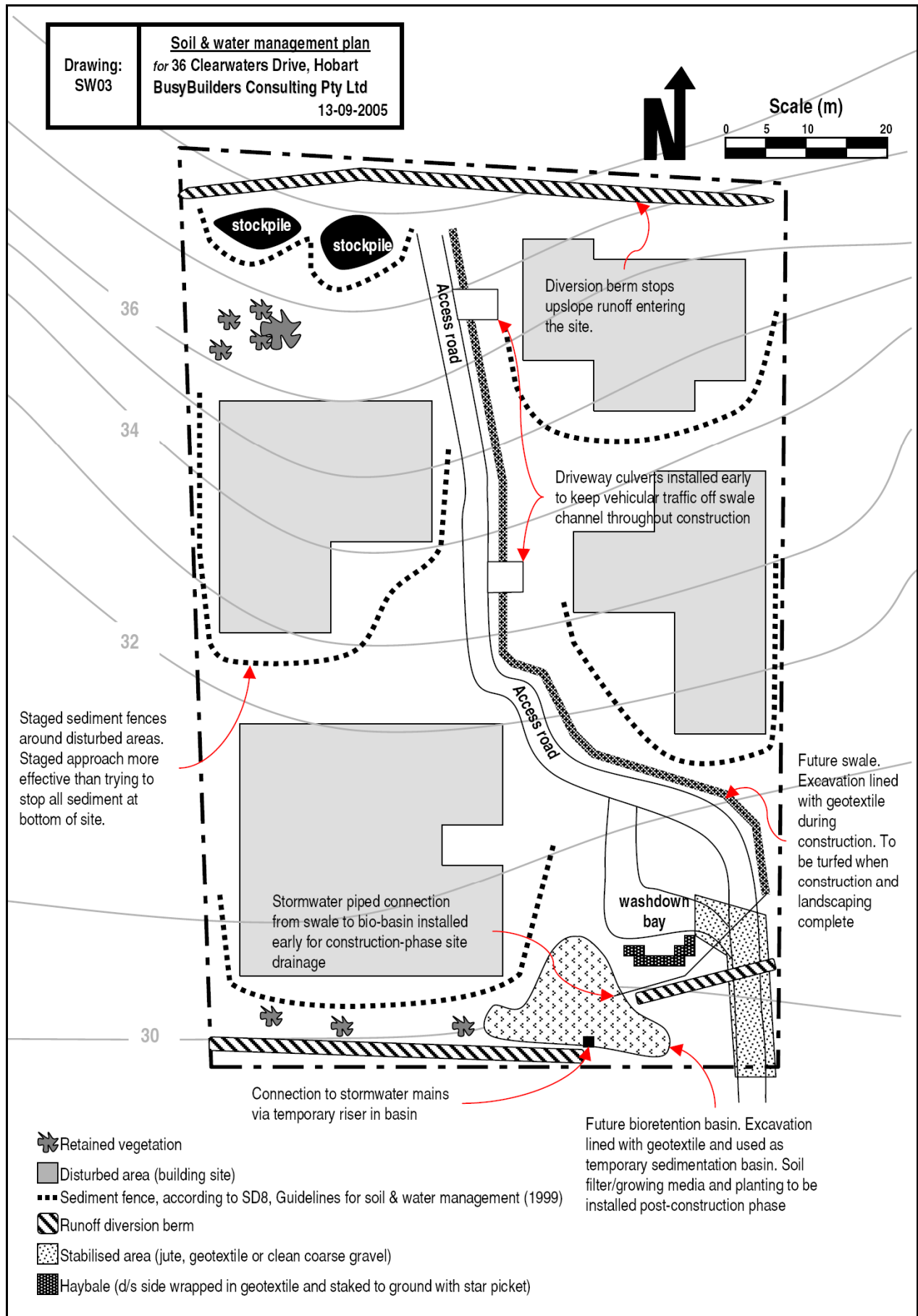


Figure F-3. Soil and water management plan for a small WSUD sub-division

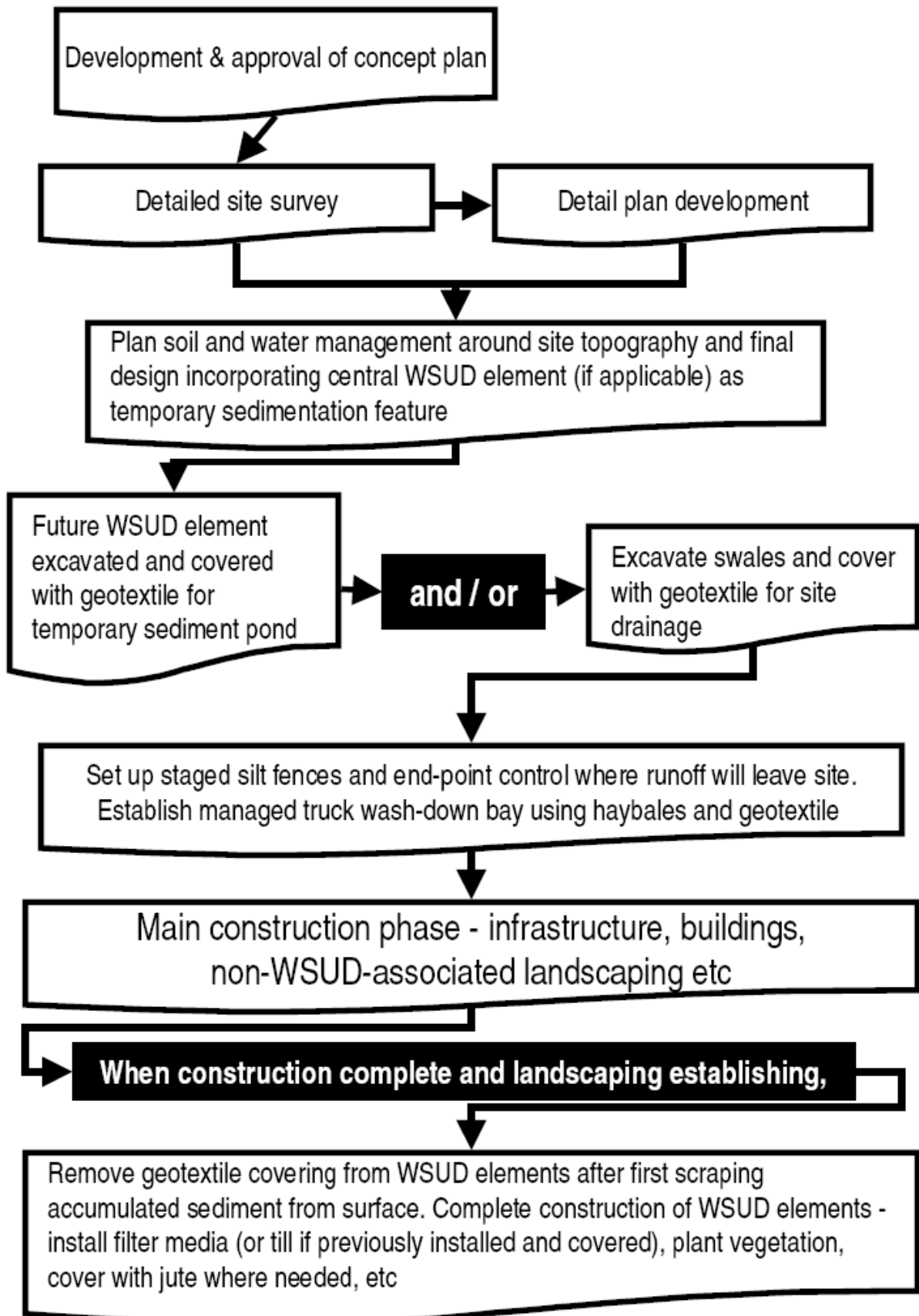


Figure F-4. Possible work-flow for sediment and erosion control at a WSUD sub-division

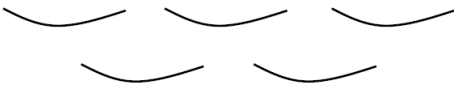
F.4. Occupational health and safety

Implementation of sediment and erosion control techniques around a construction site involves a number of issues that need to be managed within the sites occupational health and safety strategy.

Each site should be assessed for possible risks prior to establishing controls and again when controls are in place to ensure all dangers have been identified, assessed and managed.

Following are some issues identified with common techniques, however, all sites and techniques should be assessed on a site-by-site basis by a suitably qualified individual.

Table F-1. Examples of sediment and erosion control O, H & S risks

Technique	Risk	Management
Sediment fencing	Injury from tripping/falling on star pickets	Star pickets should be capped with high visibility caps immediately following installation to improve visibility and reduce the likelihood of an incident occurring. If an incident occurs, the capping provides some protection against injury.
	Tripping on fence	<p>Ensure fence is at least 500mm high to increase visibility. Also use bright coloured geotextile or mark with reflective tape at regular intervals.</p> <p>Set up silt fences in staged arc formations (see below). This provides superior runoff control and provides 'walk-through' points.</p> 
Sedimentation basins	Drowning	<p>Sedimentation basins should be surrounded with high visibility temporary fencing to prevent accidental falling in, particularly if works continue in dusk/evenings.</p> <p>Pool standard fencing is also required if site is accessible by public.</p> <p>A flotation rescue device should also be stored nearby. Deep, saturated sediments can have a 'quick-sand' effect and make getting out of a sedimentation basin extremely difficult particularly if batter slopes are steep.</p>
	Pests	Long-duration sites with permanent

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		sedimentation basins should monitor the water body for mosquito breeding and treat appropriately where required.
Geotextile coverings	Lifting-related injury	Where geotextiles have been used to protect elements from sedimentation, accumulated material should be scraped from the fabric prior to lifting it. General lifting O, H & S principles should be applied wherever manual lifting is required.

NOTE: The risks detailed above are only some possible increased risks associated with sediment and erosion control activities at a construction site. Any construction activity requires a specific site assessment of risk and a strategy for managing those identified risks.

F.5. References / further reading

Derwent Estuary Program (2009). Soil and Water Management on Building and Construction Sites, Derwent Estuary Program, Hobart

Landcom (2004). Managing Urban Stormwater: Soils and Construction. 4th Edition Landcom, NSW Australia [aka 'the Blue Book']

Workplace Standards Tasmania
<http://www.wst.tas.gov.au>