Guidelines for Erosion & Sediment Control at Building Sites in the South West of WA

Water Campaign™

Shire of Augusta Margaret River

Shire of Capel

Shire of Harvey
A Breath of Fresh Air

South West Catchments Council

Centre of Excellence in Natural Resource Management
The University of Western Australia

Government of Western Australia

Australian Government

Leschenault Catchment Council

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Torbay Inlet in the south-west of WA is seriously impacted by input of riverine sediment

Introduction

These guidelines provide a practical guide to techniques to minimise erosion, sediment transport, and stormwater pollution from building sites. They are designed to help people involved in the building industry to reduce the environmental impacts of their building activities, and to comply with their statutory environmental duties and avoid large fines.

Save money time and energy

Some of the benefits to home owners, builders and the building industry include:

- all-weather site access
- improved wet weather working conditions
- sites do not get boggy
- less mud and dust problems
- reduced stockpile losses
- reduced clean-up costs
- a better public image
- more marketable sites
- fewer public complaints
- reduced risk of fines
- healthier waterways

National and international experience shows that the cost of effective pollution management on building sites is greatly reduced within the first few years as builders become experienced with the various techniques

LEGEND

Y = Best practice

N = Not best practice

What are the impacts?

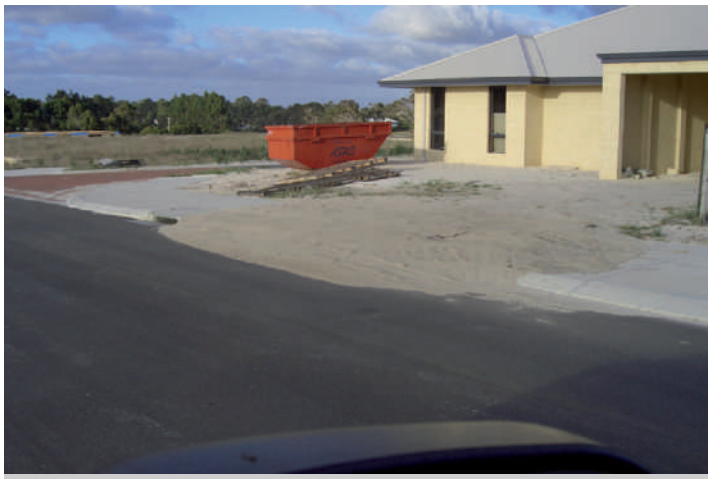
Soil, sediment and litter from building sites can be major sources of pollution that can find their way into streams and water courses. These can cause:

- impacts on recreational and commercial fishing
- sediment build-up within waterways which can lead to weed growth
- loss of valuable topsoil
- significant public safety problems when washed onto roads and intersections
- blocked drains creating flooding and increased maintenance costs
- significant harm to freshwater and marine ecosystems.
- public health issues from increased algal blooms
- reduced recreational opportunities due to increased turbidity

Erosion and sediment control on residential building sites

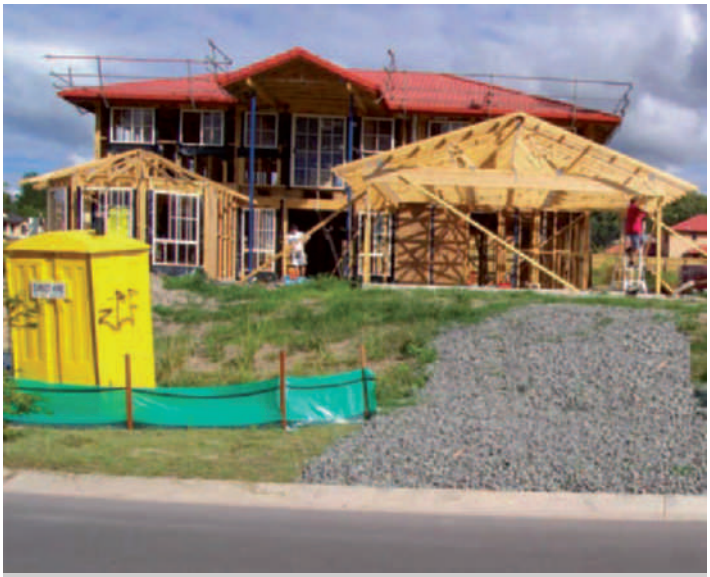
Principles of effective stormwater pollution control include:

- sensible site planning
- diversion of up-slope water (where appropriate)
- stabilised site entry/exit point
- minimisation of site disturbance and duration of disturbance
- installation of sediment controls
- along the lower edge of the site
- appropriate location and protection of stockpiles
- early connection of roofwater downpipes
- trap on-site run-off from tool, paint and concrete washing and brick, tile and concrete cutting
- continual monitoring and maintenance of all control measures
- compaction of backfilled trenches
- revegetation and stabilisation of the site
- development and implementation of erosion and sediment control management plans when appropriate.



N Poorly protected site with building sand spilling onto road near storm water drain

N Sediment moving out of Moreton Bay into ocean



Y Sediment control fence along the lower edge of a residential building site

Site planning

Careful site planning can minimise the number of control devices and so reduce interference with the building process.

Suggestions are to:

- minimise the reshaping of the land
- direct stormwater around, instead of through, the building area
- erect a sediment barrier along the lower side of the site
- design the home to suit the property type, eg. construct pole homes on steep properties
- avoid long, steep and unstable driveways
- avoid the use of exposed aggregate concrete surfaces in areas where the wash-off cannot be contained.

Environmental law

The Environmental Protection Act 1986 and Regulations, Planning and Development Act 2005, Litter Act 1979 and Local Planning Schemes are important pieces of legislation that control the way in which soil erosion and sediment are required to be dealt with on building and development sites.

Breaches of the Environmental Protection Act 1986, Planning and Development Act 2005 and Litter Act 1979 may result in: The issue of a notice under the Planning and Development Act 2005. Breaches of the provisions of Local Government Town Planning Schemes may constitute an offence for which the penalty is between $5,000 and $50,000. The issue of an Infringement notice and breach of Regulations under the Litter Act 1979 may incur a penalty of $200 and $1,000. Penalties may also apply for breaches of the Environmental Protection Act 1986 and Environmental Protection (Controlled Waste) Regulations 2004. Penalties range from $250 (to thousands of dollars or prison sentences for serious offences) and apply to individuals and/or companies.

Y Good site planning – includes sediment containment fence

N Poor site planning – stockpile outside of sediment containment fence

Erosion controls

Earthworks

- Earthworks should be kept to a minimum, and should only be commenced immediately prior to building.
- Maintain as much soil coverage as possible with the use of grass, leaf litter and mulch (only on garden beds), gravel or erosion control blanket (ECB) or matting.
- Vegetation located down-slope of the work site assists in filtering out sediment. Where practicable, maintain kerb vegetation in a healthy state during the building process.

Stockpiles

- Stockpiles and building materials should not be stored on the footpath or within the road reserve, unless permission obtained from local Council. Minimise stockpile losses with the use of covers.
- All stockpiles and building materials should be located within the sediment control zone, for example behind a sediment fence.
- Stockpiles should not be located within an overland flow path.

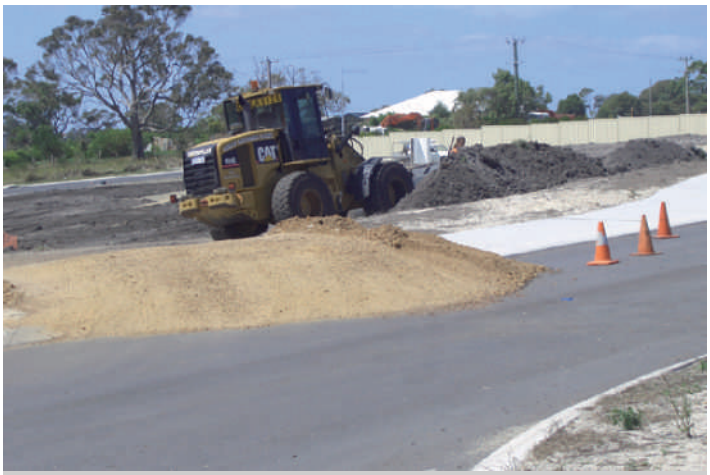
Service trenches

Backfill service trenches, cap with topsoil, and compact to a level at least 75-100 mm above the adjoining ground level (either manually or with a small machine). This allows for some subsidence of the fill material, and ensures the fill is sufficiently compacted to avoid erosion at a later time.

Blankets and matting

Erosion control blankets or matting can be used to minimise soil erosion and stormwater pollution from sites by:

- containing high erosion risk soils
- stabilising steep slopes



N Earthworks commenced with no sedimentation protection

N Stockpiles with inadequate protection

Y Correctly installed sediment fence

Site rehabilitation

All areas disturbed by building activities should be promptly and progressively stabilised, using techniques such as revegetation and landscaping, so they no longer act as sources of sediment.

Planting and mulching

To minimise soil loss, mulch should be applied to open garden beds at a depth of 75-100 mm.

This will assist in plant establishment, minimise water loss and help to control weeds.

Ensure that mulch is stabilised on unstable slopes (e.g. batters and riparian areas) to avoid it washing away and ultimately entering waterways.

Sediment control

Stabilised entry / exit point

- Manage entry/exit point (rumble pad) so that sediment is not tracked off the site.
- Restrict site access to one stabilised location. Recommended construction method for stabilising access points is a 150-200 mm deep pad of minimum 40 mm crushed rock.
- The pad should be at least 2 metres wide and extend from the kerb to the building slab.
- Where the entry/exit pad slopes towards the road, a 200 mm high bund (hump) should be installed across the pad to deflect stormwater run-off to the side where it can be filtered by a sediment fence.

Note: The location of the permanent driveway may not be an appropriate location for the construction entrance.

Y Site revegetated soon after construction

Y Garden bed mulched and planted soon after construction

Y Stabilised entry / exit during construction

Sediment barriers and fences

- Install barriers and fences along the lower side of the soil disturbance.
- The most efficient sediment barrier for building sites is specially manufactured geotextile sediment fencing.
- Sediment fences on building sites are usually wire-tied to steel posts (wire-tied sediment fences have the advantage of being more readily unhooked from their support posts during working hours).
- The support posts are spaced no greater than 2 metres apart and the sediment fence buried to a depth of 200 mm.
- For public safety and sediment control efficiency, sediment barriers should not be located outside property boundaries without Council approval.
- Sediment barriers should only be placed on the road as a last resort.
- Sediment barriers placed in front of roadside stormwater inlets are rarely effective and at best usually result in the sediment being washed down the street and into the nearest open gully inlet. However, in some circumstances, they are better than nothing.
- Don't use filter cloth or shade cloth.

In some cases, hay bales could be used to restrict the flow of sediment-laden water.

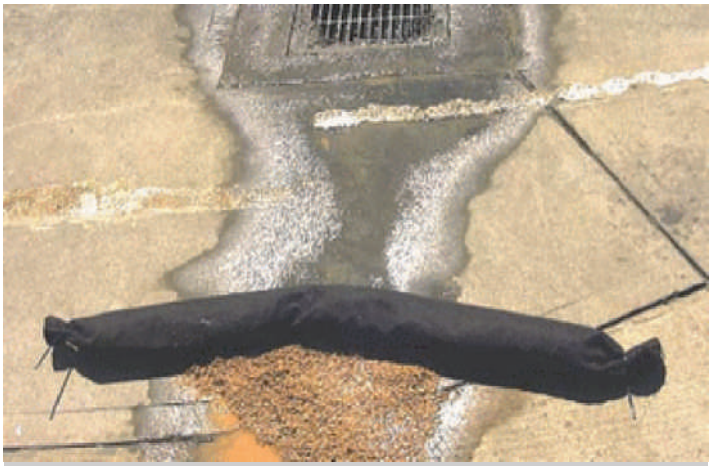
Note: Public signs that warn of the need for proper sediment control devices and maintenance are becoming more widely used and are recommended.

Maintenance of control measures

All erosion, sediment and drainage control measures need to be regularly checked and maintained in good working order. Best practice includes anticipation of potential risks and being prepared for abnormal circumstances and emergencies.
These measures include:

- Stockpile extra sediment fence fabric and posts on-site to facilitate emergency repairs.
- Reapply crushed rock to the entry/exit pad (rumble pad) if excessive sediment build-up occurs.
- Repair eroded drainage channels with rock, turf or erosion control blankets or matting.
- Ensure built-up sediment is removed at regular intervals from sediment barriers.
- Check daily and replace barriers daily if they are ripped, damaged or no longer anchored.

Y Hay bales used to restrict sediment



Y Fabric "sausage" may help to stop sediment entering stormwater drains

Ongoing maintenance could include:

- Stockpile extra sediment fence fabric and posts on-site to facilitate emergency repairs.
- Reapply crushed rock to the entry/exit pad (rumble pad) if excessive sediment build-up occurs.
- Repair eroded drainage channels with rock, turf or erosion control blankets or matting.
- Ensure built-up sediment is removed at regular intervals from sediment barriers.
- Check and replace barriers daily if they are ripped, damaged or no longer anchored.

Drainage control

- Where practicable, divert up-slope water around the disturbed area.
- Stormwater can be diverted with the use of small turf or geotextile lined catch drains, or with the use of diversion banks.
- Diverted stormwater should be discharged onto stable ground (for example turfed areas) and should not be diverted into neighbouring properties unless written permission is obtained from the land owner(s).
- Temporary or permanent downpipes should be installed as soon as practicable after the roof is laid.

Y Ongoing maintenance of control measures

Y Temporary roof drainage

Building operations

Prior to commencing building work:

- Obtain all necessary permits, licences and approvals from local authority
- Avoid clearing vegetation and excavating until ready to build.
- Where necessary in new estates, temporary revegetation may be required.

Points to consider as part of building operations:

- Tool and paint washing, brick, tile or masonry cutting and water-cooled cutting activities should be done within the property boundaries.
- All waste water should be contained on-site where possible.
- Activities should be carried out on a permeable surface or up-slope of an infiltration trench.
- Vehicles should not be parked on the footpath area or verge where they can damage essential vegetation and transport dirt onto the road.
- Contain waste concrete washed from trucks, mixers and barrows on site;
  do not wash out into stormwater systems as this can clog drains and cause flooding during storm events.

Waste materials

All hard waste should be stored on-site in a way that prevents material loss caused by wind or water. Smaller materials such as litter should be contained in covered bins or litter traps formed on three sides by a geotextile wind break or similar device. When travelling to and from the site, secure load to prevent wind blown litter polluting our waterways and roadsides.

Site clean-up

Remove accidental spills of soil or other materials from the road, gutter or any location outside the control of the primary sediment barrier:

- immediately if it is raining or likely to rain during the day.
- at least upon completion of the day's work (even if rainfall is unlikely during the night).
- use a broom and shovel instead of hosing to clean hard surfaces.
- clean up food packaging after meal breaks as this litter can enter stormwater systems and waterways.

Following storms, the road reserve and sediment barriers should be inspected and all excessive sediment residue removed.

Concrete wastes

Concrete waste washed from trucks and mixer units should be contained on-site. Builders need to demonstrate how they intend to prepare exposed aggregate surfaces without allowing cement residue to flow into stormwater drains or waterways.

Where practicable, wash cement residue onto pervious surfaces or fully contain it within temporary sediment dams created from tightly stacked sand bags. When suitably dry, shovel cement residue into a waste disposal bin. At no time should cement residue or wastewater run-off enter the roadside gutter. This may make it impractical on some sites for exposed aggregate driveways to be constructed. In such cases, an alternative driveway finish must be used.

Y Waste materials correctly stored in skip

Storage of materials on hard surfaces

Whenever possible, materials should be stockpiled within the sediment control envelope and, where necessary, covered with waterproof sheeting. Materials may be temporarily stored on hard surfaces only where it is necessary to place erodible material on hard surfaces to undertake work and no other reasonable options are available

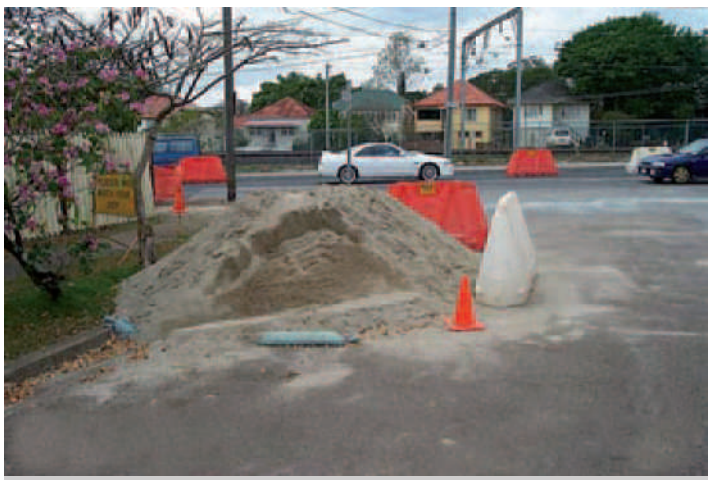
Grouped building sites

When one builder controls more than one building lot, combined-lot sediment control structures may be placed down-slope if:

- the combined sediment control measures provide a level of protection at least equal to that provided by individual lot protection
- suitable drainage and erosion control measures are applied to each building lot
- a suitable sign is placed in a prominent location outside each lot and/or at the entrance of the estate indicating such controls are in place.

Management plans

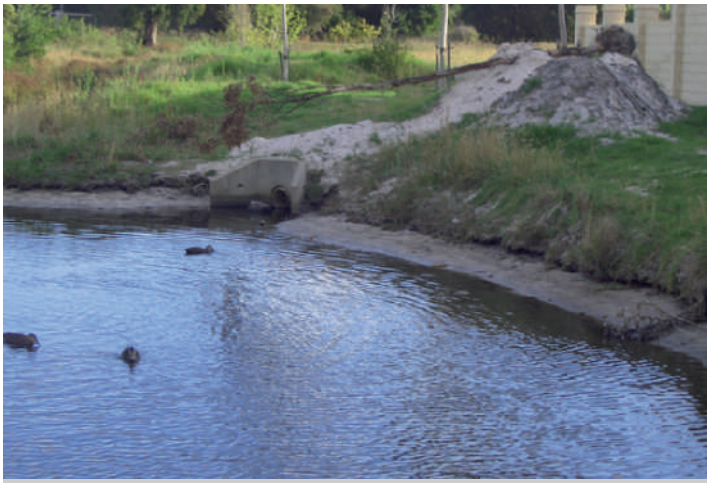
Where appropriate, discuss the submission of a management plan with the appropriate building control body. These plans need to communicate to all - builders, subcontractors, private certifiers, home owners and regulators involved in the building – how stormwater pollution will be controlled on the site.



N Stockpiles incorrectly stored on hard surface

Sediment control installation sequence

1. Establish a single stabilised entry/exit point (rumble pad).
2. Install sediment fence(s) along the low side of the site.
3. Divert up-slope water around the work site and appropriately stabilise any drainage channels.
4. Clear only the areas necessary (maintaining vegetation on paths).
5. Stockpile topsoil within the sediment controlled zone.
6. Stabilise exposed earth banks (for example, with vegetation or erosion control blankets).
7. Install on-site waste receptacles (mini-skips, bins, wind-proof litter receptors).
8. Install roof downpipes as soon as practicable after the roof is laid.
9. Ensure that all control measures are maintained in good working order.
10. Revegetate or otherwise stabilise the site.



N Waste sand and rubble indiscriminately discarded onto side of creek

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PRODUCED BY: COLIN J. MACGREGOR
Centre of Excellence in Natural Resource Management
The University of Western Australia
Unit 1, Proudlove Parade, Albany, 6332
Telephone: (08) 9842 0842
Fax: (08) 9842 8499
Email: Colin.Macgregor@uwa.edu.au

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REFERENCES: "Land development and construction sites" best management practice guideline (BMP 2.1.1) Chapter 7 "Non-structural Controls" Stormwater Management Manual for WA, 2007. http://portal.water.wa.gov.au/portal/page/portal/WaterManagement/Stormwater/StormwaterMgtManual

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