

Erosion & Sediment Management Sub Plan

1. SCOPE OF PROJECT AND SUB PLAN

| Project Details | |
|----------------------------|---|
| Scope of the Sub Plan | <p>This Erosion & Sediment Management Sub Plan provides details of the control measures that will be implemented to manage disturbed areas of the site, excavated soil, stormwater, erosion, and sedimentation during site establishment, construction, fit out and commissioning of the Institute of Applied Technology for Construction Project, located at 12-44 O'Connell St, Kingswood.</p> <p>The Sub Plan forms part of the ADCO Construction Environmental Management system. Environmental Management at this workplace is documented in the Project Environmental Management Plan, Environmental Risk Register and related Sub Plans, which together hold certification to Australian and international standards and accreditation with Federal and State authorities.</p> |
| Objectives of the Sub Plan | <ul style="list-style-type: none">● To prevent erosion and sedimentation and establish controls for surface stormwater.● To prevent pollution of stormwater drains and waterways.● To minimise disturbance to local hydrological regimes.● To ensure dewatering activities meet authority requirements and minimise impacts on adjacent water bodies.● To ensure stormwater, erosion and sedimentation controls are effective and maintained at all times. |
| Scope of Works | <p>This Sub Plan has been prepared based on consideration of the following scope of works:</p> <ul style="list-style-type: none">● Site establishment including vegetation removal, topsoil stripping, office and compound setup including waste management, material handling and storage areas. The Site Establishment Office and Amenities will utilise the existing infrastructure/ buildings on site. Amenities and additional First Aid Shed and Change room will be established alongside the amenities as detailed in the site control plan once further amenities is required.● Excavation of ground materials. The Project does not have any import or export of bulk fill.● Piling. There are 234 Bored Piers ranging roughly 8m in depth.● Construction of the building. The construction is a combination of Formed insitu concrete and Structural steel which encases the 3 story building. Due to the location of the building the Authority services will be brought in from O'Connell street.● Fit out and commissioning. The internal fit out is has high end finishes open workshops some bespoke joinery. The area has a loading dock and carparking facilities to accommodate some of the new personnel attending the building while also utilising the existing carpark. Internally the area is air-conditioned and has ICT functionality which will be leading the way for teaching in the coming years. There are public amenities, disabled and ambulant toilets. |

Key Issues and Risks

The works described above have the potential to impact directly and indirectly on the erosion, Sediment and surface runoff (stormwater) within the boundary and further downstream portions beyond the Dam. The site is situated on Eastern side of the Dam catchment.

The soils at the site are noted by PSM Geotechnics to be:

| Inferred Geotechnical Unit | Encountered depth to top of inferred unit [m] | Description |
|----------------------------|---|---|
| Topsoil | 0.0 | Sandy CLAY: low to medium plasticity, brown to dark brown, fine grained sand, trace gravel up to 5mm, sub-angular, with some rootlets |
| Natural Soil | 0.1 to 0.2 | CLAY: medium plasticity, brown and mottled orange-pale grey, minor rock fabric and shale fragments observed |
| Bedrock A | 0.6 to 4.1 | SHALE: Orange-grey and brown, extremely too highly weathered, very low strength. |
| Bedrock B | 1.0 to 7.3 | SHALE: grey to dark grey, thinly laminated, sub-horizontal, moderately weathered to fresh, low to medium strength |

It is expected that groundwater will be encountered at for the Gallery and associated works.

The works required on site will involve significant ground disturbance creating the potential for erosion, sedimentation, runoff and environmental pollution, if appropriate controls are not implemented and maintained. The activities with the greatest potential to impact on the local environment and community from a stormwater, erosion and sedimentation perspective are considered to be:

- Site clearing, establishment and operation including storage areas;
- Bulk and detailed excavation and spoil generation;
- Stockpiling;
- The loading and haulage of materials off-site;
- Stormwater and groundwater detention and dewatering; and
- Waste disposal (spoil, sediment and water).

The impacts of these works may include:

- Dirty water entry to the natural watercourses associated with ground disturbance, erosion and sedimentation;

| | |
|--------------------------------------|---|
| | <ul style="list-style-type: none"> ● Pollution of local ecosystems and waterways due to uncontrolled site runoff; ● Pollution associated with the discharge of sediment laden or contaminated water during dewatering activities; ● Surface wash off from material tracked onto local roadways; and ● Localised flooding during high intensity storm events. <p>The implementation of the control measures identified in the Environmental Plan and this Sub Plan are intended to mitigate these risks and potential impacts.</p> |
| Legislation, Approval and Guidelines | <p>State/ Regional: Protection of the Environment Operations Act 1997 NSW Government Managing Urban Stormwater: Soils and construction 4th Edition (The 'Blue Book') Best Practice Erosion and Sediment Control. Books 1-6. International Erosion Control Association (Australasia) IECA 2008. Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 Australian Guidelines for Water Quality Monitoring and Reporting 2000</p> |
| Summary of Site Controls | <p>Works must be undertaken in accordance with the with the ADCO's Project Environmental risk Register, the Project Environmental Management Plan, and the ADCO Environmental General Requirements.</p> <p>Site specific controls, monitoring, reporting and performance measurements have been identified in this Sub Plan to prevent or minimise the impacts of HSDG use and disposal on the environment, community and workers. These controls include but are not limited to:</p> <ul style="list-style-type: none"> ● Preventing erosion through minimal ground disturbance; ● The installation of erosion and sedimentation controls; ● Covering of stockpiles; ● The use of controls to trap sediment close to its source and prevent migration off site; ● The control and maintenance of site access and egress points to prevent tracking and off-site pollution; and ● The identification of acceptable detention, testing, treatment and dewatering processes. <p>An Erosion & Sediment Environmental Control Map (ECM) will be prepared for the site. The ECM is detailed on the last page of this sub plan.</p> <p>Construction stage stormwater, erosion and sedimentation requirements must be included in relevant specifications, contract agreements, subcontractor work method statements and quality assurance processes.</p> <p>Site inspections, monitoring and reporting will be undertaken by ADCO and subcontractors as detailed in the following table</p> |

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2. IMPLEMENTATION OF THE SUB PLAN

| Control Measure | Timing | Methodology | Responsibility | Monitoring and Reporting | Performance Measurement |
|---|--|--|---------------------------------------|---|--|
| Planning and Site Establishment | | | | | |
| Prepare an Erosion and Sediment Control Environmental Control Map showing the location of stormwater inlets, drains, stockpile locations and erosion and sediment control measures. | At site establishment and prior to works commencing | Review Environmental Control Map (ECM Appendix 1). This map / diagram should read in conjunction with the engaged civil consultants drawings and specifications. Provide controls for all disturbed areas of the site and around/ within the site. | Project Manager PM Site Manager SM | ECM reviewed. Map / Diagram prepared prior to works commencing. ECM reviewed and updated every 6 weeks if necessary | ECM prepared containing all relevant details and communicated. ECM updated to reflect changes in site conditions. Controls implemented in accordance with the ECM. |
| Limit ground disturbance to the area required for immediate construction. | Areas of clearing identified prior to works commencing | Detail excavation requirements on staging/sequencing program. SWMS prepared by subcontractor. Identify and fence off trees/vegetation to be retained. Communicate details. | PM SM | Review of program. Daily surveillance to assess condition of fencing. Weekly inspection checklist. | No unnecessary land disturbance. Vegetation protection fencing and signage maintained. |
| Install erosion, sediment and stormwater controls as per the ECM | Prior to works commencing | Undertake a site inspection to verify the correct location of controls. Install controls in accordance with ECM, design/engineers documentation. | SM | Daily surveillance to assess effectiveness and condition. Weekly inspection checklist. | ECM reviewed every 6 weeks. Controls modified or new controls installed as required. |
| Establish stable site exit points, parking areas, internal roads and turning areas to prevent the tracking of material off-site onto public roads. | Prior to works commencing. Maintain at all times | Construct stable site entry/exit points and roadways using appropriate materials. Obtain clearance certificates for any imported (stabilising) material before receiving it on site. | SM Foreman | Daily surveillance and maintenance. Weekly/monthly inspection checklist. Inspection of imported materials. | No tracking onto public roads or dust. Clearance certificates for all imported materials. |

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| Control Measure | Timing | Methodology | Responsibility | Monitoring and Reporting | Performance Measurement |
|--|---------------------------------------|--|----------------|--|--|
| Planning and Site Establishment (Cont.) | | | | | |
| Install a vehicle/wheel wash or shaker facility at the site exit. | Prior to construction commencing | SWMS to be prepared by subcontractor including a maintenance program. | CM SM | Daily surveillance. Weekly inspection checklist. | No mud/silt tracked onto roadways. |
| Provide sediment basins/detention areas/ to capture/store site runoff. | Prior to commencing works | Size and construct sediment basins/detention areas to meet authority requirements (i.e. project approval) where space permits. Operate and maintain in accordance with design/ engineering documentation.(The Blue Book) | PM | Daily surveillance to assess condition and capacity. Weekly/monthly inspection checklist. Inspection during and immediately after rain. | Appropriately designed and maintained detention areas/facilities. No overtopping under design conditions. |
| Install all nominated and necessary Erosion, Sedimentation and stormwater runoff controls to stabilise disturbed ground (Sediment/silt fences, V drains, floating booms, wheel wash, sand bagging, other wash down areas etc.) | Prior to commencing works | All control requirements should be coordinated and read in conjunction with the engaged civil consultants drawings and specifications. Provide controls for all disturbed areas of the site and around/ within the site. | SM | Daily surveillance to assess effectiveness and condition. Weekly inspection checklist. | ECM reviewed every 6 weeks. Controls modified or new controls installed as required. |
| Include information in the Site Induction about the risks and potential impacts of, erosion, sedimentation and stormwater runoff on the local environment and community. | Prior to works commencing and ongoing | Site Induction package to include site specific information. Deliver induction material. | PM SM | SWMS prepared by subcontractors to address erosion, sedimentation and stormwater runoff | Site induction delivered to all workers on site. |
| Erosion, Sediment and stormwater controls during construction | | | | | |
| Maintain erosion, sediment and stormwater controls in an operable condition. | At all times and after rain events | Check the condition of controls. Remove accumulated sediment and debris and dispose. Undertake maintenance as required. Install new controls as new work areas open. | SM | Daily surveillance. Weekly inspection checklist. Immediately inspected after a severe weather event, (within 24 hrs after a 1in 5 event) ECM updated. | Silt collected at base of fence. No breach of fence line. |

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| Control Measure | Timing | Methodology | Responsibility | Monitoring and Reporting | Performance Measurement |
|---|--|---|----------------|--|--|
| Erosion, Sediment and stormwater controls during construction (cont.) | | | | | |
| Maintain stormwater pipes, pits and other controls (e.g. plugs). | At all times | SWMS prepared by subcontractor. Check the condition and operation of stormwater and controls. Remove debris and sediment and dispose. Monitor for blockages. | SM | Daily surveillance. Weekly inspection checklist. | Free flowing pipes capable of discharging maximum flows. |
| Cover all loads leaving site to minimise the potential for spillage and tracking. | At all times | SWMS prepared by subcontractor to address covering of loads and prevention of tracking. Loads and the condition of trucks/tailgates checked by subcontractor before leaving site. | SM Foreman | Daily surveillance. Weekly inspection checklist | No uncovered loads No non-conformance identified. |
| Locate stockpiles away from drainage lines, watercourses, sensitive ecosystems and flood prone areas. | At all times | Stockpile locations identified on ECM SWMS prepared by subcontractor addresses stockpile management. | SM GF | Daily surveillance. Weekly inspection checklist. | No uncontrolled stockpiles. No stockpiled material runoff into the stormwater system. |
| Cover soil stockpiles and provide bunding and sediment controls around the base. (covers to be undertaken if stockpiles are to be exposed for greater than 8 weeks) | At all times | SWMS prepared by subcontractor to address. Subcontractor to implement as part of soil management and monitoring on site. | SM GF | Weekly/monthly inspection checklist. | Pre-construction check. No release of material. |
| Stabilise stockpiles with a soil binder, sealant or sterile cover crop (grass). | Maximum 2 month after stockpile placement (if the material is remaining on site) | Establish appropriately located and sized stockpiles in designated areas only. Stabilise in accordance with manufactures specifications and application procedures. | SM | Weekly/monthly inspection checklist. | No erosion or dust generated from stockpiles. |

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| Control Measure | Timing | Methodology | Responsibility | Monitoring and Reporting | Performance Measurement |
|--|--|---|----------------|---|--|
| Erosion, Sediment and stormwater controls during construction (cont.) | | | | | |
| Maintain erosion and sediment controls until the potential for erosion, sedimentation and stormwater runoff has been eliminated. | At all times | Maintain controls in accordance with ECM Do not remove controls prior to any area being deemed stable. | SM | Weekly/monthly inspection checklist Inspections during rain events. | Controls effective and in good condition. No uncontrolled discharges of sediment off-site or into waterways. |
| Stormwater Detention and Dewatering | | | | | |
| Inspect basins/tanks, detention facilities and stormwater treatment devices and remove any build-up of debris. | Ongoing. Within 24hrs of a rain event | Retain capacity in detention facilities for storm events. Inspect the site within 24hrs of a 1 in 5-year Average Recurrence Interval (ARI) event including sediment basins/detention areas and stormwater treatment devices. SWMS to be prepared by sub-contractor to address inspection, testing and dewatering. | SM | Inspection within 24hrs of nominated rain event. Weekly/monthly inspection checklist. | Detention areas and capacity of facilities maintained in operational condition. No uncontrolled discharges under design conditions. |
| Test, treat and reuse collected stormwater on-site for dust suppression, truck and plant washing (in designated areas only). | Ongoing | SWMS prepared by subcontractor to address this option. Undertake water quality testing and treatment of stormwater. Meet required water quality criteria prior to reuse. | CM SM | Metering and recording of stormwater reused on site. Water quality test results from a NATA accredited laboratory. | No discharge to exceed authority criteria. |

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| Control Measure | Timing | Methodology | Responsibility | Monitoring and Reporting | Performance Measurement |
|--|-----------------------------------|--|----------------------|---|---|
| Stormwater Detention and Dewatering | | | | | |
| Test, treat and discharge collected stormwater off-site if it cannot be reused on site. | Ongoing | SWMS prepared by subcontractor to address this option. Confirm that water quality testing, treatment and dewatering methods satisfy the requirements of the relevant statutory authority. Undertake water quality testing and treatment of stormwater. Meet specified water quality criteria prior to discharge. Minimum (50mg suspended solids & PH range 6.5 to 8.5 and no visible chemical contamination) | SM Sub-contractor | Water quality test results from a NATA accredited laboratory. Dockets for off-site disposal where the water is not acceptable for discharge. | Water treatment and dewatering undertaken in accordance with documented site procedure and Workplace Delivery Code. No discharge of non-compliant water or off-site pollution. |
| Site stabilisation | | | | | |
| Implement site stabilisation works and landscaping progressively to rehabilitate disturbed ground. | Progressively during construction | Stabilise and seal disturbed areas in accordance with the design/engineering/landscape plans and scope of works. | CM SM | Weekly inspection checklist Project planning and design meetings. | Stabilisation of all disturbed work areas. No uncontrolled runoff containing sediment or contaminants. |

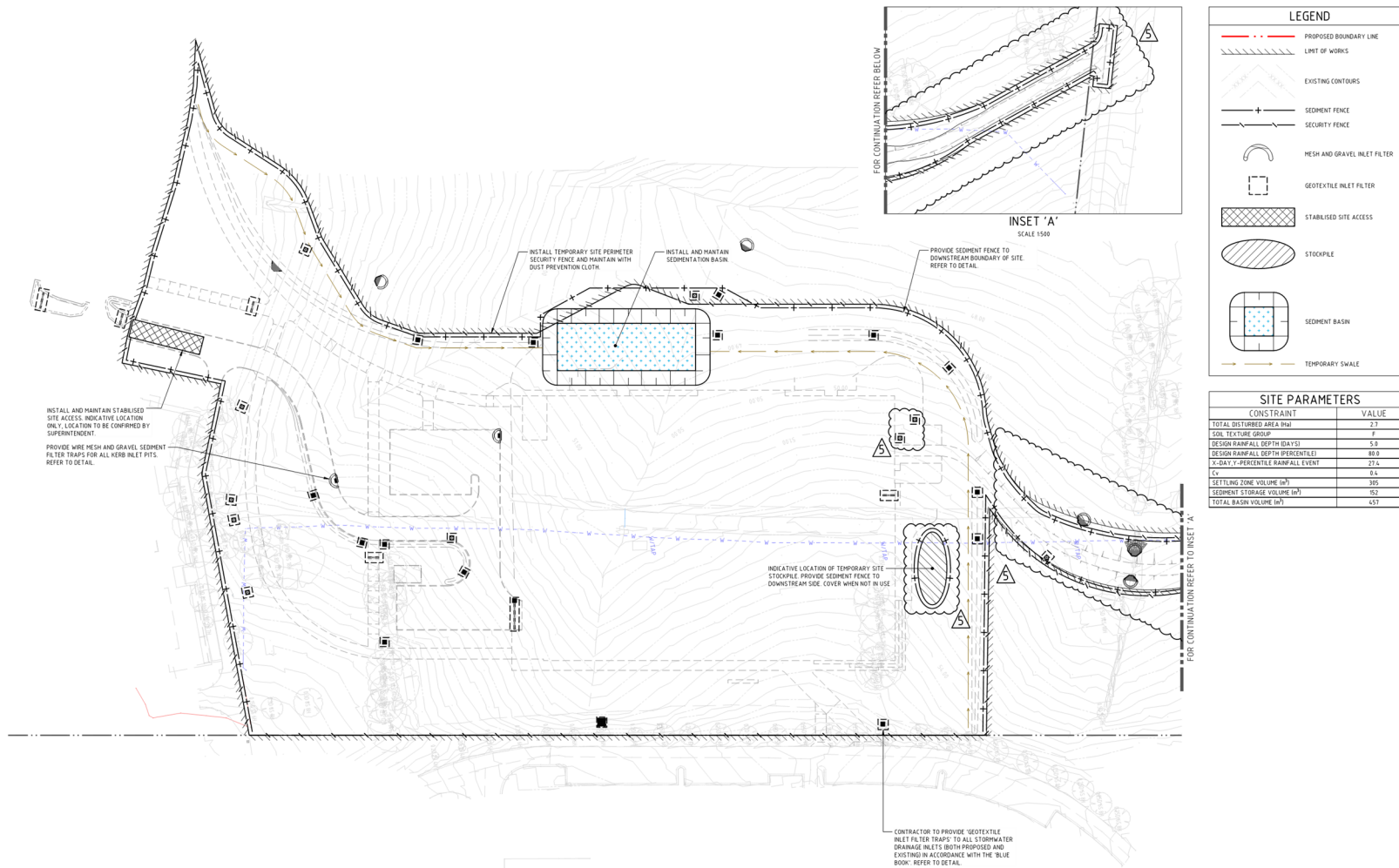
3. APPENDIX 1 – EROSION & SEDIMENT ENVIRONMENTAL CONTROL MAP – INSERT MAP AND LABEL THE ITEMS BELOW

Erosion & Sediment Control Map showing:

- Perimeter and site controls for erosion and sedimentation
- Stormwater infrastructure including pits and inlets
- Stabilised site access
- Detention areas
- Dewatering points

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- Stockpile locations
- Contaminated areas
- Other key features of the site
And surrounds including waterways



Erosion and Sediment Management

DESCRIPTION

Erosion Control: Reduces the movement of soil from rain or flowing water by preventing the problem. Preferable to sediment control.

Sediment Control: Minimizes the impacts of erosion by capturing sediment before it is discharged into the environment. Captures flowing water and holds it in place long enough for the sediment to settle.

ECOLOGICAL EFFECTS OF EROSION

- ▼ Smothers habitats of fauna and flora living waterways.
- ▼ Increases turbidity levels, decreasing the amount of light available for fauna and flora living waterway.
- ▼ Soil contains 'plant food' or nutrients (e.g. Phosphorus, Nitrogen) which can lead to excessive growth of weeds and algae in waterways.
- ▼ Soil run off from building sites may be contaminated (e.g. chemicals, heavy metals and poisons) which can harm fauna and flora in waterways.
- ▼ Sediment can block storm water drains, leading to flooding.

PROJECT PLANNING

On a project site, where there is a possibility of erosion or sediment pollution as a result of construction operations, information must be included in the [Project Risk Register \(Environmental\)](#). Project Risk Register information includes, but is not limited to:

- ▼ Details of work activities which may have an environmental impact, locally or on the eco-system.
- ▼ The potential risks of the work activities and required control measures. (This is commonly known as "Aspects and Impacts").
- ▼ Discussion of requirements of an approved Erosion and Sediment Control Plan (ESCP).

EROSION AND SEDIMENT CONTROL PLAN (ESCP)

An approved ESCP* includes, but is not limited to:

- ▼ Existing and proposed infrastructure.
- ▼ Boundaries of the site, access points, etc.
- ▼ Locations of areas to be disturbed.
- ▼ Location and details of temporary sediment and erosion control structures.
- ▼ Locations and classification of vegetation remaining / to be cleared during construction work.
- ▼ Locations of approved stockpiles areas.
- ▼ Signed approval by an Environmental Engineer.
- ▼ As required – written approval from a Regulatory Authority (e.g. Local Council, EPA).

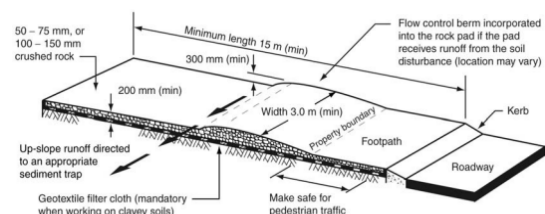
*The ESCP must be posted on Site Notice Board/s to ensure that all site personnel are aware of the required site environmental controls.

COMMON SEDIMENT CONTROL SYSTEMS

Stabilised Access Points (SAP): A stabilised means of access/egress for Plant, machinery and vehicles intended to limit the transfer of dirt from the construction site to a road.

SAP's (i.e. Rock Pads) must:

- ▼ Be installed prior to the start of construction activity.
- ▼ Be located at site entry/exit points where vehicular traffic moves from sealed to unsealed surfaces.
- ▼ Be constructed of sub-grade/base material. (e.g. 50 – 150mm rock ballast or clean recycled concrete. The size used is dependent of the weight of haulage vehicles.)
- ▼ Be wide enough to accommodate at least traffic flow (e.g. 3m for single lane or 2.5 metres per each lane).
- ▼ Have a minimum thickness of 200mm.
- ▼ Be of sufficient length (minimum 15 metres) to ensure maximum roll-over capacity for the size of vehicular traffic leaving the site.
- ▼ Be re-graded / have subgrade/base material replaced on a regular basis to ensure continuing effectiveness.
- ▼ Be designed and constructed to ensure that construction entrances do not divert dirty water from the site onto the roadway.
- ▼ Be made safe for pedestrian access. (Cover relevant areas with 25-50mm aggregate.)

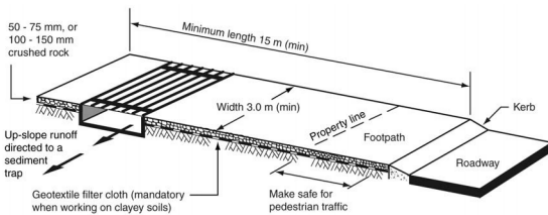


Shaker Grids: A prefabricated metal grid placed on a crushed concrete / rock ballast base with the aim of preventing sediment being realised onto a public road.

Shaker Grids must:

- ▼ Be installed on the inside of the site at least 3 metres from the site entry/exit point.
- ▼ Be installed with the rungs of the shaker pad level with the adjoining surface.
- ▼ Be wide enough to accommodate at least one lane of traffic (e.g. 3m).

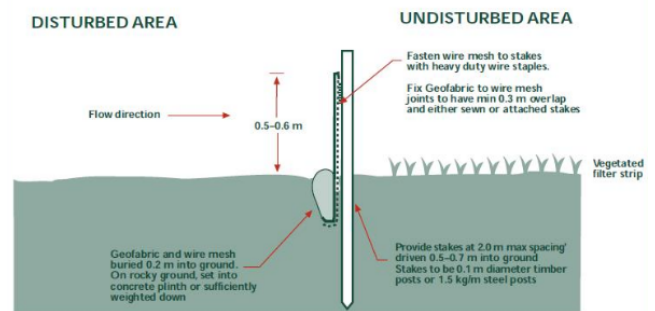
- ▼ Be of sufficient length (e.g. 6m) to ensure maximum roll-over capacity for the size of vehicular traffic leaving the site.
- ▼ Have a minimum clear depth of 300mm from the top of the rung to the finished subgrade/base level.
- ▼ Be provided with suitable barriers at the sides to ensure that all tyres of vehicles leaving the site traverse the device.
- ▼ Be cleaned and repositioned regularly to ensure that sediment does not build up in the rungs, thus reducing effectiveness.



Silt Fencing: A temporary barrier of permeable geo-textile supported by posts.

Silt fencing should:

- ▼ Be installed prior to the start of construction activity. (Note: The area below a silt fence should remain undisturbed or stabilised.)
- ▼ Remain in place until all sediment creating activities have been completed.
- ▼ Be installed within the site boundary.
- ▼ Be installed to ensure that surface water flows through and not underneath the fence.
- ▼ Be installed with a stable outlet or overflow point in case the flow rates exceed the fence's capacity to filter water.
- ▼ Follow the natural contours of the land. Installation must consider any stormwater concentration.
- ▼ Not run downslope without regular 'turn outs', as this will concentrate water flows along the fence and create scour/erosion.
- ▼ Be inspected regularly (especially after storms) and maintained in a serviceable condition. (e.g. trapped sediments removed, posts/pickets straightened, filter cloth resecured and tightened and reinstalled/rectified.)



Installation

- Dig a trench along the line of the intended fence. Where a barrier is to be formed over any distance, the fence should consist of a series of overlapped fences.

Note: Fences overlaps should be 3m wide and should end at pegs.

- Lay out the silt fence fabric on the uphill side of the trench.
- Drive 38mm square wooden pegs along the downhill slope of the trench.
- Stand the fence fabric against the posts and pull tight. Place the bottom 150-200mm of silt fence fabric flat on the floor of the trench, backfill and compact.
- Secure fabric to the fence using wire staples.

Sandbags: A temporary barrier used to trap sediment up-slope of a roadside kerb inlet.

Sandbags should:

- Be installed prior to the start of construction activity.
- Remain in place until all sediment creating activities have been completed.
- Comprise of hessian (burlap), polypropylene or other sturdy material and is filled with sand, small stones or approved soil.
- Be installed in manner which does not cause flooding.
- Be installed to ensure the safety of road users and pedestrians.
- Be installed with an overflow point in case the flow rates exceed the bag's capacity to filter water.
- Not extend more than 1 metre into a trafficable road.
- Be inspected regularly (daily) and maintained in a serviceable condition. (e.g. trapped sediment removed, broken bags replaced, bags realigned/repositioned, etc.).

