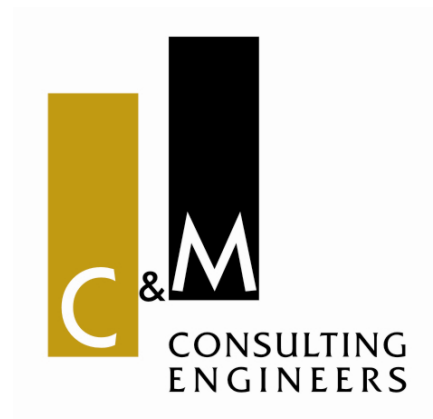




SOIL & WATER MANAGEMENT PLAN
FOR
ROYAL PRINCE ALFRED HOSPITAL
NORTH WEST PRECINCT
AT
MISSENDEN ROAD, CAMPERDOWN

For PLANNING APPLICATION

REPORT NO. R00823.2

Revision: A

JULY 2012

PROJECT DETAILS

Property Address: RPAH Missenden Road, Camperdown

Development Proposal: RPAH Redevelopment

REPORT CERTIFICATION

Report prepared by:

Report reviewed by:

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DOCUMENT CONTROL

REVISION	ISSUE DATE	ISSUED TO	ISSUED FOR
A	July 2012	Aconex	For Planning Application

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Preface

This Soil and Water Management Plan (SWMP) has been prepared in accordance with the requirements of “Managing Urban Stormwater – Soils and Construction, 4th Edition (2004)” by Landcom. This SWMP shall be applied to the construction activities carried out for the development site.

Measures outlined in this Soil and Water Management Plan must be implemented prior to and maintained during and after the construction works.

It is the Contractor’s responsibility to design the sedimentation and erosion control plan for the site such that it is accordance with this Soil and Water Management Plan and Works Specification.

General Instructions

1. The Soil and Water Management Plan (SWMP) is to be read in conjunction with the engineering plans, and any other plans and specifications that may be issued in relation to the Project.
2. Contractors shall ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in "Managing Urban Stormwater – Soils and Construction, 4th Edition (2004)" by Landcom.
3. The Contractor shall ensure that all subcontractors are informed of their responsibilities in minimising the potential for soil erosion and pollution to downslope areas.

Site Constraints and Characteristics

1. The following design parameters have been assessed for the site :

Constraint	Value	(Source)*
Rainfall Erosivity (R-factor)	3500	(Appendix B - Map 10)
Soil Erodibility (K-factor)	0.038 (<0.04)	(Table C20 – Cockle Bay)
Length/Slope Gradient Factor, LS	0.41 (<2.0, so RUSLE does not apply, and $k < 0.04$, so $V_{sed} = 50\%$ of V_{sett})	Table A1
Erosion Control Practice Factor (P-Factor)	1.3 (Compacted)	Table A2
Cover Factor (C-Factor)	1.0 (Bare Earth)	Table A4
Calculated Soil Loss, A (RUSLE equation)	71 t/Ha/yr	$A = R K L S P C$
Soil Loss Class	1 – Very Low	(Table 4.2)
Sediment Type	C	(Table C20)
Soil Hydrologic Group	B	(Table C20)
75 th Percentile 5-day Rainfall Event	23.3mm (Sydney)	(Table 6.3a)
Volumetric Runoff Coefficient, C_v	0.19	(Table F2)

* (NSW Landcom Managing Urban Stormwater Manual Reference)

2. The sediment basin sizing has been conducted on a rate per hectare basis and has been sized in accordance with the requirements of the Landcom manual "Managing Urban Stormwater - Soils and Construction", for Type D soils. The disturbed area within this catchment at any one time should be limited to an area for which each sediment basin can handle.

Sediment Basin Sizing Calculation for Type D Soil :

	TOTAL
Volumetric Runoff Coefficient, C_v	0.19 (Table F2)
75 th percentile 5 Day total rainfall depth	23.3mm
Catchment Area :	0.36 Ha
Settling Zone Volume (per hectare), $V_{sett} = 10 \times C_v \times A \times R_{75th}$	16 m ³
Disturbed Catchment Area	0.23 Ha
R K L S P C	71 t/Ha/yr
Sediment Zone Volume, $V_{sed} (0.17 A (R K L S P C)/1.3)$ V_{sed} should be >30% of V_{sett}	2.2 m ³ <30% V_{sett} (4.8m ³) So use 50% of V_{sett}
Total Sediment Basin Volume Required :	24 m ³ say 30 m³

* (NSW Landcom Managing Urban Stormwater Manual Reference)

3. The basins have been sized to accommodate the 75th percentile of 5 day continuous storm.
4. The non-disturbed portion of the catchment outside of operating area is to be bypassed the basins by physical means such as catch drains.

Basin Management

- 1 The captured stormwater in the settling zone should be drained to meet the minimum storage capacity required within a five (5) day period following rainfall, provided the acceptable water quality (NFR) and turbidity have been achieved.
- 2 Chemical flocculent such as gypsum may be dosed to aid settling within 24 hours of conclusion of each storm. The applied dosing rates should achieve the target quality within 36 to 72 hours of the storm event.

Land Disturbance Conditions

- Where practicable, the soil erosion hazard shall be kept as low as possible. Limitations to access are to be in accordance with the following table:

Land use	Limitation
Access Areas	Access is to be limited to the designated all weather roads.
Truck Wash Down Bay	Any truck exiting out of the site shall be thoroughly cleaned and limit the exportation of clay and sediment on public roads.
Remaining Lands	Entry is prohibited to remaining land. Access is only permitted with Council permission, to allow for thinning of growth in the interests of fire protection.

Construction Sequence

Works shall be undertaken in the following sequence:

- Install sediment fencing and cut drains to meet the requirements of the SWMP. Waste collection bins shall be installed adjacent to site office.
- Construct stabilised site access in location nominated by the Contractor and in accordance with the Specification.
- Install sediment control protection measures at all natural and man-made drainage structures.
- Redirect clean water around the construction site. Temporarily block off all existing in-ground drains within site once the existing building roof is removed.
- Continue building demolition except the slabs.
- Construct sediment basin for disturbed areas in accordance with the minimum volume provided in the SWMP. Install risers and two pegs in the floor of the basin and have them marked to show the top of the sediment storage zone. Ensure the basin is cleared of sediment once the design capacity is reached.
- Remove slabs and strip the building areas. Minimise the damage to the grass and low ground cover of non-disturbed areas.
- Any disturbed areas, other than grading areas, shall be stabilized with hydromulch or similar within 7 days of clearing.
- Apply permanent stabilisation to site if necessary.

Erosion Control Requirements

1. Clearly visible barrier fencing shall be installed at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only that essential for construction work and shall enter the site only through the stabilised access points.
2. All disturbed areas are to be stabilised within 14 working days of the completion of land shaping. All disturbed areas are to be protected so that the land is permanently stabilised within six months.
3. The long term ground cover factors for the construction works is not to exceed the following limits :

Land	Maximum C-factor	Remarks
Waterways and other areas of concentrated flows, post construction	0.05	Applies after ten working days of completion of formation and before concentrated flows are applied. Foot and vehicular traffic is prohibited in this area and 70% ground cover is required.
Stockpiles, post construction	0.10	Applies after ten working days from completion of formation. 60% ground cover is required.
All lands, including waterways and stockpiles, during construction.	0.15	Applies after 20 days of inactivity, even though works may be incomplete. 50% ground cover is required.

Sediment Control Conditions

1. Proprietary silt fencing shall be installed by the Contractor in accordance with their approved Sediment and Erosion Control Plan and elsewhere at the discretion of the site superintendent to contain coarser sediment fractions as near as possible to their source.
2. Sediment removed from any trapping device shall be relocated where further pollution to downslope lands and waterways cannot occur.
3. Stockpiles shall be located by the Contractor in accordance with their approved Sediment and Erosion Control Plan and elsewhere at the discretion of the site superintendent. Where stockpiles are to be in place longer than 30 days they shall be stabilised by covering with mulch or with temporary vegetation.
4. Water shall be prevented from entering the permanent drainage system unless it is sediment free. Drainage pits are to be protected in accordance with the Contractor's approved Sediment and Erosion Control Plan.
5. Temporary sediment traps at pits shall be retained until after lands they are protecting are completely rehabilitated.

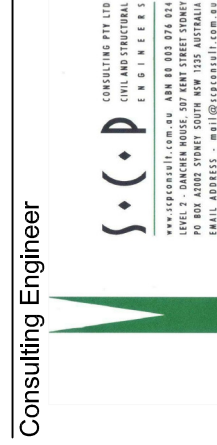
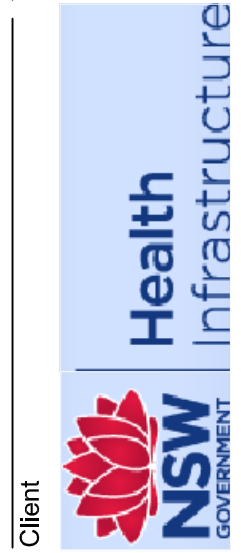
Site Maintenance Requirements

1. Waste bins are to be provided for all construction refuse. They are to be emptied at least weekly and refuse is to be disposed in accordance with the site manager's recommendations.
2. The site manager shall inspect the site at least weekly and shall;
 - 1) Ensure that all drains are operating effectively and shall make any necessary repairs;
 - 2) Remove any spilled material from area subject to runoff or concentrated flow;
 - 3) Remove trapped sediment where the capacity of the trapping device falls below 60%;
 - 4) Inspect the sediment basins after each rainfall event and/or weekly. Ensure that all sediment is removed once the sediment storage zone is full (refer to pegs installed in basins in accordance with the SWMP). Ensure that outlet and emergency spillway works are maintained in a fully operational condition at all times.
 - 5) Ensure rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate;
 - 6) Construct additional erosion or sediment control works as may be appropriate to ensure the protection of downslope lands and waterways;

- 7) Maintain erosion and sediment control measures in a fully functioning condition at all times until the site is rehabilitated;



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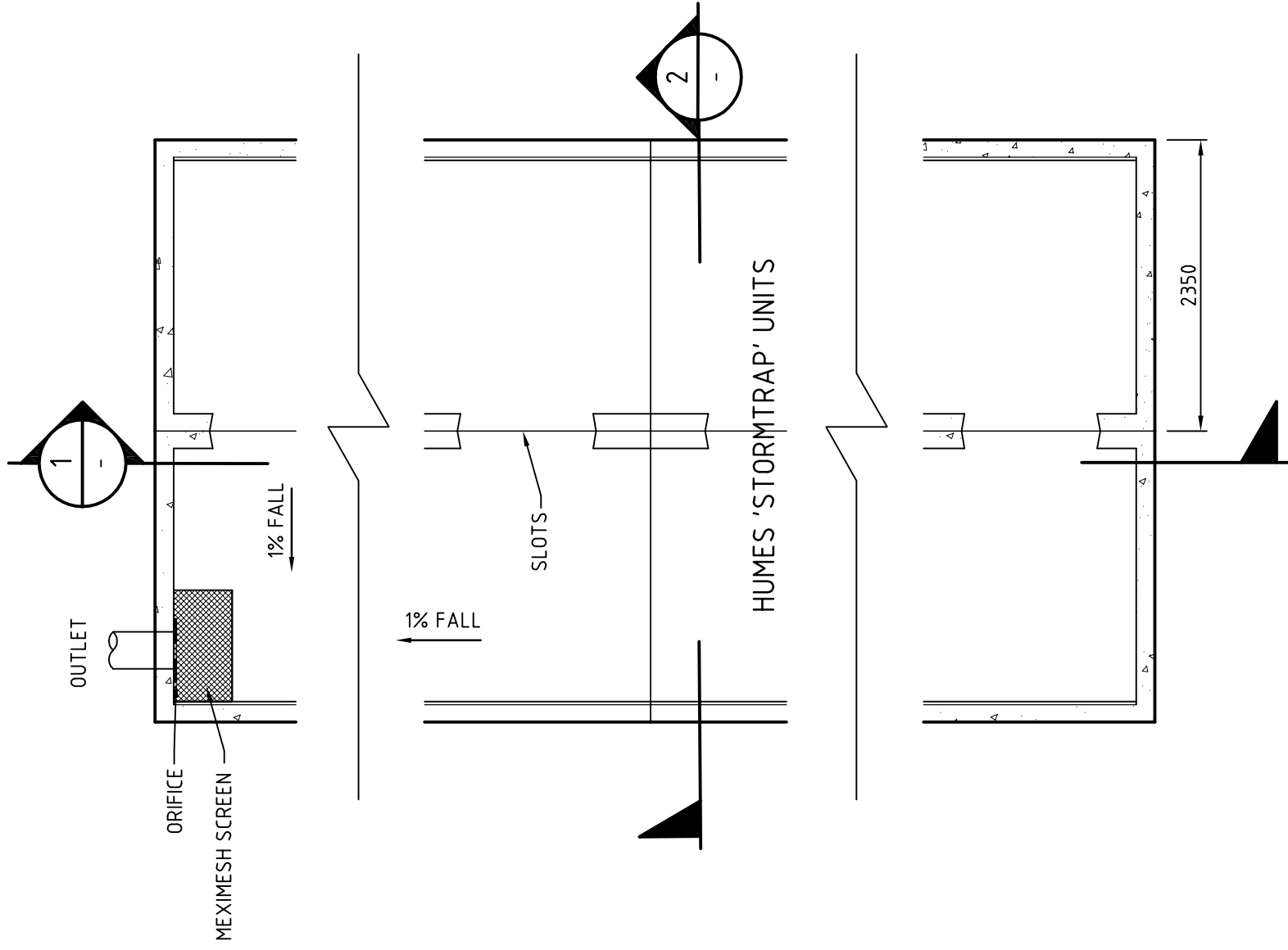
Project
RPAH NW Precinct
Missenden Road
Camperdown

Revisions			
Revision	Date	Drawn	Checked
A	08.06.12	TT	ES
B	26.06.12	TT	ES
C	03.07.12	TT	ES
D	05.07.12	TT	ES

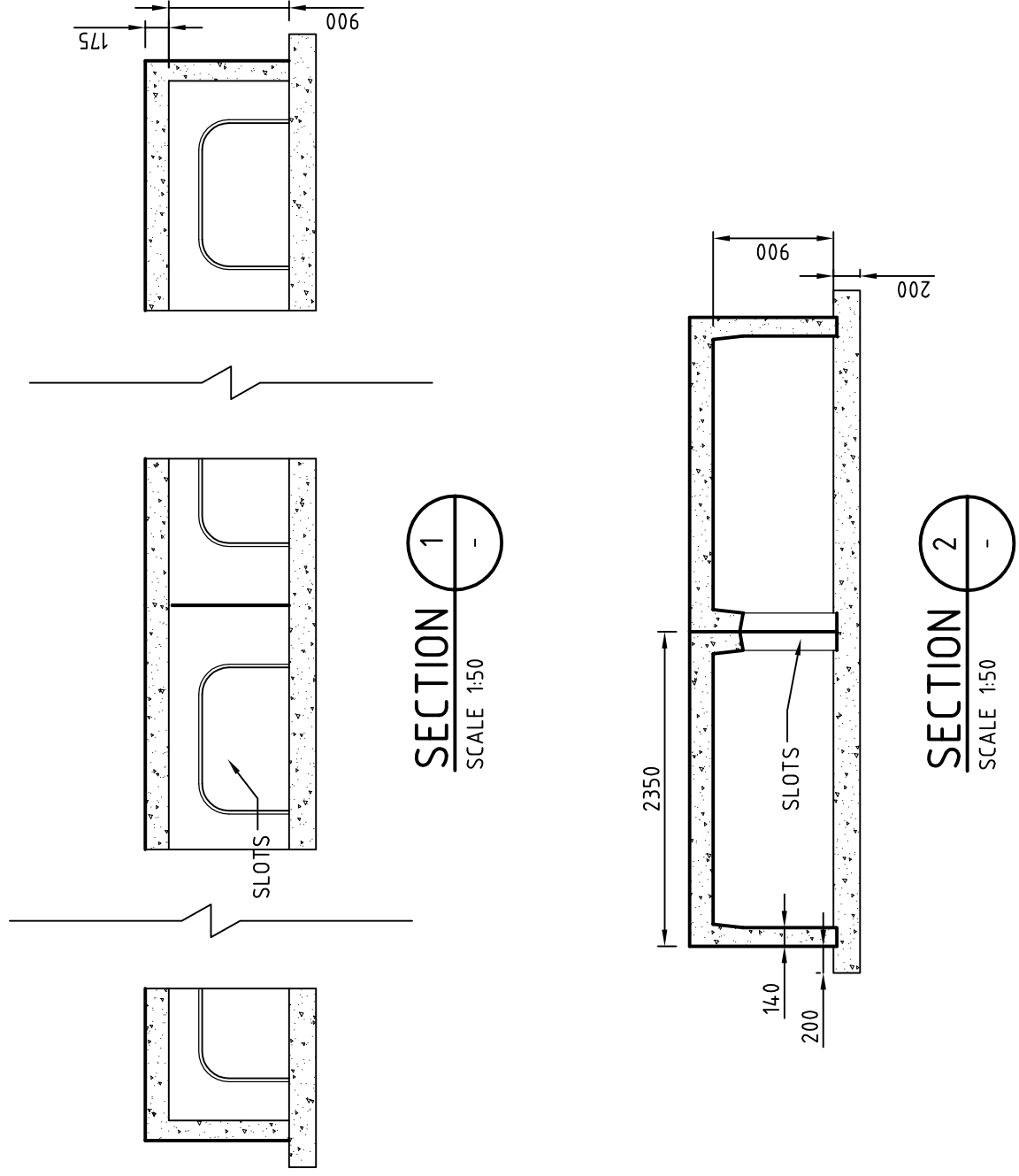
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CONCEPT
STORMWATER
PLAN



Project No. 2990
Drawing S-12-6-01
Rev D
Scale 1:200 @ A1
PROJURED DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE. CONTRACTORS MUST
VERIFY ALL DIMENSIONS AND DISCREPANCIES TO BE REPORTED TO PROJECT MANAGER.
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PLAN VIEW
SCALE 1:50



SECTION 1
SCALE 1:50

SECTION 2
SCALE 1:50

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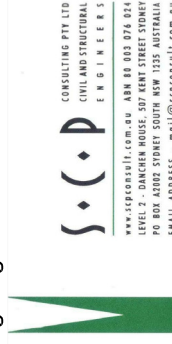
Client



Project Manager



Consulting Engineer



Project
RPAH NW Precinct
Missenden Road
Camperdown

Revisions
Revision
Date
Drawn
Checked

A	ISSUE FOR INFORMATION	08.06.12	TT	ES
B	ISSUE FOR PLANNING APPLICATION	03.07.12	TT	ES

North

Drawing title
**CONCEPT
STORMWATER
DETAILS**

Project No.
2990

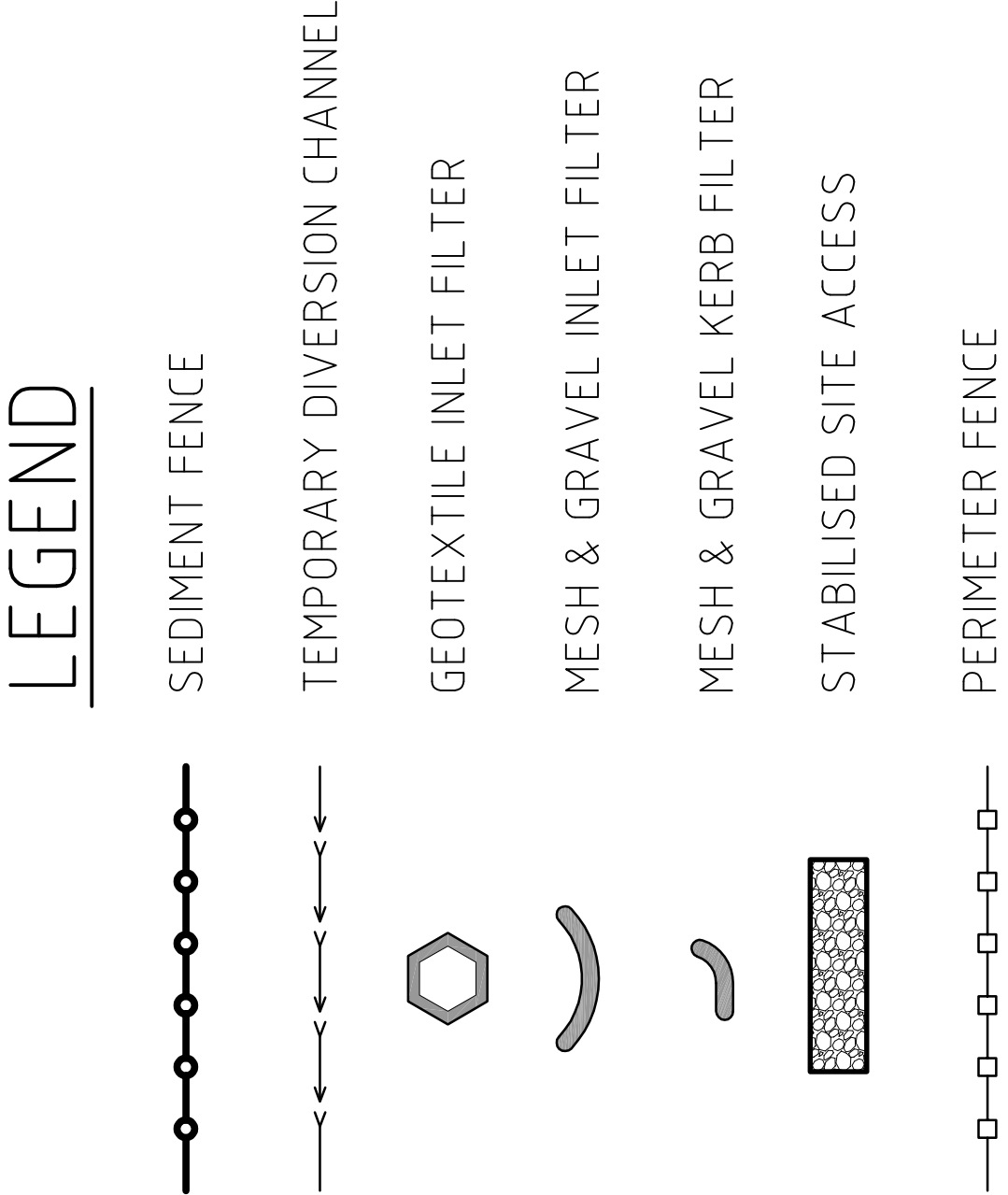
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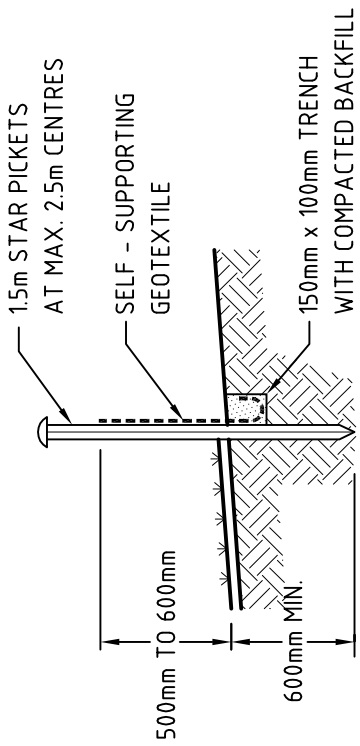
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Rev

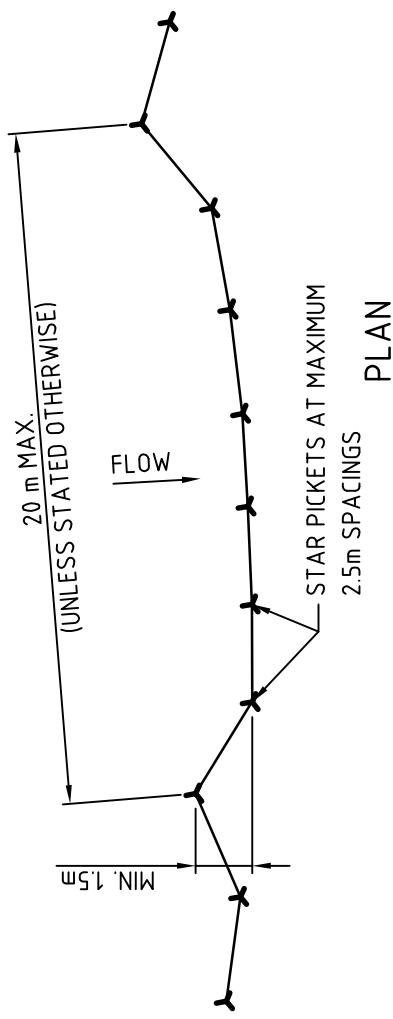
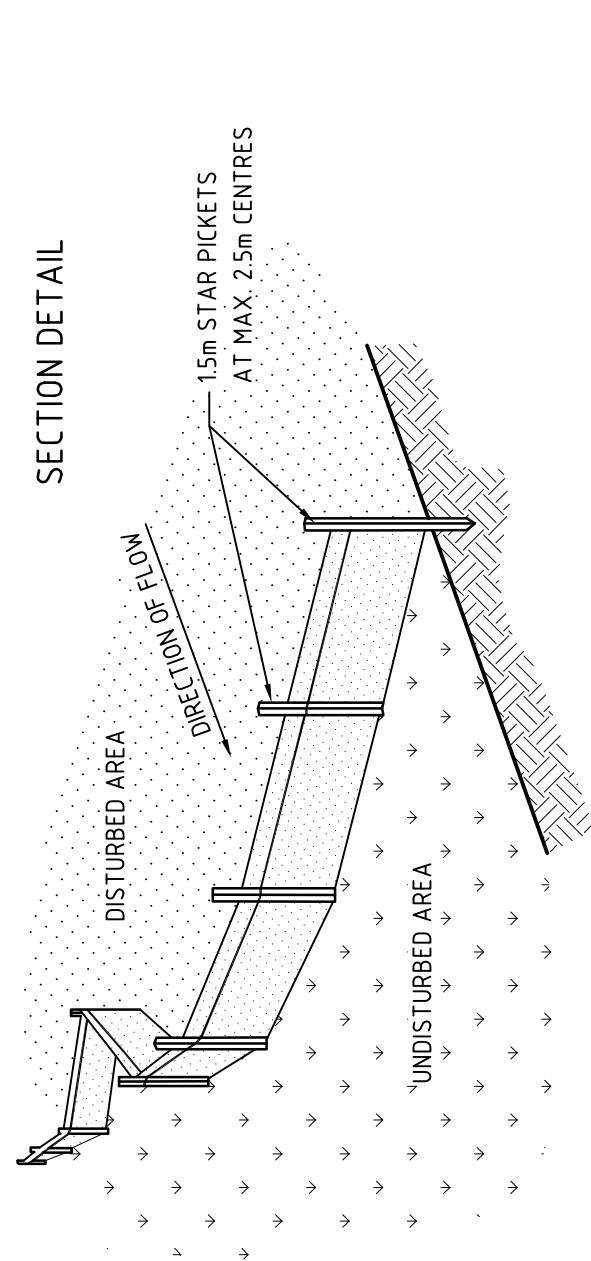
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Scale 1:50 @ A1
FOURIED DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE. CONTRACTORS MUST
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SECTION DETAIL

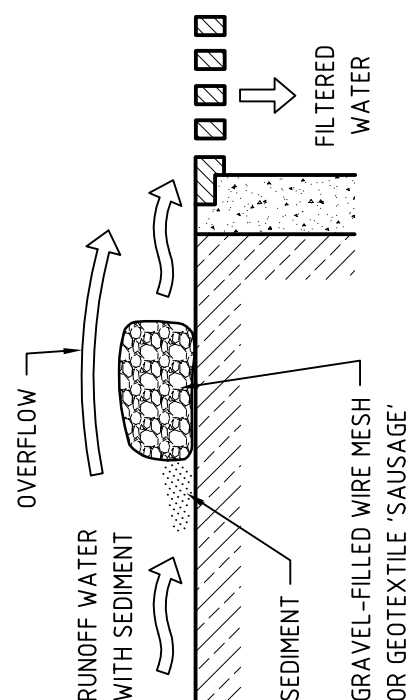
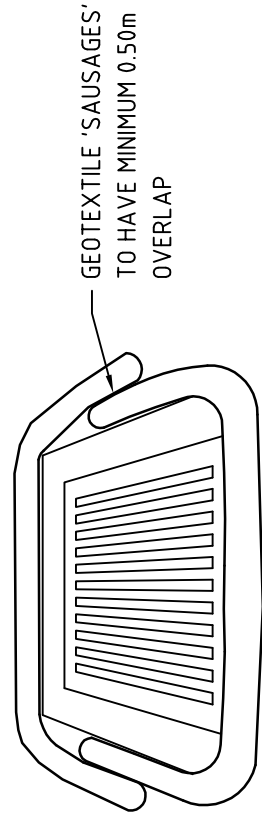


CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT. USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 15 METRE LONG STAR PICKETS INTO THE GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. JOIN THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150-mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE DETAIL

NOT TO SCALE



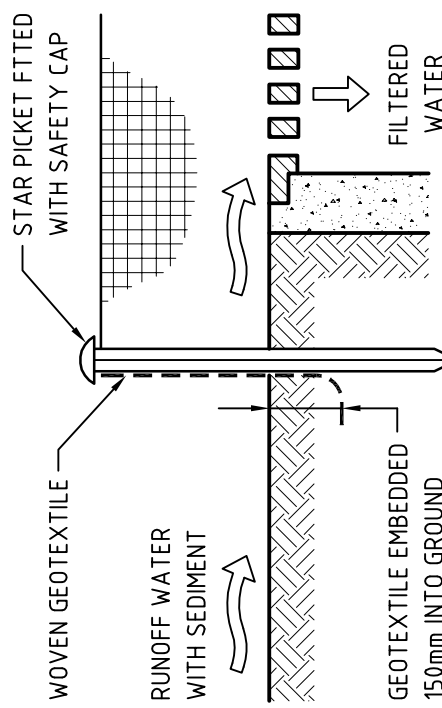
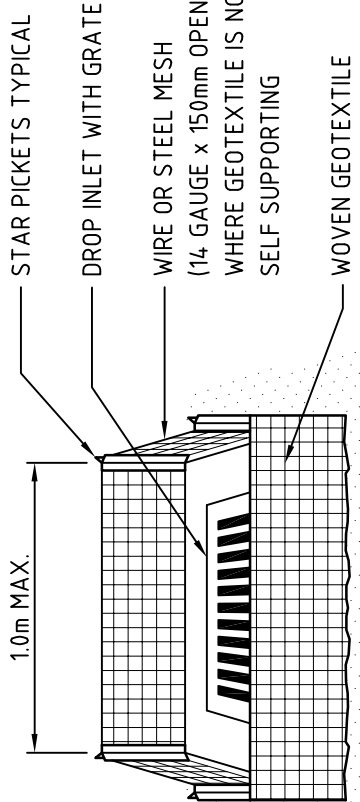
CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER DETAIL

FOR PITS WITHIN PAVEMENT AREAS

NOT TO SCALE



FOR DROP INLETS AT NON-SAG POINTS, SANDBAGS, EARTH BANK OR EXCAVATION SHALL BE USED TO CREATE ARTIFICIAL SAG POINT

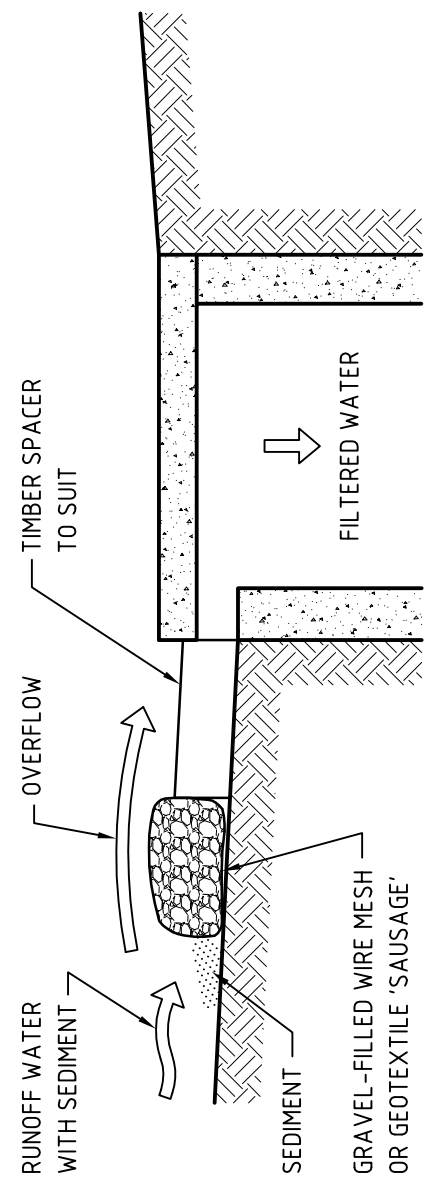
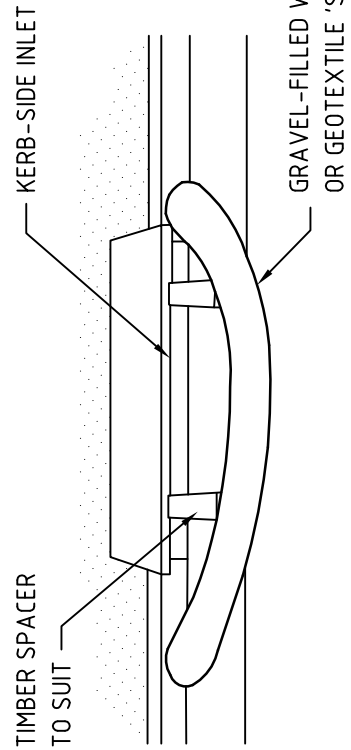
CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
3. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER DETAIL

FOR PITS WITHIN LANDSCAPED AREAS

NOT TO SCALE

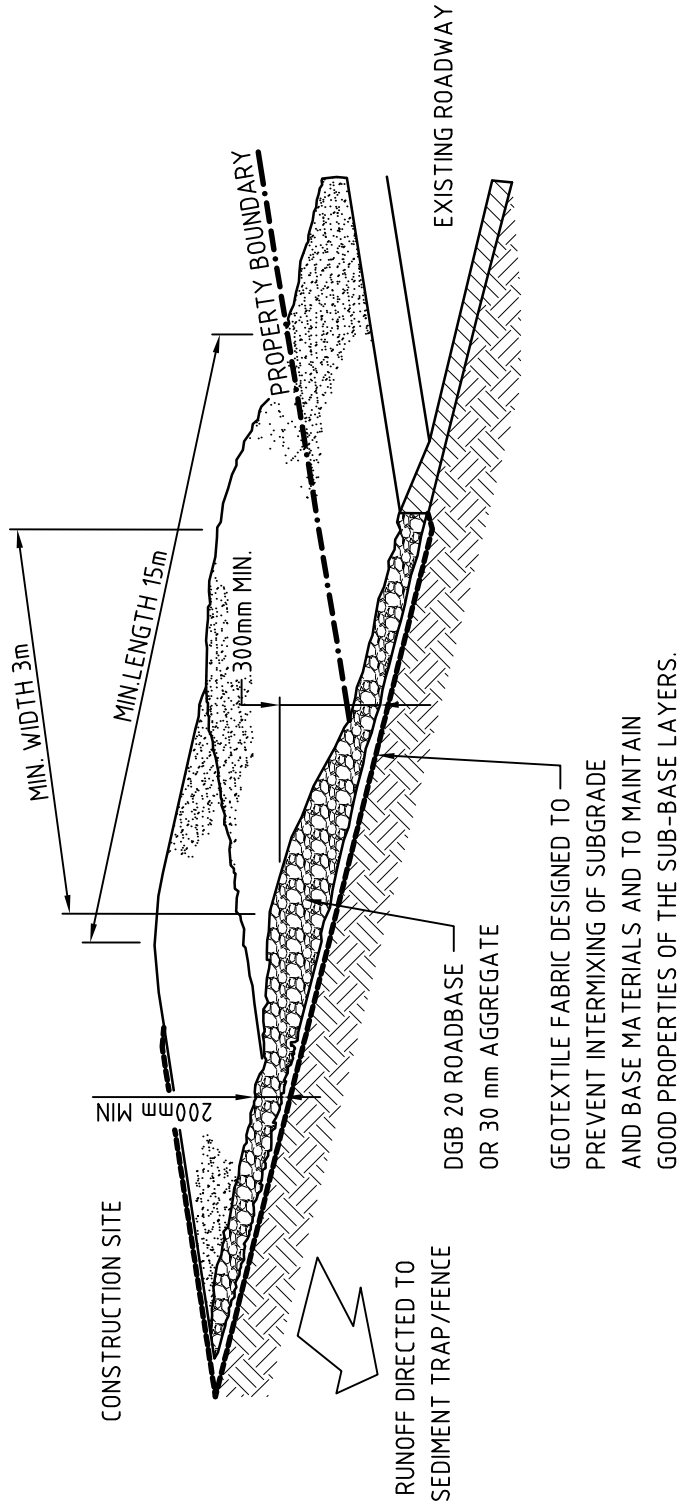


CONSTRUCTION NOTES:

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH AND GRAVEL INLET FILTER DETAIL

NOT TO SCALE



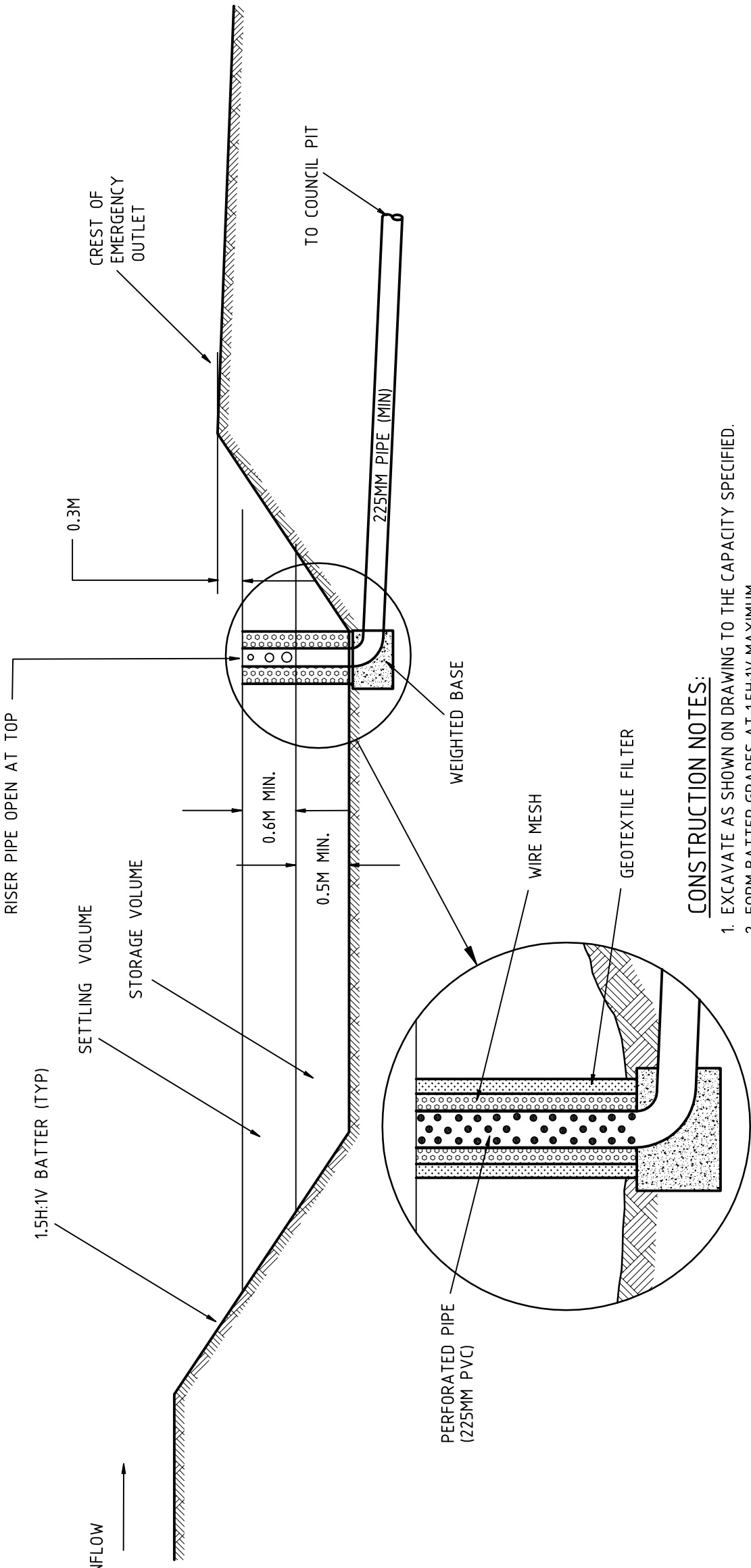
GEOTEXTILE FABRIC DESIGNED TO PREVENT INTERMIXING OF SUBGRADE AND BASE MATERIALS AND TO MAINTAIN GOOD PROPERTIES OF THE SUB-BASE LAYERS.

CONSTRUCTION NOTES:

1. STRIP THE TOPSOIL LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15m LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3m WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

STABILISED SITE ACCESS DETAIL

NOT TO SCALE



CONSTRUCTION NOTES:

1. EXCAVATE AS SHOWN ON DRAWING TO THE CAPACITY SPECIFIED.
2. FORM BATTERS TO 1:1.5H:1V MAXIMUM.
3. INSTALL THE PIPE OUTLET WITH SEEPAGE COLLARS AS SPECIFIED AS SPECIFIED.

CROSS-SECTION OF TYPICAL SEDIMENT BASIN

(NOT TO SCALE)