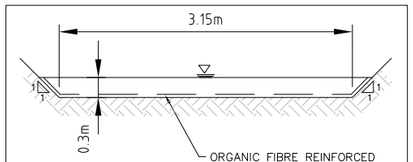
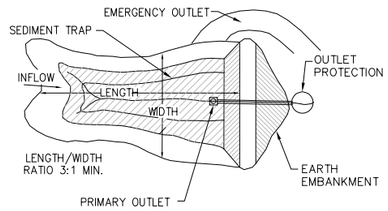


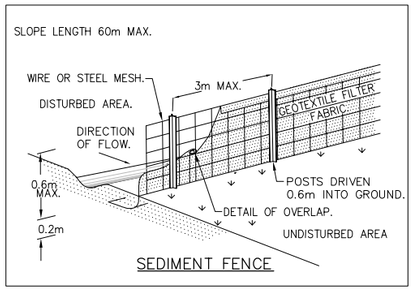
TYPICAL (MINIMUM) DRAIN DIMENSION

$Q \approx 2.14 m^3/s$ FOR 20Yr ARI FROM EXTERNAL CATCHMENT BASED ON RATIONAL METHOD

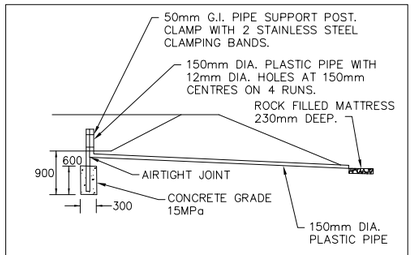
DIVERSION DRAIN



PLAN VIEW OF TYPICAL SEDIMENT BASIN



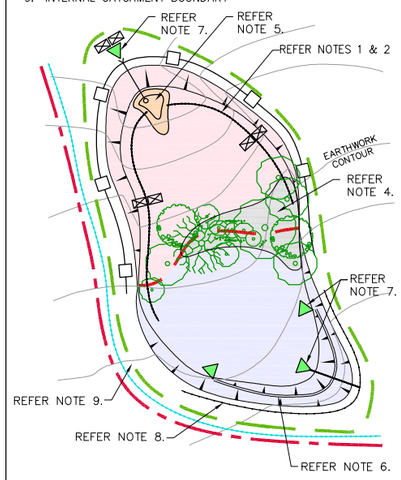
SEDIMENT FENCE



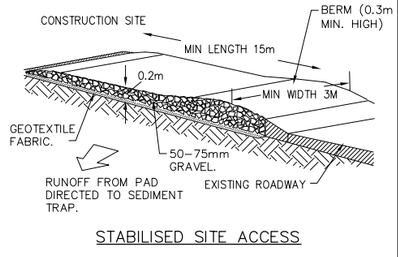
LOW FLOW OUTLET DETAIL

NOTES:

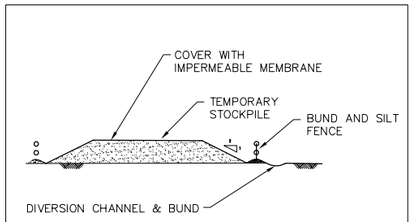
1. DIVERSION DRAIN (OR LIP ON THE TOP OF FILL BATTERS) DIRECTING FLOW INTO SEDIMENT BASIN. STRAW BALES TO BE PLACED AT 50m INTERVALS AS A MINIMUM TRANSVERSE PROTECTIVE DEVICE.
2. FOR DIVERSION DRAINS OF 0–2.5% PROVIDE TRANSVERSE STRAW BALE PROTECTION, FOR GRADES OF 2.5–20% PROVIDE GRADE STABILISING STRUCTURES AND FOR GRADE 20%+ PROVIDE ROCK CHECK DAMS.
3. A 'CLEAN' WATER DRAIN SHALL BE PROVIDED ON THE HIGH SIDE OF THE WORKS. ALL FLOWS SHALL BE DIRECTED AROUND THE CONSTRUCTION SITE WITHOUT COMING IN CONTACT WITH DISTURBED GROUND.
4. 4. VEGETATION SHALL BE RETAINED IN UNDISTURBED AREAS AND LOCATIONS OF CUT TO FILL TRANSITIONS.
5. SEDIMENT BASINS SHALL BE CONSTRUCTED IN A MANNER TO UTILISE THE PROPOSED FILL EMBANKMENT. BASIN DEPTH IS ASSUMED AT 1m TYPICALLY FOR ALL BASINS INDICATED ON THIS PLAN.
6. PROVIDE BENCHING ON BATTER SLOPES AS DETAILED.
7. LEVEL SPREADERS OR DISSIPATORS SHALL BE EMPLOYED IN ALL AREAS WHERE A DIVERSION, EMBANKMENT OR BATTER DRAIN DOES NOT OUTLET INTO ANOTHER CONTROL DEVICE.
8. 8PROVIDE BARRIER FENCING (PARAWEB AS A MINIMUM) IN AREAS WHERE A CUT BATTER EXCEEDS 2m IN VERTICAL HEIGHT.
9. INTERNAL CATCHMENT BOUNDARY



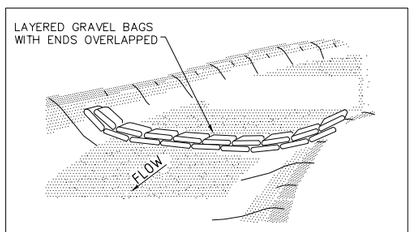
TYPICAL EROSION AND SEDIMENT CONTROLS WITHIN INDIVIDUAL CATCHMENT AREAS



STABILISED SITE ACCESS



TYPICAL TEMPORARY STOCKPILE



GRAVEL BAGS DROPED IN CANAL

NOTES:

ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH THE DEPARTMENT OF HOUSINGS "BLUE BOOK".

GEOFABRIC LINED SEDIMENT FENCE

1. FOR SEDIMENT FENCE, JOIN SECTIONS OF FABRIC AT A STAR PICKET WITH 150mm OVERLAP.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND, 3m APART.
3. DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC
5. FIX SELF-SIPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANFACTURER.

DIVERSION CANAL

1. DRAINS TO BE OF PARABOLIC OR TRAPEZOIDAL CROSS SECTION NOT V-SHAPED.
2. EARTH BANKS TO BE ADEQUATELY COMPACTED IN ORDER TO PREVENT FAILURE.
3. CONSTRUCTION IS OF A TEMPORARY NATURE AND SHALL BE REMOVED AT COMPLETION OF WORKS.
4. DIRECT DISCHARGE TO LEVEL SPREADER.
5. COMPACT WITH A SUITABLE IMPLEMENT IN SITUATIONS WHERE THEY ARE REQUIRED TO FUNCTION FOR MORE THAN FIVE DAYS.
6. EARTH BANKS TO BE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT WILL IMPEDE NORMAL FLOW.
7. ALL OPEN DRAINS TO BE TURFED AS A MINIMUM. PROVIDE JUTE MESH LINING ON ANY DRAIN WITH A LONGITUDINAL GRADE EXCEEDING 5%.

STABILISED SITE ACCESS

1. STRIP TOPSOIL AND LEVEL SITE.
2. COMPACT SUBGRADE
3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING 40mm AGGREGATE . MINIMUM LENGTH 15 METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.

CONTROL OF WIND EROSION

1. CONTRACTOR IS TO PREPARE A MANAGEMENT PLAN THAT MONITORS WIND DIRECTION AND DUST TRANSPORT OFF-SITE. RECORDS ARE TO BE KEPT OF ALL COMPLAINTS AS TO THE LOCATION, WIND DIRECTION, ACTIVITIES ON-SITE AND NATURE OF ISSUE.
2. WORKS ARE TO BE STAGED AND DISTURBED AREAS VEGETATED IMMEDIATELY TO LIMIT POTENTIAL FOR WIND EROSION.
3. DISTURBED SURFACES ARE TO BE LEFT IN A ROUGH CLODDY CONDITION WHERE POSSIBLE TO INCREASE ROUGHNESS AND SLOW SURFACE WIND SPEED.
4. DISTURBED SURFACES ARE TO BE KEPT IN DAMP AND A WATER CART AVAILABLE ON-SITE ALL TIMES.

STANDARD CALCULATIONS

Note: These "Standard Calculation" spreadsheets relate only to low erosion hazard lands as identified in figure 4.6 where the designer chooses to not use the RUSLE to size sediment basins. The more "Detailed Calculation" spreadsheets should be used on high erosion hazard lands as identified by figure 4.6 or where the designer chooses to run the RUSLE in calculations.

1. Site Data Sheet

Site name: North Penrith Defence Land

Site location: North Penrith

Precinct: North Penrith

Description of site: Assumes Type D soils

Site area	Site A	Remarks
Total catchment area (na)	55.5	
Disturbed catchment area (ha)	41	
Soil analysis		
Soil landscape	Luddenham (lu)	DIPNR mapping (if relevant)
Soil Texture Group	Type D	Sections 6.3.3(c), (d) and (e)
Rainfall data		
Design rainfall depth (days)	5	See Sections 6.3.4 (d) and (e)
Design rainfall depth (percentile)	80	See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	18.2	See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	10.2	See IFD chart for the site
Rainfall erosivity (R-factor)	2290	Automatic calculation from above data

2. Storm Flow Calculations

Peak flow is given by the Rational Formula:

$Q_y = 0.00278 \times C_{10} \times F_y \times I_{y,\,tc} \times A$

where:
- Q_y is peak flow rate (m^3/sec) of average recurrence interval (ARI) of "Y" year
- C_{10} is the runoff coefficient (dimensionless) for ARI of 10 years. Rural runoff coefficients are given in Volume 2, figure 5 of Pilgrim (1998), while urban runoff coefficients are given in Volume 1, Book VIII, figure 1.13 of Pilgrim (1998) and construction runoff coefficients are given in Appendix F
- F_y is a frequency factor for "Y" years. Rural values are given in Volume 1, Book IV, Table 1.1 of Pilgrim (1998) while urban coefficients are given in Volume 1, Book V II, Table 1.6 of Pilgrim (1998)
- A is the catchment area in hectares (ha)
- $I_{y,\,tc}$ is the average rainfall intensity (mm/hr) for an ARI of "Y" years and a design duration of "tc" (minutes or hours)

Time of concentration (t_c) = $0.76 \times (A/100)^{0.38}$ hrs (Volume 1, Book IV of Pilgrim, 1998)

Note: For urban catchments the time of concentration should be determined by more precise calculations or reduced by a factor of 50 per cent.

Peak flow calculations, 1

Site	A (ha)	tc (mins)	Rainfall intensity, I, mm/hr						C_{10}
			$1_{yr,tc}$	$5_{yr,tc}$	$10_{yr,tc}$	$20_{yr,tc}$	$50_{yr,tc}$	$100_{yr,tc}$	
A	55.5	37	33.7	56.8	64.5	74.8	88.3	98.7	0.35

Peak flow calculations, 2

ARI yrs	Frequency factor (F_y)	Peak flows A						Comment
		(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	(m3/s)	
$1_{yr,tc}$	0.8	1.456						
$5_{yr,tc}$	0.95	2.914						
$10_{yr,tc}$	1	3.483						
$20_{yr,tc}$	1.05	4.241						
$50_{yr,tc}$	1.15	5.484						
$100_{yr,tc}$	1.2	6.396						

4. Volume of Sediment Basins, *Type D* and *Type F* Soils

Basin volume = settling zone volume + sediment storage zone volume

Settling Zone Volume

The settling zone volume for *Type F* and *Type D* soils is calculated to provide capacity to contain all runoff expected from up to the y-percentile rainfall event. The volume of the basin's settling zone (V) can be determined as a function of the basin's surface area and depth to allow for particles to settle and can be determined by the following equation:

$V = 10 \times C_v \times A \times R_{y\text{-}\%ile,\ x\text{-}day}$ (m^3)

where:
- 10 = a unit conversion factor
- C_v = the volumetric runoff coefficient defined as that portion of rainfall that runs off as stormwater over the x-day period
- R = is the x-day total rainfall depth (mm) that is not exceeded in y percent of rainfall events. (See Sections 6.3.4(d), (e), (f), (g) and (h)).
- A = total catchment area (ha)

Sediment Storage Zone Volume

In the standard calculation, the sediment storage zone is 50 percent of the setting zone. However, designers can work to capture the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(ii)), in which case the "Detailed Calculation" spreadsheets should be used.

Total Basin Volume

Site	C_v	R x-day y-%ile	Total catchment area (ha)	Settling zone volume (m^3)	Sediment storage volume (m^3)	Total basin volume (m^3)
A	0.50	18.2	55.5	5050.5	2525	13888.90

ISSUE	DATE	ISSUE DESCRIPTION
B	28.10.10	FINAL
A	13.09.10	ISSUED FOR INFORMATION

LANDCOM

NORTH

NORTH PENRITH
CONCEPT PLAN APPLICATION
CONCEPT SEDIMENT AND EROSION CONTROL DETAILS

301015-00NP-CD-F10

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