SMEC
Member of the Surbana Jurong Group

Construction Soil and Water Management Sub-Plan

Picton High School Redevelopment

Prepared for: Billard Leece Partnership
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1. Introduction

1.1. Purpose

SMEC Australia Pty Ltd (SMEC) has been engaged by Billard Leece Partnership (BLP) to prepare a Construction Soil and Water Management Sub-Plan (CSWP) for the redevelopment of the Picton Senior High School (the site), located at 480 Argyle Street Picton, NSW 2571.

The redevelopment of Picton High School will accommodate 1,500 students. The project consists of:

- New future-focused permanent teaching spaces
- Covered outdoor learning areas (COLAs)
- Library
- Administration, student and staff support facilities
- Refurbishment of the hall
- Refurbishment of several existing buildings
- Removal of all demountable classrooms
- New special education facilities
- Upgrade of the existing bus and car pickup and drop-off area to increase safety for all users.

(source https://schoolinfrastructure.nsw.gov.au/schools/picton-high-school/project-overview)

This CSWP forms part of the technical inputs to clear Consent Condition B20 with State Significant Development SSD8640.

1.2. Objectives of the CSWP

The purpose of this CSWP is to guide construction activities in the management of soil and groundwater to minimise potential impacts to the receiving environment

Implementing this CSWP effectively will also allow the Site Contractor to meet regulatory requirements during site construction activities.

This CSWP has been designed in accordance the following standards and guidelines:

- Managing urban stormwater: soils and construction Volume 1, Landcom, 2004 (the 'Blue Book')
- Managing urban stormwater: soils and construction Volume 2D, Main road construction, Department of Environment and Climate Change, NSW, 2008.

LEGEND

Project Location

Cadastral Boundaries

FIG NO. 1-1 **FIGURE TITLE** Regional and Project Setting and Water Features

DATE 09/02/2018

0 50 100 200

1:7,500 Metres

PAGE SIZE A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

PROJECT NO. 30013089 **PROJECT TITLE** Picton High School Redevelopment - EIS

CREATED BY FA13847

SOURCES Roadnet MDS 2017, Public NSW
Imagery: © Department of Finance, Services & Innovation 2017

SMEC

Location: \\AUSYFSV001\Projects$\30013089 – Picton High School Redevelopment\100 Data\102 GIS\Maps\30013089_F01_Site_Locality.mxd

Last updated by: FA13847 on 9/02/2018 at 16:37

1.3. Development Details

The demolition and construction stages will be detailed during detailed design and seeking to minimise disruption school operational requirements and managed in consultation with the project construction traffic management planning.

In summary staging according to the Picton High School Masterplan is:

Stage 1 – Removal of asbestos from existing buildings.

Stage 2 – Demolition of some of the existing single storey buildings, civil works and earthworks levelling to accommodate prefabricated buildings and associated services, and the delivery of classroom de-mountables.

Stage 3 – Construction of new buildings including services, and the construction of the surrounding soft and hard landscaping works.

Stage 4 – Removal of Temporary School and landscaping.

FIG NO. 1-2 **FIGURE TITLE** Proposed Demolition and Construction

DATE 09/02/2018

0 10 20 40
1:1,500 Metres

PAGE SIZE A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

PROJECT NO. 30013089 **PROJECT TITLE** Picton High School Redevelopment - EIS

CREATED BY FA13847

SOURCES Roadnet MDS 2017, Public NSW
Imagery: © Department of Finance, Services & Innovation 2017

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Location: \\AUSYFSV001\Projects$\30013089 – Picton High School Redevelopment\100 Data\102 GIS\Maps\30013089_F02_Prop_Demo_CT.mxd

Last updated by: FA13847 on 9/02/2018 at 18:59

1.4. Assumptions

At this current stage of the planning process there are a few project variables to be defined by the construction contractor and demolition and construction phasing and to provide a more comprehensive ESCP the following assumptions have been made:

- Demolition and construction may occur progressively
- Each stage will have up gradient surface flow managed via existing drainage infrastructure
- Building identified for demolished and renovation will retain operational drainage assets where possible and do not require additional erosion and sediment controls
- Proposed demolition works does / does not include demolition of any roadways or underground utilities associated with stormwater or sewer mains. These may need specific controls implemented during decommissioning if required.

2. Existing Environment

The study area has an elevation of about 165 metres, and is largely flat with a slight swale in the middle of the study area running north/south. The terrain of the study area has been modified as a result of establishing the existing school complex including buildings and sporting facilities. About 150 metres to east of Picton High School are Redbank Creek which flows into Stonequarry Creek and into the Nepean River Both creeks are surrounded by dense remnant or regrowth vegetation.

2.1. Soil landscapes

Reference to the soil conservations service of NSW (1990) *Soil Landscapes of the Wollongong – Prt Hacking 1:100 000 Sheet* indicates that the site and study are is underlain by the Blacktown Soil Landscape This is characterised by gently undulating rises on the Wianamatta Group of Shale and Hawkesbury Sandstone, with local relief of 30 metres and slope less than 5%. Soil range from shallow (1 metre) red brown podzolic soils, comprising mostly of clayey soils on crests and upper slopes to deep yellow brown clay soils on lower slopes and areas of poor drainage These soils are typically moderately reactive with low fertility, poor soil drainage and highly plastic subsoils.

2.2. Study area catchment

The study area drains to the Redbank Creek which is a tributary of Stonequarry Creek catchment, which flows into Nepean River 1.3 kilometres to the southeast. The Nepean River flows from west to east before turning north and finally meeting the Hawkesbury River about 50 kilometres to the north.

The study areas immediate catchment boundary is defined by up gradient surface flows being managed by Argyle Street (Old Hume Highway) and Wonga Road stormwater infrastructure. These up gradient areas contain remnant or regrowth vegetation and pasture areas.

Down gradient is an established urban subdivision with curb and gutter drainage via Wood Street and Coachwood Crescent with a likely stormwater discharge point entering Redbank Creek in this location.

The demolitions sub catchments requiring management during construction to control soil and water impacts are further detailed in Section 4.

2.3. Climate

Bureau of Meteorology (BOM) climatic statistics for Picton High School (about 2.7 kilometres from Picton Council Depot) are contained in Table 2.1. Table 2.1show that rainfall occurs throughout the year although with a slight summer dominance. Temperatures are warm to mild. As a coastal area, winds can be strong at any time of year. Prevailing summer winds are from the north-east, and from the south-east in winter.

Table 2.1 Monthly climate averages for Picton (Willandra Village) Station Number: 66156as at January 2018.

Month	Jan	Feb	Mar	Apr	May	Jun		Jul	Aug	Sep	Oct	Nov	Dec	Ann-ual
Rainfall (mm)	87	90	89	70	56	68		49	45	44	63	72	70	804
Mean no. of days with >1mm	6.9	6.8	7.1	5.7	4.9	5.3		4.6	4.8	5.1	6.2	6.7	6.5	70.6
Mean min temp (°C)	15	15	13	9	6	3		2	3	5	9+	12	14	8.8
Mean max temp (°C)	29	29	27	24	20	17		17	18	21	24	26	29	23.4
Mean 9am wind speed (km/h)	7	5	5	5	6	5		5	7	8	9	9	7	6.3

2.4. Surface water quality

Stonequarry Creeks catchment is a peri-urban catchment. Agricultural activities and urban growth in the Stonequarry Creeks catchment has impacted on the water quality of the creek. The water quality of Stonequarry Creeks is likely to be characteristic of an urbanised catchment with intermittent flows.

2.5. Erosion Hazard Areas

In accordance with Section 4.4.2 of the Blue Book, areas which pose a 'high' erosion hazard are those which have a Soil Loss Class (SLC) of 5 or greater. This equates to a calculated soil loss of greater than 500 (tonnes / hectare / year). Soil loss equations for construction catchments have been provided in Section 4 of this report.

Common areas which would present a high risk of soil erosion and resulting environmental impacts include areas of concentrated flows and locations where surface gradients and slope lengths combine to increase the erosive potential of stormwater runoff. During the construction phase these locations would typically include:

- Road embankments and cut faces
- Stormwater asset realignments
- Culverts and drainage outlets
- Cut to fill for site levelling and embankments.

2.6. Environmentally Sensitive Receiving Areas

Sensitive areas in proximity to the study area include:

- To north east of the project are Stonequarry Creeks and Redbank Creek and surrounding heavily vegetated areas of remnant or regrowth vegetation
- There are remnant trees in the north east corner of the development
- One small farm dam 230 metres south of the project (south of Wonga Road)
- Two medium farm dams between 650 metres and 700 metres to the south of the project
- Agricultural landuse to the west.
- Urban residential subdivision immediately to the north.

3. DESIGN CRITERIA AND ASSUMPTIONS

The Preliminary ESCP and the associated calculations and drawings have been prepared based on the concept design for drainage.

The proposal involves the demolition of all residential structures and leaving the road pavement, footpaths and stormwater drainage intact.

3.1. Demolition Staging

The proposal corridor is highly constrained by a number of important factors to be considered during demolition staging. Construction planning must consider the following factors:

- Gently sloping terrain
- Presence of endangered ecological communities that require vegetation clearing to be minimise to the extent possible
- Adjoining residential dwellings immediately to the north.

Collectively these constraints present significant spatial challenges for the proposal to meet typical Blue Book objectives. A number of design inputs, construction methodology and property acquisition are required for final catchment size calculations in accordance with the Blue Book during detailed construction planning. Additional construction sub staging is required to assess catchments at intersections to manage traffic flows, up gradient offsite water diversions or drainage cross overs and existing stormwater asset decommissioning are not assessed in this report.

3.2. Construction Catchments

Preliminary construction catchments have been identified for the entire length of the proposal in accordance with the proposed design (refer to Appendix B Figure 1). Each construction catchment has been assessed in principle with Blue Book and using the Revised Universal Soil Loss Equation (RUSLE) to determine the need for likely sediment basin locations.

The design of construction catchments followed a best practice management approach in accordance with the Blue Book which included the following considerations:

- A maximum value / worst case scenario has been adopted for design input data
- Slope lengths have been calculated as the distance from the origin of overland flow along its flow path to the location of either concentrated flow or deposition
- Where required (e.g. intersections) catchments were sized to be inclusive of all sub stages to improve efficiency of control implementation.

Review of catchment sizing will be required at construction to reflect available lands due to acquisitions and contractor construction phasing. Up gradient urban stormwater catchments may also need to be considered in some events where offsite water diversion controls are being temporarily or permanently impacted.

3.3. Design Parameters

In accordance with the Blue Book, Table 3.1details the design parameters which have been used to estimate the RUSLE for each identified construction catchment of the proposal. Additional RUSLE calculations may need to be reviewed subject to detailed construction staging and planning details based on revised slope length and gradient factors.

Table 3.1 Demolition catchment assessment parameters.

Parameter	Value	Blue Book Reference
Sediment Type	Blacktown Soil Landscape – Type D	Table C21 Wollongong Port Hacking
Soil Hydrological Group	Blacktown Soil Landscape – Group C	Table C21 Wollongong Port Hacking
Volumetric Runoff Coefficient (Cv)	0.64	Table F2 in Appendix F
Rainfall Data	5 day / 85th %ile / 34 mm	Table 6.3(a)
Rainfall Erosivity (R factor)	2,500	Appendix B, Map 11
Soil Erodibility (K factor)	Blacktown Soil Landscape – 0.038	Table C21 Wollongong Port Hacking
Erosion Control Practice (P factor)	1.3 (compacted and smooth)	Appendix A Table A2
Ground Cover and Management Factor (C factor)	1	Appendix A Section A6

3.3.1. Slope length and gradient factor

The slope length and gradients have been measured using each designated flow path length. The values have been used to calculate the slope length (LS) factor using Table A1 of the Blue Book.

3.3.2. Erosion control practice factor

A default P factor of 1.3 has been adopted. This reflects a worst case scenario 'compacted and smooth' surface condition of the site.

3.3.3. Ground cover and management factor

A default C factor of 1 has been adopted. This reflects a worst case scenario cover factor where topsoil has been stripped.

4. Catchment Risk Assessment

4.1. Construction Catchment Sizing

Catchment sizing is based on the proposed construction activity area, project engineered elements like new pavement, new drainage features and temporary school facilities required during the construction phase schedules. The requirement for sediment basins has been considered throughout the concept design process. Placement of proposed basins have been assessed for co-location potential with the proposed permanent operational water quality basins or detention tanks.

Sizing of catchments may need to be further defined once construction staging planning is underway. Provisions for potentially larger up gradient stormwater catchments would be taken into consideration during higher risk activities for example: redirecting live stormwater assists, or when bridge deck surface water is connected to site water.

4.2. Erosion Risk Hazard and High Risk Area

An evaluation of the erosion risk was made using the RUSLE methodology. The RUSLE formula is outlined below:

A = R x K x LS x P x C

Where:

- A is computed soil loss (tonnes/hectare/year)
- R is rainfall erosivity factor
- K is soil erodibility factor
- LS is slope length and gradient factor
- P is soil conservation practice factor
- C is ground cover factor.

The values identified in Table 3.1Section 3.3 have been used in the assessment of each construction catchment. Construction catchments for Stage 1-4 construction phases is detailed in Appendix A Figure 1.

The designer (Bonacci Group Pty Ltd) has recommended not applying the RUSLE in calculation due to its recommendation for the site representing a low erosion hazard. Soil and water management computation for the construction catchments are included in Appendix B.

4.3. Soil Loss Results

As detailed in Section 6.3.2 (d) of the Blue Book 'the building of a sediment retention basin can be considered unnecessary' if the computed soil loss from a catchment is less than 150 m^3 per year. For all catchments, which exceed this requirement, a sediment basin is required.

Where the construction contractor chooses to vary the size of a construction catchment (e.g. through a change in construction staging) and final design and property acquisitions, further assessment of the soil loss from the catchment should be undertaken to confirm if a sediment basin will be required in accordance with the Blue Book.

The "Soil Loss Class" is a measure of erosion hazard that underpins the erosion control aspects of these guideline.

The current calculation of the soil loss class according to Soil and Water Computation provided by the drainage designer (Bonacci Group Pty Ltd), rates the site as low risk for soil loss. Calculations are provided in provided in Appendix B.

5. Erosion and sediment control planning

5.1. Key Management Strategies

Key management strategies for erosion and sediment control plans are to include:

- Minimise extent and duration of construction disturbance
- Ensure /separation of offsite water from site water
- Use erosion control measures to prevent offsite impacts
- Inspect and maintain erosion controls measures
- Progressively stabilise and/or rehabilitate disturbed areas as soon as operationally possible.

5.2. Primary and Progressive ESCP

The best practice management guidance for the construction of main roads and highways is provided in Soils and Construction Volume 1 Managing Urban Stormwater (Landcom, 2004) to assist in planning and implementation of appropriate controls to minimise soil erosion and control sedimentation. The purpose of these documents is to outline the intentions and fundamental principles that would be followed in the planning and implementation of erosion and sediment control measures for the proposal.

The primary ESCP contains detailed background information, risk assessment and discussion, while a series of subordinate progressive ESCPs provide up-to-date detail regarding location and installation of control measures.

Progressive ESCPs are typically developed as the project proceeds, as site conditions evolve and as flow paths are changed. Over the construction and/or maintenance phase of a project, a series of progressive ESCPs would be prepared to address all stages of the work and to provide the necessary levels of flexibility. The following steps should be undertaken prior to construction within each designated catchment area.

- A series Progressive Erosion and Sediment Control Plan (PESCP) should be prepared which details the controls and management actions implemented to minimise soil and water impacts for construction staging and at specific discharge points and revised as necessary.
- Site personnel charged with the responsibility for implementation of the PESCP should have appropriate knowledge and experience in erosion and sediment control management in accordance with the Blue Book Volume 1 and Volume 2D.
- Where permitted by design, an offsite water diversion bank or similar should be constructed at the top of the construction activity zone or catchment to divert offsite water (offsite water) around the area of disturbance (refer to plans in Appendix C for catchment boundaries). Section 5.3 further details how offsite water diversions may be constructed.
- Where required, install sediment containment measures (e.g. excavated sumps, sediment fence, sandbag traps to treat runoff from the disturbed catchment area. Placement of these control measures are restricted to the available space within the project boundary and preferably outside of the construction zone. Where space is restricted, the capacity of sediment containment measures may be reduced by separating the catchment into smaller portions by way of diversion banks or temporary cut drains.

The progressive Erosion and Sediment Control Plan is to provide additional measures as necessary to prevent sediment laden water from leaving site in the 1:100 ARI storm events. This may include but is not limited to additional bunding, silt fence reinforcement and or covering exposed areas to prevent sediment migration.

5.3. Standard Controls

The following erosion and sediment controls are indicative of controls to be used to manage soil and water impacts during construction. Table 5.1details the relevant section from the Soils and Construction Volume 1 (Landcom, 2004) and Volume 2D (DECC, 2008) where the drawings are detailed. Controls should be implemented where appropriate and maintained to ensure proper function.

Selection of control measures requires the following:

- Identifying the problem (erosion or sedimentation) to be managed
- Where the problem is erosion, identifying whether it is caused by raindrop impact or concentrated flow
- Where the problem is sedimentation, identifying if sediment is conveyed by sheet or concentrated flow
- Selecting the appropriate techniques depending on the identified specific nature of the problem.

Table 5.1 Standard erosion and sediment controls.

Control	Blue Book Drawing Reference	Blue Book Page Reference
Earth Bank (low flow)	SD 5-5	5-25
Earth Bank (high flow)	SD 5-6	5-26
Concentrated Flow (Batter Chute)	SD 5-7	5-28
Mesh and Gravel Inlet Filter	SD 6-11	6-40
Geotextile Inlet Filter	SD 6-12	6-41
Stabilised Site Access	SD 6-14	6-48
Stockpiles	SD 4-1	4-5
Rock check dams	SD 5-4	5-22
Sediment Fence	SD 6-8	6-36
Sediment Traps at drop inlets	C5	Vol 2D Appendix C, 60

Additional soil and water management notes by the designer for the PESCP is located in Appendix C.

5.3.1. Works Staging

Works are to be staged in the following order for each work stage with the relevant erosion and sediment controls implemented prior to and during each section of works as specified:

- Ensure site boundary limits and no-go areas are defined – Install site barrier fencing (or alternative measures) or maintain existing fencing/walls where suitable. Refer to the 'Access Control' notes below.

- Establish stabilised temporary site access/egress points (Standard Drawing SD 6-14), using rumble grids or similar. Refer to the 'Site Entry and Exit Points' notes. These don't need to be installed if existing sealed driveway/s remain intact and sediment tracking is alternatively managed. Locations shown on the plans are indicative only and can be moved to suit demolition. However, note that in doing so, other surrounding ESCPs must still be implemented t same effect.
- Continue using existing street layout for site facilities (e.g. car parking, site sheds, hardstand laydown) and avoid any further ground disturbance until sediment, drainage and erosion controls are in place as outlined below. The principle of minimum disturbance to existing vegetation to be implemented with 'no-go' zones isolated with flagging etc.
- 'Offsite' and 'Site' runoff to be separated.
- Where required, sediment basins and 'offsite' and 'site' water drains to be constructed immediately as permitted.
- Temporary erosion and sediment controls to be installed prior to site disturbance where reasonable and feasible.
- Install Drain Wardens (SD GB – 01) or similar pit protection around any onsite drop inlets (locations to be determined onsite prior to works). Note onsite pits may not be present onsite and in that case, this requirement is not relevant.
- Maintain existing curb and gutters and roadside stormwater drainage as shown to collect and keep offsite water flows outside of the work area (unless specified by others).
- Protect existing storm water drains in roadside and curb with sand bags or gravel socks or similar as per SD 6-11, along all streets.
- Runoff control from formations/tops of fills to sediment basins to be via one or a combination of fill shaping, diversion drains/banks, earth bunds along top edges of fill batters discharging to batter drains and storm water pits etc.
- Install sediment fences, traps and sediment filter outlets (i.e. rock filter outlets or modular sediment traps). This includes installing stabilised outlet points. Refer to the 'Sediment Control' notes and to the plans for details.
- Install containment/diversion bunds (or equivalent) and stabilise by covering with Fabric (or similar). Refer to the drawings for locations and details. In locations where there is a fence or wall present, the wall can be used in place of containment bunds as long as the wall is sealed underneath so water cannot flow through.
- The onsite team is to ensure the proposed slope lengths are adhered to.
- Disturbed areas to be progressively stabilized (e.g. final design treatments such as concrete or revegetation). Where disturbed areas are not being worked for long periods (>30 days), temporary stabilization treatments are to be considered.
- Establish a stockpile area(s) separate materials if required in accordance with the 'Stockpiling' notes.
- Form internal haul roads (truck access road), if required and stabilise in accordance with engineering specifications (e.g. compacted earth with DGB and spray seal finish. To improve and lengthen surface stability trafficable polymers are to be applied are to be applied to the surfaces (e.g. Vital HR or similar).
- Ground works can now commence to establish site facilities (e.g. material storage, workshop, site office, waste skip, concrete and concrete pump wash out),
- All surfaces excluding the immediate earthworks (cut/excavation works) are to be maintained as stabilised hardstand surfaces. In locations where hardstand surfaces are not formed or to improve and lengthen surface stability trafficable polymers are to be applied to surfaces (e.g. Vital HR or similar).

- Dewatering of excavations, etc. to be conducted as per the requirements of the Site Water Treatment and Discharge Requirements below.
- The tracking of mud/soil material onto local roads to be monitored and controlled (e.g. shaker/rumble grids, manual wheel washing, street sweeper etc.).
- Dust to be controlled on site and along unsealed roads with controls such as water carts and or limiting vehicle speeds.
- Temporary controls to be inspected regularly with maintenance/repairs undertaken as required particularly after rain events.
- This PESMP in Appendix C has been prepared as per 'Blue Book' guidelines and standard drawings - Volumes 1.
- Controls shown on the PESMP are to be installed unless otherwise noted.
- This PESMP to be revised when required (e.g. change in construction methods and/or site conditions).

5.3.2. Access Control

- Install barrier fences or suitable administrative controls to define the project works and clearing limits.
- Barrier fencing for erosion and sediment control purposes can be simply made from tape or flagging around star pickets or stakes. Alternatively, sediment fence, site security /safety fence or chain wire fences can be used for this purpose if so desired. Existing fences and or site fluffing can also be used where they are present in the relevant locations.
- Stabilised site access points (SD 6-14) are to be provided in all locations where construction/demolition vehicles enter and exit the works onto Ivanhoe Pl or public roads.
- Barrier and sediment fencing are to be used to ensure that all vehicles leaving the site pass over stabilised access point to minimise bogginess in these areas and minimise sediment tracking onto public roads.
- Barrier fencing is to be used to delineate all ‘no work’ areas.
- Barrier fencing is to be used at the discretion of the site manager to delineate other ‘No Go’ areas.

5.3.3. Soil Management and Stockpiling

- Stockpile areas are to be established within the staged locations specified in the plans. If additional or alternative locations for stockpiling are required, then they are to be subject to approval prior to establishment. All stockpiles should incorporate clearly defined access controls and comply with the regulations outlined below. Progressive ESCPs are to detail the required erosion and sediment controls for each stockpile area.
- All stockpiles are to be constructed and maintained generally in accordance with Standard Drawing SD 4-1 and the following regulations:
  - Potentially contaminated materials are not to be stockpiled with un-contaminated materials or on un-contaminated surface areas. Separate stockpile areas are to be established to ensure this. All stockpiles must have sediment fencing or equivalent installed downslope as per SD4-1.
  - Different materials types (e.g. mulched vegetation, topsoil, subsoil and other materials) are to be stockpiled separately wherever possible.
  - Soil stockpiles are to be stabilised to achieve a C – factor of 0.1 (i.e. equivalent to 60%grass cover) within 10 days of formation using a temporary soil stabiliser (e.g. VitalP74.Stonewall), geotextile, jute matting or equivalent. Also refer to table 1.

- Topsoil stockpile (where practical) should be constructed to no more than 2 meters in height wherever possible.
- Stockpiles should be battered down to a maximum slope of 2:1 wherever possible.

5.3.4. Stabilisation

- Undertake progressive stabilisation of disturbed ground surfaces as they are completed rather than at the end of the works program
- Final stabilisation is to achieve the C – factor (ground cover) detailed in Table 3-1
- Final rehabilitation is to be accordance with the landscaping/rehabilitation plans
- Areas to be revegetated are to be topsoiled first using the topsoil stripped during the initial stages of works (if suitable) or using approved imported topsoil. Refer to Standard Drawings SD4-2) for instructions regarding topsoil replacement
- Appropriate seedbed preparation should be carried out when revegetating lands (See SD 7-1)
- Jute mesh, erosion control matting (ECM), soil stabilisers (e.g. Vital stonewall) hydro mulching or an appropriate approved alternative is to be used to provide suitable ground cover until vegetation is established
- Temporary diversion drains are to be stabilised to achieve the C-factors as detailed in Table 1, using jute matting, geotextile fabric, rock or TRM etc. Refer to the plan for details. Also refer to Standard Drawings SD 5-6 and SD 5-7
- Refer to engineering drawings for any permanent drain size lining detail, if applicable
- Refer to the stockpiling notes for stabilisation requirements of stockpiles. Also refer to Table 1 and SD 4-1 in the Blue Book.
- As surfaces are stabilised (at least 90% of any finished area has at least 70% ground cover and permanent drainage measures are installed, temporary erosion and sediment control structures and water management structures can be removed (e.g. sediment fence and diversion drains).
- Temporary stabilisation on high risk areas will be undertaken prior to rainfall in accordance with the 'Rainfall Preparation Procedure' notes
- Highly trafficable areas (i.e. site access egress haul roads) will be stabilised where reasonable and feasible with suitable material such as DGB, roadbase, gravel or Dustex to minimise erosion and provide stability to vehicle movements. In catchments not draining to a sediment basin or sump (i.e. areas shown as stabilised /sealed), stabilisation of haul roads and site compound surfaces is essential.

5.4. Sediment controls

Sediment fencing or alternatives:

- Install sediment fencing in accordance with Standard Drawing SD 6-8 and Soil and Water Management Plan Drawing C005 Rev 2 in Appendix C1 or its revised updates .
- Sediment fences must be firmly trenched into the ground for their entire length.
- If sediment fences cannot be trenched into the ground (i.e. If hardstand/pavement surfaces are present) sediment fences can be secured by placing tightly abutting sandbag or coir log bunds over the fabric to hold it down.
- Tightly abutting gravel bags, coir log bunds or sand bags or can also be used in place of sediment fencing where sediment fencing cannot be installed (i.e. on hardstand areas or constantly changing areas). However, gravel bags and sand bags are to be min. 2 bags high and consideration should be given to ongoing traffic and construction movements to avoid damaging the bunds.

- Sediment fences are to be held up by securing to star pickets placed at max. 2.5m centres alternatively they can be securely attached to site security fencing.
- Sediment fences must include small 'returns' at maximum 20 metre intervals (see Standard Drawing 6-8) to minimise the risk of water flowing along them rather than through them. Sandbag bunds can be used for this purpose if desired.
- If available mulch may be use on in 200 mm high rows instead of sandbags to break up and achieve slope lengths

5.4.1. Sediment Traps/Rock Filter Dams/Modular Sediment Traps

- Sediment traps are to be formed as a sump (detention storage area) with sediment filter outlet.
- Sediment trap sumps may be split throughout the catchment as long as the filter outlets remain as to what is specified within this plan for each overflow point.
- Sediment sump sizing details are specified on the plan.
- Install the filter outlets as either a rock filter or a modular sediment trap in accordance with sizing and details shown on the plan.
- Rock filter dam outlets (if adopted) are to be installed in accordance with IECA SD RFD 01&02.
- Modular traps (if adopted) are to be built as either two sediment fences with straw bales between or as two sediment fences with 15-25 mm aggregate fill in between.
- If the above filter outlets cannot be constructed due to site/construction conditions tightly abutting coir logs or gravel filled bags are to be used as the filter outlet. Ensure the coir logs/bags are securely held in place.
- All filter outlet structures are to be built to incorporate a primary outlet (weir overflow/spillway/to ensure overflows are controlled and are stable.
- It is recommended that gypsum is placed at the inlets to the sediment traps prior to rainfall to help pre-heat site water.
- Sediment is to be removed from sediment traps and filter outlets regularly and filter aggregate/fabric/straw bales replaced as required

5.5. Dust Suppression

- Avoid dust generating activities during dry windy conditions where control options (e.g. wetting) are limited.
- Regularly clean machinery and vehicle tyres to prevent track-out of dust to public roads
- Restrict vehicle speeds on unsealed haul roads to reduce dust generation.
- Dust suppression should be carried out wherever necessary to minimise sediments becoming airborne due to wind erosion.
- Internal access tracks to be maintained/kept wet to prevent dust generation
- An appropriate water source for dust suppression and/or dust suppressant management system (e.g Vital Stonewall, Dustex, Dustguard, or equivalent) must be identified and approved by the site Environment Manager prior to starting construction works.
- Temporary stabilisers (e.g. vital bond-matt P47), geotextile, jute matting or equivalent can be used in non-trafficked areas to assist with dust control.
- Wherever possible haulroad running surfaces to be stabilised with crushed rock, aggregate, road base, a trafficable soil stabiliser or equivalent to assist with dust control on these surfaces.

5.6. Dirty water treatment and discharge requirements

Section 5 of the EIS details the consultation that has been undertaken with the various project stakeholders including Wollondilly Council, RMS, Picton High School, Picton Buslinesses. In accordance with Conditions of Consent C28, seepage or rainwater collected on-site during construction or groundwater must not be pumped to the street stormwater system unless separate prior approval is given in writing by the EPA in accordance with the POEO Act.

Implementation of the progressive erosion and sediment plan will minimise the likely volume of dirty water to be captured, treated and released. The preparation of forecast wet weather is also key. Water accumulation in sediment traps, sumps, trenches, excavations or in any other low points on site can either be:

- Assessed for re-used for dust suppression or construction purposes; or
- Pumped into a tank, truck or other holding area for later treatment; or
- Treated (If required) and tested in situ, then proposed released off site once it meets the required water quality discharge criteria (see below) and required approval or permit; or
- Any proposed active discharge of water from the project (i.e. where water is moved offsite via direct action such as pumping rather than flowing off the project (i.e where water is moved offsite via direct action such as pumping rather than flowing off the project as a result of heavy rainfall is to achieve:
  - 50mg/L or less Total Suspended Sediment (TSS)
  - pH 6.5 to 8.5 and
  - hydrocarbon sheens, no visible trace
- Discharge of any site water to the environment or for reuse on site is to be managed through the assess and approved with permit procedure.
- Adequate water quality may be achieved by using gypsum at a rate of approximately 30 kilgram per 100m^3 of stormwater. Alternative flocculating agents can only be used if the regulating authority has granted approval. Refer to manufacturer's guidelines.
- Sediment traps must be emptied within 5 calendar days of rainfall event. This includes treating water testing to confirm adequate quality, de-watering and, if required de-silting.
- These de-watering requirements apply to site water accumulating in any sort of excavation, trench, or other ponded water body on the site.
- If water is going to be used within the site for dust-suppression or construction purposes and will drain back into the sediment capture system, it may not require treatment subject to assessment for suitability.

5.7. Slope lengths

Slope lengths are to be restricted to 80 metre intervals or smaller across all exposed surfaces prior to and during rainfall.

Diversion bunds/drains, low flow earth banks (SD5-5) or sandbags/equivalent should be installed prior to rainfall events to achieve this where required. However, slope lengths are often naturally minimised due to the topography of the works and in this case additional slope breaks may not be necessary.

5.8. Rainfall preparation procedure

The weather forecast is to be monitored regularly (at least daily and hourly when rainfall imminent). By the site foreman, Environmental Manager (or their representative).

The sump and containment wall available capacity is to be continually assessed and volume/levels increased as required to appropriately manage the expected rainfall (in accordance with construction detail).

Prior to forecast rainfall (> 50% chance of 10mm or more over 24 hours), the following will occur:

- All exposed batters not draining to sediment basin or sump (i.e. exposed site compound surfaces or batter surfaces adjacent to Ivanhoe Pl or the nearby creek) are to be stabilised with temporary ground covers (i.e. vital stonewall, P47, geotextile or black plastic or equivalent)
- Batter chutes and check dams are to be installed (if not already in place)
- Progressive ESCPs to detail batter chute locations.

Prior to forecast rainfall (>50% chance of 20mm or more over 24 hours), the following will occur:

- Slope breaks will be pushed up or cut in across large exposed areas to slow down flows and minimise erosion. Refer to slope lengths notes for details.
- Additional bunds and sumps/traps are to be installed for general works areas where required to separate catchments and minimise reliance on sediment ponds (as per Engineering instruction) PESCPs to show details.

5.9. Site Inspection, monitoring and maintenance

Regular site inspections are to be conducted by the site environment manager (or their representative).

At least weekly during normal construction hours:

- Prior to forecast rainfall of 5mm or more over 24 hours; and
- Daily during rain events (if safe to do so); and
- Within 24 hours of the cessation of a rain event that causes runoff (if safe to do so).

Inspections should include documenting any urgent repair maintenance or improvement works. Records are to be kept including details of actions and their close outs.

Additional erosion and sediment controls will be installed as necessary to ensure satisfactory outcomes in keeping with project conditions and best-practice Blue Book guidelines.

This ESCP will be updated or Progressive ESCPs prepared as required.

Sediment or rocks tracked from the site will be removed from public roads as soon as possible (i.e. with street sweepers).

After rainfall, sediment accumulated in trapping devices (e.g. in sediment fences) will be removed a secure location where it can't wash or blow offsite (preferably to an active stockpile).

Weather conditions will be monitored and daily rainfall will be recorded. A BOM weather station is located nearby at Picton (Willandra Village) Station Number: 66156, Opened: 1970, Lat: 33.78°S, Lon: 151.11°E, Elevation: 65 metre and rainfall readings can be used.

Safe storage areas for wastes, fuels, excess concrete and other potential contaminants are to be delineated by the site supervisor.

Adequate supplies of erosion control measures (e.g. geofabric rolls, filter socks or similar) are to be maintained onsite for rapid deployment as required.

If required, water treatment chemical(s) and equipment are to be maintained onsite.

Dust suppression is to be undertaken as required to minimise the risk of offsite dust impacts.

After rainfall, sediment accumulated in trapping devices (e.g. in sediment fences) will be removed a secure location where it can't wash or blow offsite (preferably to an active stockpile).

Weather conditions will be monitored and daily rainfall will be recorded. A BOM weather station is located at Picton Council Depot (10 Margaret Street) about 2.9 kilometres from Picton High School, and rainfall readings can be used. The BOM station details are as follows: Station Number: 068052; Opened: 1880; Lat: 34.17°S, Lon: 150.61°E; Elevation: 165m.

Safe storage areas for wastes, fuels, excess concrete and other potential contaminants are to be delineated by the site supervisor.

Adequate supplies of erosion control measures (e.g. geofabric rolls, filter socks or similar) are to be maintained onsite for rapid deployment as required. If required, water treatment chemical(s) and equipment are to be maintained onsite. Dust suppression is to be undertaken as required to minimise the risk of offsite dust impacts.

6. Recommendations

It is the contractor's responsibility to prepare detailed erosion and sediment control plans noting the above recommendations and the following measures:

Nomination of a suitably qualified environmental representative on site to complete self-audits and monitor Soil and Water Management Plans.

- Implementation of this plan and responsibility for nomination of a suitably qualified environmental representative to ensure on going monitoring, maintenance and prevention of pollution is the responsibility of the contractor.
- A progressive erosion and sediment control plan is to be prepared for the works should be developed progressively through the constructing phase. PESCP's should be in accordance with the requirements of Managing Urban Stormwater: Soils and Construction (Landcom, 2004) and Managing Urban Stormwater-Volume 2D Main Road Construction (DECC, 2008)
- In locations where proposed post-redevelopment water quality basins are planned outside the demolition footprint, demolition phase sediment basins or other sediment control elements may be located in these places during demolition phase, subject to designs being compatible with subsequent post-redevelopment water treatment requirements
- Sizing of detailed demolition sub-catchments may need to be further defined once detailed demolition staging planning is underway. Provision for potentially larger up gradient stormwater catchments may need to be considered during higher erosion risk activities, such as redirecting live stormwater assists, changes to pavement drainage, or when bridge deck surface water is connected site water.

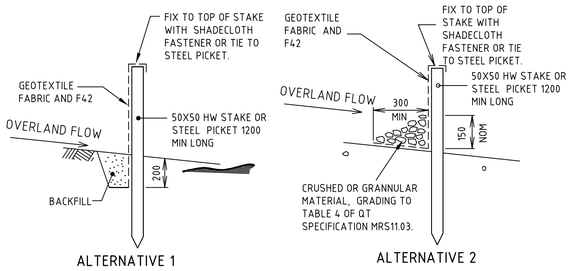
7. References

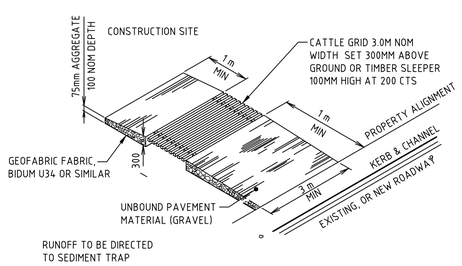
Managing urban stormwater: soils and construction Volume 1, Landcom, 2004 (the 'Blue Book')

Managing urban stormwater: soils and construction Volume 2D, Main road construction, Department of Environment and Climate Change, NSW, 2008.

Soil Landscapes of the Wollongong-Port Hacking 1:100,000 sheets, OEH 2004

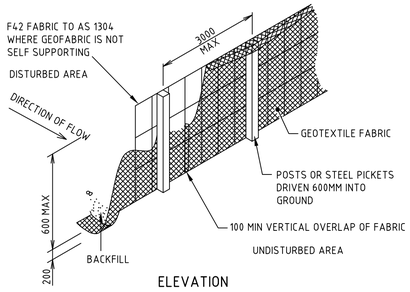
Appendix A Sediment and Erosion Control Details





TEMPORARY CONSTRUCTION VEHICLE ENTRY/EXIT SEDIMENT TRAP

NOT TO SCALE



SEDIMENT FENCE

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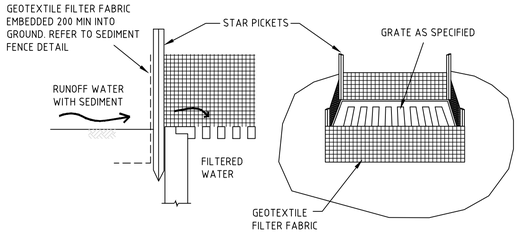

GEOTEXTILE PIT FILTER 1

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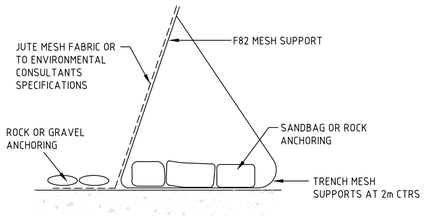
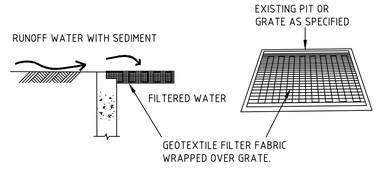


ALTERNATIVE SEDIMENT FENCE

NOT TO SCALE

ALTERNATIVE SEDIMENT FENCE NOTES

1. INSTALL THIS TYPE OF SEDIMENT FENCE WHEN USE OF SUPPORT POSTS IS NOT DESIRABLE OR NOT POSSIBLE. SUCH CONDITIONS MIGHT APPLY, FOR EXAMPLE, WHERE APPROVAL IS GRANTED FROM THE APPROPRIATE AUTHORITIES TO PLACE THESE FENCES IN HIGHLY SENSITIVE ESTUARINE AREAS.
2. USE BENT TRENCH MESH TO SUPPORT THE F82 WELDED MESH FACING AS SHOWN ON THE DRAWING ABOVE. ATTACH THE JUTE MESH TO THE WELDED MESH FACING USING UV-RESISTANT CABLE TIES.
3. STABILISE THE WHOLE STRUCTURE WITH SANDBAG OR ROCK ANCHORING OVER THE TRENCH MESH AND THE LEADING EDGE OF THE JUTE MESH. THE ANCHORING SHOULD BE SUFFICIENTLY LARGE TO ENSURE STABILITY OF THE STRUCTURE IN THE DESIGN STORM EVENT, USUALLY THE 10 YEAR EVENT.



GEOTEXTILE PIT FILTER 2

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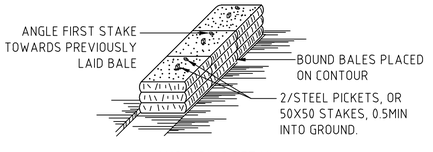

STRAW BALE BANK SEDIMENT CONTROL

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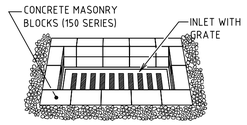

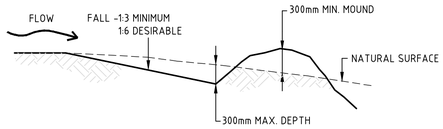

CATCH DRAIN

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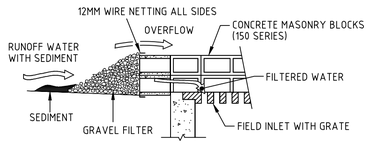

FIELD INLET SEDIMENT TRAP

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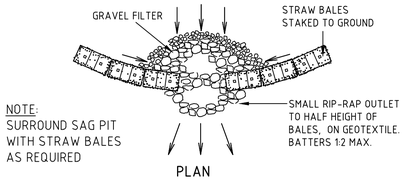

STRAW BALE AND STONE TRAP SEDIMENT CONTROL (CONCENTRATE FLOW)

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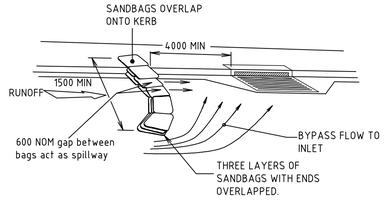

ON GRADE KERB INLET SEDIMENT TRAP

NOT TO SCALE

Rev	Description	Date	By	App
P2	TENDER ISSUE	25.01.18	CS	-
P1	PRELIMINARY	12.01.18	CS	-

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Project Name: PICTON HIGH SCHOOL REDEVELOPMENT PICTON, NSW 2571

Drawing Title: SEDIMENT & EROSION CONTROL DETAILS

TENDER

Designed	CS	Project Director Approved	Date
Drawn	CS		North
Scale	N.T.S.	Project Ref	Drawing No / Rev
Date	DEC 2017	20 21888 01	C207 P4
Sheet	A1		

Appendix B Soil and Water Management Computations

NOTES:

1. K-FACTOR AND GROUP C HYDROLOGIC GROUP BASED ON TABLE C21 "BLUEBOOK" PICTON LANDSCAPE.
2. 5-DAY 85% RAINFALL DEPTH OF 34.1mm CHOSEN AS THE AVERAGE OF CAMDEN AND MITTAGONG LANDSCAPE IN TABLE 6.3a "BLUEBOOK" AS PICTON IS LOCATED IN BETWEEN THESE LOCATIONS.
3. ANNUAL SOIL LOSS AS COMPUTED BY THE RUSLE EQUATION IS 72m^3 PER YEAR DUE TO RELATIVELY FLAT SLOPE ON SITE. CONSEQUENTLY, CONSTRUCTION OF A SEDIMENT BASIN MAY BE UNNECESSARY FOR THE CONSTRUCTION OF THE TEMPORARY SCHOOL AS THE SOIL LOSS IS LESS THAN 150m^3/YR (SECTION 6.3.2(D) "BLUEBOOK"). CONTRACTOR MAY USE ALTERNATE SEDIMENT CONTROL MEASURES SUCH THAT QUALITY OF RUNOFF IS OF AN ACCEPTABLE STANDARD.

SWMP Commentary, Detailed Calculations

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

1. Site Data Sheet

Site Name: **Picton High School**

Site Location: **Picton High School**

Precinct:

Description of Site: **Temporary school (demountables) to be built. Existing school to be demolished and reconstructed. Temporary school demountables to be removed.**

Site area	Site						Remarks
	Basin						
Total catchment area (ha)	2.1						
Disturbed catchment area (ha)	2.1						

Soil analysis

% sand (faction 0.02 to 2.00 mm							Soil texture should be assessed through mechanical dispersion only. Dispersing agents (e.g. Calgon) should not be used
% silt (fraction 0.002 to 0.02 mm)							
% clay (fraction finer than 0.002 mm)							
Dispersion percentage							E.g. enter 10 for dispersion of 10%
% of whole soil dispersible							See Section 6.3.3(e)
Soil Texture Group							See Section 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)	85						See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	34.1						See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	10.6						See IFD chart for the site

RUSLE Factors

Rainfall erosivity (*R*-factor)	2460						Automatic calculation from above data
Soil erodibility (*K*-factor)	0.034						RUSLE data can be obtained from Appendixes A, B and C
Slope length (m)	80						
Slope gradient (%)	2						
Length/gradient (*LS*-factor)	0.41						
Erosion control practice (*P*-factor)	1.3	1.3	1.3	1.3	1.3	1.3	
Ground cover (*C*-factor)	1	1	1	1	1	1	

Calculations

Soil loss (t/ha/yr)	45						
Soil Loss Class	1						See Section 4.4.2(b)
Soil loss (m^3/ha/yr)	34						
Sediment basin storage volume, m^3	12						See Sections 6.3.4(i) and 6.3.5 (e)

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P2	TENDER ISSUE	25.01.18	CS	-
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Project Name: PICTON HIGH SCHOOL REDEVELOPMENT PICTON, NSW 2571

Drawing Title: SOIL AND WATER MANAGEMENT COMPUTATIONS

TENDER

Designed	CS	Project Director Approved	Date
Drawn	CS		
Scale	N.T.S.		
Date	JAN 2018		
Sheet	A1		

North

Project Ref: 20 21786 01 | Drawing No: C208 | Rev: P4

Appendix C Erosion and sediment control elements

Table C1 - STABILISATION REQUIREMENTS AND TREATMENT METHODS

DURING DEMOLITION- TEMPORARY STABILISATION
(During periods or site shutdown when works are on hold

LANDS	STABILISATION MEASUREMENT	TIMEFRAMES	TREATMENTS METHODS - PRODUCTS	REMARKS
High risk areas; Batters, steep slopes (>30%), works in and around waterways, surfaces around culvert headwalls	C-factor = 0.1 (60%a grass cover or equivalent ground cover[1]).	Applies prior to rainfall and after 10 working days of inactivity (even though works might continue later)	Soil binder (i.e. vital P47/Stonewall or equivalent)	- stabilise all exposed surfaces by spraying surfaces with vital P47/stonewall or equivalent - application rate = 1L/m^2 of diluted vital mixture. - reapply\maintain as necessary to ensure required cover is provided.
			Geotextile, jute matting, black plastic or equivalent.	- Cover all exposed soils. - Reapply/maintain as necessary to assure the required cover is provided.
All lands (including waterways and stockpiles)	C –factor = 0.15 (50% grass cover or equivalent ground cover)	Applies after 20 working days of inactivity (even though works might continue later)	Soil binder (i.e. Vital P47/Stonewall or equivalent.	- Spray all stockpiled surfaces with Vital P47/Stonewall or equivalent. - Vital dilution rate = 1:10 (Vital: Water). - Application = 1M^2 of diluted Vital mixture. - Re-apply/maintain as necessary (approx. every 3/6 months without suitable vegetation cover) to ensure the required cover is provided.
			Geotextile, jute matting, black plastic or equivalent.	- Cover all exposed soils. - Reapply/maintain as necessary to assure the required cover is provided.

C1 Sediment and erosion control plan and notes

TEMPORARY CONSTRUCTION ACCESS - REFER DETAIL ON DRG C007

SITE COMPOUND AREA

SEDIMENT FENCE - REFER DETAIL ON DRG C007

SITE SECURITY FENCE AND DOUBLE OPENING GATE

LOCATION OF TEMPORARY SEDIMENT BASIN IF REQUIRED

MILESTONE 2 AND 3 BOUNDARY

SEDIMENT FENCE - REFER DETAIL ON DRG C007

PROVIDE FLOWPATH TO THE NORTH OF THE SEDIMENT FENCE TO ALLOW CONVEYANCE OF CLEAN DIVERTED UPSTREAM CATCHMENT FLOWS

SEDIMENT AND EROSION CONTROL MEASURES ARE TO BE PROVIDED TO ALL STORMWATER PITS AND HEADWALL OUTLETS IN ACCORDANCE WITH DETAILS ON DRG C007 AND "THE BLUE BOOK" (LANDCOM - "MANAGING STORMWATER - SOILS AND CONSTRUCTION".

BUILDING A FFL 217.740 (GROUND)

BUILDING A FFL 214.240 (LOWER GROUND)

BUILDING B FFL 213.985

BUILDING C FFL 211.935

BUILDING D FFL 213.680 (LOWER GROUND)

BUILDING E FFL 213.680 (LOWER GROUND)

BUILDING F FFL 214.44 (LOWER GROUND)

BUILDING G FFL 217.740 (GROUND)

BUILDING G FFL 214.240 (LOWER GROUND)

BUILDING H FFL 216.670 (GROUND)

TEMPORARY STOCKPILE - REFER DETAIL ON DRG C007

MAIN SCHOOL MILESTONE 2 WORKS AREA

SITE SECURITY FENCE - REFER DETAIL ON DRG C007

SITE SECURITY FENCE - REFER DETAIL ON DRG C007

SITE SECURITY FENCE - REFER DETAIL ON DRG C007

STAFF CARPARK ENTRY POINT - NOT TO BE UTILISED AS CONSTRUCTION ACCESS

MILESTONE 2 AND 3 BOUNDARY

FN-104

FN-104

LEGEND

2

- SEDIMENT FENCE
- SITE SECTURITY FENCE
- STOCKPILE
- OVERLAND FLOW
- EXISTING SURFACE CONTOURS
- EXISTING SWALE STORMWATER DRAINAGE TO BE RETAINED (CONSTRUCTED AS PART OF TEMPORARY SCHOOL CIVIL WORKS)
- EXISTING SURFACE CONTOURS
- TEMPORARY ACCESS
- GEOTEXTILE PIT FILTER
- HOARDING
- SITE BOUNDARY

SEDIMENT AND EROSION CONTROL NOTES

1. IT HAS BEEN ASSUMED THAT HOARDINGS/SILT FENCING WILL BE PROVIDED TO THE STAGE BOUNDARY SUFFICIENT TO PREVENT SEDIMENT RUNOFF FROM LEAVING SITE (EXCEPT IN THE CASE OF ENTRY/EXIT LOCATIONS WHERE TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP ARE PROVIDED). IF THIS IS NOT THE CASE, PROVIDE SEDIMENT FENCE TO STANDARD DETAIL BELOW AS REQUIRED TO PREVENT SEDIMENT FROM LEAVING SITE, DIRECT RUNOFF TO SEDIMENT BASIN.
2. ALL SEDIMENT CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH LANDCOM MANAGING URBAN STORMWATER "BLUE BOOK".

SEDIMENT CONTROL CONDITIONS

1. SEDIMENT FENCES WILL BE INSTALLED AS SHOWN AND ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER TO CONTAIN COARSER SEDIMENT FRACTIONS INCLUDING AGGREGATED FINES) AS NEAR AS POSSIBLE TO THEIR SOURCE.
2. SEDIMENT REMOVED FROM ANY TRAPPING DEVICE WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSLOPE LANDS & WATERWAYS CANNOT OCCUR.
3. STOCKPILES WILL BE PLACED WHERE SHOWN ON DRAWING OR ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER AND NOT WITHIN 5m OF HAZARD AREAS INCLUDING LIKELY AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS & DRIVEWAYS.
4. WATER WILL BE PREVENTED FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM WITH INLET FILTERS (SEE DETAILS) UNLESS IT IS SEDIMENT FREE.
5. TEMPORARY SEDIMENT TRAPS WILL BE RETAINED UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.
6. CONTRACTOR TO DESIGN/SIZE/CONSTRUCT TEMPORARY SEDIMENT BASIN, BASED ON PROPOSED STAGING. WATER SHOULD BE ALLOWED TO SETTLE BEFORE DISCHARGE. CONTRACTOR MUST VERIFY THAT WATER QUALITY MEETS AUTHORITIES REQUIREMENTS PRIOR TO DISCHARGE - WATER TO BE DISCHARGED VIA GRAVITY TO DOWNSTREAM GRASSED AREAS IN ACCORDANCE WITH CoC C28. ACCUMULATED SEDIMENT SHOULD THEN BE REMOVED & DISPOSED OF IN ACCORDANCE WITH ENVIRONMENTAL MANAGEMENT PROCEDURES.
7. PROVIDE ADDITIONAL MEASURES AS NECESSARY TO PREVENT ANY SEDIMENT LADEN WATER FROM LEAVING THE SITE IN 1:100ARI STORM EVENTS. THIS MAY INCLUDE BUT IS NOT LIMITED TO ADDITIONAL BUNDING, SILT FENCE REINFORCEMENT, OR COVERING EXPOSED AREAS TO PREVENT SEDIMENT MIGRATION.

SITE INSPECTION & MAINTENANCE CONDITIONS

THE SITE MANAGER WILL INSPECT THE SITE AT LEAST WEEKLY AND WILL:

1. ENSURE THAT DRAINS OPERATE PROPERLY & TO EFFECT ANY NECESSARY REPAIRS
2. REMOVE SPILLED SAND OR OTHER MATERIALS FROM HAZARD AREAS, INCLUDING LANDS CLOSER THAN 5m FROM AREAS OF LIKELY CONCENTRATED OR HIGH VELOCITY FLOWS ESPECIALLY WATERWAYS & PAVED AREAS.
3. REMOVE TRAPPED SEDIMENT WHENEVER LESS THAN DESIGN CAPACITY REMAINS WITHIN THE STRUCTURE
4. ENSURE REHABILITATED LANDS HAVE EFFECTIVELY REDUCED THE EROSION HAZARD AND TO INITIATE UPGRADING OR REPAIR AS APPROPRIATE.
5. CONSTRUCT ADDITIONAL EROSION AND/OR SEDIMENT CONTROL WORKS AS MIGHT BECOME NECESSARY TO ENSURE THE DESIRED PROTECTION IS GIVEN TO DOWNSLOPE LANDS AND WATERWAYS.
6. MAINTAIN EROSION & SEDIMENT CONTROL MEASURES IN A FULLY FUNCTIONING CONDITION UNTIL ALL EARTHWORK ACTIVITIES ARE COMPLETED AND THE SITE IS REHABILITATED.
7. REMOVE TEMPORARY SOIL CONSERVATION STRUCTURES AS THE LAST ACTIVITY IN THE REHABILITATION PROGRAM.

AS PART OF THE STATUTORY 'DILIGENCE OF CARE' RESPONSIBILITIES, THE SITE MANAGER WILL KEEP A LOGBOOK MAKING ENTRIES AT LEAST WEEKLY, IMMEDIATELY BEFORE FORECAST RAIN AND AFTER RAINFALL.
ENTRIES WILL INCLUDE:

1. THE VOLUME & INTENSITY OF ANY RAINFALL EVENTS
2. THE CONDITION OF ANY SOIL & WATER MANAGEMENT WORKS
3. THE CONDITION OF VEGETATION & ANY NEED TO IRRIGATE
4. THE NEED FOR DUST PREVENTION STRATEGIES
5. ANY REMEDIAL WORKS TO BE UNDERTAKEN

THE BOOK WILL BE KEPT ONSITE & MADE AVAILABLE TO ANY AUTHORISED PERSON ON REQUEST. IT WILL BE GIVEN TO THE PROJECT MANAGER AT THE CONCLUSION OF WORKS.

NOTE:

CONSTRUCTION OF SEDIMENT BASIN MAY BE UNNECESSARY AS SOIL LOSS IS LESS THAN 150m^3 (SECTION 6.3.2(D) "BLUEBOOK". REFER TO DRAWING C008 FOR RUSLE COMPUTATION DETAILS). CONTRACTOR TO ENSURE DISTURBED AREA FOR THE CONSTRUCTION OF THE SCHOOL IS LESS THAN 3.2 HECTARES. CONTRACTOR TO ENSURE SLOPE LENGTH IS MAXIMUM OF 80m AND TO CONSTRUCT BATTER AS REQUIRED TO ACHIEVE A 80m SLOPE LENGTH IN ACCORDANCE WITH FIGURE 4.2 "BLUEBOOK".

Rev	Description	Date	By	App
2	ISSUED FOR CONSTRUCTION	25.07.19	MJO	SN
1	ISSUE FOR CONSTRUCTION	22.03.19	JF	SN

NSW GOVERNMENT Education

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Project Name: PICTON HIGH SCHOOL REDEVELOPMENT PICTON, NSW 2571

Drawing Title: SOIL AND WATER MANAGEMENT PLAN

CONSTRUCTION

Designed	CS	Project Director Approved	Date
Drawn	CS	S.NAUGHTON	22.03.19
Scale	1:500		
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Project Ref	Drawing No	Rev
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08/10/19

Project Reference: 2021888

SOIL AND WATER MANAGEMENT PLAN SUMMARY MEMO

This report describes the proposed soil and water management measures that should be implemented to manage erosion and sediment runoff for "MILESTONE 2" works at Picton High School (for the 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI storm events). The measures described in this report is a proposal that is based on recommendations from Soil and Construction Managing Urban Stormwater ("Blue Book"). The contractor is responsible to adopt appropriate practices as necessary in accordance to the "Blue Book" during the construction sequence to ensure site stormwater meet relevant authority's requirements prior to discharge.

"MILESTONE 2" works involve the construction of the new school, associated landscaping, footpath, stormwater and services (refer to architectural drawing AA03-0001 for extent of "MILESTONE 2"). The roadworks are expected to be disturbed after the main school has been constructed. The disturbed area for "MILESTONE 2" development is approximately 2.15 ha (see Figure 2 overall disturbed catchment plan). The disturbed area consists of a series of level building slabs and generally slopes from the south west to the north east at an overall slope of approximately 4% (based on site survey). The catchment area for "MILESTONE 2" is approximately 2.6ha. The site falls below the A-line within the Low Erosion Hazard zone (see Figure 1) based on figure 4.6 of "Blue Book" with a R-factor (rainfall erosivity) of 1690 and typical site slope gradient of 4%. The site is therefore classified as **Low Erosion Hazard**

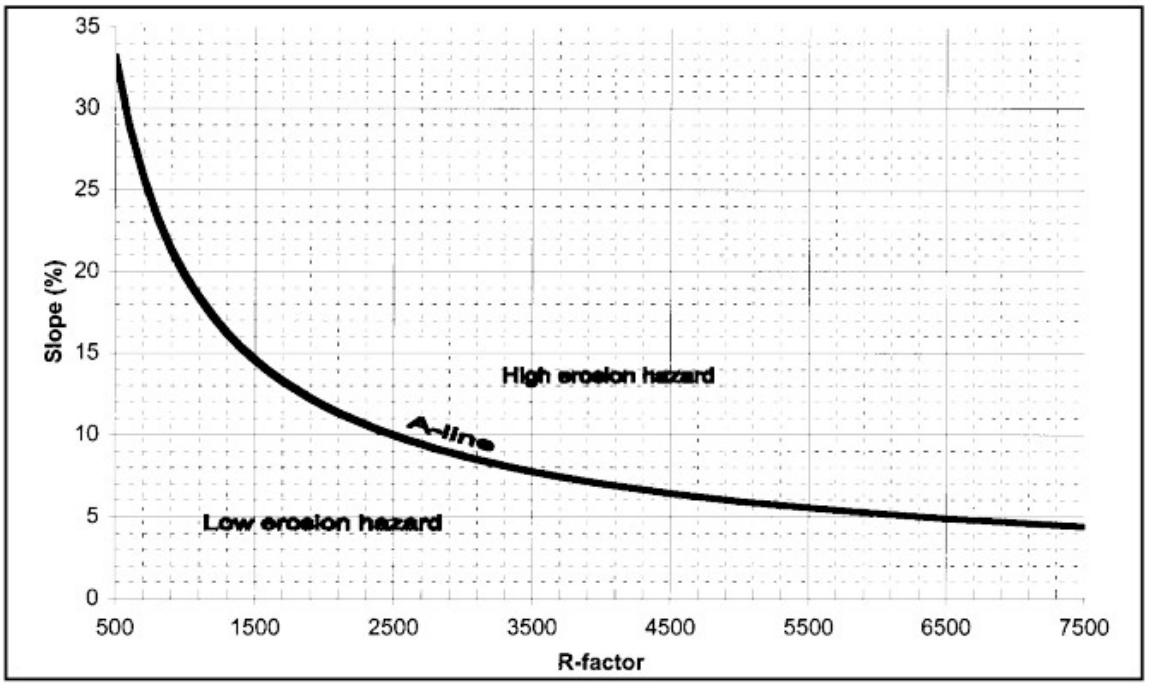


Figure 1 Erosion Hazard Classification extracted from "Blue Book"

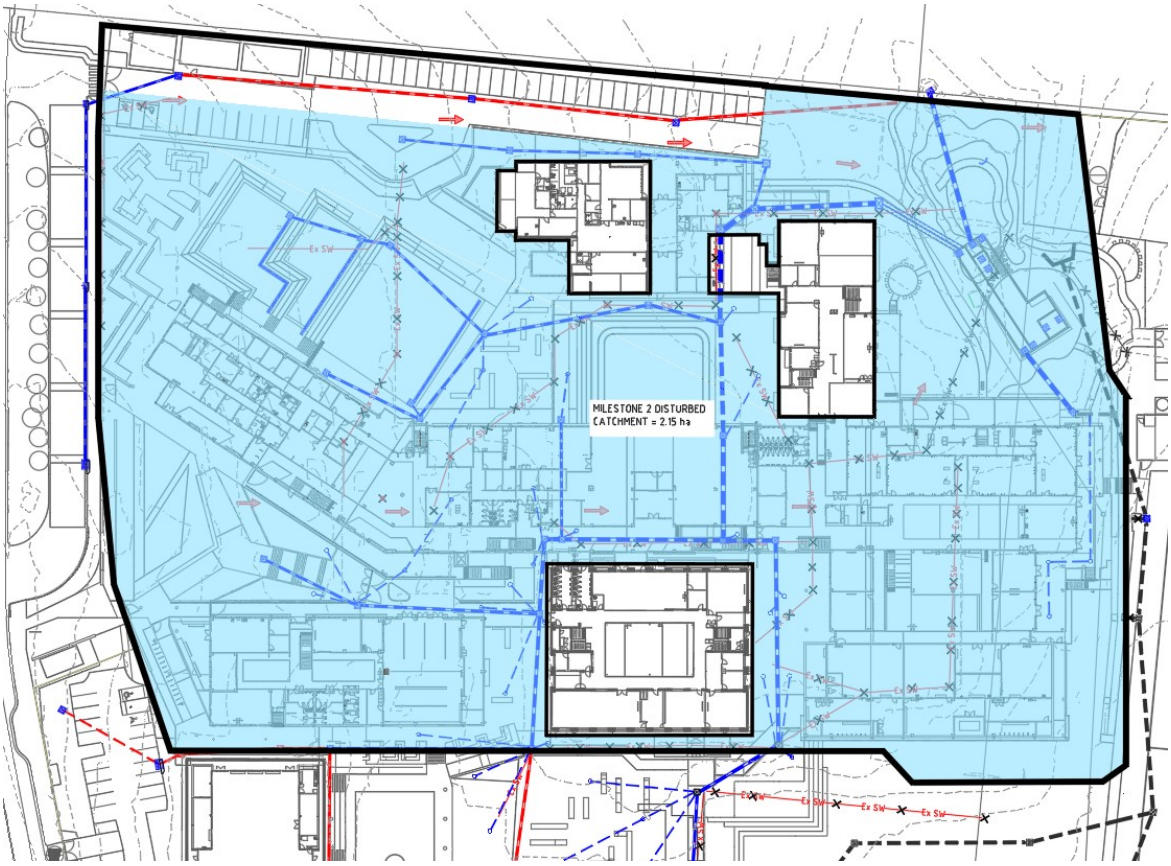


Figure 2 Disturbed Catchment

As the site area exceeds 2,500m^2, a Soil and Water Management Plan (SWMP) has been prepared addressing soil erosion and sediment runoff, inclusive of supporting calculations for soil loss.

The parameters used to calculate soil loss are shown in civil drawing C008 and are discussed below:

- A standard 5 day rainfall depth is adopted per “Blue Book”.
- Adopted 85th percentile storm depth is conservative for the site that is likely to be disturbed for longer than 6 months.
- Soil erodibility factor (K-factor) of 0.034 and type D soil texture group based on Picton soil landscape from Table C21 of ‘Blue Book”
- The 5-day 85% rainfall event is 34.1 which has been interpolated between Mittagong and Camden from Table 6.3a “Blue Book due to the site being located in between the 2 locations.
- A maximum slope length of 80m is to be maintained via the construction of berms/sediment fences as required and the typical slope gradient for the disturbed area across “MILESTONE 2” site is 4%. The adopted slope gradient is conservative as majority of the site will be levelled out for construction of proposed building slabs and is therefore not expected to have falls exceeding 2% during earthwork disturbance.
- The 2 year 6hr rainfall intensity of 8.51 is adopted based on BOM 2016 IFD data.

The calculated soil loss of 52 m^3/ha/yr over 2.32ha is predicted to yield 112m^3/yr (refer to civil drawing C008). This is a relatively conservative prediction and actual soil loss is expected to be lower due to levelling of the majority of the site for new building slabs and the adoption of a higher percentile storm depth (85^{th}) when calculating R-factor. Where soil loss is less than 150 cubic metres per year, the construction of a sediment retention basin can be considered unnecessary. In such circumstances, alternate measures may be adopted to protect the receiving waters (Section 6.3.2(D) "Blue Book"). Alternative sediment control measures are required to be undertaken on site.

It is expected that the soil and water management measures for the construction of "MILESTONE 2" are to be separated into 2 phases:

1. demolition and stripping of the site and

2. stormwater construction and bulk earthworks.

Two drawings identifying required measures for the 2 phases have been produced (refer to drawing C005 and C006). The measures which are required to be undertaken to manage sediment runoff for each phase for the 1 in 1 year ARI, 1 in 2 year ARI and 1 in 100 year ARI storm events are described below:

Phase 1) Demolition and Stripping of Site

During this stage, building slabs will be demolished with the ground stripped. The site is to be provided with catch drains, berms, sediment fences, benching and battering as required to achieve a slope length of less than 80m and slope gradient of less than 4%.

Although the construction of a sediment basin may be considered unnecessary due to the predicted soil loss being less than 150m^3/yr, the provision of a vegetated channel provides an area of sediment storage that will reduce likelihood of sediment runoff. Sediment runoff in the minor storm events (1y ARI and 5y ARI) would be temporarily stored in the vegetated channel with concrete blocks and straw bales (see Figure 3 below). The channel would need to be regularly maintained and cleaned after each rainfall event.

In major storm events (100y ARI), stormwater would flow towards the existing Council 1050mm RCP headwall inlet. Vegetation and concrete blocks in the channel reduces erosive energy of stormwater flows. Strawbales are to be provided in the channel to trap sediment runoff. Concrete blocks have been provided behind the strawbales to prevent the strawbales being washed away in the 100y ARI event. This vegetated channel is roughly trapezoidal in shape (approx. 3m wide, 1 in 4 side batters at 4% longitudinal slope- see figure 3) and adequately conveys the 100y ARI peak flow. Where concrete blocks and straw bales are placed in the channel, relatively clean water will overtop the concrete blocks as sediments would be given the opportunity to settle or become trapped by the straw bales. The expected 100y ARI peak flow is approximately 0.76m^3/s for a 2.6ha site (90% pervious at 4% slope, tc=19min). A typical cross section of the channel is shown in detail B of drawing C007.

Figure 3 Overland flow channel

A catch drain (shown in detail A of drawing C007) is proposed to convey runoff to the vegetated channel. The catchment to the catch drain is approximately 1.33ha (tc=12min) producing a peak flow of ~0.49m^3/s. The catch drain has been sized to convey 100y ARI flow. Rock check dam or other appropriate channel linings to be placed in catch drain to reduce the erosive energy of flow.

Site sediment fences is to be placed around the site as shown on drawing C005. Sediment fences provide effective means of trapping sediments in the minor storm events. Sediment fences are required to be regularly inspected and maintained after rain events. It is expected that they are required to be reinstalled after major storm events.

At site entry, shaker ramps are to be provided for construction vehicles entering and leaving the site.

Water from off site sources and that are clean are to be diverted away from the construction site. The hoarding provided around “MILESTONE 2” provides an obstruction for upstream clean water from entering the site for 1, 5 and 100y storm events. In minor storm events, upstream flows are conveyed via stormwater pipes constructed as part of temporary school works. In major events, an overland flow path is provided along the hoarding line on upstream side of the sediment fence towards the natural low point located near the sediment basin. A flow path is to be provided from the temporary school drainage line to the downstream portion of the vegetated channel to divert clean water away from the primary portion of the vegetated channel. (The upstream portion of the vegetated channel is termed the “primary vegetated channel” and downstream portion of the vegetated channel termed the “secondary vegetated channel”).

Stockpile is to be located off-line away from water channels, at maximum 1 in 2 batter slope and preferably at the top of the site. Sediment fences are to be provided around the stockpile. In forecasted major rain events, geotextile (or other measures as deemed appropriate) are to be placed over stockpiles to create a stabilized surface.

Phase 2) Construction of Stormwater and Bulk Earthworks

During this phase, bulk earthworks, trenching for stormwater pit and pipes and completion of the OSD are expected. Much of the site will be levelled in this phase to provide a platform for the building slabs. The slope length to each pit is also much less than 80m (and therefore the adopted 80m slope length used to calculate soil loss is conservative). As a result, it is expected that soil loss after bulk earthworks to be less than the calculated soil loss above. In this phase, the constructed stormwater pits and pipes convey much of the site flows offsite and therefore field inlet sediment traps are required to be provided for each pit within the disturbed area to control sediment runoff closest to the source (see Figure 5).

The primary and secondary vegetated channel sediment storage areas, concrete blocks, straw bales as provided in phase 1 is to remain operational with regular maintenance and cleaning for phase 2. These controls are located downstream of the proposed OSD tank which would act as a temporary sediment basin once proposed stormwater pits and pipes have been constructed and connected to the OSD. The construction of the outlet pipe from the OSD is to be completed in the final stage (after completion of main school and stabilization of upstream site) to allow the OSD to act as a wet sediment basin during the construction of the school. In minor storm events, the OSD would provide a volume for sediment storage. Flocculation and regular maintenance of the OSD would be needed after each rain event. In major storm events, the OSD would overflow and sediments leaving the OSD would be controlled by the primary and secondary vegetated channel, concrete blocks and straw bales. Contractor is to ensure that waters leaving the site meets relevant authority's requirements prior to discharge.

A sub-catchment plan to each of the field inlet sediment traps will enable flows to be predicted for each pit for the 1yr, 5yr, 100yr ARI storm events. This plan would assist contractor in determining which field inlet sediment traps are likely to be filled with sediment, their performances for each storm event and therefore assists in the planning and regular maintenance of these pits. The 1, 5 & 100yr flows for the major catchments are shown in Figure 4. For the smaller catchment, the flows will be less than these flows shown.

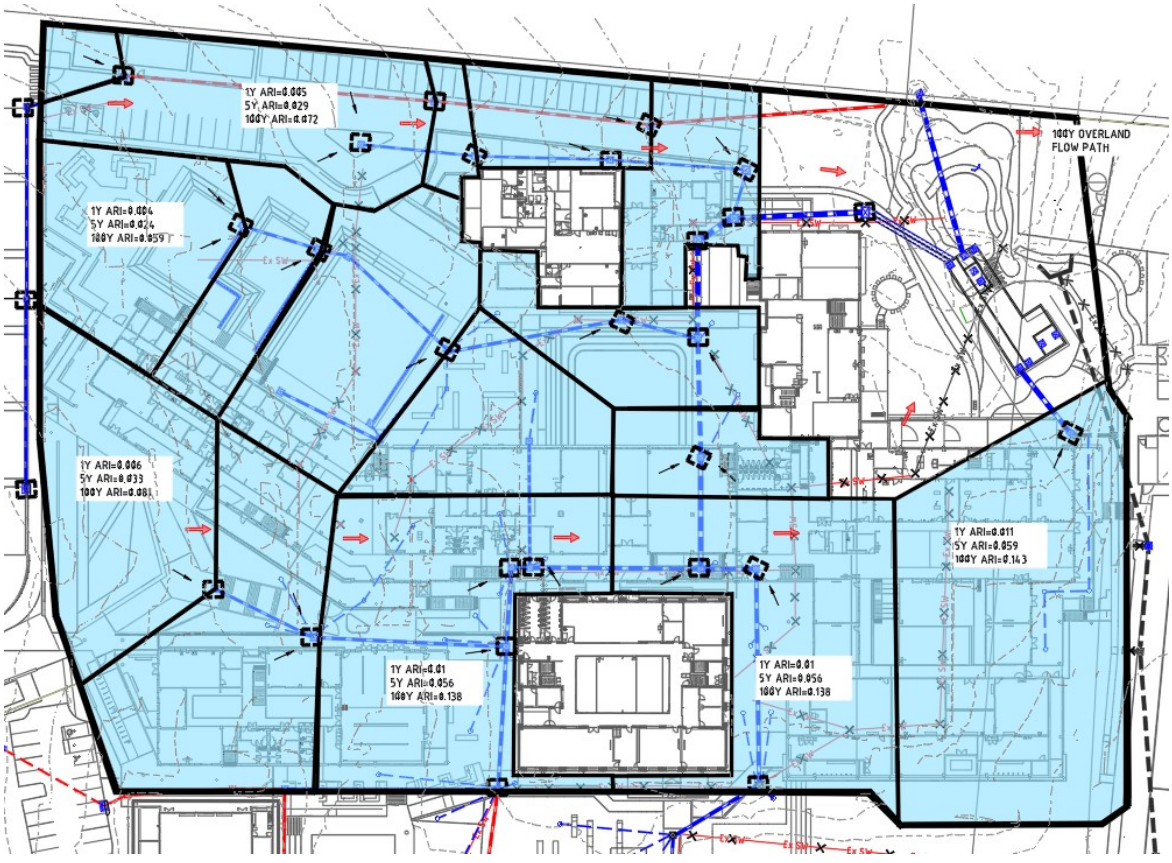


Figure 4 Field inlet sediment trap catchment

In 1yr and 5yr ARI storms, sediment runoff is filtered by the gravel filter in the field inlet sediment trap. In 100y ARI storms where flows reach up to approximately 140l/s, runoff overtops the gravel filters and flows into the stormwater pit where it is to be further managed by the temporary sediment basin (OSD). When OSD overflows, sediment is controlled by the primary and secondary vegetated channel sediment storage areas, concrete blocks & strawbales described above.

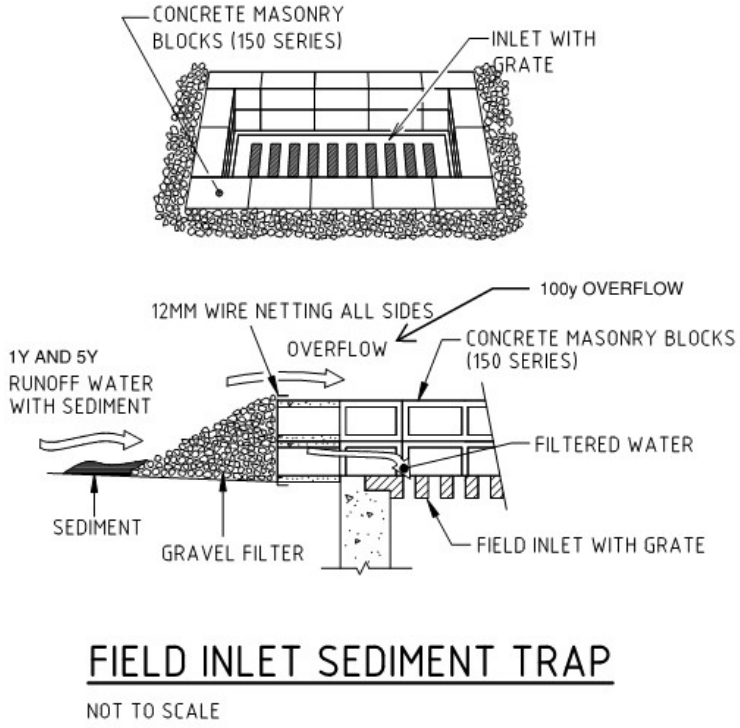


Figure 5 Field inlet sediment trap

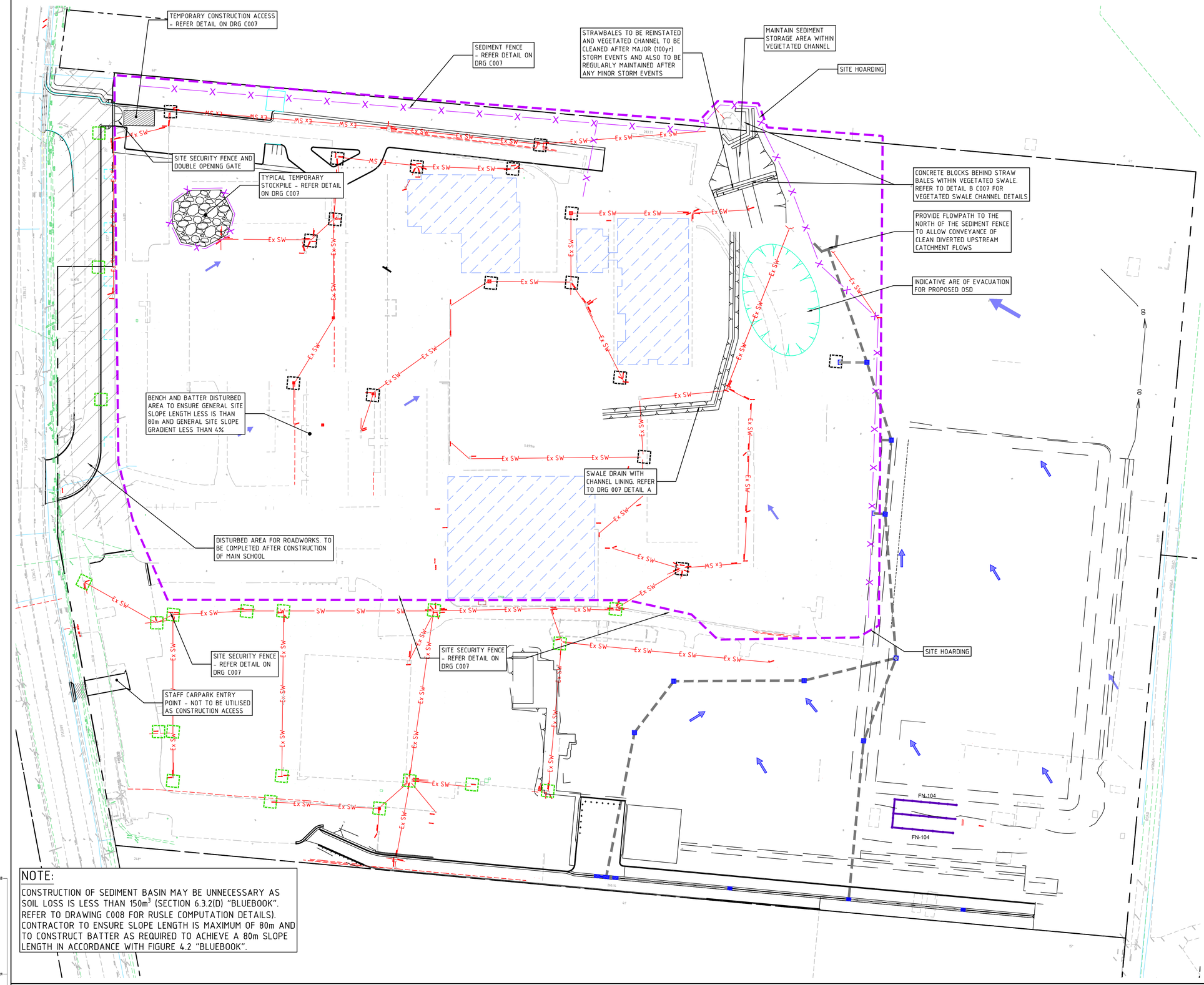
As per stage 1, the hoarding diverts upstream clean water around the construction site reducing the likelihood of sediment runoff.

Sediment fencing are to be placed around stockpiles and around the site as shown on civil drawing C005. Sediment fence are effective for the 1y and 5y ARI storm events. Sediment fences are required to be regularly inspected and maintained after rain events. It is expected that they are required to be reinstated after major storm events.

Site entry shaker ramps are to remain in phase 2.

Produced by: Jacky Hu (Civil Design Engineer)

Reviewed by: Stephen Naughton (Associate Director CPEng, NER, RPEQ)



LEGEND

- SEDIMENT FENCE
- SITE SECTURITY FENCE
- STOCKPILE
- OVERLAND FLOW
- OD — EXISTING SWALE STORMWATER DRAINAGE TO BE RETAINED (CONSTRUCTED AS PART OF TEMPORARY SCHOOL CIVIL WORKS)
- TEMPORARY ACCESS
- FIELD INLET SEDIMENT TRAP
- GEOTEXTILE PIT FILTER
- SITE HOARDING
- BUILDINGS TO BE RETAINED

SEDIMENT AND EROSION CONTROL NOTES

1. IT HAS BEEN ASSUMED THAT HOARDINGS/SILT FENCING WILL BE PROVIDED TO THE STAGE BOUNDARY SUFFICIENT TO PREVENT SEDIMENT RUNOFF FROM LEAVING SITE (EXCEPT IN THE CASE OF ENTRY/EXIT LOCATIONS WHERE TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP ARE PROVIDED). IF THIS IS NOT THE CASE, PROVIDE SEDIMENT FENCE TO STANDARD DETAIL BELOW AS REQUIRED TO PREVENT SEDIMENT FROM LEAVING SITE, DIRECT RUNOFF TO SEDIMENT BASIN.
2. ALL SEDIMENT CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH LANDCOM MANAGING URBAN STORMWATER "BLUE BOOK".
3. SEDIMENT AND EROSION CONTROL MEASURES ARE TO BE PROVIDED TO ALL STORMWATER PIT AND HEADWALL OUTLETS IN ACCORDANCE WITH DETAILS ON DRAWING No. C007 AND "THE BLUE BOOK". (LANDCOM - "MANAGING STORMWATER SOILS AND CONSTRUCTION".

SEDIMENT CONTROL CONDITIONS

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2. SEDIMENT REMOVED FROM ANY TRAPPING DEVICE WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSLOPE LANDS & WATERWAYS CANNOT OCCUR.
3. STOCKPILES WILL BE PLACED WHERE SHOWN ON DRAWING OR ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER AND NOT WITHIN 5m OF HAZARD AREAS INCLUDING LIKELY AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS & DRIVEWAYS.
4. WATER WILL BE PREVENTED FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM WITH INLET FILTERS (SEE DETAILS) UNLESS IT IS SEDIMENT FREE.
5. TEMPORARY SEDIMENT TRAPS WILL BE RETAINED UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.
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Project Name: PICTON HIGH SCHOOL REDEVELOPMENT PICTON, NSW 2571

Drawing Title: SOIL AND WATER MANAGEMENT PLAN - PHASE 1

CONSTRUCTION

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Drawn	MJO	S.NAUGHTON	22.03.19
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Date	NOV 2017		
Sheet	A1		

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Project Ref	Drawing No	Rev
20 21888 01	C005	3

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TEMPORARY CONSTRUCTION ACCESS - REFER DETAIL ON DRG C007

SEDIMENT FENCE - REFER DETAIL ON DRG C007

OSD OUTLET PIPE NOT CONNECTED UNTIL FINAL CONSTRUCTION STAGE WHEN THE CONSTRUCTION SITE HAS BEEN STABILISED AND BUILDING PADS CONSTRUCTED. (OSD TO ACT AS TEMPORARY WET SEDIMENT BASIN)

SITE SECURITY FENCE AND DOUBLE OPENING GATE

CONSTRUCTED OSD TO ACT AS TEMPORARY WET SEDIMENT BASIN IN 100year ARI STORMS. OVERFLOW FROM OSD INTO VEGETATED SWALE WHERE RUNOFF WILL BE CONTROLLED BY VEGETATED CHANNEL. STRAWBALES AND CONCRETE BLOCKS. IN MINOR STORM EVENTS SEDIMENT AND RUNOFF WILL STORED IN SEDIMENT IN OSD FLOCCULATION (REGULAR CLEANING AND MAINTANENCE WILL BE REQUIRED AFTER EACH STORM EVENT)

SITE HOARDING

DISTURBED AREA FOR ROADWORKS. TO BE COMPLETED AFTER CONSTRUCTION OF MAIN SCHOOL

BUILDING A

BUILDING B

BUILDING C

BUILDING D

BUILDING E

BUILDING G

BUILDING H

PROPOSED VEHICLE CROSSING

STAFF CARPARK ENTRY POINT - NOT TO BE UTILISED AS CONSTRUCTION ACCESS

SITE HOARDING

LEGEND

- SEDIMENT FENCE
- SITE SECTURITY FENCE
- STOCKPILE
- OVERLAND FLOW
- EXISTING SWALE STORMWATER DRAINAGE TO BE RETAINED (CONSTRUCTED AS PART OF TEMPORARY SCHOOL CIVIL WORKS)
- TEMPORARY ACCESS
- FIELD INLET SEDIMENT TRAP
- GEOTEXTILE PIT FILTER
- SITE HOARDING

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2. REMOVE SPILLED SAND OR OTHER MATERIALS FROM HAZARD AREAS, INCLUDING LANDS CLOSER THAN 5m FROM AREAS OF LIKELY CONCENTRATED OR HIGH VELOCITY FLOWS ESPECIALLY WATERWAYS & PAVED AREAS.
3. REMOVE TRAPPED SEDIMENT WHENEVER LESS THAN DESIGN CAPACITY REMAINS WITHIN THE STRUCTURE
4. ENSURE REHABILITATED LANDS HAVE EFFECTIVELY REDUCED THE EROSION HAZARD AND TO INITIATE UPGRADING OR REPAIR AS APPROPRIATE.
5. CONSTRUCT ADDITIONAL EROSION AND/OR SEDIMENT CONTROL WORKS AS MIGHT BECOME NECESSARY TO ENSURE THE DESIRED PROTECTION IS GIVEN TO DOWNSLOPE LANDS AND WATERWAYS.
6. MAINTAIN EROSION & SEDIMENT CONTROL MEASURES IN A FULLY FUNCTIONING CONDITION UNTIL ALL EARTHWORK ACTIVITIES ARE COMPLETED AND THE SITE IS REHABILITATED.
7. REMOVE TEMPORARY SOIL CONSERVATION STRUCTURES AS THE LAST ACTIVITY IN THE REHABILITATION PROGRAM.

AS PART OF THE STATUTORY 'DILIGENCE OF CARE' RESPONSIBILITIES, THE SITE MANAGER WILL KEEP A LOGBOOK MAKING ENTRIES AT LEAST WEEKLY, IMMEDIATELY BEFORE FORECAST RAIN AND AFTER RAINFALL.
ENTRIES WILL INCLUDE:

1. THE VOLUME & INTENSITY OF ANY RAINFALL EVENTS
2. THE CONDITION OF ANY SOIL & WATER MANAGEMENT WORKS
3. THE CONDITION OF VEGETATION & ANY NEED TO IRRIGATE
4. THE NEED FOR DUST PREVENTION STRATEGIES
5. ANY REMEDIAL WORKS TO BE UNDERTAKEN

THE BOOK WILL BE KEPT ONSITE & MADE AVAILABLE TO ANY AUTHORISED PERSON ON REQUEST. IT WILL BE GIVEN TO THE PROJECT MANAGER AT THE CONCLUSION OF WORKS.

NOTE:

CONSTRUCTION OF SEDIMENT BASIN MAY BE UNNECESSARY AS SOIL LOSS IS LESS THAN 150m^3 (SECTION 6.3.2(D) "BLUEBOOK". REFER TO DRAWING C008 FOR RUSLE COMPUTATION DETAILS). CONTRACTOR TO ENSURE DISTURBED AREA FOR THE CONSTRUCTION OF THE SCHOOL IS LESS THAN 3.2 HECTARES. CONTRACTOR TO ENSURE SLOPE LENGTH IS MAXIMUM OF 80m AND TO CONSTRUCT BATTER AS REQUIRED TO ACHIEVE A 80m SLOPE LENGTH IN ACCORDANCE WITH FIGURE 4.2 "BLUEBOOK".

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Project Name: PICTON HIGH SCHOOL REDEVELOPMENT PICTON, NSW 2571

Drawing Title: SOIL AND WATER MANAGEMENT PLAN - PHASE 2

CONSTRUCTION

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Drawn	MJO	S.NAUGHTON	05.10.19
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Date	OCT 2019		
Sheet	A1		

Project Ref	Drawing No	Rev
20 21888 01	C006	1

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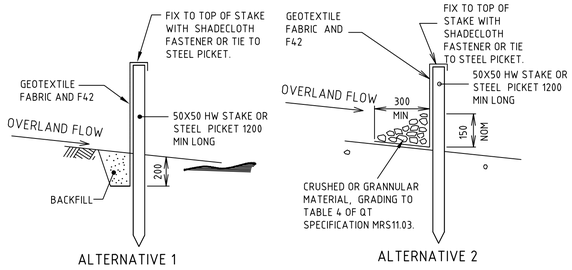

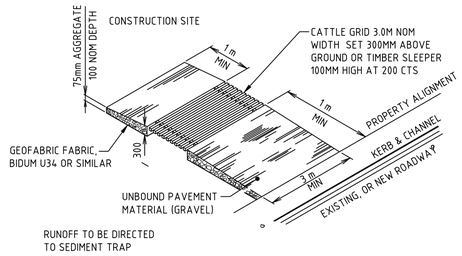

TEMPORARY CONSTRUCTION VEHICLE ENTRY/EXIT SEDIMENT TRAP

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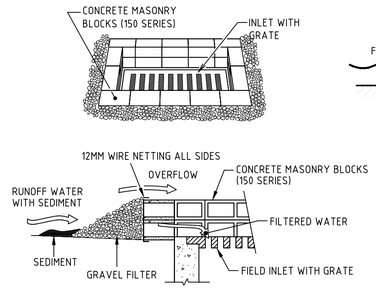

FIELD INLET SEDIMENT TRAP

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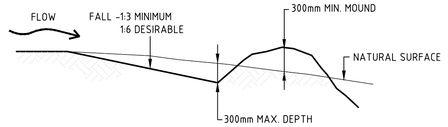
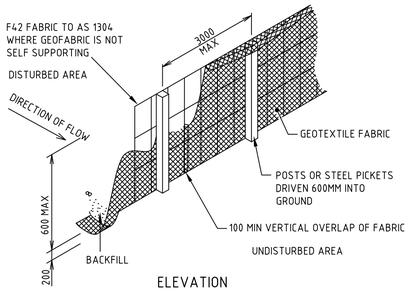


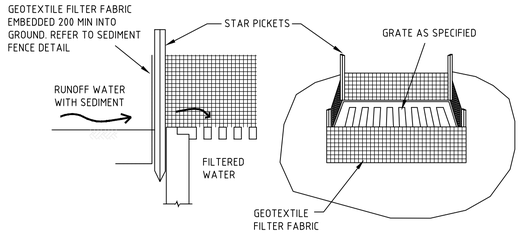
CATCH DRAIN

NOT TO SCALE



SEDIMENT FENCE

NOT TO SCALE



GEOTEXTILE PIT FILTER 1

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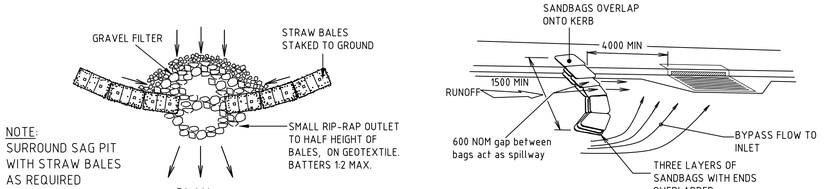
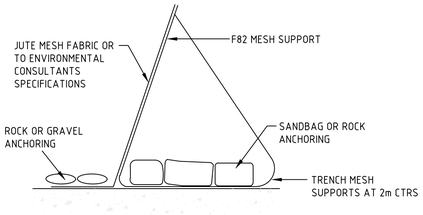


STRAW BALE AND STONE TRAP SEDIMENT CONTROL (CONCENTRATE FLOW)

NOT TO SCALE

ON GRADE KERB INLET SEDIMENT TRAP

NOT TO SCALE

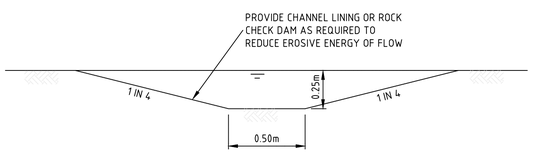


ALTERNATIVE SEDIMENT FENCE

NOT TO SCALE

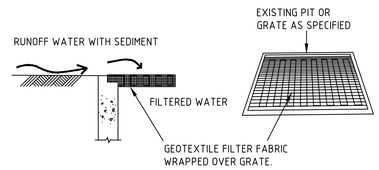
ALTERNATIVE SEDIMENT FENCE NOTES

1. INSTALL THIS TYPE OF SEDIMENT FENCE WHEN USE OF SUPPORT POSTS IS NOT DESIRABLE OR NOT POSSIBLE. SUCH CONDITIONS MIGHT APPLY, FOR EXAMPLE, WHERE APPROVAL IS GRANTED FROM THE APPROPRIATE AUTHORITIES TO PLACE THESE FENCES IN HIGHLY SENSITIVE ESTUARINE AREAS.
2. USE BENT TRENCH MESH TO SUPPORT THE F82 WELDED MESH FACING AS SHOWN ON THE DRAWING ABOVE. ATTACH THE JUTE MESH TO THE WELDED MESH FACING USING UV-RESISTANT CABLE TIES.
3. STABILISE THE WHOLE STRUCTURE WITH SANDBAG OR ROCK ANCHORING OVER THE TRENCH MESH AND THE LEADING EDGE OF THE JUTE MESH. THE ANCHORING SHOULD BE SUFFICIENTLY LARGE TO ENSURE STABILITY OF THE STRUCTURE IN THE DESIGN STORM EVENT, USUALLY THE 10 YEAR EVENT.



DETAIL A: SWALE DRAIN

NOT TO SCALE



GEOTEXTILE PIT FILTER 2

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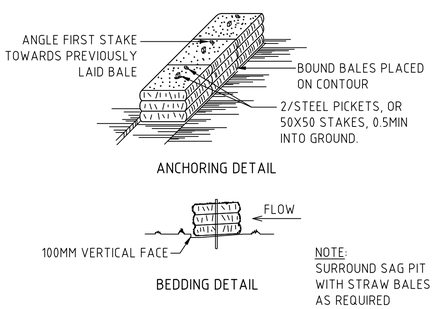

STRAW BALE BANK SEDIMENT CONTROL

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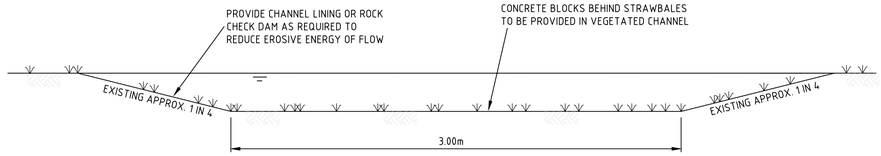

DETAIL B: OVERFLOW SWALE DRAIN

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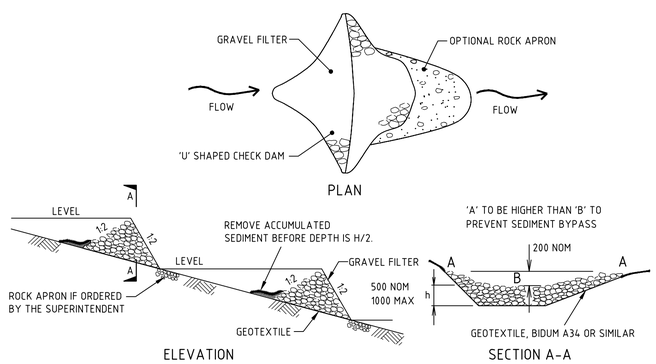

CHECK DAMS FLOW CONTROL

NOT TO SCALE

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Project Name: PICTON HIGH SCHOOL REDEVELOPMENT PICTON, NSW 2571

Drawing Title: SEDIMENT AND EROSION CONTROL DETAILS

CONSTRUCTION

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Project Ref	Drawing No	Rev
20 21888 01	C007	2

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NOTES:

1. K-FACTOR AND GROUP C HYDROLOGIC GROUP BASED ON TABLE C21 "BLUEBOOK" PICTON LANDSCAPE.
2. 5-DAY 85% RAINFALL DEPTH OF 34.1mm CHOSEN AS THE AVERAGE OF CAMDEN AND MITTAGONG LANDSCAPE IN TABLE 6.3a "BLUEBOOK" AS PICTON IS LOCATED IN BETWEEN THESE LOCATIONS.
3. ANNUAL SOIL LOSS AS COMPUTED BY THE RUSLE EQUATION IS 121m^3 PER YEAR DUE TO RELATIVELY FLAT SLOPE ON SITE. CONSEQUENTLY, CONSTRUCTION OF A SEDIMENT BASIN MAY BE UNNECESSARY FOR THE ULTIMATE SCHOOL CONSTRUCTION WORKS AS THE SOIL LOSS IS LESS THAN 150m^3/YR (REFER TO SECTION 6.3.2(D) OF THE "BLUEBOOK"). CONTRACTOR IS TO USE ALTERNATE SEDIMENT CONTROL MEASURES SUCH THAT QUALITY OF RUNOFF IS OF AN ACCEPTABLE STANDARD PRIOR TO DISCHARGE.
4. CONTRACTOR TO PROVIDE CATCH DRAIN, BENCH AND BATTER AS REQUIRED TO ENSURE SLOPE LENGTH THAN 80m AND SLOPE GRADIENT IS LESS THAN 4%

SWMP Commentary, Detailed Calculations

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

1. Site Data Sheet

Site Name: Picton High School

Site Location: Picton High School

Precinct:

Description of Site: MILESTONE 2 PICTON HS

Site area	Site						Remarks
	Basin						
Total catchment area (ha)	2.6						
Disturbed catchment area (ha)	2.15						

Soil analysis

% sand (faction 0.02 to 2.00 mm							Soil texture should be assessed through mechanical dispersion only. Dispersing agents (e.g. Calgon) should not be used
% silt (fraction 0.002 to 0.02 mm)							
% clay (fraction finer than 0.002 mm)							
Dispersion percentage							E.g. enter 10 for dispersion of 10%
% of whole soil dispersible							See Section 6.3.3(e)
Soil Texture Group							See Section 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)	85						See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	34.1						See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	8.51						See IFD chart for the site

RUSLE Factors

Rainfall erosivity (*R*-factor)	1690						Automatic calculation from above data
Soil erodibility (*K*-factor)	0.034						RUSLE data can be obtained from Appendixes A, B and C
Slope length (m)	80						
Slope gradient (%)	4						
Length/gradient (*LS*-factor)	0.91						
Erosion control practice (*P*-factor)	1.3						
Ground cover (*C*-factor)	1						

Calculations

Soil loss (t/ha/yr)	68						
Soil Loss Class	1						See Section 4.4.2(b)
Soil loss (m^3/ha/yr)	52						
Sediment basin storage volume, m^3	19						See Sections 6.3.4(i) and 6.3.5 (e)

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3	ISSUE FOR CONSTRUCTION	08.10.19	DS	SN
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Project Name: PICTON HIGH SCHOOL REDEVELOPMENT PICTON, NSW 2571

Drawing Title: SOIL AND WATER MANAGEMENT COMPUTATIONS

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Sheet	A1		

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