SEEC

Soil and Water Assessment

Extension of Friable Granite Quarry; Lot 5 DP 255133 Federal Highway, Wollogorang

Prepared for Divall's Earthmoving and Bulk Storage

Revision D
5 April 2022

Strategic Environmental & Engineering Consulting

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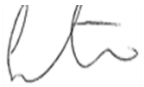
Document Certification

This document has been developed based on agreed requirements as understood by SEEC at the time of investigation. It applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects.

Any recommendations contained in this report are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation, subject to the limited scope and resources available. Within the confines of the above statements and to the best of my knowledge, this plan does not contain any incomplete or misleading information.



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SEEC

5 April 2022

Version Register

Version	Date	Author	Reviewer	Notes	Other
Draft A	2685//2021	JA	B.J	Draft issue for review	
Final B	26/07/2021	JA	B.J	Final Issue	
Final C	14/12/2021	JA	B.J	Minor Revisions	
Final D	5/04/2022	JA	B.J	Minor Revisions	

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1 INTRODUCTION

1.1 Context and Purpose

Divalls Earthmoving & Bulk Haulage proposes to extend the life of its existing friable granite extractive industry at Lot 5 DP 255133 Federal Highway, Wollogorang (the site) for at leastanother ten years. This extension is considered as designated development under Section 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

This Soil and Water Assessment has been prepared to address specific items relating to soil and water in the Planning Secretary's Environmental Assessment Requirements (SEARs), issued on 27 May 2020. It includes an assessment of how the proposed extension of extractive activities might impact on soil and water onsite and downstream, and proposes a series of recommendations to mitigate or manage those impacts.

This document should be read in conjunction with other reports and plans for the proposed development.

As part of the development subject to this assessment, no changes are proposed to the operational procedures at the site. It is proposed to extend the current extraction area to the north by approximately 3 ha.

1.2 Document Preparation

This Soil and Water Assessment was undertaken by Jason Armstrong Strategic Environmental and Engineering Consulting (SEEC) Pty Ltd for Divalls Earthmoving & Bulk Haulage. As part of preparing this assessment, a site inspection was conducted in November 2020 to identify soils, existing water management and erosion and sediment control infrastructure and procedures.

1.3 SEARs

The SEARs (issued 27 May 2020) that specifically relate to soil and water include:

- A detailed site water balance and an assessment of any volumetric water licensing requirements, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges), water supply infrastructure and water storage structures;
- Identification of any licensing requirements or other approvals required under the Water Act 1912 and/or Water Management Act 2000;
- Demonstration that water for the construction and operation of the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP);

- A description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo;
- A detailed consideration of the need to maintain an adequate buffer between all excavations and the highest predicted ground water table;
- An assessment of activities that could cause erosion or sedimentation issues, and the proposed measures to prevent or control these impacts;
- An assessment of any likely flooding impacts of the development;
- An assessment of potential impacts on the quality and quantity of existing surface and ground water resources including a detailed assessment of proposed water discharge quantities and quality against receiving water quality and flow objectives; and
- A detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts.
- Potential impacts on soils and land capability (including potential erosion and land contamination) and the proposed mitigation, management and remedial measures (as appropriate).

1.4 Objectives

This Soil and Water Assessment has been prepared to satisfy the Water-related SEARs as noted in **Section 1.3**.

2 SITE CONDITIONS

2.1 Quarry Features

The quarry consists of a number of features, which are shown in **Figure 1** and described in detail in **Table 1**.

As noted in **Section 1.1**, the extent and footprint of these features will not change.

Table 1 – Site features

Feature	Description
Quarry Area	The quarry extraction area including Main Sediment Basin and Haul Road to the Processing Area
Processing Area	Includes mobile screening equipment that can be progressively moved as required with the staging on the extraction process.
Parking area	Relatively level carpark adjacent to the main access within the quarry area (unsealed)
Amenities	Portaloo toilet with wash basin.
Product Stockpile and Loading area.	Relatively level product stockpile storage and loading area. Also shipping container used for document storage
Main Site Access	Site access driveway to and from the Federal Highway. Unsealed.

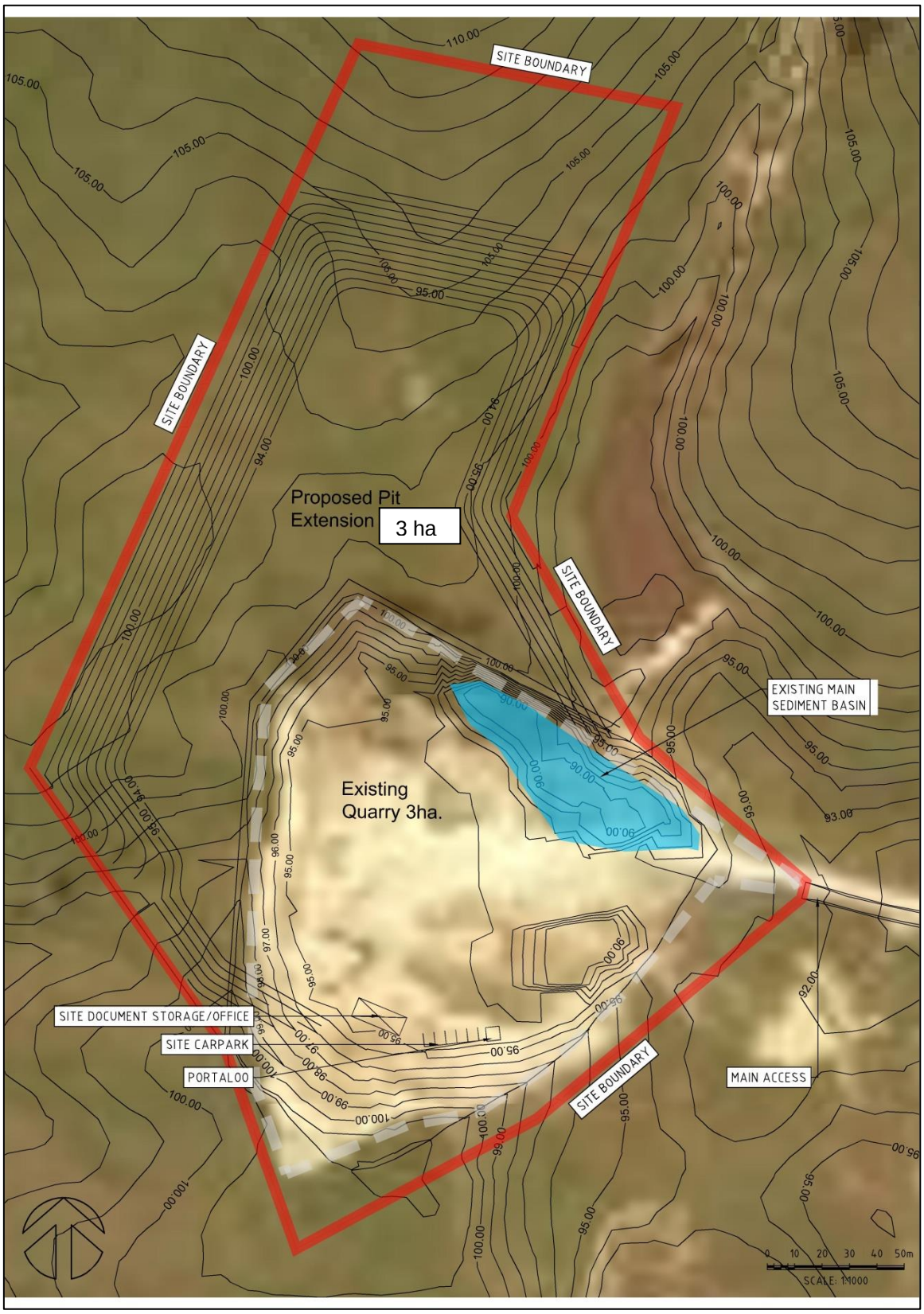


Figure 1 – Site features. Underlying image from Six Maps.

2.2 Climate

2.2.1 Rainfall

Bureau of Meteorology (BoM) rainfall statistics for nearby Breadalbane (Old Post Office) (station 70097) and evaporation statistics for Goulburn Tafe (station 070263) are contained in **Table 2**.

Table 2 – Monthly rainfall statistics for Breadalbane (Old Post Office) (BoM station 70097) and evaporation data for Goulburn Tafe (BoM station 070330).

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Rainfall (mm)	53.9	50.5	56.2	45.9	48.0	61.7	58.3	61.0	57.2	60.2	57.2	58.0	667.4
Mean no of days with rain >1mm	5.8	6.1	5.9	5.0	5.3	6.5	6.4	7.1	7.1	7.1	7.4	6.0	75.7
Evaporation (mm/day)	6.3	5.2	3.9	2.5	1.6	1.1	1.2	1.9	2.8	3.9	5.0	6.0	3.4

Although average rainfall statistics show slight winter dominance, rainfall occurs throughout the year so is unlikely to limit the potential for onsite re-use of detained surface water.

The relatively high average daily evaporation rates will contribute to significant losses of water from any surface storage such as the Main Sediment Basin. While this will limit the potential for onsite re-use of detained water, it will also limit the potential for the Main Sediment Basin to overflow and only in extreme rainfall events.

2.2.2 Intensity-Frequency-Duration (IFD) Data

The IFD chart and table for both the 2016 data sets as derived from the Bureau of Meteorology are given in **Figure 2** and **Figure 3** below.

Location

Label: Wollogorang

Latitude: -34.8876 [Nearest grid cell: 34.8875 (S)]

Longitude: 149.509 [Nearest grid cell: 149.5125 (E)]

IFD Design Rainfall Intensity (mm/h)

Issued: 03 June 2021

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

	Annual Exceedance Probability (AEP)						
Duration	**63.2%**	**50%#**	**20%***	**10%**	**5%**	**2%**	**1%**
1 min	85.5	96.7	132	155	178	208	231
2 min	72.0	80.7	107	124	140	160	175
3 min	66.0	74.1	98.8	115	130	150	165
4 min	61.4	69.1	92.8	108	124	143	158
5 min	57.6	64.9	87.6	103	117	137	151
10 min	44.2	50.1	68.5	81.0	93.1	109	122
15 min	36.3	41.1	56.4	66.7	76.7	90.0	100
20 min	31.0	35.1	48.1	56.8	65.3	76.5	85.0
25 min	27.2	30.9	42.1	49.7	57.0	66.7	74.0
30 min	24.4	27.6	37.6	44.3	50.8	59.2	65.6
45 min	19.0	21.4	28.8	33.8	38.7	44.9	49.7
1 hour	15.8	17.7	23.7	27.8	31.7	36.7	40.6
1.5 hour	12.1	13.6	18.0	21.0	23.9	27.7	30.7
2 hour	10.1	11.2	14.8	17.3	19.7	22.9	25.3
3 hour	7.81	8.66	11.4	13.3	15.1	17.7	19.6
4.5 hour	6.07	6.71	8.81	10.3	11.8	13.9	15.5
6 hour	5.09	5.63	7.39	8.66	9.97	11.8	13.3
9 hour	3.98	4.40	5.81	6.85	7.94	9.49	10.8
12 hour	3.33	3.69	4.91	5.82	6.78	8.16	9.29
18 hour	2.59	2.88	3.87	4.62	5.42	6.55	7.49

Note:
The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.
* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

Figure 2 - – 2016 IFD Table for the Project Site (From BoM)

Location

Label: Wollogorang

Latitude: -34.8876 [Nearest grid cell: 34.8875 (S)]

Longitude: 149.509 [Nearest grid cell: 149.5125 (E)]

IFD Design Rainfall Depth (mm)

Issued: 03 June 2021

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).

FAQ for New ARR probability terminology

Unit: mm

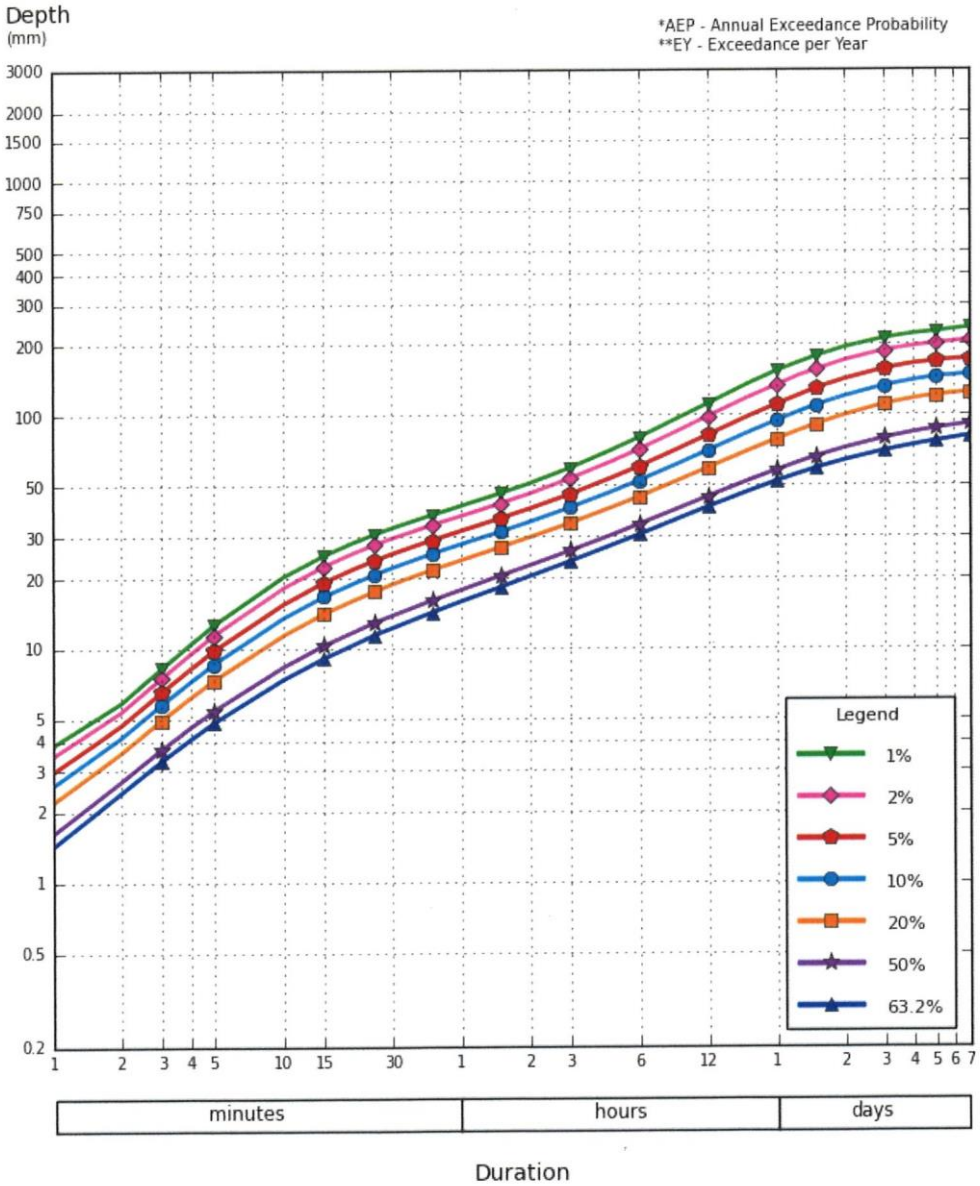


Figure 3 - – 2016 IFD Chart for the Project Site (From BoM)

2.3 Topography and Setting

The site has been operating as a quarry for at least 20 years, and extensive volumes of friable granite have already been removed from within the Quarry Area. The quarry is located on a ridge line creating a completely isolated valley that is below the natural ground level with minimal surface water run-on from surrounding areas. All surface water run-off from the quarry area drains to the existing Main Sediment Basin located in the north eastern corner of the quarry.

The mobile Processing Area, Site Office/Storage container, Parking Area and portaloo are all sited within the base of the excavated quarry area as shown in **Figure 1**.

As shown in **Figure 4**, the site is located within existing grazing land with no major vegetation located within the extent of the proposed quarry extension.

Figure 4 – Local setting. Reproduced from Google Maps, accessed December 2020.

2.4 Soils

Soil Landscape Mapping from the Goulburn 1:250,000 mapsheet shows the site lies within the Garlund Soil Landscape (C, Hird, 1990). Site observations by SEEC support the soil landscape mapping. Table 3 contains a summary of key features and potential constraints that might influence water management and erosion and sediment control during quarry operations.

Table 3 – Soil Landscape Description (based on C. Hird, 1990).

Parameter	Garland Soil Landscape
Soil landscape description	Undulating rises and valleys formed from granite parent material. Extensive areas occur in two north-south trending bands between Gunning and Hovells Creek and between Tarago Lagoon and the Isabella River.
Typical soil conditions	Moderate depth, moderately permeable loamy sand topsoils. Sandy clay loam and sandy clay to light clay subsoils over weathering granite base.
Common soil and landscape constraints	Hard setting topsoils Moderate soil fertility High structural degradation hazard Moderate water holding capacity Moderate to low erosion hazard Acidic topsoils Salinity occasionally in low-lying areas

The soil features described above are unlikely to significantly impact on water management and erosion and sediment control.

2.5 Surface Water

The site lies on a ridgeline between a first and second order intermittent watercourse located to the east and west of the site as shown in Figure 5. The eastern water course (Watercourse A) drains to Rose Lagoon to the south and from there into Willow Tree Creek and then Collector Creek to the West and ultimately to Lake George located to the south. The western watercourse (Watercourse B) drains directly to Willow Tree Creek.

There is no perimeter bunding located around the top of the existing quarry excavation and therefore there is some minor external catchment run-off contributing to flows within the existing quarry area. The mobile processing area is located within the quarry area and does not require water for its operation. Therefore no additional surface water management is required for the processing of quarry material.

As noted in **Section 2.3**, the quarry has an existing Main Sediment Basin located in the north eastern corner of the quarry floor that would be increased in capacity as required to cater for the larger catchment area. The suitability of this arrangement is determined as

part of the impact assessment in **Section 3** and any modifications required are noted in **Section 0**.

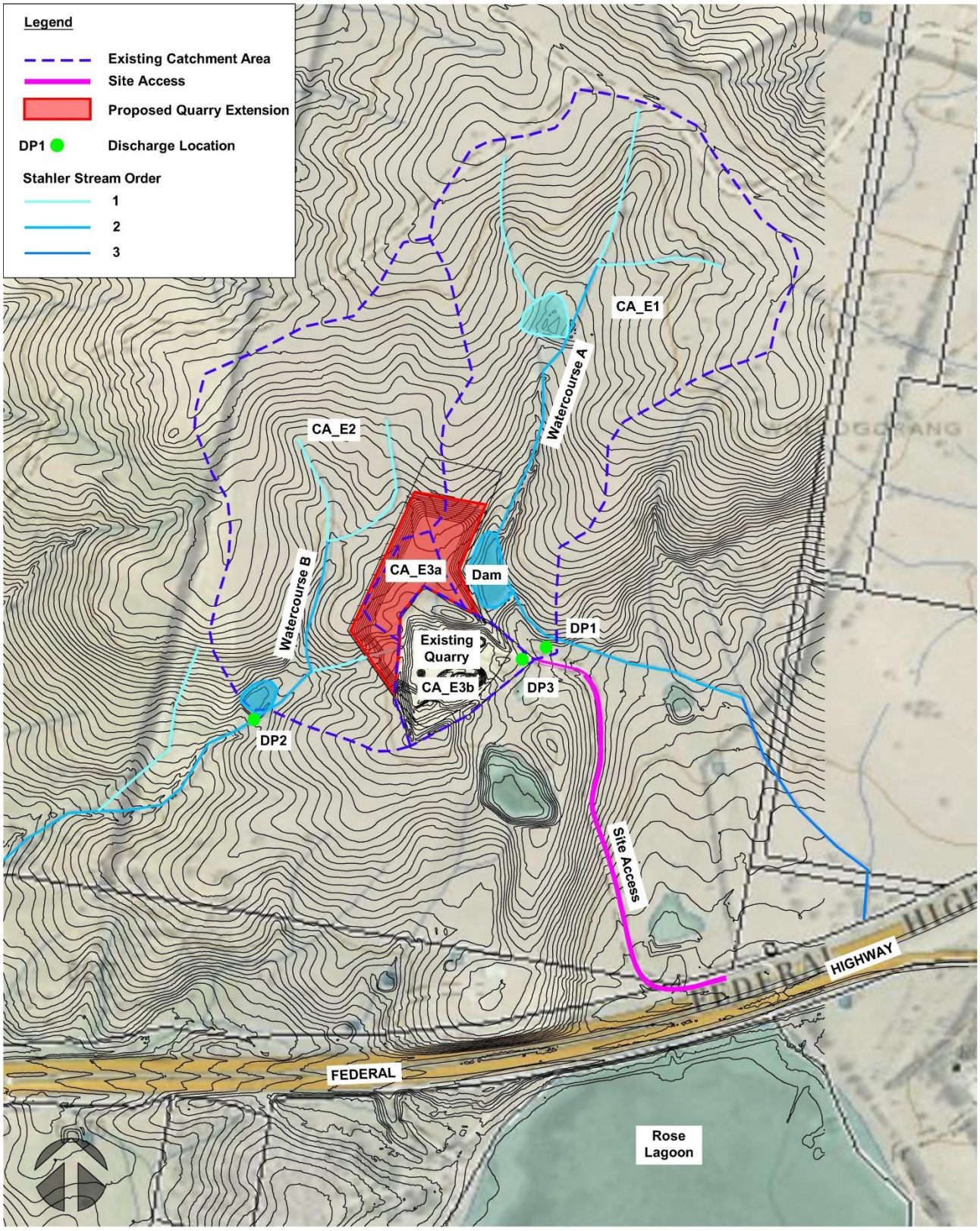


Figure 5 – Existing Site Catchments and Drainage

2.6 Flooding

The site lies on a natural ridgeline at an elevation of approximately 110 to 93 m AHD with slopes falling away to the existing watercourses A and B. The top of the dam wall located in Watercourse A is 97 m AHD. Although a flood assessment has not been conducted, flooding from the external catchments is not expected to be a significant consideration for this site. The suitability of proposal in relation to flooding is addressed as part of the impact assessment in **Section** Error! Reference source not found. and any modifications equired are noted in **Section 0**.

2.7 Groundwater

A groundwater assessment has not been undertaken as part of this soil and water assessment. However, the proposed development will not change the existing water management infrastructure, which includes a Main Sediment Basin within the Quarry Area. The Main Sediment Basin is founded on weathered granite bedrock and is not expected to significantly change as the extraction deepens. As a result, any seepage of detained water in the Main Sediment Basin into the weathered granite substrate is expected to continue in a similar manner to what occurs presently.

No downstream impacts have been reported to surface or groundwater as a result of the existing water management strategies onsite. Given the proposed development does not constitute a change of use from the current extraction activities and the depth remains in the same weathered granite substrate, no changes to groundwater conditions downstream are expected from the development.

2.8 Erosion Hazard

An evaluation of the erosion hazard was made using the approach in Chapter 4 of the Blue Book (Landcom, 2004). This process involves calculating the predicted annual average soil loss using the Revised Universal Soil Loss Equation (RUSLE) as follows:

$$A = R \times K \times LS \times P \times C$$

The results of this process are in **Table 4**.

The relative erosion hazard for each area has been taken into account when assessing risk and recommending appropriate water management and erosion and sediment control structures and practices.

Table 4 – Erosion hazard for the various areas within the quarry (based on Landcom, 2004).

Parameter	Definition	Quarry Batters	Quarry Floor and Processing Area
A	Total calculated soil loss (t/ha/yr)	716 t/ha/yr	19 t/ha/yr
R	Rainfall erosivity factor	1500	1500
K	Soil erodibility factor	0.05 (Conservative Estimate)	0.05 (Conservative Estimate)
LS	Slope length and gradient factor	7.34 (40m slope length, 33% slope)	0.19 (80m slope length, 1% slope)
P	Conservation practice factor	1.3	1.3
C	Ground cover factor	Composite C-factor of 1 adopted to account for rock and bare earth.	Composite C-factor of 1 adopted to account for rock and bare earth.
Relative erosion hazard		High	Very low

3 IMPACT ASSESSMENT

3.1 Soils, Erosion and Sediment Control

3.1.1 Dust Rise

The client (Divalls) have advised that there is little dust generated from the site as the friable granite is very moist when excavated and therefore very little water is required for dust suppression. Although that is the case the generation of dust during dry periods is still a potential risk and appropriate controls to limit dust rise will be required.

3.1.2 Erosion and Sediment Control - Rainfall

Erosion of exposed areas is expected during rainfall and, as such, appropriate sediment retention infrastructure must be in place. Providing the Main Sediment Basin within the Quarry Area is adequately sized, appropriately maintained and regularly inspected, will minimise the risk of sediment being discharged off site into downstream areas.

There is a risk of sediment runoff onto downslope lands during the stripping of topsoil during the construction phase of the development as some areas do not drain naturally to the quarry floor and the Main Sediment Basin. Appropriate erosion and/or sediment controls are required for those areas until the quarry excavation is deep enough to divert runoff to the Main Sediment Basin.

3.1.3 Sediment Tracking Onto the Federal Highway

There is a low risk of sediments being tracked from the site onto The Federal Highway where they could cause environmental problems (when washed into local waterways). Further, sediments on The Federal Highway could cause safety issues for road users. Rumble grids are in place at the driveway egress point and these will need to be regularly inspected and maintained. In addition, a regime of inspection should be enacted as well as a requirement to undertake street sweeping if sediment tracking becomes problematic. Access from the grid to the Federal Highway is and will be bitumen sealed.

3.2 Fuels, Chemicals and Oils Storage

The storage and use of fuels, chemicals and oils onsite creates a risk of environmental harm from spills or leaks. For this development, no fuels, chemicals or oils are required to be stored or administered on site therefore limiting any potential for environmental harm.

3.3 Surface Water

3.3.1 Pre-Development Catchment Flows

Peak flows from each existing catchment shown in **Figure 5** and at the locations noted as DP1, DP2 and DP3 have been estimated. The predicted peak flows for the various existing sub-catchments as estimated using the Rational Method are shown in **Table 5**.

Table 5 – Existing Catchment Peak Flows

Catchment Name	Area (Ha)	Discharge Point	Q ARI (Peak Flow) (m^3/s)						
			1YR	2YR	5YR	10YR	20YR	50YR	100Yr
CA_E1	27.32	DP1	0.267	0.337	0.531	0.703	0.887	1.187	1.398
CA_E2	20.20	DP2	0.211	0.267	0.421	0.558	0.704	0.944	1.114
CA_E3a	1.08	DP3	0.020	0.025	0.040	0.053	0.067	0.090	0.107
CA_E3b	3.00	DP3	0.054	0.065	0.100	0.124	0.150	0.194	0.224
	Total	**DP3**	0.074	0.090	0.140	0.177	0.217	0.284	0.331

3.3.2 Post Development Catchment Flows

Peak flows from each developed catchment shown in **Figure 6** and at the locations noted as DP1, DP2 and DP3 have been estimated. The predicted peak flows for the various existing sub-catchments as estimated using the Rational Method are shown in **Table 5**.

Table 6 – Proposed Post Development Catchment Flows

Catchment Name	Area (Ha)	Discharge Point	Q ARI (Peak Flow) (m^3/s)/Percentage Change (+/-%)						
			1YR	2YR	5YR	10YR	20YR	50YR	100Yr
CA_P1	26.53	DP1	0.260	0.327	0.516	0.683	0.862	1.152	1.358
CA_P2	19.15	DP2	0.205	0.259	0.409	0.542	0.685	0.918	1.083
CA_P3a	2.92	DP3	0.053	0.063	0.097	0.121	0.146	0.189	0.218
CA_P3b	3.00	DP3	0.054	0.065	0.1	0.124	0.15	0.194	0.224
	Total	**DP3**	0.107	0.128	0.197	0.245	0.296	0.383	0.442

3.3.3 Change in Surface Water Flows

The Project would decrease flows entering Watercourses A and B as the quarry extraction progressively extends within these catchment areas. The catchments draining to these watercourses would decrease slightly, as the extraction process would reshape sections of the catchments causing this runoff to drain internally to the quarry Main Sediment Basin and not to the existing watercourses. This has the potential to decrease peak flows in these downstream catchments. However this would be offset by the change in imperviousness and discharge of runoff captured within the Main Sediment Basin following the settlement of fine sediment, resulting in a reduced potential impact in overall flow volumes. This change would reduce peak flow volumes while extending the duration of flows following storm events.

The changes in peak flows at each of the discharge points DP1, DP2 and DP3 (**Figure 6**) for the post development scenario are shown in the following table.

Table 7 – Approximate Change In Peak Flows %

Discharge Point	Percentage Change (+/-%)						
	1YR	2YR	5YR	10YR	20YR	50YR	100Yr
DP1	-2.62%	-2.97%	-2.82%	-2.84%	-2.82%	-2.95%	-2.86%
DP2	-2.84%	-3.00%	-2.85%	-2.87%	-2.70%	-2.75%	-2.78%
DP3	44.59%	42.22%	40.71%	38.42%	36.41%	34.86%	33.53%

3.3.4 Downstream Water Quantity

As noted in **Section 1.1**, it is proposed to capture and manage all sediment laden water from the quarry area within the Main Sediment Basin. This would involve the treatment and release of water within the design rainfall period (5 day, 85th percentile). Some water would also be lost to evaporation and seepage into groundwater as described in the water balance for the site outlined in **Section 3.5**. Therefore provided that water captured within the quarry area is managed in accordance with the Surface Water Management Plan little impact to the existing intermittent Watercourse's A and B and Rose lagoon downstream is expected.

3.3.5 Downstream Water Quality

Erosion of exposed soils and crushed rock is expected to be the most significant potential impact to water quality. Proposed earthworks within the quarry extension would expose soil materials and increase the risk of sediment-laden water leaving the Project Area unless adequate mitigation measures are in place. The potential water quality impacts that would be applicable to the proposed works would be:

- Sediment-laden water derived from runoff from disturbed areas;
- Fuels, lubricants and hydraulic fluids, used in the various plant and equipment involved in the extraction of quarry products.

With the exception of rehabilitated, previously-backfilled areas, all these surfaces would be potential sources of sediment-laden runoff and so would be directed to and captured within the Main Sediment Basin in the base of the extraction area.

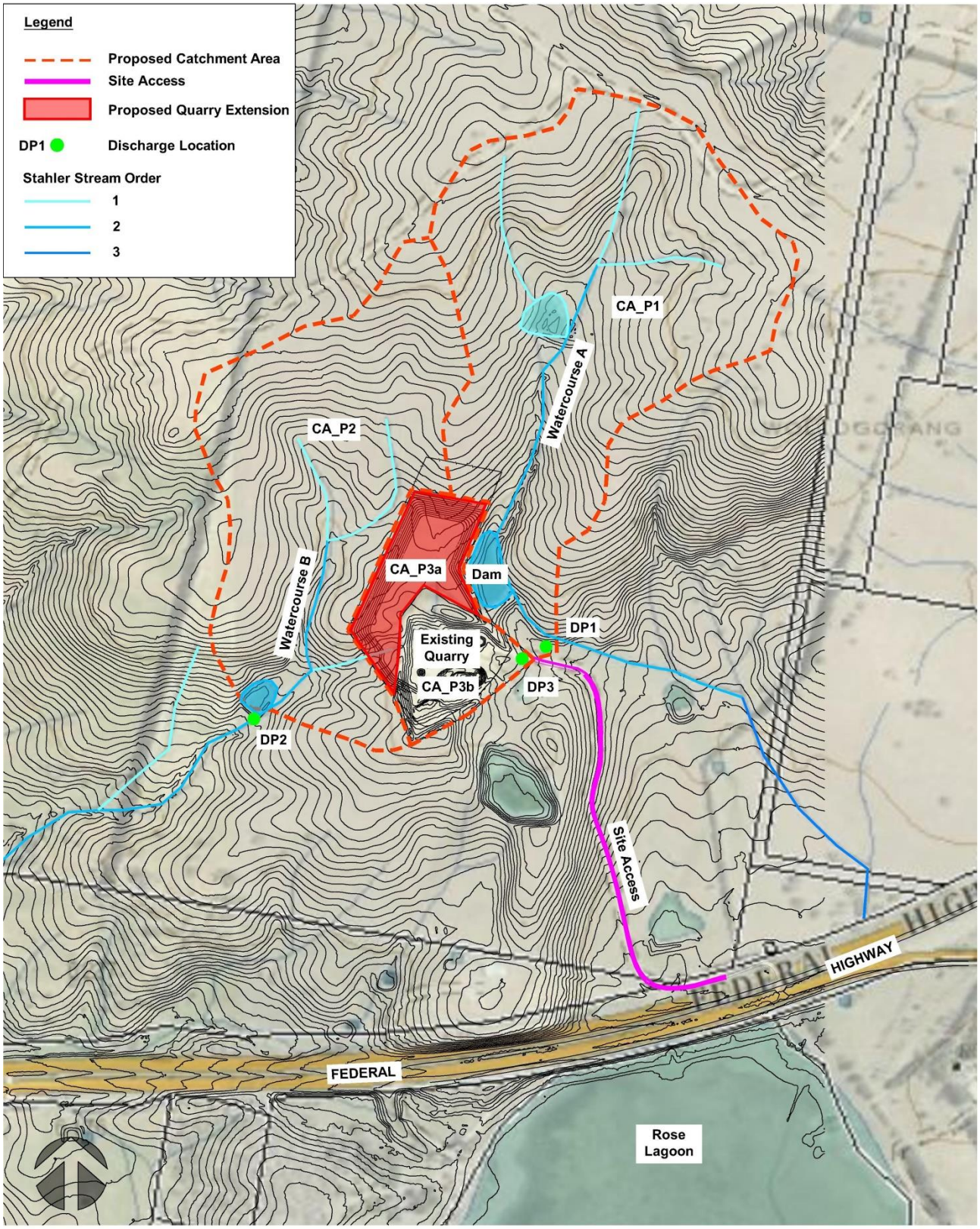


Figure 6 – Proposed Site Catchments and Drainage

3.4 Water Access Licence / Harvestable Rights

3.4.1 Harvestable Rights

Under the Water Management Act 2000 (WM Act) the site has maximum harvestable rights of 28.21ML, based on the total land holding of approximately 403 ha. There are multiple existing dams located on the property with unknown capacity.
The Main Sediment Basin would capture stormwater runoff from the existing and proposed quarry extension area for treatment and release into the downstream watercourse as required. No further surface water entitlements would be required for the Project. Separate to the harvestable right, Clause 21 of the Water Management (General) Regulation 2018 under the Water Management Act 2000 provides for several exemptions from the requirement for a Water Access Licence (WAL). These include –

> *Schedule 1 - Excluded Works, Item 3*
>
> *Dams solely for the capture, containment and recirculation of drainage and/or effluent, consistent with best management practice or required by a public authority (other than Landcom or the Superannuation Administration Corporation or any of their subsidiaries) to prevent the contamination of a water source, that are located on a minor stream.*
>
> *Schedule 4 – Access Licence Exemptions, Item 12 – Excluded works*
>
> *(1) Any landholder – in relation to the taking of water from or by means of a work referred to in item 1, 2, 3, 4, 6, 7 or 9 in Schedule 1 that is situated on the land, for the purposes and in the circumstances specified in Schedule 1 in respect of the work.*

Therefore the Excluded Work Exemption is available for mining operations to capture surface water runoff from disturbed areas without the need for a WAL in circumstances where sediment laden surface water drains into a sediment basins that are *"solely for the capture, containment and recirculation of drainage…. to prevent the contamination of a water source, that are located on a minor stream''.*

3.4.2 Water Sharing Plan

The Project Area falls within the Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012. This plan is made under Section 50 of the Water Management Act 2000 (WM Act). No additional water is required for the proposal that would affect this water sharing plan.

3.4.3 Environmental Protection Licences (EPL)

There are no current licenced environmental discharge points (EPL's) required for the current development.

3.5 Water Balance

3.5.1 Main Sediment Basin Sizing

The proposed Main Sediment Basin has been sized in accordance with the Blue Book (Landcom, 2004). This process involves calculating the predicted annual average soil loss using the Revised Universal Soil Loss Equation (RUSLE) with the relative parameters shown in **Table 4**. The following parameters have been used in addition to the figures shown in **Table 4.**

- Volumetric Runoff Coefficient (Cv) = 0.56 (Assuming hydrological group 'D' runoff coefficient.
- Sediment Basin Design Rainfall Depth: 10-day 90th percentile = 44.8mm (Goulburn).

The sediment basin volume required is 1,646m^3. This includes a sediment storage volume of 141m^3 and a water storage volume of 1,505m^3. A 10-day 90th percentile design has been adopted to allow 10 days (in lieu the shorter period of 5 days) allowing for additional time for testing, treatment and discharge of surface water. There is also ample additional volume within the base of the extraction area with preliminary calculations showing up to 12,000m^3 of volume available if required.

3.5.2 Site Water Balance

A site water balance using historical rainfall records from the Breadalbane (Old Post Office) station 70097 was undertaken to determine how often the sediment basin would reach capacity per year. The Breadlbane Station is the closest to the site with 45 years' worth of the data set used ranging from 1975 to 2020.

As the site is moderately permeable, a proportion of rainfall will infiltrate into the soil, particularly during smaller rainfall events. It is expected that more runoff would be generated during high intensity storms or long duration storms after the ground has been saturated. Figure **7** shows typical annual runoff fractions for catchments with a range of imperviousness across a variety of mean annual rainfall totals. The figure indicates that for a site of less than 30% imperviousness with a mean annual rainfall of 667mm, the expected runoff fraction is around 0.35. Therefore this runoff coefficient has been adopted for the site based on site and soil conditions.

Water loss from the site and Main Sediment Basin was estimated from the following parameters:

- Evaporation applied to the daily model as listed in Table 2.
- Intial loss across the site of 2mm/day before generating runoff.
- Seepage from the dam applied at a constant rate of 2 mm/hr.
- A conservative estimate of daily water demand for dust suppression of 20,000 Litres/day.

- No water required for processing or other on-site usage.

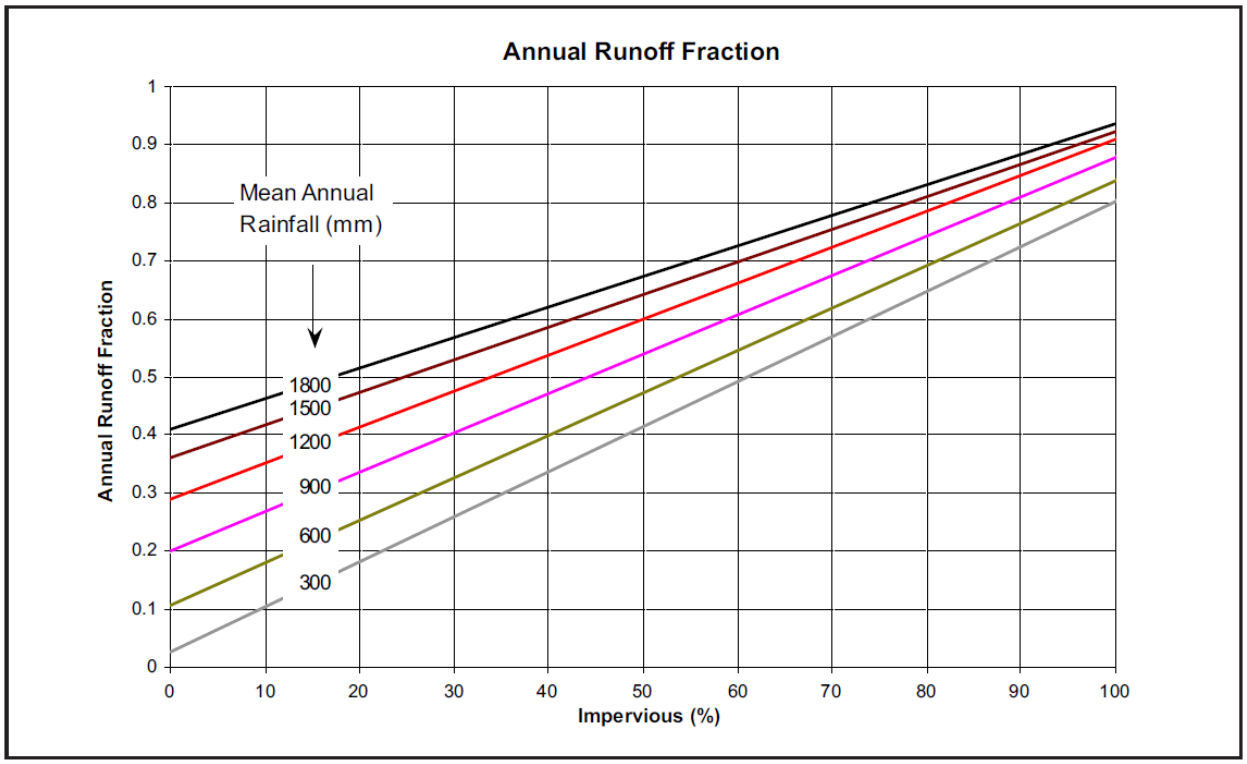


Figure 7 – Typical Runoff Fractions for Various Levels of Imperviousness and Rainfall (CRCCH, 2004)

A summary of the site water balance results are shown in **Figure 8**. A slightly larger basin capacity of 2,000m^3 (rounded up from the existing basin volume of 1,632m^3) was adopted to provide additional capacity within the quarry floor. The water balance results show that this size basin if its volume is maintained to its capacity in accordance with the Blue Book guidelines, would exceed its capacity approximately 4.6 times per year. This reduces to 0 overflows if a volume of 12,000m^3 is adopted based on the historical rainfall data.

SEEC RATES IV Results

Site: Wollogorang Quarry
Rain station: Breadalbane (Old Post Office) 70097

Total years:	45.84	Avg annual rainfall (mm):	676.03
Total days:	16743	Max daily rainfall (mm):	136.4
Total no of days when rain fell:	4462	Longest dry spell (days):	388
Avg days per year when rain fell:	97.33856894	Days when rain > S1 initial loss:	2810
Avg wet day rainfall (mm):	6.95	Avg days/yr rain > S1 initial loss:	61.30017

Input statistics:	**Main Sediment Basin**	
Capacity (L):	2000000	
Startup % full:	0.1	
Catchment area (sqm):	59500	
Initial loss per day (mm):	2	
Runoff percentage:	35	
Apply use A on wet days (Y/N):	N	
Apply use B on wet days (Y/N):	N	
Revert to mains at threshold (Y/N):	N	
Mains reversion threshold (% full):	0	
Overflows into Storage 2 (Y/N):	N	
USAGE stats (L/day):	**Main Sediment Basin**	
Usage type:	**Dust Suppression**	**Evaporation**
January	34280	16128
February	34280	13312
March	34280	9984
April	34280	6400
May	34280	4096
June	34280	2816
July	34280	3072
August	34280	4864
September	34280	7168
October	34280	9984
November	34280	12800
December	34280	15360
Results:	**Main Sediment Basin**	
% of time demand met:	72	
% of demand supplied from mains:	0	
Main Sediment Basin Surface Area (m^2)	3200	
Longest time storage ran dry (days):	389	
Avg annual mains demand (L):	0	
Avg wet day overflow (L):	9988.75	
Avg no of overflow events annually:	4.602966841	
Avg annual supply from rain in (L):	7809874	
Max daily overflow (L):	2516394	
Annual demand (L):	15208641	
Annual Usage Including losses (ML)	16	

Figure 8 – Site Water Balance Results Summary (2,000m³ Sediment Basin)

SEEC RATES IV Results

Site: Wollogorang Quarry
Rain station: Breadalbane (Old Post Office) 70097

Total years:	45.84	Avg annual rainfall (mm):	676.03
Total days:	16743	Max daily rainfall (mm):	136.4
Total no of days when rain fell:	4462	Longest dry spell (days):	388
Avg days per year when rain fell:	97.33856894	Days when rain > S1 initial loss:	2810
Avg wet day rainfall (mm):	6.95	Avg days/yr rain > S1 initial loss:	61.30017

Input statistics:	**Main Sediment Basin**	
Capacity (L):	12000000	
Startup % full:	0.1	
Catchment area (sqm):	59500	
Initial loss per day (mm):	2	
Runoff percentage:	35	
Apply use A on wet days (Y/N):	N	
Apply use B on wet days (Y/N):	N	
Revert to mains at threshold (Y/N):	N	
Mains reversion threshold (% full):	0	
Overflows into Storage 2 (Y/N):	N	
USAGE stats (L/day):	**Main Sediment Basin**	
Usage type:	**Dust Suppression**	**Evaporation**
January	34280	16128
February	34280	13312
March	34280	9984
April	34280	6400
May	34280	4096
June	34280	2816
July	34280	3072
August	34280	4864
September	34280	7168
October	34280	9984
November	34280	12800
December	34280	15360
Results:	**Main Sediment Basin**	
% of time demand met:	76	
% of demand supplied from mains:	0	
Main Sediment Basin Surface Area (m^2)	3200	
Longest time storage ran dry (days):	389	
Avg annual mains demand (L):	0	
Avg wet day overflow (L):	0	
Avg no of overflow events annually:	0	
Avg annual supply from rain in (L):	8816905	
Max daily overflow (L):	0	
Annual demand (L):	15208641	
Annual Usage Including losses (ML)	16	

Figure 9 - Site Water Balance Results Summary (12,000m³ Storage Volume)

3.6 Flooding

As noted in Section 2.6, flooding is not expected to be a significant issue for this site due to its position and topography. The watercourse with the largest catchment (Watercouse A – Catchment – CA_P1), located to the east of the site has a peak 100 Year ARI flow of 1.36m^3/s (**Table 6**). The predicted flow depth and width would vary along the watercourse based on slope, vegetation thickness and gully width. An initial check of flow depth within the gully indicates that it could reach 1.1m which would limit flow width to around 10m. A minimum cross-sectional area of 10.2m^2 (including freeboard) would be retained for Watercourse A beyond the proposed extraction area boundary to minimise the risk that these clean water flows are directed into the extraction area. Further protection can be provided by the installation of a vegetated bund (1m high) along the eastern side of the extraction area if required. As such, the proposed development is unlikely to cause or exacerbate flooding issues up or down stream.

4 RECOMMENDATIONS

4.1 Introduction

As identified in **Section 3**, there are potential impacts to soil and water as a result of the proposed extension of time for extractive activities at this site. The following section includes recommendations to manage or mitigate those impacts.

4.2 Location of Recommended Water Management Infrastructure

Figure 10 shows the locations for all recommended soil and water management structures.

4.3 Water Management Recommendations

Table 8 details the recommendations for soil and water management to be undertaken as part of normal operations at the quarry site, to manage or mitigate the potential impacts identified in **Section 3**.

Table 8 – Recommendations for Soil and Water Management

No.	Recommendation	Timing	Responsibility
1.	A Water Management Plan (WMP) will be prepared for the operational quarry. It is to incorporate the recommendations in this table.	Prior to extractive activities	Quarry manager
2.	The operational quarry will maintain the minimum capacity within the Main Sediment Basin in accordance with the 10-day 90th percentile design requirements. Refer to Section 4.4 for details of the Main Sediment Basin.	Ongoing	Quarry manager
3.	The water management structures shown on Figure 10 will be maintained or constructed as required.	Ongoing	Quarry manager
4.	Dust suppression using water will be undertaken as required to minimise the risk of dust rise.	Ongoing	Quarry manager
5.	Water for dust suppression and processing will be sourced from the main sediment basin.	Ongoing	Quarry manager
6.	Inspections will be carried out: • At least once per month during normal operations; • Prior to forecast rainfall of >50% chance of more than 50mm; and Following any rainfall of more than 50mm over any 5 day period.	As nominated.	Quarry manager

No.	Recommendation	Timing	Responsibility
7.	• Inspections will focus on the water management and erosion and sediment control infrastructure, and will be documented using the attached Inspection Sheet (Appendix A) or a suitable alternative Inspection Sheet.	Ongoing	Quarry manager
8.	Any actions requiring attention identified in a site inspection will be rectified within a reasonable timeframe.	Ongoing	Quarry manager
9.	Sediment tracking onto The Federal Highway will be visually checked daily. When sediment tracking becomes excessive or presents a safety risk to traffic, the road will be cleaned (e.g. with a sweeper truck) as soon as practicable.	Daily	Quarry manager
10.	The rumble grids at the site entrance will be checked monthly as part of the regular site inspections to ensure effective functioning.	Monthly	Quarry manager
11.	All fuels, oils and chemicals are not to be kept on site.	Ongoing	Quarry manager
12.	Environmental incidents where material harm to the environment is caused or threatened will be subject to an Emergency Response Plan.	Ongoing	Quarry manager
13.	Environmental performance will be monitored and the WMP will be reviewed, updated and amended in accordance with the schedule in Section 4.6 of this Soil and Water Assessment.	Refer to Section 4.6	Quarry manager
14.	Weather conditions and forecasts (including rainfall predictions) will be monitored daily to allow for adequate planning for significant rain events.	Daily	Quarry manager
15.	Quarrying and processing activities will be halted if the Quarry Manager determines the environment is at imminent risk of harm from activities continuing.	Ongoing	Quarry manager
16.	Daily rainfall records (in mm/day) will be collected and recorded onsite.	Daily	Quarry manager
17.	Vehicles, plant and equipment will be inspected daily for leaks of fuels or fluids.	Daily	Quarry manager

No.	Recommendation	Timing	Responsibility
18.	Environmental aspects will be included in the site induction process for new staff. This will include (although is not limited to): • Objectives of the Quarry Environmental management Plan (QEMP) and the WMP • Understanding of obligations under the NSW Protection of the Environment Operations Act (1997) not to cause pollution. • Incident reporting and management procedures (including spill response). • Details of water management and erosion and sediment control structures and procedures. • Specific requirements to minimise sediment/mud tracking onto roads Requirement to maintain environmental controls and repair damaged controls.	Ongoing	Quarry manager
19.	• The Main Sediment Basin will be de-silted as required to maintain effective capacity and function.	Ongoing	Quarry manager
20.	Drainage pathways (e.g. from the Processing Area to the Quarry Area) will be inspected for signs of scour.	Refer to Item 7 in this table	Quarry manager
21.	Active discharge of accumulated water on the site must meet the discharge criteria in Section 4.5.	Ongoing	Quarry manager
22.	Hazardous substances will be stored onsite in lockable containers, in their original receptacles.	Ongoing	Quarry manager
23.	All hazardous substances will be clearly labelled and will have Safety Data Sheets affixed or available nearby.	Ongoing	Quarry manager
24.	The use of any hazardous substance that could result in a spill will be undertaken away from water management infrastructure such as the Main Sediment Basin to minimise the risk of contaminating the stored water.	Ongoing	Quarry manager
25.	Any refueling undertaken on site shall be undertaken in designated areas only, well away from water management infrastructure such as the Main Sediment Basin to minimise the risk of contaminating the stored water.	Ongoing	Quarry manager
26.	Wherever possible, water detained onsite from surface flows will be re-used for dust control and other non-potable uses.	Ongoing	Quarry manager

4.4 Main Sediment Basin

The Main Sediment Basin is shown in **Figure 10**, and is to be constructed within the base of the quarry floor as required. As noted in **Figure 10**, the Main Sediment Basin requires a minimum capacity of 1,632 m^3 as calculated in **Section 3.5.1**. The Main Sediment Basin is

to be discharged periodically in accordance with the discharge water quality requirements outlined in **Section 4.5** and also cleaned of sediment periodically to ensure its capacity is maintained.

No spillway has been nominated for the Main Sediment Basin because:

- Treated water would be pumped to a downstream discharge point rather than overflow; and
- There is additional storage capacity within the Quarry Area beyond the nominated size of the Main Sediment Basin of up to 12,000m^3.

As such, the risk of it overtopping is very low if capacity is maintained within the basin prior to significant storm events.

4.5 Discharge Criteria

As noted in **Section 3.5**, the water management system is to maintain sufficient capacity within the Main Sediment Basin – i.e. all surface runoff is collected within the Main Sediment Basin in the Quarry Area and then re-used onsite for dust suppression purposes (with some losses via deep seepage and evaporation). Any remaining water would be treated and discharged into the receiving watercourse to maintain the basins holding capacity.

Discharges must meet the water quality requirements detailed in **Table 9**. These criteria are based on typical Blue Book (Landcom, 2004) requirements. Note that the main pollutant of concern in detained water is sediment. The chemistry of detained water is unlikely to differ significantly from natural streamflow in the nearby receiving environment.

Table 9 – Discharge water quality requirements (in the unlikely event of a site discharge).

Parameter	Recommended standard for site discharge
Total suspended solids (TSS)	50mg/L (assumed equivalent to 75 NTU)
pH	6.5 to 8.5
Oils and greases	None visible

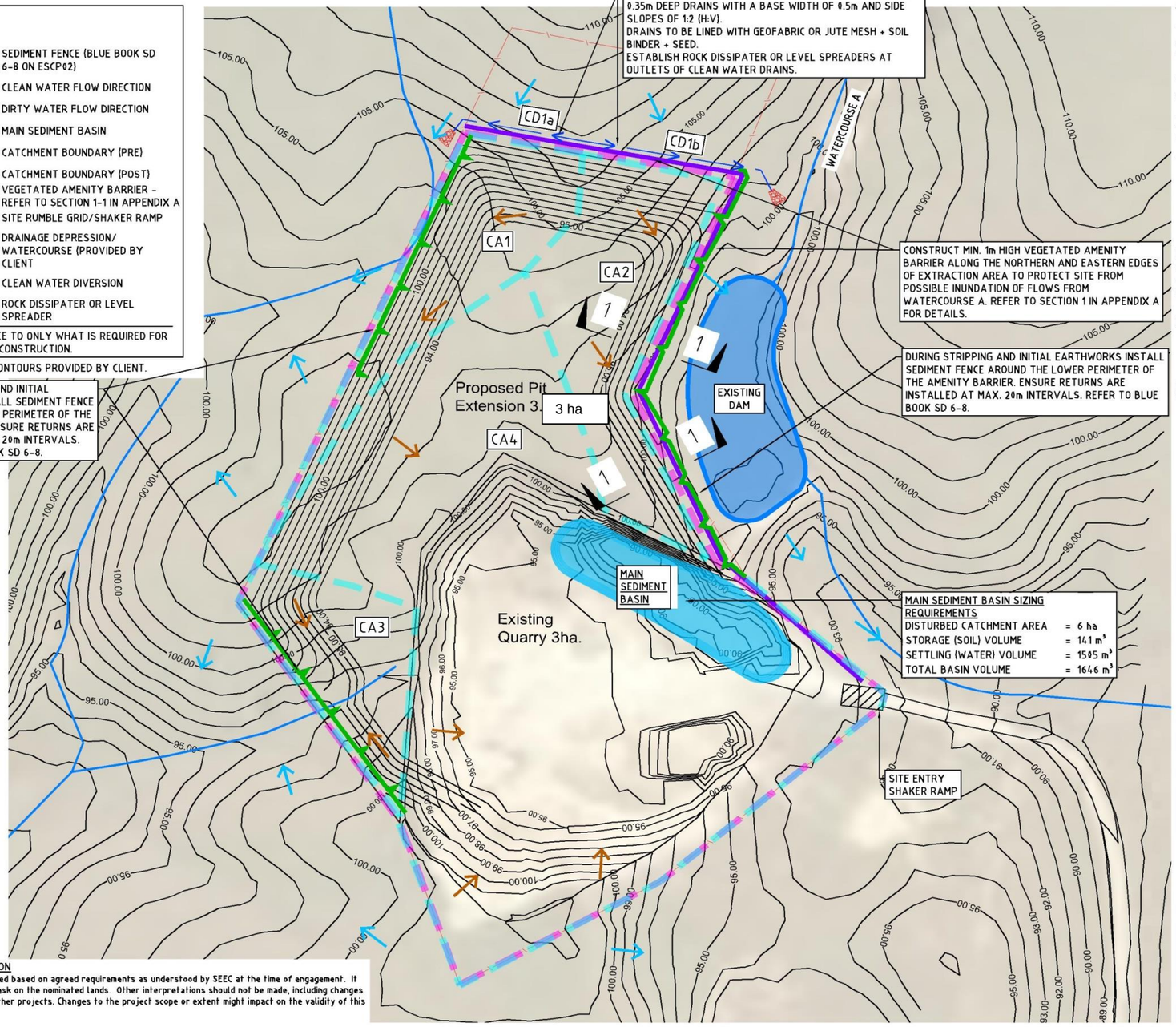
LEGEND:

- SEDIMENT FENCE (BLUE BOOK SD 6-8 ON ESCP02)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- MAIN SEDIMENT BASIN
- CATCHMENT BOUNDARY (PRE)
- CATCHMENT BOUNDARY (POST)
- VEGETATED AMENITY BARRIER - REFER TO SECTION 1-1 IN APPENDIX A
- SITE RUMBLE GRID/SHAKER RAMP
- DRAINAGE DEPRESSION/ WATERCOURSE (PROVIDED BY CLIENT
- CLEAN WATER DIVERSION
- ROCK DISSIPATER OR LEVEL SPREADER

MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

NOTE: UNDERLYING CONTOURS PROVIDED BY CLIENT.

DURING STRIPPING AND INITIAL EARTHWORKS INSTALL SEDIMENT FENCE AROUND THE LOWER PERIMETER OF THE CLEARING LIMITS. ENSURE RETURNS ARE INSTALLED AT MAX. 20m INTERVALS. REFER TO BLUE BOOK SD 6-8.



EROSION AND SEDIMENT CONTROL INSTRUCTIONS

This Erosion and Sediment Control Plan (ESCP) has been prepared in accordance with Blue Book Volume 1 (2004) and Volume 2E: Mines and Quarries (2008) and is to be read in conjunction with the SEEC report "Soil & Water Management Assessment".

This ESCP details the required erosion and sediment controls and maintenance measures necessary for works associated with the proposed extension of the friable granite quarry.

EROSION HAZARD ASSESSMENT

A = R x K x LS x P x C

The following have been used:

- R : 1,500 (R-factor Map from Blue Book)
- K : 0.05 (Conservative asbasintion)
- LS : ranges from 0.19 (80m, 1%) and 7.34 (40m, 33%)
- P : 1.3
- C : 1

Based on the above data, the potential soil loss for this site ranges from 16 to 280 t/ha/yr. Therefore, under Blue Book standards a sediment basin is required for the quarry area (CA4) as the disturbed catchment is 6 ha. However, sediment basins are not required for CA1 (0.58 ha), CA2 (0.87 ha) and CA3 (0.46 ha), with the potential soil loss for each catchment being <200 t/yr.

DESIGN ASSUMPTIONS

- Volumetric runoff coefficient (Cv) = 0.56 (assuming hydrological group D runoff coefficient - (low infiltration and high runoff)
- Sediment design rainfall depth: 10-day 90th percentile rainfall depth = 44.8 (Goulburn)

INSTRUCTIONS

The following erosion and sediment control measures are to be implemented/maintained:

- Install perimeter barrier fencing where practicable (or alternative measures) around the site and in any additional locations as required to restrict access and to minimise unnecessary disturbance.
- Install a stabilised site access/exit point in accordance with IECA Standard Drawing Exit-04 in Appendix A or use cattle grids wherever vehicles travel from unsealed areas onto sealed roads. Exact location TBC onsite.
- Install CD1a and b to divert upslope clean water around the quarry.
- Install an amenity barrier in the locations shown. Amenity barrier to be stabilised with a biodegradable soil polymer, hydromulch or vegetated.
- During stripping and initial earthworks install sediment fence around the lower perimeter of he clearing limits. Ensure returns are installed at max. 20m intervals. Refer to Blue Book Standard Drawing SD 6-8 on Appendix A.
- Construct/amend the main basin in accordance with the sizing requirements provided on this page.
- Management of dirty water is to be carried out as necessary and in accordance with the Quarry Management Plan (QMP) and must meet the following water quality criteria:
  - Total Suspended Solids (TSS) = 50 mg/L;
  - pH = 6.5 to 8.5; and
  - No visible oils and grease.
- The sediment basin is to be maintenance-cycled following rainfall. Within 10-days after rainfall of 5mm or more (i.e. sufficient rainfall to cause runoff):
  - De-water sediment basin following the project de-watering procedure inline with QMP;
  - Check the level of accumulated sediment in the sump. If it exceeds the level nominated in the QMP, de-silt the basin. Material removed from the basin must be taken to an active stockpile or spoil dump;
  - Not that is rainfall (sufficient to generate runoff) occurs within 10-days of the previous rainfall event, the 10-day maintenance requirement is reset.
  - After each rainfall event, inspect sediment basin to ensure spillway and inlet points are stable and free from scour. Repair as required.
- Stockpiles are to be managed in accordance with Blue Book Standard Drawing SD 4-1 in Appendix A.
- After rainfall, sediment accumulated in trapping devices (e.g. sediment basin, sediment fences) will be removed to a secure location where it can't wash or blow offsite (preferably to an active stockpile).
- Inspections of all erosion and sediment controls to be carried out regularly (weekly and before and after a rainfall event) and repairs/replacement of controls to be carried out as required.
- This ESCP will be updated as required.
- Weather conditions will be monitored onsite and daily rainfall will be recorded.
- Safe storage areas for wastes, fuels, excess concrete and other potential contaminants are to be delineated by the site manager and must be at least >50m from MHWS.
- Adequate supplies of erosion control measures (e.g. geofabric rolls, jute matting, hydraulic soil binders) are to be available for rapid deployment as required.
- Ensure all erosion and sediment control measures are located within the project boundary.

DOCUMENT CERTIFICATION

This plan has been developed based on agreed requirements as understood by SEEC at the time of engagement. It applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects. Changes to the project scope or extent might impact on the validity of this plan.

Any recommendations contained in this plan are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation, or as advised to us. Such recommendations are potentially subject to the limited scope and resources available.

0 10 20 30 40 50m
SCALE: 1:1000 (A1 SHEET)

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
02	05/04/22	L.O.	S.B.	J.A.	MINOR AMENDMENT
01	14/12/21	L.O.	L.O.	J.A.	MINOR AMENDMENT
00	26/07/21	L.O.	L.O.	A.M.	FINAL ISSUE
A	25/06/21	L.O.	L.O.	J.A.	DRAFT ISSUE

DRAWING STATUS: DESIGN BY L.O. | DRAWN BY L.O. | FINAL APPROVAL J.A. | SCALE: (on A1 Original) 1:1000 | FINAL

North

CLIENT: DIVALL'S EARTHMOVING BULK HAULAGE GOULBURN

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PROJECT TITLE: PROPOSED EXTENSION OF FRIABLE GRANITE QUARRY LOT 5 DP 255133 FEDERAL HWY WOLLOGORANG, NSW

DRAWING TITLE: SOIL AND WATER MANAGEMENT PLAN

PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
20000165	P01	ESCP01	02

Plot Date: Tuesday, April 5, 2022 4:28:16 PM CAD File Name: Q:\20000165 Federal Highway. Wollogorang\Drawings\20000165_P01_SWMP REV 02.dwg

Figure 10 – Location of recommended water management and erosion and sediment control structures

4.6 Performance Tracking and Document Review

4.6.1 Reporting

Reporting is required as part of the QEMP. Refer to that document for relevant requirements.

It is recommended that inspection of water management and erosion and sediment control structures be included in the WMP, as noted in **Table 8** in **Section 4.3**.

4.6.2 Record Keeping

It is recommended that the WMP require the Quarry Manager to maintain onsite all documents and records relevant to the implementation of the WMP.

Environmental records relevant to the WMP might include, but are not limited to:

- All monitoring and inspection reports / records;
- Reports on environmental incidents, complaints and follow-up actions;
- Minutes of the relevant meetings and any resulting actions; and
- Results of internal and external audits.

All records should be:

- In a legible form, or in a form that can readily be reduced to a legible form;
- Kept for at least 3 years after the monitoring or event to which they relate took place; and
- Produced in a legible form to any authorised officer of Council or NSW EPA who asks to see them.

4.6.3 Non-Conformance, Corrective and Preventative Actions

It is recommended that environmental inspection, observation and monitoring results be interpreted to identify actual and potential non-conformances with the WMP and events that may result in nuisance, environmental harm, unacceptable loss of amenity or community complaints.

The WMP should include details of how all incidents (and their corresponding actions) will be recorded by the Quarry Manager and then closed out.

4.6.4 Document Review

Continual improvement is achieved through constant measurement and evaluation, audit and review of the effectiveness of a plan, and adjustment and improvement of the QEMP and relevant sub-plans.

As such, it is recommended that the WMP be updated as required:

- To take into account changes to the environment or generally accepted environmental management practices, new risks to the environment, any hazardous substances, contamination or changes in law;
- Where required by Council, NSW EPA or any other regulatory authority; or
- In response to internal or external audits or regular management reviews.

The updated plan should be endorsed and approved internally by the Quarry Manager, except where changes are minor in nature. Minor changes would typically include those that:

- Are editorial in nature (e.g. staff or name changes);
- Do not increase the magnitude of impacts on the environment when considered individually or cumulatively;
- Do not compromise the ability of Divalls Earthmoving & Bulk Haulage to meet approval or legislative requirements.

Preparation of sub-plans or procedures as part of the WMP typically would not warrant updating the WMP unless one of the above update triggers occurs as part of preparing the sub-plan or procedure.

5 REFERENCES

Hird, C. (1990). *Soil Landscapes of the Goulburn 1:250 000 Mapsheet.* Soil Conservation Service of NSW, Sydney.

CRCCH (2004). Stormwater Flow and Quality, and the Effectiveness of Non-proprietary Stormwater Treatment Measures – A Review and Gap Analysis – *Technical Report 04/8.* Cooperative Research Centre for Catchment Hydrology.

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IECA (2008). *Best Practice Erosion and Sediment Control.* IECA Australasia, Picton NSW.

Landcom (2004). *Managing Urban Stormwater: Soils and Construction.* Volume 1. NSW Government, Sydney.

Landcom (2004). *Managing Urban Stormwater: Soils and Construction.* Volume 2E Mine and Quarries. NSW Government, Sydney

OEH NSW Government eSpade web portal. www.espade.environment.nsw.gov.au

6 APPENDICES

6.1 Appendix A: Typical Details for Water Management Structures

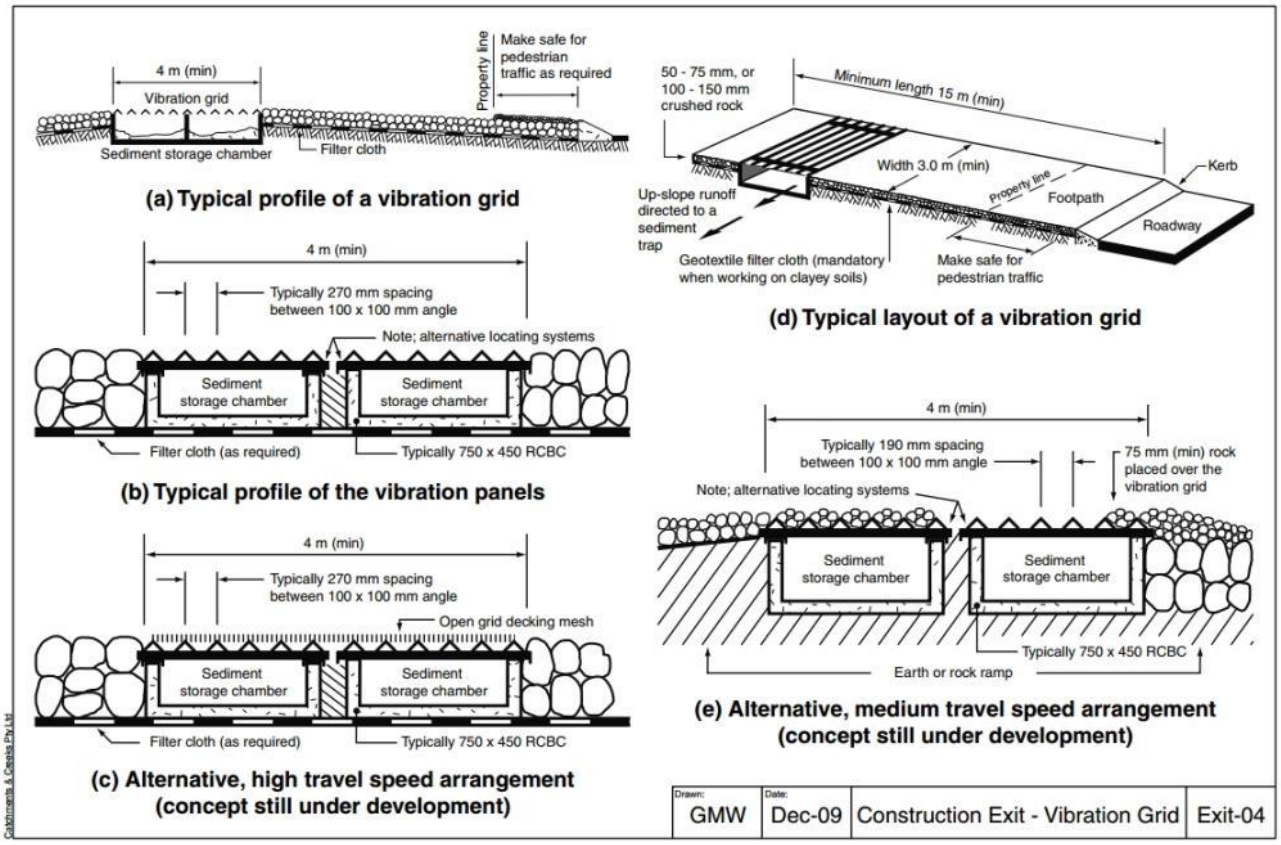
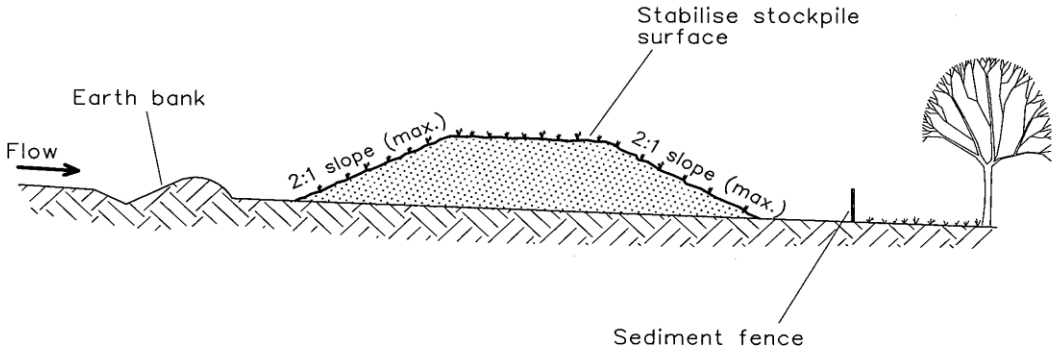


Figure 11 – Rumble grid details (by Catchments and Creeks Pty Ltd, reproduced from IECA, 2008).

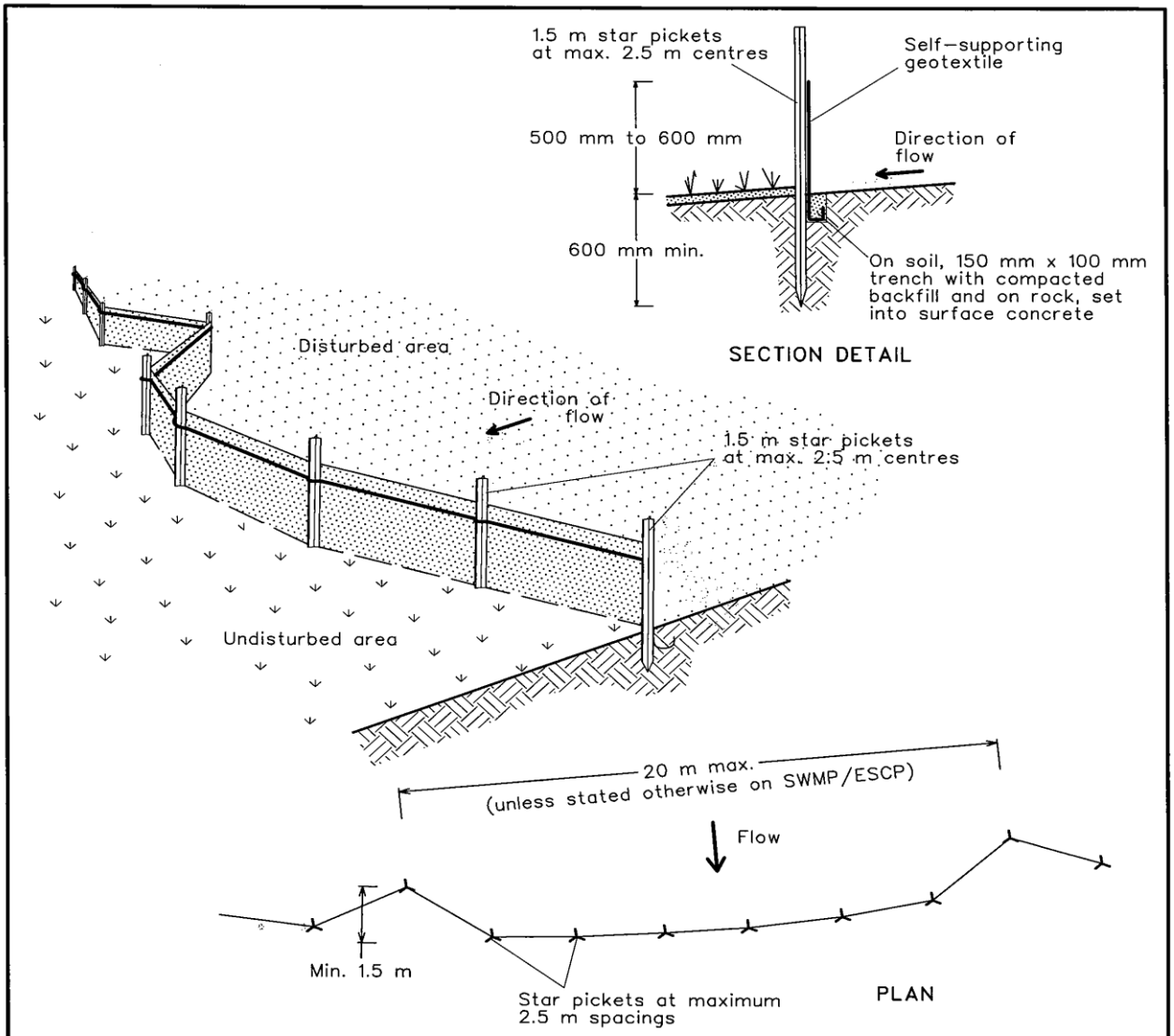


Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

STOCKPILES **SD 4-1**

Figure 12 – Stockpile Treatment Standard Drawing (Blue Book – 2004)



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE **SD 6-8**

Figure 13 – Sediment Fence Installation Standard Drawing (Blue Book – 2004)

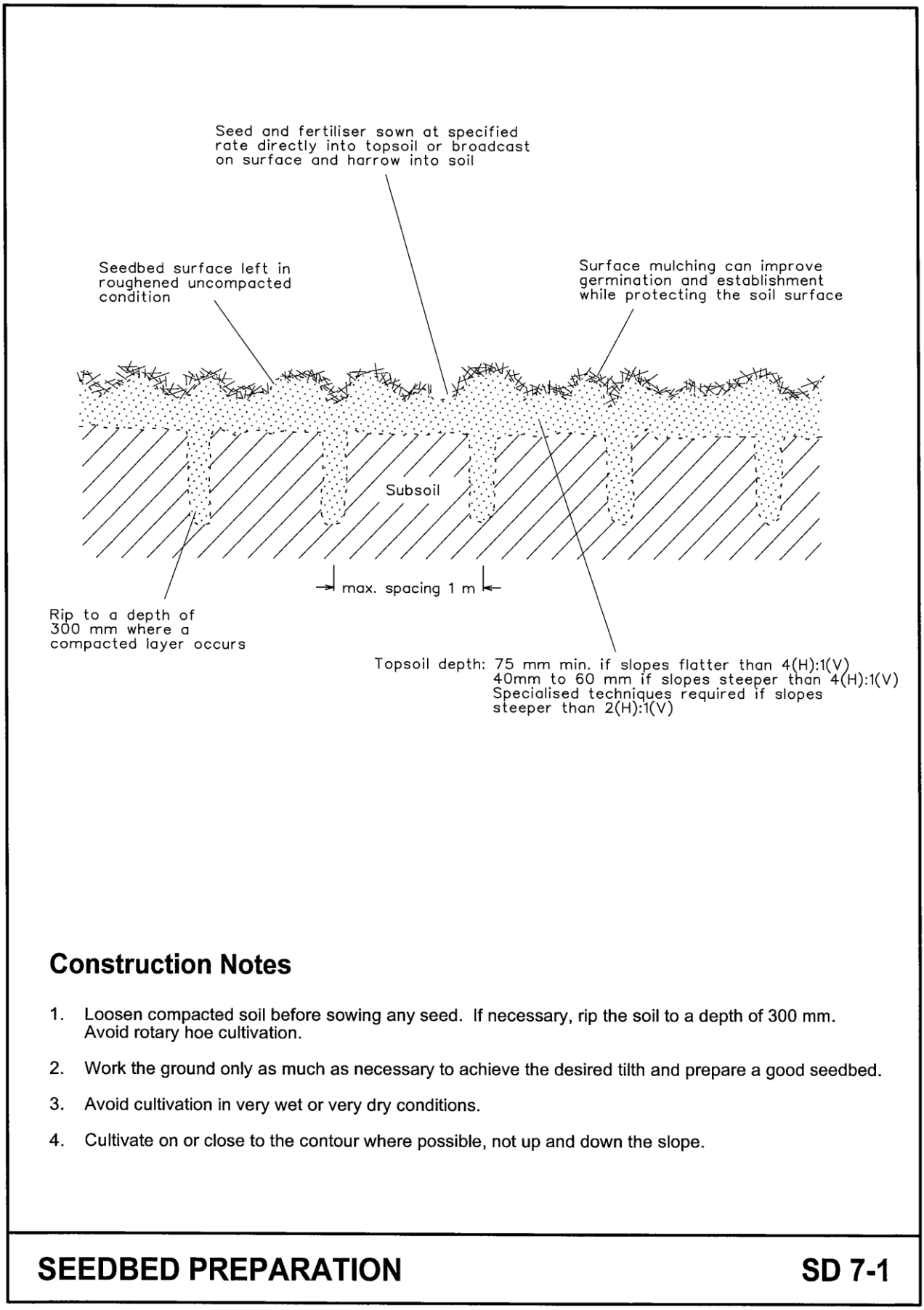


Figure 14 – Seedbed Preparation Standard Drawing (Blue Book – 2004)

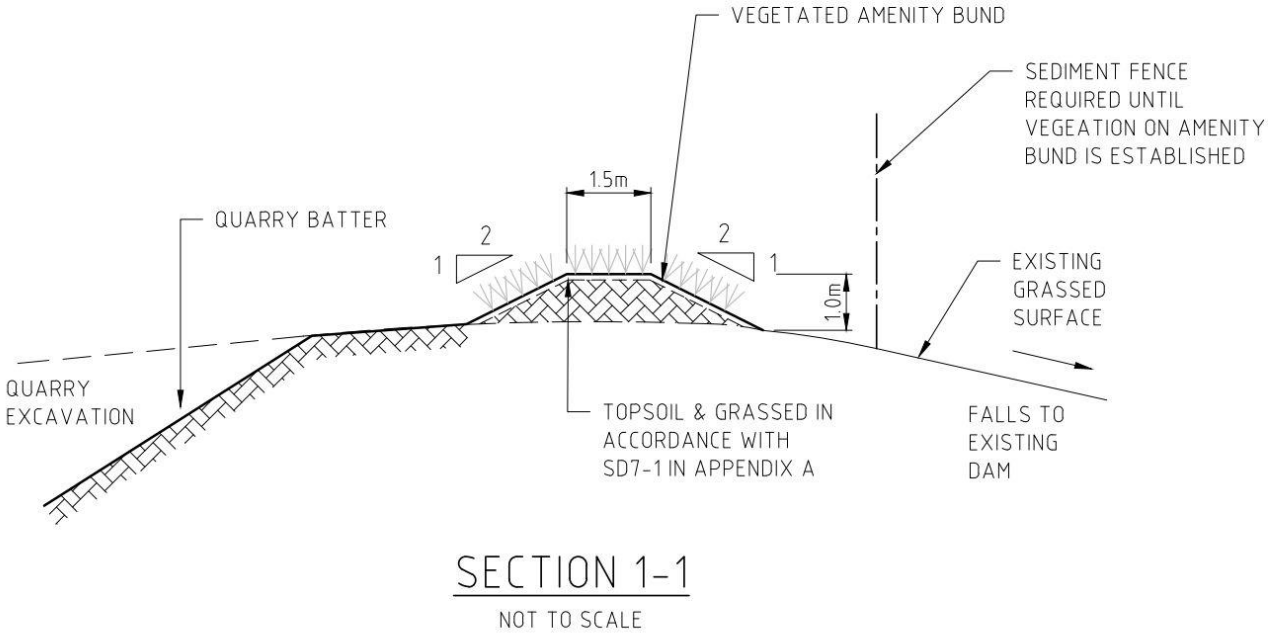


Figure 15 - Typical Section through the Vegetated Amenity Bund

6.2 Appendix B: Example Inspection Checklist

See overpage for an example inspection checklist. Refer to **Table 8** in **Section 4.3** for details of when this checklist should be completed, and for details of record-keeping associated with this checklist.

Divalls Earthmoving & Bulk Haulage – Wollogorang Quarry. Water management and erosion and sediment control inspection checklist					
Date:		Completed by (name):			
Reason for this inspection:		☐ Monthly inspection ☐ Forecast shows >50% chance of more than 50mm ☐ More than 50mm of rain received over the past 5 days			
Rainfall forecast for next 5 days at the time of inspection:	Day 1	Day 2	Day 3	Day 4	Day 5
Were all actions from previous list closed out?	☐ Yes ☐ No	If no, provide details:			

No.	Check	Record	Action required	To be fixed by (initials)
1.	Quarry Area northern bund intact and no off-site water can leak into the extraction area	☐ OK ☐ Not OK		
2.	Quarry Area eastern bund is well vegetated and shows little or no signs of erosion.	☐ OK ☐ Not OK		
3.	All runoff from the Quarry Area is directed into the Main Sediment Basin.	☐ OK ☐ Not OK		
4.	Main Sediment Basin in the Quarry Area has adequate capacity to contain the next rainfall event.	☐ OK ☐ Not OK		
5.	Any discharges of water offsite were checked to ensure the water quality requirements in the WMP were met.	☐ OK ☐ Not OK ☐ N/A		
6.	Drainage pathway from the Processing Area down to the Quarry Area is clearly defined, has adequate capacity and is not scoured.	☐ OK ☐ Not OK ☐ N/A		
7.	Bunds and filters around the Storage Area and Distribution Point are intact and not damaged or blocked with sediment.	☐ OK ☐ Not OK ☐ N/A		
8.	The Federal Highway has little or no sediment tracked onto it from the site.	☐ OK ☐ Not OK		

No.	Check	Record	Action required	To be fixed by (initials)
9.	Rumble grid is intact and functional and isn't clogged with sediment.	☐ OK ☐ Not OK ☐ N/A		
10.	Dust suppression has been proactively undertaken since the previous inspection.	☐ OK ☐ Not OK ☐ N/A		
11.	Any fuel or chemical storage areas are clearly marked and fully bunded with adequate capacity for the volumes stored.	☐ OK ☐ Not OK ☐ N/A		
12.	Any spills of fuels, oils, fluids or other potential contaminants have been cleaned up.	☐ OK ☐ Not OK ☐ N/A		
13.	Spill kit(s) are available onsite and are adequately stocked.	☐ OK ☐ Not OK ☐ N/A		
14.	Other (nominate other water management structure(s)):	☐ OK ☐ Not OK ☐ N/A		
Additional notes:				