BarkerRyanStewart

PLANNING
PROJECT MANAGEMENT
ENGINEERING
CERTIFICATION

Premier Mushrooms

Stormwater Management Report

182 Boundary Road, Glossodia

Our Ref: SY150051
December 2015

barkerryanstewart.com.au

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1 Introduction

This report has been prepared to document the stormwater management options for the proposed mushroom farm extension at 182 Boundary Road, Glossodia. Barker Ryan Stewart has been engaged to investigate the management of stormwater on the site and determine options for its detention, re-use and solids removal.

In determining stormwater management options for the site, this report will consider the following:

1. The pre-development site conditions;
2. The extent and nature of the site catchment area;
3. The storage requirements for detention and re-use purposes; and
4. The configuration of the site stormwater drainage system.

2 Existing Site

2.1 Site Location

The site of the proposed mushroom farm extension is described as 172 and182 Boundary Road, Glossodia (Lot 1, DP603811 and Lot 2, DP603811) and is located within the Hawkesbury City Council local government area. The site adjoins the boundary road reserve. The site area is approximately 20.34 hectares and the locality is shown in Figure 1 below.

Figure 1 Site Location

2.2 Existing Site Conditions

The site currently has a mushroom growing facility consisting of 12 growing rooms. The extension proposes the construction of new buildings, roads, associated landscaping and drainage works to expand the production of the existing facility.

The site has a general slope of 10%, located on the crest of a small hill with the southern side of the existing and proposed buildings falling to the south and a portion in the eastern side of the site falling towards the north-west.

The existing facility is located on Lot 1 DP603811 which contains an existing mushroom production facility and associated ancillary buildings and parking areas with its entry and exit driveways fronting Boundary road. The proposed extension will be located on Lot 2 DP603811 which contains two dwelling houses and a single driveway access with areas of vegetation and is predominantly cleared. The rear of both sites adjoins Howes Creek.

An aerial photo of the site is contained within Figure 1.

3 Proposed Development

3.1 General

The proposed development consists of increasing the number of growing rooms, sealed and formalised car parking areas, formalised accesses and a new lunch room facility for staff. The farm currently includes growing rooms, peat and compost storage facilities, workshops and sheds, car parking and driveway areas. The configuration of the proposed development is shown on the plan detailed in Appendix A.

3.2 Stormwater Management

3.2.1 General

It is proposed to implement an extensive stormwater management system on the site to manage both, the stormwater runoff from rainfall events and runoff from wash-down, cleaning and maintenance activities. This system will enable the storage of both types of runoff and the re-use of water within the farm, thereby resulting in water quality benefits for site runoff as well as significant cost savings in the operation of the farm and an environmental benefit from the reduction in water consumption. The stormwater runoff will be collected and stored in a proposed 7 megalitre dam, the roof water runoff will be collected and stored in a separate proposed 3 megalitre dam for supply to the cooling towers and boilers, whilst the wash-down water from maintenance and cleaning activities will be treated in a treatment system comprising of a settling area, solids removal system and a wetland before being discharged into the 7 megalitre storage dam. Section 4 of the report describes the water balance proposed for the site while section 5 indicates how the peak stormwater discharge shall be addressed during periods of heavy rainfall and section 6 shows how the site will manage to control the discharge of pollutants originating from the development of the site.

3.2.2 Stormwater Management System

The stormwater management system will consist of three different drainage systems separating polluted flows from wash down activities and runoff from rainfall events.

Stormwater runoff from roof will be collected through a conventional pit and pipe system. This water will be directed to the proposed 3 megalitre dam, utilised as a reservoir for water storage where it will be stored for re-use for mushroom irrigation, wash down purposes and cooling towers and boilers. Details of water balance calculations can be found in Section 4. The dam would also act as detention storage in extreme rainfall events, reducing peak runoff discharges from the impervious areas of the farm back to pre-developed flow rates. Details of estimated peak discharges for pre-developed and post-developed discharges can be found in Section 5.

The second pipe drainage system will collect the runoff from the washout of the growing rooms and adjacent areas. The wash down water will be conveyed by a separate pipe system to the existing filter unit which goes through an existing sediment trap, settling pond and filtration bed.

The third pipe drainage system will collect stormwater runoff from landscaped and driveway areas to be stored in a 7 megalitre dam for outdoor wash down purposes.

3.2.3 Catchments

The proposed buildings are located in an area where there are two significant discharges, to the south east, and south. Refer to survey plan for site contours. The proposed development will comprise of roofed areas, paved areas, settling pond, filtration bed areas and landscaped areas that will discharge to two separate storage dams for reuse. Overflows from the dam and on site detention facility will discharge to the north via the main discharge point of the site and be less than the existing corresponding flows. The new roof areas will be collecting and directing more flows back to the 3 megalitre dam to reduce bypass.

4 Water Balance Calculations

4.1 General

Water balance calculations have been undertaken for the proposed stormwater management system to estimate recycled and mains water usage for the development and determine site discharge volumes under normal operation conditions.

The calculations use daily rainfall figures from some 130 years of records to estimate the average performance of the proposed system, evaporation, water drawn and used by the facility, stormwater capture and stormwater overflow (lost from the system) during periods of heavy rainfall.

4.2 Flow Routing Method

Equation 4.1 shows the Water cycle for the proposed development. A flow routing model was generated to estimate inflow and outflow volumes by using the water balance for each time step of data. (See Equation 4.1).

$$\frac{\Delta S}{\Delta t} = I - O$$

Equation 4.1

Where, S is the storage over time (t), I is the net inflow generated from the rain and reuse, and O is the outflow from the site. The computations were completed using Excel and were conducted on daily rainfall information using daily time steps.

4.3 Rain Gauge Data

Daily rainfall records showing the amount of rain each day in millimetres, was obtained from the Bureau of Meteorology, Site Number 67021, RICHMOND - UWS HAWKESBURY, Elevation: 20 m. Suitable daily rainfall data from this station was extracted using records from between 1881 to 2010. A period of data was selected based on quality control flags on the data and a continuous record set with limited data gaps. The period selected is summarised in Table 1.

Summary of Data		
Start Date	1/01/1881	
End Date	1/3/2010	
Total Days Recorded	45682	days
Period	47126	days
Number of Gaps in Records	169	
Number of Gap Days in Records	1648	
Average Daily Rainfall	2.218	mm
Maximum Rainfall event	309.4	mm
Number of Days >1.5mm Rainfall	8332	days
Average Number of Days between events >1.5mm Rainfall	5.48	days

Table 1 Summary of Extracted Rainfall Data Records

4.4 Evaporation

Monthly statistics on mean daily evaporation records showing the mean amount of evaporation each day in millimetres was obtained from the Bureau of Meteorology, Site Number 67021, RICHMOND - UWS HAWKESBURY, Elevation: 20 m. A correction factor of 0.75 was used to adjust evaporation rates from the Class A Evaporation pan to dam surface. Mean monthly evaporation statistics are shown Table 2 below.

Month	Mean Daily Evaporation (mm)	Adjusted Daily Evaporation (mm)
January	6	4.50
February	5	3.75
March	4.1	3.08
April	3.2	2.40
May	2.2	1.65
June	1.8	1.35
July	1.9	1.43
August	2.7	2.03
September	3.8	2.85
October	4.8	3.60
November	5.1	3.83
December	5.9	4.43

Table 2 Mean Daily Evaporation (mm)

4.5 Water Demands

The following data was used as demand inputs in the calculations:

Water Demand	Rate	Source
Mushroom irrigation	12.92kl/day	Town water
Growing Room and External Wash down	157.26kl/day	7 megalitre storage dam, then bore water
Cooling towers and boilers	103.05kl/day	3 megalitre dam, then town water.

This demand data was provided by the client, who obtained it from their experience from within their other operating facilities, which currently operate in the same manner as planned for this site. These are maximum expected demands taken from a fully developed and operating plant running at full production. Water demands will be less during the earlier stages of the development.

The following assumptions were made in the calculations:

- The growing rooms demand 12.92m^3/day for irrigation and 157.26m^3/day for wash down.
- Growing room irrigation and wash down will be provided by town water, whilst external wash down will be provided by the 7 megalitre dam water.
- The cooling towers and boilers will be provided by the 3 megalitre roof dam water.
- Losses from rainfall runoff were estimated at 1mm for roof areas, 1mm for pavement areas and 5mm for Landscape areas.

- Losses from external wash down were calculated at 1mm per square metre based on 25% of the process area being washed down each day. Given the average recurrence of significant rainfall fall events is around once every 6 days, which equates to no washing down of the said areas one day in every six.
- Losses during external wash down are estimated at 5%.
- Overflow from Water Recycling Ponds Treatment area tanks will be directed to the dam.
- All irrigation water will be lost to production and transported off site in soil or mushroom produce.
- No infiltration losses to the groundwater from the dam.
- No outdoor wash down losses during wet days.

4.6 Results

4.6.1 General

A nominal site storage capacity within the dam of 7,000m^3 has been adopted. This volume will capture 100% of runoff to ensure no overflow to the creek system. This storage volume will come from the proposed dam as shown in Appendix A, which contains the design plans of the proposed dam.

Using the water balance model, the total annual runoff from the site entering into the dam and Water Recycling treatment areas is estimated to average 43,519m^3/year with an average overflow from the dam (and so storm water needing to be removed from the dam) estimated at 1760m^3/year. This will be done by irrigating. The dam water will be used for washing down external hardstand areas. Both the internal and external wash down areas would drain into the Water Recycling Pond and wetland system and be treated. The water that will be drawn from the dam is estimated at 57,401m^3/year. Mains and bore water will always be used as wash down water for the growing rooms for health reasons. A summary of the results, using the daily routing methods of analysis are detailed in Table 3.

Rain water inflow system from site (m^3/year)	Irrigation rate from dam to pasture (m^3/year)	Evaporation from dam and site (m^3/year)	Annual demand by facility (m^3/year)	Dam water used each year (m^3/year)	Mains Demand needed (m^3/year)	Bore Demand needed
28506	1760	1,606	100,755	57,401	23,725	19,629

Table 3 Average Annual Water Balance Figures

The external mains demand and bore demand of 43324m^3/year (119 m^3/day) comprises the base average daily demand for Irrigation and Growing Room wash down contributing an annual volume of 1043m^3/year (2.9 m^3/day). The reduction in mains water demand due to the dam is 53,393m^3/year (160m^3/day)

4.6.2 Roof Dam Water Usage

During this period it is estimated that the roof dam will overflow on average 4.5 days/year and will be empty 1% of its life. A summary of the results are detailed in Table 5. It shows that the dam would be able to supply some of the water used by the cooling towers. The average reduction of mains potable water per year would be 14,899 cubic metres.

Dam Storage 3ML	
Average Runoff into Dam (m3/day)	15012
Days Dam is Empty	17,896
Days Dam is Full over period of run (average days/year) (Percentage)	568 4.5 1%

Table 4 Roof Dam Storage

4.6.3 Dam Water Usage

During this period it is estimated that the dam will exceed its operating capacity on average 3 days/year and will be empty 0.82 % of its life. A summary of the results are detailed in Table 5. It shows that the dam would be able to supply all of the water used in the external wash down and supplement water used by the cooling towers. The average reduction of mains potable water per year would be 53,4 cubic metres.

Dam Storage 7ML	
Average Runoff into Dam (m3/day)	28,506
Days Dam is Empty	10,786
Days Dam is Full over period of run (average days/year) (Percentage)	376 3 0.82%
Average Mains Reduction (m3/year)	53,393

Table 5 Summary Dam Usage

4.6.4 Irrigation and Salt Content

The salt level in the dams will need to be monitored on an ongoing basis due to the possibility of salt build up resulting from the use of bore water and site activities. Left unchecked the salt build up would result in unacceptable concentrations of saline water within the washdown reuse dam. In order to reduce the salt concentration it is proposed to irrigate the water over the existing pasture located to the east of the two dams in the area as shown below. Irrigating this water will also be required to ensure that the water level within the 7 megalitre dam is maintained at or below its maximum operating level as detailed in section 5 of the report.

The findings as documented in section 4.6.3 show that on average 3 days a year the dam will need to have its storage volume reduced to maintain the maximum operating level. The annual average volume that will need to be irrigated to achieve this is 1760 cubic metres per year. The area of irrigation is shown in Figure 2 below and is estimated to be in excess of 2.5Ha. This equates to irrigating 70mm of water of the area on an annual basis.

Further to this additional water will need to be taken out of the dam during times when the salt concertation starts to become high. Monitoring of the salt levels will need to be undertaken regularly with water drawn from the dam and irrigated to lower the salt content within the dam. During these times it will be necessary to supplement the dam water with waters of lower salt concentration such as wash down water that was sourced from the mains supply, the bore or from roof runoff.

Figure 2 Irrigation area

Acceptable salinity levels for pasture is to be within the range of 1300-2200µs/cm (Primary Industries Agriculture, 2001). Salt concentrations must be monitored within the dam to ensure that it does not exceed this range. Variation in these salt levels will be a result of the amount of bore water used in the operation and the amount of rainfall over any given year. For wet periods salt concentrations will decrease significantly and for dry periods salt concentrations will increase.

5 Stormwater Design

This section addresses the stormwater management design for the proposed development. A hydraulic analysis to determine peak runoff during all storms up to and including the 1 in 100 year Average Recurrence Interval (ARI) event was conducted to ensure water flows on the site are managed. This section of the report firstly highlights the site parameters used to model the site, relating the different catchment characteristics and initial parameters adopted. The general system layout is then discussed outlining the stormwater management strategy for the site and design methodology for estimates of peak flow rates used in sizing stormwater structures.

5.1 Design Methodology

Roof areas would direct rainfall via conventional gutter and downpipe system to pits located in the driveway area. Roof water drainage grades would be a minimum 1% and a minimum size of 150mm diameter. All pits would be grated surface inlet pits allowing surface runoff to be captured. Overland flow paths convey water to either the driveway drainage system or directly into the dam for events greater than the 1 in 20 year ARI.

All storm water and roof drainage has been designed in accordance with AS 3500.3.2 1998 and council engineering guidelines. Pipe materials would be uPVC for pipe sizes up to 300mm diameter and class 3 reinforced concrete pipes for larger sizes.

The configuration of the 7 megalitre dam has been sized to accommodate water storage to satisfy reuse requirements up to the maximum operating level and a 3 megalitre storage buffer on the top of this to allow for Stormwater runoff generated from a 1 in 100 year ARI 24 hour design storm event. This will prevent any opportunity for dirty waters to overflow from the dam and discharge directly into Howes Creek by providing the opportunity to irrigate these waters over the nominated irrigation area.

5.2 Pipe Capacity and Sizing

The pipe network has been sized to cater for peak flow estimates for the 1:20 year ARI event without surcharge of pits within the network in accordance with AS3500. The peak flow estimates and projection of hydraulic grade lines through the pipe system was obtained, by using the software DRAINS. Stormwater originating from storm events greater than the 20 year ARI event will be conveyed by overland flow paths in the same general direction as the piped drainage system.

5.3 Detention Storage

Detention storage requirements have been catered for in the roof dam to attenuate flows up to the 100 year ARI storm event, with a combination of controls restricting the discharge. The outlet structure is a combination of a weir and an orifice plate controlling the discharge to that of pre-developed peak flow rates. The onsite detention storage is located above the permanent storage volume within the dam with the invert of the low flow outlet positioned at the maximum permanent storage level. All designed detention discharge structures have been designed with capacity to carry the peak flow estimates as outlined in AR&R87.

In accordance with Hawkesbury City Council guidelines, the proposed development has provided on-site detention to restrict peak post-development site discharges to peak pre-development levels. The basin has been designed to temporarily detain the runoff produced from the post development site and discharged at a controlled rate through the outlet structures. A spillway was designed to adequately convey the estimated 100 year ARI flow rate without overtopping of the basin embankment. The initial volume of the dam within the DRAINS model was set to full storage level assuming that the dam was full at the start of the rainfall event, even though there is significant water demand from the dam, meaning that it is unlikely to be full at the start of an extreme event.

5.4 Drains Modelling

5.4.1 Site Parameters

The area contributing to the catchment of the stormwater management system is essentially the area of the proposed buildings and surrounding apron and driveway areas. The catchment area draining to the basin totals 2.25ha. Estimates of pre-developed runoff from the site were calculated with the DRAINS model.

5.4.2 Rainfall and Peak Runoff estimates

The average rainfall intensity for different duration and ARI storms was generated within DRAINS by specifying statistical data sourced from the Bureau of Meteorology. This data is gathered from rain gauge data as outlined in AR&R 1987 Volume 2, IFD data used to generate the intensities. The temporal zone rainfall hydrographs were generated for all durations from 5 min up to 3hrs for the 100, 20, and 5 year ARI events.

Pit loss coefficients for full pipe flow were revised for the system based on HARE 1981. The pipes were sized to convey the 1 in 20 year ARI storm event, without surcharge within the system. Pit inlet capacities have been calculated in accordance with Council requirements.

5.5 Results

The detention basin has been designed to temporarily detain the runoff produced from post development flow and discharge it at a controlled rate through an outlet structure. The aim of the offline basin is to ensure stormwater discharges from the site are restricted to clean water originating from the roof and not stored waters from the wash down waters stored in the dam.

Table 5-5 shows that the peak discharge through the low flow outlet is effectively mitigated by an orifice plate to a flow rate equal to less than the predevelopment peak discharge for the 100, 50, 20, 5 and 1 year ARI events. The corresponding Top Water Level (TWL) in the basin during the maximum discharge storm event is at RL 24.57m. This level allows for over 300mm of freeboard to the top of bank level.

ARI event	Pre developed Q (m^3/s)	Post Developed Q (m^3/s)	Basin Water Level (m)
1	0.072	0.061	24.3
5	0.392	0.127	24.41
20	0.552	0.192	24.45
50	0.626	0.231	24.53
100	0.716	0.275	24.57

Table 6 Peak Runoff and Discharge Results

6 Stormwater Quality

This section of the report describes the control measures and management of water quality that will be implemented on site. It identifies sources of pollution and how they will be treated to minimise the risk of pollution discharging from the site.

Mushroom Farms are designed with hardstand areas and utilise rich organic material used in the growing process. This has the potential to impact on the downstream waterways. For this reason the stormwater runoff flows and wash down waters within the site are to be separated and treated separately. The wash down water is to be directed to the Water Recycling System which comprises of sediment pond, solids separator, settling pond, wetland and a grass filter area before entering the dam.

It is expected that the vast majority of pollution not only from the growing rooms but also from the hardstand areas immediately around the growing rooms will be captured by wash down waters and directed to the treatment system and used in the plant.

Given that around 90% of daily rainfall events would be captured by the dam and Water Recycling Pond treatment areas and therefore ultimately used by the facility, it is anticipated that the majority of pollution generated from hardstand areas and the building roofs will be taken out of the system by settlement within the dam due to its storage component.

7 Conclusions

This report documents the stormwater management proposal for the proposed mushroom farm expansion at 182 Boundary Road, Glossodia. The design includes the following components:

- A dual-pipe drainage system to collect both wash down water and roof stormwater runoff;
- Three separate pipes systems one to collect roof water to the 3 megalitre dam, the second one to collect runoff from the washout of the growing rooms and the final pipe system collects stormwater runoff from landscaped and driveway areas to be stored in a 7 megalitre dam for outdoor wash down purposes.
- Two proposed dams to provide storage for water reuse and therefore reduction in mains water usage;
- Water treatment system designed to reduce the organic loading of the wash down waters from the plant: and
- On site detention system positioned separate to the dam to ensure the clean roof stormwater runoff and the washdown water do not mix prior to the clean water leaving the site.

The calculations and investigations undertaken in the preparation of this report, have found that the above components will operate satisfactorily with the following capacities:

- The construction of a dam with a maximum storage capacity of approximately 7 megalitres;
- The construction of a dam with a maximum storage capacity of approximately 3 megalitres;
- The dam capacity will be sufficient to provide the site with 40% of its water usage;
- The detention storage requirement to reduce developed flows back to pre-developed flows;
- Provide adequate water quality controls for the site to ensure that stormwater leaving the site will conform to at least the minimum water quality requirements as stipulated by the relevant government organisations.

It is expected that if the above system is implemented as part of the development and satisfactorily operated and maintained, then the stormwater management of the site will meet water quality and quantity requirements.

8 References

Hawkesbury Council, *"Development Control Plan Appendix E", 2012*. Website: https://www.hawkesbury.nsw.gov.au/development/development-information/development-control-plan/toc/

Hare C.M. (1981) "Energy Losses in Pipe Systems", Advances in Urban Drainage Design, Insearch Ltd, NSW Institute of Technology

NSW Department of Primary Industries, 'Using saline water for irrigation", 2011. Website: http://www.dpi.nsw.gov.au/agriculture/resources/soils/salinity/crops/saline-irrigation

Appendix A Concept Design Plans

A1

PROJECT NUMBER: SY15051 - REVISION C

HAWKESBURY CITY COUNCIL
PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA
CONCEPT DESIGN PLANS

Prepared for: Premier Mushrooms

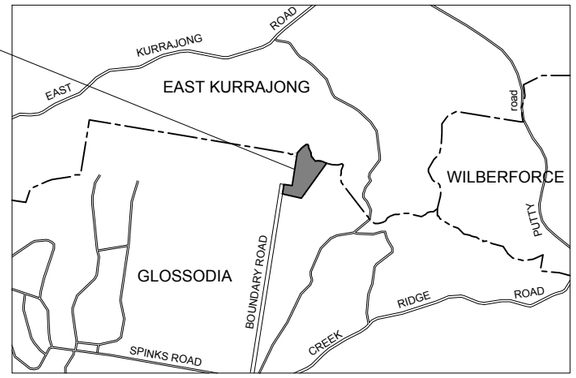
GENERAL NOTES

1. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH HAWKESBURY CITY COUNCIL'S WORKS SPECIFICATION CIVIL - 2005 REQUIREMENTS AND/OR AS DIRECTED BY THEIR REPRESENTATIVE.
2. THE CONTRACTOR IS TO IDENTIFY, LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION WORKS AND WHERE NECESSARY MAKE ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST WHERE NECESSARY.
3. COUNCIL'S TREE PRESERVATION ORDER MUST BE OBSERVED AND NO TREE SHALL BE FELLED, LOPPED OR REMOVED WITHOUT THE PRIOR APPROVAL OF COUNCIL.
4. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE WORK HEALTH & SAFETY ACT 2011 AND ALL RELEVANT OCCUPATIONAL HEALTH & SAFETY POLICIES AND REGULATIONS.
5. DIMENSIONS SHALL NOT BE SCALED FROM THE PLANS. CLARIFICATION OF DIMENSIONS SHALL BE SOUGHT FROM THE SUPERINTENDENT OR REFERRED TO THE DESIGNER.
6. SURVEY MARKS SHOWN THUS ▲ SHALL BE MAINTAINED AT ALL TIMES. WHERE RETENTION IS NOT POSSIBLE THE ENGINEER SHALL BE NOTIFIED AND CONSENT RECIEVED PRIOR TO THEIR REMOVAL.
7. ALL NEW WORK IS TO MAKE A SMOOTH JUNCTION WITH EXISTING CONDITIONS.
8. THE CONTRACTOR IS NOT TO ENTER UPON NOR DO ANY WORK WITHIN OR ON ADJACENT LANDS WITHOUT THE PRIOR APPROVAL OF THE SUPERINTENDENT AND THE WRITTEN PERMISSION OF THE OWNERS.
9. SEDIMENT MEASURES SHALL BE IMPLEMENTED PRIOR TO SOIL DISTURBANCE IN KEEPING WITH THE 4th EDITION OF LANDCOMS "SOILS AND CONSTRUCTION - MANAGING URBAN STORMWATER" MARCH 2004 TO THE SATISFACTION OF COUNCIL'S REPRESENTATIVE AND AS SHOWN IN THESE DRAWINGS.
10. THE CONTRACTOR SHALL CLEAR AND DISPOSE OF ONLY THOSE TREES THAT ARE CONDEMNED BY THE PLANS. COUNCIL'S TREE PRESERVATION ORDER SHALL BE OBSERVED AND NO TREE SHALL BE FELLED, LOPPED OR REMOVED WITHOUT PRIOR APPROVAL.
11. THE CONTRACTOR SHALL CLEAR THE SITE BY REMOVING ALL RUBBISH, FENCES, OUT HOUSES, CAR BODIES, DEBRIS, ETC. THE CONTRACTOR SHALL NOT DISPOSE OF ANY DEBRIS BY BURNING OFF IN AN OPEN FIRE.
12. UNSOUND MATERIALS AS DETERMINED BY COUNCIL'S REPRESENTATIVE SHALL BE REMOVED FROM ROADS AND LOTS PRIOR TO ANY FILLING.
13. ALL SITE REGRADING AREAS SHALL BE GRADED TO THE SATISFACTION OF COUNCIL'S REPRESENTATIVE. THE CONTRACTOR SHALL TAKE LEVELS ON THE EXISTING SURFACE AFTER STRIPPING TOPSOIL AND PRIOR TO COMMENCING ANY FILL OPERATIONS.
14. SURPLUS EXCAVATED MATERIAL SHALL BE PLACED OR DISPOSED OF IN ACCORDANCE WITH THE CONTRACT, OR AS DIRECTED BY THE SUPERINTENDENT.
15. ALL SITE FILLING SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm AND COMPACTED IN ACCORDANCE WITH COUNCIL'S SPECIFICATION AND BE TESTED AT THE REQUIRED INTERAVLS BY AN APPROVED N.A.T.A. GEOTECHNICAL LABORATORY.
16. MINIMUM 150mm THICK TOPSOIL SHALL BE SPREAD ON ALL FOOTPATHS, BERMS, BATTERS AND SITE REGRADING AREAS. EXCESS TOPSOIL SHALL BE DISPOSED OF AS DIRECTED BY THE SUPERINTENDENT.
17. ALL LAND DISTURBED BY EARTHWORKS SHALL BE SPRAY-GRASSED, OR SIMILARLY TREATED TO ESTABLISH GRASS COVER. SEED MIXTURES ARE TO BE APPROVED BY COUNCIL PRIOR TO SPRAYING. ALL GRASSED AREAS SHALL BE REGULARLY WATERED AND MAINTAINED UNTIL EXPIRATION OF THE MAINTENANCE PERIOD.
18. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL THROUGHOUT THE DURATION OF THE PROJECT.
19. ALL PITS DEEPER THAN 1.2m SHALL HAVE STEP IRONS PROVIDED IN ACCORDANCE WITH COUNCIL'S STANDARDS.
20. ALL DRAINAGE LINES THROUGH LOTS SHALL BE CONTAINED WITHIN THEIR EASEMENTS AND CONFORM WITH COUNCIL'S STANDARDS.
21. ALL DRAINAGE LINES ON HIGH SIDE AND UNDER ROADS SHALL BE BACKFILLEDWITH SHARP SAND AND HAVE 3.0m OF AGRICULTURAL LINE WRAPPED IN AN APPROVED FILTER FABRIC, DISCHARGING INTO THE DOWNSTREAM PIT.
22. SUBSOIL DRAINS SHALL BE CONSTRUCTED TO THE SATISFACTION OF COUNCIL'S REPRESENTATIVE.
23. PRECAST KERB INLET LINTELS SHALL BE USED ON GULLY PITS. GRATES SHALL BE "WELDLOK" TYPE GG 78-51 OR APPROVED EQUIVALENT.
24. PROVIDE VEHICULAR ENTRIES IN KERB AND GUTTER WHERE SHOWN OR WHERE DIRECTED BY THE SUPERINTENDANT.
25. GUIDE POSTS SHALL BE 100mm X 50mm HARDWOOD, PAINTED WHITE WITH REFLECTORS.
26. ERECT STREET NAME SIGNS, CONDUIT WARNING SIGNS AND NO THROUGH ROAD SIGNS WHERE SHOWN OR WHERE DIRECTED BY COUNCIL'S REPRESENTATIVE.
27. CONDUITS SHALL BE LAID AFTER POSITIONS HAVE BEEN DETERMINED BY THE RELEVANT AUTHORITIES AND BEFORE FINAL A.C. IS LAID
28. POSITION OF CONDUITS SHALL BE MARKED ON THE KERB.
29. FELLED TREES SHALL BE SALVAGED FOR RE-USE AS WOODCHIP MULCH OR LOG FORM FOR SITE REHABILITATION, NON-SALVAGEABLE MATERIAL SUCH AS STUMPS AND ROOTS SHALL BE DISPOSED OF OFF SITE.
30. THE CONTRACTOR SHALL PROVIDE MINIMUM 24 HOURS NOTICE TO COUNCIL'S REPRESENTATIVE FOR ALL INSPECTIONS.
31. THE CONTRACTOR SHALL MAINTAIN SERVICES AND ALL WEATHER ACCESS AT ALL TIMES TO THE ADJOINING PROPERTIES.
32. THE CONTRACTOR SHALL UNDERTAKE TRAFFIC CONTROL MEASURES TO COUNCIL'S SATISFACTION AND SHALL DISPLAY ALL APPROPRIATE WARNING SIGNS THROUGHOUT THE DURATION OF CONSTRUCTION.
33. ALL NATURAL SURFACE DATA HAS BEEN DETERMINED BY TERRAIN MODELLING. ALL CONSTRUCTION SITE WORKS MUST BE CARRIED OUT USING THE BENCH MARKS SHOWN ON THESE DRAWINGS.

DRAINAGE NOTES

1. ALL PITS DEEPER THAN 1.2m SHALL HAVE STEP IRONS PROVIDED IN ACCORDANCE WITH COUNCIL'S STANDARDS.
2. ALL DRAINAGE LINES THROUGH LOTS SHALL BE CONTAINED WITHIN THEIR EASEMENTS AND CONFORM WITH COUNCIL'S STANDARDS.
3. ALL DRAINAGE LINES ON HIGH SIDE AND UNDER ROADS SHALL BE BACKFILLEDWITH SHARP SAND AND HAVE 3.0m OF AGRICULTURAL LINE WRAPPED IN AN APPROVED FILTER FABRIC, DISCHARGING INTO THE DOWNSTREAM PIT.
4. SUBSOIL DRAINS SHALL BE CONSTRUCTED TO THE SATISFACTION OF COUNCIL'S REPRESENTATIVE.
5. PRECAST KERB INLET LINTELS SHALL BE USED ON GULLY PITS. GRATES SHALL BE "WELDLOK" TYPE GG 78-51 OR APPROVED EQUIVALENT.
6. ON COMPLETION OF PIPE INSTALLATION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AREAS, GRASSED AREAS AND ROAD PAVEMENTS.
7. TRENCH WIDTHS ARE TO BE KEPT TO A MINIMUM CONSISTENT WITH THE LAYING AND BEDDING OF THE RELEVANT SERVICE AND CONSTRUCTION OF PERSONNEL ACCESS WAYS AND PITS. REFER TO AUTHORITIES STANDARDS FOR MINIMUM TRENCH WIDTHS. STANDARD TRENCH WIDTHS ARE THE DIMENSIONS OF UNSUPPORTED TRENCHES. SUPPORT EXCAVATIONS TO THE REQUIREMENTS OF THE CONSTRUCTION SAFETY REGULATIONS 1950 UNDER THE CONSTRUCTION SAFETY ACT 1912 (AS AMENDED) APPLY.
8. PITS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH AS3500.3-2003 PLUMBING AND DRAINAGE - STORMWATER DRAINAGE STANDARD UNLESS OTHERWISE SPECIFIED BY THE LOCAL COUNCIL OR AUTHORITY.
9. PITS SIZES IN ACCORDANCE WITH AS3500.3-2003 ARE TO BE:
   450 x 450mm WHERE THE DEPTH IS LESS THAN 600mm
   600 x 600mm WHERE THE DEPTH IS 600 - 900mm
   600 x 900mm WHERE THE DEPTH IS 900 - 1200mm
   900 x 900mm WHERE THE DEPTH IS GREATER THAN 1200mm
10. IF A PIT IS SHOWN ON THE KERB ALIGNMENT IT IS REQUIRED TO BE CONSTRUCTED AS A KERB INLET PIT UNLESS OTHERWISE NOTED.
11. BACKFILL SERVICE TRENCHES TO REQUIREMENTS WITHOUT DELAY FOR THE SECTION OF PIPE THAT HAS BEEN COMPLETED AND APPROVED, IF POSSIBLE ON THE SAME WORKING DAY.

LOCATION OF WORKS



LOCALITY SKETCH
NOT TO SCALE

SHEET INDEX

LEGEND

- ROOF DRAINAGE LINE
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- 24 — NATURAL SURFACE CONTOUR
- -79.2 — DESIGN SURFACE CONTOUR
- TABLE DRAIN
- EXISTING HEADWALL
- PROPOSED HEADWALL
- LIMIT OF CONSTRUCTION — LIMIT OF WORKS
- PIT 1/2 — PIT NUMBER
- SS — SUBSOIL DRAINAGE LINE
- GRATED SURFACE INLET PIT
- SEALED PIT

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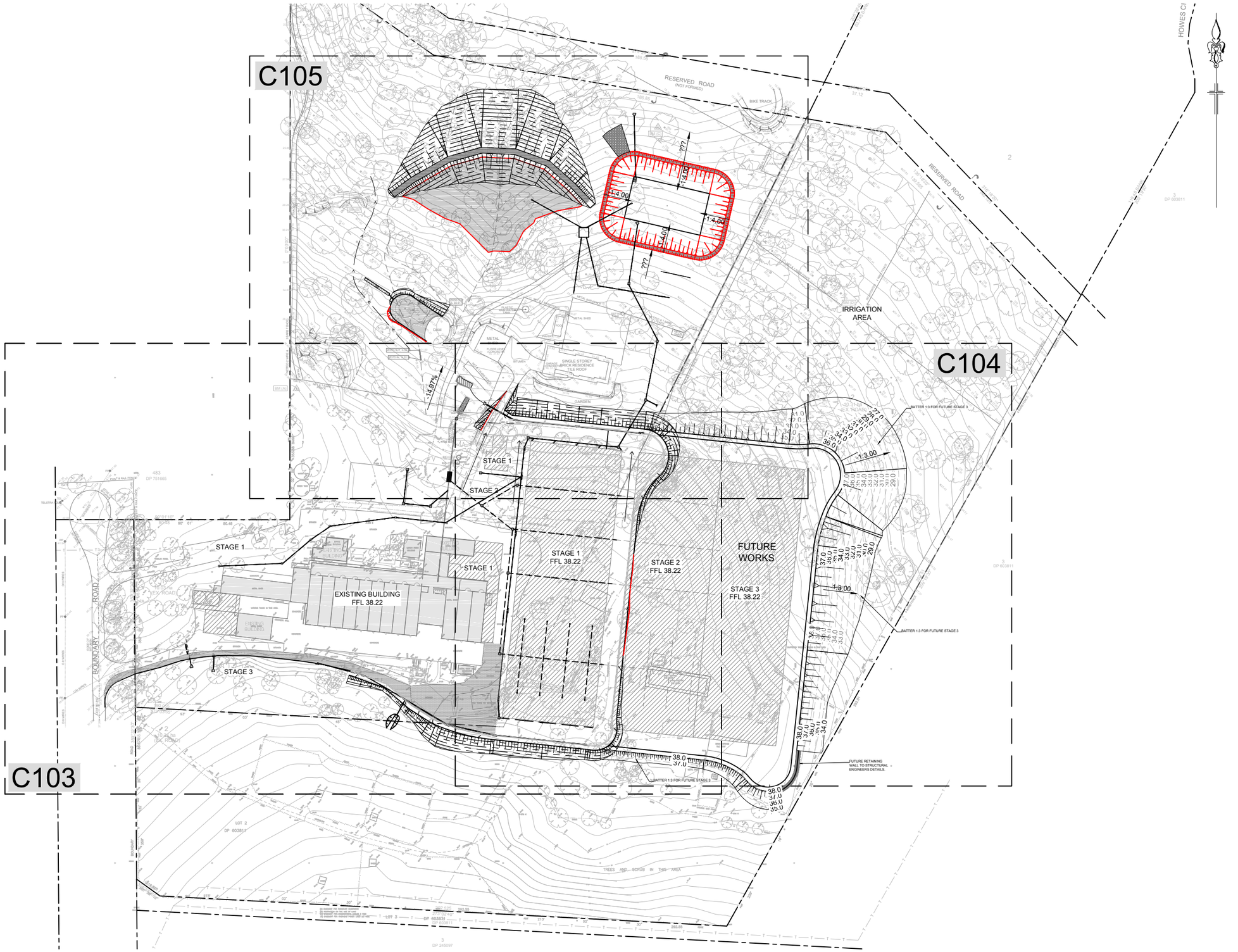
A1



SITE PLAN
SCALE 1:1000

20 0 20 40 60 80 100
METRES
1:1000

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No	DATE	AMENDMENT
C	03/12/15	REVISED DRAINAGE LAYOUT & OSD AND DAM SIZE
B	26/10/15	ISSUED FOR COMMENTS
A	04/09/15	ISSUED FOR COMMENTS

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Client:
PREMIER MUSHROOMS

PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA

SITE PLAN

Designed: GJ/RW
Drawn: CM
Checked: GJ

Scales: Plan 1:1000
Horiz.
Vert.
X-Sect.
Datum: A.H.D.

Plan No.
SY15051C102
File Ref.
SY15051C1_C.dwg
REV.
C
SHEET 2 OF 8 SHEETS

A1

NOTE:
ANY DOWNPIPES LOCATED ON NORTHERN SIDE OF EXISTING BUILDING ARE TO BE CONNECTED TO CAR PARK DRAINAGE LINE.

CONSTRUCT CATCH DRAIN FROM HEADWALL TO SEDIMENT TRAP.

EXISTING FIRST SEDIMENT TRAP.

EXISTING FILTER UNIT

CONSTRUCT NEW PIT OVER EXISTING STORMWATER DRAINAGE AND CONNECT PROPOSED STORMWATER TO EXISTING FILTER UNIT. CONFIRM SIZE OF EXISTING PIPE PRIOR TO CONNECTION.

PROVIDE BUFFER TANK FOR DETENTION OF STORMWATER TO SLOW FLOWRATE INTO SOLIDS SEPARATOR. SOLIDS SEPARATOR TO BE LOWERED BY 0.8m

BATTER 1V:4H TO EXISTING SURFACE FROM HARDSTAND PROPOSED LEVELS.

OVERLAND FLOW PATH

CONCRETE HARDSTAND STAGE 1

OVERLAND FLOW PATH

CONTRACTOR TO ENSURE A SMOOTH TRANSITION BETWEEN NEW AND EXISTING WORKS.

CONTRACTOR TO ENSURE A SMOOTH TRANSITION BETWEEN NEW AND EXISTING WORKS.

EDGE OF EXISTING BITUMEN TO BE WIDEN AND EXTEND TO COUNCIL STANDARDS AND REQUIREMENTS.

CONTRACTOR TO LOCATE LINE, SIZES AND LEVEL OF EXISTING SERVICES AND REPORT ANY CONFLICT TO SITE SUPERINTENDENT PRIOR TO CONSTRUCTION OF ANY STORMWATER RETICULATION.

EXISTING PIPE AND HEADWALL TO EXTEND TO EDGE OF NEW WORKS.(TYPICAL) CONTRACTOR TO CONFIRM COVER AND CONDITION OF EXISTING PIPE.

PROVIDE SCOUR PROTECTION AT OUTLET HEADWALLS.

EDGE OF EXISTING BITUMEN TO BE WIDEN AND EXTEND WITH EXISTING CROSS FALL TO BE MAINTAINED.

PROVIDE SCOUR PROTECTION AT OUTLET HEADWALLS.

THIS AREA TO BE REGRADED TO MATCH NEW BUILDING LEVEL AND AND TRANSITION BETWEEN EXISTING AND NEW PROPOSED EXTERNAL LEVELS.

CONTRACTOR TO LOCATE LINE, SIZES AND LEVEL OF EXISTING SERVICES AND REPORT ANY CONFLICT TO SITE SUPERINTENDENT PRIOR TO CONSTRUCTION OF ANY STORMWATER RETICULATION.

PROVIDE Ø525 STUB FOR FUTURE STAGE 2 & 3 ROOF DRAINAGE.

CAP, SEAL & BURY END OF PIPE FOR FUTURE CONNECTION.

OVERLAND FLOW PATH

BATTER 1:3 FOR FUTURE STAGE 3

REFER DRAWING C104 FOR CONTINUATION

PROPOSED STORAGE STAGE 2

PROPOSED STORAGE STAGE 1

EXISTING BUILDING FFL 38.22

STAGE 1 FFL 38.22

STAGE 2 FFL 38.22

STAGE 1

STAGE 2

STAGE 3

EXISTING BUILDING

SINGLE STOREY BRICK RESIDENCE TILE ROOF

GARDEN

483 DP 751665

10.03 ha (EX. ROAD)

10.34 ha (EX. ROAD)

BOUNDARY ROAD

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PLAN
SCALE 1:500

10 0 10 20 30 40 50 METRES 1:500

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Client: PREMIER MUSHROOMS

PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA

ENGINEERING PLAN - SHEET 1

Designed: GJ/RW
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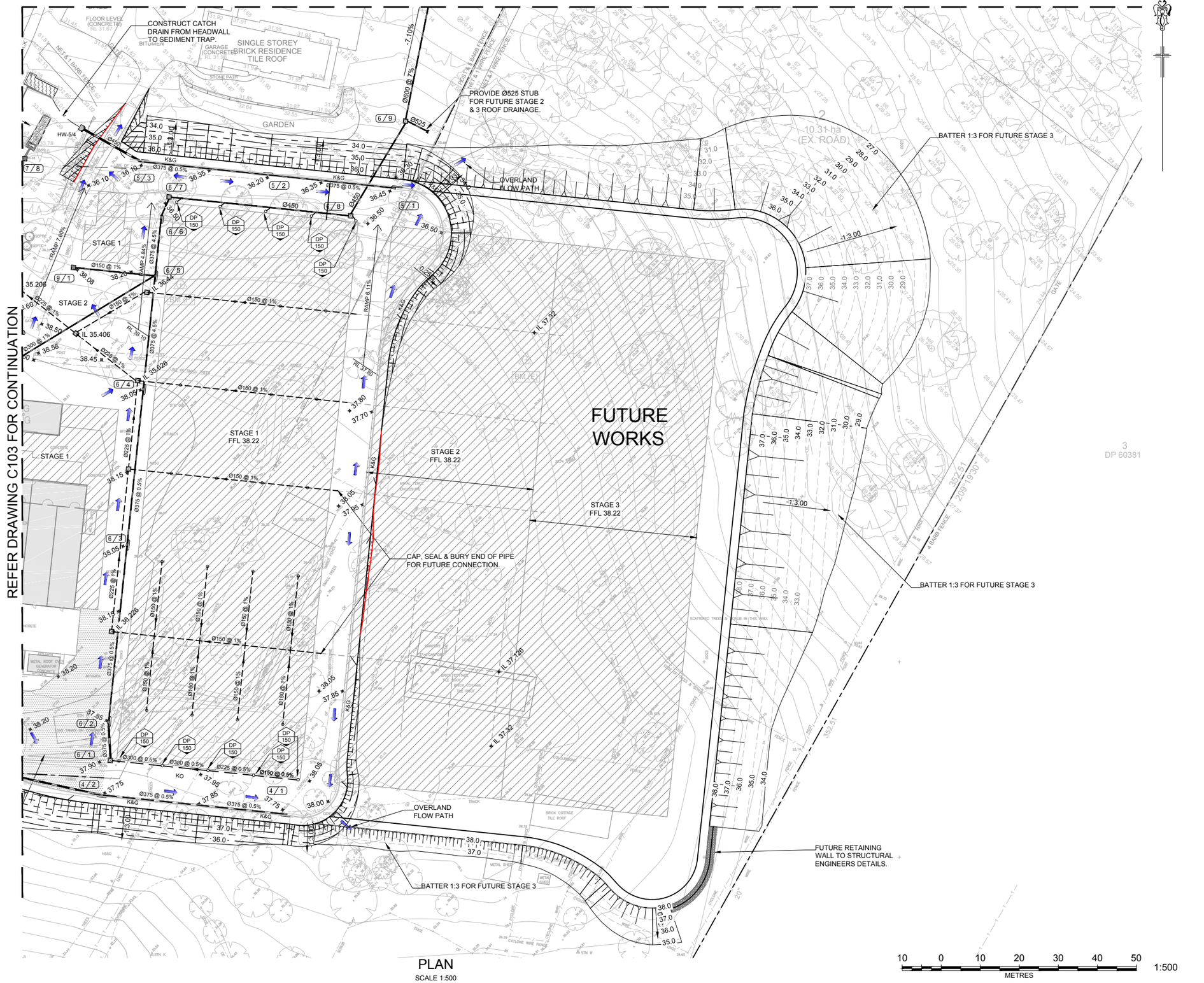
Scales: Plan 1:500, Horiz., Vert., X-Sect.
Datum: A.H.D.

Plan No. SY15051C103
File Ref. SY15051C1_C.dwg
REV. C
SHEET 3 OF 8 SHEETS

A1

REFER DRAWING C105 FOR CONTINUATION

REFER DRAWING C103 FOR CONTINUATION



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Client: PREMIER MUSHROOMS

PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA

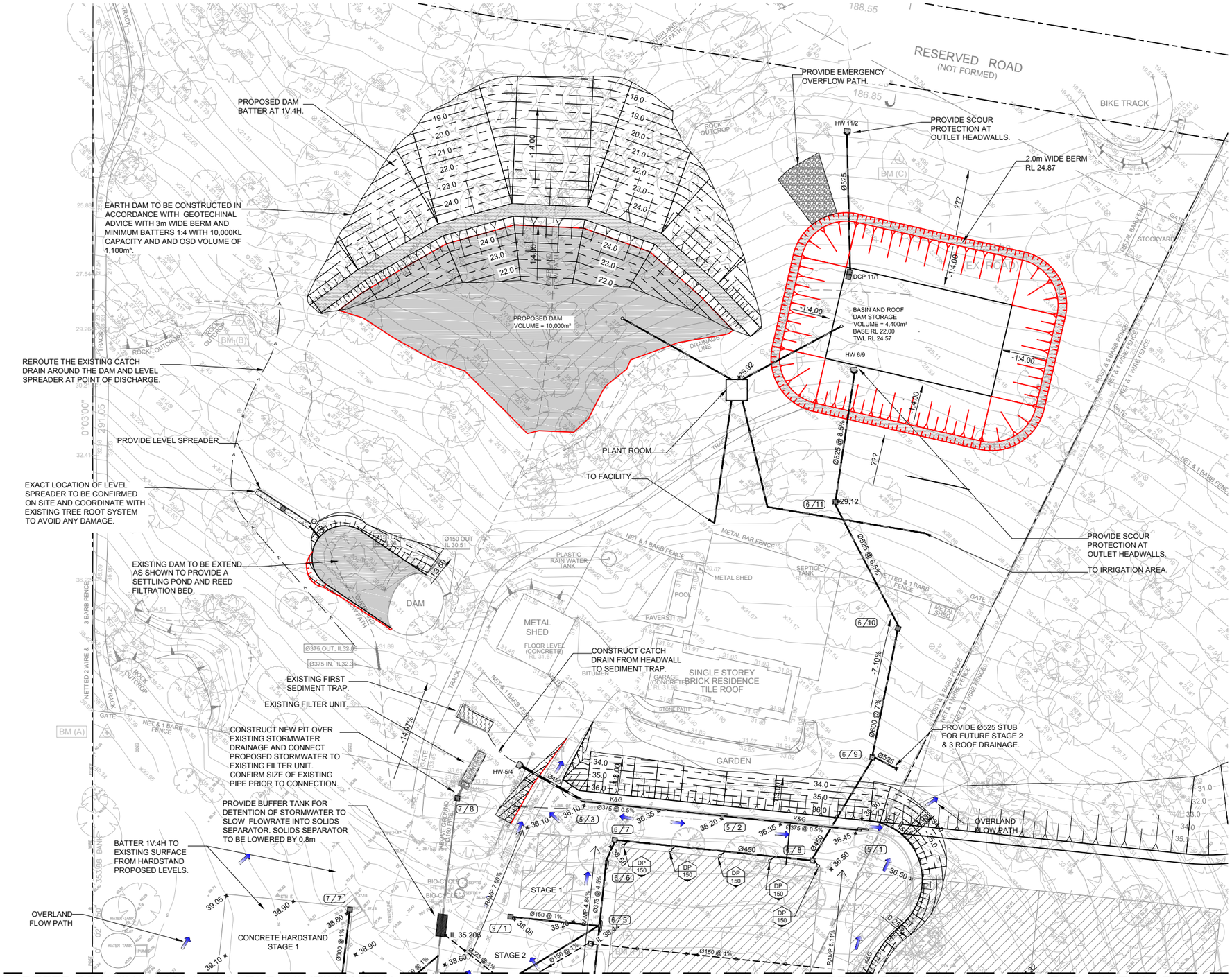
ENGINEERING PLAN - SHEET 2

Designed: GJ/RW
Drawn: CM/RW
Checked: GJ

Scales: Plan 1:500
Horiz.
Vert.
X-Sect.
Datum: A.H.D.

Plan No. SY15051C104
File Ref. SY15051C1_C.dwg
REV. C
SHEET 4 OF 8 SHEETS

A1



PLAN
SCALE 1:500

10 0 10 20 30 40 50
METRES 1:500

DIAL BEFORE YOU DIG www.1100.com.au

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Client: PREMIER MUSHROOMS

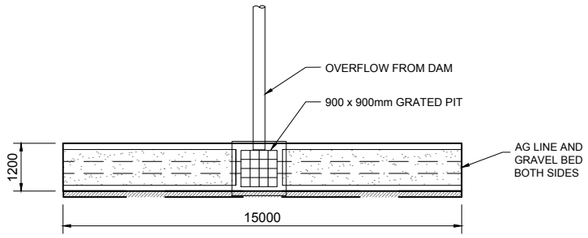
PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA

ENGINEERING PLAN - SHEET 3

Designed: GJ/RW
Drawn: CM/RW
Checked: GJ
Scales: Plan 1:500, Horiz., Vert., X-Sect.
Datum: A.H.D.

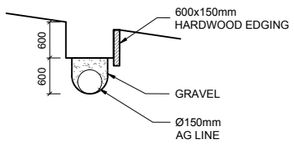
Plan No. SY15051C105
File Ref. SY15051C1_C.dwg
REV. C
SHEET 5 OF 8 SHEETS

A1



PLAN LEVEL SPREADER

NOT TO SCALE



SECTION LEVEL SPREADER

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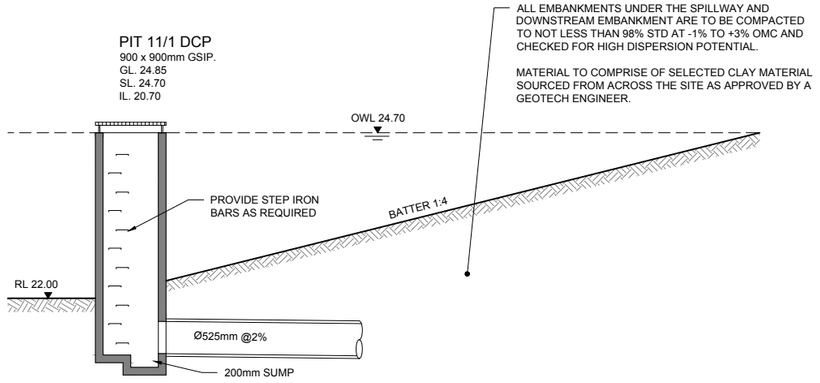
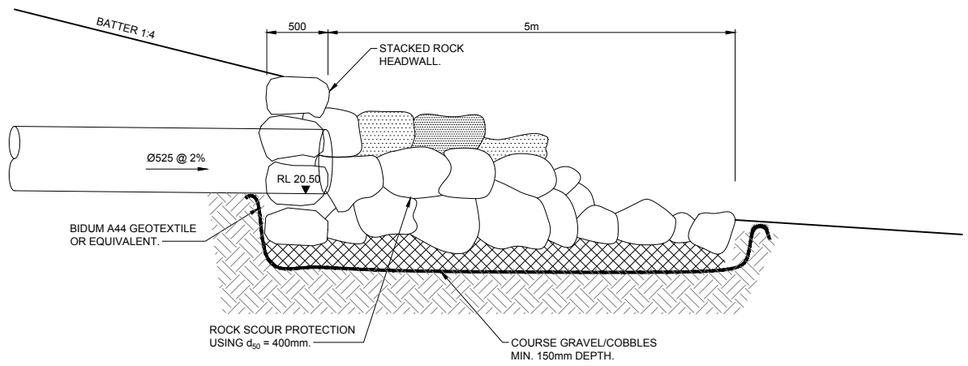


TYPICAL BASIN PIT DETAIL

SCALE 1:50



STACKED ROCK HEADWALL DETAIL

SCALE 1:25

DIAL BEFORE YOU DIG
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0.5 0 0.5 1.0 1.5 2.0 2.5 1:25
METRES

1 0 1 2 3 4 5 1:50
METRES

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Client:

PREMIER MUSHROOMS

PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA

SECTIONS AND DETAILS

Designed: GJ
Drawn: CM
Checked: GJ

Scales: Plan 1:500
Horiz.
Vert.
X-Sect.

Datum: A.H.D.

Plan No.
SY15051C106

File Ref. SY15051C1_C.dwg REV. C

SHEET 6 OF 8 SHEETS

A1

EROSION AND SEDIMENTATION CONTROL NOTES

1. PRIOR TO THE COMMENCEMENT OF SITE DISTURBANCE, THE CONTRACTOR SHALL ESTABLISH ALL NECESSARY EROSION AND SEDIMENTATION CONTROL MEASURES IN ACCORDANCE WITH THIS PLAN, COUNCIL'S "CIVIL WORKS SPECIFICATION, PART 2 -CONSTRUCTION", AND THE NSW DEPARTMENT OF HOUSING'S PUBLICATION "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION".
2. THE LOCATION OF EROSION AND SEDIMENTATION CONTROL DEVICES SHOWN ON THIS PLAN ARE INDICATIVE ONLY AND SHOULD BE ADJUSTED TO SUIT SITE CONDITIONS.
3. WHERE WORKS ARE DELAYED OR IN ABEYANCE AND DISTURBED AREAS ARE LIKELY TO BE EXPOSED FOR A PERIOD OF TWO MONTHS OR MORE, TEMPORARY REHABILITATION WORKS SHALL BE UNDERTAKEN TO PROTECT THE SITE.
4. ALL DISTURBED AREAS SHALL BE TOPSOILED, SEEDED AND MULCHED WITHIN 2O DAYS OF THE COMPLETION OF THE WORKS.
5. ALL AREAS WITH SLOPES STEEPER THAN 12% (1 in 8) SHALL BE STRAW MULCHED IN CONJUNCTION WITH SEEDING, OR TURFED.
6. SILT BARRIERS LOCATED AROUND KERB INLET AND ROAD PITS SHALL BE REINSTATED FOLLOWING ROAD PAVING WORKS IF IT IS LIKELY THAT UNDISTURBED AREAS WILL STILL DRAIN TO THE PIT.
7. SANDBAGS SHALL BE PLACED ACROSS THE END OF ROAD CONSTRUCTION AT THE COMPLETION OF EACH DAYS WORK TO PREVENT EROSION OF THE CONSTRUCTED MATERIAL.
8. THE CONTRACTOR SHALL CONDUCT WEEKLY INSPECTIONS OF THE SITE TO ENSURE THAT ALL DEVICES AND REHABILITATION AREAS HAVE BEEN ADEQUATELY MAINTAINED. THE CONTRACTOR SHALL ALSO KEEP A LOG BOOK DETAILING SUCH INSPECTIONS, AND RECORDING RAINFALL EVENTS AND OTHER RELEVANT EVENTS.
9. TOPSOIL SHALL BE STOCKPILED IN THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY COUNCIL'S ENGINEER. WHERE IT IS LIKELY THAT STOCKPILES WILL REMAIN IN PLACE FOR A PERIOD EXCEEDING 4 WEEKS, THEN THE STOCKPILE SHALL BE STABILISED BY SEEDING OR EQUIVALENT METHODS.
10. ALL REVEGETATION WORKS ARE TO BE MAINTAINED, INCLUDING WATERING AND MOWING WHERE NECESSARY UNTIL THE COMPLETION OF THE MAINTENANCE PERIOD.
11. THE MOVEMENT OF VEHICULAR TRAFFIC ON THE SITE SHALL BE CONFINED TO DESIGNATED AREAS DURING CONSTRUCTION WORKS. VEHICULAR ACCESS SHALL BE DENIED TO AREAS TO BE LEFT UNDISTURBED.
12. SITE ACCESS SHALL BE LIMITED TO THE LOCATIONS SHOWN ON THIS PLAN. SHAKE-DOWN AREAS SHALL BE CONSTRUCTED AS SHOWN.
13. DURING CONSTRUCTION WORKS, DUST CONTROL MEASURES SHALL BE IMPLEMENTED TO MINIMISE THE AMOUNT OF DUST GENERATED FROM THE SITE. THESE MEASURES TO BE IMPLEMENTED TO COUNCIL'S SATISFACTION.
14. MAINTENANCE AND CLEANING OF CONSTRUCTION PLANT SHALL BE CARRIED OUT IN AN AREA WHERE RUNOFF CAN BE CONTAINED AND APPROPRIATELY TREATED AND DISPOSED OF.
15. ALL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE ADEQUATELY REGENERATED. THIS STAGE SHALL BE DETERMINED BY THE CERTIFIER.

LEGEND

- SEDIMENT FENCE
- STABILISED SITE ACCESS AT ENTRANCE TO WORKS
- SURFACE INLET PIT SEDIMENT TRAP
- HAY BALE SEDIMENT TRAP

SOIL AND WATER MANAGEMENT PLAN
SCALE 1:1000

20 0 20 40 60 80 100 METRES 1:1000

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No	DATE	AMENDMENT
C	03/12/15	REVISED DRAINAGE LAYOUT & OSD AND DAM SIZE
B	26/10/15	ISSUED FOR COMMENTS
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Client: PREMIER MUSHROOMS

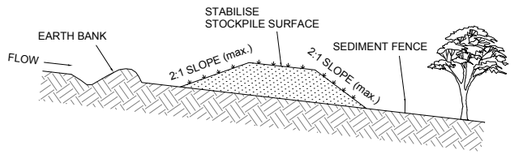
PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA

SOIL AND WATER MANAGEMENT

Designed: RW
Drawn: RW
Checked: GJ
Scales: Plan 1:1000, Horiz., Vert., X-Sect.
Datum: A.H.D.

Plan No. SY15051C107
File Ref. SY15051C1_C.dwg
REV. C
SHEET 7 OF 8 SHEETS

A1



CONSTRUCTION NOTES

1. WHERE POSSIBLE LOCATE STOCKPILE AT LEAST 5 METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOWS, ROADS, HAZARD AREAS AND MIN. 1.5m AWAY FROM EMBANKMENTS.

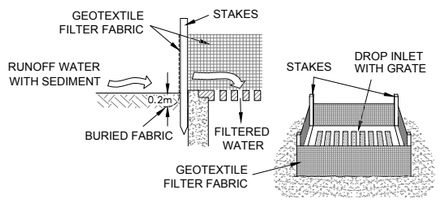
2. CONSTRUCT ON THE CONTOUR AS A LOW, FLAT ELONGATED MOUND.

3. WHERE THERE IS SUFFICIENT AREA TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.

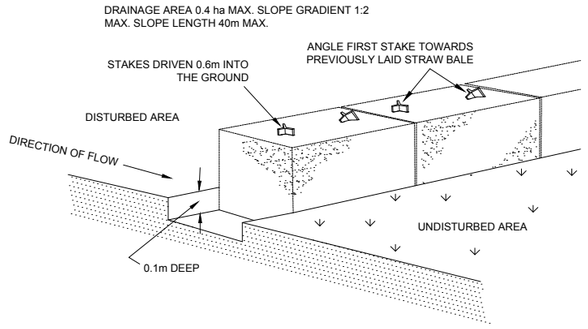
4. REHABILITATE IN ACCORDANCE WITH THE SWMP/ESCP.

5. CONSTRUCT EARTH BANK (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT RUN OFF AROUND THE STOCKPILE AND A SEDIMENT FENCE (STANDARD DRAWING 6-8) 1 TO 2 METRES DOWNSLOPE OF STOCKPILE.

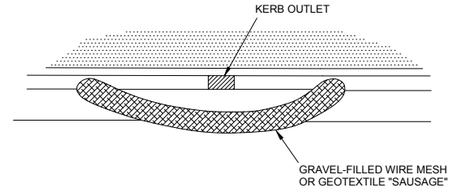
TOPSOIL STOCKPILE



SURFACE INLET PIT SEDIMENT TRAP



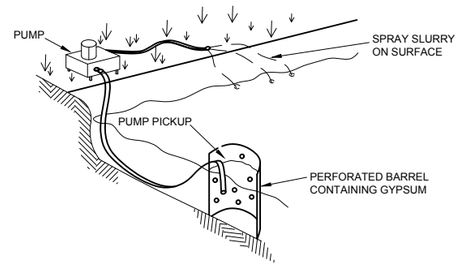
STRAW BALE SEDIMENT FILTER



CONSTRUCTION NOTES

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH X 400mm WIDE.
3. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING FILTER.
4. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

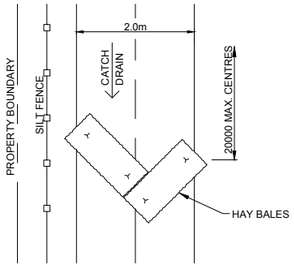
MESH & GRAVEL FILTER "SAUSAGE" BARRIER



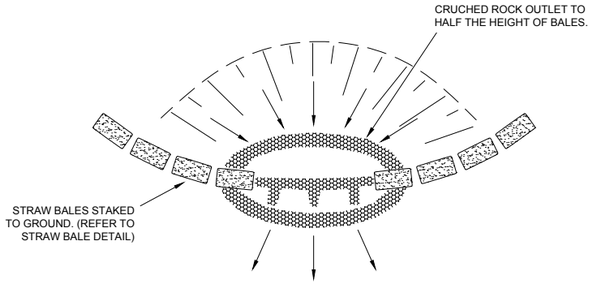
NOTE:
1. FLOCCULATION TO BE USED IF WATER IS NOT CLEAR (IE: SEDIMENT GREATER THAN 50 mg/L) PRIOR TO DISCHARGING FROM TEMPORARY PUMP OUT

2. FOR RATES & AGENTS SEE APPENDIX E OF HOUSING NSW "MANAGING URBAN SW SOILS & CONSTRUCTION".

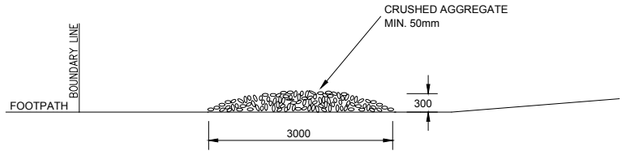
FLOCCULATION DETAIL



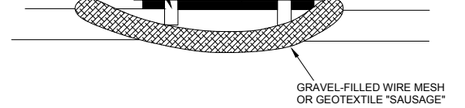
CATCH DRAIN DETAIL

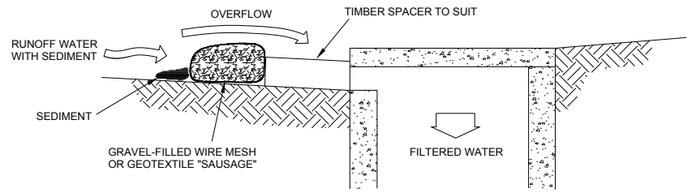


STRAW BALE & CRUSHED ROCK SEDIMENT FILTER



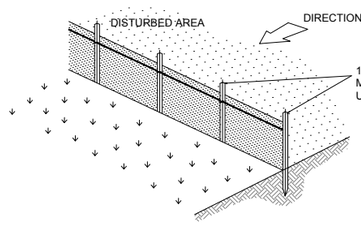
VEHICLE DUST SHAKE DOWN DETAIL

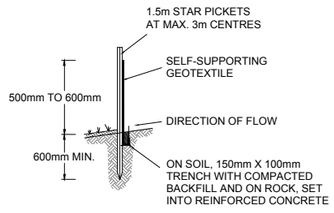




CONSTRUCTION NOTES

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





SECTION DETAIL

CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARRALLEL TO THE CONTOURS OF THE SITE.

2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND 2.5 METRES APART (MAX.)

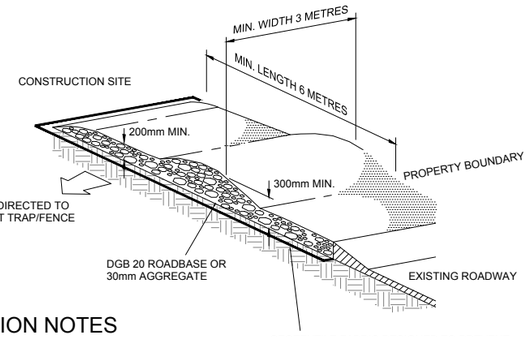
3. DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.

4. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.

5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.

6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE



CONSTRUCTION NOTES

1. STRIP TOPSOIL AND LEVEL SITE.

2. COMPACT SUBGRADE.

3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE.

4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROADBASE OR 30mm AGGREGATE. MINIMUM LENGTH 15 METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.

5. CONSTRUCT HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.

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

GEOFABRIC MAY BE A WOVEN OR NEEDLE PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4-90) OF 2500 N

STABILISED SITE ACCESS

No	DATE	AMENDMENT
C	03/12/15	REVISED DRAINAGE LAYOUT & OSD AND DAM SIZE
B	26/10/15	ISSUED FOR COMMENTS
A	04/09/15	ISSUED FOR COMMENTS

Barker Ryan Stewart
Sydney P: 02 9659 0005
Central Coast P: 02 4325 5255
Hunter P: 02 4966 8385
ABN: 26 134 067 842
barkerryanstewart.com.au
mail@barkerryanstewart.com.au

Client: PREMIER MUSHROOMS

PROPOSED MUSHROOM FARM
182 BOUNDARY ROAD, GLOSSODIA

SOIL AND WATER MANAGEMENT DETAILS

Designed: RW
Drawn: RW
Checked: GJ
Scales: Plan 1:500, Horiz., Vert., X-Sect.
Datum: A.H.D.

Plan No. SY15051C108
File Ref. SY15051C1_C.dwg
SHEET 8 OF 8 SHEETS
REV. C