LEGEND

- SEDIMENT FENCE (SD 6-8)
- BARRIER FENCE
- STRAW BALE FILTER (SD 6-7)
- DIVERSION DRAINS (SD 5-6)
- STOCKPILES (SD 4-1)
- CHECK DAM (SD 5-4)
- STABILISED SITE ACCESS (SD 6-14)
- ACCESS ROAD TABLE DRAIN
- LEVEL SPREADER (SD 5-6)
- PIPE CULVERT
- ENERGY DISSIPATER (SD 5-8)
- LOW LEVEL WATERCOURSE CROSSING

TABLE 1 MAXIMUM ACCEPTABLE C-FACTORS AT NOMINATED TIMES DURING WORKS

LANDS	MAXIMUM C-FACTOR	REMARKS
Waterways and other areas subjected to concentrated flows (e.g. table drains), post construction and during operation	0.05	Applies after ten working days from completion of formation and before they are allowed to carry any concentrated flows. Flows will be limited to those shown in Table 5.2 of Landcom (2004). Foot and vehicular traffic will be prohibited in these areas
Stockpiles and batters, post construction and during operation	0.10	Applies after ten working days from completion of formation. Maximum C-factor of 0.10 equals 60% ground cover
All lands, including waterways and stockpiles after construction	0.15	Applies after 20 working days of inactivity, even though works might continue later. Maximum C-factor of 0.15 equals 50% ground cover
All lands, including waterways and stockpiles during construction and operation	0.05	Applies after 60 working days of inactivity, even though works might continue later. Maximum C-factor of 0.05 equals 70% ground cover

TABLE 2 LIMITATIONS TO ACCESS DURING CONSTRUCTION

LAND USE	LIMITATION	REMARKS
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans	All site workers should clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope) or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones on site. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries
Remaining lands, including revegetation areas	Entry prohibited except for essential management works	Thinning of growth might be necessary, for example, for fire reduction or weed removal

GENERAL NOTES

- This plan is to be read in conjunction with the accompanying Water Cycle Management Plan report by SEEC Morse McVey (Reference 09000242-R-01). Standard drawings (SD) are shown on 09000242-SWMP02.

EROSION AND SEDIMENT CONTROL FOR THE ACCESS ROAD CONSTRUCTION PHASE

1. Before commencement of earthworks, the site is to be secured and the following erosion and sediment control measures installed in order except for item 14 which is to be undertaken regularly (Refer to the Monitoring and Maintenance notes):
2. Establish a stabilised site access (Standard Drawing SD 6-14) in the locations shown (Drawing 09000242-SWMP01) and anywhere where construction vehicles enter a works area from a bitumen road.
3. Establish a site office, toilet and parking area.
4. Establish sediment fencing in the locations shown (Drawing 09000242-SWMP01) and following Standard Drawing SD 6-8 (Refer to the Sediment Fencing notes).
5. Establish barrier fencing in the locations shown (Drawing 09000242-SWMP01) to delineate the edge of the works area (Refer to the Barrier Fencing notes).
6. Construct table drains/diversion drains in the locations shown (Drawing 09000242-SWMP01) and engineering drawings.
7. Install check dams in the table drains at maximum 80m intervals as per Standard Drawing SD 5-4 (Refer to Drawing 09000242-SWMP01 for locations).
8. Stabilise table drains and batters using kikuyu grass or equivalent (Refer to the Stabilisation notes).
9. Install straw bales or sediment fences at the inlet points of all culvert/pipes.
10. Construct energy dissipaters at the outlets of all road culverts in accordance with Standard Drawing SD 5-8.
11. Once all of the above measures are complete and stable, construction works for the access road can commence in accordance with the engineering plans.
12. Strip Topsoil when moist only (not wet or dry).
13. Stockpiles are to be positioned in the locations shown and in accordance with the Stockpiling notes.
14. Progressively stabilise ground surfaces as works are completed (Refer to the Stabilisation notes).
15. If rain is predicted and/or the site is closed, place check berms on exposed surfaces at 20m spacings (e.g straw wattles, straw bales).
16. Once all access road construction works have completely finished and all ground surfaces, table drains and batters are stabilised (in accordance with Table 1) the following erosion and sediment control measures for the access road construction stage can be removed:
    - Sediment fencing;
    - Barrier fencing;
    - Sediment traps at culvert/pipe inlets (i.e. Straw bale filter or sediment fencing);
    - Check dams.

    (NOTE: Table drains, batters, culverts/pipes and energy dissipaters are permanent fixtures and should remain in place after the access road construction has been completed.)

STOCKPILING

Stockpile locations are shown on Drawing 09000242-SWMP01. The site manager is to designate safe stockpile sites in these locations. All stockpiles must be constructed and maintained in accordance with Standard Drawing SD 4-1 and the following regulations:

- All stockpiles must have sediment fencing installed around their bases as per Standard Drawing SD 4-1.
- Stockpiles are not to be positioned within a riparian zone (i.e. within 40m of a creek).
- Mulched vegetation, topsoil and subsoil (if applicable) are to be stockpiled separately.
- Stockpiles are to be trimmed, deep ripped to 300mm, immediately sown with permanent pasture species and fertilised.
- Stockpiles are to be stabilised to achieve a C-factor of 0.1 within 10 days of formation. Stabilisation measures on stockpiles must be employed as per the requirements set out in Table 1 and Table 2.
- Stockpiles can be constructed to maximum 3m in height, however where there is sufficient area, they should be less than 2 meters in height.
- The working face of the stockpile should be battered down at a maximum slope of 3:1.

SEDIMENT FENCING

- Install sediment fences in the locations shown on Drawings 09000242-SWMP01.
- Install all sediment fencing in accordance with Standard Drawing SD 6-8.
- Sediment fences must be firmly trenched into the ground for their entire length.
- Sediment fences must include small 'returns' (see Standard Drawing 6-8) to minimise the risk of water flowing along them rather than through them.
- Sediment fences are to be installed around the toe of all stockpiles (Refer to Standard Drawing SD 4-1).

BARRIER FENCING

- Install barrier fences in the locations shown on Drawing 09000242-SWMP01.
- Barrier fencing can simply be made from tape wound around star pickets or stakes. Alternatively, sediment fence or chain wire fences can be used for this purpose if so desired.
- Barrier and sediment fencing is to be used to ensure that all vehicles entering and leaving the site pass over a stable access point to minimise bogginess in these areas and minimise sediment tracking onto public roads.
- Barrier fencing is to be used to delineate the areas adjacent to the creek and dams as 'no go' zones.
- Barrier fencing is to be used at the discretion of the site manager to delineate other 'no go' areas.
- The soil erosion hazard on the site will be kept as low as practicable by minimising land disturbance. Some ways of doing this are outlined in Table 2.

DUST SUPPRESSION

- The access roads will require dust suppression.
- The water for dust suppression may be sourced from the existing dams or from tanker.
- The application rate for the access road is estimated at 2mm per non-rainy day, however application rates will be dependent on weather, temperature, vehicle movements and surface infiltration rates.

STABILISATION

- Diversion drains and table drains are to be stabilised as indicated in Table 1 .
- Stockpiles are to be stabilised as per the requirements of Table 1 and as shown in Standard Drawing SD 4-1.
- Culvert outlets are to be stabilised in accordance with Table 1 and energy dissipaters are to be provided as per Standard Drawing SD 5-8.
- Final stabilisation is to achieve C-factors as dictated by Table 1 (Refer to Drawing 09000242-SWMP01).
- All construction-phase erosion and sediment control measures (e.g. sediment fences, and energy dissipaters) are to remain in place for the duration of the works.
- Prepared the filled surface by loosening it (SD7-1)
- Place topsoil at 75 mm thickness, 50 mm if slope exceeds 4:1 (SD4-2)
- Incorporate any ameliorants necessary to ensure good growth.
- Seed the surface. Incorporate sterile crops such as oats and/or Japanese Millet to quickly form a good ground cover until native species grow.
- Sow when ground moisture is sufficient; irrigate if required.
- Keep traffic off rehabilitated areas.

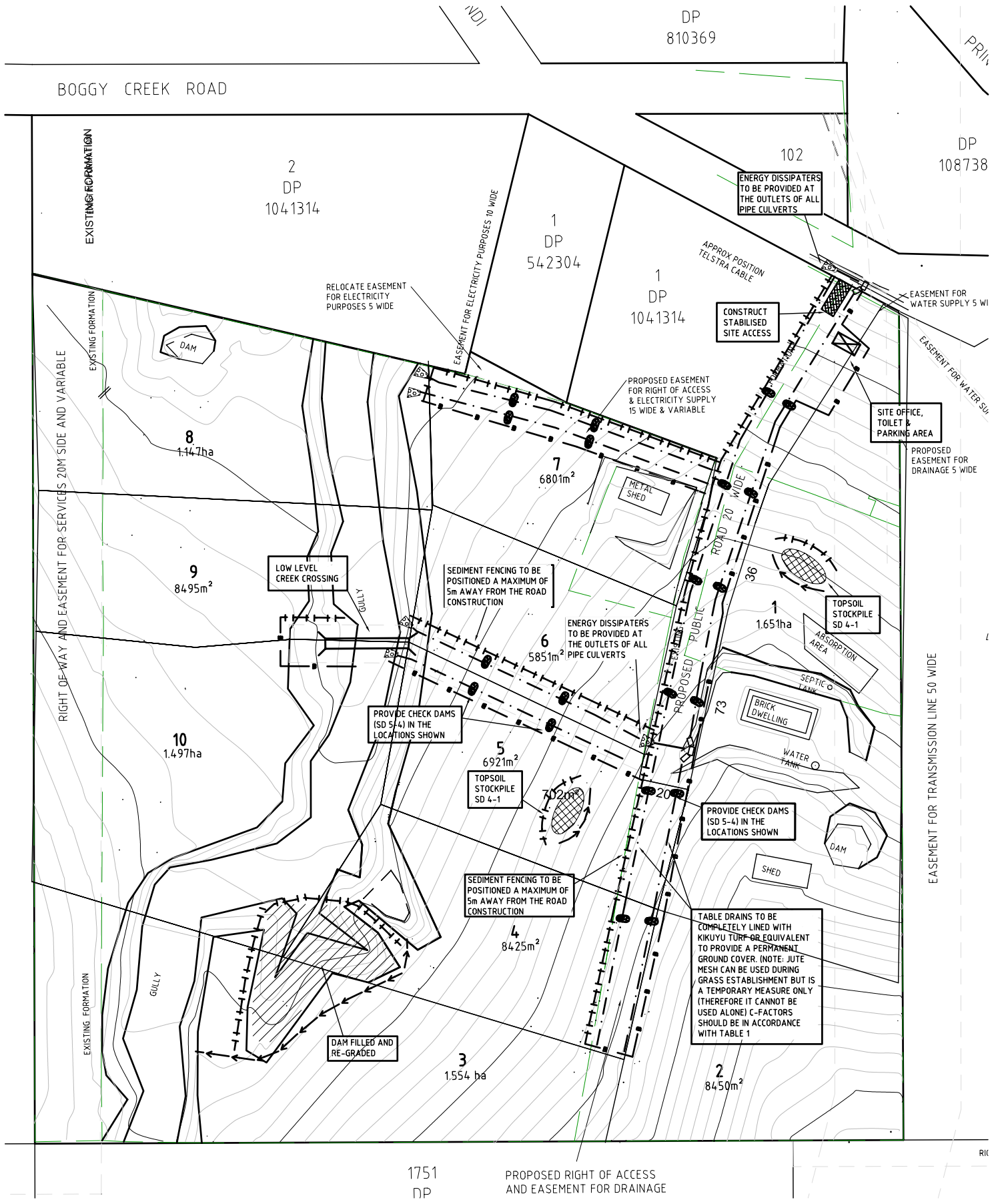
SELF AUDITING PROGRAM

- A self-auditing program must be initiated for the site. The site manager is to inspect the site at least fortnightly and maintain a log of inspections, paying particular attention to:
  - i. Removal of spilled clay/shale or other materials from near riparian areas (i.e. creek and existing dams).
  - ii. Ensuring barrier fencing is maintained and exclusion zones are being observed by all workers and contractors.
  - iv. Constructing additional erosion and/or sediment control works as might become necessary to ensure the desired water control is achieved.
  - v. Maintaining erosion and sediment control measures in a functioning condition for the duration of the excavation works.
  - vi. Removal of trapped sediment and disposal to safe areas.
- Areas of localised soil erosion are to be identified and appropriate preventative measures implemented. These will include:
  - i. Planting additional stabilising vegetation or wind breaks.
  - ii. Stabilising soils with mulches or alternative soil binders.
  - iii. Taking steps to minimise any concentrated stormwater flows.
- Any areas of localised poor drainage are to be identified and appropriate remedial action taken. This will include:
  - i. Installing formalised drainage channels or pipes.
  - ii. Improving soil permeability by cultivating the soil surface.
  - iii. Improving soil permeability by installing infiltration trenches.

MONITORING AND MAINTENANCE

General

- The site manager is to delineate an appropriate location for the site office or compound/s.
- Safe storage areas for wastes, fuels and other hazardous materials are to be delineated at the discretion of the site manager. These areas should be stored and managed as per the requirements for containment bunds.
- Storage locations for erosion control materials are to be delineated at the discretion of the site manager.
- Any waste materials (such as rocks and debris) are to be removed from any publically trafficked road surface as soon as possible.
- Any sediment accumulated in trapping devices is to be removed and deposited in a secure location where there is a low risk that it will be re-entrained in runoff.
- Waste receptacles are to be emptied as necessary. Disposal of waste must be in a manner approved by the site superintendent.
- Replace straw bales at 3-monthly intervals.



SOIL AND WATER MANAGEMENT PLAN

SCALE 1 : 1000 A1

REV	DATE	BY	APP.	REVISION DETAILS

DRAWING STATUS		
DESIGN BY	M.P.	06/10
DRAWN BY	D.J.M	06/10
FINAL APPROVAL	M.P	06/10
SCALE: (on A1 Original)	1 : 1000	
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PROJECT TITLE: PROPOSED SUBDIVISION OF LOT 101 DP 1087389 MILLINGANDI ROAD MILLINGANDI

DRAWING TITLE: SOIL AND WATER MANAGEMENT PLAN

PROJECT NO.	SHEET NO.	REV
09000242	SWMP01	

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