Appendix 2

### **Annexure 3**

# Erosion and Sediment Control Plan Tailings Storage Facility



#### **BIG ISLAND MINING PTY LTD**

Dargues Gold Mine

#### **ENVIRONMENTAL ASSESSMENT - MODIFICATION 3**

Report No. 752/38 – July 2015 Appendix 2

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#### **DEFINITIONS**

TSF: Tailings Storage Facility

Stage 1: The scope of Stage 1 works is defined in Knight Piesold Drawings (Knight Piesold,

Conditional Discharge: Stormwater trapped in a sediment basin will be tested, treated if necessary and released under a controlled discharge policy.

Unconditional Discharge: Stormwater in excess of the design capacity of a sediment basin will flow through it unconditionally.

#### **EROSION AND SEDIMENT CONTROL STAGING REQUIREMENTS**

All erosion and sediment controls must be installed (in order) and functioning prior to undertaking any stripping or earthworks. The site supervisor or environmental manager is to ensure this. Stripping and earthworks necessary to implement the required erosion and sediment controls is permitted but is to be kept to an absolute minimum.

Erosion and sediment control locations, details and sizes to be confirmed onsite during construction with detailed survey. Controls may need to be varied to suit site conditions.

#### Site Preparation

Before commencement of stripping and earthworks, the site is to be secured and the following erosion and sediment control measures installed in order except for Items 10 to 16 which are to be undertaken progressively as required throughout all stages of works (Refer to the Monitoring and Maintenance notes):

- 1. Establish a site office, toilet and parking area (alternatively existing amenities can be used).
- 2. Barrier fencing should be installed around the edge of the construction boundaries to restrict access and in any additional locations as necessary to minimise unnecessary disturbance. Refer to the 'Barrier Fencing' notes below. Delineate only those lands to be disturbed for the upcoming stage of the TSF construction. All access to the TSF Dam construction works must be confined within designated access points.
- 3. Establish sediment fencing in the locations shown and following Standard Drawing SD 6-8 (Refer to the 'Sediment Fencing' notes below).
- 4. Establish the stockpile area within the location specified and following Standard Drawing SD 4-1 (Refer to the 'Stockpiling' notes below).
- 5. Clean water diversion drains are to be constructed and stabilised in sections refer the specific notes 'Erosion and Sediment Controls During Clean Water Diversion Drain Construction' on Drawing 13000046 P04 ESCP04 for specific erosion and sediment control requirements during drain construction. (Refer to Table 5 and Detail 1 for all sizing and lining specifications). Energy dissipaters are to be installed at the outlets (Refer to Detail 2). The waterway crossing within CD1 is to be installed in conjunction with the construction of this drain and in accordance with Standard Drawing 5-1.
- 6. Site specific erosion and sediment controls are to be installed for the construction of TSFSB1 - refer the specific notes 'Erosion and Sediment Controls During TSFSB1 Construction on Drawing 13000046 P04 ESCP04 for specific erosion and sediment control requirements during the basin construction. This sediment basin is to be constructed including its outlet spillway and energy dissipater (Refer to Table 4 for sizing, construction and stabilisation details and to future engineering & geotechnical design & construction specifications for construction details).
- 7. Once TSFSB1 is constructed including its outlet spillway and dissipater construct TSFSB2 and TSFSB3 (Refer to Table 4 for sizing, construction and stabilisation details and to future engineering & geotechnical design & construction specifications for construction details).
- 8. Dirty water diversion drains are to be formed and stabilised (Refer to Table 5 for all sizing and lining specifications). Energy dissipaters are to be installed at the outlets (Refer to Detail 2). (Refer to Drawing 13000046\_P04\_ESCP004

#### GENERAL EROSION AND SEDIMENT CONTROL REQUIREMENTS

for locations).

- 9. Main earthworks can now commence refer to the 'TSF Construction and Earthworks' Staging notes and Drawing 13000046 PO3 ESCP04. Topsoil stripping and disturbance is to be minimised as much as possible to the TSF embankment footprint only until the embankment is of sufficient height to provide at least 800m<sup>3</sup> retention capacity behind it. This is especially critical within catchment CA1 (i.e. the catchment draining into TSFSB1).
- 10. Stockpile topsoil and subsoil separately and in accordance with the requirements on Standard Drawing SD 4-1 and the 'Stockpiling' notes below. 11. Slope lengths across disturbed lands to be maintained at the required
- intervals during all rainfall events (Refer to the 'Slope Lengths' notes).
- 12. Dust suppression to be carried out when required (Refer to the 'Dust Suppression' notes).
- 13. Treatment of dirty water is to be carried out as necessary in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes.
- 14. Monitoring, maintenance and auditing is to be carried out regularly as required, in accordance with the 'Monitoring and Maintenance' notes and the 'Self Auditing Program' notes.
- 15. Undertake progressive stabilisation of lands (in accordance with engineering detail) as final earthworks are complete in each area (rather than waiting until the completion of works).
- 16. Surfaces are to be stabilised to achieve the ground cover requirements as outlined within Table 1. If the engineered surface stabilisation treatments on the downstream TSF embankment batter do not achieve the requirements within Table 1, additional/alternative stabilisation treatments are to be employed (e.g. temporary stabilisation with heavy duty soil polymer (i.e. Vital Stonewall) or equivalent).

#### $\underline{\mathsf{TSF}\;\mathsf{Construction}\;\mathsf{and}\;\mathsf{Earthworks}}$

- 17. When the 'Site Preparation' works are complete, main earthworks can
  - Topsoil stripping and disturbance is to be minimised as much as possible to the TSF embankment footprint only until the embankment is of sufficient height to provide at least 800m3 retention capacity behind it. This is especially critical within catchment CA1 (i.e. the catchment draining into TSFSB1).
  - Stockpile topsoil and subsoil separately. Stockpiles are to be managed
  - including stabilisation in accordance with the requirements on Standard
  - Drawing SD 4-1 and the 'Stockpiling' notes below.
  - If rainfall is forecast (>50% chance of >5mm) exposed soil faces within the topsoil stockpile are to be temporarily stabilised. Temporary stabilisation can be achieved by spraying stockpiles with Vital P47/stonewall (or equivalent) alone.
  - The notes 10 to 16 under "Site Preparation" generally apply.
- 17. As the TSF embankment proceeds, a temporary spillway is to be progressively incorporated into the embankment wall to ensure potential overflows during construction works will pass over the embankment wall in a stable manner. This temporary spillway is only essential prior to significant rainfall capable of overtopping the dam wall. It is to be constructed to engineering design.
- 18. If TSFSB1 has available capacity, water ponding in the low point behind the TSF embankment can be pumped into TSFSB1 for treatment and to minimise water impacting on the dam wall embankment. Pumps should be managed at all times to ensure water is not directed into TSFSB1 when it is full.
- 19. Once the TSF embankment is of sufficient height to provide at least 2,300m<sup>3</sup> retention capacity behind it. TSFSB2 can be removed if desired. However, it is recommended that TSFSB2 is maintained for as long as possible as this basin

- will minimise the amount of upslope water impacting on the upper toe of the TSF embankment
- 20. TSFSB1 and TSFSB3 are to remain until the completion of the TSF Stage 1 embankment is complete (as defined within the Knight Piesold plans (Knight

#### **STOCKPILING**

The topsoil stockpile location is shown on Drawings 13000046 P04 ESCP004. Topsoil stockpiling is to be staged so that surfaces are being progressively stabilised. Temporary subsoil stockpiling can occur within the confined TSF construction area (i.e. within catchments CA1, CA2 and CA3) at the discretion of the site supervisor. Other locations may be possible, however, approval must be granted and appropriate erosion and sediment controls implemented.

All stockpile areas should also incorporate clearly defined access controls and comply with the regulations outlined below.

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 base as per Standard Drawing SD 4-1.
- Stockpiles are not to be positioned within a riparian zone (i.e. within 40m of a drainage reserve/creek).
- Mulched vegetation, topsoil and subsoil (if applicable) are to be stockpiled separately.
- Topsoil stockpiles are to be trimmed and immediately sown with permanent pasture species.
- Stockpiles are to be progressively stabilised to achieve a C-factor of 0.1 within 10 days of formation of each section. Stabilisation measures on stockpiles must be employed as per the requirements set out in Table 1.
- Stabilisation of topsoil stockpiles can be achieved by seeding and spraying stockpiles with Vital P47, hydromulching, covering with jute matting or geotextile (or equivalent).
- Stabilisation of temporary subsoil stockpiles (in place for < 3 months) can be achieved by spraying with Vital P47/stonewall, hydromulching, covering with jute matting or geotextile alone (i.e. seed is not necessary).
- Long term subsoil stockpiles (in place for > 3 months) are to be stabilised by applying a topsoil surface coating first (see SD 4-2 and SD 7-1) and then further stabilising as per the topsoil stabilisation recommendations above.
- If rainfall is forecast (>50% chance of >=5mm/day) exposed stockpile faces within the topsoil stockpile area are to be temporarily stabilised. Temporary stabilisation can be achieved by spraying stockpiles with Vital P47/stonewall (or equivalent) alone
- Topsoil stockpiles should be constructed to no more than 2 meters in height where possible.
  - The working face of a stockpile should be no steeper than 2:1

#### SEDIMENT FENCING

- Install sediment fences in the locations shown on Drawings 13000046 P04 ESCP004.
- Install all sediment fencing in accordance with Standard Drawing SD 6-8.
- Sediment fences must be firmly trenched into the ground for

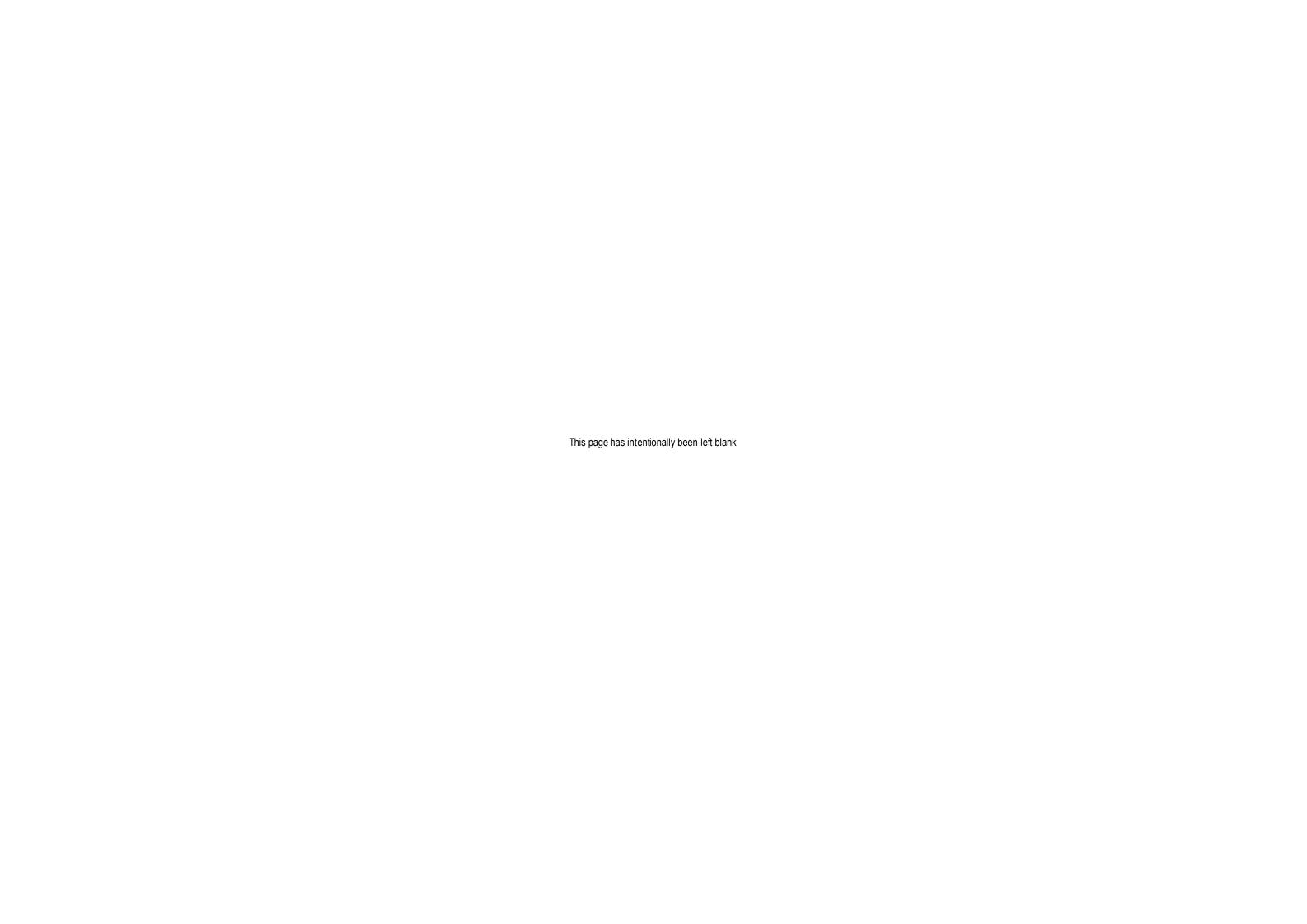
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DARGUES GOLD PROJECT -TAILINGS STORAGE FACILITY (TSF) STAGE 1

EROSION & SEDIMENT CONTROL GENERAL NOTES & REQUIREMENTS SHEET 1 OF 2 PROJECT NO. SUB-PR NO. DRAWING NO. 13000046 P04 ESCP01 00



#### **ENVIRONMENTAL ASSESSMENT - MODIFICATION 3** Report No. 752/38 - July 2015 GENERAL EROSION AND SEDIMENT CONTROL REQUIREMENTS CONTINUED their entire length. less following a rainfall event that caused flow into it. Although not essential, it is recommended that flow or rainfall Sediment fences must include small 'returns' (see Standard activated flocculant/coagulant dosing occurs at the TSFSB1 Drawing 6-8) to minimise the risk of water flowing along them rather than through them. sediment basin inlet/s for settling out dirty water. Sediment fences are to be installed around the toe of all A sediment basin marker is to be installed within all sediment contractors. basins indicating the sediment volume level. stockpiles (Refer to Standard Drawing SD 4-1). Sediment is to be cleaned out (removed) from the sediment BARRIER FENCING basins prior to it reaching this sediment volume level. Barrier fencing is to be used to delineate the work extent. Install barrier fencing around the edge of the works boundary. DIRTY WATER TREATMENT AND CONDITIONAL DISCHARGE REQUIREMENTS Any water accumulating onsite within sediment basins or within Install 2-5m from the edge of the construction area. works. the general works area (e.g. excavations, boxed out sections, Barrier fencing can simply be made from tape wound around sediment traps, sumps or any other low point) must be star pickets or stakes. Alternatively, sediment fence, flagging areas. or chain wire fences can be used for this purpose if so desired. considered as dirty water and is to be tested and treated as Existing site fences can also be used where it is present in the necessary to ensure it complies with the water quality relevant locations. requirements in Table 3 prior to being discharged from site. Barrier fencing is to be used at the discretion of the site All conditional discharges must be approved by the site supervisor or environmental manager and are to have a breaks. manager to delineate other 'no go' areas to minimise unecessary disturbance. discharge permit/authorisation form. The soil erosion hazard on the site will be kept as low as binders. If the water is going to be used back on-site for construction practicable by minimising land disturbance. Some ways of doing or dust-suppression purposes, in catchments that drain back this are outlined in Table 2. into the sediment capture system, it will not require treatment to settle out suspended solids. SLOPE LENGTHS SEDIMENT BASINS Dirty water treatment is to be achieved by using approved The required sediment basin sizes and details are shown in flocculants/coagulants only. Although not essential, it is recommended that flow or rainfall Table 4. Sediment basins are to be constructed in accordance with activated flocculant/coagulant dosing occurs at the TSFSB1 Standard Drawing SD 6-4 and engineering and geotechical sediment basin inlet/s for settling out dirty water. If manual specifications/design. treatment is carried out it is essential that the Gypsum is to be shallow ripped into the basin internal walls at flocculating/coagulating agent is spread evenly over the entire a rate of 5 tonnes/ha during basin construction. pond surface for proper treatment of water. MONITORING AND MAINTENANCE The sediment basins are to be built to incorporate a primary outlet (weir overflow/spillway) sized to have a capacity to **DUST SUPPRESSION** pass the 100 year ARI peak flow (minimum). (Refer to Table $4\,$ Dust suppression should be carried out whenever necessary to for sizing and details). The Basin spillways and outlet minimise sediment becoming air borne due to wind erosion. Ensure a reliable water source and/or dust suppression dissipaters are to be designed and constructed in accordance with engineering and geotechnical specifications/design.

management system (i.e. dustex, dustguard or Vital Stonewall) is available onsite prior to starting any construction works (including stripping and clearing works).

#### STABILISATION

requirements as outlined within Table 1. TSF surfaces are to be stabilised in accordance with the engineering design. If the engineered surface stabilisation treatments do not achieve the requirements within Table 1, additional/alternative

Surfaces are to be stabilised to achieve the ground cover

stabilisation treatments are to be employed (e.g. replacing topsoil (SD 4-2 and SD 7-1), seeding and/or temporary stabilisation with heavy duty soil polymer (i.e. Vital P47/Stonewall) or equivalent).

Stockpiles are to be stabilised in accordance with the 'Stockpiling' notes and Table 1.

#### **SELF AUDITING PROGRAM**

A self-auditing program must be initiated for the site. The site manager is to inspect the site at least weekly and after a rainfall event that causes runoff. They must maintain a log of inspections, paying particular attention to:

- Removal of spilled soils or other materials from near creeks/drainage lines.
- Ensuring barrier fencing is maintained and exclusion zones are being observed by all workers and
- Constructing additional erosion and/or sediment control works as might become necessary to ensure the desired water control is achieved.
- Maintaining erosion and sediment control measures in a functioning condition for the duration of the
- Removal of trapped sediment and disposal to safe
- Areas of localised soil erosion are to be identified and appropriate preventative measures implemented. These might include but are not limited to:
  - Planting additional stabilising vegetation or wind
  - Stabilising soils with mulches or alternative soil
  - Taking steps to minimise any concentrated stormwater flows.

Ensure slope lengths are maintained at maximum 100m intervals across all disturbed lands during any rainfall event.

If necessary diversion bunds/drains, low flow earth banks (Standard Drawing SD 5-5) or sandbags/equivalent should be installed prior to any forecast rainfall event to achieve this.

- The site manager is to delineate an appropriate location for the site office or compound/s (or existing amenities can be
- A rain gauge is to be installed on site and daily rainfall is to be recorded
- All conditional and unconditional discharges will be recorded.
- Safe storage areas for wastes, fuels and other hazardous materials are to be delineated at the discretion of the site
- Storage locations for erosion control materials (e.g. jute matting) 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
- 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.

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An energy dissipater is to be incorporated into the outlet of

Gypsum is to be shallow ripped into the spillway surfaces and

dissipater surface at the base of the spillway at a rate of 10

Any 'Conditional Discharges' from the sediment basins must

further details). 'Conditional Discharges' are those up to the

Note that, if sediment basin water is pumped into a tanker

truck for later use, it cannot be discharged from the tanker

offsite or into a creek/dam without first being tested and,

Trapped water within a sediment basin must be effectively

treated (if necessary), settled, tested to comply with the

water quality limits (Table 3) and discharged within 5-days or

where necessary, treated (Refer to the 'Dirty Water Treatment and Discharge Requirements' below for further

comply with the water quality requirements (Refer to the 'Dirty Water Treatment and Discharge Requirements' below for

each spillway overflow. TSFSB1 dissipater is to extend to

watercourse or 100% vegetated lands. Construct with geotextile and rock size equivalent to the spillway overflow

and in accordance with Standard Drawing SD 5-8.

tonnes/ha prior to placing geotextile and rock.

design event.

details).





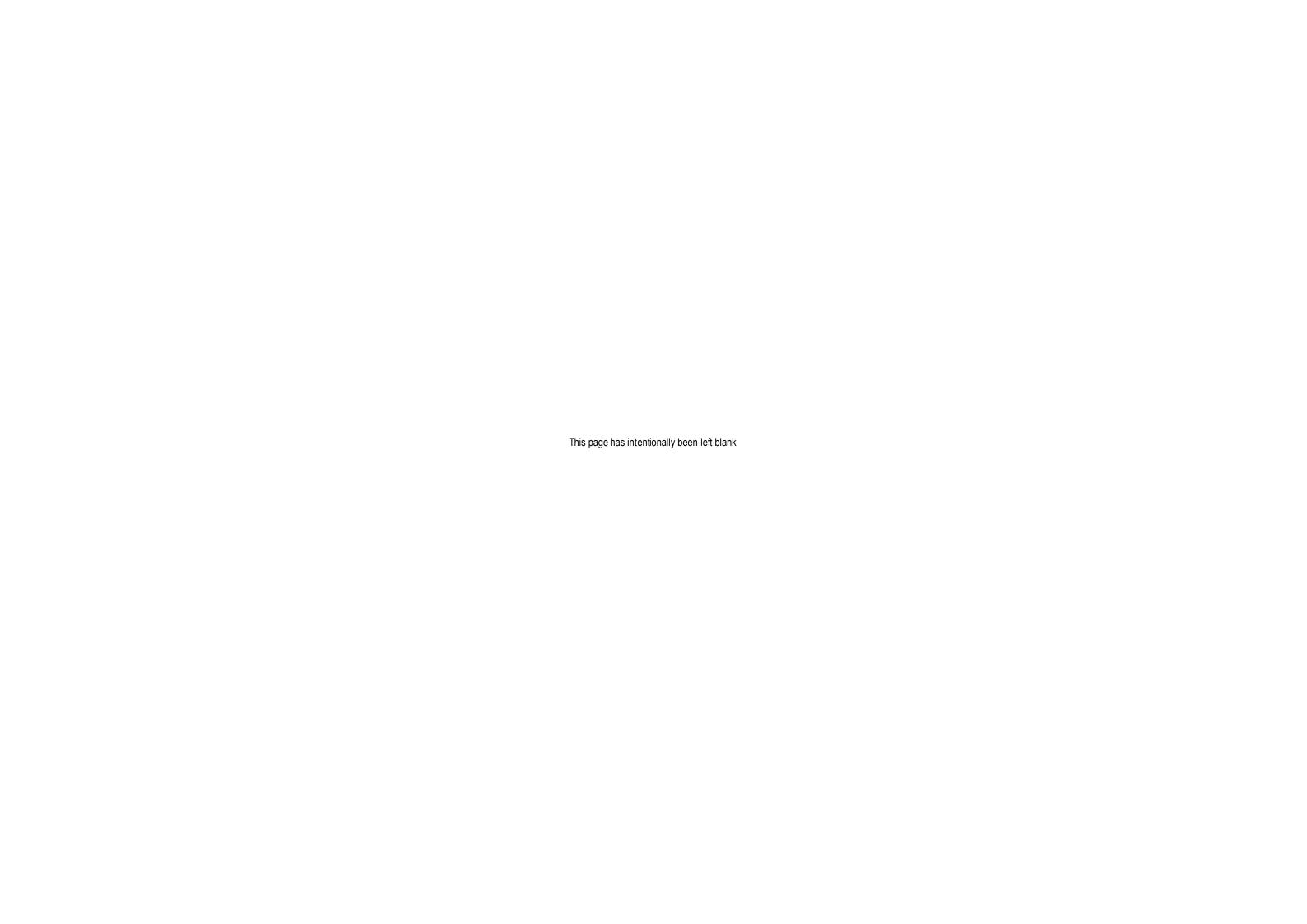
DARGUES GOLD PROJECT -TAILINGS STORAGE FACILITY (TSF) STAGE 1

EROSION & SEDIMENT CONTROL GENERAL NOTES & REQUIREMENTS SHEET 2 OF 2 PROJECT NO. SUB-PR NO. DRAWING NO.

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| TABLE 1 MAXIMUM ACCEPTABLE C-FACTORS AT NOMINATED TIMES   |                     |  |  |  |  |  |  |
|---|---------------------|--|--|--|--|--|--|
| LANDS   | MAXIMUM<br>C-FACTOR | REMARKS  |  |  |  |  |  |
| Downstream face of TSF<br>emabankment batter  | 0.10                | Applies prior to rainfall (>50% chance of rainfall >=5mm/day). Maximum C-factor of 0.10 equals 60% ground cover  |  |  |  |  |  |
| Topsoil stockpile during construction   | 0.10                | Applies prior to rainfall (>50% chance of rainfall >=5mm/day). Maximum C-factor of 0.10 equals 60% ground cover  |  |  |  |  |  |
| Waterways and other areas<br>subjected to concentrated<br>flows (e.g. table drains), post<br>construction and during<br>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. Maximum C-factor of 0.05 equals 70% ground cover |  |  |  |  |  |
| Stockpiles and batters, post construction   | 0.10                | Applies after ten working days from completion of formation.<br>Maximum C-factor of 0.10 equals 60% ground cover   |  |  |  |  |  |
| All lands, including waterways<br>and stockpiles during<br>construction and operation   | 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 post construction   | 0.05                | Applies after 60 working days of completion of works.<br>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)<br>metres from the edge of<br>any essential construction<br>activity as shown on the<br>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 corridors                                    | Limited to a maximum width of 7 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,<br>including revegetation<br>areas | Entry prohibited except<br>for essential management<br>works  | Thinning of growth might be necessary, for example, for fire reduction or weed removal   |  |  |  |  |  |

| TABLE 3                             |  |  |  |  |  |  |  |
|-------------------------------------|--|--|--|--|--|--|--|
| STORMWATER DISCHARGE/RELEASE LIMITS |  |  |  |  |  |  |  |
| CHARACTERISTIC                      | LIMIT  |  |  |  |  |  |  |
| рН                                  | 6.5-8.5  |  |  |  |  |  |  |
| Total suspended solids (mg/L)       | 40*<br>(Maximum)   |  |  |  |  |  |  |
| Turbidity (NTU)                     | An approved correlated NT<br>value which corresponds to<br><40mg/L TSS |  |  |  |  |  |  |
| Hydrocarbons                        | Nil visible  |  |  |  |  |  |  |

TSS has been reduced from the Blue Book sensitivity of the receiving environment.

#### **BACKGROUND AND CALCULATIONS**

RUSLE: A = SOIL LOSS (tonnes/ha/yr) = R.K.LS.P.C.

THE AVERAGE ANNUAL SOIL LOSS CALCULATIONS WERE UNDERTAKEN USING THE "BLUE BOOK" – MANAGING URBAN STORMWATER (LANDCOM, 2004)

| R-FACTOR               | 2,500 (MANAGING URBAN STORMWATER, LANDCOM, 2004)     |  |  |  |  |  |  |  |
|------------------------|--|--|--|--|--|--|--|--|
| K-FACTOR               | 0.06   |  |  |  |  |  |  |  |
|                        | SOILS ARE TYPE D (DISPERSIBLE)                       |  |  |  |  |  |  |  |
| LS-FACTOR              | 13.85<br>(SLOPE = 30%, MAX. SLOPE LENGTH = 100m)     |  |  |  |  |  |  |  |
| P-FACTOR               | 1.3 - DEFAULT ASSUMED                                |  |  |  |  |  |  |  |
| C-FACTOR               | 1 - DEFAULT ASSUMED                                  |  |  |  |  |  |  |  |
| CATCHMENT<br>AREAS     | TOTAL STAGE 1 CATCHMENT AREA = 8.1ha                 |  |  |  |  |  |  |  |
|                        | TSESB1 CATCHMENT AREA (CA1) = 3.4ha                  |  |  |  |  |  |  |  |
|                        | TSFSB2 CATCHMENT AREA (CA2) = 2.35ha                 |  |  |  |  |  |  |  |
|                        | TSFSB3 CATCHMENT AREA (CA3) = 2.35ha                 |  |  |  |  |  |  |  |
| ESTIMATED<br>SOIL LOSS | = 2700 t/ha/yr = 21870 tonnes/yr (SOIL LOSS CLASS 7) |  |  |  |  |  |  |  |

THE "BLUE BOOK" REQUIRES THE INSTALLATION OF A SEDIMENT BASIN ON THE SITE IF THE SOIL LOSS > 200 tonnes/yr. THE SOIL LOSS FOR THIS SITE IS > 200 tonnes/yr, THEREFORE SEDIMENT BASIN/S ARE

#### ADOPTED VALUES FOR SEDIMENT BASIN AND DRAINAGE CALCULATIONS:

- 2yr, 6hr ARI event = 10.5mm/hr
- 5-day, 85th%'ile rainfall depth = 42.4mm (Temporary sediment basins for TSF construction)
- C<sub>10</sub> (for disturbed/construction areas) = 0.9
- C10 (for grassed upslope/clean water areas) = 0.55

|        | TABLE 4 - SEDIMENT BASIN AND BASIN SPILLWAY SIZING DETAILS |   |      |   |  |  |  |  |  |  |
|--------|--|---|------|---|--|--|--|--|--|--|
| Basin  | Sediment Storage<br>Volume (m³)                            | Settling Volume Total Basin Vo<br>(m³) (m³) |      | Basin Spillway                              |  |  |  |  |  |  |
| TSFSB1 | 865  | 995   | 1860 |   |  |  |  |  |  |  |
| TSFSB2 | 813  | 688   | 1501 | To engineering spec <mark>ifications</mark> |  |  |  |  |  |  |
| TSFSB3 | 813  | 688   | 1501 |   |  |  |  |  |  |  |
|        |  |   |      |   |  |  |  |  |  |  |

- Sediment basins and their spillways are to be constructed in accordance with engineering and geotechnical specifications to be structurally sound and geotechnically stable.
- Gypsum is to be shallow ripped into the basin walls at a rate of 5 tonnes/ha during basin construction.
- Gypsum is to be shallow ripped into the spillway walls at a rate of 10 tonnes/ha during basin construction
- Ensure the total basin volumes are provided within the available basin capacity below the spillway level.
- The outer batters/basin walls are to be stabilised by topsoiling and seeding and lining with jute matting (or equivalent) to achieve 70% cover within 10 days after completing the basin construction.
- Ensure suitable access is provided into the sediment basins to enable treatment, sediment removal and maintenance.
- A sediment marker is to be installed within each basin (well away from the inlets and outlets) to indicate the sediment storage volume level (measured from the bottom surface of the basin). - Dissipaters are to be provied at the outlet of sediment basin spillways and are to extend to a watercourse or 100% vegetated lands.

#### TABLE 5 - DIVERSION DRAIN SIZING AND LINING DETAILS

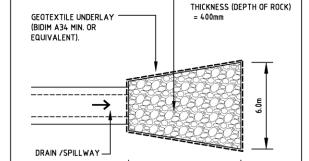
| DRAIN SIZING DETAILS      |  |                       |               |              |               |            |
|---------------------------|--|-----------------------|---------------|--------------|---------------|------------|
|                           | Refer to 'Det  | tail 1' below a       | and Blue Book | Standard Dra | awings SD 5-5 | and SD 5-6 |
| Structure Name            | CD1  | CD2                   | CD3           | CD4          | DD1           | DD2        |
| Channel depth, D (m)      |  |                       | 0.6           | 0.6          | 0.4           | 0.4        |
| Channel base width, B (m) | To opging  | To engineering detail |               | 1.2          | 0.6           | 0.6        |
| Channel side slope (H:V)  | To enginee   |                       |               | 2            | 2             | 2          |
| Channel top width, T (m)  |  |                       | 3.6           | 3.6          | 2.2           | 2.2        |
| Stabilisation and lining  | g See 'Drain Stabilisation and Lining' below                                   |                       |               |              |               |            |
| Drain slope (%)           | Drains to fall in the direction shown. Drain slopes to be relative to the site |                       |               |              |               |            |
|                           | topography. However, the minimum drain slope to be 1%.                         |                       |               |              |               |            |

#### DRAIN STABILISATION AND LINING Soil preparation (prior to lining drains): Gypsum is to be shallow ripped into the subgrade surface at a rate of 10 nes/ha prior to placing topsoil. - The ground surface is to be left rough and uneven prior to lining the drain. Drain lining - CD1 and CD2: - Refer to engineering specifications - Geotextile underlay (bidim A34 min. or equivalent

The geotextile is to be placed loosely over the

- Rock rip-rap (d50 = 200mm DIA)

## **DETAIL 1 - DIVERSION DRAIN/CHUTE**



**DETAIL 2 - ROCK DISSIPATER** 

ROCK DISSIPATERS TO BE INSTALLED IN ACCORDANCE WITH BLUE BOOK STANDARD DRAWING (SD 5-8).

4.0m

- GYPSUM IS TO BE SHALLOW RIPPED INTO THE SUBGRADE SURFACE (AT A RATE OF 10 tonnes/ha) PRIOR TO PLACING
- BASIN SPILL WAY DISSIPATERS ARE TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ENGINEERING DETAILS.

| REV | DATE     | DES.   | DRN.   | APP. | REVISION DETAILS             | DRAWING          | Nort    |   |  |  |  |
|-----|----------|--------|--------|------|------------------------------|------------------|---------|---|--|--|--|
|     |          |        |        |      |                              | DESIGN BY        | A.J.B.  |   |  |  |  |
|     |          |        |        |      |                              | DRAWN BY         | A.J.B.  | 7 |  |  |  |
|     |          |        |        |      |                              | FINAL APPROVAL   | M.P.    | 7 |  |  |  |
|     |          |        |        |      |                              |                  | 7       |   |  |  |  |
|     |          |        |        |      |                              | (on A3 Original) |         |   |  |  |  |
|     |          |        |        |      |                              | E00 10           | 5551111 | 7 |  |  |  |
| 00  | 21/05/15 | A.J.B. | A.J.B. | M.P. | ISSUE FOR APPROVAL           | IFOR AP          | PROVAL  |   |  |  |  |
| Α   | 18/05/15 | A.J.B. | A.J.B. | M.P. | DRAFT ISSUE FOR CONSULTATION |                  | INOTAL  |   |  |  |  |



DARGUES GOLD PROJECT -TAILINGS STORAGE FACILITY (TSF) STAGE 1

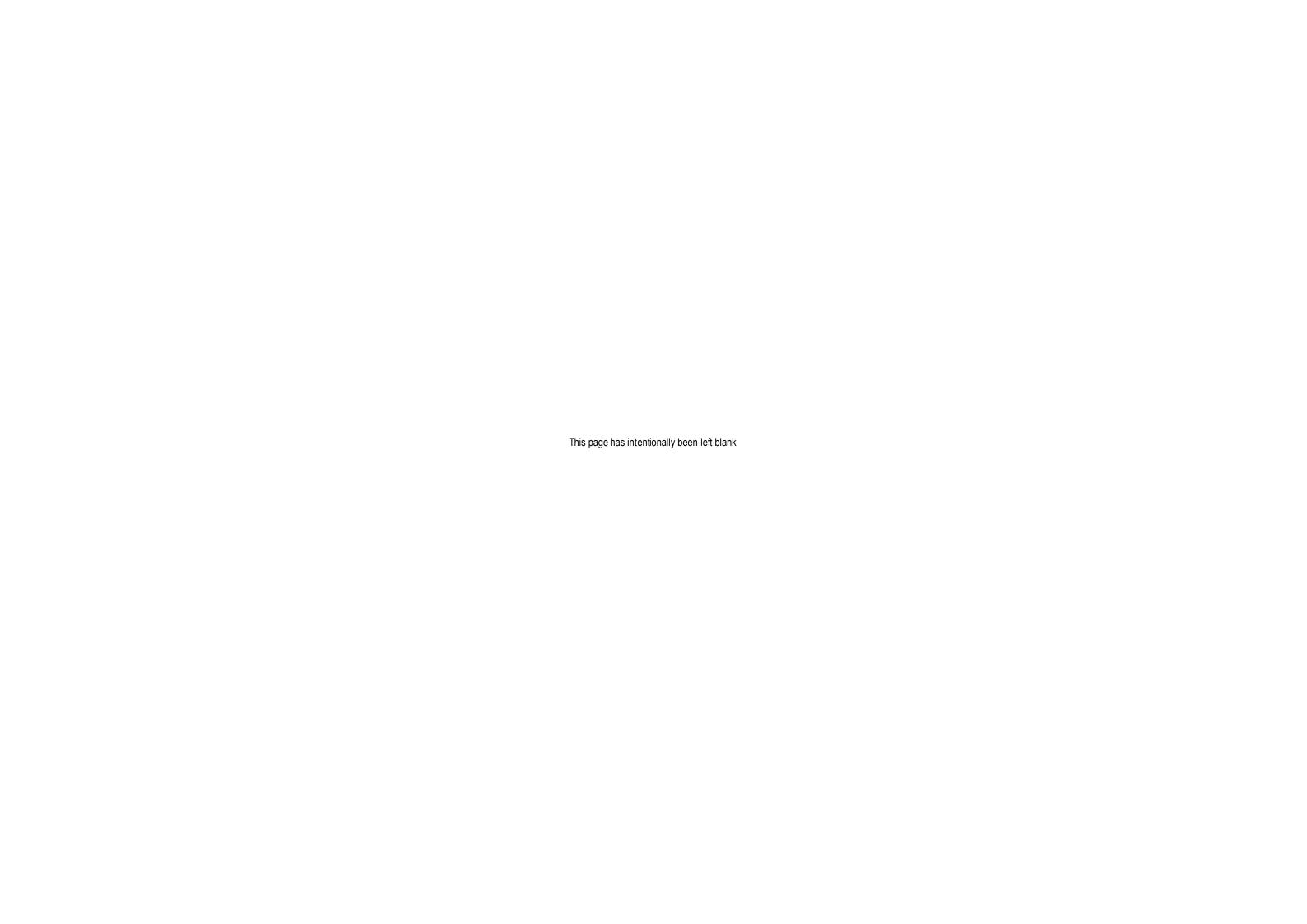
EROSION & SEDIMENT CONTROL PLAN CALCULATIONS & TABLES

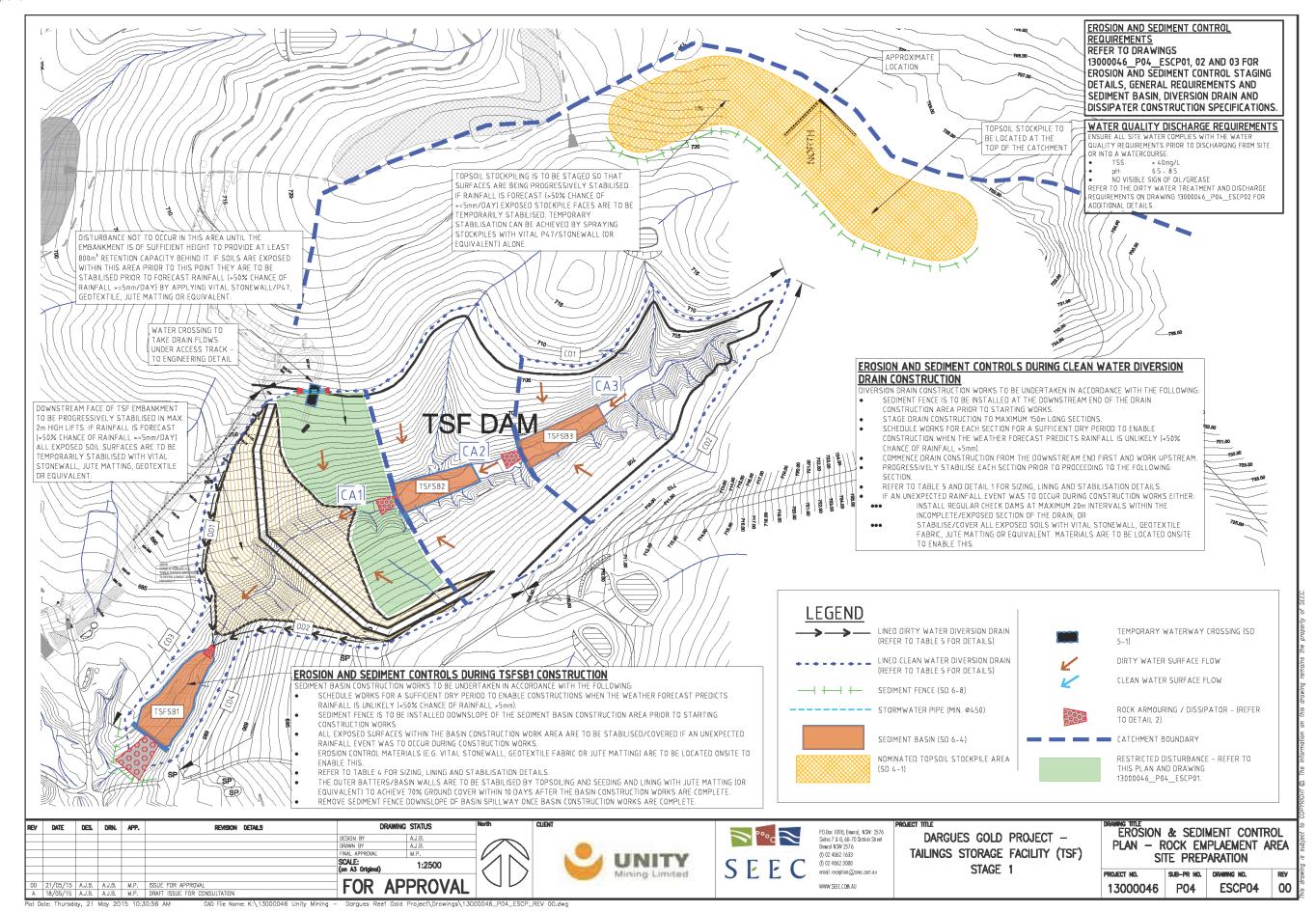
ROCK RIP-RAP dso: = 200mm

SUB-PR NO. DRAWING NO. ESCP03 00 13000046 P04

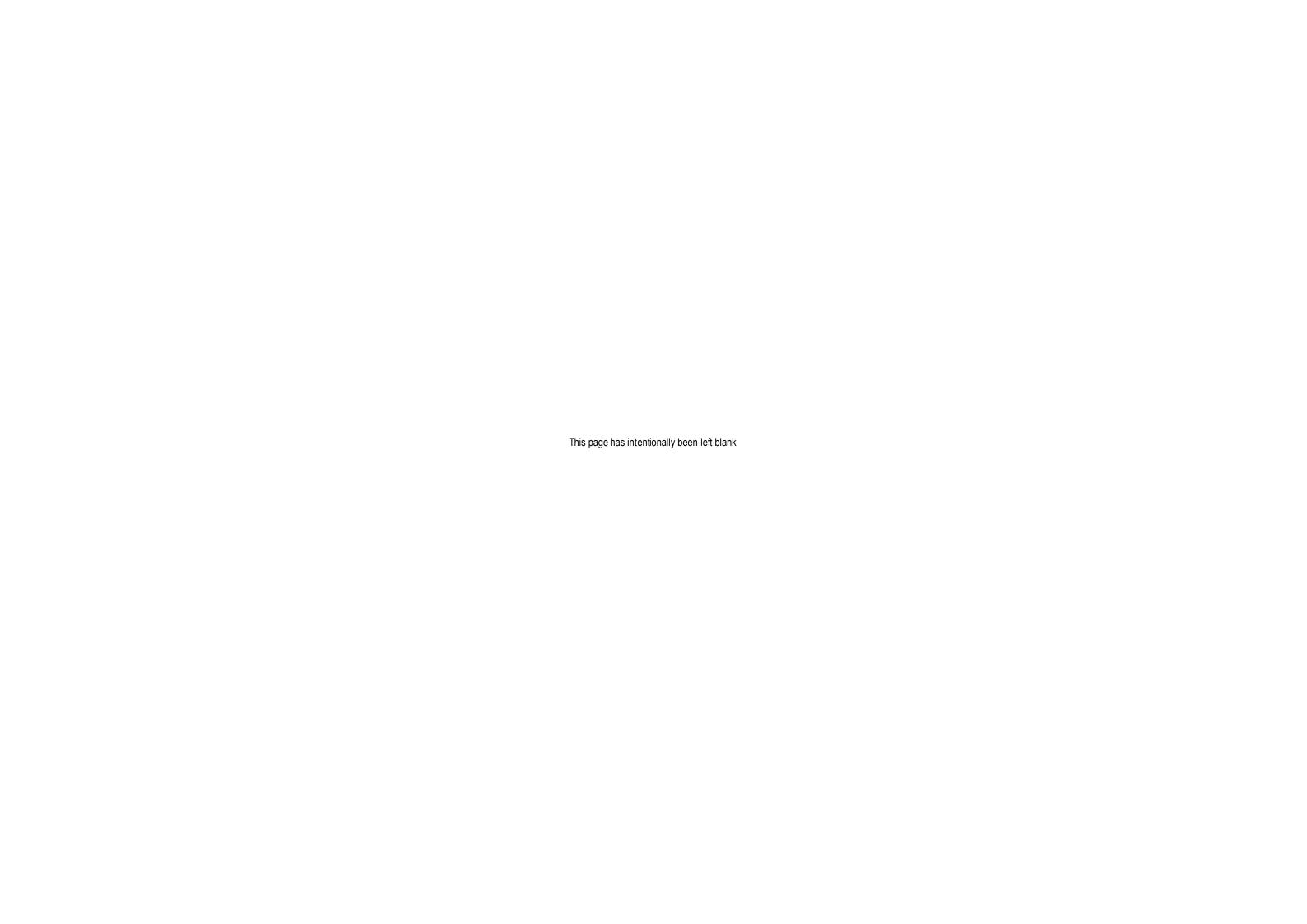
Plot Date: Thursday, 21 May 2015 10:30:49 AM

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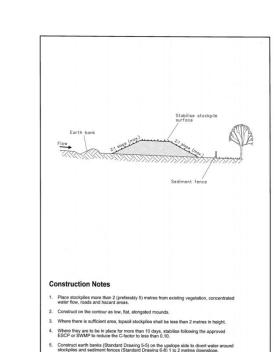




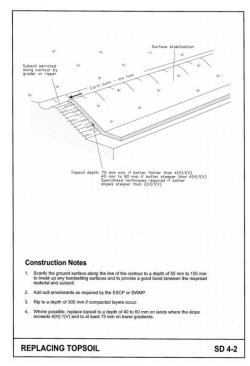


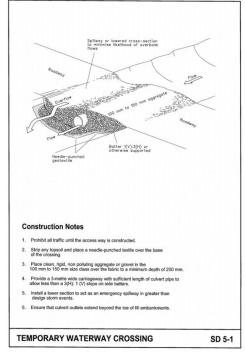


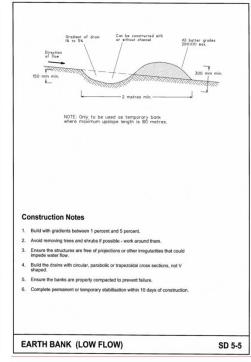
Report No. 752/38 – July 2015 Appendix 2

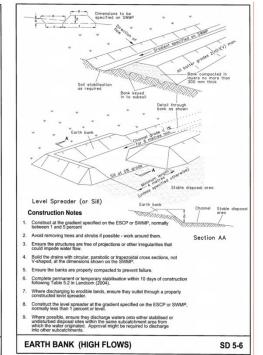


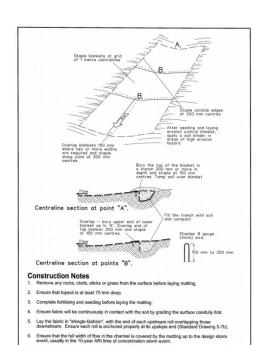
STOCKPILES



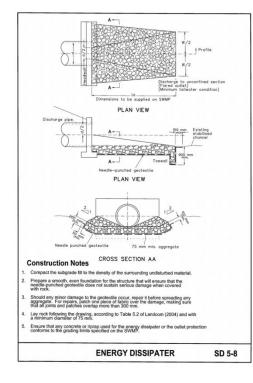


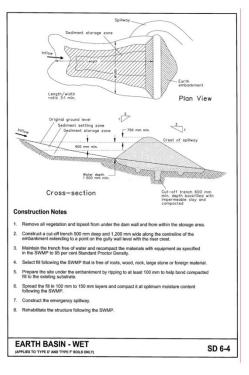


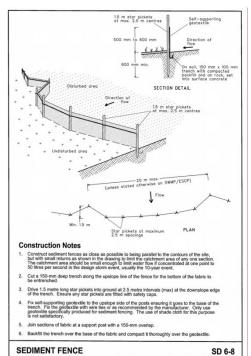


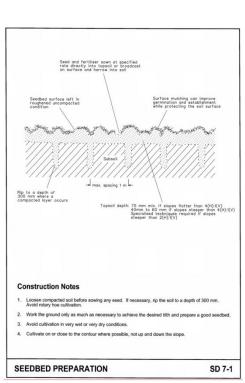


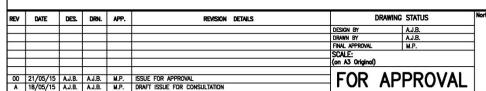
RECP: CONCENTRATED FLOW











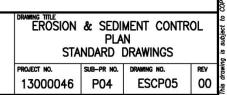
SD 5-7

SD 4-1





DARGUES GOLD PROJECT —
TAILINGS STORAGE FACILITY (TSF)
STAGE 1





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