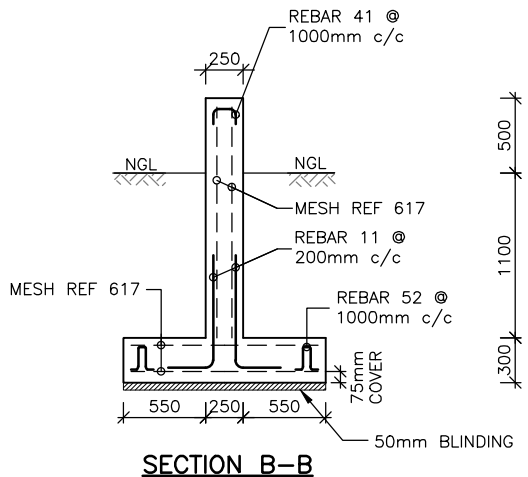
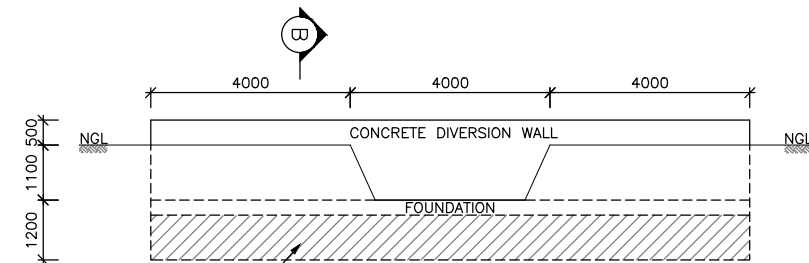


---

**APPENDIX C – DESIGN DRAWINGS**

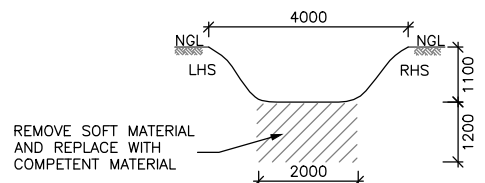


**SECTION B-B**



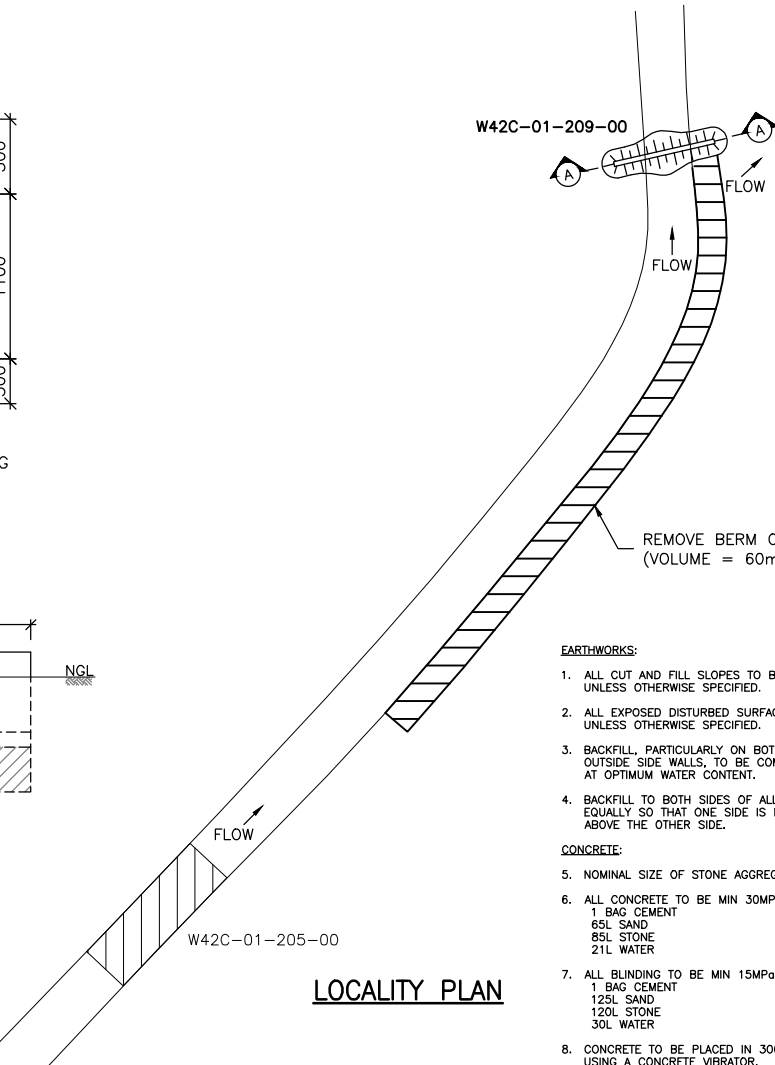
**SECTION A-A**

REMOVE SOFT MATERIAL AND REPLACE WITH COMPETENT MATERIAL COMPACTED IN 100mm LAYERS



**CROSS SECTION THROUGH CHANNEL**

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**LOCALITY PLAN**

**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**CONCRETE:**

5. NOMINAL SIZE OF STONE AGGREGATE TO BE SIZE 19-26mm.
6. ALL CONCRETE TO BE MIN 30MPa CONCRETE MIX:  
1 BAG CEMENT  
65L SAND  
85L STONE  
21L WATER
7. ALL BLINDING TO BE MIN 15MPa CONCRETE MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
8. CONCRETE TO BE PLACED IN 300mm LAYERS AND VIBRATED USING A CONCRETE VIBRATOR.
9. MIN 50mm COVER REQUIRED ON ALL CONCRETE REINFORCING UNLESS OTHERWISE SPECIFIED.
10. NOT MORE THAN 1m DEPTH OF CONCRETE TO BE CAST PER DAY.

**DISPERSIVE SOILS:**

- (ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):
12. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
  13. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
  14. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.

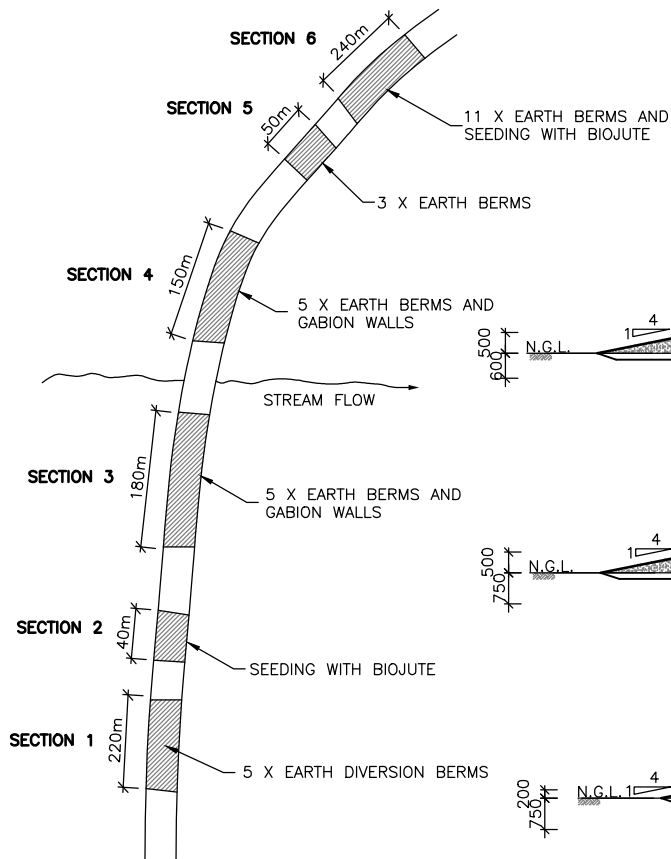


**PROJECT**  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**  
CONCRETE DIVERSION BERM

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

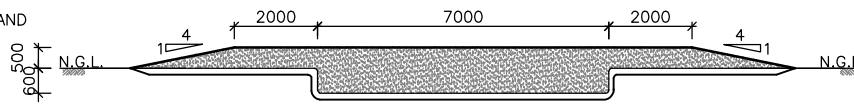
|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-209-00/01 | A       |



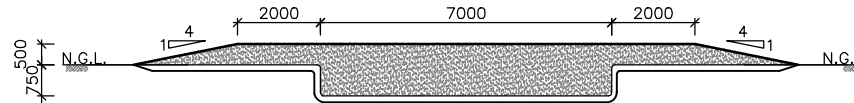
PLAN LAYOUT

NOTE: HEIGHT OF BERMS ABOVE SIDE BANKS TO BE 500mm HIGHER THAN LOWEST BANK ON THE SIDE WHERE WATER WILL BE DISCHARGING.

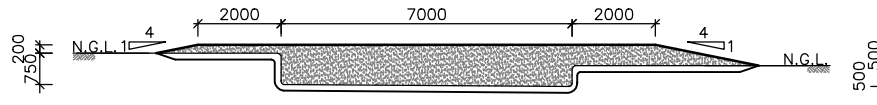
NOTE: SIDE BANKS TO BE SLOPED WHERE NECESSARY ALONG SECTIONS 1 TO 6.



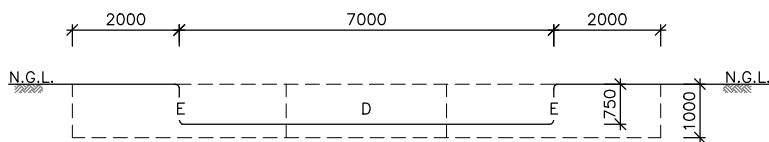
TYPICAL BERM DETAIL FOR SECTION 1



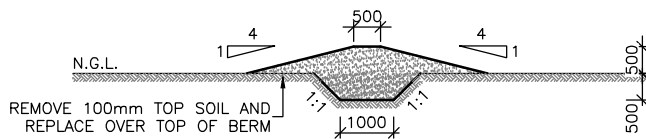
TYPICAL BERM DETAIL FOR SECTIONS 3, 4 & 5



TYPICAL BERM DETAIL FOR SECTION 6



TYPICAL SECTION THROUGH GABION WALL IN SECTION 3 & 4



TYPICAL CROSS SECTION THROUGH BERM

GABIONS:

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>. e.g. AG200.
- 100mm - 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRIABLE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX: 1 BAG CEMENT, 125L SAND, 120L STONE, 30L WATER.
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

EARTHWORKS:

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

DISPERSIVE SOILS:

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
- FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
- ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

GABION & RENO MATTRESS SIZES

| CODE | SIZE              |
|------|-------------------|
| A    | 1.0 x 1.0 x 1.0m  |
| B    | 1.5 x 1.0 x 1.0m  |
| C    | 2.0 x 1.0 x 1.0m  |
| D    | 3.0 x 1.0 x 1.0m  |
| E    | 4.0 x 1.0 x 1.0m  |
| F    | 2.0 x 0.5 x 0.5m  |
| G    | 2.0 x 1.0 x 0.5m  |
| H    | 3.0 x 1.0 x 0.5m  |
| J    | 4.0 x 1.0 x 0.5m  |
| K    | 2.0 x 1.0 x 0.3m  |
| L    | 3.0 x 1.0 x 0.3m  |
| M    | 6.0 x 2.0 x 0.17m |
| N    | 6.0 x 2.0 x 0.23m |
| P    | 6.0 x 2.0 x 0.3m  |

NOTES

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



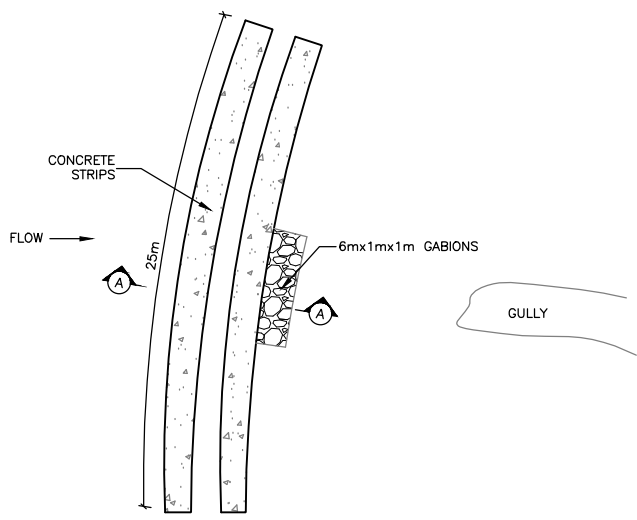
PROJECT  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

DRAWING DESCRIPTION  
NEW ROAD AND SURFACE  
CROSS DRAINS

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | B.MCCAROGHER |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

DRAWING No. W42C-02-208-00/01 REV No. A

NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.



**LOCALITY PLAN**

**CONCRETE:**

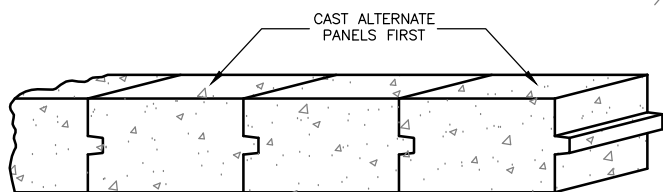
1. NOMINAL SIZE OF STONE AGGREGATE TO BE SIZE 19–26mm.
  2. ALL CONCRETE TO BE MIN 30MPa CONCRETE MIX:  
1 BAG CEMENT  
65L SAND  
85L STONE  
21L WATER
  3. ALL BLINDING TO BE MIN 15MPa CONCRETE MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
  4. CONCRETE TO BE PLACED IN 300mm LAYERS AND VIBRATED USING A CONCRETE VIBRATOR.
  5. MIN 50mm COVER REQUIRED ON ALL CONCRETE REINFORCING UNLESS OTHERWISE SPECIFIED.
  6. NOT MORE THAN 1m DEPTH OF CONCRETE TO BE CAST PER DAY.
  7. ALL CONCRETE WALLS TO BE FULLY SUPPORTED UNTIL THEY ARE BACKFILLED TO THE DESIGNED LEVEL.
- DISPERSIVE SOILS:**  
(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):
8. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
  9. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
  10. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**GABIONS:**

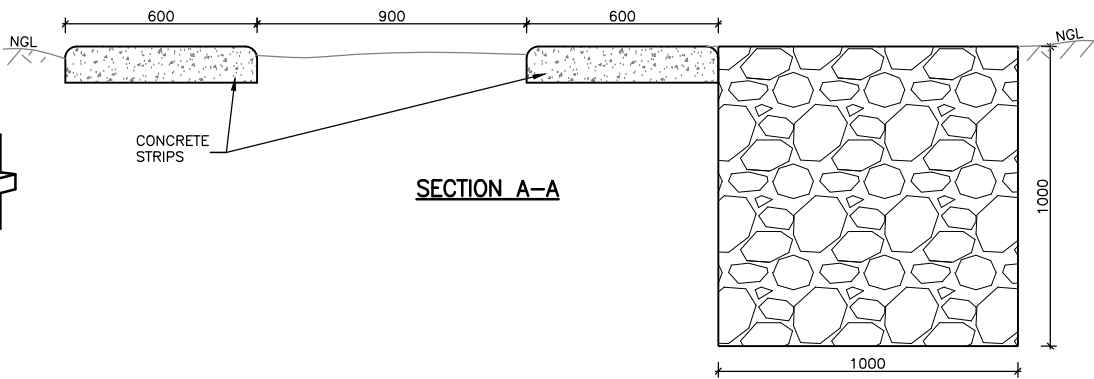
1. GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
  2. GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>, e.g. AG200.
  3. 100mm – 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRIABLE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
  4. ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
  5. CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
  6. GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
  7. GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.
- EARTHWORKS:**
8. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
  9. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
  10. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
  11. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**NOTES**

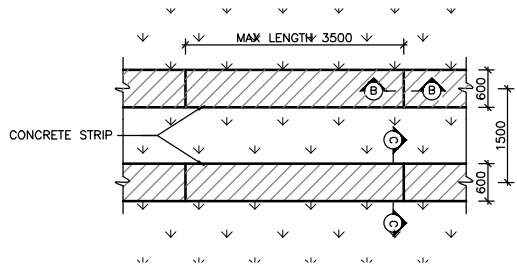
1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



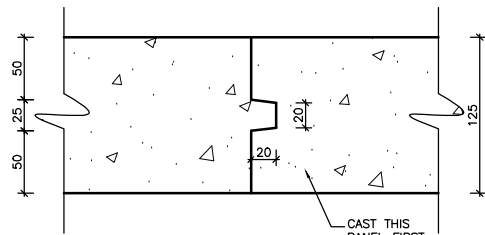
**SCHEMATIC VIEW OF JOINT BETWEEN PANELS**



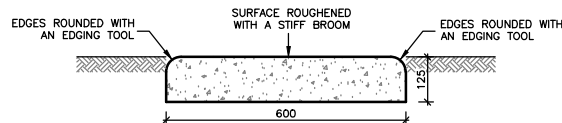
**SECTION A-A**



**PLAN OF CONCRETE STRIP**



**SECTION B-B**



**SECTION C-C**

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**

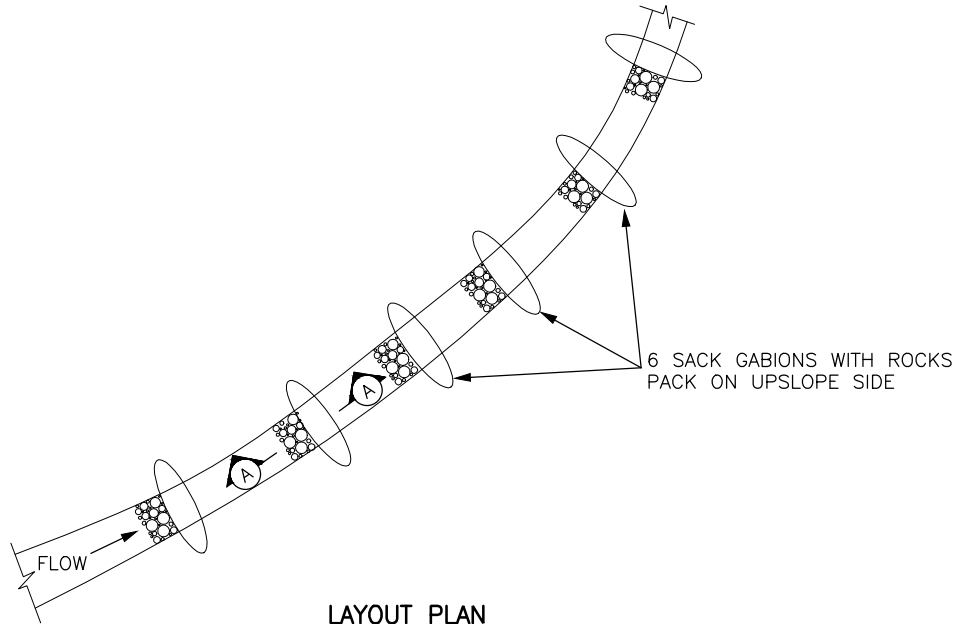


**PROJECT**  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

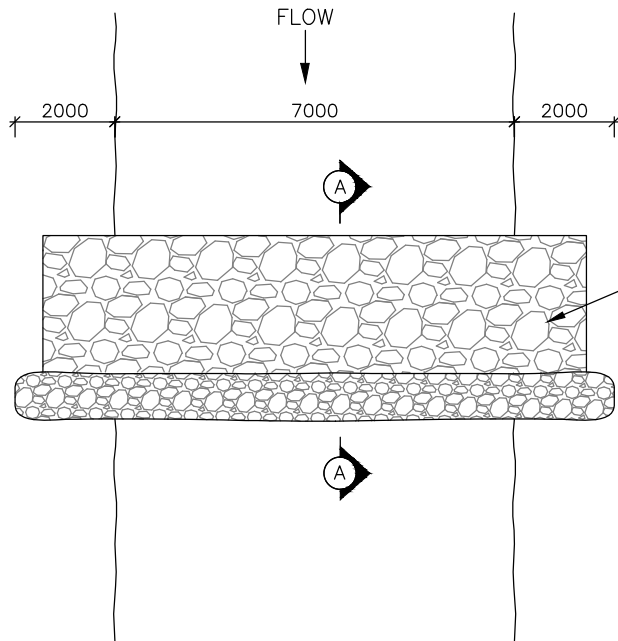
**DRAWING DESCRIPTION**  
CONCRETE STRIPS AND  
GABION PROTECTION

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-209-00/01 | A       |

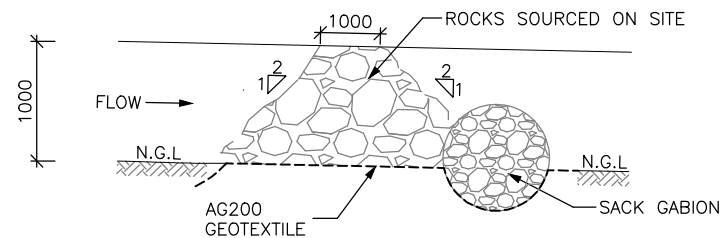


LAYOUT PLAN



PLAN

BANKS TO BE SLOPED, SACK GABION AND ROCKPACKS TO BE KEYED INTO BANKS



SECTION A-A

GABIONS:

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>. e.g. AG200.
- 100mm – 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRIABLE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX: 1 BAG CEMENT 125L SAND 120L STONE 30L WATER
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

EARTHWORKS:

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

DISPERSIVE SOILS:

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
- FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
- ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

NOTES

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

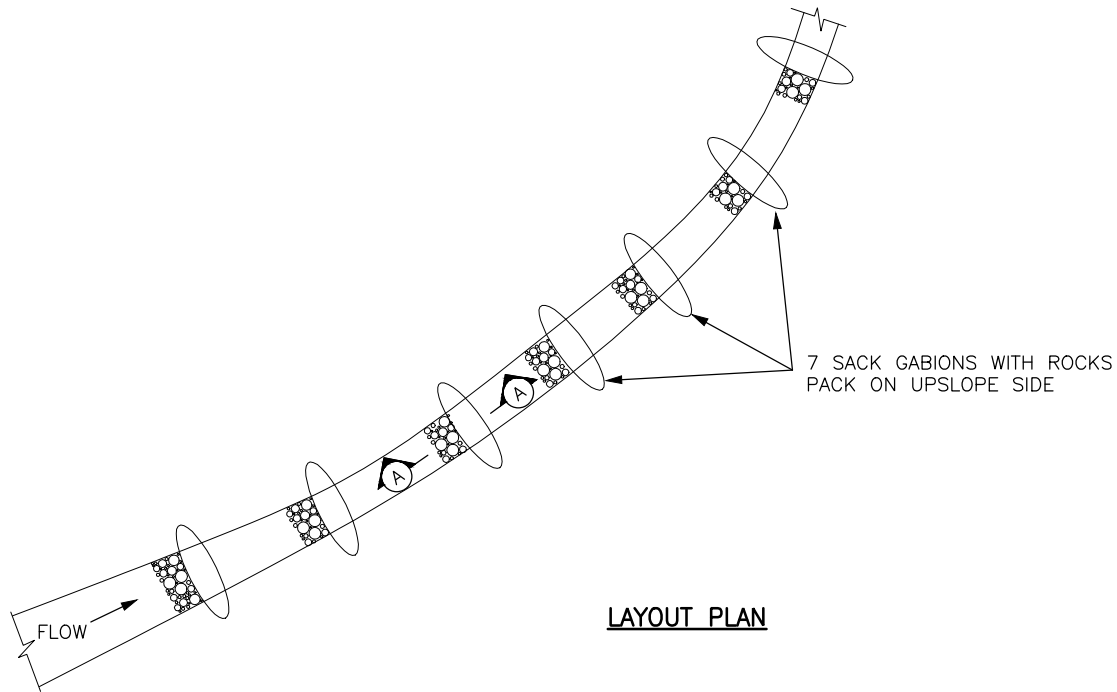
PROJECT  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

DRAWING DESCRIPTION  
ROCKPACKS

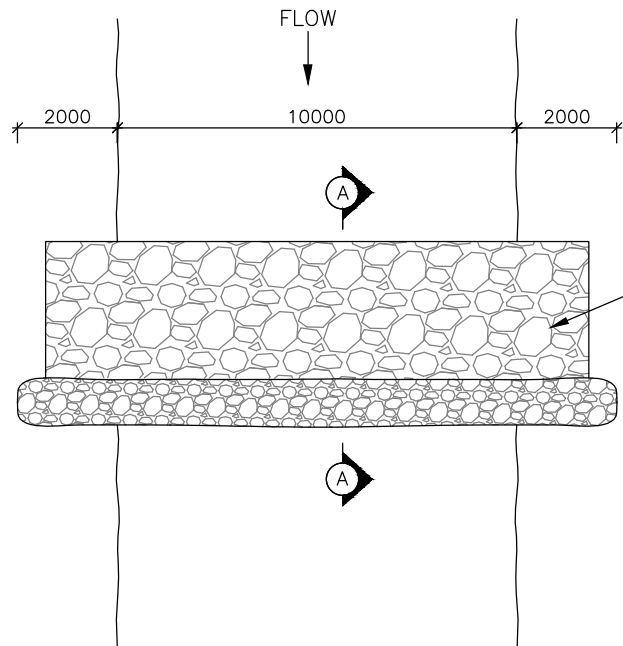
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | B.MCCAROGHER |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-211-00/01 | A       |

NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.

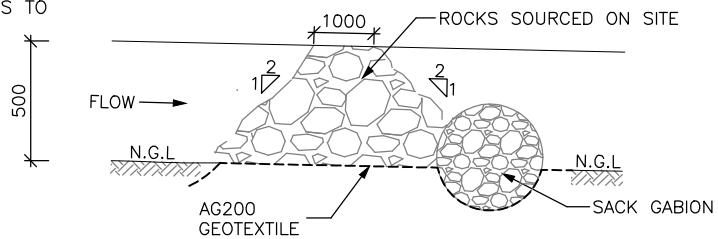


**LAYOUT PLAN**



**PLAN**

BANKS TO BE SLOPED, SACK GABION AND ROCKPACKS TO BE KEYED INTO BANKS



**SECTION A-A**

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**

**GABIONS:**

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>. e.g. AG200.
- 100mm – 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRIABLE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX: 1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

**EARTHWORKS:**

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

- (ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):
- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
  - FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
  - ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



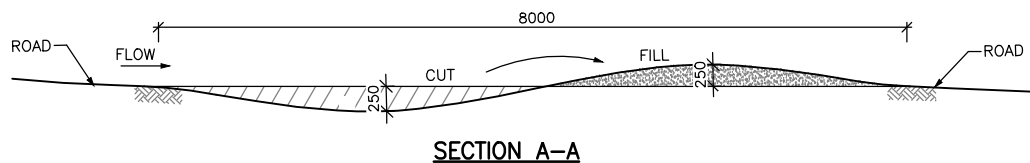
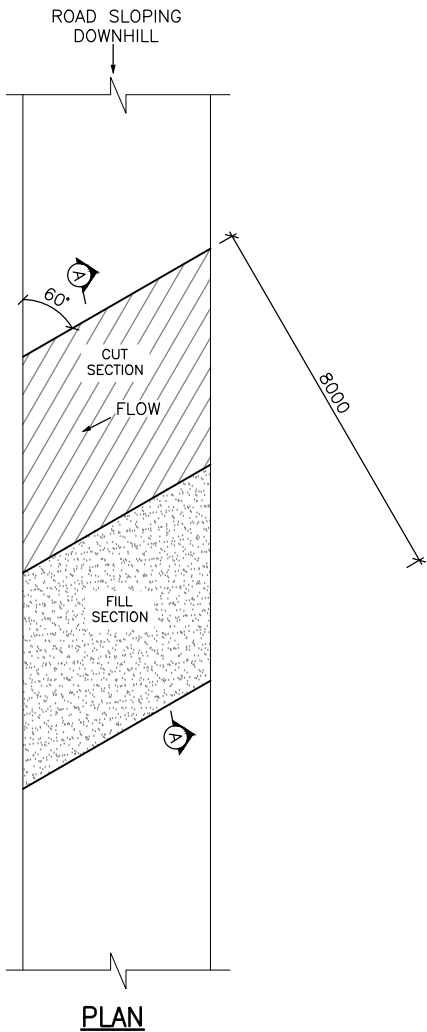
**aurecon**

**PROJECT**  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**  
ROCKPACKS

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | B.MCCAROGHER |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-212-00/01 | A       |



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

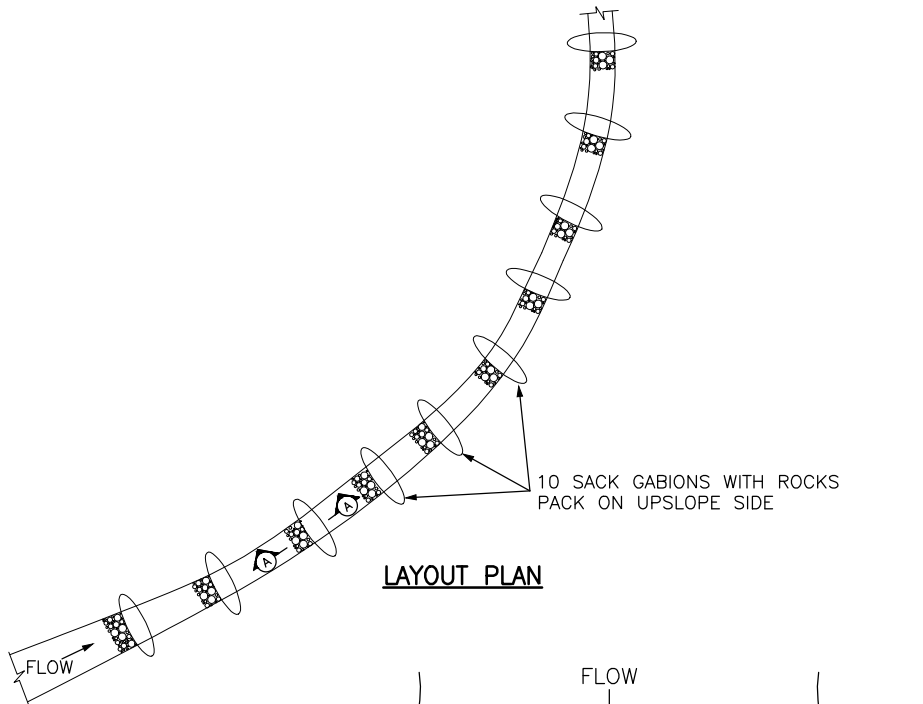
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-213-00/01 | A.      |

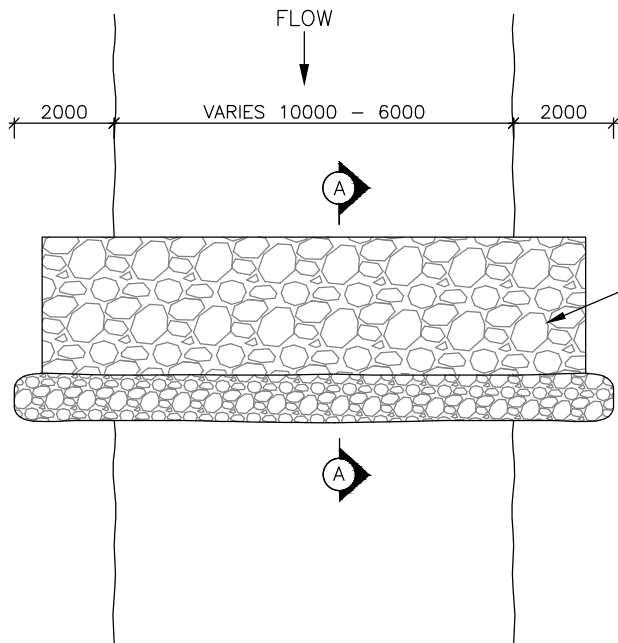
**NOTE:**

A TOTAL OF 16 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**

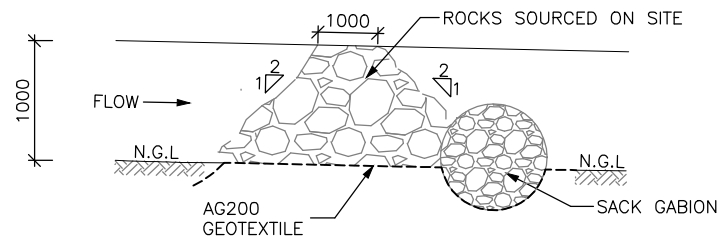


LAYOUT PLAN



PLAN

BANKS TO BE SLOPED, SACK GABION AND ROCKPACKS TO BE KEYED INTO BANKS



SECTION A-A

GABIONS:

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>. e.g. AG200.
- 100mm - 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRIABLE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX: 1 BAG CEMENT 125L SAND 120L STONE 30L WATER
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

EARTHWORKS:

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

DISPERSIVE SOILS:

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
- FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
- ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

NOTES

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

PROJECT

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

DRAWING DESCRIPTION

ROCKPACKS

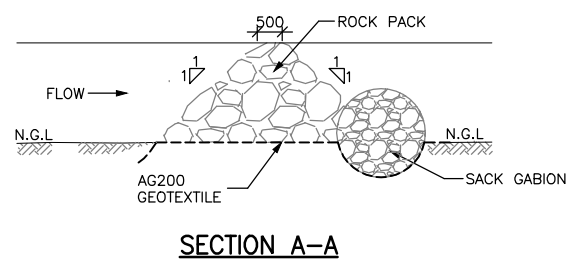
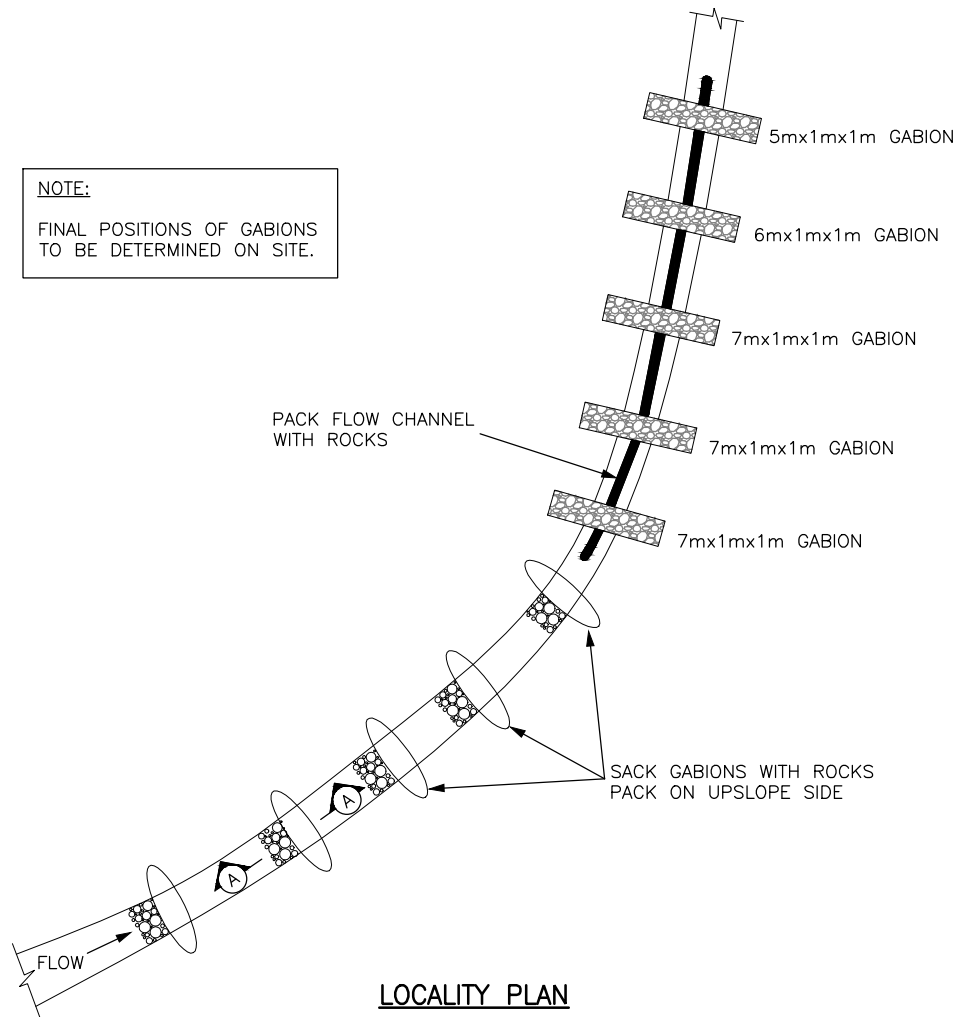
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | B.MCCAROGHER |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-215-00/01 | A.      |

NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.



**NOTE:**  
FINAL POSITIONS OF GABIONS TO BE DETERMINED ON SITE.



**GABIONS:**

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>. e.g. AG200.
- 100mm - 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRIABLE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

**EARTHWORKS:**

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

- (ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):
- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
  - FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
  - ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**PROJECT**  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

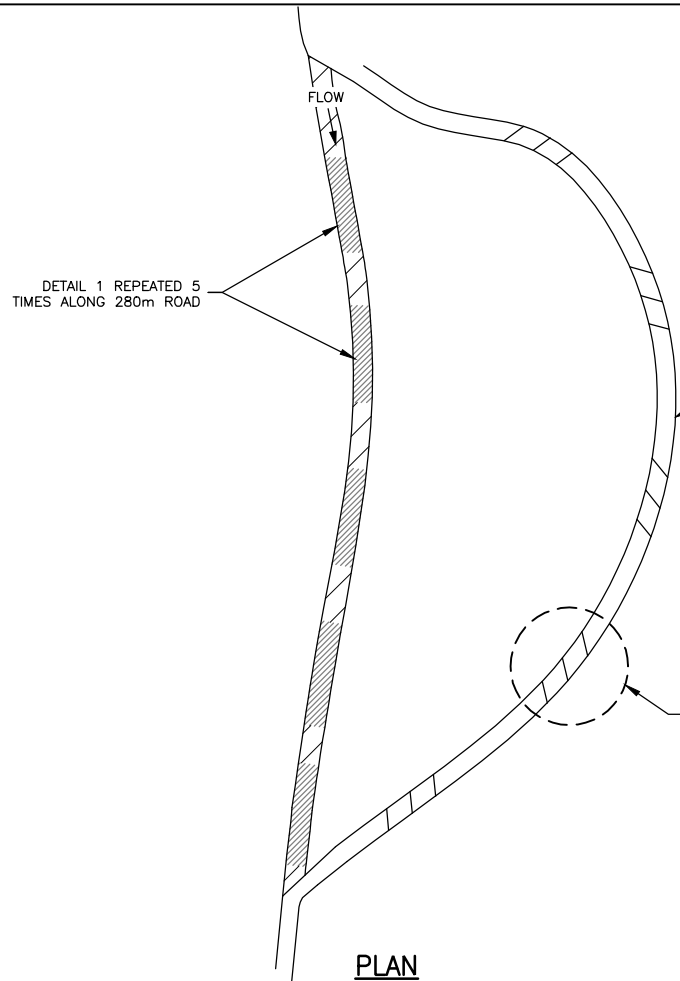
**DRAWING DESCRIPTION**  
GULLY STABILIZATION

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**

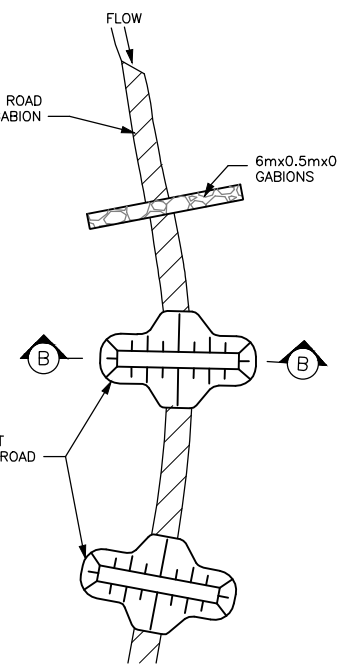
|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-216-00/01 | A.      |

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



DECOMMISSION OLD ROAD WITH BERMS AND GABION DEFLECTION WALLS

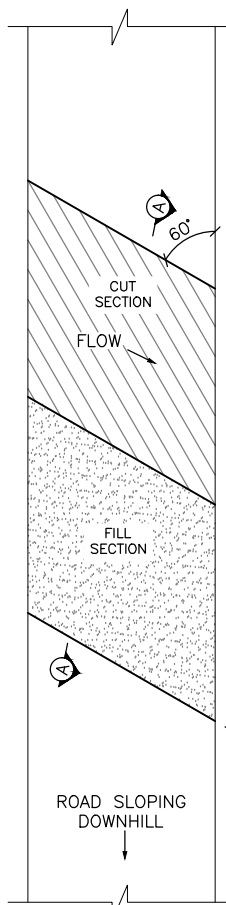
PROTECT NEW ROAD BY CONSTRUCTING A SERIES OF 18 SURFACE CROSS DRAINS (SEE DETAIL 2)



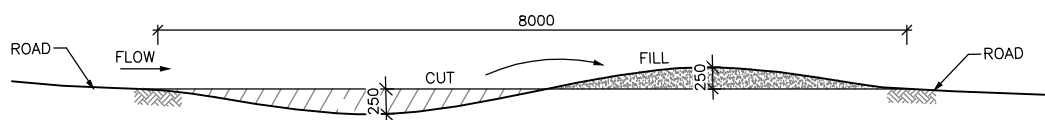
BERMS TO DIVERT WATER OFF THE ROAD (SEE DETAIL 1)

**DETAIL 1**

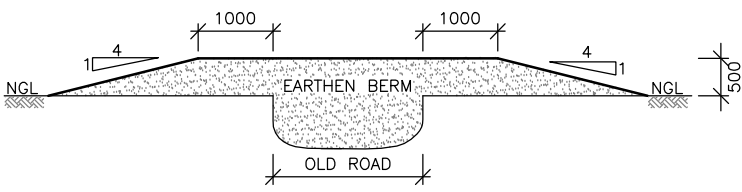
- EARTHWORKS:**
1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
  2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
  3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
  4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.
- DISPERSIVE SOILS:**  
(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):
5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BUNDLING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
  6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
  7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.



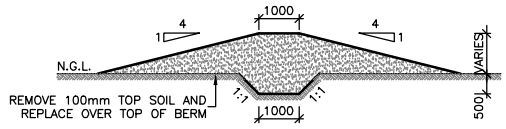
**DETAIL 2: PLAN OF SURFACE DRAIN**



**SECTION A-A**



**SECTION B-B**



**TYPICAL CROSS SECTION THROUGH BERM**

- NOTES**
1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
  2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.

**WORKING FOR WETLANDS**

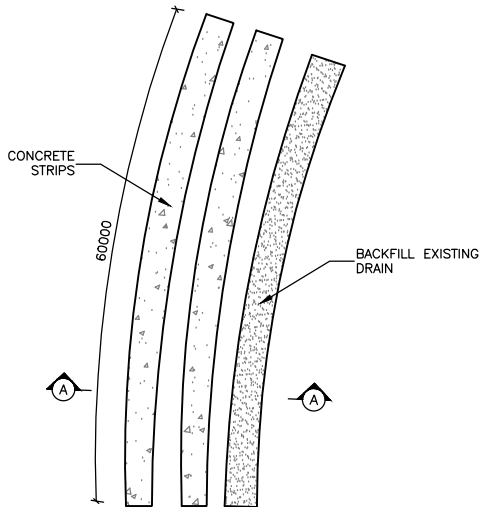
**aurecon**

**PROJECT**  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

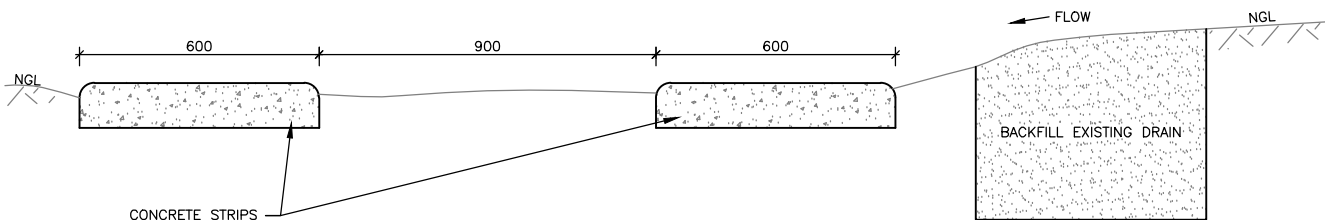
**DRAWING DESCRIPTION**  
NEW ROAD AND SURFACE  
CROSS DRAINS

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

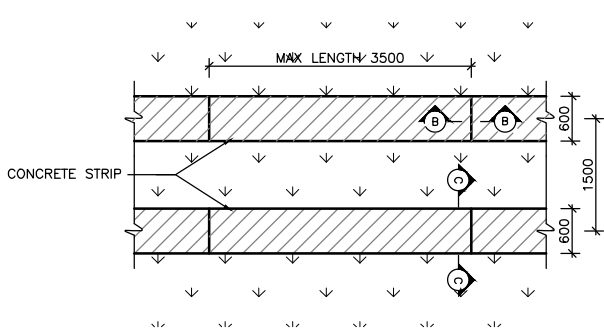
|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-217-00/01 | A.      |



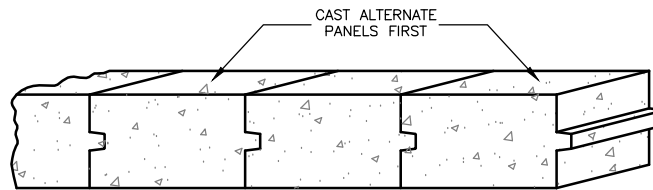
**LOCALITY PLAN**



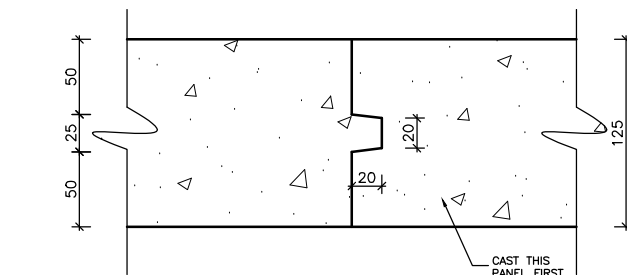
**SECTION A-A**



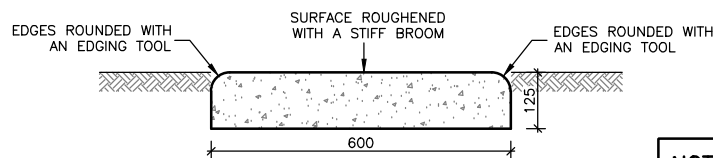
**PLAN OF CONCRETE STRIP**



**SCHEMATIC VIEW OF JOINT BETWEEN PANELS**



**SECTION B-B**



**SECTION C-C**

**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**CONCRETE:**

5. NOMINAL SIZE OF STONE AGGREGATE TO BE SIZE 19-26mm.
6. ALL CONCRETE TO BE MIN 30MPa CONCRETE MIX:  
1 BAG CEMENT  
65L SAND  
85L STONE  
21L WATER
7. ALL BLINDING TO BE MIN 15MPa CONCRETE MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
8. CONCRETE TO BE PLACED IN 300mm LAYERS AND VIBRATED USING A CONCRETE VIBRATOR.
9. MIN 50mm COVER REQUIRED ON ALL CONCRETE REINFORCING UNLESS OTHERWISE SPECIFIED.
10. NOT MORE THAN 1m DEPTH OF CONCRETE TO BE CAST PER DAY.
11. ALL CONCRETE WALLS TO BE FULLY SUPPORTED UNTIL THEY ARE BACKFILLED TO THE DESIGNED LEVEL.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

12. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
13. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
14. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

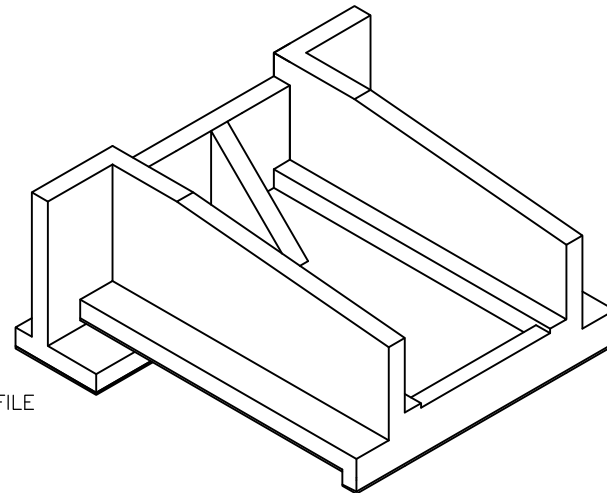
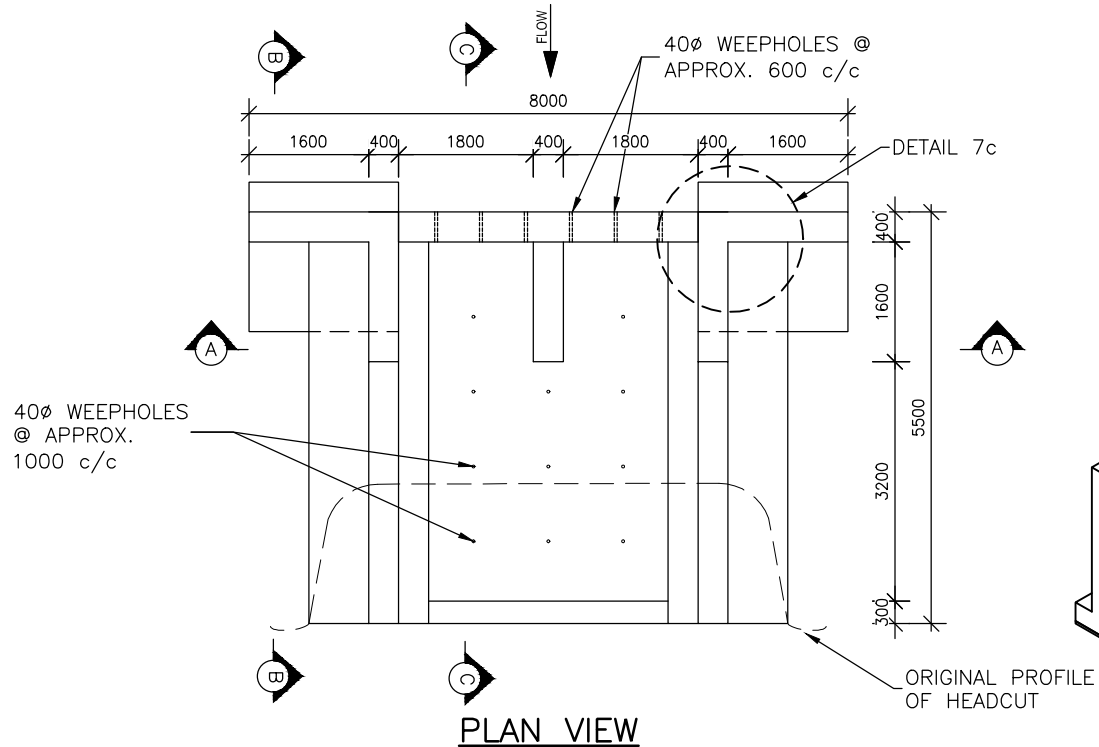
**DRAWING DESCRIPTION**

CONCRETE STRIPS AND  
BACKFILL EXISTING DRAIN

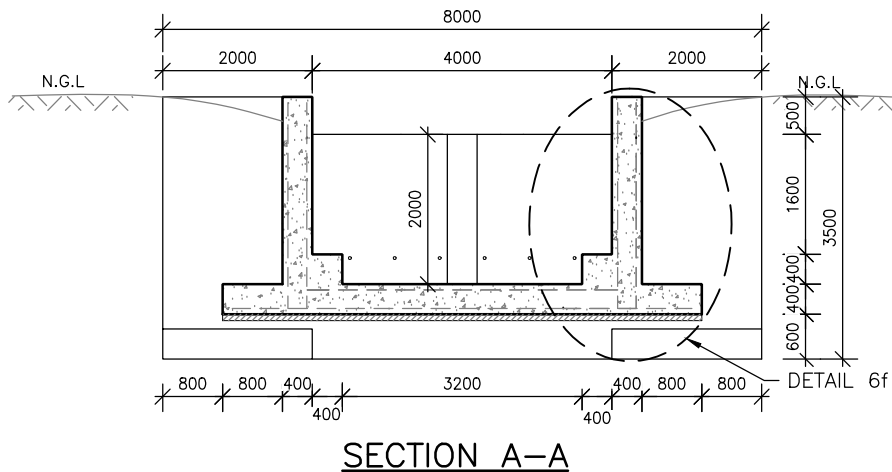
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-218-00/01 | A.      |

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



ISOMETRIC VIEW



SECTION A-A

NOTE: STRUCTURE TO BE SET INTO HEADCUT TO CREATE SPACE FOR CONSTRUCTION OF APRON SLAB.

NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.

- NOTES
1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
  2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



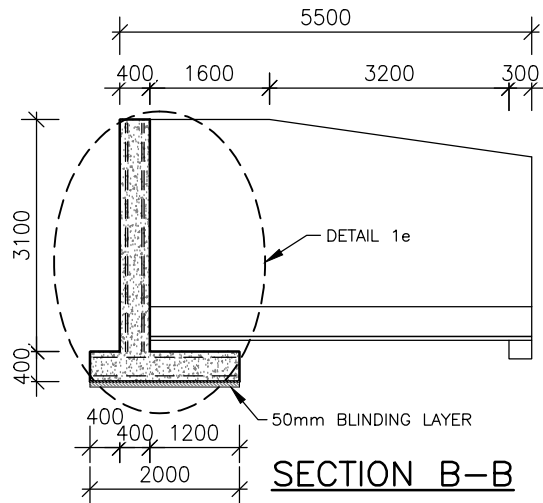
**aurecon**

PROJECT  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

DRAWING DESCRIPTION  
CONCRETE WEIR

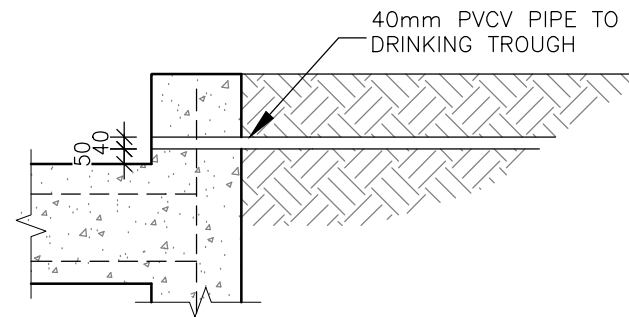
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | D.RAJNA      |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-219-00/01 | A       |



**SECTION B-B**

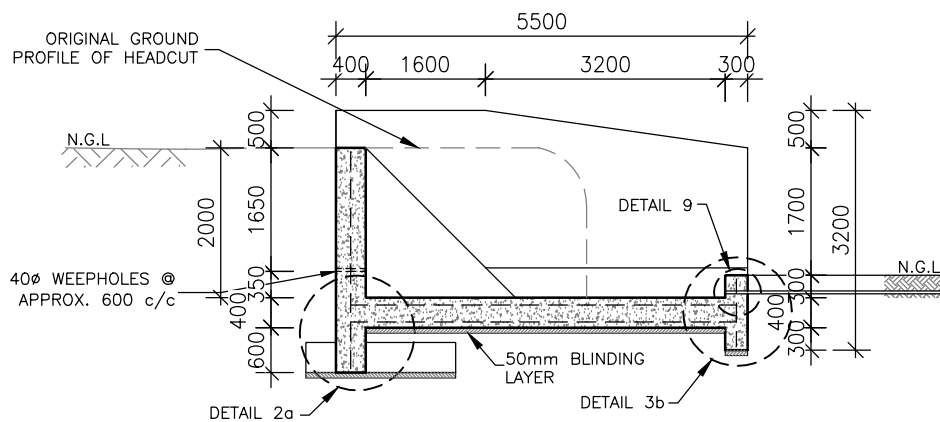
| DETAIL No. | SHEET No. | DESCRIPTION                       |
|------------|-----------|-----------------------------------|
| -          | SHEET 02  | TYPICAL WEEPHOLE DETAIL           |
| -          | SHEET 02  | TYPICAL CONSTRUCTION JOINT DETAIL |
| -          | SHEET 02  | STANDARD NOTES FOR CONCRETE WEIRS |
| -          | SHEET 03  | REBAR DETAIL                      |
| 1e         | SHEET 05  | KEY WALL DETAILS                  |
| 2a         | SHEET 06  | SPILLWAY DETAILS                  |
| 3b         | SHEET 06  | CUT-OFF WALL DETAILS              |
| 6f         | SHEET 09  | SHOULDER WALL DETAILS             |
| 7c         | SHEET 12  | SPILLWAY CORNER DETAILS           |



**DETAIL 9**

**NOTE:**

4.0m x 4.0m CONCRETE CAPPED RENO MATTRESS TO BE INSTALLED AROUND THE DRINKING WATER TROUGH.



**SECTION C-C**

**NOTES**

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

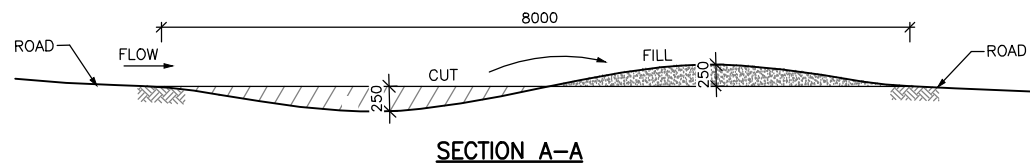
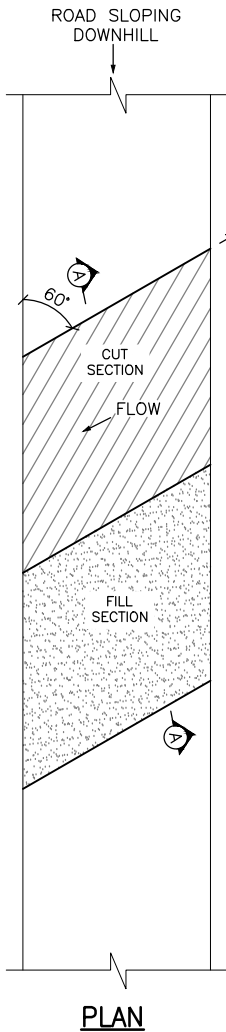
**DRAWING DESCRIPTION**

CONCRETE WEIR

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | D.RAJNA      |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-219-00/02 | A       |

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

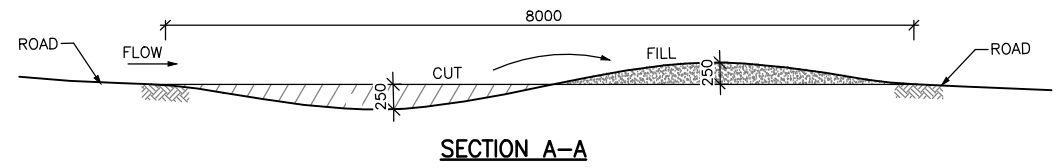
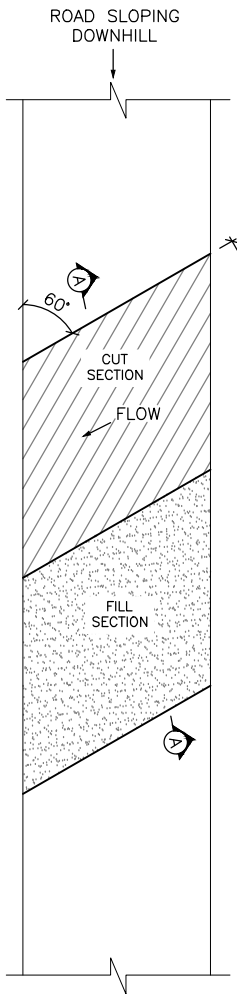
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-220-00/01 | A       |

**NOTE:**

A TOTAL OF 21 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**  
(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

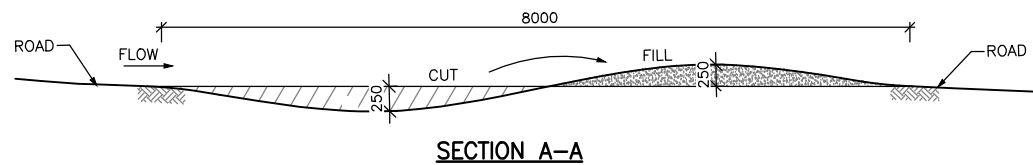
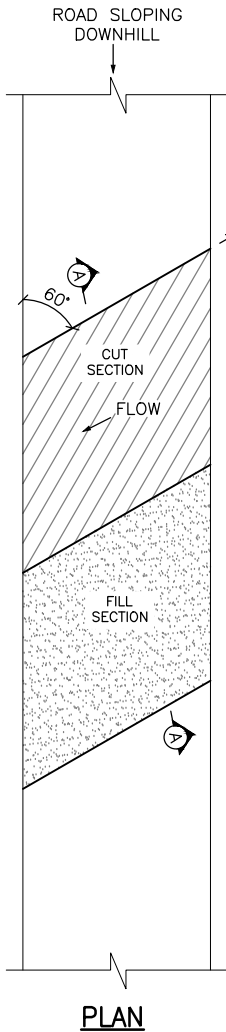
**DRAWING DESCRIPTION**  
SURFACE CROSS DRAIN

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-221-00/01 | A.      |

**NOTE:**  
A TOTAL OF 9 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

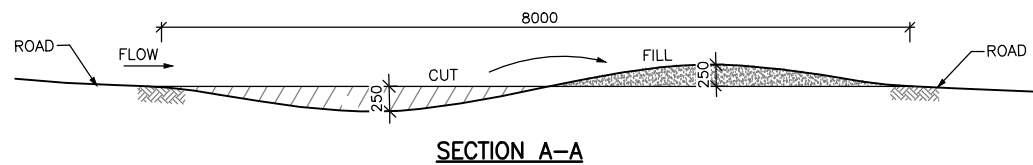
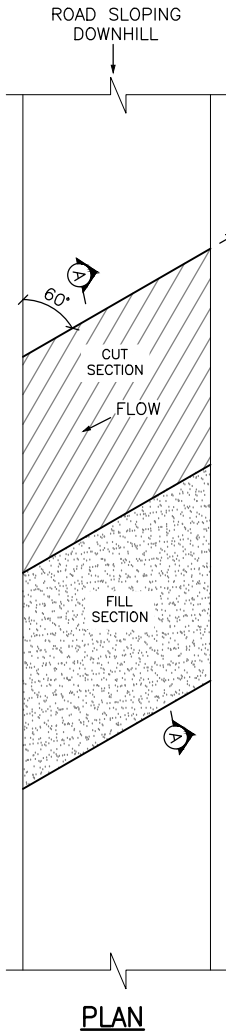
|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-222-00/01 | A.      |

**NOTE:**

A TOTAL OF 5 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**





**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

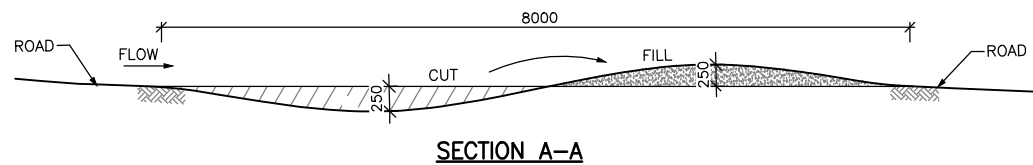
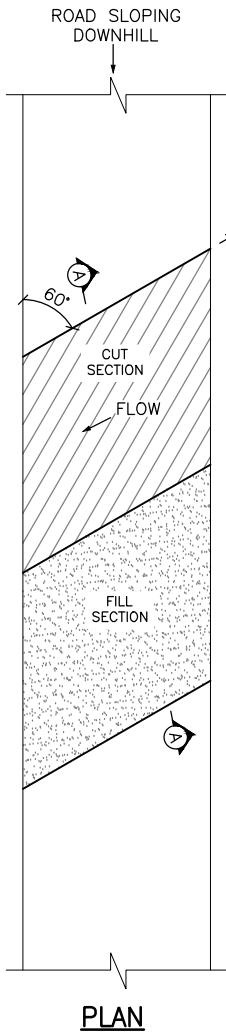
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-223-00/01 | A.      |

**NOTE:**

A TOTAL OF 4 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

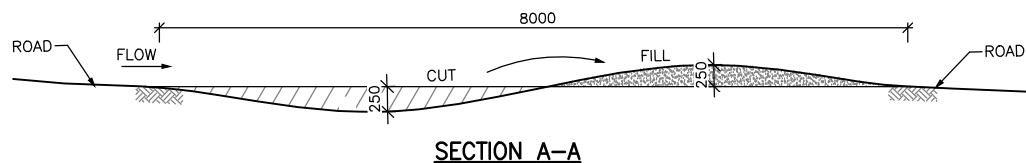
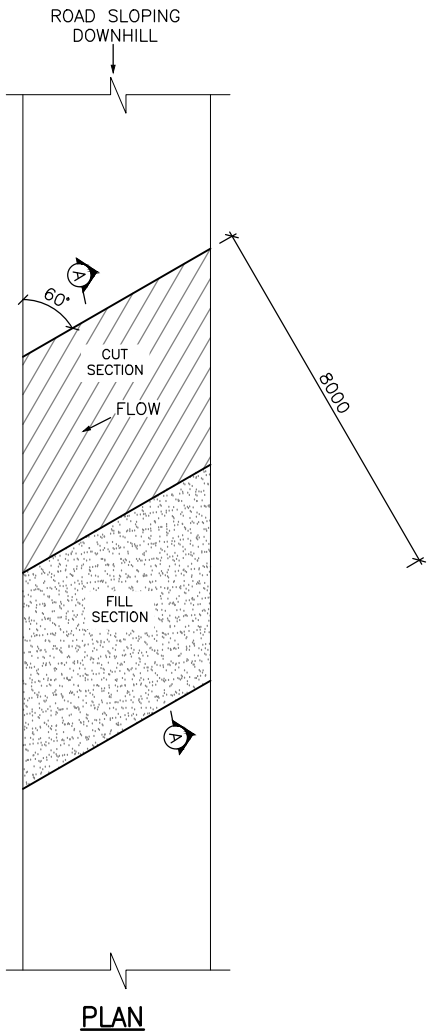
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-224-00/01 | A.      |

**NOTE:**

A TOTAL OF 3 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

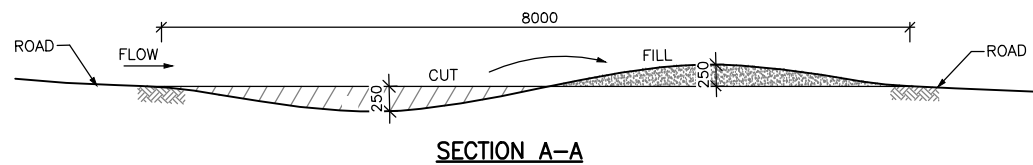
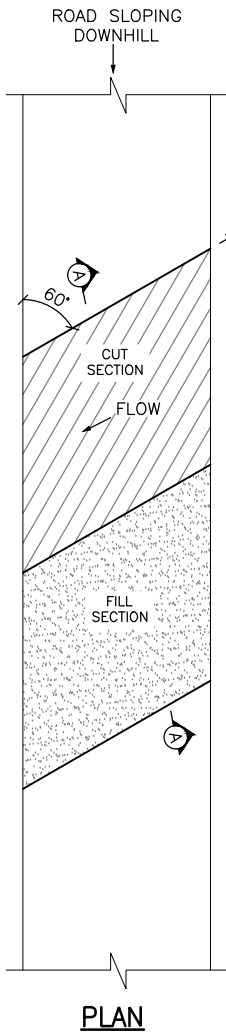
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-225-00/01 | A.      |

**NOTE:**

A TOTAL OF 14 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

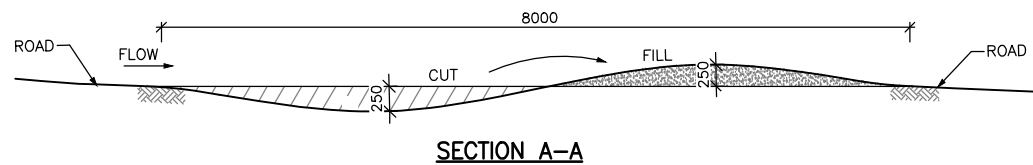
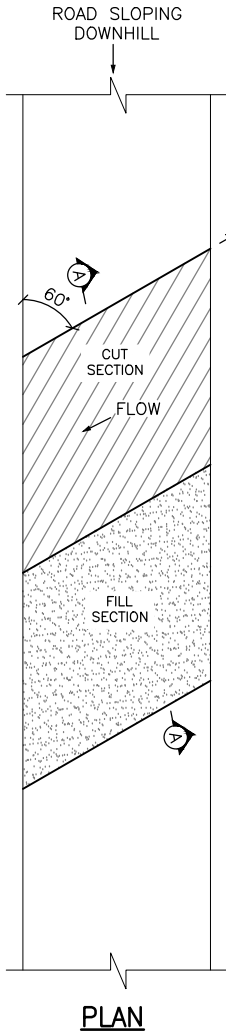
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-226-00/01 | A.      |

**NOTE:**

A TOTAL OF 32 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

SURFACE CROSS DRAIN

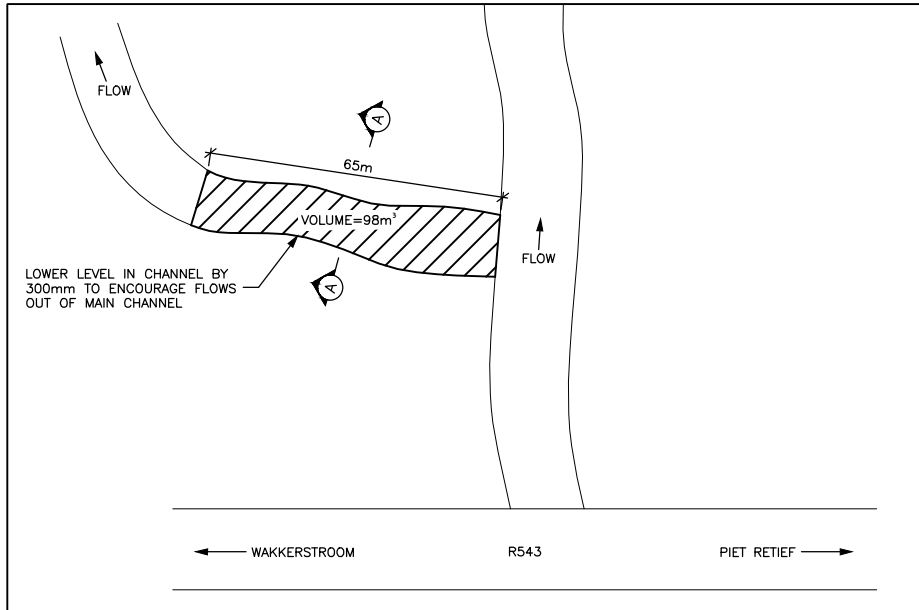
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-02-227-00/01 | A.      |

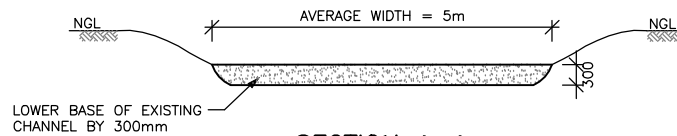
**NOTE:**

A TOTAL OF 24 SURFACE CROSS DRAINS TO BE CONSTRUCTED AT 20m INTERVALS ON STEEP SECTIONS TO DIVERT WATER OFF THE ROAD.

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**LOCALITY PLAN**



**SECTION A-A**

**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

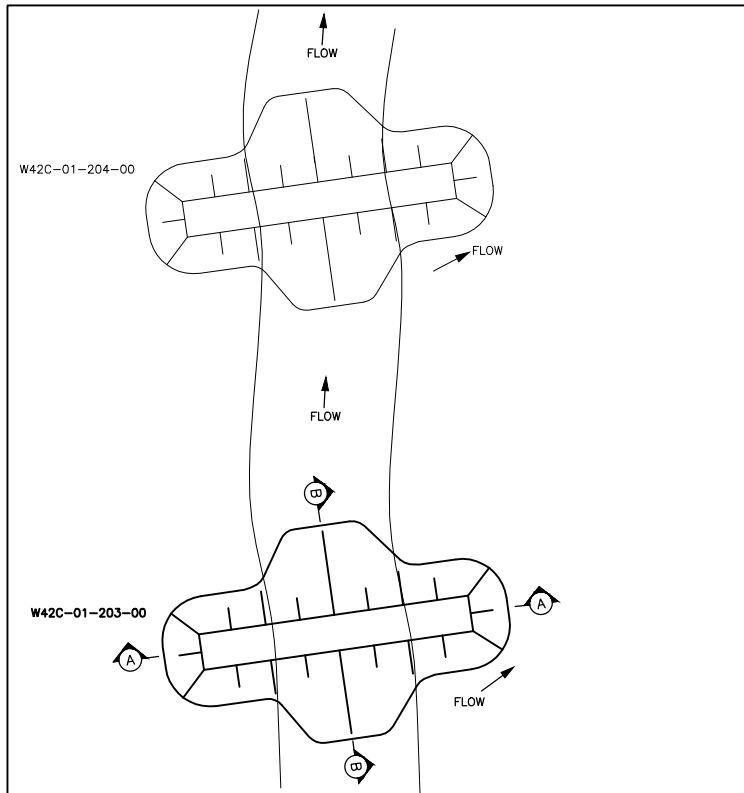
**DRAWING DESCRIPTION**

EXCAVATION OF  
EXISTING CHANNEL

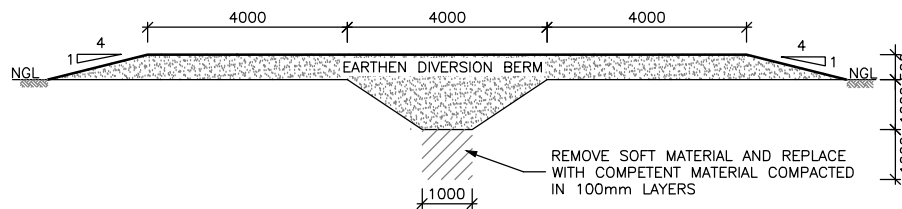
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| V31A-01-201-00/01 | A       |

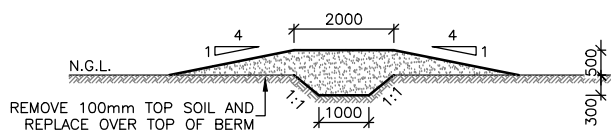
**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**LOCALITY PLAN**



**SECTION A-A**



**SECTION B-B**

**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

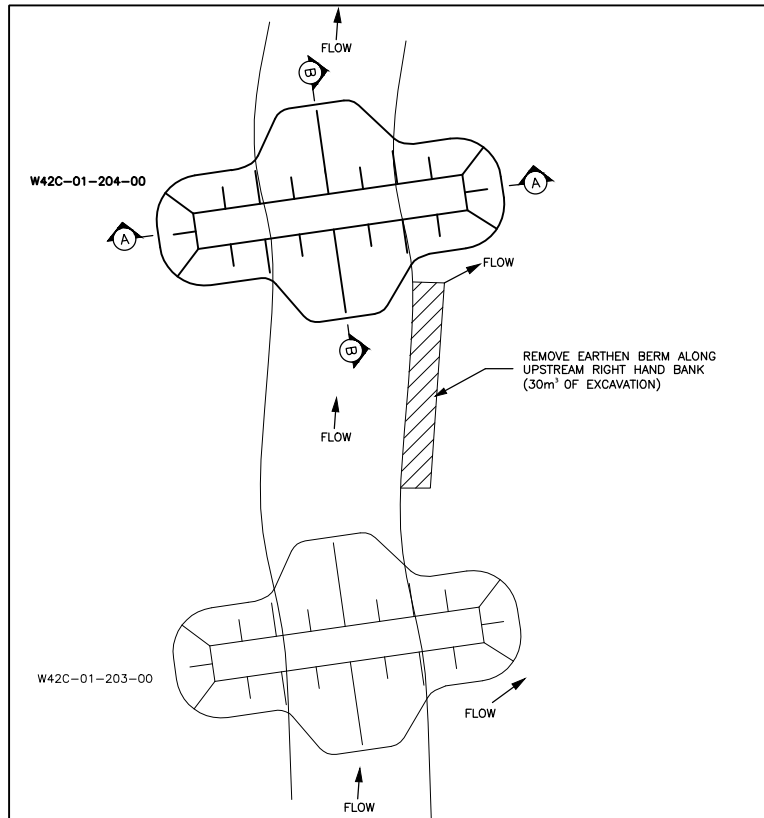
**DRAWING DESCRIPTION**

EARTHEN DIVERSION BERM

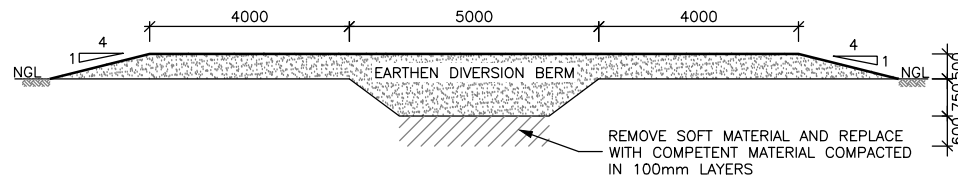
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-203-00/01 | A.      |

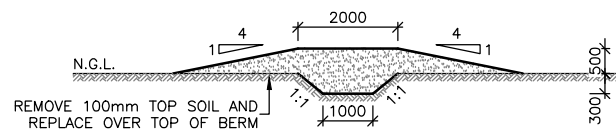
**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**LOCALITY PLAN**



**SECTION A-A**



**SECTION B-B**

**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

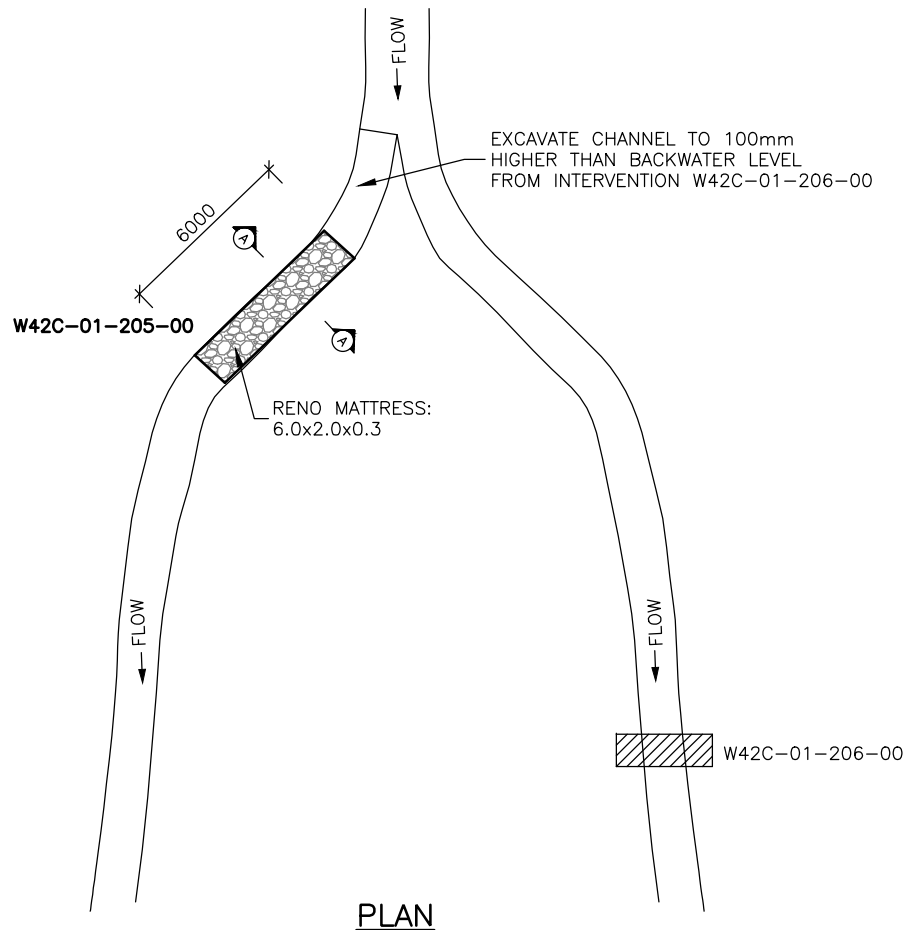
EARTHEN DIVERSION BERM

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

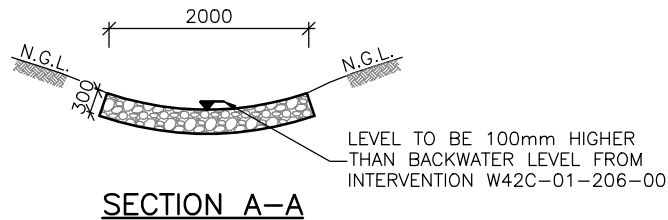
|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-204-00/01 | A.      |

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**





PLAN



SECTION A-A

**GABIONS:**

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>. e.g. AG200.
- 100mm - 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRAGILE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

**EARTHWORKS:**

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**  
(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
- FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
- ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

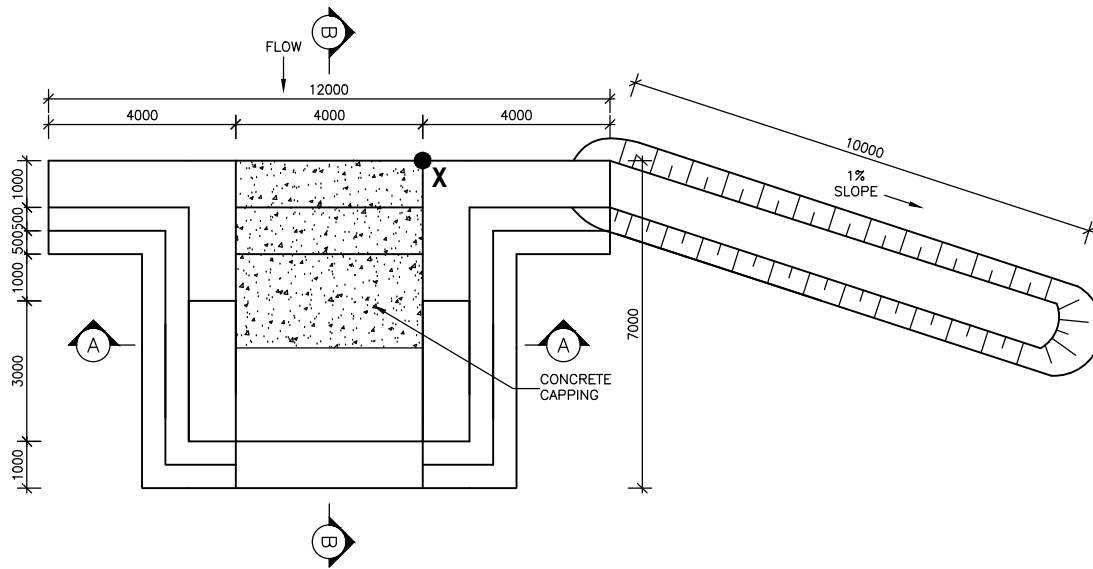
**DRAWING DESCRIPTION**

RENO MATTRESS

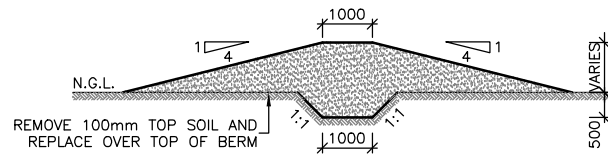
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | B.MCCAROGHER |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-205-00/01 | A       |

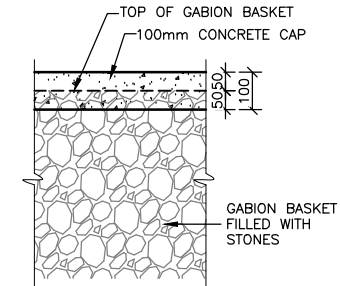
**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



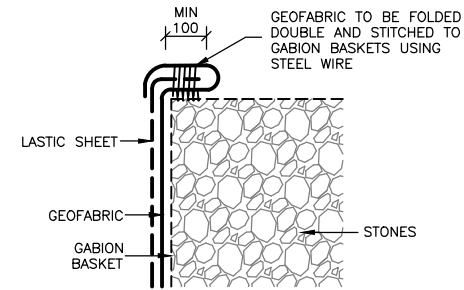
| GABION QUANTITIES |             |
|-------------------|-------------|
| CODE              | NO. BASKETS |
| B                 | 18          |
| C                 | 2           |
| D                 | 16          |
| E                 | 4           |
| H                 | 2           |
| J                 | 3           |
| K                 | 7           |
| L                 | 10          |
| P                 | 6           |



TYPICAL CROSS SECTION THROUGH BERM

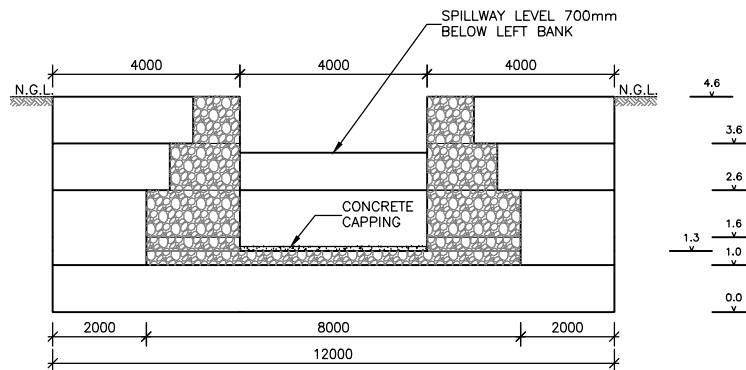


TYPICAL DETAIL OF CONCRETE CAPPING FOR GABIONS & RENO MATTRESSES

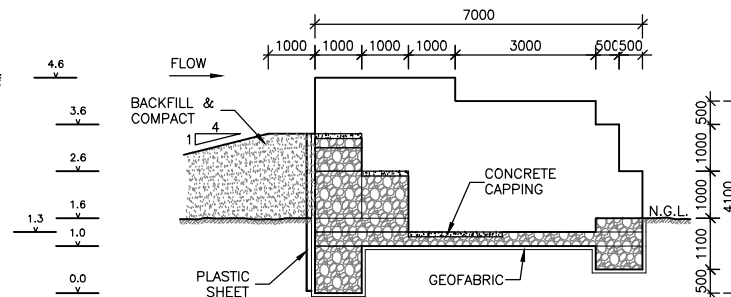


TYPICAL DETAIL FOR TYING OF GEOFABRIC TO GABIONS & RENO MATTRESSES WITH PLASTIC SHEET

NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.



SECTION A-A



SECTION B-B

NOTES

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

PROJECT

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

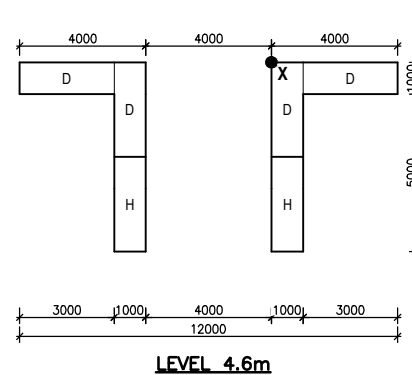
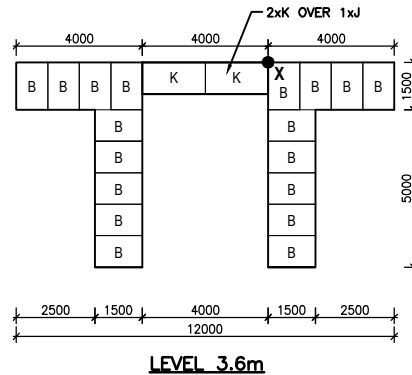
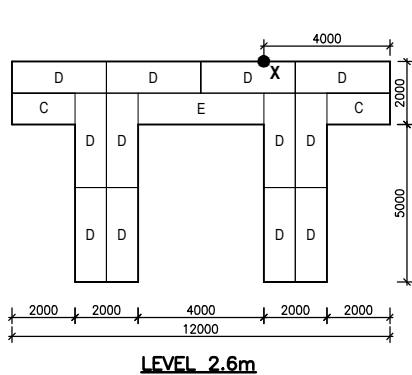
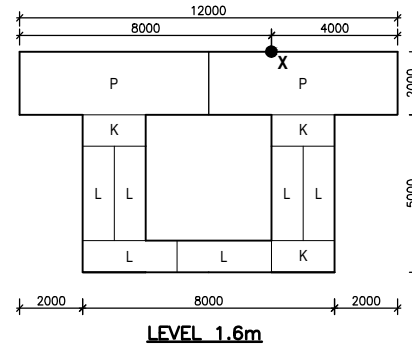
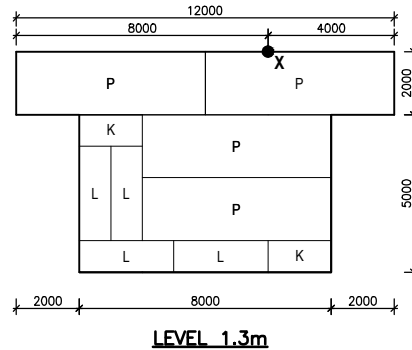
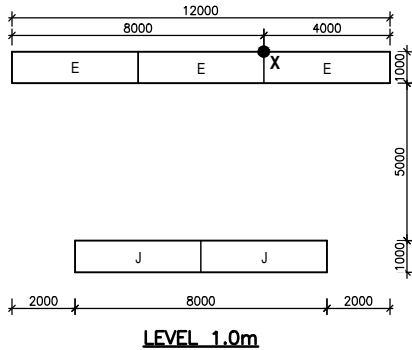
DRAWING DESCRIPTION

GABION WEIR:  
LEVELS & DETAILS

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | D.RAJNA      |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-206-00/01 | A       |

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**GABIONS:**

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>. e.g. AG200.
- 100mm - 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRILABLE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

**EARTHWORKS:**

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
- FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
- ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**GABION & RENO MATTRESS SIZES**

| CODE | SIZE              |
|------|-------------------|
| A    | 1.0 x 1.0 x 1.0m  |
| B    | 1.5 x 1.0 x 1.0m  |
| C    | 2.0 x 1.0 x 1.0m  |
| D    | 3.0 x 1.0 x 1.0m  |
| E    | 4.0 x 1.0 x 1.0m  |
| F    | 2.0 x 0.5 x 0.5m  |
| G    | 2.0 x 1.0 x 0.5m  |
| H    | 3.0 x 1.0 x 0.5m  |
| J    | 4.0 x 1.0 x 0.5m  |
| K    | 2.0 x 1.0 x 0.3m  |
| L    | 3.0 x 1.0 x 0.3m  |
| M    | 6.0 x 2.0 x 0.17m |
| N    | 6.0 x 2.0 x 0.23m |
| P    | 6.0 x 2.0 x 0.3m  |

**NOTES**

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



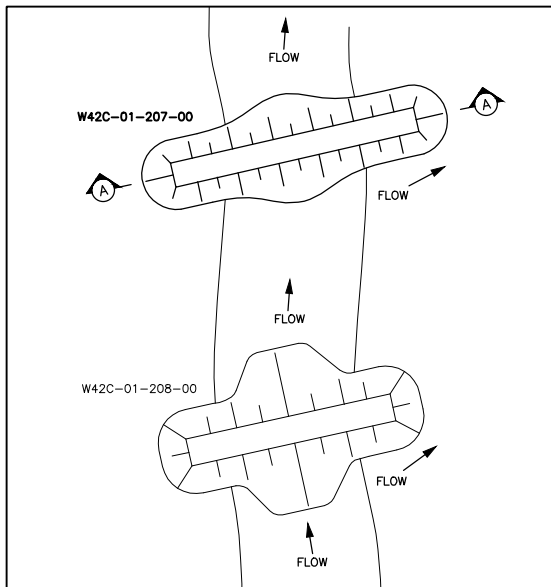
**aurecon**

**PROJECT**  
WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

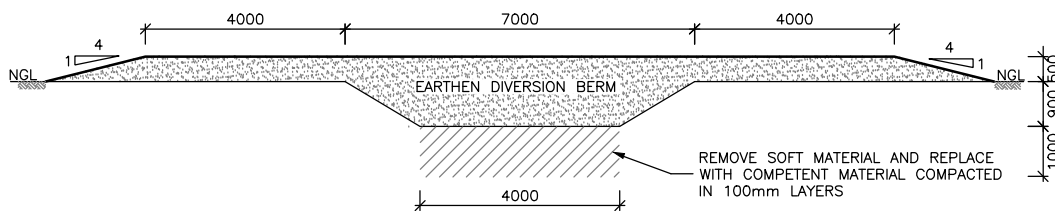
**DRAWING DESCRIPTION**  
GABION WEIR:  
LEVELS & DETAILS

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | D.RAJNA      |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

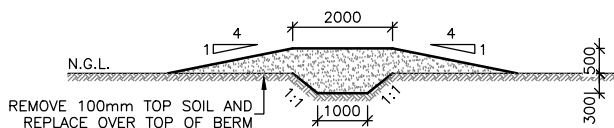
|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-206-00/02 | A       |



**LOCALITY PLAN**



**SECTION A-A**



**SECTION B-B**

**GABIONS:**

- GABION BASKETS AND RENO MATTRESSES TO BE CONSTRUCTED OF DOUBLE TWISTED, HEXAGONAL, PVC COATED, GALVANISED WIRE MESH OF NOMINAL DIAMETER 80mm MESH, WITH 3.4mm o/d FRAME WIRE AND 2.7mm o/d MESH WIRE WITH PARTITIONS AT 1m CENTRES.
- GEOFABRIC TO BE NON-WOVEN, NOT LESS THAN 195g/m<sup>2</sup>, e.g. AG200.
- 100mm - 200mm STONE TO BE USED IN ALL GABIONS AND RENO MATTRESSES. STONE FILL MUST BE NON-FRAGILE & INSOLUBLE e.g. GRANITE, BASALT, LIMESTONE OR SANDSTONE.
- ALL GABIONS AND RENO MATTRESSES TO COMPLY WITH SANS-1200-DK.
- CONCRETE CAPPING TO BE MINIMUM 15MPa & MIX:  
1 BAG CEMENT  
125L SAND  
120L STONE  
30L WATER
- GEOFABRIC TO BE INSERTED AT ALL SOIL/MESH INTERFACES UNLESS OTHERWISE SPECIFIED.
- GEOFABRIC TO HAVE WEEPHOLES PUNCHED THROUGH USING 10mm STEEL ROD AT APPROXIMATELY 4 HOLES/m<sup>2</sup>.

**EARTHWORKS:**

- ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
- BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
- BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.
- DISPERSIVE SOILS:  
(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):
- IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
- FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
- ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

- AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
- AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

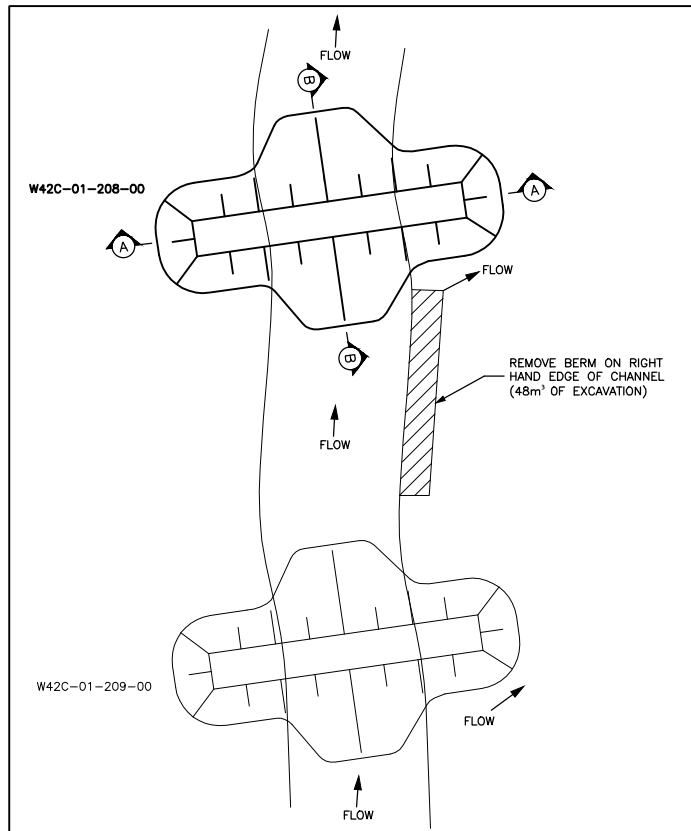
**DRAWING DESCRIPTION**

GABION DIVERSION WALL

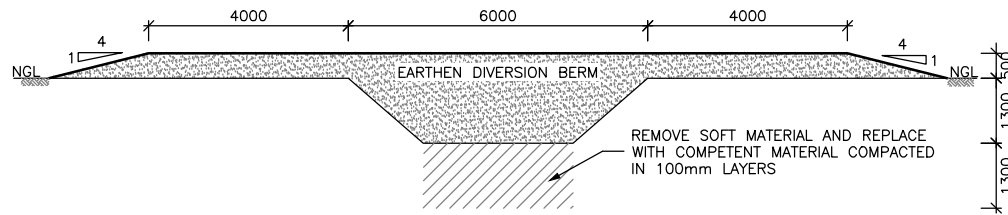
|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-207-00/01 | A       |

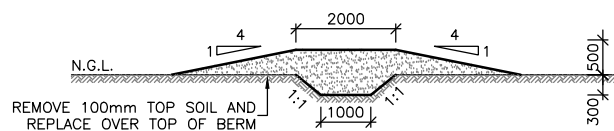
**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**



**LOCALITY PLAN**



**SECTION A-A**



**SECTION B-B**

**EARTHWORKS:**

1. ALL CUT AND FILL SLOPES TO BE NOT STEEPER THAN 1:4, UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED DISTURBED SURFACES TO BE REVEGETATED, UNLESS OTHERWISE SPECIFIED.
3. BACKFILL, PARTICULARLY ON BOTH SIDES OF KEYWALLS AND OUTSIDE SIDE WALLS, TO BE COMPACTED IN 100mm LAYERS AT OPTIMUM WATER CONTENT.
4. BACKFILL TO BOTH SIDES OF ALL WALLS TO BE DONE EQUALLY SO THAT ONE SIDE IS NEVER MORE THAN 1m ABOVE THE OTHER SIDE.

**DISPERSIVE SOILS:**

(ONLY APPLICABLE IN AREAS WITH DISPERSIVE SOILS):

5. IT IS CRITICAL TO ENSURE THAT THE FOUNDING SOIL NEVER DRIES OUT AND REMAINS AS UNDISTURBED AS POSSIBLE. THE BLINDING LAYER SHOULD THEREFORE BE CAST AS SOON AS A PORTION OF EXCAVATION HAS BEEN FINISHED.
6. FILL MATERIAL TO BE GOOD QUALITY, WELL-GRADED GRAVEL OR CLAY (NOT DISPERSIVE CLAY FOUND IN PARTS OF THE FLOOD PLAIN).
7. ALL MATERIAL THAT IS EXCAVATED FROM THIS SITE AND RE-USED FOR BACKFILL SHALL BE WELL MIXED WITH 100kg OF LIME PER CUBIC METRE OF SOIL, AND PLACED AND COMPACTED AT OPTIMUM MOISTURE CONTENT.

**NOTES**

1. AURECON ACCEPTS RESPONSIBILITY FOR THE ENGINEERING DESIGN TO THE EXTENT THAT THIS IS BASED ON AVAILABLE INFORMATION. THE AVAILABLE INFORMATION IS LIMITED TO WHAT COULD BE INTERPRETED DURING A SINGLE SITE VISIT OF NO LONGER THAN A FEW HOURS. NO GEOTECHNICAL, TOPOGRAPHICAL, GEOMORPHOLOGIC AND OTHER ENGINEERING RELATED SURVEYS HAVE BEEN UNDERTAKEN TO INFORM THE DESIGN. THIS IS NON-STANDARD ENGINEERING PRACTICE AND THEREFORE AURECON IS INDEMNIFIED BY THE CLIENT AND DOES NOT ACCEPT RESPONSIBILITY FOR THE ASSOCIATED RISK OF FAILURE FROM THE ABOVE LIMITATIONS OR ANY DAMAGES THAT MAY OCCUR.
2. AURECON IS INDEMNIFIED AGAINST ANY ASSOCIATED DAMAGES AND ACCEPTS NO LIABILITY ASSOCIATED WITH THE CONSTRUCTION AND IMPLEMENTATION OF ENGINEERING INTERVENTIONS DUE TO AURECON BEING INSTRUCTED TO HAVE LIMITED CONTACT WITH THE IMPLEMENTER DURING THE CONSTRUCTION PHASE RESULTING IN OUR INABILITY TO DILIGENTLY SUPERVISE AND ASSESS ANY PROGRESS.



**aurecon**

**PROJECT**

WORKING FOR WETLANDS  
MPUMALANGA  
WAKKERSTROOM

**DRAWING DESCRIPTION**

EARTHEN DIVERSION BERM

|                 |              |
|-----------------|--------------|
| DATE            | JULY 2012    |
| DRAWN BY        | A.MOHAMED    |
| DRAWING CHECKED | D.TOWNSHEND  |
| DESIGNED BY     | T.PIKE       |
| DESIGN CHECKED  |              |
| SCALE           | NOT TO SCALE |

|                   |         |
|-------------------|---------|
| DRAWING No.       | REV No. |
| W42C-01-208-00/01 | A.      |

**NOT FOR CONSTRUCTION. SUBJECT TO EVALUATION OF SITE CONDITIONS BY THE ENGINEER AT SETTING OUT STAGE.**