

### **Design Guidelines**

The secondary oil containment system shall be designed as a passive system not requiring any instrumentation or control systems. The system shall consist of an impermeable liner anchored to an excavated earthen berm or affixed to a concrete wall, and a floor attached to the liner that consists of a needle-punched non-woven geotextile mat infused with oil immobilizer proprietary material. The liner shall be impermeable to liquid and the floor shall allow water to pass through but shall seal and block the flow of any liquid or oil in the event of an oil leak.

Manufacturer and designer of the oil containment system shall be a company that specializes in the manufacturing of needle-punched non-woven geotextile mats for secondary oil containment with a minimum of 9 years experience.

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Containment system shall be designed according to site specification and approved by a Professional Engineer experienced with construction of secondary oil containment systems.

Materials and products shall be fabricated under strict quality control and good manufacturing practices free from defects in material and workmanship.

### **Standards**

Secondary oil containment system shall meet or exceed the requirements set out by the SPCC, 40 CFR 112.(7)(C) Secondary containment for electrical equipment. The system shall comply with the guidelines set out by IEEE. P980 Guide for Containment and Control of Oil Spills in Electrical Substations.

## Materials

### Oilmat

- Top layer
  - Black needle-punched non-woven geotextile
- Middle layer
  - Copoly-005
  - Woven polyethylene scrim
- Bottom layer
  - Black needle-punched non-woven geotextile
- Nominal mass – 3,265 g/m<sup>2</sup> ASTM D5993
- Nominal polymer loading – 2,800 g/m<sup>2</sup>
- Peel Strength – 0.7 kgf ASTM D6496
- Grab Tensile Strength – 80 kgf ASTM D4632
- Puncture Resistance – 60 kgf ASTM D6241
- CBR Puncture strength – 371.5 ±41.0 kgf ASTM D6241
- Compressive Strength – 137.3 ±13.5 kgf ASTM D6364
- Tear Strength MD – 51.3±4.1 kgf ASTM D4533
- Tear Strength CD – 83.0 ±13.5 kgf ASTM 4533
- Hydraulic Conductivity (@ 5 psi, 20°C) – 5.0x10<sup>-5</sup> cm/s ASTM D5084
- UV Resistance 70% @ 500 hours ASTM D4355 (applies to non-woven components only)

### Liner

- Reinforced Polyethylene constructed of pre-stressed high density polyethylene tapes woven into a stable network and coated in a thin film of linear low density polyethylene.
- Nominal thickness – 0.61mm ASTM D1777
- Coating thickness – 0.061mm ASTM D1777
- Nominal Weight – 340 g/m<sup>2</sup>
- Tensile Strength MD – 1,500 N ASTM D5034
- Tensile Strength CD – 1,500 N ASTM D5034

## SorbWeb™ Plus/SorbWeb™ Plus *with* SAM



- Elongation – 15% ASTM D751
- Low temperature bend - 55°C ASTM D2136
- Burst Strength – 4,480 kPA ASTM D3786
- UV resistance - >90% after 2000 hours ASTM G151-00
- Heat bonded seam (manufacturer weld) strength 21.0 N/mm ASTM D7747 25.4mm strip



**Performance**

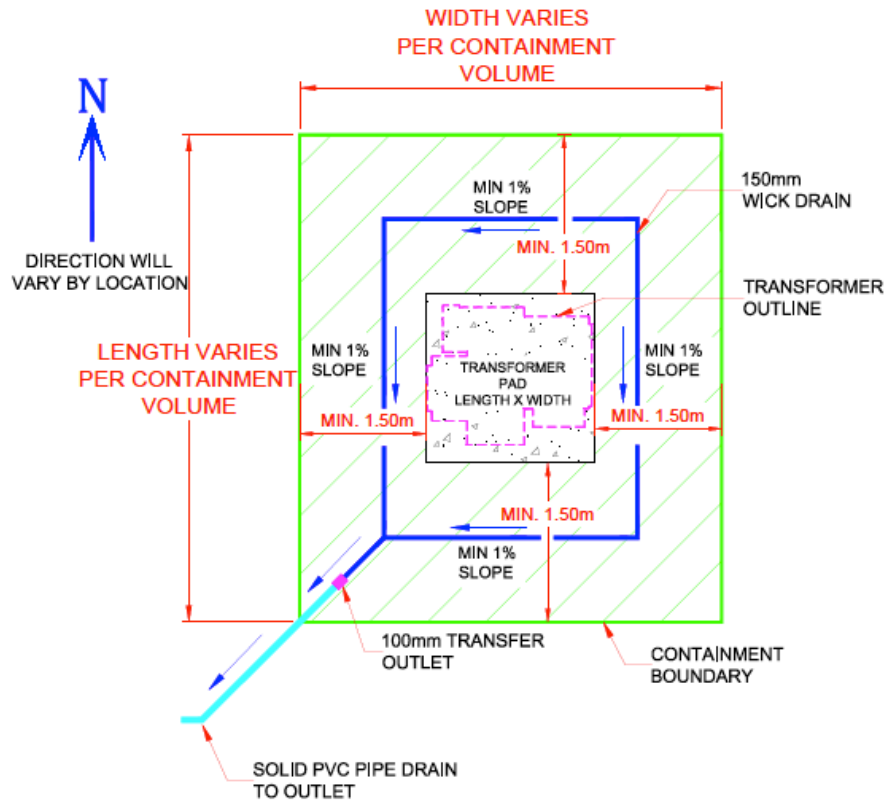
Oil detected below the system after a spill shall be within allowable quantities determined by national and/or province/state regulations following an oil spill. Needle-punched non-woven geotextile mat shall seal upon oil coming in contact with it. System shall have a UV resistance of 70% or greater.

**Containment Construction**

The installation of the secondary oil containment system shall be supervised by a qualified technician provided by the manufacturer of the system. The installation shall be monitored to ensure the design guidelines are met and the materials are installed correctly.

Appendix

# APPENDIX A: TYPICAL CONTAINMENT AREA



**NOTES:**

1. ALL DIMENSIONS ARE IN METRIC UNLESS OTHERWISE STATED.
2. CONTAINMENT BOUNDARY TO BE AN EXCAVATED EARTHEN PERIMETER WITH A 1:1 SLOPE.
3. THE SOIL BELOW THE TRANSFORMER PAD SHOULD NOT BE LOOSENEED OR DISTURBED DURING CONSTRUCTION OF SORBWEB.
4. CONTAINMENT FLOOR MUST BE LEVEL ABOVE THE DRAINAGE.
5. CONCRETE STRUCTURES MUST BE INSPECTED FOR ANY CRACKS OR OPENINGS THAT MUST BE SEALED PRIOR TO SORBWEB INSTALLATION.
6. DURING CONSTRUCTION THE PERIMETER BERM MUST AT ALL TIMES BE PROTECTED FROM RUTTING AND DAMAGE WHEN DRIVING VEHICLES AND EQUIPMENT OVER IT.
7. FIRE QUENCHING STONE MUST BE A WASHED CRUSHED, 100% FRACTURED, WELL GRADED BETWEEN 38mm-75mm. STONE CAN BE BASALT, GRANITE, LIMESTONE OR COMPATIBLE. THE VOID RATIO OF THE STONE MUST BE A MINIMUM OF 40%. STONE MUST HAVE A MINIMUM ELECTRICAL RESISTIVITY OF 3000 ohm-m.
8. ALL MATERIALS REQUIRE A MINIMUM 200mm COVER. THE DESIGN DOES NOT INCLUDE THIS AMOUNT OR ANY OTHER SURFACE STONE.
9. SORBWEB CONTAINMENT SYSTEM IS DESIGNED TO PERFORM WITH LUMINOL TRI AND VOLTESO 35 ONLY, ANY OTHER OIL SHOULD BE TESTED PRIOR TO INSTALLATION OF SORBWEB SYSTEM.
10. SORBWEB PLUS SYSTEM IS DESIGNED TO CONTAIN 110% OIL VOLUME OF THE TRANSFORMER (XX,XXX LITERS) AND A 1 IN 25 YEAR, 24 HOUR RAINFALL EVENT, THE SYSTEM WILL CONTAIN A TOTAL LIQUID VOLUME OF XX,XXX LITERS.
11. CONSTRUCTED EARTHEN BERM SHALL BE GRANULAR MATERIAL COMPACTED TO 100% SPMDD AROUND THE CONTAINMENT AREA IN LIFTS NO GREATER THAN 150mm. COHESIVE MATERIAL IS SUITABLE FOR BERM CONSTRUCTION IN LIFTS NO GREATER THAN 200mm, COMPACTED TO 98% SPMDD.
12. BIAXIAL GEOGRID MUST BE TERRAFIX TBX 3000, LAYFIELD EGRID 3030, OR EQUIVALENT. BIAXIAL GEOGRID MUST HAVE COVERSTONE PLACED IMMEDIATELY AFTER PLACEMENT.
13. DRAINAGE REQUIRES A MINIMUM SLOPE OF 1%. REGULATORY APPROVAL FOR DRAINAGE TO BE OBTAINED BY OTHERS, AS REQUIRED.
14. SUBGRADE TO BE PROTECTED FROM FROST AS PER THE GEOTECHNICAL ENGINEERS RECOMMENDATION.
15. THE DRIVABILITY OVER THE BERM MUST BE LIMITED TO XX,XXXKG PER TRIDEM AXLE AS PER REGULATIONS.
16. DESIGN IS BASED ON INFORMATION RECEIVED ONLY.

**LEGEND**

- CONTAINMENT AREA
- CONCRETE
- TRANSFORMER OUTLINE
- WICK DRAIN
- SOLID PVC PIPE

PLAN VIEW



DESCRIPTION:

**TYPICAL SORBWEB™ PLUS with SAM CONTAINMENT AREA**

PROJECT: **ENGINEERING STANDARDS**

CLIENT: **ALBARRIE GEOCOMPOSITES**

DATE: **Oct. 13, 2015**

SCALE: **NOT TO SCALE**

DOCUMENT ID: **AB12345A**

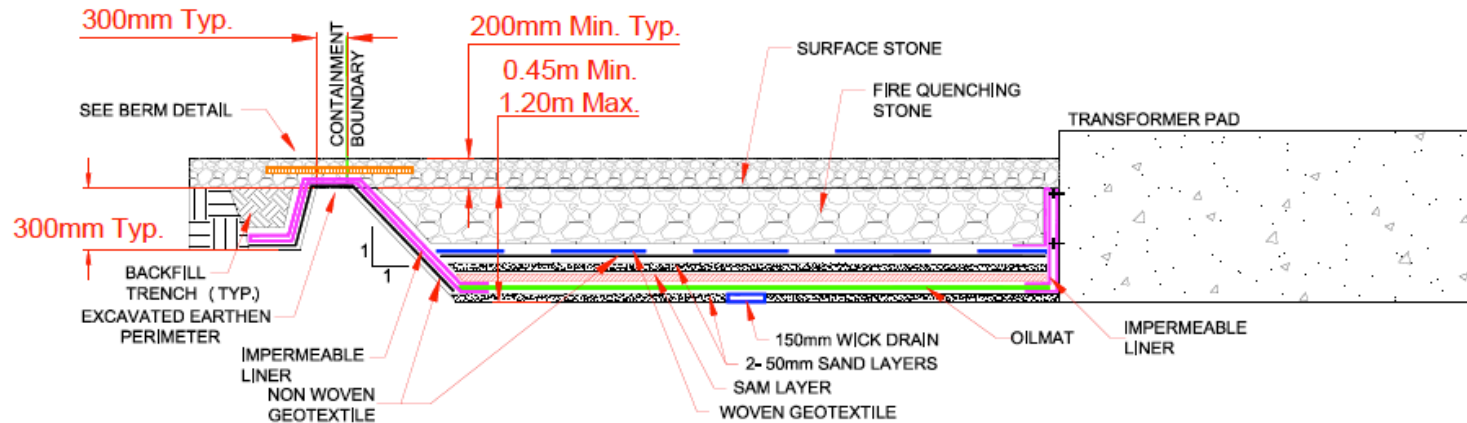
REVISION #

DRAWN BY: **K.D.**

CHECKED BY: **O.W.**

APPROVED BY: **O.W.**

# APPENDIX B: TYPICAL CONTAINMENT DETAILS



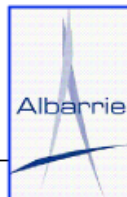
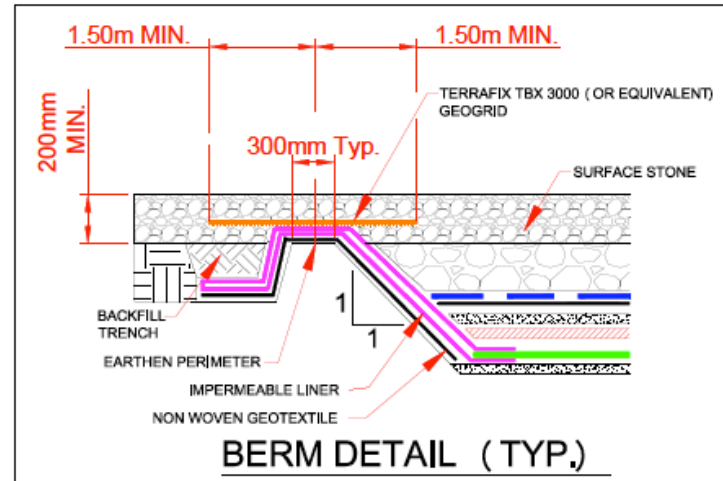
### LEGEND

	CONCRETE		SAND
	FIRE QUENCHING STONE		EARTH

### COMPOSITE VIEW

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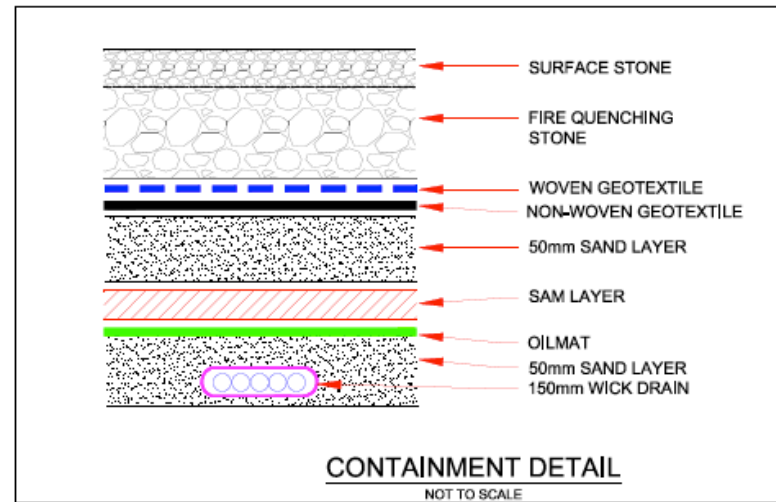
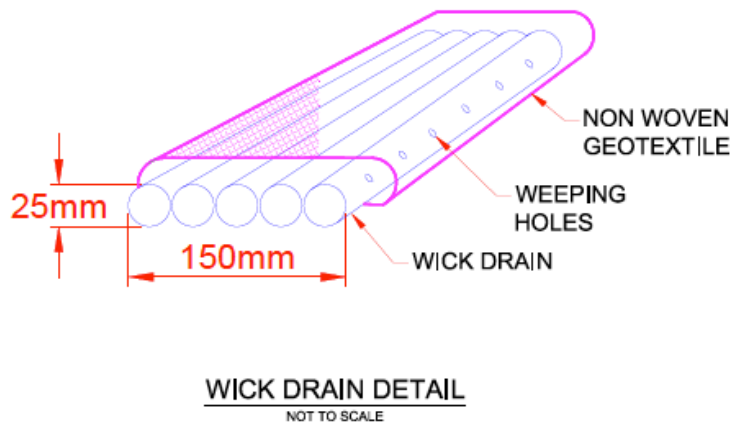
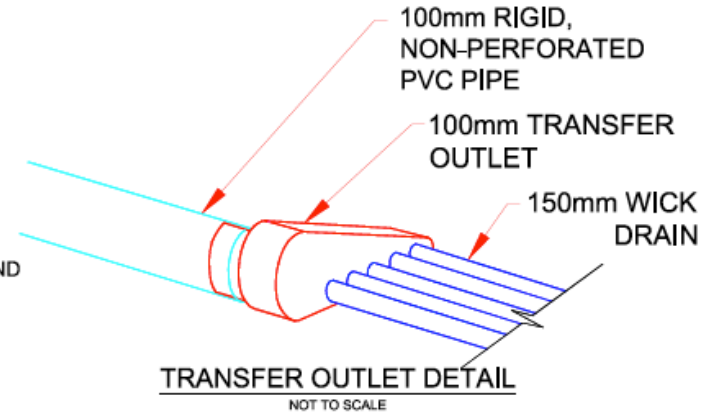
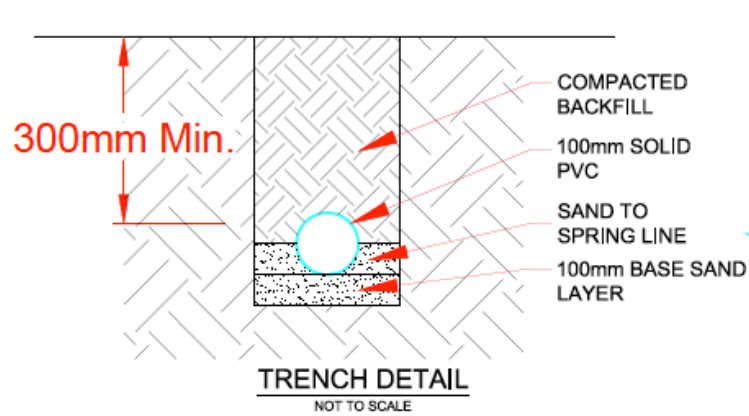


DESCRIPTION:  
**TYPICAL SORBWEB™ PLUS with SAM CONTAINMENT DETAILS**

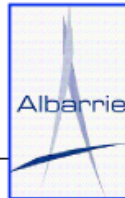
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DRAWN BY:	K.D.	CHECKED BY:	O.W.	APPROVED BY:	O.W.
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# APPENDIX B1: TYPICAL DRAINAGE DETAILS



SEE APPENDIX A FOR NOTES



DESCRIPTION:  
**TYPICAL SORBWEB™ PLUS with SAM DRAINAGE DETAILS**

PROJECT: <b>ENGINEERING STANDARDS</b>	
CLIENT: ALBARRIE GEOCOMPOSITES	
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DRAWN BY: K.D.	CHECKED BY: O.W.	APPROVED BY: O.W.
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