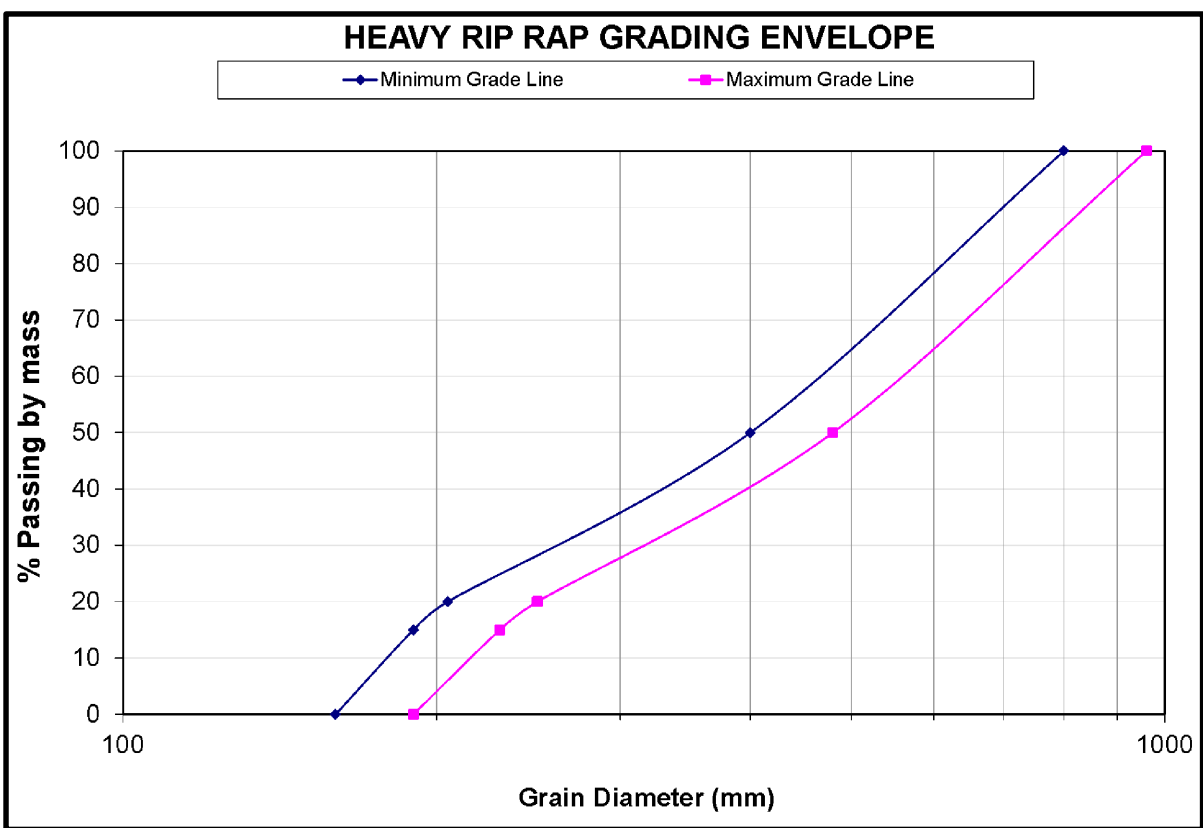
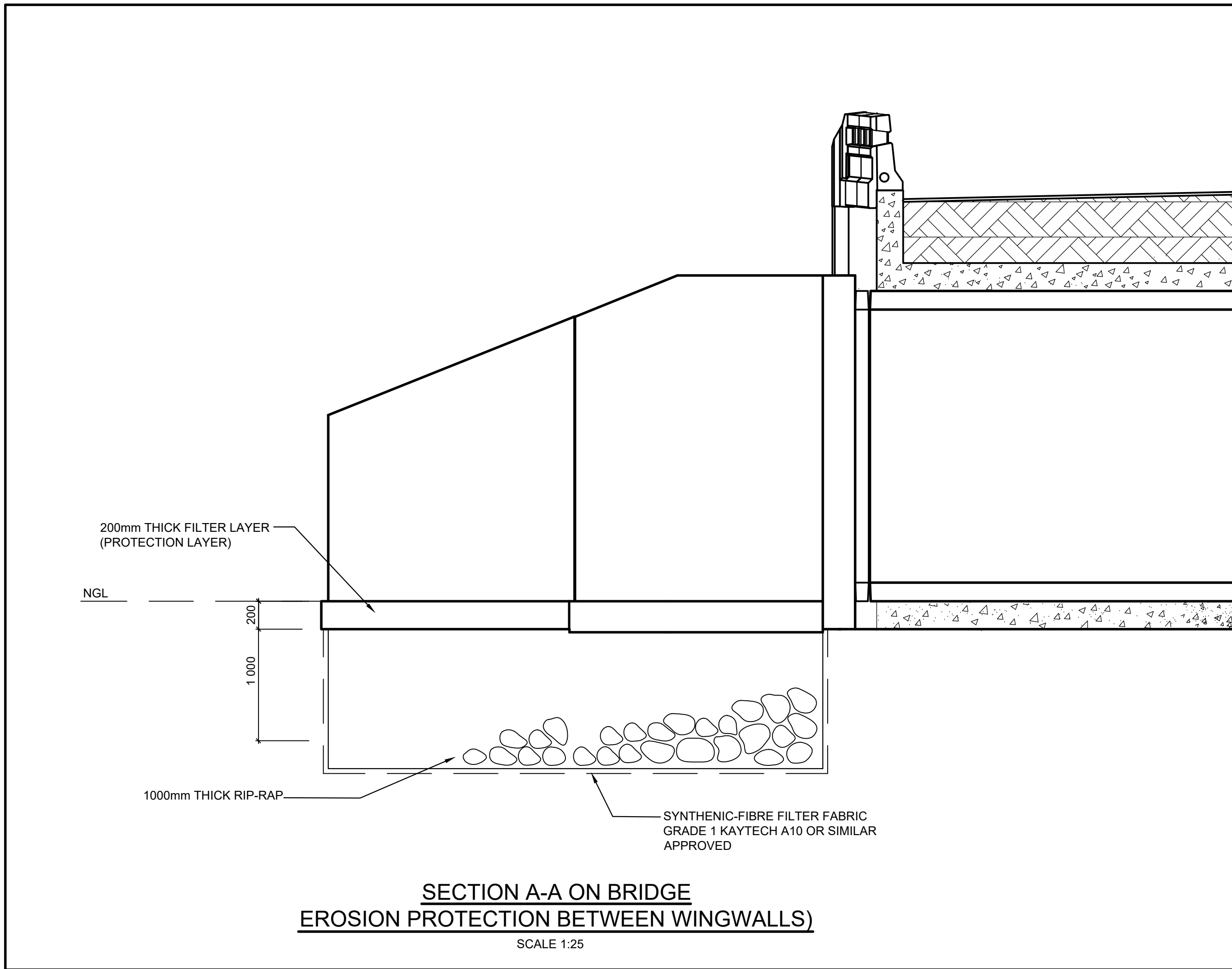
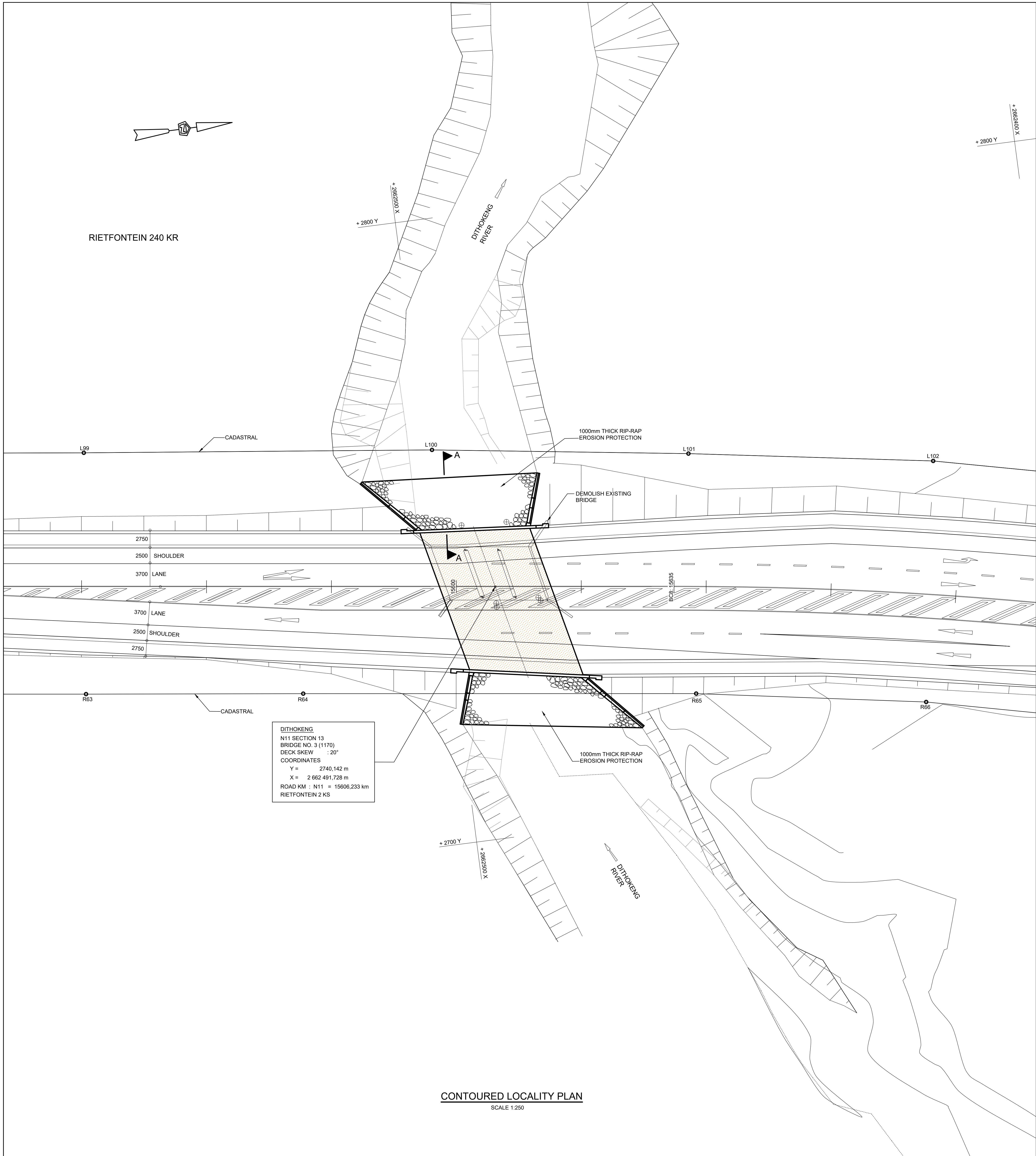




HEAVY RIP RAP GRADING ENVELOPE			
% Passing sieve by mass	Diameter D	Distribution	
		Min Grain size (mm)	Max Grain size (mm)
100	D100 or Dmax	800	960
50	D50	400	480
20	D20	205	250
15	D15	190	230
0	D0 or Dmin	160	190

PROPERTY REQUIREMENTS FOR NON-WOVEN GEOTEXTILE FILTER FABRIC FOR SPECIFIC APPLICATIONS					
PROPERTY	UNIT	SUB-SOIL DRAINAGE	GABIONS AND RENO MATTRESSES	MEDIUM GRADED RIP RAP	HEAVY GRADED RIP RAP
COLTO GRADE		GRADE 2	GRADE 1	GRADE 1	GRADE 1
KAYTECH GRADE OR SIMILAR		A4	A6	A8	A10
THICKNESS (UNDER 2kPa)	mm	2.1	3.4	5.6	9.3
MASS (MINIMUM)	g/m ²	200	320	620	950
POROSITY	%	93	92	89	87
NORMAL PERMEABILITY	1x10 ⁻³ m/s	4.9	5.9	4.9	5.3
PENETRATION LOAD (CBR)	kN	2.5	4.5	8.8	11.3
PUNCTURE RESISTANCE (DIAMETER OF HOLE)	mm	20	13	4	2
NOTE: 1. ALL FILTER FABRIC TO BE USED SHALL BE NON-WOVEN CONTINUOUS FILAMENT NEEDLE-PUNCHED POLYESTER GEOTEXTILE 2. A 200mm THICK SAND PROTECTION LAYER SHALL BE PLACED ON THE GEOTEXTILE BEFORE THE RIP RAP IS PLACED (NOT SHOWN ON DRAWING) 3. OVERLAP FOR ALL GEOTEXTILES SHALL BE AT LEAST 300 mm					
WIRE MESH SPECIFICATIONS FOR GABION BOXES AND RENO MATTRESSES					
GABIONS	PVC COATED GALVANISED WIRE MESH WITH TOTAL NOMINAL THICKNESS (WIRE DIAMETER PLUS PVC COATING) OF 3.7mm DIAMETER AND MESH OPENINGS OF 80X100mm (MACCAFERRI MESH TYPE 80 OR SIMILAR)				
RENO MATTRESSES	PVC COATED GALVANISED WIRE MESH WITH TOTAL NOMINAL THICKNESS (WIRE DIAMETER PLUS PVC COATING) OF 3.7mm DIAMETER AND MESH OPENINGS OF 80X100mm (MACCAFERRI MESH TYPE 80 OR SIMILAR)				

		CONSTRUCTION RECORD WORKS CONTRACT ENGINEER		DESIGNED BY		CONSULTANT APPROVAL		HEAD OFFICE 48 Tambotie Avenue Val de Grace Pretoria 0184 PO Box 415 Pretoria 0001 South Africa Tel: (012) 844 8000		NORTHERN REGION 38 Ida Street Menlo Park Pretoria 0081 Private Bag X17 Lynnwood Ridge 0040 Tel: (012) 426 6200		ACCEPTANCE THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING for CEO: SA NATIONAL ROADS AGENCY LTD. Date:		PROJECT DESCRIPTION REHABILITATION OF NATIONAL ROUTE N11 SECTION 13 FROM R518 INTERSECTION(km 8.340) TO GROOTSANDSLOOT RIVER(km 24.280)		PROJECT NUMBER DRAWING LOCATION DATA ROUTE SECTION DRAWING km DISTANCE DRAWING TYPE BRIDGE/STRUCTURE No. CONSULTANT DRAWING No. SANRAL DOCUMENT #		NRA N.011-130-2010/1 START N11 13 END N11 13 DRAINAGE 251020/KP0/001/DD VER V1	
V1	March 19	ORIGINAL VERSION	CONSULT. ENG.	Name Prof. Reg. No. Date	Name Prof. Reg. No. Date	Name Prof. Reg. No. Date	Name Prof. Reg. No. Date							SCALE : AS SHOWN	SHEET 1 OF 1				