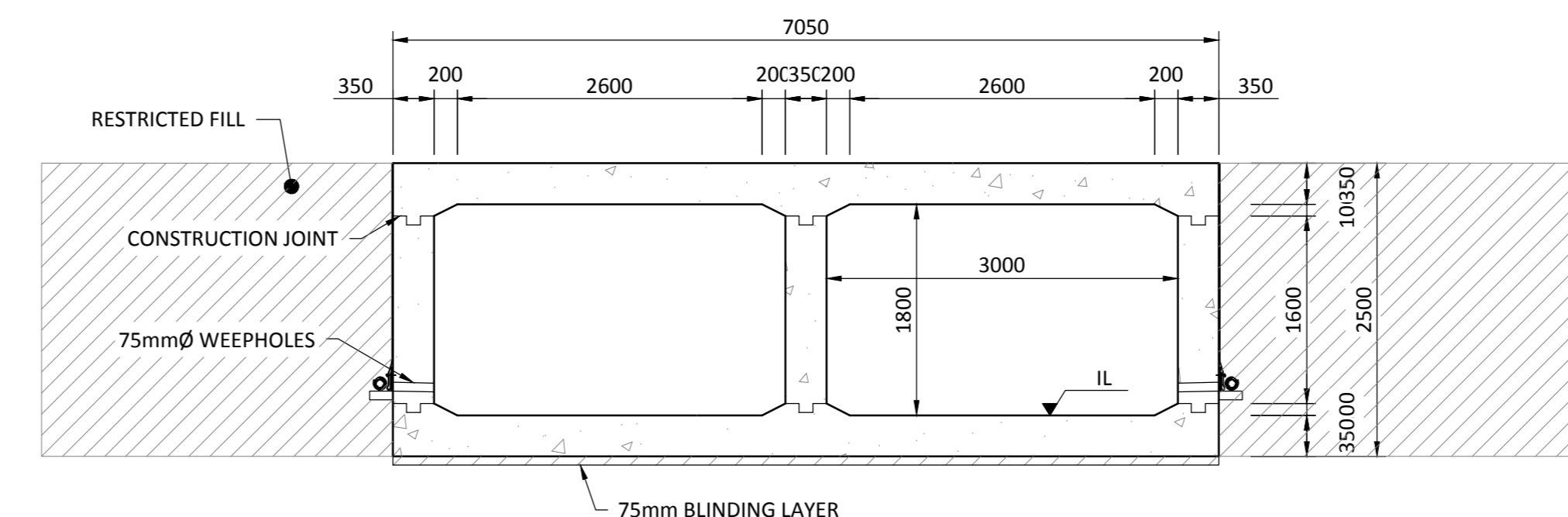
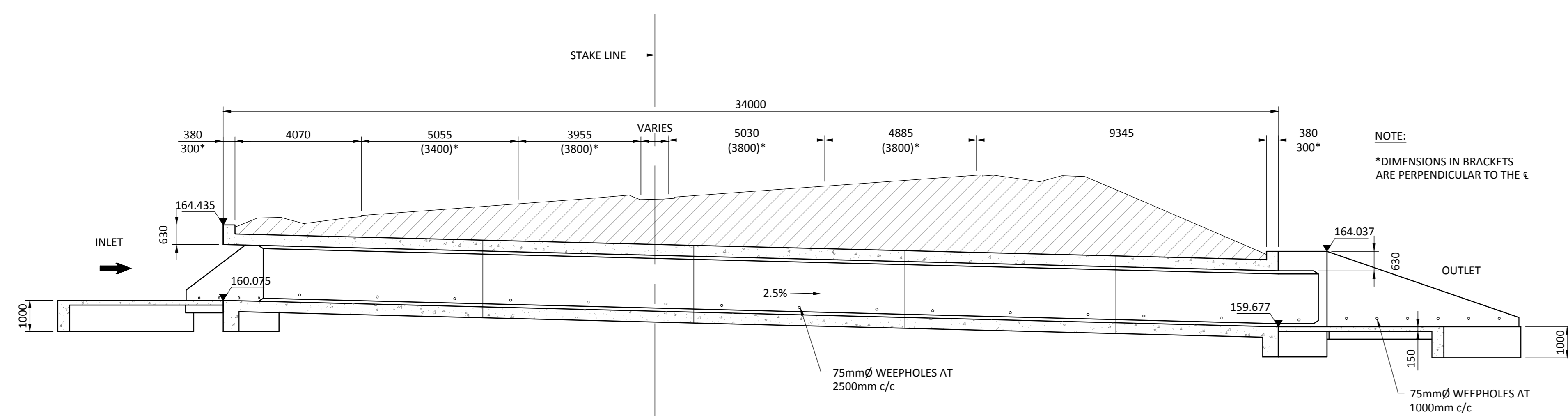


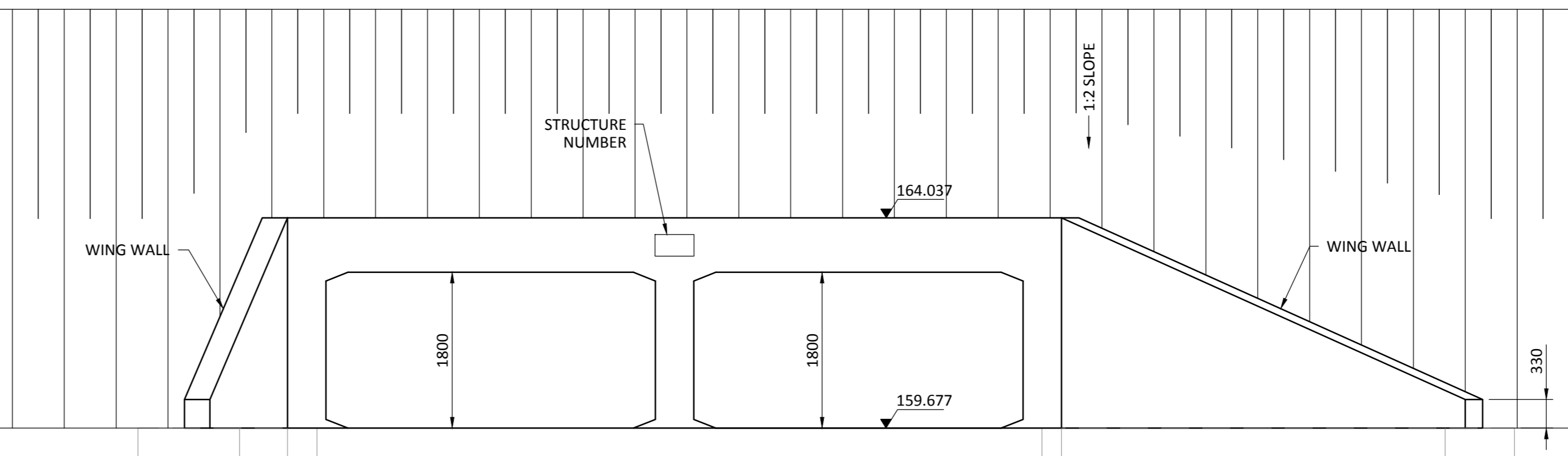
PLAN  
SCALE 1:200



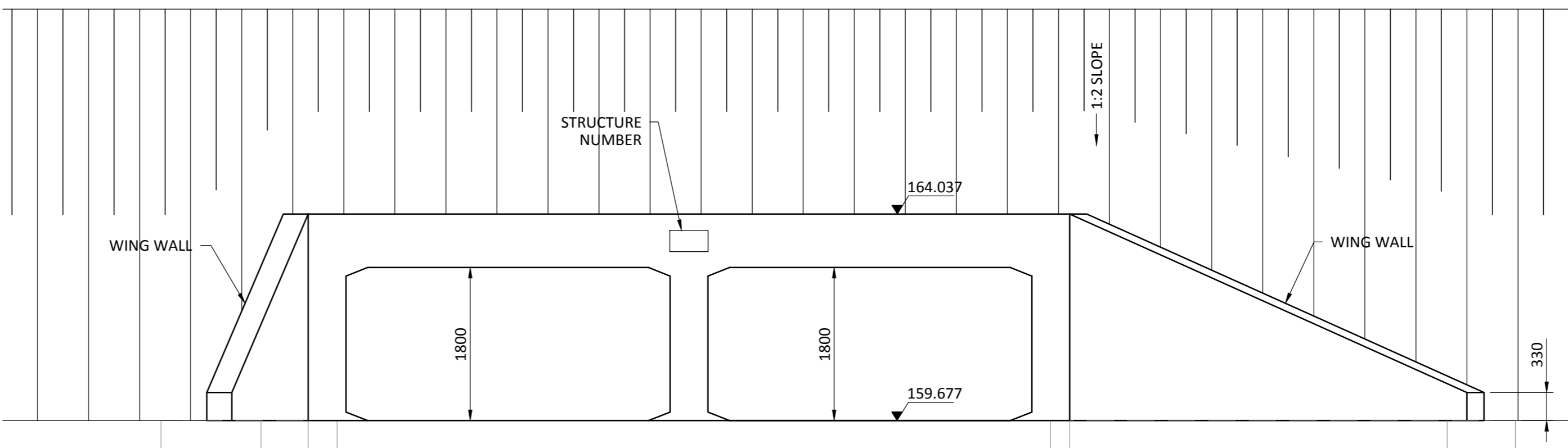
CROSS SECTION  
SCALE 1:50



LONGITUDINAL SECTION ALONG c  
SCALE 1:100



INLET ELEVATION  
SCALE 1:50



OUTLET ELEVATION  
SCALE 1:50

**NOTES**

1. GENERAL
  - 1.1 DESIGN OF THE STRUCTURE IS IN ACCORDANCE WITH "CODE OF PROCEDURE FOR THE PLANNING AND DESIGN OF HIGHWAY AND ROAD STRUCTURES IN SOUTH AFRICA" FEBRUARY 2002 AND "TMH7-CODE OF PRACTICE FOR THE DESIGN OF HIGHWAY BRIDGES AND CULVERTS IN SOUTH AFRICA" 1981 AND AMENDMENTS TO DATE.
2. DESCRIPTION OF STRUCTURE
  - 2.1 SINGLE CELL 5.0m X 4.0m REINFORCED CONCRETE CULVERT
  - 2.2 THE STRUCTURE IS FOUNDED ON HARD ROCK.
  - 2.3 ALLOWABLE BEARING PRESSURE = TBC
  - 2.4 DESIGN BEARING PRESSURE = 150 kPa
3. DESIGN LOADS
  - 3.1 DESIGN LIVE LOAD
    - (a) NA
    - (b) NB36
    - (c) NC
  - 3.2 UNIT WEIGHTS OF MATERIAL:
    - (a) FILL MATERIAL = 20 kN/m<sup>3</sup>
    - (b) REINFORCED CONCRETE = 25 kN/m<sup>3</sup>
    - (c) ASPHALT = 21 kN/m<sup>3</sup>
  - 3.3 EARTH PRESSURE ON RETAINING STRUCTURES (IN ACCORDANCE WITH TMH 7, PART 2 2.4.2):
    - (a) EARTH = 20 kN/m<sup>2</sup> PER METER DEPTH.
    - (b) NA, NB36 AND NC SURCHARGE.
    - (c) NO ADDITIONAL PRESSURE DUE TO WATER HAS BEEN ALLOWED FOR (SUBSOIL DRAINAGE HAS BEEN PROVIDED).
  - 3.4 SUPPLEMENTARY ACTIONS, WHERE APPLICABLE, ARE IN ACCORDANCE WITH TMH7 PARTS 1 AND 2.
4. MATERIAL AND FINISHES
  - 4.1 THE MATERIAL AND WORK SHALL COMPLY WITH THE RELEVANT CLAUSES OF SERIES 2000, 3000, 5000, 6000 AND 7000 OF THE STANDARD SPECIFICATIONS AND SHALL INCLUDE THE FOLLOWING.
  - 4.2 CHARACTERISTIC STRENGTH OF MATERIALS:
    - 4.2.1 REINFORCEMENT:
 

DESCRIPTION	CHARACTERISTIC STRENGTH (MPa)	YOUNG'S MODULUS (GPa)
MILD STEEL BARS	250	200
HIGH TENSILE STEEL	450	200
WELDED STEEL	450	200
MESH FABRIC		
    - 4.2.2 CONCRETE:
 

DESCRIPTION	CHARACTERISTIC STRENGTH (MPa)	CONCRETE CLASS (MPa/mm)
SLAB	30	W30/26
WALLS	30	W30/26
WINGWALLS	30	W30/26
BLINDING/MASS CONCRETE	15	15/19
  - 4.3 SURFACE FINISHES:
 

	FORMED	UNFORMED
EXPOSED SURFACES	F2	U2
CONCEALED SURFACES	F1	U1
  - 4.4 MINIMUM CONCRETE COVER : 50mm
  - 4.5 ALL EXPOSED SHARP CORNERS SHALL BE CHAMFERED 25mm x 25mm.
  - 4.6 JOINTS TO BE SEALED USING DOW CORNING 888 OR EQUIVALENT (INSIDE) AND BITUMIN IMPREGNATED STRIPS (OUTSIDE).
  - 4.7 BACKFILL AND BEDDING MATERIAL REQUIREMENTS AS SPECIFIED.
5. CONSTRUCTION
  - 5.1 FOUNDING:
    - 5.1.1 FOUNDING CONDITIONS NEED TO BE CHECKED ON SITE BEFORE COMMENCEMENT OF CONSTRUCTION. ADVANCE NOTICE TO BE GIVEN TO THE ENGINEER SHOULD BEARING CAPACITY BE LESS THAN IS REQUIRED.
    - 5.1.2 UNSUITABLE FOUNDING MATERIAL SHALL BE REMOVED TO A DEPTH AS INDICATED BY THE ENGINEER AND REPLACED WITH APPROVED FOUNDATION FILL OR MASS CONCRETE.
  - 5.2 NEW IN-SITU CULVERT
    - 5.2.1 ALL CONSTRUCTION JOINTS MUST BE PREPARED STRICTLY IN ACCORDANCE WITH SECTION 6408 OF THE SPECIFICATION.
    - 5.2.2 CONSTRUCTION JOINTS, OTHER THAN THOSE INDICATED, SHALL NOT BE ALLOWED UNLESS APPROVED BY THE ENGINEER.
6. HYDRAULIC DATA
  - 6.1 EFFECTIVE CATCHMENT AREA = 9.7 Km<sup>2</sup>
  - 6.2 DESIGN FLOOD (Q) RECURRENCE INTERVAL = 25 yrs
  - 6.3 DESIGN FLOOD LEVELS:
 

FLOOD	RECURRENCE INTERVAL	FLOOD (m <sup>3</sup> /s)	VELOCITY FLOW (m/s)
Q <sub>2</sub>	2	38.1	2.4
Q <sub>5</sub>	5	65.4	2.8
Q <sub>25</sub>	25	38.0	2.5
Q <sub>100</sub>	50	47.0	4.8
  - 6.4 FREEBOARD TO SHOULDER BREAK POINT BASED ON Q<sub>25</sub> = 6.56m

	CONSTRUCTION RECORD WORKS CONTRACT ENGINEER Name : Prof. Reg. No. : Date : SANRAL PROJECT MANAGER Name : Prof. Reg. No. : Date :	 <b>PORT ELIZABETH OFFICE</b> 2 FORT STREET CENTRAL 6000 TEL: +27 (0)41 585 2514 FAX: +27 (0)41 585 8478 REG. No. 1966/006628/07	DESIGNED BY NAME : E.N. ARENDSE Prof. Reg. No. : 20120155 CHECKED BY NAME : E.J. SMUTS Prof. Reg. No. : 950324 DRAWN BY NAME :	CONSULTANT APPROVAL Name : E.J. SMUTS Prof. Reg. No. : 950324 Date :	HEAD OFFICE 48 Tambotie Avenue Val de Grace Pretoria 0184 PO Box 415 Pretoria 0001 South Africa Tel: (012) 844 8000	THE SOUTH AFRICAN NATIONAL  SOUTHERN REGION SANRAL House Southern Life Gardens 70 2nd Avenue Newton Park Port Elizabeth 6045 PO Box 27230 Greenacres 6067 Tel: (041) 398 3200	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 <b>NATIONAL ROUTE N2 SECTION 11:          NEW REDHOUSE CHELSEA INTERCHANGE</b> DRAWING DESCRIPTION REDHOUSE CHELSEA ARTERIAL - GENERAL ARRANGEMENT	PROJECT NUMBER <b>NRA N.002 - 110 - 2012/1</b> DRAWING LOCATION DATA ROUTE SECTION DRAWING km DISTANCE DRAWING TYPE BRIDGE/STRUCTURE No. CONSULTANT DRAWING No. PD SANRAL DOCUMENT #	START N2 11 N/A STRUCTURES - BRIDGES VER V1	END N2 11 N/A STRUCTURES - BRIDGES VER V1
No.	DATE	REVISION	CONSULT. ENG.	SCALE : AS SHOWN		SHEET 01 OF 01					