



16. THE TRAFFIC FACE OF RAILS SHALL BE SET IN LINE WITH THE TOP EDGE OF PLINTH WITHIN THE FOLLOWING TOLERANCES:  
 (i) UPPER RAIL ± 15mm  
 (ii) LOWER RAIL - 15mm  
 (+VE TOWARDS TRAFFIC; -VE AWAY FROM TRAFFIC)
17. ON SITE WELDING IS NOT PERMITTED UNLESS OTHERWISE AGREED BY THE ENGINEER.
18. STRENGTH OF REINFORCED CONCRETE PARAPETS:-
- | ITEM | CRITERION   | STRENGTH                |
|------|---|-------------------------|
| 1a   | MINIMUM ULTIMATE MOMENT OF RESISTANCE AGAINST VERTICAL BENDING AT BASE (REINFORCEMENT AT TRAFFIC FACE-INTERMEDIATE PANEL).                  | 100kNm/m (INTERMEDIATE) |
| 1b   | MINIMUM ULTIMATE MOMENT OF RESISTANCE AGAINST VERTICAL BENDING AT BASE (REINFORCEMENT AT TRAFFIC FACE-END PANEL).                           | 133kNm/m (END SECTION)  |
| 2    | MINIMUM ULTIMATE MOMENT OF RESISTANCE AGAINST HORIZONTAL BENDING (REINFORCEMENT AT OUTER FACE).   | 50kNm/m                 |
| 3    | MINIMUM ULTIMATE HORIZONTAL TRANSVERSE SHEAR RESISTANCE.  | 220kN/m                 |
| 4    | MINIMUM ULTIMATE TRANSVERSE SHEAR LOAD TO BE TRANSFERRED AT CONNECTED VERTICAL JOINTS BETWEEN LENGTHS OF IN-SITU PARAPET OR PRECAST PANELS. | 165kN                   |
19. VERTICAL CONCRETE JOINTS SHALL BE PROVIDED IN THE CONCRETE PORTION OF THE PARAPET TO PREVENT LONGITUDINAL ACTION IN DECK STIFFENING. JOINT SPACING SHALL BE DETERMINED BY THE ENGINEER BUT SHALL NOT BE LESS THAN 3000mm.
20. CONCRETE GRADE SHALL BE 40/20.
21. STEEL REINFORCEMENT SHALL BE HIGH YIELD COMPLYING WITH CONSTRUCTION STANDARD CS2 : 1995 AND SHALL BE CUT AND BENT IN ACCORDANCE WITH BS 8666 : 2000.
22. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, THE MINIMUM COVER TO ANY REINFORCEMENT SHALL BE 50mm. FILL COVER IS TO BE MAINTAINED AT GROOVES AND ANY ARCHITECTURAL FINISHES ON THE CONCRETE SURFACE.
23. TYPE OF BAR REINFORCEMENT:  
 T = HOT ROLLED HIGH YIELD DEFORMED BAR OF MINIMUM YIELD STRESS 460N/mm<sup>2</sup>.
- BAR SPACING INDICATED ON THE DRAWINGS SHALL BE PERPENDICULAR TO BARS, UNLESS INDICATED OTHERWISE.
24. MINIMUM ANCHORAGE AND LAP LENGTHS SHALL BE 31d AND 43d RESPECTIVELY UNLESS OTHERWISE SPECIFIED.  
 (d DENOTES BAR DIAMETER)

- NOTES:
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
  - ALL STEELWORK SHALL BE HOT ROLLED / FINISHED SECTIONS COMPLYING WITH BS4, BS EN 10025 OR BS EN 10210-2 AS APPROPRIATE.
  - STEELWORK SHALL BE GRADE S355JH TO BS EN 10025 OR GRADE S355J0 TO BS EN 10210-1 OR EQUIVALENT.
  - ALL STEELWORK SHALL BE HOT DIP GALVANIZED TO BS EN ISO 1461 OR EQUIVALENT.
  - WELDING OF STEEL SHALL BE IN ACCORDANCE WITH BS EN 1011-1 AND BS EN 1011-2 AND ELECTRODES SHALL BE IN ACCORDANCE WITH BS EN 499.
  - WELDING SYMBOLS ARE IN ACCORDANCE WITH BS499.
  - WELDS ARE 6mm CONTINUOUS FILLET WELDS UNLESS OTHERWISE SPECIFIED.
  - STAINLESS STEEL BOLTS AND NUTS SHALL BE GRADE A4-80 TO BS EN ISO 3506-1 AND BS EN ISO 3506-2 WITH COMPATIBLE STAINLESS STEEL WASHERS.
  - A NYLON OR OTHER APPROVED PLASTIC WASHER SHALL BE PROVIDED AT EVERY INTERFACE BETWEEN STAINLESS STEEL AND GALVANIZED STEEL.
  - FASTENERS OTHER THAN STAINLESS STEEL MATERIALS SHALL BE CADMIUM OR ZINC ELECTROPLATED, HOT-DIP GALVANIZED, OR SHERARDISED TO THE APPROPRIATE BRITISH STANDARDS.
  - PARAPET POSTS SHALL BE FIXED VERTICALLY AND BASE PLATES SHALL BE BOLTED DOWN TIGHTLY WITH LEVELS ADJUSTED BY STEEL SHIMS.
  - RAIL EXPANSION JOINTS SHALL BE PROVIDED AT ALL STRUCTURE MOVEMENT JOINTS.
  - PARAPET RAILS SHALL BE CONTINUOUS OVER AT LEAST TWO POSTS. MAXIMUM RAIL LENGTH SHALL BE 12000.
  - BEDDING SHALL BE CEMENT / SAND GROUT WITH MIN. COMPRESSIVE STRENGTH OF 40N/mm<sup>2</sup>.
  - AFTER FABRICATION, ALL STEELWORK SHALL BE PAINTED WITH THE FOLLOWING PAINT SYSTEM:  
 LIFE TO FIRST MAINTENANCE : 5 - 15 YEARS, MEDIUM DURABILITY AS DEFINED IN BS EN ISO 12944 PART 5  
 PRETREATMENT : TWO-PACK ETCH PRIMER.  
 PRIMER : CHLORINATED RUBBER ZINC PHOSPHATE PRIMER, 70um MINIMUM TOTAL DRY-FILM THICKNESS.  
 UNDERCOAT : MICACIOUS IRON OXIDE CHLORINATED RUBBER UNDERCOAT, 100um MINIMUM TOTAL DRY-FILM THICKNESS.  
 FINISH : CHLORINATED RUBBER FINISH COAT THAT IS RESISTANT TO FISH OIL AND OTHER ANIMAL AND VEGETABLE OILS, 60um MINIMUM TOTAL DRY-FILM THICKNESS.

no.	date	description	initial
REVISION			
		name	signature
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		Chief Highway Engineer	

contract no.

file no.

project no.

contract

drawing title

**L3 COMBINED DOUBLE RAIL CONCRETE PARAPET (TYPE PEN)**

(SHEET 1 OF 2)

drawing no. **SSD161(1)** scale **AS SHOWN**

office **BRIDGES AND STRUCTURES DIVISION** 結構部及

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