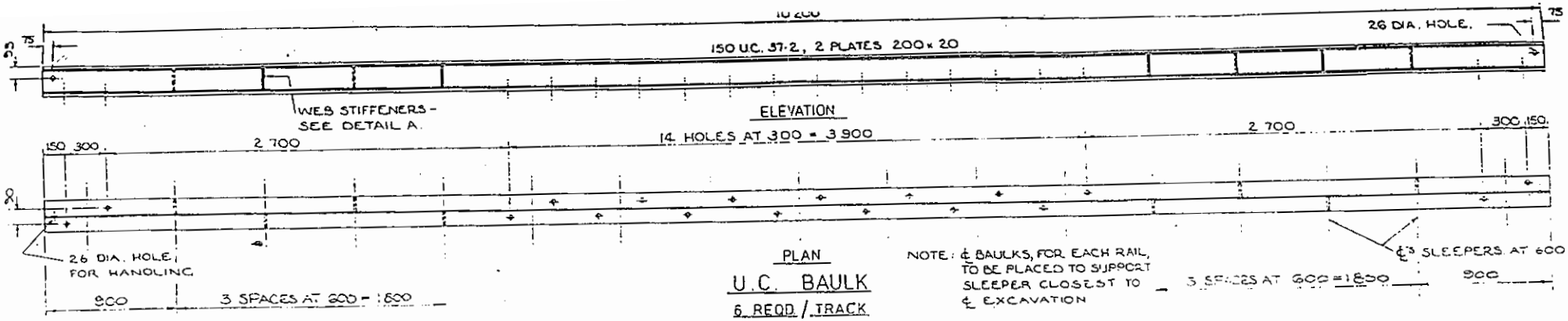


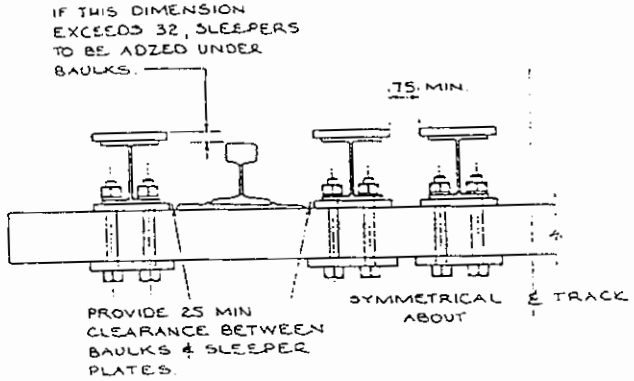
PLAN

U.C. BAULK

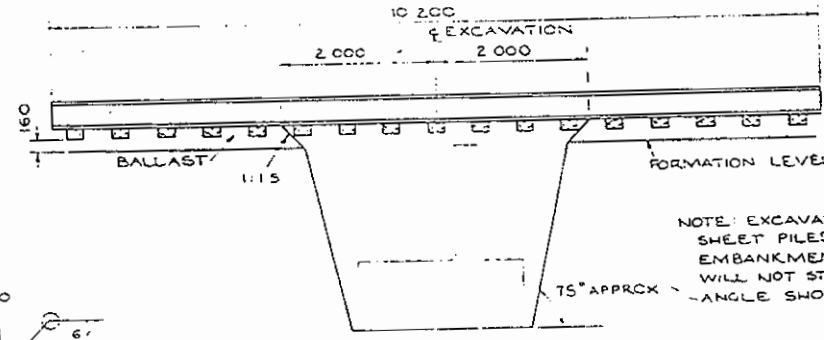
6 REQD / TRACK

SCALE 1:20

NOTE: ℄ BAULKS, FOR EACH RAIL, TO BE PLACED TO SUPPORT SLEEPER CLOSEST TO ℄ EXCAVATION



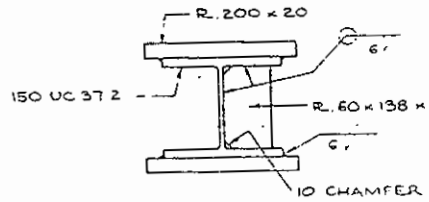
ELEVATION



NOTE: EXCAVATION TO BE SHEET PILED IF EMBANKMENT MATERIAL WILL NOT STAND UP AT ANGLE SHOWN.

CONSTRUCTION ELEVATION

SCALE 1:50

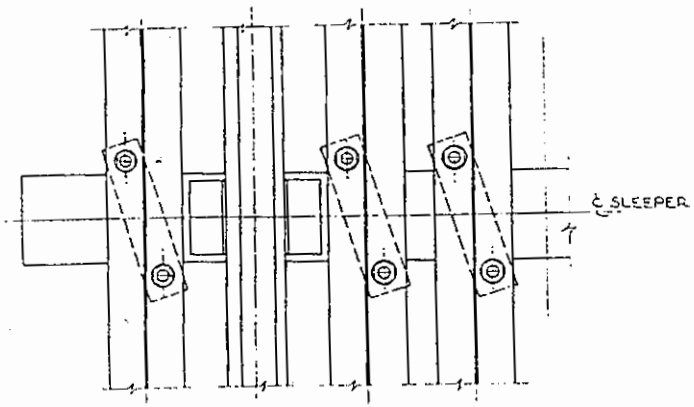


DETAIL A

WEB PLATES

48 REQD / TRACK

SCALE 1:5

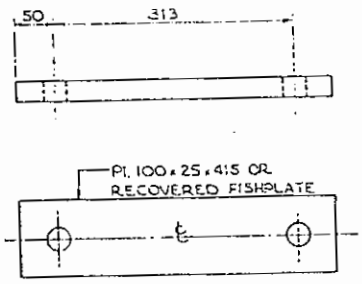


PLAN

TOP FLANGES REMOVED FOR CLARITY

TYPICAL ARRANGEMENT

SCALE 1:10



STRAP

54 REQD / TRACK

SCALE 1:5

NOTES:

PAINT ALL COMPONENTS WITH INORGANIC ZINC.

BAULKS TO SUPPORT 7 CENTRE SLEEPERS OVER EXCAVATION AND TO BE TIED DOWN TO ONE SLEEPER EACH END. EACH BAULK TO BE PROVIDED WITH 18 BOLTS, 24 DIA., 215 LG. THREAD 75, WITH NUT & SPRING WASHER (TOTAL 108/TRACK). ALL HOLES TO BE 26 DIA. FOR M24 BOLTS UNLESS OTHERWISE NOTED. BOLTS ETC., GALV.

DESIGN: M22 - 10% IMPACT + M24.

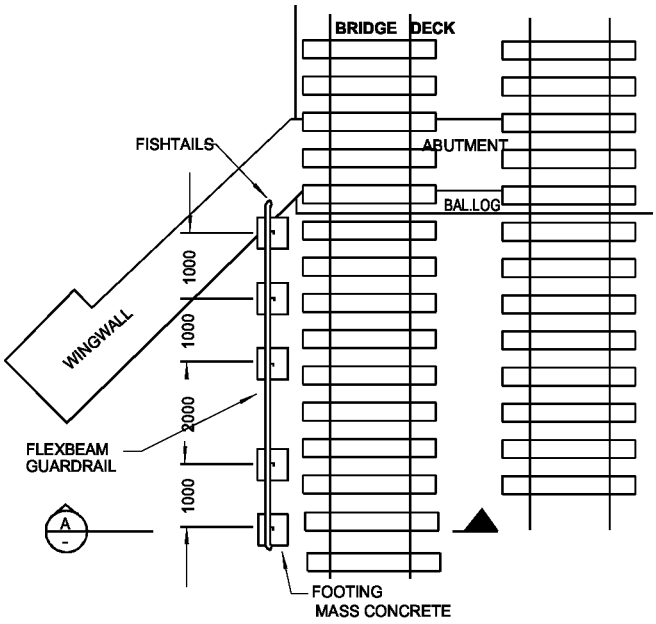
PUBLIC TRANSPORT COMMISSION OF N.S.W.
RAIL DIVISION — WAY AND WORKS BRANCH

TEMPORARY TRACK SUPPORT EXCAVATION WIDTH UP TO 4·0m CLEAR SPAN

DESIGNED K.R.L. DRAWN D.E.D.	CHECKED K.R.L. SUPERVISOR M.E.W.	A/D.E.B.
SENIOR DESIGN ENGINEER		APPROVED 21/12/78
PRINCIPAL ENGINEER DESIGN		GENERAL MANAGER

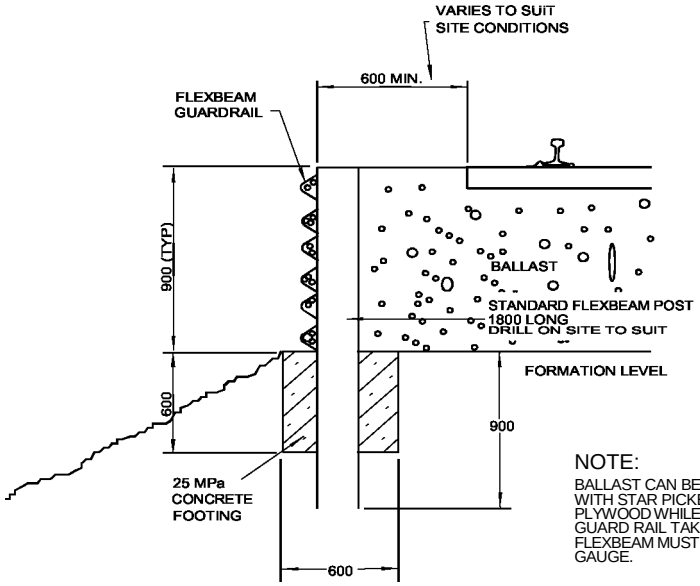
No. 207-165.

Appendix 3 - Ballast Retention Walls



PLAN

N.T.S.



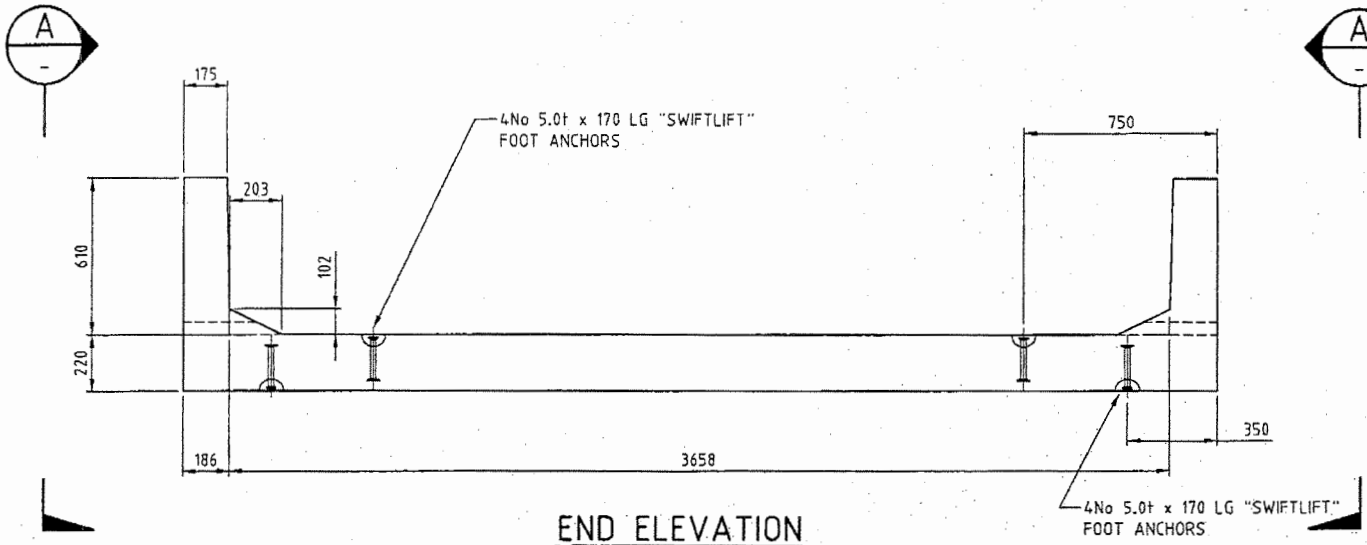
NOTE:

BALLAST CAN BE EXCAVATED AND SUPPORTED WITH STAR PICKETS AND TWO LAYERS 20mm PLYWOOD WHILE CONSTRUCTION OF FLEXBEAM GUARD RAIL TAKES PLACE
FLEXBEAM MUST NOT ENCROACH ON STRUCTURE GAUGE.

SECTION A

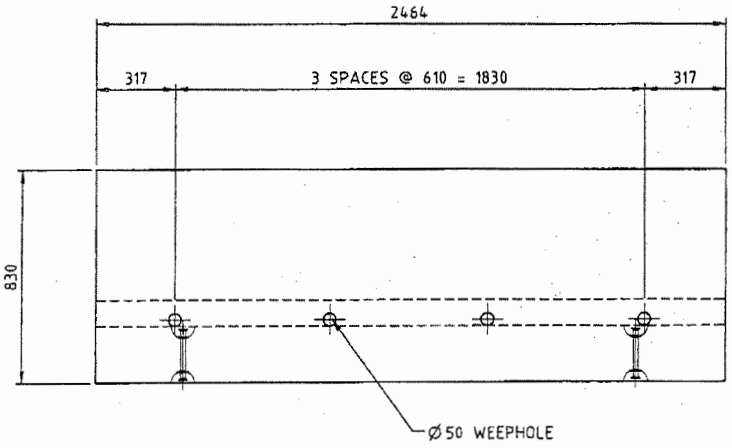
N.T.S.

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	ISSUED FOR MANUFACTURE	DFW	09/05/05	RGE
1	DESIGN LOADINGS ADDED	DFW	27/05/05	RGE



END ELEVATION

SCALE 1:20



VIEW A

SCALE 1:20

NOTES:

1. MINIMUM CONCRETE STRENGTH f'c = 50 MPa
2. MINIMUM COVER TO REINFORCEMENT = 25mm
3. MINIMUM CONCRETE STRENGTH AT STRIPPING FROM FORM = 20 MPa
4. REFER TO DRAWING 11742-TA-02 FOR REINFORCEMENT DETAILS
5. APPROXIMATE UNIT MASS = 7.3t
6. MINIMUM SLING LENGTH = 3800mm

DESIGN LOADING: 1

1. RAIL LOADING 300LA TO AS5100.
2. SLEEPER LENFTH = 2.44m.
3. MINIMUM BALLAST THICKNESS UNDER SLEEPER = 300mm.
3. UNITS PLACED ON COMPACTED FOUNDATION WITH A MINIMUM BEARING PRESSURE OF 250 kPa (WORKING).

Humes TECHNICAL (DESIGN) SERVICES
BRISBANE, QUEENSLAND

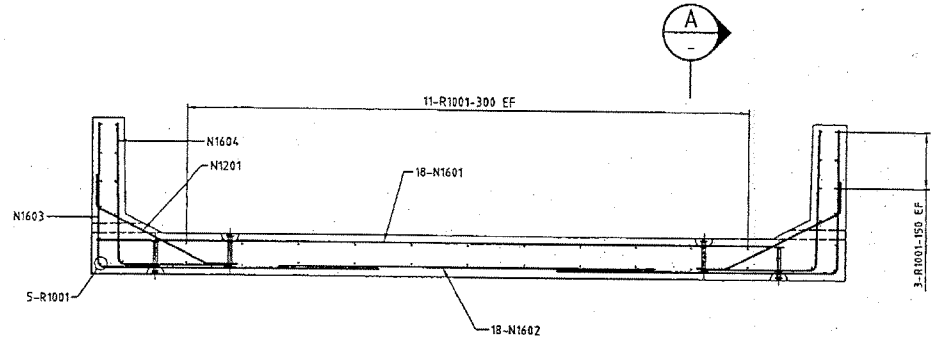
Readymix Holdings Pty Limited ABN 67 099 732 297

DSN.	DFW	09/05/05
DWN.	DFW	09/05/05
CKD.	RGE	09/05/05
APP.	DFW	09/05/05

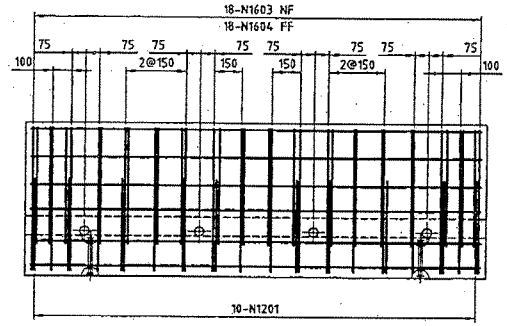
ARTC
NEW ENGLAND HIGHWAY OVERBRIDGE
MAIN NORTH SOUTH RAIL AT MUSWELLBROOK
INVERT BOX CULVERT BALLAST BOX
PRODUCT DETAILS

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:1	A3	11742-TA-01	1

ISSUE	DETAILS OF ALTERATIONS	DWN	DATE	CKD
0	ISSUED FOR MANUFACTURE	DFW	09/05/15	RGE



END ELEVATION
SCALE 1:20



VIEW A
SCALE 1:20

REINFORCEMENT SCHEDULE

BAR MARK	GRADE & SIZE	SHAPE DESCRIPTION	PIN	'a'	'b'	'c'	'd'	'e'	'f'	CUTTING LENGTH	No OFF	BAR WT. kg
N1603	N16	a b	64	1500	770	-	-	-	-	2237	36	127.25
N1604	N16		64	770	770	-	-	-	-	1507	36	85.72
N1601	N16	a	-	3938	-	-	-	-	-	3938	18	112.00
N1602	N16		-	2000	-	-	-	-	-	2000	18	56.88
R1001	R10		-	2404	-	-	-	-	-	2404	44	65.22
N1201	N12	a b c a	48	150	670	337	-	-	-	1046	20	18.58

ALL DIMENSIONS ARE TO THE OUTSIDE OF THE BAR SHAPE UNO. TOLERANCE ON DIMENSIONS TO BE +0, -10mm.

TOTAL REINFORCEMENT MASS = 466 kg
NET CONCRETE MASS = 6804 kg
TOTAL UNIT MASS = 7270 kg
CONCRETE VOLUME = 2.75 m3

NOTES:

1. ALL REINFORCEMENT TO AS4671
2. 'N' BAR REINFORCEMENT fsy = 500 MPa
3. NOMINAL COVER TO REINFORCEMENT = 30mm ± 5 UNO
4. REFER TO DRAWING 11742-TA-01 FOR PRODUCT DETAILS
5. REINFORCEMENT WHICH IS TO BE CUT TO CLEAR LIFTERS, FERRULES OR BLOCKOUTS MUST BE REINSTATED WITH A BAR OF THE SAME DIAMETER AND MINIMUM LAP OF 40xBAR DIAMETER
6. REINFORCEMENT NOTATION: 2-N1202-200 FF
   - NUMBER OF BARS
   - BAR TYPE AND MARK
   - BAR SPACING (MAXIMUM)
   - BAR POSITION i.e. NF = NEAR FACE, FF = FAR FACE, EF = EACH FACE

Humes TECHNICAL (DESIGN) SERVICES BRISBANE, QUEENSLAND

DSN.	DFW	09/05/15
DWN.	DFW	09/05/15
CKD.	RGE	09/05/15
APP.	DFW	09/05/15

ARTC
NEW ENGLAND HIGHWAY OVERBRIDGE
MAIN NORTH SOUTH RAIL AT MUSWELLBROOK
INVERT BOX CULVERT BALLAST BOX
REINFORCEMENT DETAILS

SUPERSEDES	PLOT SCALE	SIZE	DRG. NO.	ISSUE
	1:1	A2	11742-TA-02	0

CONSTRUCTION NOTES

GENERAL:

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS AND OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS AND WITH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCIES SHALL BE REFERRED TO THE SUPERINTENDENT FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.

G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT EDITIONS, INCLUDING AMENDMENTS, OF AS5100 AND OTHER RELEVANT AUSTRALIAN STANDARDS.

G3 UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS AND COORDINATES ARE IN METRES. 'UNO' DENOTES 'UNLESS NOTED OTHERWISE'.

G4 DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS. ANY SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION COMMENCES.

G5 ANY DIMENSIONS RELATING TO EXISTING FOUNDATIONS OR STRUCTURE SHALL BE VERIFIED ON SITE BY THE CONTRACTOR PRIOR TO FABRICATION AND COMMENCEMENT OF WORK.

G6 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVER STRESSED. TEMPORARY BRACING, FORMWORK, FALSEWORK, SHORING, TEMPORARY STRUCTURES AND THE LIKE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

G7 SUBSTITUTES SHALL ONLY BE MADE WITH THE APPROVAL OF THE SUPERINTENDENT.

G8 WHERE THE ENGINEER IS REQUIRED FOR INSPECTION AND/OR SUPERVISION, A MINIMUM OF 24 HOURS NOTICE SHALL BE GIVEN.

ASSUMED CONSTRUCTION PROCEDURE:

CP1 REMOVE EXISTING BALLAST LOG.

CP2 REMOVE TOP OF EXISTING BALLAST WALL TO SUIT SEATING LEVEL OF NEW BALLAST LOG. ENSURE SOUND SEATING MATERIAL.

CP3 INSTALL NEW BALLAST LOG BY SLIDING BENEATH RAILS.

CP4 ALIGN BALLAST LOG THEN CORE HOLES IN EXISTING WALLS WALL THROUGH FORMED VOIDS IN BALLAST LOG FOR DOWELS.

CP5 CLEAN OUT CORE HOLES & VOIDS IN BALLAST LOG

CP6 LIFT BALLAST LOG TO CORRECT HEIGHT & PACK. INSTALL DOWELS. EPOXY GROUT DOWELS BETWEEN BALLAST LOG & BALLAST WALL

CP7 DELKOR ALT 1 ELASTIC RAIL FASTERNER SHALL BE FITTED IN PLACE WITHOUT BISCUITS OR CLIPS. GENERALLY INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ARTCN207031110001, SHEET 2.

THE ALT 1 ELASTIC RAIL FASTENERS WILL USE THREADED 24mm ROD TO SECURE DELKOR FASTENERS IN PLACE. THE THREADED ROD WILL BE FITTED IN A HOLE DRILLED TO A DEPTH OF NOT LESS THAN 200mm. THE HOLES DIAMETER SHALL BE A SMOOTH CLEARANCE FIT SO THE THREADED ROD MOVES FREELY IN THE HOLE AND IS NOT AN INTERFERENCE FIT OVER THE FULL DEPTH OF THE HOLE.

THE THREADED ROD SHALL BE SECURED IN THE ABUTMENT WITH MEGA EPOXY 206 (or APPROVED EQUIVALENT) WITH ACCELERATOR ADDED IF REQ'D, USED STRICTLY IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.

THE DELKOR PLATE SHALL NOT BE SECURED IN PLACE UNTIL THE MEGA EPOXY 206 (OR APPROVED EQUIVALENT) HAS CURED.

FINAL FITMENT TO THE ABUTMENT SHALL ENSURE THE FOLLOWING.

a. THE ASSEMBLED AND INSTALLED DELKOR PLATE SHALL BE LEVEL ACROSS AND ALONG THE ABUTMENT.
b. EACH INSTALLED THREADED ROD WILL INCLUDE FITMENT OF HELICAL SPRING AND SERRATED WASHER SECURED BY A 24mm NUT.
c. THE FITTED THREADED ROD SHALL BE OF A LENGTH TO ENSURE THAT A MINIMUM TWO THREADS ARE SHOWING ABOVE THE NUT SECURING THE DELKOR ASSEMBLY COMPLETE WITH 3mm PLATE/PAD IN PLACE.

Rev	Date	Revision Description	Drawn	App
A	4.07.08	ISSUED FOLLOWING INITIAL TRIAL INSTALLATION	P.S	R.T

Designed by AUSTRALIAN RAIL TRACK CORPERATION 6312

Scale N.T.S. Date 4.07.08

Designed M.S./S.G

Drawn P.S.

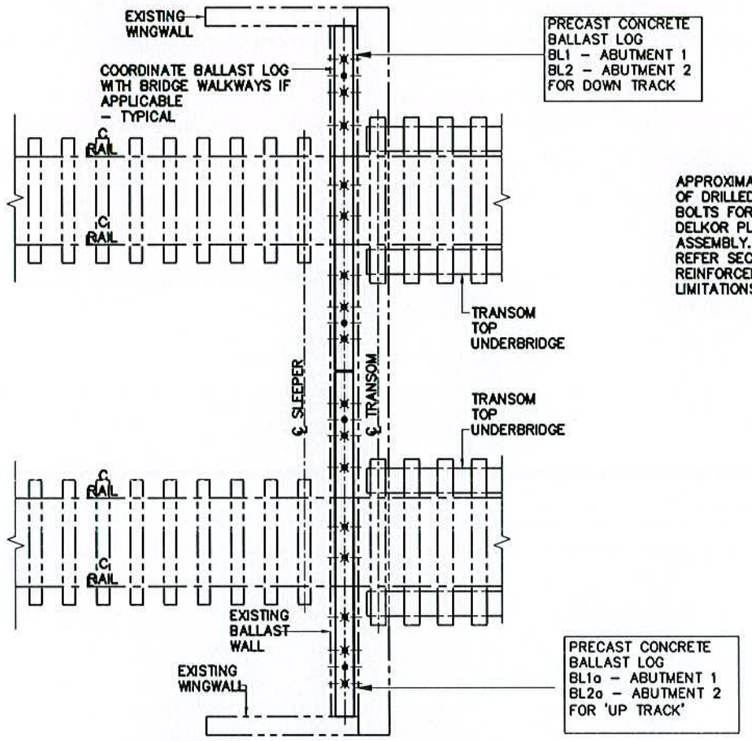
Checked R.T. Certified 10/07/08

ARTC AUSTRALIAN RAIL TRACK CORPORATION LTD

A ARTCN2070310001

STANDARD PRECAST LOAD BEARING CONCRETE BALLAST LOG FOR TRANSOM TOP UNDERBRIDGE

Sheet No. 1 of 3



SINGLE TRACK – 1 BALLAST LOG REQ'D PER ABUTMENT
DOUBLE TRACK – 2 BALLAST LOGS REQ'D PER ABUTMENT

SINGLE & DOUBLE TRACK CONFIGURATION PRECAST CONCRETE BALLAST LOG ARRANGEMENT

(SCALE 1:50)

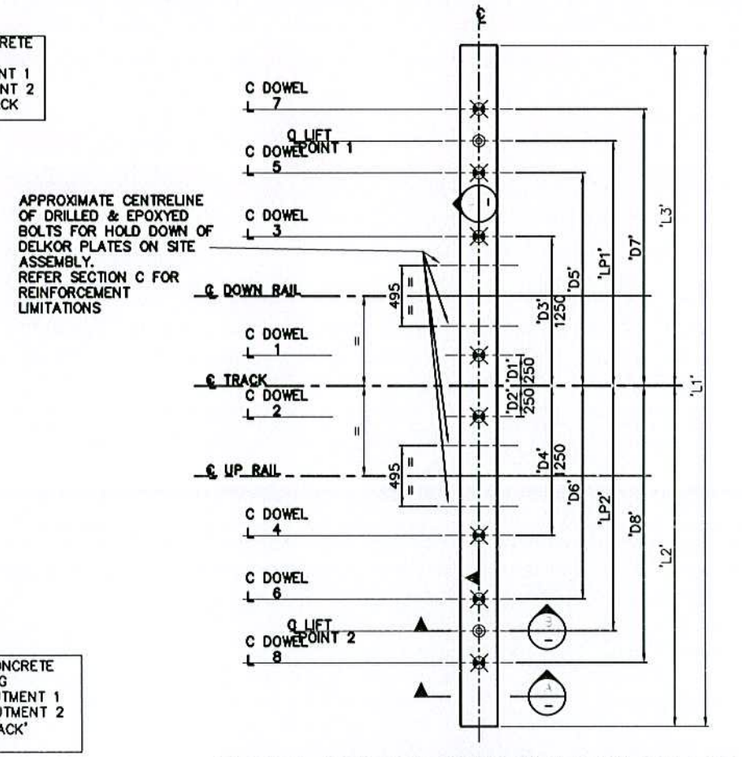
TABLE 1 – BALLAST LOG DIMENSIONS

DIMENSION REFERENCE	DESIGN LIMITS (mm)		BALLAST LOG DIMENSIONS (mm) (REFER NOTES TO TABLE 1 BELOW)	
			BL1	BL2
L1	7500 MAX.	3800 MIN.		
L2	3750 MAX.	1900 MIN.		
L3	3750 MAX.	1900 MIN.		
H1	450 MAX.	225 MIN.		
H2	450 MAX.	225 MIN.		
D1	FIXED DIMENSION		250	250
D2	FIXED DIMENSION		250	250
D3	FIXED DIMENSION		1250	1250
D4	FIXED DIMENSION		1250	1250
D5	2500 MAX.	2000 MIN.		
D6	2500 MAX.	2000 MIN.		
D7	3450 MAX.	3250 MIN.		
D8	3450 MAX.	3250 MIN.		
LP1	3000 MAX.	1550 MIN.		
LP2	3000 MAX.	1550 MIN.		

APPROX MASS OF EACH BALLAST LOG UNIT = $\left[\left(\frac{H1 + H2}{2}\right) \times L1\right] \times 720kg$
WHERE H1, H2 & L1 ARE IN METRES

NOTES TO TABLE 1:

1. BALLAST LOG DIMENSIONS SHALL BE DETERMINED TO SUIT EACH ABUTMENT ON A SITE SPECIFIC BASIS
2. MIN CENTRELINE DISTANCE BETWEEN DOWEL & LIFTING ANCHOR SHALL BE 300
3. CENTRELINE DISTANCE FROM OUTER MOST DOWEL OR LIFTING ANCHOR TO END OF BALLAST LOG SHALL BE 300 MIN./750 MAX.
4. CENTRELINE DISTANCE BETWEEN DOWELS (EXCLUDING DOWELS 1 & 2) SHALL BE 1000 TYPICAL, 750 MIN./1450 MAX.



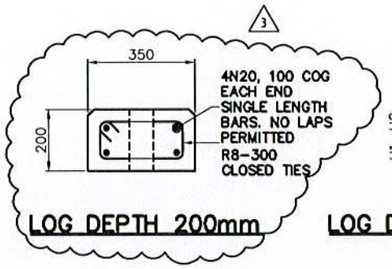
TYPICAL PRECAST CONCRETE BALLAST LOG DETAIL

(SCALE 1:25)

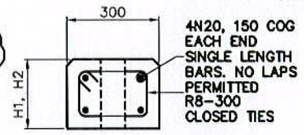
⊠ DENOTES DOWEL LOCATION
REFER 'SECTION A' DWG ARTCN2070310001 Sht

◎ DENOTES LIFTING ANCHOR LOCATION
REFER 'SECTION B' THIS DWG.

NOTE:
WHEN TRACK IS SUPER-ELEVATED 'H1' IS LOW SIDE, 'H2' IS HIGH SIDE
WHEN NO SUPER-ELEVATION 'H1' = 'H2'



LOG DEPTH 200mm



LOG DEPTH 225 to 300mm

LOG DEPTH 300 to 450mm

SECTION A

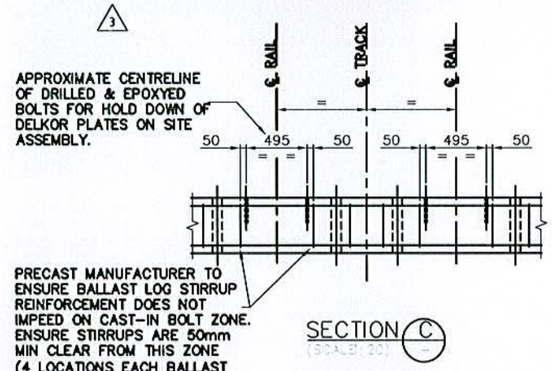
FOR GENERAL CONSTRUCTION NOTES, REFER SHEET 1.

CONCRETE:

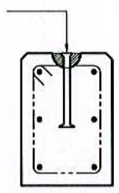
C1 ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH AS5100 AND THE SPECIFICATION. ALL CONCRETE SHALL BE MANUFACTURED AND SUPPLIED IN ACCORDANCE WITH AS1379 & AS5100.5 SECTION 16.
C2 CONCRETE EXPOSURE CLASSIFICATION TO AS5100 AS FOLLOWS: –
PRECAST BALLAST LOGS – B1
C3 CONCRETE QUALITY SHALL BE IN ACCORDANCE WITH AS1379 & AS5100.5 SECTION 16 FOR CONCRETE ELEMENTS AS FOLLOWS: –
– CONCRETE STRENGTH GRADE TO AS1379: – S40
– 56 DAY SHRINKAGE STRAIN (MAX.): – 650 μ
– ALL OTHER CONCRETE PROPERTIES FOR THE NOMINATED SPECIAL CLASS CONCRETE SHALL COMPLY WITH THE REQUIREMENTS FOR THE EQUIVALENT STRENGTH GRADE NORMAL CLASS CONCRETE SET OUT IN AS1379
C4 CONCRETE PRODUCTION ASSESSMENT SHALL BE IN ACCORDANCE WITH AS1379 SECTION 6. PROJECT ASSESSMENT SHALL BE IN ACCORDANCE WITH THE SPECIFICATION AND AS1379SECTION 6.5 AS APPLICABLE.
C5 CONCRETE FORMWORK SHALL COMPLY WITH AS5100.5, AS3610 & THE SPECIFICATION.SURFACE FINISH CLASS SHALL BE 'CLASS 2', IN ACCORDANCE WITH AS3610.
C6 SUPPLY, PLACE & CURE CONCRETE TO MINIMISE SHRINKAGE. ALL CONCRETE SHALL BE CURED IN ACCORDANCE WITH THE SPECIFICATION & AS5100.5 SECTION 16. THE USE OF SPRAYED MEMBRANE–FORMING CURING COMPOUNDS COMPLYING WITH AS3799 SHALL BE PERMITTED. PVA CURING COMPOUNDS ARE NOT PERMITTED.

CONCRETE REINFORCEMENT:

R1 CONCRETE REINFORCEMENT SHALL BE IN ACCORDANCE WITH AS5100.5 SECTION 16 AND THEFOLLOWING: –
R – ROUND BARS TO AS/NZS4671 (R250N)
N – DEFORMED RIBBED BARS TO AS/NZS4671 (D500N)
R2 EXPLANATION OF NOTATION FOR REINFORCEMENT USED ON DRAWINGS: E.G. 8N24–300
8 – DENOTES NUMBER OF REINFORCING BARS
N24 – DENOTES BAR GRADE & NOMINAL DIAMETER
300 – DENOTES DISTANCE BETWEEN BAR CENTRES
R3 REINFORCEMENT IS REPRESENTED DIAGRAMATICALLY AND NOT NECESSARILY IN TRUE POSITION. ALL HOOKS & BENDS SHALL BE IN ACCORDANCE WITH AS5100.
R4 ALL REINFORCEMENT SHALL BE SECURELY SUPPORTED IN ITS CORRECT POSITION DURING CONCRETE PLACEMENT AT A MAX. SPACING OF 60 BAR DIAMETERS FOR BARS AND 800mm FOR FABRIC BY APPROVED BAR CHAIRS, OR SUPPORT BARS SO AS NOT TO BE DISPLACED.



SECTION C



TYPICAL LIFTING ANCHOR DETAILS

SECTION B

3	4.07.08	AMENDMENT OF LINDSAY AND DYNAN DESIGN OF 12.02.07 BASED ON FIELD TESTS / 200mm DEEP LOG ADDED / SECTION C ADDED	P.S.	R.T.
2	27.03.08	DRAWING PRESENTATION REFINED 2nd SHEET ADDED	M.S.	K.D.
1	12.02.07	ISSUED FOR CONSTRUCTION	J.C.	S.G.
A	17.01.07	ISSUED FOR CLIENT REVIEW	J.C.	S.G.
Rev	Date	Revision Description	Drwn.	App.

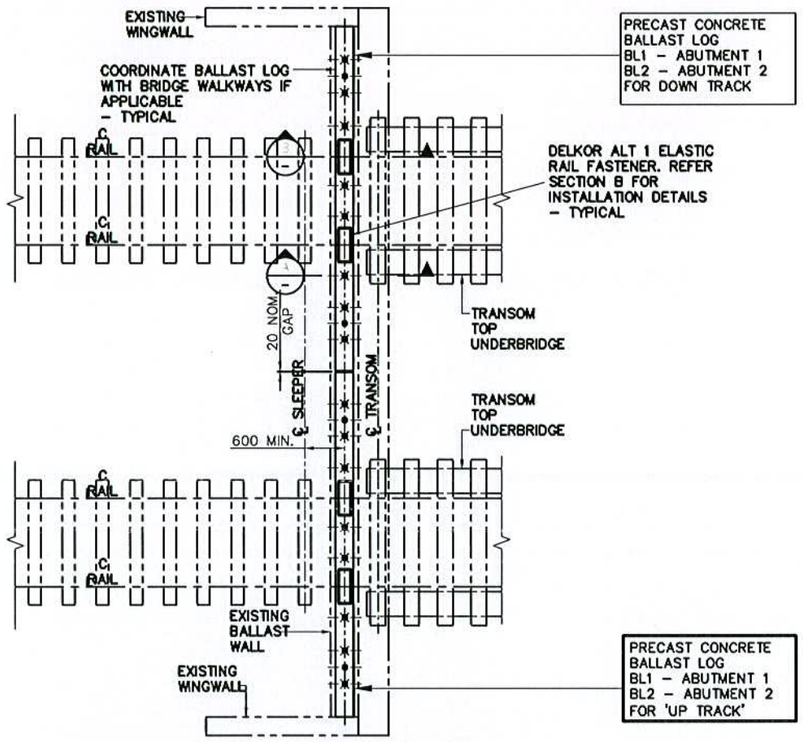
Designed by: AUSTRALIAN RAIL TRACK CORPERATION 6312
Scale: 1:50, 25, 10 Date: 04.07.08
Designed: M.S./S.G.
Drawn: P.S.
Checked: R.T.
Certified: 10/07/08

AUSTRALIAN RAIL TRACK CORPORATION LTD

A 1 2 3 ARTCN2070310001

TITLE
STANDARD PRECAST LOAD BEARING CONCRETE BALLAST LOG FOR TRANSOM TOP UNDERBRIDGE

Sheet No. 3 of 3



SINGLE TRACK – 1 BALLAST LOG REQ'D PER ABUTMENT

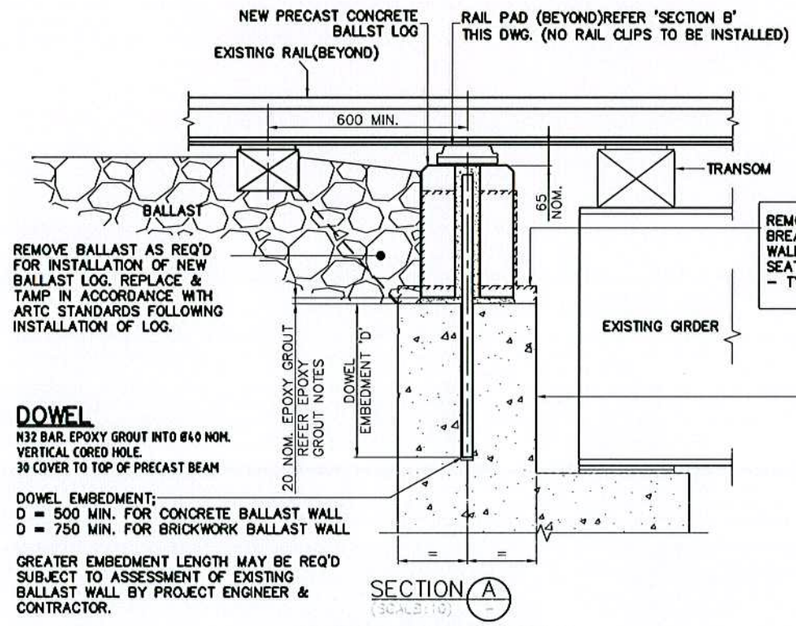
DOUBLE TRACK – 2 BALLAST LOGS REQ'D PER ABUTMENT

SINGLE & DOUBLE TRACK ARRANGEMENT PRECAST CONCRETE BALLAST LOG SETOUT

(SCALE 1:50)

EXISTING ABUTMENTS SHALL BE INDIVIDUALLY ASSESSED TO CONFIRM SUITABILITY FOR STANDARD PRECAST BALLAST LOG INSTALLATION AS DETAILED ON THIS DRAWING

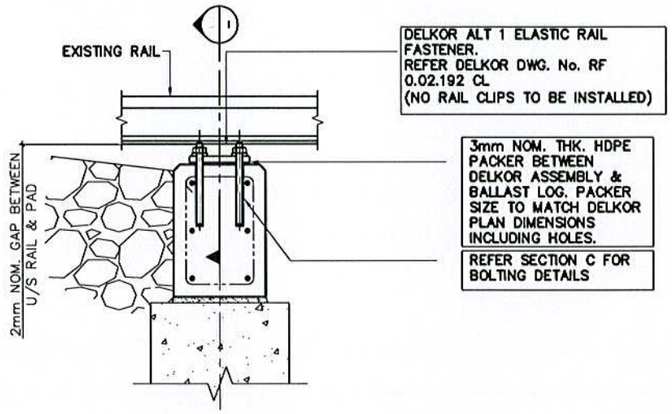
REFER DRAWING ARTCN2070310001 Sht 3 FOR PRECAST BALLAST LOG DETAILS



TYPICAL DOWEL DETAIL

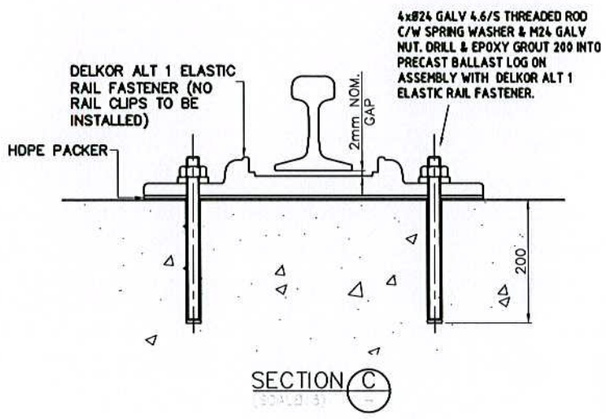
RECORD OF AS BUILT

CONTRACTOR TO PROVIDE DIMENSIONS OF AS-BUILT DETAILS AS LISTED IN THIS TABLE	
	'AS-BUILT' DIMENSIONS (mm)
THICKNESS OF HDPE PACKER INSTALLED BETWEEN UNDERSIDE OF DELKOR ASSEMBLY & TOP OF BALLAST LOGS	
CONSTRUCTED DEPTH OF PRECAST BALLAST LOGS	
EMBEDED LENGTH OF N32 DOWELS INTO EXISTING BALLAST WALLS.	



SECTION B
(SCALE 1:10)

TYPICAL DELKOR PAD SEATING ARRANGEMENT



SECTION C
(SCALE 1:5)

Rev	Date	Revision Description	Drwn	App
3	4.07.08	AMENDMENT OF LINDSAY AND DYNAN DESIGN OF 12.02.07 BASED ON FIELD TESTS	P.S	R.T
2	27.03.08	DRAWING PRESENTATION REFINED 2nd SHEET ADDED	M.S	K.D
1	12.02.07	ISSUED FOR CONSTRUCTION	J.C	S.G
A	17.01.07	ISSUED FOR CLIENT REVIEW	J.C	S.G

Designed by: AUSTRALIAN RAIL TRACK CORPERATION 6312

Scale: 1:50, 10, 5 — Date: 04.07.08

Designed: M.S./S.G

Drawn: P.S.

Checked: R.T.

Certified: 10/07/08

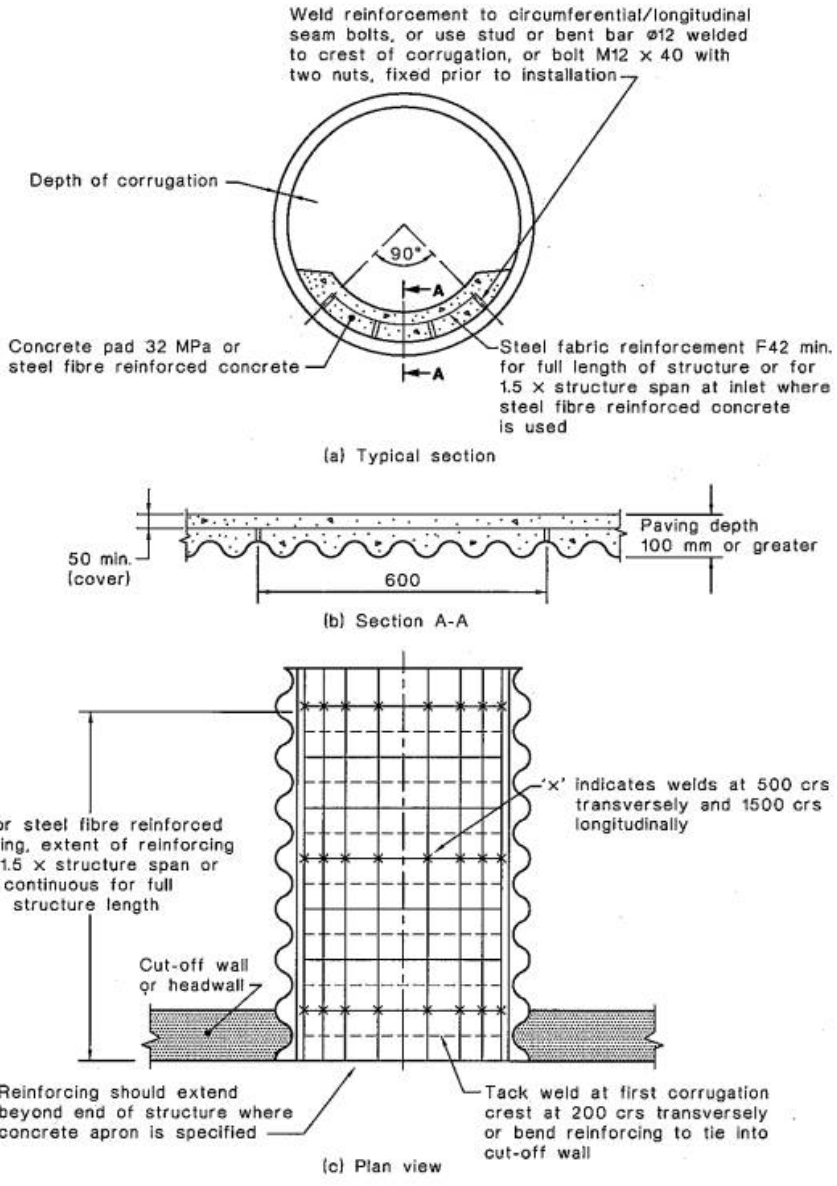
AUSTRALIAN RAIL TRACK CORPORATION LTD

ARTCN2070310001

STANDARD PRECAST LOAD BEARING CONCRETE BALLAST LOG FOR TRANSOM TOP UNDERBRIDGE

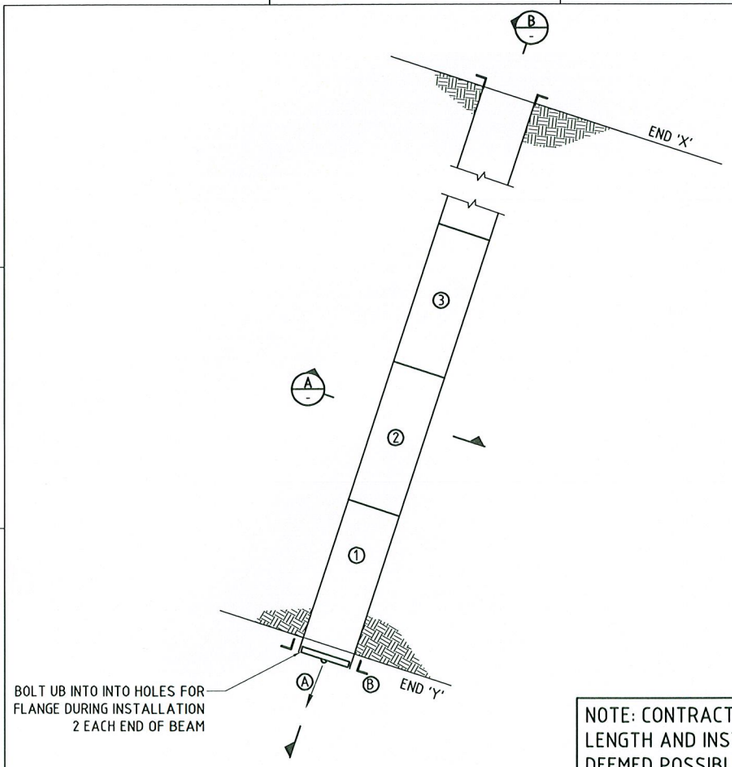
Sheet No. 2 of 3

TYPICAL DETAIL FOR REPAIR OF ACCESSIBLE PIPE CULVERTS - EXTRACT FROM AS/NZS 2041

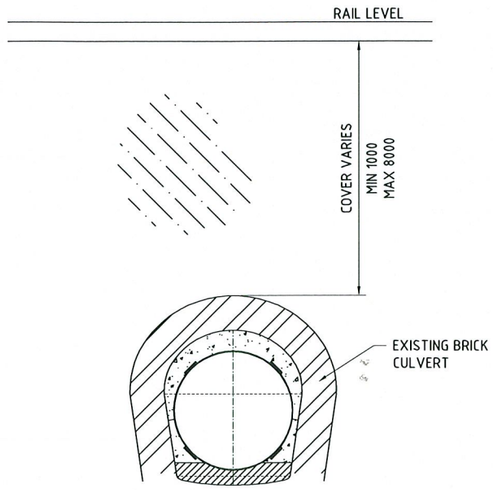


DIMENSIONS IN MILLIMETRES

FIGURE C1 INVERT LINING ARRANGEMENT FOR CORRUGATED METAL STRUCTURES

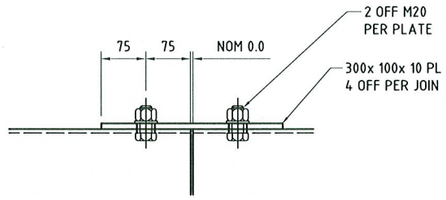


PROPOSED ERECTION PROCEDURE
SEE NOTE 13
NOT TO SCALE



SECTION A
N.T.S.

NOTE: CONTRACTOR MAY FABRICATE A SINGLE PIPE LENGTH AND INSTALL AS ONE PIECE IF INSTALLATION IS DEEMED POSSIBLE BY THE CONTRACTOR



DETAIL 1
SCALE 1: 10

NOTES

1. DIMENSION '*' MAY VARY.
NOMINAL DIAMETERS 300 TO 900 PROVIDED FOR ON THIS DRAWING. ALL WALL THICKNESS 6mm.

2. CULVERT SHAPE AND SIZE MAY VARY. APPROPRIATE SLEEVE SIZE IS TO BE ASSESSED IN CONJUNCTION WITH OVERALL SIZE, SHAPE AND CLEARANCES AVAILABLE.

3. STEEL CULVERT SLEEVE IS DESIGNED TO RETAIN THE INTEGRITY OF THE EXISTING BRICK CULVERT. CAPACITY FOR RAIL LOADS IS THAT OF THE EXISTING CULVERT STRUCTURE.

4. DIMENSIONS AND ALIGNMENT OF BRICK ARCH CULVERT AND PROPOSED SLEEVE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION OF PIPE SLEEVE TO ENSURE SATISFACTORY CLEARANCE AND INSTALLATION TOLERANCE.

5. SLEEVE TO BE FABRICATED FROM MILD STEEL PLATE AND CONTINUOUS SEAM WELDED. COMPLETED SLEEVE IS TO BE HOT-DIPPED GALVANISED TO AS/NZS 4680. PIPE TO AS 3678-GRADE 250.

6. LENGTH OF SLEEVE TO BE DETERMINED BY INSTALLER. JOINTS BETWEEN SLEEVE SECTIONS TO BE BUTT AND FLUSH TO PREVENT LEAKAGE DURING GROUTING. SITE WELDING OF JOINTS BETWEEN SLEEVE SECTIONS IS NOT PERMITTED.

7. CRACKS IN EXISTING CULVERT TO BE SEALED WITH FLEXIBLE SEALANT (SIKAFLEX 11FC OR EQUIVALENT) PRIOR TO SLEEVE INSTALLATION.

8. GROUT TO BE SAND/CEMENT MORTAR WITH F'c 15MPa AND NON SHRINK WITH SLUMP ENABLING PLACEMENT TO ENSURE ALL VOIDS BETWEEN EXISTING CULVERT AND SLEEVE ARE COMPLETELY FILLED.

9. GROUT FILLING TO BE UNDERTAKEN BY EXPERIENCED PERSONNEL AND PLACED BY SQUEEZE PUMPING WITHIN 1 HOUR OF MIXING.

10. INSTALLER IS TO ENSURE NO NET ADDITIONAL LOADS ARE PLACED ON THE EXISTING BRICK ARCH CULVERT STRUCTURE DURING SLEEVE OPERATIONS. INSTALLATION METHOD AND ANY TEMPORARY WORKS ARE TO BE APPROVED BY THE SUPERINTENDENT'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF WORKS.

11. THE SITE OF THE WORKS IS SUBJECT TO FLOODING. NO WORK IS TO BE CARRIED OUT DURING RAINFALL OR WHEN RAIN APPEARS IMMINENT. GROUTING OPERATIONS SHALL NOT BE COMMENCED WHERE RAIN IS FORECAST IN THE 24 HOURS FOLLOWING PROPOSED GROUTING WORK.

12. SLEEVE IS TO BE FABRICATED TO ENSURE THAT A CONTINUOUS SLEEVING OF CULVERT IS ACHIEVED OVER ITS ENTIRE LENGTH WITH NO GAPS ALONG ITS LENGTH.

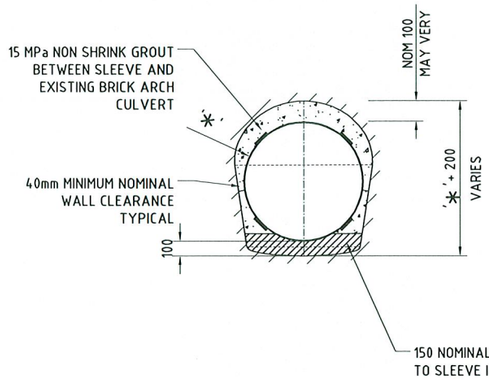
13. PROPOSED ERECTION PROCEDURE - BOLT SLEEVES AS SHOWN ON DETAIL 1 OUTSIDE EXISTING CULVERT AND PULL SLEEVES FROM END 'X' TO END 'Y' WITH 200UC46 PULLING BEAM (A) - PULL SLEEVES 300mm CLEAR OF END 'Y' AND BOLT FLANGE (B)

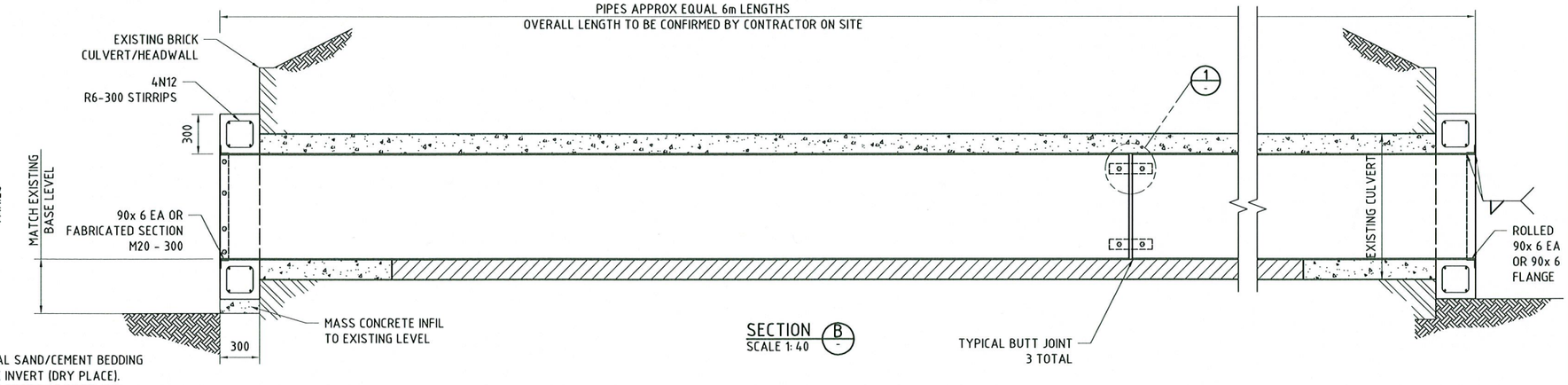
14. INSTALLER IS TO IMPLEMENT APPROPRIATE SEDIMENTATION AND EROSION CONTROL FOR THE WORKS TO ENSURE NO CEMENT CONTAMINATED RUNOFF OR OTHER POLLUTANTS FROM THE WORKS ENTERS THE DOWNSTREAM WATERCOURSE.

15. ALL EXPOSED CONCRETE: F'c 32MPa 40mm COVER TO ALL BARS. MATERIALS AND INSTALLATION TO BE IN ACCORDANCE WITH AS3600, AS5100 AND ANY OTHER RELEVANT STANDARDS INCLUDING ARTC STANDARDS.

16. WATERWAY OPENING - ASSUMPTION IS MADE THAT THE INSERTED PIPE WILL NOT HAVE ANY ADVERSE EFFECT ON THE OVERALL OPENING SIZE. NO HYDROLOGY/HYDRAULIC ANALYSIS BEEN PERFORMED.

17. RAILWAY TRAFFIC - THE WORK IS TO BE CARRIED OUT UNDER NORMAL TRAFFIC OPERATION. THE WORK SHALL NOT INTERFERE WITH THE RAIL TRAFFIC. THE STRUCTURAL INTEGRITY OF THE EXISTING STRUCTURE SHALL BE MAINTAINED AT ALL TIMES.





SECTION B
SCALE 1: 40

Used on / Next higher assembly:

Filename: | Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Ind. Rev.	Approv.
2	24.7.09	NOTES ADDED	AEW	RIK		
1	13.7.09	ISSUED FOR CONSTRUCTION	AEW	RIK		

Designing Company: Cardno Stanwill
CARDNO STANWILL
18a BOLFORD STREET, BROADMEADOW NSW 2292
CS3325

Designed AEW 24.7.09
Checked RIK 13.7.09
Ind.Rev. Company CARDNO STANWILL | Ind.Rev. Name
Review Signature

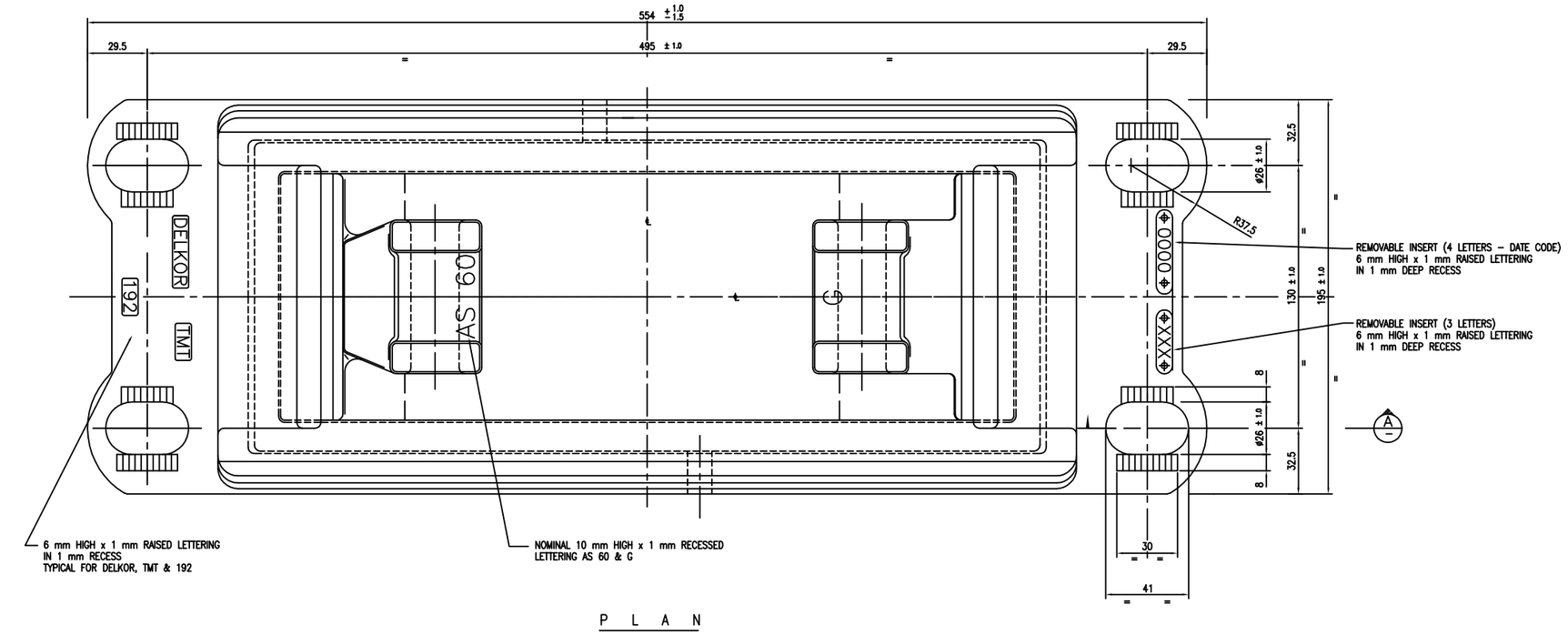
ARTC APPROVAL
Approved By
Signed
Approval Date 27/6/09

AUSTRALIAN RAIL TRACK CORPORATION LTD

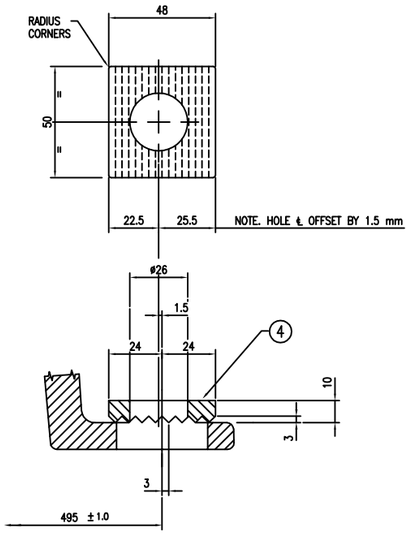
ARTCN3090096001

BRICK CULVERTS
– STANDARD STEEL SLEEVE
– DETAILS

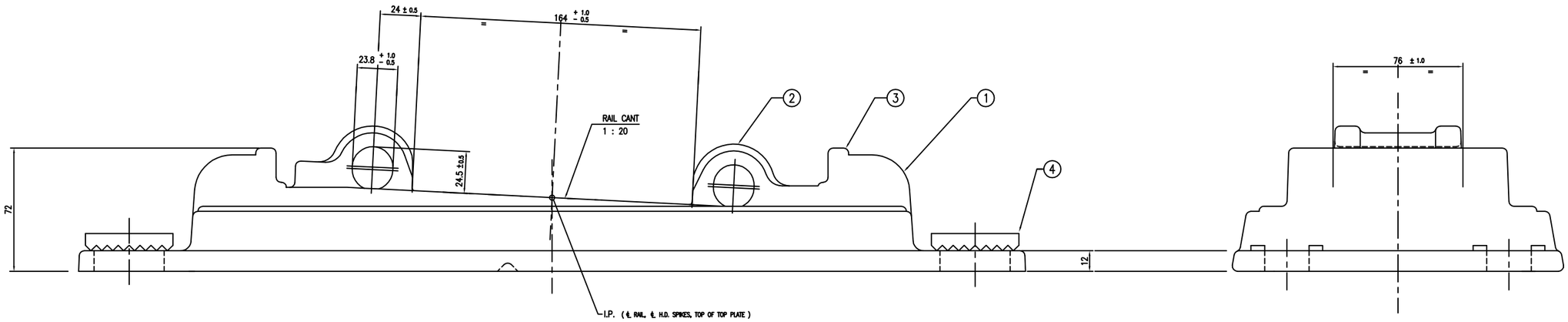
Sheet No. 1 of 1
Scale: 1:40



P L A N



SECTION A



ITEM NO.	REQ'D	DESCRIPTION	MAT'L	MASS kg	REMARKS
4	4	SERRATED WASHER	400/12		GALV
3	1	RUBBER	NR		
2	1	TOP PLATE	400/12		RF 1.00.192 C
1	1	BOTTOM PLATE	400/12		RF 1.01.192 B

DIMENSIONS WITHOUT LIMITS:
MACHINED: UP TO 1000 ± 0.25, OVER 1000 TO 3000 ± 0.5, OVER 3000 ± 1.
STRUCTURAL: UP TO 3000 ± 1, OVER 3000 TO 5000 ± 1.5, OVER 5000 ± 2.
ANGULARITY: ± 1°
BREAK ALL SHARP EDGES AND CORNERS 0.5 MAX.

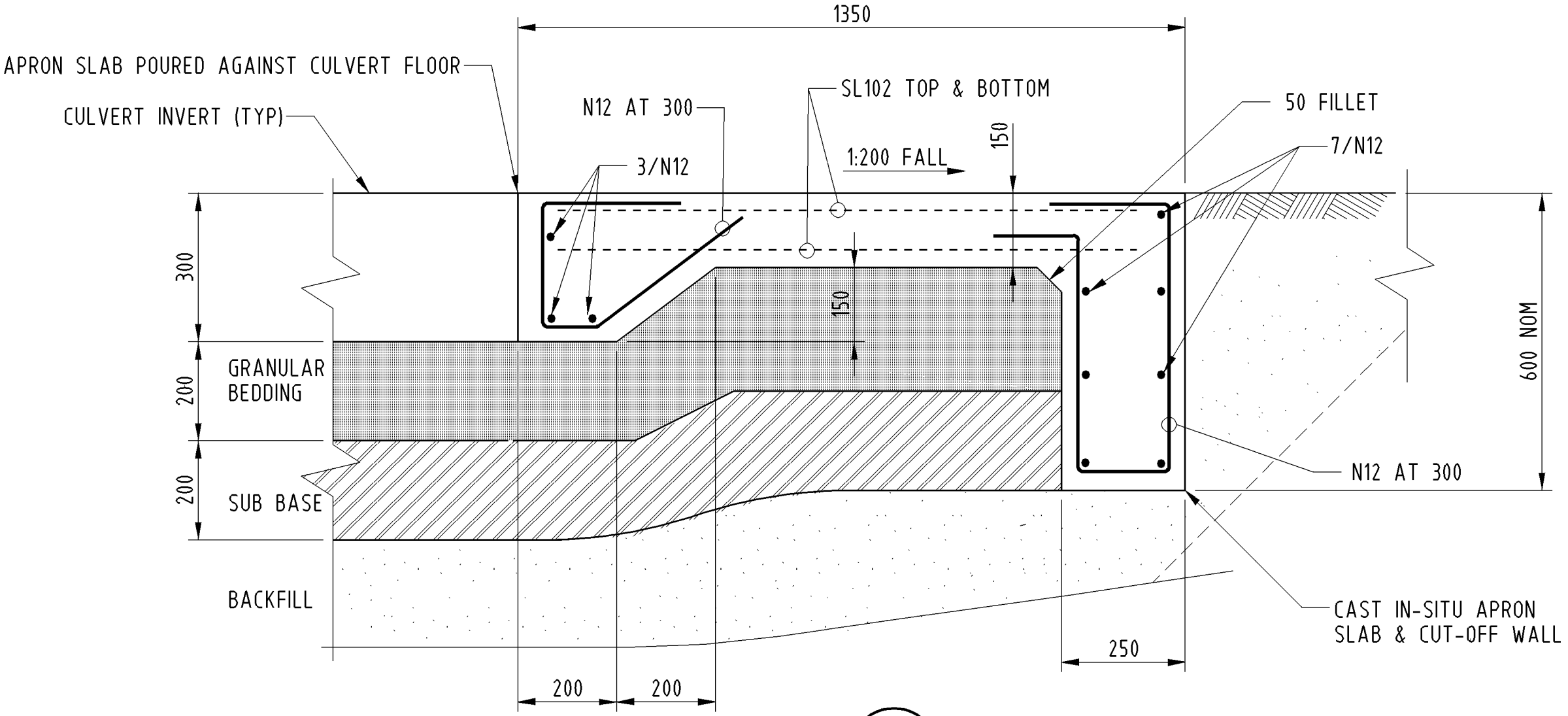
DATE:	BY:	DESCRIPTION	REV.

DELKOR RAIL PTY LIMITED
SYDNEY

DELKOR ALTERNATIVE 1
ELASTIC RAIL FASTENER
RAIL TYPE AS 60 (RAIL CANT 1 : 20)

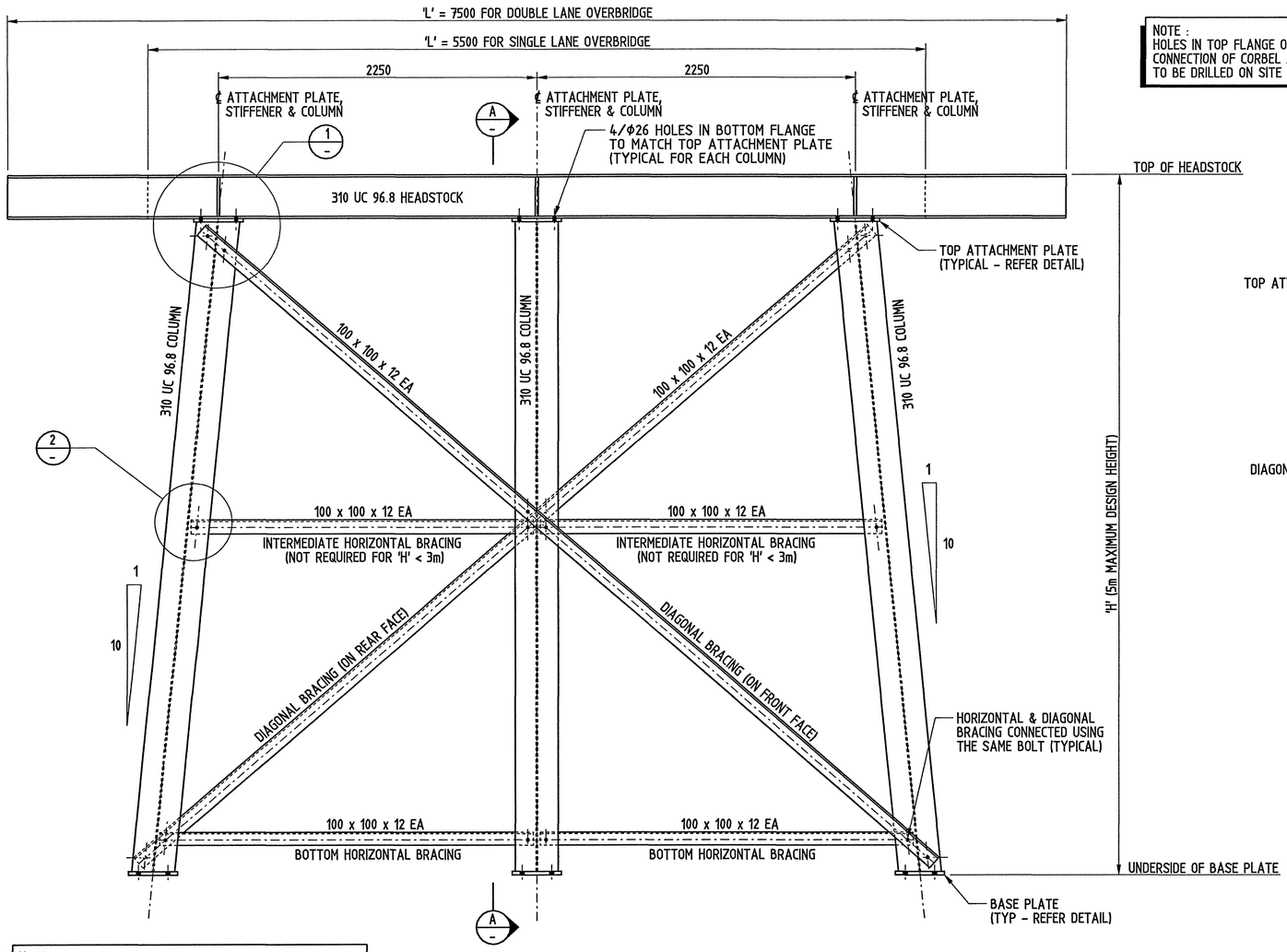
DRAWN	M.F	JUN '06	SCALE 1 : 1
CHECKED			
APPROVED			

DRG. NO. RF 0.02.192 CL REV. △



DETAIL 1

SCALE 1:10 -



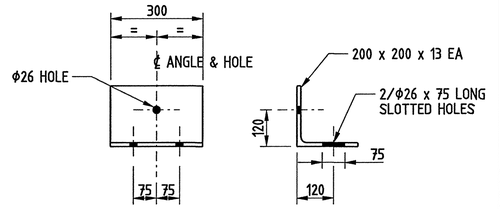
NOTE :
HOLES IN TOP FLANGE OF HEADSTOCK FOR CONNECTION OF CORBEL ATTACHMENT ANGLES TO BE DRILLED ON SITE TO SUIT LOCAL CONDITIONS

NOTE :
- DIMENSIONS 'H' & 'L' TO BE ADVISED BY PROJECT ENGINEER
- No. OF TRESTLES AND CORBEL ATTACHMENT ANGLES TO BE ADVISED BY PROJECT ENGINEER

ELEVATION OF TRESTLE

SCALE 1:20

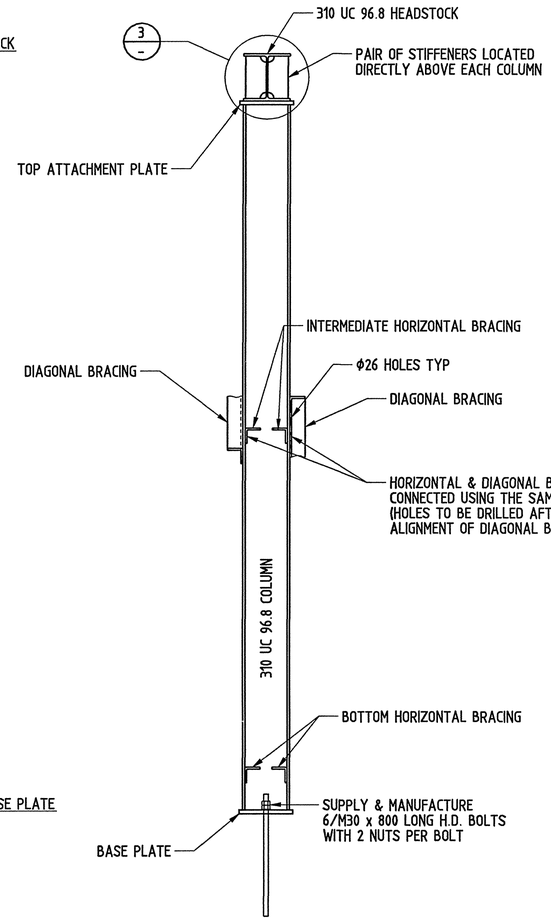
MASS = 3t GROSS



CORBEL ATTACHMENT ANGLE

(2 REQUIRED PER CORBEL)

SCALE 1:10



SECTION A

SCALE 1:20

NOTES

GENERAL

1. DIMENSIONS SHALL NOT BE SCALED FROM THIS DRAWING.

DESIGN

1. DESIGN CODE : BRIDGE DESIGN CODE AS 5100 – 2004.
2. DESIGN LOADING : SINGLE T44 LOADING WITH 30% DLA.
3. ADJOINING SPAN LENGTHS SHALL NOT BE MORE THAN 7m.
4. NOT DESIGNED FOR TRAIN DERAILMENT LOADING.
5. ENSURE EXISTING CONCRETE FOOTING IS IN A STRUCTURALLY SOUND CONDITION (TO BE VERIFIED BY A STRUCTURAL ENGINEER).

STEELWORK

1. ALL STRUCTURAL STEELWORK SHALL COMPLY WITH AS 4100.
2. ALL ROLLED STEEL SECTIONS SHALL COMPLY WITH AS 3679 GRADE 300PLUS.
3. ALL STEEL PLATE SHALL COMPLY WITH AS 3678 GRADE 250.

BOLTING

1. ALL STRUCTURAL BOLTS SHALL BE M24 GRADE 8.8/TF TO AS 1252 UNO.
2. ALL HOLDING DOWN BOLTS SHALL BE M30 GRADE 4.6/S TO AS 1111 UNO.
3. TF BOLTS SHALL BE INSTALLED USING APPROVED LOAD INDICATING WASHER OR BY TURN OF NUT METHOD AND SHALL BE TIGHTENED FROM SNUG TIGHT CONDITION TO 210kN MIN. BOLT TENSION.
4. PROVIDE SPRING WASHERS FOR H.D. BOLTS.

WELDING

1. ALL WELDS SHALL COMPLY WITH AS 1554 PART 1, CATEGORY SP.
2. EXTENT OF WELD INSPECTION : 100% VISUAL EXAMINATION 10% NON DESTRUCTIVE TESTING
3. ALL FILLET WELDS SHALL BE 8mm CONTINUOUS UNO.
4. WELDING SYMBOLS ARE IN ACCORDANCE WITH AS 1101.3–1987.

GALVANIZING

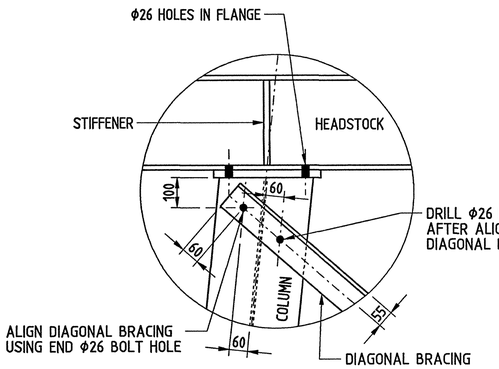
1. ALL STEELWORK SHALL BE HOT DIP GALVANIZED TO AS/NZS 4680.
2. ALL BOLTS, NUTS & WASHERS SHALL BE GALVANIZED TO AS 1214.
3. ALL VENT HOLES FOR GALVANIZING SHALL BE PUNCHED OR DRILLED.

ASSEMBLY

1. TRESTLE SHALL BE TRIAL ASSEMBLED IN SHOP TO ENSURE ACCURACY OF COMPONENTS PRIOR TO TRANSPORTATION TO SITE.

HANDLING

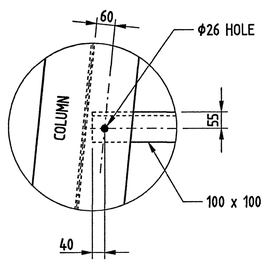
1. HANDLING OF ALL COMPONENTS SHALL BE IN ACCORDANCE WITH WORKCOVER REQUIREMENTS.
2. STEEL COMPONENTS SHALL BE HANDLED WITH CARE TO AVOID STRUCTURAL DAMAGE.
3. DAMAGED COATINGS SHALL BE REPAIRED WITH 2 PACK EPOXY ZINC RICH PRIMER 75um DFT SUCH AS DULUX ZINCANODE 202 OR APPROVED EQUIVALENT.



DETAIL 1

SCALE 1:10

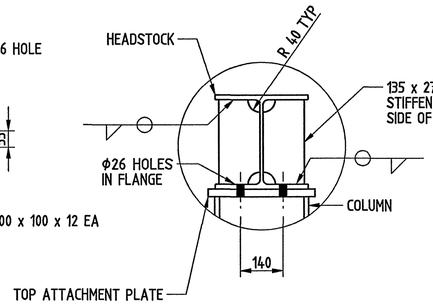
NOTE : TYPICAL FOR ALL DIAGONAL BRACING



DETAIL 2

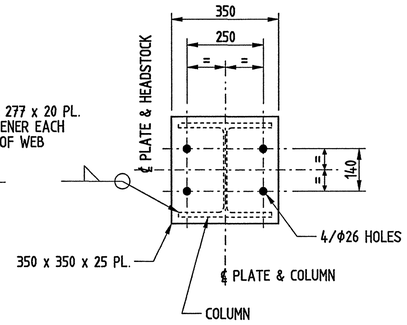
SCALE 1:10

NOTE : TYPICAL FOR ALL HORIZONTAL BRACING



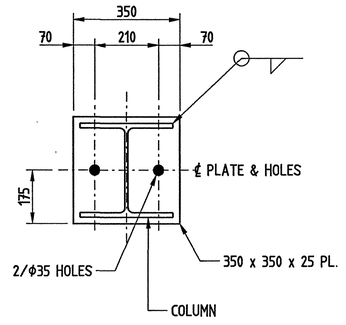
DETAIL 3

SCALE 1:10



TOP ATTACHMENT PLATE

SCALE 1:10



BASE PLATE

SCALE 1:10

AMD	REFERENCE	DESCRIPTION	SIGN./DATE

owner and maintainer of the new rail network
RAILINFRASTRUCTURE CORPORATION

RIC ENGINEERING
CIVIL DESIGN

DRAWN C Clark
DESIGNED AJG
DRG CHECK AJG
DESIGN VERIFIED
GROUP LEADER
PRINCIPAL DESIGN ENGINEER, CIVIL 16.7.04 DATE

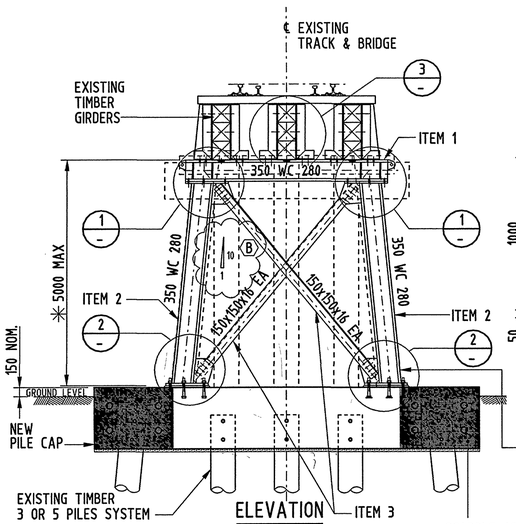
STANDARD

STEEL TRESTLE FOR ROAD OVERBRIDGES

STEELWORK DETAILS ©

FILE No. A/03/325	SHEET 1 OF 1	A1
T.M.C. ID. 250000	No. CV 0219816	A

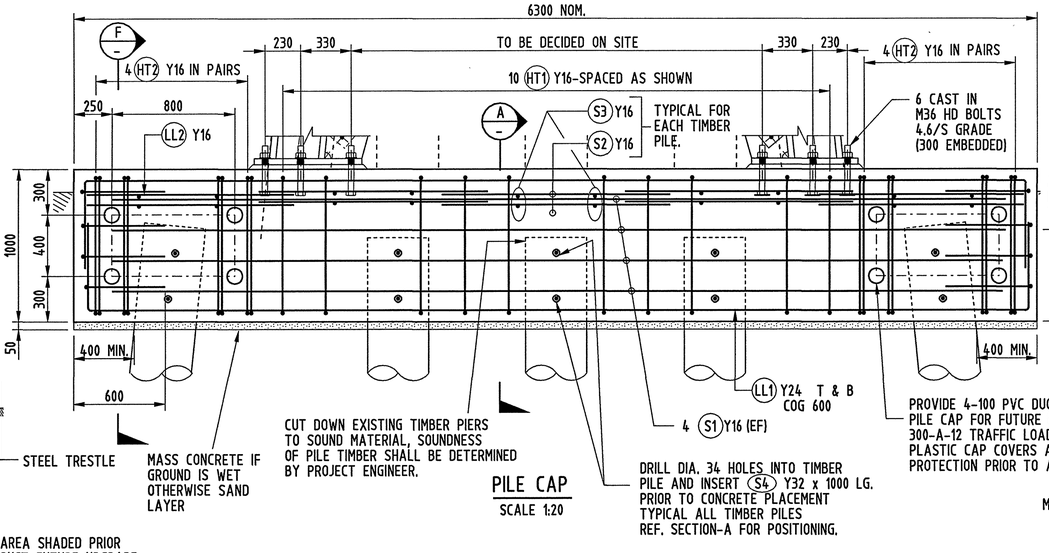
DF 801-554



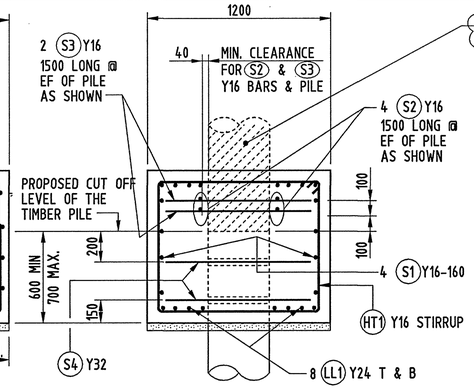
ELEVATION
SCALE 1:50

✳ FOR TRESTLE HEIGHTS GREATER THAN 5000mm REFER TO DESIGN OFFICE.

SCABBLE AREA SHADED PRIOR TO CONSTRUCT FUTURE UPGRADE REFER TO DESIGN NOTE No.2



PILE CAP
SCALE 1:20



SECTION A
SCALE 1:20

REMOVE TIMBER PIER (SHADED PART) PRIOR TO PLACING PILING REINFORCEMENT. (B)

NOTES

GENERAL
1. DIMENSIONS SHALL NOT BE SCALED FROM THIS DRAWING.
2. THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION DURING CONSTRUCTION. NO PART SHALL BE OVER STRESSED. PROVIDE BRACING AS REQUIRED.
3. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT SAA CODES.

DESIGN
1. DESIGN CODE : AUSTRALIAN BRIDGE DESIGN CODE-1996.
2. NEW PILE CAP IS DESIGNED FOR TRAFFIC LOAD 2 x CLASS 81 LOCOMOTIVES + 2 x 100t COAL WAGONS ON 7.3m TRANSOM TOP SPANS.
3. DESIGN IS BASED ON EXISTING PILES BEING IN GOOD CONDITION AND CAPABLE OF MAINTAINING ADDITIONAL DEAD LOAD. THIS TO BE CONFIRMED BY PROJECT ENGINEER.
4. FOR THE UPGRADE TO TRAFFIC LOAD OF 300-A-12 ADDITIONAL PILES AND PILE CAPS SHALL BE INSTALLED.

CONCRETE
1. CONCRETE 28 DAY COMPRESSIVE STRENGTH f'c = 40 MPa.
2. EXPOSURE CLASSIFICATION = B1.
3. 25mm CHAMFERS & FILLETS SHALL BE PROVIDED TO ALL EXPOSED EDGES AND CORNERS UNO.
4. ALL CONCRETE WORK SHALL COMPLY WITH RTA SPECIFICATION 2080

REINFORCEMENT
1. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671, WHERE
   N DENOTES GRADE 500N DEFORMED RIBBED BAR
   R DENOTES GRADE 250N PLAIN ROUND BAR.
   W DENOTES GRADE 500N RIBBED WIRE
2. DESIGNATION OF REINFORCING BARS : 10/S1 N24-200 EF
   - No OF BARS
   - BAR SHAPE NOTATION
   - DUCTILITY CLASS AND DIA
   - SPACING OF BARS
   - LOCATION COMMENT

NOTE: ALL BARS LABELLED 'F' SHALL BE 'W'

3. CLEAR COVER TO REINFORCEMENT SHALL BE 50mm.
4. COGS & HOOKS SHALL BE IN ACCORDANCE WITH AUSTRALIAN BRIDGE DESIGN CODE.
5. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR AS APPROVED IN WRITING BY THE SUPERINTENDENT.
6. MESH SHALL BE LAPPED 2 TRANSVERSE WIRES PLUS 50mm.
7. BAR SHAPES SHALL BE IN ACCORDANCE WITH AS 1100.500-1985.

BOLTING
1. ALL STRUCTURAL BOLTS SHALL BE M24 GRADE 8.8/TF UNO.
2. ALL HOLD DOWN BOLTS SHALL BE M36 GRADE 4.6/S UNO.
3. TF BOLTS TO BE INSTALLED USING TURN OF NUT METHOD.

STEELWORK
1. ALL STRUCTURAL STEELWORK SHALL COMPLY WITH RTA FORM 2200.
2. ALL ROLLED AND WELED STEEL SECTIONS SHALL COMPLY WITH AS 3679 GRADE 300PLUS.
3. ALL STEEL PLATE SHALL COMPLY WITH AS 3678 GRADE 250.

WELDING
1. ALL WELDS SHALL COMPLY WITH AS 1554 PART 5, CATEGORY SP.
2. ALL FILLET WELDS TO BE 6mm CONTINUOUS UNO.
3. ALL BUTT WELDS TO BE FULL PENETRATION U.N.O.
4. WELD SYMBOLS ARE TO AS 1101 PART 3.

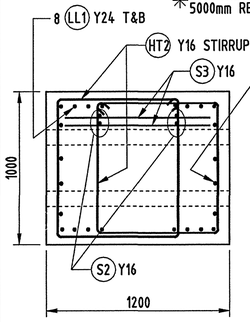
GALVANIZING
1. ALL STEELWORK SHALL BE HOT DIP GALVANIZED TO AS/NZS 4680.
2. ALL BOLTS, NUTS & WASHERS SHALL BE GALVANIZED TO AS 1214.
3. ALL VENT HOLES FOR GALVANIZING SHALL BE PUNCHED OR DRILLED.

CONSTRUCTION SEQUENCE

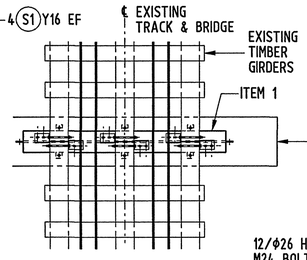
STAGE 1 (PRIOR TO THE REMOVAL OF THE EXISTING TIMBER TRESTLE)
1. INSTALL TEMPORARY PROPPING TO SUPERSTRUCTURE ON BOTH SIDES OF THE TRESTLE.
2. EXCAVATE TO FIND THE GOOD AND SOUND SECTION OF TIMBER PILES.
3. ESTABLISH FOUNDING LEVELS OF THE NEW PILECAP THAT PROVIDES REQUIRED EMBEDMENT LENGTHS OF TIMBER PILES.

STAGE 2 (REMOVAL OF EXISTING TIMBER TRESTLE AND CONSTRUCTION OF NEW STEEL TRESTLE) (B)
1. REMOVE THE EXISTING TIMBER TRESTLE TO THE PREDETERMINED LEVELS.
2. CONSTRUCT THE PILECAP, COMPLETE WITH H.D. BOLTS CAST IN.
3. INSTALL NEW STEEL TRESTLE.
4. REMOVE TEMPORARY PROPPING.

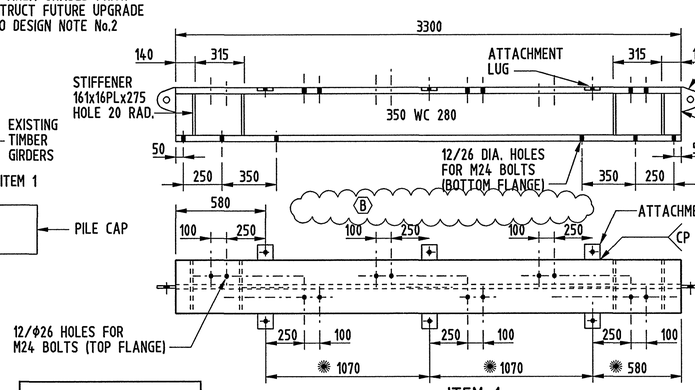
STAGE 3 (FUTURE UPGRADING FROM CLASS 81 LOCOMOTIVE TO 300-A-12 TRAFFIC LOAD)
1. INSTALL NEW PILES REQUIRED FOR THE TRAFFIC LOADS.
2. SCABBLE AREAS LOCALLY AROUND 100 DIA. FORMED HOLES ON EXISTING PILE CAP CONCRETE SURFACE FOR THE CONSTRUCTION OF NEW PILE CAPS AS SPECIFIED ON DRAWING.
3. CONSTRUCT NEW PILE CAPS AND INSTALL STRESS BARS THROUGH THE DUCTS PROVIDED BY THE OLD AND NEW PILE CAPS.



SECTION F
SCALE 1:20

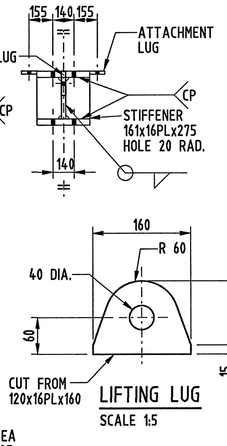


PLAN
SCALE 1:50

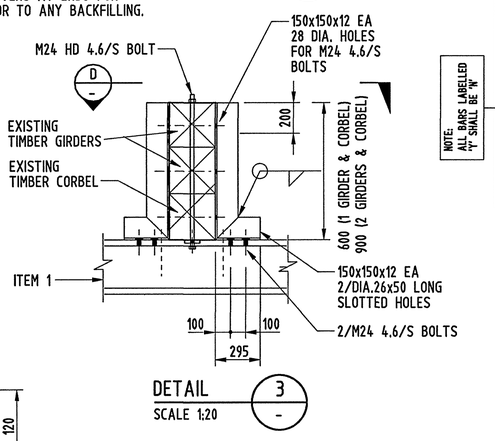


✳ DENOTES DIMENSIONS TO BE VERIFIED BY SITE MEASUREMENTS

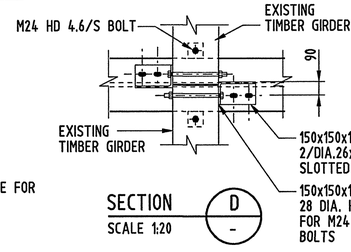
ITEM 1
SCALE 1:20 1 REQUIRED



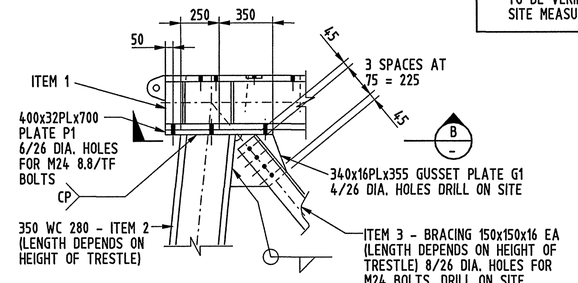
LIFTING LUG
SCALE 1:5



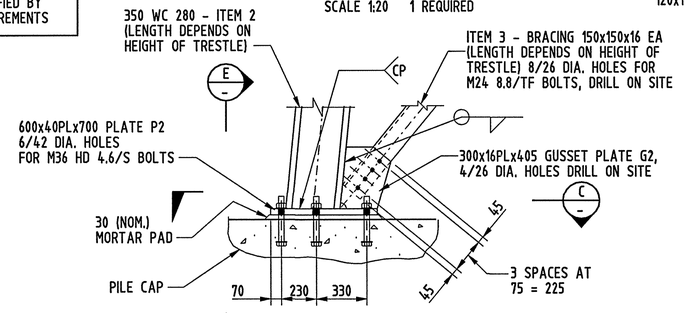
DETAIL 3
SCALE 1:20



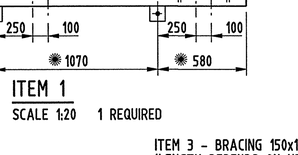
SECTION D
SCALE 1:20



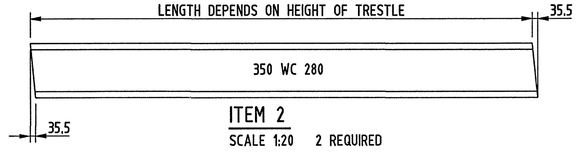
DETAIL 1
SCALE 1:20



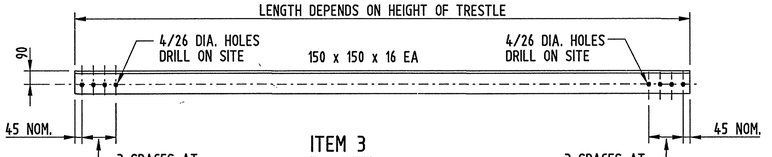
DETAIL 2
SCALE 1:20



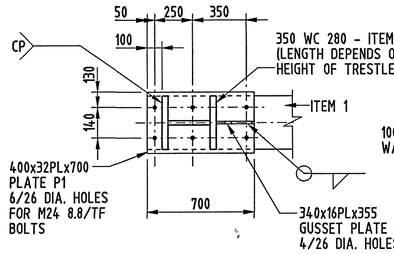
ATTACHMENT LUG
SCALE 1:5



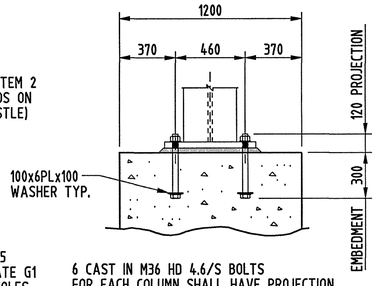
ITEM 2
SCALE 1:20 2 REQUIRED



ITEM 3
SCALE 1:20 2 REQUIRED

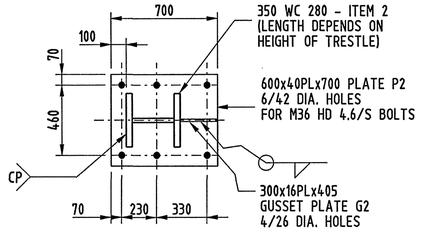


SECTION B
SCALE 1:20



6 CAST IN M36 HD 4.6/S BOLTS FOR EACH COLUMN SHALL HAVE PROJECTION LENGTH OF 120 AND 80 THREADED LENGTH. AND EMBEDMENT LENGTH OF 300

SECTION E
SCALE 1:20



SECTION C
SCALE 1:20

MASS
1. MASS OF TRESTLE COMPLETE WITH BASE PLATES AND BRACKETS
   HEIGHT: 5m 5.0t
   HEIGHT: 4m 4.5t
   HEIGHT: 3m 4.0t

AMD	REFERENCE	DESCRIPTION	VERIFIED SIGN / DATE	APPROVED SIGN / DATE
B	VARIOUS	TITLE AMENDED, CONST. SEQUENCE ALTERED & PIGLE RAKE ADDED	31/01/02	31/1/02

owner and maintainer of the new rail network
RAILINFRASTRUCTURE CORPORATION

RIC ENGINEERING
CIVIL DESIGN
✳ SIGNED ON ORIGINAL

DRAWN	✳ F.B.
DESIGNED	✳ A.N.
DRG CHECKED	✳ N.S.
DESIGN VERIFIED	✳ R.K.
PROJECT LEADER	✳ J.M.
MANAGER, CIVIL DESIGN	✳ J. Muscat 27/08/01 (DATE)

VARIOUS LOCATIONS
VARIOUS LINES
TRANSOM TOP TIMBER UNDERBRIDGES
TYPICAL 3 OR 5 TIMBER TRESTLE RENEWAL-NEW PILECAP
MISCELLANEOUS DETAILS (B)

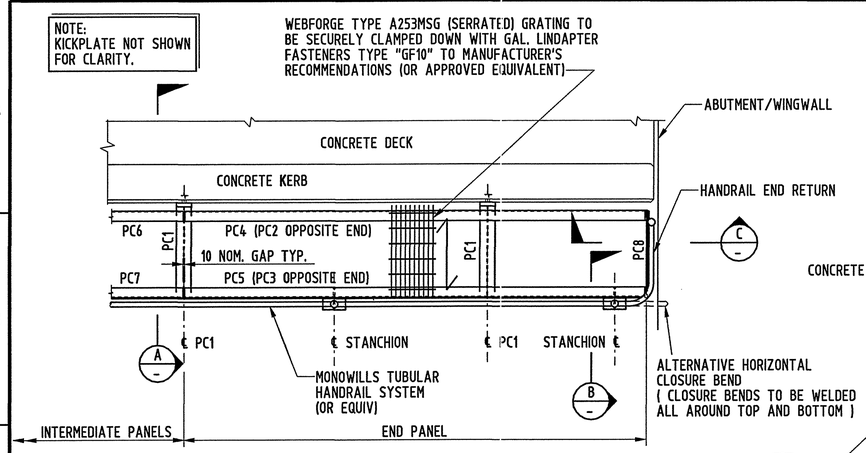
FILE No. A /03040	SHEET 1 OF 1	A1
T.M.C. PW 260000	No. CV 0014037	B

DF 801x554

F.BATTIERI

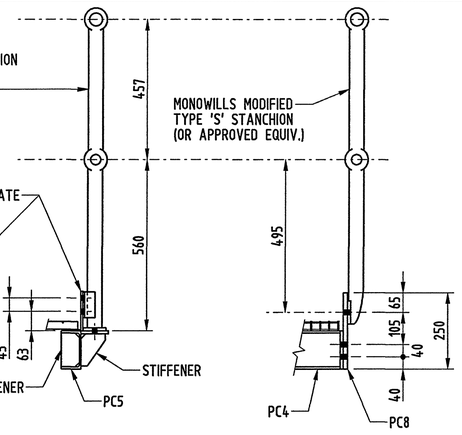
NSharp 11-JAN-2002 14:11 u:\COMMON\dgn\1999\Various locations\vlubms.dgn

NOTE:
KICKPLATE NOT SHOWN FOR CLARITY.



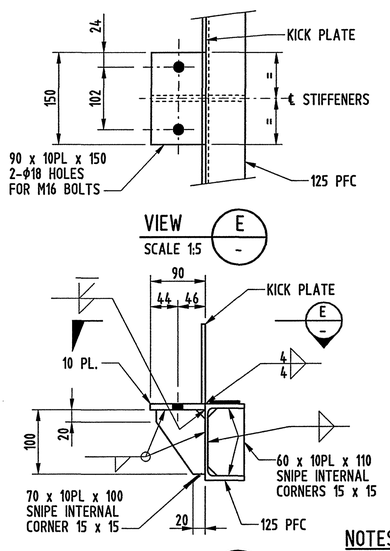
PART PLAN - SQUARE END WALKWAY
SCALE 1:20

SECTION A
SCALE 1:10

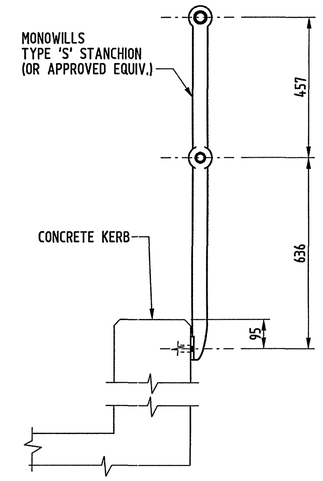


SECTION B
SCALE 1:10

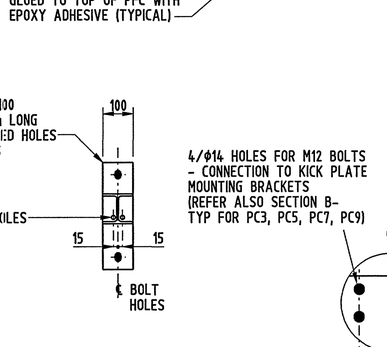
SECTION C
SCALE 1:10



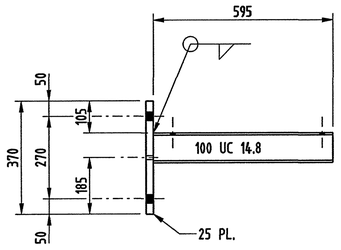
SECTION D
SCALE 1:5



TYPICAL HANDRAIL AT KERB
SCALE 1:10



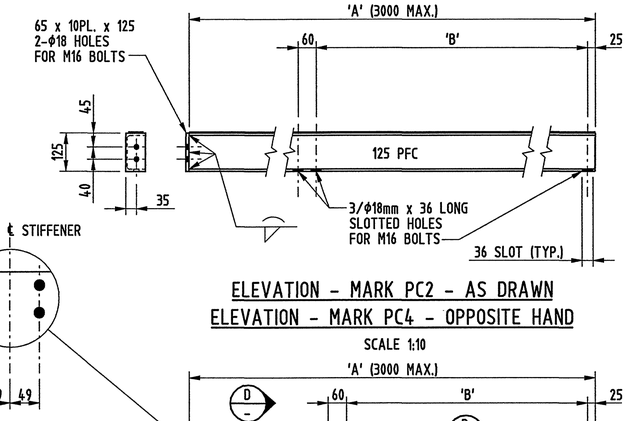
50 WIDE x 5 THK. RUBBER BEARING STRIP (DURO 40 MIN) GLUED TO TOP OF PFC WITH EPOXY ADHESIVE (TYPICAL)



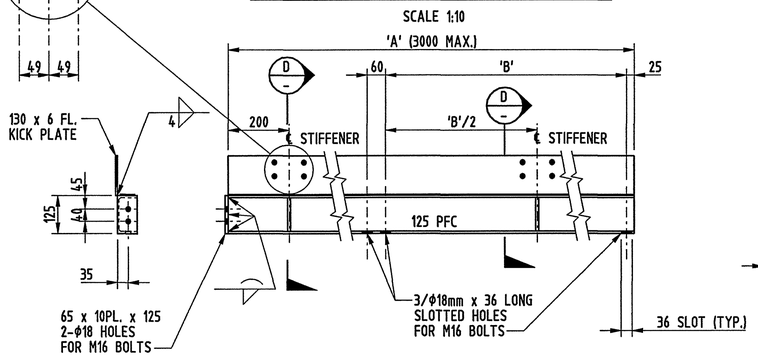
ELEVATION - MARK PC1
SCALE 1:10

END ELEVATION - MARK PC1
SCALE 1:10

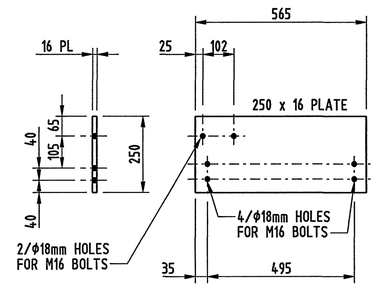
PLAN - MARK PC1
SCALE 1:10



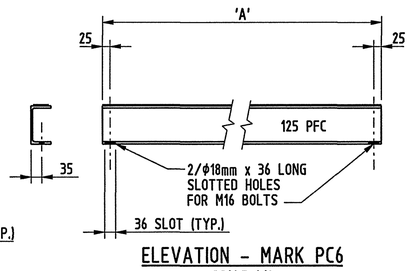
ELEVATION - MARK PC2 - AS DRAWN
ELEVATION - MARK PC4 - OPPOSITE HAND
SCALE 1:10



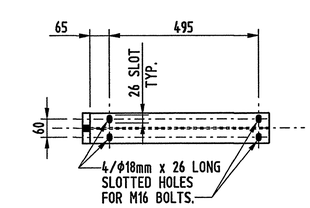
ELEVATION - MARK PC5 - AS DRAWN
ELEVATION - MARK PC3 - OPPOSITE HAND
SCALE 1:10



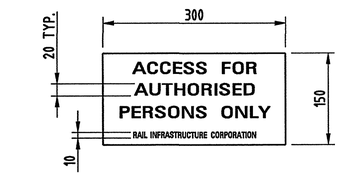
ELEVATION - MARK PC8
SCALE 1:10



ELEVATION - MARK PC6
SCALE 1:10

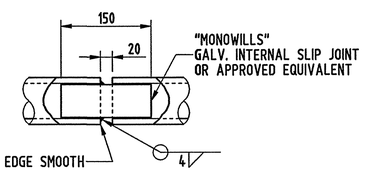


PLAN - MARK PC1
SCALE 1:10



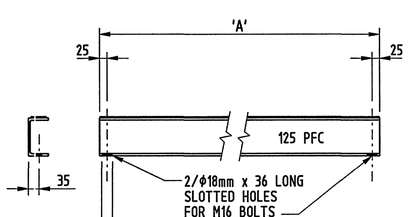
WALKWAY ACCESS SIGN - 2 REQ'D.
SCALE 1:5

SIGN TO BE DISPLAYED AT EACH WALKWAY END ON A SUITABLE BRACKET ATTACHED VERTICALLY TO HANDRAIL AND KNEERAIL. SIGN TO BE 3mm THICK ALUMINIUM PLATE WITH BLACK TEXT ON YELLOW REFLECTIVE BACKGROUND TO AS 1319. SIGN TO BE VISIBLE FROM TRACK.

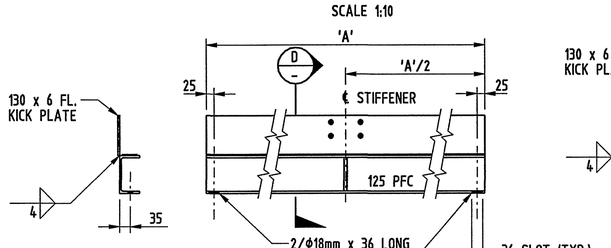


NOTE: EXPANSION JOINT AS SPECIFIED ON GENERAL ARRANGEMENT

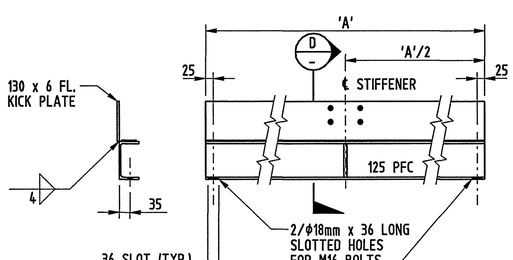
TYPICAL HANDRAIL EXPANSION JOINT
SCALE 1:5



ELEVATION - MARK PC10
SCALE 1:10



ELEVATION - MARK PC9
SCALE 1:10



ELEVATION - MARK PC7
SCALE 1:10

NOTES

DESIGN:
1. DIMENSIONS SHALL NOT BE SCALED FROM THIS DRAWING.

DESIGN:
1. LIVE LOAD = 5kPa

STEELWORK
1. ALL STRUCTURAL STEELWORK SHALL COMPLY WITH AS 4100.
2. ALL ROLLED STEEL SECTIONS SHALL COMPLY WITH AS 3679 GRADE 300PLUS.
3. ALL STEEL PLATE SHALL COMPLY WITH AS 3678 GRADE 250.

PROTECTIVE COATING
1. ALL STEELWORK TO BE HOT DIP GALVANISED, AND ANY DAMAGED/UNCOATED AREA TO BE REPAIRED, IN ACCORDANCE WITH AS/NZS 4680 1999.

BOLTING
1. ALL STRUCTURAL BOLTS SHALL BE GRADE 8.8/S (GALV.) WITH NUTS AND SPRING WASHERS (GALV.) IN ACCORDANCE WITH AS 1252 & AS 1214.
2. ALL HANDRAIL BOLTS SHALL BE M16 GRADE 8.8/TF (GALV.) WITH NUTS IN ACCORDANCE WITH AS 1252 & AS 1214.
3. "LOCTITE 262" OR APPROVED EQUIV. TO BE APPLIED TO ALL BOLTS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

WELDING
1. ALL WELDS SHALL COMPLY WITH AS 1554 PART 1, CATEGORY SP.
2. EXTENT OF WELD INSPECTION :
   100% VISUAL EXAMINATION
   10% NON DESTRUCTIVE TESTING
3. ALL FILLET WELDS SHALL BE 6mm CONTINUOUS UNO.
4. ALL BUTT WELDS SHALL BE COMPLETE PENETRATION.
5. WELDING SYMBOLS ARE IN ACCORDANCE WITH AS 1101.3-1987.

EPOXY ADHESIVE
1. EPOXY ADHESIVE FOR JOINING RUBBER TO STEEL USE EPIREZ D5-070NS OR APPROVED EQUIVALENT.

HANDRAILS & GRATING
1. ALL HANDRAILS FIXTURES, FITTINGS & CONNECTIONS AS WELL AS STEEL GRATING SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS. (MONOWILLS, WEBFORGE OR EQUIVALENT)

WALKWAY DETAILS
1. REFER "WALKWAY DETAILS" TABLE AND "MARKING PLAN" ON GENERAL ARRANGEMENT.

AMD	REFERENCE	DESCRIPTION	VERIFIED SIGN / DATE	APPROVED SIGN / DATE
B	ALL	DRAWING REDRAWN	2/10/03	K.C. 2.10.03

owner and maintainer of the new rail network
RAILINFRASTRUCTURE CORPORATION

RIC ENGINEERING
CIVIL DESIGN
* SIGNED ON ORIGINAL

DRAWN	* C.CALLAGHAN	
DESIGNED	* A.NG	
DRG CHECKED	* N.NAZARENKO	
DESIGN VERIFIED	* P.PRASAD	
PROJECT LEADER	* P.PRASAD	
PRINCIPAL DESIGN ENGINEER, CIVIL	*K.Chong 06/06/03	DATE

STANDARD

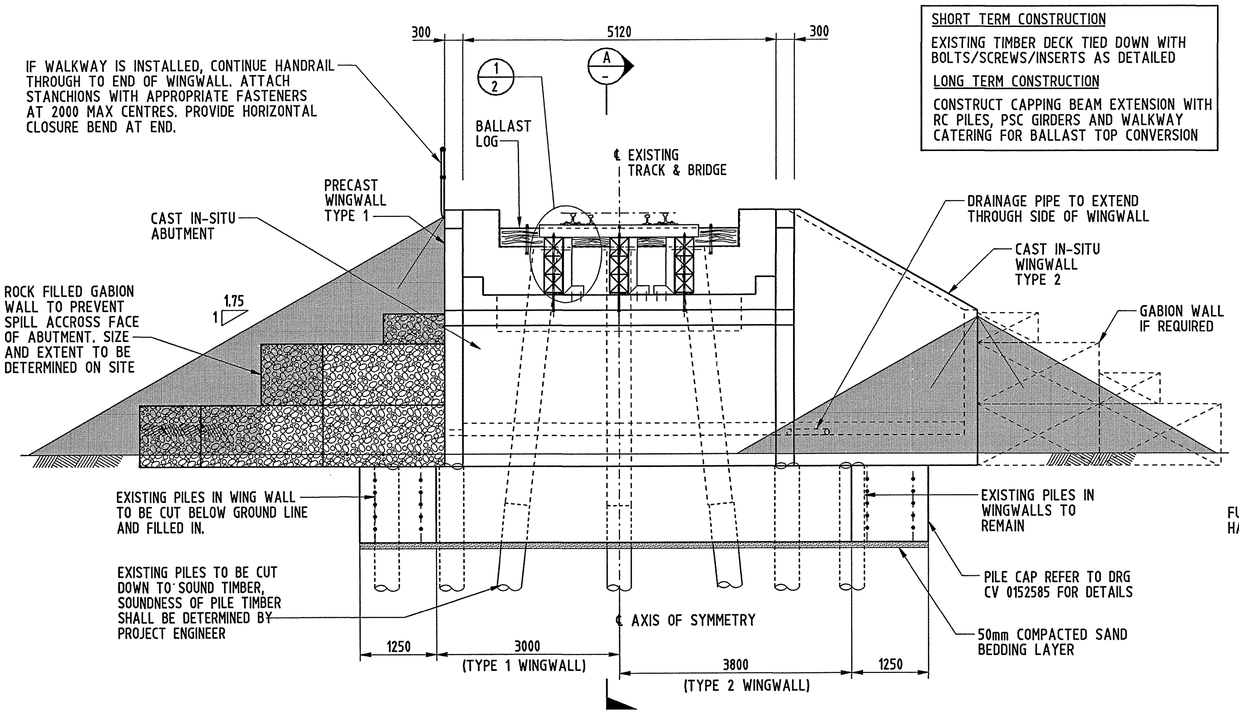
STEEL WALKWAYS & HANDRAILS FOR CONC. STRUCTURES WITH SQUARE ABUTMENTS
STEELWORK DETAILS

FILE No. A / 03 / 083	SHEET 1 OF 1	A1
T.M.C. PW 260000	No. CV 0022997	B

C.CALLAGHAN

DF 801x554

nnazare2 02-OCT-2003 15:02 u:\Common\dgn\2003\Standards\stdwalkway.dgn



WINGWALL TYPE 1
(PRECAST)

WINGWALL TYPE 2
(CAST IN-SITU)

ELEVATION
SCALE 1:50

SHORT TERM CONSTRUCTION

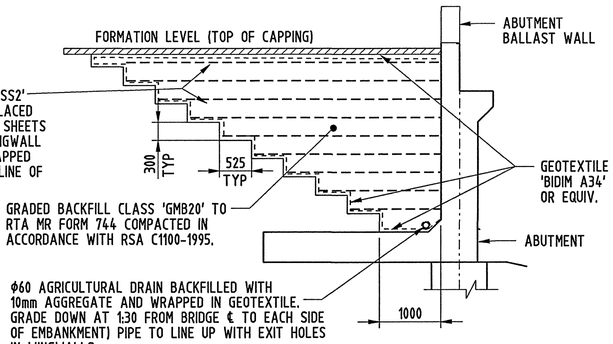
EXISTING TIMBER DECK TIED DOWN WITH BOLTS/SCREWS/INSERTS AS DETAILED

LONG TERM CONSTRUCTION

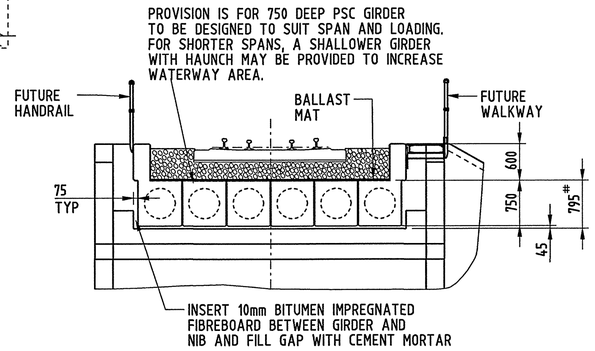
CONSTRUCT CAPPING BEAM EXTENSION WITH RC PILES, PSC GIRDERS AND WALKWAY CATERING FOR BALLAST TOP CONVERSION

HEIGHT H	LENGTH L
2800 – 3100	2900
2400 – 2800	2600
2000 – 2400	2200
2000 OR LESS	1800

TABLE 1



ABUTMENT APPROACH GEOTECH DETAIL
SCALE 1:50



ELEVATION OF FUTURE BALLAST TOP CONVERSION
SCALE 1:50

NOTES

GENERAL

1. DIMENSIONS SHALL NOT BE SCALED FROM THIS DRAWING.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNO.
3. THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION DURING CONSTRUCTION. NO PART SHALL BE OVERSTRESSED. PROVIDE BRACING AS REQUIRED.
4. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT SAA CODES AND THE BY LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITY.

DESIGN

1. DESIGN CODE : AUSTRALIAN BRIDGE DESIGN CODE.
2. DESIGN LOADING : 300-A-12 + FULL DYNAMIC ALLOWANCE
3. DESIGN IS BASED ON EXISTING PILES BEING IN GOOD CONDITION AND CAN SUSTAIN ADDITIONAL DEAD LOAD.
4. ABUTMENT CONCRETE WORK IS DESIGNED FOR MAXIMUM SPAN LENGTH OF 8.4m BALLAST TOP.

CEMENT MORTAR

1. CEMENT MORTAR – 1 PART CEMENT : 3 PARTS SAND (BY VOLUME)

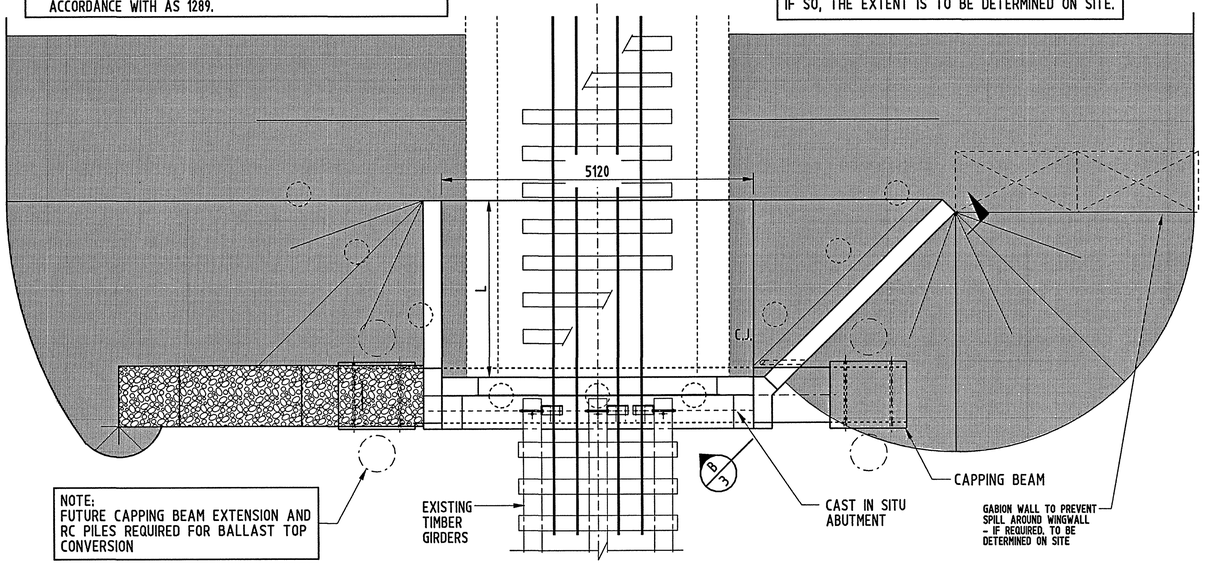
GABION WALL

1. ALL GABION CAGES SHALL BE GALVANISED WIRE WITH PVC SLEEVE.
2. THICKNESS OF WIRE TO BE 1.00mm.
3. DESIGN TO BE CARRIED OUT BY QUALIFIED ENGINEER

EXCAVATION AND BACKFILL

1. EXCAVATION AND CONSTRUCTION OF FOUNDATION SHALL COMPLY WITH THE REQUIREMENTS OF RTA MR FORM No. 2030.
2. NEW EMBANKMENT CONSTRUCTION SHALL BE CARRIED IN ACCORDANCE WITH TECHNICAL STANDARD TS 3423.
3. BACKFILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 300mm COMPACTED THICKNESS AND SHALL BE COMPACTED TO NOT LESS THAN 95% STANDARD COMPACTION DETERMINED IN ACCORDANCE WITH AS 1289.

NOTE:
AN ASSESSMENT IS TO BE MADE TO DETERMINE IF SCOUR PROTECTION IS REQUIRED ON THE APPROACH EMBANKMENTS AND UNDER THE BRIDGE STRUCTURE. IF SO, THE EXTENT IS TO BE DETERMINED ON SITE.



WINGWALL TYPE 1
(PRECAST)

WINGWALL TYPE 2
(CAST IN-SITU)

PLAN
SCALE 1:50

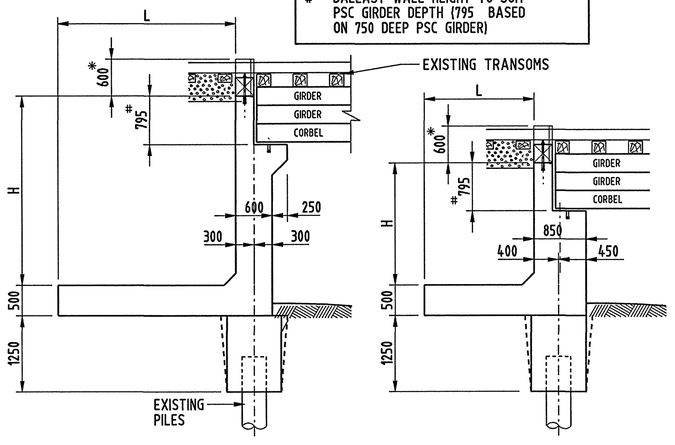
NOTE:
- IF A SITE IS FLAT AND LEVEL THEN PRECAST CULVERT UNITS MAY BE A PREFERRED SOLUTION.
- WHEN SETTING OUT, CONSIDER ALIGNMENT AND SPAN LENGTHS OF FUTURE PSC GIRDERS

ALL DETAILS ON THIS SET OF DRAWINGS HAVE BEEN DRAWN UP FOR MAXIMUM ALLOWABLE HEIGHTS (WORST CASE)

THIS ABUTMENT DESIGNED FOR MAXIMUM 8.4m BALLAST TOP SPAN

* – IF BRIDGE IS ON A CURVE AND HAS SUPERELEVATION A CHECK SHOULD BE DONE TO ENSURE BALLAST WILL NOT SPILL OVER KERBS. WALL HEIGHT TO BE ADJUSTED TO SUIT

\# – BALLAST WALL HEIGHT TO SUIT PSC GIRDER DEPTH (795 BASED ON 750 DEEP PSC GIRDER)



ABUTMENT TYPE A
FOR 3100 ⩾ H > 2000

ABUTMENT TYPE B
FOR H ⩽ 2000

SECTION A
SCALE 1:50

REFERENCE

THIS DRAWING SUPERSEDES DRAWING No CV 0150374

AMD	REFERENCE	DESCRIPTION	VERIFIED SIGN / DATE	APPROVED SIGN / DATE

RAIL SERVICES AUSTRALIA

RSA CONSULTING CIVIL DESIGN

DRAWN G.GILLIGAN
DESIGNED
DRG CHECK
DESIGN CHECK G.GILLIGAN
PROJECT LEADER
MANAGER, CIVIL DESIGN 20/12/01 DATE

VARIOUS LOCATIONS

VARIOUS LINES

TYPICAL TIMBER UNDERBRIDGE RENEWAL

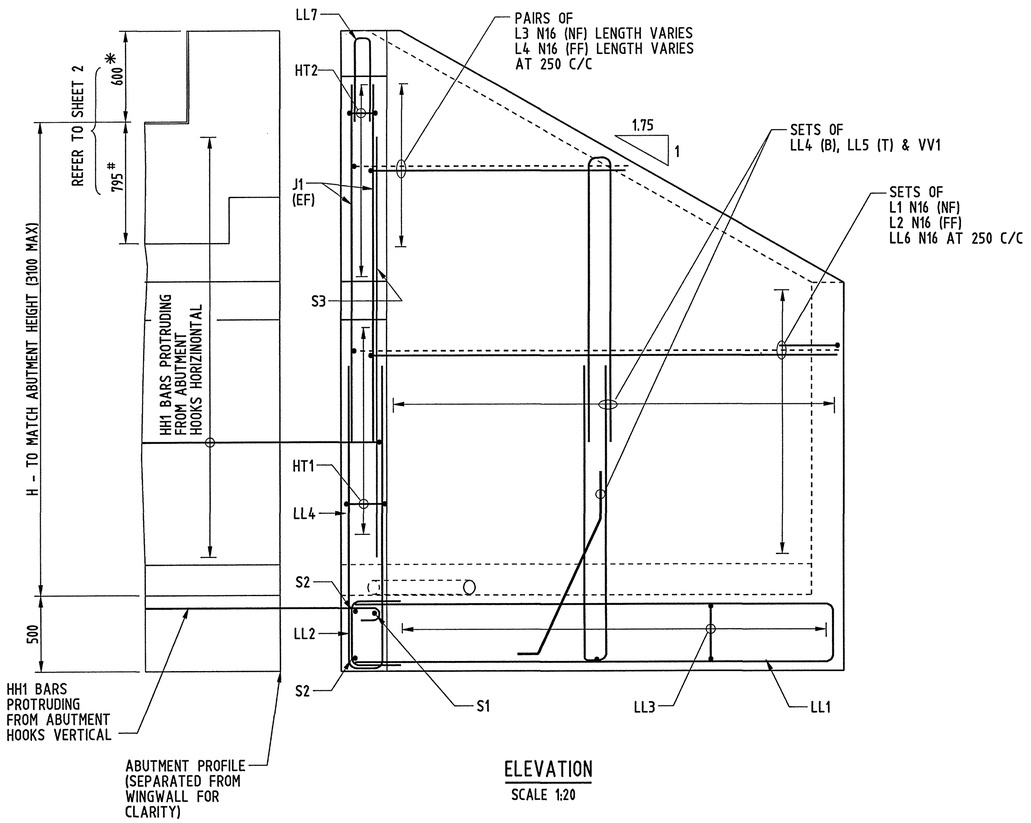
ABUTMENT AND WINGWALL

GENERAL ARRANGEMENT

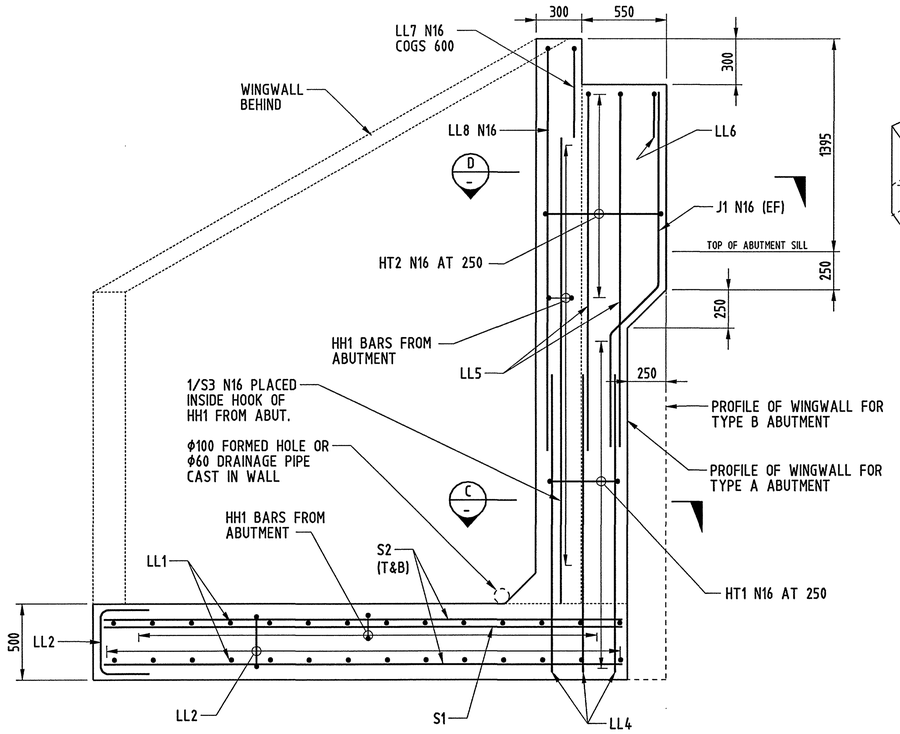
PROJECT No.	SHEET 2 OF 12	A1
T.M.C. ID. PW 260000	No. CV 0174890	A

DF 801×554

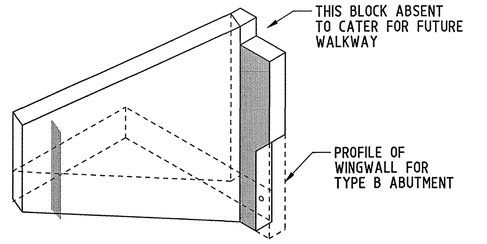
NSharp 20-DEC-2001 08:55 u:\COMMON\dgn\1999\Various locations\wckubga.dgn



ELEVATION
SCALE 1:20



SECTION A
SCALE 1:20



TYPE 2 WINGWALL
TO SUIT TYPE A ABUTMENT (TO SUIT TYPE B ABUTMENT - SIMILAR AS NOTED)

ISOMETRIC
SCALE 1:30

NOTES

GENERAL

1. DIMENSIONS SHALL NOT BE SCALED FROM THIS DRAWING.
2. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT SAA CODES AND THE BY LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITY.

DESIGN

1. DESIGN CODE : AUSTRALIAN BRIDGE DESIGN CODE.
2. DESIGN LOADING : 300-A-12 + FULL DYNAMIC ALLOWANCE

CONCRETE

1. ALL CONCRETE SHALL BE MIXED, PLACED & CURED IN ACCORDANCE WITH RTA FORM No. 2080
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH f'c = 32 MPa.
3. EXPOSURE CLASSIFICATION = B1
4. 25mm CHAMFERS & FILLETS SHALL BE PROVIDED TO ALL EXPOSED EDGES AND CORNERS UNO.
5. SURFACE FINISH TO BE CLASS 2.
6. CLEAR COVER TO REINFORCEMENT SHALL BE 50mm.

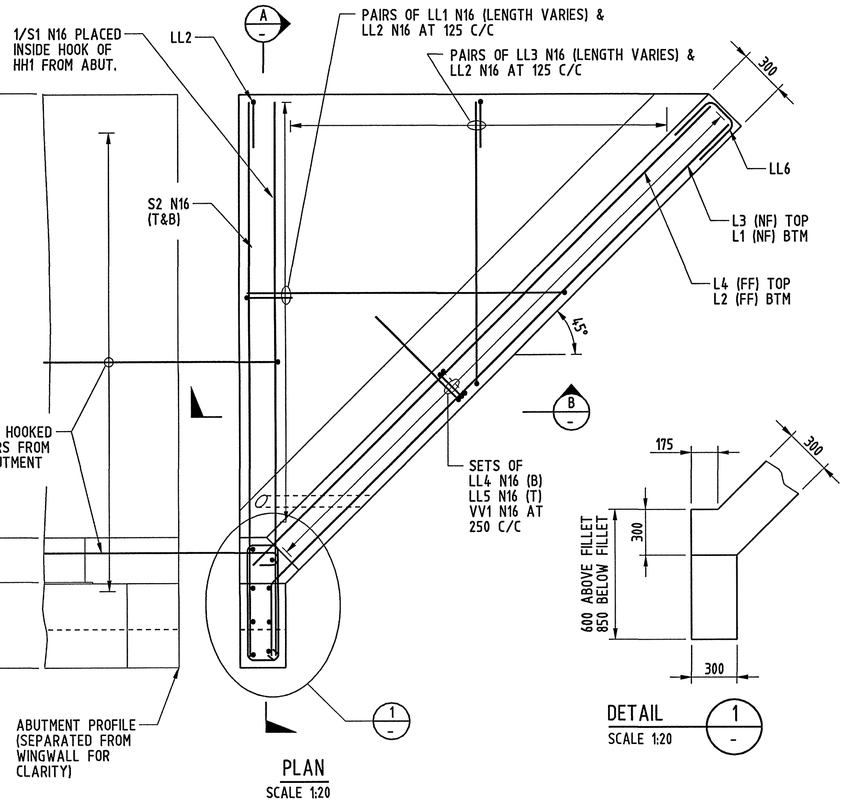
REINFORCEMENT

1. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671, WHERE N DENOTES GRADE 500N DEFORMED RIBBED BAR
2. DESIGNATION OF REINFORCING BARS : 10/S1 N24-200 EF
   - No OF BARS
   - BAR SHAPE NOTATION
   - DUCTILITY CLASS AND DIA
   - SPACING OF BARS
   - LOCATION COMMENT
3. COGS AND HOOKS SHALL BE IN ACCORDANCE WITH ABDC.
4. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR AS APPROVED IN WRITING BY THE SUPERINTENDENT.
5. COG LENGTHS TO BE 300 UNO

REFERENCE

ABUTMENT & WINGWALL - GENERAL ARRANGEMENT	CV 0174890
ABUTMENT TYPE A - CONCRETE DETAILS	CV 0174891
ABUTMENT TYPE A - REINFORCEMENT DETAILS	CV 0174892
ABUTMENT TYPE B - CONCRETE DETAILS	CV 0174893
ABUTMENT TYPE B - REINFORCEMENT DETAILS	CV 0174894

THIS DRAWING SUPERSEDES DRAWING No CV 0150376

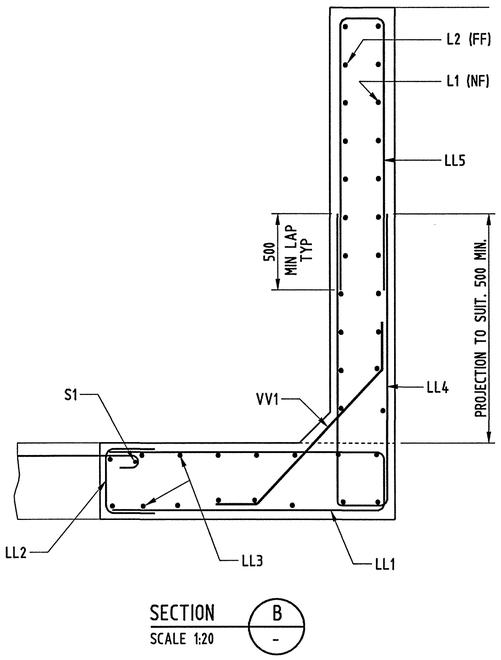


PLAN
SCALE 1:20

SECTION C
SCALE 1:20

SECTION D
SCALE 1:20

DETAIL 1
SCALE 1:20



SECTION B
SCALE 1:20

AMD	REFERENCE	DESCRIPTION	VERIFIED SIGN / DATE	APPROVED SIGN / DATE

owner and maintainer of the new rail network
RAILINFRASTRUCTURE CORPORATION

RIC ENGINEERING
CIVIL DESIGN

DRAWN G. GILLIGAN
DESIGNED
DRG CHECKED
DESIGN VERIFIED G. GILLIGAN
PROJECT LEADER
MANAGER, CIVIL DESIGN 20/12/01 DATE

WARNING SCANNED IMAGE

VARIOUS LOCATIONS

VARIOUS LINES

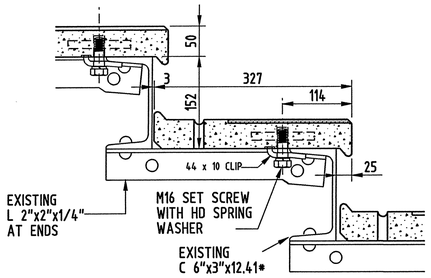
TYPICAL TIMBER UNDERBRIDGE RENEWAL
WINGWALL – TYPE 2
REINFORCED CONCRETE DETAILS

PROJECT No.	SHEET 8 OF 12	A1
T.M.C. ID. PW 260000	No. CV 0174896	A

DF 801×554

NSharp 19-DEC-2001 13:45 u:\COMMON\dgn\1999\Various locations\wckubww.dgn

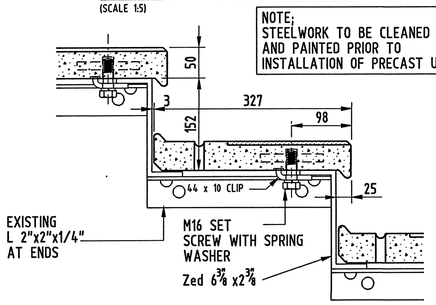
G GILLIGAN



RISERS ON EXISTING 6"x3"x12.41# Cs

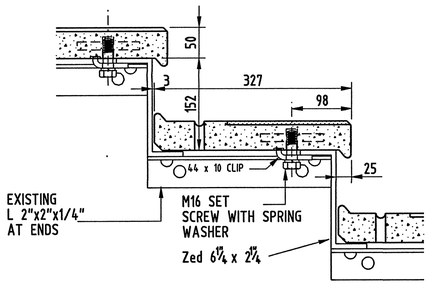
(SCALE 1:5)

NOTE;
STEELWORK TO BE CLEANED AND PAINTED PRIOR TO INSTALLATION OF PRECAST UNITS



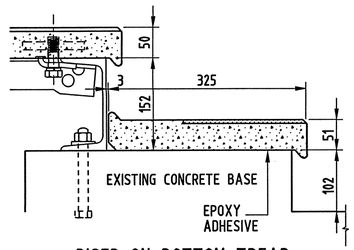
RISERS ON EXISTING 6 3/8 x 2 3/8 Zeds

(SCALE 1:5)



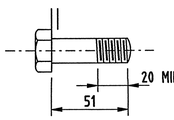
RISERS ON EXISTING 6 1/4 x 2 1/4 Zeds

(SCALE 1:5)



RISER ON BOTTOM TREAD

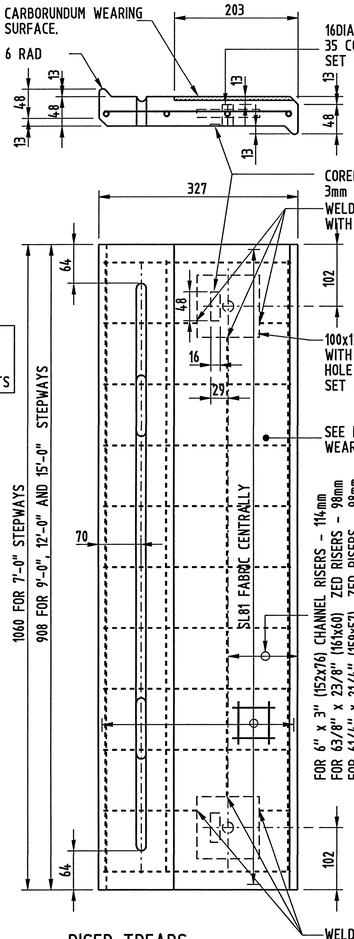
(SCALE 1:5)



M16 SET SCREW (SCALE 1:2)

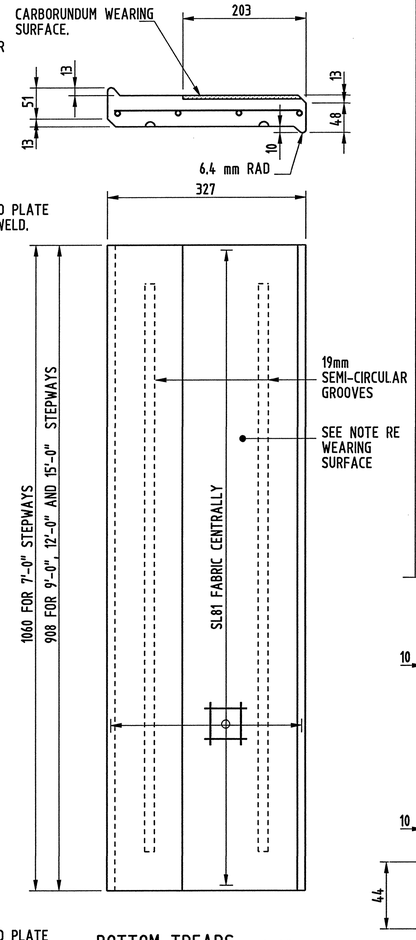
2 REQUIRED PER TREAD
2 REQUIRED PER FRONT LANDING SLAB

M16 HD SPRING WASHER TO BE SUPPLIED WITH EACH SET SCREW.



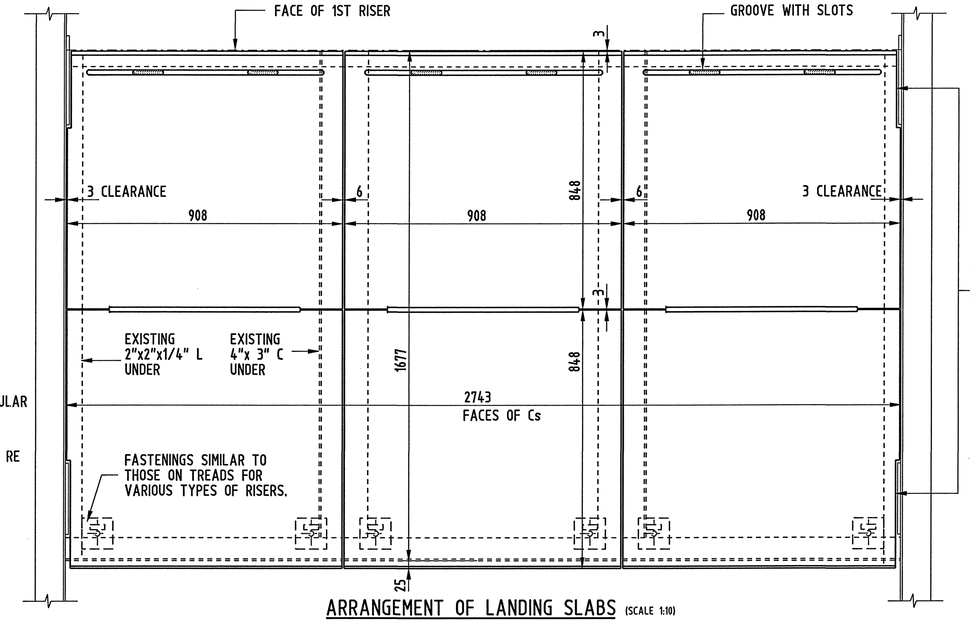
RISER TREADS (SCALE 1:5)

2 REQUIRED PER STEP FOR 7'-0" (2134mm) STEPWAY
3 REQUIRED PER STEP FOR 9'-0" (2743mm) STEPWAY
4 REQUIRED PER STEP FOR 12'-0" (3658mm) STEPWAY
5 REQUIRED PER STEP FOR 15'-0" (4572mm) STEPWAY



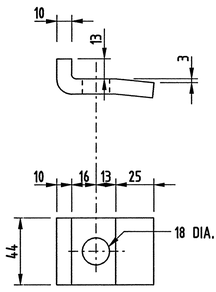
BOTTOM TREADS (SCALE 1:5)

2 REQUIRED PER STEP FOR 7'-0" (2134mm) STEPWAY
3 REQUIRED PER STEP FOR 9'-0" (2743mm) STEPWAY
4 REQUIRED PER STEP FOR 12'-0" (3658mm) STEPWAY
5 REQUIRED PER STEP FOR 15'-0" (4572mm) STEPWAY

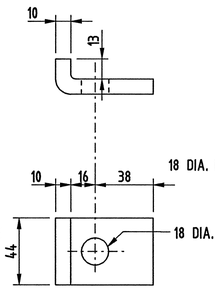


ARRANGEMENT OF LANDING SLABS (SCALE 1:10)

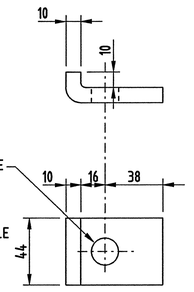
FOR INDIVIDUAL LANDING SLAB REPLACEMENT
FOR REPLACEMENT OF LANDING BY ONE SINGLE LANDING SLAB
PROVIDE PANEL TO ENGINEERS DESIGN



FOR 6"x3" Cs



FOR 6 3/8 x 2 3/8 Zeds



FOR 6 1/4 x 2 1/4 Zeds

DETAILS OF CLIPS (SCALE 1:2)

2 REQUIRED PER TREAD
2 REQUIRED PER FRONT LANDING SLAB

NOTE:
THIS DRAWING SUPERSEDES DRAWING No. 43-19 FOR THE MANUFACTURE OF REPLACEMENT STEP TREADS.

NOTES:

PRECAST CONCRETE

1. ALL CONCRETE WORK SHALL COMPLY WITH RTA FORMS B80 AND B110.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH f'c = 50 MPa.
3. EXPOSURE CLASSIFICATION = B1.

REINFORCEMENT

1. ALL REINFORCEMENT BARS SHALL BE IN ACCORDANCE WITH AS/NZS 4671, WHERE SL DENOTES GRADE 500L SQUARE RIBBED WIRE MESH
2. CLEAR COVER TO REINFORCEMENT SHALL BE 20mm.
3. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR AS APPROVED IN WRITING BY THE SUPERINTENDENT.

SURFACE TREATMENT FOR EXISTING STEEL

S1 SURFACE PREPARATION
1. REMOVE ALL LOOSE RUST AND PAINT WITH A HAND WIRE BUSH OR APPROPRIATE POWER TOOL.

S2 SURFACE PREPARATION
1. DAMAGED COATINGS SHALL BE REPAIRED WITH 2 PACK EPOXY ZINC RICH PRIMER 75um DFT SUCH AS DULUX ZINCANODE 202 OR APPROVED EQUIVALENT.
2. FINAL COAT OF PAINT SHALL MATCH EXISTING COLOUR.

EPOXY GROUT AND EPOXY MORTAR

1. EPOXY MIX - MEGAPOXY H OR APPROVED EQUIVALENT 3 PARTS A : 1 PART B (BY VOLUME)
2. EPOXY MORTAR - 1 PART EPOXY MIX : 2 PARTS SAND : 4 PARTS LESS THAN 5mm SCREENINGS (BY VOLUME)

GALVANIZING

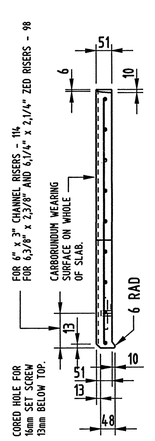
1. ALL STEELWORK SHALL BE HOT DIP GALVANIZED TO AS/NZS 4680.
2. ALL BOLTS, NUTS & WASHERS SHALL BE GALVANIZED TO AS 1214.

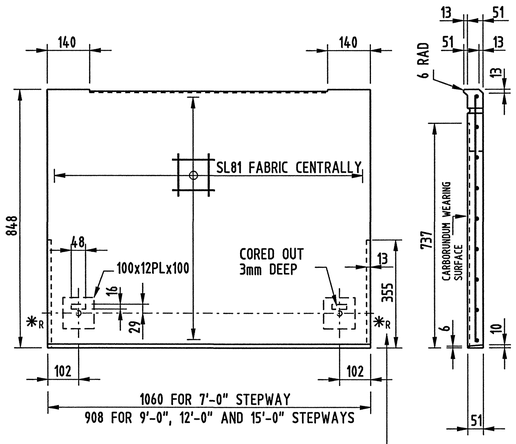
SILICON CARBIDE (CARBORUNDUM) WEARING SURFACE

1. SILICON CARBIDETOPPING SHALL BE ASBRA No. 2 SUREGRIP OR APPROVED EQUIVALENT, APPLIED AT A RATE OF 1 kg/m TO TOP SURFACE, TO MANUFACTURER'S RECOMMENDATIONS.

REFERENCE

STANDARD CONCRETE TREADS & LANDING SLABS DRG No. 43-19

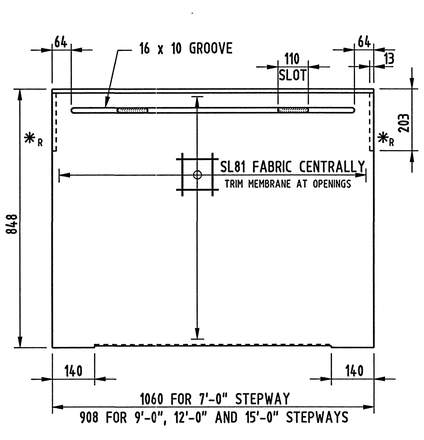




NOTE:
*R DENOTES - RECESS TO CLEAR SPLICE PLATE ON OLDER TYPE STAIRWAYS ONLY, CONFIRM ON SITE.

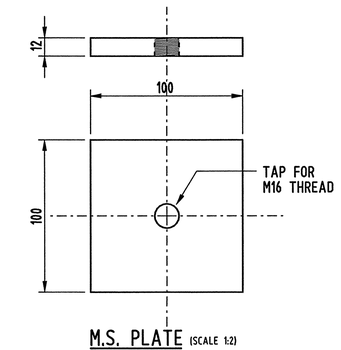
FRONT LANDING SLABS (SCALE 1:10)

2 REQUIRED PER LANDING FOR 7'-0" (2134mm) LANDING
3 REQUIRED PER LANDING FOR 9'-0" (2743mm) LANDING
4 REQUIRED PER LANDING FOR 12'-0" (3658mm) LANDING
5 REQUIRED PER LANDING FOR 15'-0" (4572mm) LANDING



BACK LANDING SLABS (SCALE 1:10)

2 REQUIRED PER LANDING FOR 7'-0" (2134mm) LANDING
3 REQUIRED PER LANDING FOR 9'-0" (2743mm) LANDING
4 REQUIRED PER LANDING FOR 12'-0" (3658mm) LANDING
5 REQUIRED PER LANDING FOR 15'-0" (4572mm) LANDING



M.S. PLATE (SCALE 1:2)

2 REQUIRED PER TREAD
2 REQUIRED PER FRONT LANDING SLAB

AMD	REFERENCE	DESCRIPTION	VERIFIED SIGN / DATE	APPROVED SIGN / DATE

owner and maintainer of the new rail network
RAILINFRASTRUCTURE CORPORATION

RIC ENGINEERING CIVIL DESIGN

DRAWN
DESIGNED
DRG CHECKED
DESIGN VERIFIED
PROJECT LEADER
PRINCIPAL DESIGN ENGINEER, CIVIL — DATE 25.3.03

STANDARD

REPLACEMENT CONCRETE TREADS & LANDING SLABS FOR STANDARD STEEL FOOTBRIDGES

PRECAST REINFORCED CONCRETE DETAILS ©

FILE No. A / 0 / 3311	SHEET 1 OF 1	A1
T.M.C. PW 270000	No. CV 0191345	A

DF 801x554

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