

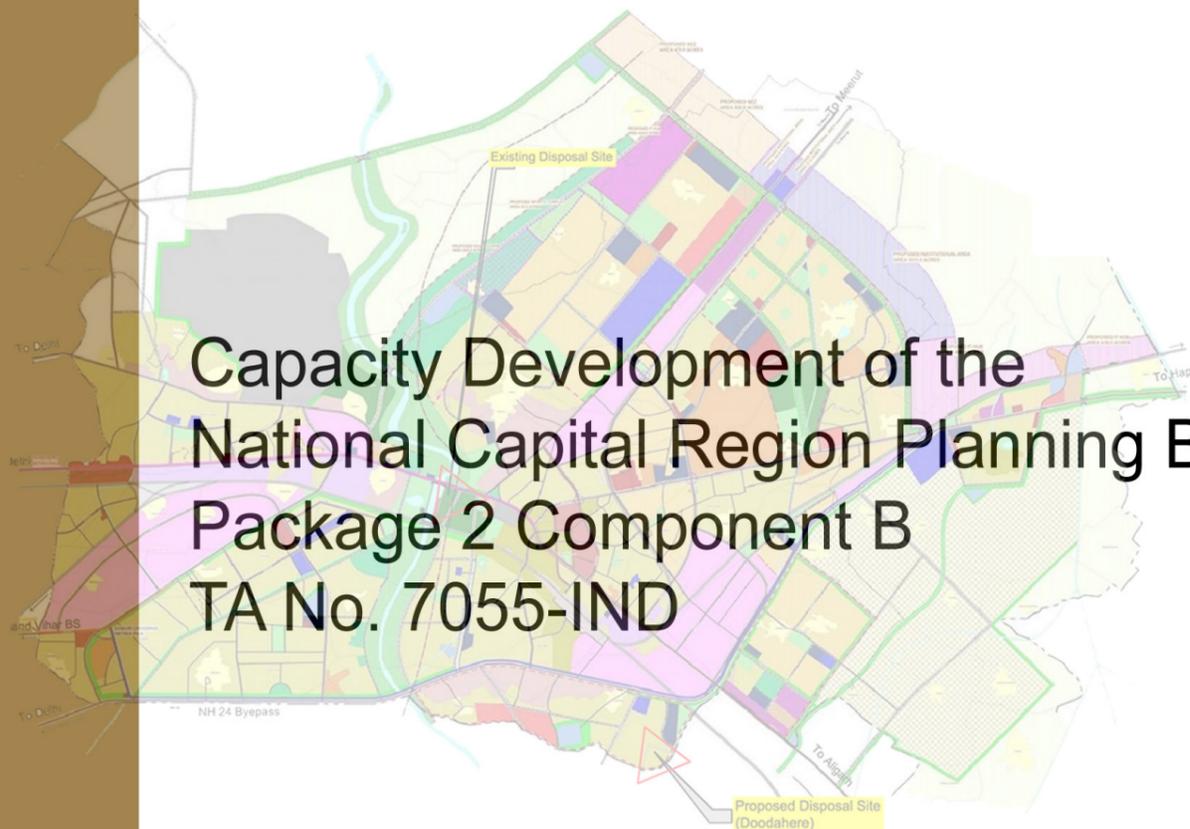


Asian Development Bank
National Capital Region Planning Board



FINAL REPORT

Capacity Development of the
National Capital Region Planning Board
Package 2 Component B
TA No. 7055-IND



Volume V-A3 : Detailed Drawings

**Detailed Project Report for
Flyover at Mohan Nagar Junction in Ghaziabad**



WilburSmith
ASSOCIATES

July 2010

NCR Planning Board
Asian Development Bank

**Capacity Development of the National
Capital Region Planning Board
(NCRPB) – Component B
(TA No. 7055-IND)**

FINAL REPORT
Volume V-A3: DPR for Flyover at Mohan Nagar Junction in
Ghaziabad

Detailed Drawings

July 2010



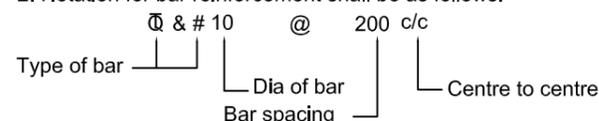
Capacity Development of the NCRPB: Component B (ADB TA-7055)

GENERAL NOTES

A) GENERAL

- These notes are applicable for drawings for RCC structure /PSC structures to the extent relevant.
- The design of flyover is done in accordance with the IRC Codes of practice, MORT&H standards and specifications and relevant IS Codes of practice.
Following codes shall be refer to for any clarification.
 - IRC : 5 - 2000
 - IRC : 6 - 2000
 - IRC :18 - 2000
 - IRC :21 - 2000
 - IRC :78 - 2000
 - IRC :83 - 2000
- The construction shall be done in accordance with MORT&H specification for Road and Bridge work -2000 and other supplementary technical specifications.
- All dimensions are in mm. Only written dimensions shall be followed. No drawing shall be scaled. Levels and Chainages are in meters unless specified otherwise.
- The following loads have been considered in the design.
 - Two lanes of IRC Class 70R or four lanes of IRC Class A on carriageway, whichever produces the worst effect.
 - Wearing coat load with density of 2.2 T/m³ is considered in the design.
- The designs are applicable for "SEVERE" conditions of exposure.

2. Notation for bar reinforcement shall be as follows.



Bar spacing indicated on the drawing shall be perpendicular to bars unless indicated in the drawing.

- Steel spacer bars shall be provided between adjacent layers of parallel reinforcement and spaced at not more than 60 x smaller bar dia. The diameter of the spacer bar shall be at least 25mm but not less than the dia of the parallel reinforcement.
- Binding wires should be annealed 16 gauge mild steel wires free from deleterious matters, dust etc...

Water

- Water to be used in concreting, grouting and curing shall conform to Clause 5.1 (ii) of IRC: SP:33-1989.
- Maximum water cement ratio shall be 0.40.

Expansion Joints

- The expansion joints must be robust, durable, water tight and replaceable. It must be provided over the full width of superstructure including kerb and footpath following the profile of the same (where relevant). Expansion joints shall be obtained only from approved manufacturers and be of proven type. Details of expansion joints may be got approved before commencement of construction. Site fabricated expansion joints shall be prohibited.
- Presence of manufacturers representative at the time of positioning of embedded parts and installation of expansion joints is mandatory.

Bearings

- POT PTFE type of bearings from approved manufacturers shall only be used.
- Presence of manufacturers representative at the time of placing of bearings is mandatory. Pedestal details at every pier location shall be worked out separately by the contractor and got approved by the Engineer In Charge.

C) WORKMANSHIP/DETAILING

- Cover

Minimum cover to any reinforcement shall be as specified in IRC: 21 - 2000 clause 304.3 unless specified otherwise.

Clear cover to main reinforcement shall be as follows

Girder / Deck Slab /Diaphragm	50mm
Pier cap/Pier/Pedestals	40mm
Pilecap/Pile	75mm
Crash Barrier	40mm

For ensuring proper cover to reinforcement bars, mortar blocks of same grade as of the parent concrete shall be provided & should be able to withstand crushing during concreting.
- Welding of reinforcement bars shall not be permitted.
- Bending of reinforcement bars shall be as per IS:2502-1963.
- Construction joints shall be provided at locations shown in the drawing.
- Minimum lap length shall be kept as 50 d where "d" is the diameter of bars.

- Supporting chairs of dia not less than 12 mm shall be provided at suitable intervals, as per IS: 2502 -1963
- Sharp edges of concrete shall be chamfered (10mmx10mm).
- Shuttering plates shall suitably be stiffened to enable the compaction by form vibrators.
- Full width screed vibrator shall be used for compaction of concrete in deck slab. Proper compaction of concrete shall be ensured by the use of form and / or needle vibrators.
- Formwork details shall be submitted by the contractor for approval of the Engineer-in-Charge and shall be load tested before use.
- Bar splices shall be used where needed according to approved fabrication drawing, indicating them clearly and shall conform to provisions of IRC 21 clause 304.6 and other relevant clauses.
- All setting out dimensions, reduced levels, concrete dimensions to be verified at site before construction commences. Any discrepancy shall be brought to the notice of the Engineer in Charge.

D) SPECIAL NOTES ON PRESTRESSING

- Ultimate tensile strength of the wire shall not be less than 1860 N/mm².
- H.T wires shall confirm to appendix 1 of IS-1785 part-1.
- All cables shall have smooth profile (without kinks) passing through given ordinates and firmly supported at every 1.0m interval.
- BBR system of prestressing or equivalent system shall be adopted after getting the consent of the design engineer.
- Sheathing for the cables shall be made of corrugated HDPE ducts of approved make.
- The extensions are based on the following data.

Wobble co-efficient k=0.002/m length.

Friction co-efficient $\mu = 0.17$

Modulus of elasticity of steel in wires $e_s = 2.1 \times 10^5$ Mpa
- Extensions are the main criteria and not the force at jack end. In case designed extension is not obtained at design force, jacking force shall be increased (limited to 80% of UTS) till the cable attains designed extension.
- The variation in the total extension for a girder and the span shall be within $\pm 5\%$. If the variation is more than $\pm 5\%$, the matter shall be referred to engineer in charge.
- Slip at each end shall be measured. A slip of 6mm is considered in design. no extra extension is permissible.
- The ducts shall be grouted after stressing is completed; as per Appendix 5 of IRC- 18 - 2000 and with approval of engineer- in - charge with cement grout of w/c ratio 0.45. Grouting pressure shall be between 0.5N/mm² to 0.7N/mm².
- The cables shall be stressed only on the 28th day after casting or when girder attains strength of 50Mpa
- The cables shall be stressed from both the ends simultaneously with uniform pressure.
- The sequence of stressing of cables shall be followed from the respective drawings.
- The clear cover to sheathings shall be a minimum of 75mm
- Grout vent pipes shall be located at all high and low points of the tendon profile.
- Reinforcing steel interfering with the tendons shall be adjusted as directed by engineering in charge.
- For details of anchorage adopted refer bbr cona compact system, (anchorage type M3)

B) MATERIALS SPECIFICATIONS

Concrete

- Concrete shall be of design mix and shall have characteristic strength for different type as follows:

I) Girders / Deck slab / Diaphragms	- M50
II) Pier cap/Pier/Pedestals	- M50
III) Pilecap/Pile	- M40
IV) Crash Barrier	- M40
V) Levelling course	- M15
- Ordinary Portland cement conforming to IS:269 or High strength Ordinary Portland cement conforming to IS:8112 capable of achieving the required design concrete strength shall only be used.
- To improve workability of concrete and cement grout, admixtures conforming to IS:6925 and IS : 9103 could be permitted subject to satisfactory proven use.
- Minimum cement content shall be 380Kg/cum for RCC structure and 400Kg/cum for PSC
- Maximum water cement ratio shall be 0.40.
- The nominal maximum size of aggregate to be used in RCC works shall be 20mm.

Reinforcement

- All reinforcing steel shall be of High Yield Strength Deformed Bars, Grade designation Fe - 415, conforming to IS:1786 and Mild steel bars Grade designation Fe -240, shall conform to IS:432 part-1.

Client:

**Asian Development Bank
National Capital Region Planning Board**

Consultant:

Wilbur Smith Associates

Drawn: SSN Checked: APK Sheet No.

Date: Dec.2009 Approved: AN

Scale: As shown

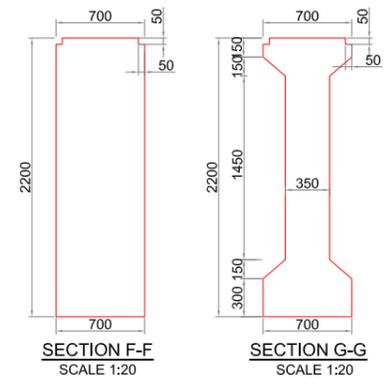
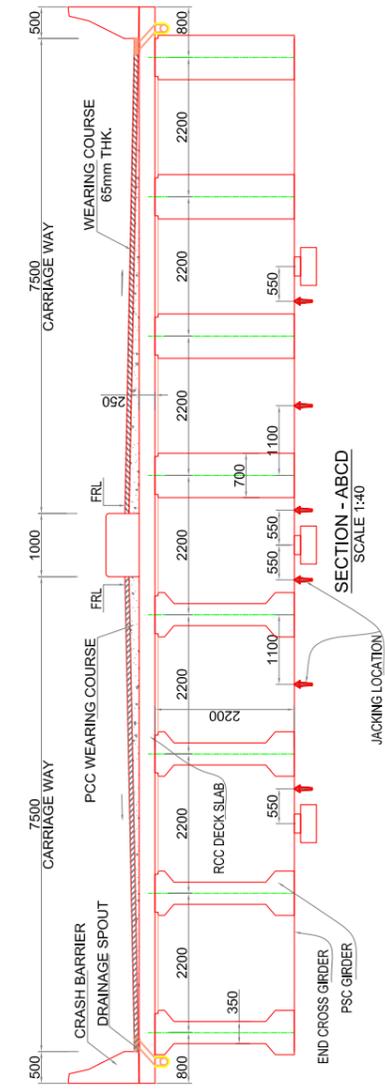
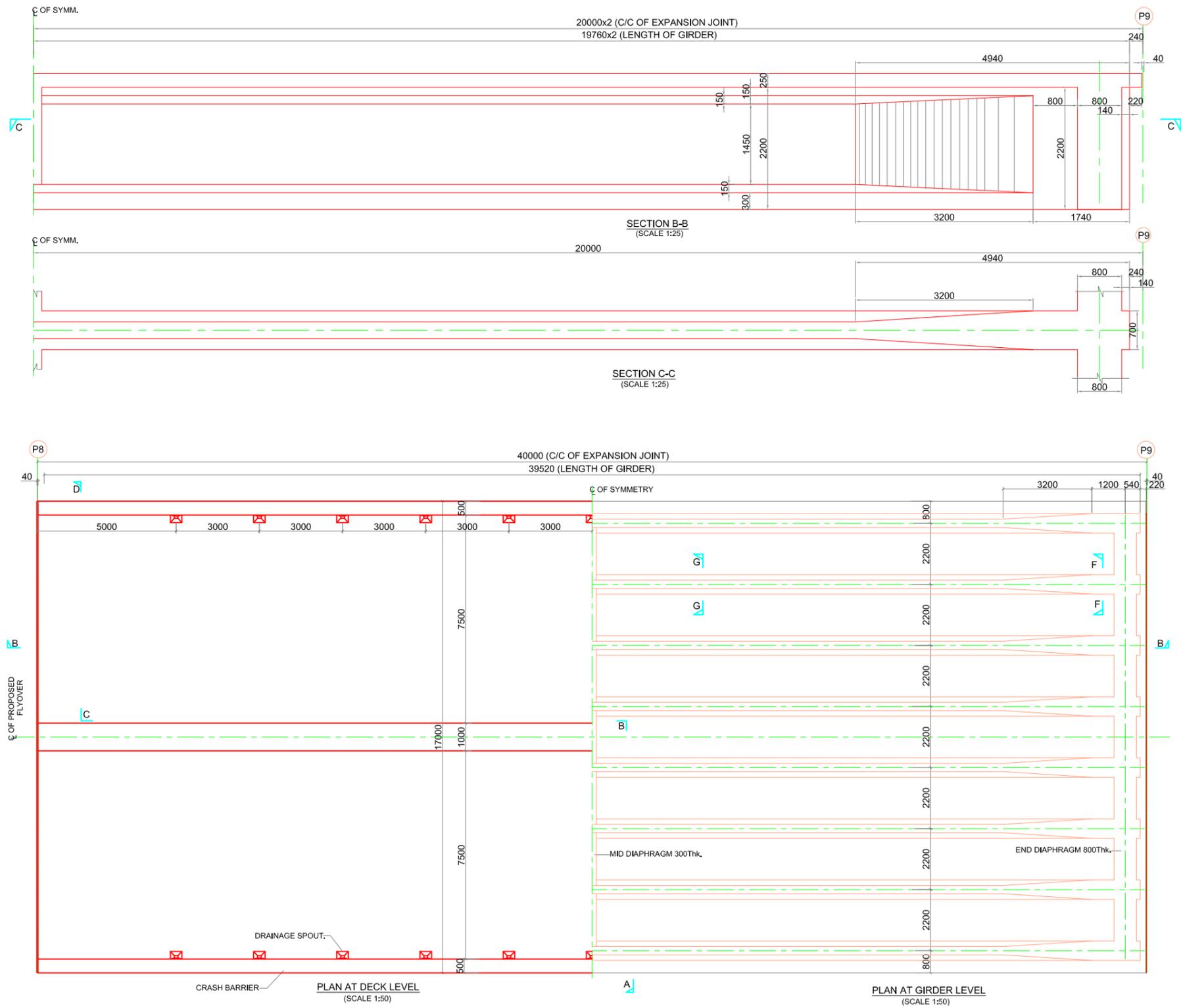
Drawing No.
MN - 2D-60 -001-01

List of Drawings

Drawing No.	:	Drawing Title
General Drawings		
MN-2D-00-001-01	:	General Notes
MN-1D-10-001-01/1 to 2	:	Plan & Profile (2 sheets)
General Arrangement Drawings		
MN-2D-60-001-01/1 to 6	:	General Arrangement Drawing of Flyover (6 sheets)
Superstructure		
MN-2D-60-001-02/1	:	Dimension Details of PSC I Girder
MN-2D-60-001-02/2	:	Reinforcement Details of Deck Slab (PSC I Girder Location)
MN-2D-60-001-02/3	:	Reinforcement Details of Cross Girder
MN-2D-60-001-02/4	:	Cable Profile and Anchorage Details of PSC I Girder
MN-2D-60-001-02/5	:	Reinforcement Details of PSC I Girder
Substructure		
MN-2D-60-001-03/1	:	Dimension Details of Abutment & Foundation
MN-2D-60-001-03/2	:	Dimension Details of Pier and Foundation
MN-2D-60-001-03/3	:	Reinforcement Details of Abutment & Foundation
MN-2D-60-001-03/4	:	Reinforcement Details of Pier and Foundation (P3 to P13)
MN-2D-60-001-03/5	:	Reinforcement Details of Pier and Foundation (P1, P2, P14 and P15)
Miscellaneous Drawings		
MN-2D-80-001-01	:	Miscellaneous Details
MN-2D-80-001-02	:	Details of Reinforced Earth Wall
MN-2D-80-001-03	:	Details of Reinforced Earth Wall
MN-2D-80-001-04	:	Details of Bearings

Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK DIMENSION DETAILS OF PSC GIRDER



- NOTES:-**
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS WRITTEN OTHERWISE
 - NO DIMENSIONS SHALL BE SCALED FROM THIS DRAWING ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED
 - THE FOLLOWING GRADES OF CONCRETE SHALL BE USED FOR
 - a) GIRDER/DECK SLAB/DIAPHRAGM - M50
 - b) CRASH BARRIER - M40
 - REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS (DENOTED AS #) HAVING YIELD STRENGTH OF 415Mpa & CONFORMING TO IS:1786
 - CRASH BARRIERS SHALL BE CASTED ONLY AFTER 14 DAYS OF CASTING OF DECK SLAB
 - PVC PIPES SHALL BE PROVIDED FOR UTILITIES BEFORE CASTING OF CRASH BARRIER

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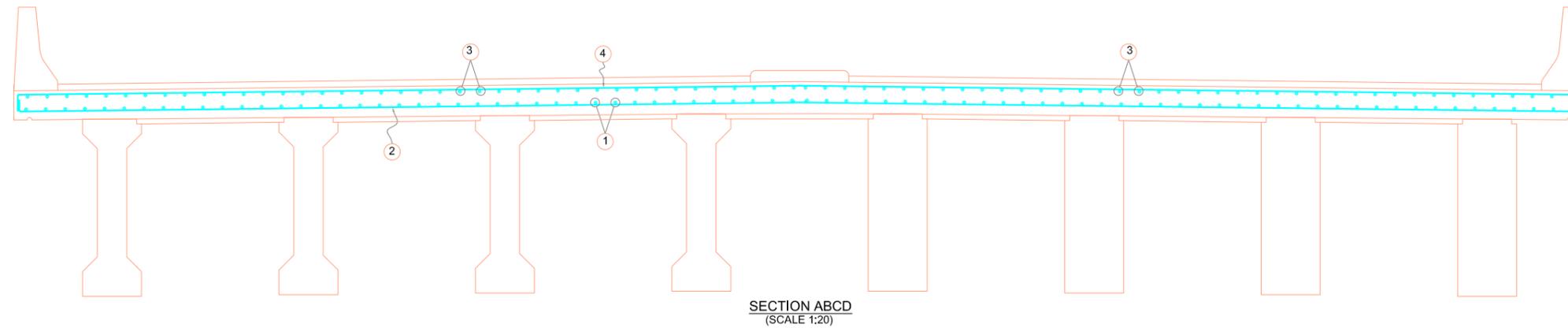
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Date: Dec.2009 Approved: AN 1 OF 5

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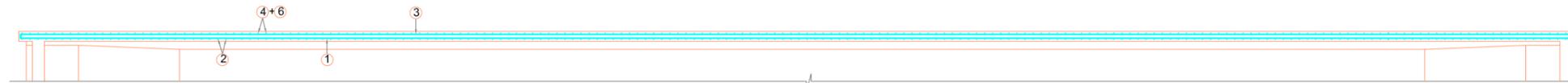
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MN - 2D-60 -001-02 / 1

Capacity Development of the NCRPB: Component B (ADB TA-7055)

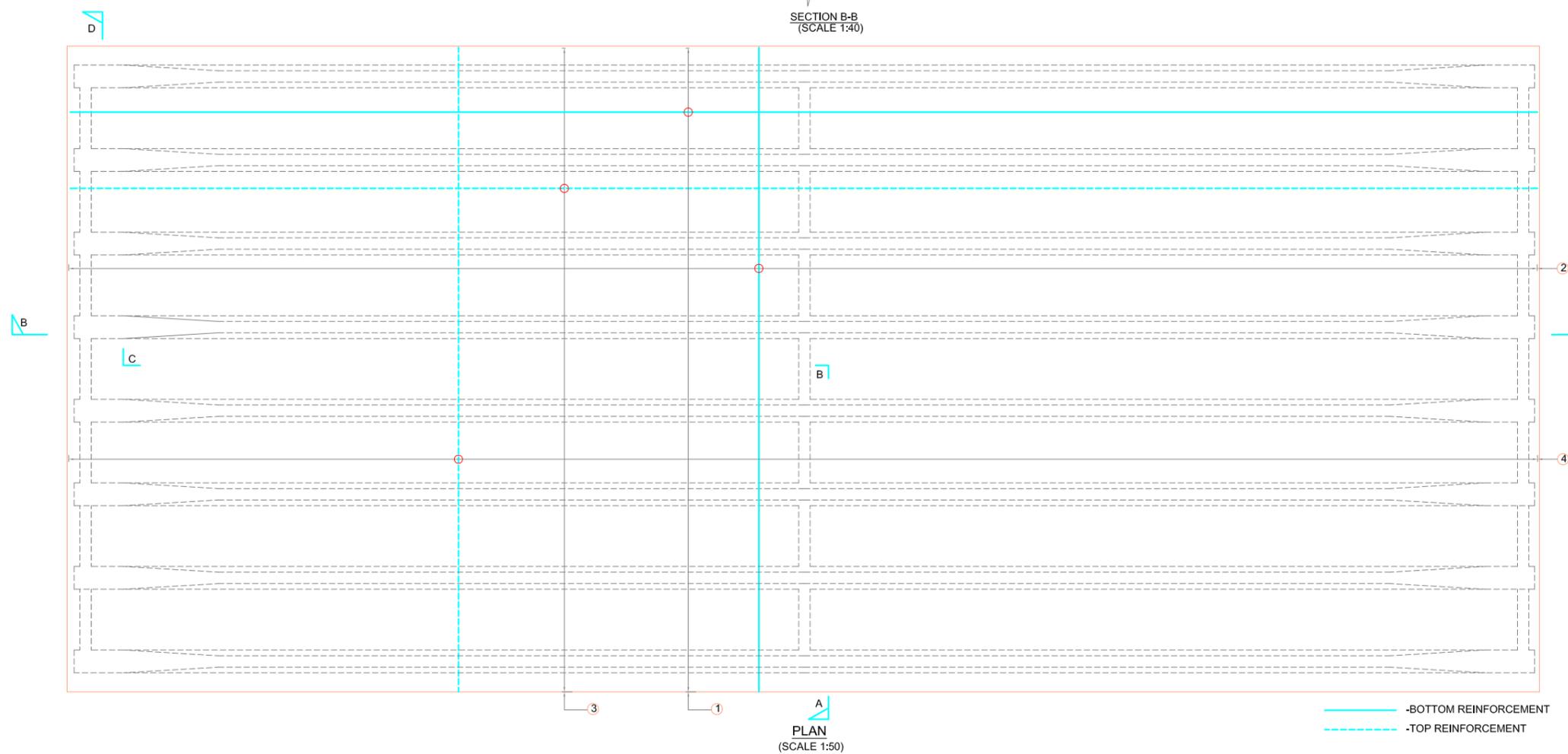
FLYOVER AT MOHAN NAGAR CHOWK
REINFORCEMENT DETAILS OF DECK SLAB
(PSC I GIRDER LOCATION)



SECTION ABCD
(SCALE 1:20)



SECTION B-B
(SCALE 1:40)



PLAN
(SCALE 1:50)

— BOTTOM REINFORCEMENT
- - - TOP REINFORCEMENT

SCHEDULE OF REINFORCEMENT

BAR NO	BAR SHAPE	DIA. OF BAR AND SPACING
①	100 39860 100	# 10@150c/c
②	100 16900 100	# 16@150c/c
③	100 39860 100	# 10@150c/c
④	100 16900 100	# 16@150c/c

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS WRITTEN OTHERWISE
- NO DIMENSIONS SHALL BE SCALED FROM THIS DRAWING ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED
- THE FOLLOWING GRADES OF CONCRETE SHALL BE USED FOR
 - a) GIRDER/DECK SLAB/DIAPHRAGM - M50
 - b) CRASH BARRIER - M40
- REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS (DENOTED AS #) HAVING YIELD STRENGTH OF 415Mpa & CONFORMING TO IS:1786
- CLEAR COVER FOR ANY REINFORCEMENT SHALL BE 50mm UNLESS OTHERWISE SPECIFIED

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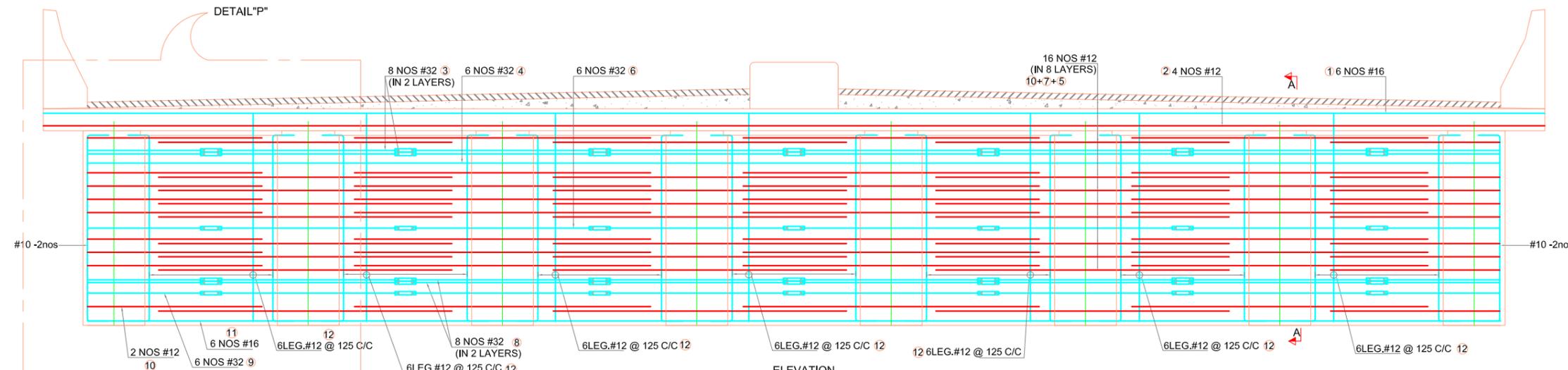
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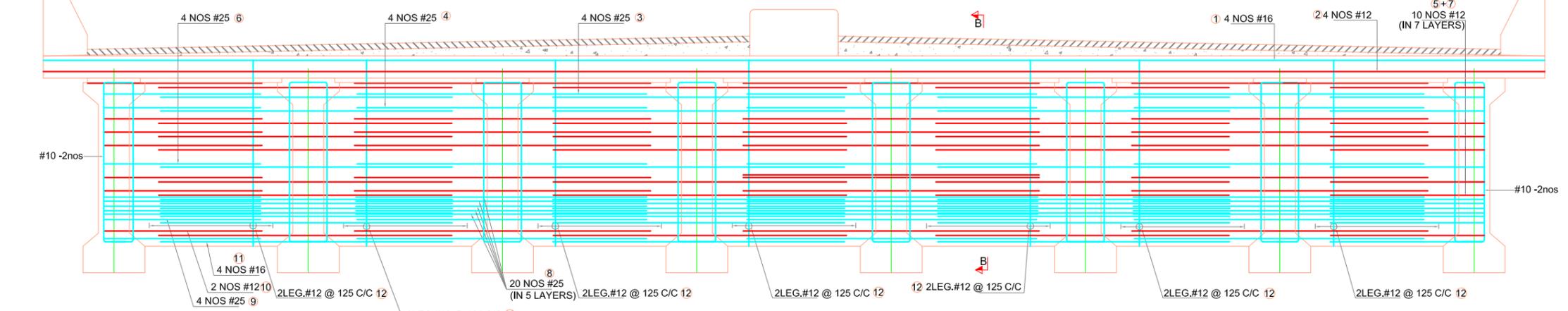
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Capacity Development of the NCRPB: Component B (ADB TA-7055)

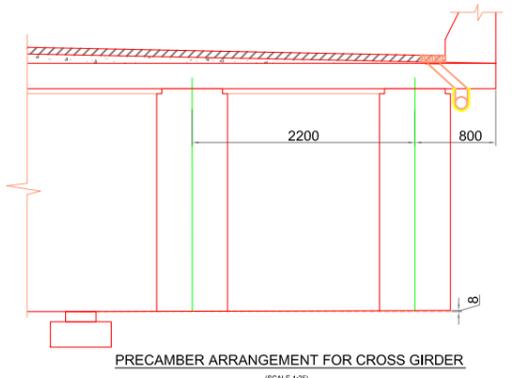
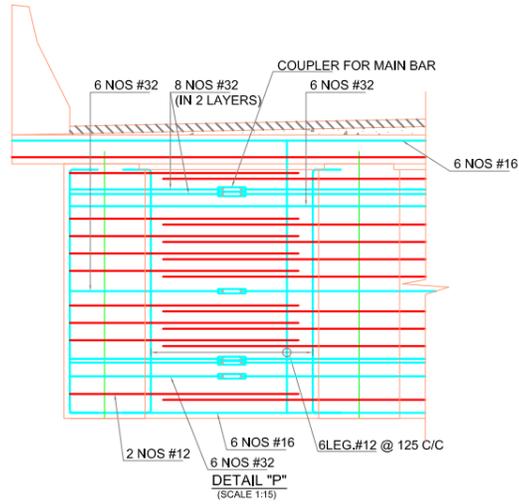
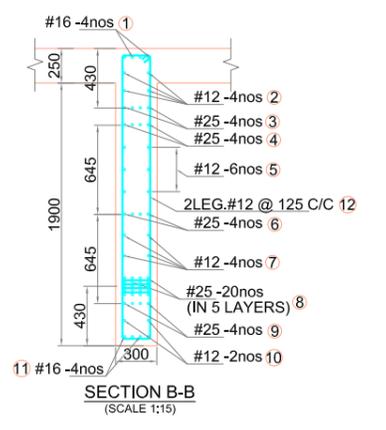
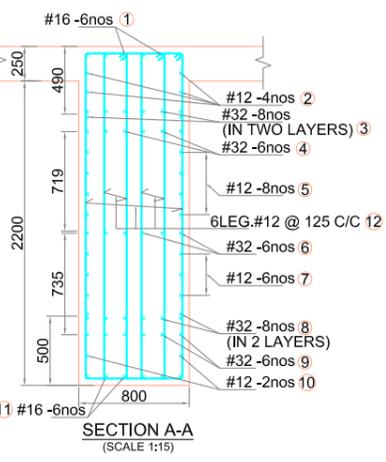
FLYOVER AT MOHAN NAGAR CHOWK REINFORCEMENT DETAILS OF CROSS GIRDER



ELEVATION
REINFORCEMENT DETAILS OF END CROSS GIRDER
(SCALE 1:20)
DECK SLAB REINFORCEMENT IS NOT SHOWN FOR CLARITY



ELEVATION
REINFORCEMENT DETAILS OF MID CROSS GIRDER
(SCALE 1:20)
DECK SLAB REINFORCEMENT IS NOT SHOWN FOR CLARITY



SCHEDULE OF REINFORCEMENT:-
(MID CROSS GIRDER)

BAR NO	BAR SHAPE	DIA. OF BAR AND SPACING/NO.
1	100 16900 100	16 4
2	100 varies 100	12 4
3	100 varies 100	25 4
4	100 varies 100	25 4
5	100 varies 100	12 6
6	100 varies 100	25 4
7	100 varies 100	12 4
8	100 varies 100	25 20
9	100 varies 100	25 4
10	100 varies 100	12 2
11	100 varies 100	16 4
12	200 200 200	12 125

SCHEDULE OF REINFORCEMENT:-
(END CROSS GIRDER)

BAR NO	BAR SHAPE	DIA. OF BAR AND SPACING/NO.
1	100 16900 100	16 6
2	100 16000 100	12 4
3	100 16000 100	32 8
4	100 16000 100	32 6
5	100 varies 100	12 8
6	100 16000 100	32 6
7	100 varies 100	12 6
8	100 16000 100	32 8
9	100 16000 100	32 6
10	100 varies 100	12 2
11	100 16000 100	16 6
12	600 2100 100 2350	12 125

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS WRITTEN OTHERWISE.
- NO DIMENSIONS SHALL BE SCALED FROM THIS DRAWING ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED
- GRADES OF CONCRETE SHALL BE M50
- REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS (DENOTED AS #) HAVING YIELD STRENGTH OF 415MPa & CONFORMING TO IS:1786
- CLEAR COVER FOR ANY UNREINFORCEMENT SHALL BE 50mm UNLESS OTHERWISE SPECIFIED
- CRASH BARRIERS SHALL BE CASTED ONLY AFTER 14 DAYS OF CASTING OF DECK SLAB
- ALL REINFORCEMENT BARS SHALL BE TREATED WITH ANTI CORROSIVE SOLUTION
- PRECAMBER OF 8mm SHALL BE PROVIDED AT THE CROSS GIRDER ENDS

Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SSN
Date: Dec.2009
Scale: As shown

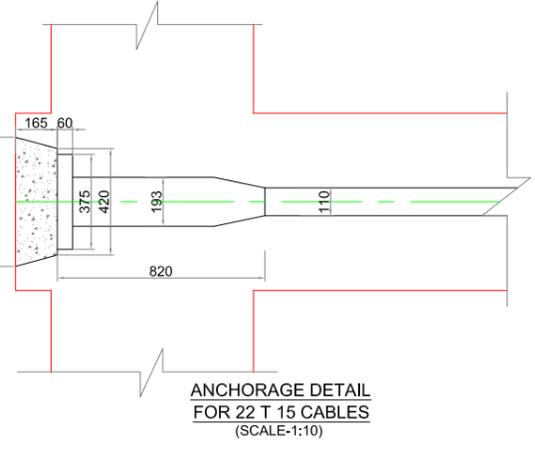
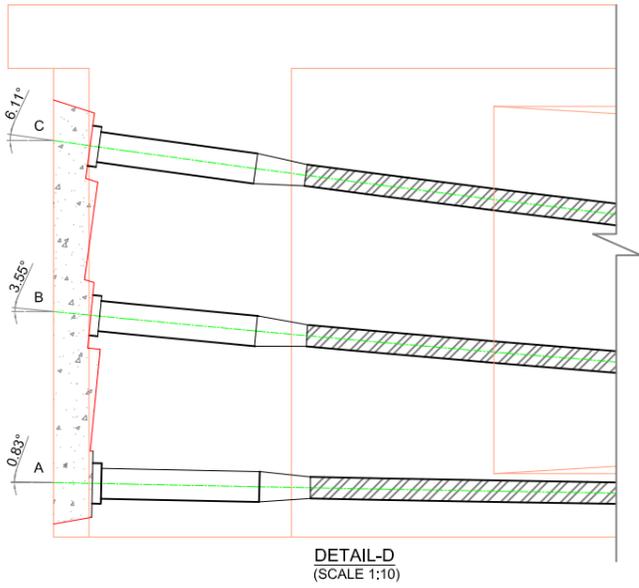
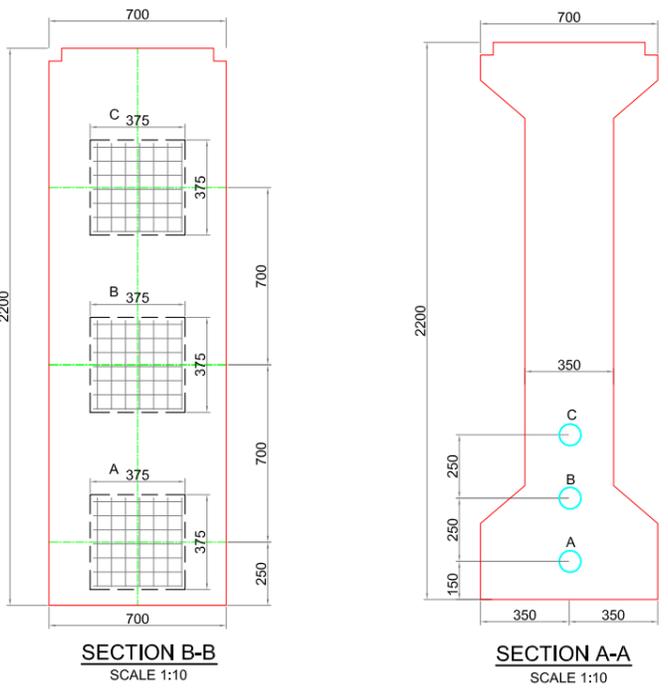
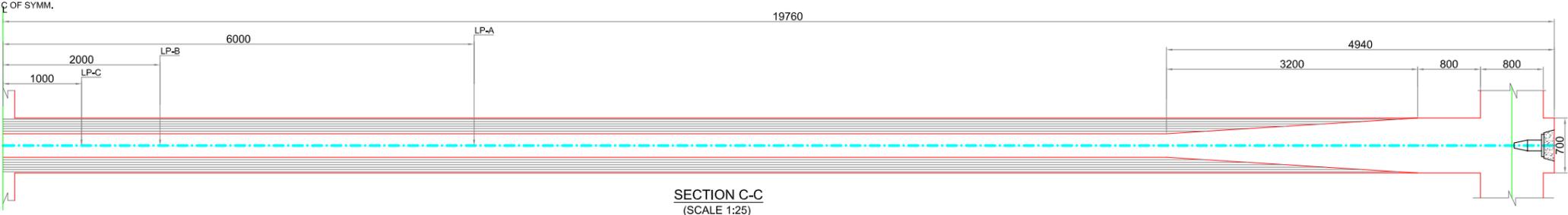
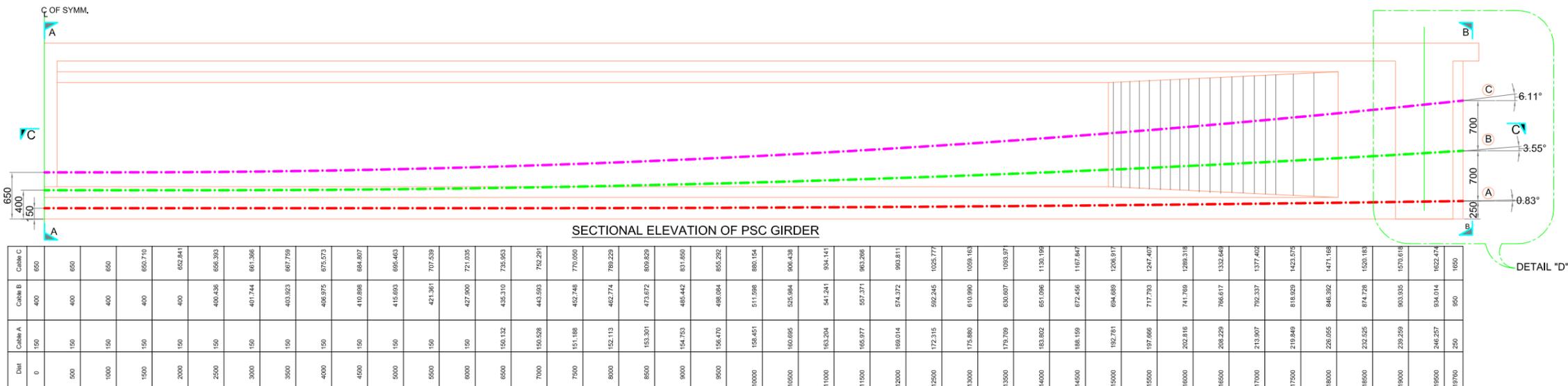
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Sheet No.
3 OF 5

Drawing No.
MN - 2D-60 -001-02 / 3

Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK CABLE PROFILE AND ANCHORAGE DETAILS OF PSC GIRDER



- NOTES:-**
- ALL THE CABLES ARE MADE UP OF 22 Nos 15.2mm DIA HD STRANDS WITH SHEATHING DIAMETRE OF 100mm DESIGNATED AS 22 T 15 OF BBR CONA COMPACT SYSTEM OF PRESTRESSING
 - ULTIMATE TENSILE STRENGTH OF THE STRANDS SHALL NOT BE LESS THAN 1860 N/mm².
 - H.T STRANDS SHALL CONFIRM TO APPENDIX 1 OF IS-1785 PART-1.
 - ALL CABLES SHALL HAVE SMOOTH PROFILE (WITHOUT KINKS) PASSING THROUGH GIVEN ORDINATES AND FIRMLY SUPPORTED AT EVERY 1.0M INTERVAL.
 - BBR SYSTEM OF PRESTRESSING OR EQUIVALENT SYSTEM SHALL BE ADOPTED AFTER GETTING THE CONSENT OF THE DESIGN ENGINEER.
 - SHEATHING FOR THE CABLES SHALL BE MADE OF CORRUGATED HDPE DUCTS OF APPROVED MAKE.
 - THE EXTENSIONS ARE BASED ON THE FOLLOWING DATA.
WOBBLE CO-EFFICIENT $K = 0.002/m$ LENGTH.
FRICTION CO-EFFICIENT $\mu = 0.17$
MODULUS OF ELASTICITY OF STEEL IN WIRES $E_s = 2.1 \times 10^5 MPa$
 - EXTENSIONS ARE THE MAIN CRITERIA AND NOT THE FORCE AT JACK END. IN CASE DESIGNED EXTENSION IS NOT OBTAINED AT DESIGN FORCE, JACKING FORCE SHALL BE INCREASED (LIMITED TO 80% OF UTS) TILL THE CABLE ATTAINS DESIGNED EXTENSION.
 - THE VARIATION IN THE TOTAL EXTENSION FOR A GIRDER AND THE SPAN SHALL BE WITHIN $\pm 5\%$. IF THE VARIATION IS MORE THAN $\pm 5\%$, THE MATTER SHALL BE REFERRED TO ENGINEER IN CHARGE.
 - SLIP AT EACH END SHALL BE MEASURED. A SLIP OF 6mm IS CONSIDERED IN DESIGN. NO EXTRA EXTENSION IS PERMISSIBLE.
 - THE DUCTS SHALL BE GROUTED AFTER STRESSING IS COMPLETED; AS PER APPENDIX 5 OF IRC 18 - 2000 AND WITH APPROVAL OF ENGINEER-IN - CHARGE WITH CEMENT GROUT OF W/C RATIO 0.45. GROUTING PRESSURE SHALL BE BETWEEN $0.5 N/mm^2$ TO $0.7 N/mm^2$
 - THE CABLES SHALL BE STRESSED ONLY ON THE 28th DAY AFTER CASTING OR WHEN GIRDER ATTAINS STRENGTH OF 50 MPa
 - THE CABLES SHALL BE STRESSED FROM BOTH THE ENDS SIMULTANEOUSLY WITH UNIFORM PRESSURE.
 - THE SEQUENCE OF STRESSING OF CABLES SHALL BE FOLLOWED
 - 1st - CABLE A
 - 2nd - CABLE B
 - 3rd - CABLE C
 - THE CLEAR COVER TO SHEATHINGS SHALL BE A MINIMUM OF 75mm. CLEAR DISTANCE BETWEEN THE CABLES SHALL BE 100mm.
 - GROUT VENT PIPES SHALL BE LOCATED AT ALL HIGH AND LOW POINTS OF THE TENDON PROFILE.
 - REINFORCING STEEL INTERFERING WITH THE CABLES SHALL BE ADJUSTED AS DIRECTED BY ENGINEER IN CHARGE.
 - FOR DETAILS OF ANCHORAGE ADOPTED REFER BBR CONA COMPACT SYSTEM, (ANCHORAGE TYPE M3)

LEGEND
LP - LIFT POINT OF CABLES

DESIGN FORCE AND EXTENSIONS

CABLE NO.	TYPE OF CABLE	PRE-STRESSING FORCE AT JACKING END (KN)	EXTENSION REQUIRED (mm)
C	22 T 15	4542	131
B	22 T 15	4542	138.5
A	22 T 15	4542	139

Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SSN
Date: Dec.2009

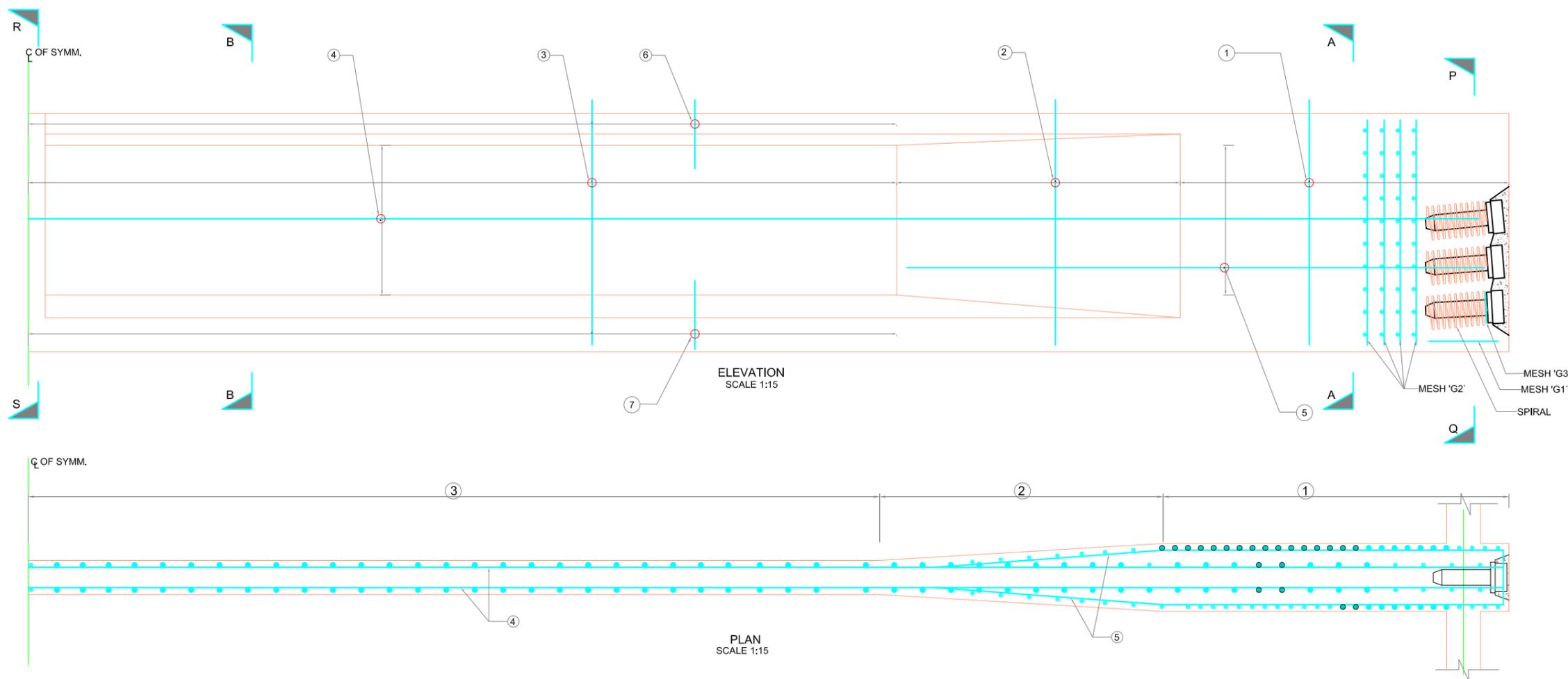
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4 OF 5

Scale: As shown
Drawing No. MN - 2D-60 -001-02 / 4

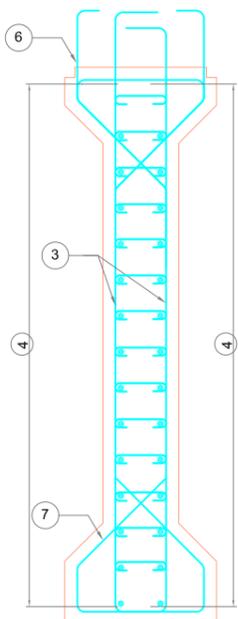
Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK REINFORCEMENT DETAILS OF PSC GIRDER

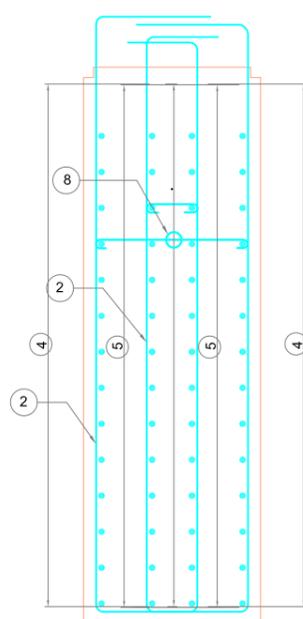


SCHEDULE OF REINFORCEMENT

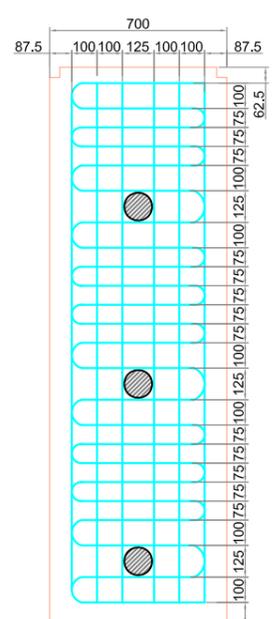
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②		4L-#12@150C/C
③		2L-#12@150C/C
④		#10@150c/c
⑤		#10@150c/c
⑧		#10 @ 150 C/C
⑨		#10 @ 150 C/C
⑦		#12 @ 150 C/C
⑥		#12 @ 150 C/C



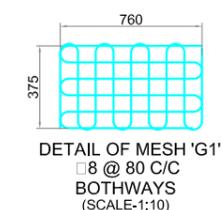
SECTION B-B
SCALE 1:10



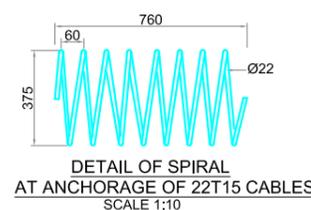
SECTION A-A
SCALE 1:10



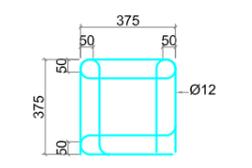
DETAIL OF MESH 'G2'
VERTICAL Ø16
HORIZONTAL Ø16
(SCALE-1:10)



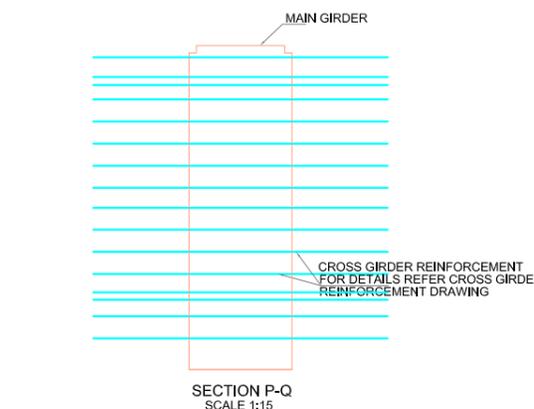
DETAIL OF MESH 'G1'
8 @ 80 C/C
BOTHWAYS
(SCALE-1:10)



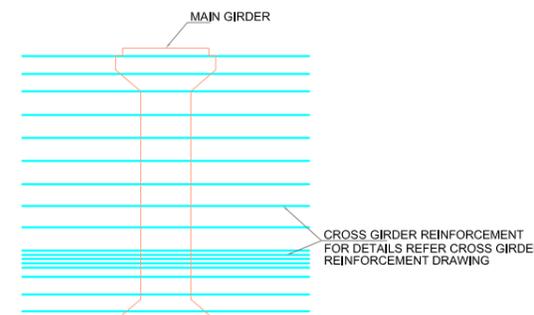
DETAIL OF SPIRAL
AT ANCHORAGE OF 22T15 CABLES
SCALE 1:10



DETAIL OF MESH 'G3'
AT ANCHORAGE PLATE DIM.
375mm x 375mm FOR 22T15 CABLES
SCALE 1:10



SECTION P-Q
SCALE 1:15



SECTION R-S
SCALE 1:15

NOTES

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
- CONCRETE GRADE FOR GIRDER SHALL BE
 - DECK SLAB - M50
 - DIAPHRAGM - M50
 - GIRDER - M50
 - CRASH BARRIER - M40
- REINFORCEMENT SHALL BE OF GRADE Fe 415 CONFIRMING TO IS:1786
- CLEAR COVER TO ANY REINFORCEMENT SHALL BE 40mm UNLESS OTHERWISE MENTIONED.
- CROSS GIRDER OF SPECIFIED LENGTH AS PER DRAWING SHALL BE CASTED MONOLITHIC WITH THE GIRDER AS PER THE DIRECTIONS OF ENGINEER-IN-CHARGE
- THE BAR BENDING DIAGRAMS SHOWN ARE FOR GUIDANCE ONLY. THE CONTRACTOR SHALL PREPARE THE BAR BENDING SCHEDULES AND GOT APPROVED BY THE ENGINEER IN CHARGE BEFORE EXCICUTION.

Client:

**Asian Development Bank
National Capital Region Planning Board**

Consultant:

Wilbur Smith Associates

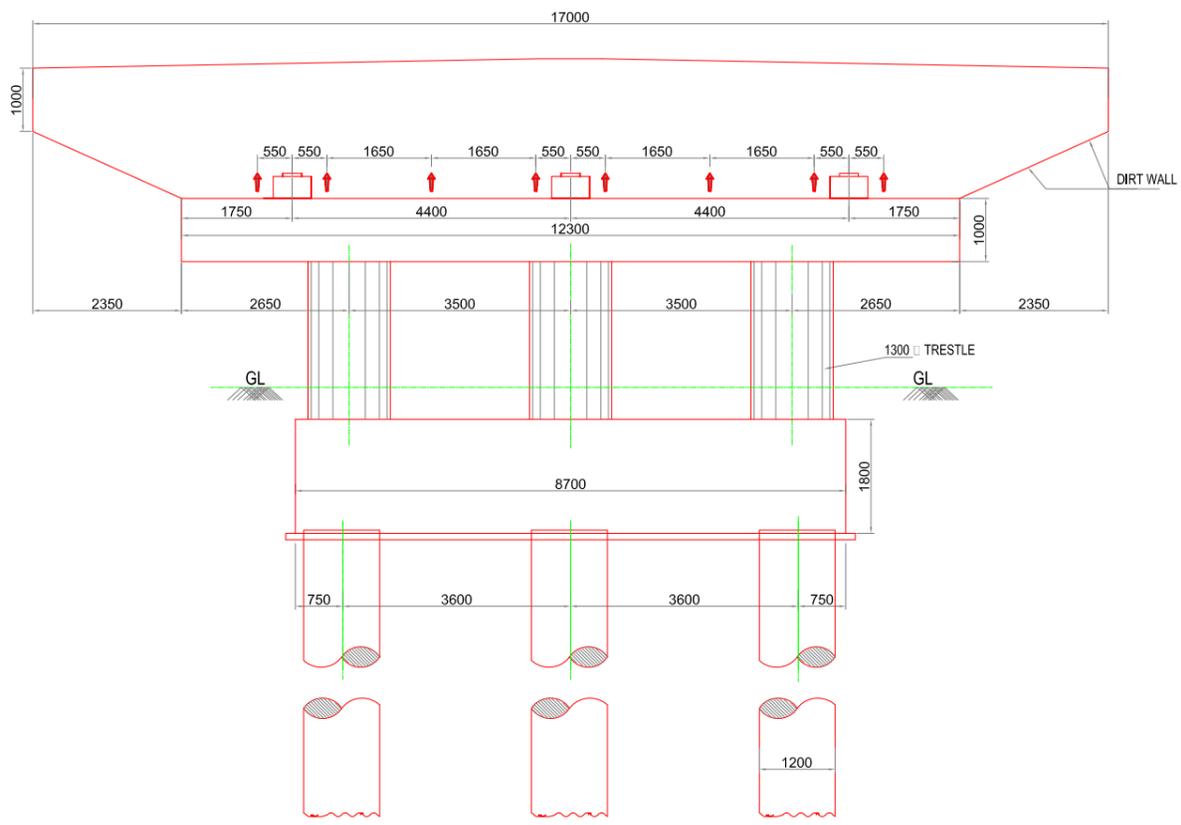
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Date: Dec.2009 Approved: AN 5 OF 5

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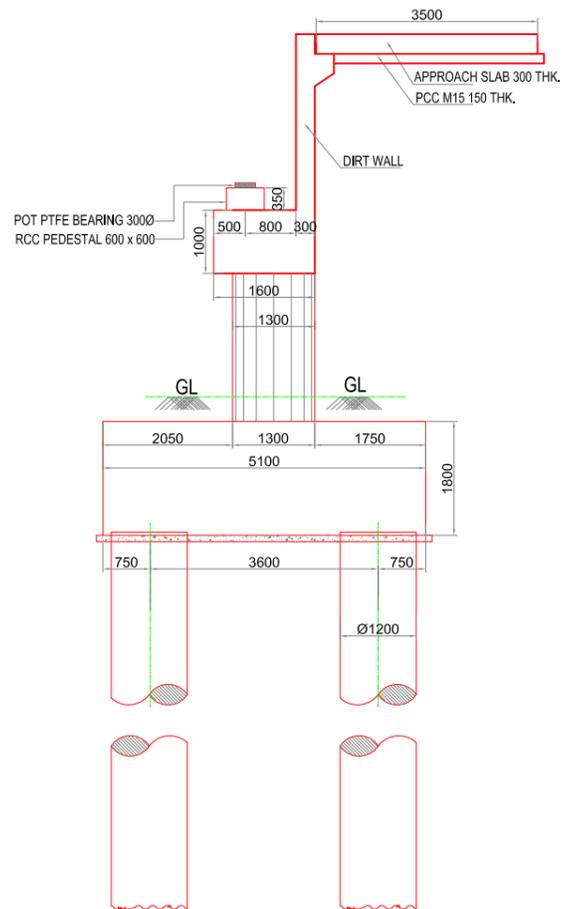
Drawing No. MN - 2D-60 -001-02 / 5

Capacity Development of the NCRPB: Component B (ADB TA-7055)

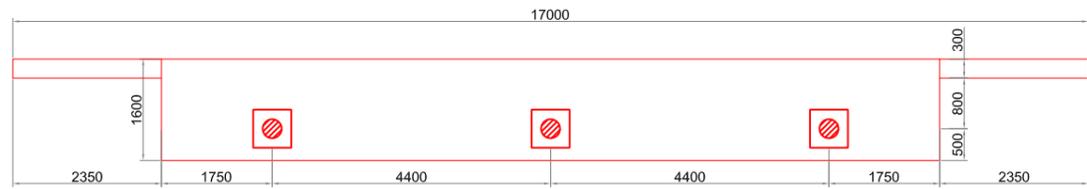
FLYOVER AT MOHAN NAGAR CHOWK DIMENSION DETAILS OF ABUTMENT AND FOUNDATION



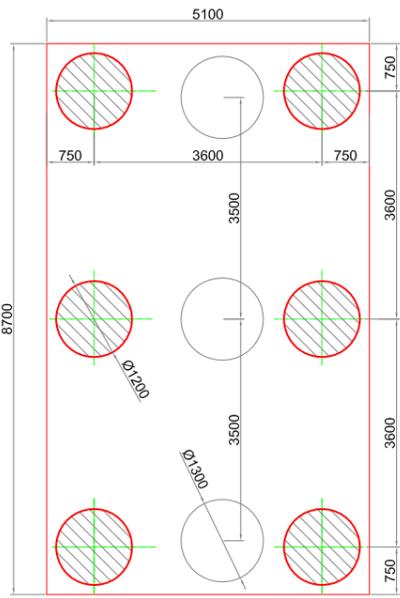
TYPICAL CROSS SECTION OF ABUTMENT



TYPICAL CROSS SECTION OF ABUTMENT



PLAN AT ABUTMENT CAP TOP LEVEL



PLAN AT ABUTMENT CAP TOP LEVEL

NO	PIER NO.	CHAINAGE	FRL	ABUTMENT CAP TOP LVL	G.L.	PILE CAP TOP LVL	FOUNDING LVL
1	A1	0+811	217.400	214.248	212.784	212.284	187.784
2	A2	1+451	212.800	209.448	207.656	207.156	182.656

- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED. THE DRAWING SHALL NOT BE SCALED.
 - THE FOLLOWING GRADE OF CONCRETE SHALL BE USED FOR
 - a) SUBSTRUCTURE - M50
 - b) FOUNDATION - M40
 - c) APPROACH SLAB - M30
 - d) DIRT WALL & BRACKET - M50
 - e) LEVELLING COURSE - M15
 - REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS Fe415 & CONFORMING TO IS:1786-1985
 - VERTICAL LOAD CARRYING CAPACITY OF 1.2m DIA PILE IS 250 T

Client:
**Asian Development Bank
National Capital Region Planning Board**

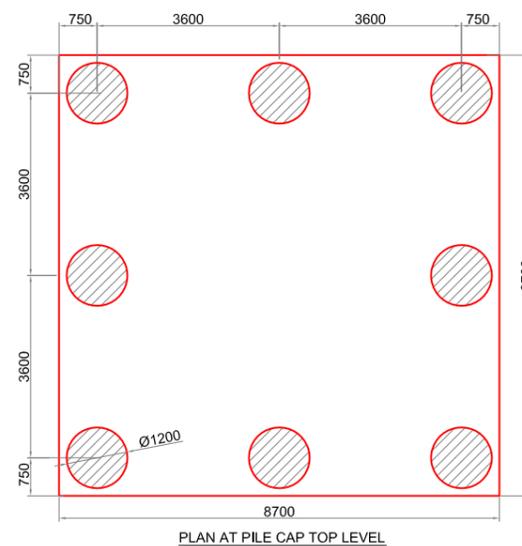
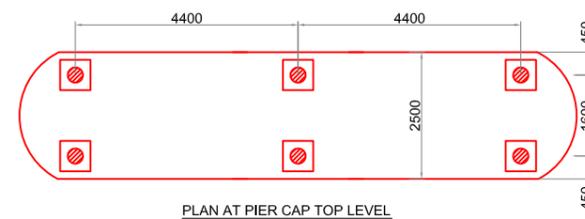
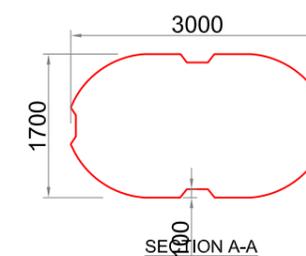
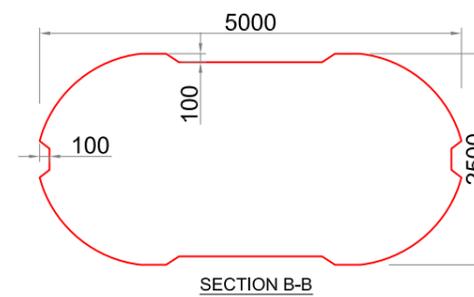
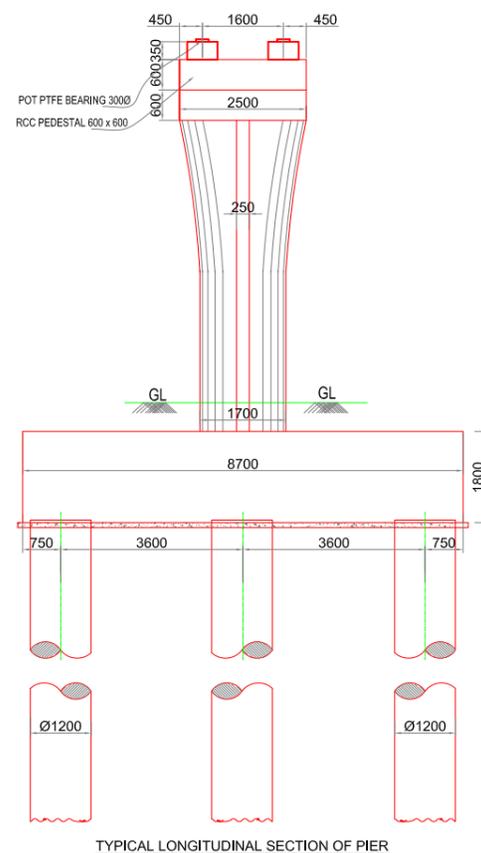
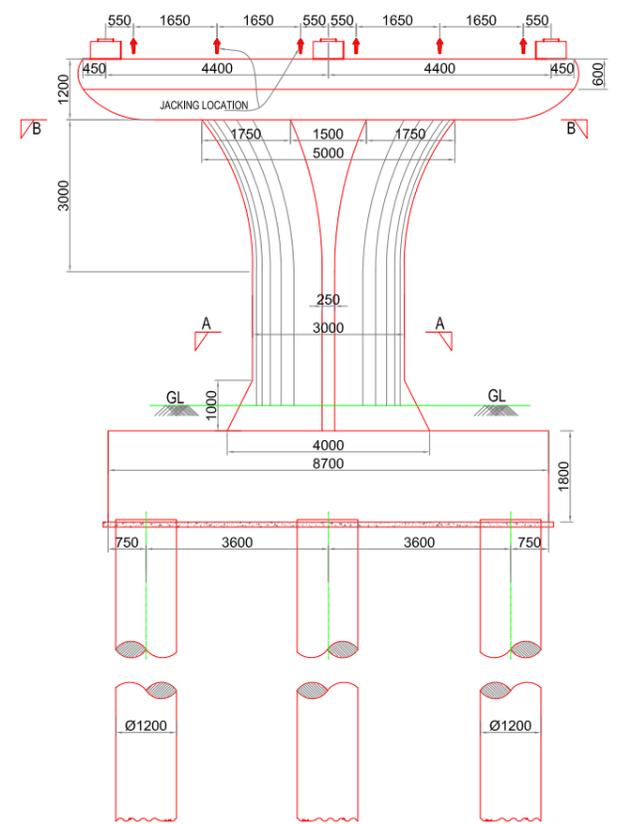
Consultant:
Wilbur Smith Associates

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Date: Dec.2009 Approved: AN 1 OF 5

Scale: As shown
Drawing No. MN - 2D-60 -001-03 / 1

Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK
DIMENSION DETAILS OF PIER AND FOUNDATION



NO	PIER NO.	CHAINAGE	FRL	PIER CAP TOP LVL	G.L	PILE CAP TOP LVL	FOUNDING LVL
1	P1	0+851	218.500	215.348	212.572	212.072	187.572
2	P2	0+891	219.400	216.248	212.927	212.427	187.927
3	P3	0+931	220.100	216.948	212.877	212.377	187.877
4	P4	0+971	220.560	217.408	212.658	212.158	187.658
5	P5	1+011	220.889	217.737	212.387	211.887	187.387
6	P6	1+051	221.000	217.848	211.843	211.343	186.843
7	P7	1+091	220.900	217.748	211.391	210.891	186.391
8	P8	1+131	220.600	217.448	211.100	210.600	186.100
9	P9	1+171	220.100	216.948	210.700	210.200	185.700
10	P10	1+211	219.400	216.248	210.122	209.622	185.122
11	P11	1+251	218.500	215.348	209.620	209.120	184.620
12	P12	1+291	217.400	214.248	209.205	208.705	184.205
13	P13	1+331	216.200	213.048	208.748	208.248	183.748
14	P14	1+371	215.000	211.848	208.383	207.883	183.383
15	P15	1+411	213.800	210.648	207.988	207.488	182.988

- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED, THE DRAWING SHALL NOT BE SCALED.
 - THE FOLLOWING GRADE OF CONCRETE SHALL BE USED FOR
 - a) SUBSTRUCTURE - M50
 - b) FOUNDATION - M40
 - c) LEVELLING COURSE - M15
 - REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS Fe415 & CONFORMING TO IS:1786-1985
 - VERTICAL LOAD CARRYING CAPACITY OF 1.2m DIA PILE IS 250 T
 - ONE WORKING PILE SHALL BE TESTED.

Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

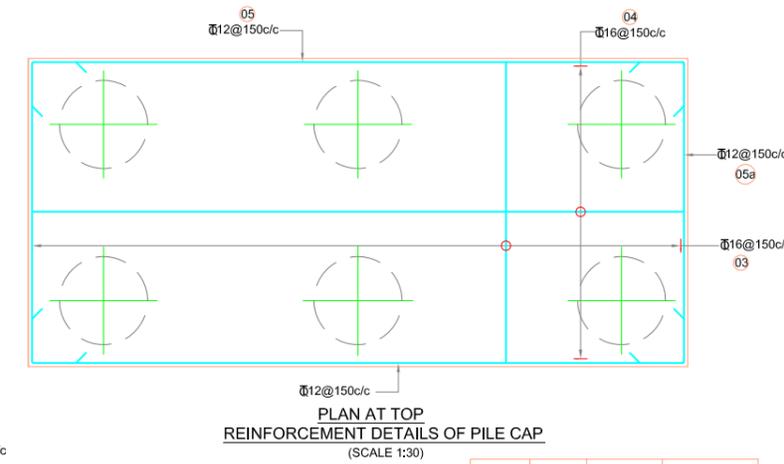
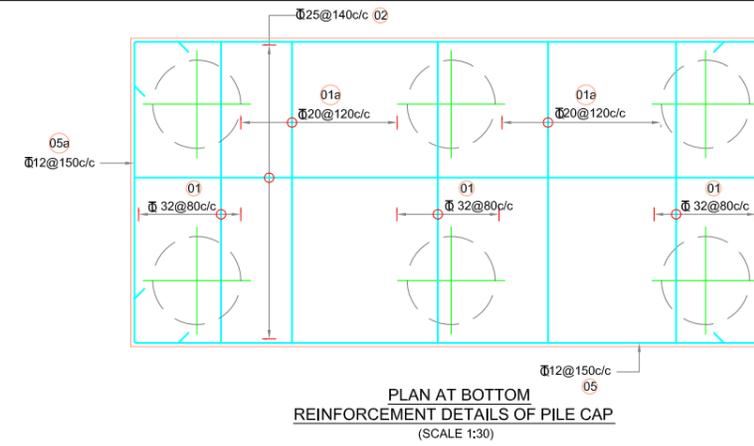
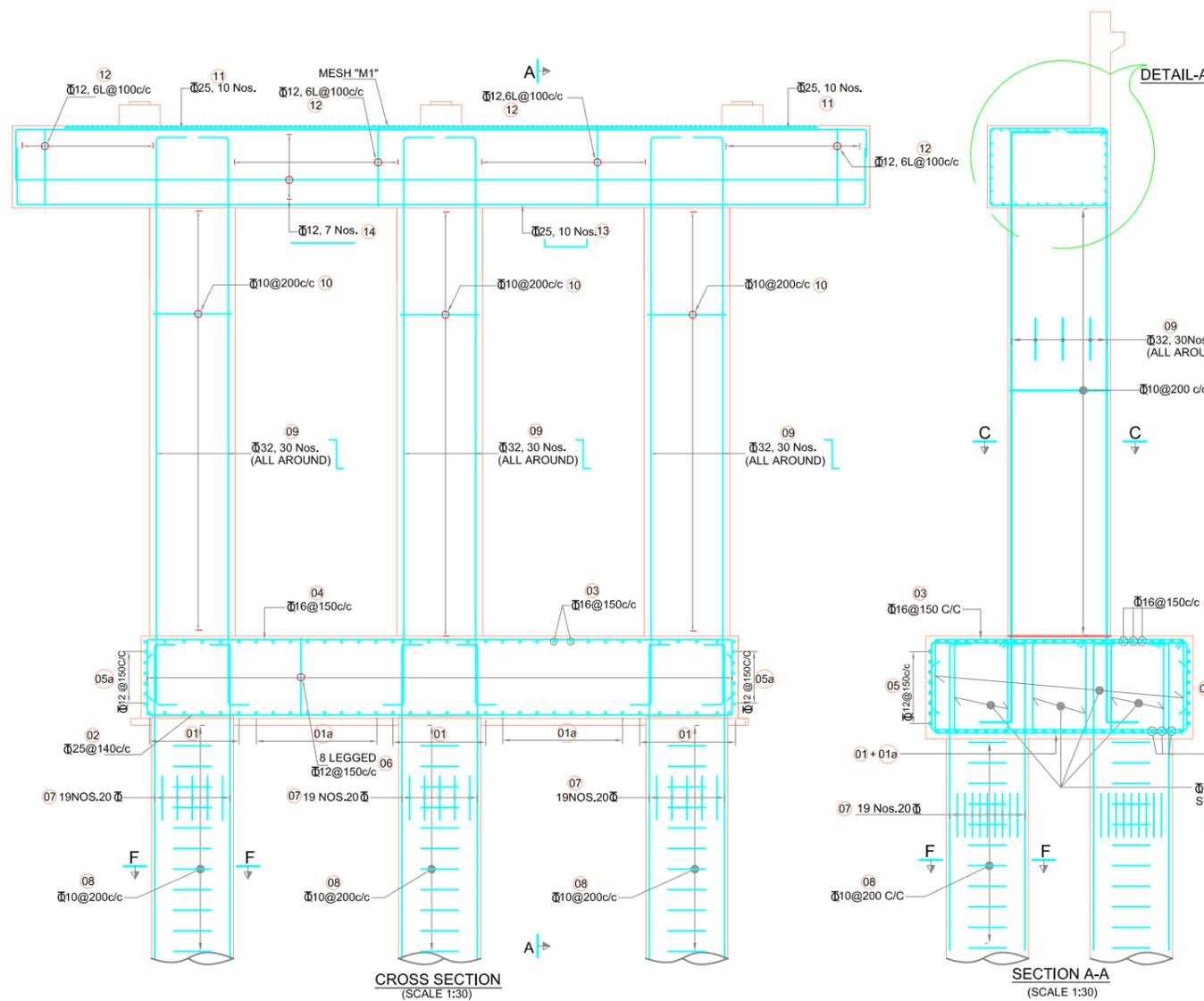
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Date: Dec.2009 Approved: AN 2 OF 5

Scale: As shown

Drawing No.
MN - 2D-60 -001-03 / 2

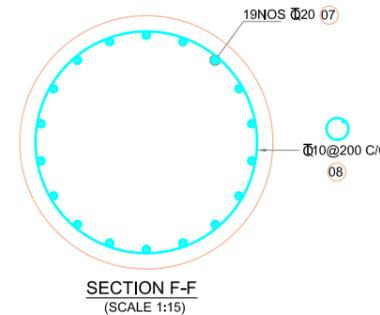
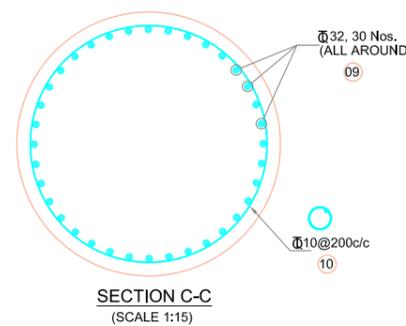
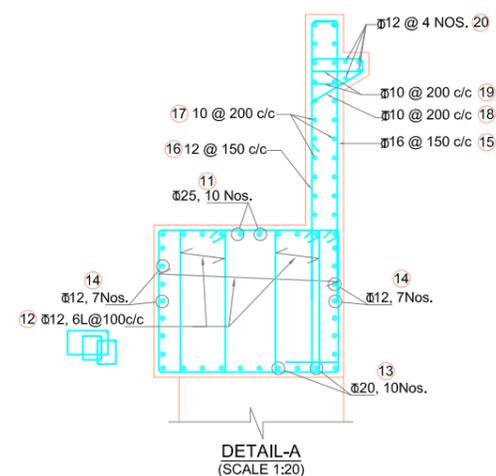
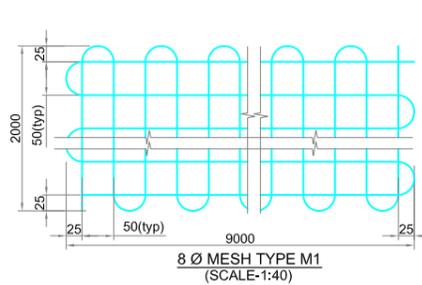
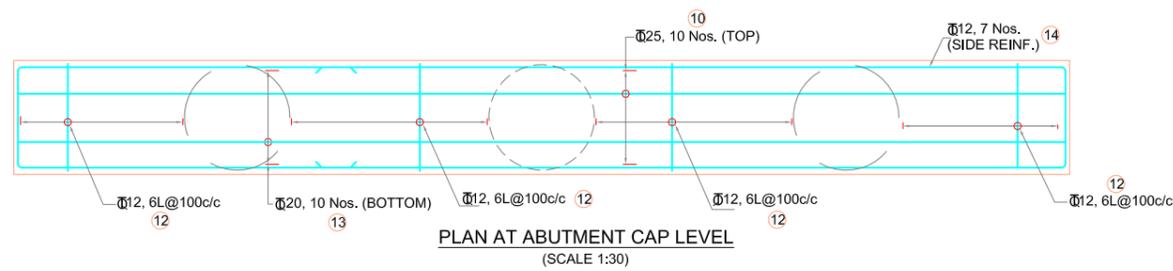
Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK REINFORCEMENT DETAILS OF ABUTMENT AND FOUNDATION



BAR NO.	BAR DIA (mm)	SPACING / NOS. (mm)	BAR SHAPE AND LENGTH (mm)
01	32	80	1300 4950
01a	20	120	1300 4950
02	25	125	1300 8550
03	16	150	1300 4950
04	16	150	1300 8550
05	12	150	8550
05a	12	150	4950
06	16	150	4950 1400 1650 1650
07	20	19	24300 500 600
08	10	200	Ø1050
09	32	30	varies 1600
10	10	200	Ø1150
11	25	10	750 12200
12	12	100	1500 300 900
13	20	10	750 12200
14	12	7x2	750 12200
15	16	150	200 varies
16	12	150	200 varies
17	10	200	200 varies
18	10	200	100 520 500 800 120
19	10	200	100 520 360 710
20	10	4	200 16920

- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED. THE DRAWING SHALL NOT BE SCALED.
 - THE FOLLOWING GRADE OF CONCRETE SHALL BE USED FOR
 - a) SUBSTRUCTURE - M50
 - b) FOUNDATION - M40
 - c) APPROACH SLAB - M30
 - d) DIRT WALL & BRACKET - M50
 - e) LEVELLING COURSE - M15
 - REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS Fe415 & CONFORMING TO IS:1786-1985
 - DEVELOPMENT LENGTH FOR ALL REINFORCEMENT STEEL SHALL BE 50 TIMES BAR DIAMETER
 - CLEAR COVER TO MAIN REINFORCEMENT SHALL BE
 - a) FOR SUB STRUCTURE - 40mm
 - b) FOUNDATION - 75mm



Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SSN
Date: Dec.2009

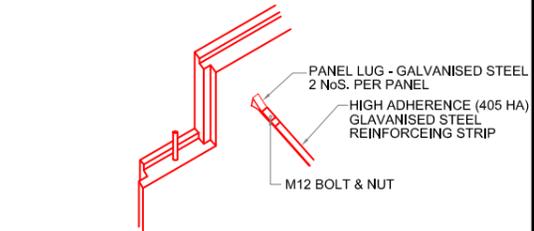
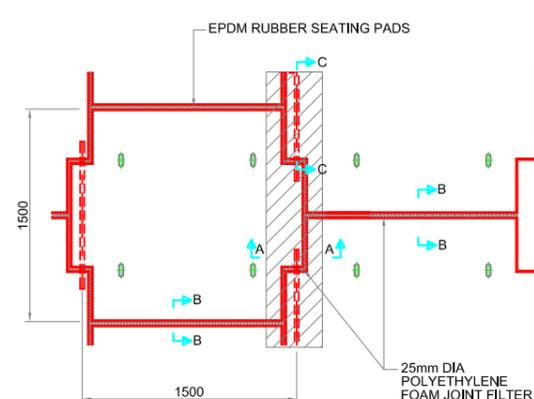
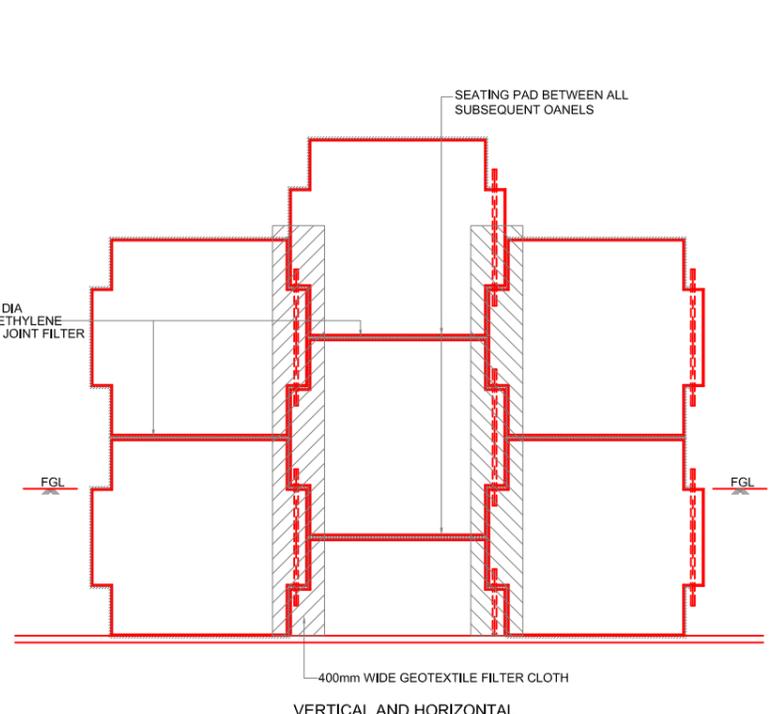
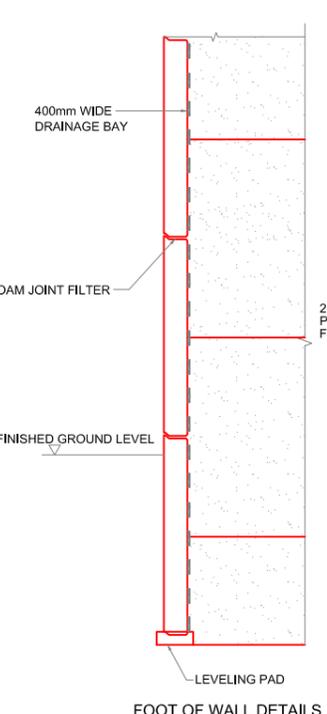
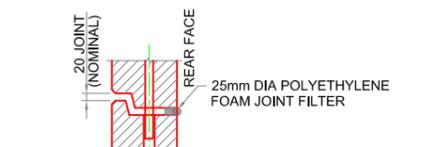
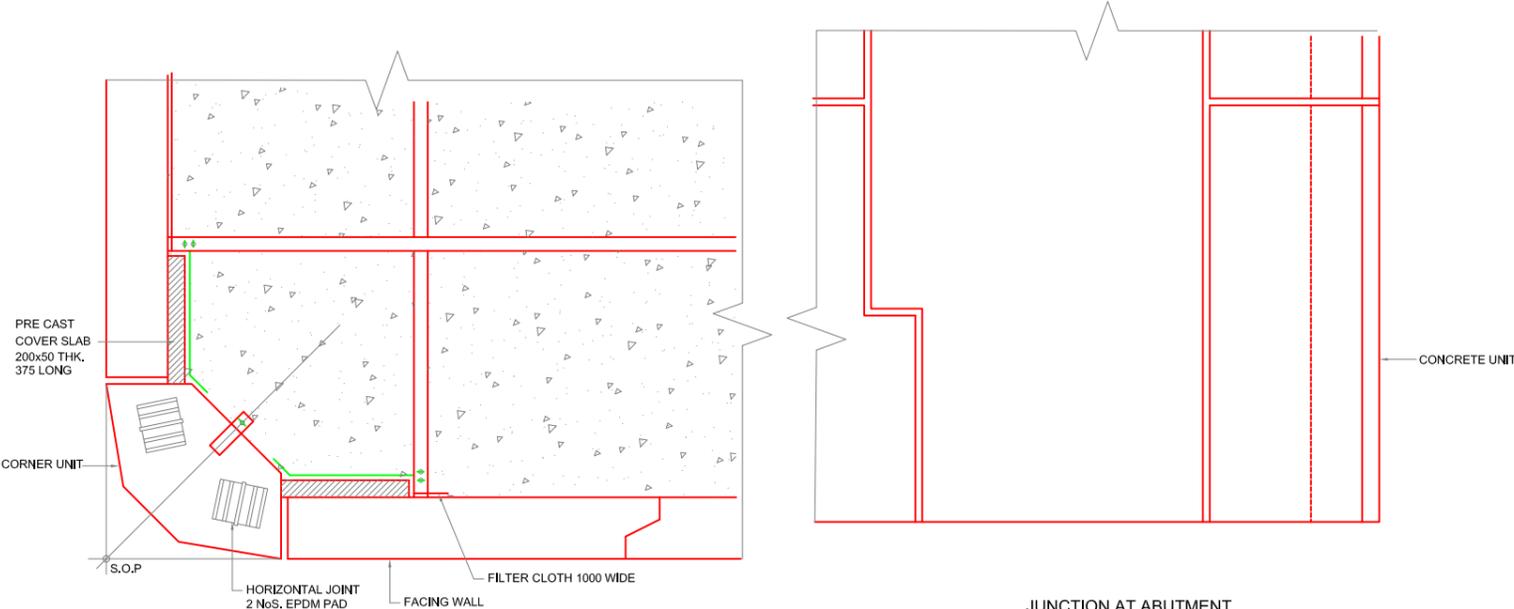
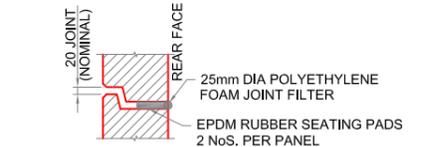
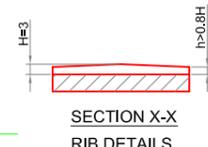
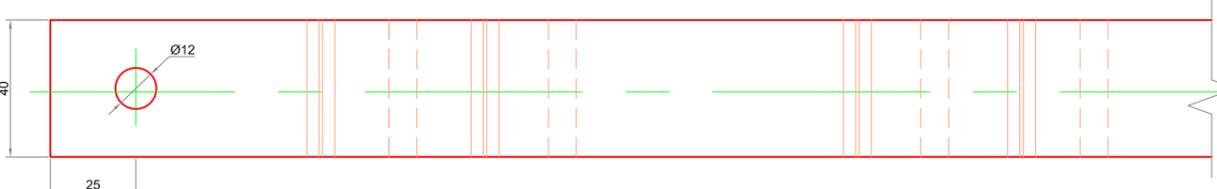
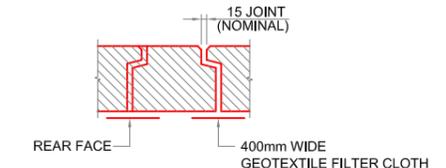
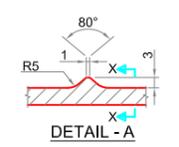
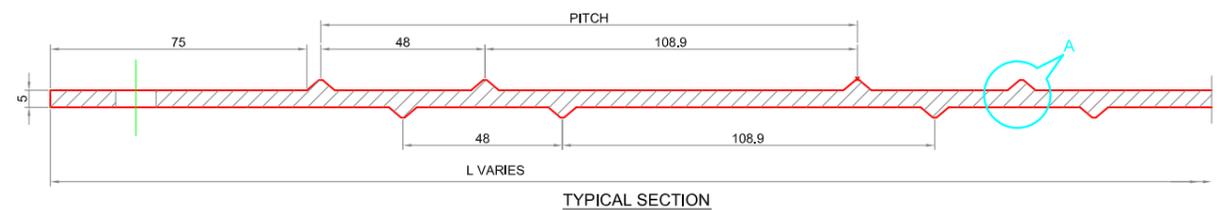
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Approved: AN

Sheet No.
3 OF 5

Scale: As shown
Drawing No. MN - 2D-60 -01-03 / 3

Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK DETAILS OF REINFORCED EARTH WALL



Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SSN
Date: Dec.2009

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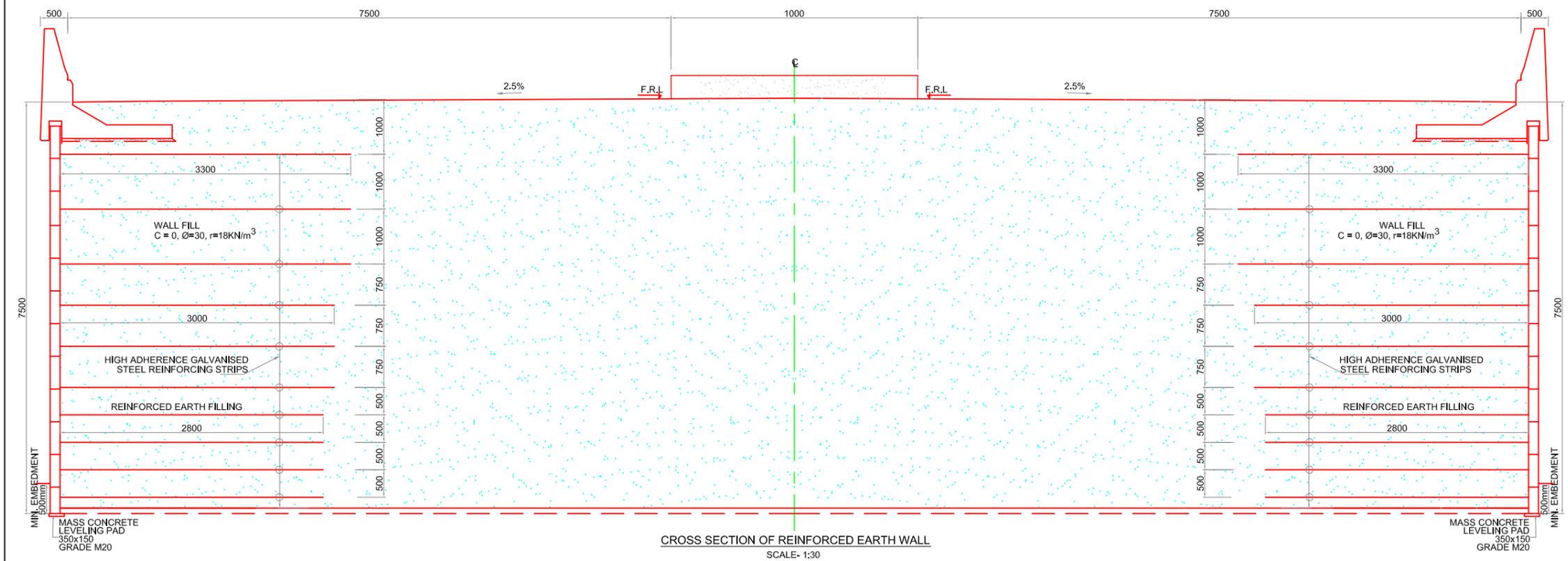
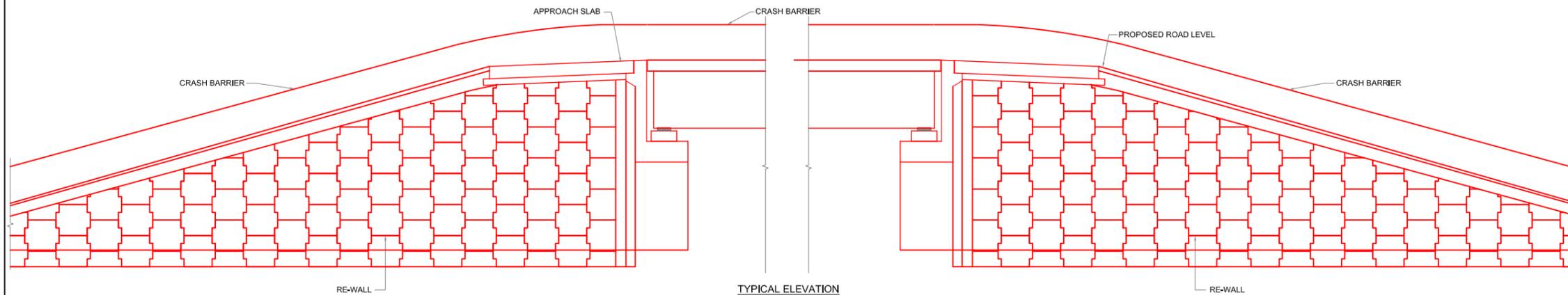
Sheet No.
2 OF 2

Scale: As shown

Drawing No.
MN - 2D-80 - 001-02

Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK DETAILS OF REINFORCED EARTH WALL



- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 2. REINFORCED EARTH FILL TO BE IN ACCORDANCE WITH TENDER SPECIFICATION.
 3. SUPPLY OF HIGH ADHERENCE GALVANISED STEEL REINFORCING STRIP, INSERT AND MOULD METAL FOR REINFORCED EARTH FACING PANELS PLASTERINGS, AND JOINTING MATERIALS IN ACCORDANCE WITH TENDER SPECIFICATION.
 4. LEVELING PAD MASS CONCRETE GRADE M20, TO BE SMOOTH AND LEVEL TO WITHIN $\pm 3\text{mm}$ OF THE LEVELS SHOWN ON THE ELEVATION.
 5. FOR METHOD OF CONSTRUCTION OF THE REINFORCED EARTH STRUCTURE, SEE THE WALL CONSTRUCTION MANUAL AS ISSUED IN TENDER SPECIFICATION.
 6. ALL FACING PANELS ARE 180mm THICK.
 7. PANEL SIZE & SHAPE TO BE APPROVED BY CLIENT/ENGINEER
 8. THE FINAL DESIGN AND EXECUTION WILL BE CARRIED OUT BY REINFORCED EARTH MANUFACTURER
 9. FOR DETAILS OF CRASH BARRIER REFER DRAWING NO:MN - 2D-80 -001-01

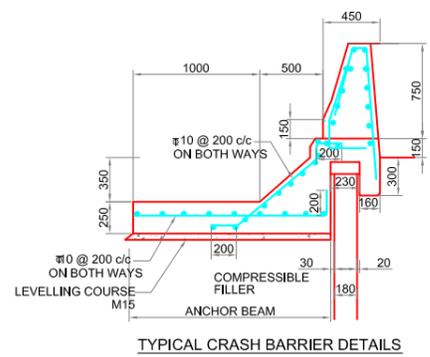
Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SSN
Date: Dec.2009
Scale: As shown
Drawing No. MN - 2D-80 - 001-02

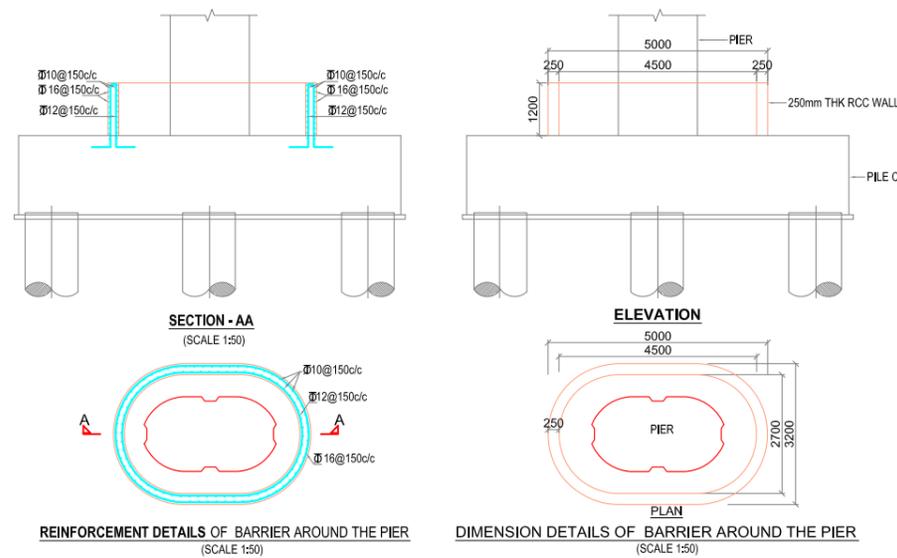
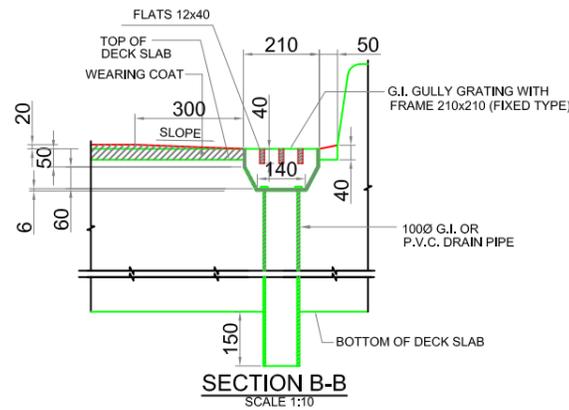
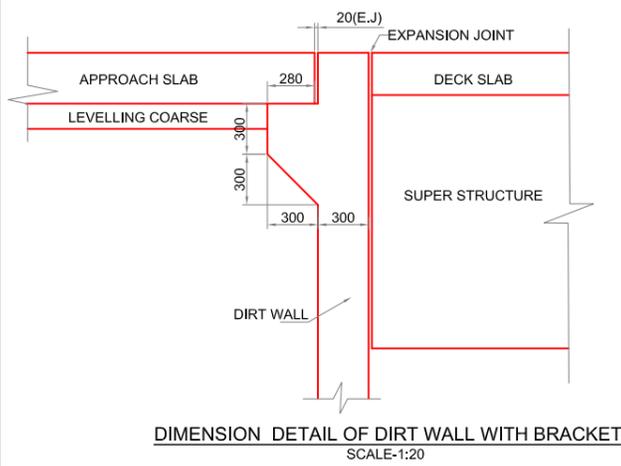
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Approved: AN

Sheet No. 1 OF 2



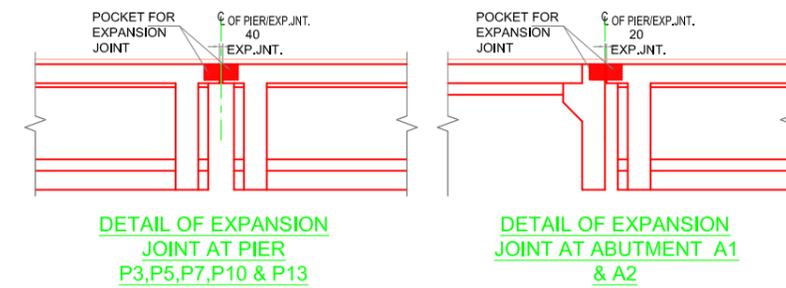
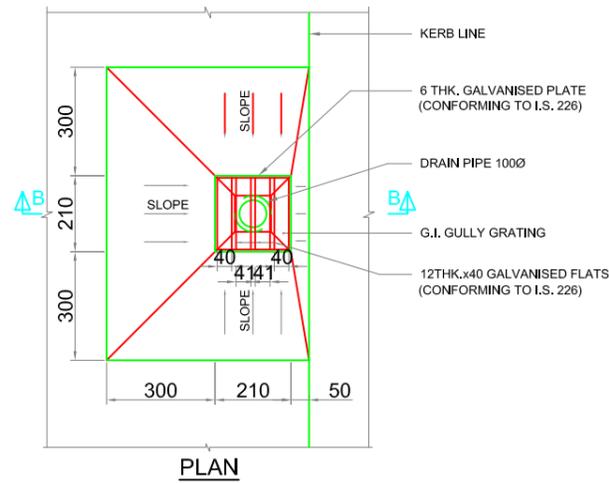
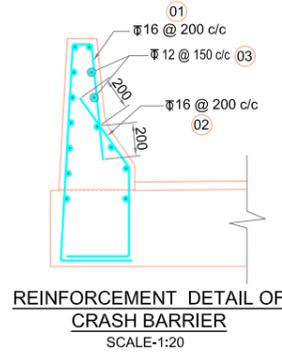
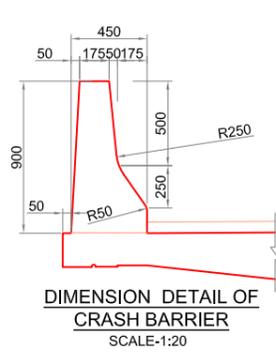
Capacity Development of the NCRPB: Component B (ADB TA-7055)

FLYOVER AT MOHAN NAGAR CHOWK MISCELLANEOUS DETAILS



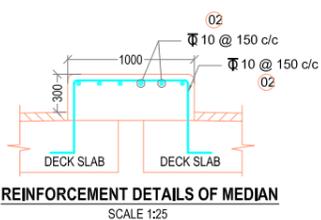
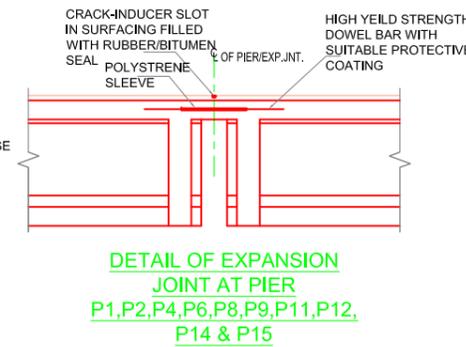
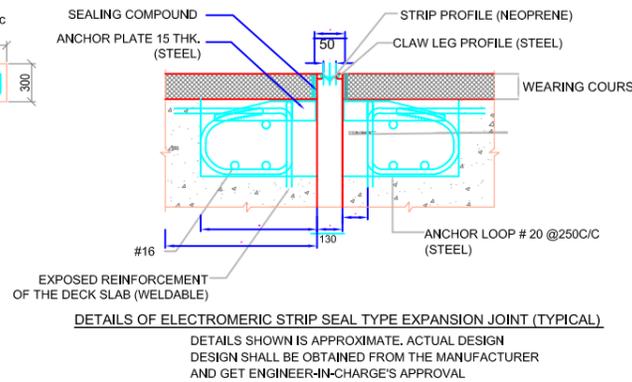
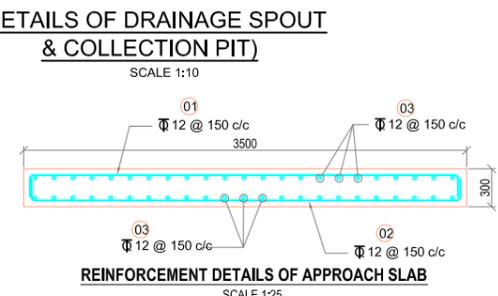
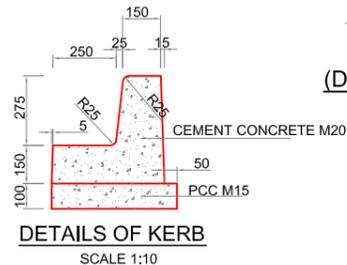
REINFORCEMENT DETAILS OF DRAIN (FOR 1m LENGTH)

BAR NO.	BAR DIA (mm)	SPACING / NOS. (mm)	BAR SHAPE AND LENGTH (mm)
01	8	200	900, 250, 50, 350, 900
02	8	200	70, 1150, 900, 150
03	8	200	150, 520, 150
04	8	200	1000
05	10	2	1000
06	10	150	200, 1270
07	10	150	1000



REINFORCEMENT DETAILS OF CRASH BARRIER (FOR 1m LENGTH)

BAR NO.	BAR DIA (mm)	SPACING / NOS. (mm)	BAR SHAPE AND LENGTH (mm)
01	16	150	1000, 800, 1000
02	12	150	500, 280, 600
03	12	150	1000

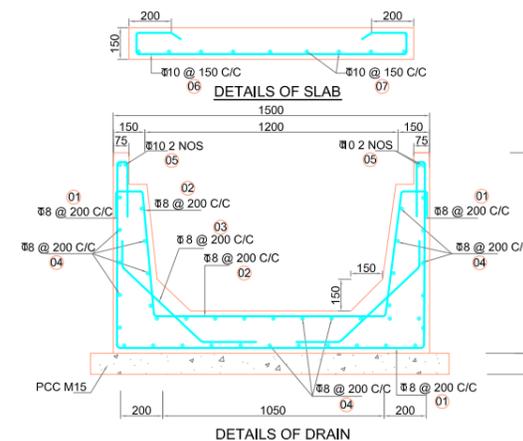
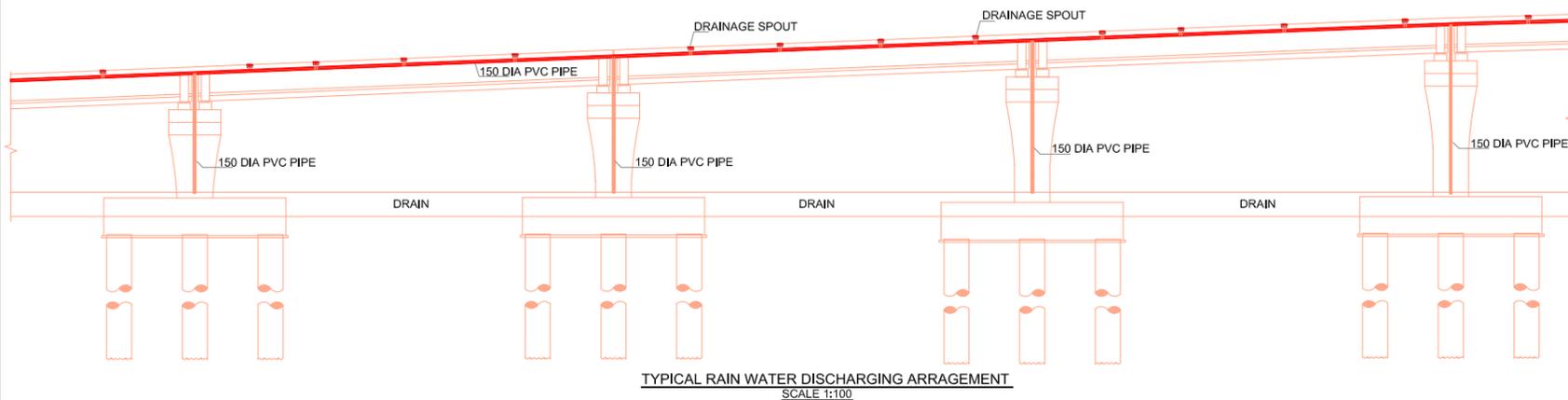


REINFORCEMENT DETAILS OF MEDIAN FOR 1m LENGTH

BAR NO.	BAR DIA (mm)	SPACING / NOS. (mm)	BAR SHAPE AND LENGTH (mm)
01	10	150	400, 900, 150
02	10	150	1000

REINFORCEMENT DETAILS OF APPROACH SLAB

BAR NO.	BAR DIA (mm)	SPACING / NOS. (mm)	BAR SHAPE AND LENGTH (mm)
01	12	150	200, 3400, 200
02	12	150	200, 3400, 200
03	12	150	200, 16900, 200



- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS IN METERS UNLESS OTHERWISE STATED. THE DRAWING SHALL NOT BE SCALED.
 - THE FOLLOWING GRADE OF CONCRETE SHALL BE USED FOR
 - a) CRASH BARRIER - M40
 - b) APPROACH SLAB - M30
 - c) DIRT WALL & BRACKET - M50
 - d) BARRIER AROUND THE PIER - M25
 - REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS Fe415 & CONFORMING TO IS:1786-1985
 - DEVELOPMENT LENGTH FOR ALL REINFORCEMENT STEELS SHALL BE 50 TIMES THE DIAMETER

Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SSN
Date: Dec.2009

Checked: APK
Approved: AN

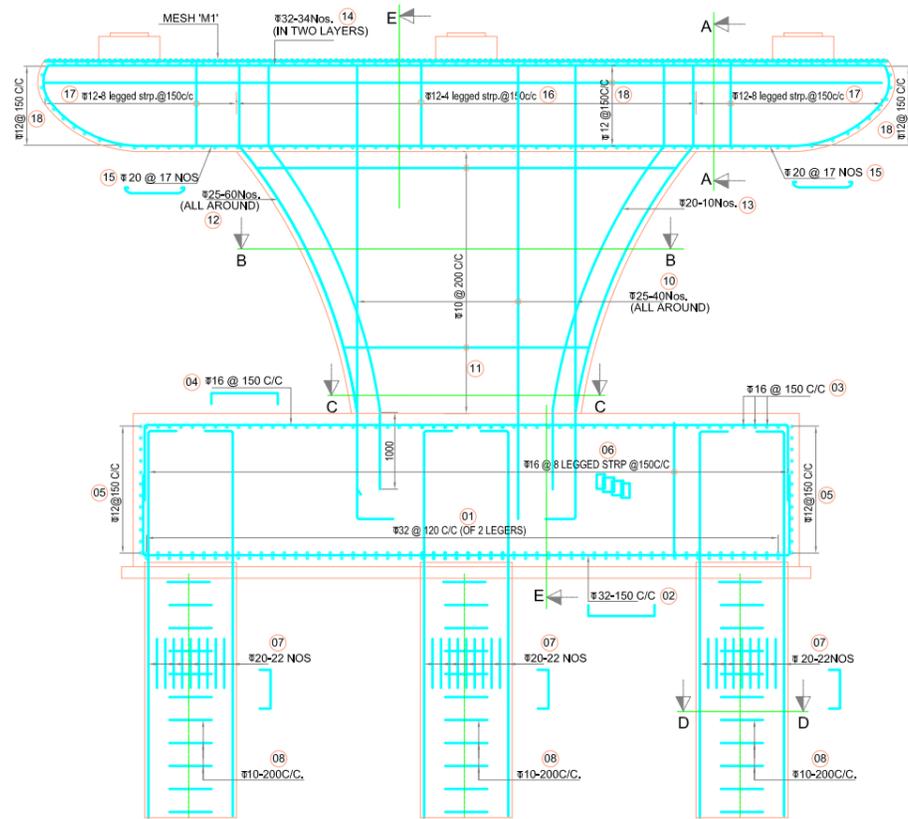
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1 OF 1

Scale: As shown

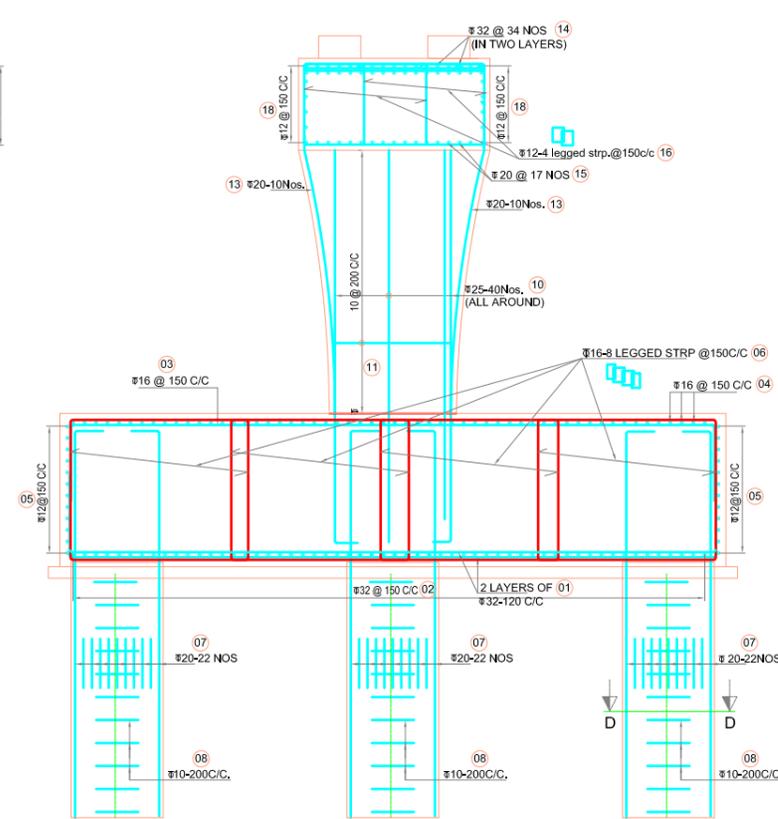
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Capacity Development of the NCRPB: Component B (ADB TA-7055)

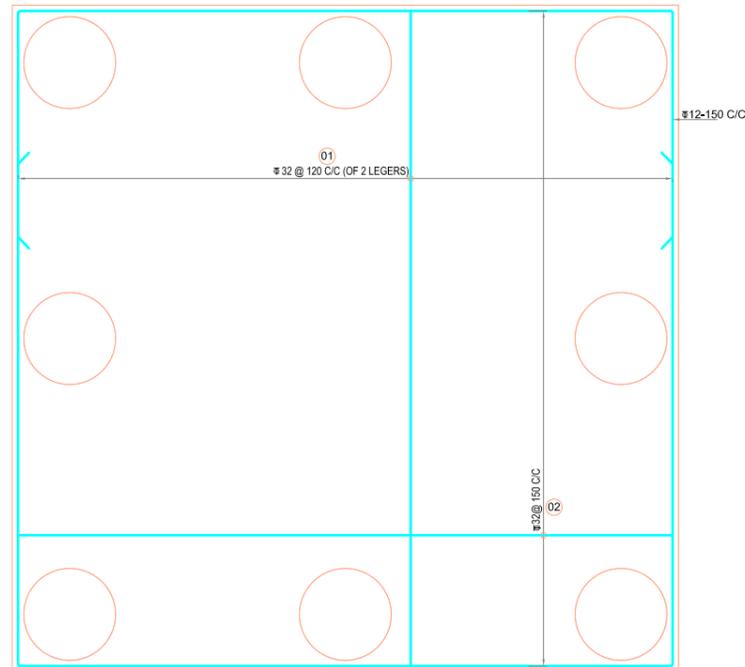
FLYOVER AT MOHAN NAGAR CHOWK REINFORCEMENT DETAILS OF PIER AND FOUNDATION (P1,P2,P14 & P15)



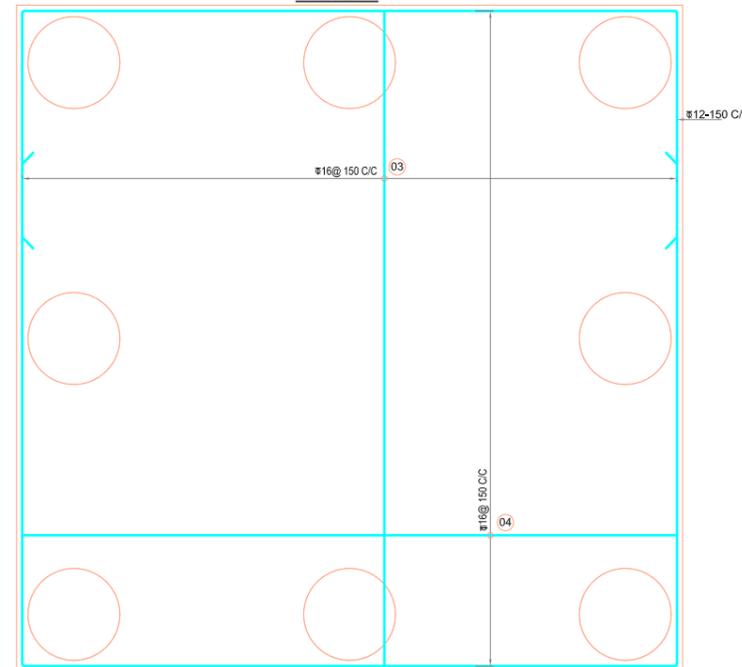
CROSS SECTION OF PIER



SECTION E-E

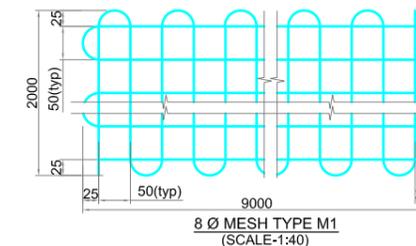


PLAN OF PILE CAP AT BOTTOM



PLAN OF PILE CAP AT TOP

BAR NO.	BAR DIA (mm)	SPACING / NOS. (mm)	BAR SHAPE AND LENGTH (mm)
01	32	120 (TWO LAYERS)	1300 8550 1300
02	32	150	1300 8550 1300
03	16	150	8550 1300 1300
04	16	150	8550 1300 1300
05	12	150	8550
06	16	150	2250 1650 1650
07	20	22	24300 600 600
08	10	200	∅1050 varies 1600 1600
10	25	40	varies 1600 1600
11	10	200	7050
11b	10	200	VARIES
11c	10	200	VARIES
11d	10	200	VARIES
12	25	60	varies
13	20	10x2	varies
14	32	34	600 9600
15	20	17	1275 8580
16	12	150	1650 1100
17	12	150	2400 300 VARIES
18	12	150	VARIES



8 Ø MESH TYPE M1 (SCALE-1:40)

- NOTES:**
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED. THE DRAWING SHALL NOT BE SCALED.
 - THE FOLLOWING GRADE OF CONCRETE SHALL BE USED FOR
 - a) SUBSTRUCTURE - M50
 - b) FOUNDATION - M40
 - c) LEVELLING COURSE - M15
 - REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS Fe415 & CONFORMING TO IS:1785-1985
 - DEVELOPMENT LENGTH FOR ALL REINFORCEMENT STEEL SHALL BE 50 TIMES BAR DIAMETER
 - CLEAR COVER TO MAIN REINFORCEMENT SHALL BE
 - a) FOR SUB STRUCTURE - 40mm
 - b) FOUNDATION - 75mm

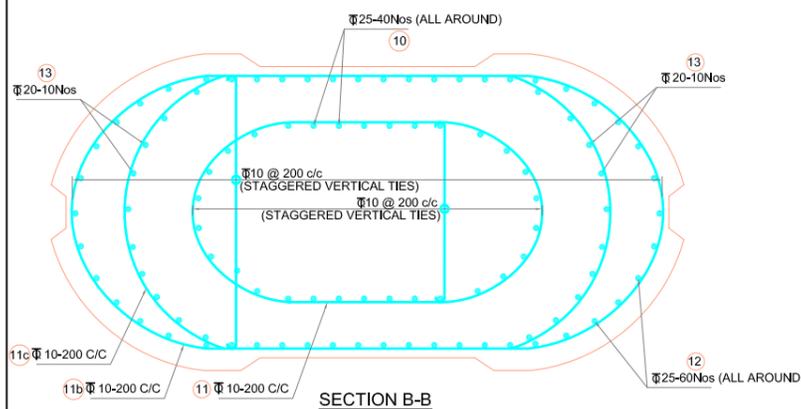
Client:
**Asian Development Bank
 National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

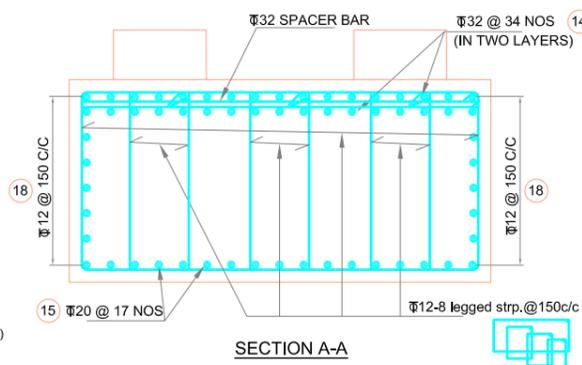
Drawn: SSN Checked: APK Sheet No.
 Date: Dec.2009 Approved: AN 5 OF 5

Scale: As shown

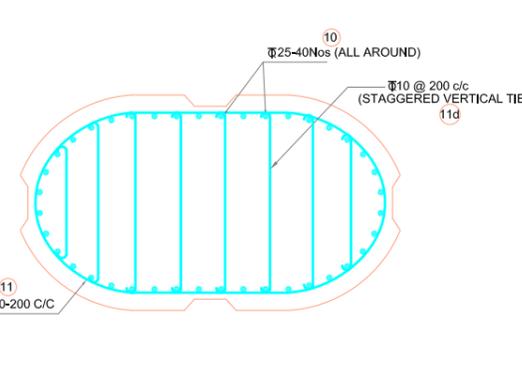
Drawing No. MN - 2D-60 -001-03 / 5



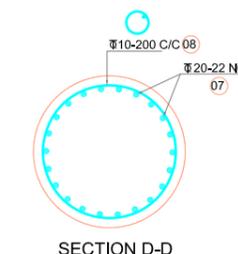
SECTION B-B



SECTION A-A



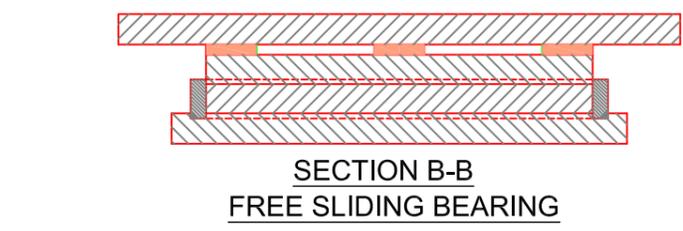
SECTION C-C



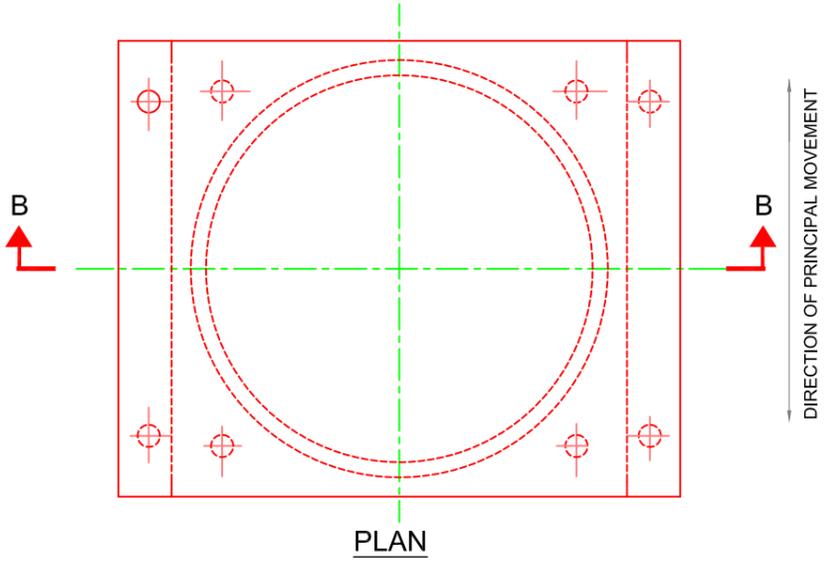
SECTION D-D

Capacity Development of the NCRPB: Component B (ADB TA-7055)

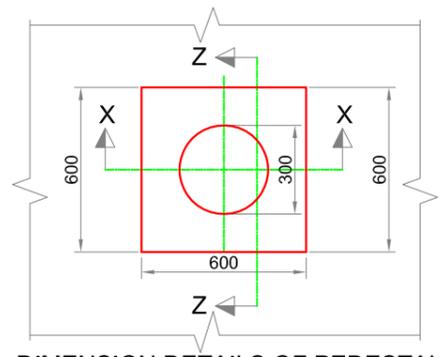
FLYOVER AT MOHAN NAGAR CHOWK DETAILS OF BEARING



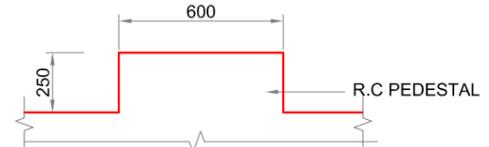
**SECTION B-B
FREE SLIDING BEARING**



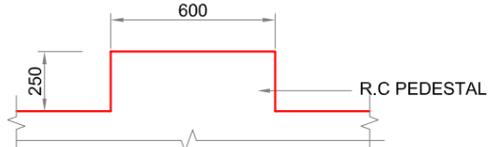
PLAN



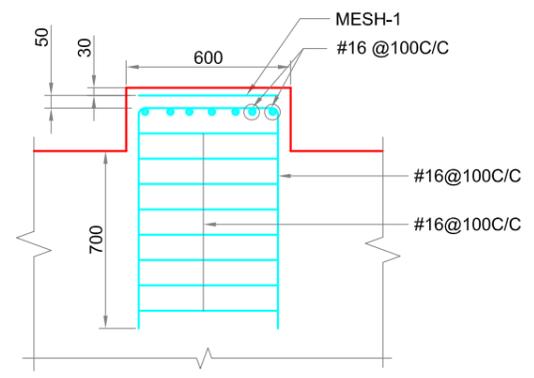
**DIMENSION DETAILS OF PEDESTAL
SCALE-1:20**



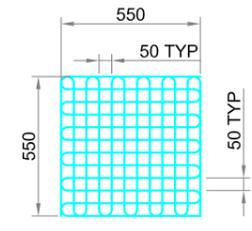
**SECTION X-X
SCALE-1:20**



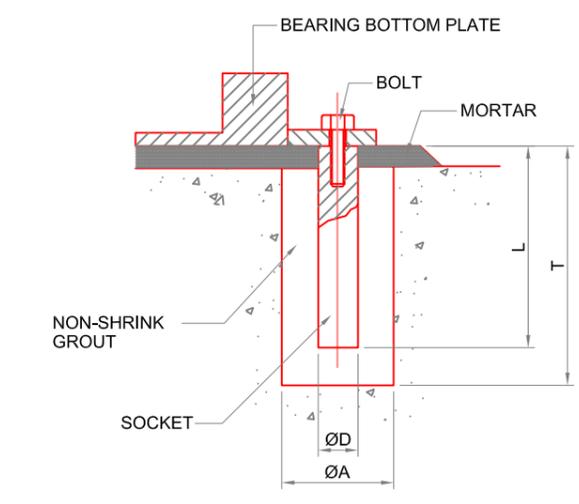
**SECTION Y-Y
SCALE-1:20**



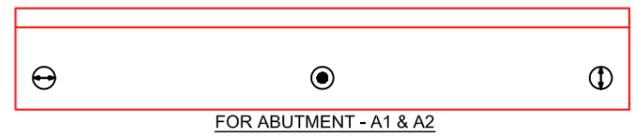
**SECTION Z-Z
SCALE-1:20**



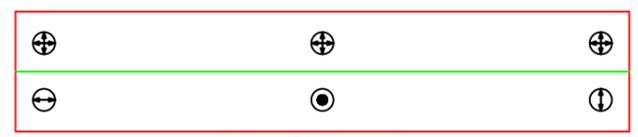
**MESH-1 (#8-50C/C)
SCALE-1:20**



ANCHORAGE DETAIL



FOR ABUTMENT - A1 & A2



FOR PIER - P1 TO P15

PARAMETERS REQUIRED FOR THE DESIGN OF POT/PTFE AND GUIDE BEARINGS

1	2	3				4				5	6	7	8		9			
		VERTICAL LOAD, (KN)				HORIZONTAL LOAD, (KN)							GRADE OF CONCRETE	BEARING MATERIAL (C.S)		MOVEMENT	ROTATION	TENTATIVE SIZE OF THE PEDESTAL
		MAX (KN) D.L	MIN (KN) D.L+L.L	MAX (KN) D.L	MIN (KN) D.L+L.L	LONGL.	TRANSVERSE	LONGL.	TRANSVERSE									
FIXED: PIN BEARINGS	17	2330	1866	1683	1213	135	120	300	125	M50	M50	POT PTFE	-	-	0.008	600x600x350		
FREE: POT-PTFE/GUIDE BEARINGS	45	2330	1866	1683	1213	-	-	-	-	M50	M50	POT PTFE	23.2	-	0.008	600x600x350		
GUIDE BEARINGS	34	2330	1866	1683	1213	-	120	300	125	M50	M50	POT PTFE	23.2	-	0.008	600x600x350		

- NOTES :-**
1. THE BEARING MANUFACTURER SHALL DESIGN THE BEARINGS TO THE REQUIREMENTS GIVEN ON THE DRAWINGS AND TO IRC 83 - PART 1 AND IRC 83-2002 PART-III DETAILS AND DESIGN CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR HIS APPROVAL BEFORE MANUFACTURING COMMENCES.
 2. FULL SCALE HORIZONTAL LOAD AND FRICTION TEST UP TO 1.5 TIMES WORKING LOAD SHALL BE PERFORMED FOR EACH TYPE OF BEARING, FULL SCALE TEST MAY BE WAIVED IF PREVIOUS TESTS HAVE BEEN SUCCESSFULLY CARRIED OUT FOR EACH TYPE OF BEARING.
 3. DISC BASES AND ROCKERS, AND ALL SLIDING PLATES ARE TO BE MADE OF CORROSION PROTECTED MILD STEEL. SLIDING PLATES ARE TO BE FACED WITH A SMOOTH SURFACE OF HIGH QUALITY STAINLESS STEEL. SLIDING SURFACES SHALL BE PURE P.T.F.E. INCORPORATING GREASE POCKETS WHICH ALLOWS A CONTINUOUS FLOW OF LUBRICANT.
 4. ELASTOMER USED FOR ROTATIONAL PURPOSES SHALL BE HIGH GRADE NATURAL RUBBER TO BS 1154.
 5. FIXING BOLTS SHALL BE CORROSION PROTECTED HIGH TENSILE ISO GRADE 8.8.

Client:
**Asian Development Bank
National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SSN
Date: Dec.2009
Scale: As shown
Drawing No. MN- 2D-80 -001-03

Checked: APK
Approved: AN

Sheet No.
1 OF 1

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