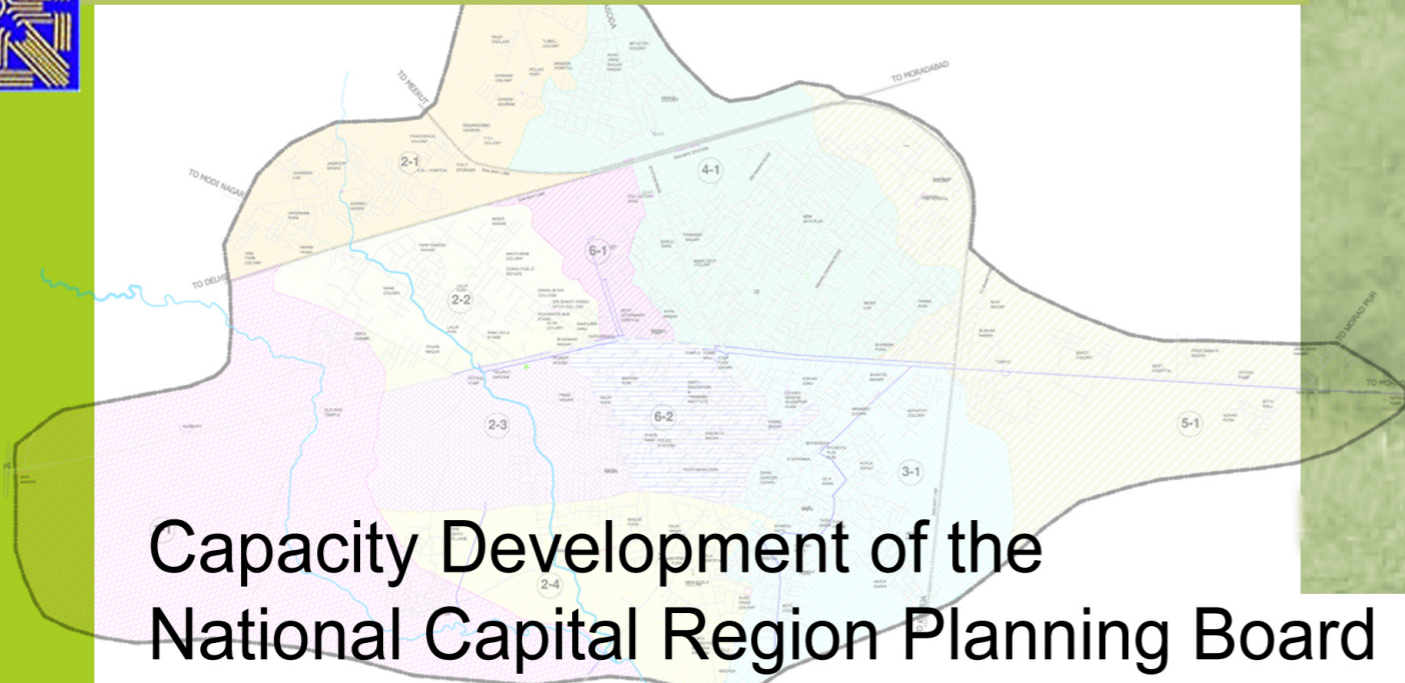




Asian Development Bank

National Capital Region Planning Board



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



FINAL REPORT

**Volume III-B: Detailed Drawings
Detailed Project Report for
Rehabilitation of Major Drains in Hapur**



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 III-B: DPR for Rehabilitation of Major Drains in Hapur
– Drawings

July 2010



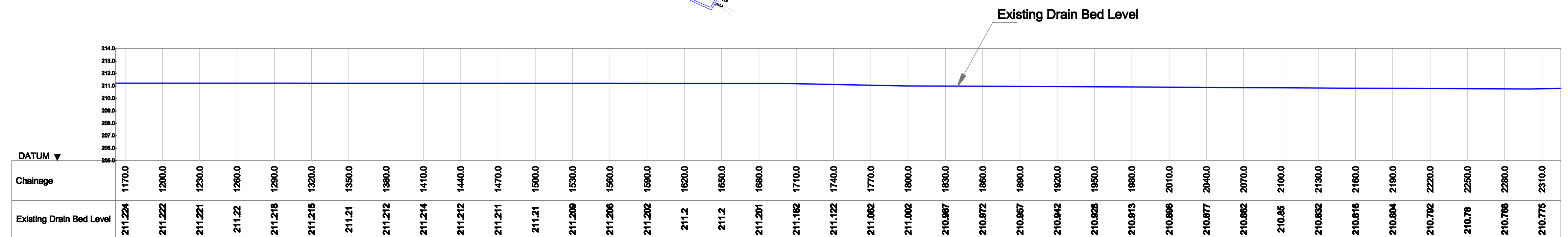
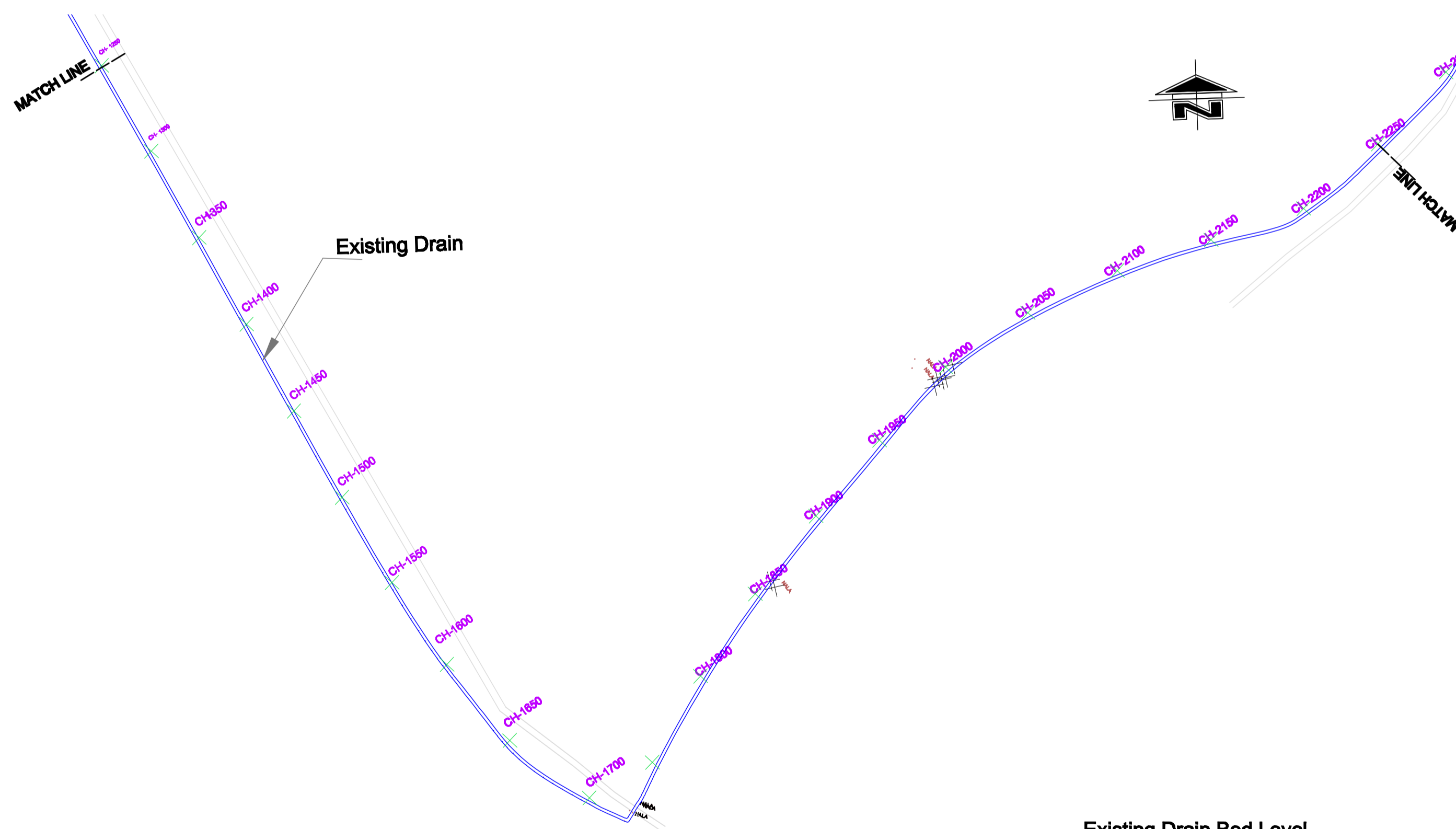
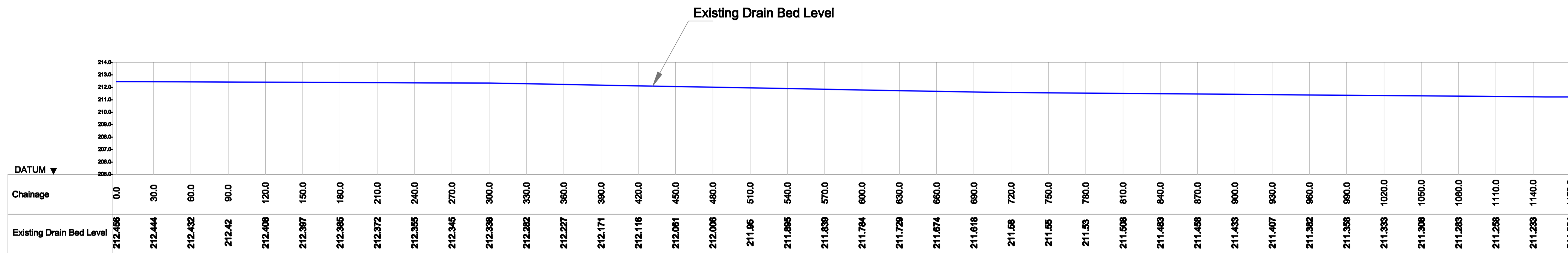
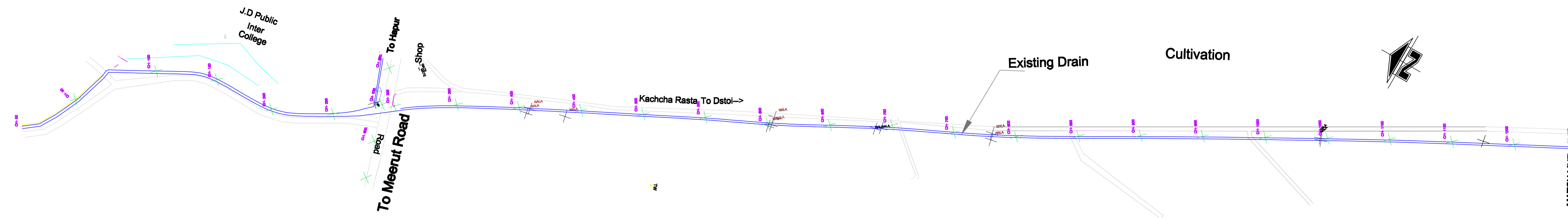
Volume III B: DPR for Major Drains in Hapur - Drawings

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S. No	Drawings No.	Drawing Title	Drawing Size
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2	Drg. No. NCRPB-HAPUR-DR-01B	Existing L-Section of Drain No.2 (Ch.2310 to 4650)	A1
3	Drg. No. NCRPB-HAPUR-DR-01C	Existing L-Section of Drain No.2 (Ch.4650 to 6700)	A1
4	Drg. No. NCRPB-HAPUR-DR-02A	Existing Cross Section of Drain No.2 (Ch.1750 to 2700)	A3
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6	Drg. No. NCRPB-HAPUR-DR-02C	Existing Cross Section of Drain No.2 (Ch.4350 to 5050)	A3
7	Drg. No. NCRPB-HAPUR-DR-02D	Existing Cross Section of Drain No.2 (Ch.5100 to 5950)	A3
8	Drg. No. NCRPB-HAPUR-DR-02E	Existing Cross Section of Drain No.2 (Ch.6000 to 6700)	A3
9	Drg. No. NCRPB-HAPUR-DR-03A	Proposed L-Section of Drain No.2(Ch.1750 to 2850)	A1
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13	Drg. No. NCRPB-HAPUR-DR-04	Typical Details of Masnory Retaining Wall	A3
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			A3

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

Hapur
Existing Plan and L-Section of Drain No.2 (Ch.00 to Ch.2310)



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

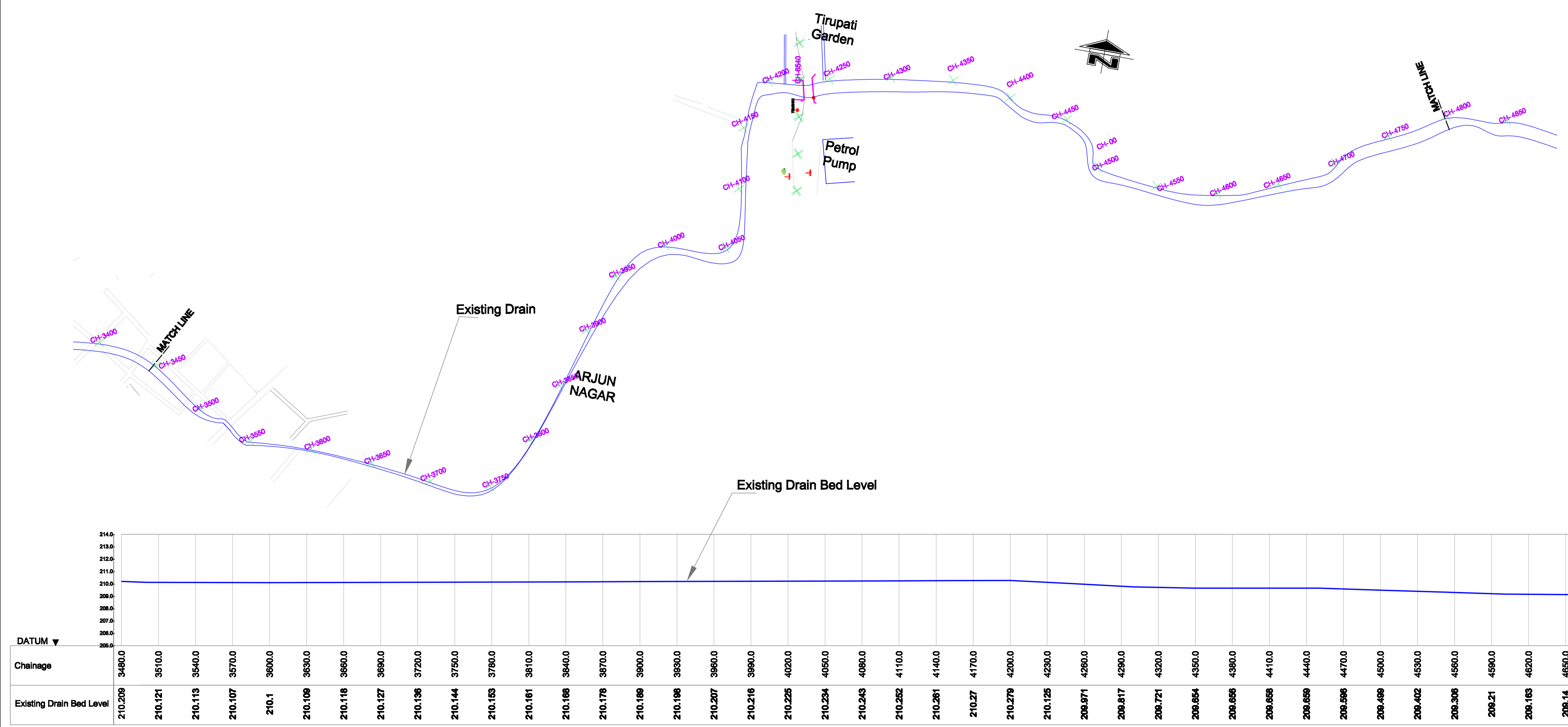
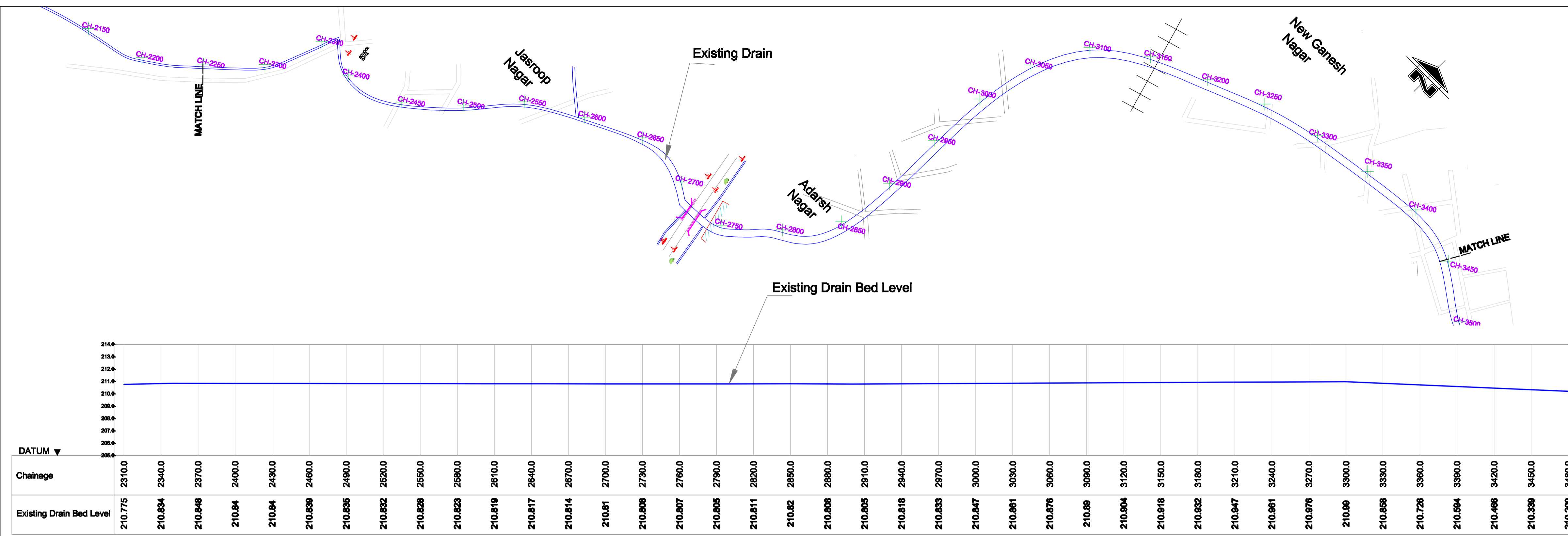
Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009
Checked: HVS
Approved: NSS
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Drg. No.NCRPB-HAPUR-DR-01A

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

Hapur
Existing Plan and L-Section of Drain No.2 (Ch.2310 to Ch.4650)



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

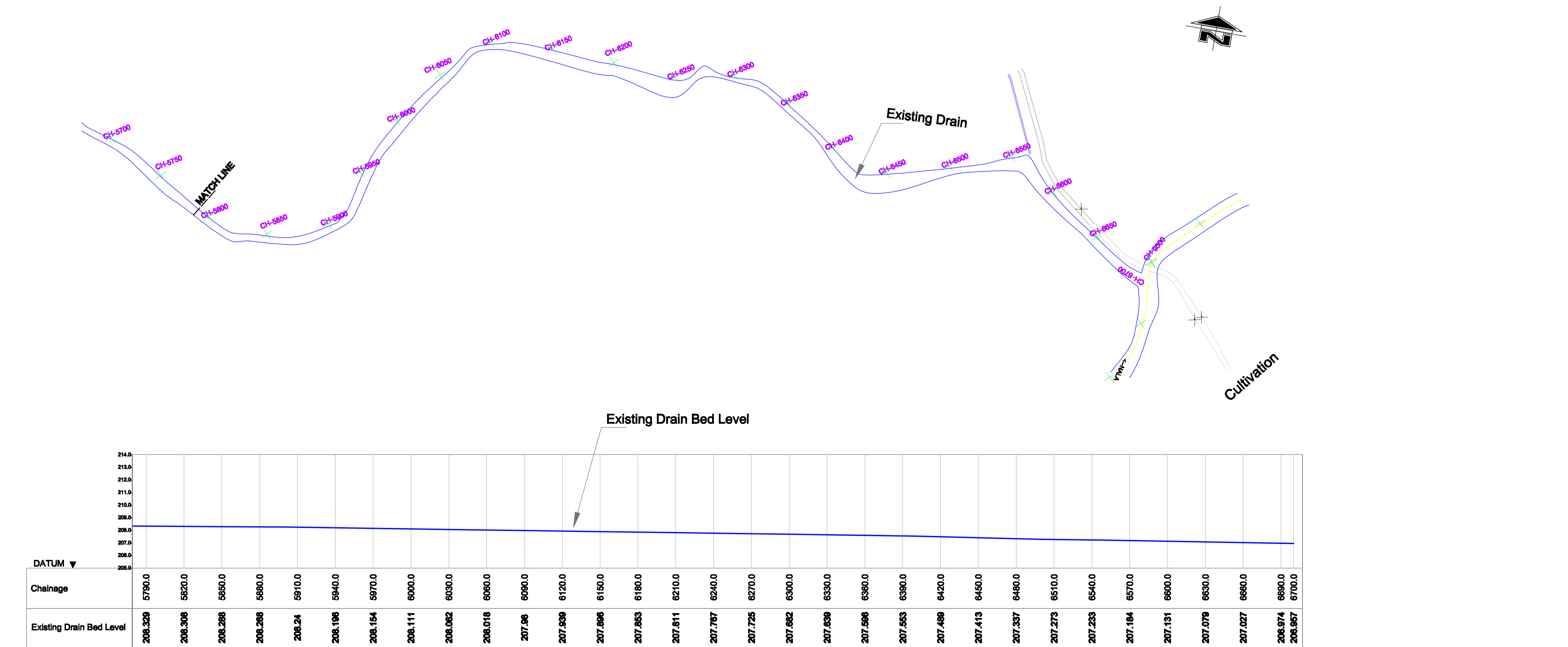
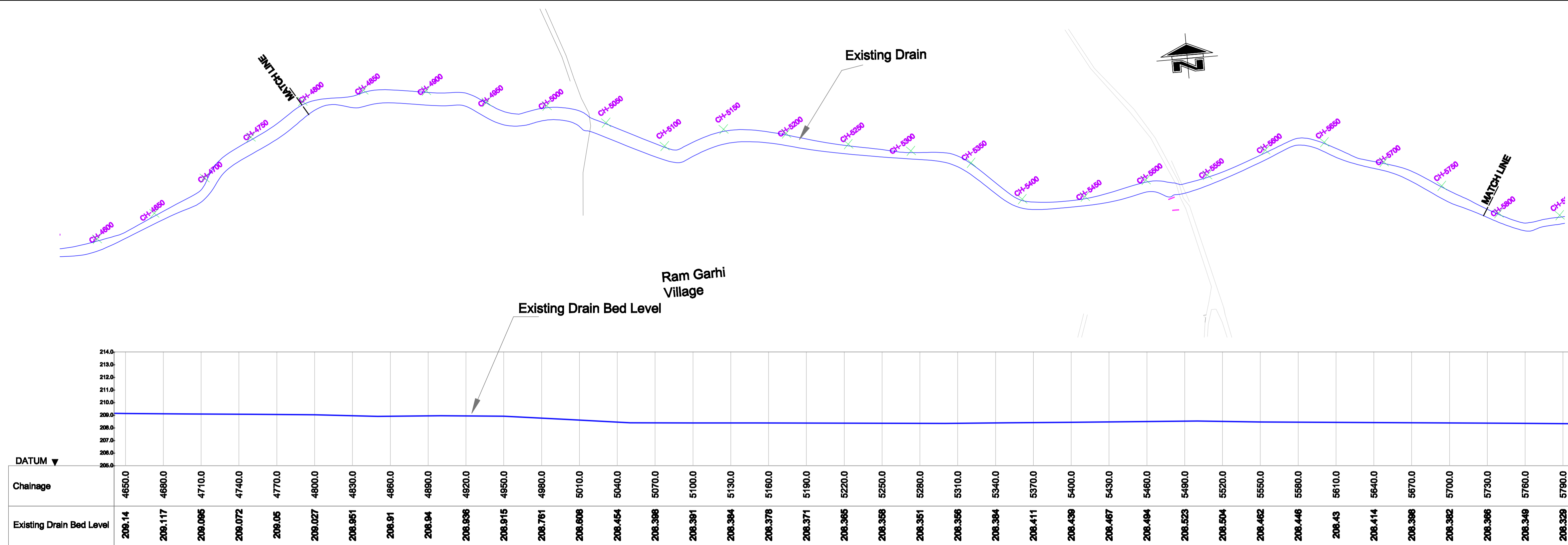
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Capacity Development of the NCRPB: Component B (ADB TA-7055)

Hapur
Existing Plan and L-Section of Drain No.2
(Ch.4650 to Ch.6700)



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

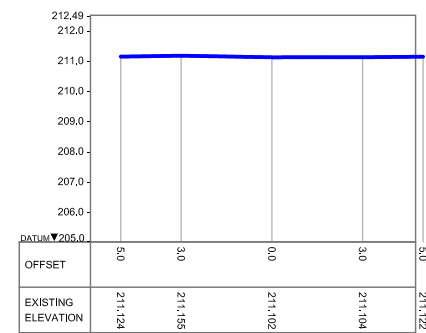
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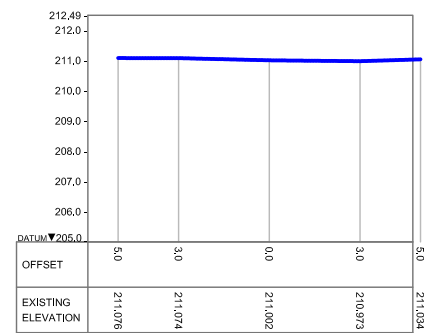
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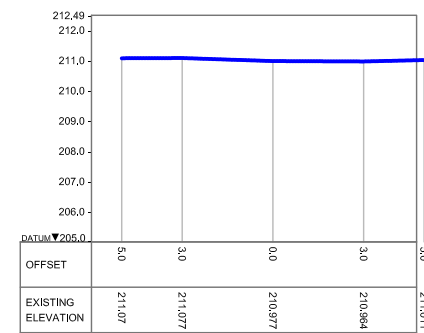
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Existing Cross Section of Drains No.2
(Ch.1750 to Ch.2700)



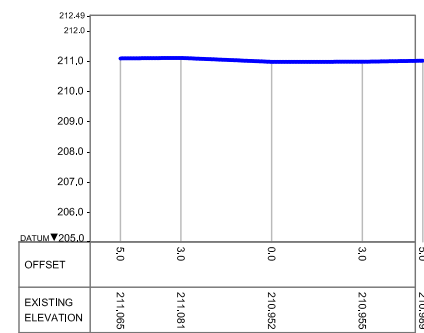
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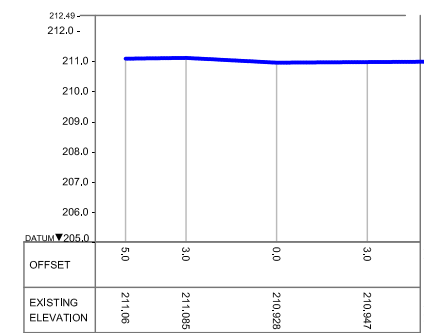
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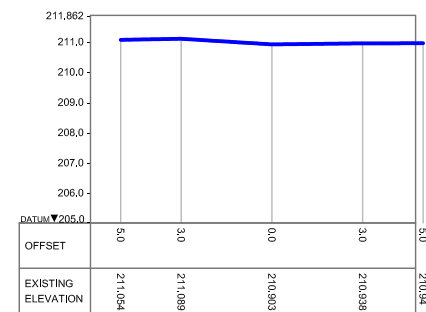
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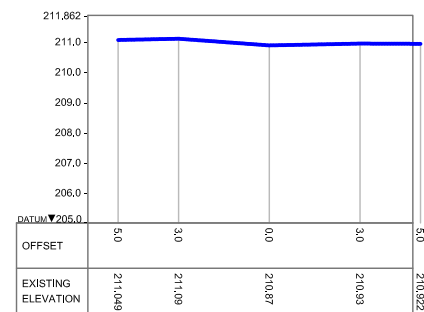
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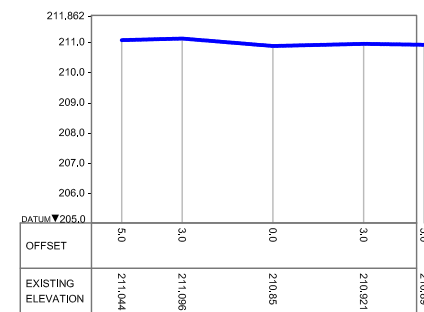
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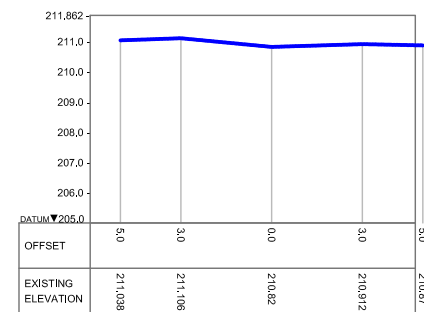
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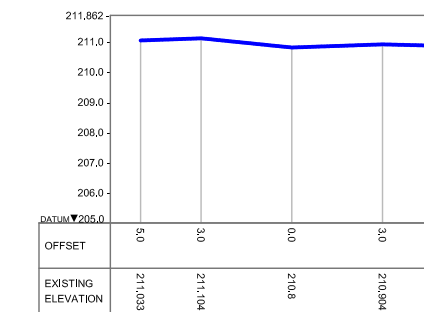
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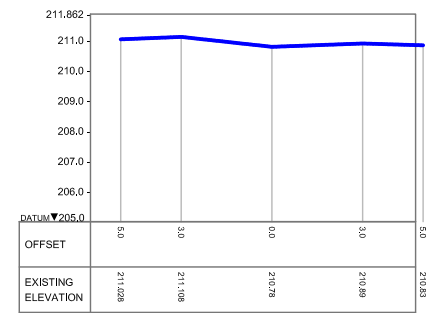
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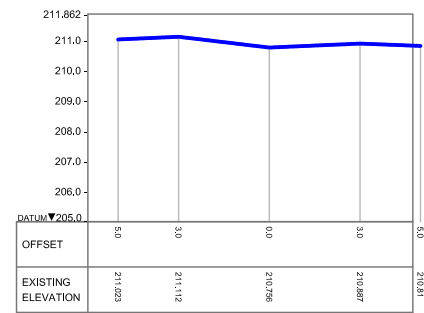
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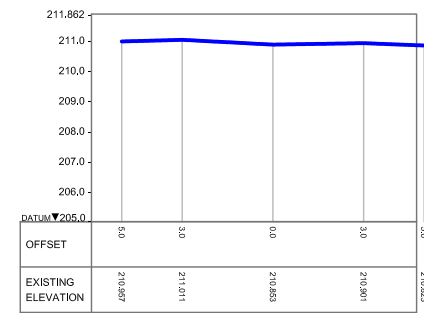
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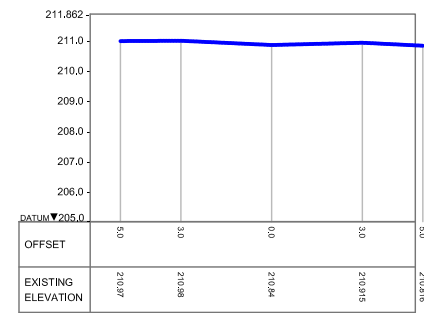
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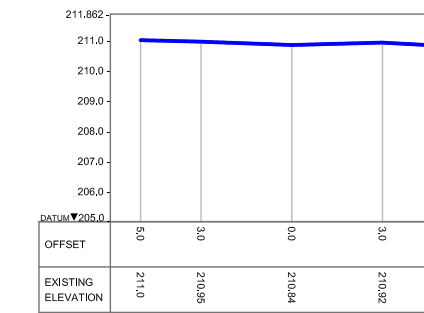
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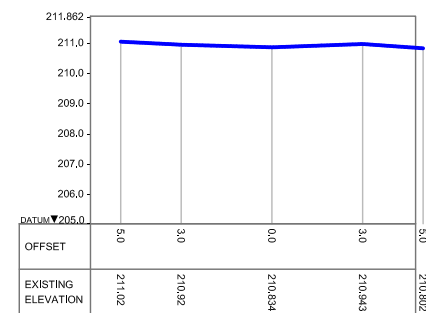
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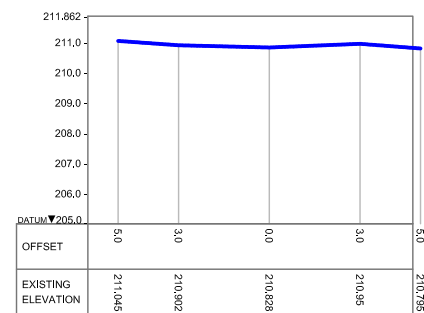
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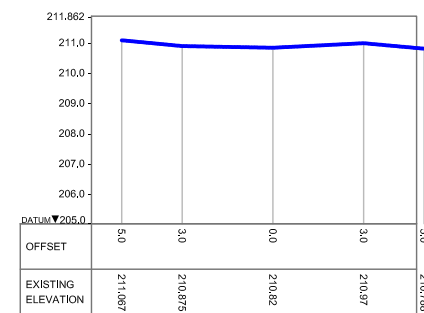
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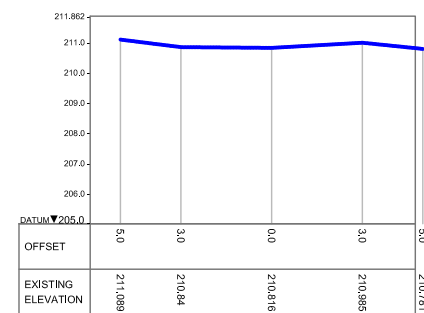
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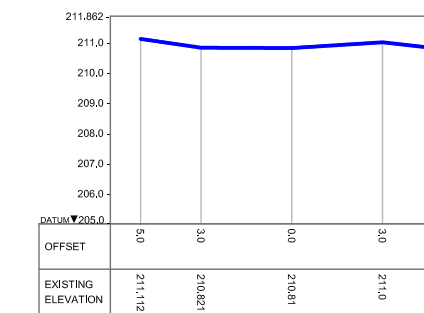
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Ch: 2600.0



Ch: 2650.0



Ch: 2700.0

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

Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009

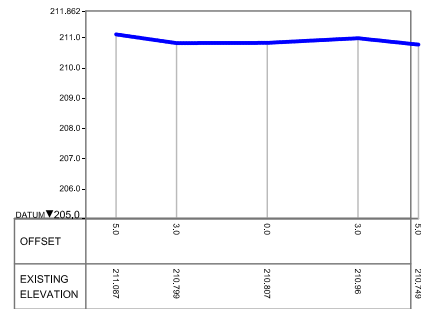
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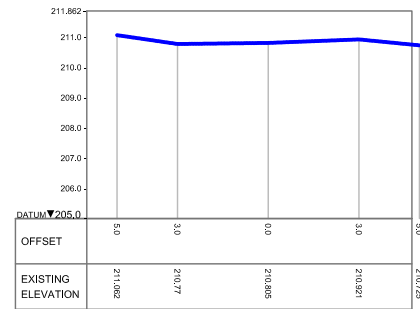
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Capacity Development of the NCRPB: Component B (ADB TA-7055)

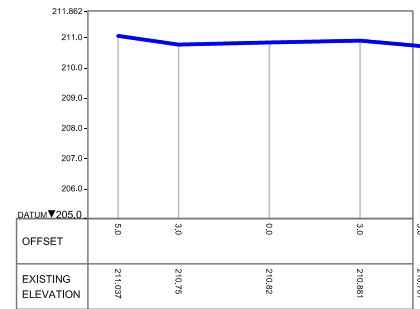
Hapur
Existing Cross Section of Drains No.2
(Ch.2750 to Ch.3450)



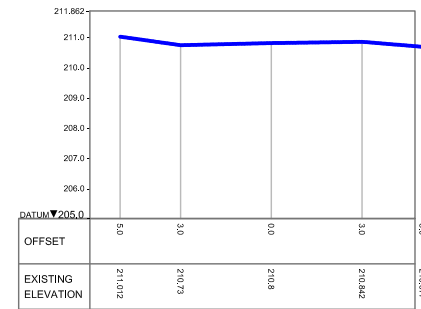
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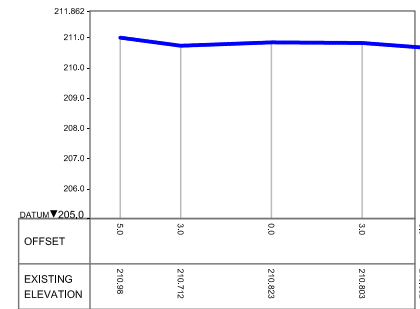
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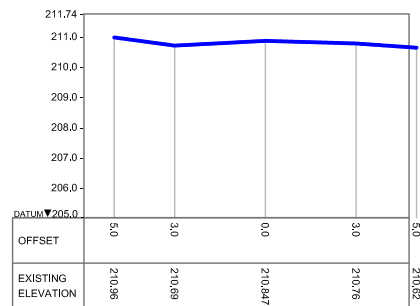
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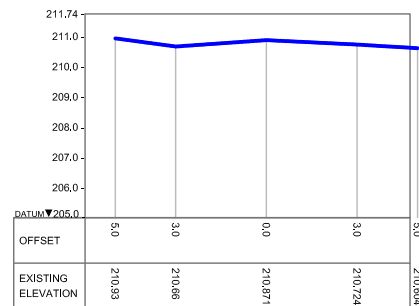
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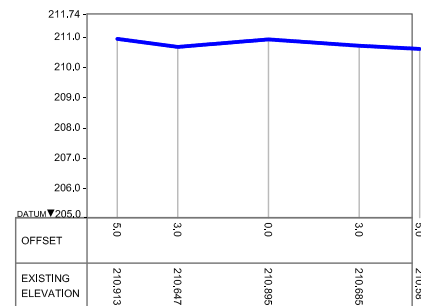
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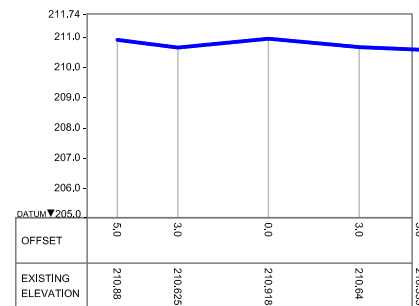
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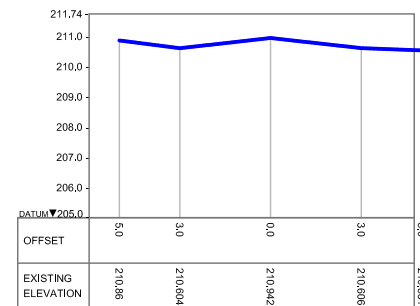
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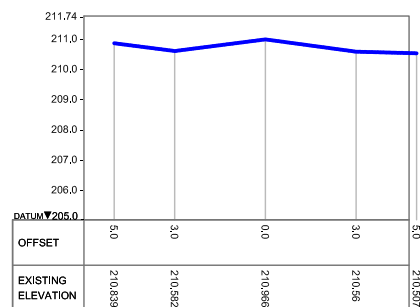
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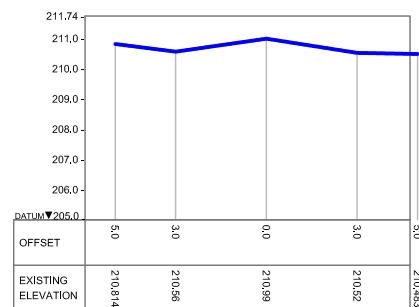
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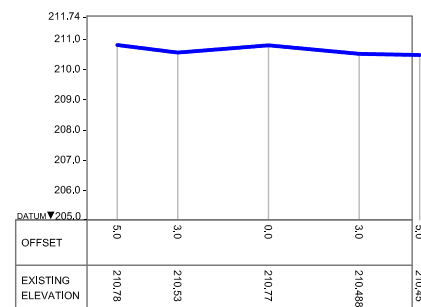
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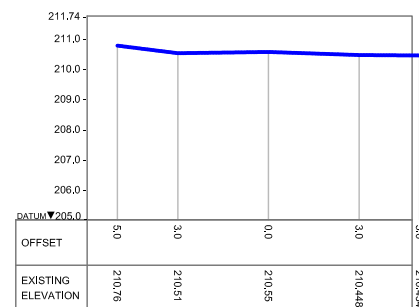
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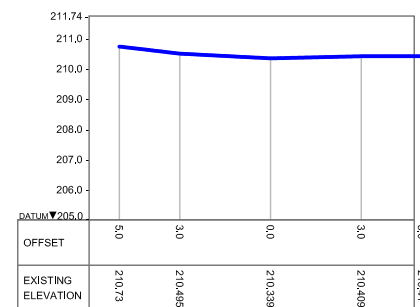
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Ch: 3350.0



Ch: 3400.0



Ch: 3450.0

Client:
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National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009

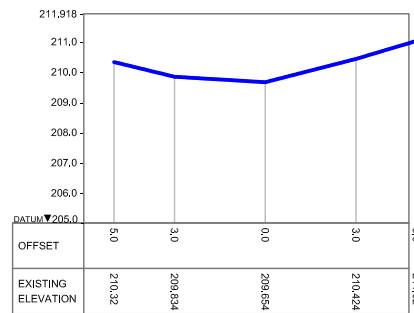
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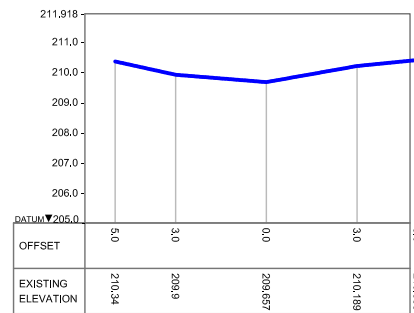
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Capacity Development of the NCRPB: Component B (ADB TA-7055)

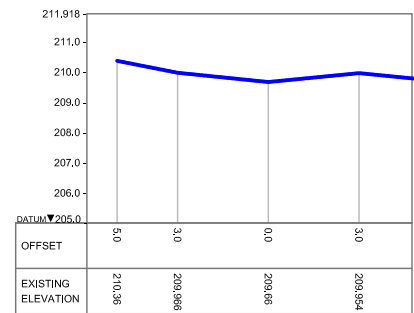
Hapur
Existing Cross Section of Drains No.2
(Ch.4350 to Ch.5050)



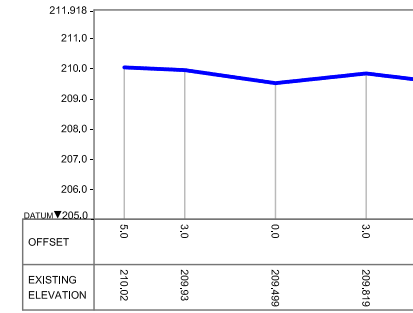
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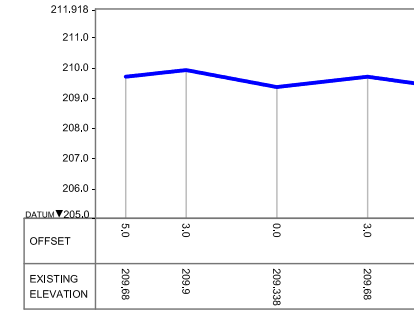
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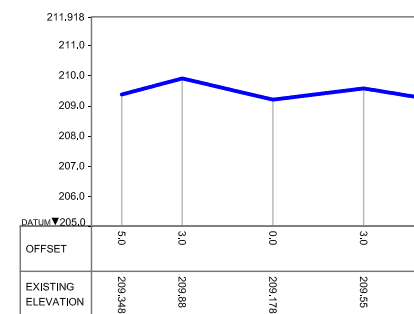
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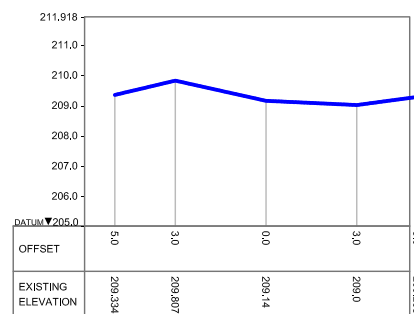
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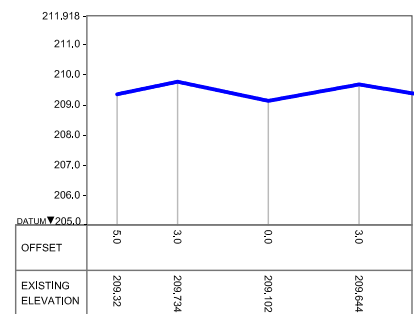
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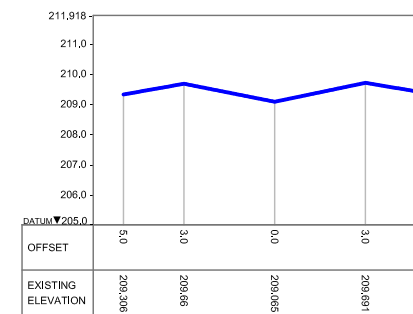
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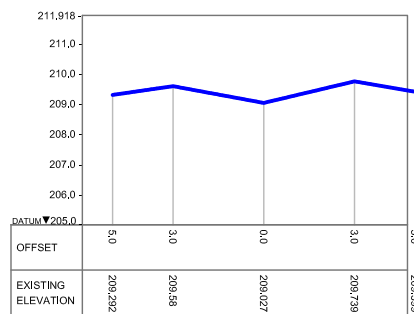
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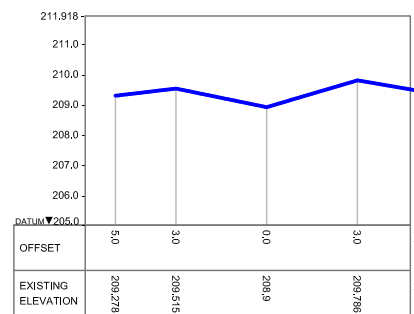
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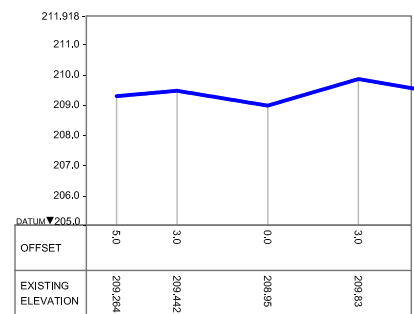
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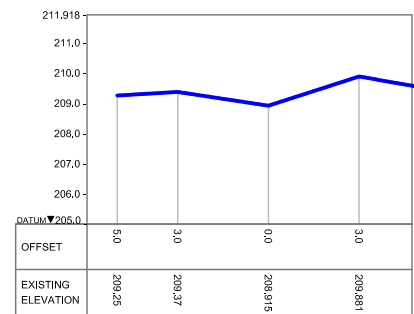
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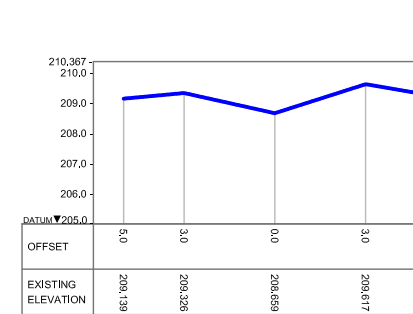
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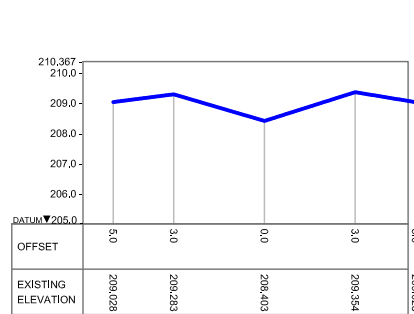
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Ch: 4950.0



Ch: 5000.0



Ch: 5050.0

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

Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009

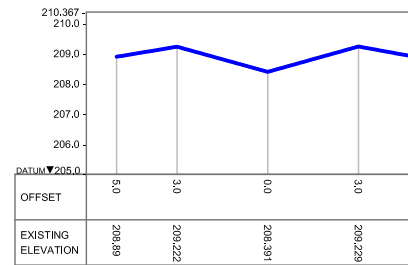
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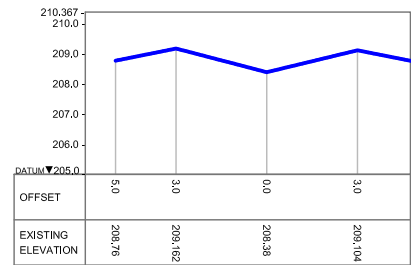
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Capacity Development of the NCRPB: Component B (ADB TA-7055)

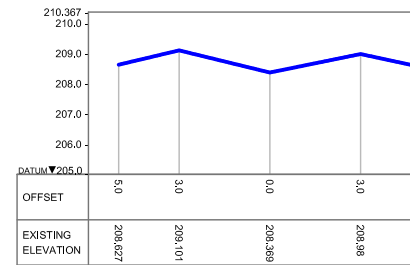
Hapur
Existing Cross Section of Drains No.2
(Ch.5000 to Ch.5950)



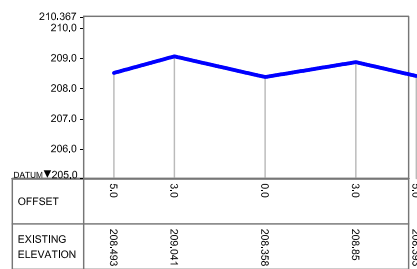
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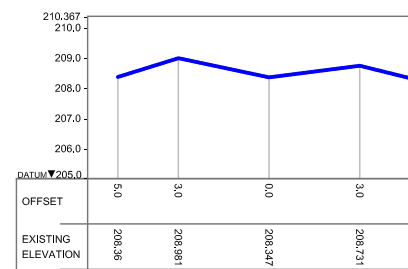
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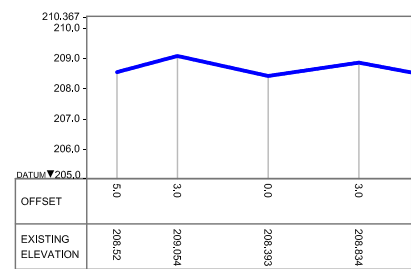
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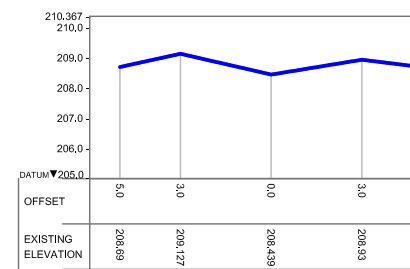
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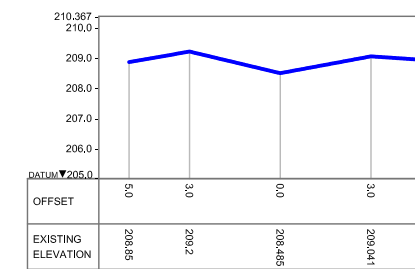
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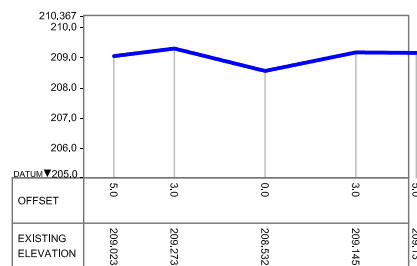
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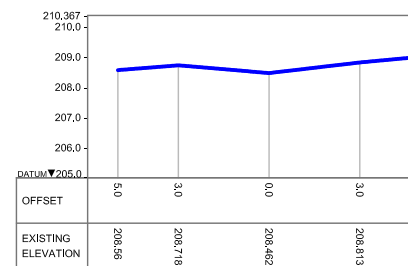
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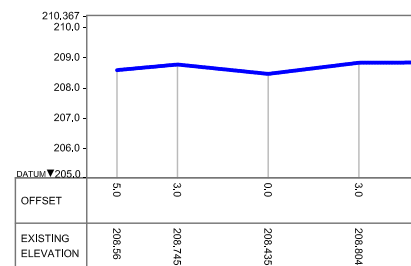
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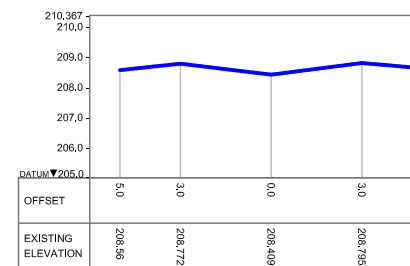
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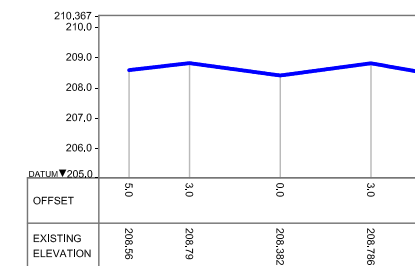
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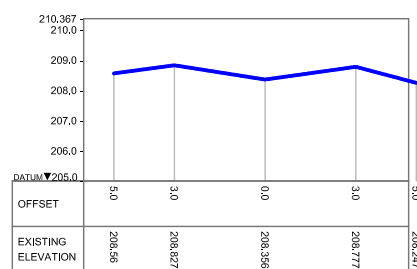
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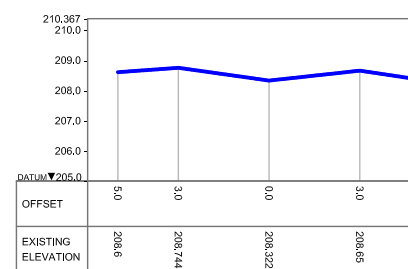
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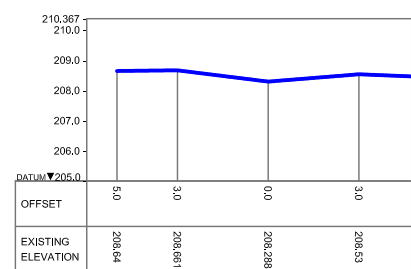
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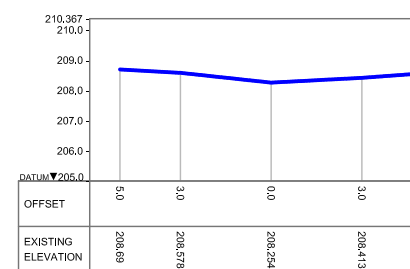
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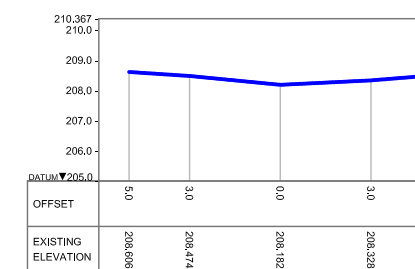
Ch: 5800.0



Ch: 5850.0



Ch: 5900.0



Ch: 5950.0

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

Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009

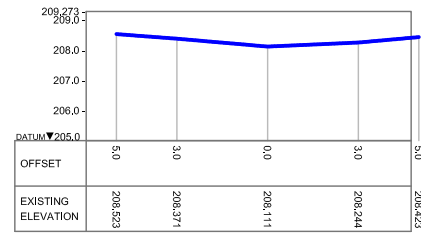
Checked: HVS
Approved: NSS

Scale: 0.0 2.0 4.0 6.0 8.0 Meters

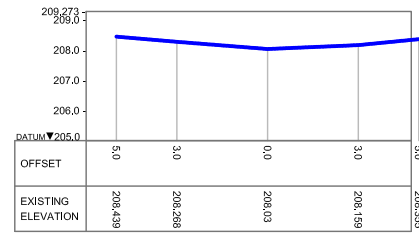
Drg. No.NCRPB-HAPUR-DR-02D

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

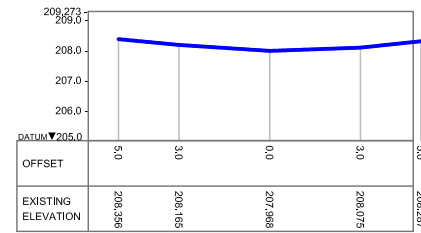
Hapur
Existing Cross Section of Drains No.2
(Ch.6000 to Ch.6700)



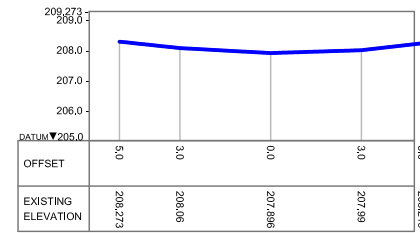
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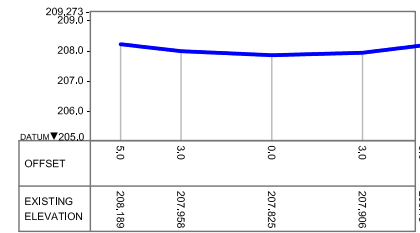
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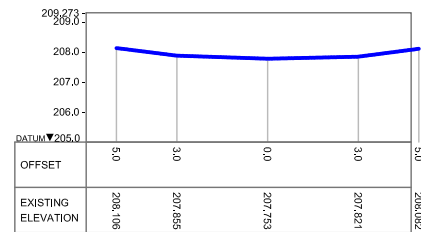
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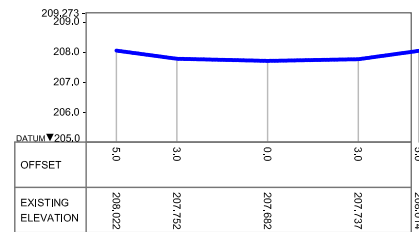
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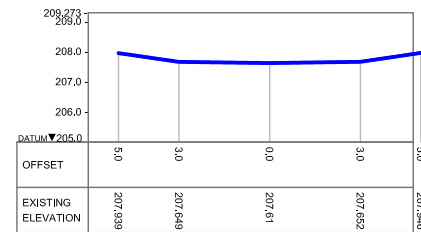
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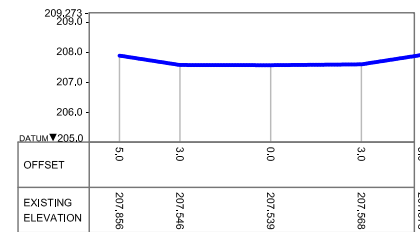
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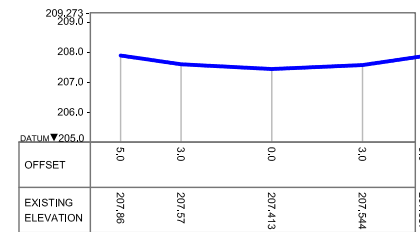
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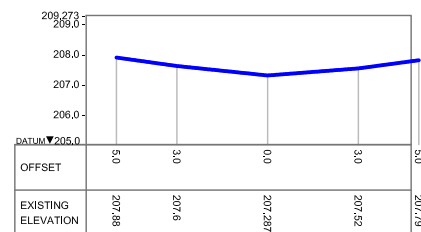
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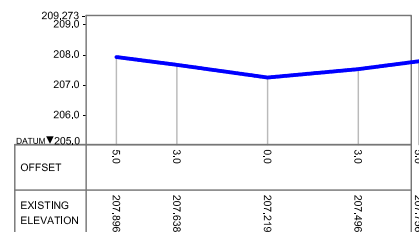
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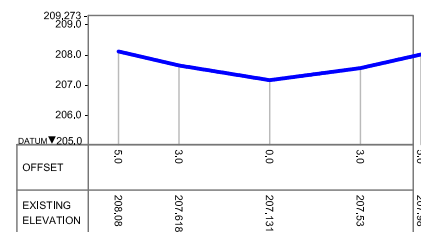
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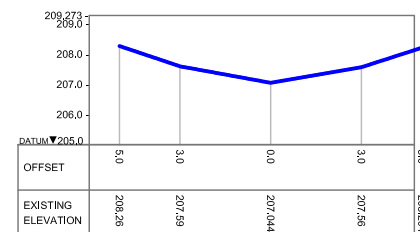
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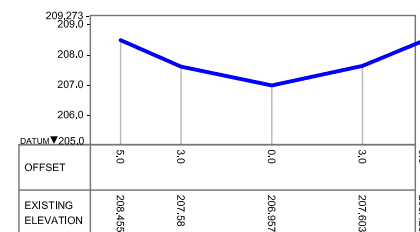
Ch: 6550.0



Ch: 6600.0



Ch: 6650.0



Ch: 6700.0

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

Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009

Checked: HVS
Approved: NSS


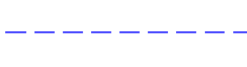


Scale: 0.0 2.0 4.0 6.0 8.0 Meters

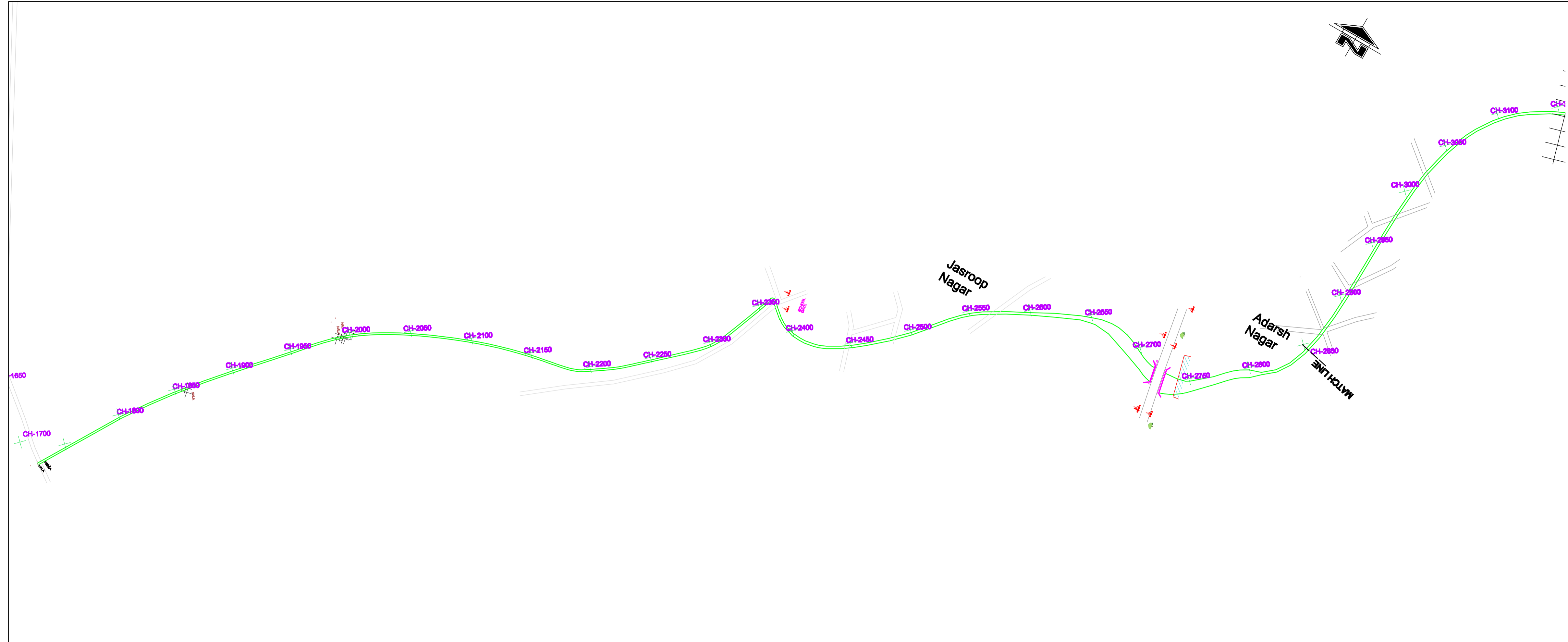
Drg. No.NCRPB-HAPUR-DR-02E

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

Hapur
Proposed L-Section of Drain No.2
(Ch.1710 to 2850)

Legend

-  Proposed Drain
-  Existing Drain Bed Level
-  Drain Top Level
-  Proposed Drain Bed Level



Chainage	Existing Drain Bed Level	Drain Top Level	Proposed Drain Bed Level
1710.0	211.182	211.200	210.900
1740.0	211.122	-	-
1770.0	211.062	-	-
1800.0	211.002	-	-
1830.0	210.987	-	-
1860.0	210.972	-	-
1890.0	210.957	-	-
1920.0	210.942	-	-
1950.0	210.928	211.10	210.750
1980.0	210.913	-	-
2010.0	210.898	-	-
2040.0	210.877	-	-
2070.0	210.862	-	-
2100.0	210.85	211.00	210.670
2130.0	210.832	-	-
2160.0	210.816	-	-
2190.0	210.804	-	-
2220.0	210.792	-	-
2250.0	210.78	211.00	210.610
2280.0	210.768	-	-
2310.0	210.775	-	-
2340.0	210.834	-	-
2370.0	210.848	-	-
2400.0	210.84	211.00	210.550
2430.0	210.84	-	-
2460.0	210.839	-	-
2490.0	210.835	-	-
2520.0	210.832	-	-
2550.0	210.828	211.00	210.490
2580.0	210.823	-	-
2610.0	210.819	-	-
2640.0	210.817	-	-
2670.0	210.814	-	-
2700.0	210.81	211.10	210.430
2730.0	210.808	-	-
2760.0	210.807	-	-
2790.0	210.805	-	-
2820.0	210.811	-	-
2850.0	210.82	211.00	210.370

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

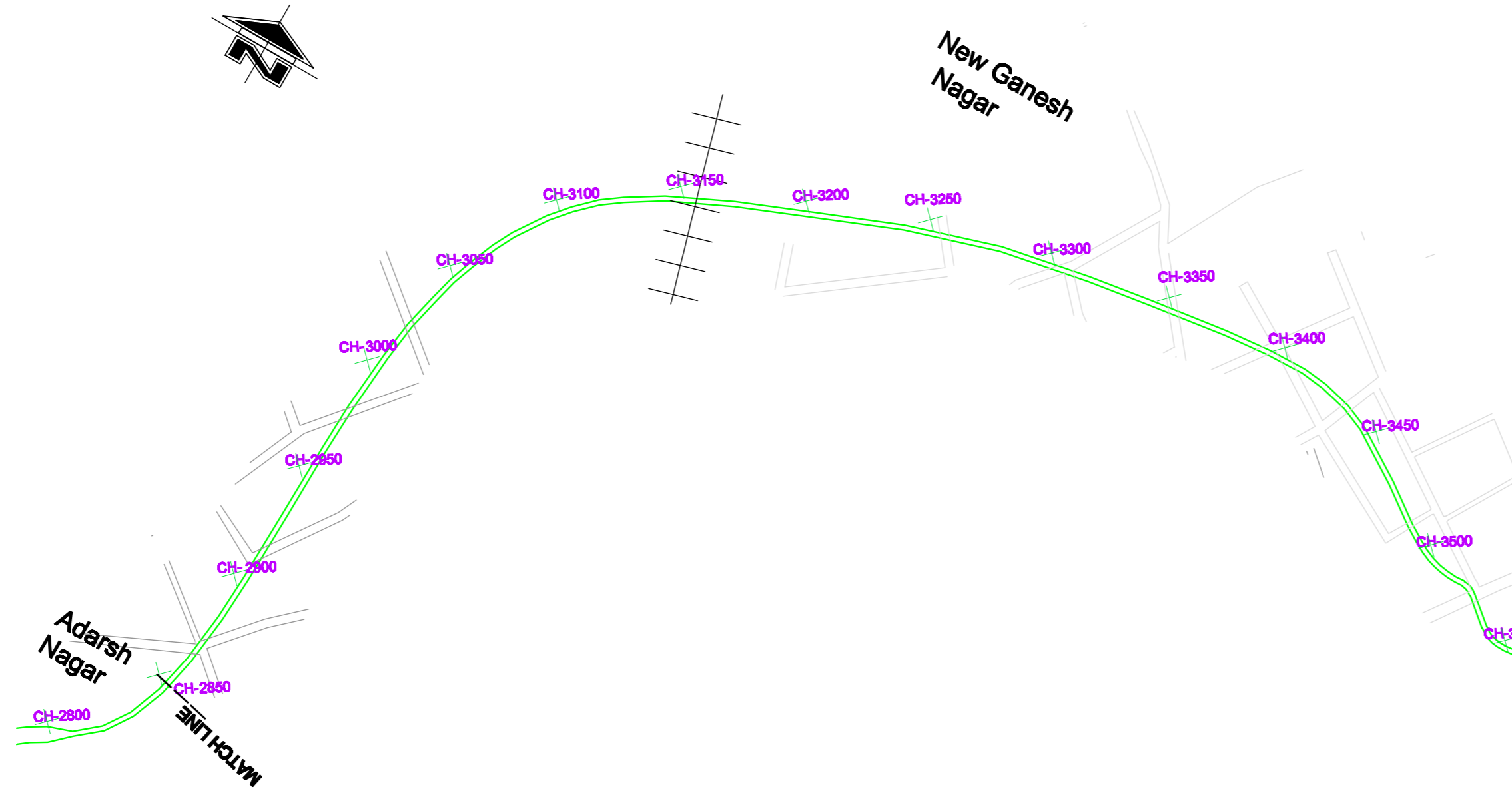
Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009
Checked: HVS
Approved: NSS
Scale: HORIZONTAL 0 40 80 120 160 Meters
VERTICAL 0 4 8 12 16 Meters





Drg. No.NCRPB-HAPUR-DR-03A

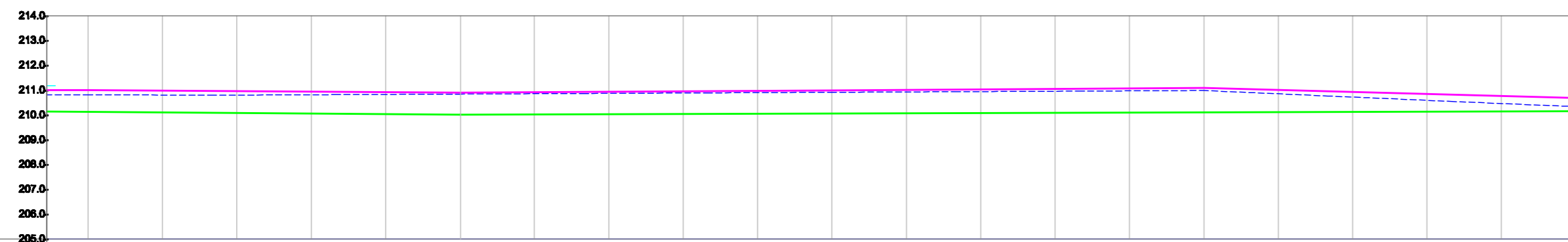
**Capacity Development of
the NCRPB: Component B
(ADB TA-7055)**

Hapur
Proposed L-Section of Drain No.2
(Ch.2850 to 3450)



Legend

-  Proposed Drain
-  Existing Drain Bed Level
-  Drain Top Level
-  Proposed Drain Bed Level

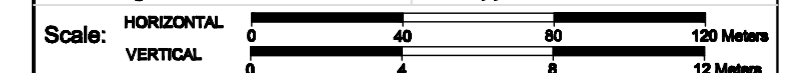


Chainage	2850.0	2880.0	2910.0	2940.0	2970.0	3000.0	3030.0	3060.0	3090.0	3120.0	3150.0	3180.0	3210.0	3240.0	3270.0	3300.0	3330.0	3360.0	3390.0	3420.0	3450.0
Existing Drain Bed Level	210.82	210.808	210.805	210.818	210.833	210.847	210.861	210.876	210.89	210.904	210.918	210.932	210.947	210.961	210.976	210.99	210.858	210.726	210.594	210.466	210.339
Drain Top Level	211.00	.	.	.	.	210.90	.	.	.	.	210.95	.	.	.	.	211.00	.	.	.	.	210.70
Proposed Drain Bed Level	210.370	.	.	.	.	210.310	.	.	.	.	210.250	.	.	.	.	210.193	.	.	.	.	210.143

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

Consultant:
Wilbur Smith Associates

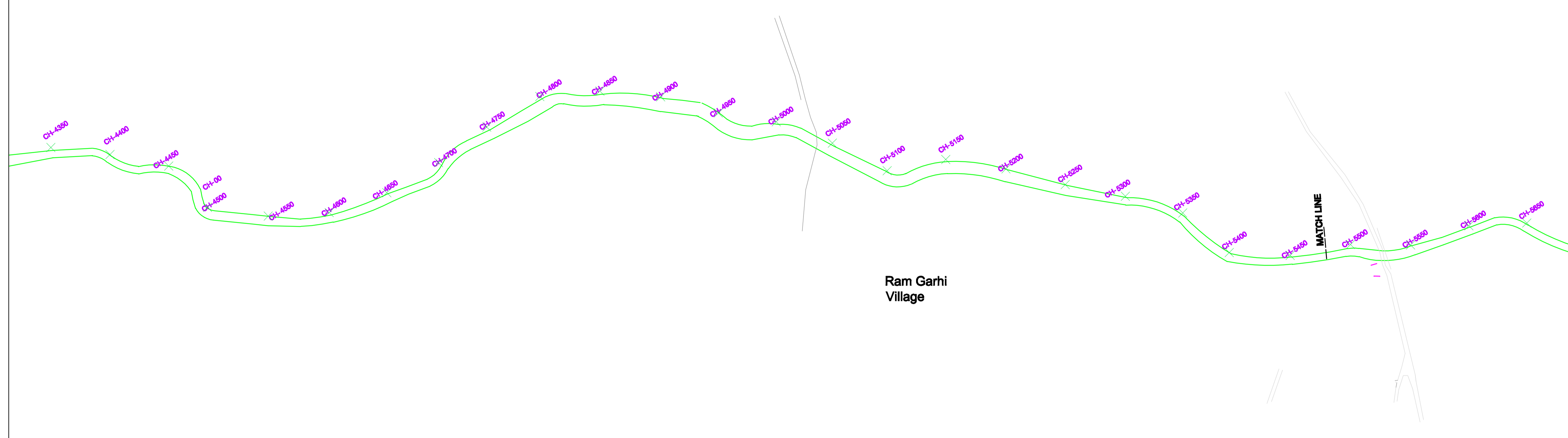
Drawn: SK
Date: August 2009
Checked: HVS
Approved: NSS



Drg. No. NCRPB-HAPUR-DR-03B

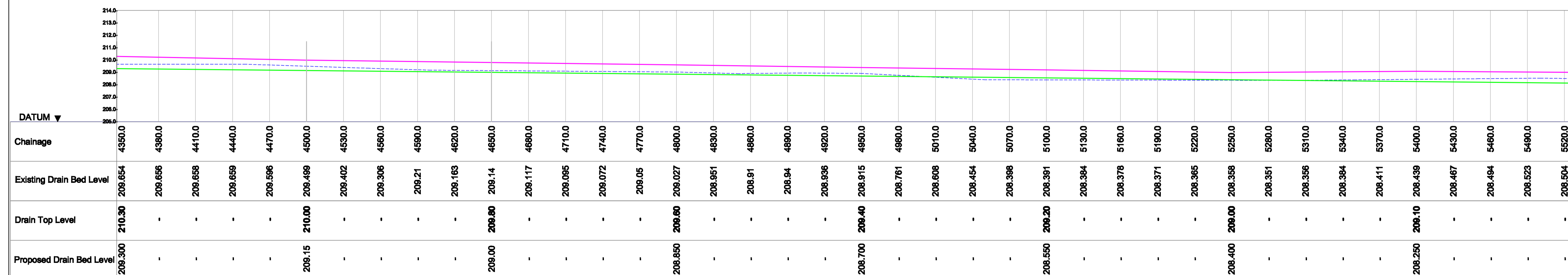
Capacity Development of the NCRPB: Component B (ADB TA-7055)

Hapur
Proposed L-Section of Drain No.2
(Ch.4350 to 5520)



Legend

- Proposed Drain
- Existing Drain Bed Level
- Drain Top Level
- Proposed Drain Bed Level



Client:
Asian Development Bank
National Capital Region Planning Board

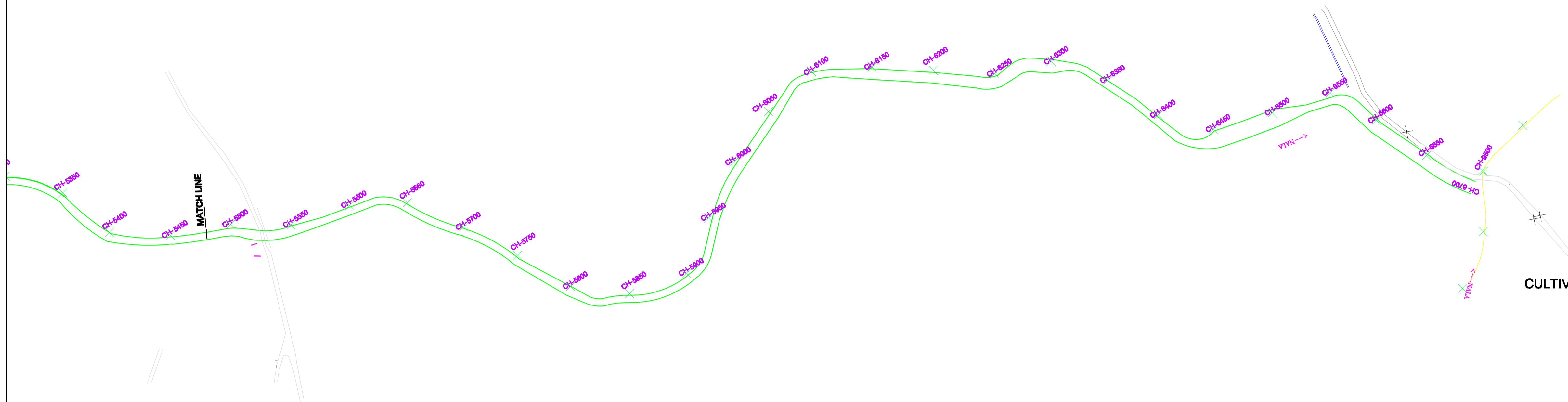
Consultant:
Wilbur Smith Associates

Drawn: SK
Date: August.2009
Checked: NSS
Approved: HVS
Scale: HORIZONTAL 0 40 80 120 160 Meters
VERTICAL 0 4 8 12 16 Meters

Drg. No.NCRPB-HAPUR-DR-03C

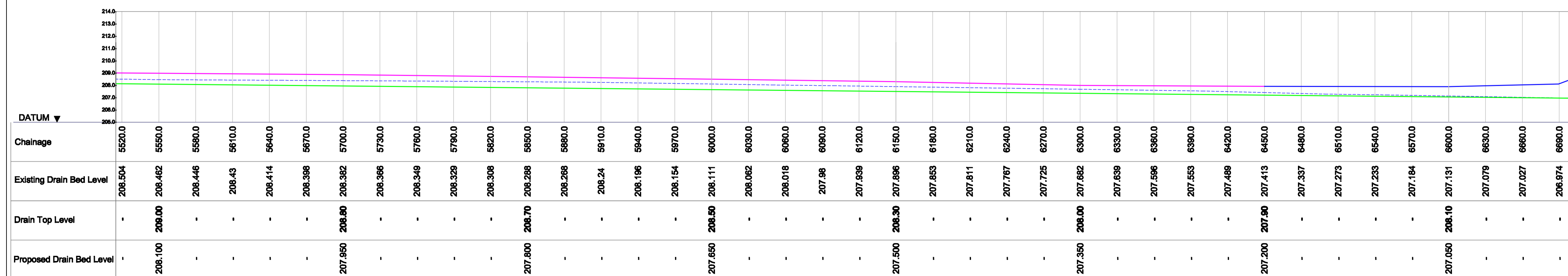
Capacity Development of the NCRPB: Component B (ADB TA-7055)

Hapur
Proposed L-Section of Drain No.2
(Ch.5520 to 6700)



Legend

- Proposed Drain
- Existing Drain Bed Level
- Drain Top Level
- Proposed Drain Bed Level



Client:
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National Capital Region Planning Board**

Consultant:
Wilbur Smith Associates

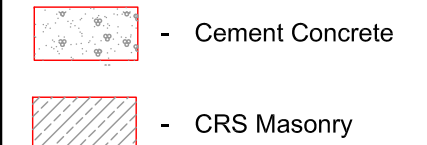
Drawn: SK
Date: August.2009
Checked: HVS
Approved: NSS
Scale: HORIZONTAL 0 40 80 120 160 Meters
VERTICAL 0 4 8 12 16 Meters

Drg. No.NCRPB-HAPUR-DR-03D

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

Hapur Typical Details of Masonry Retaining Wall

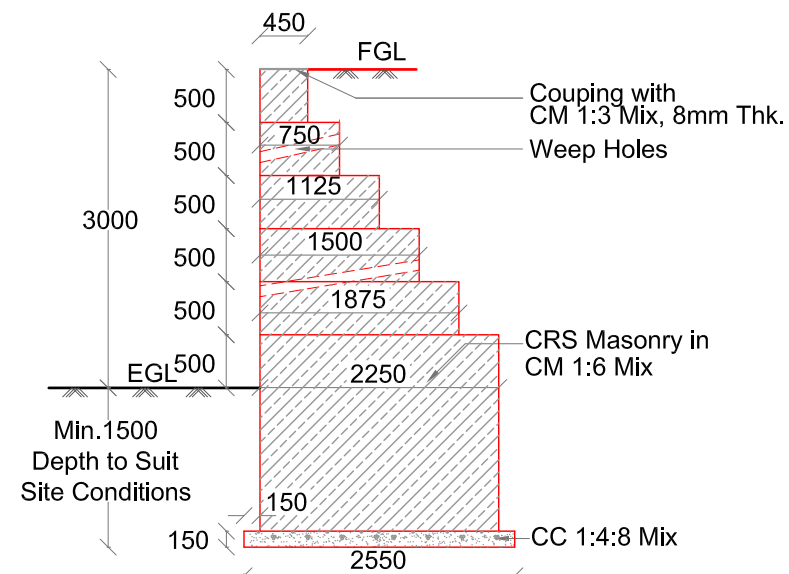
Legend:



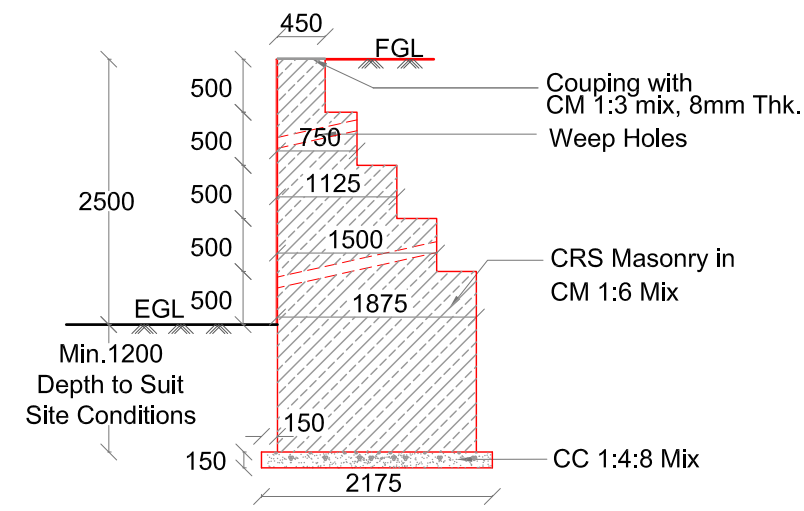
FGL - Formation Ground Level
EGL - Existing Ground Level
SBC - Safe Bearing Capacity
CRS - Coarse Rubble Masonry

Notes:

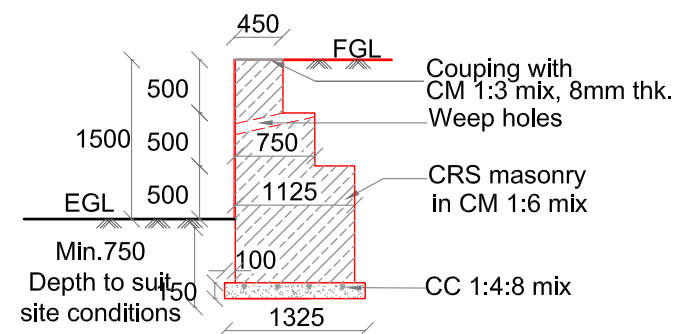
- All Dimensions are in Millimetres Unless Otherwise Noted.
- Weep Holes to Be Provided @ One Hole (100 Mm Ø) Per Sq.m in a Staggered Pattern
- Weep Holes Shall be Filled with no Fines Concrete of 1:4 Mix (One Cement + Four Aggregate 20mm Downgrade)
- Expansion Joint Shall be Provided at every 10.0 M Interval and at all Change of Directions (Corners).
- Expansion Joints shall be for the Entire Height of Retaining Wall.
- The Expansion Joints shall be Filled with Bituminous Pad and Top Provided with Bitumen Cap.
- The Retaining Wall has Been Designed for a Sbc Value of 150 Kn/m², Ø = 15° (wet Earth) W = 1800 Kg / Cu.m, K = 0.588
- Depth of Foundation Shown is the Minimum Requirement, This May Vary to Suit Site Conditions.
- For Walls over 750mm thick, the Outside Face Upto 450mm Thick Shall be Paid as CRS Second Sort and the Balance RR.
- For Walls 750mm and Less thick, the entire Wall shall be Paid as CRS Second Sort.
- In all Concrete Items Coarse Aggregate Shall be 20mm



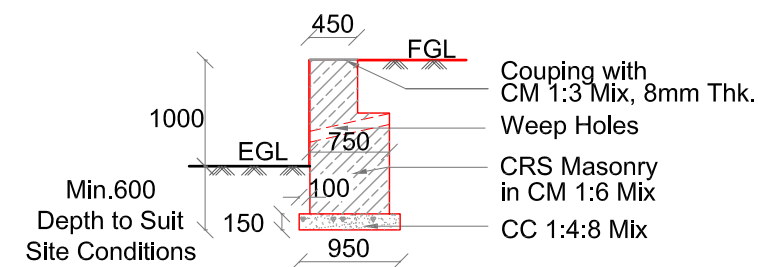
Retaining Wall Detail
(3.0 m Height)



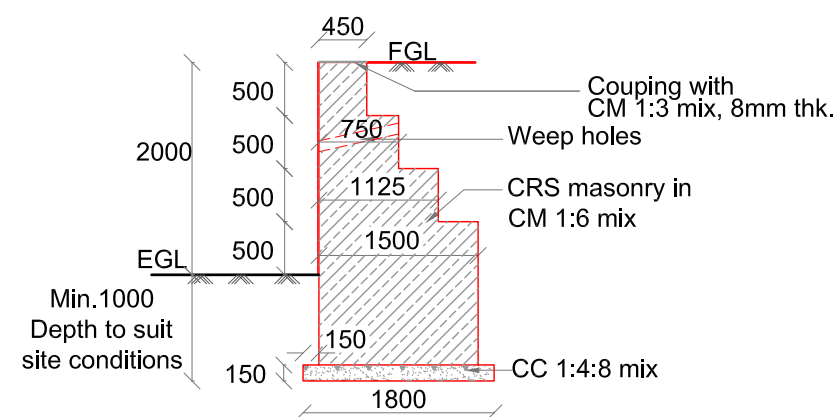
Retaining Wall Detail
(2.50 m Height)



Retaining Wall Detail
(1.50 m Height)



Retaining Wall Detail
(1.0 m Height)



Retaining Wall Detail
(2.0 m Height)

Client

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

Consultant

Wilbur Smlth Associates

Drawn:SK
Date: August, 2009

Checked: HVS
Approved: NSS

Scale: 00 750 1500 2250 3000 Millimetres

Drg. No. NCRPB/HAPUR/DR-04

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

**Hapur
Typical Details of RCC Retaining Wall**

Legend:

FGL - Formation Ground Level

EGL - Existing Ground Level

SBC - Safe Bearing Capacity

Notes :

1. The Retaining Wall has been Designed for a SBC Value of 150 KN/m²
2. All Dimensions are in Millimetres Unless Otherwise Noted.
3. Grade of concrete mix shall be M20 (1:1½:3) Conforming to IS 456 - 2000.
4. Reinforcement Bars shall be high strength deformed Bars of Grade Fe 415 conforming to IS 1786 - 1985.
5. Clear Cover for Retaining Wall - 40 mm
6. Weep Holes to be Provided @ one Hole (100 mm Ø) per Sq.m in a Staggered Pattern
7. Weep holes shall be filled with no fines concrete of 1:4 mix (one cement + four aggregate 20mm downgrade)
8. Expansion Joint shall be provided at every 10.0 m Interval and at all Change of Directions (Corners).
9. Expansion Joints Shall be for the Entire Height of Retaining Wall.
10. The Expansion Joints shall be filled with Bituminous Pad and Top Provided with Bitumen Cap.
11. In all Concrete items Coarse Aggregate shall be 20mm.

Client

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

Consultant

Wilbur Smith Associates

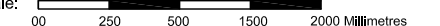
Drawn:SK

Checked: HVR

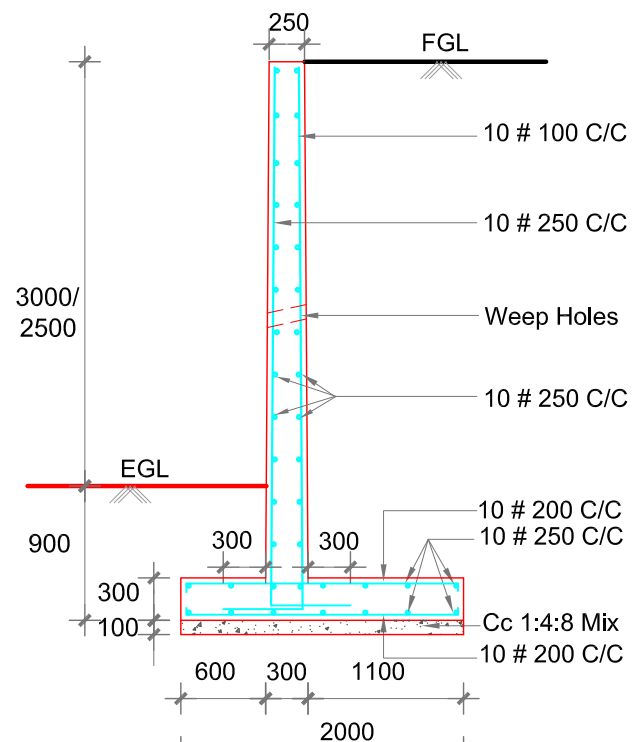
Date: August, 2009

Approved: NSS

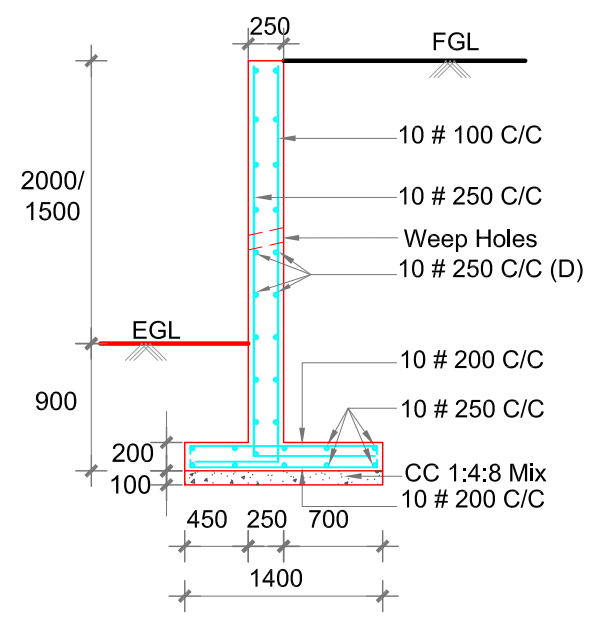
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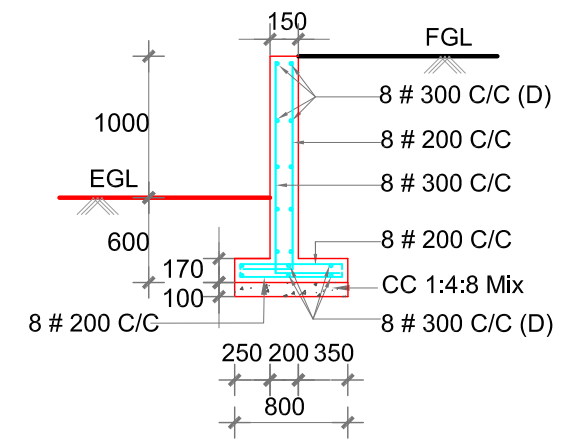
Drg. No. NCRPB/HAPUR/DR-05



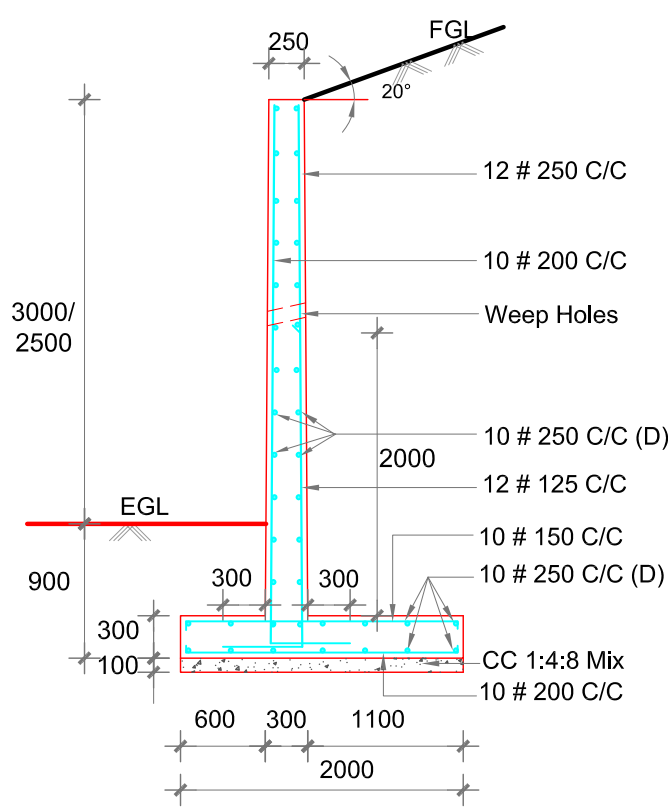
**Retaining Wall Detail
(2.50 m, 3.0 m Height)**



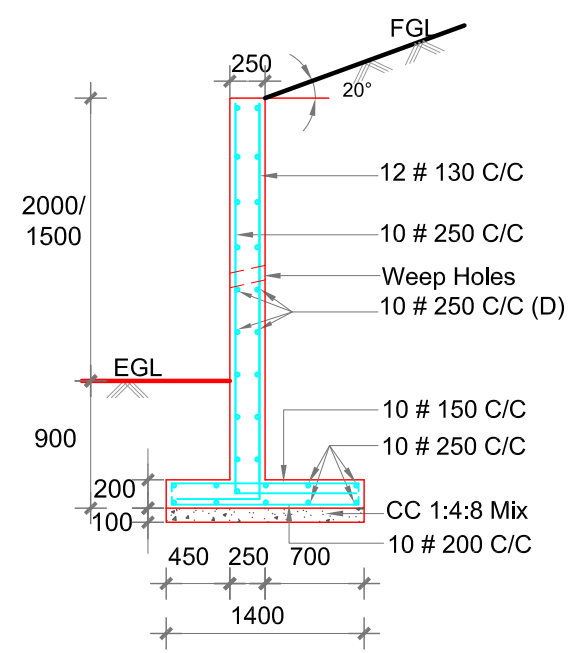
**Retaining Wall Detail
(2.0 m, 1.50 m Height)**



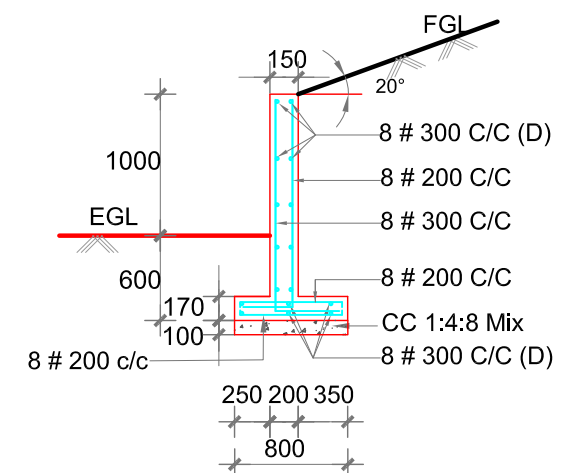
**Retaining Wall Detail
(1.0 m Height)**



**Retaining Wall with
Sloping Surcharge (2.50 m, 3.0 m Height)**



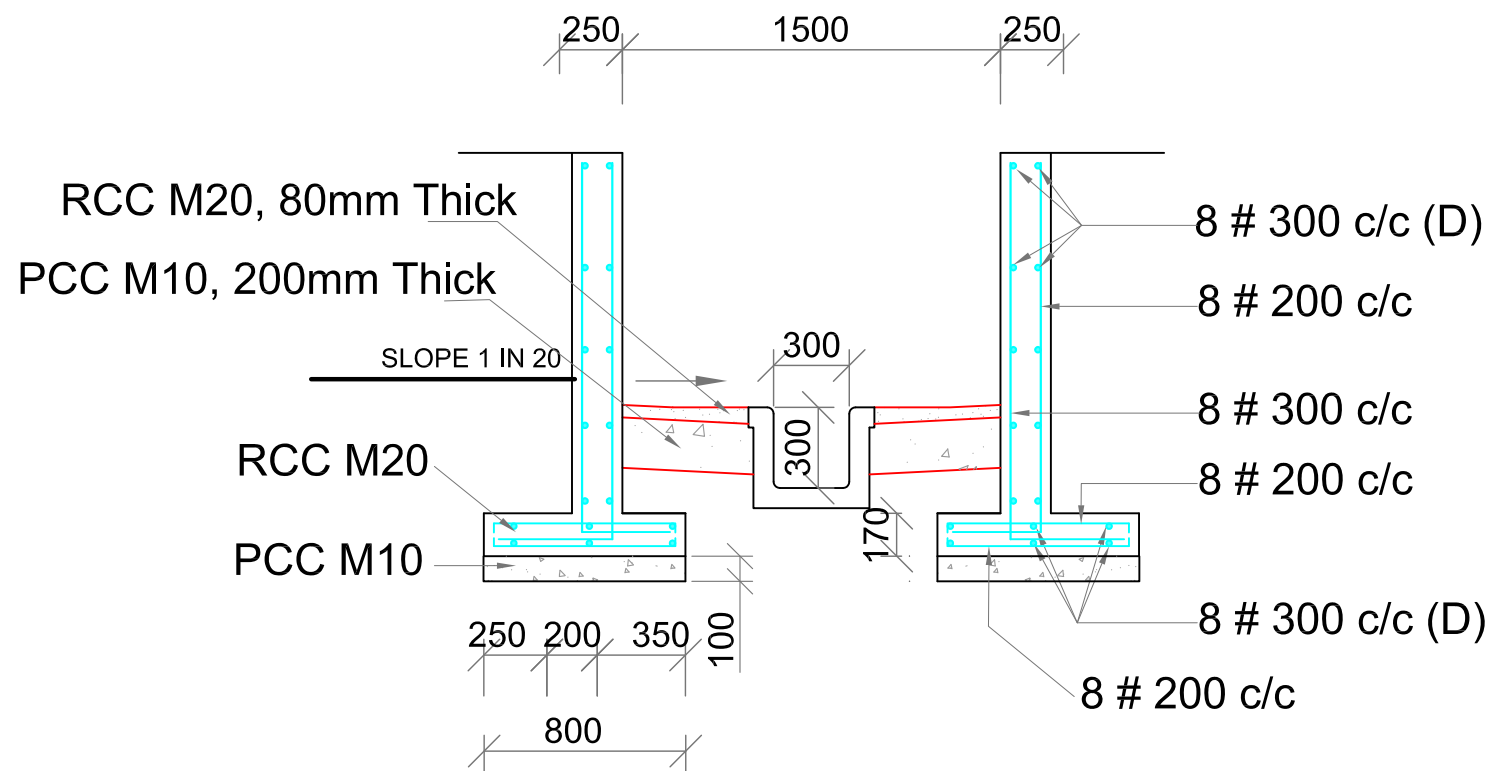
**Retaining Wall with
Sloping Surcharge (2.0 m, 1.50 m height)**



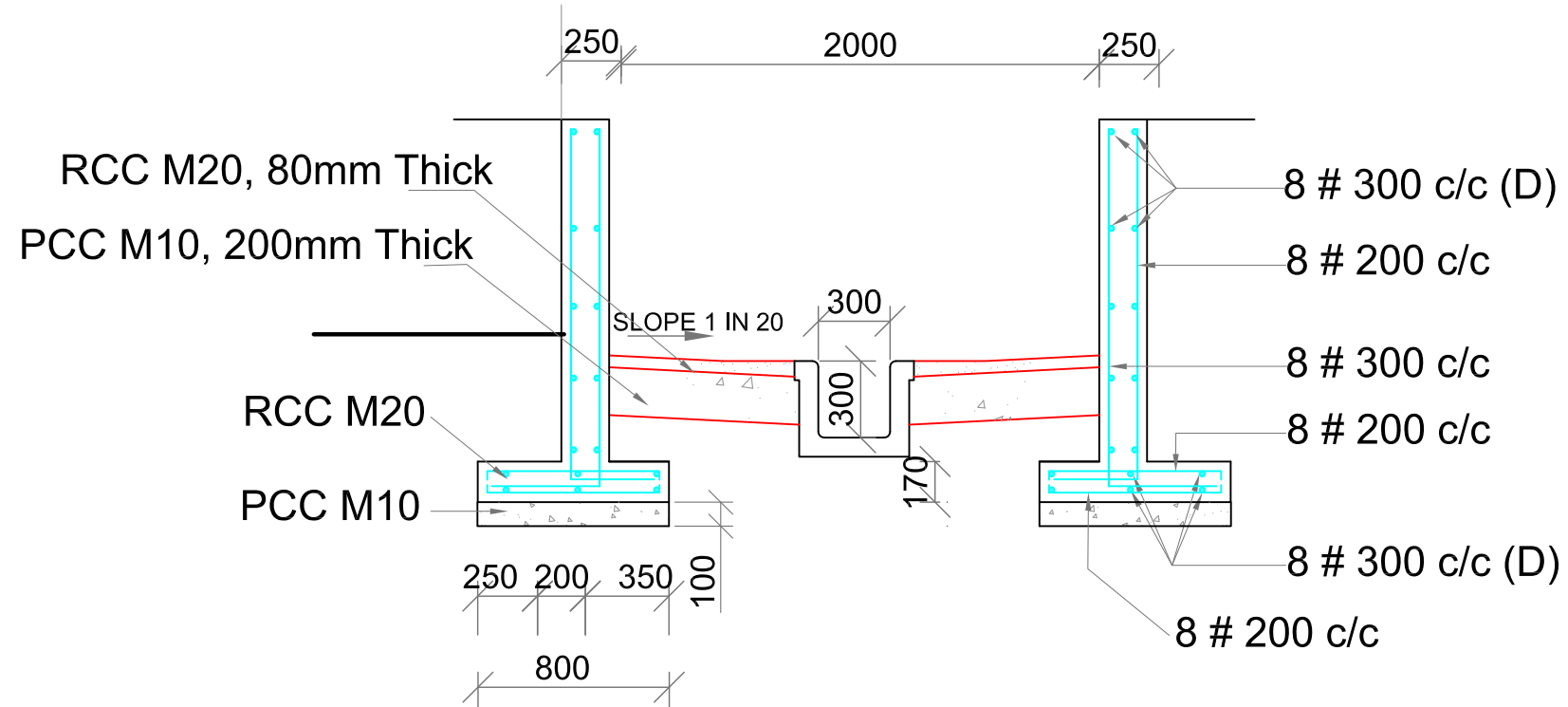
**Retaining Wall with
Sloping Surcharge (1.0 m Height)**

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

Hapur
Cross Section of the Proposed Drain



Cross Section of Drain from Ch 1700 to 2350



Cross Section of Drain from Ch 2450 to 3500

Legend:

- FGL - Formation ground level
- EGL - Existing ground level
- SBC - Safe Bearing Capacity

Notes:

1. All Dimensions are in Millimetres Unless Otherwise Noted.
2. Weep Holes to be Provided @ One Hole (100 Mm Ø) Per Sq.m in a Staggered Pattern
3. Weep Holes Shall be Filled with no Fines Concrete of 1:4 Mix (One Cement + Four Aggregate 20mm Downgrade)
4. Expansion Joint shall be Provided at Every 10.0 M Interval and at all Change of Directions (Corners).
5. Expansion Joints shall be for the Entire Height of Retaining Wall.
6. The Expansion Joints Shall be Filled with Bituminous Pad and Top Provided with Bitumen Cap.
7. The Retaining Wall Has Been Designed for a SBC Value of 150 kN/m^2 , $\phi = 15^\circ$ (wet Earth) $W = 1800 \text{ Kg / Cu.m}$, $K = 0.990$
8. Depth of Foundation shown is the Minimum Requirement, This May vary to Suit Site Conditions.
9. For Walls over 750mm thick, the Outside Face upto 450mm Thick shall be Paid as CRS Second Sort and the Balance RR.
10. For Walls 750mm and less thick, the Entire Wall shall be Paid as CRS Second Sort.
11. In all Concrete Items Coarse Aggregate shall be 20mm.

Client

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

Consultant

Wilbur Smith Associates

Drawn: SK

Checked: HVS

Date: Aug. 2009

Approved: NSS



Scale 1:30

Drg. No. NCRPB-HAPUR-DR-6A

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

Hapur
Cross Section of the Proposed Drain

Legend:

-  - Cement Concrete
-  - CRS Masonry

- FGL - Formation ground level
- EGL - Existing ground level
- SBC - Safe Bearing Capacity
- CRS - Coarse Rubble Masonry

Notes:

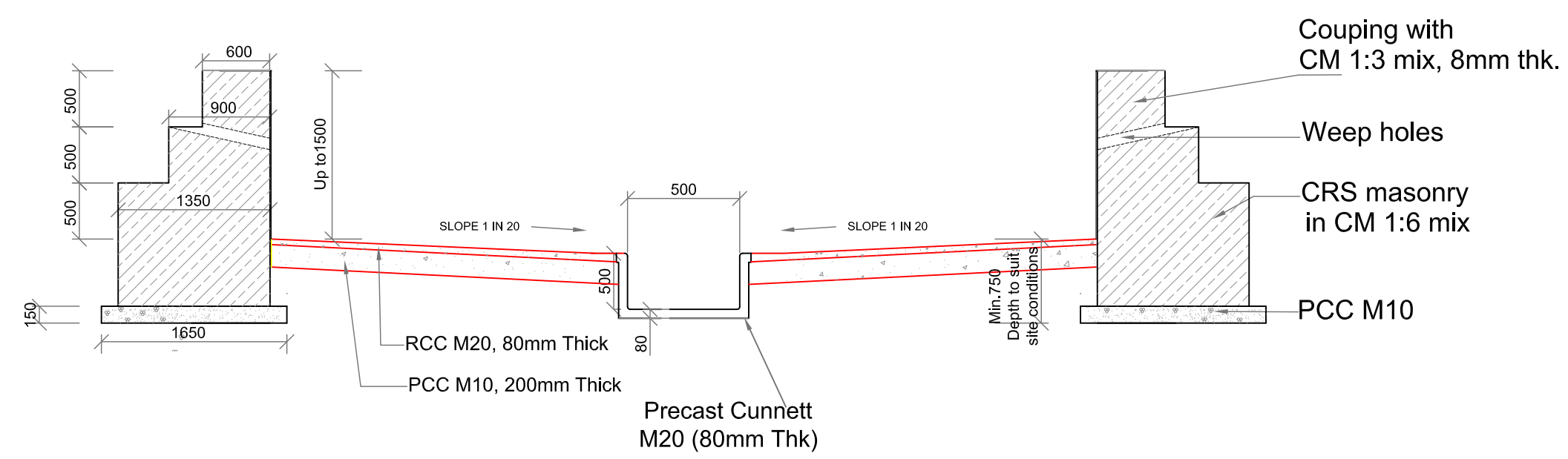
1. All Dimensions are in Millimetres Unless Otherwise Noted.
2. Weep Holes to be Provided @ One Hole (100 Mm Ø) Per Sq.m in a Staggered Pattern
3. Weep Holes Shall be Filled with no Fines Concrete of 1:4 Mix (One Cement + Four Aggregate 20mm Downgrade)
4. Expansion Joint shall be Provided at Every 10.0 M Interval and at all Change of Directions (Corners).
5. Expansion Joints shall be for the Entire Height of Retaining Wall.
6. The Expansion Joints Shall be Filled with Bituminous Pad and Top Provided with Bitumen Cap.
7. The Retaining Wall Has Been Designed for a SBC Value of 150 K_n/m², Ø = 15 (wet Earth) W = 1800 Kg / Cu.m, K = 0.990
8. Depth of Foundation shown is the Minimum Requirement, This May vary to Suit Site Conditions.
9. For Walls over 750mm thick, the Outside Face upto 450mm Thick shall be Paid as CRS Second Sort and the Balance RR.
10. For Walls 750mm and less thick, the Entire Wall shall be Paid as CRS Second Sort.
11. In all Concrete Items Coarse Aggregate shall be 20mm.

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

Consultant
Wilbur Smith Associates

Drawn: SK	Checked: HVS
Date: Aug. 2009	Approved: NSS

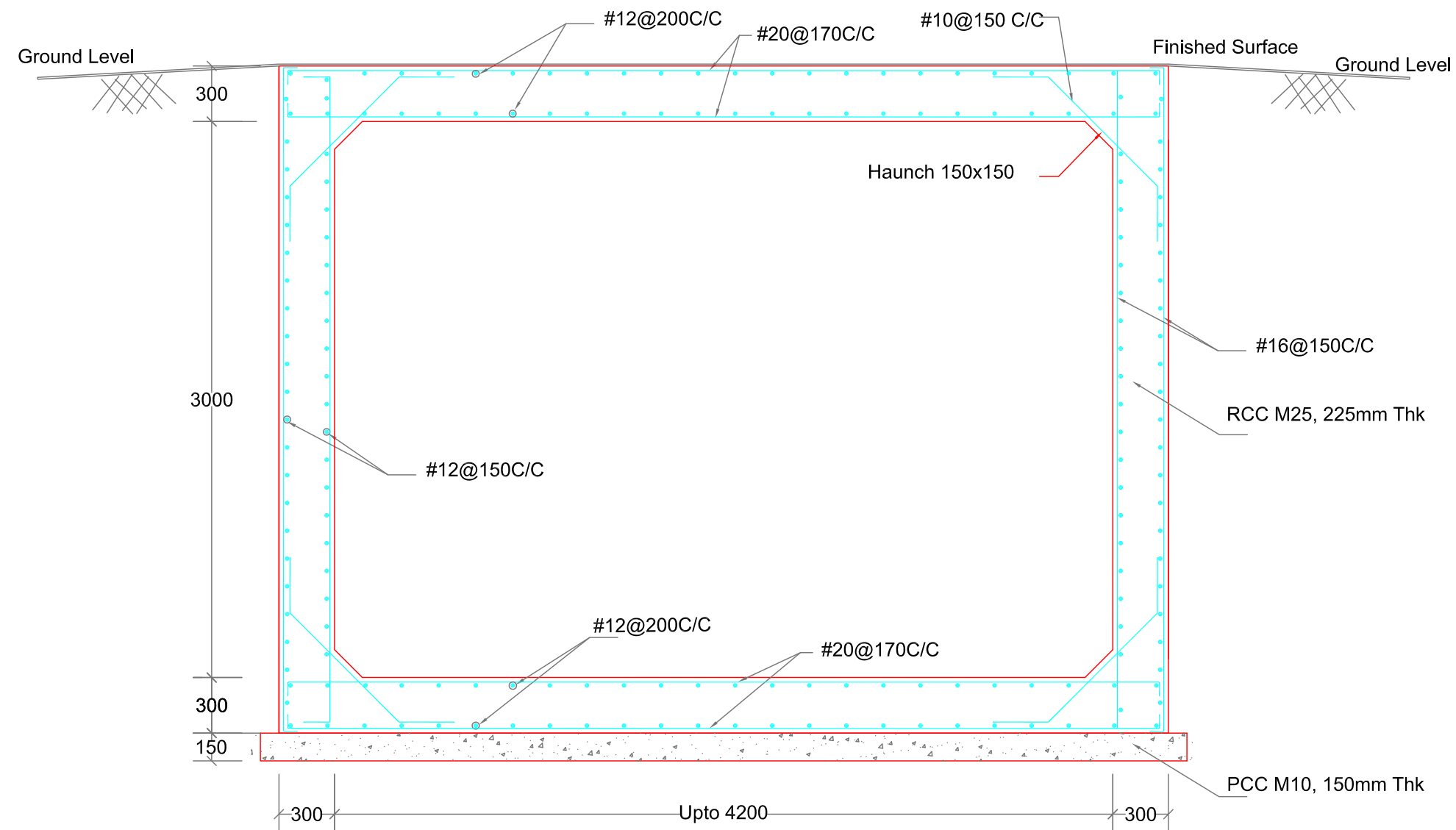
Scale 1:50
Drg. No. NCRPB-HAPUR-DR-6B



Cross Section of Drain from Ch 4250 to 6700

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

Hapur
Box Girder of 3m Width



Box Girder 3.0m Width

Notes

1. All Dimensions are in mm Unless Mentioned Otherwise
2. Grade of Concrete P.C.C M10 and R.C.C M25
3. Grade of Steel FE 415
4. Construction Shall Conform to Latested of I.S. 456-2000
5. Expansion Joint Provided 45m Interval
6. Clear Cover - 40mm for Slab, 40mm for RCC Wall, 50mm for Footing
7. Development Length - 50 Times of Dia of Bar

Client:

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

Consultant:

Wilbur Smith Associates

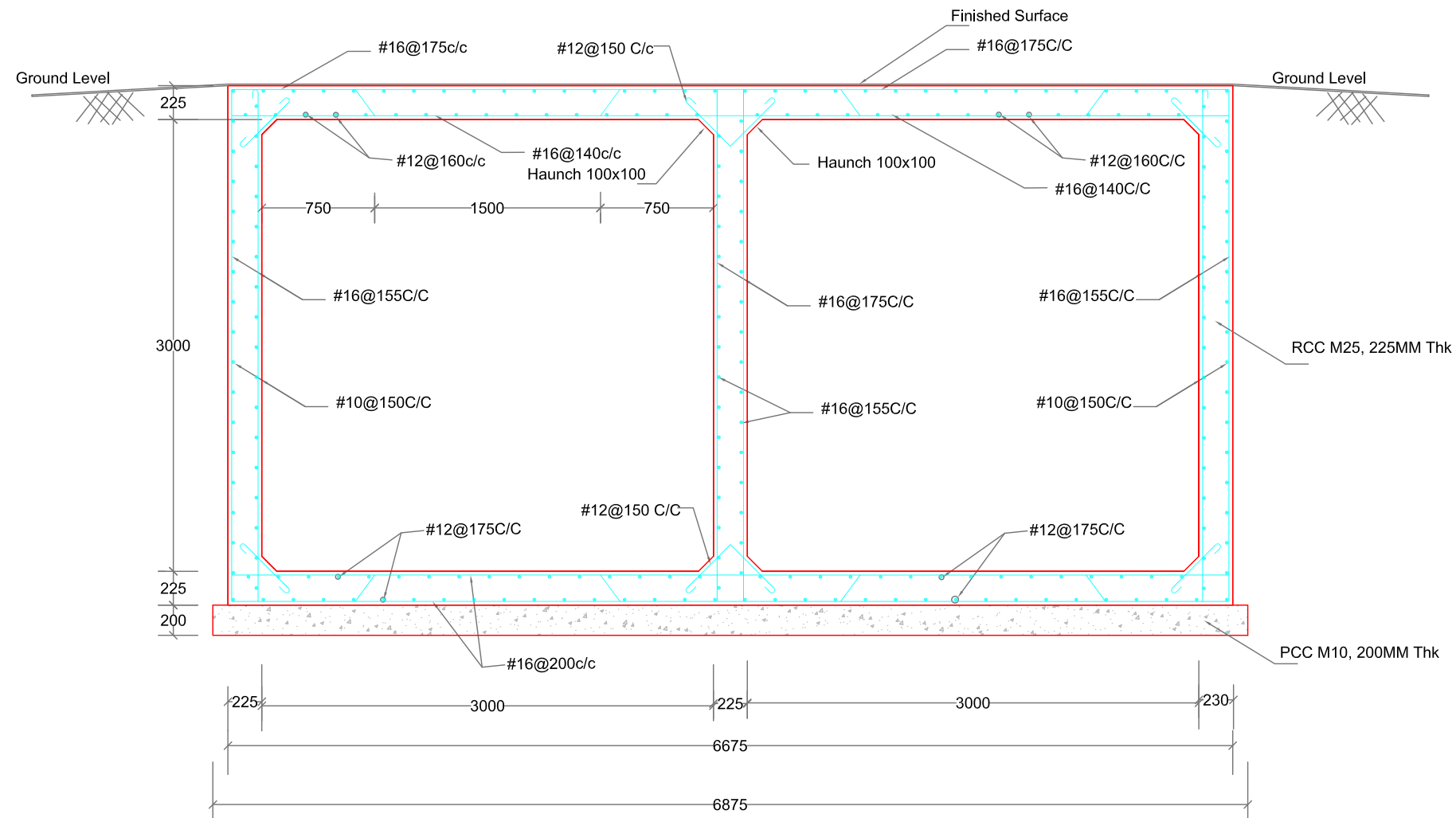
Drawn: SK
Date: August.2009
Scale 1:30

Checked: HVS
Approved: NSS

Drg. No.NCRPB-HAPUR-DR-7A

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

Hapur
Box Girder of 6m Width



Box Girder 6.0m Width

Notes

1. All Dimensions are in mm Unless Mentioned Otherwise
2. Grade of Concrete P.C.C M10 R.C.C M25
3. Grade of Steel FE 415
4. Construction Shall Conform to Latested of I.S. 456-2000
5. Expansion Joint Provided 45m Interval
6. Clear Cover - 40mm for Slab, 40mm for RCC Wall, 50mm for Footing
7. Development Length - 50 Times of Dia of Bar

Client:

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

Consultant:

Wilbur Smith Associates

Drawn: SK

Checked: HVS

Date: August.2009

Approved: NSS

Scale 1:40

Drg. No.NCRPB-HAPUR-DR-7B

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