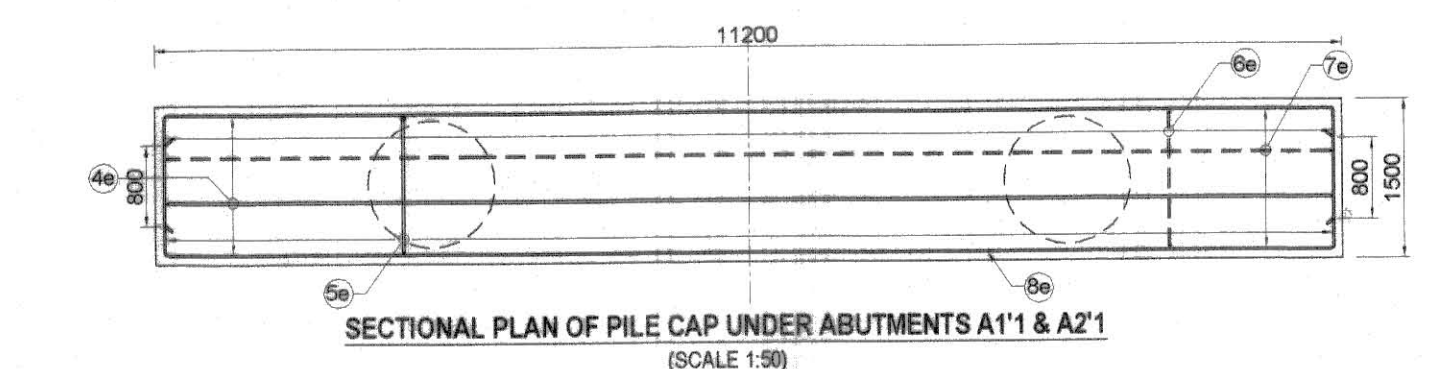
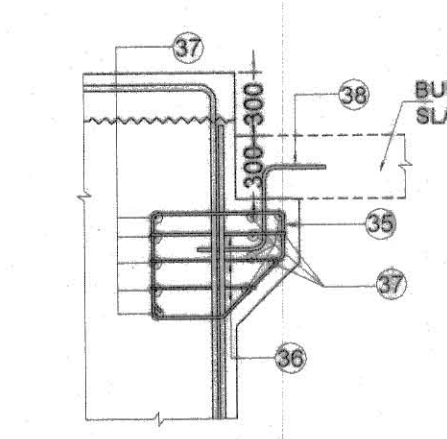


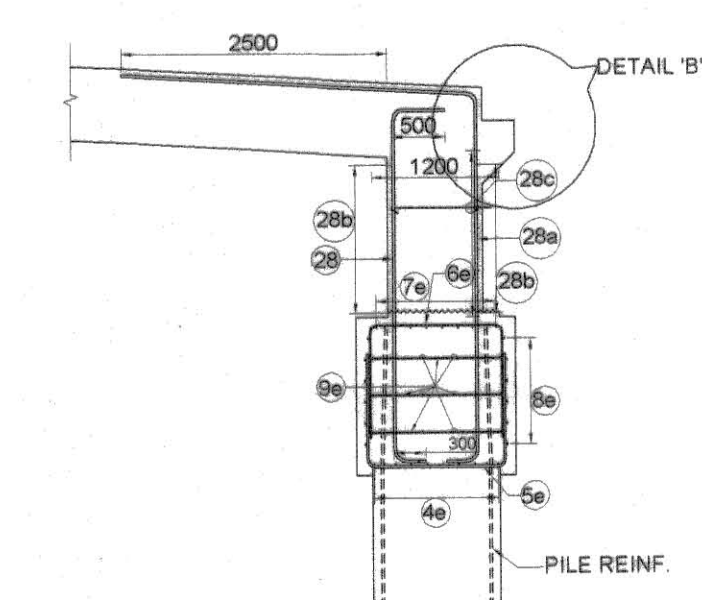
SECTIONAL ELEVATION OF PILE UNDER PIERS P1 TO P4 & ABUTMENTS A1 & A2 (SCALE 1:50)



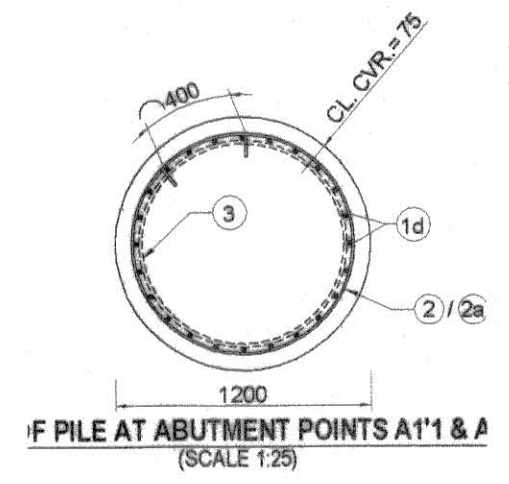
SECTIONAL PLAN OF PILE CAP UNDER ABUTMENTS A1'1 & A2'1 (SCALE 1:50)



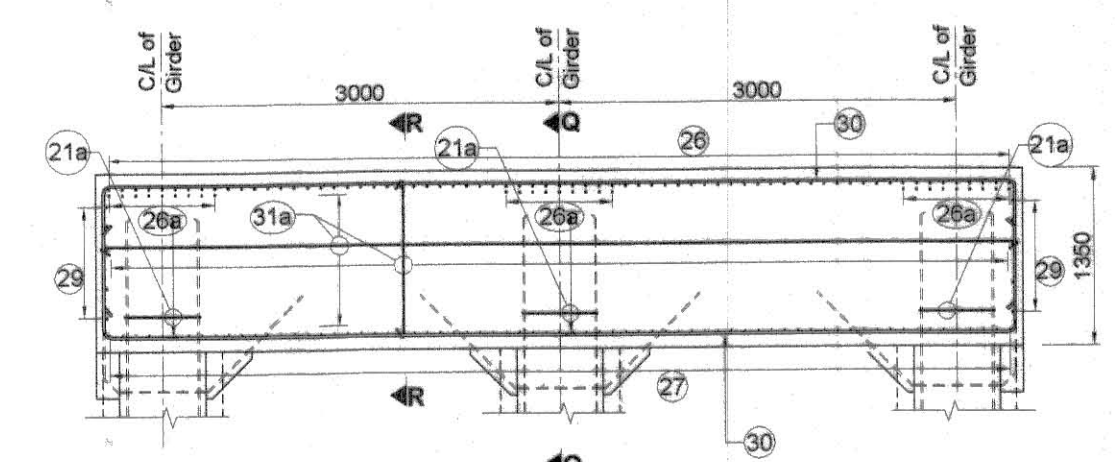
DETAIL 'A' FOR A1 & A2 (SHOWING CORBEL REINF. ALONE) (SCALE 1:25)



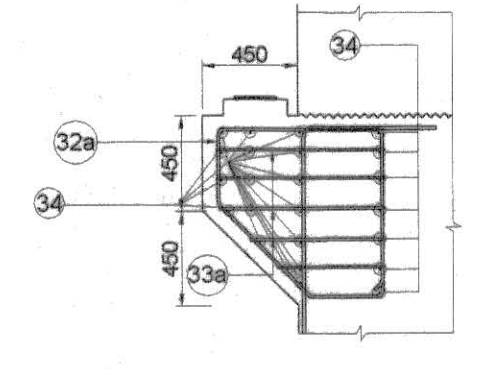
SECTIONAL ELEVATION OF PILE CAP & ABUTMENTS A1'1 & A2'1 (SCALE 1:50)



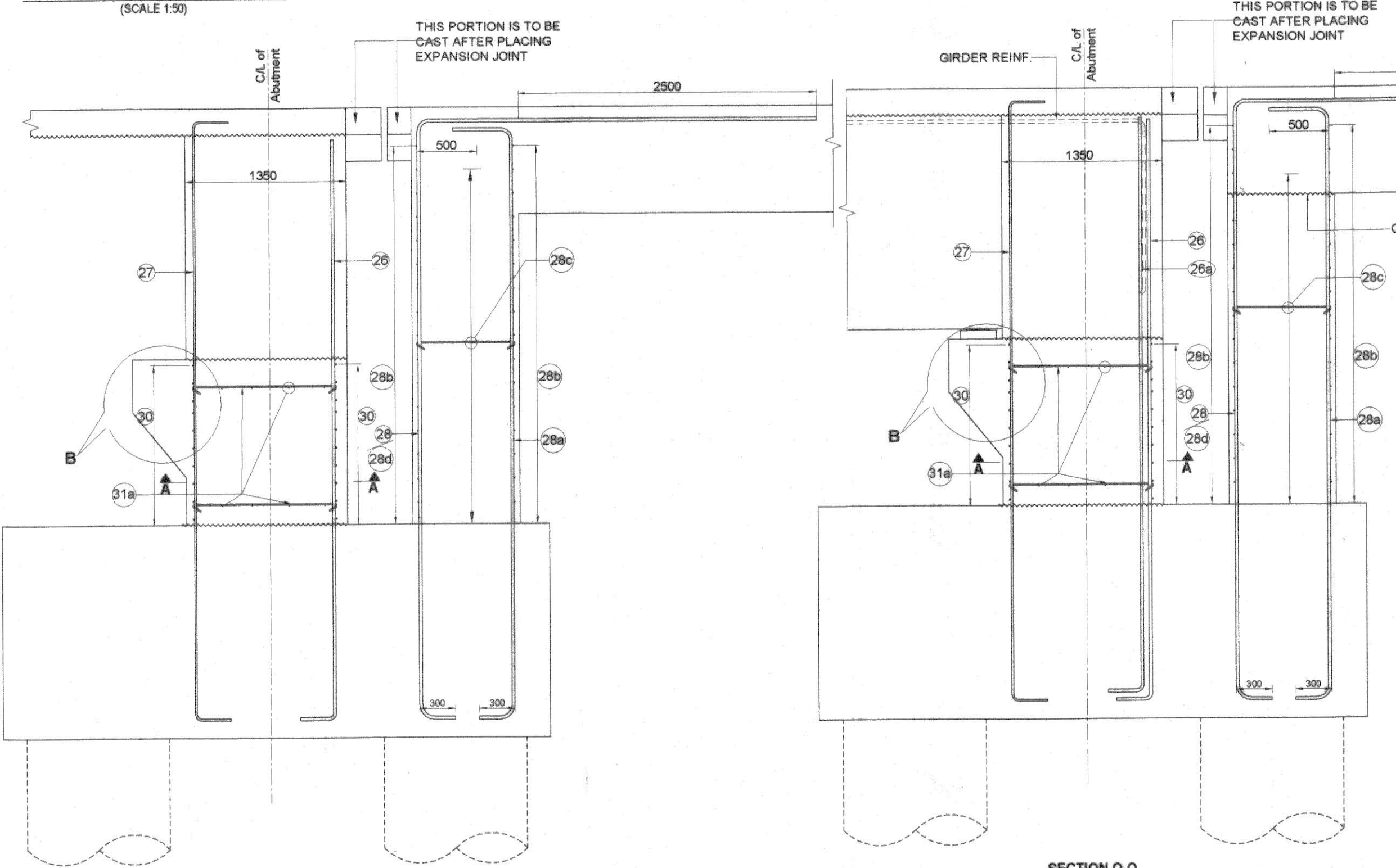
'F' PILE AT ABUTMENT POINTS A1'1 & A2'1 (SCALE 1:25)



SECTIONAL PLAN OF ABUTMENT AT A1 & A2 (30M SPAN) (SCALE 1:40)

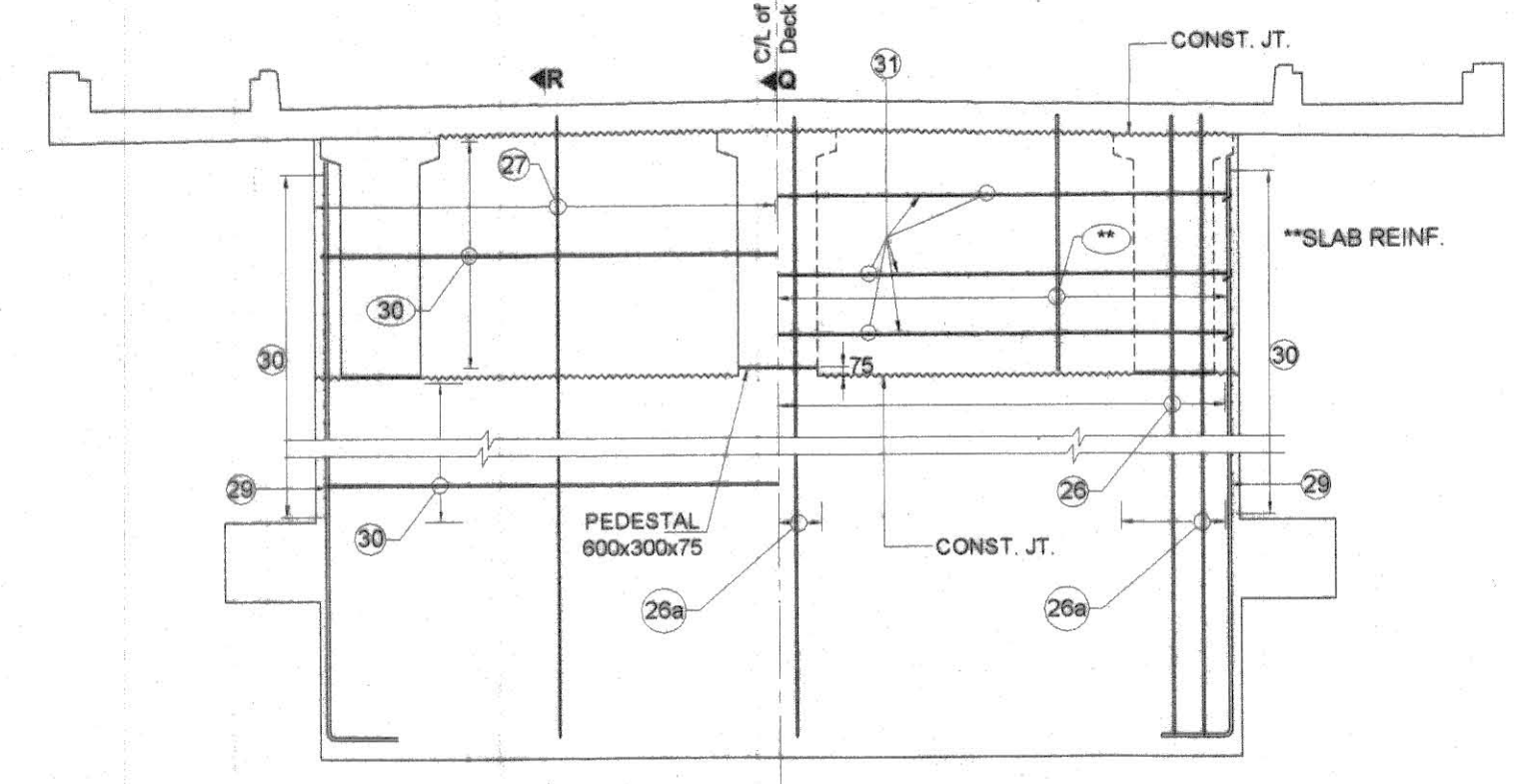


DETAIL 'B' FOR A1 & A2 (SHOWING CORBEL REINF. ALONE) (SCALE 1:25)

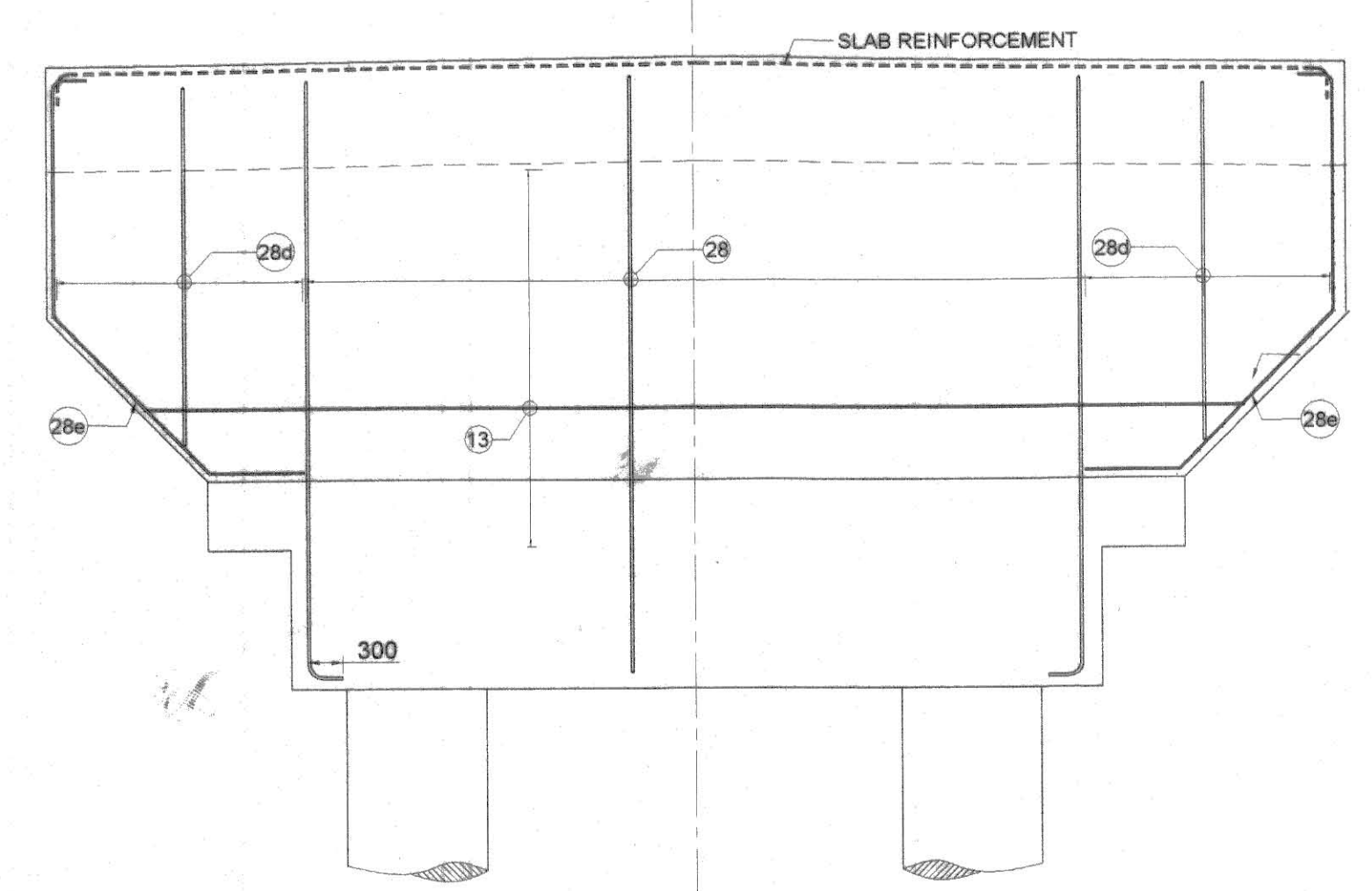


SECTION R-R (SHOWING ABUT. WALL RFT. ALONE) (SCALE 1:25)

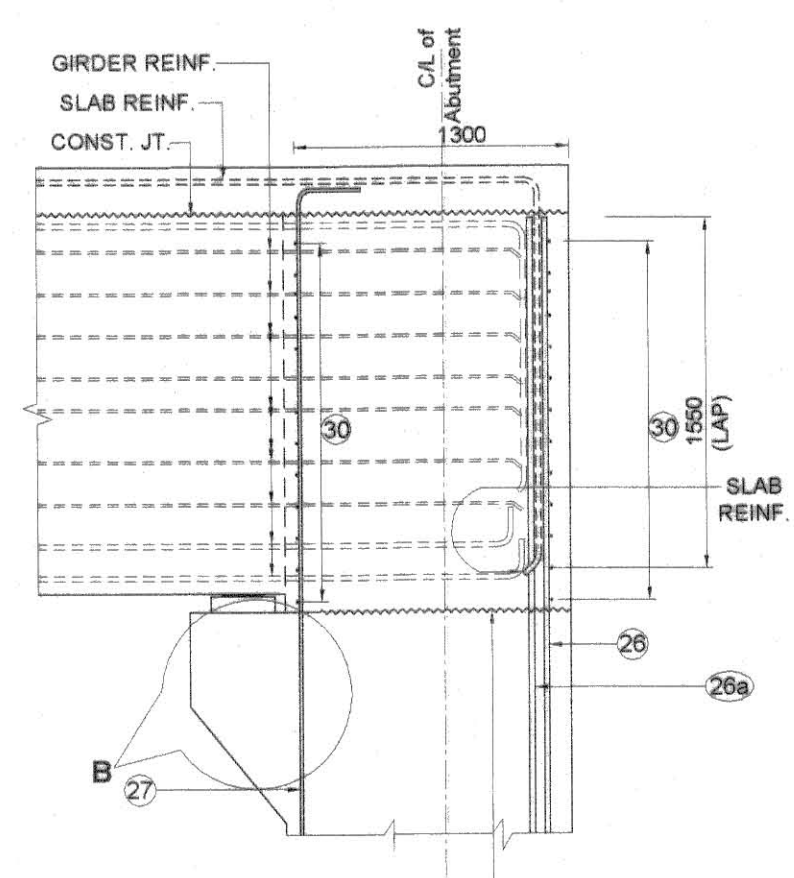
SECTION Q-Q (SHOWING DIAPHRAGM REINF. ALONE) (SCALE 1:25)



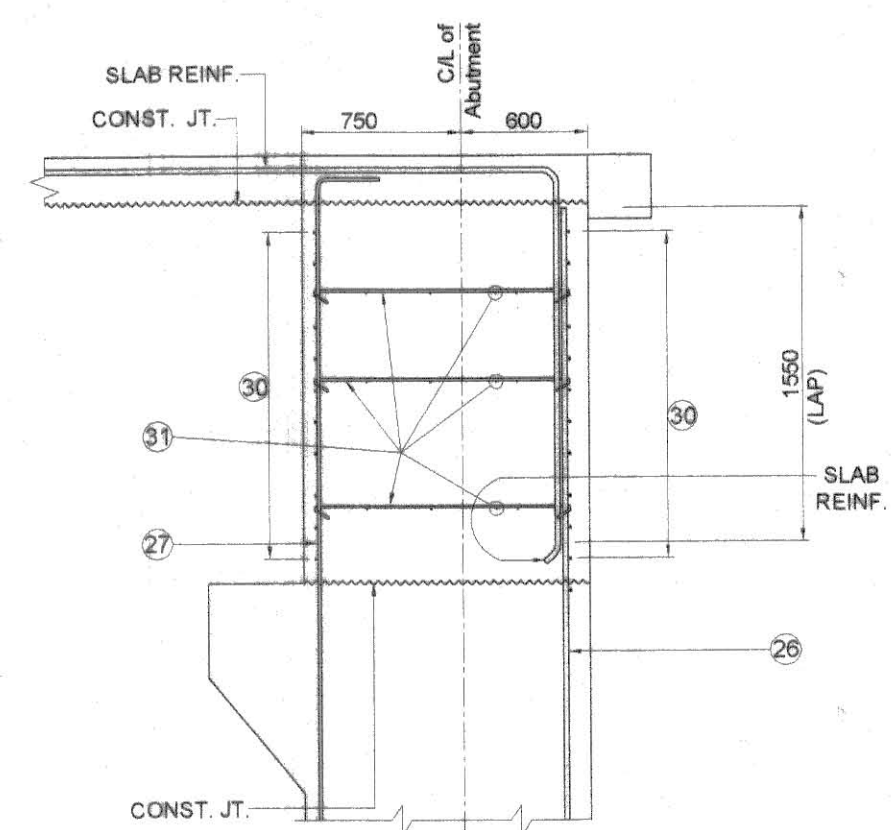
HALF SECTIONAL ELEVATION (SHOWING ABUTMENT & DIAPHRAGM REINF.) (SCALE 1:40)



SECTIONAL ELEVATION OF ABUTMENT WALL AT A1 & A2 (10 M SPAN) (SCALE 1:40)



SECTION Q-Q (SHOWING DIAPHRAGM REINF. ALONE) (SCALE 1:25)



SECTION R-R (SHOWING DIAPHRAGM REINF. ALONE) (SCALE 1:25)

SL. No.	BAR SHAPE	BAR DIA. Nos./SPACING	REMARKS
1	V	25 - 24Nos.	MAIN
2	4	10@100c	TIES
3	4	10@150c	TIES
4	4	10@1500c	STIFFNER
5	4	25@150c	MAIN BOT.
6	4	20@150c	MAIN TOP
7	4	20@150c	MAIN TOP
8	4	20, 6 Nos.	WRAP AROUND
9	4	10@300c	MESH

SL. No.	BAR SHAPE	BAR DIA. Nos./SPACING	REMARKS
20	V	25@100c	VERTICAL
21	V	25, 9 Nos.	VERTICAL
22	V	18@100c	VERTICAL
23	V	20@100c	VERTICAL
24	V	18@100c	VERTICAL
25	V	12@100c	HORIZONTAL
26	V	10@300c VERT. & HORIZ.	LINKS
27	V	16@100c	VERTICAL
28	V	16, 6 Nos.	SIDEFACE
29	V	25@150c	VERTICAL
30	V	16@150c	SIDEFACE WRAP
31	V	10@300c	MESH
32	V	12@300c	MESH
33	V	10@300c	MESH
34	V	16@100c	MAIN
35	V	12@150c (5 Nos.)	HORIZONTAL STIRRUPS
36	V	10 - 24Nos.	HORIZONTAL
37	V	12@100c	MAIN
38	V	12@150c (5 Nos.)	HORIZONTAL STIRRUPS
39	V	10 - 12Nos.	HORIZONTAL
40	V	12@200c	DOWELS

No.	Letter No.	Date	Description
1	CE/R&B/KLM/1217/2017	15/06/2017	Investigation Details

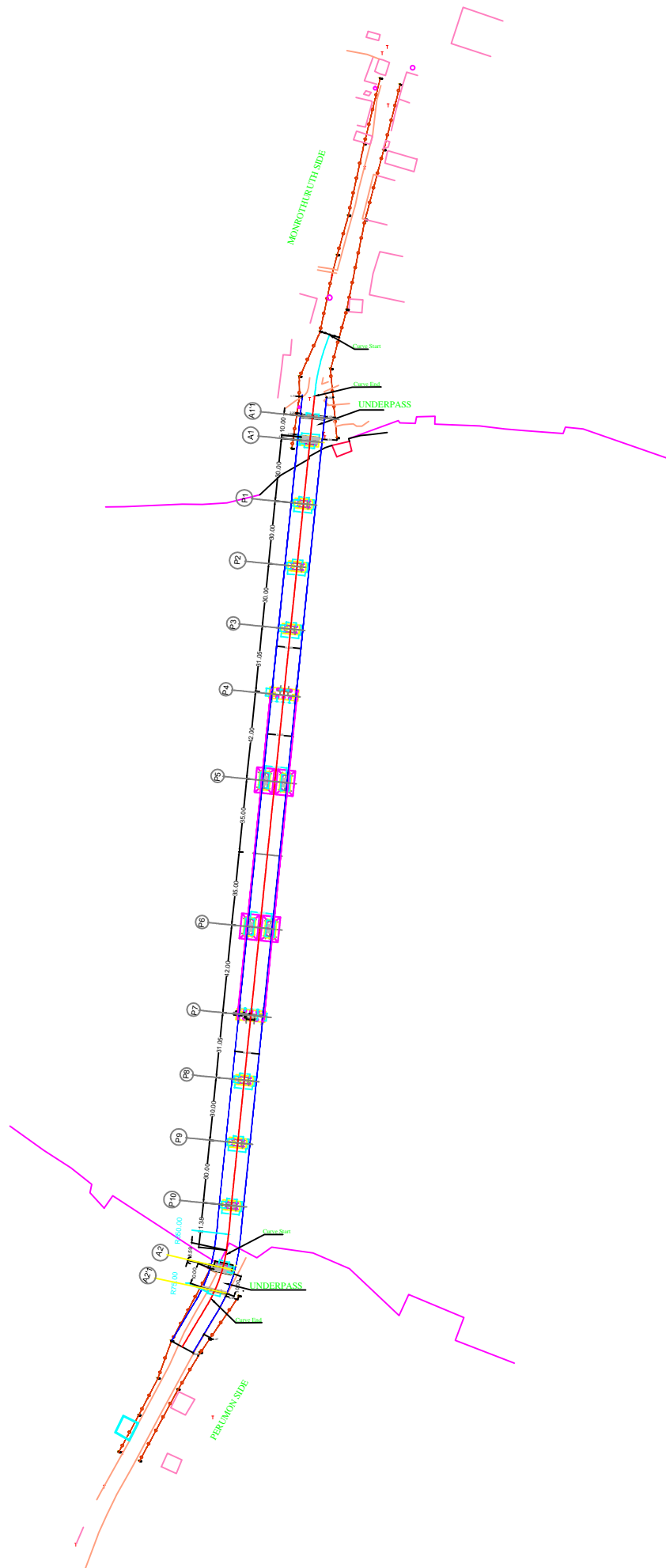
No.	Drawing/Sheet No.	Date	Drawing Title
1	CEDO/BD/116/17/Rev1	03/02/2021	GENERAL DESIGN DRAWING(1A/2-1C/2)

Rev. No.	Designed	Checked	Reviewed	Recommended	Approved	Date	Description
1							

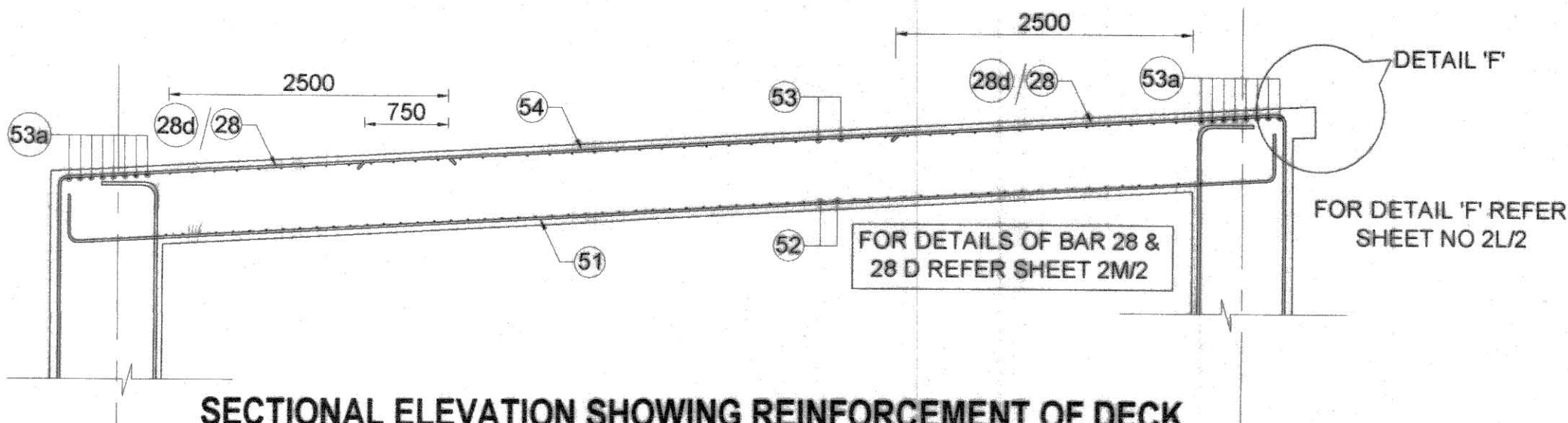
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PEZHUM THURUTHU-PERUMON	
NAME OF CROSSING:	ROAD CHAINAGE AT C/L OF CROSSING:
ASHTAMUDIKAYAL	CH: 338.50
NAME OF BRIDGE:	BRIDGE No.
PERUMON BRIDGE	

DRAWING ISSUED FOR:	EXECUTION WING:
<input type="checkbox"/> DPR PREPARATION	ROADS AND BRIDGES
<input type="checkbox"/> ADMIN./FINANCIAL SANCTION	NAME OF DIVISION:
<input type="checkbox"/> TECHNICAL SANCTION	ALAPPUZHA
<input checked="" type="checkbox"/> CONSTRUCTION	DRAWN BY:
ROAD CATEGORY:	BINO BRIGIT P.B.
<input type="checkbox"/> NATIONAL HIGHWAY	3rd GRADE DRAFTSMAN
<input type="checkbox"/> STATE HIGHWAY	DESIGNED BY:
<input checked="" type="checkbox"/> MAJOR DISTRICT ROAD	ARUN K.V.
<input type="checkbox"/> OTHER DISTRICT ROAD	ASSISTANT BRIDGE ENGINEER
<input type="checkbox"/> VILLAGE ROAD	CHECKED BY:
BRIDGE CATEGORY:	PHOENIX S.S.
<input type="checkbox"/> CULVERT	BRIDGE ENGINEER
<input type="checkbox"/> MINOR BRIDGE	REVIEWED BY:
<input checked="" type="checkbox"/> MAJOR BRIDGE	SAJU S.
<input type="checkbox"/> FLYOVER BRIDGE	SENIOR BRIDGE ENGINEER
<input type="checkbox"/> UNDER PASS	RECOMMENDED BY:
<input type="checkbox"/> ROAD OVER BRIDGE	SANDHYA.G.MENON
<input type="checkbox"/> ROAD UNDER BRIDGE	DIRECTOR (I & QC)
<input type="checkbox"/> CAUSEWAY	APPROVED BY:
CONSTRUCTION NATURE:	MADHUMATHI.K.R.
<input checked="" type="checkbox"/> NEW	CHIEF ENGINEER (DESIGN)
<input type="checkbox"/> RECONSTRUCTION	DATE:
<input type="checkbox"/> REHABILITATION	03/02/2021

Bridges Design Unit	
CHIEF DESIGN OFFICE	
DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT	
PUBLIC OFFICE COMPOUND, MUSEUM P.O.	
THIRUVANANTHAPURAM, KERALA. PIN: 695 033	
Tel: 04712322029 Website: keralapwd.gov.in	
Fax: Email: bducdso@gmail.com	
DRAWING TITLE:	DRAWING SCALE:
REINFORCEMENT DETAILS	1:100, 1:40, 1:20
OF PILE & PILE CAP A1'1&A1'2	SHEET SIZE:
AND ABUTMENT A1'1,A2'1,A1 & A2	A1
	REVISION No:
	R0
DRAWING No.	SHEET No.
CEDO/BD/116/17/Rev1	2M/2

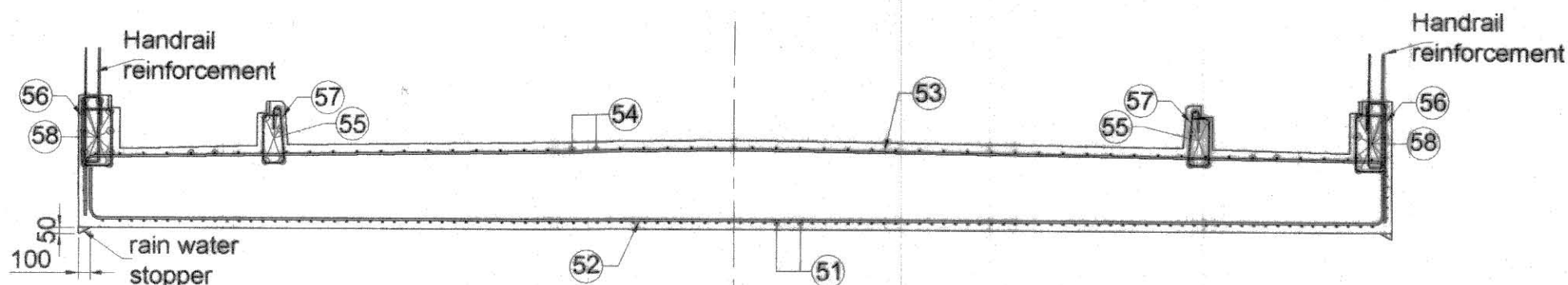


KERALA PUBLIC WORK DEPARTMENT DRIQ BOARD, THIRUVANANTHAPURAM			
TITLE: GENERAL ALIGNMENT DRAWING			
DRAWN:	SCALE:	DRG NO:	REV:
DESIGNED:	CHECKED:	APPROVED:	
PROJECT: KIIFB 16-17 CONSTRUCTION OF PERUMAN BRIDGE CONNECTING PERUMAN AND MANDROTHURUTHU ACROSS AZHTAMUDI LAKE.			



SECTIONAL ELEVATION SHOWING REINFORCEMENT OF DECK SLAB AT SPAN BETWEEN A1'1 & A1 and A2 & A2'1

(SCALE 1:50)



CROSS SECTION SHOWING REINFORCEMENT OF DECK SLAB AT MIDSPAN OF SPAN

(SCALE 1:50)

SCHEDULE OF REINFORCEMENT

SLAB	REINFORCEMENT	SLAB REINF.
51		Φ20@100c/c
52		Φ16@150c/c
53		Φ16@200c/c
53a		Φ20, 8 Nos
54		Φ16@100c/c
55		Φ10 - 5 Nos.
56		Φ10@150c/c
57		Φ10@200c/c
58		Φ10 - 10 Nos.

Note: The actual bar bending dimensions of reinforcements shall be verified at site before placing the bars in position.

3			
2			
1	CE/BD/116/17/2017	03/06/2017	Investigation Details

No	Letter No.	Date	Description
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REFERENCE LETTERS			
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3			
2			
1	CE/BD/116/17/2017	03/02/2021	DETAILS OF ADDITIONAL LIND SPAN

No	Drawing/Sheet No.	Date	Drawing Title
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REFERENCE DRAWINGS			
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R4			
R3			
R2			
R1			

Rev. No.	Design	Checked	Reviewed	Recommended	Approved	Date	Description
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REVISIONS							
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NAME OF ROAD		ROAD NO.	
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PEZHUM THURLUTH- PERUMON			
--------------------------	--	--	--

NAME OF CROSSING		ROAD CROSSING AT	
------------------	--	------------------	--

ASHTAMUDI KAYAL		CH. 0+38.950	
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NAME OF BRIDGE		BRIDGE NO.	
----------------	--	------------	--

PERUMON BRIDGE			
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DRAWING ISSUED FOR:			
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<input type="checkbox"/> DPR PREPARATION	<input type="checkbox"/> EXECUTION WORK
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<input type="checkbox"/> ADMIN. / FINANCIAL SANCTION	<input type="checkbox"/> ROADS AND BRIDGES
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<input type="checkbox"/> TECHNICAL SANCTION	<input type="checkbox"/> NAME OF DIVISION
---	---

<input checked="" type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> KOLLAM
--	---------------------------------

ROAD CATEGORY:	
----------------	--

<input type="checkbox"/> NATIONAL HIGHWAY	<input type="checkbox"/> BINGO BRIGIT P.A.
---	--

<input type="checkbox"/> STATE HIGHWAY	<input type="checkbox"/> 3rd GRADE DRAFTER
--	--

<input checked="" type="checkbox"/> MAJOR DISTRICT ROAD	<input type="checkbox"/> ARUN K.V.
---	------------------------------------

<input type="checkbox"/> OTHER DISTRICT ROAD	<input type="checkbox"/> ASSISTANT BRIDGE ENGINEER
--	--

<input type="checkbox"/> VILLAGE ROAD	<input type="checkbox"/> PHOENIX S.S.
---------------------------------------	---------------------------------------

BRIDGE CATEGORY:	
------------------	--

<input type="checkbox"/> CULVERT	<input type="checkbox"/> CHECKED BY:
----------------------------------	--------------------------------------

<input checked="" type="checkbox"/> MINOR BRIDGE	<input type="checkbox"/> SANDHYA G.MENON
--	--

<input checked="" type="checkbox"/> MAJOR BRIDGE	<input type="checkbox"/> DIRECTOR (S&O)
--	---

<input type="checkbox"/> FLYOVER BRIDGE	<input type="checkbox"/> DATE:
---	--------------------------------

<input type="checkbox"/> UNDER PASS	<input type="checkbox"/> 03/02/2021
-------------------------------------	-------------------------------------

<input type="checkbox"/> ROAD OVER BRIDGE	<input type="checkbox"/> APPROVED BY:
---	---------------------------------------

<input type="checkbox"/> ROAD UNDER BRIDGE	<input type="checkbox"/> MADHUMATHY K.R.
--	--

<input type="checkbox"/> CAUSEWAY	<input type="checkbox"/> CHIEF ENGINEER (DESIGN)
-----------------------------------	--

CONSTRUCTION NATURE:	
----------------------	--

<input checked="" type="checkbox"/> NEW	<input type="checkbox"/> RECOMMENDED BY:
---	--

<input type="checkbox"/> RECONSTRUCTION	<input type="checkbox"/> SANDHYA G.MENON
---	--

<input type="checkbox"/> REHABILITATION	<input type="checkbox"/> DIRECTOR (S&O)
---	---

DATE:	
-------	--

03/02/2021	
------------	--

APPROVED BY:	
--------------	--

MADHUMATHY K.R.	
-----------------	--

CHIEF ENGINEER (DESIGN)	
-------------------------	--

Bridges Design Unit	
---------------------	--

CHIEF DESIGN OFFICE	
---------------------	--

DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT	
---	--

PUBLIC OFFICE COMPOUND, PERUMON P.O.	
--------------------------------------	--

THIRUVANANTHAPURAM, KERALA. PIN: 695 033	
--	--

Tel: 04712322029 Website: kstateltd.gov.in	
--	--

Fax: Email: kstateltd@gmail.com	
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DRAWING TITLE	
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REINFORCEMENT DETAILS OF	
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RCC SLAB (10M SPAN)	
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DRAWING NO.	
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CE/BD/116/17 (REV1)	
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FILE NO.	
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BD/33/2017/DESIGN/11	
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SHEET NO.	
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2N/2	
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KEY PLAN:

NOTES:

- GENERAL
- All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
- Only written dimensions are to be followed. No drawing shall be scaled.

No.	Letter No.	Date	Description
1	CE/R&B/KLM/1217/2017	15/06/2017	Investigation Details

REFERENCE LETTERS

No.	Drawing/Sheet No.	Date	Drawing Title
1	1/2	31/03/2018	GENERAL DESIGN DRAWING

REFERENCE DRAWINGS

Rev. No.	Designed	Checked	Reviewed	Recommended	Approved	Date	Description
R4							
R3							
R2							
R1							

REVISIONS

NAME OF ROAD: PEZHUM THURUTHU-PERUMON ROAD No.

NAME OF CROSSING: ASHTAMUDI KAYAL ROAD CHANGING AT CL. OF CROSSING: CH: 338.50

NAME OF BRIDGE: PERUMON BRIDGE BRIDGE No.

DRAWING ISSUED FOR:
 DPR PREPARATION
 ADMIN./FINANCIAL SANCTION
 TECHNICAL SANCTION
 CONSTRUCTION

ROAD CATEGORY:
 NATIONAL HIGHWAY
 STATE HIGHWAY
 MAJOR DISTRICT ROAD
 OTHER DISTRICT ROAD
 VILLAGE ROAD

BRIDGE CATEGORY:
 CULVERT
 MINOR BRIDGE
 MAJOR BRIDGE
 FLYOVER BRIDGE
 UNDER PASS
 ROAD OVER BRIDGE
 ROAD UNDER BRIDGE
 CAUSEWAY

DESIGNED BY: *[Signature]*
 ARUN K.V.
 ASSISTANT BRIDGE ENGINEER

CHECKED BY: *[Signature]*
 PHOENIX S.S.
 BRIDGE ENGINEER

REVIEWED BY: *[Signature]*
 SAJU S.
 SENIOR BRIDGE ENGINEER

RECOMMENDED BY: *[Signature]*
 SANDHYA G. MENON
 DIRECTOR

DATE: 03/02/2021

APPROVED BY: *[Signature]*
 MADHUMATHI K.R.
 CHIEF ENGINEER (DESIGN)

CONSTRUCTION NATURE:
 NEW
 RECONSTRUCTION
 REHABILITATION

DRAWING TITLE: REINFORCEMENT DETAILS
 RCC SLAB (30 M SPAN)

DRAWING No.: CEDO/BD/116/17(Rev1) BD/33/2017/Design/HW

DRAWING SCALE: 1:100, 1:40, 1:20
 SHEET SIZE: A1
 REVISION No.: R0
 SHEET No.: 2L/2

SECTIONAL ELEVATION C-C
 (SCALE 1:50)

SECTIONAL ELEVATION D-D
 (SCALE 1:50)

SECTION OF KERB ABOVE DIAPHRAGM
 (DETAIL A)
 (SCALE 1:25)

THIS PORTION IS TO BE CAST AFTER PLACING EXPANSION JOINT
 (SCALE 1:25)

SCHEDULE OF REINFORCEMENT

SL. No.	BAR SHAPE	BAR DIA. Nos./ SPACING
41	11100	Φ16 @ 200c/c (ALTERNATE)
42	2000	Φ16 @ 200c/c (ALTERNATE)
43	2600	Φ20 @ 200c/c (ALTERNATE)
44	9600	Φ12 @ 100c/c
45	2750	Φ10 @ 150c/c
46	1100 8850	Φ25 @ 100c/c
46a	16000	Φ25 @ 100c/c
46b	15200	Φ12 @ 100c/c
47		Φ12 @ 200c/c
48		Φ10 @ 200c/c
49		Φ10 @ 200c/c
50		Φ10 - 4Nos.
51		Φ10 @ 200c/c
52		Φ10 - 10Nos.
53		Φ12 @ 150c/c
54		Φ12 @ 150c/c
55		Φ12, 7 Nos.

TYPICAL SECTIONAL PLAN OF SUPERSTRUCTURE
 (SCALE 1:100)

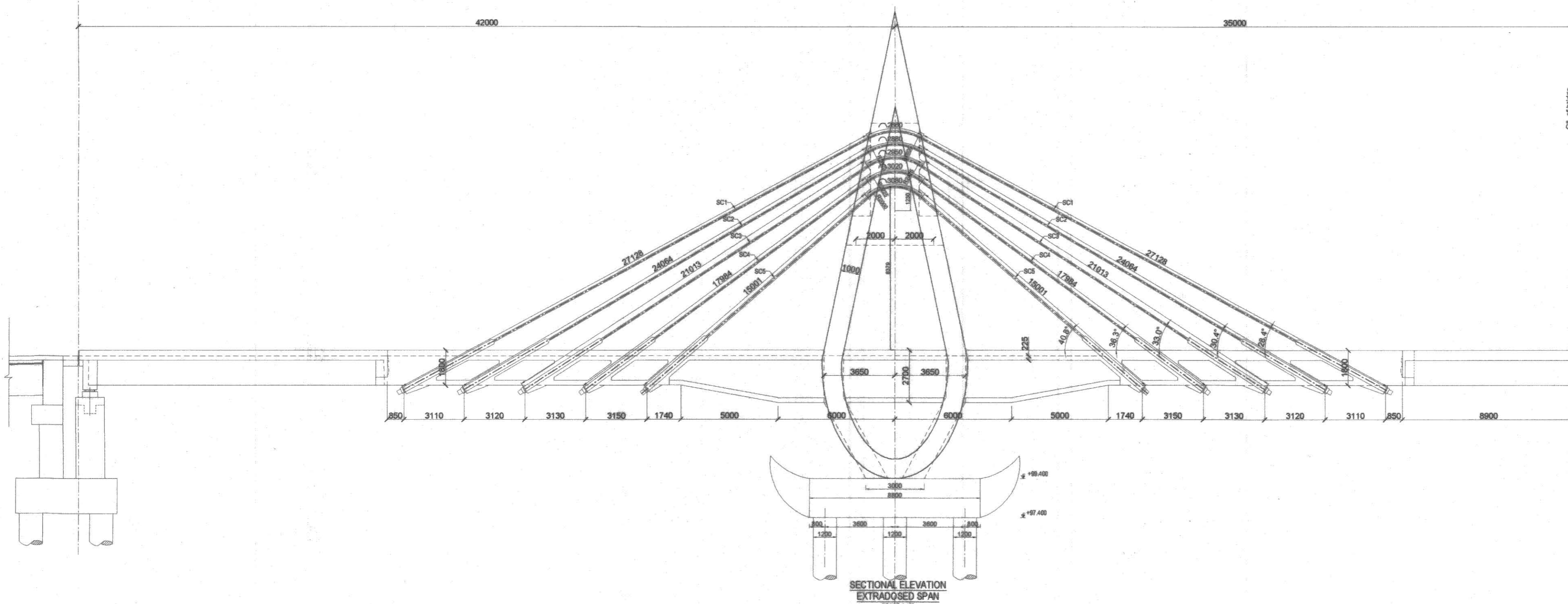
SECTION A-A
 (SCALE 1:50)

SECTION B-B
 (SCALE 1:50)

--- TOP BAR
 --- BOTTOM BAR



Bridges Design Unit
 CHIEF DESIGN OFFICE
 DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT
 PUBLIC OFFICE COMPOUND, MUSEUM P.O.
 THIRUVANANTHAPURAM, KERALA. PIN: 695 033
 Tel: 04712322029 Website: keralapwd.gov.in
 Fax: Email: bdudco@gmail.com

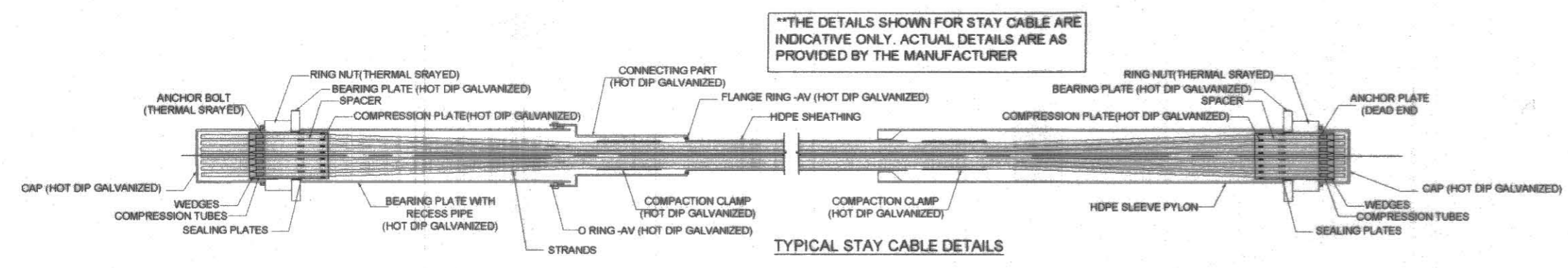


SECTIONAL ELEVATION
EXTRADOSED SPAN
SCALE 1:100

- REVISED FROM ORIGINAL
- The stay cables shall be of seven wire galvanized strands, coated (waxed/greased and HDPE sheathed), Low relaxation, Grade 1860 Mpa, weldless and conforming to EN 10138
 - The protection system of sheathed strand shall be as follows
 - Galvanization
 - minimum :190gm/m²
 - maximum :350gm/m²
 - Sealant (wax/grease) quantity (min)
 - Helical sheathing :5gm/m
 - Round sheathing :25gm/m
 - Minimum thickness of individual HDPE sheathing :1.5mm
 - Minimum friction between sheath and strand :160N/m length
 - Sheath is of non recycled black anti UV treated HDPE
 - The HDPE stay pipe shall consist of co-extruded high density polyethylene, with a colored external layer and a black internal layer
 - Minimum thickness of stay pipe shall be 6mm or dia/36
 - The standalone physical properties of strands shall be as follows
 - Nominal diameter :15.7mm
 - Minimum specified Ultimate stress :1860 Mpa
 - Nominal area :150 mm²
 - Modulus of Elasticity :195000 Mpa +/- 5%
 - Fatigue & static strength
 - Number of cycles :2 millions
 - Upper stress limit :0.45 UTS
 - Stress range :300 Mpa
 - Minimum fatigue strength :Tensile force >= 95% MLTS
 - Details of saddle shall be as per manufactures requirement.

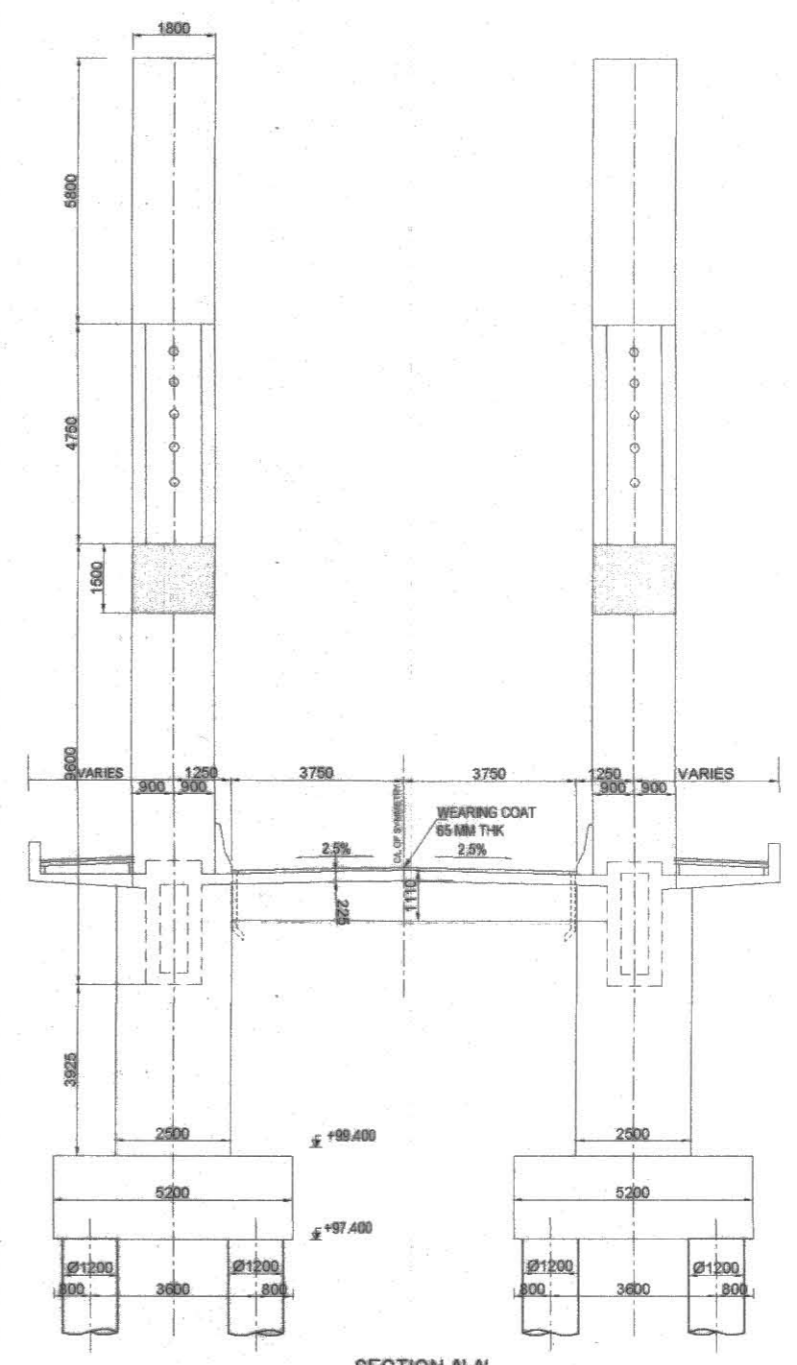
TABLE 1: DETAILS OF STAY CABLE

Sl No.	Cable No	Number of Strands	Number of cables	Anchorage Unit & saddle
1	SC1	19	4	as per manufacturer
2	SC2	17	4	as per manufacturer
3	SC3	15	4	as per manufacturer
4	SC4	13	4	as per manufacturer
5	SC5	11	4	as per manufacturer



**THE DETAILS SHOWN FOR STAY CABLE ARE INDICATIVE ONLY. ACTUAL DETAILS ARE AS PROVIDED BY THE MANUFACTURER

TYPICAL STAY CABLE DETAILS
SCALE 1:100



SECTION A-A
SCALE 1:100

KEY PLAN:

- NOTES:
- GENERAL
 - All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
 - Only written dimensions are to be followed. No drawing shall be scaled.
 - Properly stiffened steel plates shall be used as shuttering for casting Deck Slab and Cross Girders.
 - The Reinforcements for Parapet Posts, Parapet bases and Road Kerbs shall be dowelled out from Deck slab as shown.
 - Construction stage of the structure shall be as shown in the drawing.

No.	Letter No.	Date	Description
1	CE/RMB/KLN/1217/2017	15/06/2017	Investigation Details

REFERENCE LETTERS

No.	Drawing/Sheet No.	Date	Drawing Title
1	1/2	31/03/2018	GENERAL DESIGN DRAWING

REFERENCE DRAWINGS

Rev. No.	Designed	Checked	Reviewed	Recommended	Approved	Date	Description
R4							
R3							
R2							
R1							

REVISIONS

NAME OF ROAD: PEZHUM THURUTHU-PERUMON	ROAD No.
NAME OF CROSSING: ASHTAMUDIKAYAL	ROAD CHANGAGE AT CIL OF CROSSING: CH: 338.50
NAME OF BRIDGE: PERUMON BRIDGE	BRIDGE No.

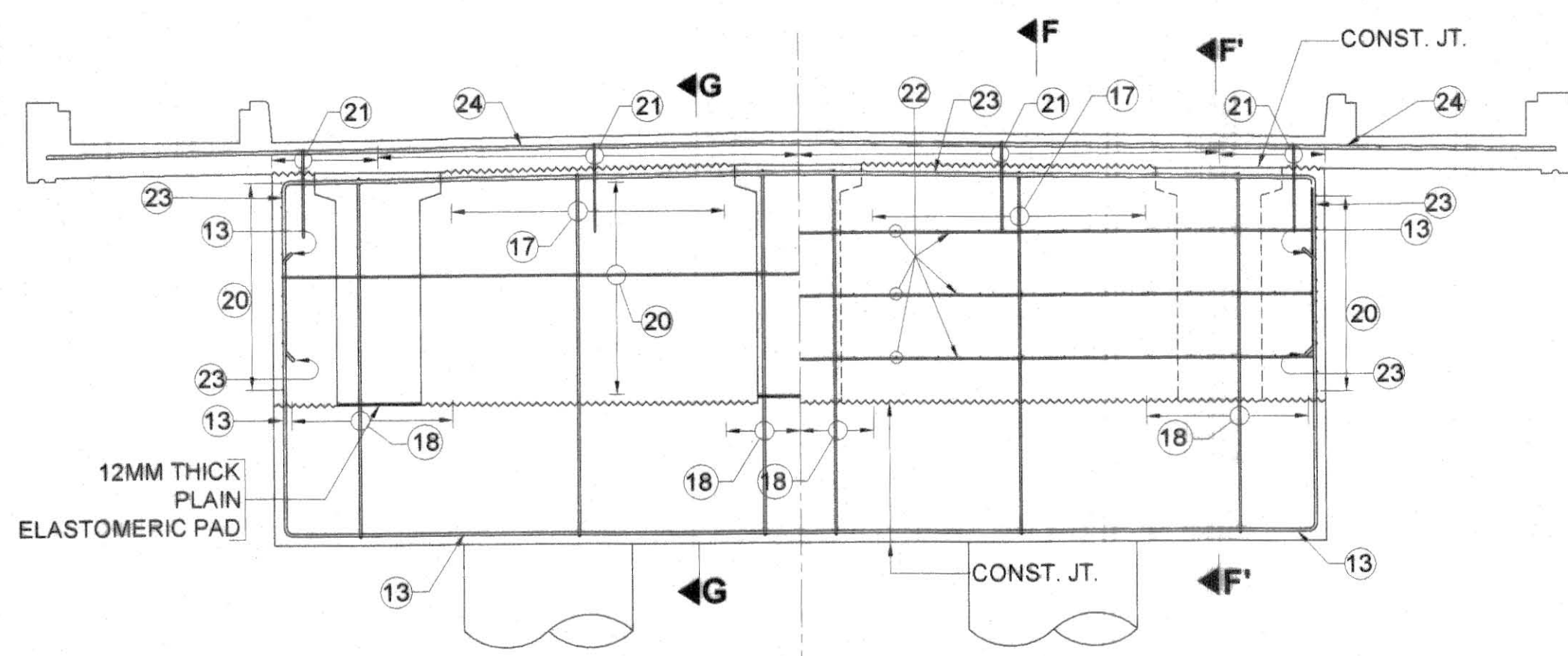
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ROAD CATEGORY: <input type="checkbox"/> NATIONAL HIGHWAY <input type="checkbox"/> STATE HIGHWAY <input checked="" type="checkbox"/> MAJOR DISTRICT ROAD <input type="checkbox"/> OTHER DISTRICT ROAD <input type="checkbox"/> VILLAGE ROAD	DRAWN BY: BINO BRIGIT P.B. 3rd GRADE DRAFTSMAN
BRIDGE CATEGORY: <input type="checkbox"/> CULVERT <input type="checkbox"/> MINOR BRIDGE <input checked="" type="checkbox"/> MAJOR BRIDGE <input type="checkbox"/> FLYOVER BRIDGE <input type="checkbox"/> UNDER PASS <input type="checkbox"/> ROAD OVER BRIDGE <input type="checkbox"/> ROAD UNDER BRIDGE <input type="checkbox"/> CAUSEWAY	DESIGNED BY: ARUN K.V. ASSISTANT BRIDGE ENGINEER
CONSTRUCTION NATURE: <input checked="" type="checkbox"/> NEW <input type="checkbox"/> RECONSTRUCTION <input type="checkbox"/> REHABILITATION	CHECKED BY: PHOENIX S.S. BRIDGE ENGINEER
DATE: 03/07/2020	REVIEWED BY: SAJU S. SENIOR BRIDGE ENGINEER
	RECOMMENDED BY: SANDHYA G.MENON DIRECTOR
	APPROVED BY: MADHUMATHI K.R. CHIEF ENGINEER (DESIGN)

Bridges Design Unit
CHIEF DESIGN OFFICE
DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT
PUBLIC OFFICE COMPOUND, MUSEUM P.O.
THELVANANTHAPURAM, KERALA. PIN: 695 001
Tel: 04712322029 Website: keralapwd.gov.in
Fax: 04712325856 Email: bducdco@gmail.com

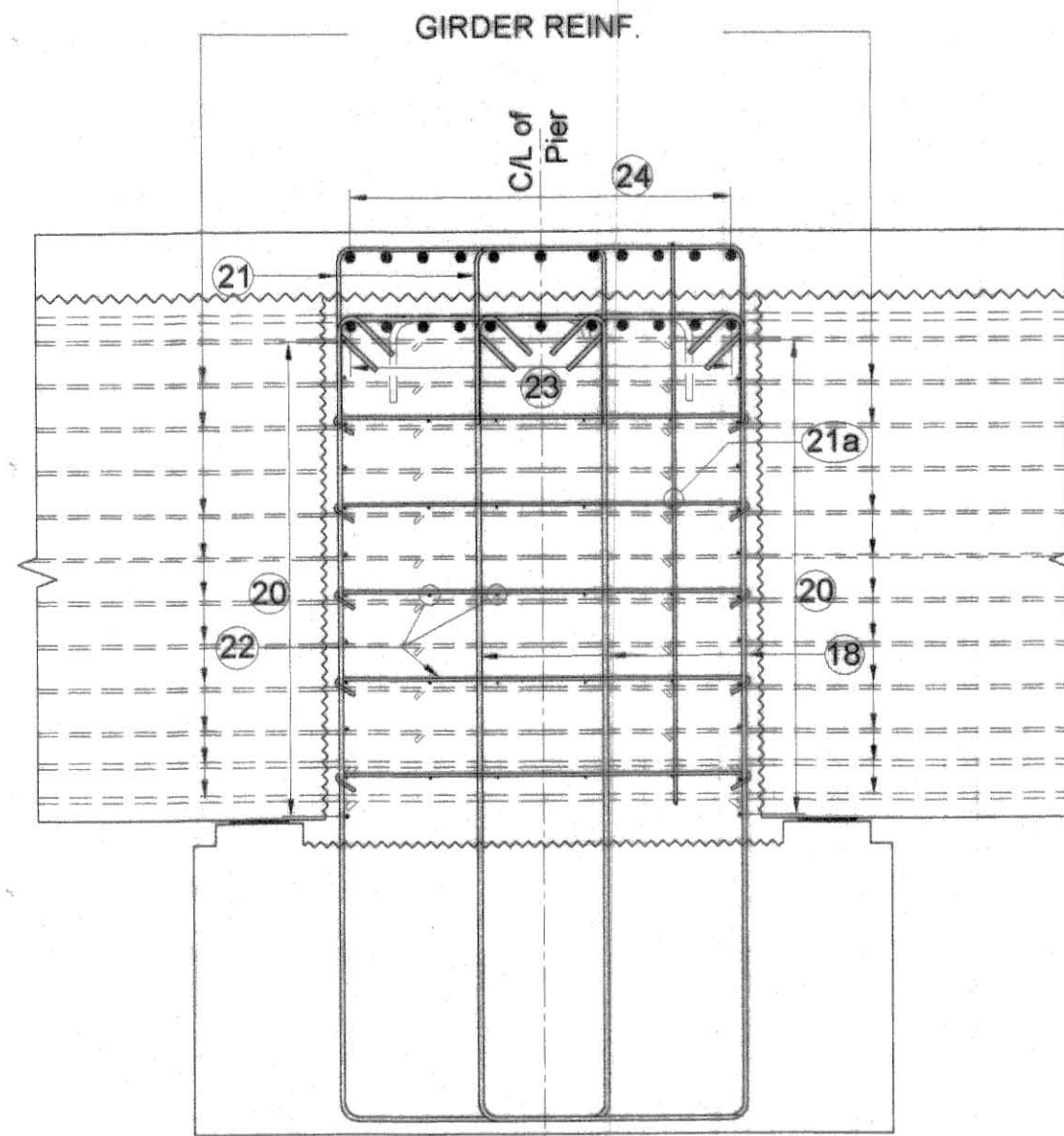
DRAWING TITLE: **DETAILS OF EXTRADOSED SPAN**

DRAWING SCALE: 1:100, 1:40, 1:20
SHEET SIZE: A1
REVISION No.: R0
SHEET No.: 1B/2

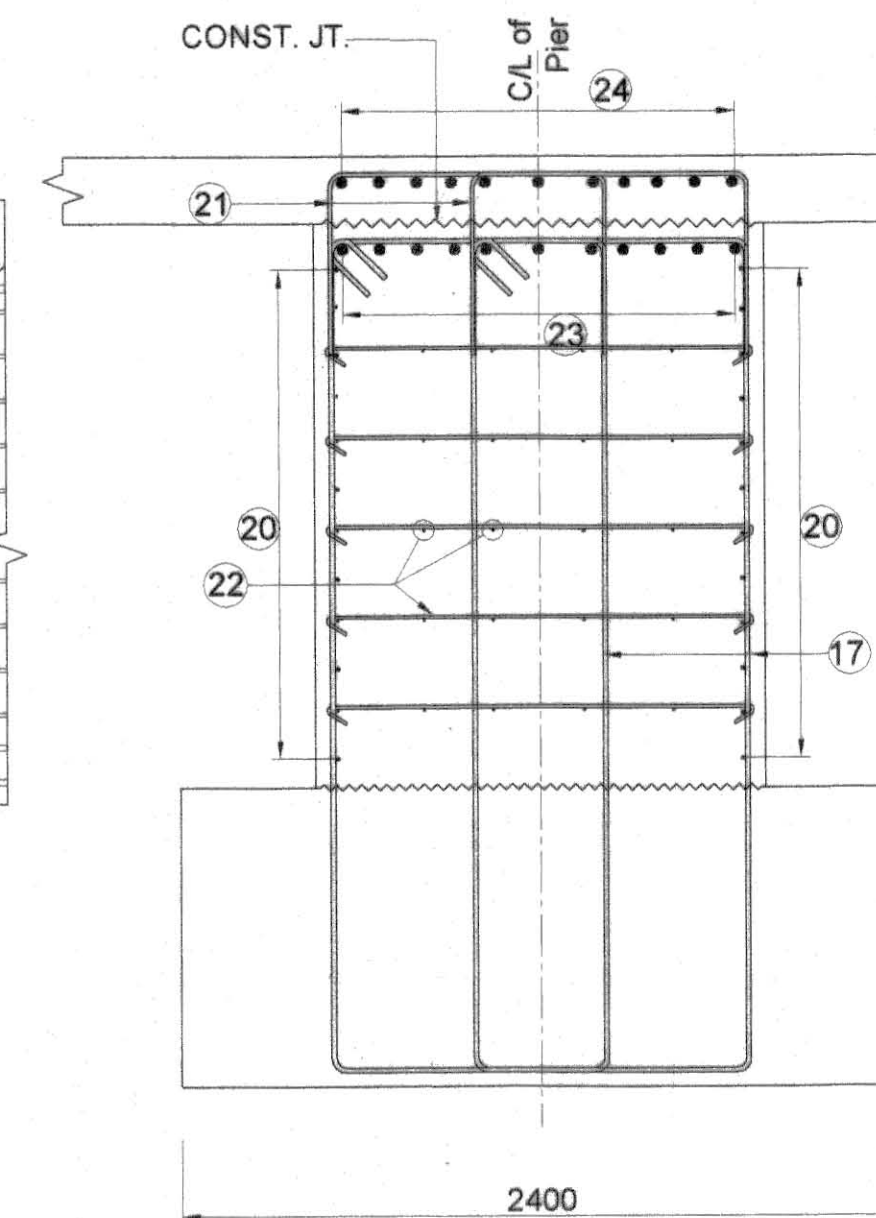
DRAWING No.: CEDO/BD/116/17(Rev1) FILE No.: BD/33/2017/Design/HW



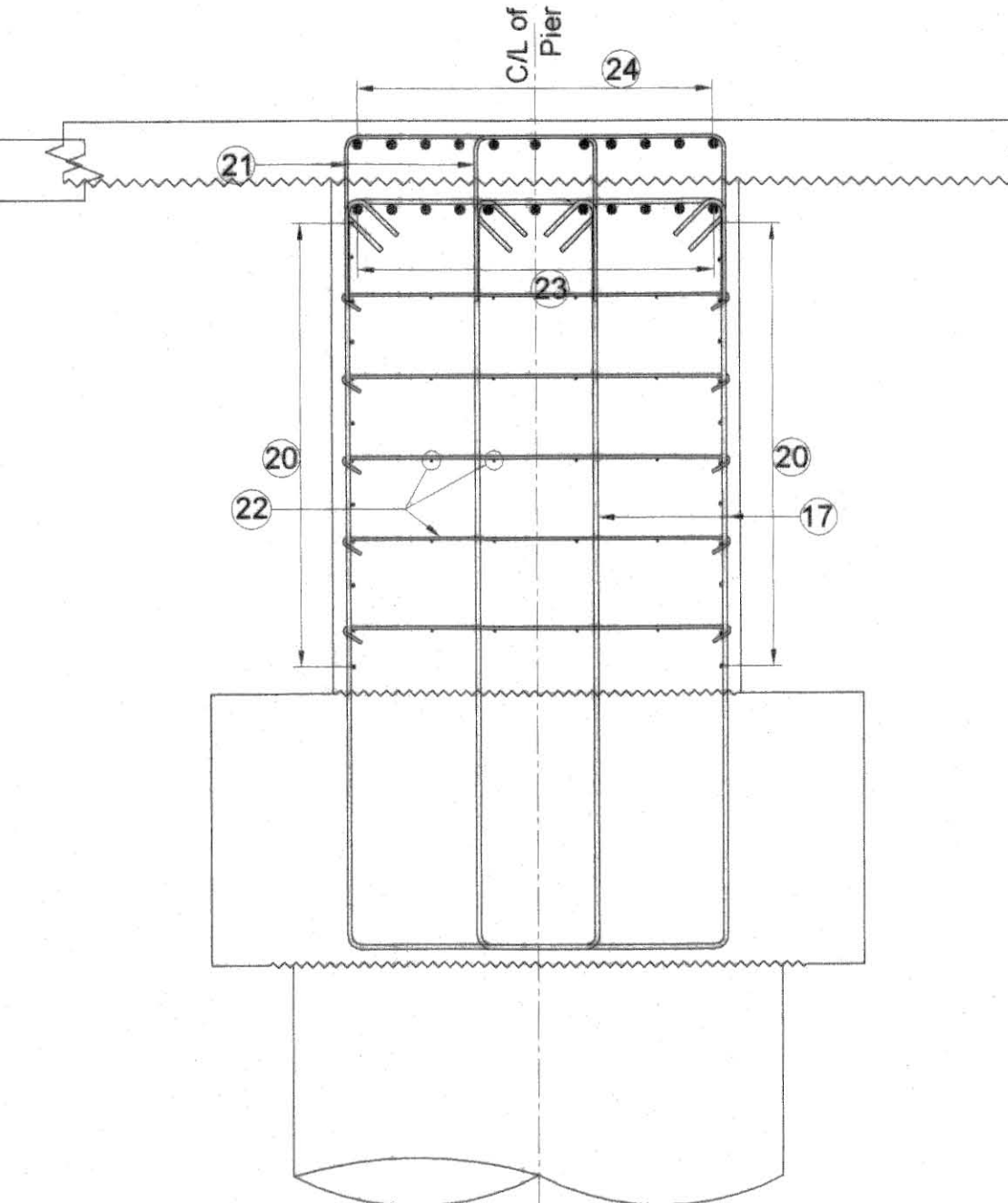
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(SHOWING DIAPHRAGM RFT. ALONE)
SCALE 1:40



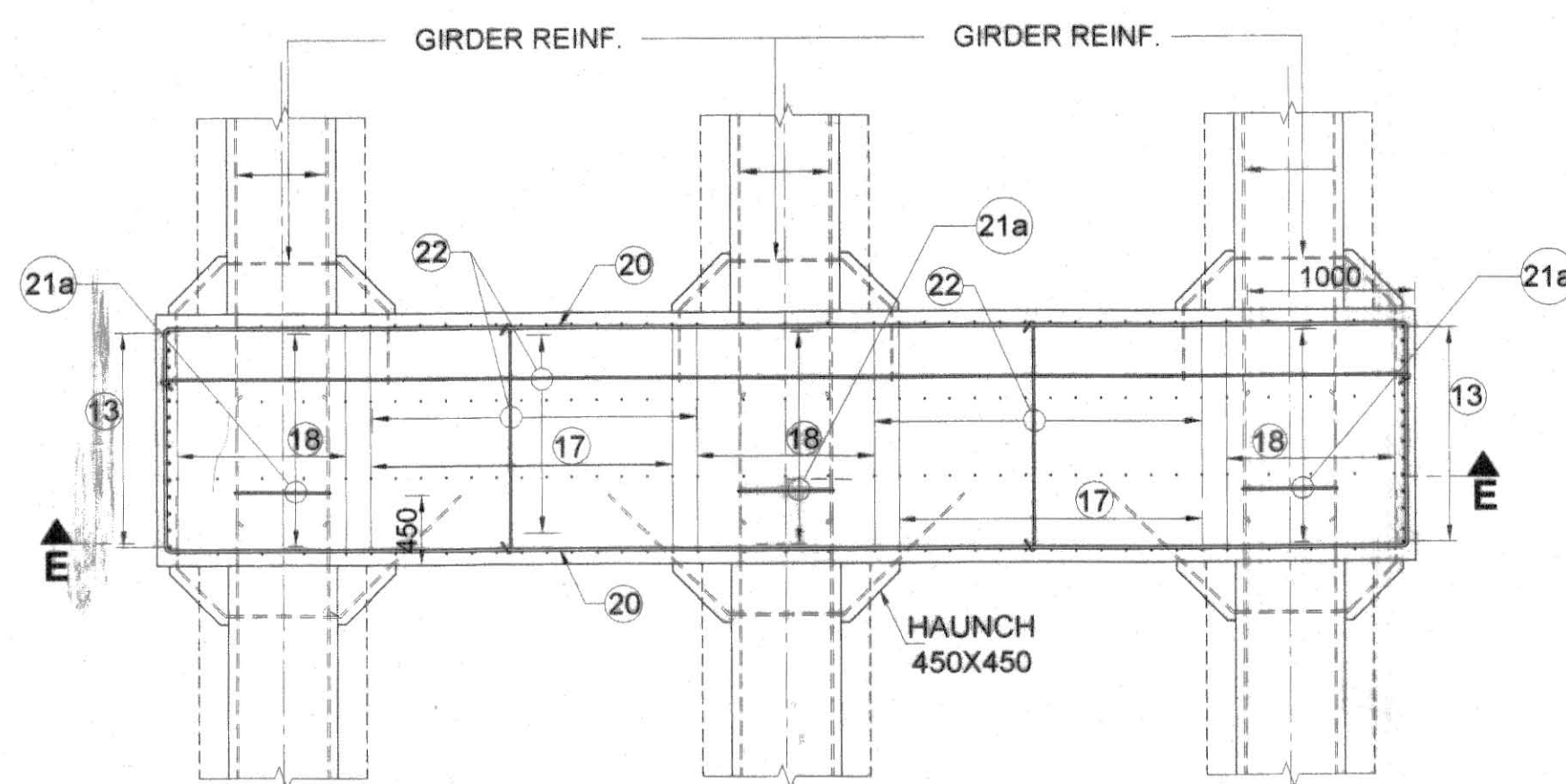
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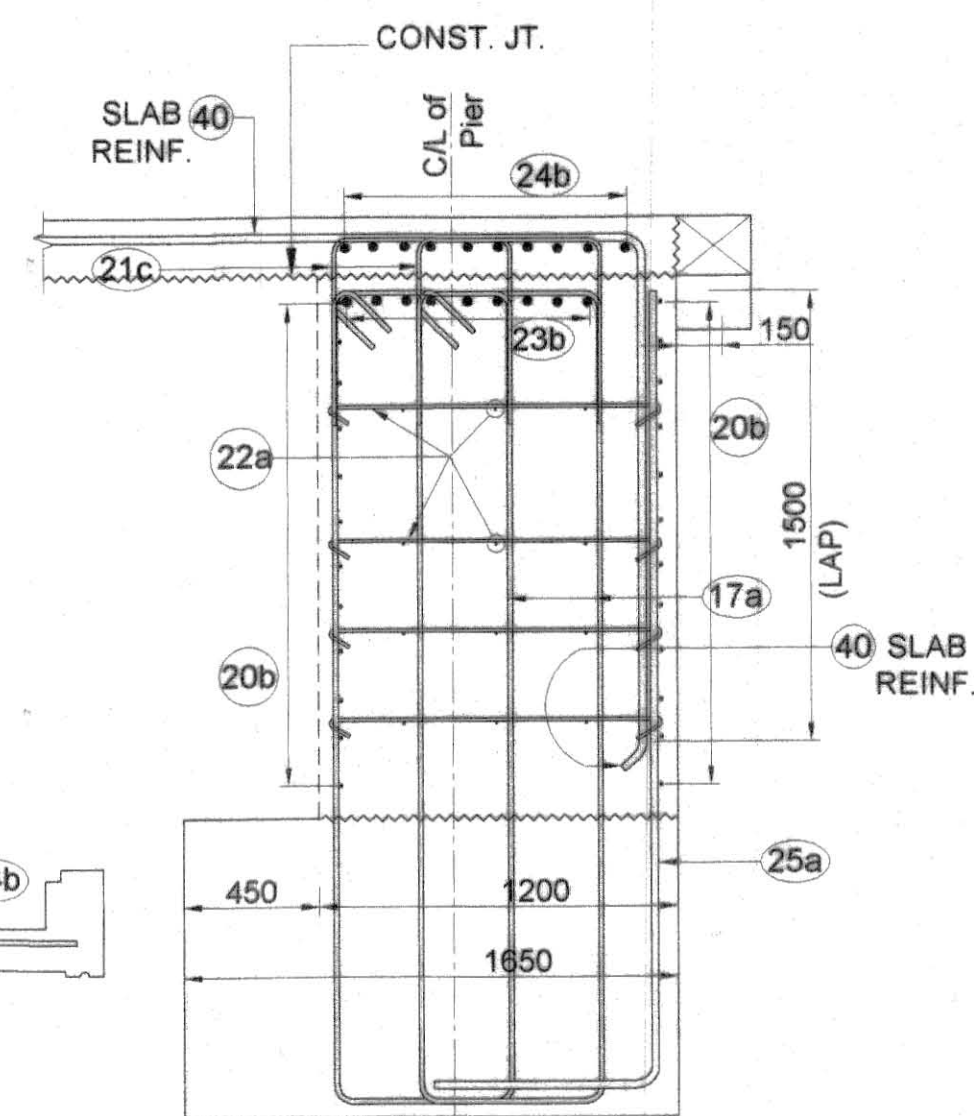
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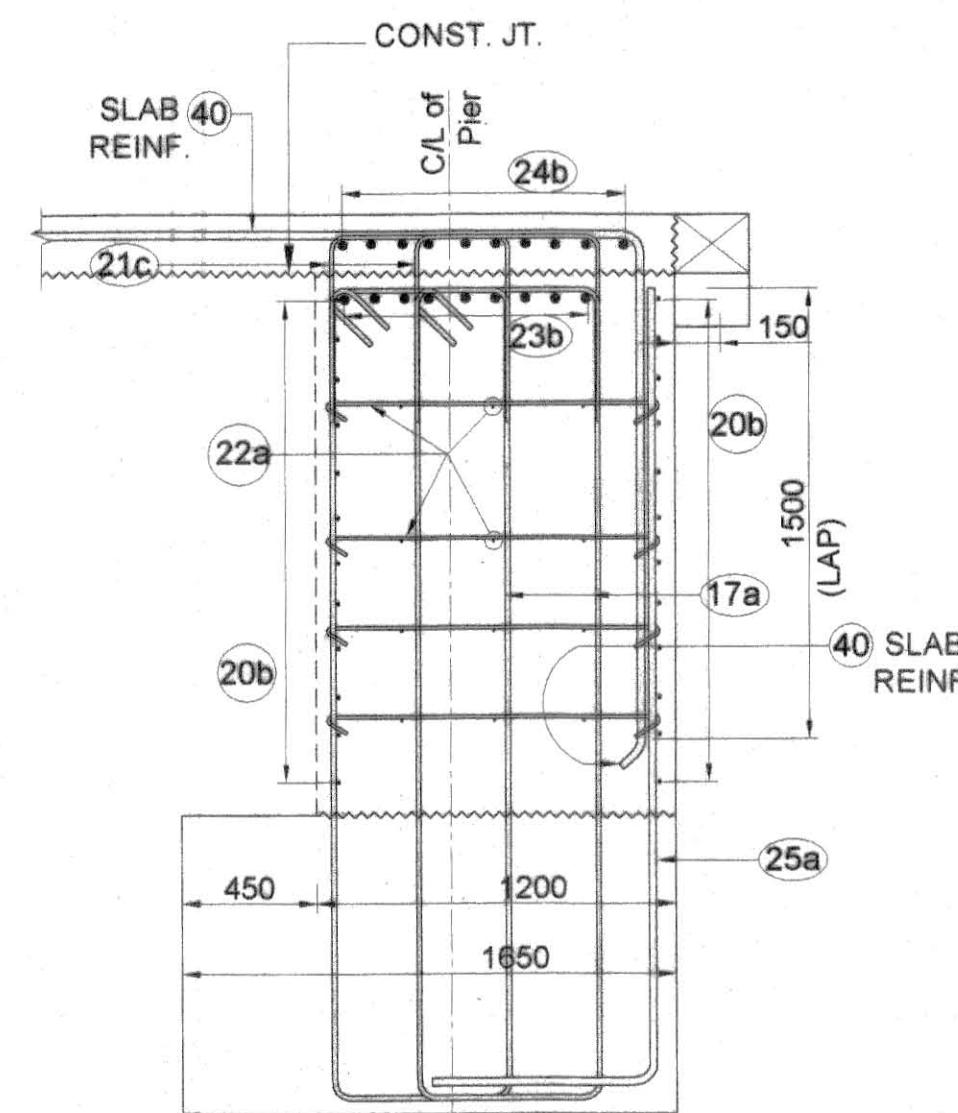
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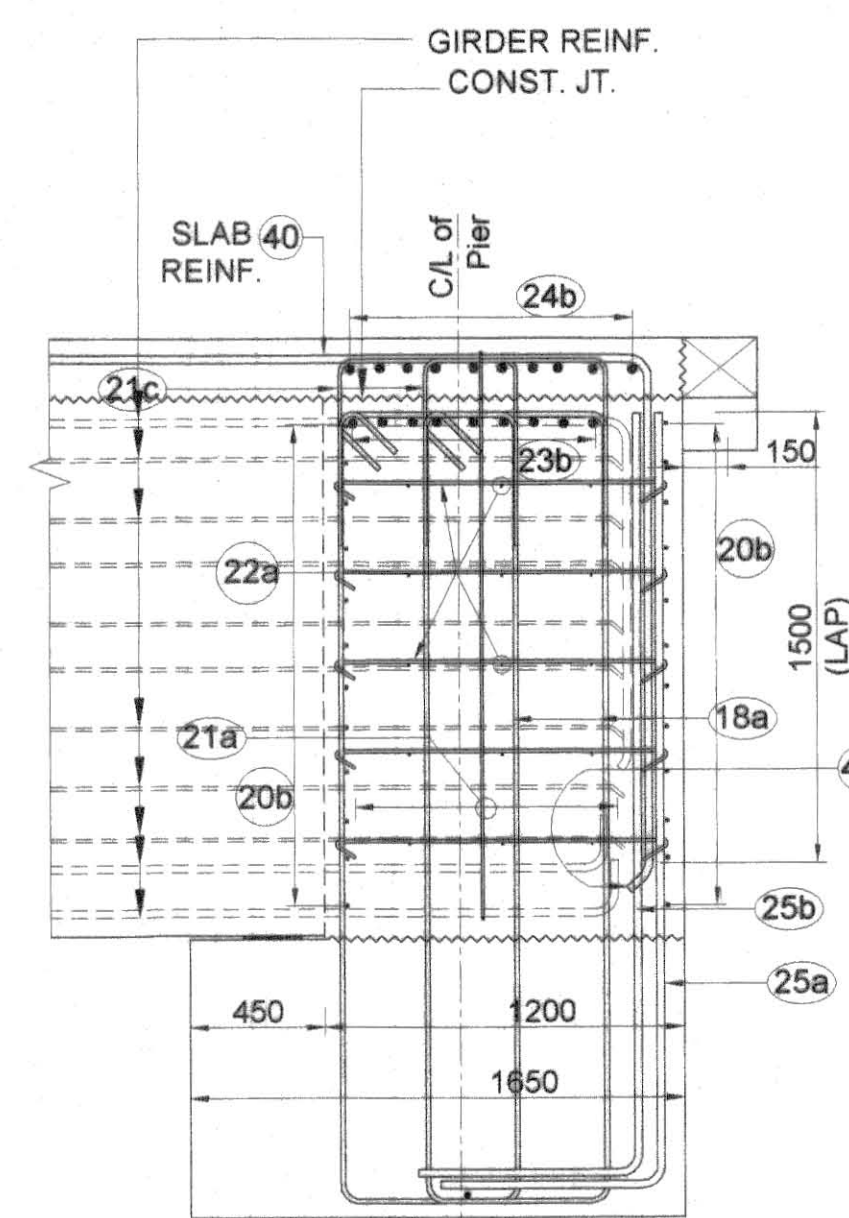
SECTIONAL PLAN OF DIAPHRAGM
ABOVE PIERS P1 TO P3 & P8 TO P10
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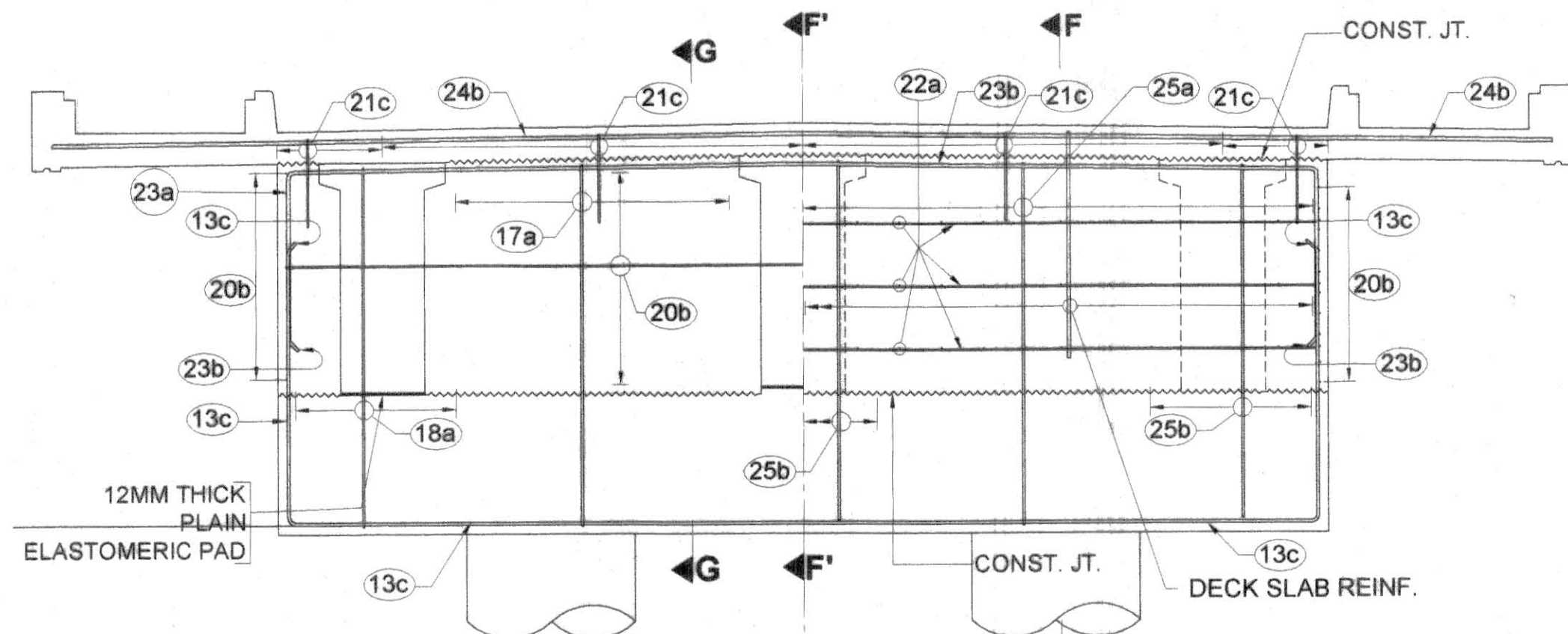
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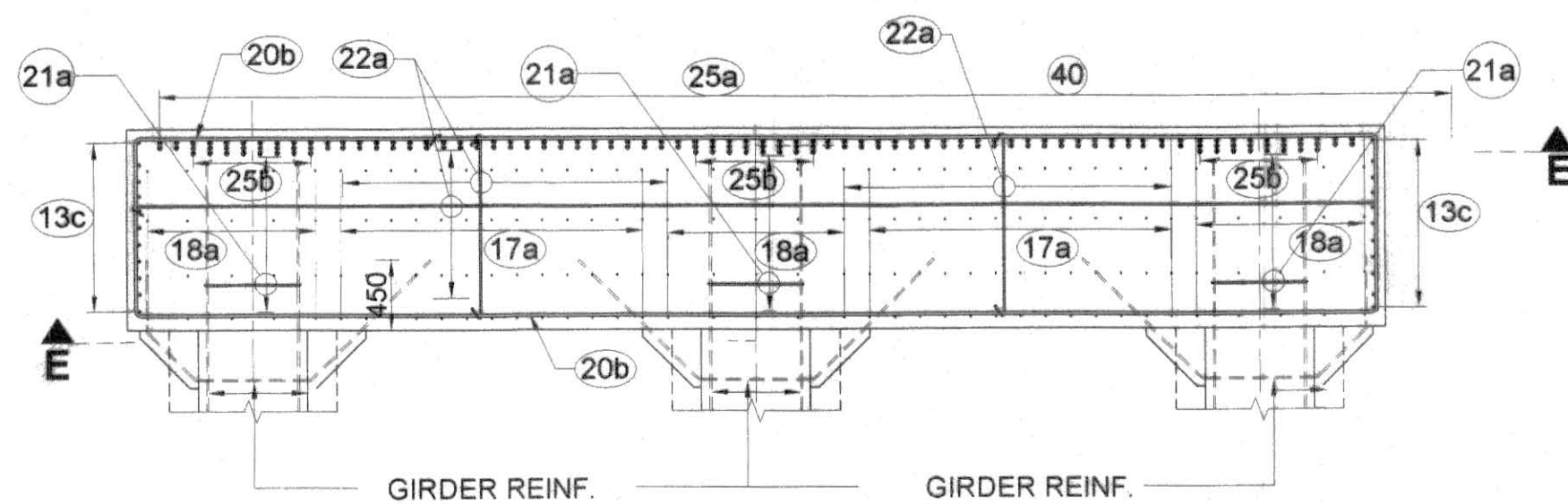
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SCALE 1:25



SECTION F-F
SCALE 1:25



HALF SECTIONAL ELEVATION E-E
(SHOWING DIAPHRAGM RFT. ALONE)
SCALE 1:40



SECTIONAL PLAN OF DIAPHRAGM
ABOVE PIERS P4 & P7 (30M SPAN)
SCALE 1:40

SL. No.	BAR SHAPE	BAR DIA. Nos./SPACING	REMARKS
20	[Diagram]	Φ16@125oc	HORIZONTAL
21	[Diagram]	Φ16@150oc	VERTICAL
21a	[Diagram]	Φ12@125oc	VERTICAL
22	[Diagram]	Φ10@300oc	MESH
23	[Diagram]	Φ25, 12Nos.	TOP MAIN
24	[Diagram]	Φ25, 12Nos.	TOP MAIN

Note: The actual bar bending dimensions of reinforcements shall be verified at site before placing the bars in position.

SL. No.	BAR SHAPE	BAR DIA. Nos./SPACING	REMARKS
21a	[Diagram]	Φ12@125oc	STIRRUPS
20b	[Diagram]	Φ16@125oc	WRAP AROUND
21c	[Diagram]	Φ16@150oc	VERTICAL
22a	[Diagram]	Φ10@300oc	MESH
23c	[Diagram]	Φ25, 8 Nos.	TOP MAIN
24b	[Diagram]	Φ25, 9Nos.	HORIZONTAL

Note: The actual bar bending dimensions of reinforcements shall be verified at site before placing the bars in position.

No.	Letter No.	Date	Description
1	CE/R&B/KLM/1217/2017	15/06/2017	Investigation Details

No.	Rev. No.	Design/Sheet No.	Date	General Design Drawing	Drawing Title
1	1/2	31/03/2018	31/03/2018	GENERAL DESIGN DRAWING	REINFORCEMENT DETAILS OF DIAPHRAGM P1 TO P4 AND P7 TO P10

R4	R3	R2	R1

NAME OF ROAD	ROAD No.
PEZHAM THURUTHU-PERUMON	

NAME OF CROSSING	ROAD CHAIRAGE AT C/L OF CROSSING
ASHTAMUDIKAYAL	CH: 338.50

NAME OF BRIDGE	BRIDGE No.
PERUMON BRIDGE	

DRAWING ISSUED FOR	EXECUTION NAME
<input type="checkbox"/> DPR PREPARATION <input type="checkbox"/> ADMIN./FINANCIAL SANCTION <input type="checkbox"/> TECHNICAL SANCTION <input checked="" type="checkbox"/> CONSTRUCTION	ROADS AND BRIDGES

ROAD CATEGORY	NAME OF DIVISION
<input type="checkbox"/> NATIONAL HIGHWAY <input type="checkbox"/> STATE HIGHWAY <input checked="" type="checkbox"/> MAJOR DISTRICT ROAD <input type="checkbox"/> OTHER DISTRICT ROAD <input type="checkbox"/> VILLAGE ROAD	ALAPPUZZHA

BRIDGE CATEGORY	DRAWN BY
<input type="checkbox"/> CULVERT <input type="checkbox"/> MINOR BRIDGE <input checked="" type="checkbox"/> MAJOR BRIDGE <input type="checkbox"/> FLYOVER BRIDGE <input type="checkbox"/> UNDER PASS <input type="checkbox"/> ROAD OVER BRIDGE <input type="checkbox"/> ROAD UNDER BRIDGE <input type="checkbox"/> CAUSEWAY	BINO BRIGIT P.B. 3RD GRADE DRAFTSMAN

DESIGNED BY	CHECKED BY
[Signature]	[Signature]

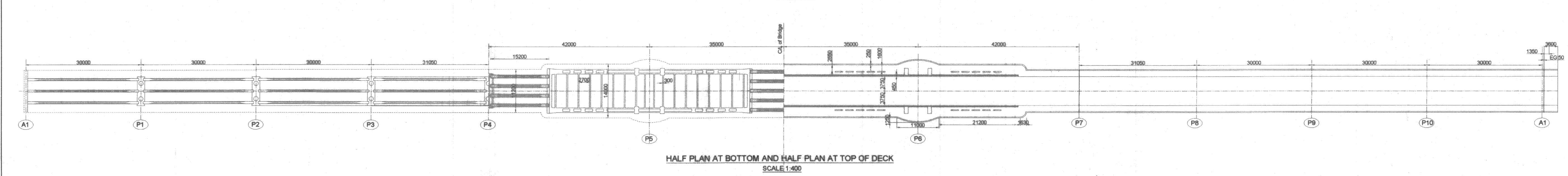
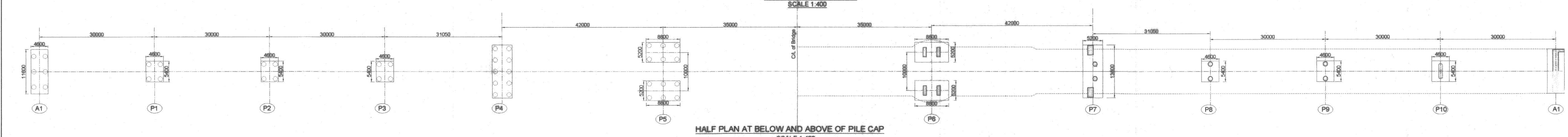
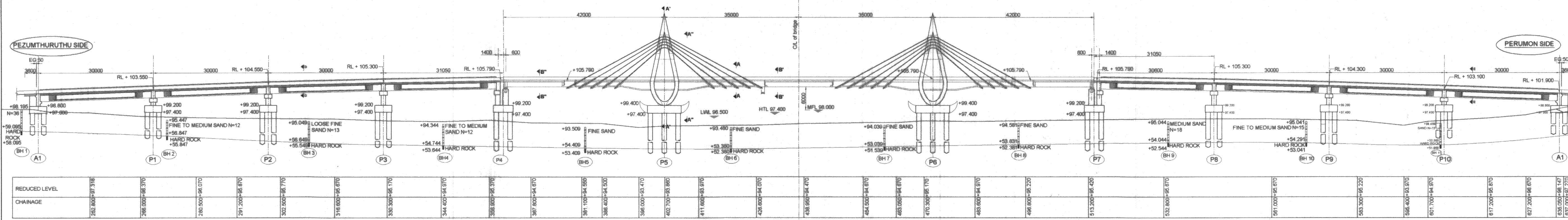
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<input checked="" type="checkbox"/> NEW <input type="checkbox"/> RECONSTRUCTION <input type="checkbox"/> REHABILITATION	PHOENIX S.S. BRIDGE ENGINEER

DATE	APPROVED BY
03/02/2021	[Signature]

DESIGN OFFICE	CHIEF ENGINEER (DESIGN)
BRIDGES DESIGN UNIT CHIEF DESIGN OFFICE DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT PUBLIC OFFICE COMPOUND, MUSEUM P.O. THRIUVANANTHAPURAM, KERALA, PIN: 695 033 Tel: 04712322029 Website: keralapwd.gov.in Fax: bdudco@gmail.com	MADHUMATHI.K.R. CHIEF ENGINEER (DESIGN)

DRAWING TITLE	DRAWING SCALE
REINFORCEMENT DETAILS OF DIAPHRAGM P1 TO P4 AND P7 TO P10	1:100, 1:40, 1:20

DRAWING No.	FILE No.	SHEET No.
CED/BD/116/17(Rev1)	BD/33/2017/Design/HW	21/2



NOTES:

1. GENERAL
2. All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
3. Only written dimensions are to be followed. No drawing shall be scaled.
4. Properly stiffened steel plates shall be used as shuttering for casting Deck Slab and Cross Girders.
5. The Reinforcements for Parapet Posts, Parapet bases and Road Kerbs shall be doweled out from Deck slab as shown.
6. Construction stage of the structure shall be as shown in the drawing.

No	Letter No.	Date	Description
1	CE/R&B/KLM/1217/2017	15/06/2017	Investigation Details

No	Drawing/Sheet No.	Date	Drawing Title
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Rev No	Designed	Checked	Reviewed	Recommended	Approved	Date	Description
1							

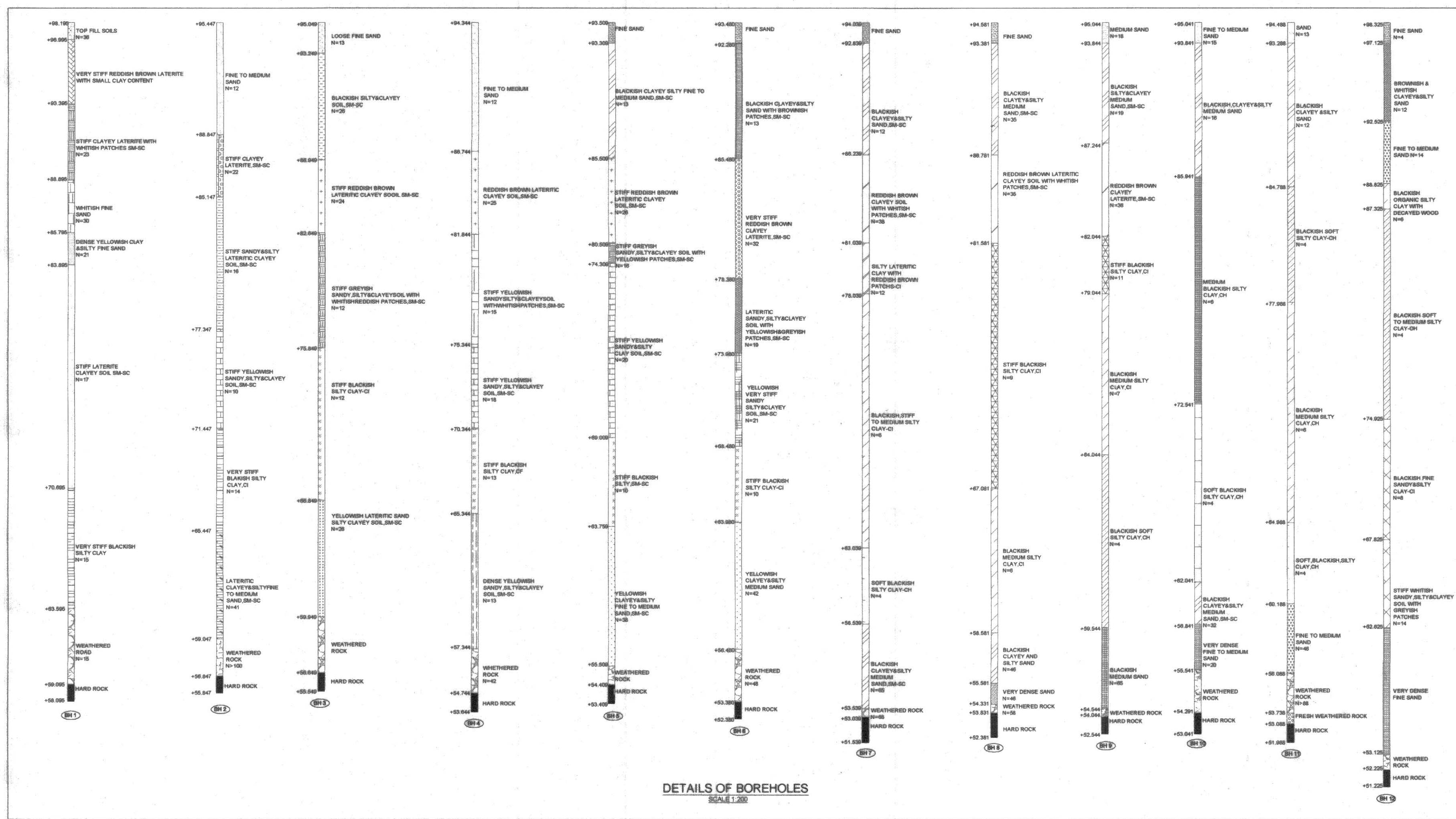
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R4	
R3	
R2	
R1	

REVISIONS	
NAME OF ROAD:	ROAD No:
PEZHUM THURUTH- PERUMON	
NAME OF CROSSING:	ROAD CHAIRAGE AT CL OF CROSSING:
ASHTAMUDI KAYAL	CH: 0/438.950
NAME OF BRIDGE:	BRIDGE No:
PERUMON BRIDGE	

DRAWING ISSUED FOR:	EXECUTION WING:
<input type="checkbox"/> DPR PREPARATION	ROADS AND BRIDGES
<input type="checkbox"/> ADMIN./FINANCIAL SANCTION	NAME OF DIVISION:
<input type="checkbox"/> TECHNICAL SANCTION	KOLLAM
<input checked="" type="checkbox"/> CONSTRUCTION	DRAWN BY:
ROAD CATEGORY:	BINO BRIGIT P.B.
<input type="checkbox"/> NATIONAL HIGHWAY	3rd GRADE DRAFTSMAN
<input type="checkbox"/> STATE HIGHWAY	DESIGNED BY:
<input checked="" type="checkbox"/> MAJOR DISTRICT ROAD	ARUN K.V.
<input type="checkbox"/> OTHER DISTRICT ROAD	ASSISTANT BRIDGE ENGINEER
<input type="checkbox"/> VILLAGE ROAD	CHECKED BY:
BRIDGE CATEGORY:	PHOENIX S.S.
<input type="checkbox"/> CULVERT	BRIDGE ENGINEER
<input type="checkbox"/> MINOR BRIDGE	REVIEWED BY:
<input checked="" type="checkbox"/> MAJOR BRIDGE	SAJU S.
<input type="checkbox"/> FLYOVER BRIDGE	SENIOR BRIDGE ENGINEER
<input type="checkbox"/> UNDER PASS	RECOMMENDED BY:
<input type="checkbox"/> ROAD OVER BRIDGE	SANDHYA G MENON
<input type="checkbox"/> ROAD UNDER BRIDGE	DIRECTOR
<input type="checkbox"/> CAUSEWAY	APPROVED BY:
CONSTRUCTION NATURE:	MADHUMATHY K R
<input checked="" type="checkbox"/> NEW	CHIEF ENGINEER (DESIGN)
<input type="checkbox"/> RECONSTRUCTION	DATE:
<input type="checkbox"/> REHABILITATION	03/07/2020

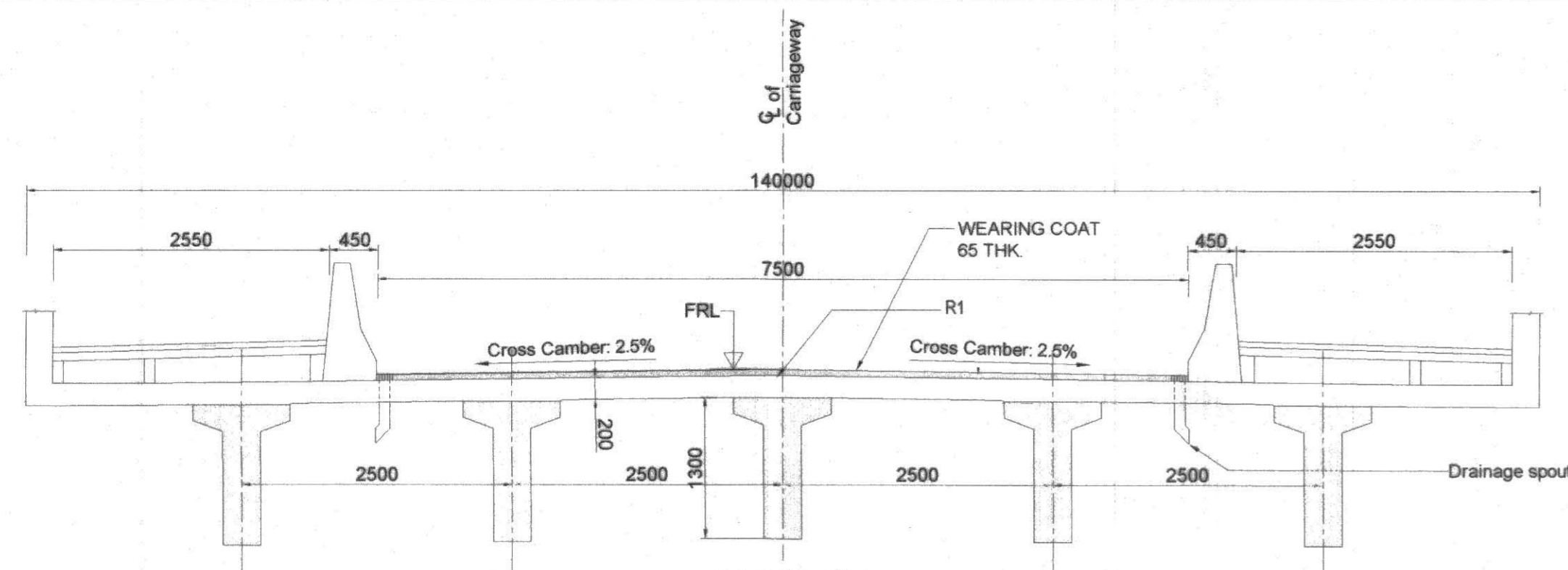
REDUCED LEVELS AT VARIOUS POINTS IN PIERS AND ABUTMENTS

	A1	P1	P2	P3&P7	P4&P7	P5&P6	P9	P10	A2
ROAD LEVEL (R1)	102.550	103.550	104.550	105.300	105.790	105.790	104.300	103.190	101.900
DECK TOP (R2)	102.485	101.485	104.485	105.235	105.725	105.725	104.235	103.125	101.835
DECK SOFT LEVEL (R3)	100.385	101.385	102.385	103.135	103.625	103.625	102.135	101.025	99.735
ABUT/PIER CAP TOP LEVEL (R4)	101.280	102.280	103.030	103.520	104.010	104.010	102.510	101.400	100.110
PILE CAP LEVEL (R5)	98.800	99.200	99.200	99.200	99.400	99.400	99.200	99.200	98.800
PILE CAP BOTTOM LEVEL (R6)	97.000	97.400	97.400	97.400	97.400	97.400	97.400	97.400	97.000

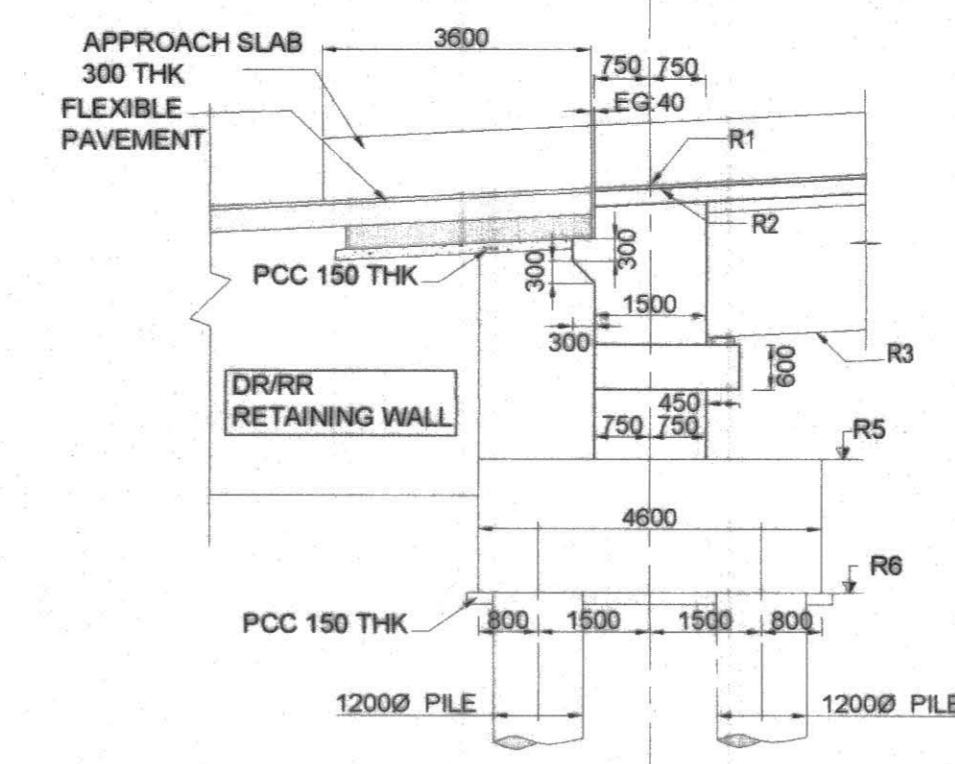


Bridges Design Unit
CHIEF DESIGN OFFICE
 DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT
 PUBLIC OFFICE COMPOUND, MUSEUM P.O.
 THIRUVANANTHAPURAM, KERALA. PIN: 695 001
 Tel: 04712322029 Website: keralapwd.gov.in
 Fax: 04712325856 Email: bducd@gmail.com

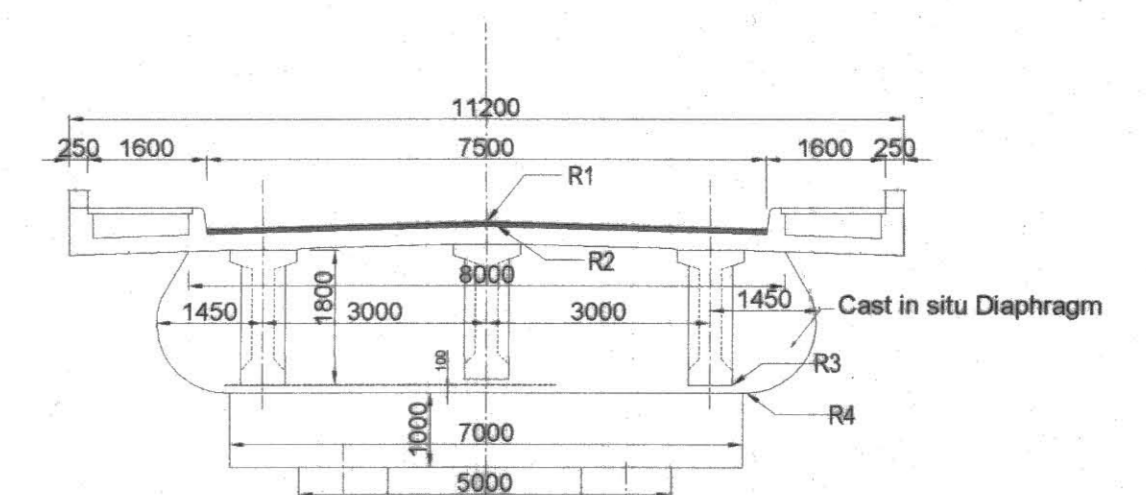
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FILE NO:	BD/33/2017/DESIGN/SH	REVISION No:	R0
		SHEET No:	1A/2



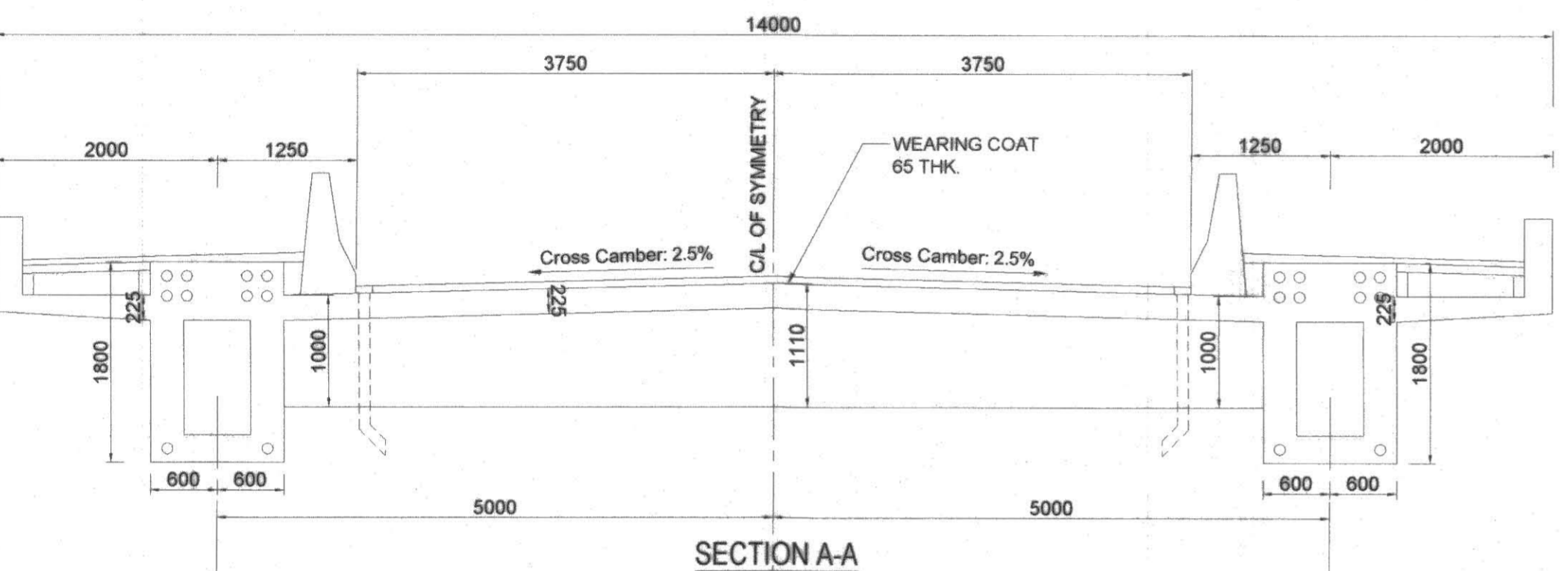
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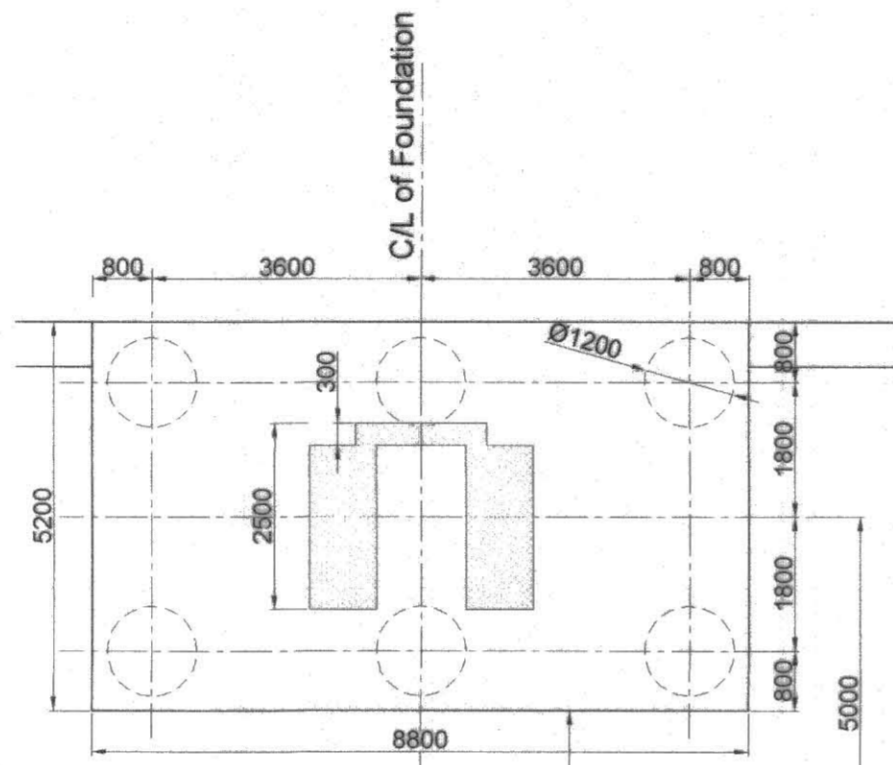
SECTIONAL ELEVATION AT A1 & A2
SCALE 1:100



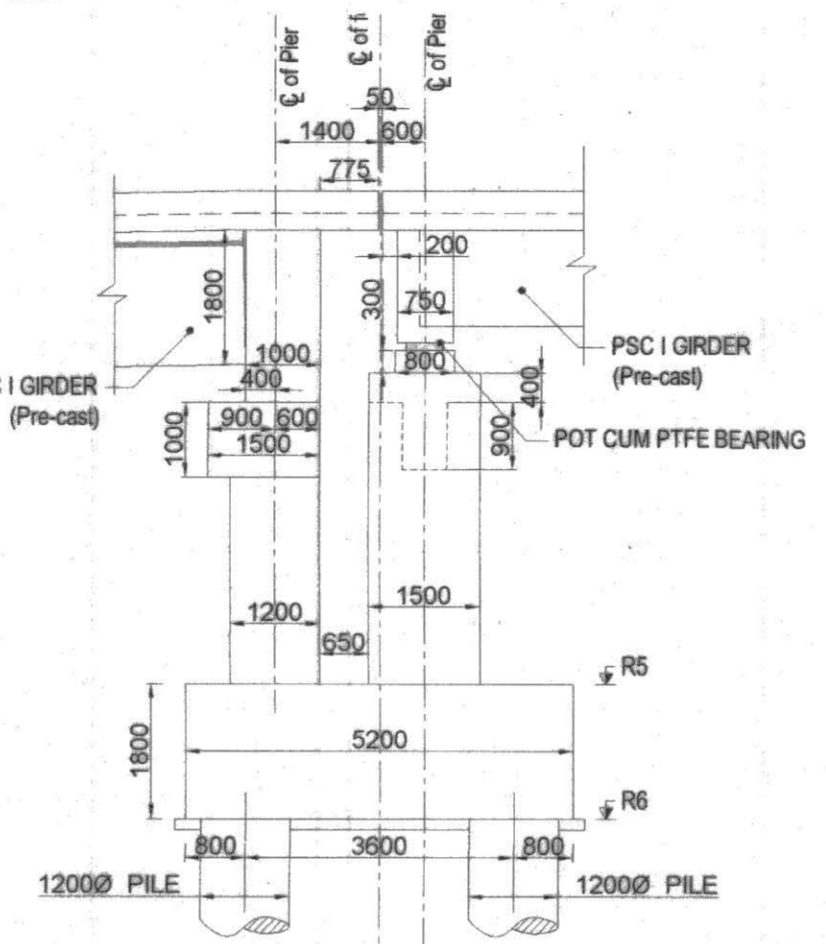
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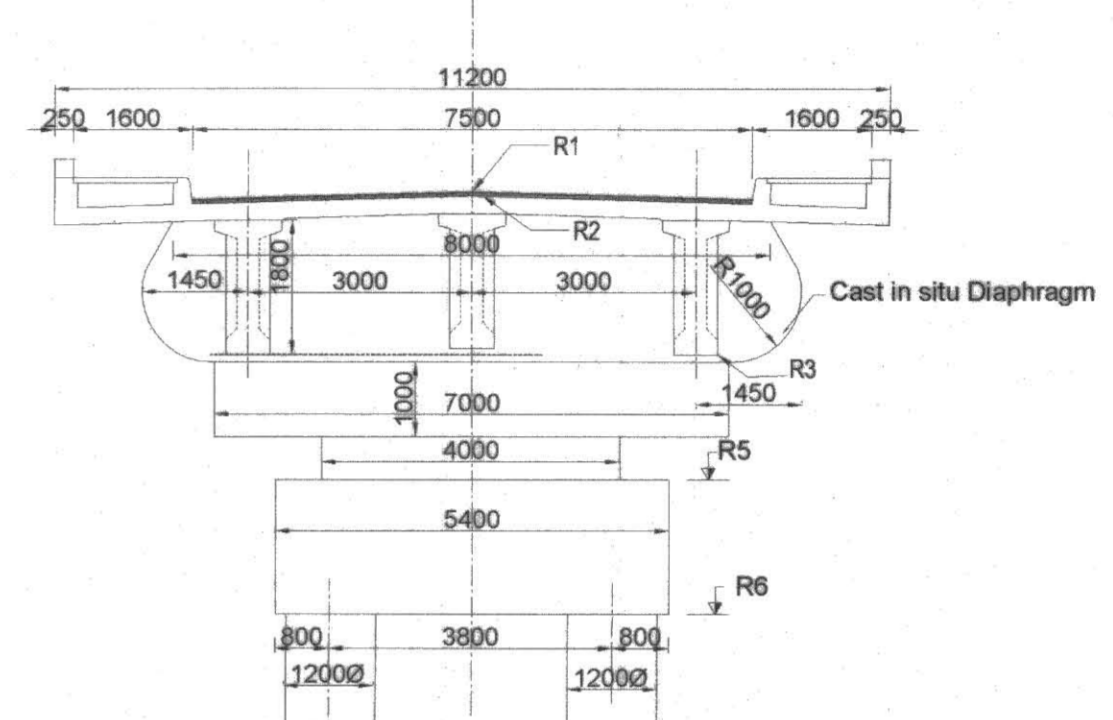
SECTION A-A
(SCALE 1:40)
VARIES



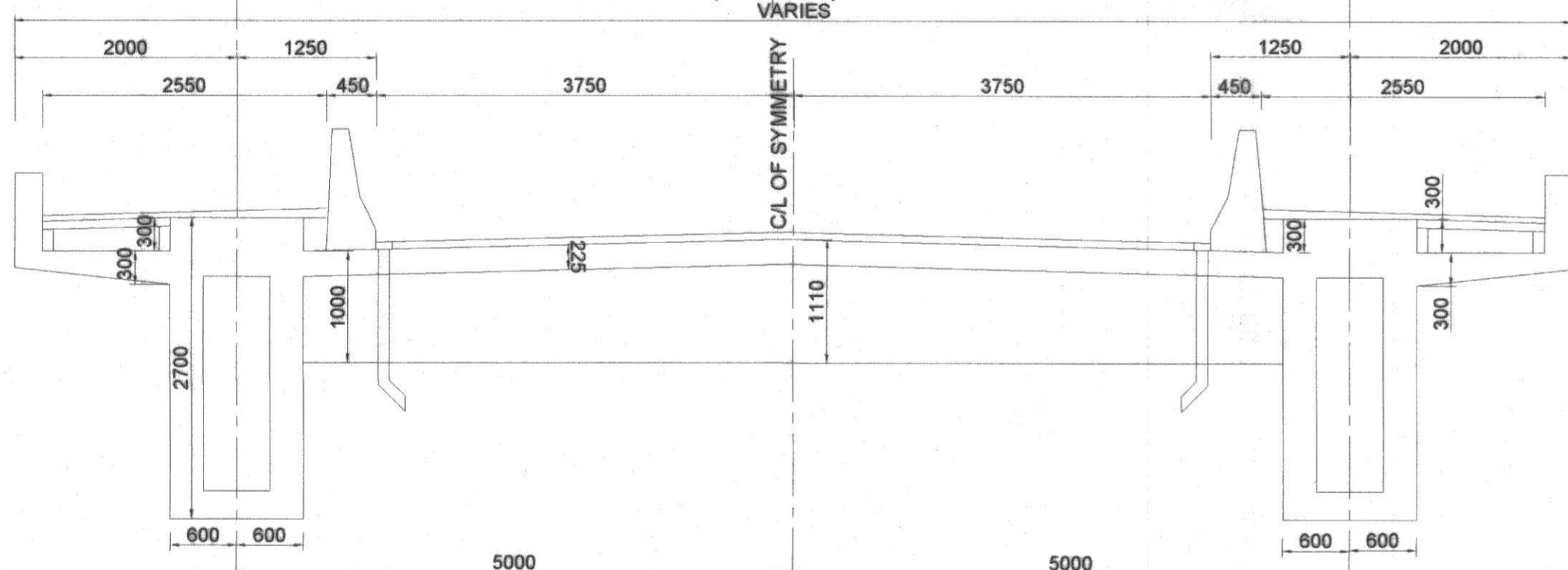
ARRANGEMENT OF PILE UNDER
PIERS P4 & P7
SCALE 1:100



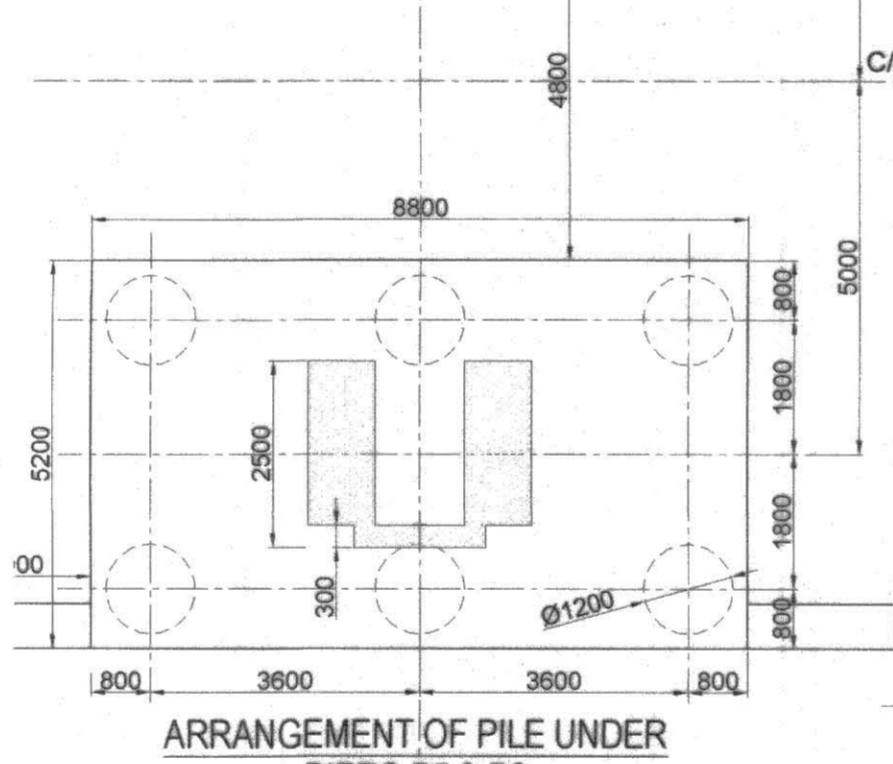
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PIERS P4 & P7
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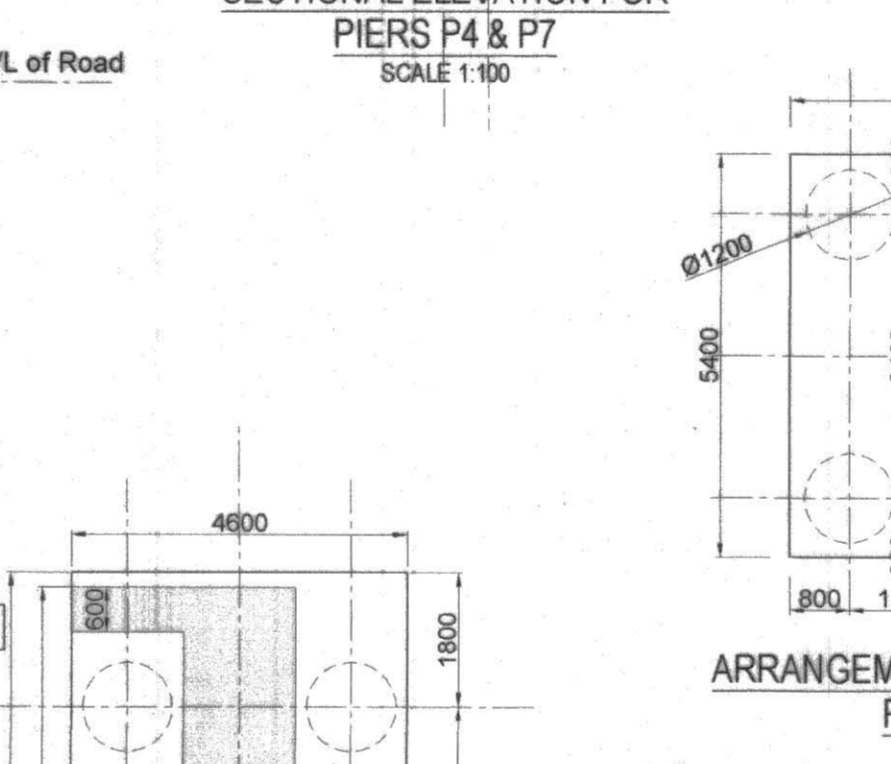
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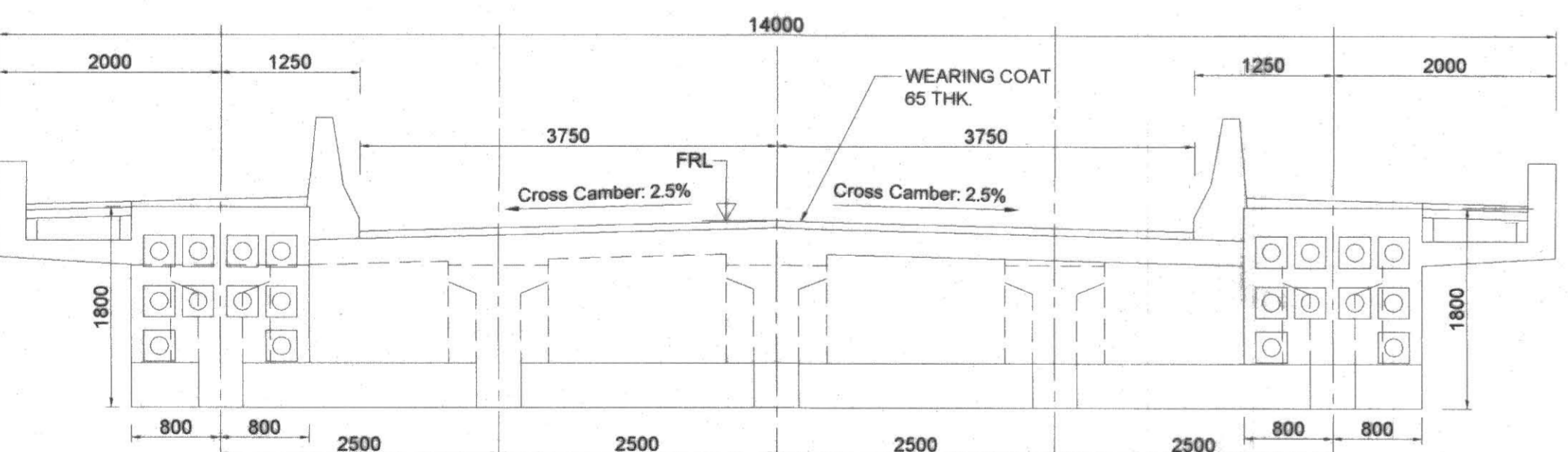
SECTION A'-A'
(SCALE 1:40)



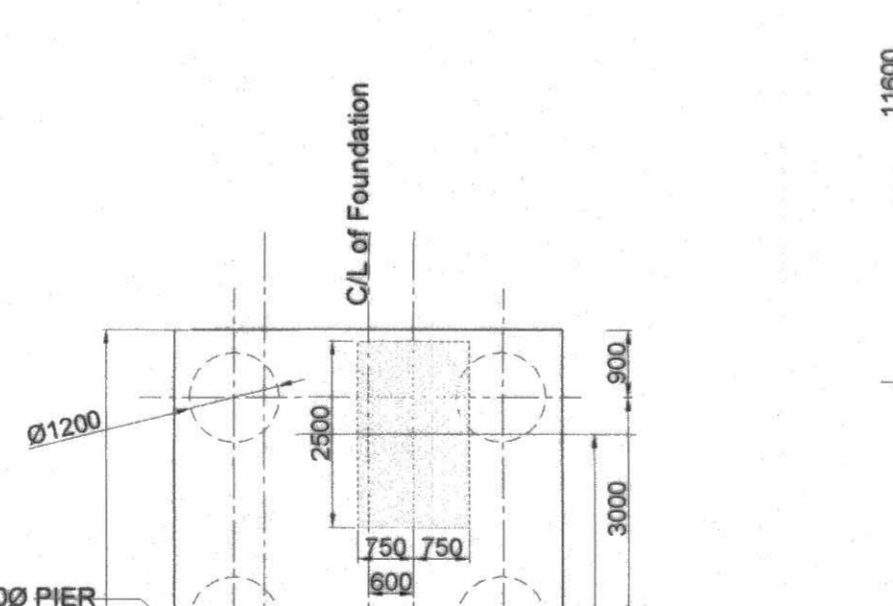
ARRANGEMENT OF PILE UNDER
PIERS P5 & P6
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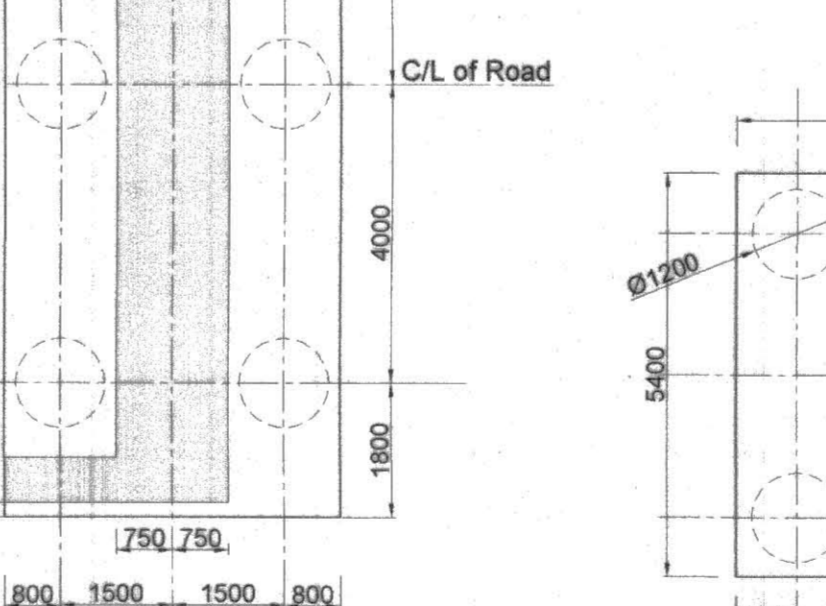
ARRANGEMENT OF PILE UNDER
PIERS P10
SCALE 1:100



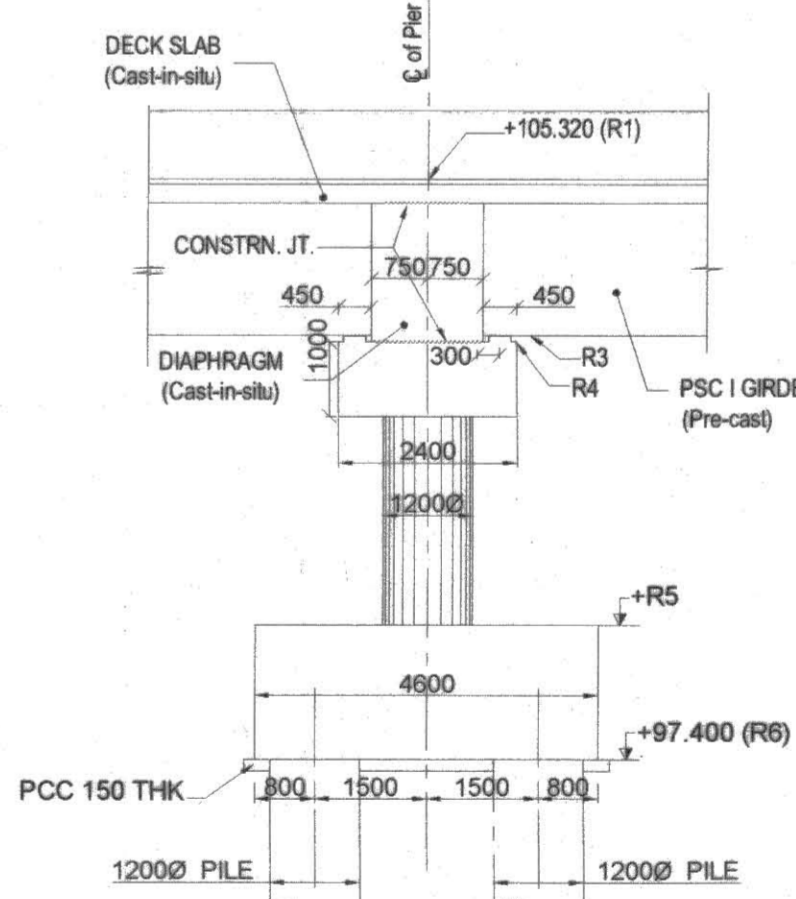
SECTION B'-B'
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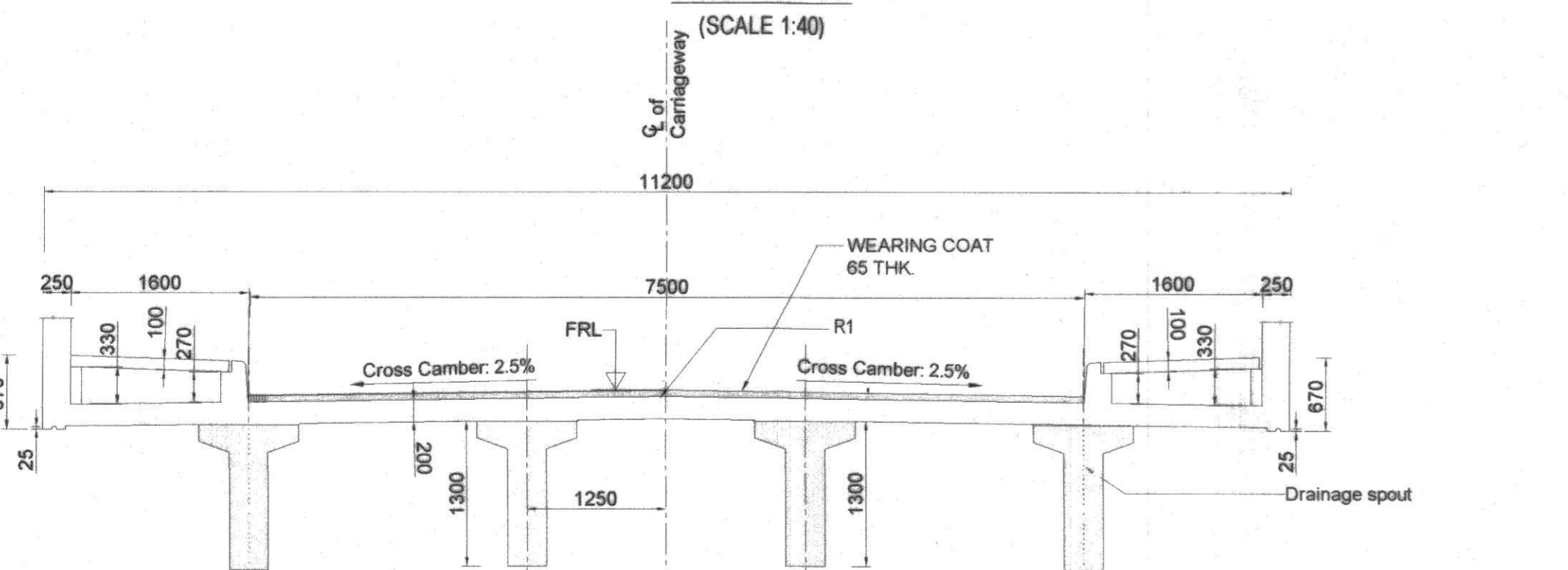
PILE ARRANGEMENT UNDER
ABUTMENTS A1 & A2
SCALE 1:100



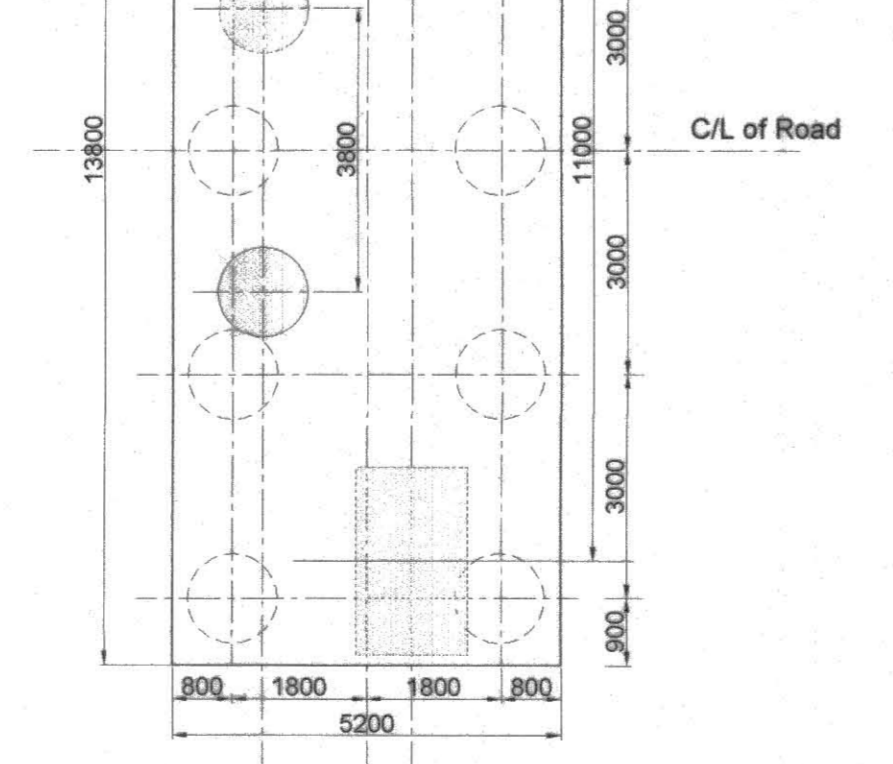
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PIERS P1 TO P3, P8 & P9
SCALE 1:100



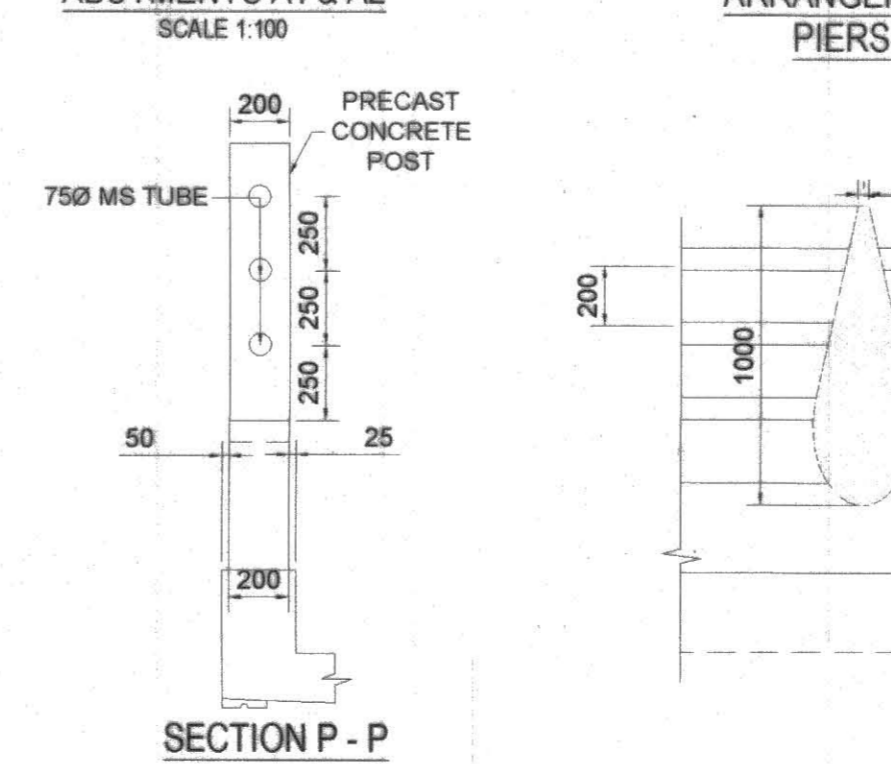
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PIERS P1 TO P3 & P8 TO P10
(SCALE 1:100)



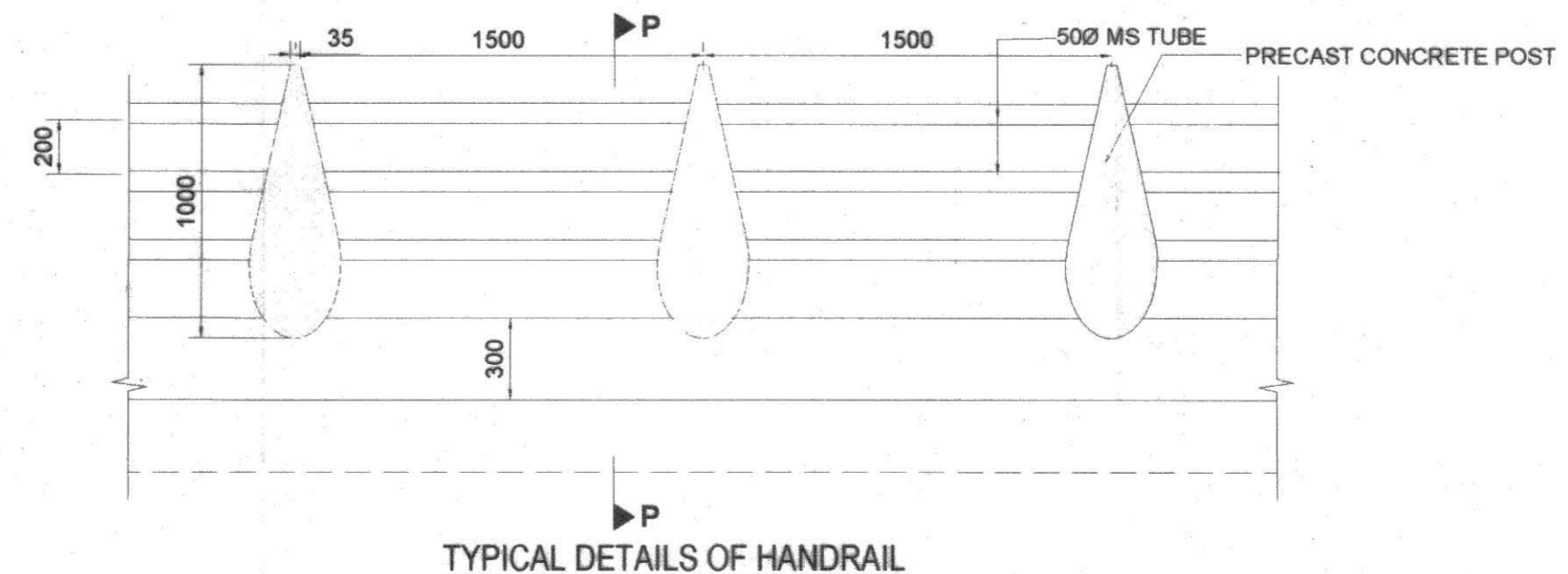
SECTION B''-B''
(SCALE 1:40)



ARRANGEMENT OF PILE UNDER
PIERS P4 & P7
SCALE 1:100



SECTION P - P
SCALE 1:25



TYPICAL DETAILS OF HANDRAIL
SCALE 1:25

KEY PLAN:

- NOTES:
1. GENERAL
 2. All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
 3. Only written dimensions are to be followed. No drawing shall be scaled.
 4. Properly stiffened steel plates shall be used as shuttering for casting Deck Slab and Cross Girders.
 5. The Reinforcements for Parapet Posts, Parapet bases and Road Kerbs shall be dowelled out from Deck slab as shown.
 6. Construction stage of the structure shall be as shown in the drawing.

No	Letter No.	Date	Description
1	CE/R&B/KLM/1217/2017	15/06/2017	Investigation Details

REFERENCE LETTERS			
No	1/2	31/03/2018	GENERAL DESIGN DRAWING
REFERENCE DRAWINGS			

REVISIONS							
Rev. No	Designed	Checked	Reviewed	Recommended	Approved	Date	Description
R4							
R3							
R2							
R1							

NAME OF ROAD: PEZHUM THURUTH- PERUMON ROAD No.

NAME OF CROSSING: ASHTAMUDI KAYAL ROAD CHAINAGE AT C/L OF CROSSING: CH: 0/438.950

NAME OF BRIDGE: PERUMON BRIDGE BRIDGE No.

DRAWING ISSUED FOR:	EXECUTION WING:
<input type="checkbox"/> DPR PREPARATION <input type="checkbox"/> ADMIN./FINANCIAL SANCTION <input type="checkbox"/> TECHNICAL SANCTION <input checked="" type="checkbox"/> CONSTRUCTION	ROADS AND BRIDGES
ROAD CATEGORY:	NAME OF DIVISION:
<input type="checkbox"/> NATIONAL HIGHWAY <input type="checkbox"/> STATE HIGHWAY <input checked="" type="checkbox"/> MAJOR DISTRICT ROAD <input type="checkbox"/> OTHER DISTRICT ROAD <input type="checkbox"/> VILLAGE ROAD	KOLLAM
BRIDGE CATEGORY:	DRAWN BY:
<input type="checkbox"/> CULVERT <input type="checkbox"/> MINOR BRIDGE <input checked="" type="checkbox"/> MAJOR BRIDGE <input type="checkbox"/> FLYOVER BRIDGE <input type="checkbox"/> UNDER PASS <input type="checkbox"/> ROAD OVER BRIDGE <input type="checkbox"/> ROAD UNDER BRIDGE <input type="checkbox"/> CAUSEWAY	BINO BRIGIT P.B. 3rd GRADE DRAFTSMAN
CONSTRUCTION NATURE:	CHECKED BY:
<input checked="" type="checkbox"/> NEW <input type="checkbox"/> RECONSTRUCTION <input type="checkbox"/> REHABILITATION	ARUN K.V. ASSISTANT BRIDGE ENGINEER
DATE:	REVIEWED BY:
03/07/2020	SAJU S. SENIOR BRIDGE ENGINEER
APPROVED BY:	RECOMMENDED BY:
MADHUMATHY K R. CHIEF ENGINEER (DESIGN)	SANDHYA G MENON DIRECTOR

Bridges Design Unit
 CHIEF DESIGN OFFICE
 DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT
 PUBLIC OFFICE COMPOUND, MUSEUM P.O.
 THIRUVANANTHAPURAM, KERALA. PIN: 695 001
 Tel: 04712322029 Website: keralapwd.gov.in
 Fax: 04712325856 Email: bducdp@gmail.com

DRAWING TITLE:	DRAWING SCALE:
GENERAL DESIGN DRAWING	1:400, 1:200
DRAWING No:	SHEET SIZE:
CEDO/BD/116/17(Rev1)	A0
FILE NO:	REVISION No:
BD/33/2017/DESIGN/HW	R0
	SHEET No:
	1B/2

NOTES ON BRIDGE ELEMENTS

1. SUPERSTRUCTURE

- The superstructure shall be PSC Box girder and RCC slab For the central Extradosed span PSC I girder and Rcc slab for the end span
- The geometrical features of superstructures are given in Table-1.
- The Grade of concrete for superstructure shall be as per the Table 3.
- The superstructure shall be constructed as per the layout shown and construction sequence indicated in the respective Drawings.
- No construction joint shall be provided between the bottom bulb and the web. Construction joint may be provided at the junction of the web and the fillet(haunch) between the deck slab, if the same is not indicated in the Drawing, with the approval of the Engineer.
- Provision of construction joint in the span direction shall conform to the Drawings or as per directions of the Engineer.
- The permissible tolerances of Superstructure and slab are given below:
 - Variation in thickness of web, flange & slab : -5mm to +10mm
 - Variation in overall depth or width : ±5mm
 - Variation in overall length or effective span : <±10mm OR 0.1% of span length, whichever is less.
 - Surface unevenness (for 3m straight edge) : 5mm

2. SUBSTRUCTURE

- The substructure elements such as piers, abutment, wing/return wall, etc shall be constructed strictly in conform to the drawings or as directed by the Engineer.
- The Grade of concrete for substructure shall be as per the Table 3.
- Vertical construction joints are not permitted and horizontal construction joints shall be avoided as far as possible by arranging the concrete pour in one single operation.
- In case of tall piers and abutments, use of slipform shall be preferred. The design, erection and raising of slipform shall be subject to special specifications which will be furnished by the Contractor, subject to the approval of the Engineer.
- Adequate number of weep holes having 75mm diameter at spacing not exceeding one metre in both directions shall be provided to prevent any accumulation of water and building up of hydrostatic pressure behind the abutment and wing wall.
- The permissible tolerances of substructure elements are given below:
 - Variation in cross sectional dimensions : +10mm/-5mm
 - Misplacement from specified position in plan : ±10mm
 - Variation of levels at the top : ±10mm
 - Variation of reduced levels of bearing areas : ±5mm
 - Variation from plumb over full height : ±10mm
 - Surface unevenness (for 3m straight edge) : 5mm

3. FOUNDATIONS

The foundation is designed based on the soil parameters furnished in the subsoil investigation. During construction, any marginal deviation in foundation depth is observed, sufficient number of confirmatory borings shall be taken and reported to this office for revising the design

5. PILE FOUNDATION:

- Piles shall be constructed as per the guidelines given in IS: 2911 subject to limitations/stipulations given in IRC: 78.
- Bored cast-in-situ piles having diameter as indicated in the drawing shall be provided and socketed as required into hard rock. In the case of piles resting on soft rock or dense sand, it shall be ensured that soil underneath the founding level have SPT values (N) greater than 50 for a continuous depth of three times the diameter of pile from founding level.
- Drilling mud such as bentonite suspension having properties in confirmation with annexure-D of IS: 2911 (Part-1/sec. 2): 2010 shall be maintained throughout the boring process to ensure the stability of the walls of bore holes until the pile has been concreted.
- Permanent mild steel liner (casing pipe) having thickness 6mm shall be provided for all piles from bottom of pile cap to atleast 1.0metre below the Design Scour Level (DSL). Wherein the walls of boreholes cannot be stabilized by bentonite suspension for situations mentioned in Cl. 709.1.4 of IRC:78 and for short piles to be socketed into hard rock, additional length of permanent liner below DSL shall be provided. The total estimated length of permanent liner/casing pipe, required for each pile group is given in Table-4.

- The grade and mix properties of concrete for piles shall be as per the values mentioned in Table-3. The concrete shall be easily workable such that the slump is between 150 to 200mm.
- The pile shall be concreted wholly by tremie and the method of deposition shall no be changed part way up the pile, to prevent the laitance from being entrapped within the pile.
- The first charge of concrete shall be placed with a sliding plug pushed down the tube ahead of it or with a steel plate of adequate charge to prevent mixing of concrete and water. however, the plug shall not be left in the concrete as a lump.
- The tremie pipe shall always penetrate well into the concrete with an adequate margin of safety against accidental withdrawal of the pipe. the tremie shall be always full of concrete.
- The concreting of the pile must be completed in one continuous operation. In the exceptional case of interruption of concreting, but which can be resumed within the initial setting time of concrete, the tremie shall not be taken out the concrete. Instead it shall be raised and lowered slowly, from time to time to prevent the concrete from setting.
- The top of concrete in a pile shall be brought above the cut off level to permit removal of all laitance and weak concrete before pile cap is laid. this will ensure good concrete at the cut off level after stripping open its bars for embedment into cap.
- The permissible tolerance for piles shall be such that the shift at platform level not exceeding 75mm and the tilt not exceeding 1 in 150.
- Routine load test as per IS: 2911 (Part-IV) shall be done for a working pile in a group of alternate foundations of piers and abutments, if the same is resting on hard rock, to reconfirm the allowable pile capacity mentioned above. in the case of piles resting on soft rock or dense sand, the test shall be done for a working pile in a group of all the foundations of piers and abutments.
- The routine test shall be carried for a test load of at least one and half times the working load for which the maximum settlement of test loading in position being not exceeding 12 mm.
- Piles have minimum working load carrying capacity as given in Table-4.

4. HAND RAILS OR CRASH BARRIERS

- The hand rails or crash barriers shall be of cast-in-situ type or pre-cast type RCC structure with concrete grade not lesser than M30 for railings and M40 for crash barriers and the maximum aggregate shall be limited to 12mm.
- All steel railing elements and fittings shall be galvanised or painted with an approved paint. Steel railings shall be given one shop coat of paint and three coats of paint after erection, if sections are not galvanised.

5. BEARINGS

II. POT CUM PTFE BEARING

- The Contractor shall furnish the design of Pot/Pot-cum-PTFE bearing for the load and movement requirements as indicated in the Drawings of bearing layout and shall get the approval from the Engineer-in-charge. The design shall be in accordance with latest version IRC:83 (Part III).
- The bearings shall be manufactured to high standards both in terms of material quality and workmanship. The Acceptance of the bearings shall be based on the inspection, test results and certification prescribed in the latest version of IRC: 83 (Part-III).
- The bearings shall be installed with care to ensure their correct functioning in accordance with the design of the whole structure.

Span arrangement	4X30+1X42+2X35+1X42+4X30m
Overall length	403.635m
Overall width	14.000/11.20m
Carriageway width	7.5m
Pylon height from deck level	17.60m
Footpath	1.500m(min) on both sides
Bridge type	PSC Box girder and RCC slab For the central Extradosed span PSC I girder and Rcc slab for the end spans

Table-2: HYDRAULIC PARAMETERS

Design MFL/HFL	+98.000
Design OFL/HTL	+97.400
Design LWL	96.500
Design Scour Level at Pier points	-
Design Scour Level at Abutment points	-
Design linear ventway	-
Design discharge at MFL	-

TABLE - 3: CONCRETE MIX FOR VARIOUS BRIDGE COMPONENTS

Sl. No.	Component	Grade of concrete	Max. W/C ratio	Min. cement content (kg/cum)	Clear cover	Exposure condition
1	Superstructure (All spans)	M45	0.45	360	as per the drg.	Severe
2	Approach slab	M30	0.45	360	50	Severe
(a)	Pile cap	M35	0.45	360	75	Severe
(b)	Pile	M40	0.40	400	75	Very severe
3	RC pylons & piers	M45	0.45	360	50	Severe
3	RCC piers and Abutment	M35	0.45	360	50	Severe

Standard Deviation for Mix design shall be 6

TABLE - B: DESIGN PARAMETERS OF FOUNDATION

Pier No.	Foundation type	Diameter of Pile (mm)	Vertical load (kN) on pile		Horizontal load on pile(kN)	Socket depth into hard strata (mm)	Estimated length of MS liner/Casing pipe for pile (mM)
			Max.	Min.			
A1	Pile	1200	2500	-	120	600	1250
P1	Pile	1200	2750	-	50	600	7500
P2	Pile	1200	2750	-	50	600	7500
P3	Pile	1200	2750	-	50	600	7500
P4	Pile	1200	2850	-	50	600	7500
P5	Pile	1200	3000	-	50	600	7500
P6	Pile	1200	3000	-	50	600	7500
P7	Pile	1200	2850	-	150	600	7500
P8	Pile	1200	2750	-	50	600	7500
P9	Pile	1200	2750	-	50	600	7500
10	Pile	1200	2750	-	50	600	7500
A2	Pile	1200	2500	-	120	600	5000

KEY PLAN:

NOTES:

- GENERAL
- All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
- Only written dimensions are to be followed. No dimension shall be scaled.
- Properly stiffened steel plates shall be used as shuttering for casting Deck Slab and Cross Girders.
- The Reinforcement for Parapet Posts, Parapet bases and Road Kerbs shall be detailed out from Deck slab submittal.
- Construction stage of the structure shall be as shown in the drawing.

No.	Letter No.	Date	Description
1	CE/AM/MLM/1317/2017	13/09/2017	Investigation Details

No.	Drawing Sheet No.	Date	Drawing Title
1	1/2	31/03/2018	GENERAL DESIGN DRAWING

Rev. No.	Design	Checked	Reviewed	Recommended	Approved	Date	Description
1							

NAME OF ROAD	ROAD No.
PEZHUM THURUTH- PERUMON	
NAME OF CROSSING	ROAD CHANGING AT CL OF CROSSING
ASHTAMUDI KAYAL	CH: 0/436/950
NAME OF BRIDGE	BRIDGE No.
PERUMON BRIDGE	

DRAWING PREPARED FOR	EXECUTIVE WORK
<input type="checkbox"/> CIPR PREPARATION	ROADS AND BRIDGES
<input type="checkbox"/> ADMIN./FINANCIAL SANCTION	NAME OF DIVISION
<input type="checkbox"/> TECHNICAL SANCTION	KOLLAM
<input type="checkbox"/> CONSTRUCTION	DRAWN BY:
ROAD CATEGORY:	BINO BRIGIT P.B.
<input type="checkbox"/> NATIONAL HIGHWAY	3RD GRADE DRAFTSMAN
<input type="checkbox"/> STATE HIGHWAY	DESIGNED BY:
<input checked="" type="checkbox"/> MAJOR DISTRICT ROAD	SAJUN K.V.
<input type="checkbox"/> OTHER DISTRICT ROAD	ASSISTANT BRIDGE ENGINEER
<input type="checkbox"/> VILLAGE ROAD	CHECKED BY:
BRIDGE CATEGORY:	PHOENIX S.S.
<input type="checkbox"/> CULVERT	BRIDGE ENGINEER
<input type="checkbox"/> MINOR BRIDGE	REVIEWED BY:
<input checked="" type="checkbox"/> MAJOR BRIDGE	SAJU S.
<input type="checkbox"/> FLYOVER BRIDGE	SENIOR BRIDGE ENGINEER
<input type="checkbox"/> UNDER PASS	RECOMMENDED BY:
<input type="checkbox"/> ROAD OVER BRIDGE	SANDHYA S MENON
<input type="checkbox"/> ROAD UNDER BRIDGE	DIRECTOR
<input type="checkbox"/> CAUSEWAY	APPROVED BY:
CONSTRUCTION NATURE:	MADHURATHY K.R.
<input checked="" type="checkbox"/> NEW	CHIEF ENGINEER (DESIGN)
<input type="checkbox"/> RECONSTRUCTION	DATE:
<input type="checkbox"/> REHABILITATION	03/07/2020

Bridges Design Unit	
CHIEF DESIGN OFFICE	
DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT	
PUBLIC OFFICE COMPOUND, MUSEUM P.O.	
THIRUVANANTHAPURAM, KERALA, PIN 695 001	
Tel: 0471 2320029 Website: keralapw.gov.in	
Fax: 0471 2325856 Email: bdcd@kpw.in	

DRAWING TITLE	DRAWING SCALE
NOTES ON BRIDGE ELEMENTS	1:600, 1:200
DRAWING NO.	SHEET SIZE
BD/33/2017/DESIGN/1	A0
FILE NO.	REVISIONS
BD/33/2017/DESIGN/1	RD
	SHEET No.
	1H/2

NOTES ON CONCRETING

1. CONTROL OF SURFACE EVAPORATION

Use the graphical figure (Fig.1) below to estimate and control the loss of water through surface evaporation in the laid concrete. One or more of the following actions shall be taken to reduce the surface evaporation rate to no more than one kilogram of water per square metre of surface area per hour.

- Construct Windbreakers to effectively reduce the wind velocity (to suit) in the area of concrete placement. The construction of windbreakers or enclosure should not proceed without approval of the Engineer with respect to their structural design relative to safety, stability, adverse loads, and vibrations in the falsework.
- Install stationary Fog Sprayers upwind of the concreting operation to effectively increase the relative humidity in the area of concrete placement.
- When necessary, effectively reduce the temperature of concrete (to suit) by cooling one or more of its components as well as lightly spray water to wet the shutters and the tied reinforcements. Ice, if added to the mix-water, shall be completely melted prior to using that water.

2. CONSTRUCTION JOINTS:

- As far as possible the location of Construction Joints shall be as shown in the Drawings, but if not shown on the Drawings, but found absolutely necessary, they shall be planned in advance and the placing of concrete has to be carried out continuously from Joint to Joint.
- A Construction Joint should not be located near the centroid level of the section where the transverse SHEAR stress is maximum.
- The Joint should be nearly perpendicular to the principal lines of tensile stress and in general be located at points of minimum Shear and minimum Moment, as far as possible.
- Where dowels, reinforcing bars, or other adequate ties are not shown at Construction Joints in the Drawings, 'keys' should be formed at reasonable spacing by embedding water-soaked beveled timbers while the concrete is still soft.
- These keys should be sized as shown in the details, or as directed by the Engineer, and these key-forming timbers shall be removed when the concrete has initially set.
- In resuming concreting work, the surface of the concrete previously placed shall first be thoroughly cleaned of dirt, scum, laitance, loosely projecting aggregates and any other soft material, using stiff wire brushes, and - if deemed necessary by the Engineer - by sand blasting.
- The concrete surface shall then be thoroughly soaked with clean water (just before further concreting) and the free water, etc. air-blown away, and the cleaned concrete surface painted with a thin layer of cement slurry, and then only further concrete poured.
- 'Wire-mesh' and other similar items do not provide a proper construction joint, and they shall not be used.

3. COLD JOINTS:

- When a planned 'continuous' placement of concrete in any structural member is interrupted or delayed, for any reason, for a period long enough for the previously partially placed concrete to take its initial set, the Engineer may declare such a joint as a Cold Joint and the Contractor shall immediately remove the previously partially placed concrete from the Forms.
- However, where feasible, the previously partially placed concrete may instead be suitably and carefully hacked and its hacked end brought into 'low shear low moment' zone as far as possible, and given shear key depressions after bringing it nearly perpendicular to the principal lines of tensile stress (for example: brought to vertical or nearly vertical in a beam with principal bending reinforcement horizontal) and thereafter same treatment shall be given to it as to a Construction Joint and only then the concreting resumed (making sure all reinforcements are as per the approved Drawings and the Shuttering has been brought to line and plumb tightly).

4. CONCRETING IN HOT WEATHER

- When the temperature of the 'concrete mixture' is expected to exceed about 25°C, a retarding admixture shall be included in the approved mix design since setting time tends to reduce at higher temperatures.
- The temperature of the concrete mixture immediately before placement shall not exceed 32°C.

- When the ambient air temperature is above 32°C, all Forms, reinforcing steel, and other contact surfaces shall be cooled to below 32°C until concrete is placed.
- When such high ambient temperature conditions exist, the most appropriate solution is to resort to evening-night-&-morning-time concreting.
- However, if the above stated precautions are taken to help lower the temperature of contact surfaces and the concrete mix-ingredients are also cooled (explained ahead), concreting can be carried out even during day hours provided the ambient air temperature in shade does not exceed 40°C.
- Mixers, chutes, belts, hoppers, pump lines, and other production and placement equipment can be shaded, painted white, covered with (wet) burlap, or otherwise cooled to reduce the effect of the sun's heat.
- Forms and reinforcing steel can be sprinkled with cold water and covered with wet burlap until controlled concreting commences.
- Sprinkling the area with water spray, gainfully cools the contact surfaces and surrounding air and desirably increases its relative humidity.
- This not only reduces the 'temperature rise' of the concrete but also minimizes evaporation of water from the concrete during placement and after casting.
- There should be no standing water or puddles on the sub-grade or inside the Forms when the concrete is placed.
- The mix water may be cooled by using shaved or crushed ice but only as much ice should be used as will be melted entirely before this water is added to the mix.
- All water used for making ice and for cooling or sprinkling, and curing, must meet the same quality requirements as those for water used for Mixing of Concrete.
- Of particular concern are the polluting sulphates and chlorides (salts) in the mix, which can adversely affect the cement and corrode the reinforcing steel, respectively. These must be kept below their specified limits.

- Transporting and placing concrete shall be done as quickly as practical during hot weather. Delays contribute to loss of slump, a damaging increase in concrete temperature and loss of workability.
- Enough workmen and equipment shall always be available to handle and place concrete immediately upon delivery.
- Prolonged mixing, even at agitating speed of the Drum, shall be avoided since it might heat-up the mix and reduce workability.
- If delays occur, the heat generated by continued mixing/agitating can be minimized by stopping the mixer and then agitating intermittently, but the delays shall be kept short.
- Since concrete hardens more rapidly in hot weather, extra care in placing techniques is required to avoid Cold Joints.
- For placement of Concrete in Walls, Shafts, Columns, etc., shallower layers may be required to assure proper consolidation and monolithicity with each previous lift, effective dissipation of heat of hydration and to prevent segregation of the mix.
- Temporary sunshades and windbreakers help to minimize adverse effects of hot weather, winds, and surface evaporation.

5. CAUTION AGAINST PLASTIC SHRINKAGE/SETTLEMENT CRACKING

- Plastic Shrinkage cracks develop prior to initial setting of concrete and can appear more prominently in slabs. If the rate of surface evaporation from the freshly laid concrete is faster than the rate of upward bleeding through it, the concrete surface tends to dry up, hence shrink, causing cracks in plastic concrete due to tension from this shrinking under such condition. These cracks travel downwards from the surface and their propagation is locked only upon 'initial setting' of concrete.
- The longer the initial setting time, deeper will these cracks penetrate. If they travel down to a significant depth of slab, then the slab can become a bunch of isolated concrete blocks separated by these cracks, and hence not be structurally monolithic with the rest of the Deck-section. Such deep-penetrating crack distress, in all probability, generally is not repairable by Epoxy filling of these cracks. The result may be a major Damage, requiring major rehabilitation.

.....cont'd.

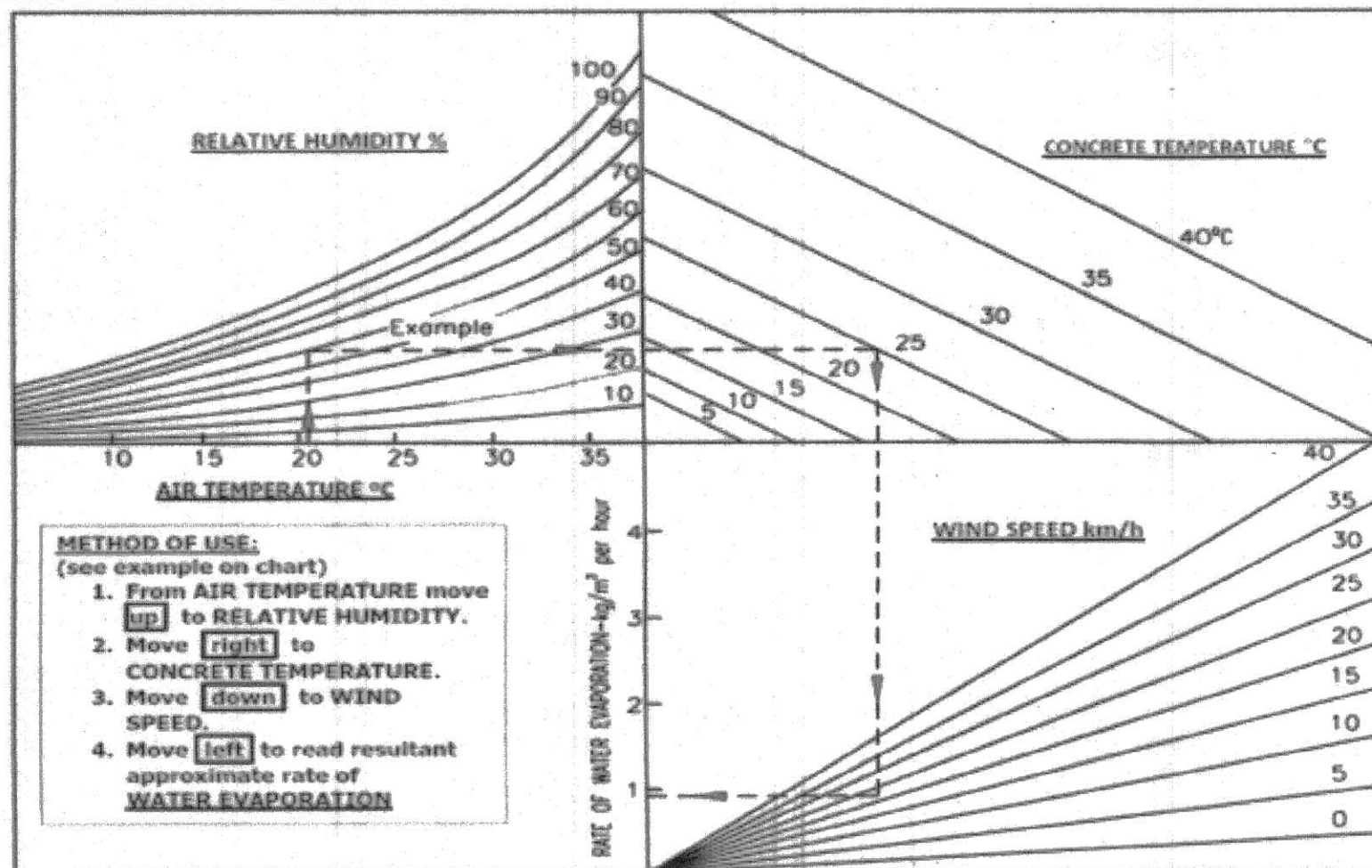


Fig.1 WATER EVAPORATION RATE FROM PLASTIC CONCRETE SURFACE

KEY PLAN:

NOTES:

- GENERAL
- All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
- Only written dimensions are to be followed. No drawing shall be valid.
- Properly stiffened steel plates shall be used as shuttering for casting Deck Slab and Cross Girders.
- The Retarders for Parapet Posts, Parapet bases and Road Kerbs shall be detailed out from Deck slab shown.
- Construction stage of the structure shall be shown in the drawing.

No	Letter No.	Date	Description
1			
2			
3			
4			

REFERENCE LETTERS			
No	Letter No.	Date	Description
1			
2			
3			
4			

REFERENCE DRAWINGS			
No	Drawing/Sheet No.	Date	Drawing Title
1	1/2	31/03/2018	GENERAL DESIGN DRAWING
2			
3			
4			

REVISIONS			
Rev. No	Designed/Checked/Reviewed/Revised/Issued	Approved	Date
1			
2			
3			
4			

NAME OF ROAD: PEZHUM THURUTH- PERUMON	ROAD No.
NAME OF CROSSING: ASHTAMUDI KAYAL	ROAD CROSSING AT CL OF CROSSING CH: 0/438.950
NAME OF BRIDGE: PERUMON BRIDGE	BRIDGE No.

DRAWING PREPARED FOR: <input type="checkbox"/> DPR PREPARATION <input type="checkbox"/> ADMIN./FINANCIAL SANCTION <input type="checkbox"/> TECHNICAL SANCTION <input checked="" type="checkbox"/> CONSTRUCTION	ROADS AND BRIDGES NAME OF DIVISION: KOLLAM DRAWN BY: BINO BRIGIT P.B. 3rd GRADE ENGINEER
ROAD CATEGORY: <input type="checkbox"/> NATIONAL HIGHWAY <input type="checkbox"/> STATE HIGHWAY <input checked="" type="checkbox"/> MAJOR DISTRICT ROAD <input type="checkbox"/> OTHER DISTRICT ROAD <input type="checkbox"/> VILLAGE ROAD	REVISIONS: ARJUN K.V. ASSISTANT BRIDGE ENGINEER
BRIDGE CATEGORY: <input type="checkbox"/> CULVERT <input type="checkbox"/> MINOR BRIDGE <input checked="" type="checkbox"/> MAJOR BRIDGE <input type="checkbox"/> FLYOVER BRIDGE <input type="checkbox"/> UNDER PASS <input type="checkbox"/> ROAD OVER BRIDGE <input type="checkbox"/> ROAD UNDER BRIDGE <input type="checkbox"/> CAUSEWAY	CHECKED BY: Sd/- PHOENIX S.S. BRIDGE ENGINEER
CONSTRUCTION NATURE: <input checked="" type="checkbox"/> NEW <input type="checkbox"/> RECONSTRUCTION <input type="checkbox"/> REHABILITATION	REVIEWED BY: SANJIV S. SENIOR BRIDGE ENGINEER
DATE: 03/07/2020	APPROVED BY: MADHUMATHY K.R. CHIEF ENGINEER, DESIGN

Bridges Design Unit			
CHIEF DESIGN OFFICE DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT PUBLIC OFFICE COMPOUND, MUSEUM P.O. THIRUVANANTHAPURAM, KERALA PIN: 695 001 Tel: 04712322029 Website: keralapwd.gov.in Fax: 04712325856 Email: pdedoc@kwa.gov.in			
DRAWING TITLE: NOTES ON CONCRETING-1	DRAWING SCALE: 1:400, 1:300 SHEET SIZE: A0	REVISIONS: RO	DRAWING NO: 1F/2
DRAWING No: CEDO/BD/116/17(Rev1)	FILE NO: BD/33/2017/DESIGN/HW	SHEET No:	

- c) Hence minimum doses of Retarders and Super-Plasticizers shall be used so as to keep the initial setting time to just the required minimum to allow the required 'workability' of concrete.
- d) These cracks can be of random pattern (alligator-skin pattern) and/or may be somewhat parallel to each other and nearly perpendicular to the direction of wind that prevailed at the time of casting. Hence the field staff must look for these cracks before the concrete has initially set and, should these cracks occur, the plastic concrete should be quickly lightly 're-trowelled' on its surface (not re-vibrated) to close these cracks in time.
- e) Reducing the ambient Temperature and increasing the ambient Relative Humidity (by Fog-spraying), lowering the Temperature of Concrete to less than 32°C (by cooling the Aggregates and the mix-water), and reducing the Dosage of Retarder and Super-Plasticizer, will help in controlling the endemically dangerous Plastic Shrinkage Cracking.
- f) Concrete slabs which are correctly re-trowelled should not exhibit Plastic Shrinkage cracks because the action of floating and trowelling is a form of recompaction that tends to close them as fast as they form. (This trowelling can, however, aggravate sedimentation of solids in the mix and cause Plastic Settlement cracks - see ahead.)
- g) Although the Plastic Shrinkage cracks can be wide at their start (even up to 2 mm), the width rapidly diminishes with depth. Nevertheless, in severe cases they may pass through the full depth of a slab, in contrast with most types of Plastic Settlement cracks.
- h) Plastic Shrinkage cracks rarely reach the free ends of the slab (e.g. the edges of a slab) because these edges are free to move under plastic shrinkage. This is a very important way of differentiating them from long-term drying shrinkage cracks if the time of formation is unknown. However, Plastic Shrinkage cracks will form up to the ends of a slab which has been cast against a previous pour, especially if there is continuity of steel, because this acts as restraint.
- i) The factors that determine rate of surface evaporation are: the temperature of the concrete, the air temperature, relative humidity, and wind velocity of the air adjacent to the concrete. The evaporation increases as the humidity decreases, as the wind velocity increases, as the air temperature decreases, and as the concrete temperature increases. Of particular interest is the fact that rapid evaporation is at least as big a problem in cold weather as in hot weather! Even when the relative humidity be 100 per cent in cold weather, there will be a large amount of evaporation if the concrete is warm! Of all the factors listed above, only the concrete temperature is easily controllable. There is a definite advantage to cool the concrete! It shall be placed as cool as practical in warm weather and should not be overheated in cold weather. If the concrete temperature is reduced to about 27°C to 15°C, much of the evaporation can be eliminated.
- j) In hot weather, sometimes concreting during 4pm on the previous day up to 12 noon on the next day may be resorted to for preventing formation of Plastic cracks and obtaining better quality concrete. But this will be effective only if it gives significantly lower concrete temperatures and lower wind velocity. The reduction of air temperature BUT not that of concrete (even with the increase in relative humidity) will not significantly reduce the Plastic Shrinkage cracking.
- k) If it is not possible to eliminate the risk of Plastic Shrinkage cracks even by improved timely curing, then changes to the concrete mix must be considered. First, check that the concrete does not contain an admixture with high retarding effects. If it does, try to reduce it or replace it with the one that does not retard so much (rather than counter it by adding a compensating accelerator!). Second, consider the use of air entrainment. Air-entrained concrete exhibits less Plastic Shrinkage cracks than plain concrete. At first sight this might seem illogical because as air entrainment reduces the rate of bleeding it should increase the risk of Plastic Shrinkage cracks occurring at a given rate of evaporation. However, most commercially available air-entraining agents are 'detergents' and therefore reduce the surface tension caused by drying, and consequently reduce the shrinkage cracking.
- l) The prevention and timely repair of Plastic Shrinkage cracks in slabs is particularly critical. This is because the cracks are wide at the top and can rapidly take in pollutants which may cause subsequent spalling and prevent the subsequent satisfactory application of sealing materials. Clearly wide cracks in slabs are not likely to be self-healing at the top and are likely to spall and allow ingress of pollutants.

- m) Plastic Settlement cracks occur in not-yet-initially-set concrete when there is a relatively high amount of bleeding through it and some form of obstruction to the downward sedimentation of its solids (e.g. the reinforcement bars). These obstructions 'break the back of the settling concrete' over them as its solids fall downwards around them, fomenting formation of hollows under their 'belly'. Thus Cracks show directly over formwork-tie-bolts and over reinforcement near the top of the plastic concrete, reflecting their pattern. Such Cracks can also appear in narrow columns and walls where the said sedimentation is prevented by the resulting arching of the concrete due to downward passage for sedimentation and there may be further aggravation by the presence of horizontal bars.
- n) Plastic Settlement Cracks can be prevented by reducing the bleeding and hence the sedimentation, and by reducing the obstructions to sedimentation.
- o) Admixtures such as plasticizers reduce water demand and thus are the most effective way of reducing bleeding and sedimentation and hence the plastic settlement cracks. These can also be eliminated by light re-vibration (not re-trowelling) of the not-yet-initially-set concrete if they have formed, thus also filling back the under-belly hollows.
- p) This light re-vibration shall not be applied too soon otherwise a second phase of bleeding can still cause Plastic Settlement cracks. The correct time can easily be determined by simple site trials: it will be the last time that a vibrating poker can be inserted into the concrete and removed without leaving a significant trace. Re-vibration is often the only way to eliminate plastic settlement cracks, particularly in deep sections. Trowelling the surface can actually aggravate these cracks as the pressure may only cause further settlement of solids.
- q) Plastic cracks by their very nature pass through the cement matrix and around aggregate particles; therefore they are very rugged and capable of transferring shear, providing there is sufficient reinforcement to maintain aggregate interlock. Consequently full structural repairs (using epoxy formulation) may not be necessary, only if the crack penetration is minor. If deep penetration damage is done, epoxying will not restore full monolithicity.
- r) If cracks follow the pattern of the top reinforcement it may be difficult at first to determine whether they are due to Plastic Shrinkage or Plastic Settlement. If it can be shown that the cracks 'pass through the slab' and follow the pattern of the steel, then they are almost certainly Plastic Shrinkage cracks that have been orientated by the steel.
- s) Plastic cracks often form in the top face of sections e.g., Plastic Shrinkage cracks in slabs, and/or Plastic Settlement cracks on top of deep beams and walls. Thus they can be accessible, and this coupled with the fact that they form so early in the life of concrete, means that they may widen as thermal contraction and drying shrinkage take place. Consequently it may not be wise to fill plastic cracks with 'rigid' epoxy materials until it is certain that the long-term effects have subsided.
- t) Plastic Settlement cracks over steel must be immediately and efficiently 'sealed' if the concrete is in an exposed state (to eliminate the risk of corrosion of the steel). Reduced bond strengths due to under-belly voids thus formed under steel bars are dangerous.

6. CURING AND PROTECTION OF YOUNG CONCRETE:

All structural concrete shall be cured for a period of time required to obtain the specified strength, but for not less than fourteen consecutive days (and nights) beginning immediately after 'initial setting' of concrete (which is when it loses its surface sheen). Curing (Membrane-curing or Water-curing) of laid concrete shall be carried out as generally explained below:

Membrane-Curing the Concrete:

- a) Except for at Construction Joints and surfaces sealed by Forms, liquid membrane curing compound can be used (for curing the concrete) as follows:
- b) On bridge deck top surface and other exposed surfaces, liquid membrane curing compound shall be applied soon after Initial Setting and as the Surface Sheen has disappeared and the concrete is still slightly damp (not wet).
- c) On shuttered i.e. formed vertical surfaces, Forms shall be stripped as soon as practical (generally after 24 hours of casting) and liquid membrane curing compound applied immediately except in the areas that require rubbing or finishing during the curing period.

- c) These areas shall be kept water-wet until their finishing is completed, whereafter the liquid curing membrane shall be uniformly applied on them also when their surface is damp.
- d) White-pigmented liquid membrane curing compound shall be used for all surfaces where the structure temperature during curing period is likely to reach about 35°C or more.
- e) For bridge decks which are to receive an asphaltic overlay, residual curing membrane (after curing) shall be removed prior to the overlaying.
- f) Removal methods and results should be approved by the Engineer.
- g) The membrane curing compound used shall be of longer lasting duration and in accordance with the requirements specified for curing membrane material, AASHTO M 148 or the equivalent IS Specification.
- h) The curing membrane shall be applied in two applications one immediately following the other.
- i) The rate of each application of curing compound shall be as prescribed by the manufacturer, with a spreading rate per application of at least one litre of liquid per five square metres of concrete surface.
- j) If the concrete has dried up or has become dry, it shall be thoroughly wetted with water and the curing compound applied just as the surface film of water disappears and the surface is damp.
- k) During curing operations any unsprayed surfaces shall be kept cured with watered Hessian cloth, and sprayed with the curing compound when Surface is damp (not wet).
- l) Any curing membrane material on Construction Joints and/or on reinforcing steel shall be completely removed before the following concrete pour.
- m) Hand operated spraying equipment shall be capable of applying constant and uniform pressure to provide uniform and even distribution of the curing membrane at the rates required.
- n) The curing compound shall be kept thoroughly mixed at all times during usage/application.
- o) No traffic of any kind shall be permitted on the curing membrane until the curing period is completed.

Water-Curing the Concrete:

- a) All concrete surfaces, unless still sealed by unreleased Forms (which shall be kept from heating-up under ambient temperature) or submerged, shall be water-cured unless liquid membrane cured.
- b) Water curing shall begin just after initial setting of concrete (which generally occurs by about 60 minutes of placement of un-admixed concrete and by about 120 to 180 minutes of placement of admixed concrete) and just after the surface water sheen has disappeared.
- c) Surfaces water-cured shall be covered with wet sand, cotton mats, or double-thickness burlap (Jute/Hessian) sheets.
- d) This Hessian material shall be placed tightly around and behind any projecting reinforcing steel in order to completely cover the fresh concrete surface. The Hessian material shall be completely saturated with water and kept continuously saturated throughout the curing period.
- e) After the initial saturation, unless water is kept running, all surfaces shall be covered with thick polythene sheeting or other approved impervious material in order to protect/prevent drying-up of concrete surface being cured continuously.
- f) The sheeting shall be weighted down or secured well to prevent moisture-loss but the surfaces of the concrete shall be readily available for inspection of the Engineer (or his Representative).
- g) Sheeting that contains holes or is otherwise damaged shall be repaired or replaced immediately.
- h) The Contractor shall be responsible for thoroughly inspecting and monitoring the concrete surfaces throughout the curing period to ensure continuous wet curing. Additional water shall be poured on any areas where saturation is reduced.
- i) Inspection of curing by the Contractor shall be conducted at least TEN times per day and night for the duration of the curing period - and even more often if ordered so by the Engineer.
- j) The Engineer shall be advised of the curing inspection schedule and he (or his Representative) may accompany the workmen to verify the acceptability of curing.

KEY PLAN:

NOTES:

- GENERAL
- All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
- Only written dimensions are to be followed. No drawing shall be scaled.
- Properly stiffened steel plates shall be used as shuttering for casting Deck Slabs and Cross Girders.
- The Reinforcements for Parapet Posts, Parapet bases and Road Kerbs shall be dowelled out from Deck Slabs as shown.
- Construction stage of the structure shall be as shown in the drawing.

3			
2			
1	CE/BR/BD/116/17/Rev1	15/06/2017	Investigation Details

No	Letter No.	Date	Description
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REFERENCE LETTERS

5			
4			
3			
2			

1	1/2	31/03/2018	GENERAL DESIGN DRAWING
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REFERENCE DRAWINGS

R4			
R3			
R2			
R1			

REVISIONS

Rev. No	Design	Checked	Reviewed	Revised/Amended	Approved	Date	Description
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NAME OF ROAD: PEZHUM THURUTH- PERUMON ROAD No.

NAME OF CROSSING: ASHTAMUDI KAYAL ROAD CHANGING AT CL. OF CROSSING: CH: 0/430.950

NAME OF BRIDGE: PERUMON BRIDGE BRIDGE No.

DRAWING DESIGNED FOR: CDPR PREPARATION ADMIN./FINANCIAL SANCTION TECHNICAL SANCTION CONSTRUCTION

EXECUTION WORK: ROADS AND BRIDGES

NAME OF DIVISION: KOLLAR

ROAD CATEGORY: NATIONAL HIGHWAY STATE HIGHWAY MAJOR DISTRICT ROAD OTHER DISTRICT ROAD VILLAGE ROAD

BRIDGE CATEGORY: CULVERT MINOR BRIDGE MAJOR BRIDGE FLYOVER BRIDGE UNDER PASS ROAD OVER BRIDGE ROAD UNDER BRIDGE CAUSEWAY

CONSTRUCTION NATURE: NEW RECONSTRUCTION REHABILITATION

DATE: 03/07/2020

APPROVED BY: SANDHYA G MENON DIRECTOR

CHIEF ENGINEER (DESIGN): MASHUMATHY K R

BRIDGES DESIGN UNIT

CHIEF DESIGN OFFICE

DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT

PUBLIC OFFICE COMPOUND, MUSEUM P.O. THIRUVANANTHAPURAM, KERALA, PIN: 695 001

Tel: 04 71232029 Website: keralapwd.gov.in

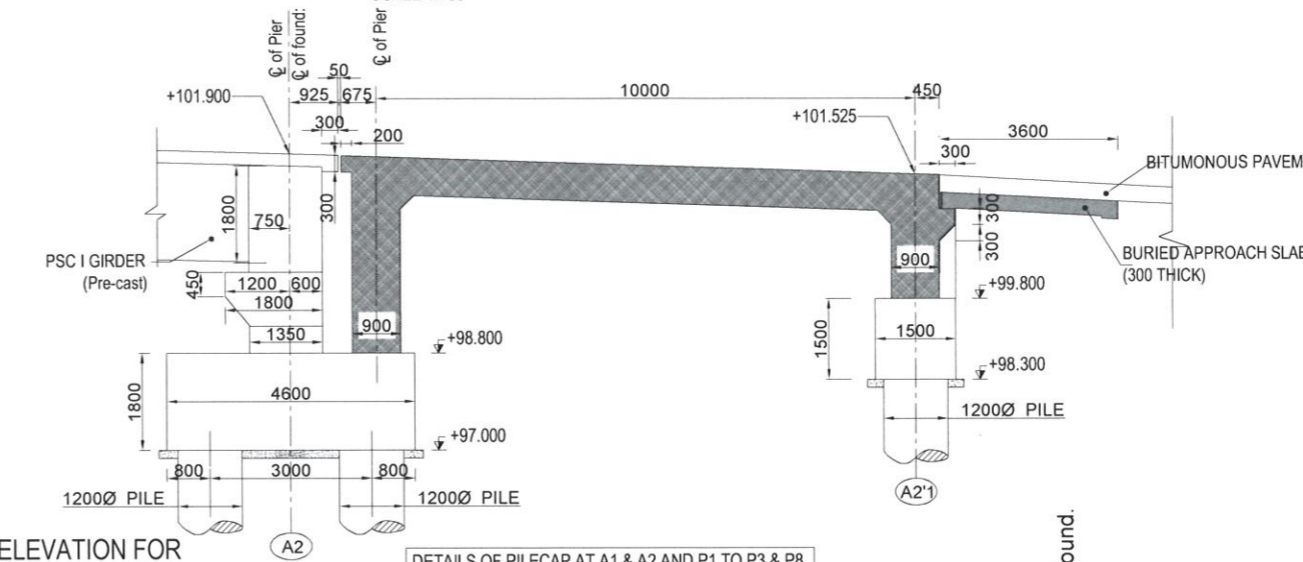
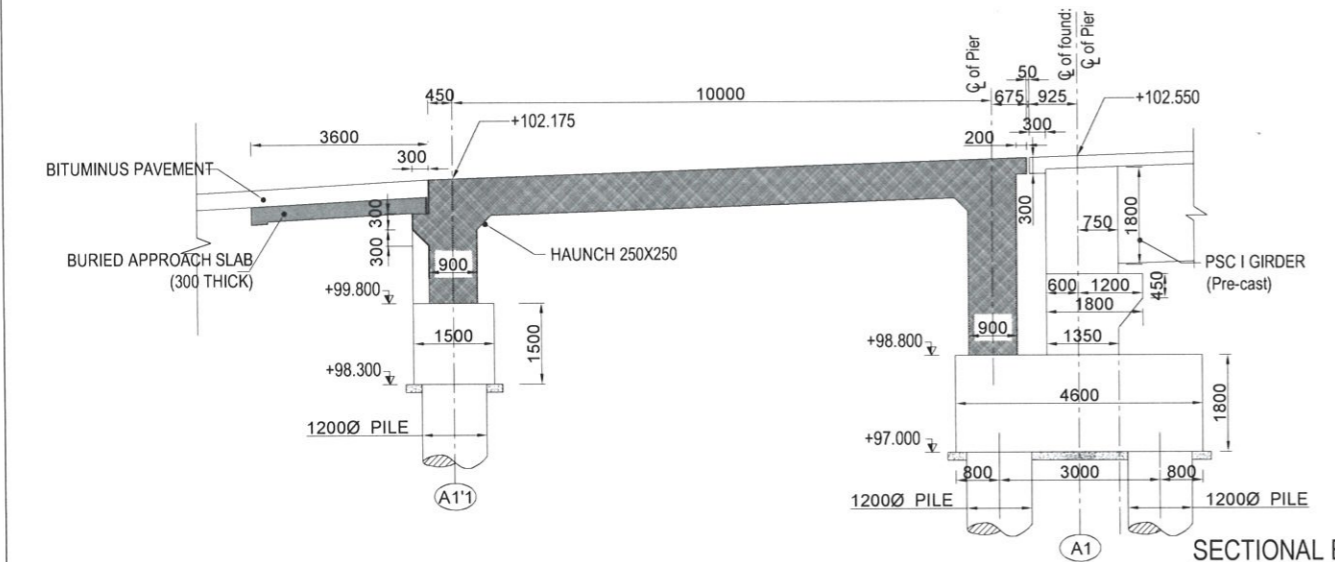
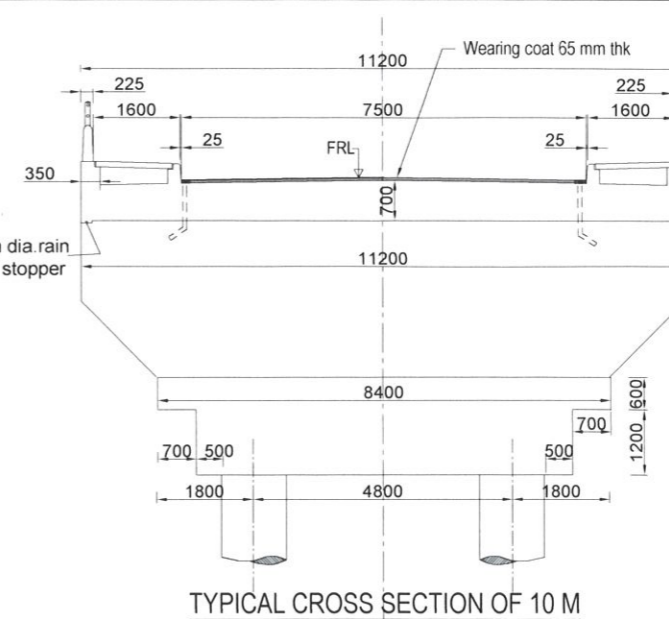
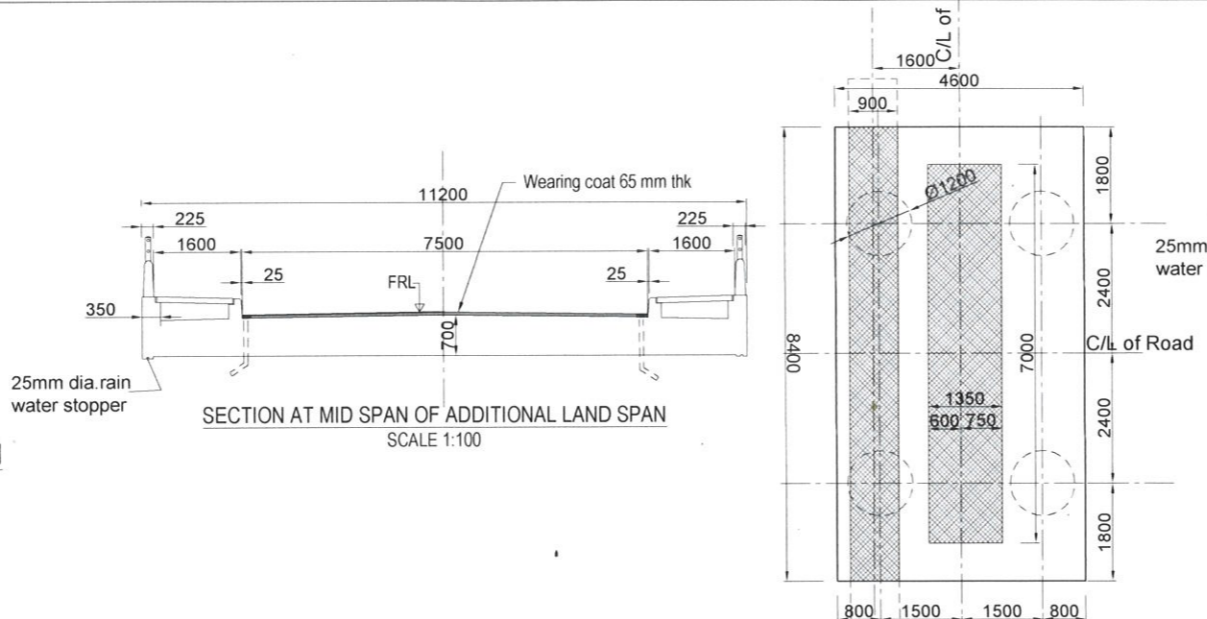
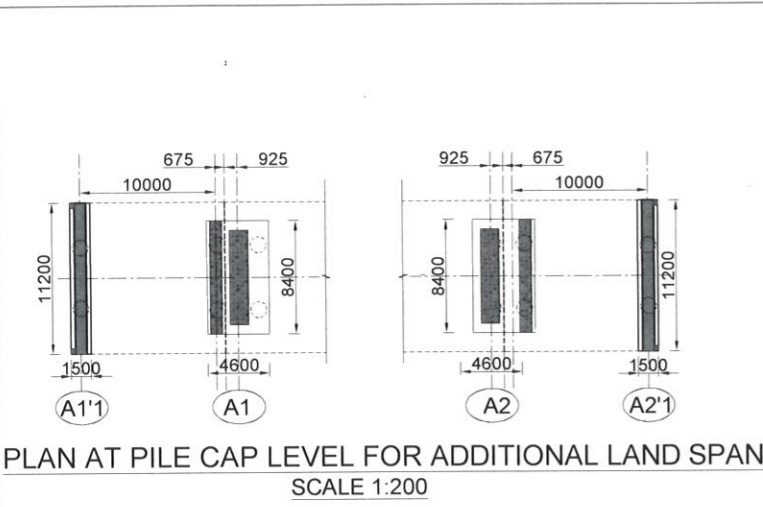
Fax: 04 71232995 Email: info@kpwd.com

DRAWING TITLE: NOTES ON CONCRETING - 2

DRAWING NO: CEDO/BD/116/17/Rev1

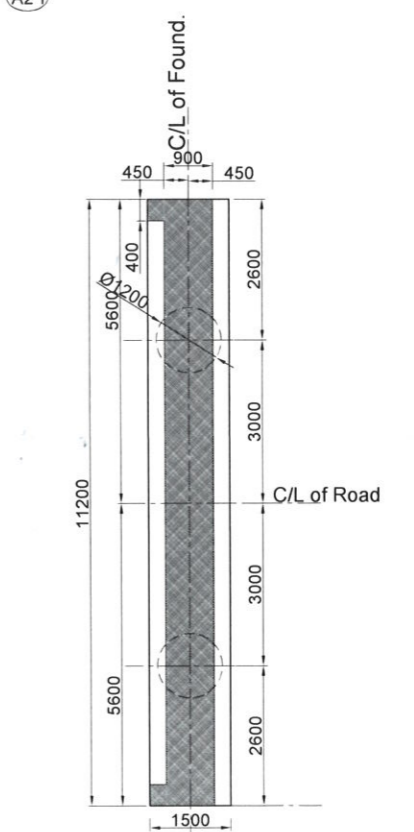
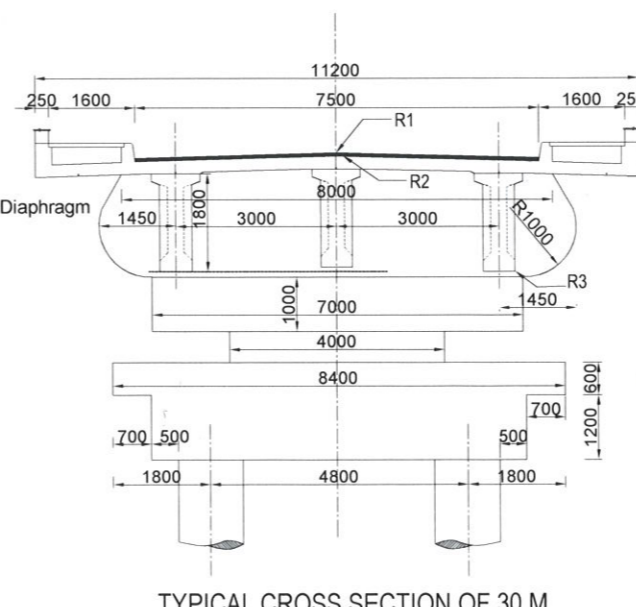
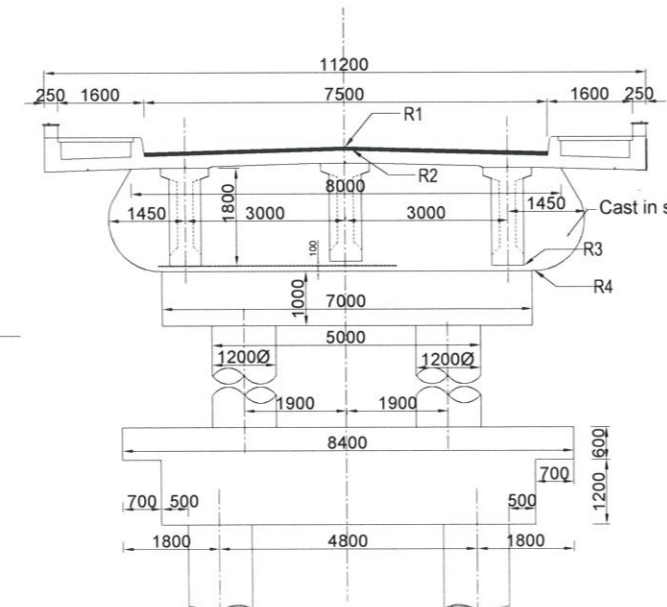
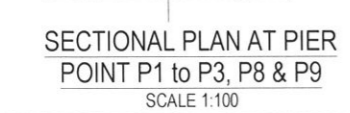
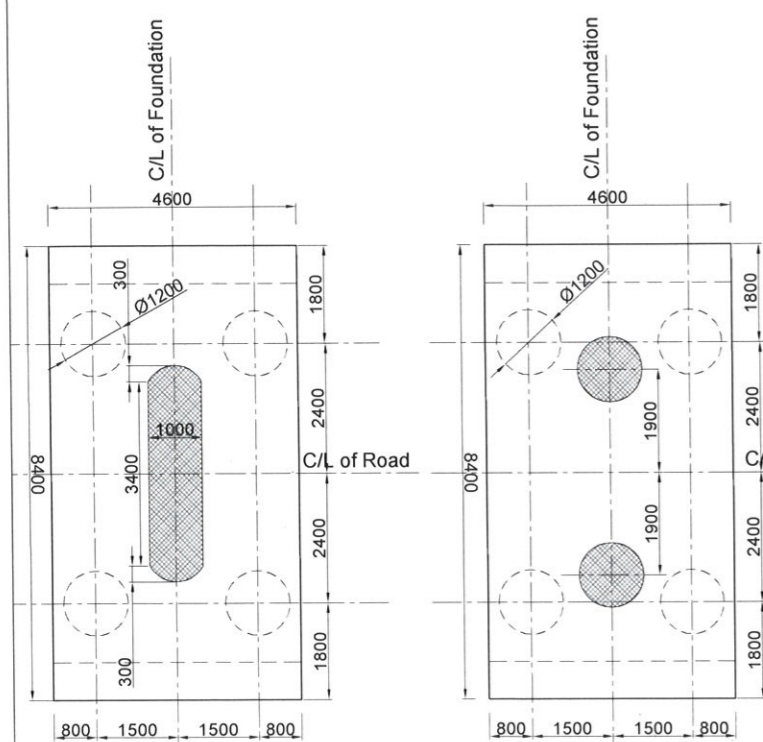
FILE NO: BD/33/2017/DESIGN/MW

SHEET NO: 1G/2



DETAILS OF PILECAP AT A1 & A2 AND P1 TO P3 & P8 TO P9 IN THIS DRAWING SUPERSEDES DRAWING NO CDO/BD/116/17 (REV1) SHEET 1A/2 & 1B/2

THIS DRAWING IS PREPARED BASED ON MINUTES OF MEETING ON 04/01/2021 HELD IN THE CHAMBER OF CHIEF ENGINEER (BRIDGES)



KEY PLAN:

NOTES:

- GENERAL
- All dimensions are in millimeters and all levels are in meters unless otherwise mentioned.
- Only written dimensions are to be followed. No drawing shall be scaled.
- Properly stiffened steel plates shall be used as shuttering for casting Deck Slab and Cross Girders.
- The Reinforcements for Parapet Posts, Parapet bases and Road Kerbs shall be doweled out from Deck slab as shown.
- Construction stage of the structure shall be as shown in the drawing.

No.	Letter No.	Date	Description
1	CE/R&B/KLM/1217/2017	15/06/2017	Investigation Details

REFERENCE LETTERS

No.	Letter No.	Date	Description
1	CDO/BD/116/17 (REV1)_1/2	31/03/2018	GENERAL DESIGN DRAWING

REFERENCE DRAWINGS

Rev. No.	Designed	Checked	Reviewed	Recommended	Approved	Date	Description
R4							
R3							
R2							
R1							

REVISIONS

Rev. No.	Designed	Checked	Reviewed	Recommended	Approved	Date	Description
3							
2							
1							

NAME OF ROAD	ROAD No.
PEZHUM THURUTH- PERUMON	
NAME OF CROSSING	ROAD CHAIRAGE AT C/L OF CROSSING
ASHTAMUDI KAYAL	CH: 0/438.95
NAME OF BRIDGE	BRIDGE No.
PERUMON BRIDGE	
DRAWING ISSUED FOR	EXECUTION WING
<input type="checkbox"/> DPR PREPARATION	ROADS AND BRIDGES
<input type="checkbox"/> ADMIN./FINANCIAL SANCTION	NAME OF DIVISION
<input type="checkbox"/> TECHNICAL SANCTION	KOLLAM
<input checked="" type="checkbox"/> CONSTRUCTION	DRAWN BY
ROAD CATEGORY	BINO BRIGIT P.B. 3 rd GRADE DRAFTSMAN
<input type="checkbox"/> NATIONAL HIGHWAY	DESIGNED BY
<input type="checkbox"/> STATE HIGHWAY	ARUN K.V. ASSISTANT BRIDGE ENGINEER
<input checked="" type="checkbox"/> MAJOR DISTRICT ROAD	CHECKED BY
<input type="checkbox"/> OTHER DISTRICT ROAD	PHOENIX S.S. BRIDGE ENGINEER
<input type="checkbox"/> VILLAGE ROAD	REVIEWED BY
BRIDGE CATEGORY	RECOMMENDED BY
<input type="checkbox"/> CULVERT	SAJU S. SENIOR BRIDGE ENGINEER
<input type="checkbox"/> MINOR BRIDGE	REVIEWED BY
<input checked="" type="checkbox"/> MAJOR BRIDGE	SANDHYA G MENON DIRECTOR
<input type="checkbox"/> FLYOVER BRIDGE	APPROVED BY
<input type="checkbox"/> UNDER PASS	MADHUMATHY K R CHIEF ENGINEER (DESIGN)
<input type="checkbox"/> ROAD OVER BRIDGE	DATE
<input type="checkbox"/> ROAD UNDER BRIDGE	3/2/2021
<input type="checkbox"/> CAUSEWAY	
CONSTRUCTION NATURE	
<input checked="" type="checkbox"/> NEW	
<input type="checkbox"/> RECONSTRUCTION	
<input type="checkbox"/> REHABILITATION	

Bridges Design Unit
 CHIEF DESIGN OFFICE
 DESIGN WING, KERALA PUBLIC WORKS DEPARTMENT
 PUBLIC OFFICE COMPOUND, MUSEUM P.O.
 THIRUVANANTHAPURAM, KERALA. PIN: 695 001
 Tel: 04712322029 Website: keralapwd.gov.in
 Fax: 04712325856 Email: bducds@gmail.com

DRAWING TITLE: DETAILS OF -ADDITIONAL LAND SPAN

DRAWING SCALE: 1:400, 1:200
 SHEET SIZE: A4
 REVISION No: R0
 SHEET No: 1H/2

