

Indian Concrete Institute, Bangalore Centre

Technical Lecture Series

Innovation & Impact

Innovative Design of Viaduct



Prof. Aravind Galagali

Ministry of Water Resources

Government of Karnataka, Bengaluru.

Cell: 9448113737, Email: galagali.aravind@gmail.com

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BIT, Bengaluru

Highlights

- Longest Viaduct in India
- Water Conveyance & Road on the top
- Tallest pier Height (app 100 feet)
- Innovative application of Technology
- Challenges in Design & Execution
- Completion before time

Design & Construction of AQUEDUCT/ VIADUCT

Current Practices

Conventional Cast In-Situ RCC Aqueduct on Don River, Vijayapur, Karnataka



Huge Centering/Shuttering...!



Don Aqueduct, Observe Span...Design..!

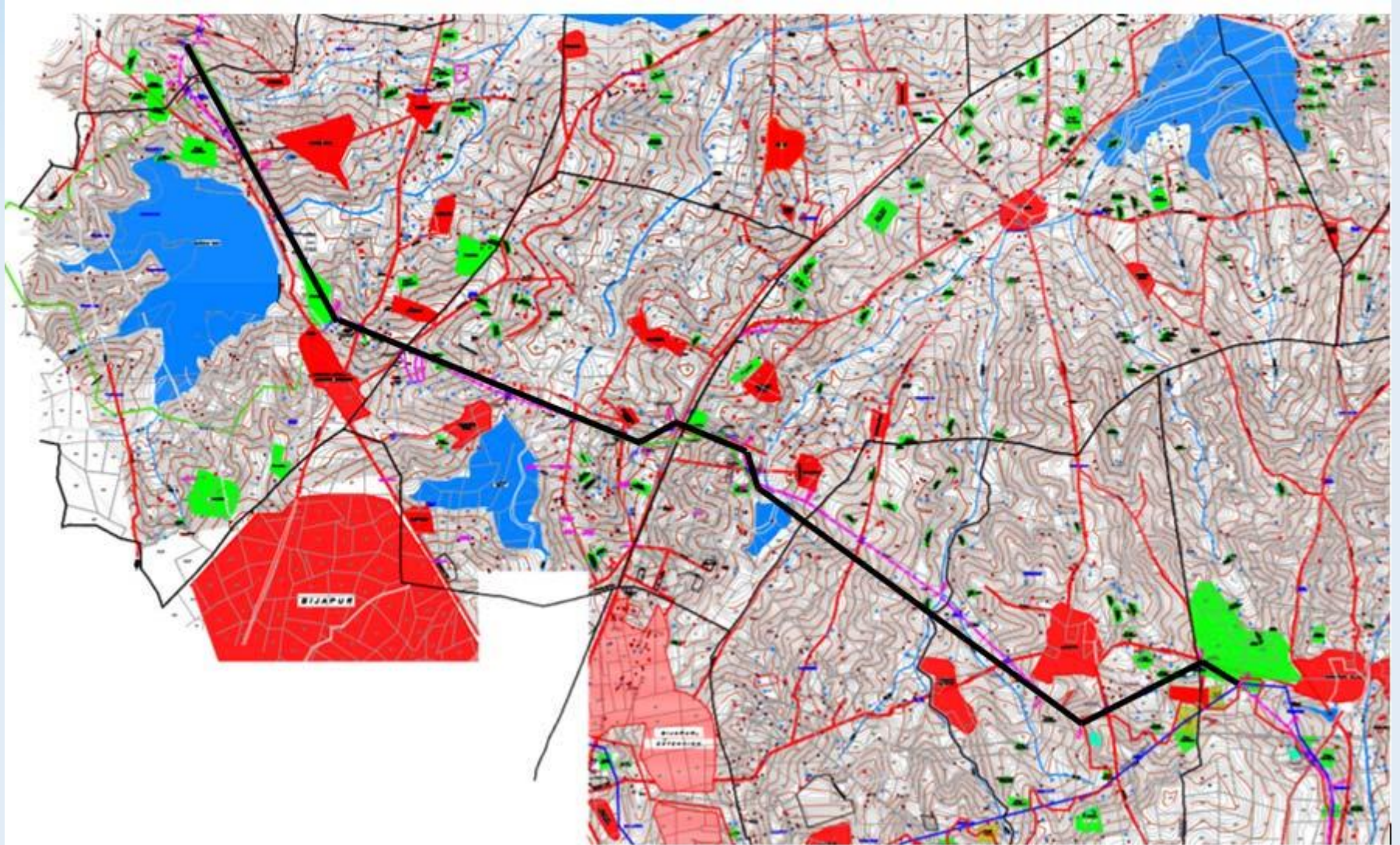


Innovative Application of Technology

**Design & Construction of
TIDAGUNDI VIADUCT
At Vijayapur, Karnataka**

**For
Water Resources Department
Govt of Karnataka**

Tidagundi Viaduct At Vijayapur, Karnataka



Challenges in Mega Projects

- **Time Over run**
 - How to complete the projects in time..?
- **Cost Over run**
 - Delay leads to cost escalation..!
- **Quality Control during consruction**
 - Minimum or No mechanism..!
- **Maintenance**
 - Minimum or Zero ..!
- **Resistance for Change**

Challenges in Tidagundi Viaduct

At Vijayapur, Karnataka

Need for Innovation:

- **Site Conditions**
 - Highly undulating
 - Height of Pier varies from 5 m to 30 m
- **Time Constraint**
 - Total length : 15.5 Km
- **Design Constraints**
 - Durability...Maintenance
 - Cost Effectiveness
 - Aesthetics
 - Constructability
(Type of Str, Material, Know how, Machineries etc)

Innovative Application of Technology

Approach For Design & Construction Solutions

Durability & Maintenance

Issues :

- Water Tightness- Zero Leakage
- Minimum number of Joints
- Entire span as one single unit
- Quality assurance in Construction

Options :

- RCC V/s PSC
- Segmental /Non Segmental Construction

Outcome : Prestressed Concrete Structure

Cast in Situ V/s Precast Structure

Issues :

- Length of structure: 15.5 km
- Time constraint : Max 18 months.
- Cantering/Shuttering
- Quality assurance in Construction

Precast Concrete Structure –Best Choice

- Standardisation & Repetition
- Speedy construction
- Better Quality control & Assurance in casting yard
- Minimum site activities
- Cost Effective

Post tensioned V/s Pre tensioned..?

Post tensioned Structures :

- Thicker sections to accommodate cables
- Requires end block/ diaphragms for anchoring of cables
- Obstruction for flow of water
- Slender Sections in Pretensioned Str.

Outcome :

Pre-Tensioned

Pre Cast

Non Segmental Str.

Shape of Superstructure

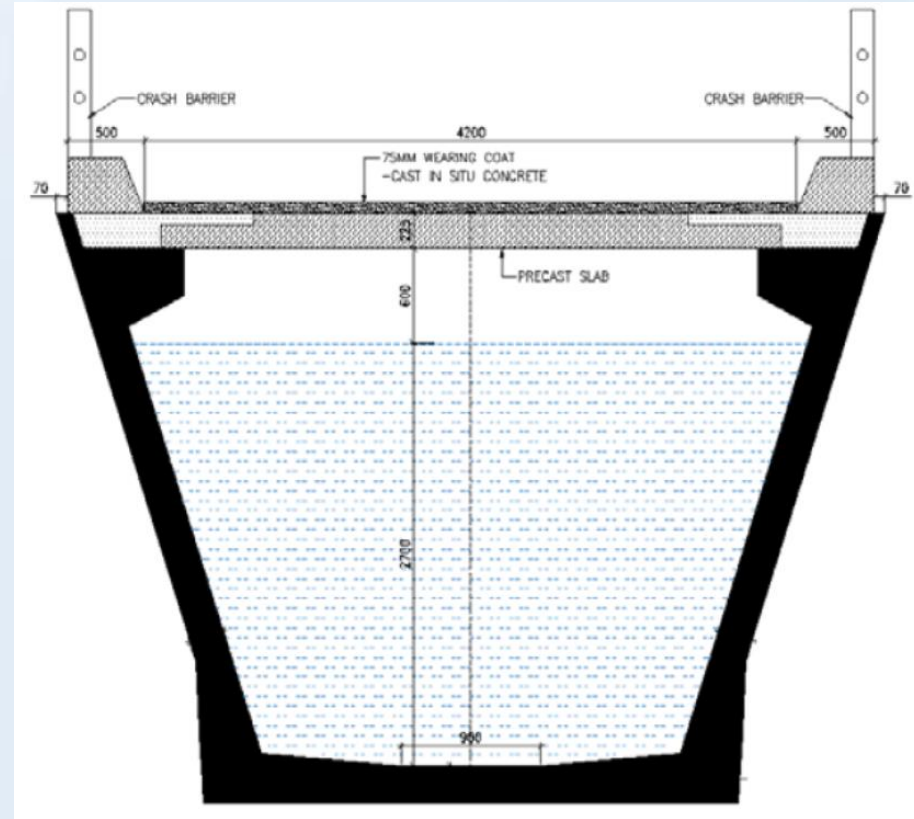
Trough :

- Governed by Hydraulic parameters
- Least wetted perimeter desirable

-Trapezoidal section-

is Hydraulic section with least wetted perimeter, max Conveyance

- Smaller base reduces pier dimension
- Being a BOX, has structural advantage

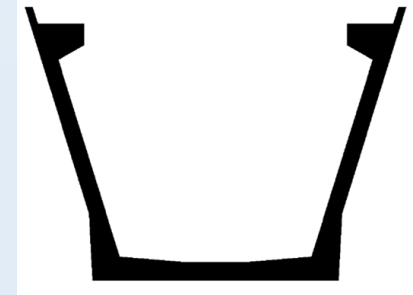
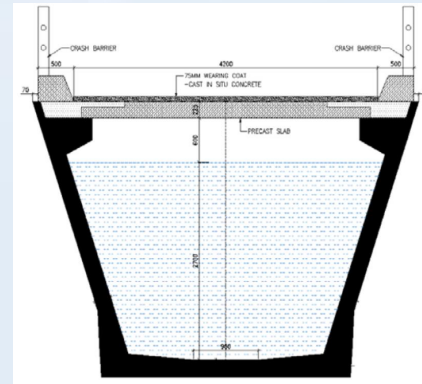


Max Span of Superstructure..?

Self wt of each span depends on c/s & span

Issues:

- Thinner sections
- Least self weight
- Casting arrangements
- Transportation
- Lifting & Placing on Pier caps (Cranes)



Options: Max lifting capacity: 500 MT at normal Hts.
: 150 MT at ht of 35 m

Outcome : Self wt of each span < 300 MT,
using two cranes, one at each end.

Design Parameters

Tidagundi Viaduct At Vijayapur, Karnataka

Trough : Governed by Hydraulic parameters
: **Precast, Pre Tensioned str.**

Span: 30m (Max); One Trough Weight : <300 MT

Top slab : Precast, 3m wide Panels

Lifting : Two cranes of 500 MT capacity
(Max lifting capacity at a ht of 30 m:150MT)

Pier : Ht -5 m to 30 m, Tapering(2.4 to 1.2 M), RCC (M50)

Foundation: Isolated, M40

Dimensions: Trapezoidal Trough

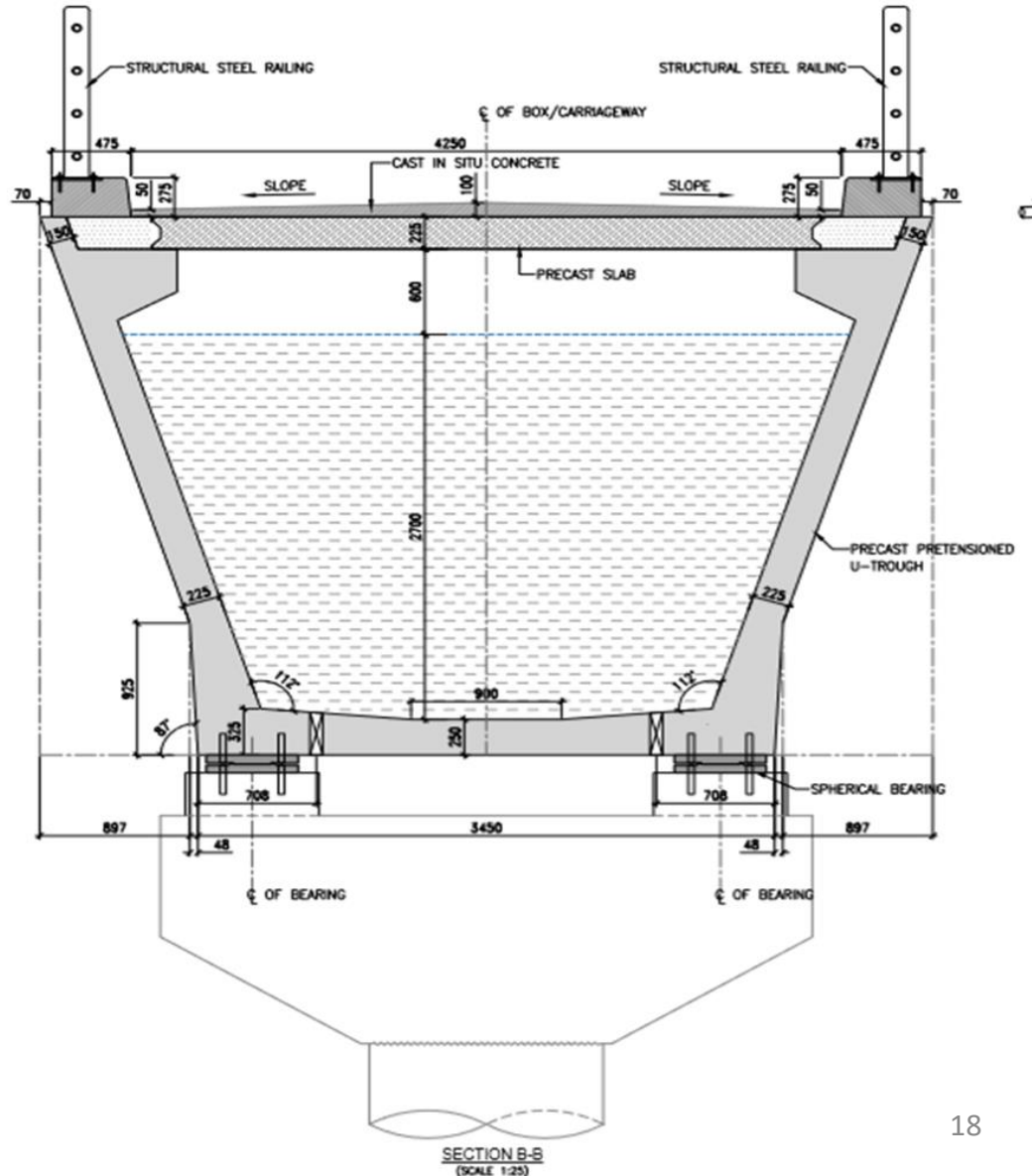
Discharge: 500 Cusecs

Trapezoidal Cross-Section:
5200x3300 mm

Service road with IRC
class A loading.

Pre-tensioned precast
trough

Max Span : 30 m

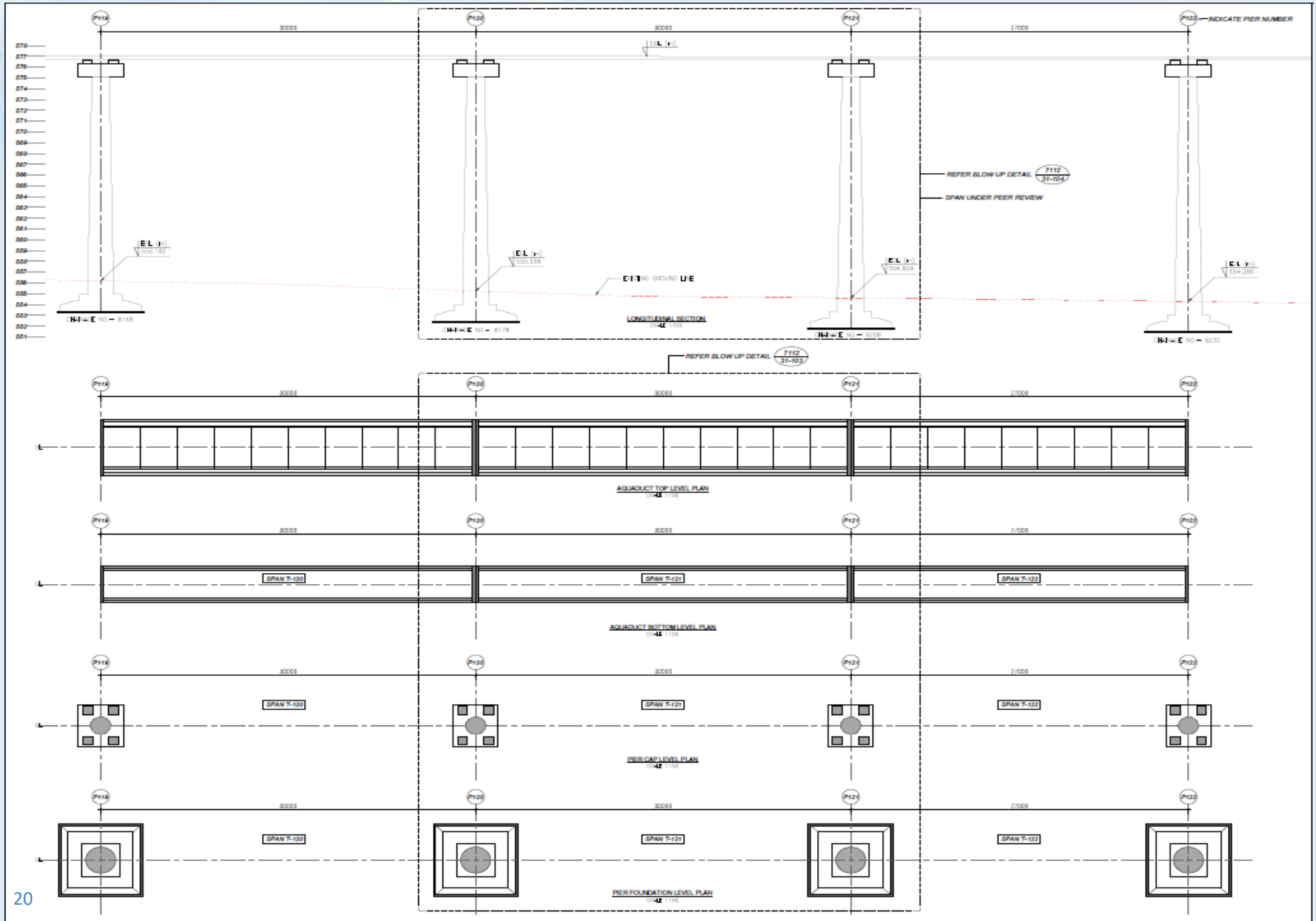


Material Used

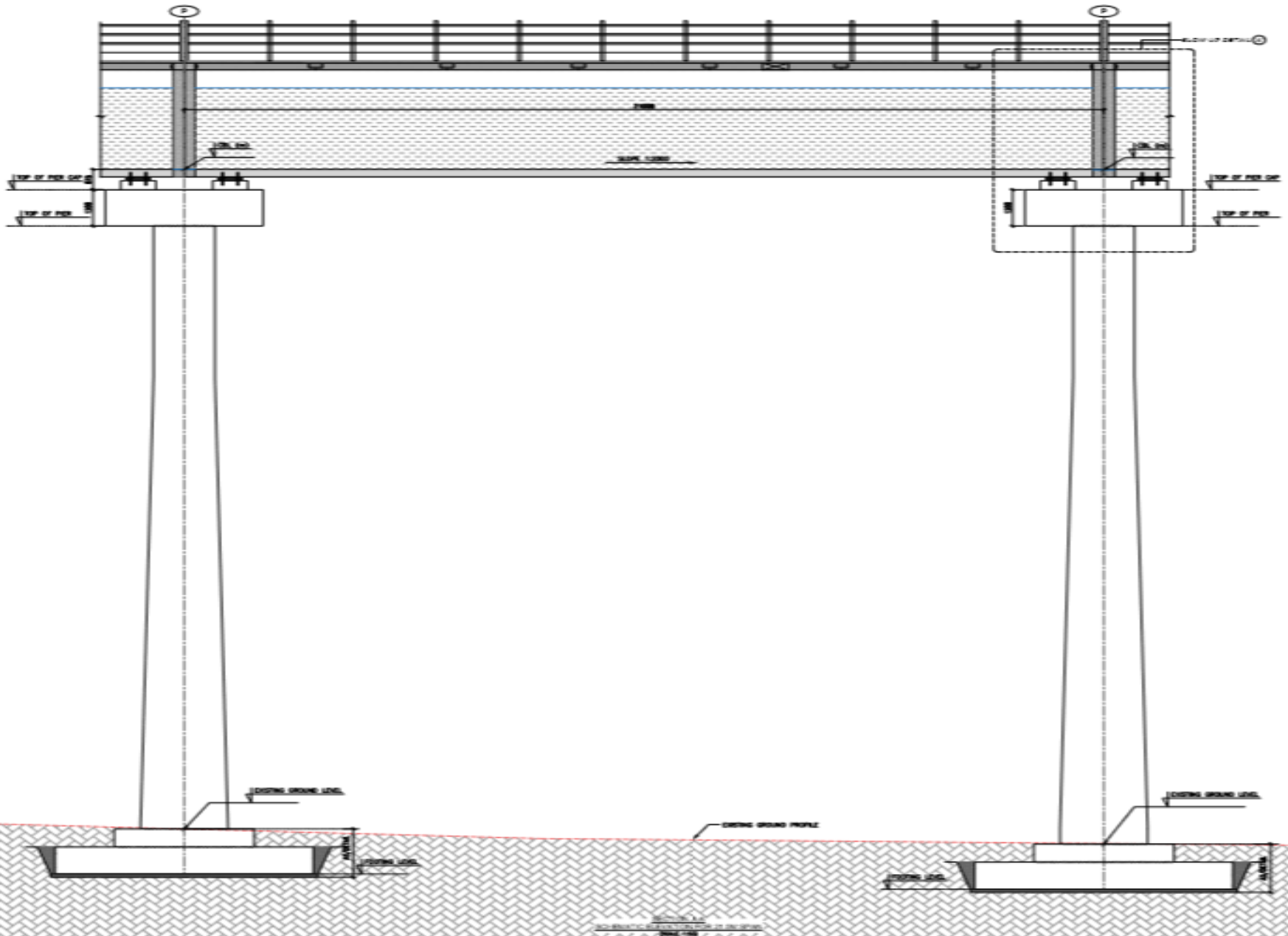
Concrete:

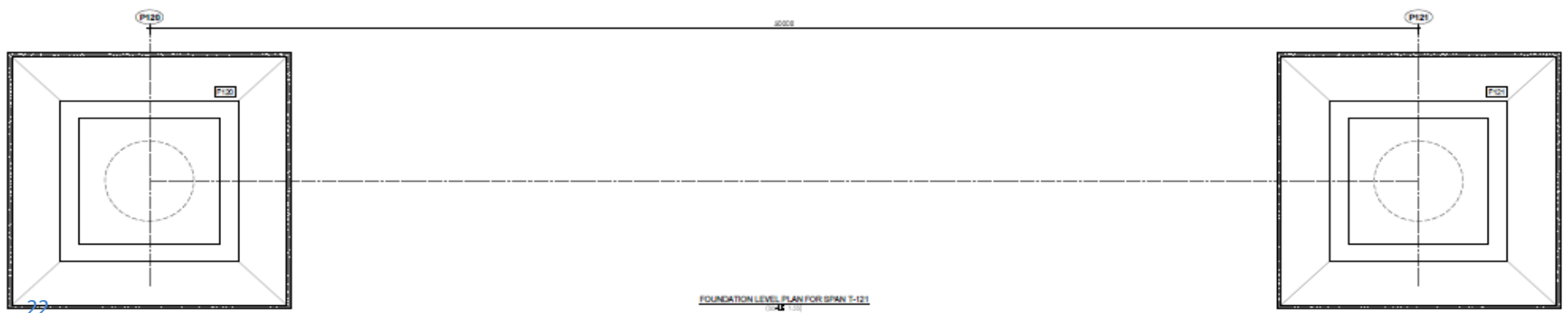
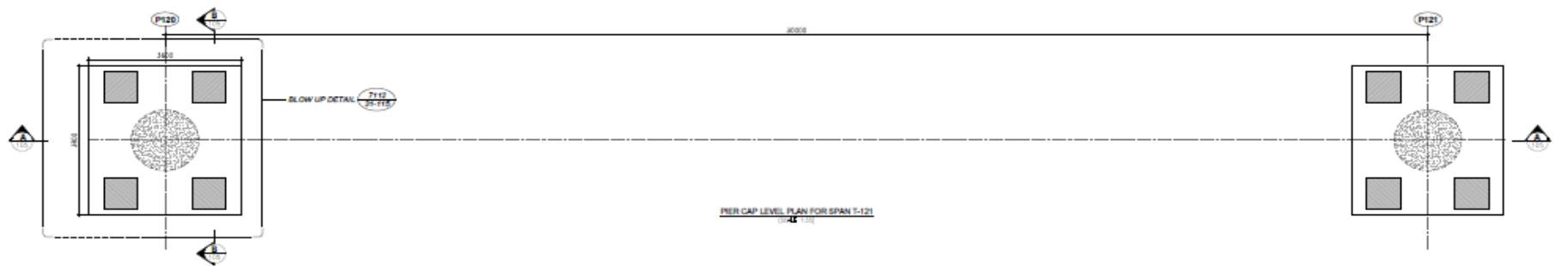
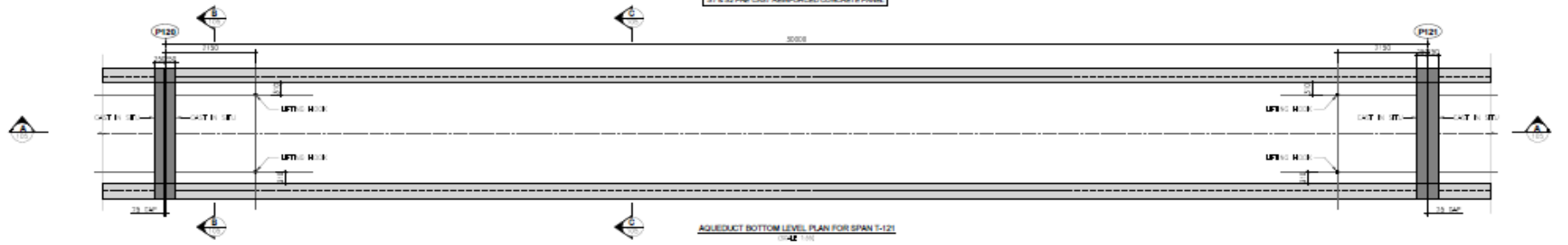
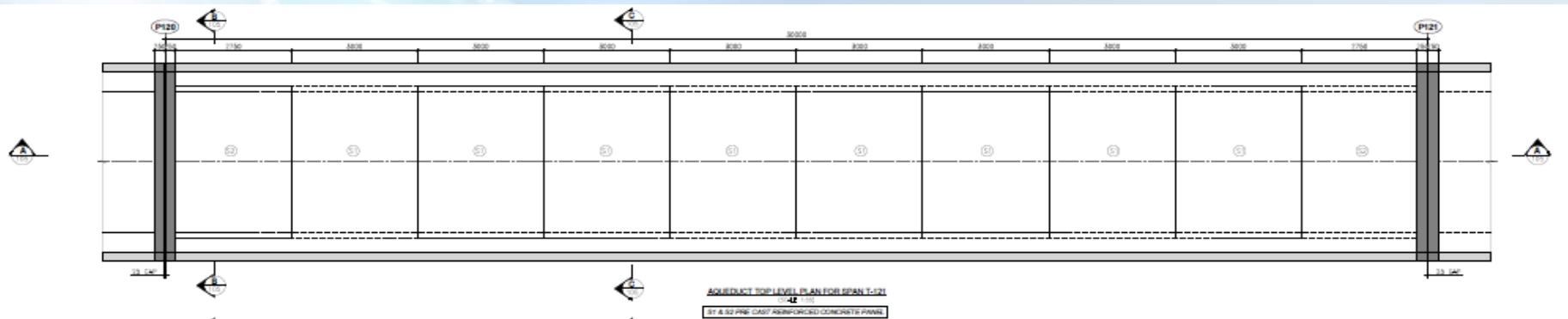
- Precast Pre-tensioned Superstructure - M50, GGBS
- During Transfer of Pre Stress - M35
- Cast-in-Situ Stiches - M50
- RCC Substructure (Pier) - M50
- RCC Pier Cap - M40
- RCC Open Foundations - M40
- Pre Cast RCC Railing - M30
- PCC for Levelling Course - M15
- **Reinforcement:** Fe-500 D conforming to IS: 1786
- **Prestressing HTS :** Gr270 ASTM,
15.2mm dia. strands

GENERAL ARRANGEMENT DETAIL



GAD: One Span (Max: 30m)

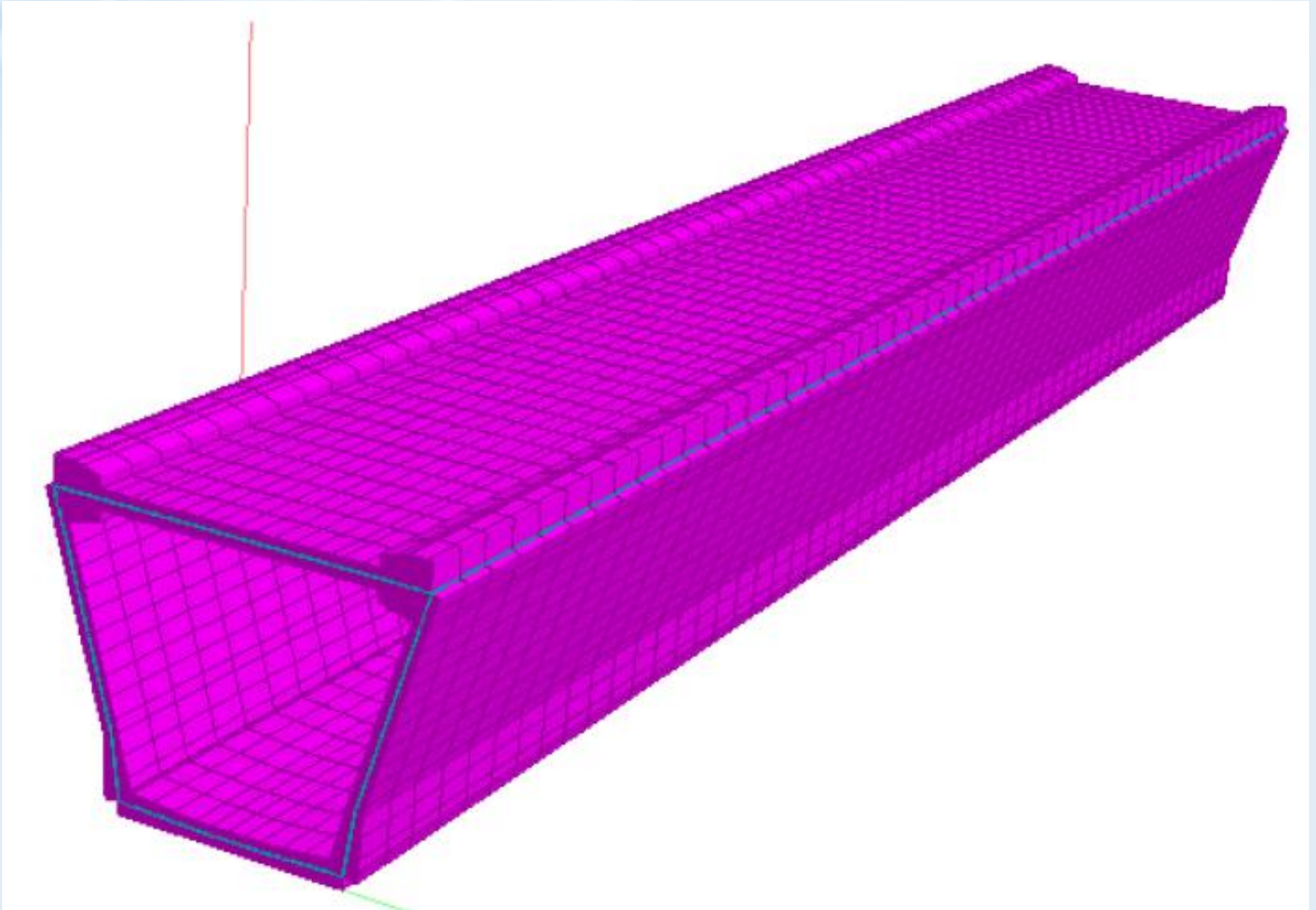




Method of Analysis & Design

- **Super structure:**
 - Longitudinal Analysis & Transverse Analysis.
- **Sub Structure** : Pier, Pier Cap & Foundation
- **Software:**
 - STAAD PRO
 - OASYS Software for Stress Check and Crack Width Criteria
 - Micro Soft Excel Programs (In-house)

Full Span is modelled in **STAAD Pro**. using 4 noded quadrilateral plate element of approximate size 0.5 m x 0.5m, **Many Load Combinations** as per Codes



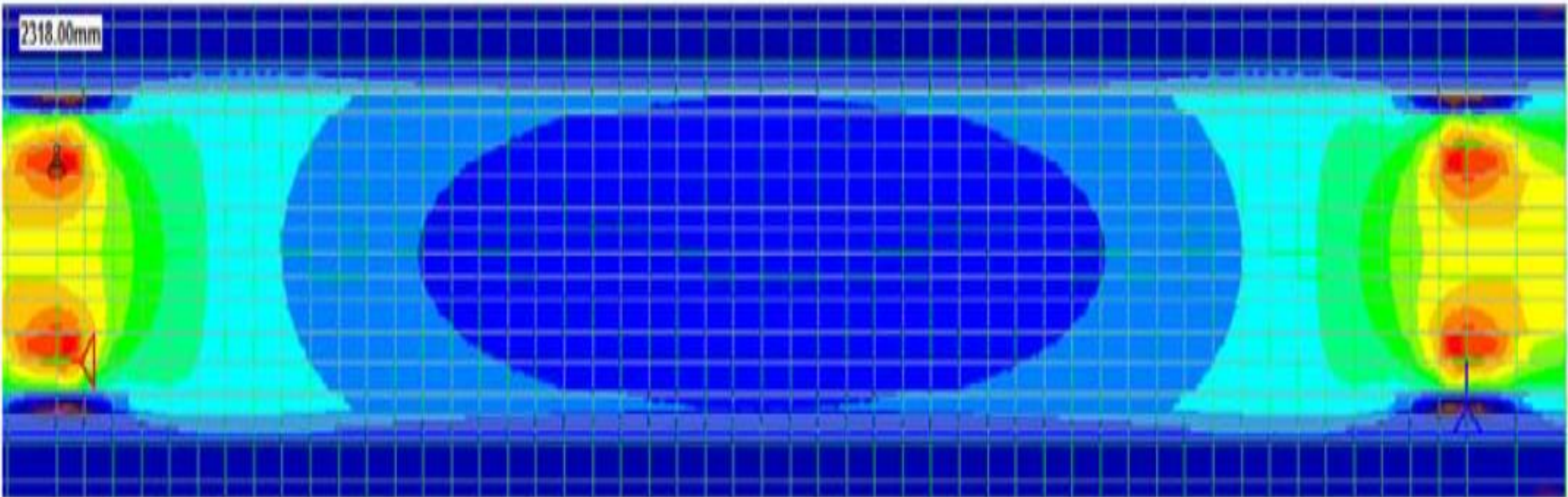


Figure 9. Transverse moment distribution during lifting

TYPICAL STRANDS ARRANGEMENT DETAIL

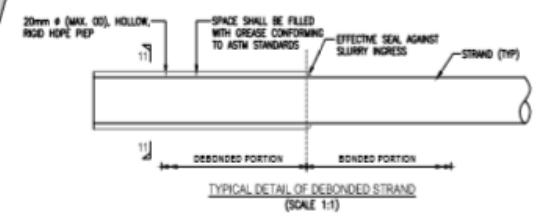
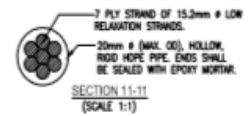
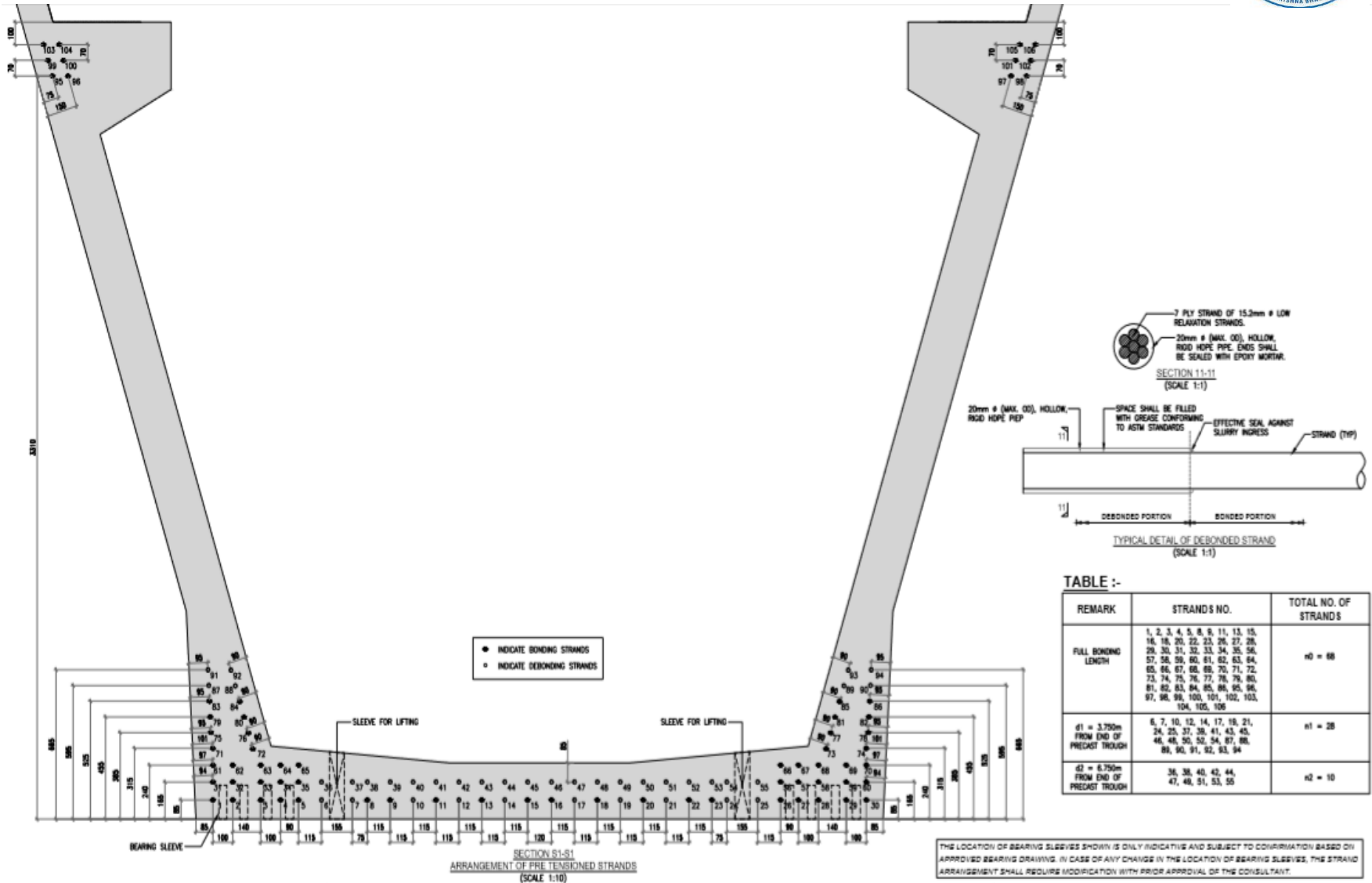
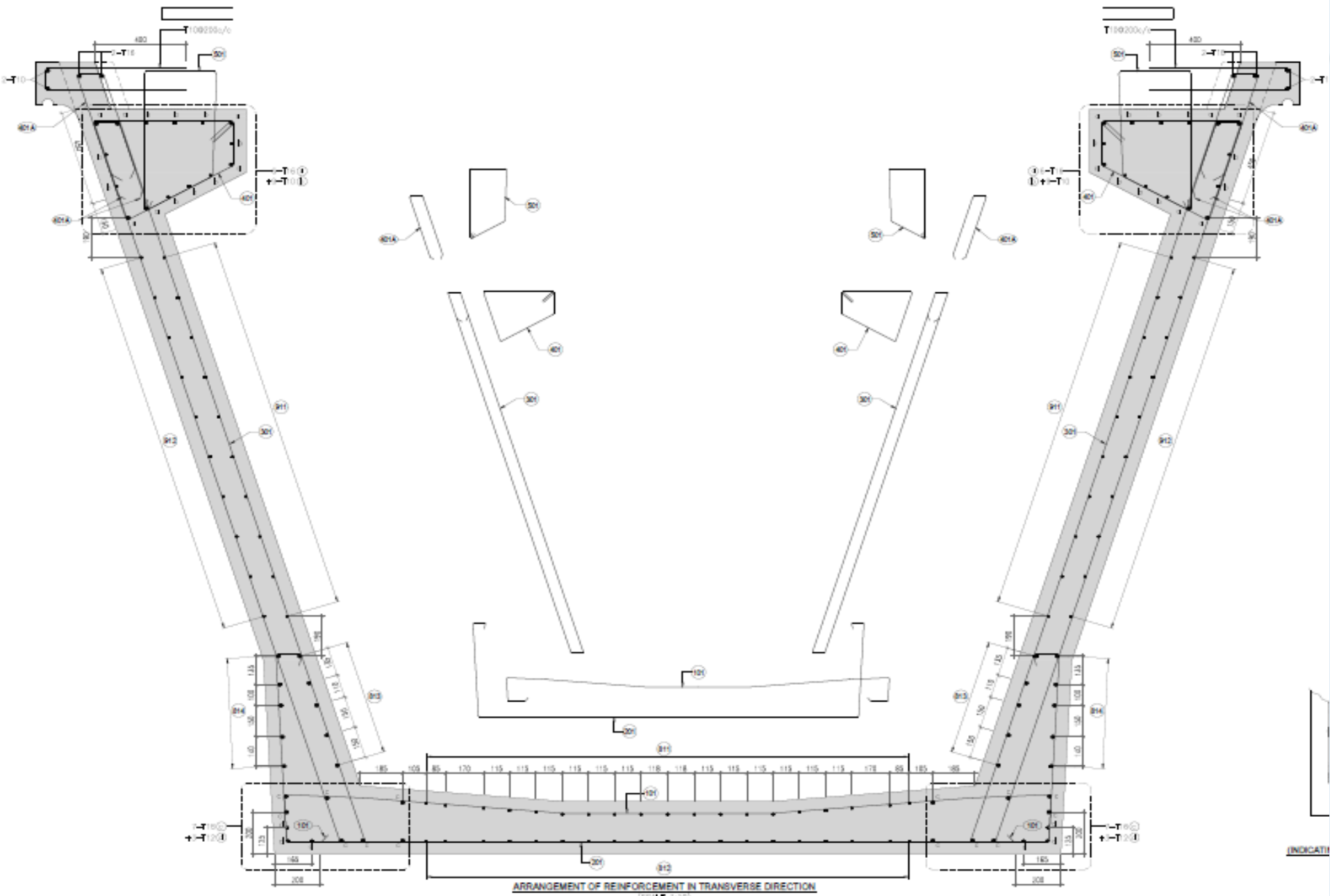


TABLE :-

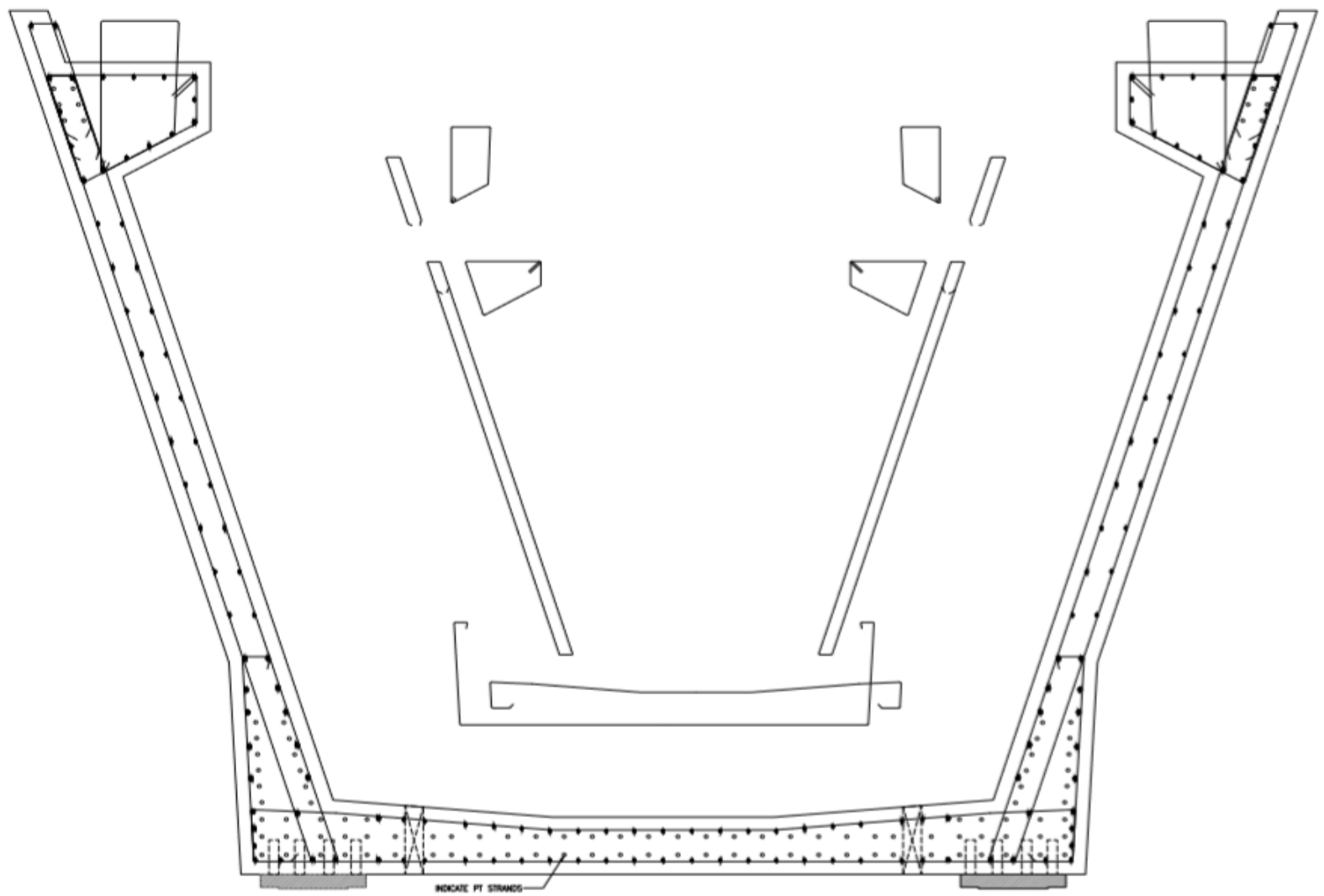
REMARK	STRANDS NO.	TOTAL NO. OF STRANDS
FULL BONDING LENGTH	1, 2, 3, 4, 5, 8, 9, 11, 13, 15, 16, 18, 20, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 89, 90, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106	n0 = 88
d1 = 3.750m FROM END OF PRECAST TROUGH	6, 7, 10, 12, 14, 17, 19, 21, 24, 25, 37, 38, 41, 43, 45, 46, 48, 50, 52, 54, 67, 68, 88, 90, 91, 92, 93, 94	n1 = 28
d2 = 6.750m FROM END OF PRECAST TROUGH	36, 38, 40, 42, 44, 47, 48, 51, 53, 55	n2 = 10

THE LOCATION OF BEARING SLEEVES SHOWN IS ONLY INDICATIVE AND SUBJECT TO CONFIRMATION BASED ON APPROVED BEARING DRAWING. IN CASE OF ANY CHANGE IN THE LOCATION OF BEARING SLEEVES, THE STRAND ARRANGEMENT SHALL REQUIRE MODIFICATION WITH PRIOR APPROVAL OF THE CONSULTANT.

Reinforcement Details in Superstructure



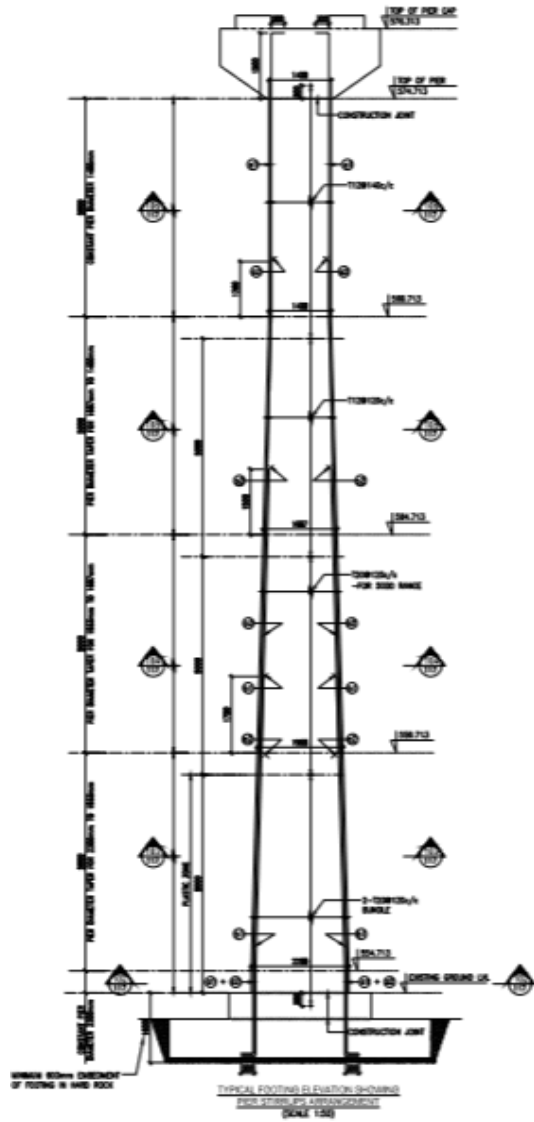
REINFORCEMENT ARRANGEMENT ALONG WITH STRANDS



ARRANGEMENT OF REINFORCEMENT WITH PRE TENSIONED STRANDS

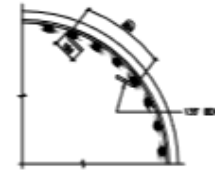
(SCALE 1:10)

TYPICAL PIER DIMENSION AND REINFORCEMENT DETAIL

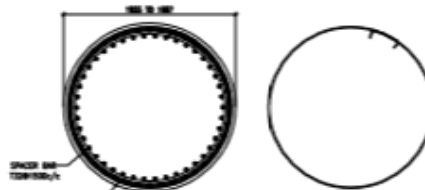


• OUTER LAYER - 21 nos. = 720 mm
• INNER LAYER - 21 nos. = 720 mm

**SECTION 101-101
CROSS SECTION OF PIER
(SCALE 1:20)**



**DETAIL Y
(SCALE 1:10)**



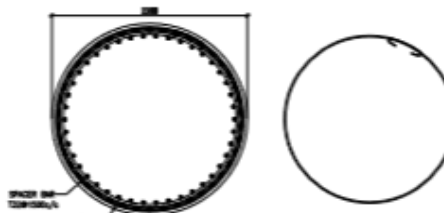
• OUTER LAYER - 21 nos. = 720 mm
• INNER LAYER - 42 nos. = 720 mm

**SECTION 102-102
CROSS SECTION OF PIER
(SCALE 1:20)**



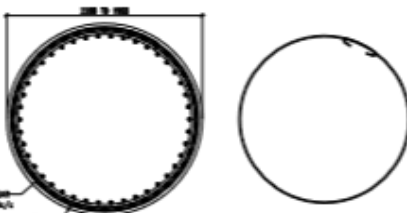
• OUTER LAYER - 21 nos. = 720 mm
• INNER LAYER - 21 nos. = 720 mm

**SECTION 103-103
CROSS SECTION OF PIER
(SCALE 1:20)**



• OUTER LAYER - 21 nos. = 720 mm
• INNER LAYER - 42 nos. = 720 mm

**SECTION 104-104
CROSS SECTION OF PIER
(SCALE 1:20)**



• OUTER LAYER - 21 nos. = 720 mm
• INNER LAYER - 42 nos. = 720 mm

**SECTION 105-105
CROSS SECTION OF PIER
(SCALE 1:20)**

Some (Non Technical) Challenges

- Resistance for Change...!
 - By Contractors, Engineers, Administrators etc.
- Non-Familiarity with new of Technology
- Hesitance to create new infrastructure
 - : Casting Yard,
 - : Transportation,
 - : Lifting Arrangements
 - : Procurement of Cranes
 - : Trained man power



Construction of Tidagundi Viaduct

Casting Yard Preparations & RMC Plant



Reinforcement Jigg & Pre tensioning Yard

Two Beds of 200m each, Cranes of 140MT,

Production: 12 segments at a time with a cycle of 7 to 9 days.



Form Work



TRough- REINFORCEMENT ASSEMBLY



Trough- Reinforcement Assembly



2018/6/4 14:32

Side Wall Inside Shuttering



Stressing End



Jacking end of Pre Tensioning





Concrete M50 Grade with GGBS



Concreting of Trough



Concreting of Trough



2018/12/2



Trough Curing at Casting Yard



PRECAST SEGMENTS AT CASTING YARD





Troughs ready for Lifting & Transportation to Site



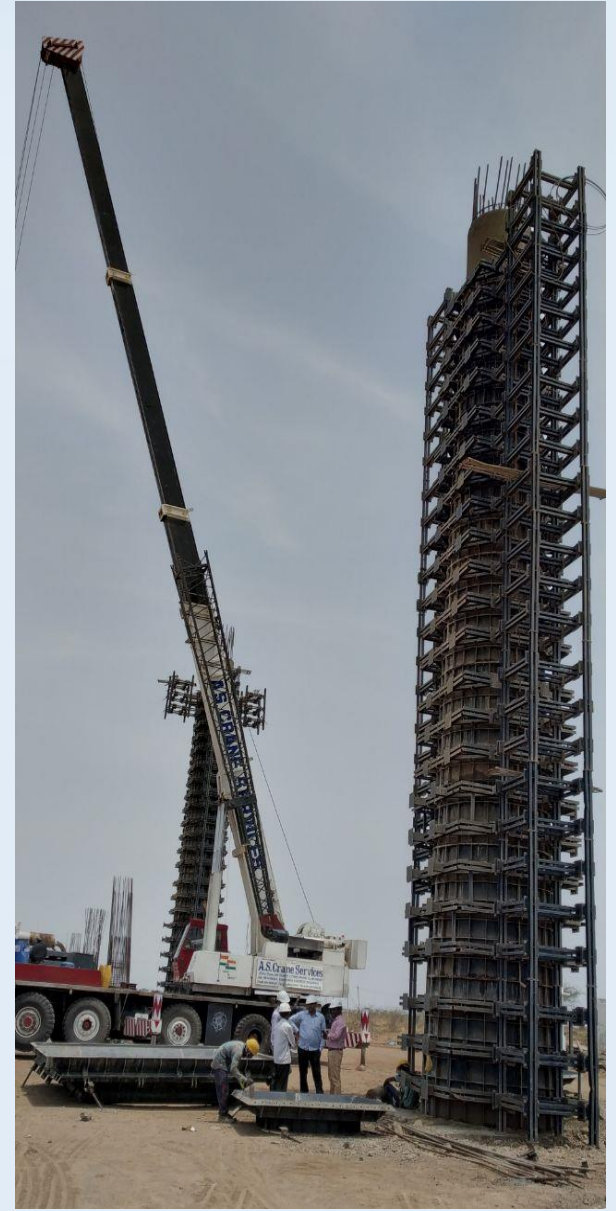
CONSTRUCTION OF PIER





2018-1-19

PIER CONCRETING



PIER CONCRETING- Shuttering Arrangments





Quality of Concrete & Finishing of Pier



PIER CAP CONCRETING





Piers & Pier Caps



2018/7/10 11:01

Series of Piers Ready for Superstructure



MACALLOY BARS FOR LIFTING OF TROUGH



Ready for Lifting...



2018-1-22 11:21



TRANSPORTATION OF TROUGH





TRANSPORTATION OF TROUGH



TRANSPORTATION OF TROUGH



TRANSPORTATION OF TROUGH





2018-2-27



ERECTION OF 230Tonne TROUGH





2018-2-27



Trough Placing on Pier



ERECTION AND PLACEMENT OF TROUGH ON



Rail / Road Crossings



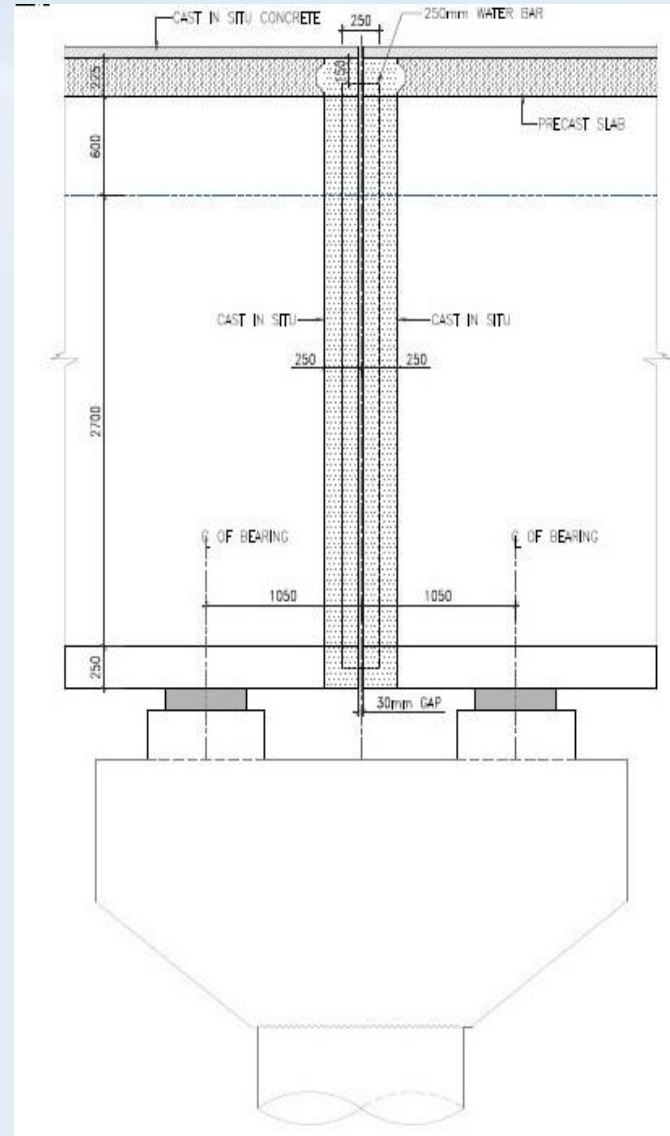
Troughs Placed on Pier Cap



Gap between Troughs

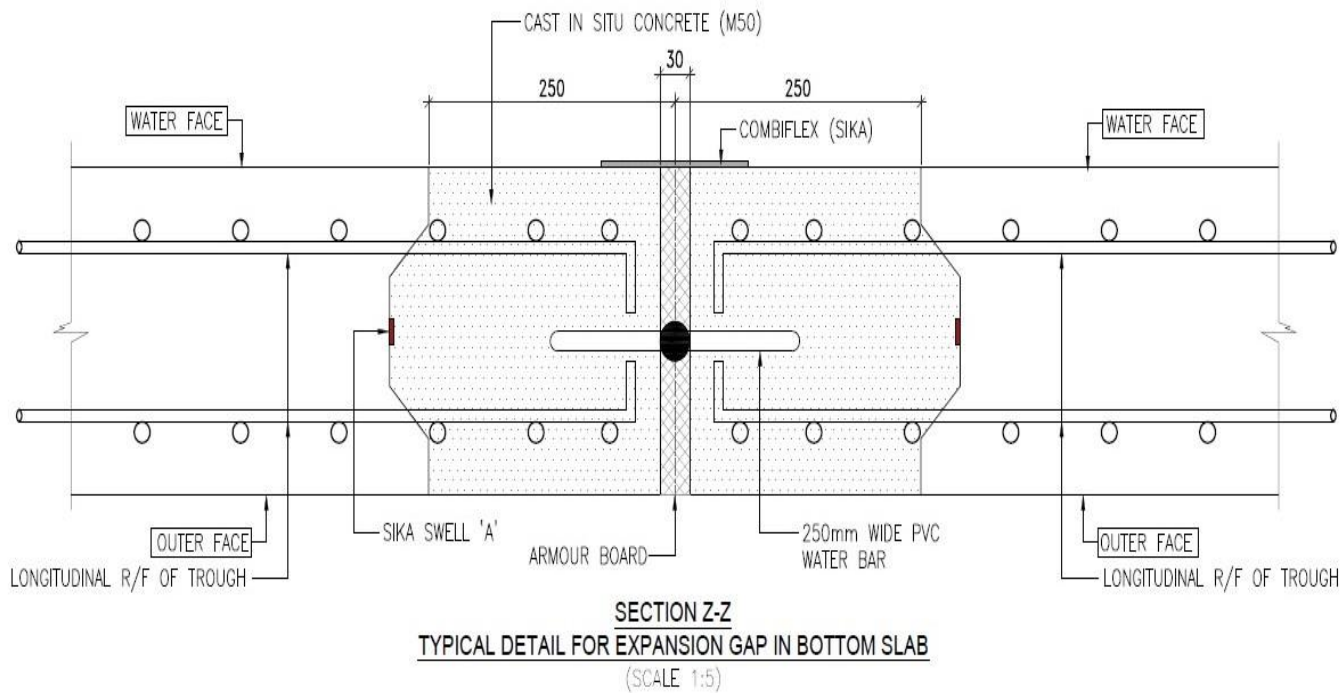
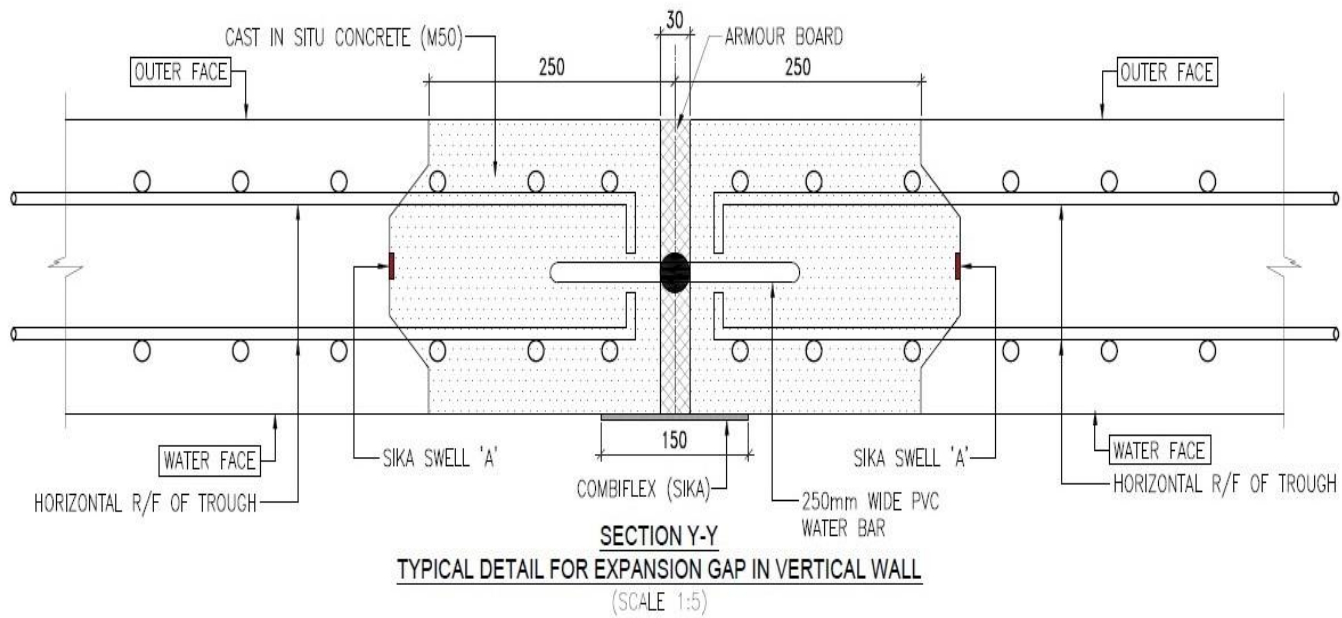


Stitching of Gap between two Troughs



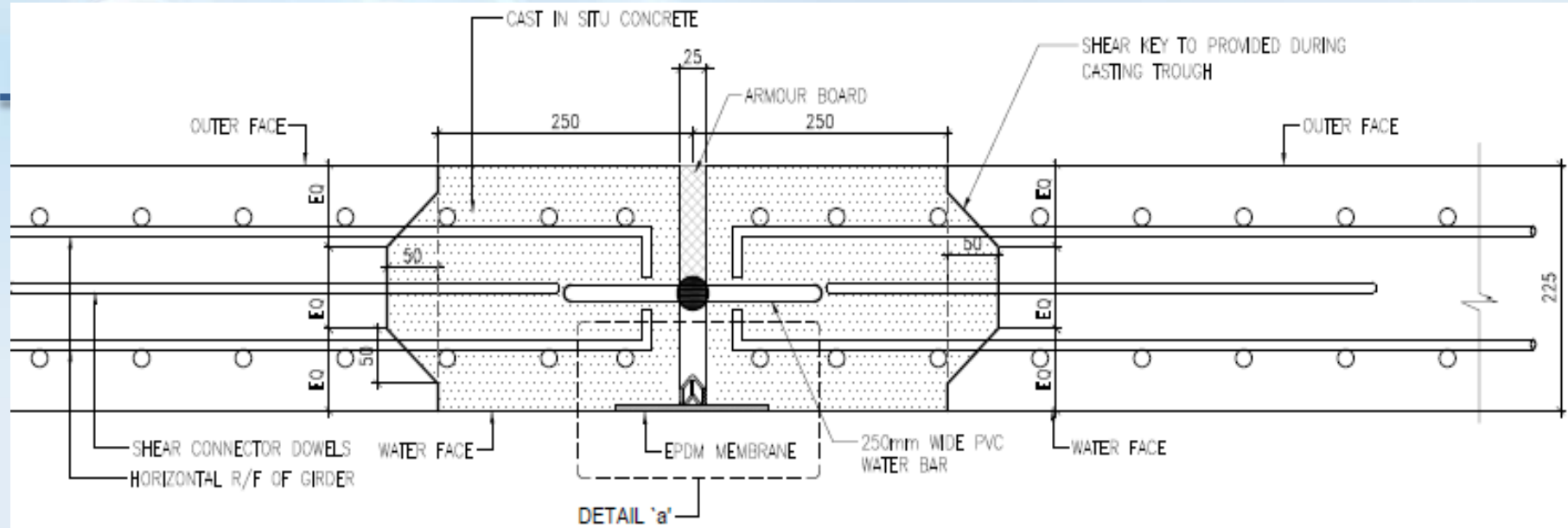
Expansion Joints

- Adjacent segments - **stitched together** at Pier Cap using **Cast In Situ Concrete at both ends**(250mm)
- Stitching of concrete done with
 - **Heavy Duty Water Bar at mid depth of sections**, along with Expansion Gap of 25mm for Thermal and Creep Movement.
- Expansion Joint Treatment shall be done **W Seal Type Gasket and EPDM Water Treatment** to ensure for Water Tightness of Joint.

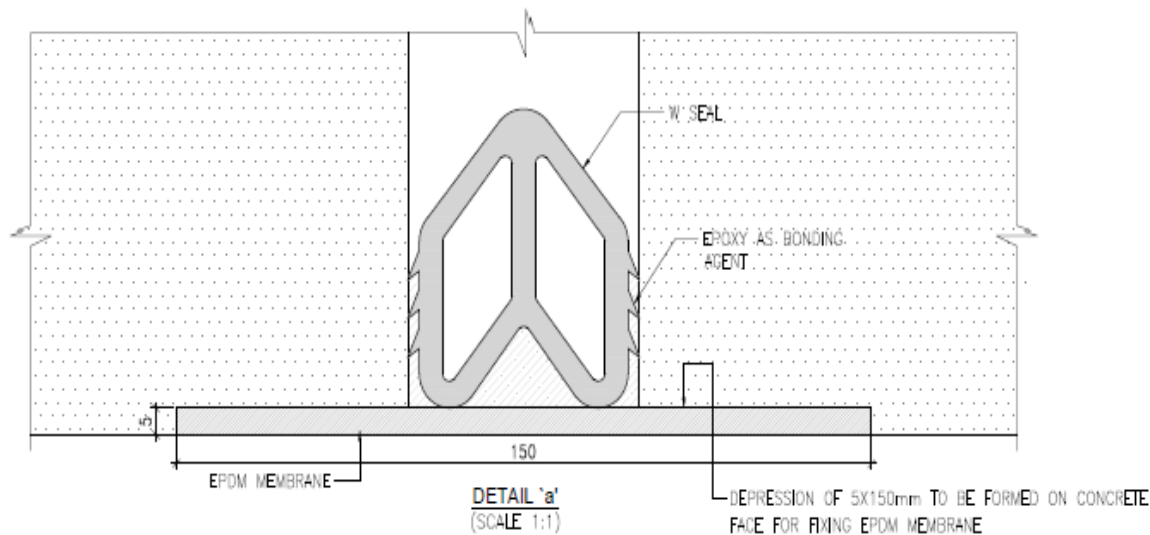


STICHING OF PRECAST SEGMENTS

STICHING OF PRECAST SEGMENTS



SECTION D-D
(TYPICAL JOINING DETAIL TO TWO GIRDER AT PIER CAP)
(SCALE 1:5)



Water Bar and expansion joint treatment shall be done during stitching of adjacent spans, to achieve water tightness



STICHING : Cast in situ Concreting



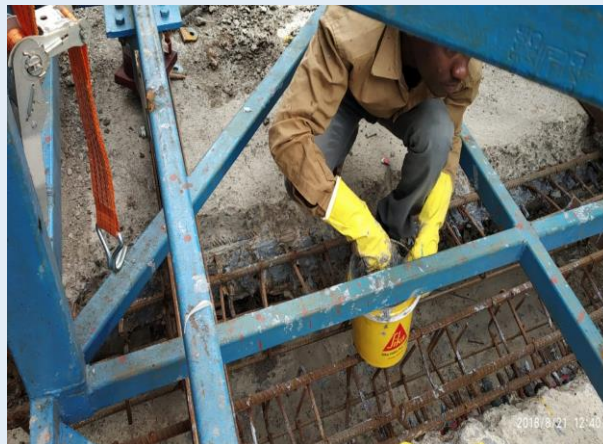
STICHING Arrangements-Movable Trolley



WATER PROOFING FOR JOINTS



STICHING OF PRECAST SEGMENTS



WATER PROOFING FOR JOINTS



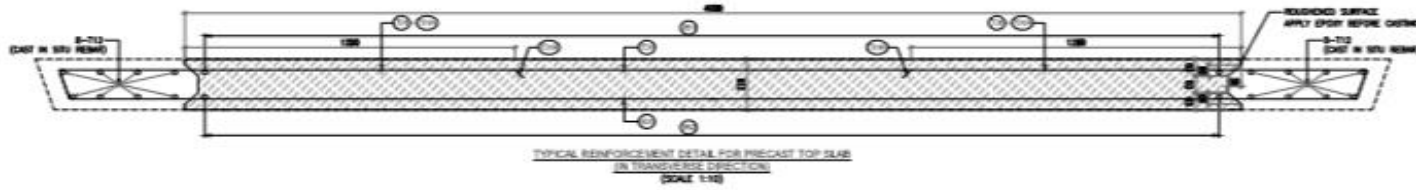
TOP SLAB PRECAST AND PLACING IN POSITION



Stitching of Top Slab & Side Curbs



REINFORCEMENT DETAIL OF PRECAST TROUGH TOP SLAB

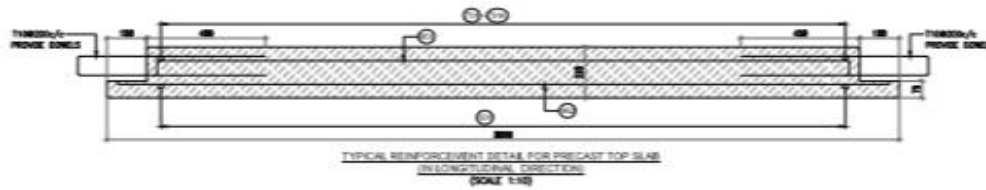


TRANSVERSE REINFORCEMENT SCHEDULE FOR PRECAST SLAB PANEL:-

S.NO.	BAR MARK	REINFORCEMENT	SHAPE OF BAR
1	(T12)	T12 @800u/c	□
	(T12)	T12 @800u/c	□
	(T8)	T8 @180u/c	□

LONGITUDINAL REIN. SCHEDULE FOR PRECAST SLAB PANEL:-

S.NO.	REINFORCEMENT	SHAPE OF BAR
(T12)	T12 @180u/c	□
(T12)	T12 @180u/c	□

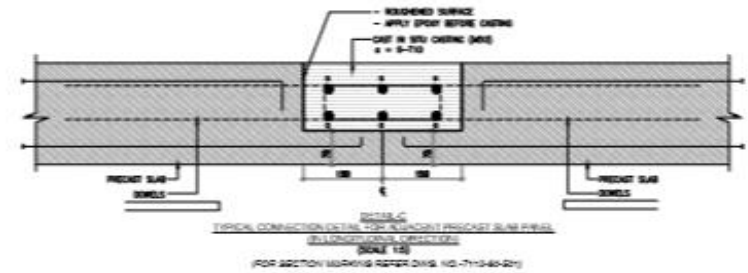
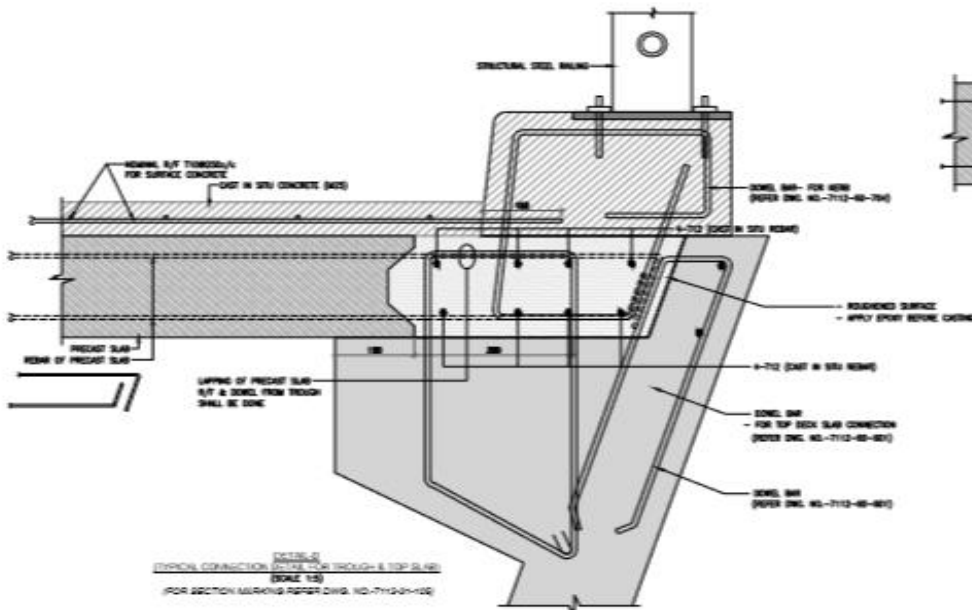


TRANSVERSE REINFORCEMENT SCHEDULE FOR CAST IN SITU SLAB :-

S.NO.	BAR MARK	REINFORCEMENT	SHAPE OF BAR
1	(T12)	T12 @800u/c	□
	(T12)	T12 @800u/c	□
	(T8)	T8 @180u/c	□

LONGITUDINAL REIN. SCHEDULE FOR CAST IN SITU SLAB :-

S.NO.	REINFORCEMENT	SHAPE OF BAR
(T12)	T12 @180u/c	□
(T12)	T12 @180u/c	□



FINISHED VIADUCT (AQUEDUCT)







Quantities Executed

Total Quantity of Concrete : 1,00,000 Cum

(Substructure: 45,000 Cum & Super Str: 55,000 Cum)

Grade of Concrete : M50 & M40 with GGBS

Total Quantity of Rebars : 12,445 MT

(Substructure: 4,732 MT & Super Str: 7,613 MT)

Total Quantity of Pre Tensioning Strands : 1600 MT

Time of Completion : 12 Months

Design & Execution Team

PROJECT : ELEVATED VIADUCT at TIDAGUNDI

COST OF PROJECT : Rs 280.26 Cr.

TENDER DURATION : 18 MONTHS

CONTRACTOR : M/s SHANKARANARAYANA
CONSTRUCTIONS PRIVATE LTD,
BENGALURU.

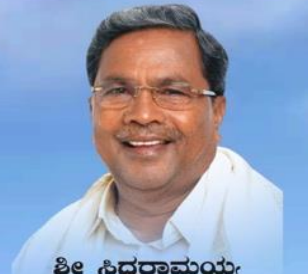
DESIGNER : M/s ROOT DESIGNERS, BENGALURU.

PROOF CHECKING : **M/s ALOK BHOWMIC, NEW DELHI.**

DESIGN WETTING : Dr Kishorechandra, **IISc, BENGALURU.**



ಕರ್ನಾಟಕ ಸರ್ಕಾರ - ಜಲಸಂಪನ್ಮೂಲ ಇಲಾಖೆ
ಕೃಷ್ಣಾ ಭಾಗ್ಯ ಜಲ ನಿಗಮ ನಿಯಮಿತ



ಶ್ರೀ ಸಿದ್ದರಾಮಯ್ಯ
ಸರ್ಕಾರದ ಮುಖ್ಯಮಂತ್ರಿಗಳು, ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ಅಧ್ಯಕ್ಷರು, ಕೃಷ್ಣಾ ಭಾಗ್ಯ ಜಲ ನಿಗಮ ನಿಯಮಿತ

ದೇಶದಲ್ಲೇ ಅತೀ ಉದ್ದನೆಯ ಬೃಹತ್ ಕಾಲುವೆ ಮೇಲುಸೇತುವೆ

ವಿಜಯಪುರದ ಇಂಡಿ ಭಾಗದ ರೈತರ ಬದುಕಿಗೆ ಅಶಾಂತಿರಣವಾಗಲಿರುವ ಯೋಜನೆ

ನೀರಾವರಿ ಇಲಾಖೆಯ ಮಹತ್ತರ ಹೆಜ್ಜೆ

ಮುಳವಾಡ ಏತ ನೀರಾವರಿ ಯೋಜನೆ ಹಂತ-3ರಡಿಯ ತಿಡಗುಂದಿ ಶಾಖಾ ಕಾಲುವೆ ಬೃಹತ್ ಮೇಲುಸೇತುವೆ ಕಾಮಗಾರಿ ಭೂಮಿ ಪೂಜೆ

ದಿನಾಂಕ: 15.08.2017 ಮಂಗಳವಾರ, ಬೆಳಿಗ್ಗೆ 11.00 ಗಂಟೆಗೆ
ಸ್ಥಳ: ಉಗ್ರಾಡ ಎದುರಿಗೆ, ಬುರಣಾಪುರ ಗ್ರಾಮ

ಮೇಲುಸೇತುವೆ ನಿರ್ಮಾಣದಿಂದ ನೀರಾವರಿ ಸೌಲಭ್ಯಕ್ಕೆ ಒಳಪಡುವ ಗ್ರಾಮಗಳು

ಮದಬಾವಿ, ಬುರಣಾಪುರ, ಐನಾಪುರ, ಭೂತನಾಳ, ಹಂಚಿನಾಳ, ಭರಟಗಿ, ಕನ್ನಾಳ, ಅಲಿಯಾಬಾದ, ಇಂಗನಾಳ, ಗುಗದಡ್ಡಿ, ನಾಗತಾಣ, ದ್ಯಾಪೇರಿ, ಹುಣಶ್ಯಾಳ, ಗುಣಕಿ, ಮಿಂಚಿನಾಳ, ತಿಡಗುಂದಿ, ಬಮ್ಮನಳ್ಳಿ, ಮುಖಣಾಪುರ, ದೊಮನಾಳ, ಕನ್ನೂರ, ಅರ್ಧೂರ್, ಕ್ಯಾತನಾಳ, ಸಿರನಾಳ, ಅಗಸನಾಳ, ಬಸನಾಳ, ಕೊತನಾಳ, ಕ್ಯಾತನಕೆರೆ, ಹೊಸಹಳ್ಳಿ & ಫತಪುರ

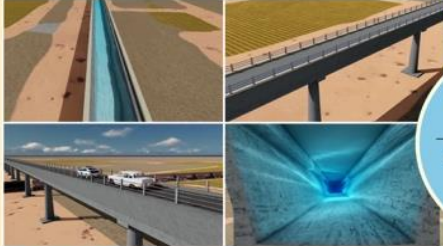
- ಮುಳವಾಡ ಏತ ನೀರಾವರಿ ಯೋಜನೆ ಹಂತ-3 ಒಂದು ಪ್ರತಿಷ್ಠಿತ ಏತ ನೀರಾವರಿ ಯೋಜನೆಯಾಗಿದೆ.
- ಈ ಯೋಜನೆಯಡಿ ಅಲಮಟ್ಟಿ ಜಲಾಶಯದ ಹಿನ್ನೀರಿನಿಂದ ಆರ್.ಎಲ್.640.00 ಮೀ. ಮಟ್ಟದವರೆಗೆ ನೀರನ್ನು ಎತ್ತಿ ಬರಬೇಡಿ ವಿಜಯಪುರ ಜಿಲ್ಲೆಯ 5.60 ಲಕ್ಷ ಎಕರೆ ಅಭಿವೃದ್ಧಿ ಪ್ರದೇಶಕ್ಕೆ ನೀರಾವರಿ ಸೌಲಭ್ಯ ಕಲ್ಪಿಸಲಾಗುವುದು.
- ಈ ಯೋಜನೆಯಲ್ಲಿ ಪ್ರಮುಖವಾಗಿ ಬರುವ 3-ಮುಖ್ಯ ಸ್ಥಾವರಗಳು ಬಳೂತಿ, ಹಣಮಾಪುರ ಮತ್ತು ಮಸೂತಿ ಗ್ರಾಮಗಳ ಹತ್ತಿರ ಬರುತ್ತವೆ. ಬಳೂತಿ ಜಾಕ್‌ವೆಲ್ (ಪ್ಯಾಕೇಜ್-1) ಮತ್ತು ಹಣಮಾಪುರ ಜಾಕ್‌ವೆಲ್ (ಪ್ಯಾಕೇಜ್-2) ಸಂಬಂಧಿಸಿದ ಸಿವಿಲ್ ಮತ್ತು ಇಲೆಕ್ಟ್ರೋ-ಮೆಕ್ಯಾನಿಕಲ್ ಕಾಮಗಾರಿಗಳು

- ಪೂರ್ಣಗೊಂಡಿದ್ದು, ಪ್ರಾಯೋಗಿಕವಾಗಿ ಚಾಲನೆ ಮಾಡಲಾಗುತ್ತಿದೆ.
- ತಿಡಗುಂದಿ ಶಾಖಾ ಕಾಲುವೆಯು ಒಂದು ಪ್ರಮುಖ ಶಾಖಾ ಕಾಲುವೆಯಾಗಿದ್ದು, ವಿಜಯಪುರ ಕಾಲುವೆ ಕಿ.ಮೀ 70.05 ರಲ್ಲಿ (ಮದಬಾವಿ ಗ್ರಾಮದ ಬಳಿ) ಆಫ್‌ಟೀಕ್ ಹೊಂದಿರುತ್ತದೆ.
- ತಿಡಗುಂದಿ ಶಾಖಾ ಕಾಲುವೆಯ ಒಟ್ಟು ಉದ್ದ 64.00 ಕಿ.ಮೀ ಇದ್ದು 14.229 ಕ್ಯೂಸೆಕ್ ನೀರನ್ನು ಹರಿಸುವ ಸಾಮರ್ಥ್ಯ ಹೊಂದಿದೆ. ಈ ಕಾಲುವೆಯಿಂದ ವಿಜಯಪುರ ಹಾಗೂ ಇಂಡಿ ತಾಲೂಕಿನ ಒಟ್ಟು 29 ಗ್ರಾಮಗಳ ಸುಮಾರು 62,400 ಎಕರೆ (25,572 ಹೆಕ್ಟೇರ್) ಅಭಿವೃದ್ಧಿ ಕ್ಷೇತ್ರಕ್ಕೆ ನೀರಾವರಿ ಸೌಲಭ್ಯ ಕಲ್ಪಿಸಲಾಗುವುದು.

- ತಿಡಗುಂದಿ ಶಾಖಾ ಕಾಲುವೆಯ ಕಿ.ಮೀ 0.00 ರಿಂದ 2.70 ರವರೆಗೆ ಹಾಗೂ ಕಿ.ಮೀ 17.43 ರಿಂದ 40.00 ರವರೆಗಿನ ಕಾಮಗಾರಿಗಳು ಪ್ರಗತಿಯಲ್ಲಿವೆ.
- ತಿಡಗುಂದಿ ಶಾಖಾ ಕಾಲುವೆ ಕಿ.ಮೀ 2.70 ರಿಂದ 17.43 ರವರೆಗಿನ (14.73 ಕಿ.ಮೀ ಉದ್ದ - ಅಪ್ರೋಚ್ ಸಮೇತ ಅಕ್ವಿಡಕ್ಟ್ ನಿರ್ಮಾಣ ಒಳಗೊಂಡು) ಕಾಲುವೆ ಅಲೈನ್‌ಮೆಂಟ್ ವಿಜಯಪುರ ನಗರ ಪ್ರದೇಶದ ಪಕ್ಕದಲ್ಲಿ ಹಾದು ಹೋಗುತ್ತಿದ್ದು, ಶಾಖಾ ಕಾಲುವೆಯು ಸಿ.ಬಿ.ಎಲ್. (ತಳಮಟ್ಟ) ಸ್ಥಳೀಯ ಜಮೀನಿನ ಮಟ್ಟದಿಂದ ಸರಿ ಸುಮಾರು ಗರಿಷ್ಠ 30 ಮೀ. ಎತ್ತರದಲ್ಲಿರುವುದರಿಂದ, ಈ ಬೃಹತ್ ಕಾಲುವೆ ಮೇಲುಸೇತುವೆಯನ್ನು ನಿರ್ಮಿಸಲಾಗುತ್ತಿದೆ.



ದೇಶದಲ್ಲೇ ಅತೀ ಉದ್ದನೆಯ ಬೃಹತ್ ಕಾಲುವೆ ಮೇಲುಸೇತುವೆ



ಮೇಲುಸೇತುವೆ ಅಲೈನ್‌ಮೆಂಟ್ ಹಾದು ಹೋಗುವ ಗ್ರಾಮಗಳು
ಬುರಣಾಪುರ, ಐನಾಪುರ, ಅಲಿಯಾಬಾದ್, ಹಂಚಿನಾಳ, ಭೂತನಾಳ, ಅರಕೇರಿ

ಮೇಲುಸೇತುವೆಯ ಉದ್ದ
14.73 ಕಿ.ಮೀ (ಕಿ.ಮೀ 2.70 ರಿಂದ 17.46 ವರೆಗೆ)

ಜಮೀನು ತಳಮಟ್ಟದಿಂದ ಗರಿಷ್ಠ ಎತ್ತರ
30 ಮೀ.

ಮೇಲುಸೇತುವೆ ವಿಸ್ತಾರ
ಆಧುನಿಕ ತಂತ್ರಜ್ಞಾನ ಅಳವಡಿಕೆಯ "ಪಿ-ಸ್ಕ್ರಾಪ್ ಪ್ರೀ-ಟೆನ್ಷನ್" ವಿನ್ಯಾಸ

ಮೇಲುಸೇತುವೆ ನಿರ್ಮಾಣದ ವಿವರಗಳು
ವಿಷಮಭುಜ ಚೌಕದ ಆಕಾರ, ಪರಿವೀಕ್ಷಣೆಗಾಗಿ ಮೇಲ್ಭಾಗದಲ್ಲಿ ರಸ್ತೆ ನಿರ್ಮಾಣ

ಸ್ಕ್ರಾಪ್ (ಪೀಯುರುಗಳ ನಡುವಿನ ಅಂತರ) ವಿವರ
ಒಟ್ಟು 409 ಸ್ಕ್ರಾಪ್‌ಗಳು (ಪ್ರತಿ ಸ್ಕ್ರಾಪ್ ಉದ್ದ 30 ಮೀ.)

ಯೋಜನೆ ಮೊತ್ತ ರೂ. 280.26 ಕೋಟಿ
ಕಾಮಗಾರಿ ನಿರ್ಮಾಣ ಆವಧಿ 18 ತಿಂಗಳು

Construction

- **Video (2 min)**



AT TIDUGUNDI,
VIJAYAPURA, KARNATAKA.

The background features a light blue gradient with several lens flare effects and bubbles. The lens flares are bright, multi-colored streaks radiating from the top left corner. The bubbles are translucent and vary in size, scattered across the upper portion of the image.

Thank You