



Registration No.0107537000939

ITALIAN-THAI DEVELOPMENT PUBLIC COMPANY LIMITED

Dhaka Mass Rapid Transit Development Project Contract No. CP-03 & CP-04
14, Purana Paltan (3rd Floor), Darus Salam Arcade Dhaka, Bangladesh

Date: 15 April 2018

Ref No. : ITD/CP03-04/MS/S 034 Rev. 01

The Engineer
NKDM Association
House No. 8/B, Road No. 29
Gulshan-1, Dhaka-1212, Bangladesh

For the Attention of: Mr. Takayuki FUJITOMI, Acting Team Leader

Subject: Submission of the Method Statement for Erection of the Segment Viaduct for the Main Line.

Dear Sir,

Pursuant to Contract Volume 3-2 of 6: Particular Specifications, Part-02, Civil and Structural Works, clause 6 and sub-clause 6.1.4, we are pleased to submit our Method Statement, ref no. ITD/CP03-04/MS/S 034 Rev. 01 dated 10th April 2018, for the Erection of the Segment Viaduct for the Main Line for your review and approval.

If you require any further information please contact the undersigned.

Yours faithfully,
For and on behalf of
Italian-Thai Development Public Company Limited

Thawit Yuenyong
Project Manager

Encl.:

1) ITD/CP03-04/MS/S 034 Rev. 01 40 Pages

CC.:

1) Mr. Md. Sarwar Uddin Khan, Deputy General Manager (TP), The Employer (DMTC)

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SUBMITTAL FORM

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Title : METHOD STATEMENT FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE

Purpose R A Inf. Rec.

To : Mr. Takayuki FUJITOMI

Discipline : Method Statement

CC : Mr. Md. Aftabuddin Talukder

Spec. Section/Clause: Volume 4-3, 4-4, 4-3-5, 5-5

Sub-Contractor/Supplier:

For Contractor Use			For Employer or Employer's Representative Use					
Item No.	Description	Rev.	Date Received :			Date Returned	Employer / Rep	
			Review Status					
			NONO	NOO	NONOC			
B	C							
1	METHOD STATEMENT FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE	1						

<p>All items submitted have been checked, reviewed and co-ordinated by the Contractor. They are in conformance with the requirements of the Contract Document, except as noted, and are approved by the Contractor for this Project.</p>		<p>Detailed Comment Review Attached Ref.No.:</p>	
<p>Prepared by : <i>Mr. Kiatpong Chan</i> (MR. KIATPONG) CHAN</p>		<p>Reviewed and Approved by : <i>Mr. Thewit Yuenyong</i> Mr. Thewit Yuenyong Project Manager</p>	
<p>Date: 10/04/2018</p>		<p>Date: 15 APR 2018</p>	
<p>Note:</p>		<p><input type="checkbox"/> Approved / Notice of No Objection <input type="checkbox"/> Approved with Comments as below / Notice of No Objection with Comments (With "B" or "C") <input type="checkbox"/> No Objection / No Comment <input type="checkbox"/> Rejected with Comments as below and Resubmit / Notice of Objection ("With A")</p> <p>Note: Acceptance of ER does not relieve the Contractor of its Contractual Obligations</p>	
<p>Purpose R = For Review A = For Approval Inf. = For Information Rec = For Record</p>		<p>(Signature)</p>	

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dd. 15 APR 2018 Page 40 Pages.

**DHAKA MASS RAPID TRANSIT DEVELOPMENT PROJECT
LINE 6
CONTRACT CP-03 & CP-04**

**METHOD STATEMENT FOR ERECTION OF SEGMENTAL
VIADUCT FOR MAIN LINE**

Document No. ITD/CP03-04/MS/S 034 Revision No.01

PREPARED BY:



ITALIAN-THAI DEVELOPMENT PUBLIC COMPANY LIMITED

Italian-Thai Development Pcl. (ITD)	The Engineer (NKDM)
Name :	Name :
Position :	Position :
Signature :	Signature :
Date :	Date :
Status	
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1.0 INTRODUCTION

Precast segmental viaduct with box girder shape has been proposed by DMTCL for construction of Dhaka Mass Rapid Transit Development project. The span length of viaduct is ranging from 17.00m. To 35.00m. The typical span is 30.00m.

This method statement covers the erection of various types of viaduct span for main line, access to depot and station areas.

2.0 SPECIFICATION AND REFERENCE DOCUMENT

Particular specification is contained in Volume 3-2 of 6, Part-02 Civil and Structure, Clause-6 Pre-stressing works, Sub-clause 6.1.4 Pc Precast Segment, (3) Working drawing, calculations & manuals, (b) Information required, (1) & (2)

3.0 MATERIALS

- a) Precast segmental Viaduct
- b) Pre-Stressing strands
- c) Pre-stressing bars
- d) Bearings
- e) Epoxy bonding agent
- f) Grouting material for tendons

4.0 RESOURCE, EQUIPMENT AND FACILITIES

The equipment and tools for this operation shall be listed as below:

a) Launching Gantry

The details of the launching gantry are described as below:

1. Erection truss/Launching gantry

1.1 General description

Name of LG is LG500-35 LG is Launching Girder, 500 is maximum capacity and 35 is length of erection. This LG acceptable erection in span length 35 – 40m. Double truss structure length in 90.00m. Truss ends are installed with connection frame. Each truss section is A type, divided into 9 sections, among which there are 6 piece of 11.80m sections and 2 pieces of 6.60m. 1 Piece of 6m. Height of middle truss is 3.2m, overall height of main truss in 3.649m, width 1.8m.

The upper chord is "I" shape welded by steel plate, and lower chord of main beam adopt reinforced I beam, web member is rolled square tube. Web member weld to upper chord and lower chord. Rail for WT traveling is laying on top of upper chord with conduct rail channel aside. Bottom of main truss mounted with rail beam which designed with stoppers for main truss longitudinal launching.

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conduct rail channel aside. Bottom of main truss mounted with rail beam which designed with stoppers for main truss longitudinal launching.

The main truss material is Q345B, connection bolts are 10.9 high strength bolts. Connection pin material is 40Cr, platform and non-bearing frames are made by material no less than Q235B.

1.2 Operating condition and Capabilities of launching gantry.

- All gantry shall be use for erection of simple span and continuous span.
- Segment delivery methods shall be fed below span.
- Maximum permissible slope of main truss for LG launching $\pm 4\%$
- Minimum working radius When span in 35m, $R=160m$
- Maximum segment dimension (L×W×H) 2.92mx9.8mx 2Max. Segment weight 48.00t.
- Segment feeding From Front, rear, bottom
- Winch trolley rated capacity & lifting height 60t / lifting height 27m
- Winch trolley hoisting speed 0-3m/min(load);0-6m/min(no load)
- Winch trolley travel speed 0-10m/min
- Winch trolley side shifting $\pm 0.55m$
- 5t overhead crane hoisting speed & height 7m/min /lifting height 30m
- 5t overhead crane travel speed 0-10m/min
- Spreader rotation $\pm 180^\circ$
- Spreader cross adjustment $\pm 4\%$
- Spreader longitudinal adjustment $\pm 4\%$
- LG max. Side shift speed 0.5m/min
- LG longitudinal moving speed 1m/min
- Max. Wind speed (shifting or launching status) $\leq 16m/s$
- Max. Wind speed (erection status) $\leq 24m/s$
- Max. Wind speed (parking) $\leq 49m/s$
- Power supply 3Ph4W.total power 150kw.215m.

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1.3 Other

The position of front and rear support legs, and generator platform on both ends of each gantry can be change to the specified direction.

b) Launching gantry

The launching gantry is composed of different element types as per the flowering:
(Refers of Attachment 5: Operation manual by HLCCM)

1. Main Girder

There are two main steel girders, braced together at each end. They are the main constituent of the gantry. Each of them has a rail on top which allows a transition of the frame.

2. Front Leg(FL)

The Front Leg is fixed under the forefront of main truss, moving together with the main truss and capable of relevant support requirements. Front leg mounted with individual jacking system with adjustment of 1200mm to overcome the deflection of main truss and ensure the LG self-launching.

3. Middle Leg(ML)

Middle legs are the key components of LG, main function: bearing the load and jacking LG, launching the main truss, moving backward and forward, side shift; adjust the slope of LG and main truss, Two middle legs structure are designed the same and capable of moving forward and backward along the Main Truss.

4. Rear Leg(RL)

RL main consists of: travel system, telescopic boom, lower cross beam, screw support, pin and cylinder and etc. The travel system enables the RL to move along the rear Main truss. The support cross beam and screw support can stand on web position of double track or single track segment. When erection, the RL will move close to RML so that segment can be lifted within 12m from end of main truss.

5. ML anchoring

The ML anchoring including: tie down between ML and SBG, ML tie down with ML cross beam, tie down with MT (By pushing system and self-lock system).

6. Tools for ML

The ML working height range is 3.8m~4.3m, adjustment range is 500mm, support cylinder stroke is 500mm, screw jack stroke is 500mm. The tools can achieve higher status. The ML main cross beam should be kept leveled, even when the bridge had cross slope and longitudinal slope.

7. RL travelling and anchor

RL is designed with travel system to make it capable of traveling along MT.RL can be anchored with MT by binder plate. When RL traveling is not needed, it must be anchored

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8. Rear Leg side shifting

When LG working on the span with radius, the long cantilever of cross beam is on the outside of curve, and short cantilever end is inside the curve

9. Winch trolley (WT) 60.00 ton

The WT is the main working unit of LG, there is one set of 60t WT. The WT mainly consists with main frame, winch, side-shift hydraulic system, travel system, rail clamp, power supply system, relevant electric cabin and etc.

10. WT anti drop device

Four sets of Derail proof device are designed aside the travel system (at inner side of MT) to avoid derail when MH travels in high speed.

11. 5t Overhead crane

The 5t overhead crane is assistant working unit, capable of traveling along the Main truss, mainly consists of electrical hoist and travel system.

The main beam is single box structure, hanging the 5t electric hoist on the I beam at the bottom of main girder. The support leg height is 1350mm which allows to rise the hook above the Main truss.

12. Spreader

The spreader is suitable for picking up segment from front side, rear side and bottom. The lifting point can be adjusted to fit for different segments. The movable pulley block on top of spreader is capable of $\pm 180^\circ$ rotation. And the cross slope and longitudinal slope can be adjusted for alignment by cylinders accordingly. The longitudinal and cross slope adjustment range are $\pm 4\%$. All movement is controlled by remote controller.

13. Hanging system

The hanging system temporarily fix hanging the segments on Main truss, mainly consists of hanging beam and PT bar. The hanging beam is fixed with segment by PT bar. For safety, the fixing PT Bar should be pre-stressed. Generally the pre-stress force is 5 ton for each. Make sure no loosen or sliding happens between the hanging beam tools and segment during lifting and assembly. The upper PT bar will hang the segments on the MT in sequence. And center hole jack can be installed on the top of PT bar to adjust the segment space. When feeding segment from rear side, the rotation of segment shall be considered. Thus the segment shall be hanging staggered by extension PT bar.

14. Pier bracket

Each LG equipped with 1pcs of Pier bracket, Front middle leg's foot print connect to the pier head and stand on the pier head. Middle leg and pier bracket have to fix by 4pc 32mm PT Bar. Pier bracket tie down to pier head by 4pcs 50mm PT bar.

c) Other items

d) Temporary jacks

e) Temporary pre-stressing bars

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- f) Generators
- g) Survey measuring instruments
- h) Small tools Personal Protective Equipment helmets, safety shoes, glasses, reflective vest and masks.

5.0 PROCEDURE**5.1 Preparation Works**

All operatives or staff working within the segmental viaduct erection areas shall wear the Personal Protective Equipment (PPE) The equipment being used for this work shall be in conformance with the safety regulation requirements.

The training courses for relevant tasks, including all specific safety inductions shall be organizer for the relevant operatives. During the erection period, the respective engineers shall closely supervise the work.

All necessary arrangement shall be determined to ensure that no damage to the relevant utility services adjacent to those areas shall be affected

Due to a major problem of the traffic, the segmental viaduct is scheduled to be erected during the night time. Therefore, the power supply, warning lights, notices, fence hoarding and other lighting system shall be adequately provided to facilitate the working area.

Relevant temporary structural members and working platforms shall be installed, fully fixed and inspected to ensure that all platform are capable of safety withstanding all the imposed load.

The traffic management shall be discuss, determined and officially approved by all concerned parties.

5.2 Assembly and install erection truss/launching girder

The installation process of launching girder following activities shall be performed:

Sequence 1

- 1.1 Install main girder on ground then splice joint by p/t bar stressing and install shear pin see operation manual.
- 1.2 Install pier bracket and tie down pier bracket with p/t bar.

Sequence 2

- 2.1 Install launching truss support (FML and RML) at Pn,P(n+1)

Sequence 3

- 3.1 Slide support (LT) to position of lifting.
- 3.2 Lifting main girder (LT) on position by all terrain crane 220t.

Sequence 4

- 4.1 Slide support (LT) to real position.
- 4.2 Lifting support (RT) on position by crane 50t.

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Sequence 5

- 5.1 Lifting main girder (RT) by mobile crane 220t. 2 ea.
- 5.2 Slide support to position and install accessory of main truss and sideling system.

Sequence 6

- 6.1 Install bracing of main girder
- 6.2 Install front leg and winch.

Note:

The total weight of the launching girder, excluding lifting accessories and supports, is 350 tons.

- The installation of girder is divided into two parts each part is 170 tons.
- There are two cranes to be used for lifting the girder (170 tons).
- As a result, each crane shall lift the girder at the weight of 85 tons.

Once everything is found to be acceptable, all segments of the main truss shall be installed and placed on Front and Rear Support (FS and RS).

5.3 Erect segmental viaduct for main line**Preparation work and Casting Concrete Plinth**

- a. After the concrete placement of the pier is complete, and the 28-day concrete strength has been achieved, surveyors shall perform an inspection of relevant pier locations and prescribe the corresponding off-set line, level and alignment aspects at the pier location.
- b. The precast segmental viaducts shall be performed as described in method statement for manufacturing process of viaduct segment. The precast segmental viaducts shall be delivered to the construction site, provided that the concrete specimen test results are at least 100% of 28-day compressive strength. In addition, the following items shall be completely performed prior to the erection of the segmental viaducts on the pier head.
 1. The concrete specimen test results of the concrete plinths are at least 80% of 28-day compressive strength, and the corresponding pot bearings/bearing pads are placed and completely fixed on the concrete plinths.
- c. Once relevant precast segmental viaducts have been transported by the trucks with gooseneck trailer to the erection area, an inspection shall fully be performed and the results shall be found to be acceptable prior to being erected.
- d. The subsequent precast segmental viaducts shall be lifted in the same manner as described above until all precast segmental viaducts between the piers are completely suspended at the specified level.

5.3.1 Erection Process of Segmental Viaduct for Simple Span

After the truss is launched to the position between Pn+1(P.85) and Pn+2(P.86) for the simple span, as shown on Attachment 7, the following activities shall be performed

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Sequence 1.

- 1.1 After installation launching gantry is completed.
- 1.2 Install hanging beam with shear pipes on the top of the segment.
- 1.3 Move winch frame to middle of launching gantry.
- 1.4 Connect lifting beam to spreader beam with pins.
- 1.5 Lift the first segment and move into the erection span.

Sequence 2

- 2.1 Turning segment (D1) and move to its position (as shown).
- 2.2 Adjust the level of segment (D1) as specified.
- 2.3 Attach segment (D1) to hanging equipment.
- 2.4 Transfer weight of segment from winch frame to the hanging equipment.

Sequence 3

- 3.1 Lift and move segment (S1) into the erection span.
- 3.2 Turning the segment (S1) and move to its position (as shown).
- 3.3 Connect hanging bar to hanging beams with nut.
- 3.4 Transfer weight of segment (S1) from winch frame to hanging system.
- 3.5 Release lifting beam from hanging beams.

Sequence 4

- 4.1 Lift and move segment (S2) into the erection span.
- 4.2 Turning the segment (S2) and move to its position (as shown).
- 4.3 Connect hanging bar to hanging beams with nut.
- 4.4 Transfer weight of segment (S2) from winch frame to hanging system.
- 4.5 Release lifting beam from hanging beams.

Sequence 5

- 5.1 Repeat stage 3 for segment (S3) (S4) and (S4A)
- 5.2 Bring the segment slowly in contact with the previous segment to dry match the shear keys and to check the alignment.
- 5.3 Bring the segment slowly in contact with the previous segment to dry match the shear keys and to check the alignment.

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Remark: some of remaining segments need to be placed: some of remaining segments need to be placed in staggered position to provide space for turning the last segment (D1). Some of remaining segments need to be placed in staggered position to provide space for apply epoxy glue and temporary stressing

Sequence 6

- 6.1 Move winch frame to segment s1.
- 6.2 Connect lifting beam to hanging beams with pins.
- 6.3 Release p/t bar from hanging beams.
- 6.4 Move segment s1 to d1 final position.
- 6.5 Adjust the level of segment s1 as specified.

Sequence 7

- 7.1 Move winch to segment (S1) and release p/t bar for hanging
- 7.2 Move segment (S1) to final position for apply epoxy glue and temporary stressing with stressing force 400 KN.

Sequence 8

- 8.1 Move winch to segment (S2) and release p/t bar for hanging
- 8.2 Adjust segment (S2) to final position for apply epoxy glue and temporary stressing with stressing force 400 KN.

Remark: some of remaining segments need to be placed in: some of remaining segments need to be placed in staggered position to provide space for apply epoxy glue and temporary stressing

Sequence 9

- 9.1 Replete stage 7-8 for segment full span.
- 9.2 Recheck alignment again before 100% stressing tendons.
- 9.3 Install stressing platform.
- 9.4 Start stressing tendons.

Sequence 10

- 10.1 Load transfer to pier head.
- 10.2 Relocation hanging beam.
- 10.3 Uninstall stressing platform.

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5.3.2 Launching Truss Process**Sequence 11**

- 11.1 Install (RL) inform 5.1m. Ahead of rear pier head.
- 11.2 Move winch 60t and crane 5t to over fm.
- 11.3 Adjust rear leg jack and activate rear leg.
- 11.4 Dismantle bolt between (RS) and pier bracket, (RS) disconnect with pier bracket.

Sequence 12

- 12.1 Drive (RS) forward and then activate and tie down to pier segment.
- 12.2 Un-active rear leg.

Sequence 13

- 13.1 Relocation rear leg and install to pier bracket.
- 13.2 Install rear leg at rear of main truss.

Sequence 14

- 14.1 Launch main truss to next pier.
- 14.2 Active front leg and tie down outrigger.

Note: Then move winch and crane 5t. Over MS. Double check the fs is retract to min height, operator can adjust the fs and MS height in case the outrigger of fs may interference with the seism buffer, LG allow to launch the main truss with slop 1.5%

Sequence 15

- 15.1 Move winch to pier segment (pn+1) and then move MS to next pier segment.
- 15.2 RL still lock and active.

Sequence 16

- 16.1 Move winch and crane 5t. To position PN and then drive fs and pier bracket to PN+2 and tie down.

Sequence 17

- 17.1 Move winch and crane 5t. To position middle of next span.
- 17.2 Launch main truss until RL position the last member of main truss.

Sequence 18

- 18.1 Un-active RL and launch main truss to erection position.
- 18.2 Segment erection PN+1 and load transfer.

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Sequence 19

19.1 Move stressing platform to next pier.

19.2 Remove hanging beam and temporary stressing beam.

Sequence 20

20.1 Replete stage 15. To 19.

6.0 SAFETY PROVISIONS

- i. All truck mixers, crawler cranes, or truck mounted concrete pumps that are used for concrete work shall be driven carefully.
- ii. Cutting rebar shall be carefully operated. Gloves shall be used during cutting rebar.
- iii. Welding mask shall be always used during welding procedure.
- iv. All persons entering the construction areas shall be provided with safety induction training.
- v. All workers shall wear safety belts during working at height.
- vi. All workers being outdoors have to stop working during heavy raining and lightning periods.
- vii. Defective equipment shall be properly rectified or not to be used.
- viii. All slings attached to the lifting points of formwork or other lifted materials shall be properly checked before lifting.
- ix. No smoking in the working area.

7.0 ENVIRONMENTAL PROVISIONS

- A. The work shall be carried with sufficient environmental protection.
- B. Working platforms or walkway shall be clean, not slippery, and free from Debris.

8.0 TRAFFIC MANAGEMENT

- a. The remaining traffic management shall be prepared and submitted to NKDM in a separate submission henceforth.

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9.0 ATTACHMENTS

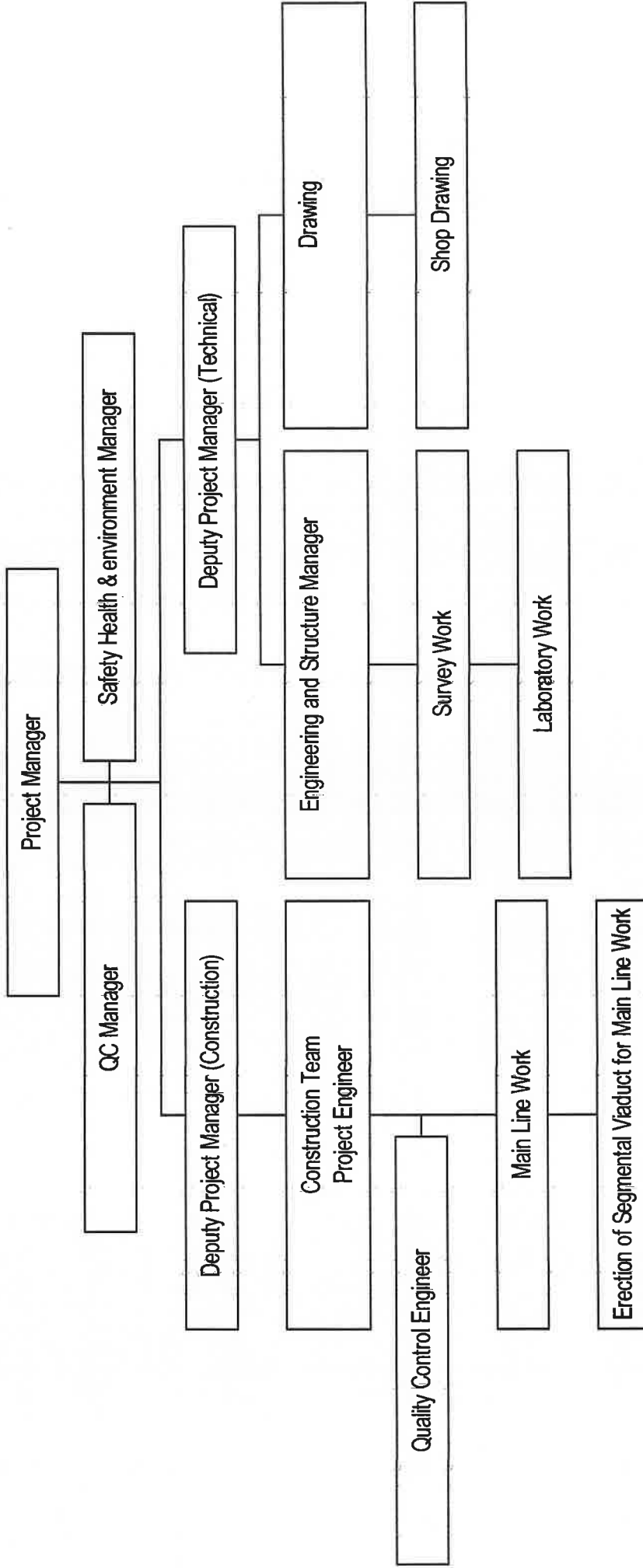
- ATTACHMENTS 1 - SUB-ORGANIZATION CHART FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE
- ATTACHMENTS 2 - INSPECTION AND TEST PLAN FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE
- ATTACHMENTS 3 - QUALITY CONTROL CHECKLIST FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE
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ATTACHMENT 1
**SUB-ORGANIZATION CHART FOR ERECTION
OF SEGMENTAL VIADUCT FOR MAIN LINE**

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Sub-Organization Chart for Erection of Segmental Viaduct for Main Line



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ATTACHMENT 2
INSPECTION AND TEST PLAN FOR
ERECTION OF SEGMENTAL VIADUCT FOR
MAIN LINE

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ITD

Project : DHAKA MASS TRANSIT DEVELOPMENT PROJECT CONSTRUCTION OF VIADUCT AND ELEVATED STATION
 Contract No. CP03-04
 Item Description : N/A
 Location : N/A
 Specification No : Construction Specification Civiland Structure

INSPECTION AND TEST PLAN

FOR
METHOD STATEMENT FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE (EQUIPMENT CONDITION OF ERECTION GANTRY)

Quality System : ISO 9001 : 2008
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 Approved by : Mr. Nakibain Chindapluk
 IER Approved : N/A

No.	Activity	Inspection and Tests Required	Inspection Activity			Form Checklist No.	Verification/Acceptance Sign Off By	Acceptance Criteria	
			Subcont	Vendor	ITD				NKCM
1	Submission	-Material Shop Drawing, Method Statement	N/A	N/A	R	N/A	N/A	Refer to relevant specification	
2	Materials	-Approved Precast segmental box girders -Approved Wire strands	X	N/A	X	ITD/CP03-04/MS/ST034/01	Engineer	Refer to material submission/Approved Material	
3	Equipment	-Crane and its equipment and related equipment	X	N/A	X	ITD/CP03-04/MS/ST034/01	Engineer	Refer to relevant specification	
4	Interface Coordination	-E&M embedded items	X	N/A	X	ITD/CP03-04/MS/ST034/01	Electrical / Mechanical Engineer	Refer to relevant Drawing/Method Statement	
5	In-process Inspection								
5.1	Inspect equipment and tools								
5.1.1	Adjusting device	-Vertical Jacks -Hydraulic Pump -Hydraulic hoist -Horizontal Jack -Hanger bars -Connector	N/A	N/A	X	ITD/CP03-04/MS/ST034/01,02	QC/Foreman	Function/No/Leakage	
			N/A	N/A	X	ITD/CP03-04/MS/ST034/01,02	QC/Foreman	Function/Oil	
			N/A	N/A	X	ITD/CP03-04/MS/ST034/01,02	QC/Foreman	No leakage	
			N/A	N/A	X	ITD/CP03-04/MS/ST034/01,02	QC/Foreman	Function/No leakage	
			N/A	N/A	X	ITD/CP03-04/MS/ST034/01,02	QC/Foreman	No marks/No bond	
			N/A	N/A	X	ITD/CP03-04/MS/ST034/01,02	QC/Foreman	Full/Firm attached	
	Symbol	Legend	Symbol					Legend	
	H	Mandatory Hold Point-Hold Until Approved	D					Document or Record Required	
	W/O	Witness Point-Optional	X					Subcontract Inspection	
	w	Witness Point	R					Review Point	
	S/.....	Surveillance Point-Random ITD / Each Quantity	N/A					Not Applicable	
	N	Notify IER (Request for Inspection)							

Document No.	Revision	Page No.
ITD/CP03-04/MS/ST034/01	No.01	1 of 6
	Date : April 9,2018	

ITD

Project : DHAKA MASS TRANSIT DEVELOPMENT PROJECT CONSTRUCTION OF VIADUCT AND ELEVATED STATION
 Contract No. CP03-04
 Item Description : N/A
 Location : N/A
 Specification No : Construction Specification Civil and Structure

INSPECTION AND TEST PLAN

FOR
 METHOD STATEMENT FOR ERECTION OF SEGMENTAL
 VIADUCT FOR MAIN LINE
 (EQUIPMENT CONDITION OF ERECTION GANTRY)

Quality System : ISO 9001 : 2008
 Document Type : Controlled
 Date : April 10, 2018
 Prepared by : Md. Manuf Ahmed
 Approved by : Mr. Nabbarin Chindapluk
 ER Approved : N/A

No.	Activity	Inspection and Tests Required	Inspection Activity			Document		Verification/Acceptance Sign Off By	Acceptance Criteria
			Subcont.	Vendor	ITD	NKOM	Form Checklist No.		
5.1.2	Winch Frame	-Lifting Winch	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function
		-Lifting Sling	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Smooth/No wire break
		-Lifting hook	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	No crack/Connect
		-Motor Drive (Right Front end)	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function
		-Motor Drive (Left Front end)	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function
		-Motor Drive (Right Front end)	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function
		-Motor Drive (Left Front end)	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/No Jam
5.1.3	LCB	-Gear Motor	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function
		-Gear Rack (NO mark not)	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	No mark not/Warning/Smooth/Clear
		-Supporting Jacks	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/No leakage
		-Pump for Jacks	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/Oil
		-Heat for Jacks	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	No leakage
		-Roller	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/No Jam
		-Guide Roller	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/No Jam
		-Transverse Jacks	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function
5.1.4	Inspect General equipment and Tools	-Centre hole Jacks for bar Steering	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/No leakage
		-P/T bar of each glider connection	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Smooth/No Mark/No bend
		-Benz/Nut for Transom Frame	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/No crack/Smooth thread
		-Benz/Nut for Transom beam	N/A	N/A	X	W/O	ITD/CP03-04/MMS/ST034/01_02	QC/Foreman	Function/Smooth thread/No mark
		Legend					Symbol		
		Mandatory Hold Point-Hold Until Approved					D		Document or Record Required
		Witness Point-Optional					X		Subcontract Inspection
		Witness Point					R		Review Point
		Surveillance Point-Random ITD / Each Quantity					N/A		Not Applicable
		Notify ER (Request for Inspection)							

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	Date : April 9, 2018	

ITD		INSPECTION AND TEST PLAN			FOR		METHOD STATEMENT FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE (EQUIPMENT CONDITION OF ERECTION GANTRY)		Quality System Document Type		Acceptance Criteria		
Project : DHAKA MASS TRANSIT DEVELOPMENT PROJECT CONSTRUCTION OF VIADUCT AND ELEVATED STATION		Inspection Activity		Form		Verification/Acceptance Sign Off By		Document		ISO 9001 : 2008			
Contract No. CP03-04		Inspection and Tests Required		Checklist No.		Sign Off By		Document		Controlled			
Item Description : N/A		Inspection and Tests Required		Form		Sign Off By		Document		Date : April 10, 2018			
Location : N/A		Inspection and Tests Required		Form		Sign Off By		Document		Prepared by : Md. Masuf Ahmed			
Specification No : Construction Specification Civiland Structure		Inspection and Tests Required		Form		Sign Off By		Document		Approved by : Mr. Nakharin Chindapluk			
		Inspection and Tests Required		Form		Sign Off By		Document		For Approval : N/A			
No.	Activity	Subcontract	Vendor	ITD	NKDM	Form	Checklist No.	Verification/Acceptance Sign Off By	Document	Acceptance Criteria			
5	Launching Truss Process												
5.2.1	Before Launching												
	- Equipments check list	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Complete			
	- Launching System	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		In position and fix			
	- Gear Motor	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		In position and fix			
	- Leveling	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		In level with water level			
	- Tighten of nut of roller jacks	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Tight			
	- Labour (with radius)	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		In position			
	- Leveling vertically of truss support	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Correct			
	- Tie down force of next support	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Correct			
	- Rest support spindles releasing	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Complete			
5.2.2	After launching												
	- Rear support	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Fully fix			
	- Main Truss	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Complete			
	- Alignment and level of trusses	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Tight			
	- Tighten of nut of upper jacks	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		In ready position			
	- Gantry erection position	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman		Usually by visual checking			
	- Slings, Bars, Connectors/Pins	N/A	N/A	X	W/O		ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman					
Legend				Symbol									
H	Mandatory Hold Point-Hold Until Approved			D				Document or Record Required					
W/O	Witness Point-Optional			X				Subcontract Inspection					
W	Witness Point			R				Review Point					
S/.....	Surveillance Point-Random ITD / Each Quantity			N/A				Not Applicable					
N	Notify ER (Request for Inspection)												

ITD

INSPECTION AND TEST PLAN
FOR
METHOD STATEMENT FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE (EQUIPMENT CONDITION OF ERECTION GANTRY)

Project : DHAKA MASS TRANSIT DEVELOPMENT PROJECT CONSTRUCTION OF VIADUCT AND ELEVATED STATION
Contract No. CP03-04
Item Description : N/A
Location : N/A
Specification No : Construction Specification Civil and Structure

Quality System : ISO 9001 : 2008
Document Type : Controlled
Date : April 10, 2018
Prepared by : Md. Manuf Ahmad
Approved by : Mr. Nakshar Chhirdapuk
ER Approved : N/A

No.	Activity	Inspection and Tests Required	Inspection Activity			Document		Verification/Acceptance Sign Off By	Acceptance Criteria
			Subcont.	Vendor	ITD	NKDM	Form Checklist No.		
5.3	Erection of Segmental Viaduct								
5.3.1	Before lifting - Equipments check list -Chart Motor	- All equipment checking - Installed Gear Motor	N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	Complete
		- Transverse leveling - Tighten of nut of roner jacks - Labour (with radlos)	N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	In position and fix in level with water level
		- Level and vertically of next support - The down force of next support - Rear support spindle releasing	N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	Tight In position
5.3.2	Simple Span								
a	During Lifting - Temporary stressing beams - Lifting beams	- Installed and fix Temporary stressing beam in segmental viaduct - Lifting beams shall be connected to the hanging beam with the corresponding pins. - Pin and hook connection	N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	Fully fix
		- Erected segmental viaduct	N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	Fully fix
		- Alignment of each segment - Level of each segment - Shear key position	N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	10 ton hand light each bar Correct
b	After lifting - Stressing platform - Install Temporary PT bars	- Installation of stressing platform - Stressing force of temporary PIT bars	N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	Correct
			N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	Position and level are correct
			N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer/Foreman	Bearing installation check-list is completed
			N/A	N/A	X	W/O	ITD/CP03-04/MS/ST034/01.02	Engineer	Top and bottom bars 10 ton
Legend									
	Symbol								
	H	Mandatory Hold Point-Hold Until Approved					D		Document or Record Required
	W/O	Witness Point-Optional					X		Subcontract Inspection
	w	Witness Point					R		Review Point
	S/.....	Surveillance Point-Random ITD / Each Quantity					N/A		Not Applicable
	N	Notify ER (Request for Inspection)							
Legend									
Document No. ITD/CP03-04/MS/ST034/01									
Revision No. 01									
Date : April 9, 2018									
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ITD		INSPECTION AND TEST PLAN		FOR		METHOD STATEMENT FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE (EQUIPMENT CONDITION OF ERECTION GANTRY)		Quality System : ISO 9001 : 2008 Document Type : Controlled Date : April 10, 2018 Prepared by : Md. Maruf Ahmed Approved by : Mr. Nakharin Chindapituk ER Approved : N/A	
No.	Activity	Inspection and Tests Required	Inspection Activity		Form Checklist No.	Verification/Acceptance Sign Off By	Acceptance Criteria		
			Subcont.	Vendor					
	- Post Erection Process	- Place horizontal jack and apply force - Stress all tendons	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer	Position Force 10 ton each		
	- Removed temporary PT bars	- Release temporary PT bars and transom beams	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer	Complete		
	- Release and hanger bars	- Release all hanger bars and hanging beam	N/A	N/A	ITD/CP03-04/MS/ST03401.02	QC/Foreman	Complete		
3.3.3	Continuous Span					QC/Foreman	Complete		
a.	During Lifting	- Installed and fix hanging beams in segmental viaduct	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Fully fix		
	- Transom beams	- Installed and fix temporary stressing beams in segmental viaduct	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Fully fix		
	- Lifting beams	- Lifting beams shall be connected to the spreader beam with the corresponding pins	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Fully fix		
	- Erected segmental viaduct	- Pin and hook connection	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	10 ton hand tight each bar		
		- Alignment of each segment	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Correct		
		- Level of each segment	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Correct		
		- Shear key position	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Position and level are correct.		
b.	After Lifting								
	- Instant temporary PT bars	- Stressing force of temporary PT bars	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer	Top and bottom bars 10 ton		
	- Concrete chime	- Installation concrete chime	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Position and level are correct		
	- Stressing platform	- Installation of stressing platform	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Bearing installation check-list is completed		
	- Post Erection Process	- Place horizontal jack and apply force	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer/Foreman	Position Force 10 ton each		
	- Adjust segmental viaduct	- Apply and adjust of force 30 tons horizontal jack between pier segments.	N/A	N/A	ITD/CP03-04/MS/ST03401.02	Engineer	Complete		
	Symbol	Legend			Symbol				
	H	Mandatory Hold Point-Hold Until Approved			D	Document or Record Required			
	W/C	Witness Point-Optional			X	Subcontract Inspection			
	w	Witness Point			R	Review Point			
	S/.....	Surveillance Point-Random ITD / Each Quantity			N/A	Not Applicable			
	N	Notify ER (Request for Inspection)							

Document No.	ITD/CP03-04/MS/ST03401	Revision	No.01
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ITD		INSPECTION AND TEST PLAN		Quality System		
Project : DHAKA MASS TRANSIT DEVELOPMENT PROJECT CONSTRUCTION OF VIADUCT AND ELEVATED STATION Contract No. CPD3-04 Item Description : N/A Location : N/A Specification No : Construction Specification Civil and Structure		FOR METHOD STATEMENT FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE (EQUIPMENT CONDITION OF ERECTION GANTRY)		ISO 9001 : 2008 Controlled Date : April 10, 2018 Prepared by : Mr. Manof Ahmed Approved by : Mr. Nakhairin Chindapruk ER Approved : N/A		
No.	Activity	Inspection Activity			Verification/Acceptance Sign Off By	Acceptance Criteria
		Subcont	Vendor	ITD		
	- Post-Tension Process	N/A	N/A	X	W/O	Engineer/NKDM Concrete compressive strength of 25 Mpa - As shown in Method Statement Post-Tension of wire strand as shown on the drawings and in Method Statement
	- Other tendon shall be stress	N/A	N/A	X	W/O	Engineer
	- Release temporary PT bars and stressing beams	N/A	N/A	X	W/O	QC/Foreman Complete
	- Release all hanger bars and hanging beam	N/A	N/A	X	W/O	QC/Foreman Complete
	- Release horizontal/jack after release all P/T bars hanging	N/A	N/A	X	W/O	QC/Foreman Complete
6	Final inspection	N/A	N/A	H,N,W	W	NKDM Follow to drawings/relevant specifications
7	Quality Record Submission	D	N/A	D	R	NKDM As shown in Method Statement
Legend						
Symbol						
H		Mandatory Hold Point-Hold Until Approved				
W/O		Witness Point-Optional				
w		Witness Point				
S _{surveillance}		Surveillance Point-Random ITD / Each Quantity				
N		Notify ER (Request for Inspection)				
Document No.		Revision				
ITD/CPD3-04/MS/ST03401		No.01				
Page No.		Date : April 9, 2018				
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ATTACHMENT 3

QUALITY CONTROL CHECKLIST FOR ERECTION OF SEGMENTAL VIADUCT FOR MAIN LINE

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Method Statement for Erection of Segmental Viaduct for Main Line

Quality Control Checklist for Erection of Segmental Viaduct for Main Line

Simple Span Continuous Span

Record No.: _____
 Location: _____
 Inspection Date.: _____
 Drawing Ref. no. _____

EN = Site Engineer, FM = Foreman, Lab = Laboratory, EE = Electrical Engineer, ME = Mechanical Engineer, ER = Employer's Representative,
 SU = Survey, SP = Supervisor Person, QC = Quality Control, Dwg. No. = Drawing Number

Item	Description	Acceptance Criteria	By	TIC	Acceptance		Sign
					Yes	No	
1	Materials						
	- Approved Precast segmental viaduct	Refer to material submission/Approved Material	EN	X			
	- Approved Wire strands	Refer to material submission/Approved Material	EN	X			
2	Equipment						
	- Crane and its equipment and related equipment	Refer to relevant drawing/method Statement	EN	X			
3	Interface Coordination	E&M embedded items	EE/ME	X			
4	In-process Inspection						
4.1	Erection of Segmental Viaduct						
	- General checking of launching girder, precast segmental viaduct	Refer to ITP of this Method Statement	SU/EN/QC/FM / NKDM	X			
	- Survey checking,	Refer to ITP of this Method Statement	SU/EN/QC/FM / NKDM	H, N, W			
	- Stressing and grouting	Refer to ITP of this Method Statement	SU/EN/QC/FM / NKDM	H, N, W			
5	Final Inspection	Follow to drawings/relevant specifications	NKDM	H, N, W			
6	Quality Record Submission	Completion of documents.	NKDM	D			

TIC = Test & Inspection Category, H = Hold Point, W = Witness Point, R = Review Point
 D = Document Required, W/O = Witness Point-Optional, X = Subcontractor Inspection, S = Surveillance Point, N = Notify ER (Request for Inspection)

Remark: _____

Inspected (ITD): _____ (Engineer)	Verified by (NKDM): _____ (Inspector)
Date : _____	Date : _____
Inspected (ITD): _____ (Inspector)	Verified by (NKDM): _____ (Project Engineer)
Date : _____	Date : _____

Document No.	Revision	Page No.
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Method Statement for Erection of Segmental Viaduct

Inspection Sheet for Erection of Precast Segmental Viaduct

Simple Span Continuous Span

Location:	Span No.:	Date:
Span Length:m.	Type of Segmental Viaduct:	
Drawing No./ Rev. :		

EN = Site Engineer, SU = Survey, QC = Quality Control, FM = Foreman, EE = Electrical Engineer, ME = Mechanical Engineer,
 NKDM = Employer's Representative

Item	Description	Acceptance Criteria	Sign Acceptance		Inspected by	Remarks
			Yes	No		
1	General Checking of Launching Girder					
	- Launching Girder is in position and ready to install precast segmental viaduct	Conform to Method Statement			(FM/EN)	
	- Location of Temporary supports	Position and level are correct			(FM/EN)	
2	Precast Segmental Viaduct					
	- Segment Type, Segment numbering	Conform to span layout drawing			(FM/EN)	
3	Survey Checking					
	- Alignment and level of each segment(Before stressing)	Line & Level are correct			(FM/EN)	Refer to Method statement for the field survey control of the erected geometry.
	- Alignment and level of each segment (After stressing)	Line & Level are correct			(FM/EN)	
4	Stressing and Grouting					
	- Calibration of Hydraulic Stressing Jack	Complete			(FM/EN)	
	- Temporary Stressing (By hanging beams)	10 tons. per bar			(FM/EN)	
	- PC. Strand, Anchorage & Wedge Installation	Conform to Shop drawing			(FM/EN)	
	- Installation of External Tendons	Size and Position are correct			(FM/EN)	
	- Stressing of Tendons (Force and Elongation)	Conform to Shop drawing			(FM/EN)	Refer to Method statement – ITD/MS/CP03-04/ALL/SP 0025 Rev.01
	- Tendon Grouting	20 days after installation			(FM/EN)	
	- Protection of End Anchorages	After Grouting is completed			(FM/EN)	
5	Final Inspection	Conform to drawing and relevant specifications			(NKDM)	

The Contractor : _____ By ITD's Engineer/Site Engineer Date : _____ _____ Agreed by QC Date : _____	NKDM : _____ Inspector/Engineer Date : _____ _____ Resident Engineer, or Deputy Resident Engineer Date : _____
---	--

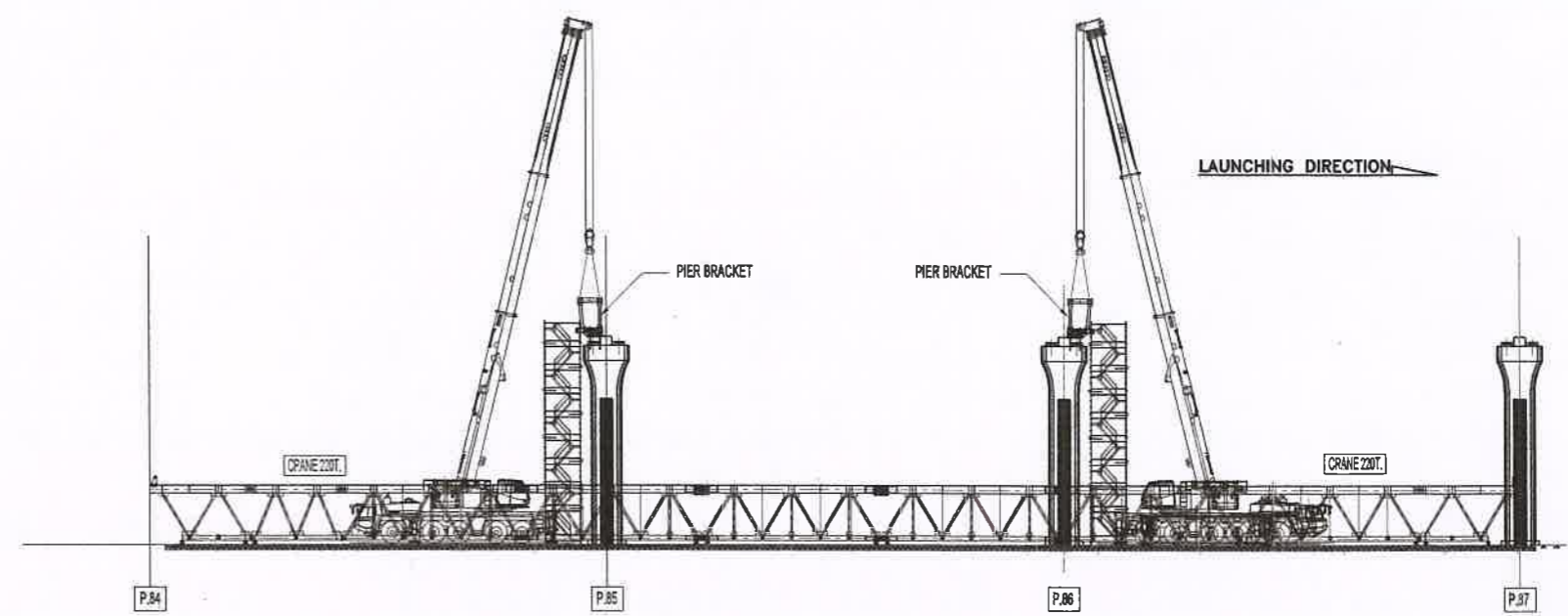
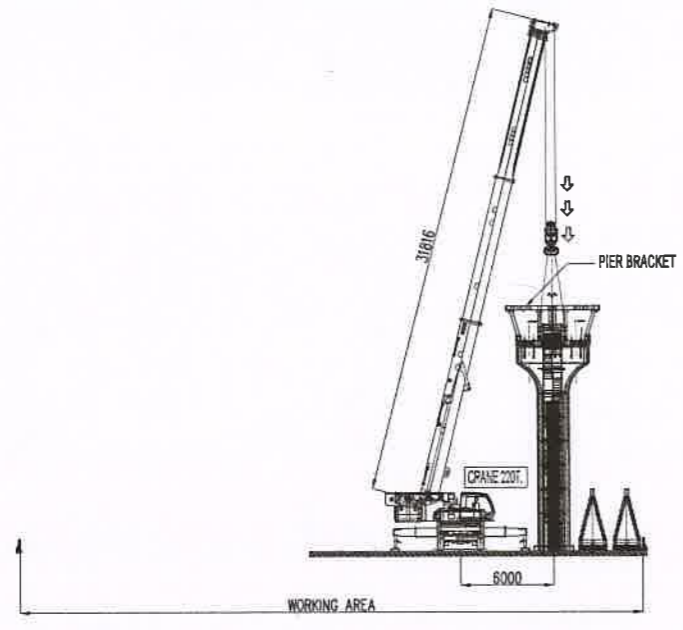
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ATTACHMENT 4
Sequence - Assembly and install erection
truss/launching girder

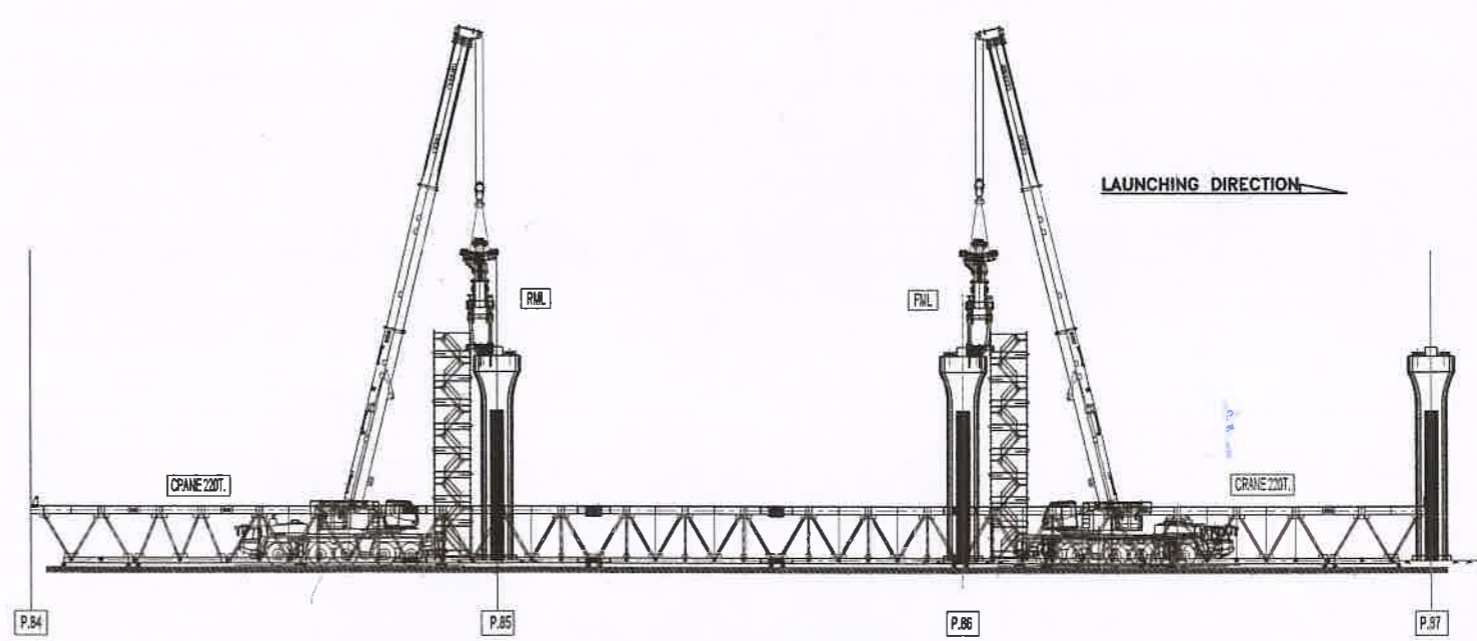
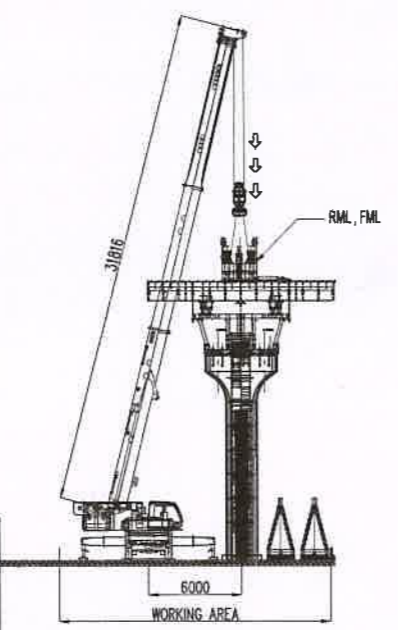
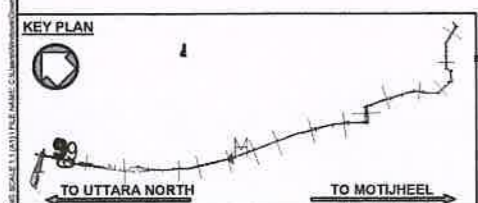
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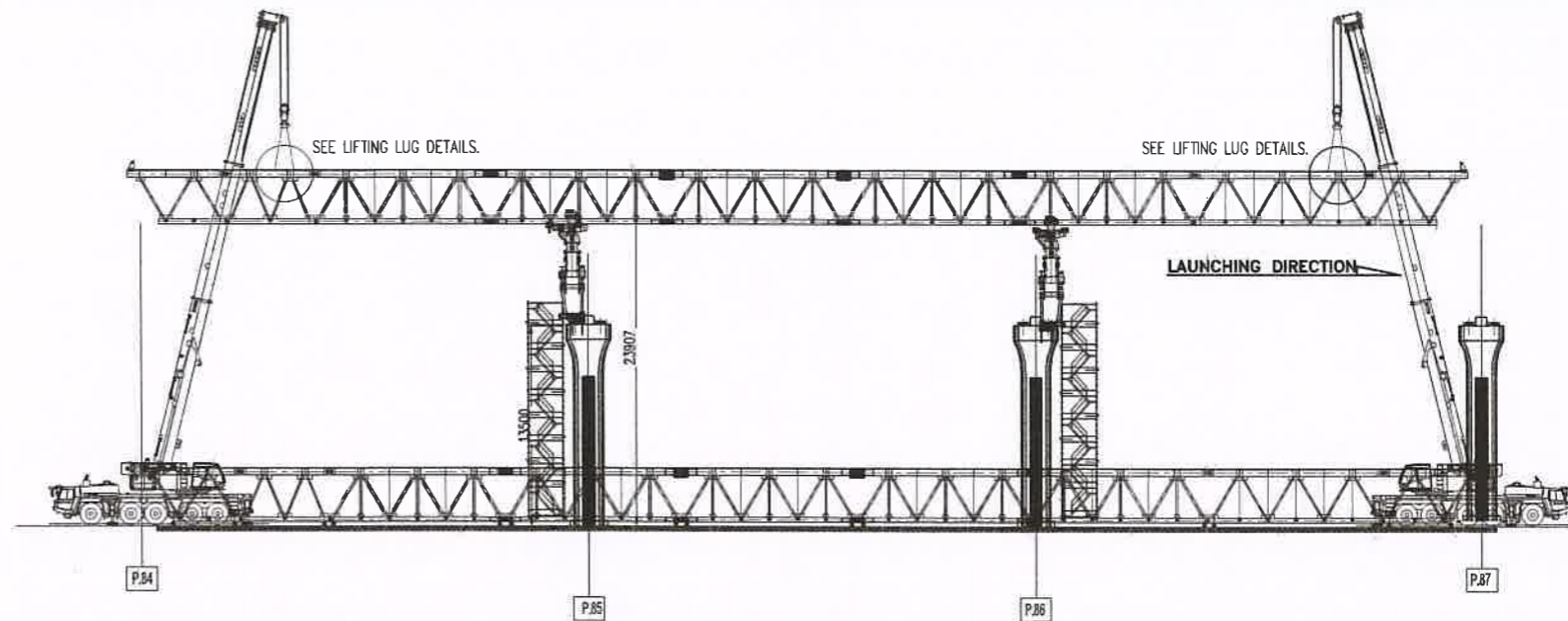
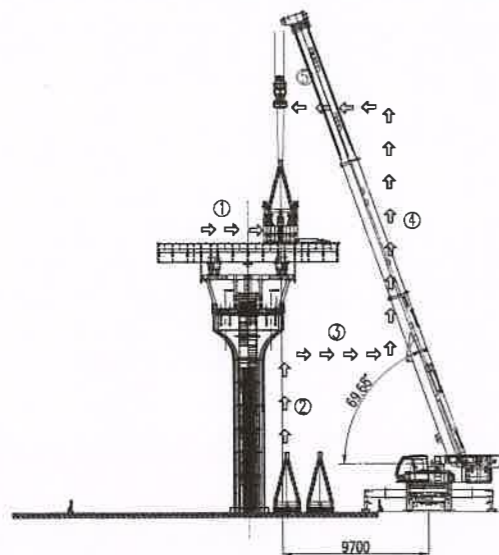
STAGE 1 :

- 1.1 INSTALL MAIN GIRDER ON GROUND THEN SPLICE JOINT BY P/T BAR STRESSING AND INSTALL SHEAR PIN SEE OPERATION MANUAL.
- 1.2 INSTALL PIER BRACKET AND TIE DOWN PIER BRACKET WITH P/T BAR.

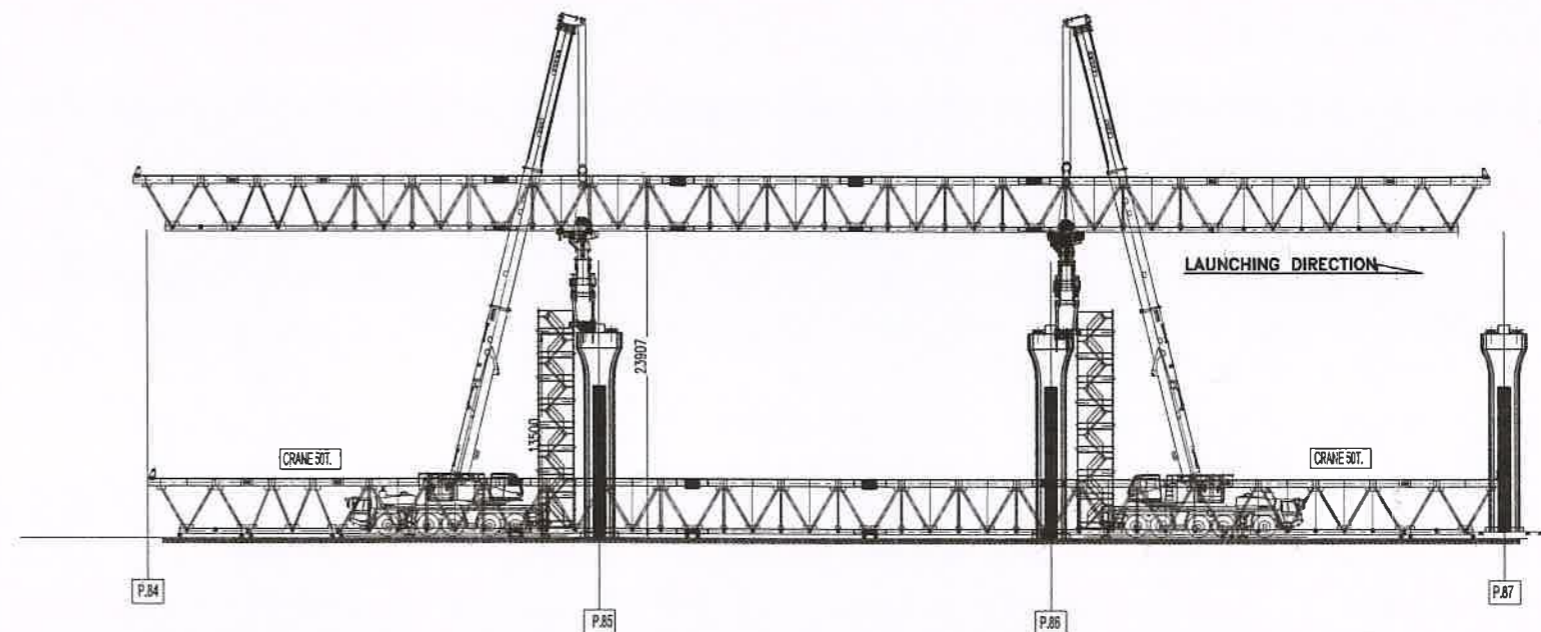
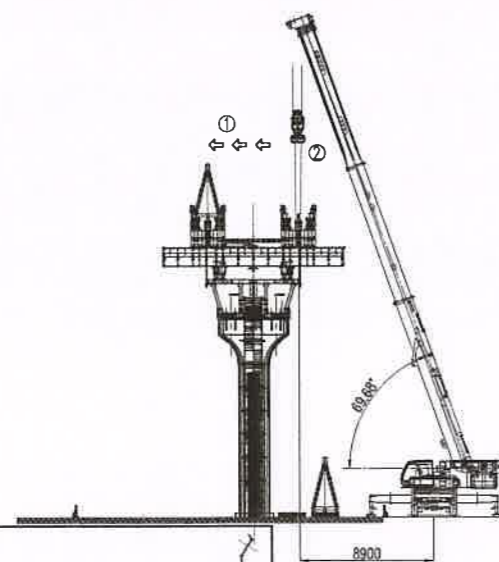


STAGE 2 : INSTALL LAUNCHING TRUSS SUPPORT (FML AND RML) AT P.85-86

 Dhaka Mass Transit Company Limited (DMTCL) Dhaka, Bangladesh	 NKDM Association	 ITALIAN-THAI DEVELOPMENT COMPANY LIMITED	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">REVISION</th> </tr> <tr> <th>REV.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REVISION			REV.	DATE	DESCRIPTION													<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">PROJECT NAME</td> <td colspan="2">DRAWN BY</td> </tr> <tr> <td colspan="2">DHAKA MASS RAPID TRANSIT DEVELOPMENT PROJECT JICA LOAN NO. BD - P69</td> <td colspan="2"> </td> </tr> <tr> <td colspan="2">CONTRACT TITLE</td> <td colspan="2">CHECKED BY</td> </tr> <tr> <td colspan="2">CP-03 Viaducts and Elevated Stations from Uttara North to Pallabi. CP-04 Viaducts and Elevated Stations from Pallabi to Agargaon.</td> <td colspan="2"> </td> </tr> <tr> <td colspan="2">DATE OF REVISION</td> <td colspan="2">DATE OF REVISION</td> </tr> <tr> <td colspan="2"> </td> <td colspan="2"> </td> </tr> </table>	PROJECT NAME		DRAWN BY		DHAKA MASS RAPID TRANSIT DEVELOPMENT PROJECT JICA LOAN NO. BD - P69				CONTRACT TITLE		CHECKED BY		CP-03 Viaducts and Elevated Stations from Uttara North to Pallabi. CP-04 Viaducts and Elevated Stations from Pallabi to Agargaon.				DATE OF REVISION		DATE OF REVISION						<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SCALE</td> <td>SHEET NO.</td> <td>DRAWING NUMBER</td> <td>REVISION</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	SCALE	SHEET NO.	DRAWING NUMBER	REVISION				
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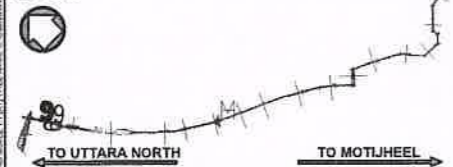


STAGE 3 :
 3.1 SLIDE SUPPORT (LT) TO POSITION OF LIFTING.
 3.2 LIFTING MAIN GIRDER (LT) ON POSITION BY ALL TERRAIN CRANE 220T.

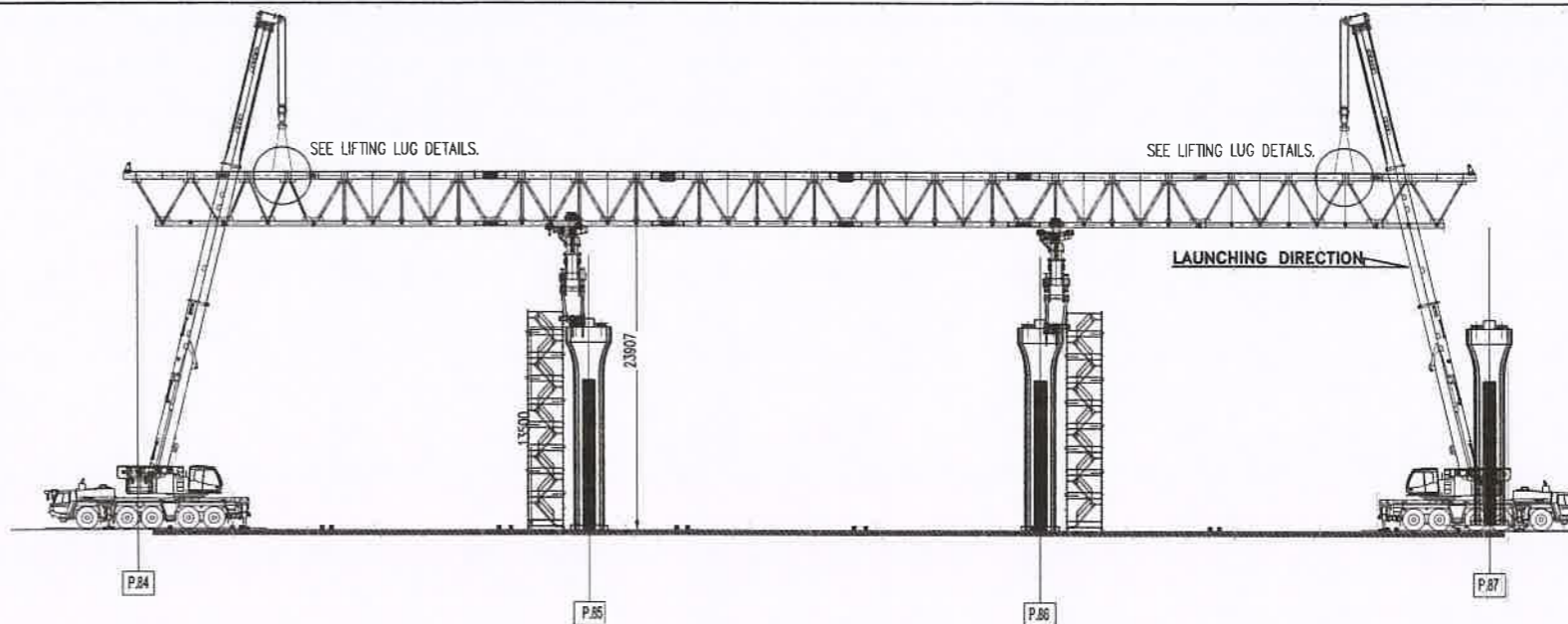
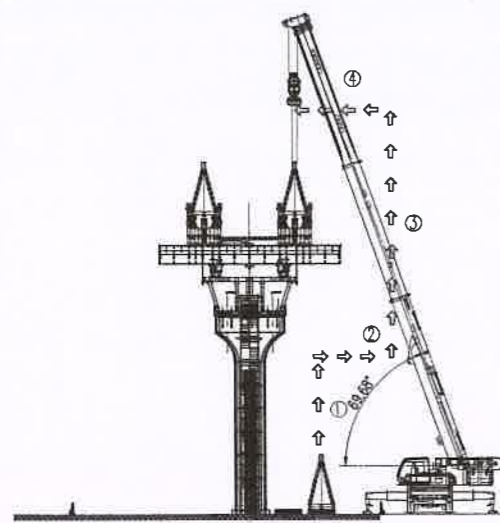


STAGE 4 :
 4.1 SLIDE SUPPORT (LT) TO REAL POSITION.
 4.2 LIFTING SUPPORT (RT) ON POSITION BY CRANE 50T.

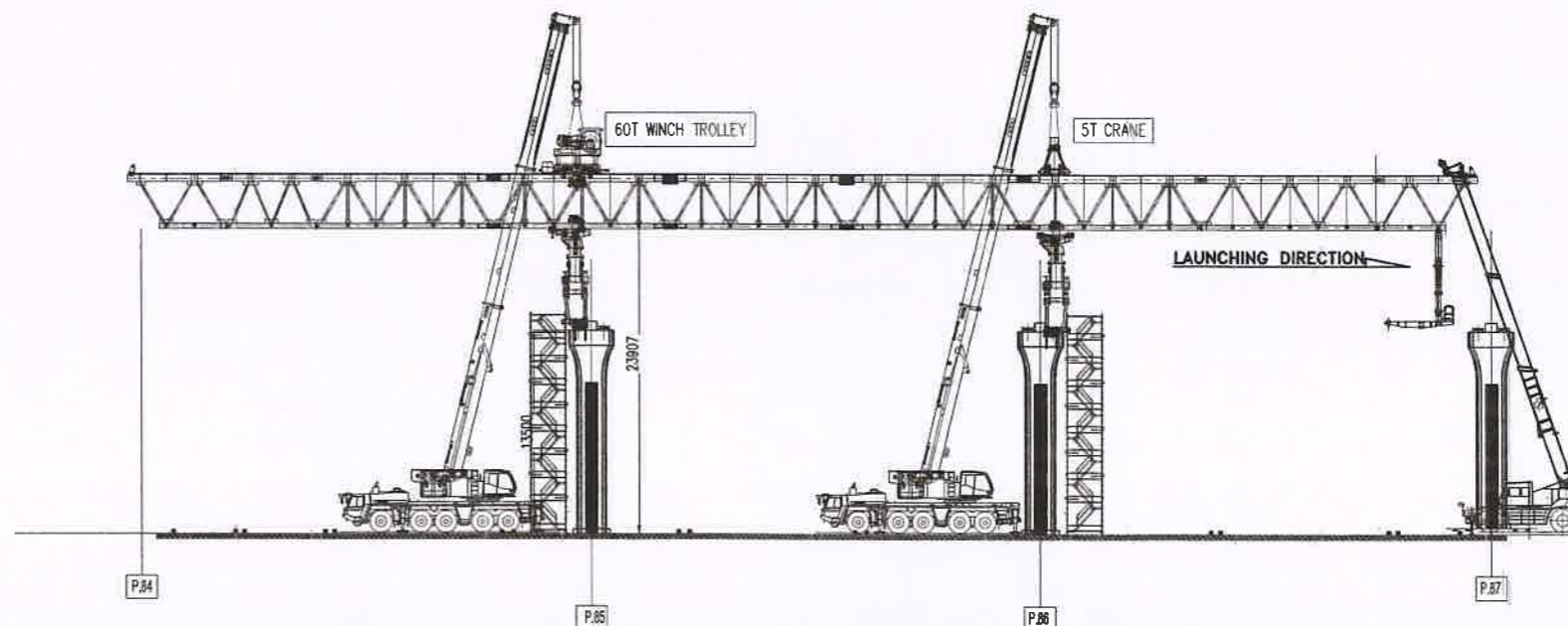
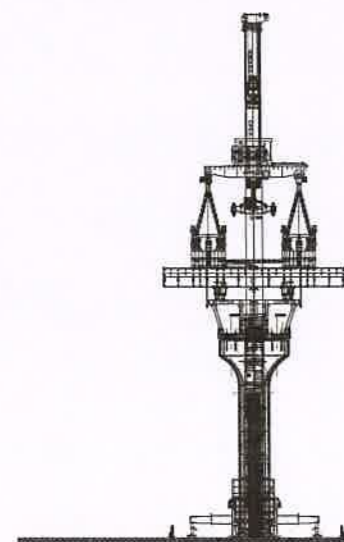
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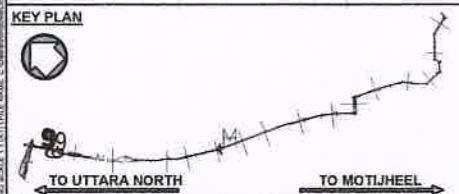
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STAGE 5 :
 5.1. LIFTING MAIN GIRDER (RT) BY MOBILE CRANE 220T. 2 EA.
 5.2. SLIDE SUPPORT TO POSITION AND INSTALL ACCESSORY OF MAIN TRUSS AND SIDELING SYSTEM.



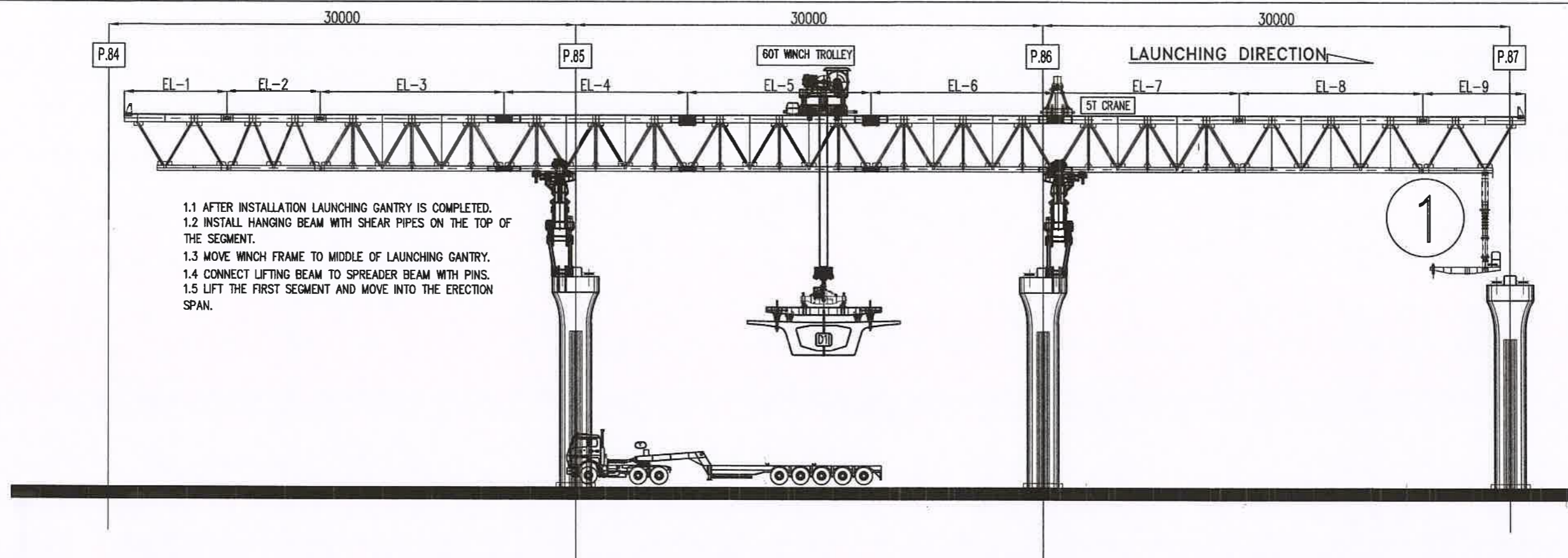
STAGE 6
 6.1. INSTALL BRACING OF MAIN GIRDER
 6.2. INSTALL FRONT LEG AND WINCH.



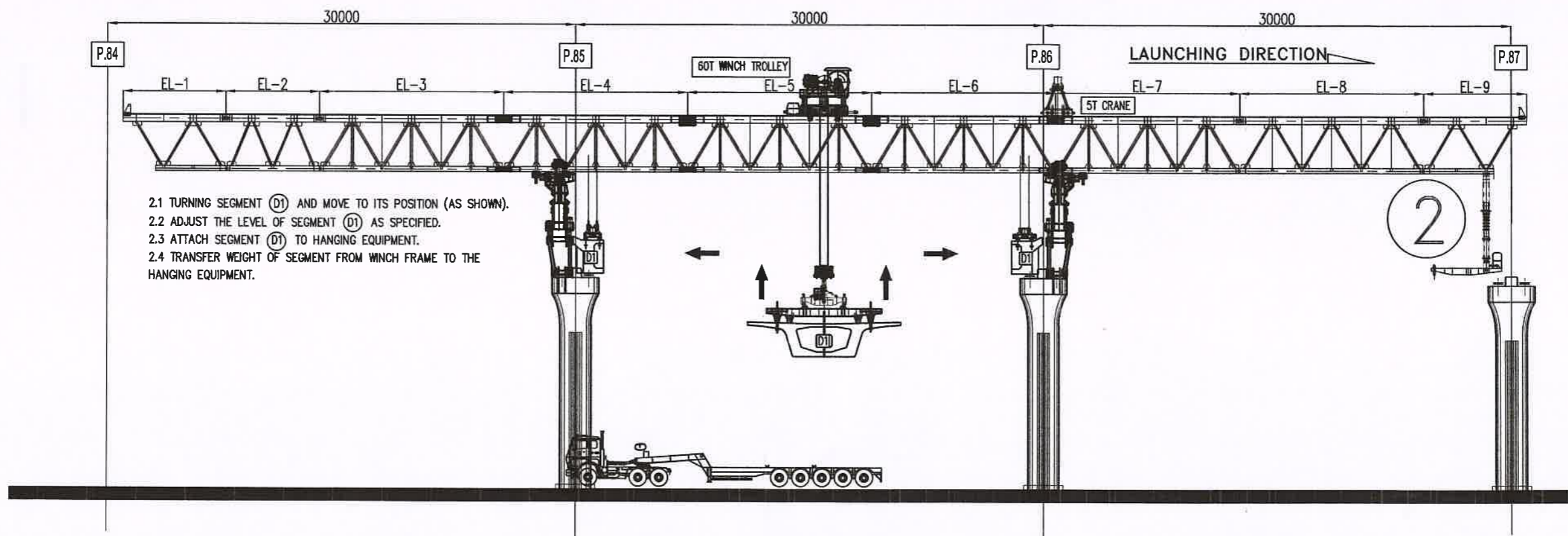
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			CONTRACTOR	CONSULTANT	PROJECT NO.	DRAWING NO.	SCALE	STATUS

ATTACHMENT 5
Sequence - Erection Process of Segmental
Viaduct for Simple Span

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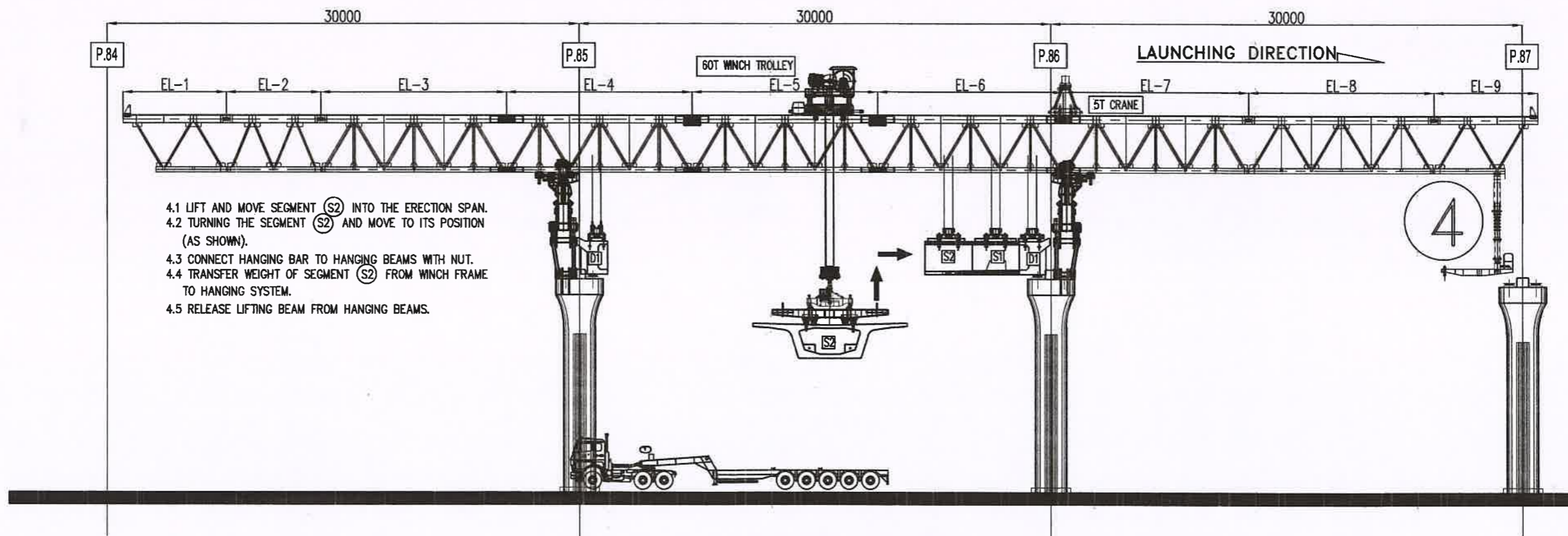
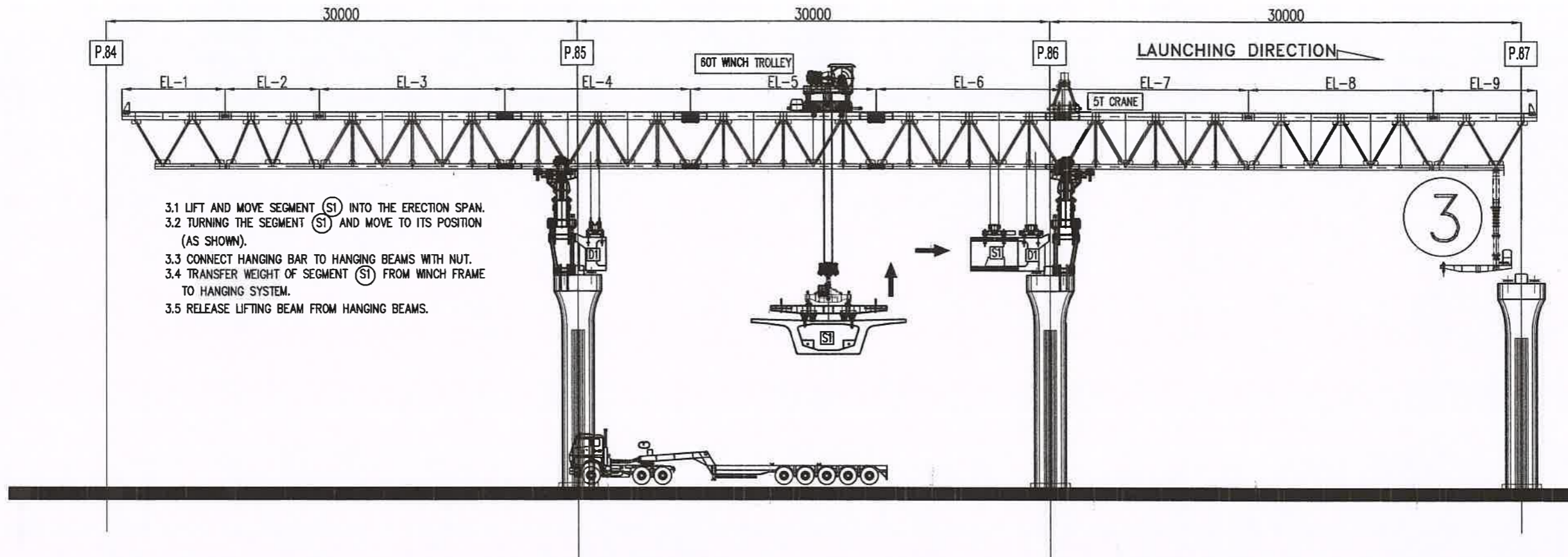


- 1.1 AFTER INSTALLATION LAUNCHING GANTRY IS COMPLETED.
- 1.2 INSTALL HANGING BEAM WITH SHEAR PIPES ON THE TOP OF THE SEGMENT.
- 1.3 MOVE WINCH FRAME TO MIDDLE OF LAUNCHING GANTRY.
- 1.4 CONNECT LIFTING BEAM TO SPREADER BEAM WITH PINS.
- 1.5 LIFT THE FIRST SEGMENT AND MOVE INTO THE ERECTION SPAN.






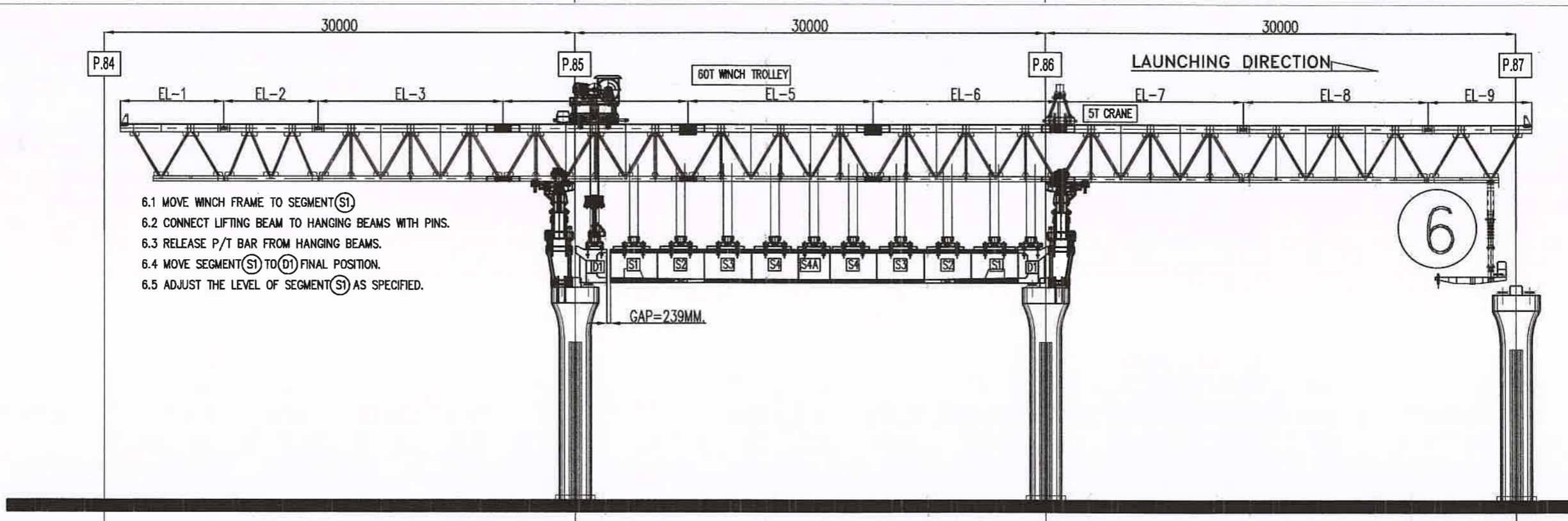
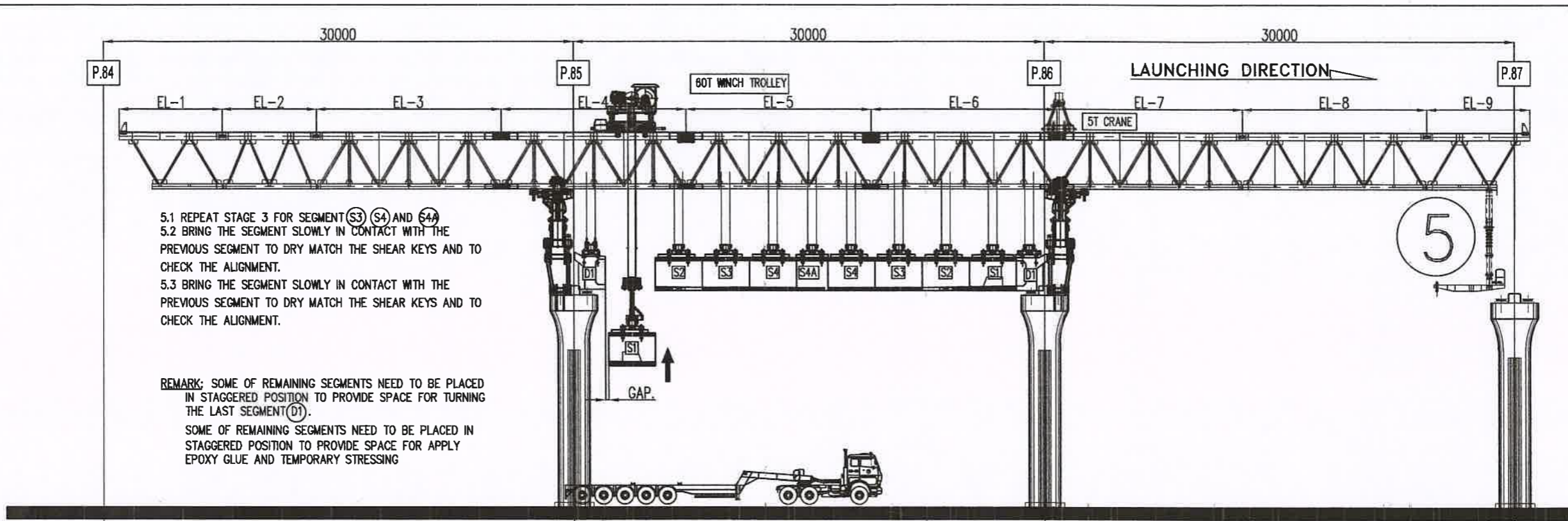
- 2.1 TURNING SEGMENT (D1) AND MOVE TO ITS POSITION (AS SHOWN).
- 2.2 ADJUST THE LEVEL OF SEGMENT (D1) AS SPECIFIED.
- 2.3 ATTACH SEGMENT (D1) TO HANGING EQUIPMENT.
- 2.4 TRANSFER WEIGHT OF SEGMENT FROM WINCH FRAME TO THE HANGING EQUIPMENT.

<p>CLIENT</p> <p>Dhaka Mass Transit Company Limited (DMTCL) Dhaka, Bangladesh</p>	<p>CONSULTANT</p> <p>NKDM Association</p> <p>Nippon Koei Co. Ltd. Nippon Koei India Pvt. Ltd. Daini Metro Rail Corporation Ltd. Mott MacDonald Ltd. Mott MacDonald Pvt. Ltd. Development Design Consultants Ltd.</p>	<p>CONTRACTOR</p> <p>ITALIAN-THAI DEVELOPMENT COMPANY LIMITED</p>	<p>REVISION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REV.	DATE	DESCRIPTION																<p>PROJECT NAME</p> <p>DHAKA MASS RAPID TRANSIT DEVELOPMENT PROJECT JICA LOAN NO. BD - P69</p> <p>CONTRACT TITLE</p> <p>CP-03 Viaducts and Elevated Stations from Uttara North to Pallabi. CP-04 Viaducts and Elevated Stations from Pallabi to Agargaon.</p>	<p>DESIGNED BY</p> <p>CHECKED BY</p> <p>VERIFIED BY</p> <p>DATE OF ISSUE</p>	<p>ISSUING TITLE</p> <p>SCALE</p> <p>DWG NO.</p> <p>REVISION NUMBER</p> <p>REVISION :</p>
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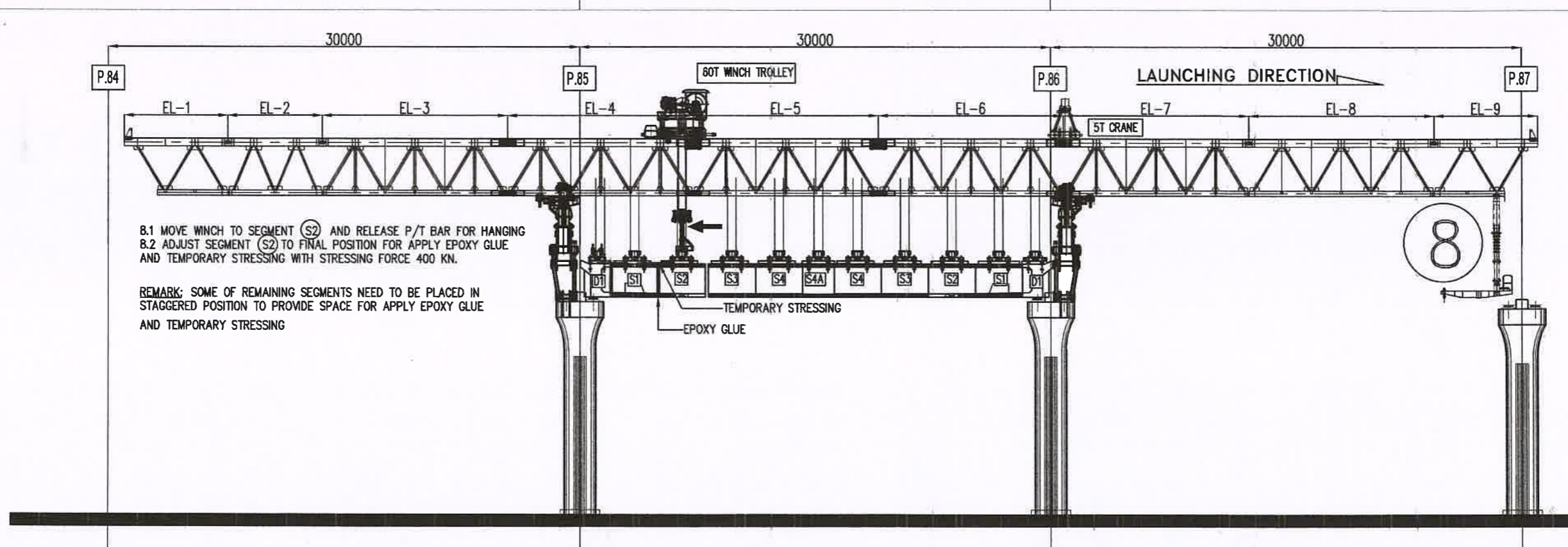
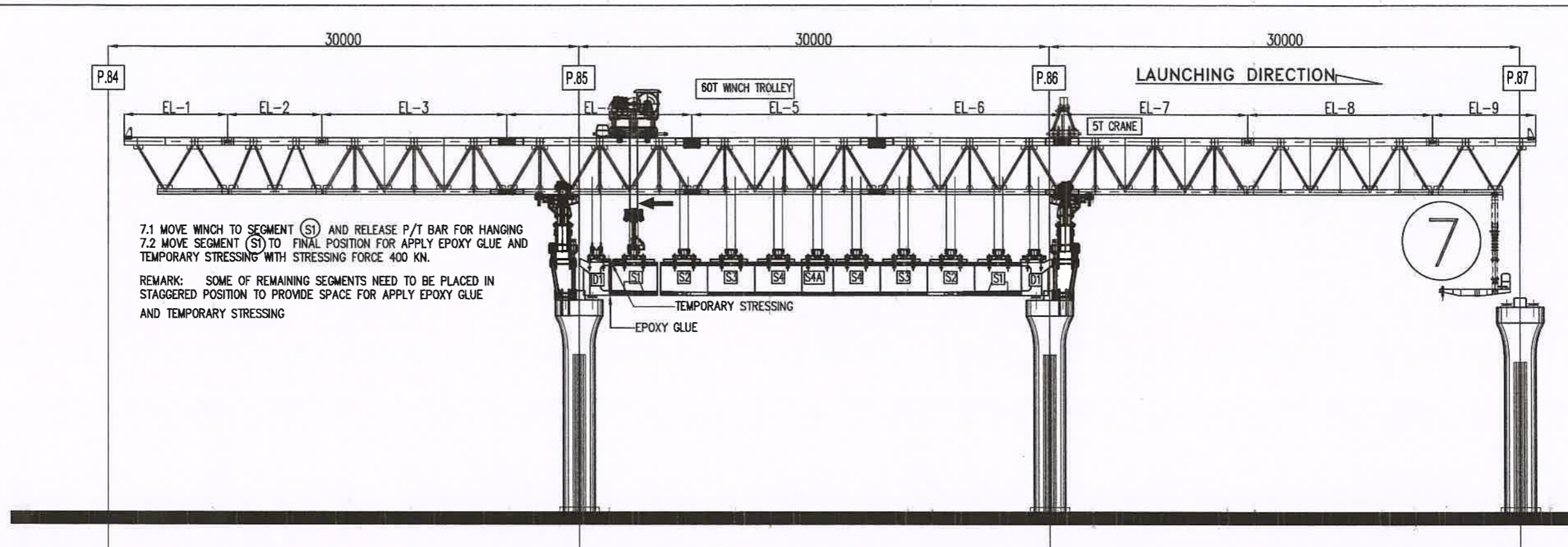


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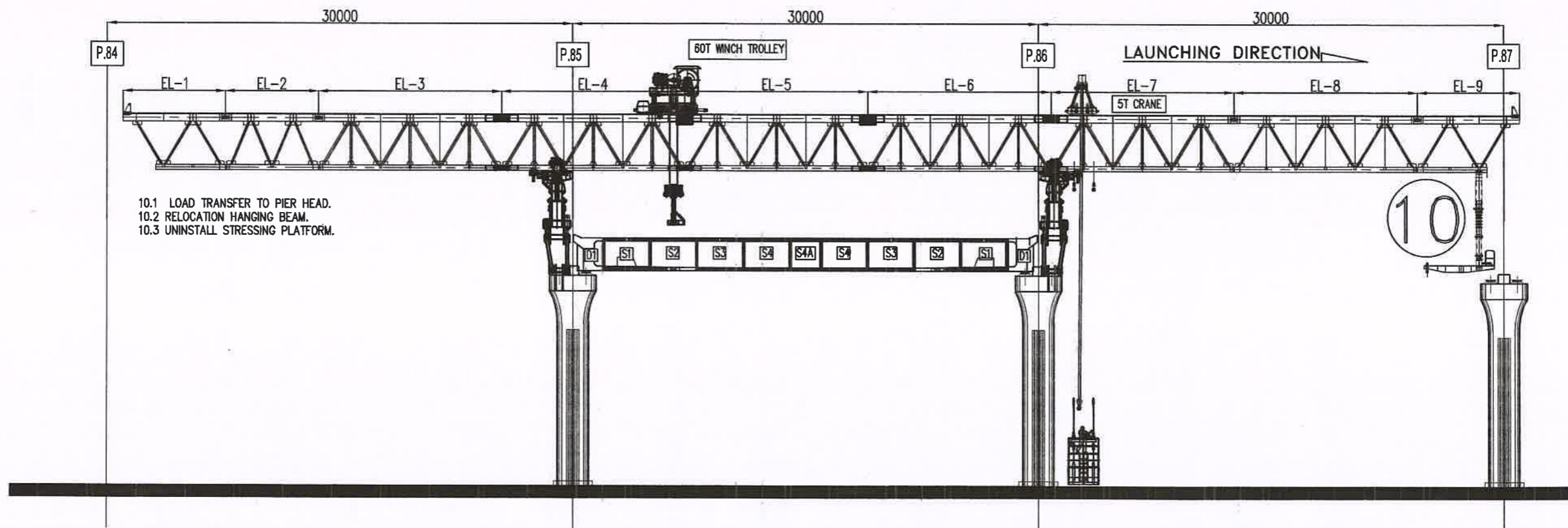
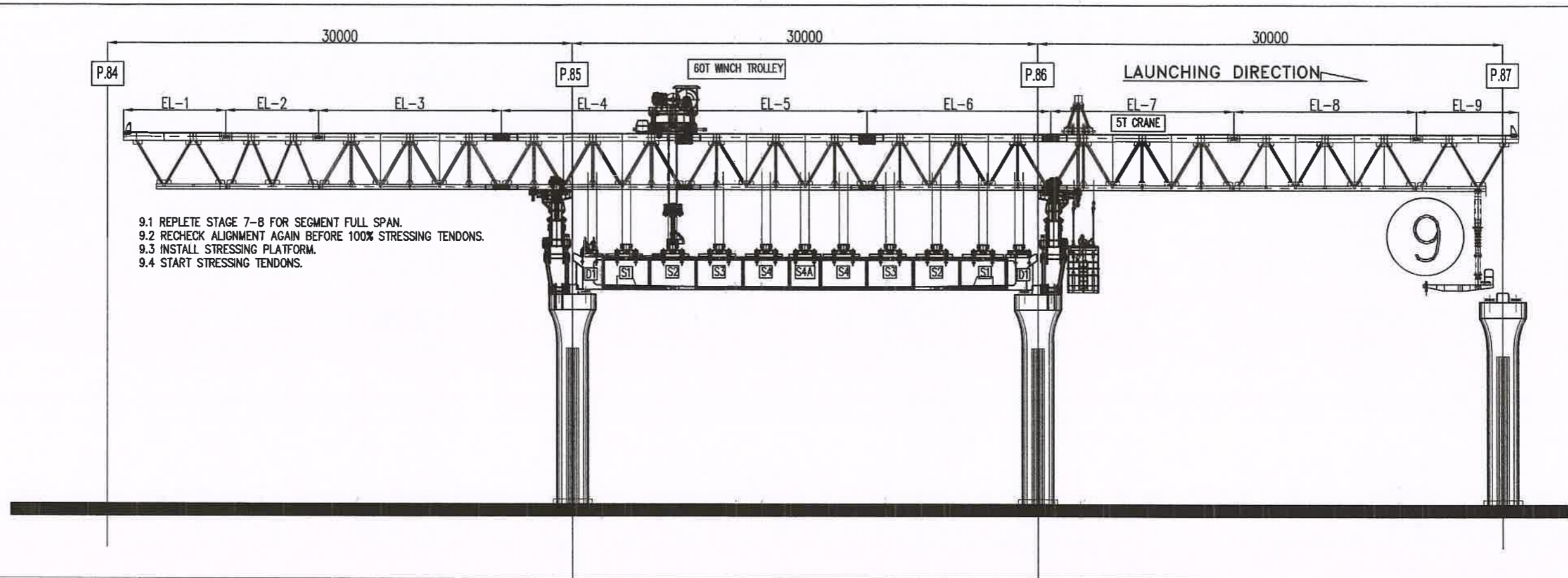


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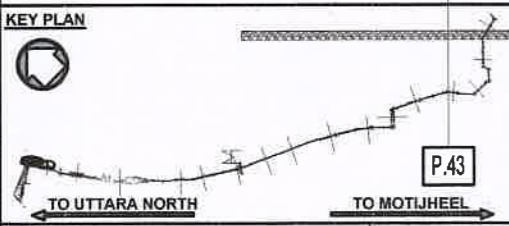
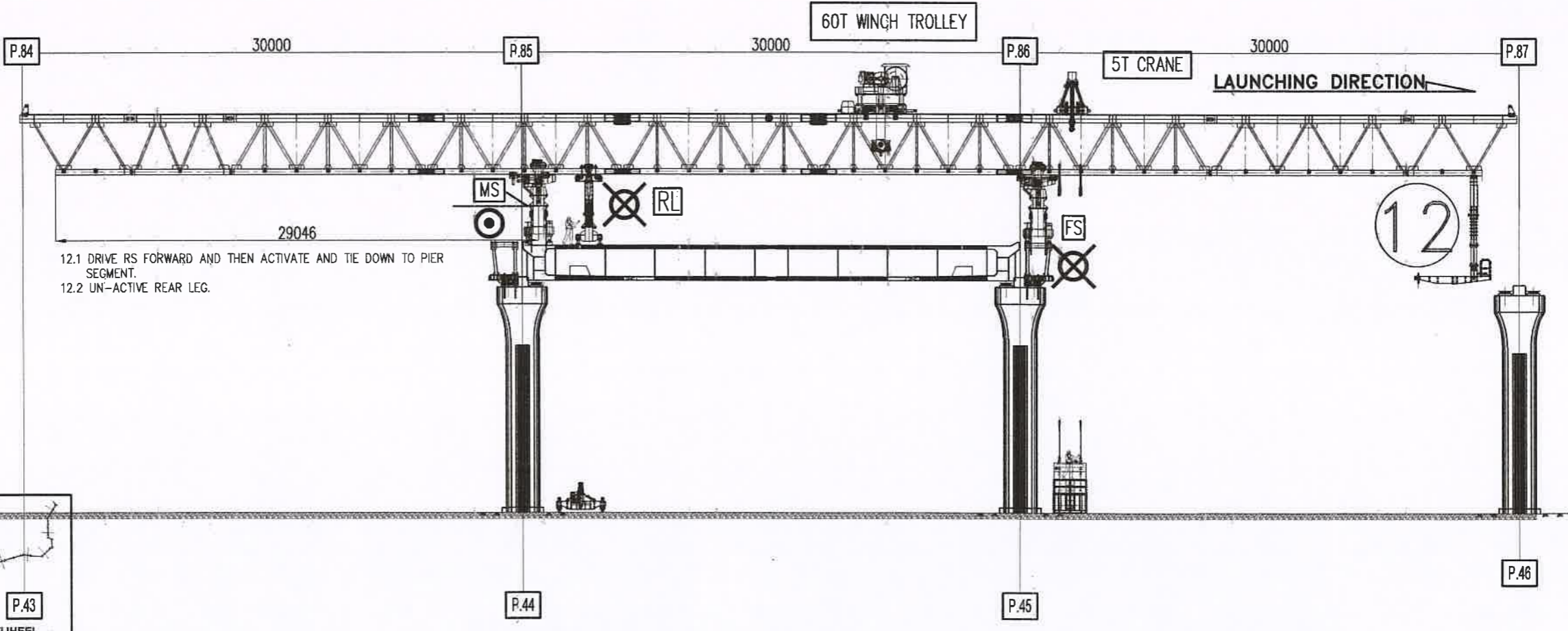
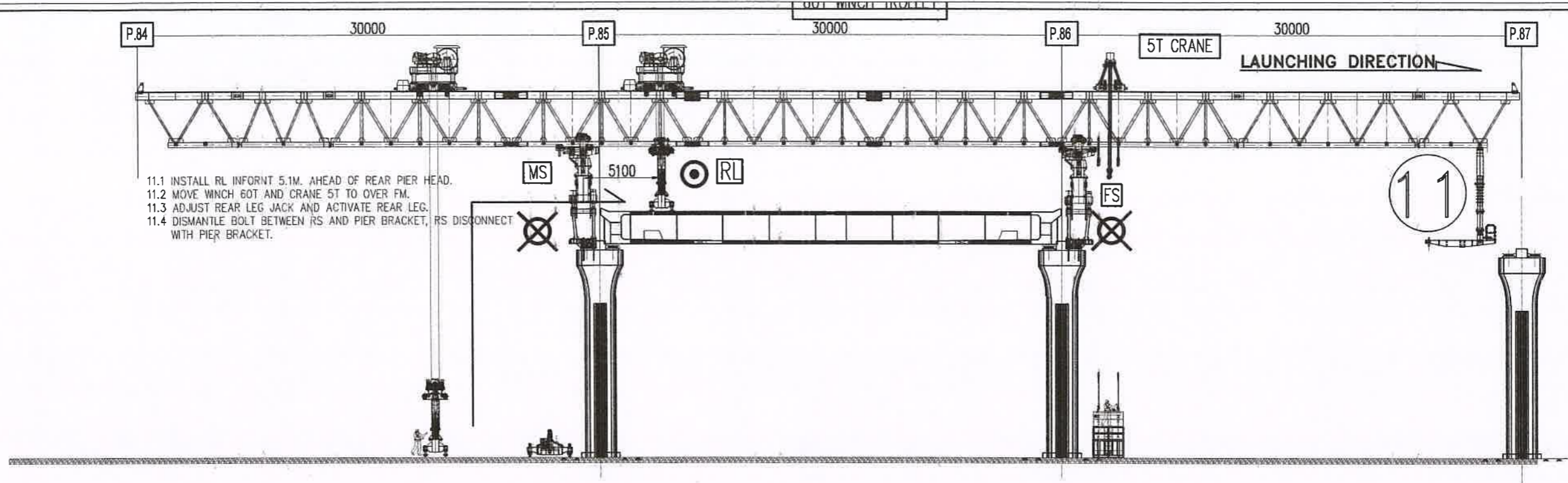


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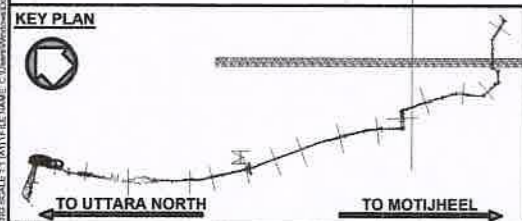
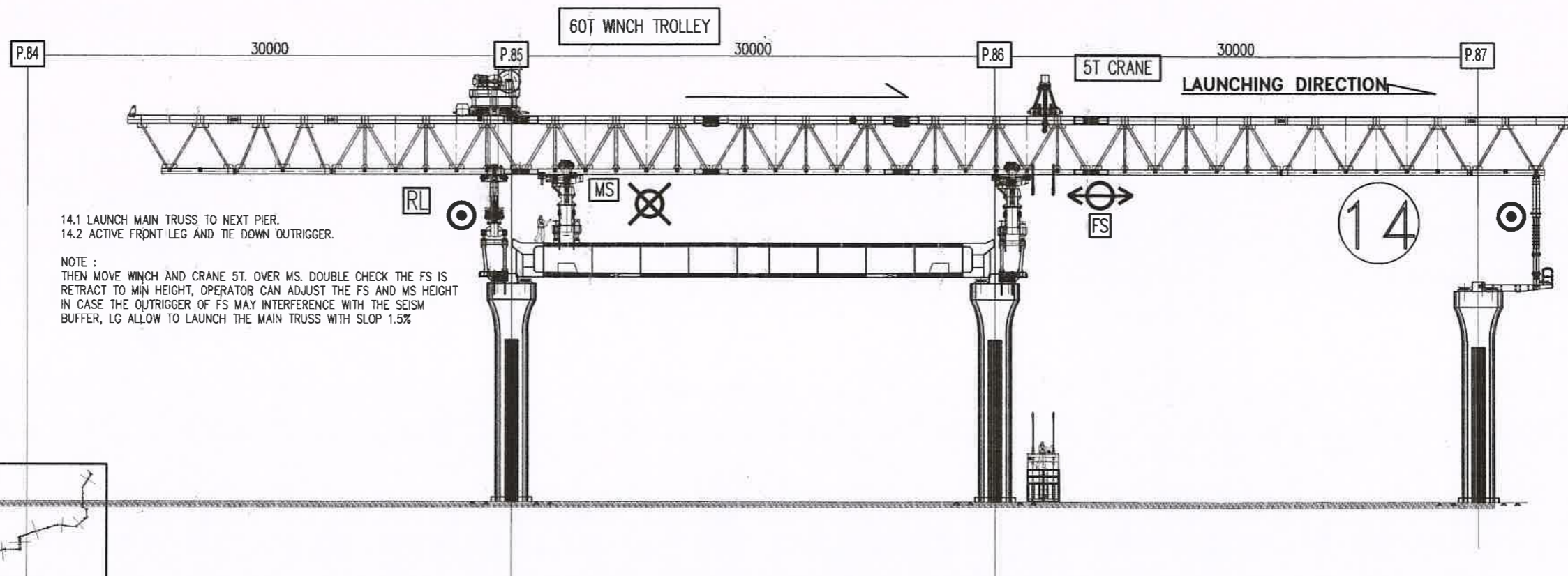
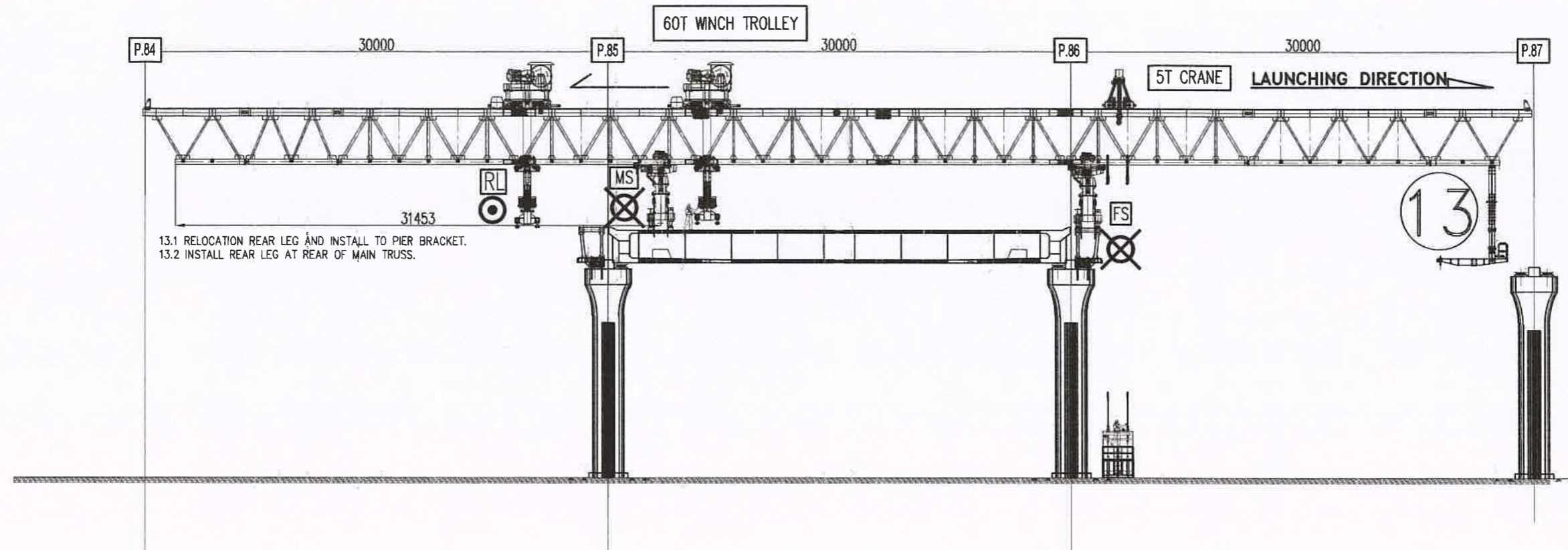
ATTACHMENT 6

WORKING SEQUENCE FOR LAUNCHING TRUSS PROCESS

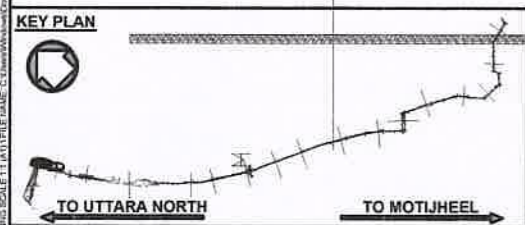
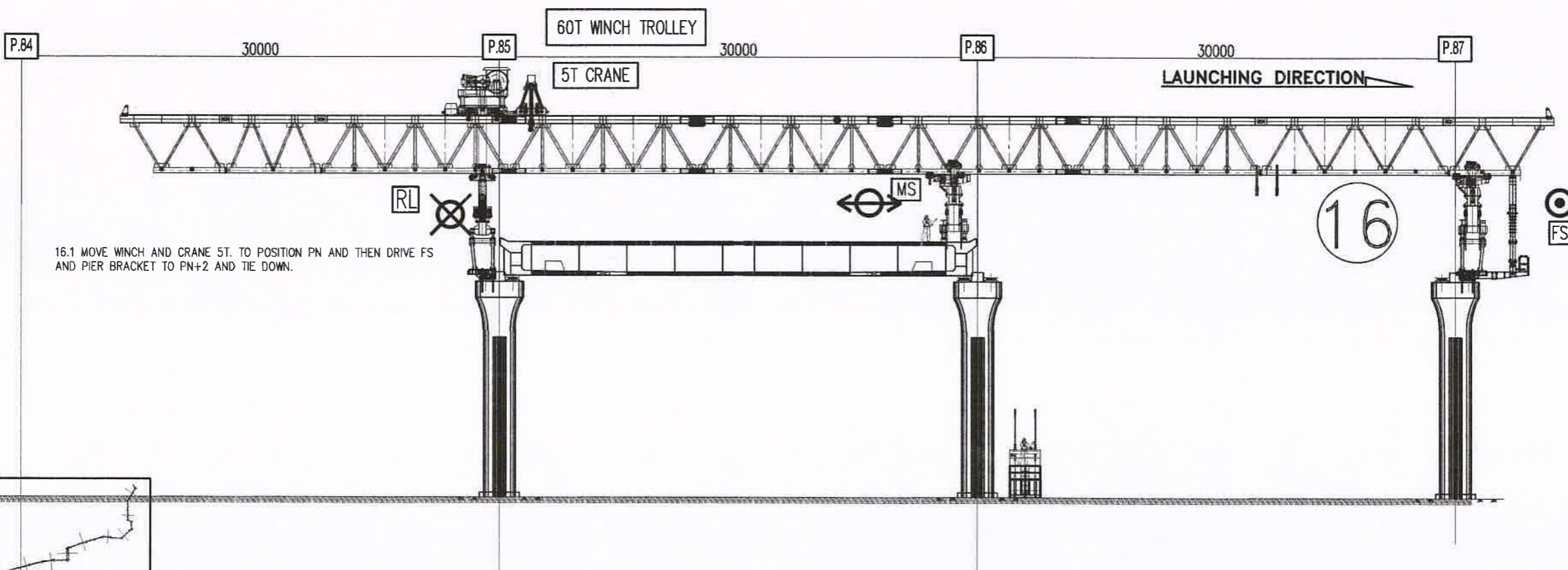
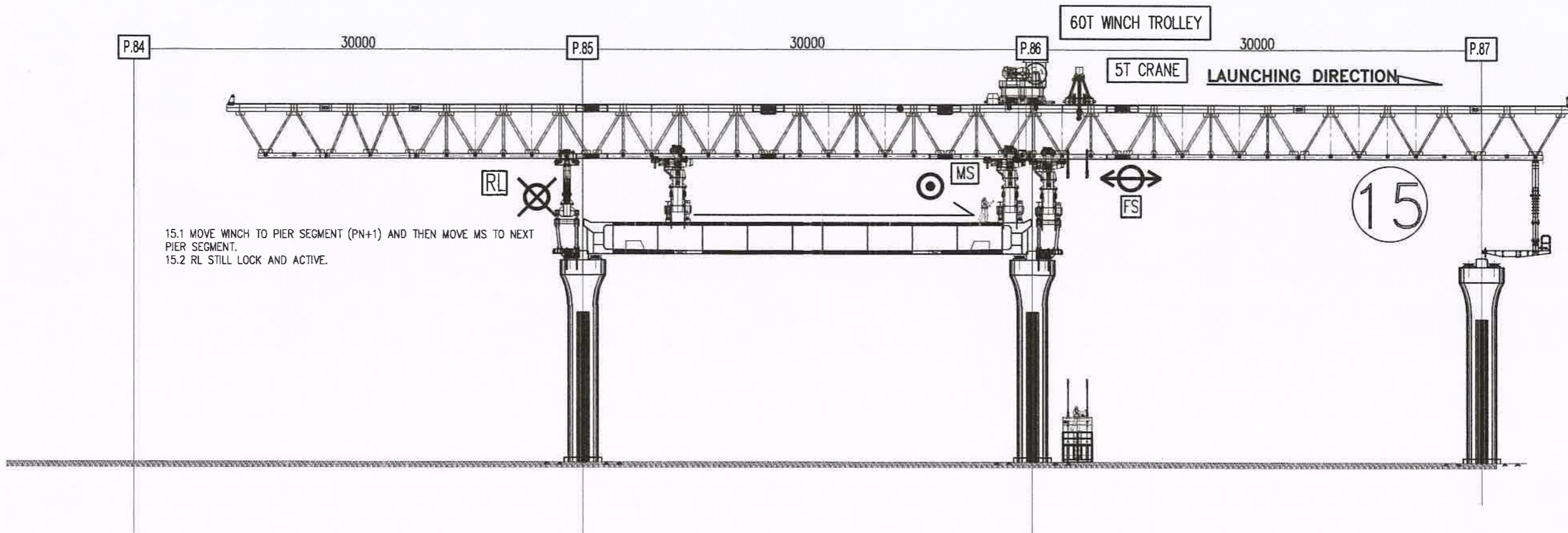
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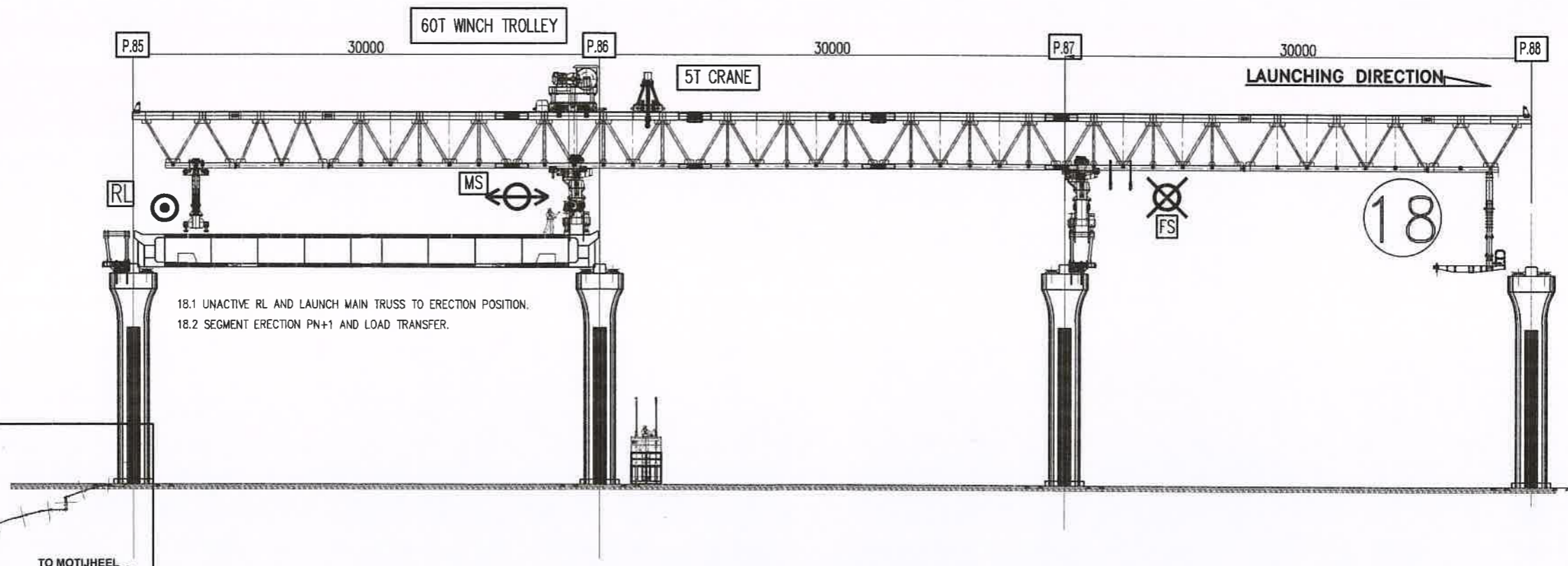
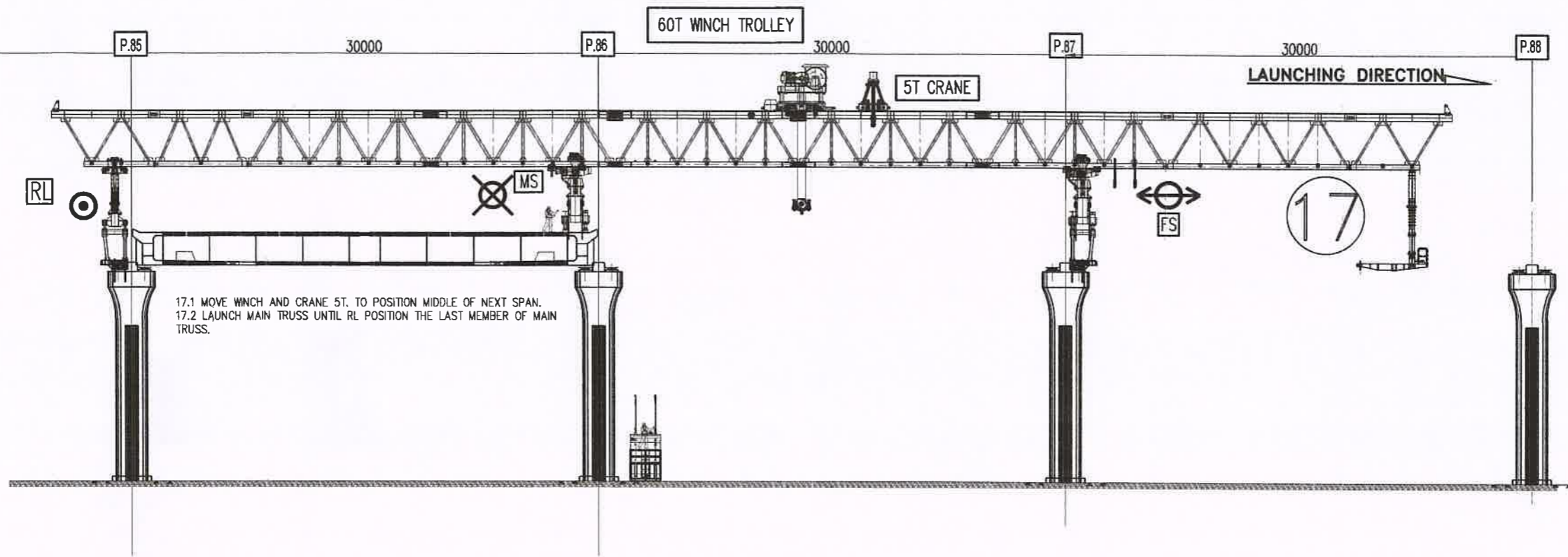
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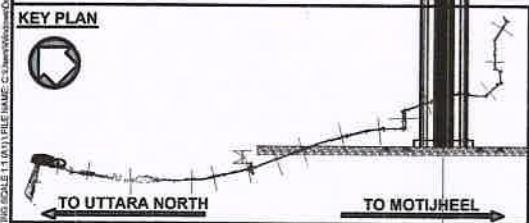
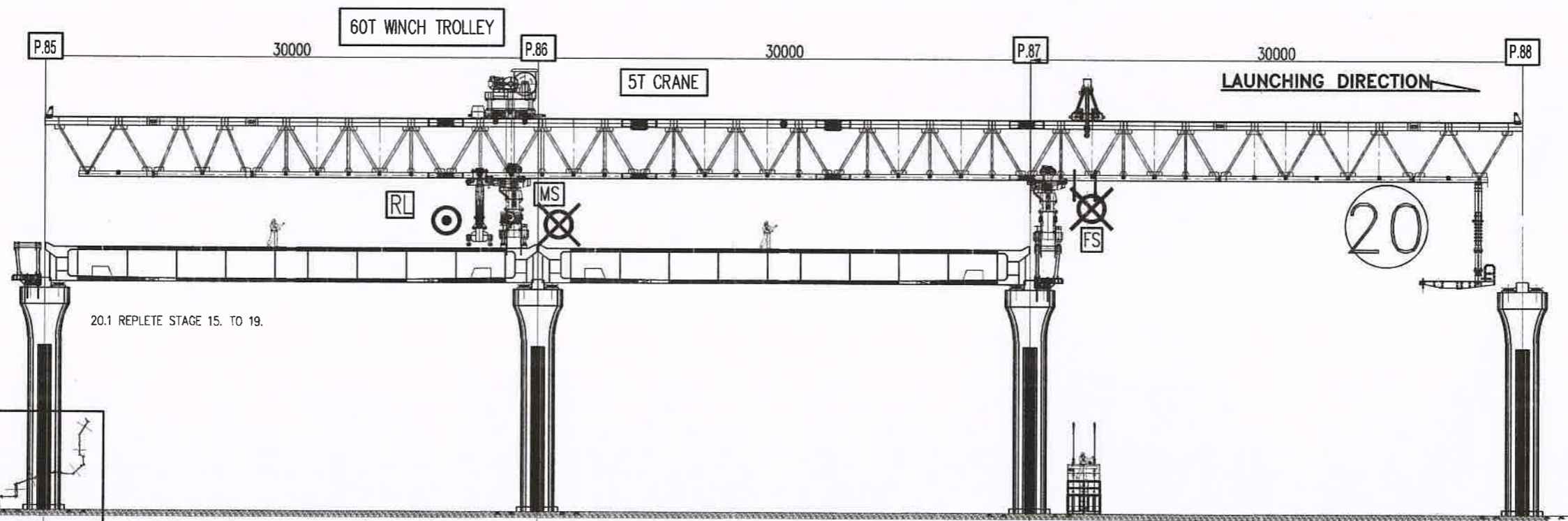
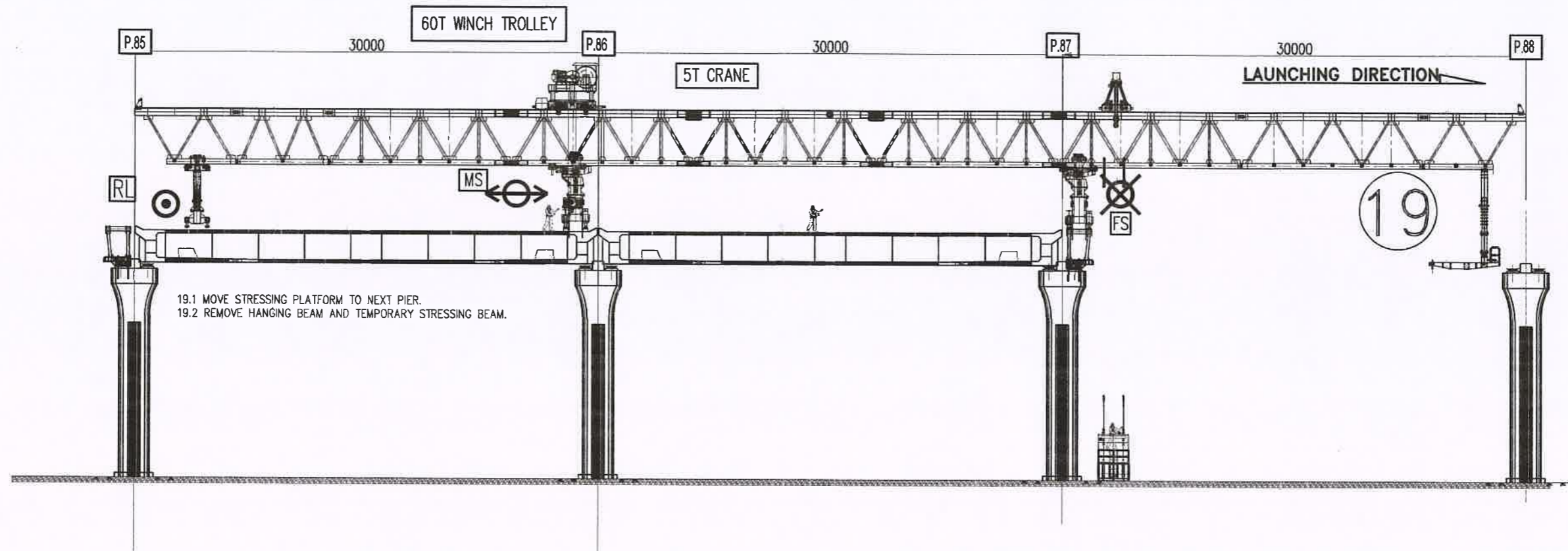
<p>Dhaka Mass Transit Company Limited (DMTCL) Dhaka, Bangladesh</p>	<p>NKDM Association</p>	<p>ITALIAN-THAI DEVELOPMENT COMPANY LIMITED</p>	<p>REV. DATE DESCRIPTION</p> <table border="1"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table>																<p>PROJECT NAME DHAKA MASS RAPID TRANSIT DEVELOPMENT PROJECT JICA LOAN NO. BD - P69</p> <p>CONTRACT TITLE CP-03 Viaducts and Elevated Stations from Uttara North to Pallabi. CP-04 Viaducts and Elevated Stations from Pallabi to Agargaon.</p>	<p>DRAWN BY</p> <p>CHECKED BY</p> <p>VERIFIED BY</p> <p>DATE OF ISSUE</p>	<p>DRAWING TITLE</p> <p>SCALE</p> <p>STATUS</p> <p>TRAINING NUMBER</p> <p>REVISION</p>
<p>CLIENT</p>	<p>CONTRACTOR</p>	<p>CONTRACT NO.</p>	<p>DATE</p>	<p>SCALE</p>	<p>STATUS</p>	<p>TRAINING NUMBER</p>															



KEY PLAN



<p>Dhaka Mass Transit Company Limited (DMTCL) Dhaka, Bangladesh</p>	<p>CLIENT</p>	<p>NKDM Association</p>	<p>CONSULTANT</p> <p>Nippon Kowai Co. Ltd. Nippon Kowai India Pvt. Ltd. Daiichi Metro Rail Corporation Ltd. Mott MacDonald Ltd. Mott MacDonald Pvt. Ltd. Development Design Consultants Ltd.</p>	<p>CONTRACTOR</p> <p>ITALIAN-THAI DEVELOPMENT COMPANY LIMITED</p>	<p>REVISION</p> <table border="1"> <thead> <tr> <th>REV.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>			REV.	DATE	DESCRIPTION																<p>PROJECT NAME</p> <p>DHAKA MASS RAPID TRANSIT DEVELOPMENT PROJECT JICA LOAN NO. BD - P69</p>		<p>DRAWN BY</p> <p>CHECKED BY</p> <p>VERIFIED BY</p> <p>DATE OF ISSUE</p>		<p>DRAWING TITLE</p> <p>SCALE</p> <p>STATUS</p> <p>DRAWING NUMBER</p> <p>REVISION</p>	
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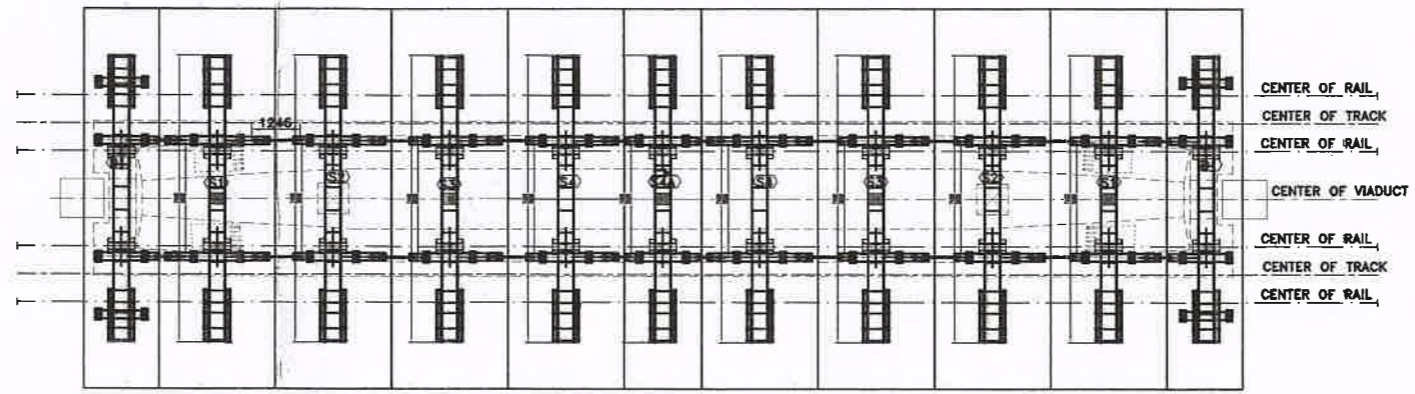


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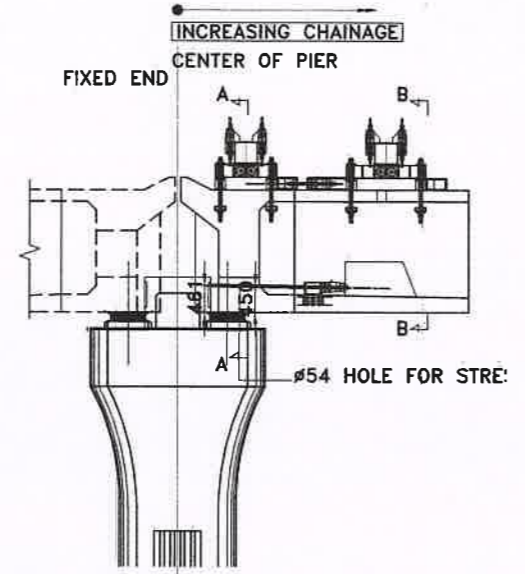
ATTACHMENT 7

TEMPORARY PT STRESSING

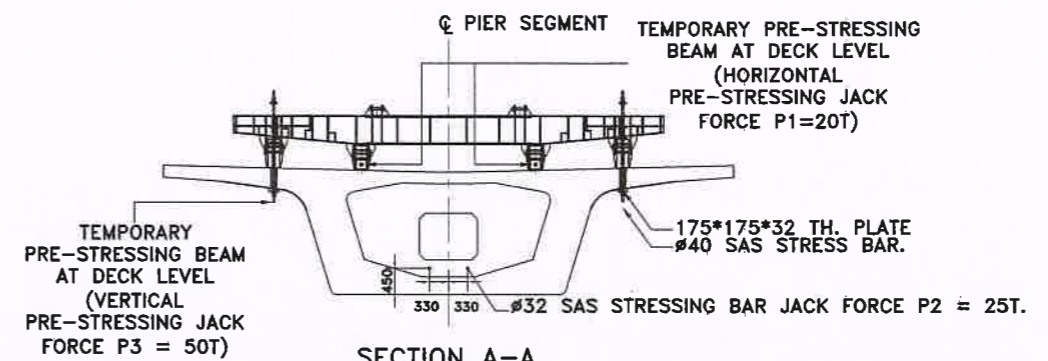
Document No.	Revision		Page No.
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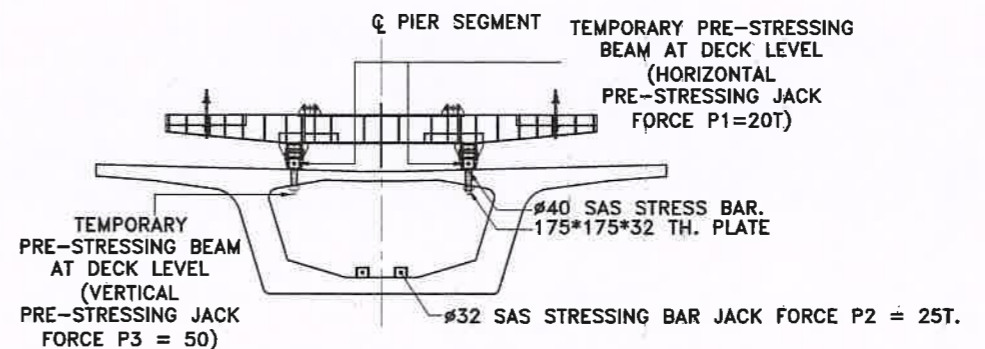
TOP SLAB PLAN
SCALE 1:75



ELEVATION PIER SEGMENT DETAIL
SCALE 1:50



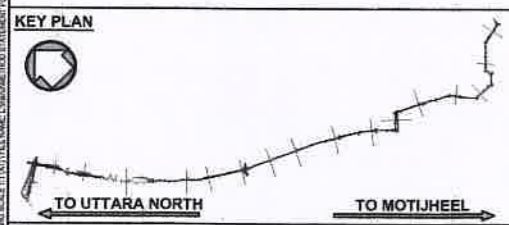
SECTION A-A
SCALE 1:50



SECTION B-B
SCALE 1:50

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS ARE IN METRES.
 2. THE DIMENSIONS SHOULD NOT BE MEASURED FROM THE DRAWING, ONLY WRITTEN DIMENSIONS TO BE CONSIDERED.
 3. THE CONCRETE GRADE OF THE SUPERSTRUCTURE SEGMENTS BASED ON 28 DAYS STRENGTH (f_{ck}) IS 45MPa.
 4. THE BOX SEGMENTS ARE TO BE PRECASTED AT THE CASTING YARD AND ERECTED AND POST TENSIONED AT THEIR ACTUAL POSITION.
 5. APPROPRIATE CONSTRUCTION LOAD FROM LAUNCHING GIRDER HAS BEEN CONSIDERED.
- REFERENCE DRAWINGS:-
- a) GENERAL NOTES : TD-ALL-VPS-GBA-00001
 - b) REINFORCEMENT DETAILS OF SUPERSTRUCTURE FOR CURVED (R 000m) SPAN : TD-ALL-VPS-GBA-00005 to 00012.
 - c) POST TENSIONING DETAILS OF SUPERSTRUCTURE FOR CURVED (R 000m) SPAN : TD-ALL-VPS-GBA-00013 & 00014.
 - d) SHEAR KEY DETAILS OF SUPERSTRUCTURE : TD-ALL-VPS-GBA-00015 to 00020.
 - e) DETAIL OF EXPANSION JOINT & WATER STOPPING CONCRETE : TD-ALL-VPS-NPS-10012 & 10015



		REVISION REV. DATE DESCRIPTION		PROJECT NAME DHAKA MASS RAPID TRANSIT DEVELOPMENT PROJECT JICA LOAN NO. BD - P69	DRAWN BY CHECKED BY APPROVED BY DATE OF ISSUE	SHEET TITLE SCALE STATUS DRAWING NUMBER REVISION
		CONTRACTOR DEVELOPMENT DESIGN CONSULTANTS LTD.	CONTRACT TITLE CP-03 Viaducts and Elevated Stations from Uttara North to Pallabi. CP-04 Viaducts and Elevated Stations from Pallabi to Agargaon.			