

Appendix 2: Xe Bangnouan Bridge

Appendix 2-a: Inventory Data and General View

Bridge Inventory Data (General Information)

Road No.	13S	Latest updated by whom	Vannaxay
Road name	NR No.13 South	Date of update	04-03-22
Road class	National Road	Availability of bridge drawings	absence
Road link ID	T	Bridge type (Steel [Bailey]/PC/RC)	Steel
Bridge ID/No.	Unknown	Bridge length (m)	140.00
Bridge name	Xe Bangnouan	Number of span(s)	3
River name	Xe Bangnouan	Number of substructure(s)	4
Location of bridge centre (Chainage)	540 Km 200 m	Max. Span length (m)	53.00
Coordinates (Latitude: ° ' ")	N: 16° 00' 10.17"	Min. Span length (m)	43.00
Coordinates (Longitude: ° ' ")	E: 105° 28' 45.19"	Number of main girder(s)	2
Bridge location (Province)	Savannakhet	Total bridge width (m)	10.00
Year of construction	1998	Inbound lane width (m)	3.495
Latest repair year	None	Outbound lane width (m)	3.495
Design standard of bridge	Unknown	Freeboard (m)	3.095
Max. permissible design load	40.00 Ton	Material of superstructure	Steel
Source of funding	Australia	Material of substructure	RC
Latest year of traffic volume survey	No Data	Material of expansion joint	Steel
Traffic volume	No Data	Material of bearing shoes	Steel
Traffic volume of heavy vehicle	No Data		
Detour	absence		
Remarks			

<p>① Inbound direction</p>	<p>② Outbound direction</p>
<p>③ Upstream direction</p>	<p>④ Downstream direction</p>
<p>⑤ From the right bank direction of upstream</p>	<p>⑥ from the left bank direction of upstream</p>
<p>⑦ From the right bank direction of downstream</p>	<p>⑧ From the left bank direction of downstream</p>
<p>Remarks</p> <p>-----</p> <p>-----</p> <p>-----</p> <p>-----</p>	

Bridge Inventory Data (Superstructure)

Inspection type	Detailed Inspection	Inspection method	Close visual inspection
Span No.	1	Span name	SP-1
Structure type	Steel Girder	Use material	Steel
Span length (m)	43.00	Deck material	RC
Crossing object	River	Main girder structure	Continuous
Bearing type	Steel	Rust proofing	Presence
Span No.	2	Span name	SP-2
Structure type	Steel Girder	Use material	Steel
Span length (m)	53.00	Deck material	RC
Crossing object	River	Main girder structure	Continuous
Bearing type	Steel	Rust proofing	Presence
Span No.	3	Span name	SP-3
Structure type	Steel Girder	Use material	Steel
Span length (m)	43.00	Deck material	RC
Crossing object	River	Main girder structure	Continuous
Bearing type	Steel	Rust proofing	Presence
Span No.		Span name	
Structure type		Use material	
Span length (m)		Deck material	
Crossing object		Main girder structure	
Bearing type		Rust proofing	
Span No.		Span name	
Structure type		Use material	
Span length (m)		Deck material	
Crossing object		Main girder structure	
Bearing type		Rust proofing	
Span No.		Span name	
Structure type		Use material	
Span length (m)		Deck material	
Crossing object		Main girder structure	
Bearing type		Rust proofing	
Span No.		Span name	
Structure type		Use material	
Span length (m)		Deck material	
Crossing object		Main girder structure	
Bearing type		Rust proofing	
Span No.		Span name	
Structure type		Use material	
Span length (m)		Deck material	
Crossing object		Main girder structure	
Bearing type		Rust proofing	
Span No.		Span name	
Structure type		Use material	
Span length (m)		Deck material	
Crossing object		Main girder structure	
Bearing type		Rust proofing	
Span No.		Span name	
Structure type		Use material	
Span length (m)		Deck material	
Crossing object		Main girder structure	
Bearing type		Rust proofing	
Remarks	<div style="border: 1px solid black; height: 150px; width: 100%;"></div>		

Bridge General View

Road No.	13S	Bridge location (Chainage)	540 Km + 200 m
Road name	NR No.13 South	Bridge location (Province)	Savannakhet
Bridge ID/No.	Unknown	Coordinates (Latitude)	16° 00' 10.17"
Bridge name	Xe Bangnouan	Coordinates (Longitude)	105° 28' 45.19"



Side Views



Plan Views

Appendix 2: Xe Bangnouan Bridge

Appendix 2-b: Detailed Drawings

Drawings List

Drawing Number	Drawing Title
0	Drawings List
1a	General View (1)
1b	General View (2)
2	3D View
3	Superstructure Side and Plan Views
4	Superstructure Cross Sections at Abutment A1 and A2
5	Superstructure Cross Sections at Pier P1 and P2
6	Superstructure Cross Sections at Center of Span
7	Substructure Abutment Details
8	Substructure Pier Details
9	Connection Details
10	Bearing Layout Plan
11	Fixed Bearing Details
12	Free Bearing Details
13	Longitudinal Direction Movable Bearing Details
14	Transverse Direction Movable Bearing Details



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Fax : (856-21) 313258 Ban Vathak, Muang Siewthak
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DRAWING TITLE:

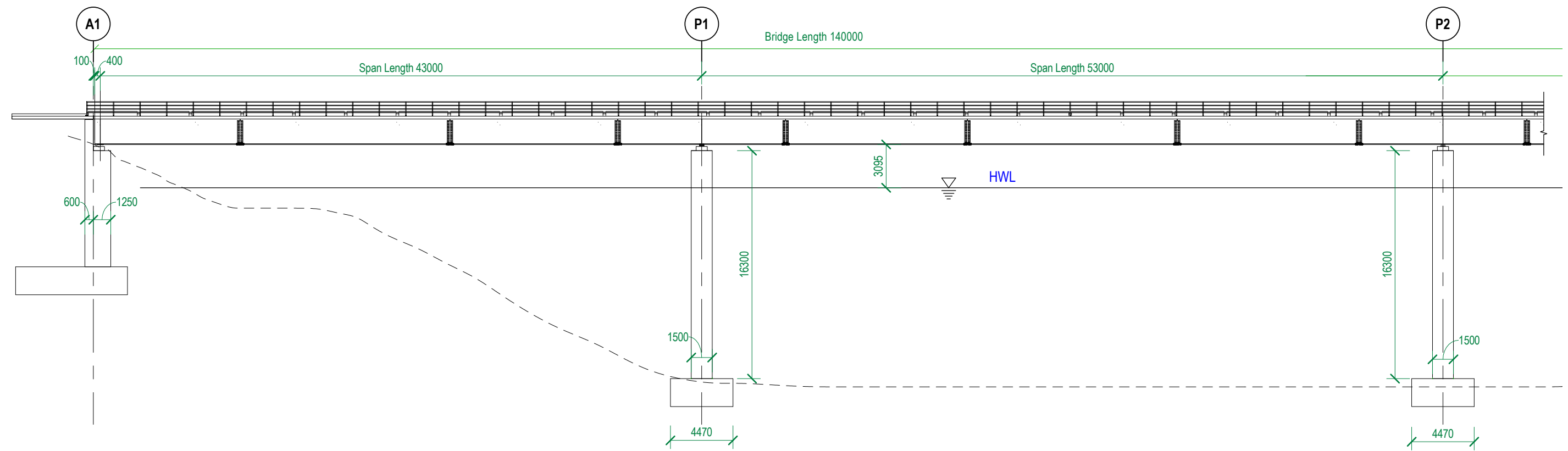
Drawings List

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INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		
PROJECT MANAGER:	A. SAKULKU		

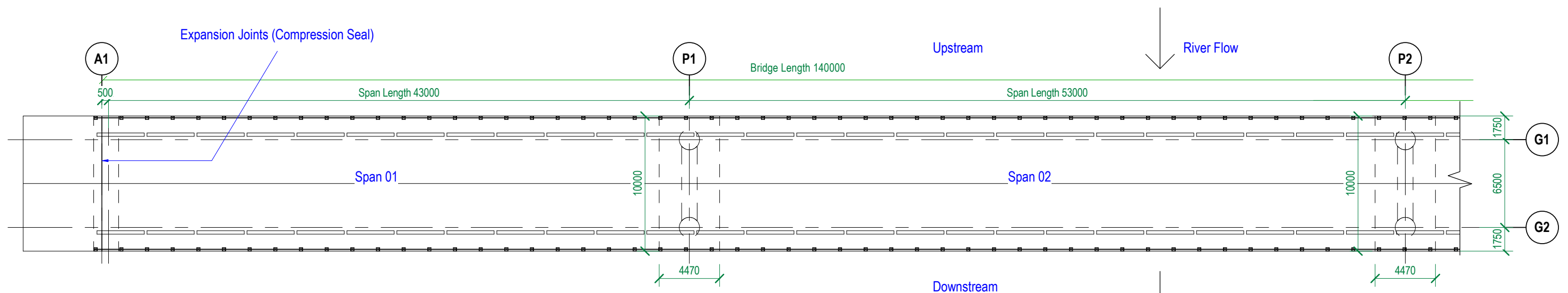
General View of Xe Bangnouan Bridge

To Vientiane Capital

To Champasak Province



1 Side View - 01
1 : 300



2 Top View 01
1 : 300

A2-9



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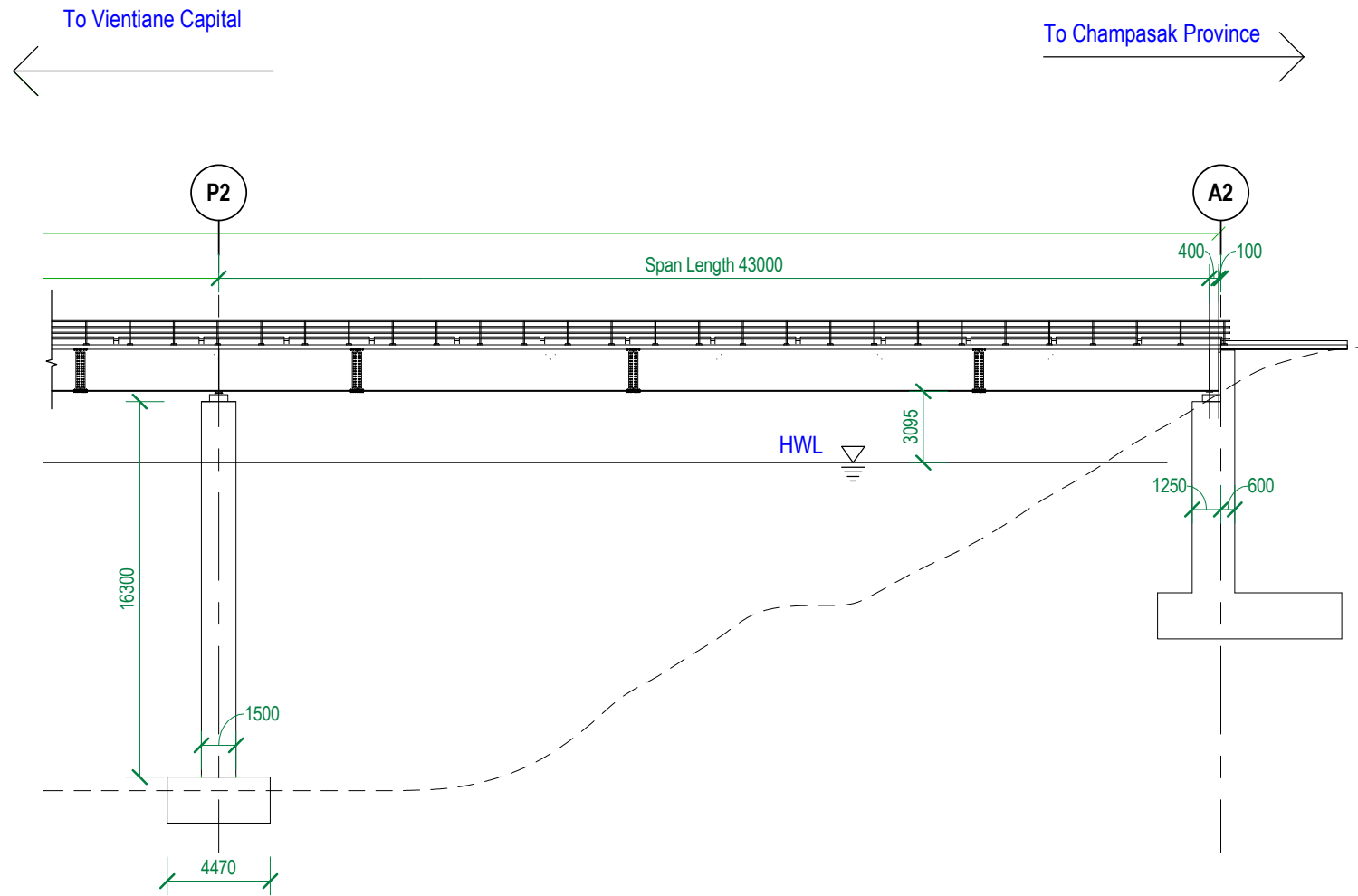
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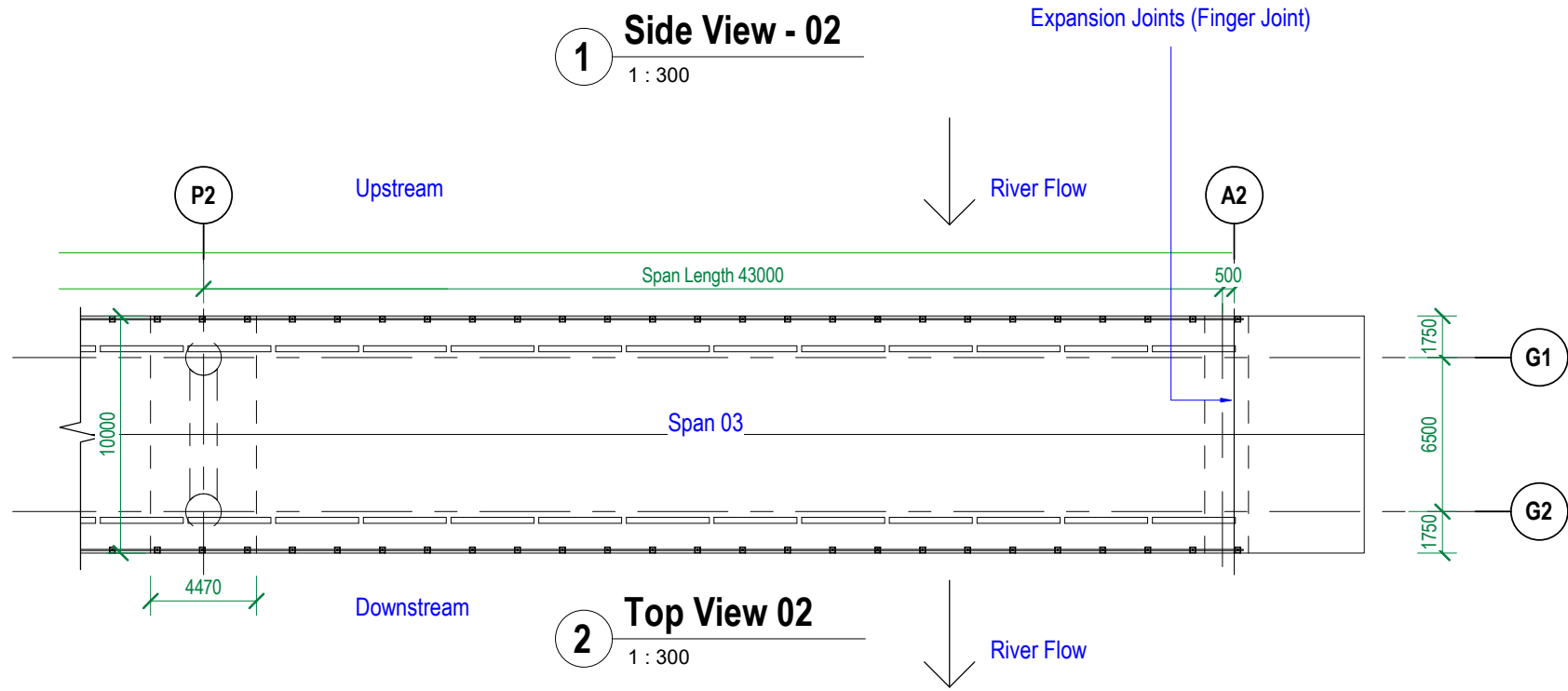
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DRAWING TITLE:
General View (1)

TITLE	NAME	SIGNATURE	DRAWING No.:
DRAWN:	NILANDONE		1a
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		1 : 300
PROJECT MANAGER:	A. SAKULKU		



1 Side View - 02
1 : 300



2 Top View 02
1 : 300

Bridge Data	
Road No.	13S
Road Name	NR No.13 South
Bridge Type	Steel Girder Bridge
Bridge Name	Xe Bangnouan Bridge
River Name	Xe Bangnouan
Province	Savannakhet
Location	540km + 200m
Total Bridge Length	140.00m
Total Bridge Width	10.00m
Max Load Capacity	40.00T
Construction Year	1998
Number of Span	3
Number of Substructure	4
Max Span Length	53.00m
Min Span Length	43.00m
Number of Main Girder	2
Material of Superstructure	Composite Steel Girder & RC Deck
Material of Substructure	RC
Material of Expansion Joint	Steel
Material of Bearing	Steel
Source of Funding	Australia

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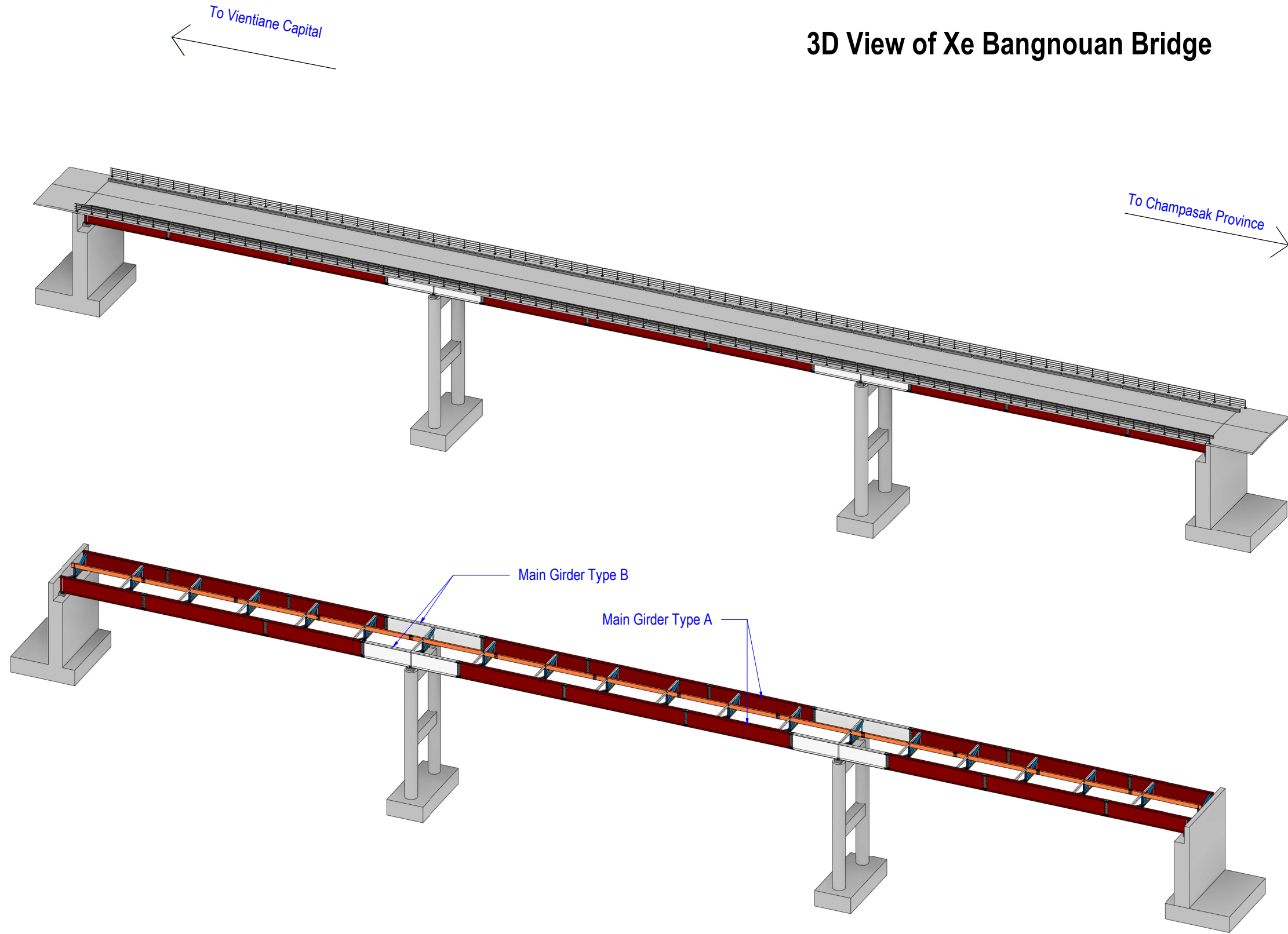
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DRAWING TITLE: General View (2)

TITLE	NAME	SIGNATURE	DRAWING No.:
DRAWN:	NILANDONE		1b
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		As indicated
PROJECT MANAGER:	A. SAKULKU		

3D View of Xe Bangnouan Bridge



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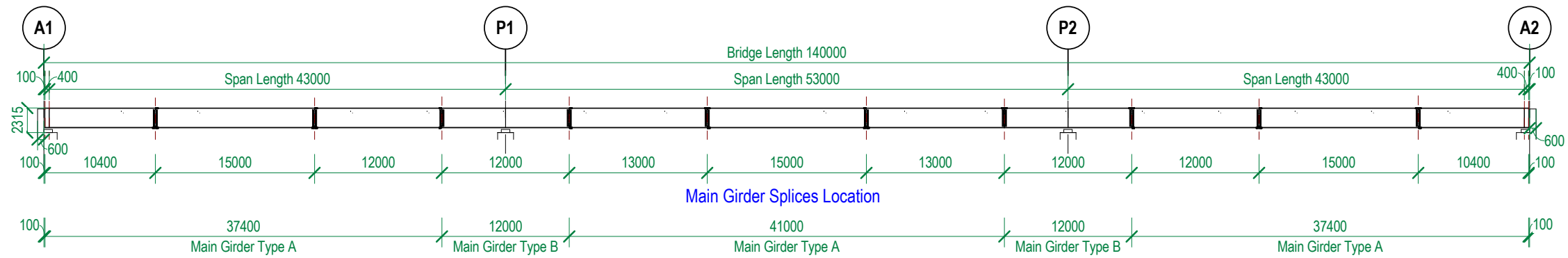
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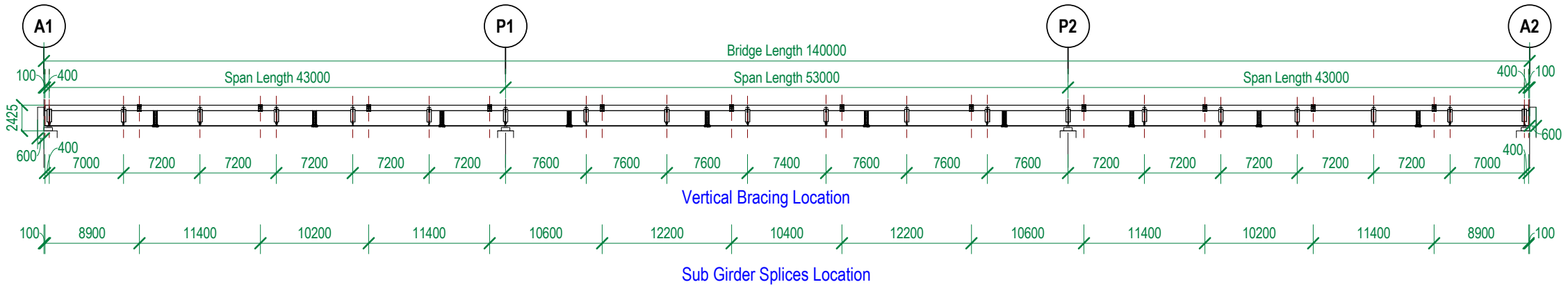
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3D View

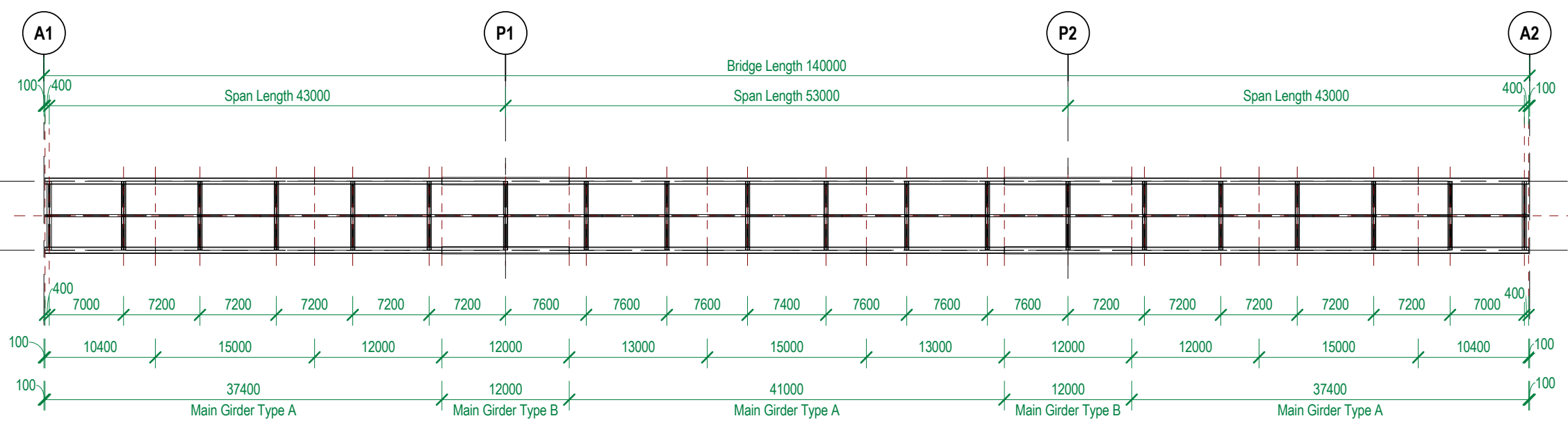
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INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		
PROJECT MANAGER:	A. SAKULKU		



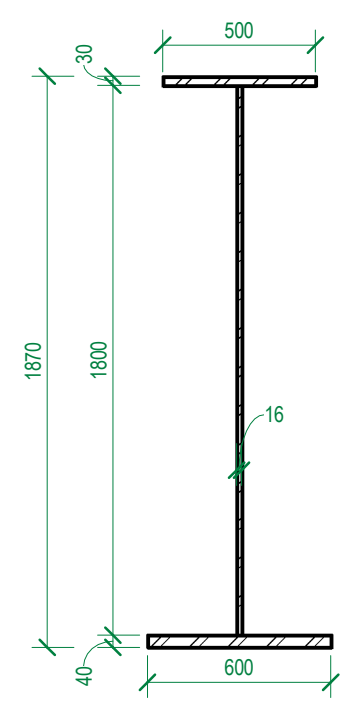
1 Superstructure Side View
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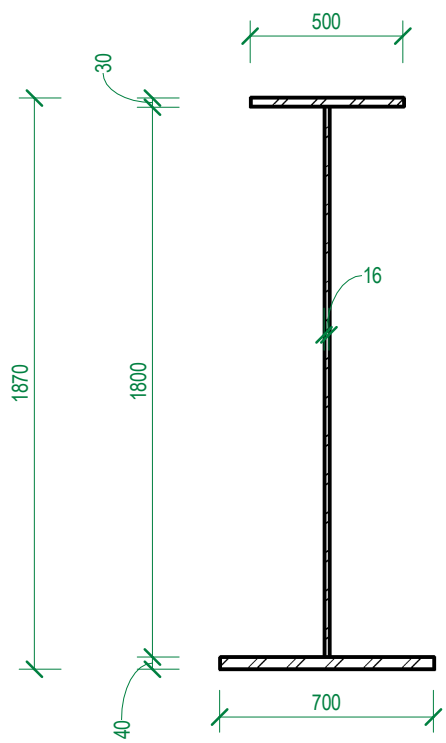
2 Superstructure Longitudinal Section View
1 : 500



3 Superstructure Plan View
1 : 500



4 Main Girder Type A
1 : 25



5 Main Girder Type B
1 : 25



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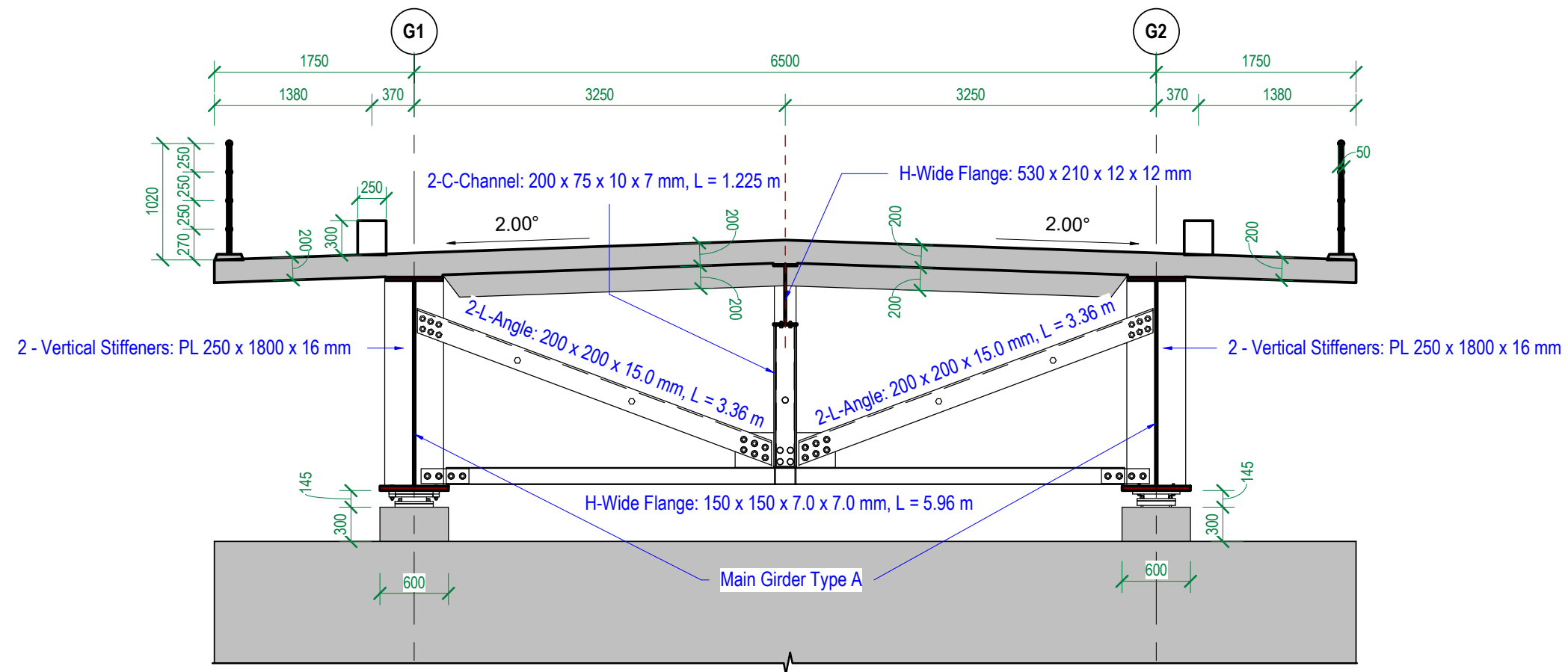


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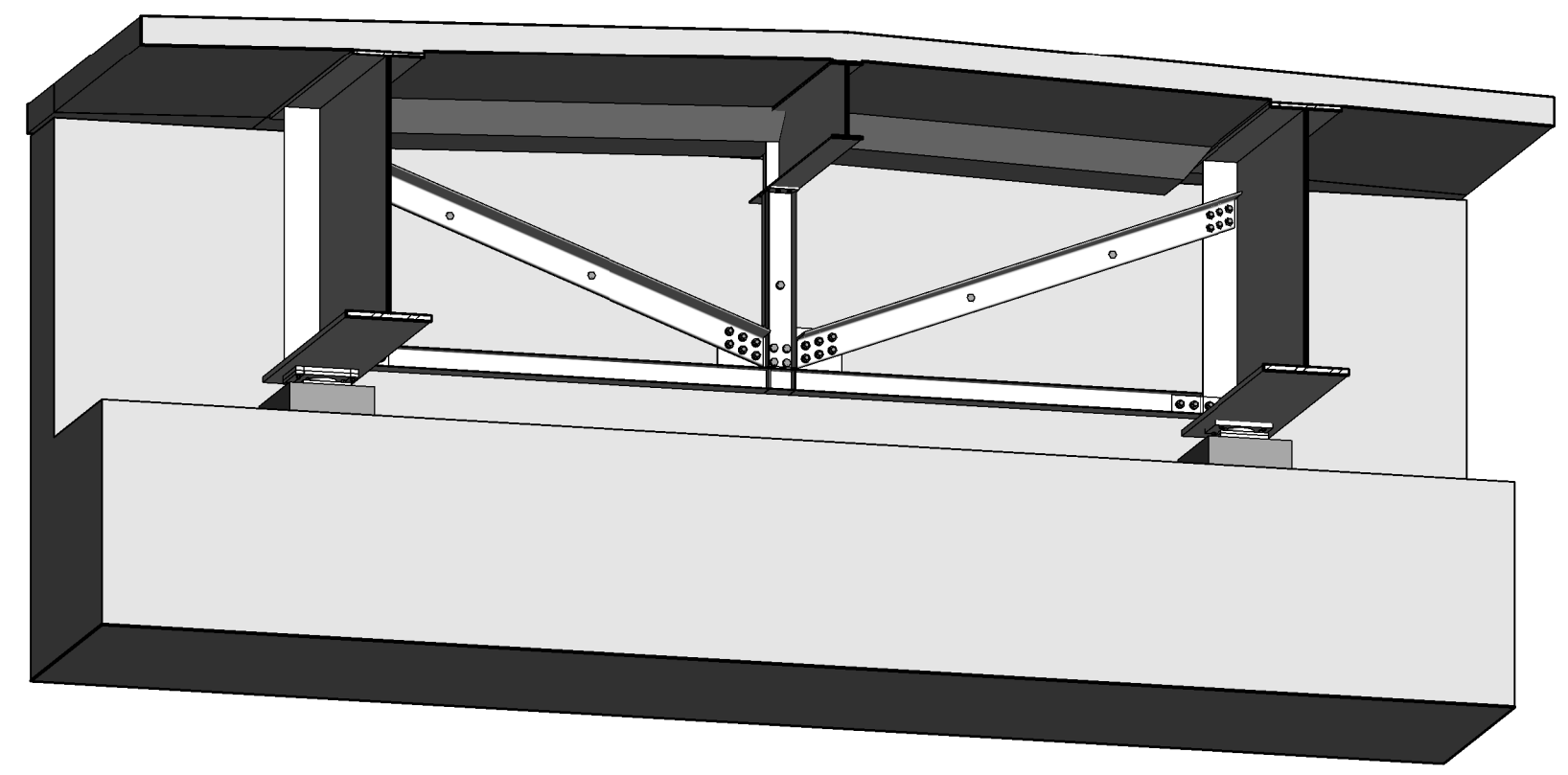
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DRAWING TITLE:
Superstructure Side and Plan Views

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DRAWN:	NILANDONE		3
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		As indicated
PROJECT MANAGER:	A. SAKULKU		



1 Cross Section at Abutment A1 and A2
1 : 50



2 Bracing at Abutment A1 and A2 3D View



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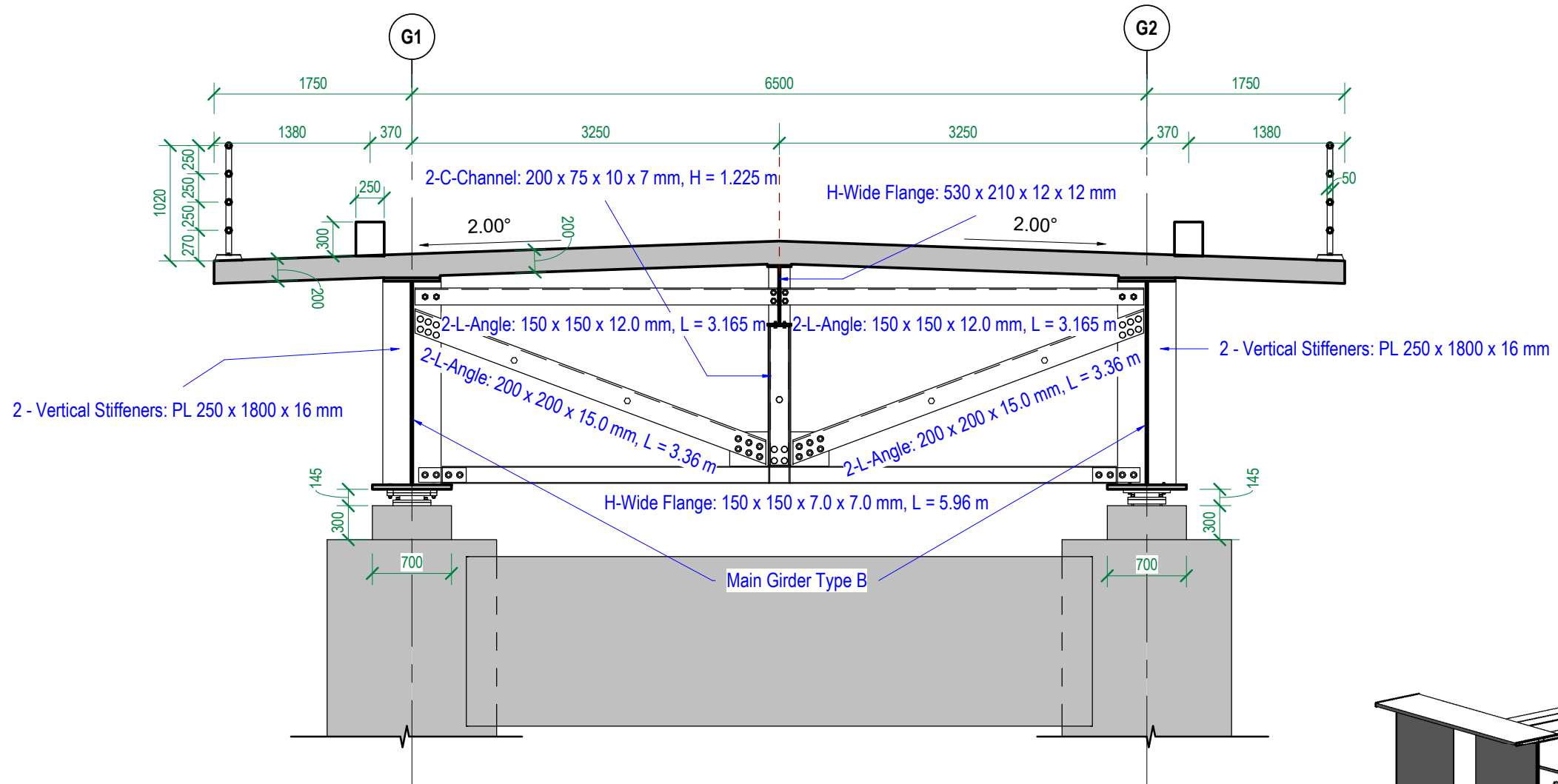


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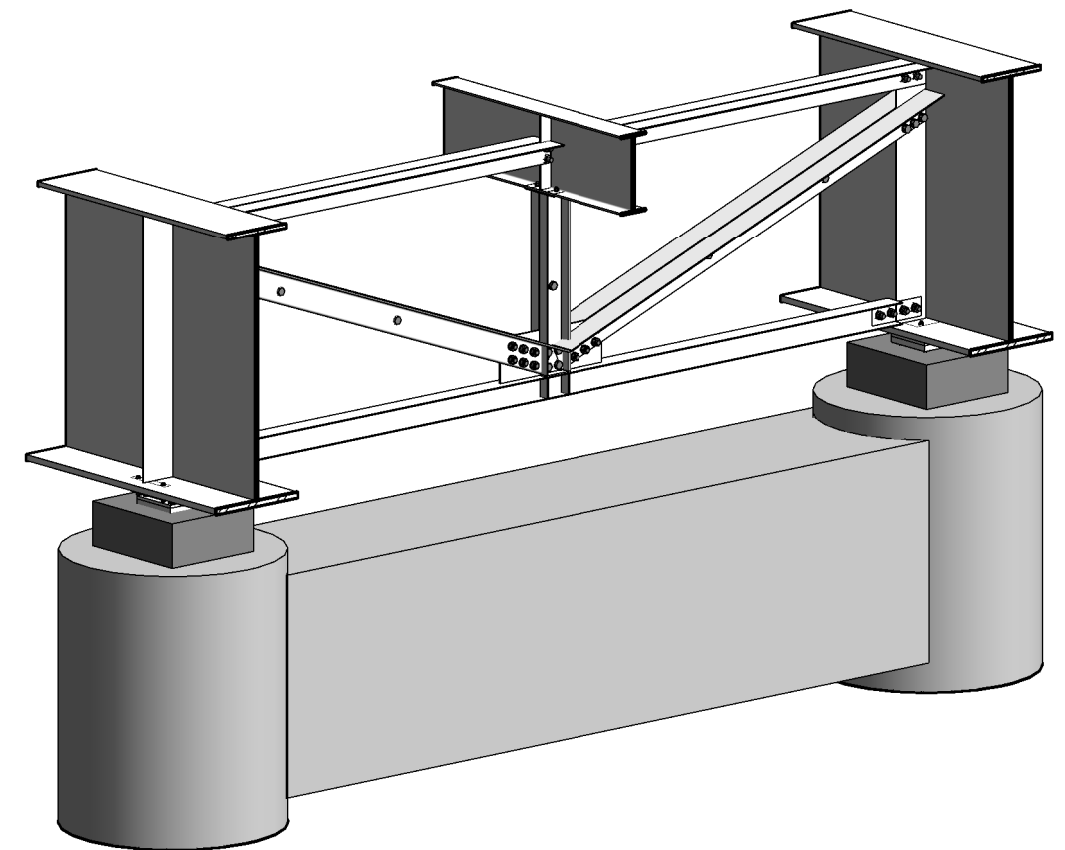
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Superstructure Cross Sections at Abutment A1 and A2

TITLE	NAME	SIGNATURE	DRAWING No.:
DRAWN:	NILANDONE		4
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		1 : 50
PROJECT MANAGER:	A. SAKULKU		



1 **Cross Section at Pier P1 and P2**
1 : 50



2 **Bracing at Pier P1 and P2 3D View**
1 : 50



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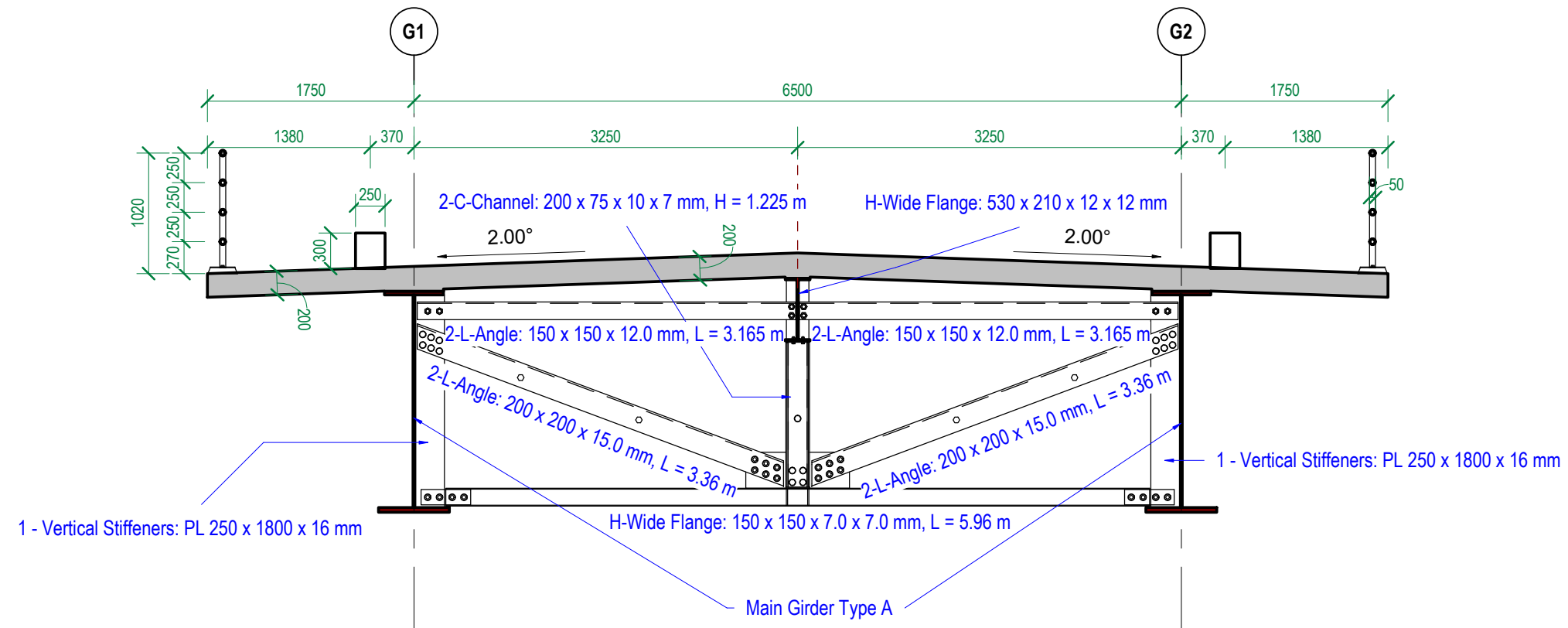
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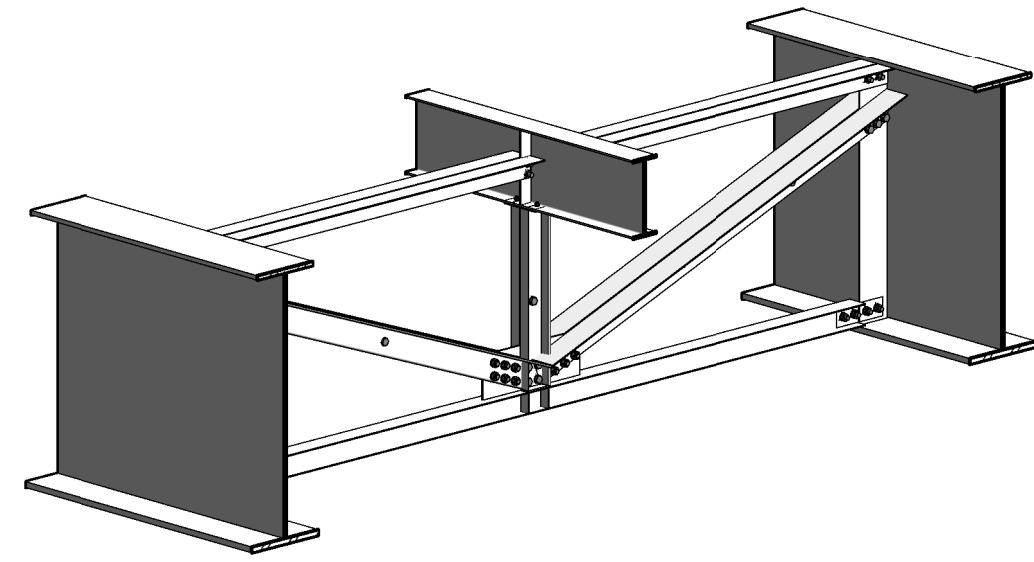
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Superstructure Cross Sections at Pier P1 and P2

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INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		1 : 50
PROJECT MANAGER:	A. SAKULKU		



1 Cross Section at Center of Span
1 : 50



2 Bracing at Center of Span 3D View



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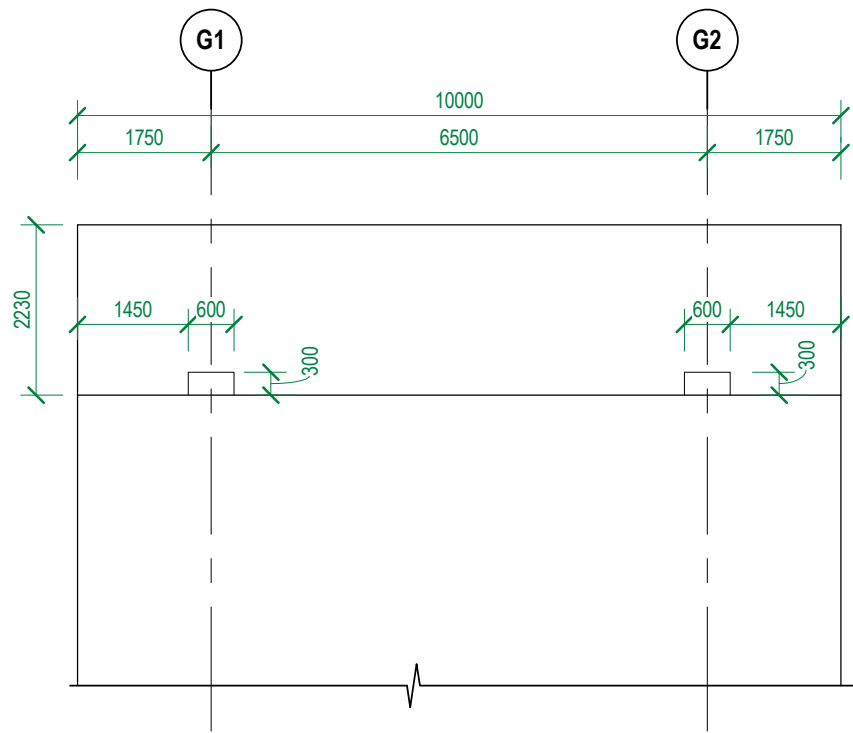
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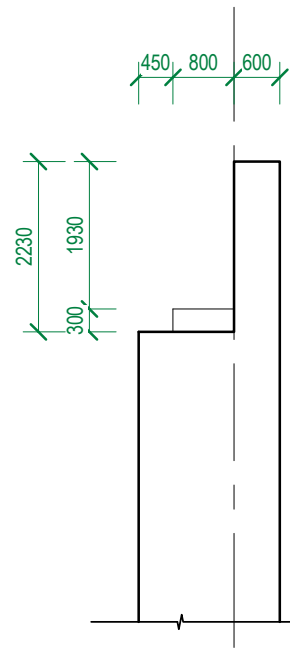
DRAWING TITLE:
Superstructure Cross Sections at Center of Span

TITLE	NAME	SIGNATURE
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INSPECTOR:	VANNAXAY	
TEAM LEADER:	Dr. SOPHA	
PROJECT MANAGER:	A. SAKULKU	

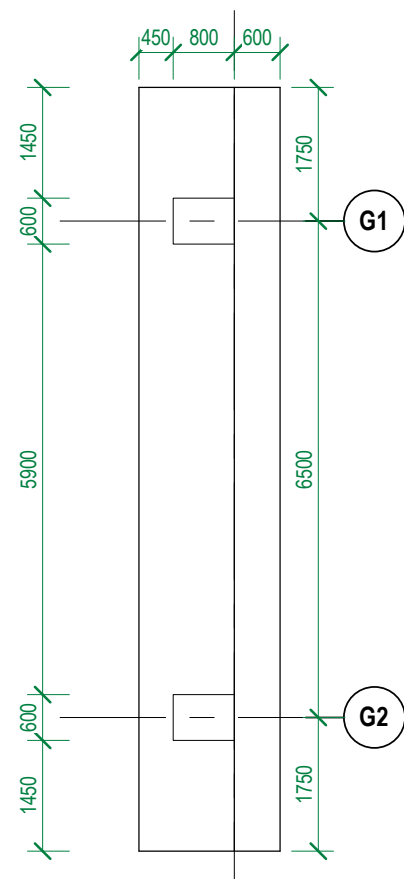
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6
SCALE:
1 : 50



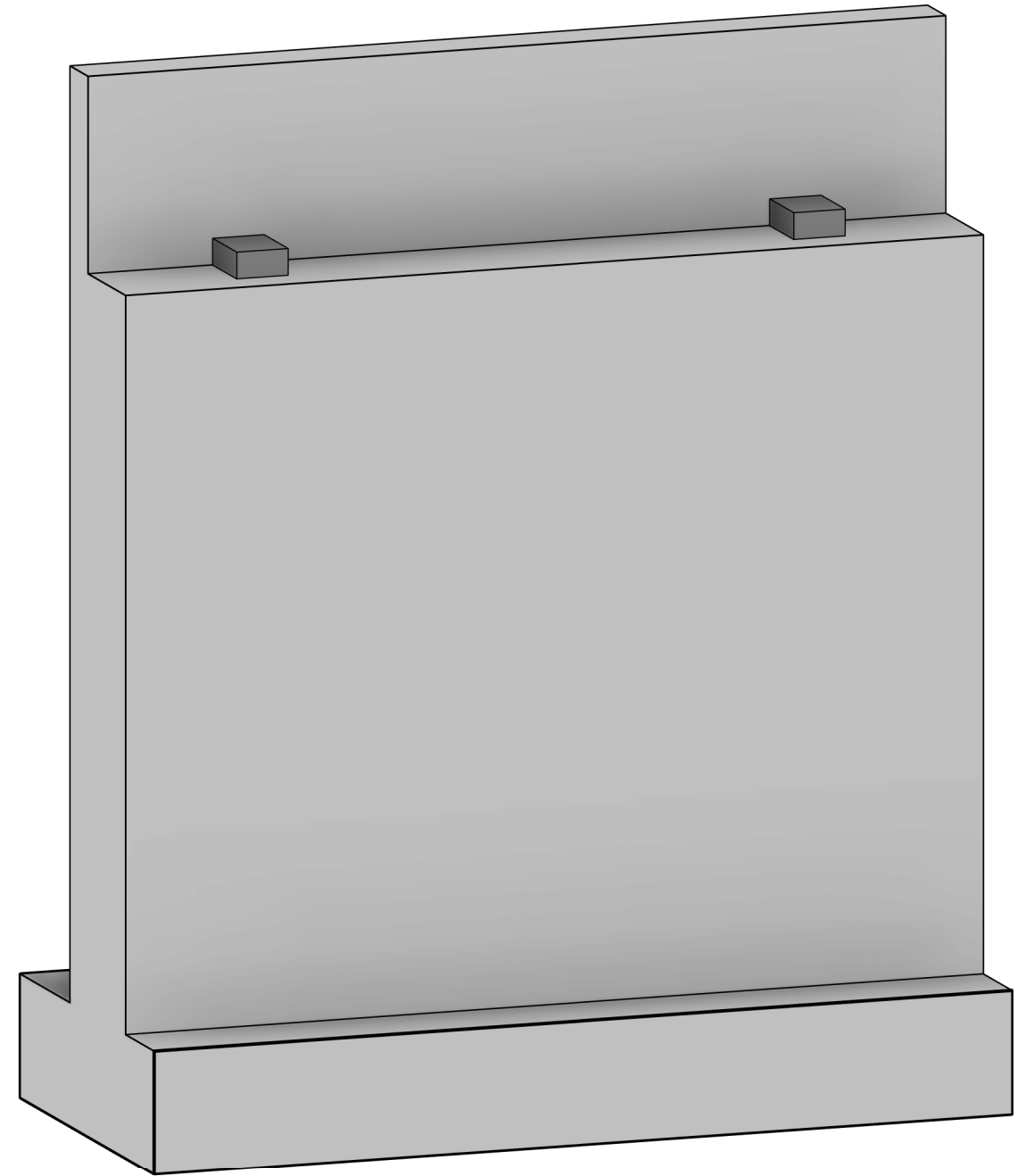
1 Cross Section View of Abutment A1 & A2
1 : 100



2 Side View of Abutment A1 & A2
1 : 100



3 Plan View of Abutment A1 & A2
1 : 100



4 3D View of Abutment



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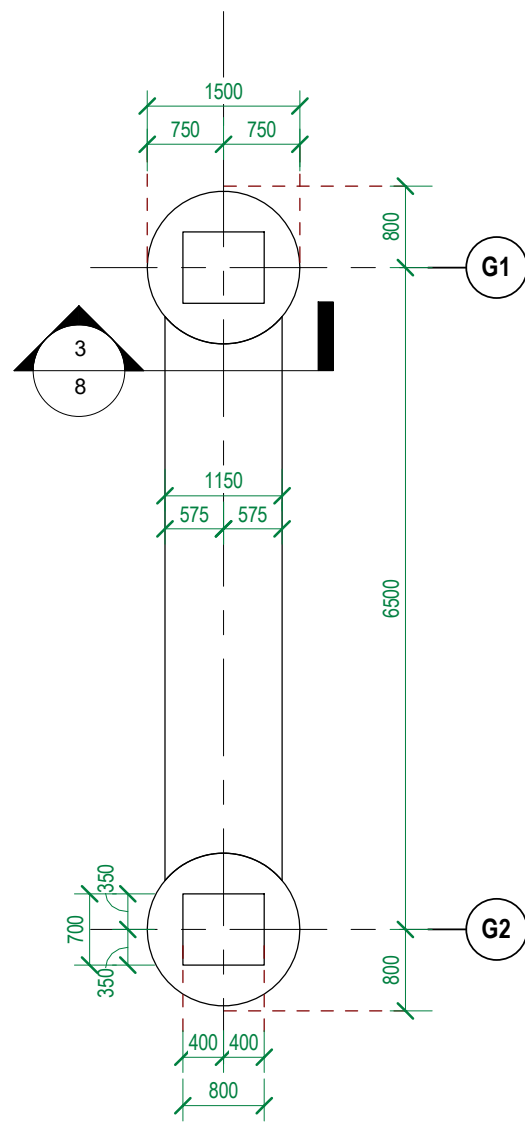
Substructure Abutment Details

TITLE	NAME	SIGNATURE
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INSPECTOR:	VANNAXAY	
TEAM LEADER:	Dr. SOPHA	
PROJECT MANAGER:	A. SAKULKU	

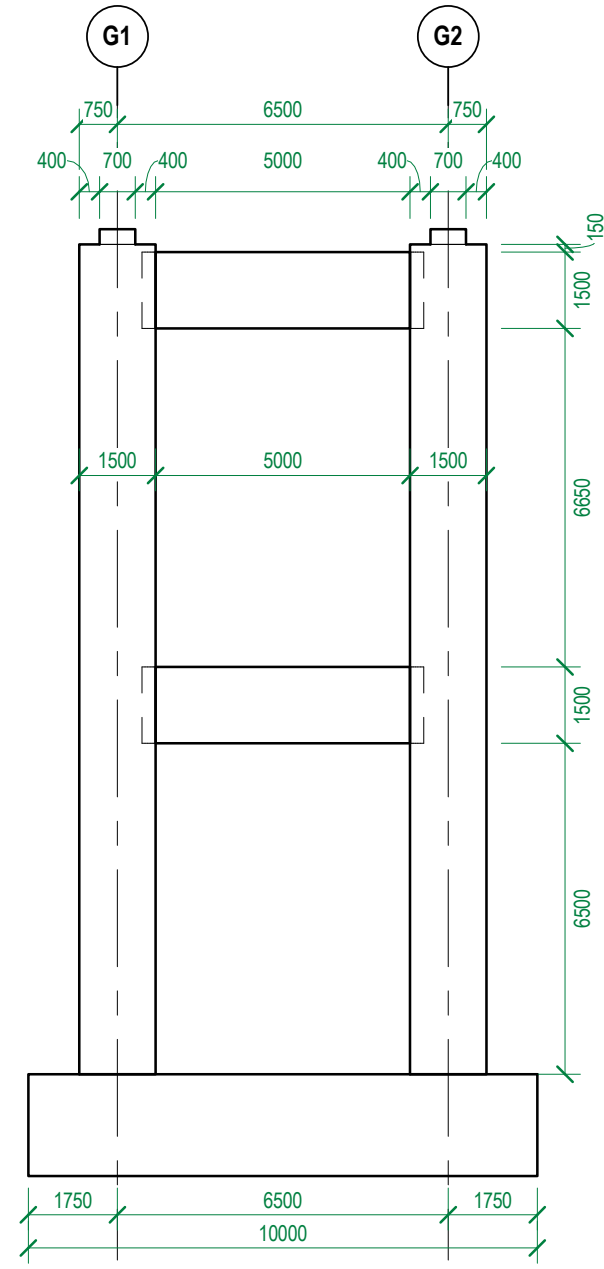
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SCALE:
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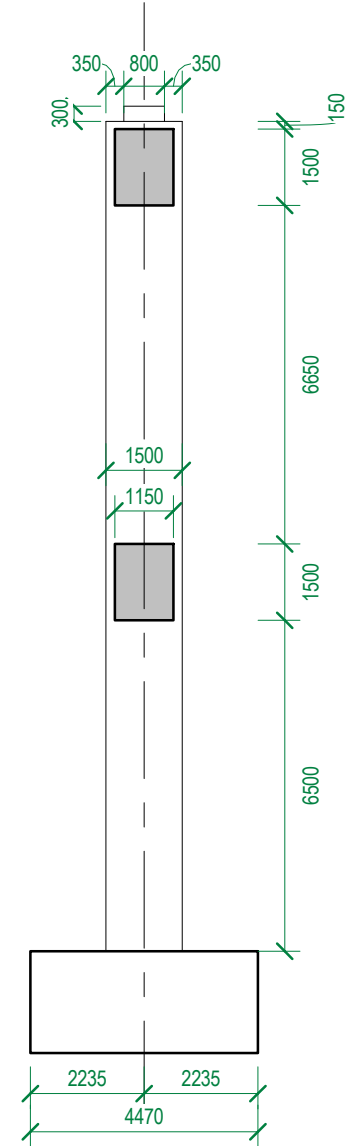
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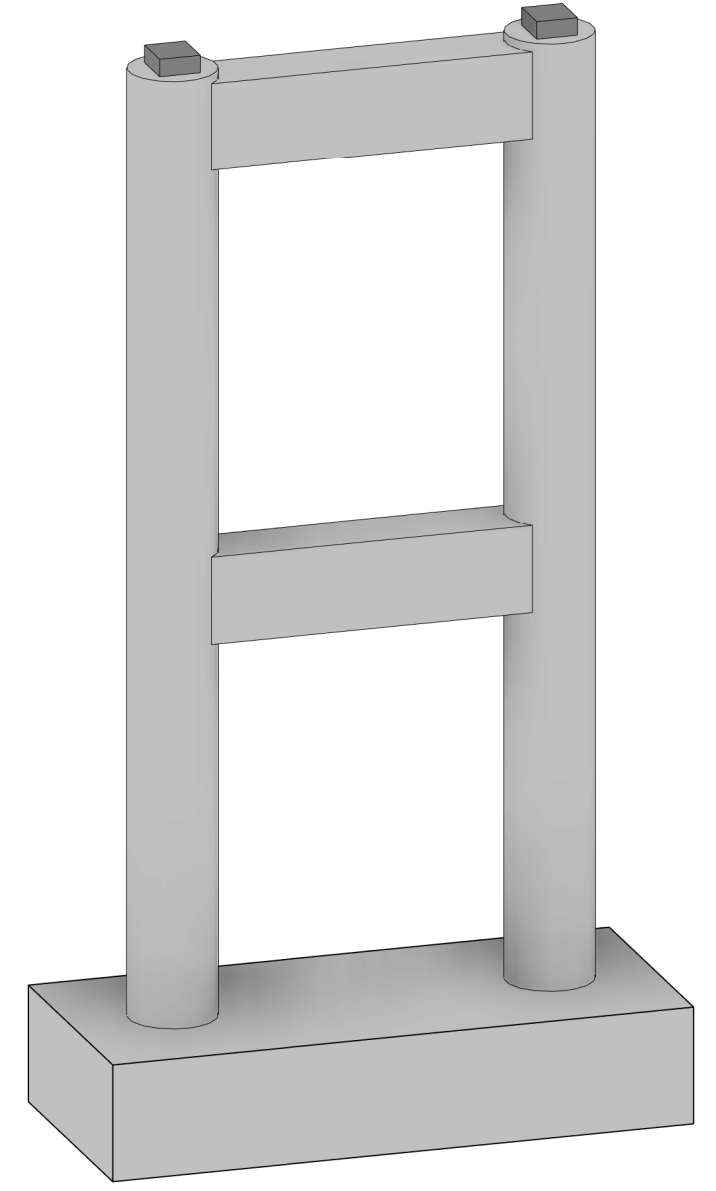
1 Plan View of Pier P1 & P2
1 : 75



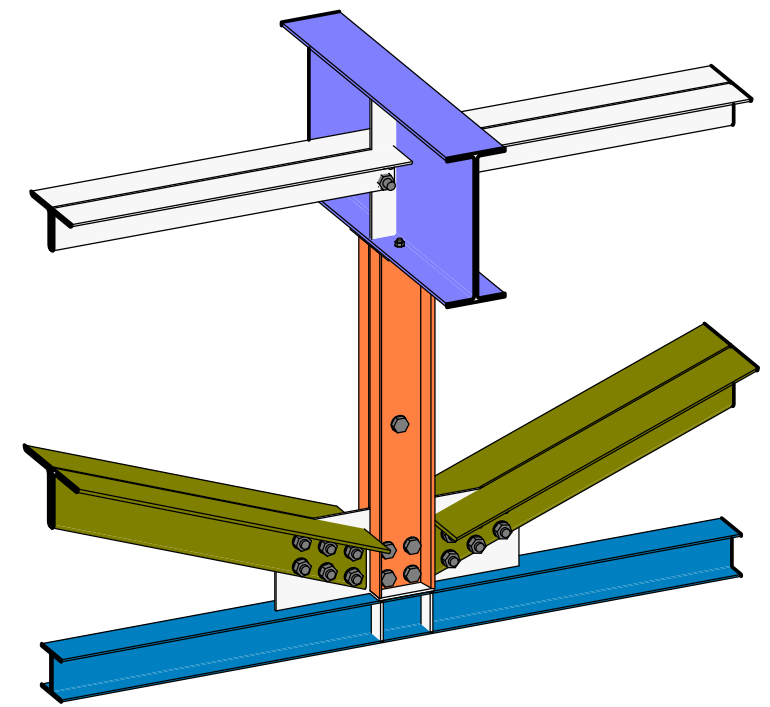
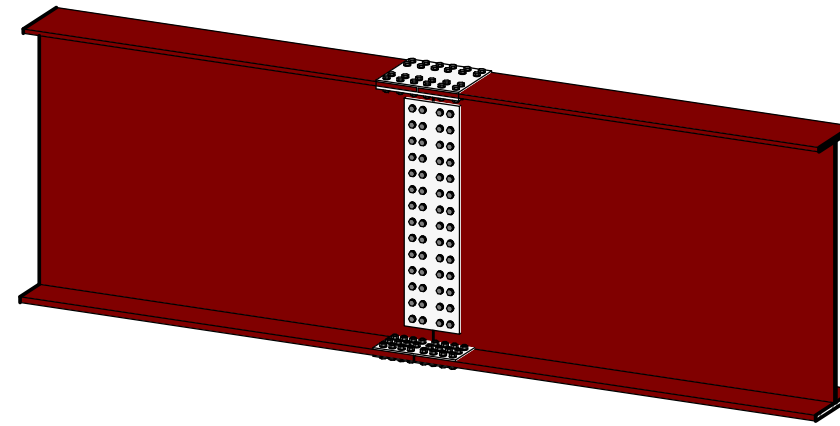
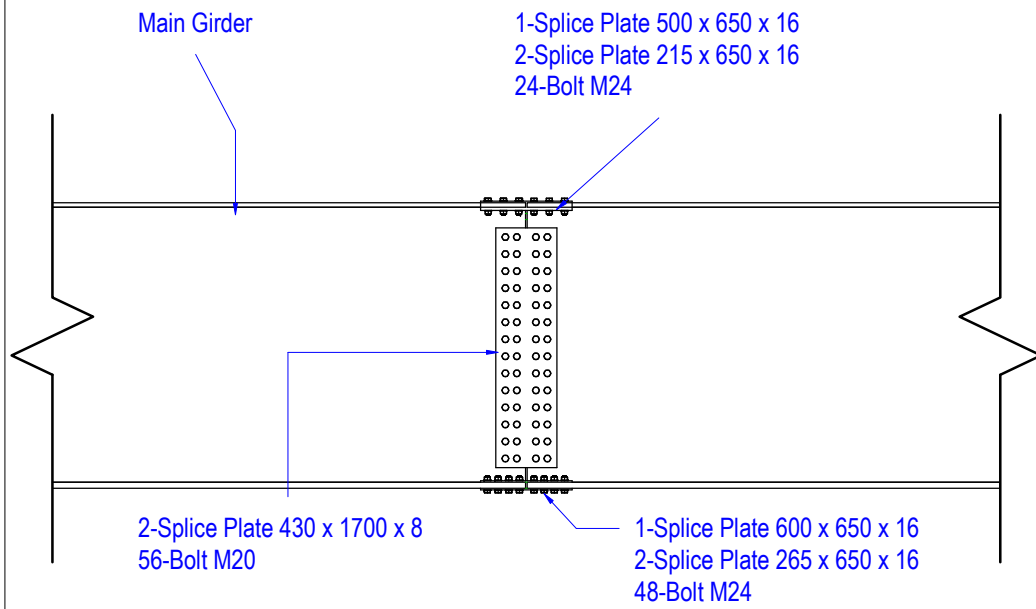
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1 : 150



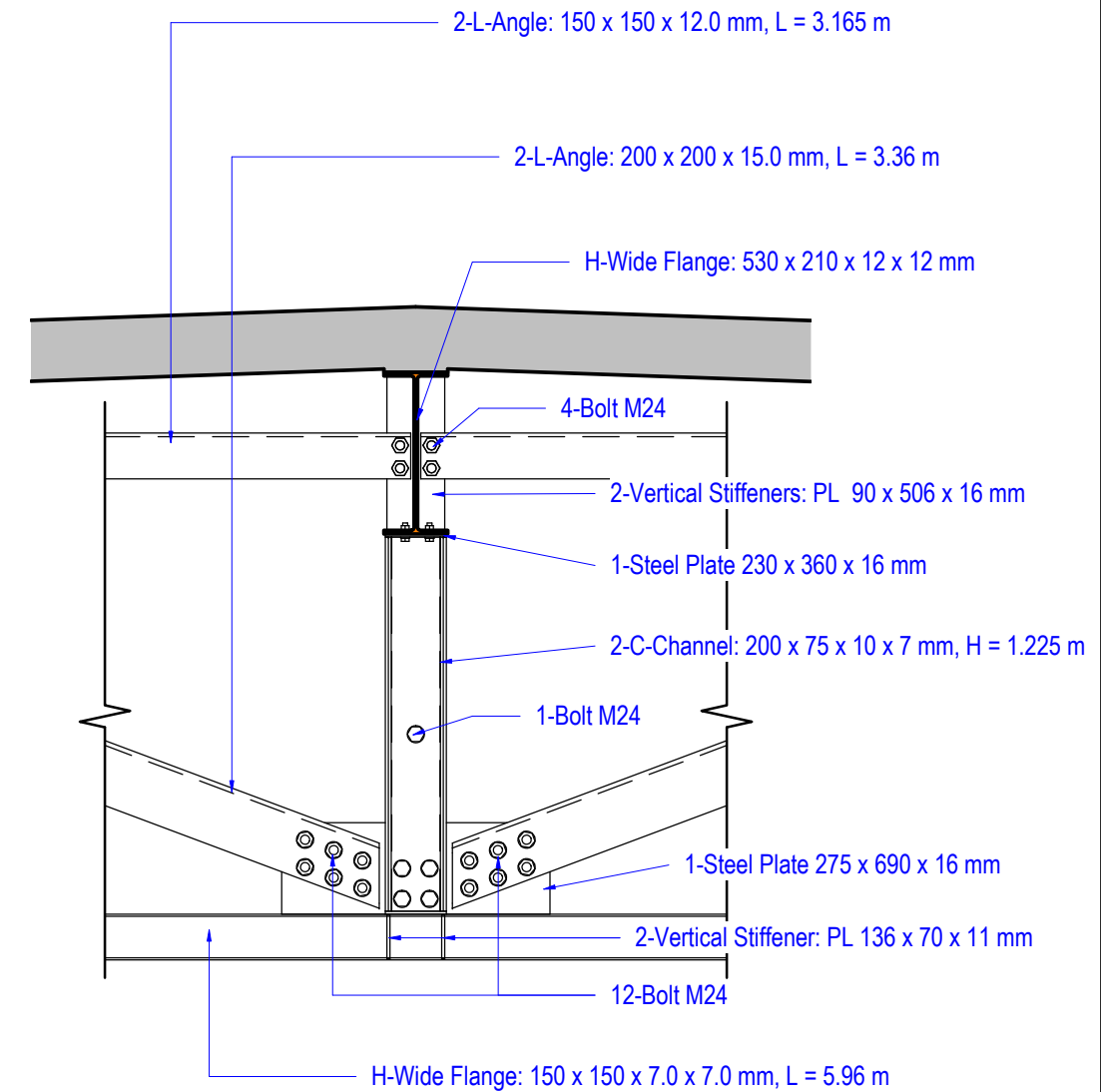
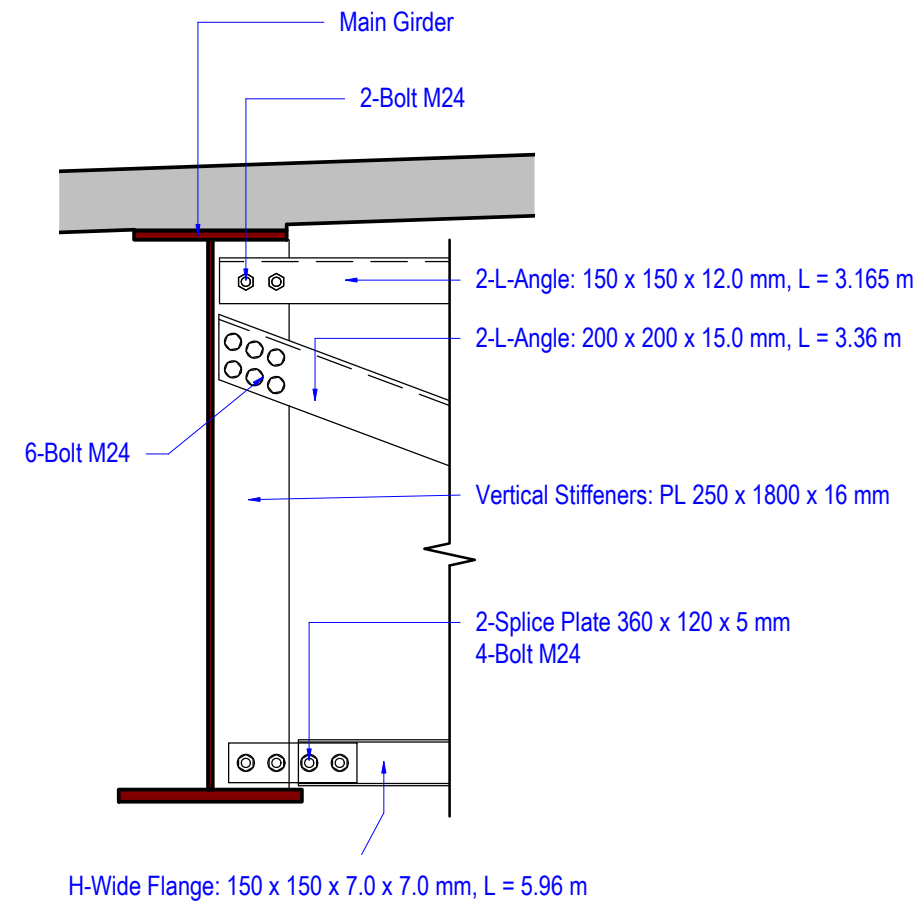
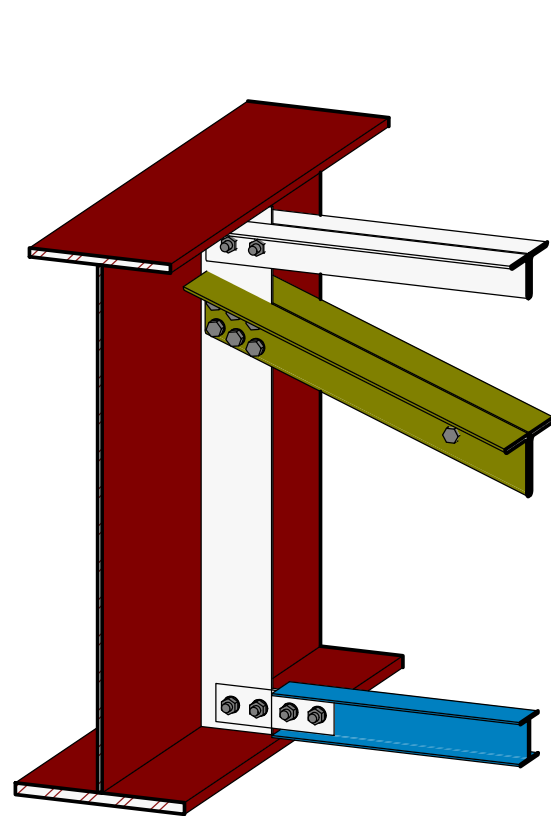
3 Side View of Pier P1 & P2
1 : 150



4 3D View of Pier



1 Main Girder Splice Details
1 : 50



2 Bracing and Main Girder Connection Details
1 : 25

3 Bracing Connection Details
1 : 25

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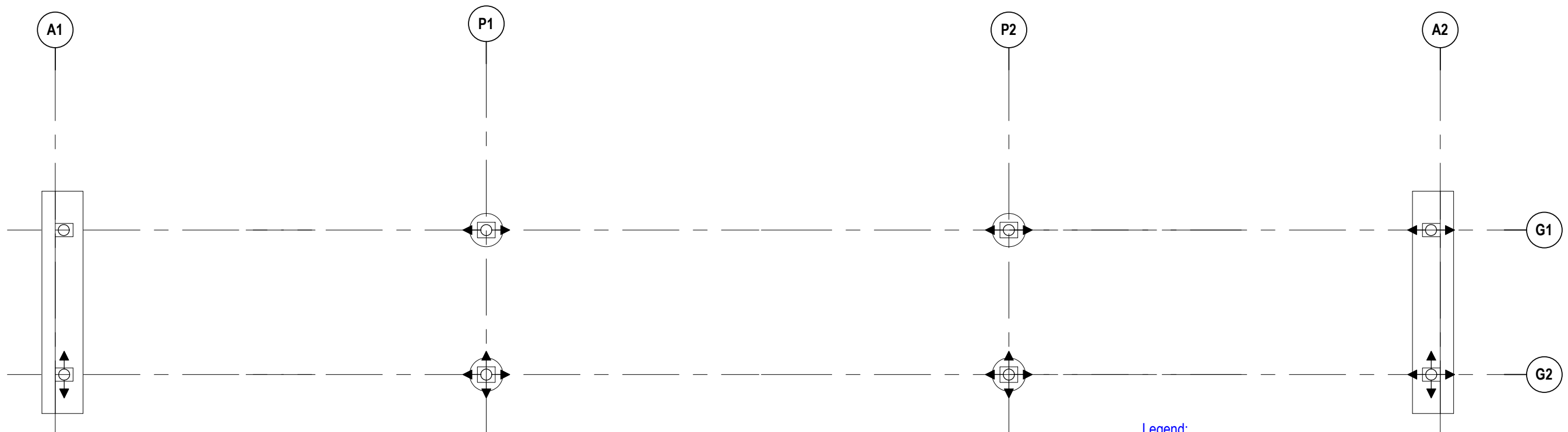
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LAO CONSULTING GROUP
Tel: (856-21) 313289 377 Lao-Thai Road
Fax: (856-21) 313258 Ban Vathak, Muang Soudanak
P.O. BOX 3097 Vientiane, Lao PDR
E-mail: lcg@laoconsulting.com

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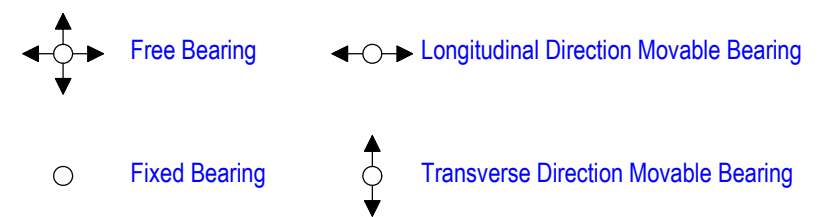
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Connection Details

TITLE	NAME	SIGNATURE	DRAWING No.:
DRAWN:	NILANDONE		9
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		As indicated
PROJECT MANAGER:	A. SAKULKU		



Legend:



A2-19



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Fax : (856-21) 313258 Ban Vatnak, Muang Soudanak
E-mail : lcg@laoconsulting.com Vientiane, Lao PDR

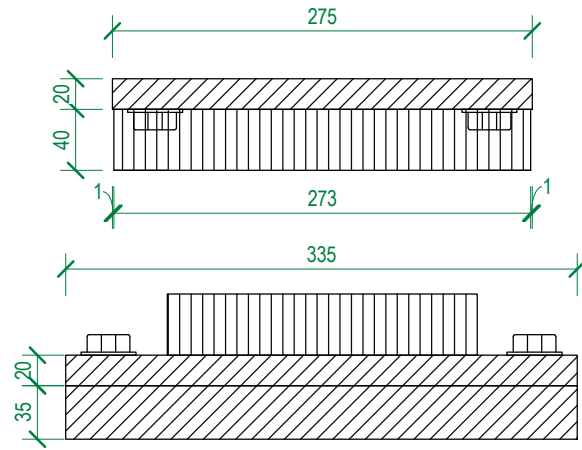
THE PROJECT FOR CAPACITY DEVELOPMENT ON BRIDGE
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DRAWING TITLE:

Bearing Layout Plan

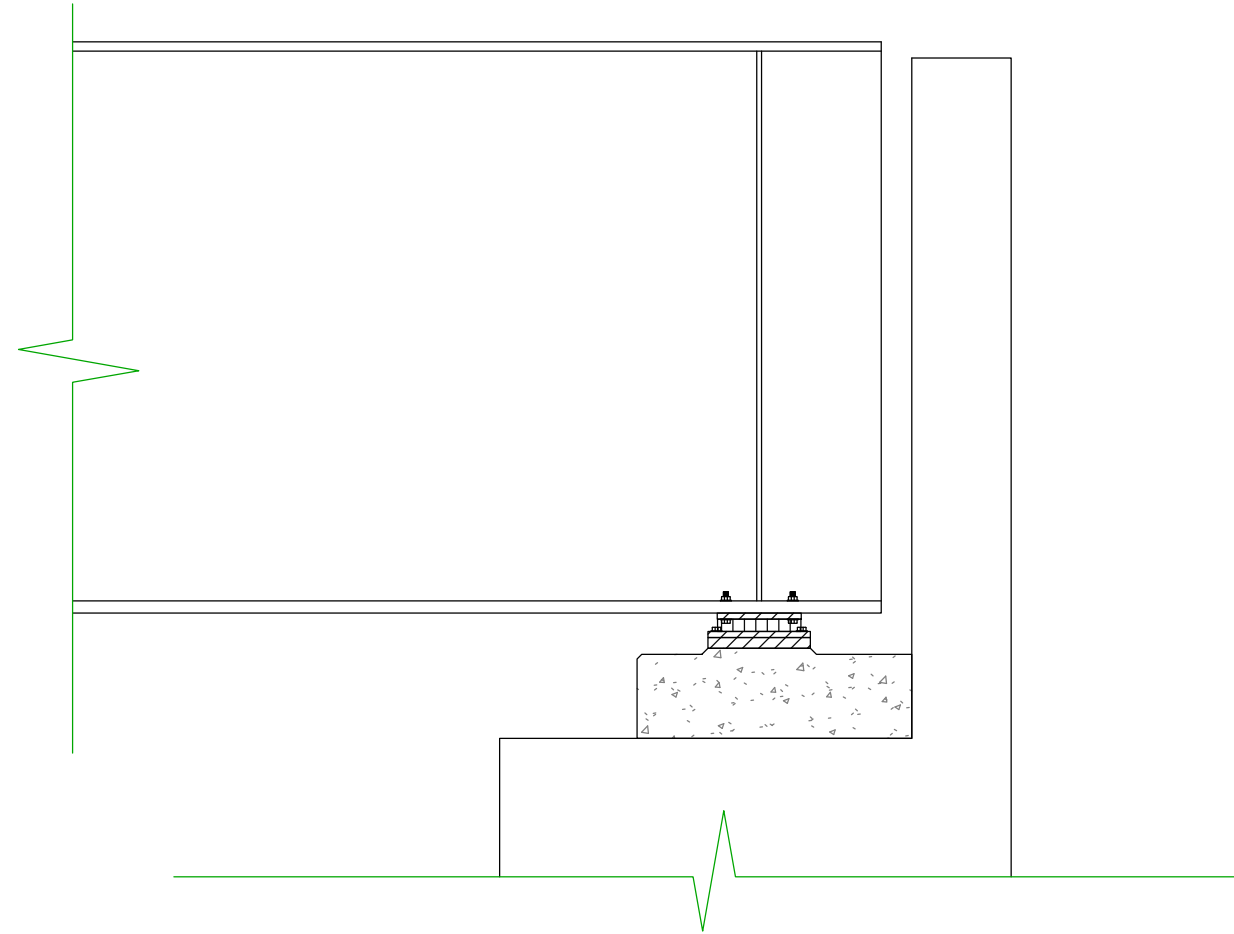
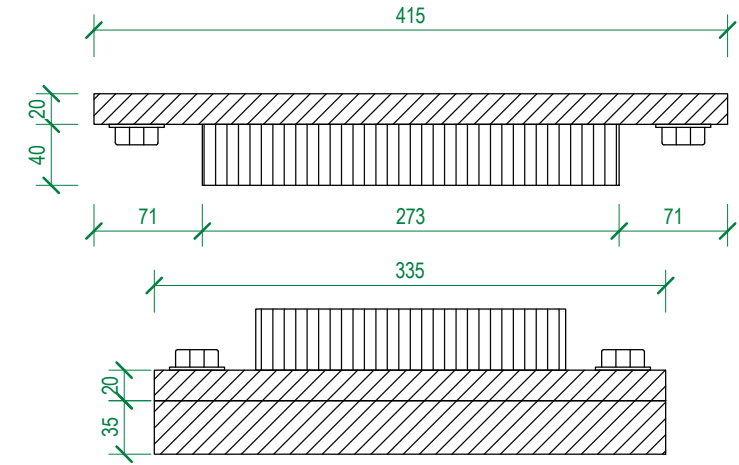
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DRAWN:	NILANDONE		10
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		1 : 200
PROJECT MANAGER:	A. SAKULKU		

Fixed Bearing Details

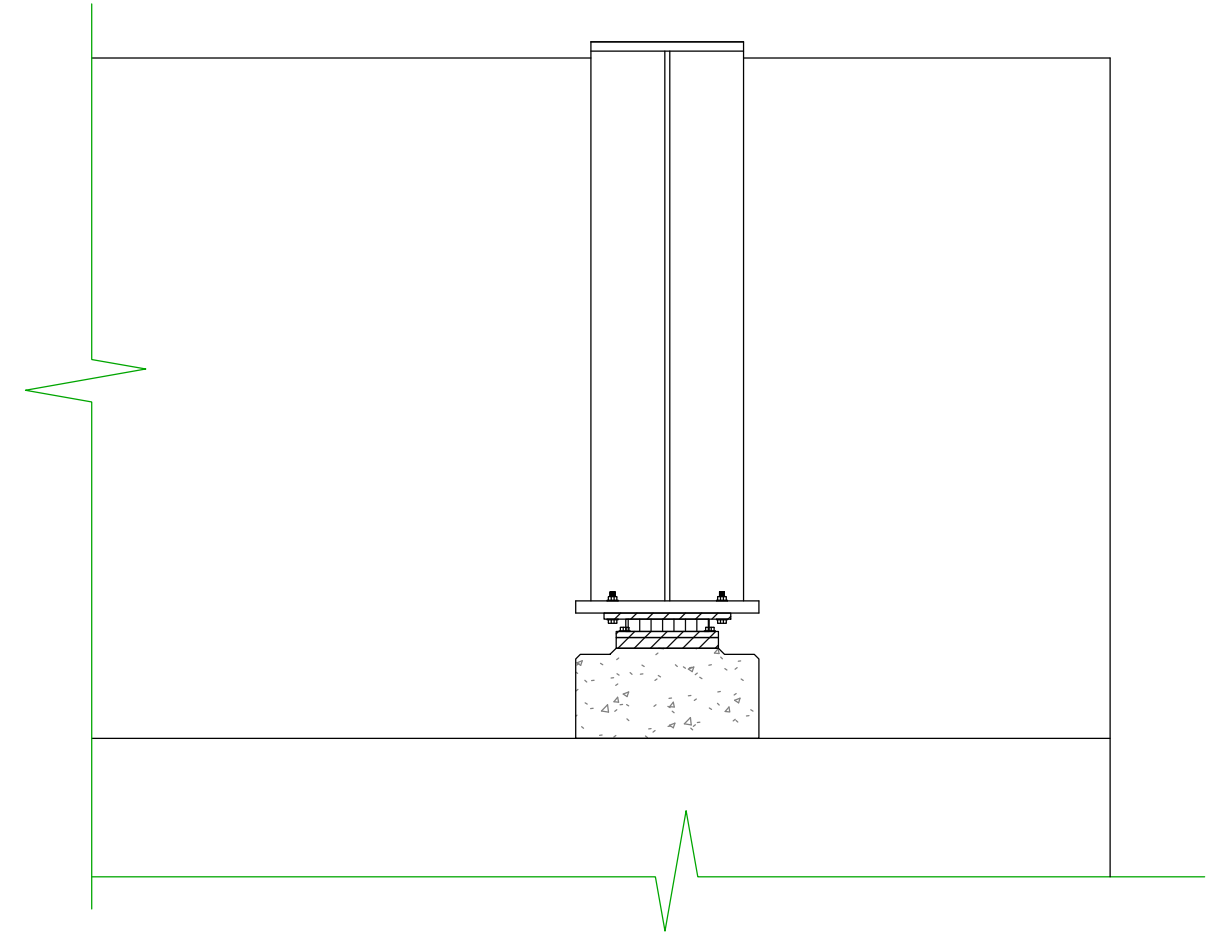


Top Plate and Steel Cylinder Pot

Base Plate and Steel Piston (inside)
Bottom Plate



Side View



Front View

A2-20



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E-mail: lcg@laoconsulting.com Vientiane, Lao PDR

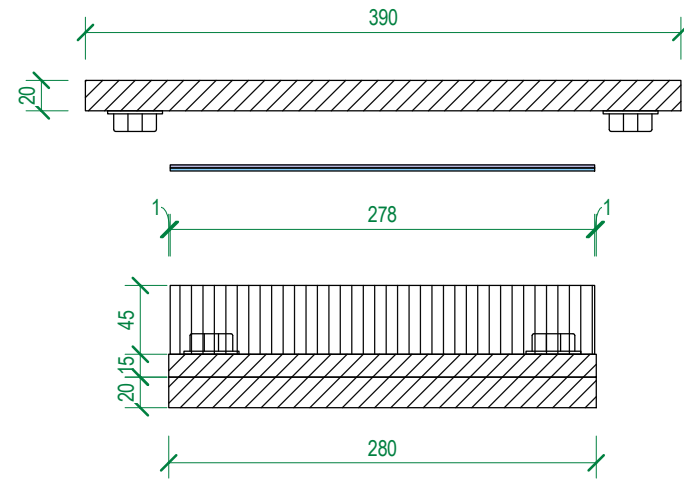
THE PROJECT FOR CAPACITY DEVELOPMENT ON BRIDGE
MAINTENANCE AND MANAGEMENT

DRAWING TITLE:

Fixed Bearing Details

TITLE	NAME	SIGNATURE	DRAWING No.:
DRAWN:	NILANDONE		11
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		As indicated
PROJECT MANAGER:	A. SAKULKU		

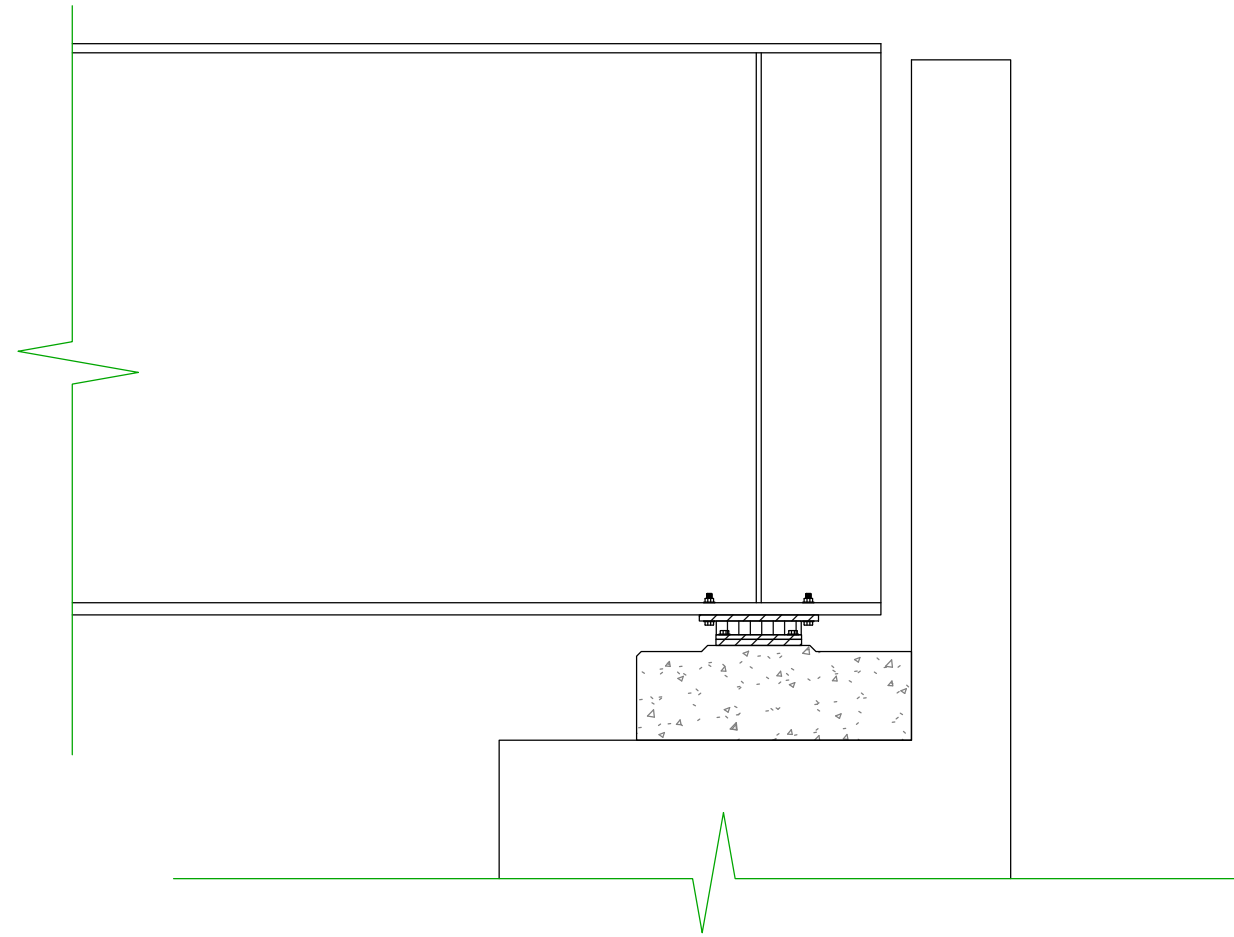
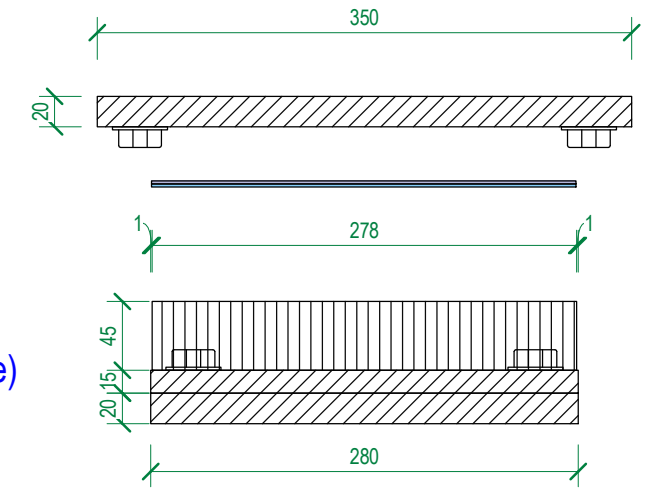
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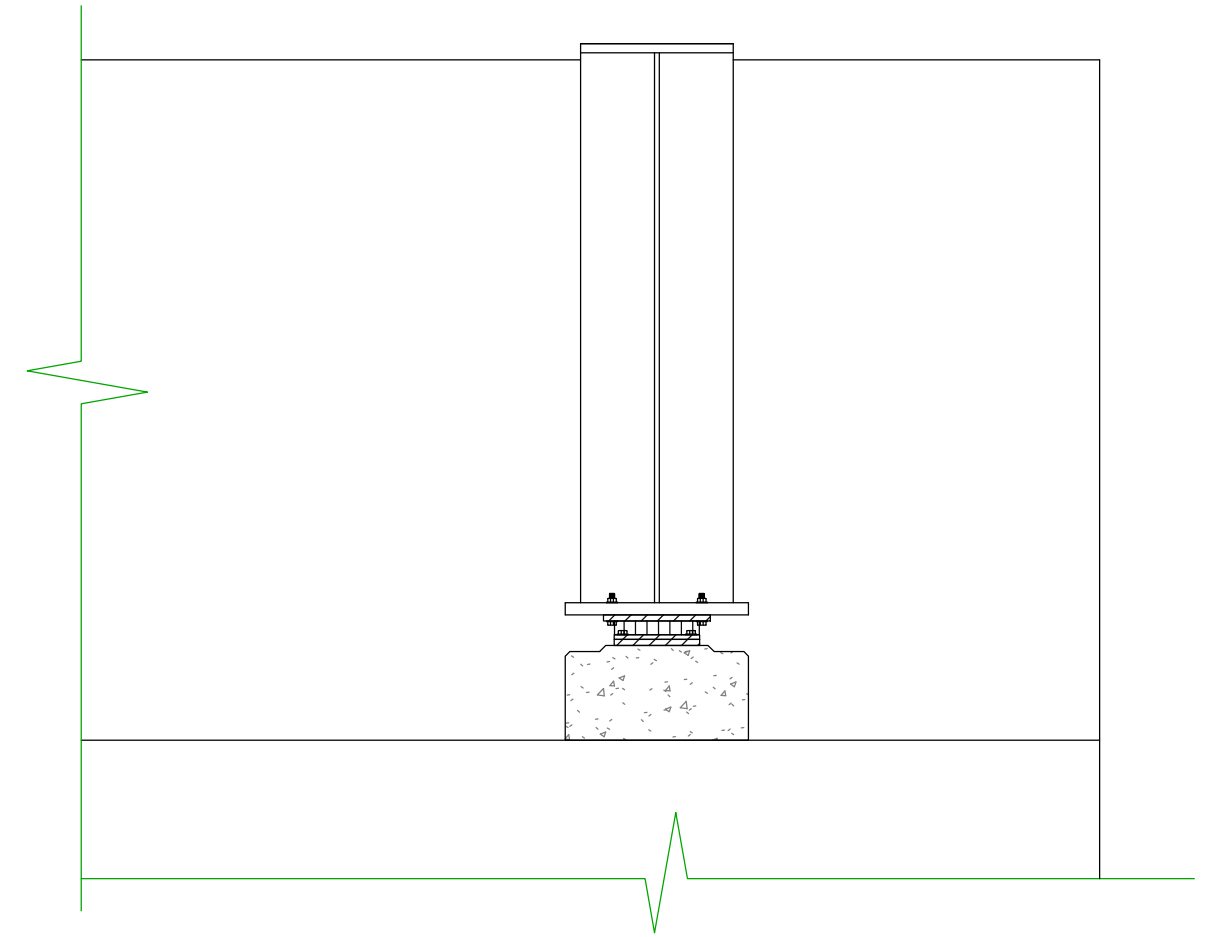
Top Plate

Stainless Steel Panel and PTFE

Base Plate, Steel Cylinder Pot, and Steel Piston (inside)
Bottom Plate



Side View



Front View

A2-21



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THE PROJECT FOR CAPACITY DEVELOPMENT ON BRIDGE
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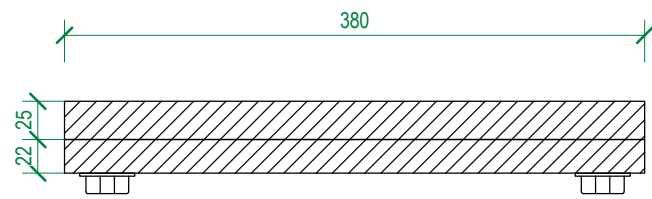
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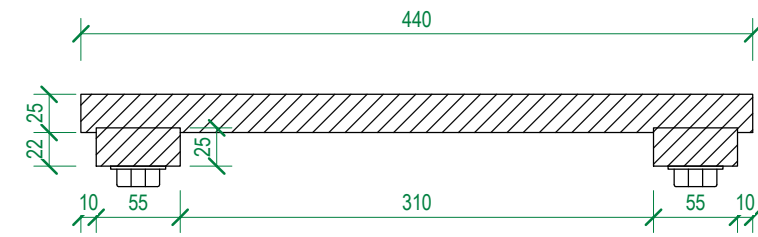
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DRAWN:	NILANDONE	
INSPECTOR:	VANNAXAY	
TEAM LEADER:	Dr. SOPHA	
PROJECT MANAGER:	A. SAKULKU	

DRAWING No.:
12
SCALE:
As indicated

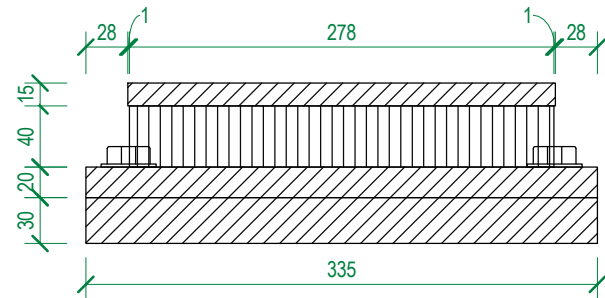
Longitudinal Direction Movable Bearing Details



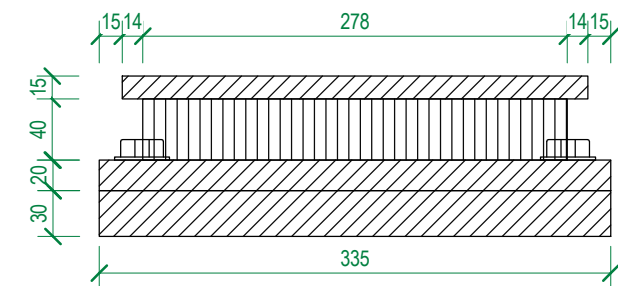
Top Plate with Edge Steel Guide



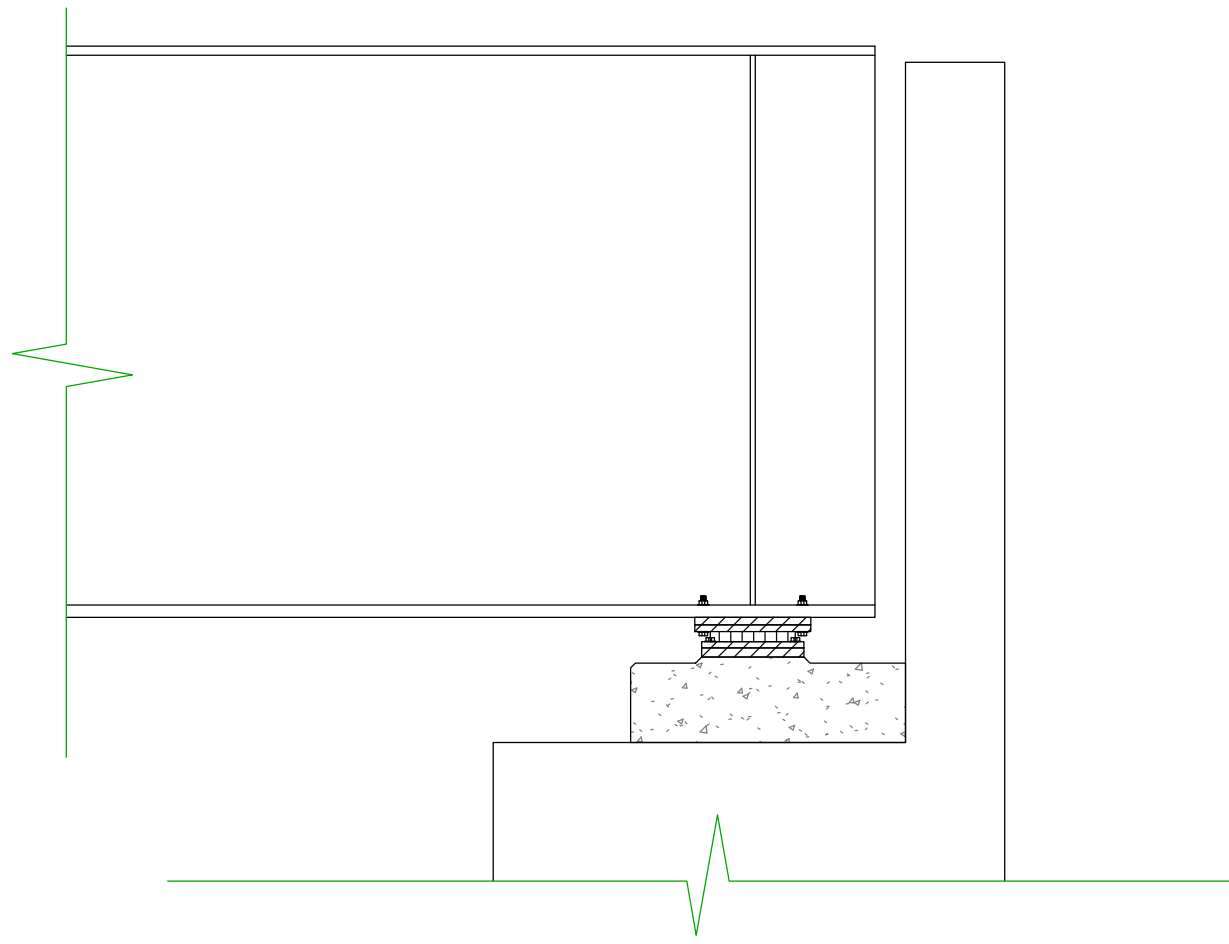
Stainless Steel Panel and PTFE



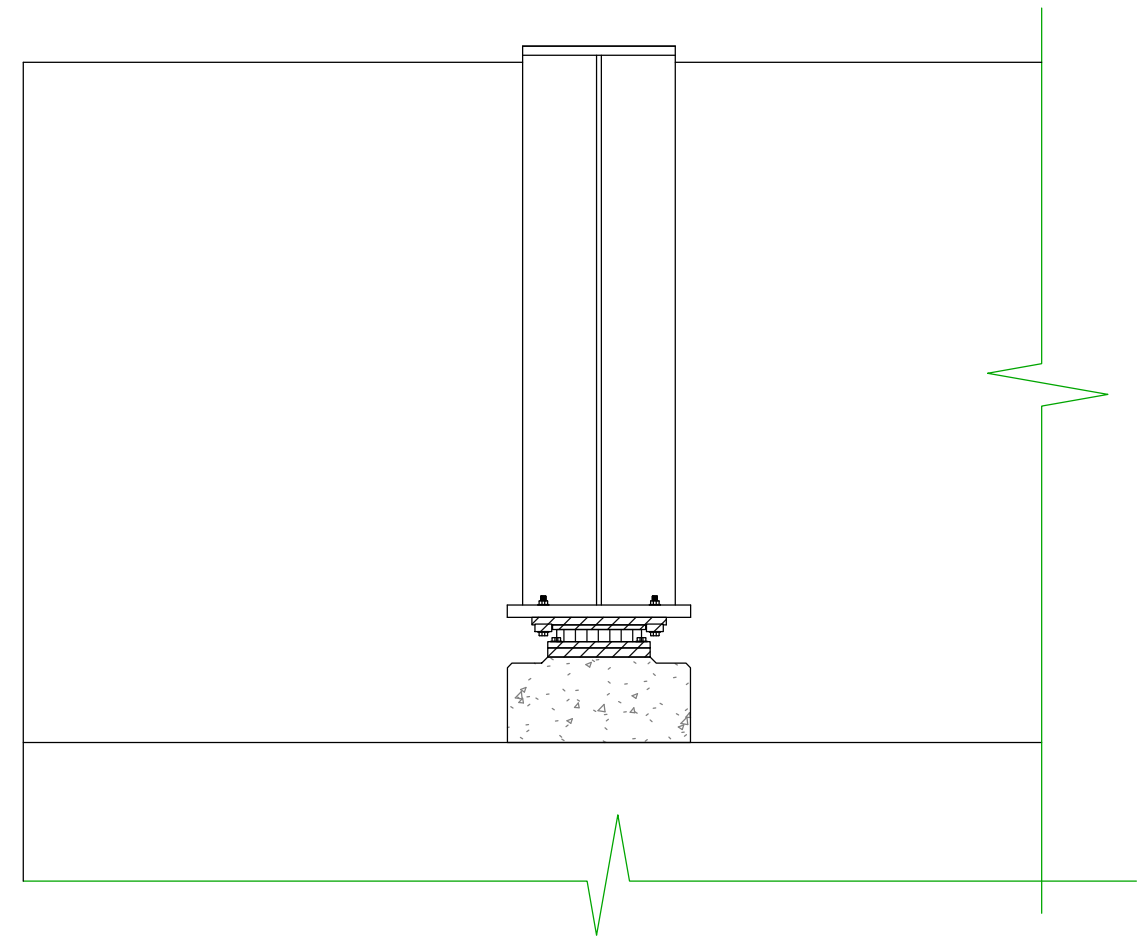
Base Plate, Cylinder Pot Plate, and Steel Piston (inside)



Bottom Plate



Side View



Front View

A2-22



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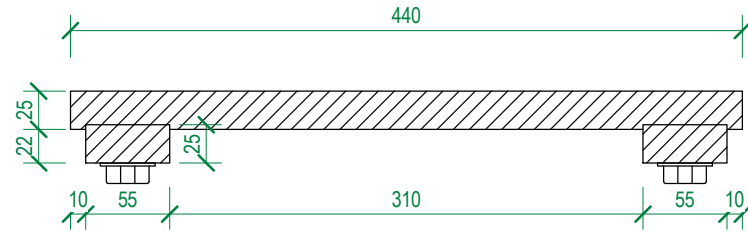
THE PROJECT FOR CAPACITY DEVELOPMENT ON BRIDGE
MAINTENANCE AND MANAGEMENT

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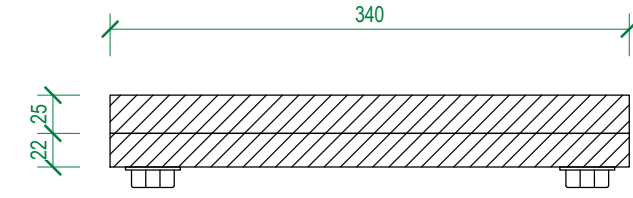
Longitudinal Direction Movable Bearing Details

TITLE	NAME	SIGNATURE	DRAWING No.:
DRAWN:	NILANDONE		13
INSPECTOR:	VANNAXAY		SCALE:
TEAM LEADER:	Dr. SOPHA		As indicated
PROJECT MANAGER:	A. SAKULKU		

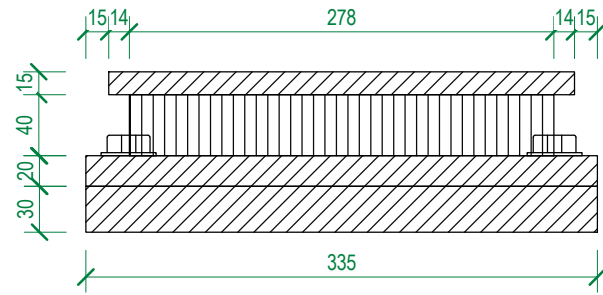
Transverse Direction Movable Bearing Details



Top Plate with Edge Steel Guide

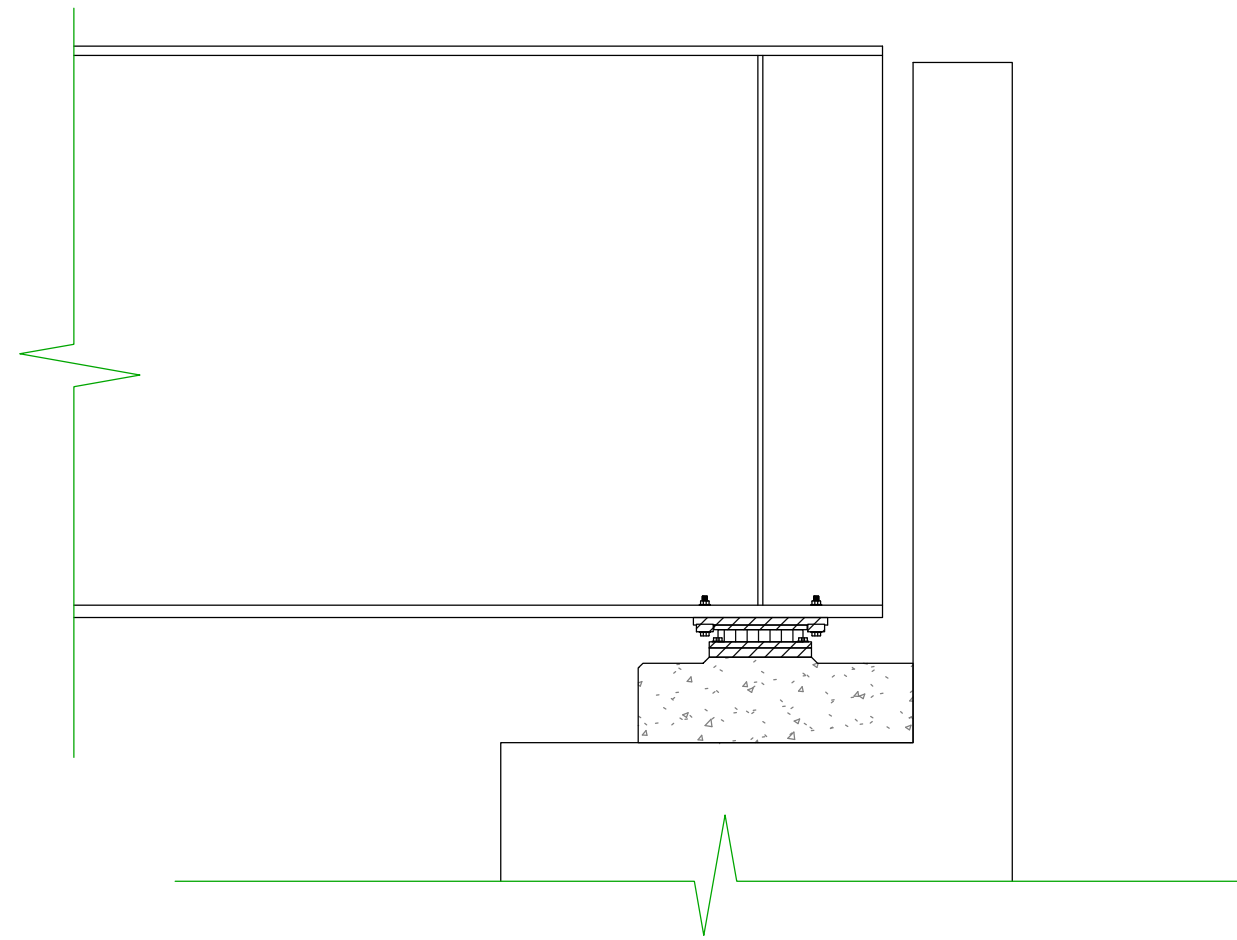
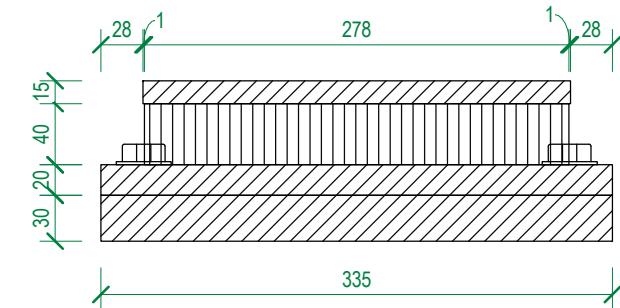


Stainless Steel Panel and PTFE

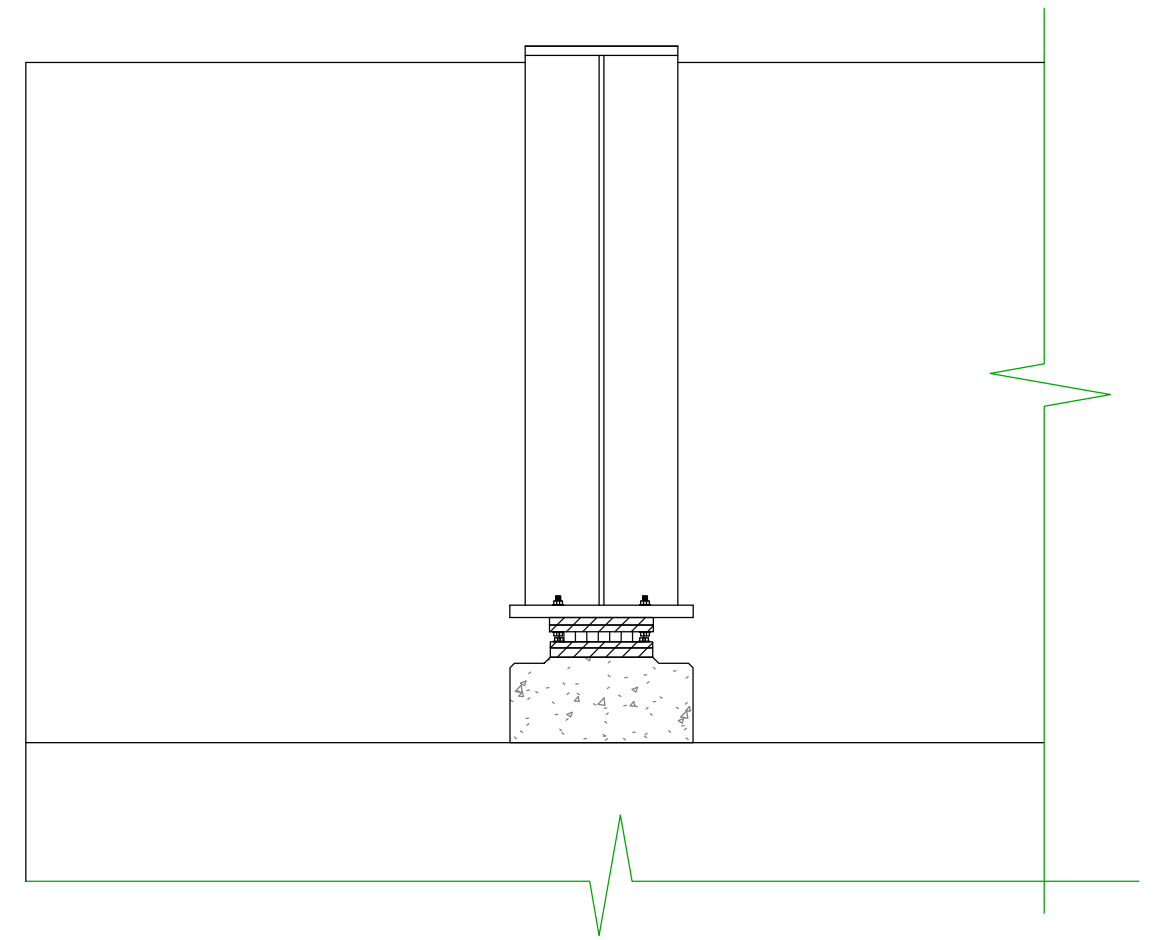


Base Plate, Cylinder Pot Plate, and Steel Piston (inside)

Bottom Plate



Side View



Front View

A2-23



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LAO CONSULTING GROUP
Tel: (856-21) 313288 377 Lao-Thai Road
Fax: (856-21) 313258 Ban Vathak, Moung Seuthak
E-mail: kg@laoconsulting.com P.O. BOX 3097
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THE PROJECT FOR CAPACITY DEVELOPMENT ON BRIDGE
MAINTENANCE AND MANAGEMENT

DRAWING TITLE:

Transverse Direction Movable Bearing Details

TITLE	NAME	SIGNATURE
DRAWN:	NILANDONE	
INSPECTOR:	VANNAXAY	
TEAM LEADER:	Dr. SOPHA	
PROJECT MANAGER:	A. SAKULKU	

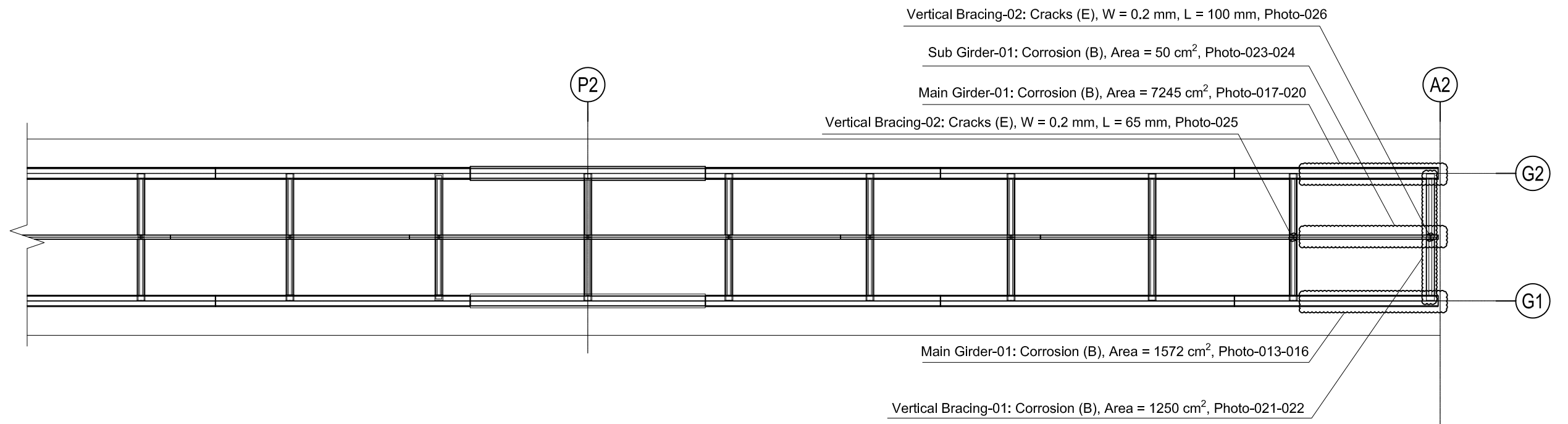
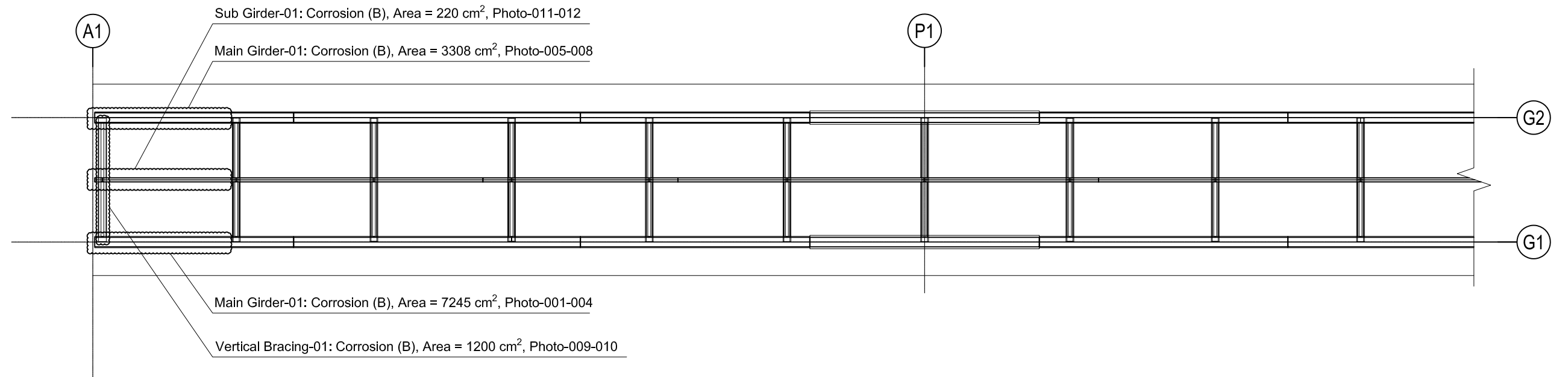
DRAWING No.:
14

SCALE:
As indicated

Appendix 2: Xe Bangnouan Bridge

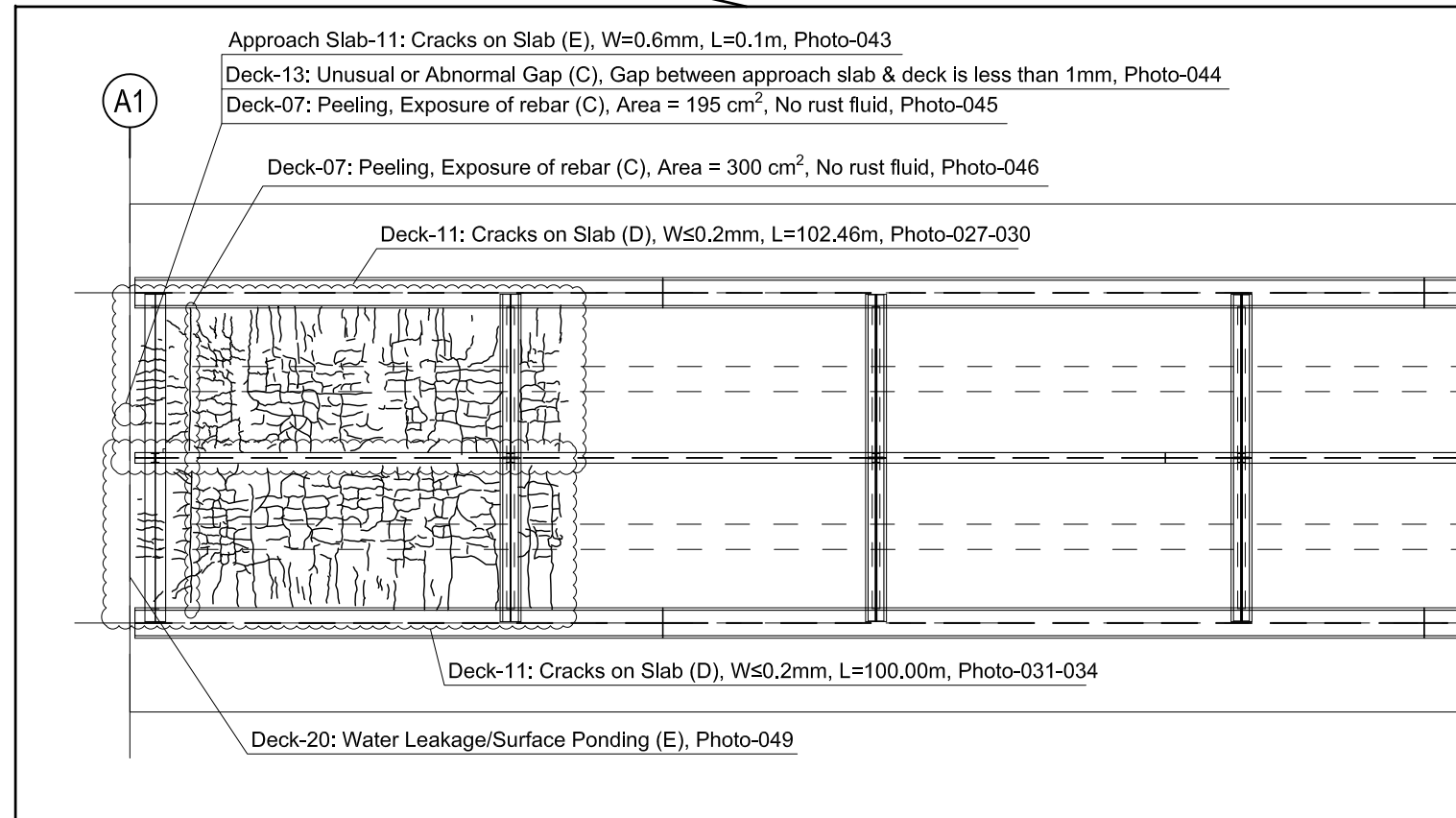
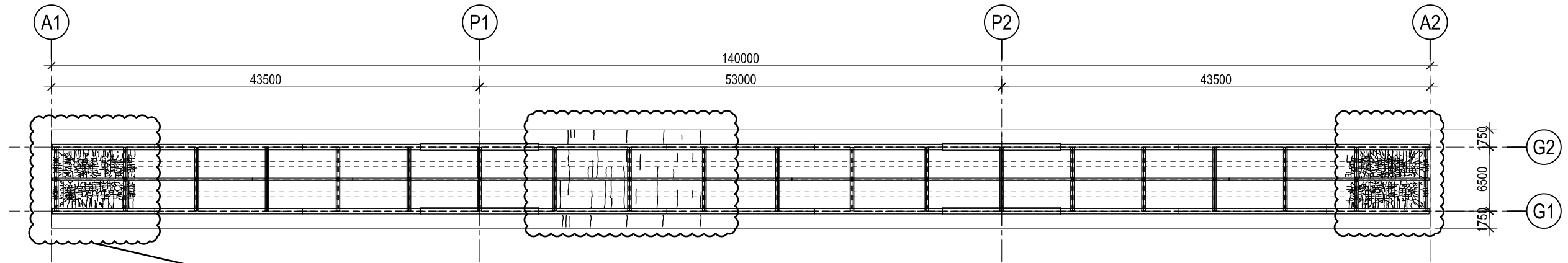
Appendix 2-c: Damage Drawings

*Note1: Main Girder-05: Degradation of Anticorrosion Performance. The damage grade C is generally observed. The outermost anticorrosion coating has discoloration and loosened locally.
 *Note2: Vertical Bracing-05: Degradation of Anticorrosion Performance. The damage grade C is generally observed. The outermost anticorrosion coating has discoloration and loosened locally.
 *Note3: Sub Girder-05: Degradation of Anticorrosion Performance. The damage grade C is generally observed. The outermost anticorrosion coating has discoloration and loosened locally.
 *Note4: Damages between 1st and 2nd bracing (8.5m-long) counted from abutment A1 and A2 have been recorded by closely conducting a visual inspection.



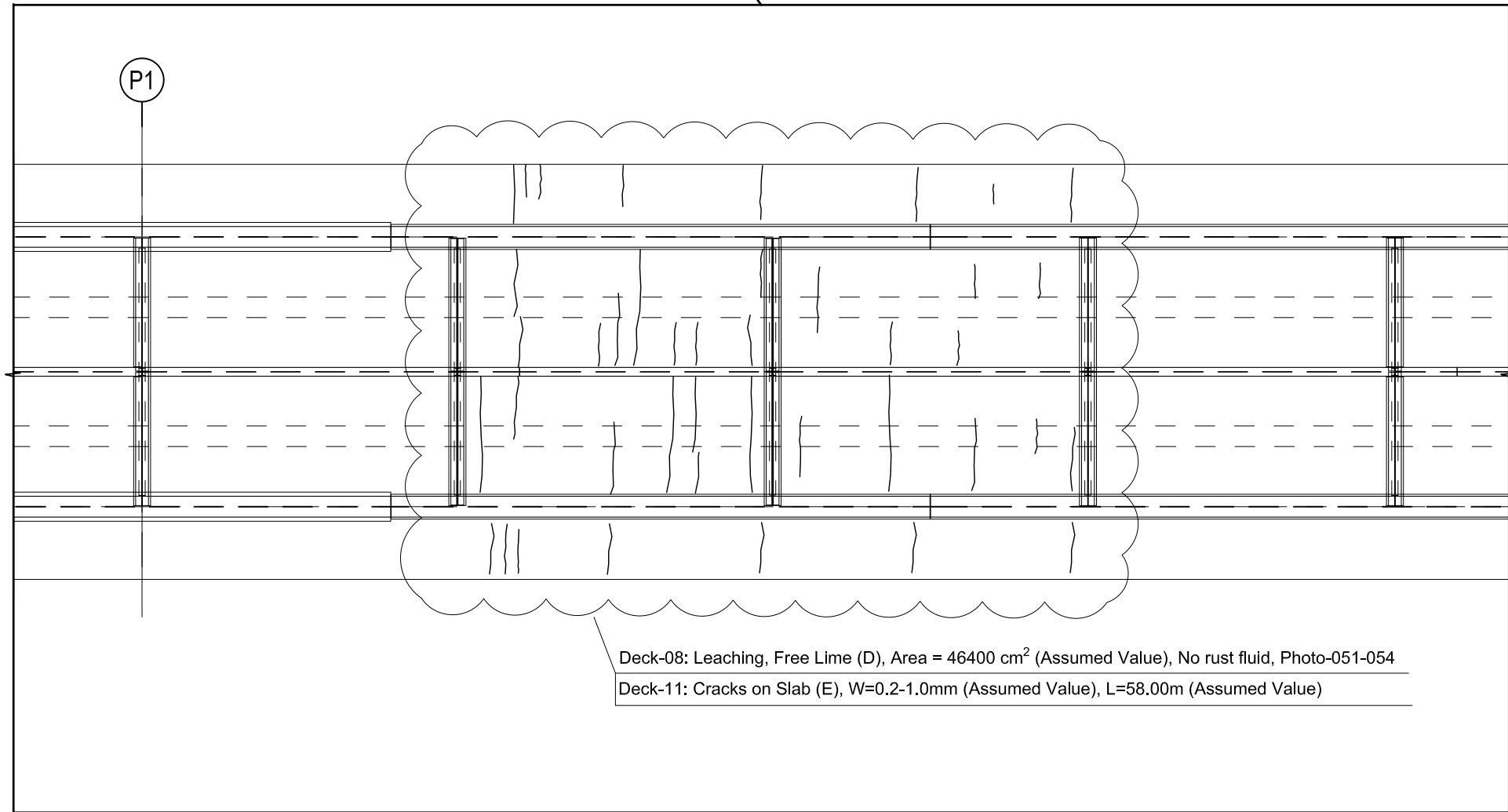
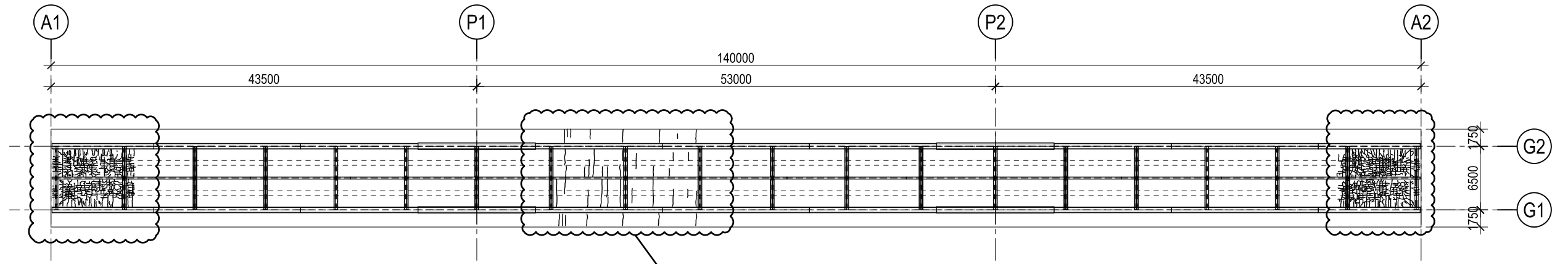
Damage Drawings Bottom View (Steel Member: Main Girder, Sub Girder and Vertical Bracing)

*Note1: Damages between 1st and 2nd bracing (8.5m-long) counted from abutment A1 and A2 have been recorded by closely conducting a visual inspection.
 *Note2: Damages between pier P1 and P2 have been recorded by using binoculars and telephoto camera due to site constraints.



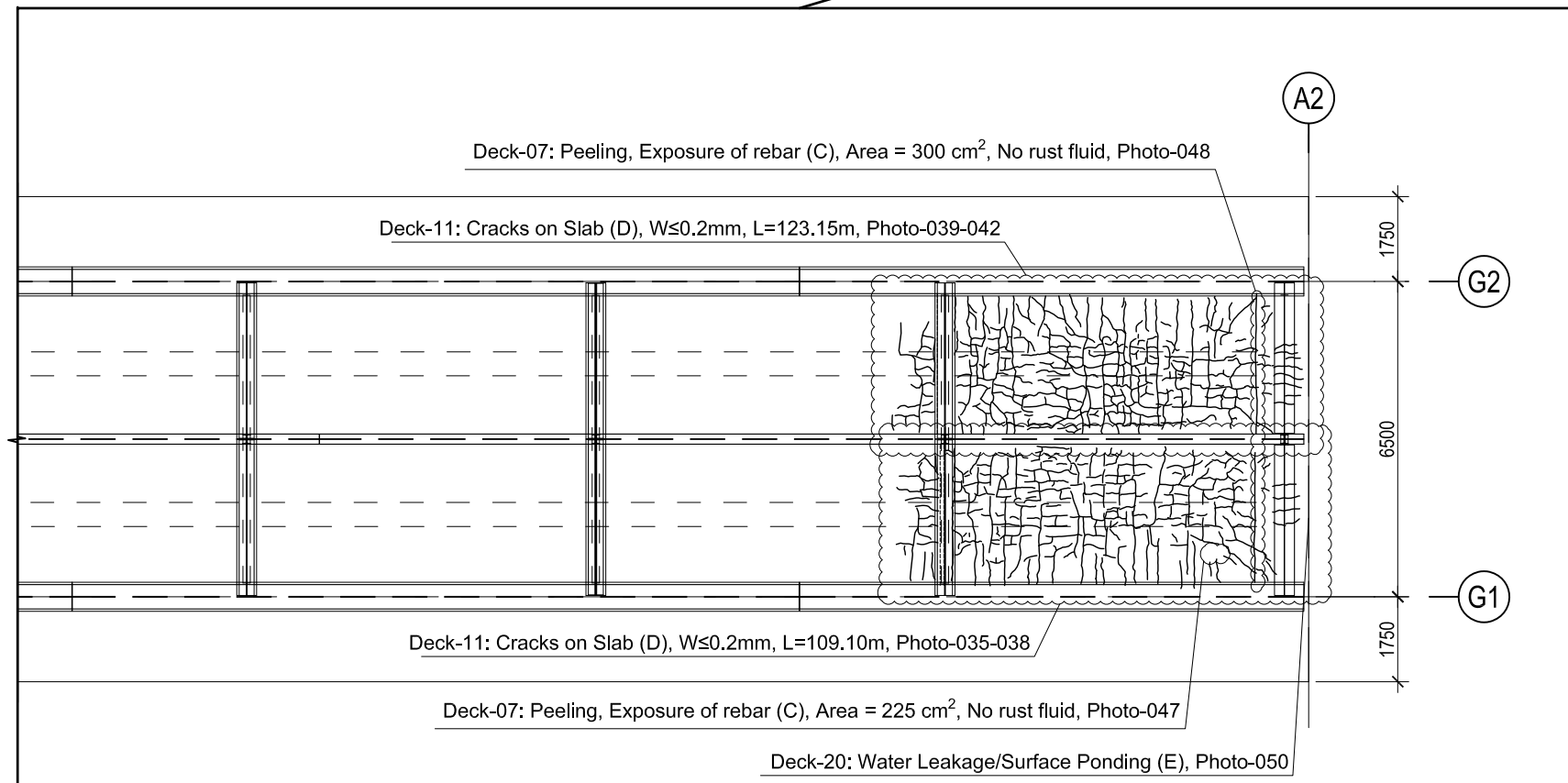
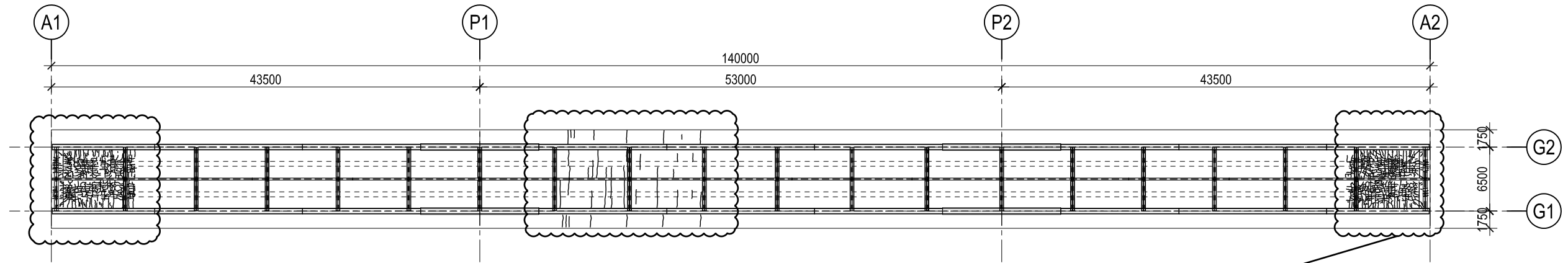
Damage Drawings Bottom View (Concrete Member: Deck) Span - 1

*Note1: Damages between 1st and 2nd bracing (8.5m-long) counted from abutment A1 and A2 have been recorded by closely conducting a visual inspection.
 *Note2: Damages between pier P1 and P2 have been recorded by using binoculars and telephoto camera due to site constraints.



Damage Drawings Bottom View (Concrete Member: Deck) Span - 2

*Note1: Damages between 1st and 2nd bracing (8.5m-long) counted from abutment A1 and A2 have been recorded by closely conducting a visual inspection.
 *Note2: Damages between pier P1 and P2 have been recorded by using binoculars and telephoto camera due to site constraints.

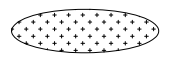





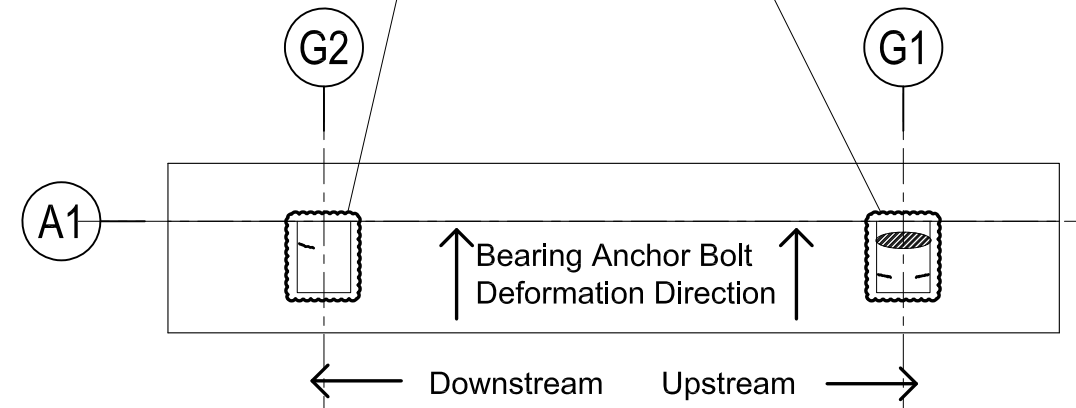
Damage Drawings Bottom View (Concrete Member: Deck) Span - 3

Bearing Body-01: Corrosion (C), Photo-055
Bearing Body-05: Degradation of Anticorrosion Performance (C), Photo-056
Mortar (Grout Pad)-06: Cracks (E), W=0.55mm, L=0.07m, Photo-057
Bearing Body-17: Others (E), Rubber is damaged, Photo-058
Bearing Anchor Bolt-23: Deformation/Loss (E), Photo-059

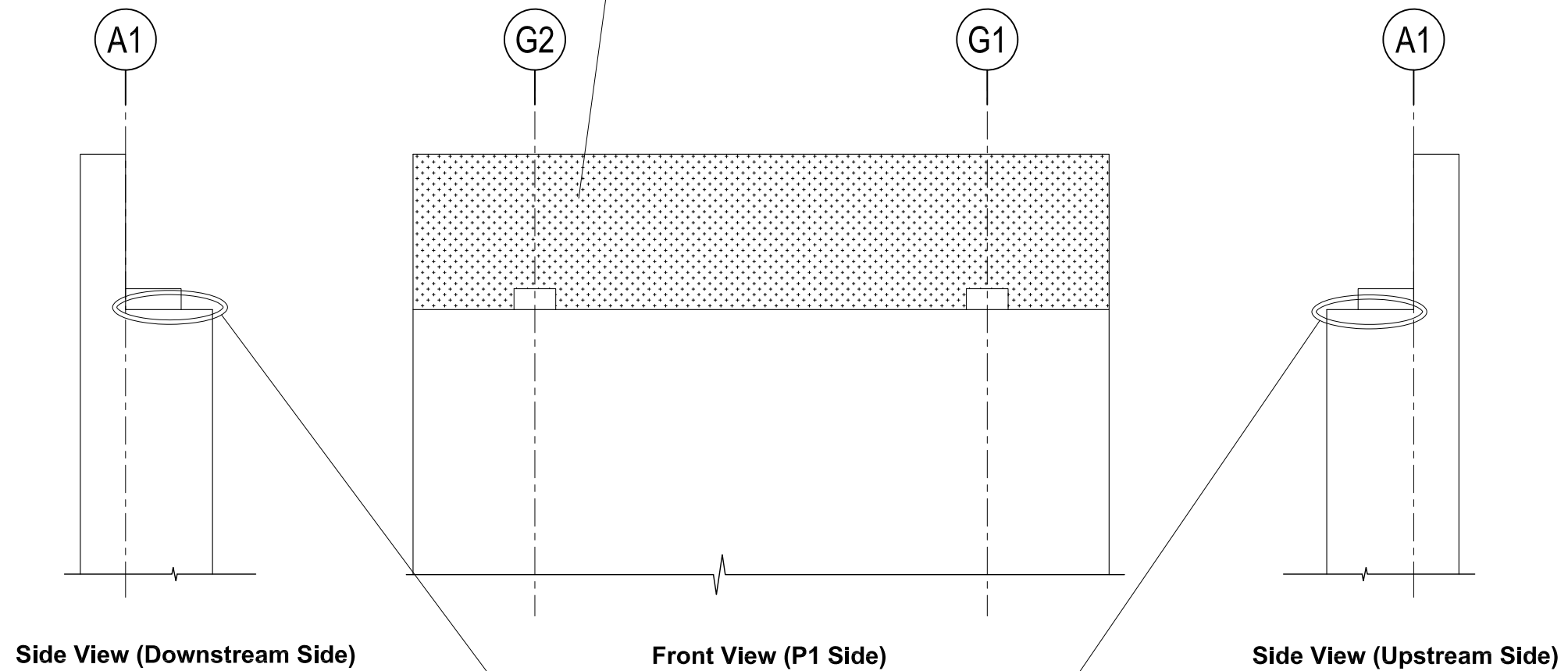
Bearing Body-01: Corrosion (C), Photo-060
Bearing Body-05: Degradation of Anticorrosion Performance (C), Photo-061
Mortar (Grout Pad)-06: Cracks (B), W=0.10mm, L=0.08m, Photo-062
Mortar (Grout Pad)-06: Cracks (B), W=0.15mm, L=0.07m, Photo-063
Mortar (Grout Pad)-07: Peeling, Exposure of Rebar (C), Area = 570 cm², Photo-064
Bearing Body-17: Others (E), Rubber is damaged, Photo-065
Bearing Anchor Bolt-23: Deformation/Loss (C), Photo-066

Legend of damage

Damage type	Mark
20-Water Leakage Surface Ponding	
24-Sediment Clogging	
06-Cracks	
07-Peeling, Exposure of rebar	



Body-20: Water Leakage Surface Ponding (E), Photo-067



Body-24: Sediment Clogging (E), Photo-068

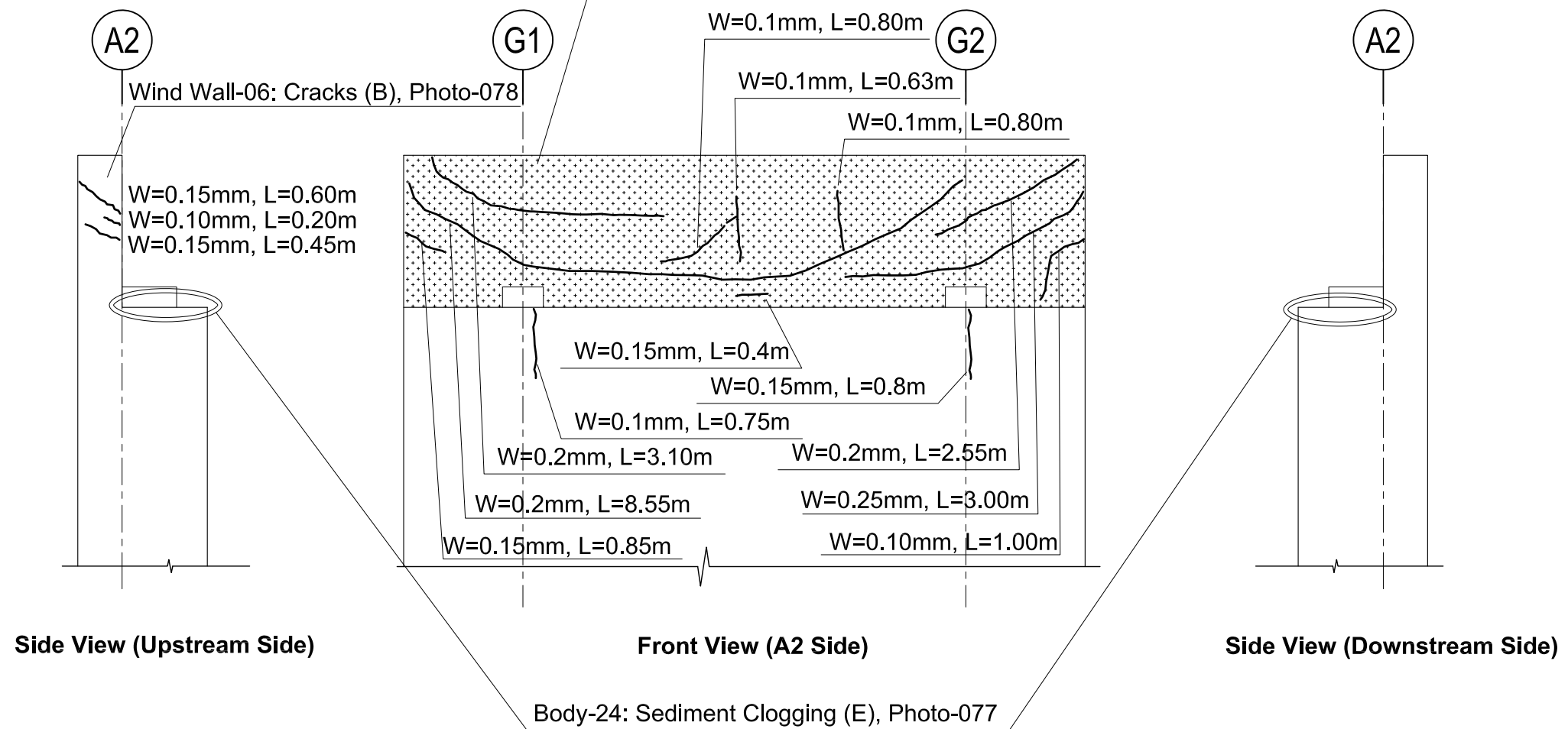
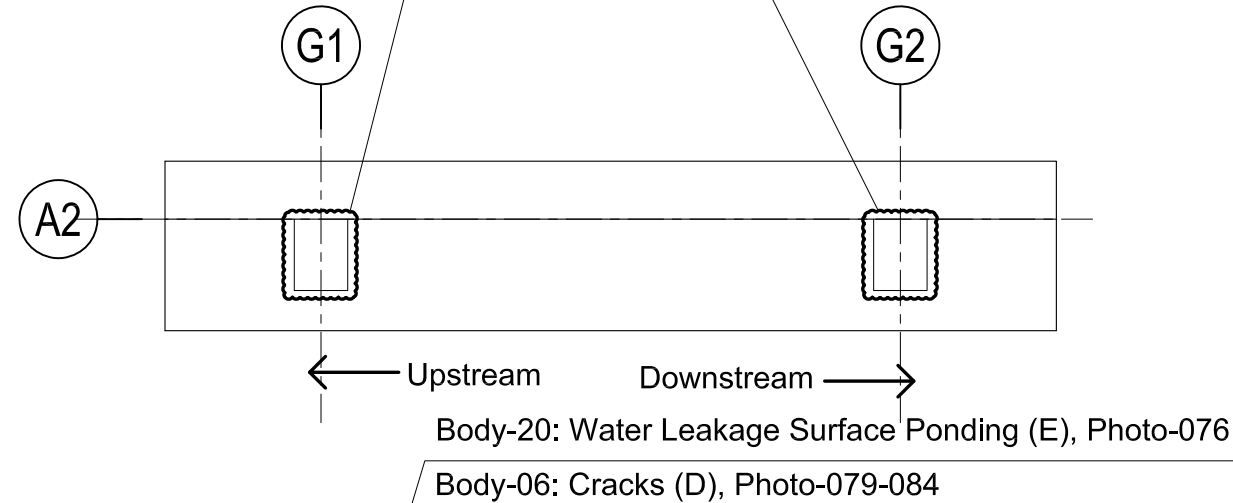
Abutment A1 Damage Drawings

Bearing Body-01: Corrosion (C), Photo-069
 Bearing Body-05: Degradation of Anticorrosion Performance (C), Photo-070
 Bearing Body-17: Others (E), Rubber is damaged, Photo-071

Bearing Body-01: Corrosion (C), Photo-072
 Bearing Body-05: Degradation of Anticorrosion Performance (C), Photo-073
 Bearing Body-17: Others (E), Rubber is damaged, Photo-074
 Bearing Anchor Bolt-03: Loose/Drop-off (E), Photo-075

Legend of damage

Damage type	Mark
20-Water Leakage Surface Ponding	
24-Sediment Clogging	
06-Cracks	
07-Peeling, Exposure of rebar	



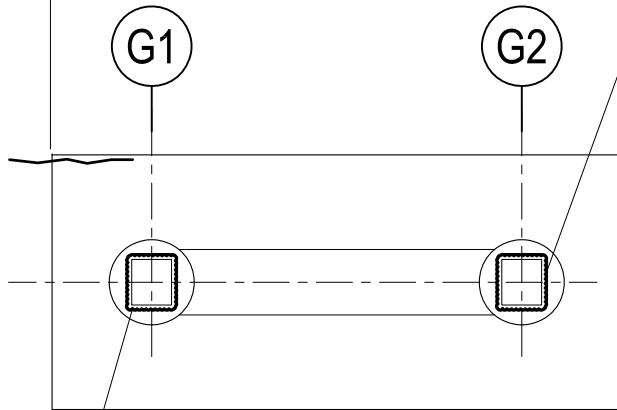
Abutment A2 Damage Drawings

*Note1: Damages of bearing have been recorded by using binoculars and telephoto camera due to site constraints.



Foundation-06: Cracks (E),
W=0.65mm L=0.1m, Photo-087

Bearing Body-01: Corrosion (C), Photo-090
Bearing Body-05: Degradation of
Anticorrosion Performance (C),

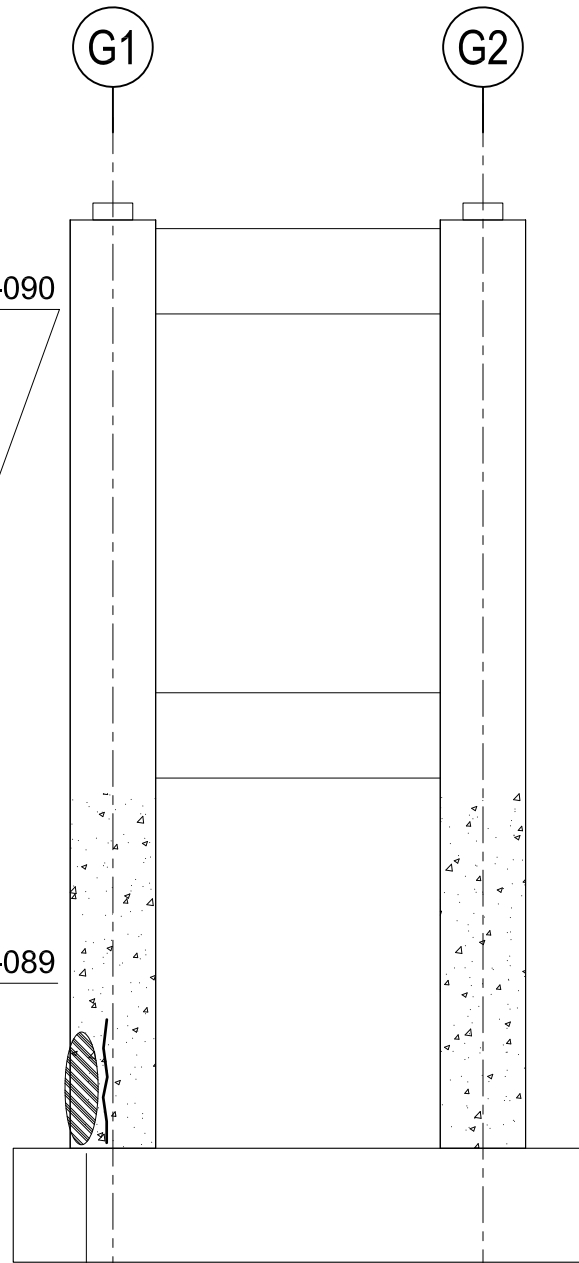


Top View

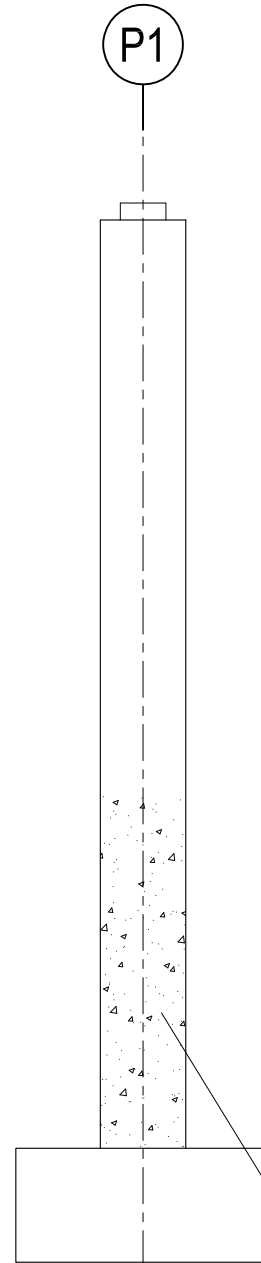
Bearing Body-01: Corrosion (C), Photo-089
Bearing Body-05: Degradation of
Anticorrosion Performance (C),

Legend of damage

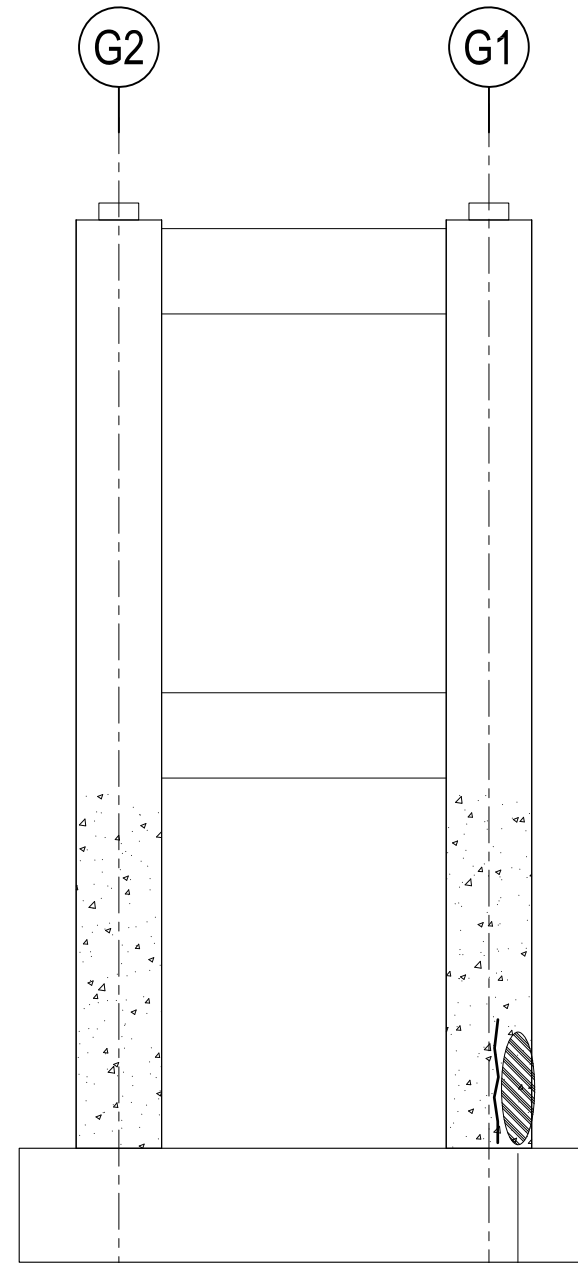
Damage type	Mark
06-Cracks	
07-Peeling, Exposure of rebar	
26-Scoring	



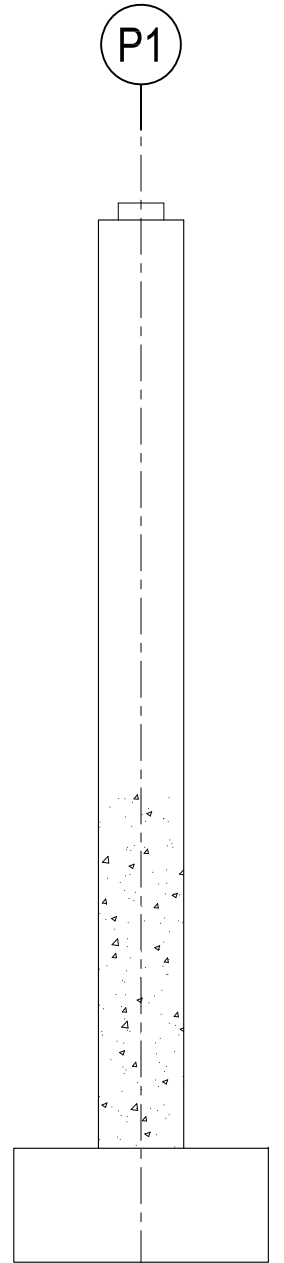
Front View (A1 Side)



Side View (Upstream Side)



Front View (A2 Side)



Side View (Downstream Side)

Pier-06: Cracks (C), W=0.2mm L=0.7m, Photo-085

Pier-07: Peeling, Exposure of rebar (C), Area = 4200 cm², No rust fluid

Pier-26: Scouring (C), Photo-088

Pier-06: Cracks (E), W=0.5mm L=2.1m, Photo-086

Pier-07: Peeling, Exposure of rebar (C), Area = 4300 cm², No rust fluid

Pier P1 Damage Drawings

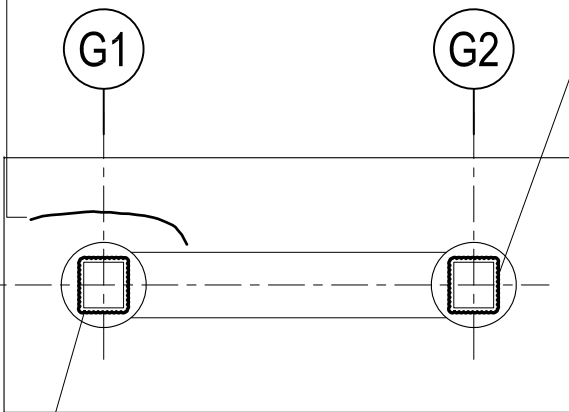
*Note1: Damages of bearing have been recorded by using binoculars and telephoto camera due to site constraints.

← Upstream Downstream →

← Downstream Upstream →

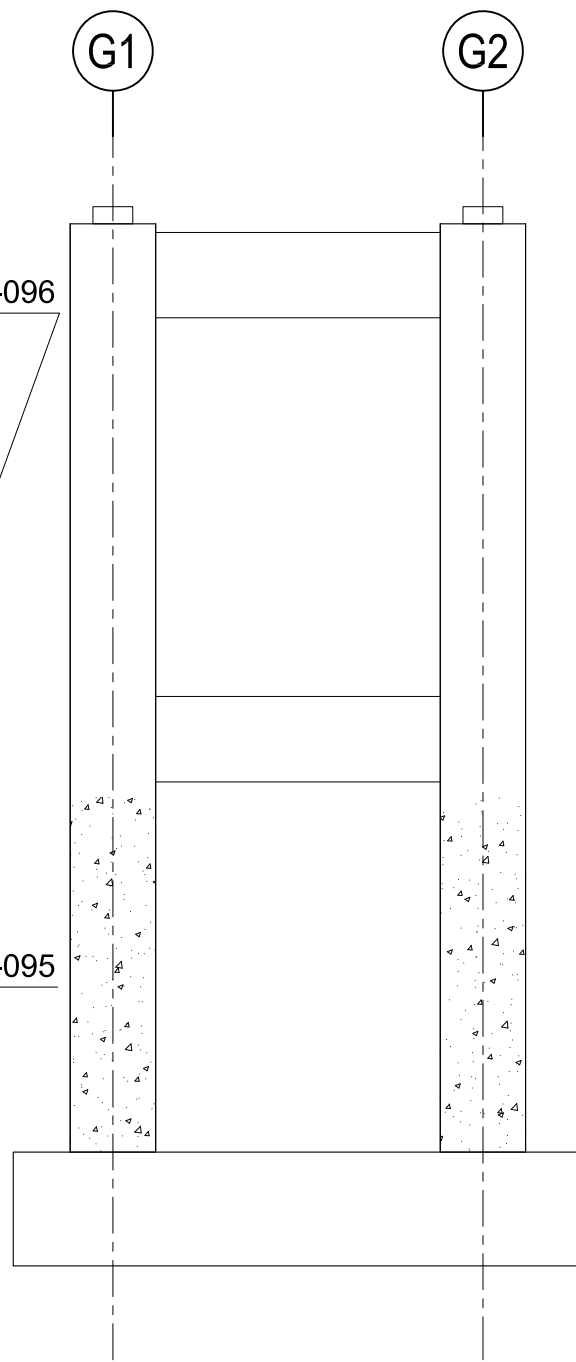
Foundation-06: Cracks (D),
W=0.35mm L=2.1m, Photo-091

Bearing Body-01: Corrosion (C), Photo-096
Bearing Body-05: Degradation of
Anticorrosion Performance (C),

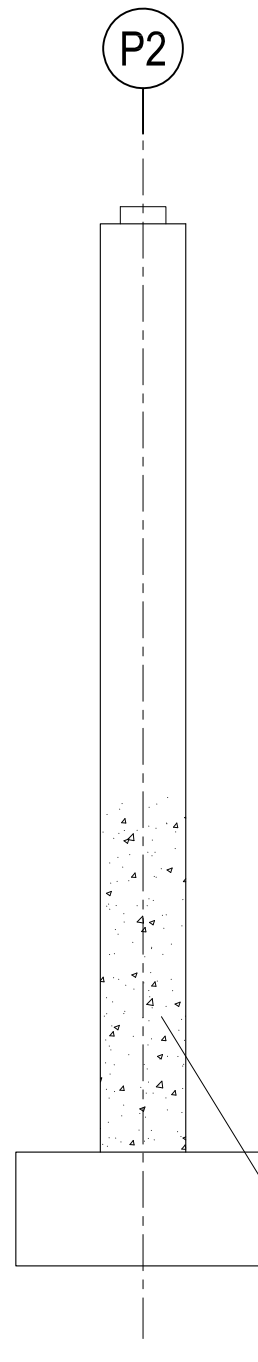


Top View

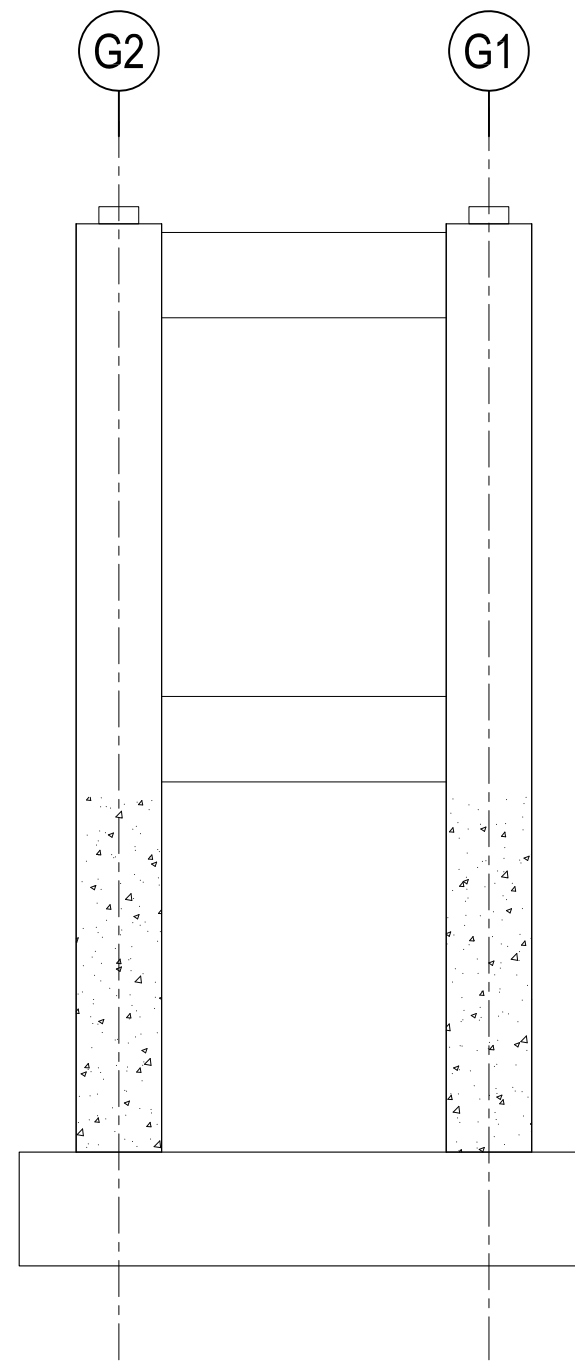
Bearing Body-01: Corrosion (C), Photo-095
Bearing Body-05: Degradation of
Anticorrosion Performance (C),



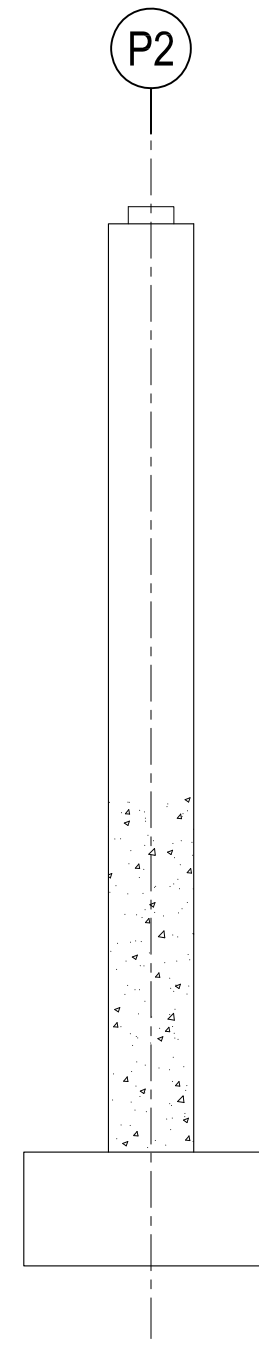
Front View (A1 Side)



Side View (Upstream Side)



Front View (A2 Side)



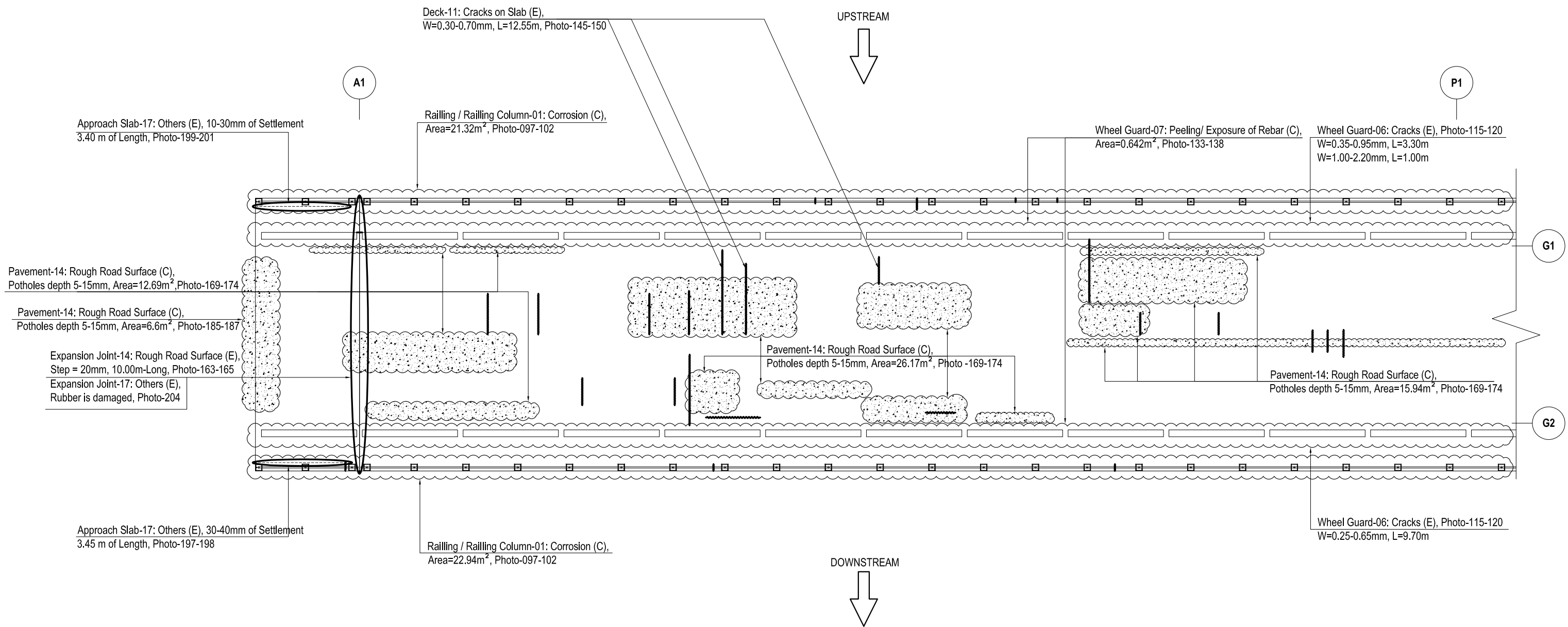
Side View (Downstream Side)

Pier-26: Scouring (C), Photo-092-094

Legend of damage

Damage type	Mark
06-Cracks	
07-Peeling, Exposure of rebar	
26-Scouring	

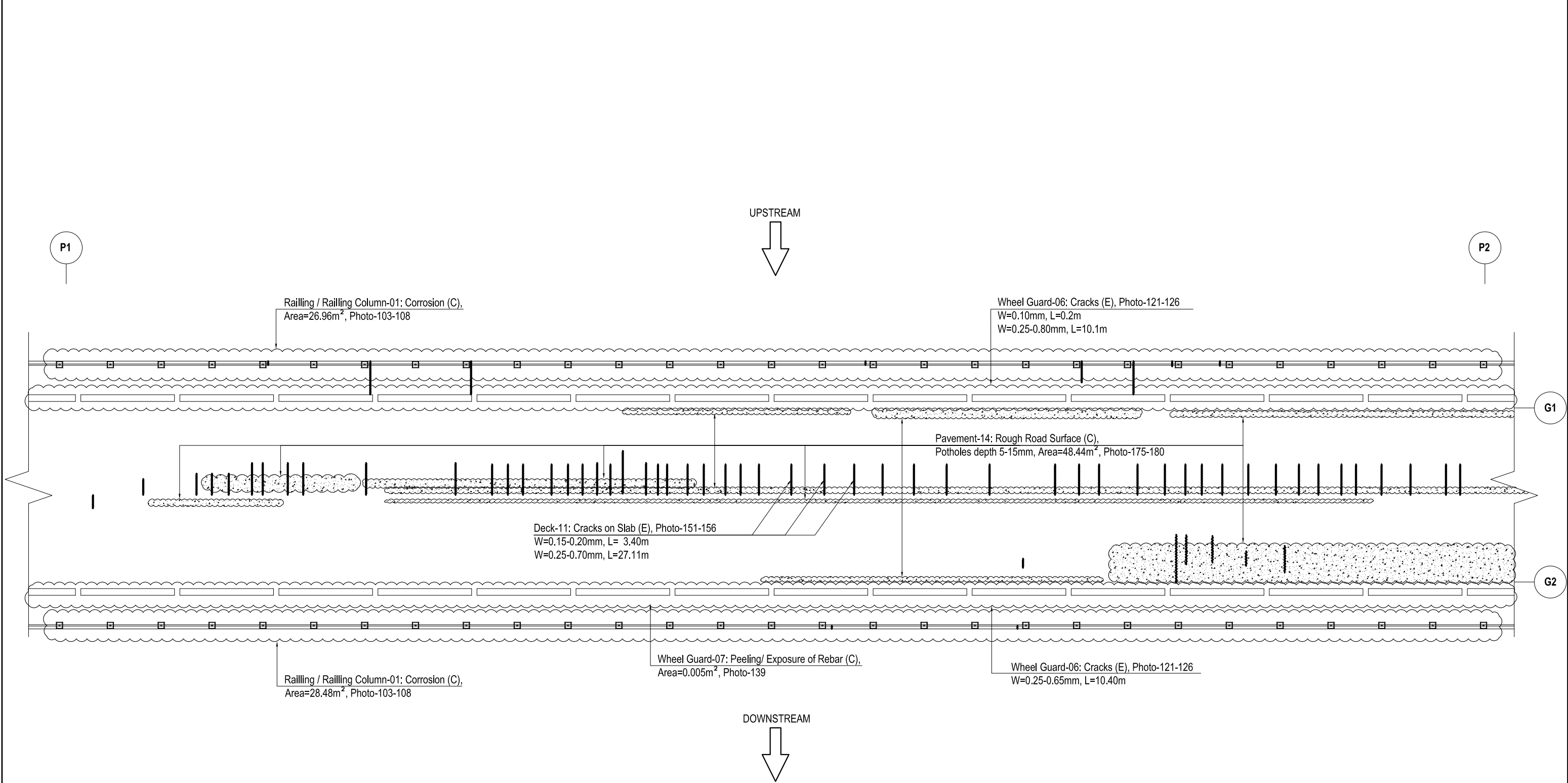
Pier P2 Damage Drawings



Legend of damage

Damage type	Mark
11-Cracks on Slab	
14-Rough Road Surface	

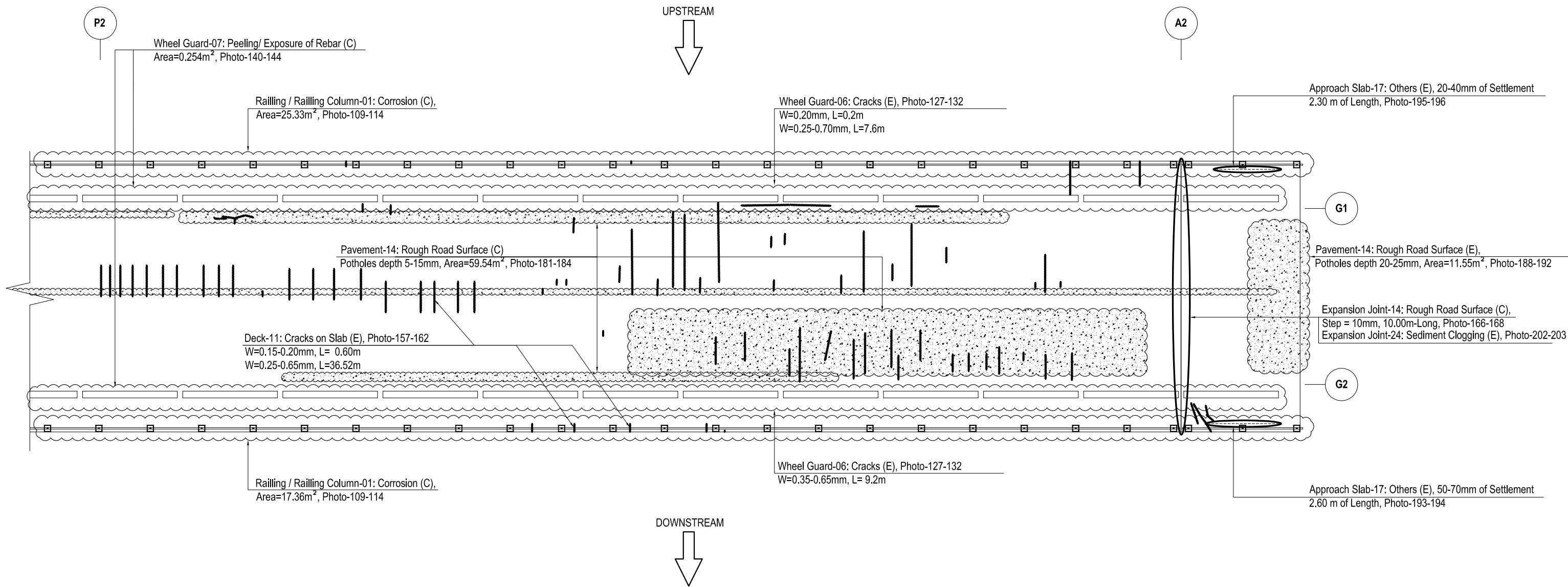
Damage Drawing Top View Span - 1



Legend of damage

Damage type	Mark
11-Cracks on Slab	-----
14-Rough Road Surface	~~~~~

Damage Drawing Top View Span - 2



Legend of damage

Damage type	Mark
11-Cracks on Slab	
14-Rough Road Surface	

Damage Drawing Top View Span - 3