

BRIDGE&CULVERT

GENERAL VIEW

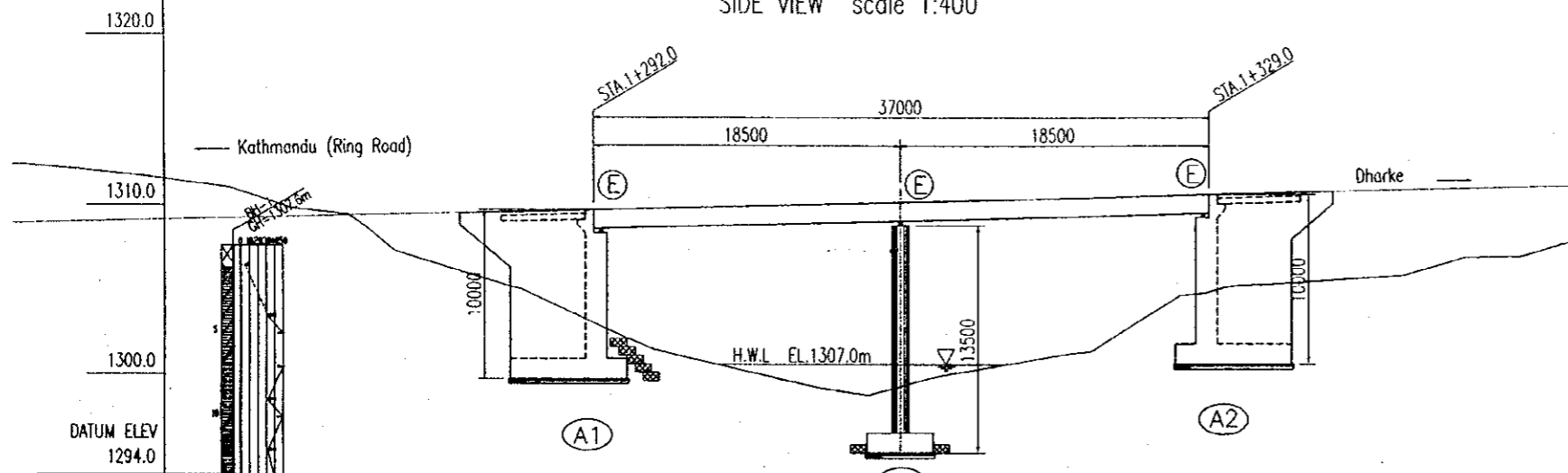
DESIGN CRITERIA

| | | |
|---------------------|---------------------------------|----------------|
| TYPE | Center Span | RC HOLLOW SLAB |
| | Side Span | RC HOLLOW SLAB |
| BRIDGE LENGTH | 37.000m | |
| SPAN ARRANGEMENT | 2@18.5m | |
| WIDTH | 10.80m | |
| LIVE LOAD | B-TYPE LIVE LOAD (JRA STANDARD) | |
| SEISMIC COEFFICIENT | K _h =0.15 | |
| ANGLE OF SKEW | 90°00'00" | |
| RADIUS OF CURVATURE | R=∞ | |
| LONGITUDINAL SLOPE | 2.50% | |

MATERIALS

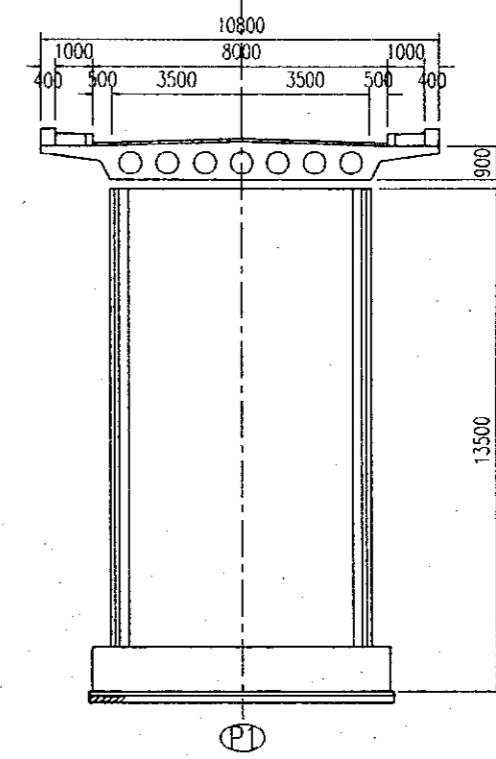
| | | |
|----------|----------------|---------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | - |

SIDE VIEW scale 1:400

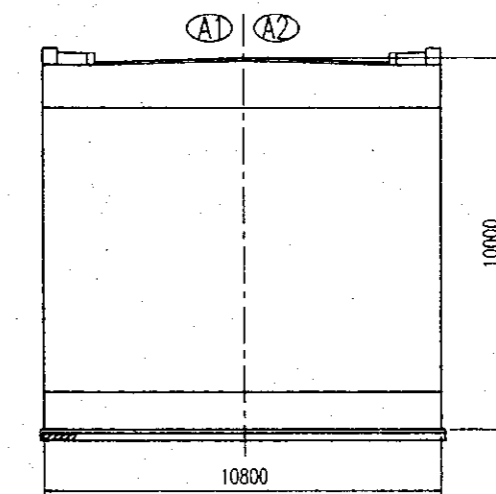
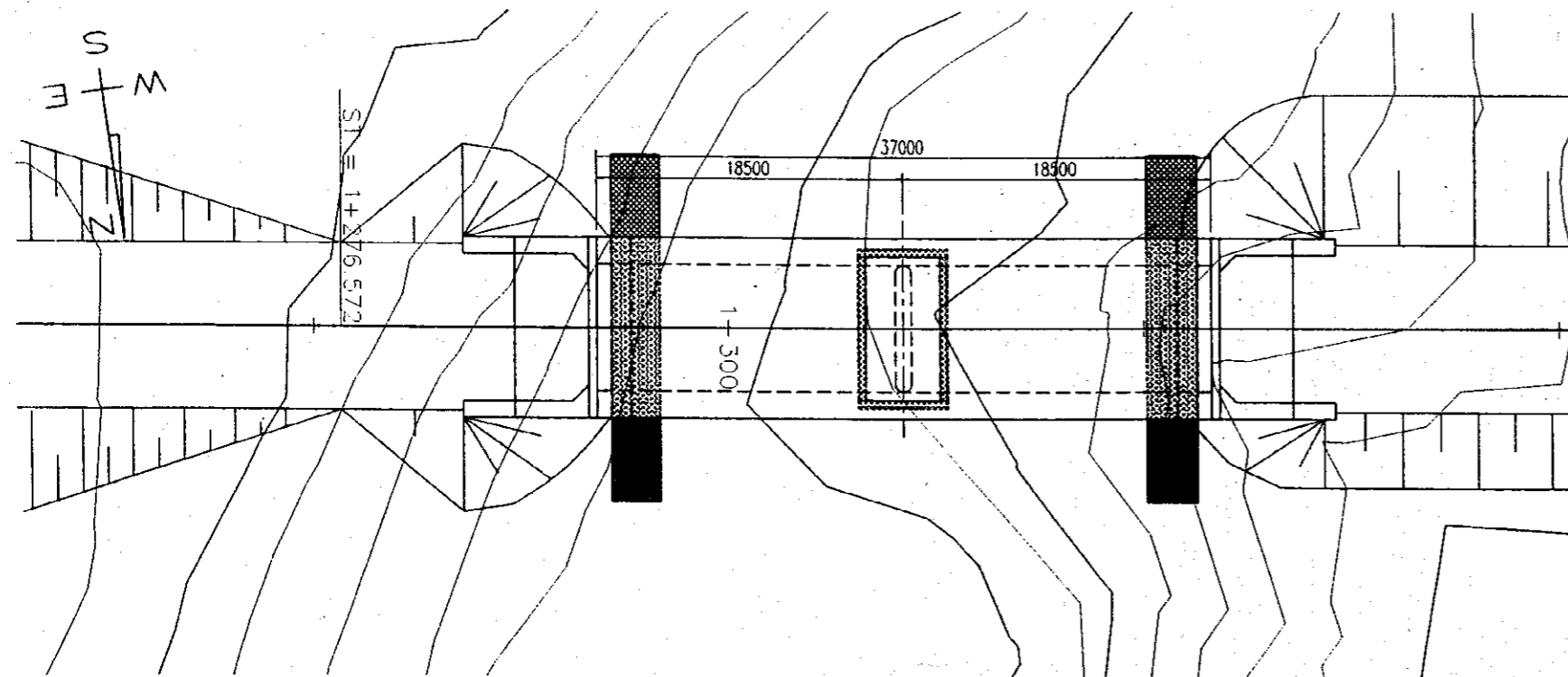



| | | | | | | |
|-----------------|----------|----------|----------|----------|----------|----------|
| GRADIENT | i=2.50% | | | | | |
| PROPOSED HEIGHT | | | | | | |
| GROUND HEIGHT | 1309.728 | 1309.375 | 1300.571 | 1310.000 | 1303.346 | 1310.625 |
| DISTANCE | 1+275 | 1+292 | 1+300 | 1+310.5 | 1+325 | 1+329 |
| CURVE ELEMENT | R=∞ | | | | | |

CROSS SECTION scale 1:200



PLAN scale 1:400



| | | | | |
|---|---|---|---|---------|
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Kachauda Khola Bridge (STA.1+283 - 1+334) | Bc-1 |

GENERAL VIEW

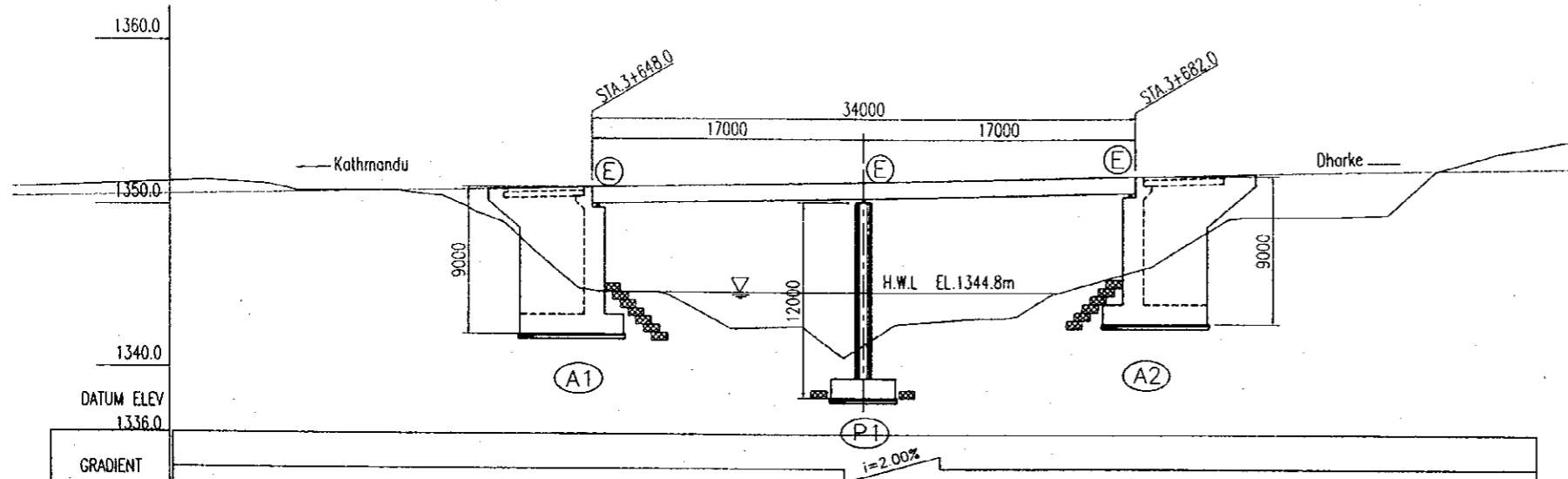
DESIGN CRITERIA

| | | |
|---------------------|-------------|---------------------------------|
| TYPE | Center Span | RC HOLLOW SLAB |
| | Side Span | RC HOLLOW SLAB |
| BRIDGE LENGTH | | 34.00m |
| SPAN ARRANGEMENT | | 2@17.0m |
| WIDTH | | 10.80m |
| LIVE LOAD | | B-TYPE LIVE LOAD (JRA STANDARD) |
| SEISMIC COEFFICIENT | | $K_h=0.15$ |
| ANGLE OF SKEW | | $90^{\circ}00'00''$ |
| RADIUS OF CURVATURE | | $R=\infty$ |
| LONGITUDINAL SLOPE | | 2.00% |

MATERIALS

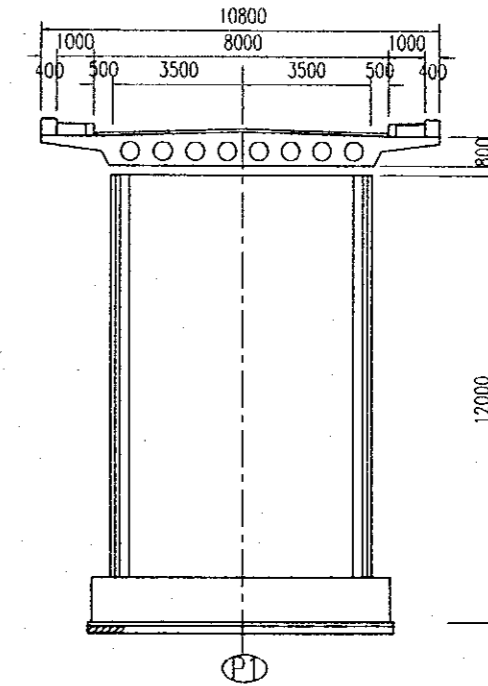
| | | |
|----------|----------------|---------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | - |

SIDE VIEW scale 1:400

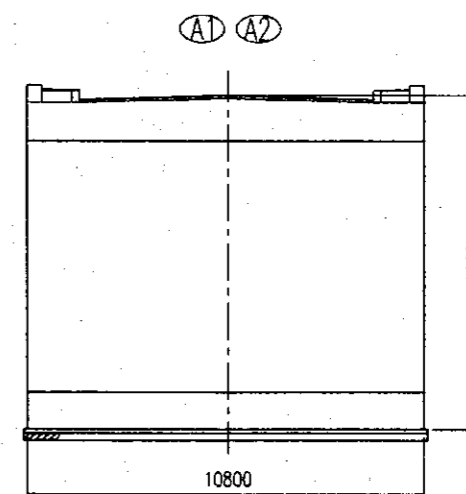
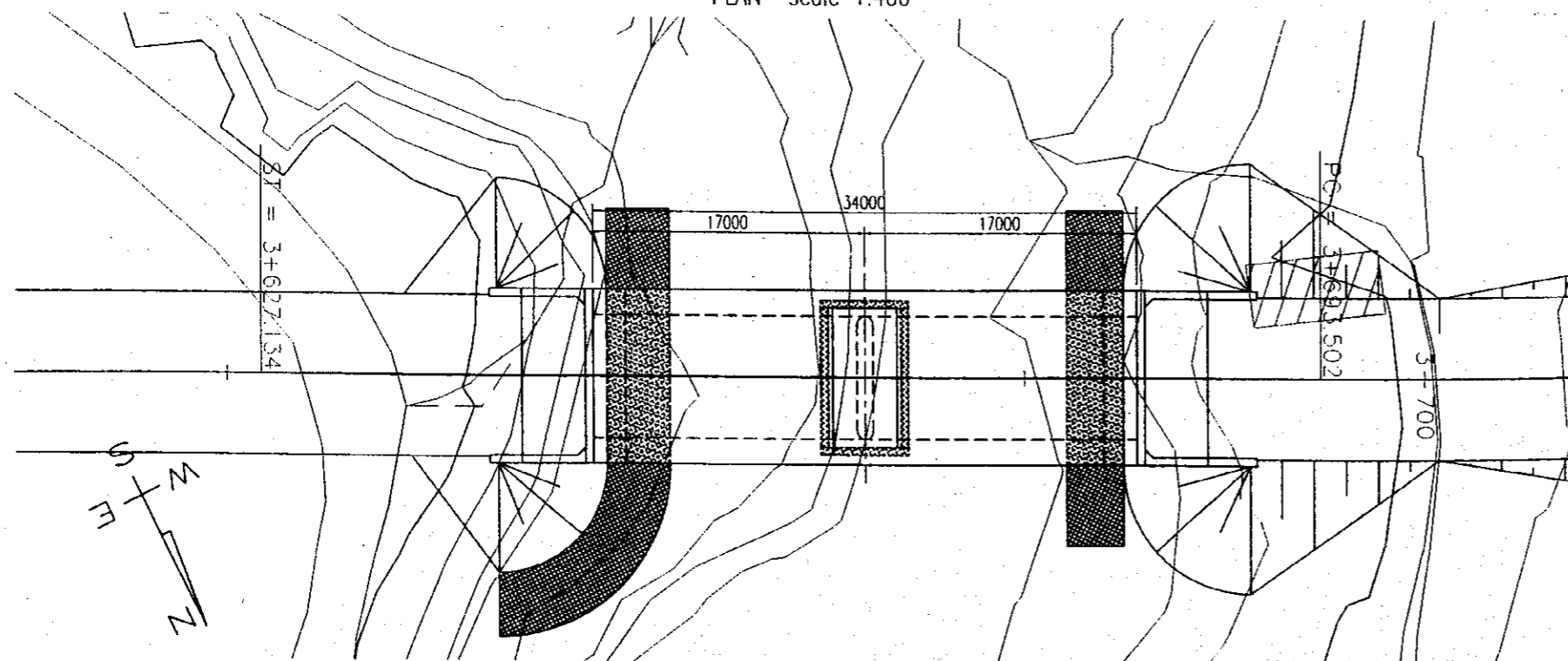


| | | | | | |
|-----------------|----------|----------------|--------------|----------------|----------|
| GRADIENT | | | | | |
| PROPOSED HEIGHT | 1350.706 | 1351.206 | 1351.706 | 1352.206 | |
| GROUND HEIGHT | 1351.445 | 1344.776 | 1343.559 | 1351.538 | 1352.206 |
| DISTANCE | 3+625 | 3+648 3+650 | 3+666 | 3+675 3+682 | 3+700 |
| CURVE ELEMENT | | | $R = \infty$ | | |

CROSS SECTION scale 1:200



PLAN scale 1:400



PROJECT NAME

CLIENT

CONSULTANT

DWG TITLE

DWG NO.

THE FEASIBILITY STUDY ON
THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD
IN THE KINGDOM OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY
HIS MAJESTY'S GOVERNMENT OF NEPAL
MINISTRY OF PHYSICAL PLANNING AND WORKS
DEPARTMENT OF ROADS



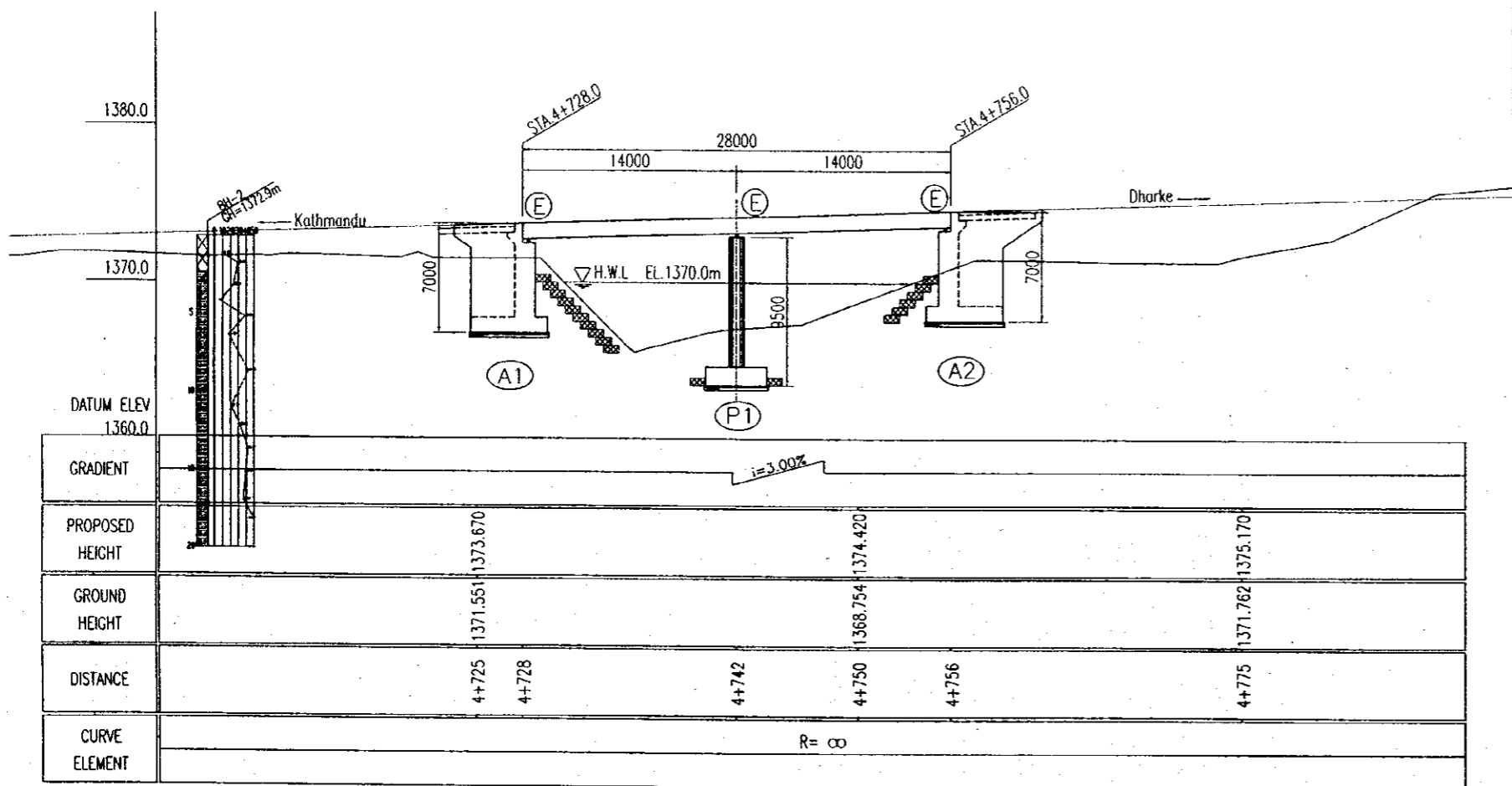
NIPPON KOEI CO., LTD.
Consulting Engineers
Tokyo, JAPAN

Ghatte Khola Bridge (STA.3+643 - 3+688)

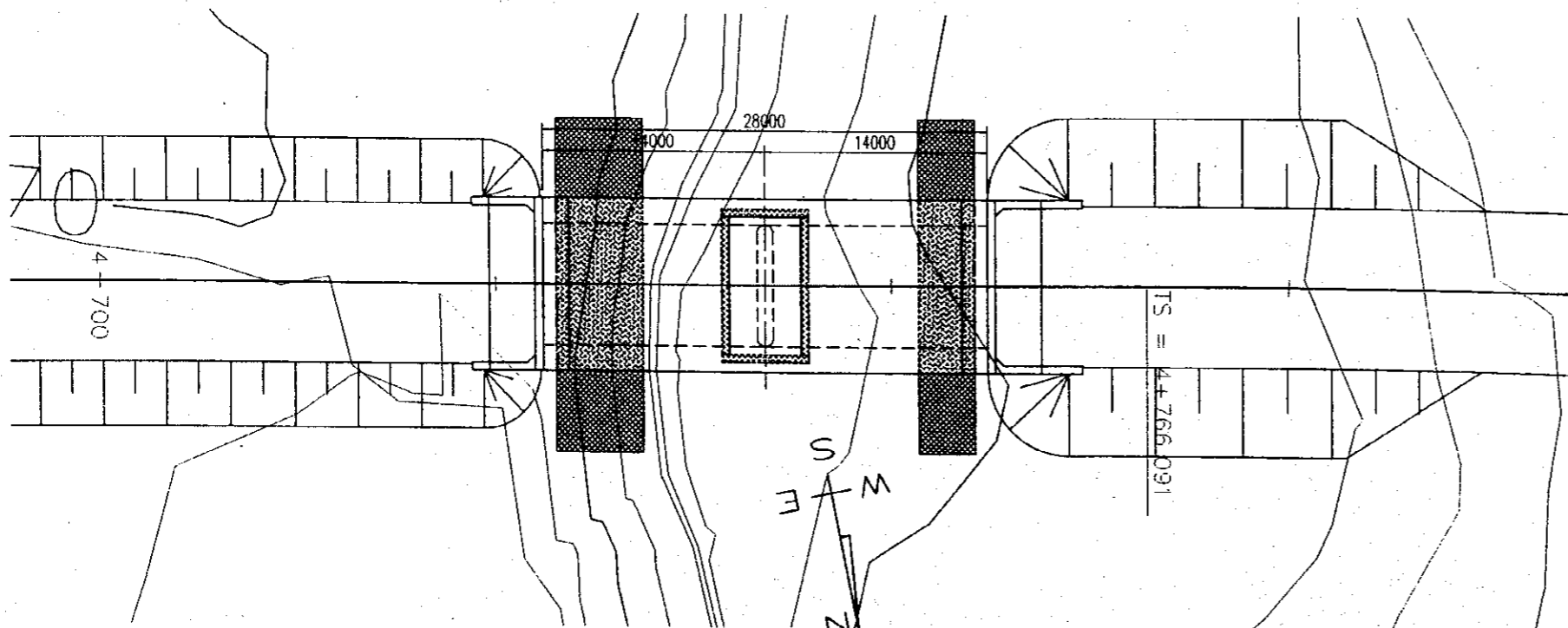
Bc-2

GENERAL VIEW

SIDE VIEW scale 1:400



PLAN scale 1:400



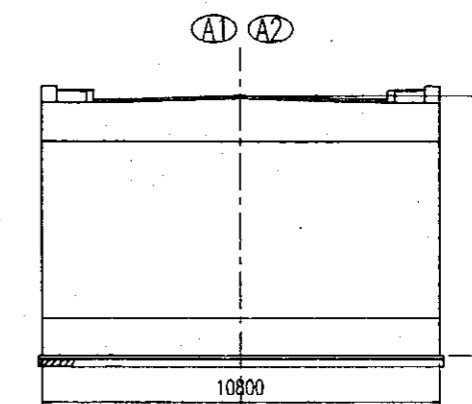
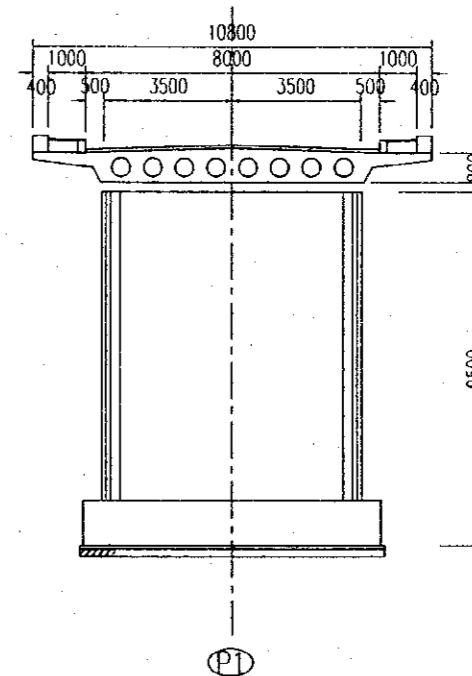
DESIGN CRITERIA


| | | |
|---------------------|---------------------------------|----------------|
| TYPE | Center Span | RC HOLLOW SLAB |
| | Side Span | RC HOLLOW SLAB |
| BRIDGE LENGTH | 28.00m | |
| SPAN ARRANGEMENT | 2@14.0m | |
| WIDTH | 10.80m | |
| LIVE LOAD | B-TYPE LIVE LOAD (JRA STANDARD) | |
| SEISMIC COEFFICIENT | K _h =0.15 | |
| ANGLE OF SKEW | 90°00'00" | |
| RADIUS OF CURVATURE | R=∞ | |
| LONGITUDINAL SLOPE | 3.00% | |

MATERIALS

| | | |
|----------|----------------|---------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | - |

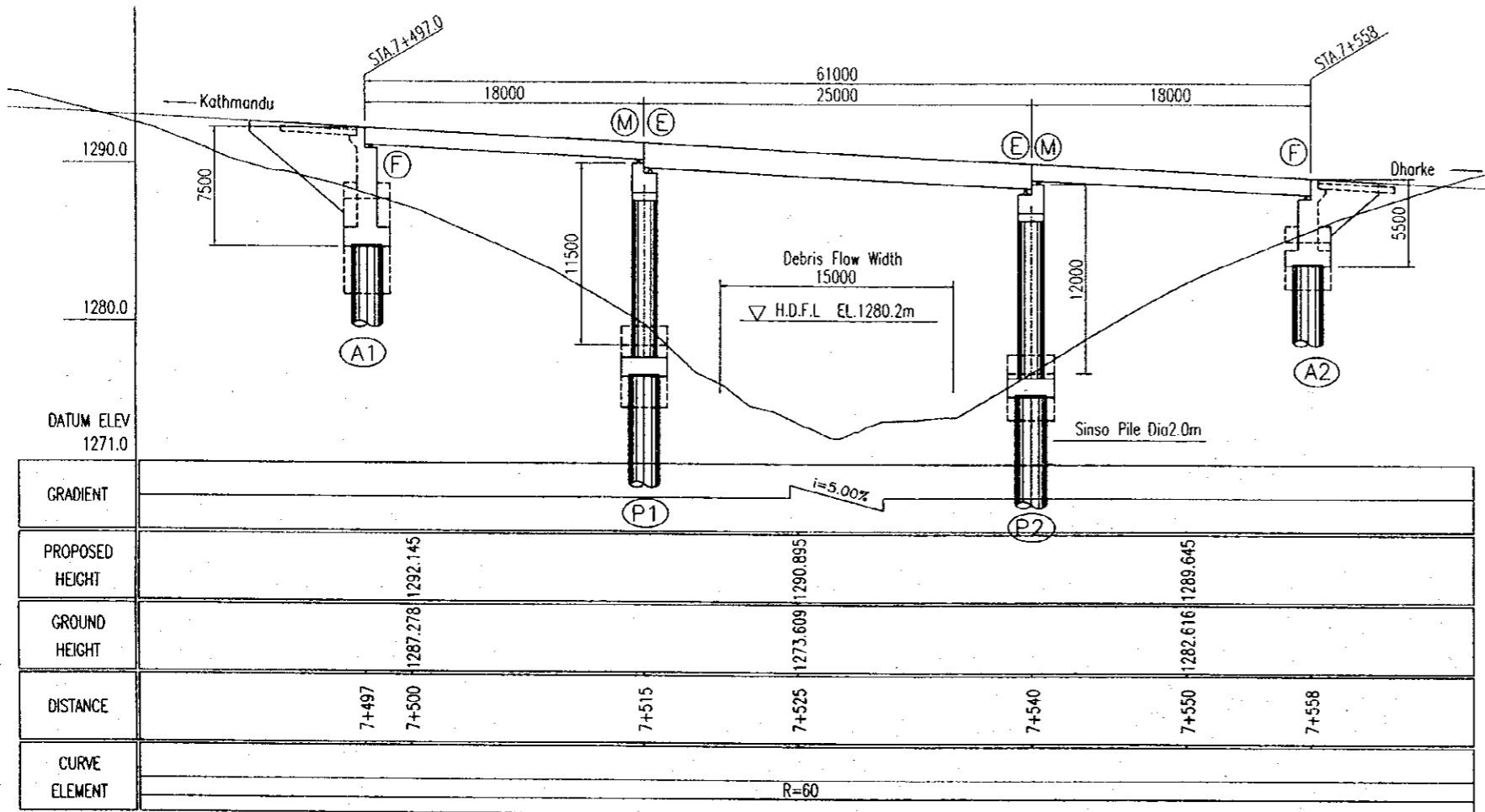
CROSS SECTION scale 1:200



| | | | | |
|---|---|---|--|---------|
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Tirbeni Khola Bridge (STA.4+729 - 4+759) | Bc-3 |

GENERAL VIEW

SIDE VIEW scale 1:400



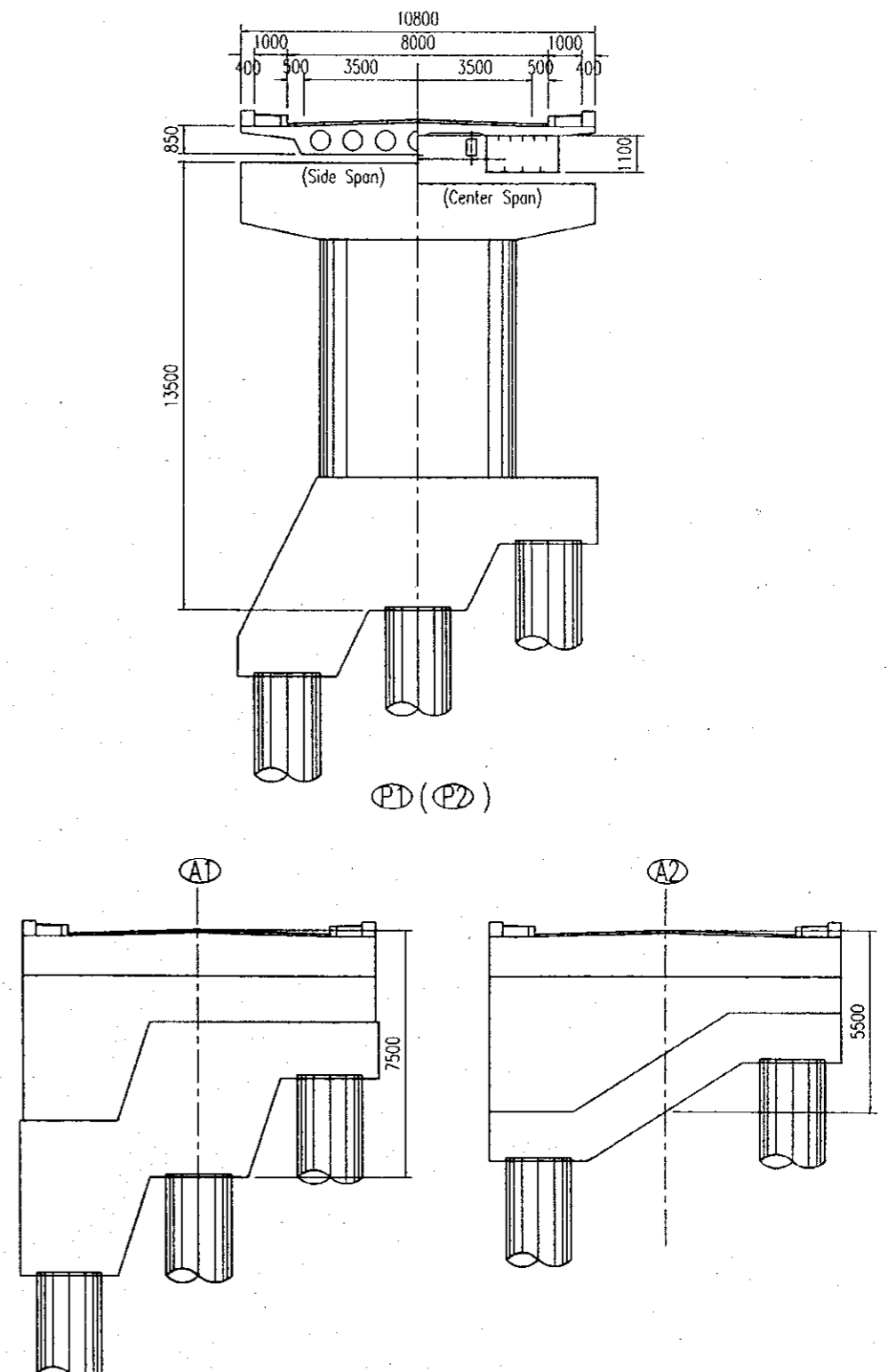
DESIGN CRITERIA

| | | |
|---------------------|---------------------------------|----------------|
| TYPE | Center Span | Steel I Girder |
| | Side Span | RC HOLLOW SLAB |
| BRIDGE LENGTH | 66.0m | |
| SPAN ARRANGEMENT | 18.0+30.0+18.0m | |
| WIDTH | 10.80m | |
| LIVE LOAD | B-TYPE LIVE LOAD (JRA STANDARD) | |
| SEISMIC COEFFICIENT | K _h =0.15 | |
| ANGLE OF SKEW | 90°00'00" | |
| RADIUS OF CURVATURE | R=60m | |
| LONGITUDINAL SLOPE | 5.00% | |

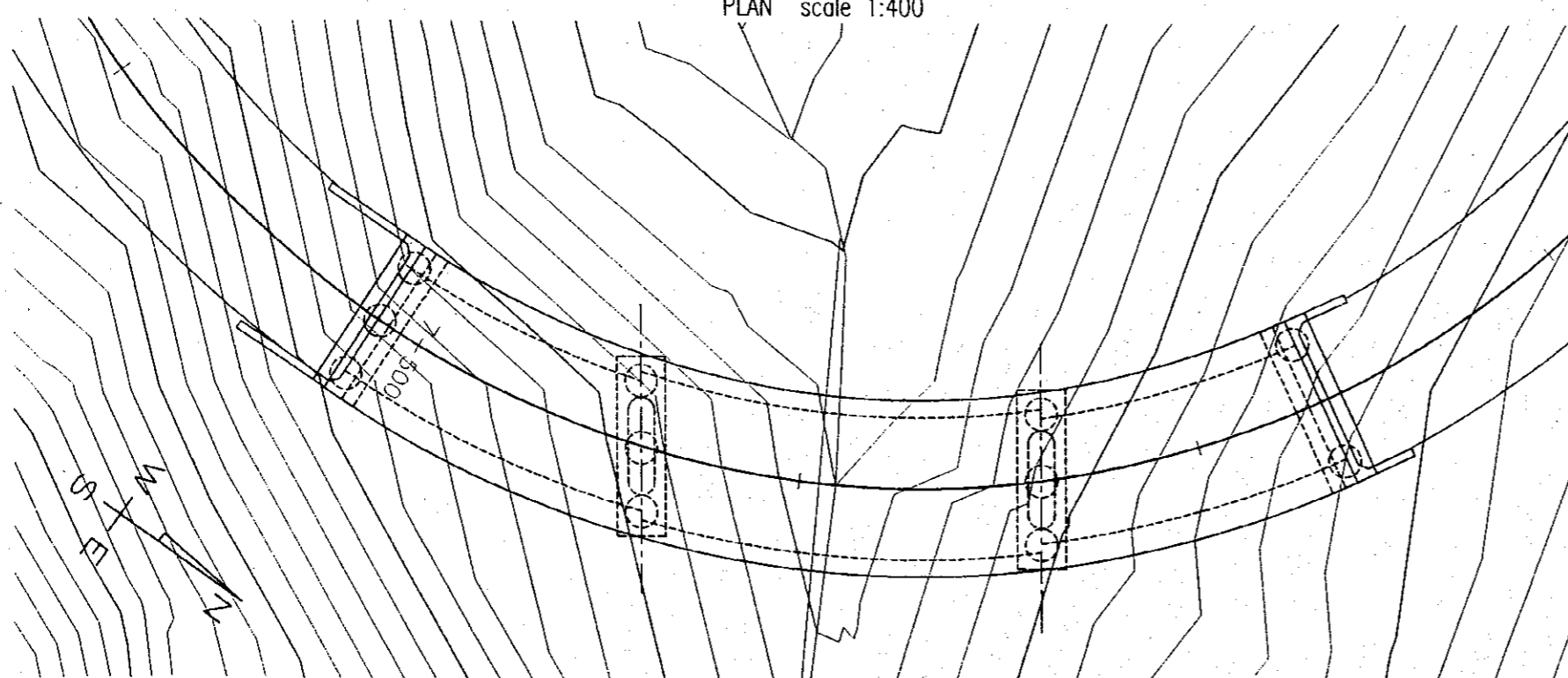
MATERIALS

| | | |
|----------|----------------|----------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | 30N/mm ² |
| | GIRDER | SS400, SM400, SM490Y |

CROSS SECTION scale 1:200



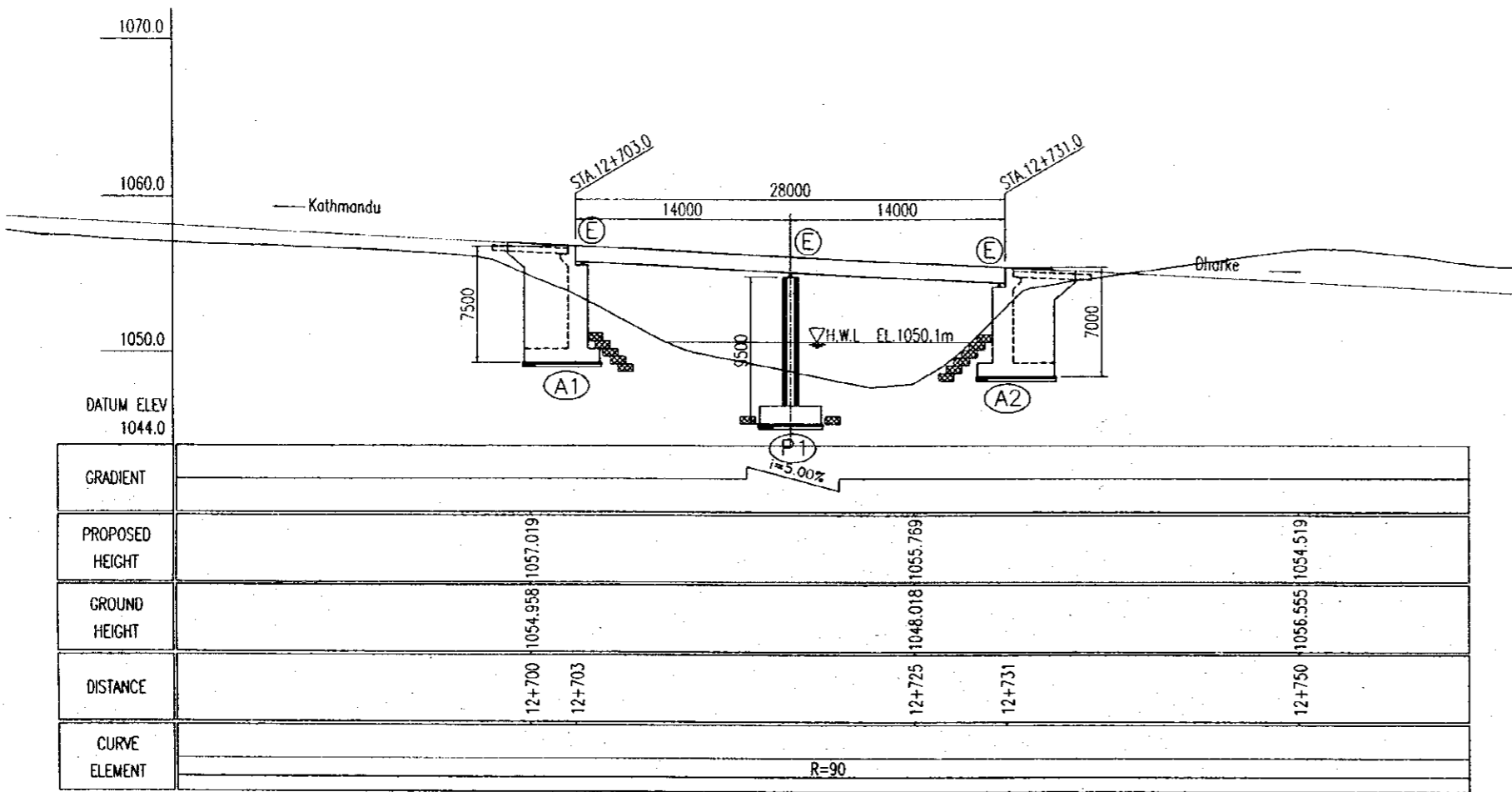
PLAN scale 1:400



| | | | | |
|---|--|--|---|---|
| <p>PROJECT NAME</p> <p>THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL</p> | <p>CLIENT</p> <p>JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS</p> | <p>CONSULTANT</p> <p style="text-align: center;"> NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN</p> | <p>DWG TITLE</p> <p style="text-align: center;">Thulo Khola Bridge (STA.7+494.5 - 7+560.5)</p> | <p>DWG NO.</p> <p style="text-align: center;">Bc-4</p> |
|---|--|--|---|---|

GENERAL VIEW

SIDE VIEW scale 1:400



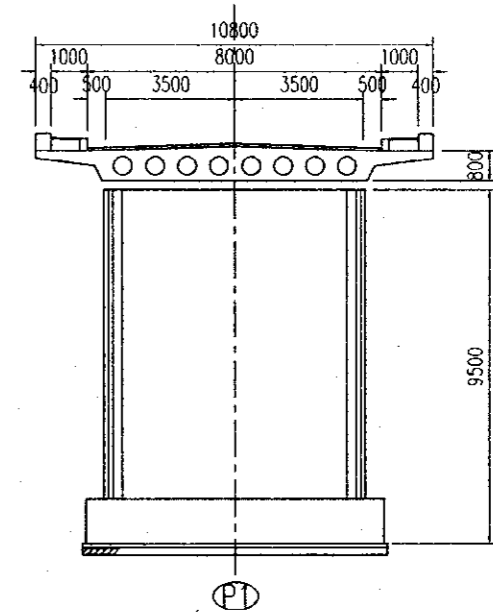
DESIGN CRITERIA

| | | |
|---------------------|---------------------------------|----------------|
| TYPE | Center Span | RC HOLLOW SLAB |
| | Side Span | RC HOLLOW SLAB |
| BRIDGE LENGTH | 28.0m | |
| SPAN ARRANGEMENT | 2@14.0m | |
| WIDTH | 10.80m | |
| LIVE LOAD | B-TYPE LIVE LOAD (JRA STANDARD) | |
| SEISMIC COEFFICIENT | Kh=0.15 | |
| ANGLE OF SKEW | 90°00'00" | |
| RADIUS OF CURVATURE | R=90m | |
| LONGITUDINAL SLOPE | 5.00% | |

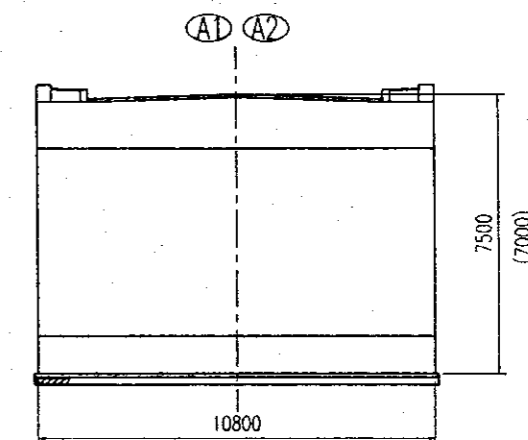
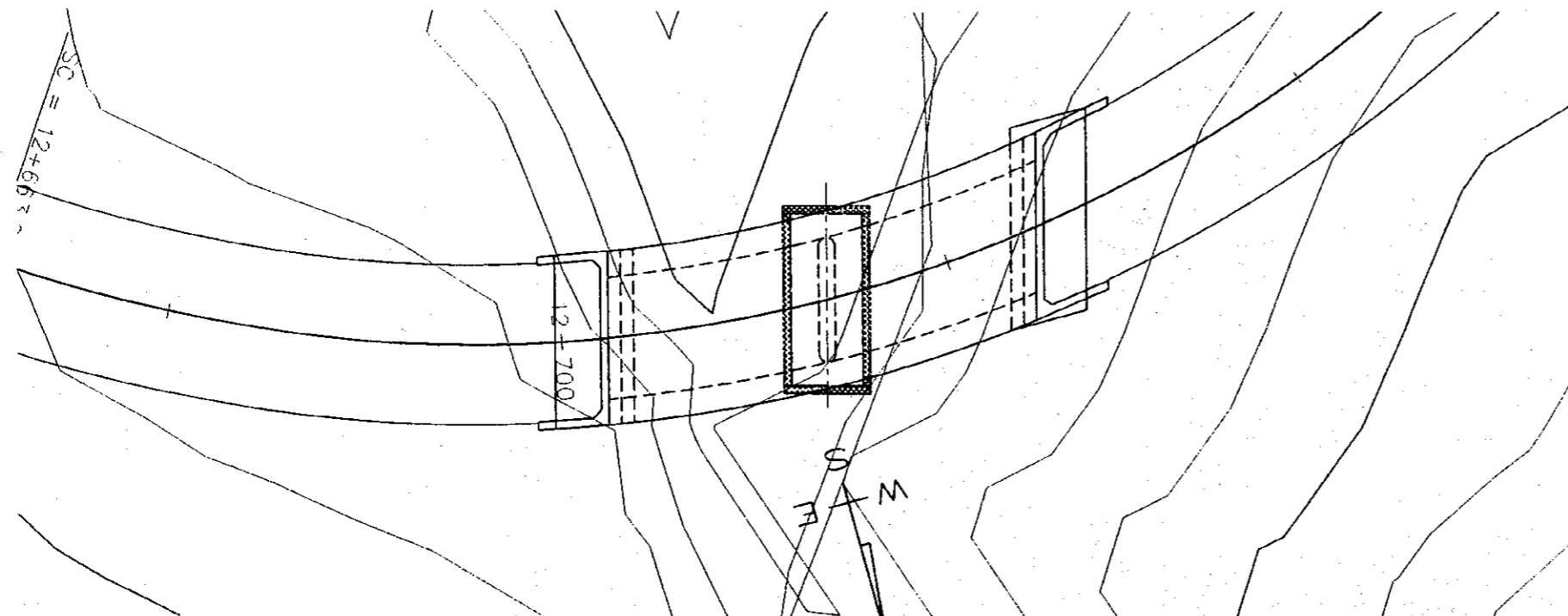
MATERIALS


| | | |
|----------|----------------|---------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | - |

CROSS SECTION scale 1:200
SUPERSTRUCTURE



PLAN scale 1:400



| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|--|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Ari Khola Bridge (STA.12+703 - 12+731) | Bc-5 |

GENERAL VIEW

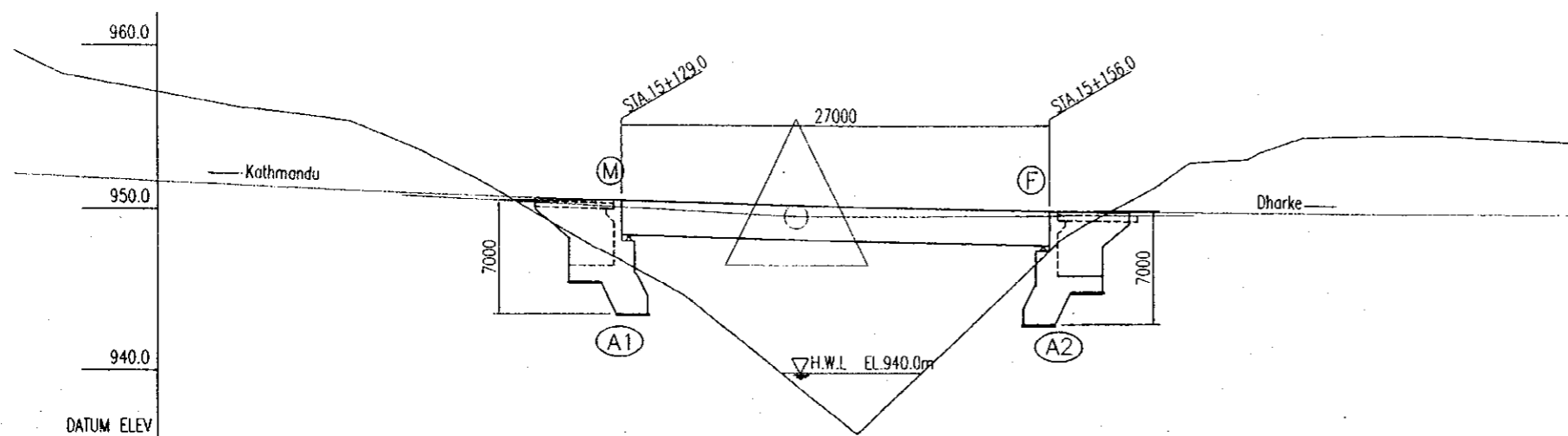
DESIGN CRITERIA

| TYPE | Center Span | Steel I Girder |
|---------------------|---------------------------------|----------------|
| | Side Span | - |
| BRIDGE LENGTH | 27.0m | |
| SPAN ARRANGEMENT | 27.0m | |
| WIDTH | 10.80m | |
| LIVE LOAD | B-TYPE LIVE LOAD (JRA STANDARD) | |
| SEISMIC COEFFICIENT | Kh=0.15 | |
| ANGLE OF SKEW | 80°00'00" | |
| RADIUS OF CURVATURE | R=∞ | |
| LONGITUDINAL SLOPE | 2.50% | |

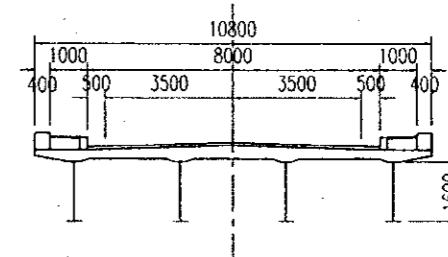
MATERIALS

| | | |
|----------|----------------|----------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | SS400, SM400, SM490Y |

SIDE VIEW scale 1:400

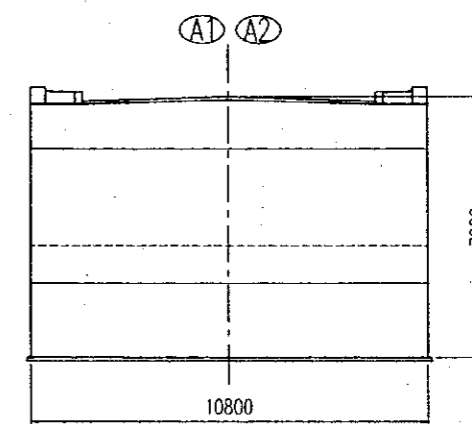
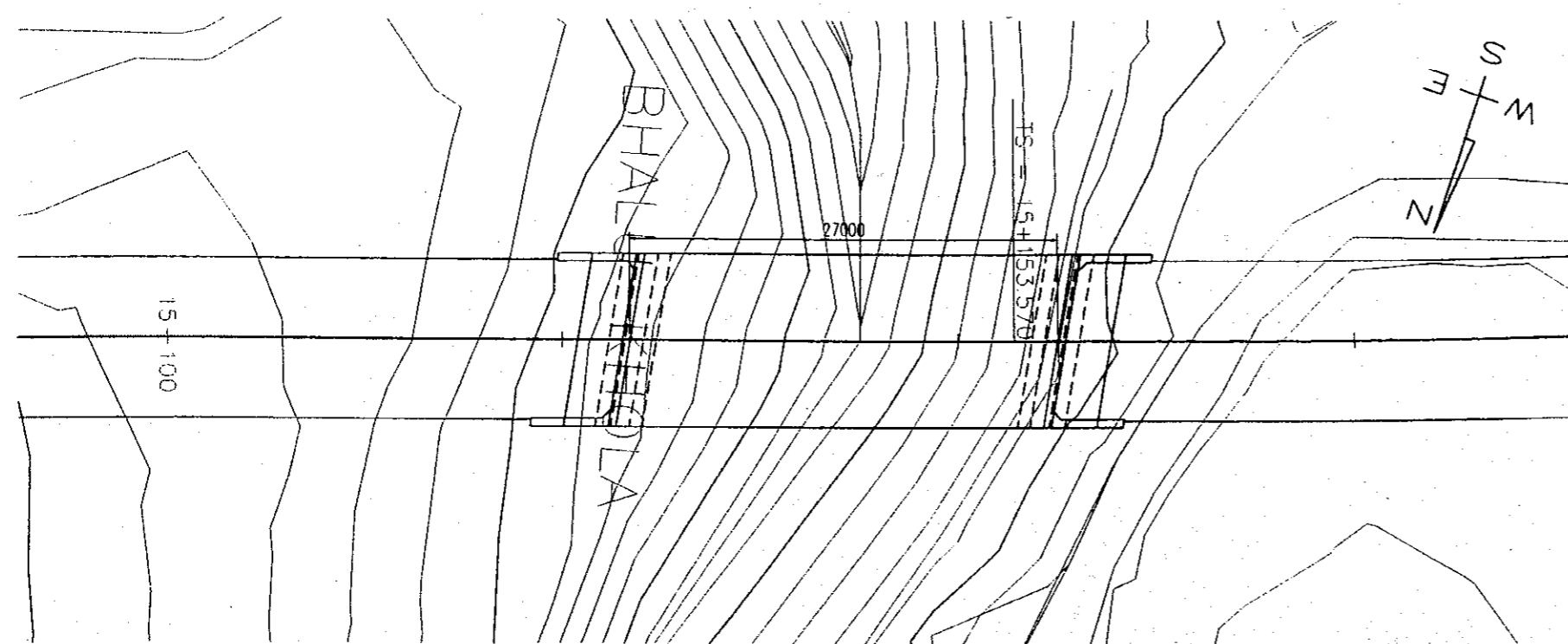



CROSS SECTION scale 1:200
SUPERSTRUCTURE



| GRADIENT | i=5.00% | | i=0.229% | |
|-----------------|---------|---------|----------|---------|
| PROPOSED HEIGHT | 15+125 | 15+129 | 15+150 | 15+156 |
| GROUND HEIGHT | 949.012 | 950.741 | 941.974 | 950.112 |
| DISTANCE | 15+125 | 15+129 | 15+150 | 15+156 |
| CURVE ELEMENT | R=∞ | | | |

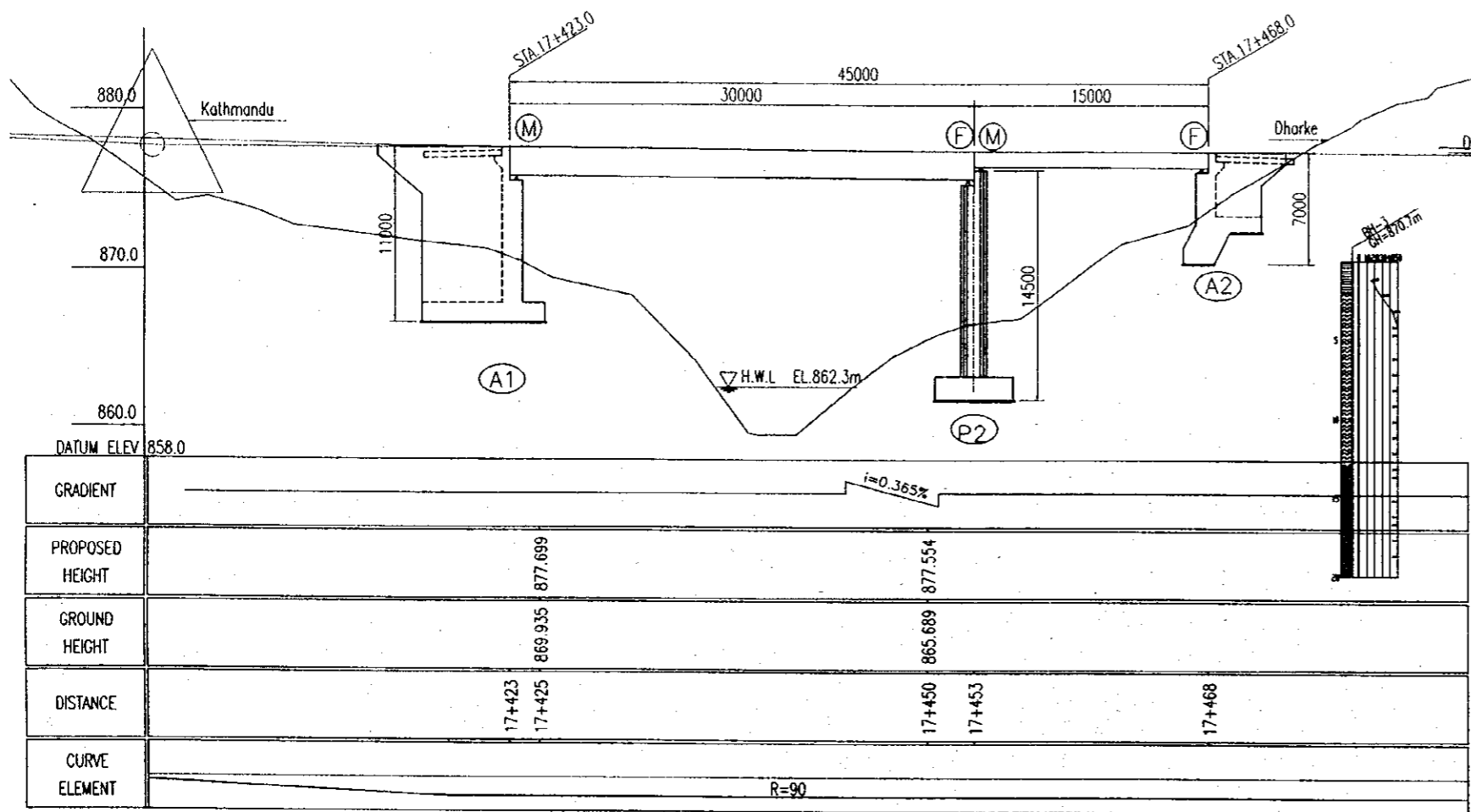
PLAN scale 1:400



| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|--|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Bhalu Khola Bridge (STA.15+129 - 15+156) | Bc-6 |

GENERAL VIEW

SIDE VIEW scale 1:400



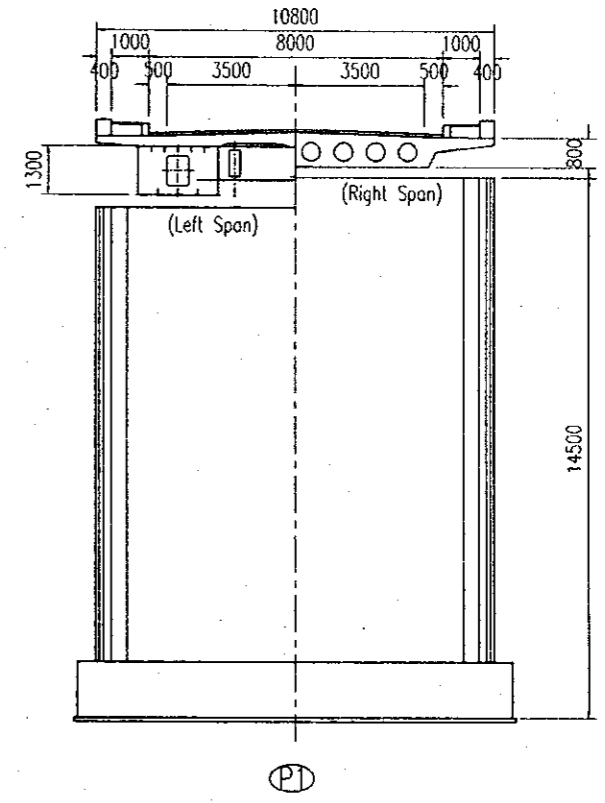
DESIGN CRITERIA

| | | |
|---------------------|---------------------------------|----------------|
| TYPE | Center Span | STEEL I GIRDER |
| | Side Span | RC HOLLOW SLAB |
| TOTAL BRIDGE LENGTH | 55.0m | |
| SPAN | 15.0m+25.0m+15.0m | |
| WIDTH | 10.80m | |
| LIVE LOAD | B-TYPE LIVE LOAD (JRA STANDARD) | |
| SEISMIC COEFFICIENT | Kh=0.15 | |
| ANGLE OF SKEW | 90°00'00" | |
| RADIUS OF CURVATURE | R=∞ | |
| LONGITUDINAL SLOPE | 5.00% | |

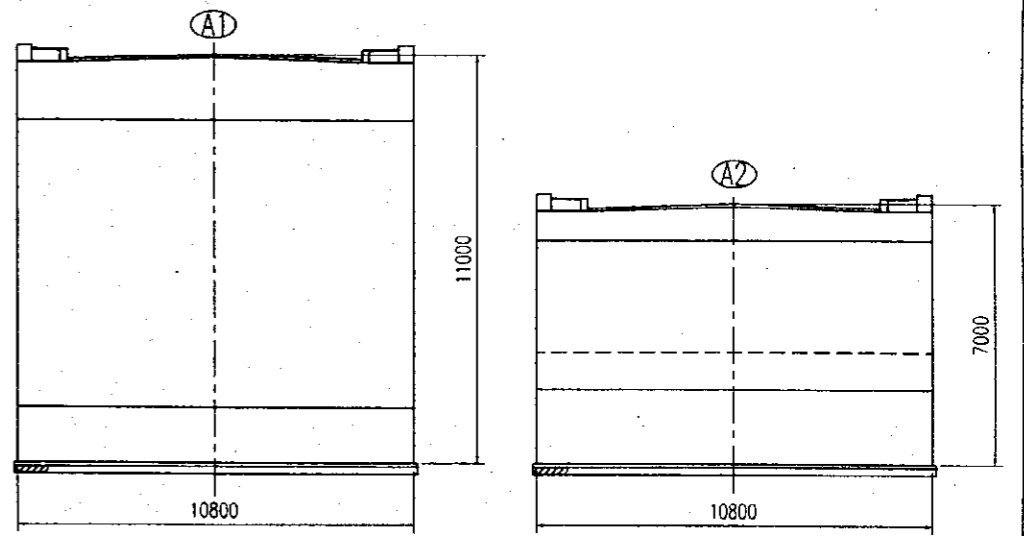
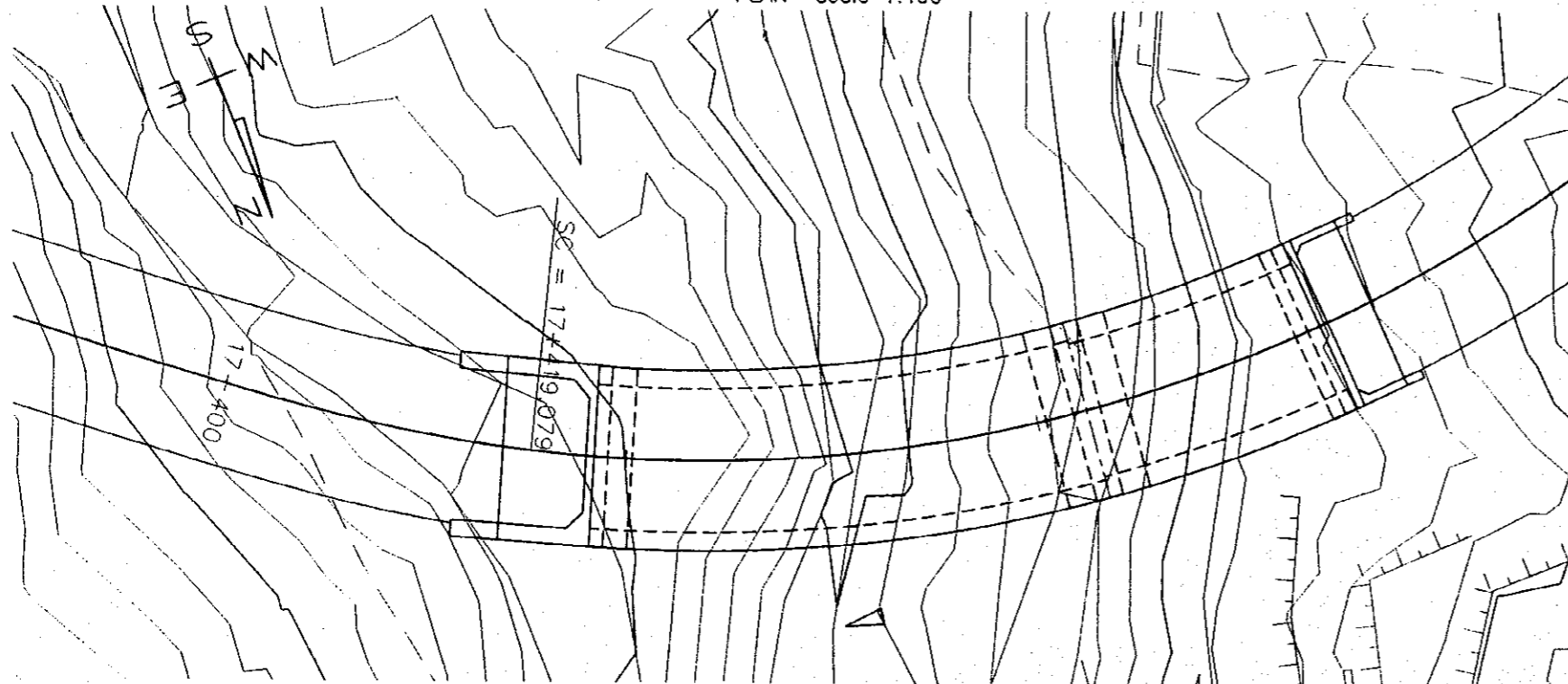
MATERIALS

| | | |
|----------|----------------|----------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | SS400, SM400, SM490Y |

CROSS SECTION scale 1:200
SUPERSTRUCTURE



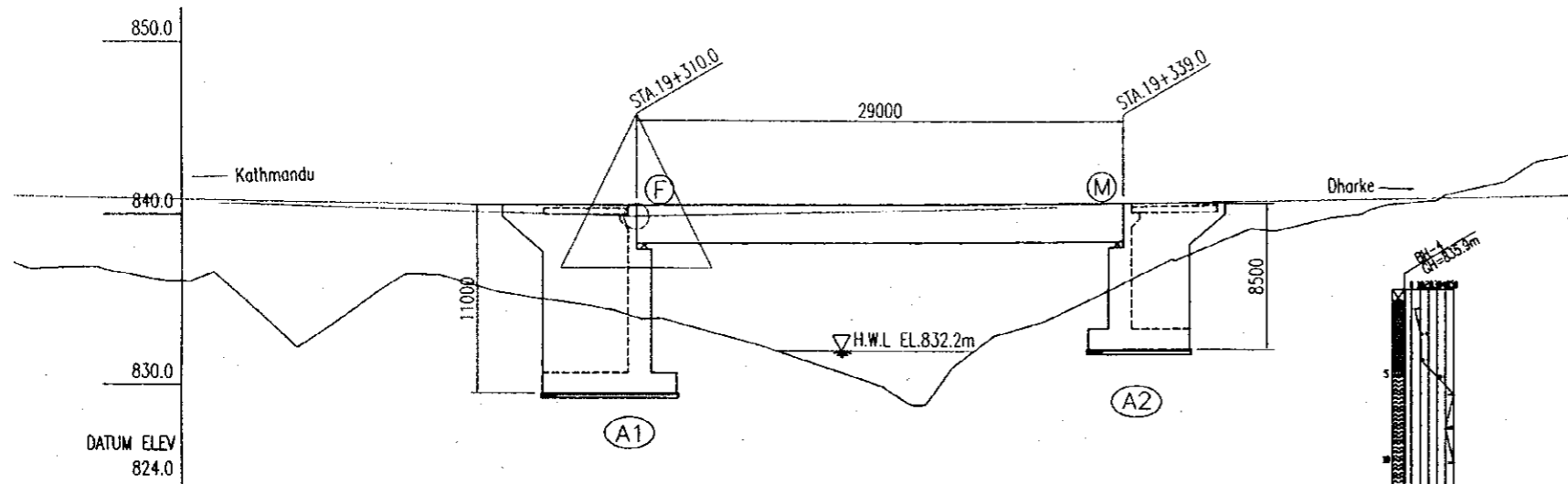
PLAN scale 1:400



| | | | | |
|---|---|---|--|---------|
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS | NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Rupse Khola Bridge (STA.7+413 - STA.7+468) | Bc-7 |

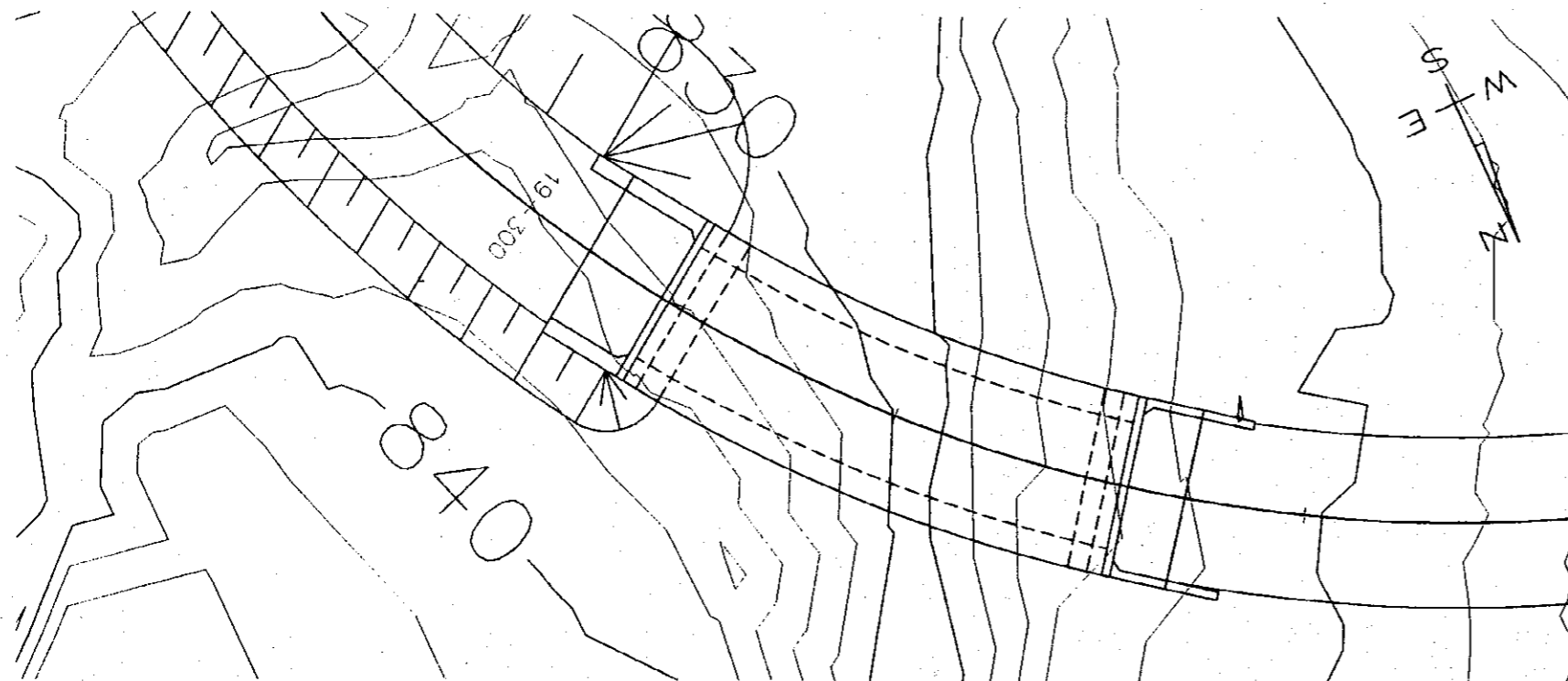
GENERAL VIEW

SIDE VIEW scale 1:400



| | | | | | |
|-----------------|---------|--------|------------|---------|---------|
| DATUM ELEV | 824.0 | | | | |
| GRADIENT | i=2.75% | | V.C.L. = m | i=2.50% | |
| PROPOSED HEIGHT | 840.695 | | 840.697 | | 841.026 |
| GROUND HEIGHT | 836.076 | | 829.866 | | 839.748 |
| DISTANCE | 19+300 | 19+310 | 19+325 | 19+339 | 19+350 |
| CURVE ELEMENT | R=90 | | | | |

PLAN scale 1:400



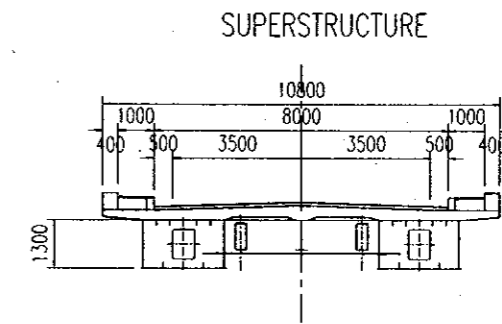
DESIGN CRITERIA

| | | |
|---------------------|-------------|----------------------------------|
| TYPE | Center Span | RC HOLLOW SLAB |
| | Side Span | RC HOLLOW SLAB |
| BRIDGE LENGTH | | 32.0m |
| SPAN ARRANGEMENT | | 2@16.0m |
| WIDTH | | 10.80m |
| LIVE LOAD | | B-TYPE LIVE LOAD (JIRA STANDARD) |
| IMPACT COEFFICIENT | | i=20/(50+L) |
| SEISMIC COEFFICIENT | | Kh=0.15 |
| ANGLE OF SKEW | | |
| RADIUS OF CURVATURE | | R=90m |
| LONGITUDINAL SLOPE | | 2.75% 2.50% |

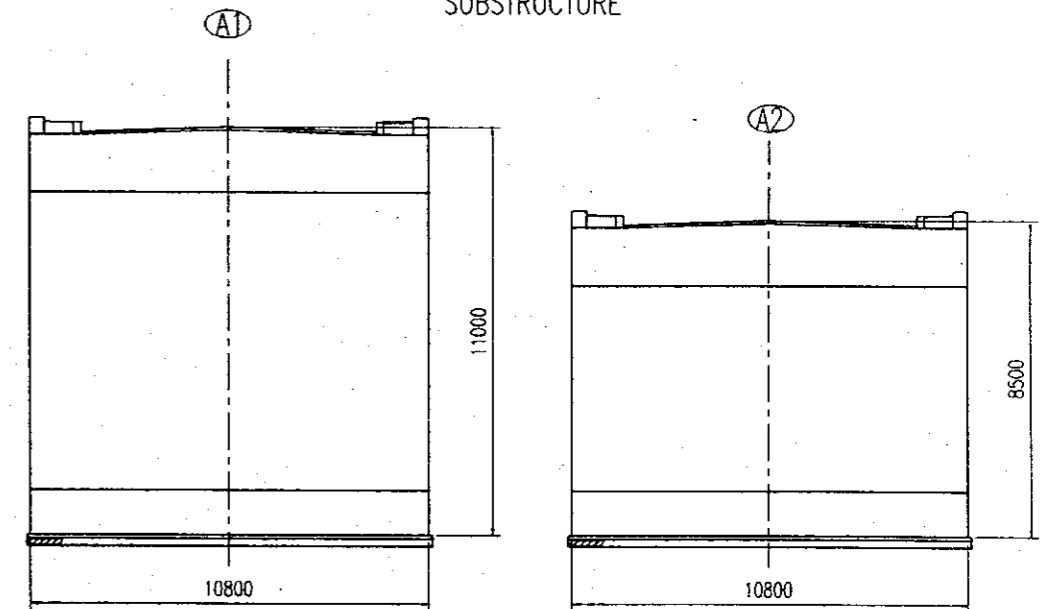
MATERIALS

| | | |
|----------|----------------|---------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | - |

CROSS SECTION scale 1:200



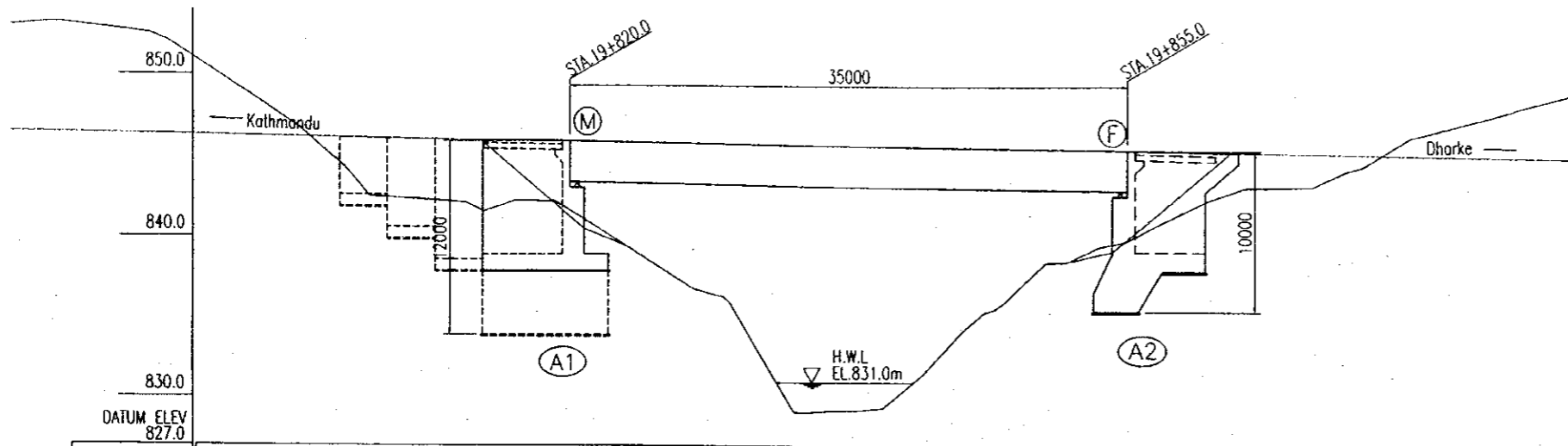
SUBSTRUCTURE



| | | | | |
|---|---|---|--|---------|
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS | NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Dhobi Khola I Bridge (STA.19+305 - 19+337) | Bc-8 |

GENERAL VIEW

SIDE VIEW scale 1:400



DESIGN CRITERIA

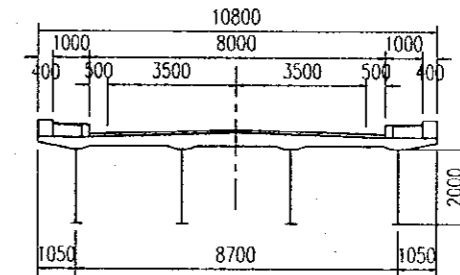
| | | |
|---------------------|-------------|----------------------------------|
| TYPE | Center Span | STEEL I GIRDER |
| | Side Span | RC HOLLOW SLAB |
| BRIDGE LENGTH | | 53.0m |
| SPAN ARRANGEMENT | | 15.0m+25.0m+13.0m |
| WIDTH | | 10.80m |
| LIVE LOAD | | B-TYPE LIVE LOAD (JIRA STANDARD) |
| SEISMIC COEFFICIENT | | Kh=0.15 |
| ANGLE OF SKEW | | 90°00'00" |
| RADIUS OF CURVATURE | | R=150m |
| LONGITUDINAL SLOPE | | 1.50% |

MATERIALS

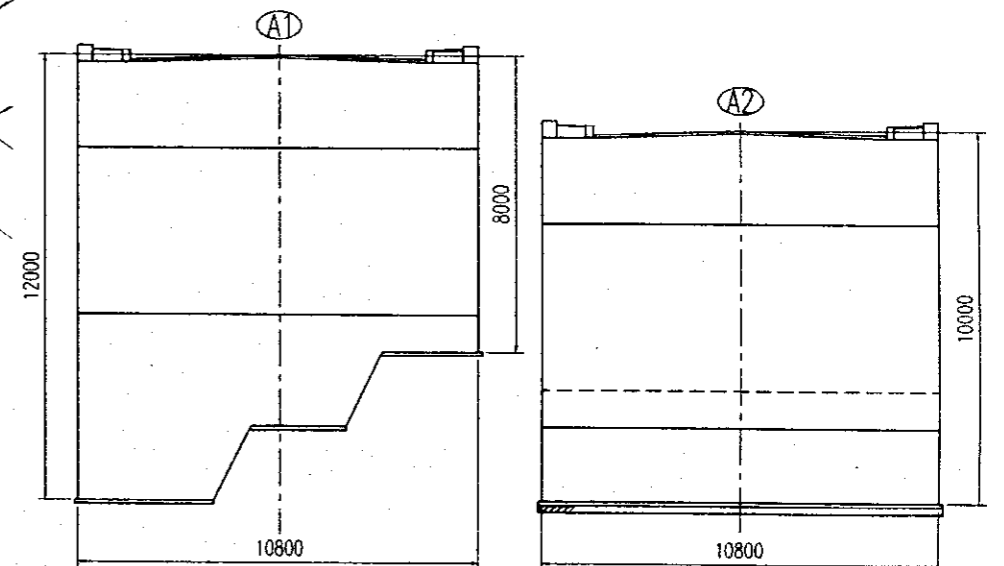
| | | |
|----------|----------------|----------------------|
| CONCRETE | SUPERSTRUCTURE | 30N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | - |
| | GIRDER | SS400, SM400, SM490Y |

CROSS SECTION scale 1:200

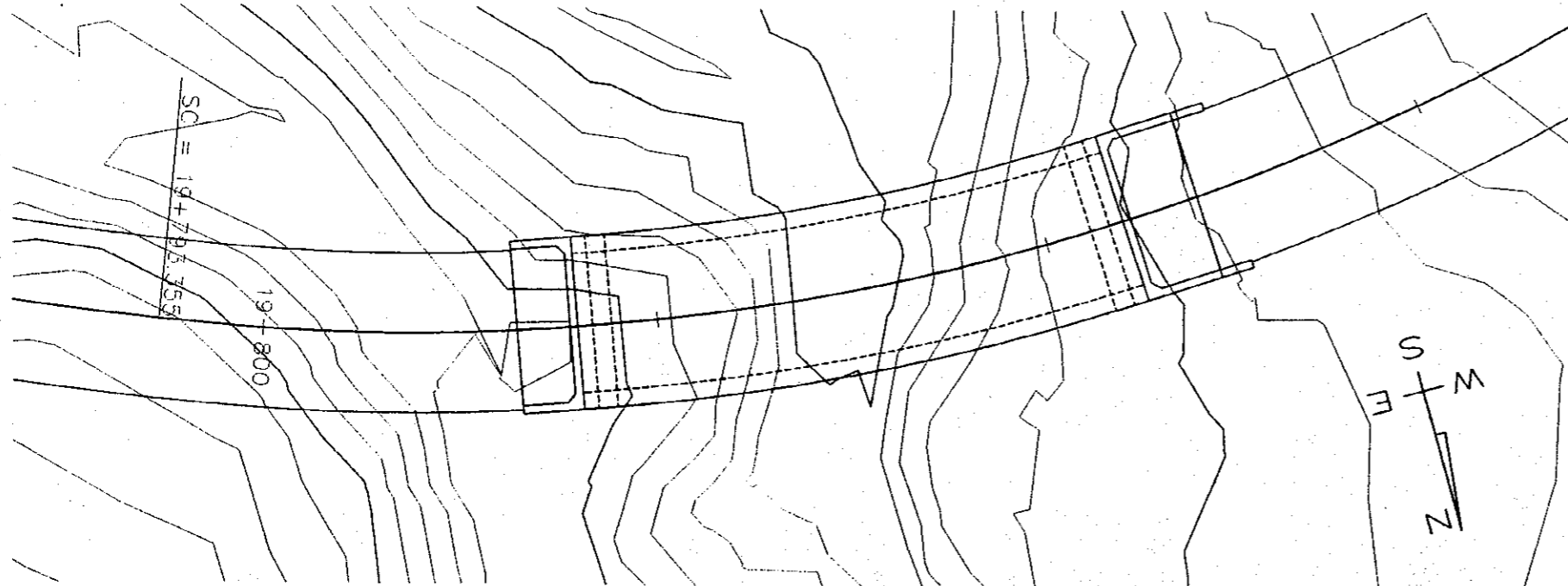
SUPERSTRUCTURE




SUBSTRUCTURE



PLAN scale 1:400



| | | |
|-----------------|---------|---------|
| GRADIENT | i=1.50% | |
| PROPOSED HEIGHT | 846.250 | 845.875 |
| GROUND HEIGHT | 848.618 | 838.541 |
| DISTANCE | 19+800 | 19+855 |
| CURVE ELEMENT | R=150 | |

| | | | | |
|---|---|---|--|---------|
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Dhobi Khola 2 Bridge (STA.19+809 - 19+862) | Bc-9 |

GENERAL VIEW

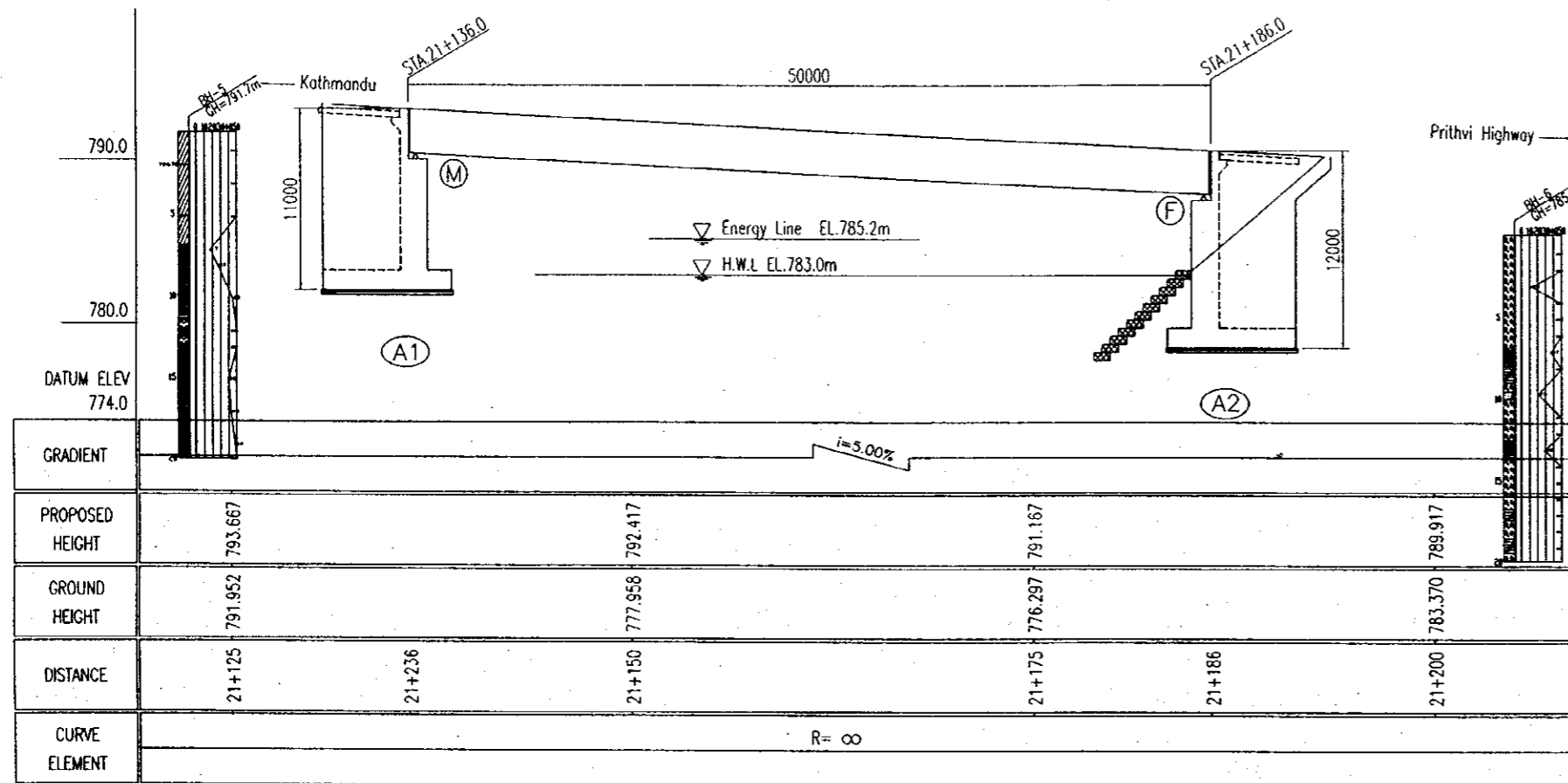
SIDE VIEW scale 1:400

DESIGN CRITERIA

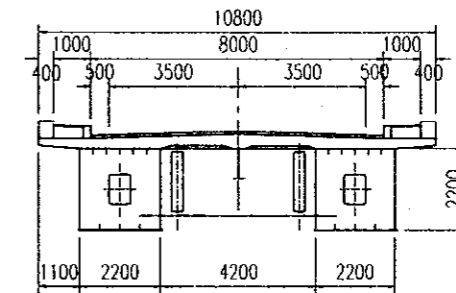
| | | |
|---------------------|-----------|---------------------------------|
| TYPE | Main Span | STEEL BOX GIRDER |
| | Side Span | -- |
| BRIDGE LENGTH | | 58.0m |
| SPAN ARRANGEMENT | | 58.0m |
| WIDTH | | 10.80m |
| LIVE LOAD | | B-TYPE LIVE LOAD (JRA STANDARD) |
| SEISMIC COEFFICIENT | | $K_h=0.15$ |
| ANGLE OF SKEW | | $90^{\circ}00'00''$ |
| RADIUS OF CURVATURE | | $R=\infty$ |
| LONGITUDINAL SLOPE | | 5.00% |

MATERIALS

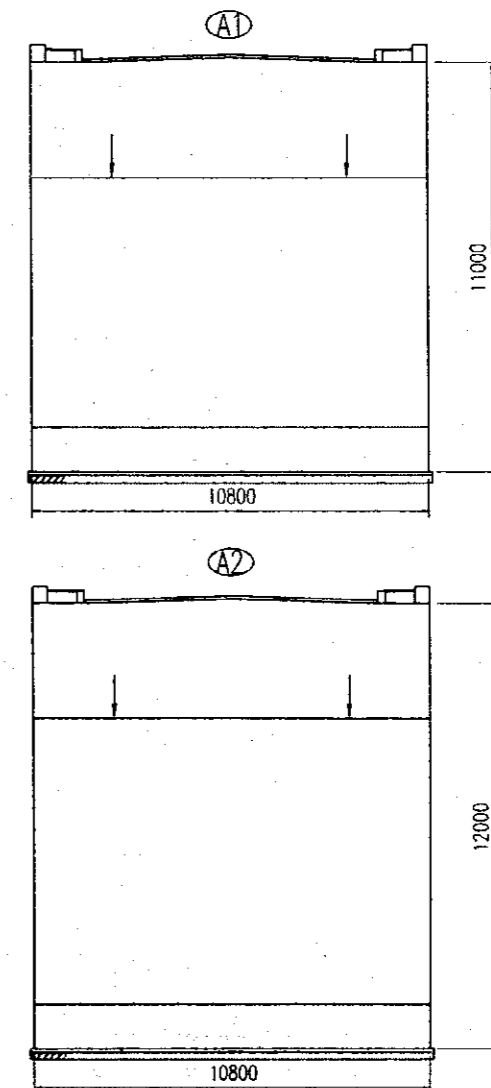
| | | |
|----------|----------------|----------------------|
| CONCRETE | SUPERSTRUCTURE | 24N/mm ² |
| | SUBSTRUCTURE | 24N/mm ² |
| STEEL | PILE | -- |
| | GIRDER | SS400, SM400, SM490Y |



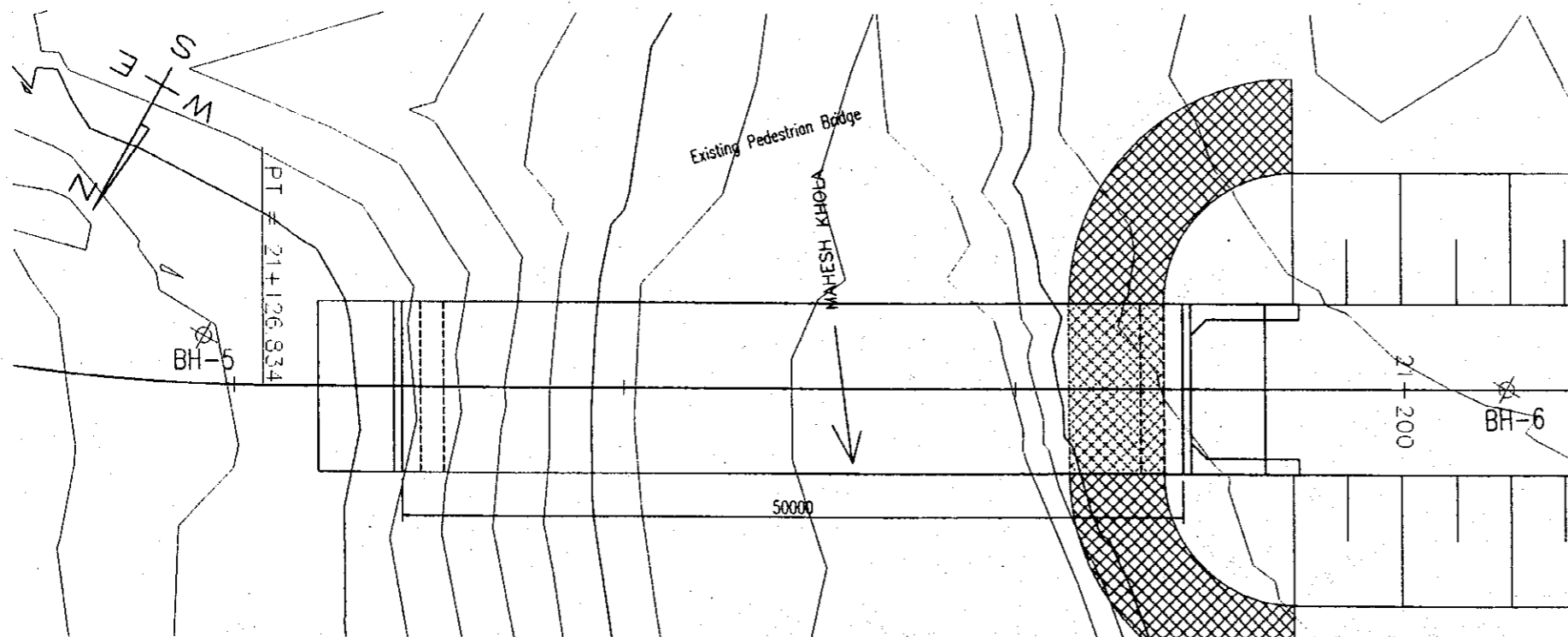
CROSS SECTION scale 1:200
SUPERSTRUCTURE



SUBSTRUCTURES



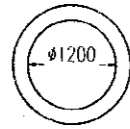
PLAN scale 1:400



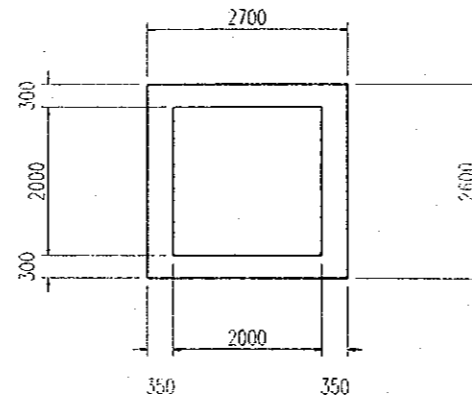
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|---|---|---|-------------------------------------|---------|
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS | NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Dharke Bridge (STA.21+136 - 21+194) | Bc-10 |

Type of Culvert Scale 1:200

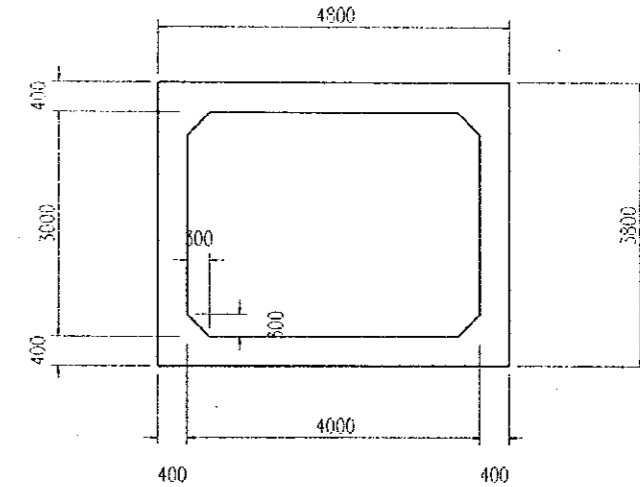
Pype Culvert Type A



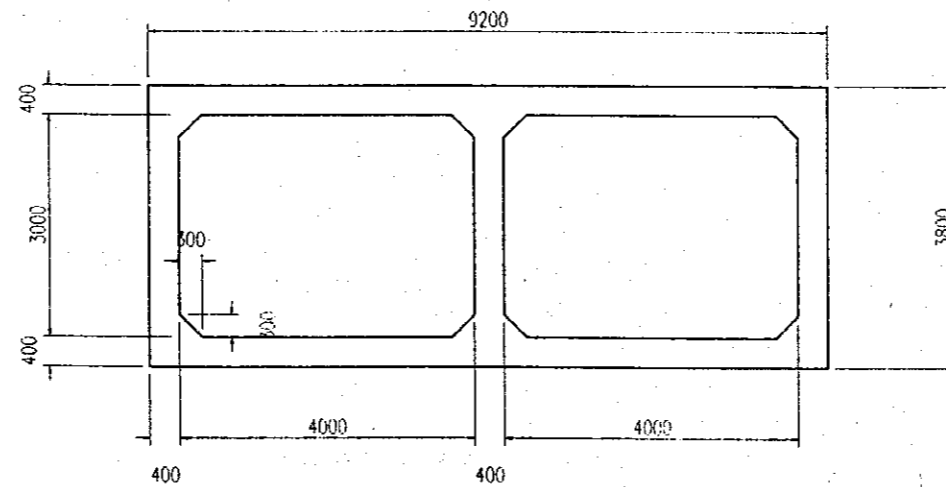
Box Culvert Type A




Box Culvert Type B



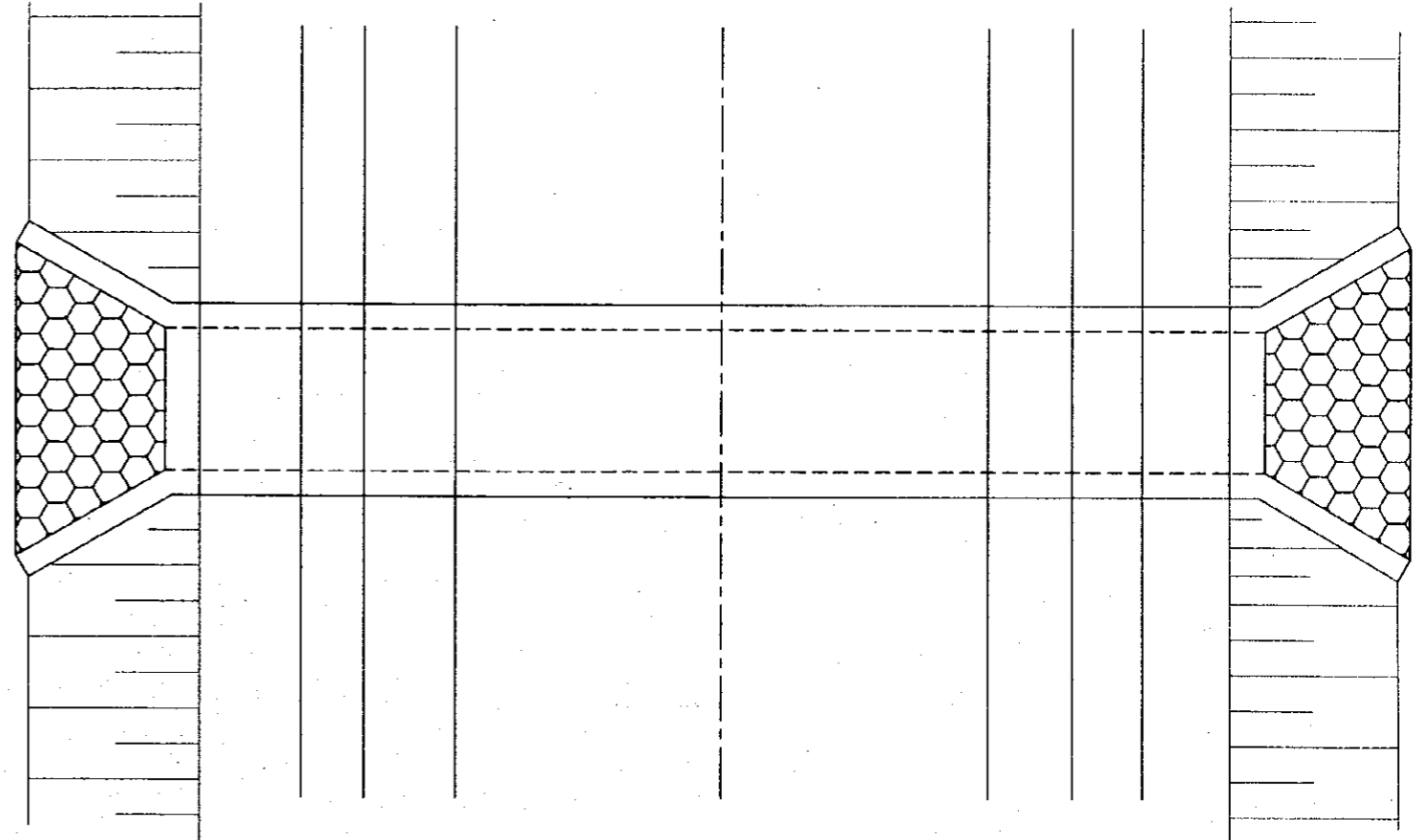
Box Culvert Type C



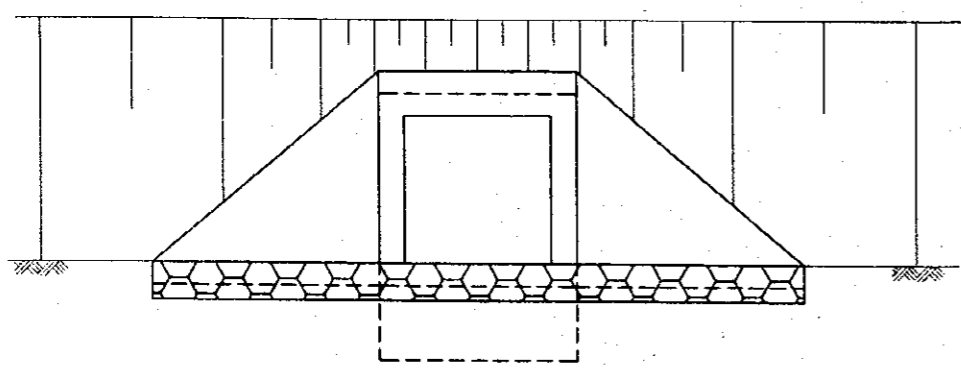
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|-----------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Type of Culvert | Bc-11 |

Layout of Box Culvert (Plain Area) Scale 1:200

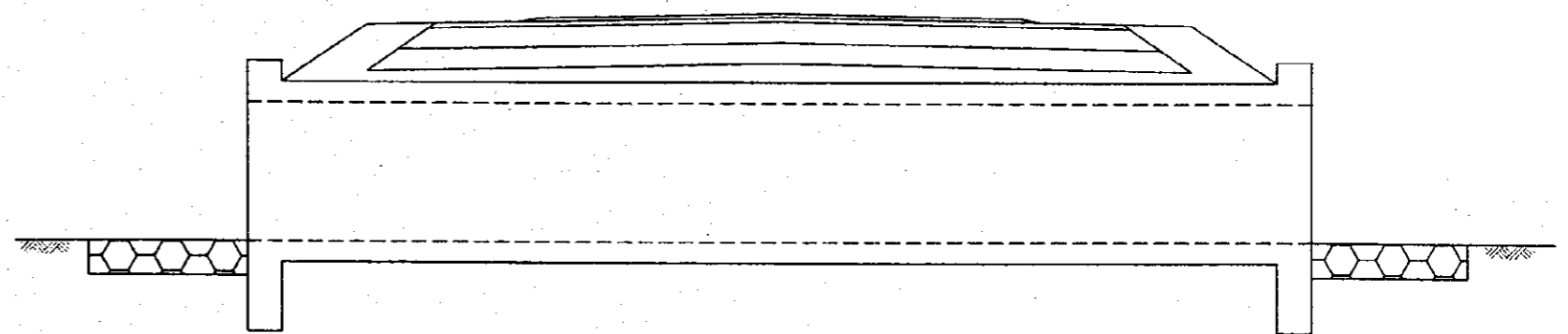
Plan




Section



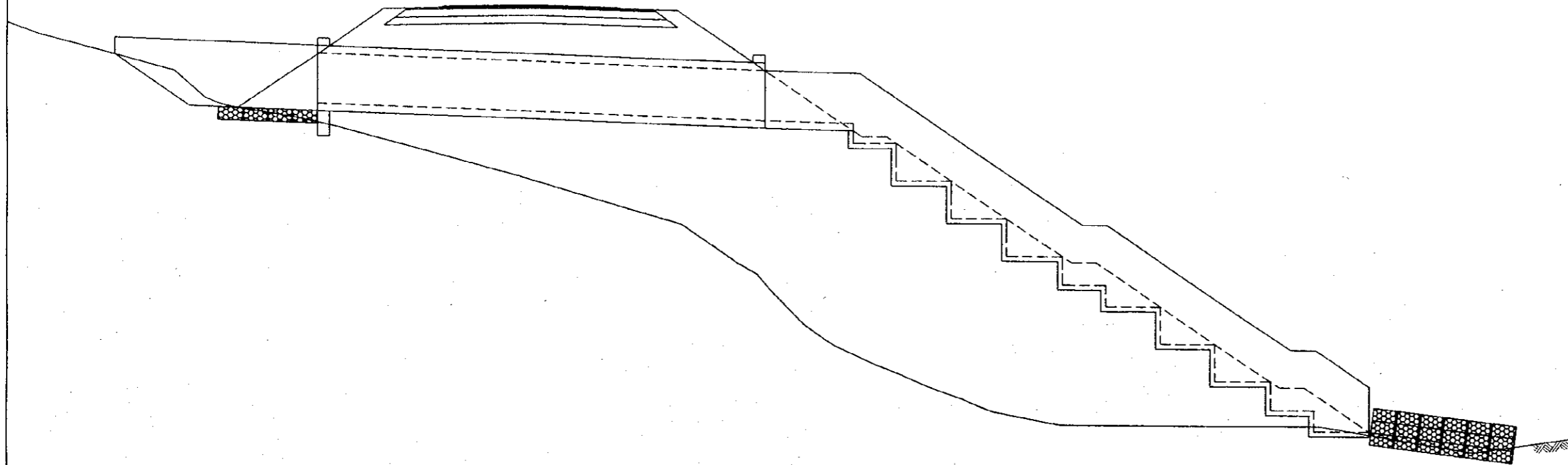
Elevation



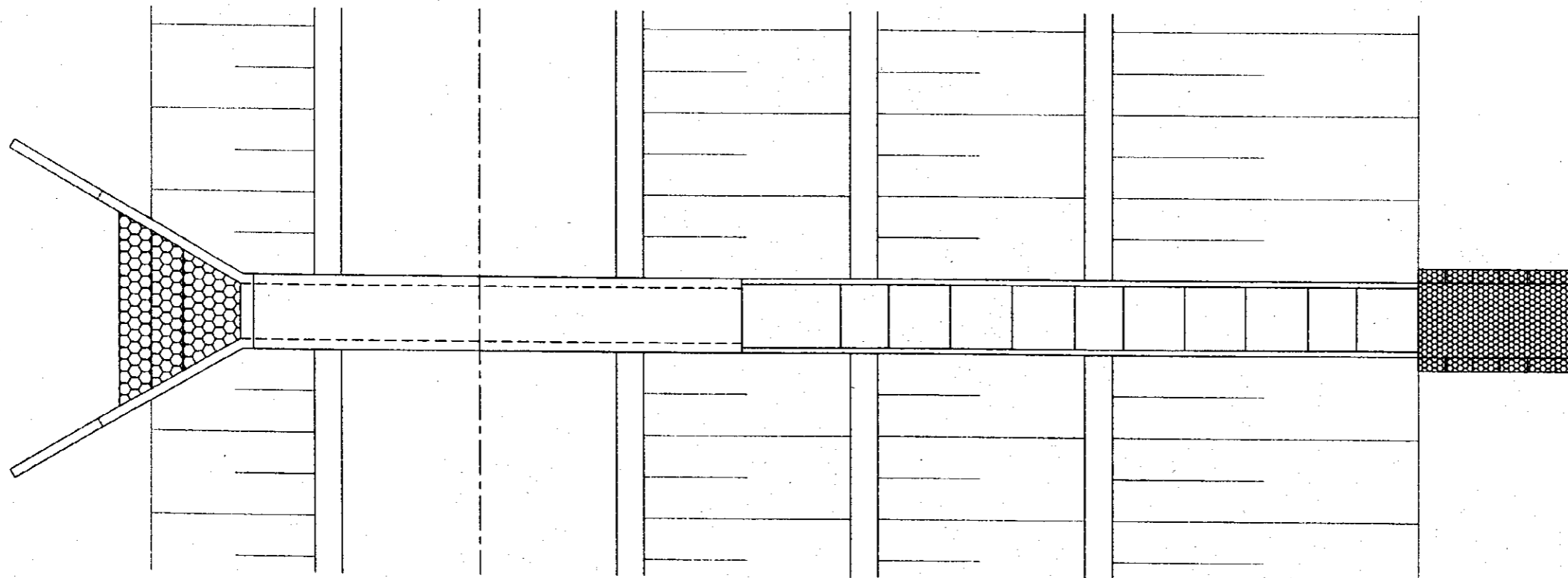
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|------------------------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Layout of Box Culvert (Plain Area) | Bc-12 |


Layout of Box Culvert (Mountainous Area) Scale 1:200

Elevation



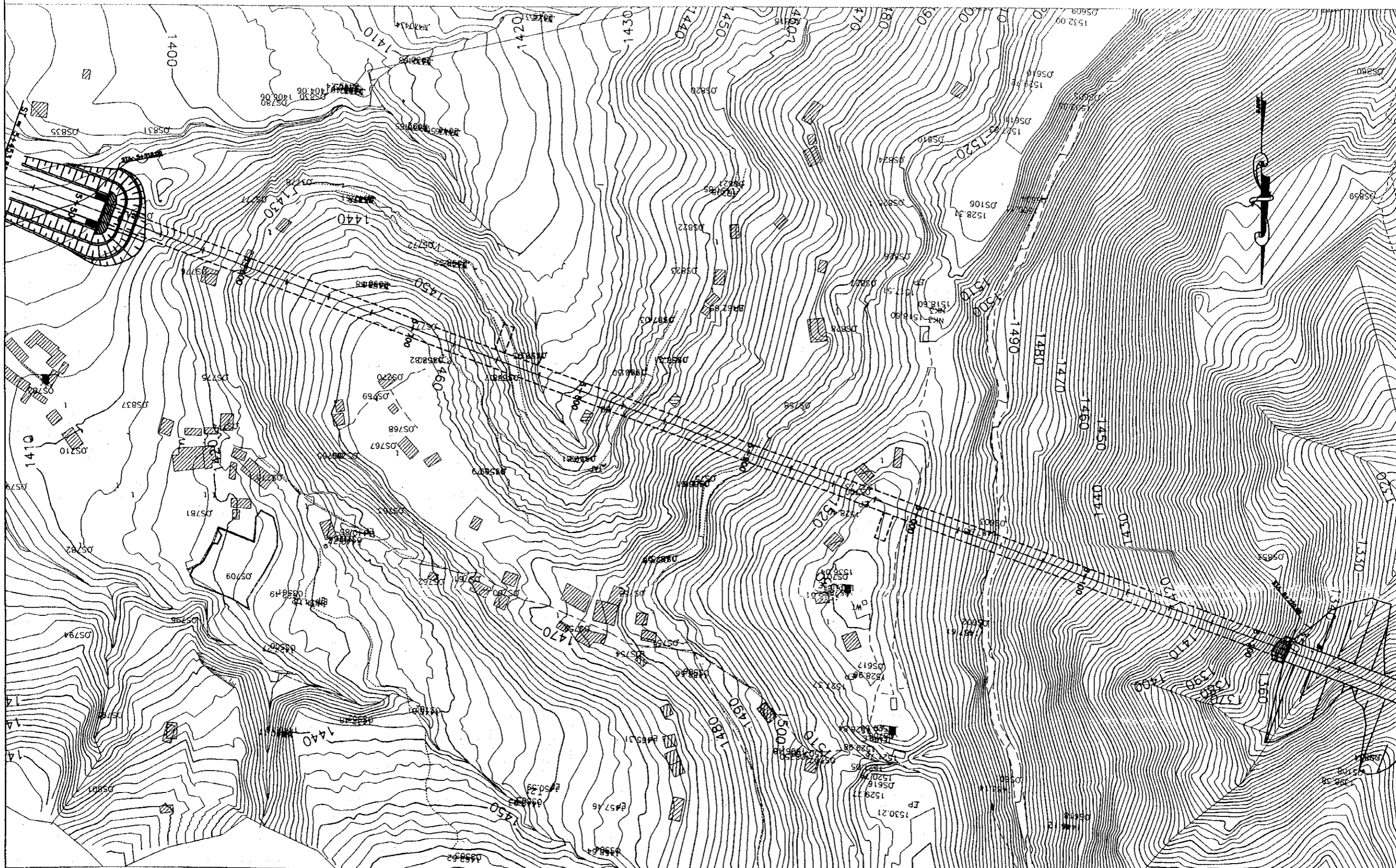
Plan




| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|---|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Layout of Box Culvert. (Mountainous Area) | Bc-13 |

TUNNEL

General View of Tunnel scale 1:2000

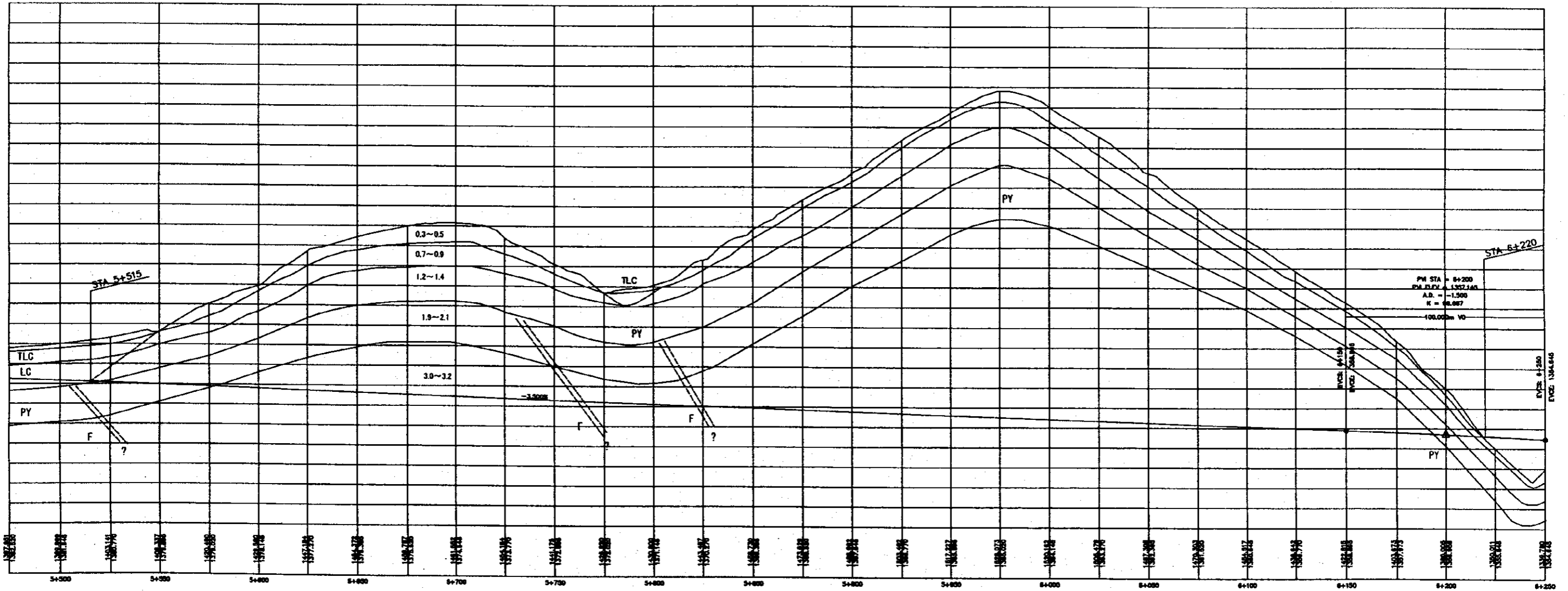


| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|------------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | General View of Tunnel | Tn-1 |

Geological Profile of Tunnel scale 1:2,000

Explanatory notes

| Mark | Formation |
|------|---|
| TLC | Talus to debris flow deposit without boulders |
| LC | Lacustrine deposit |
| PY | Phyllite |



| | | | | | | | |
|---------------------|---------------|------------|------------|------------|------------|------------|---------------|
| Rock Classification | D III-a 40 | D II 65 | D I 130 | D II 75 | D I 350 | D II 20 | D III-G 25 |
|---------------------|---------------|------------|------------|------------|------------|------------|---------------|

PROJECT NAME

THE FEASIBILITY STUDY ON
THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD
IN THE KINGDOM OF NEPAL

CLIENT

JAPAN INTERNATIONAL COOPERATION AGENCY
HIS MAJESTY'S GOVERNMENT OF NEPAL
MINISTRY OF PHYSICAL PLANNING AND WORKS
DEPARTMENT OF ROADS

CONSULTANT



NIPPON KOEI CO., LTD.
Consulting Engineers
Tokyo, JAPAN

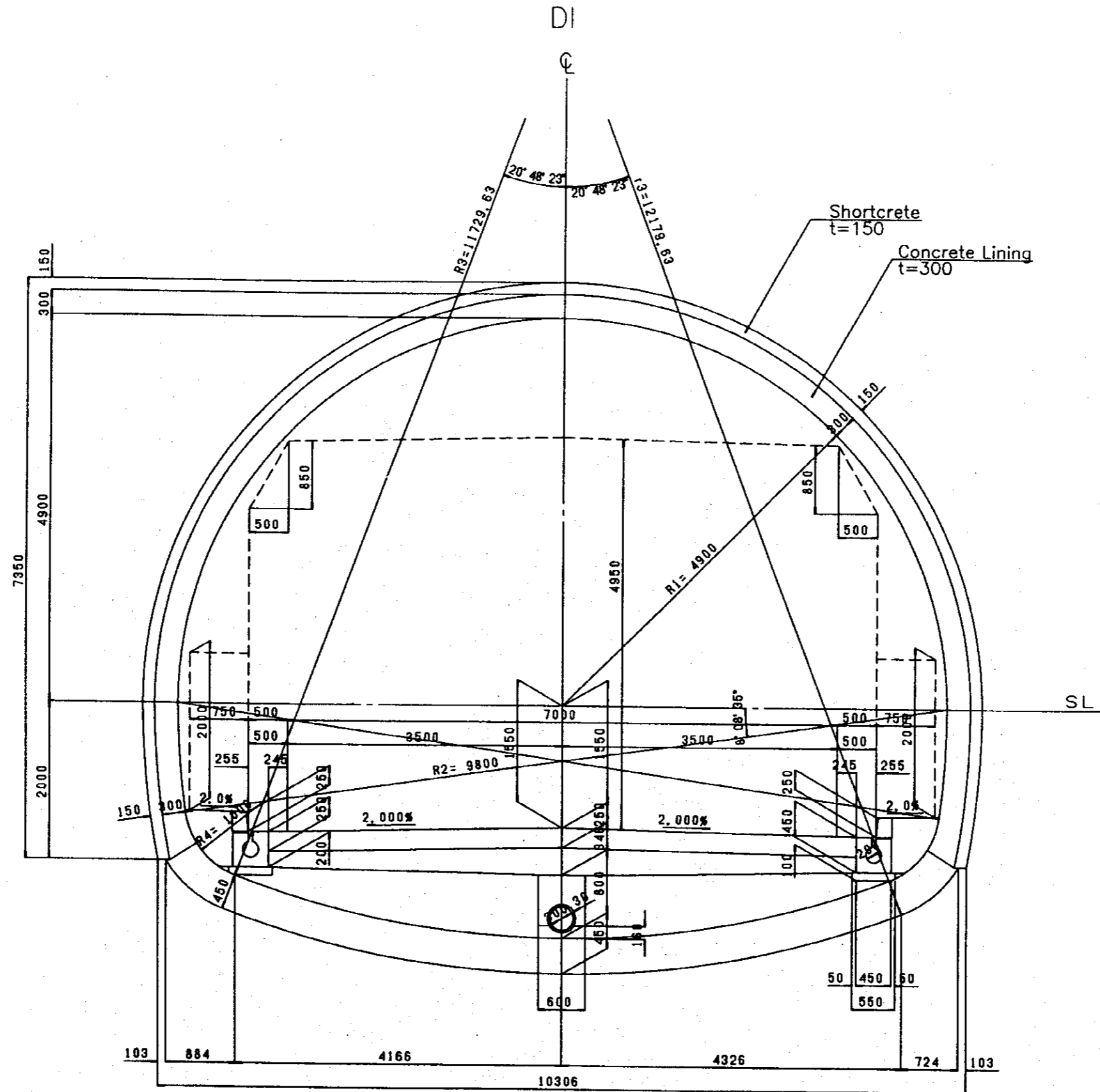
DWG TITLE


Geological Profile of Tunnel

DWG NO.

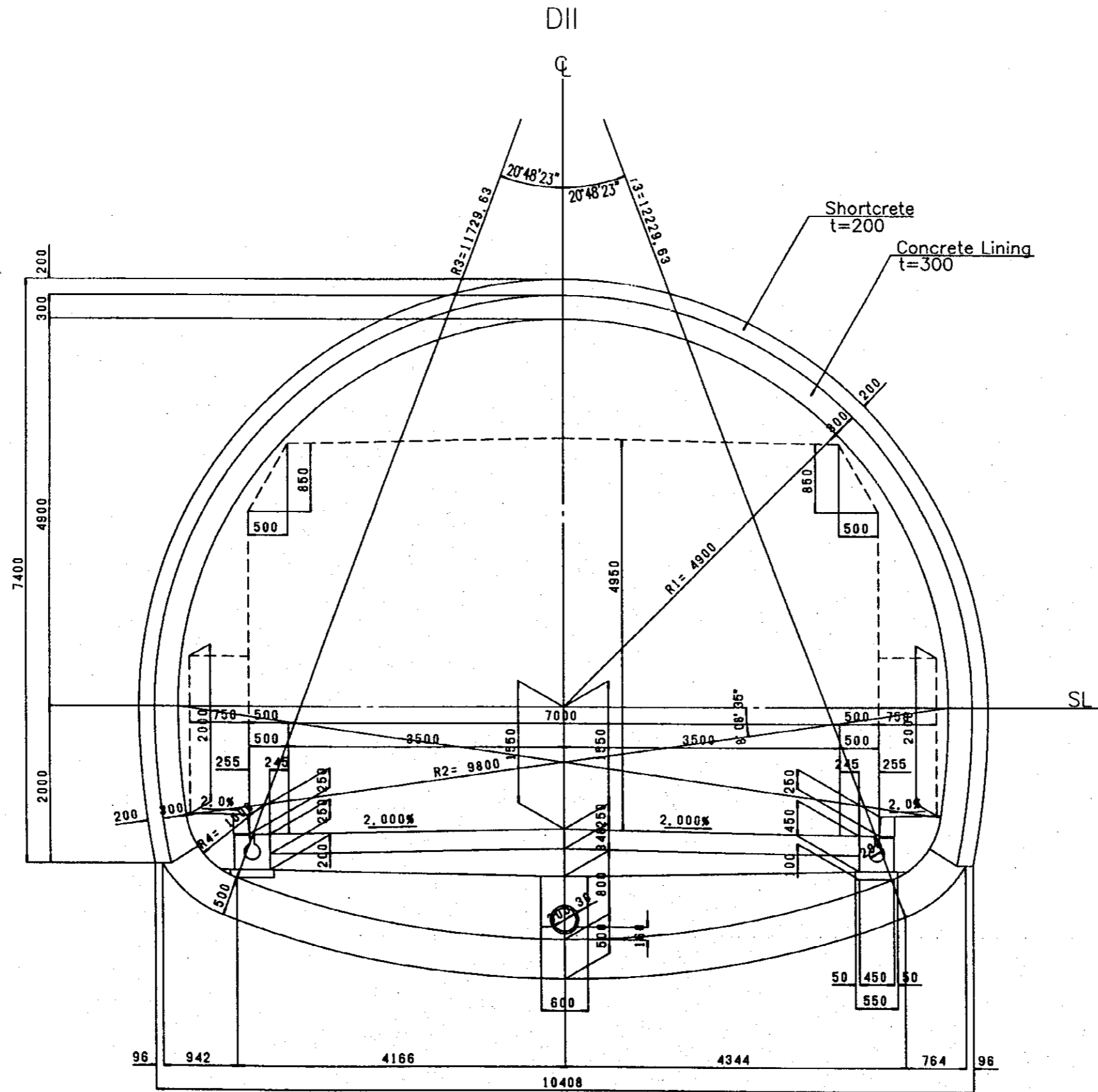
Tn-2


Typical Cross Section of Tunnel S=1:60



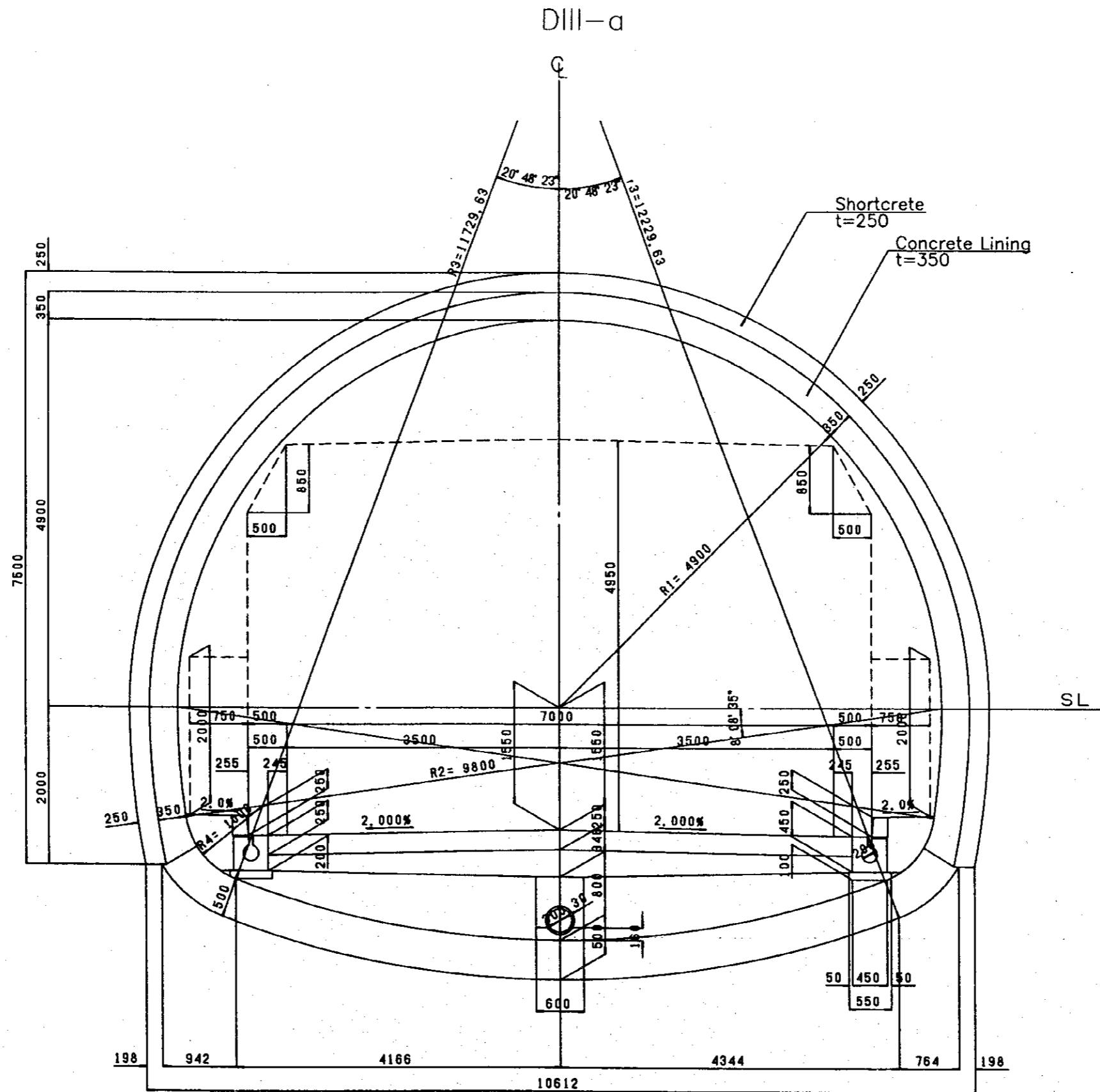
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|---|---|--|---------------------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Typical Cross Section of Tunnel | Tn-3 |

Typical Cross Section of Tunnel S=1:60



| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|---------------------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Typical Cross Section of Tunnel | Tn-4 |

Typical Cross Section of Tunnel S=1:60



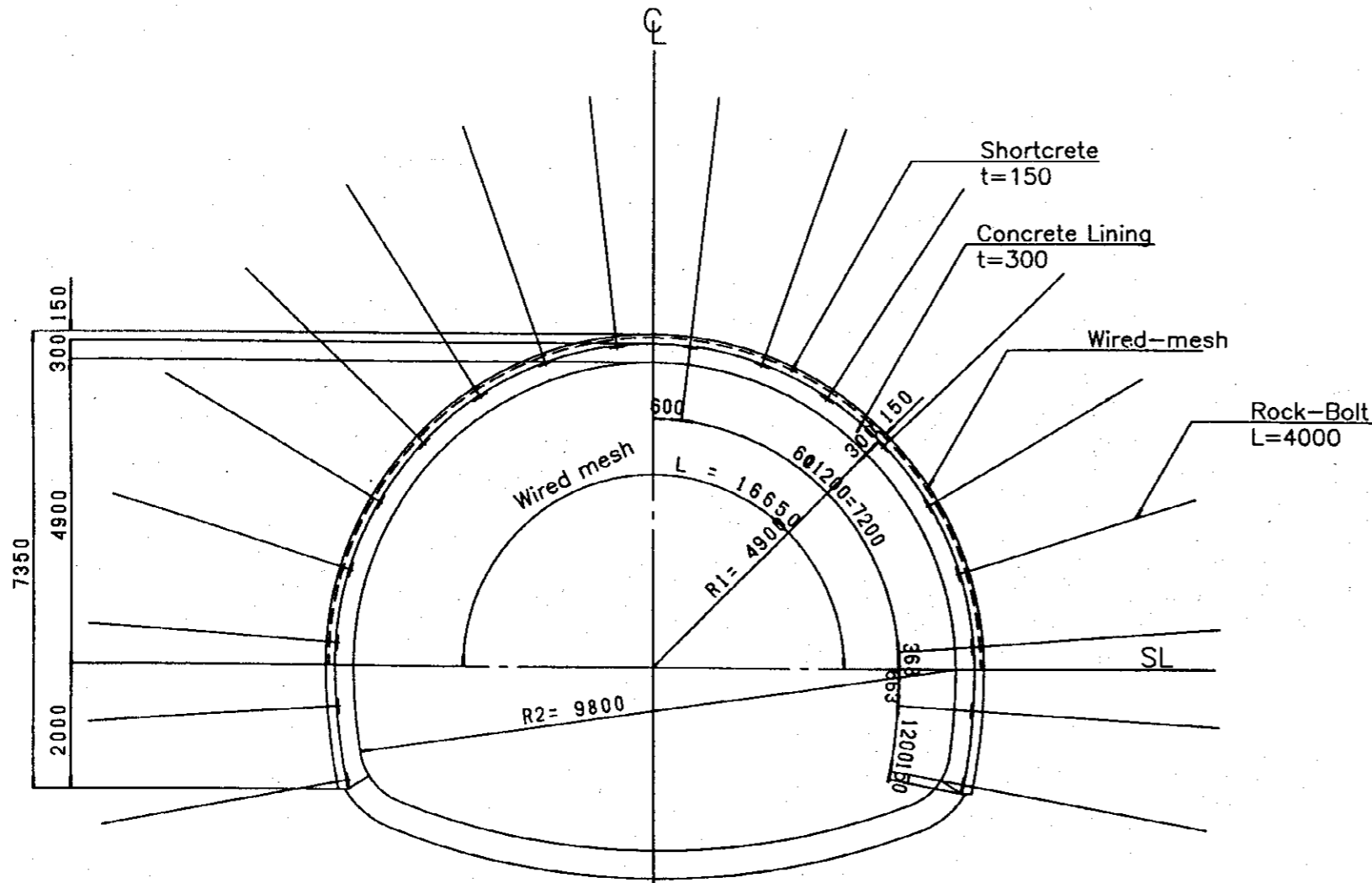
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|---------------------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS | NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Typical Cross Section of Tunnel | Tn-5 |

Supporting System

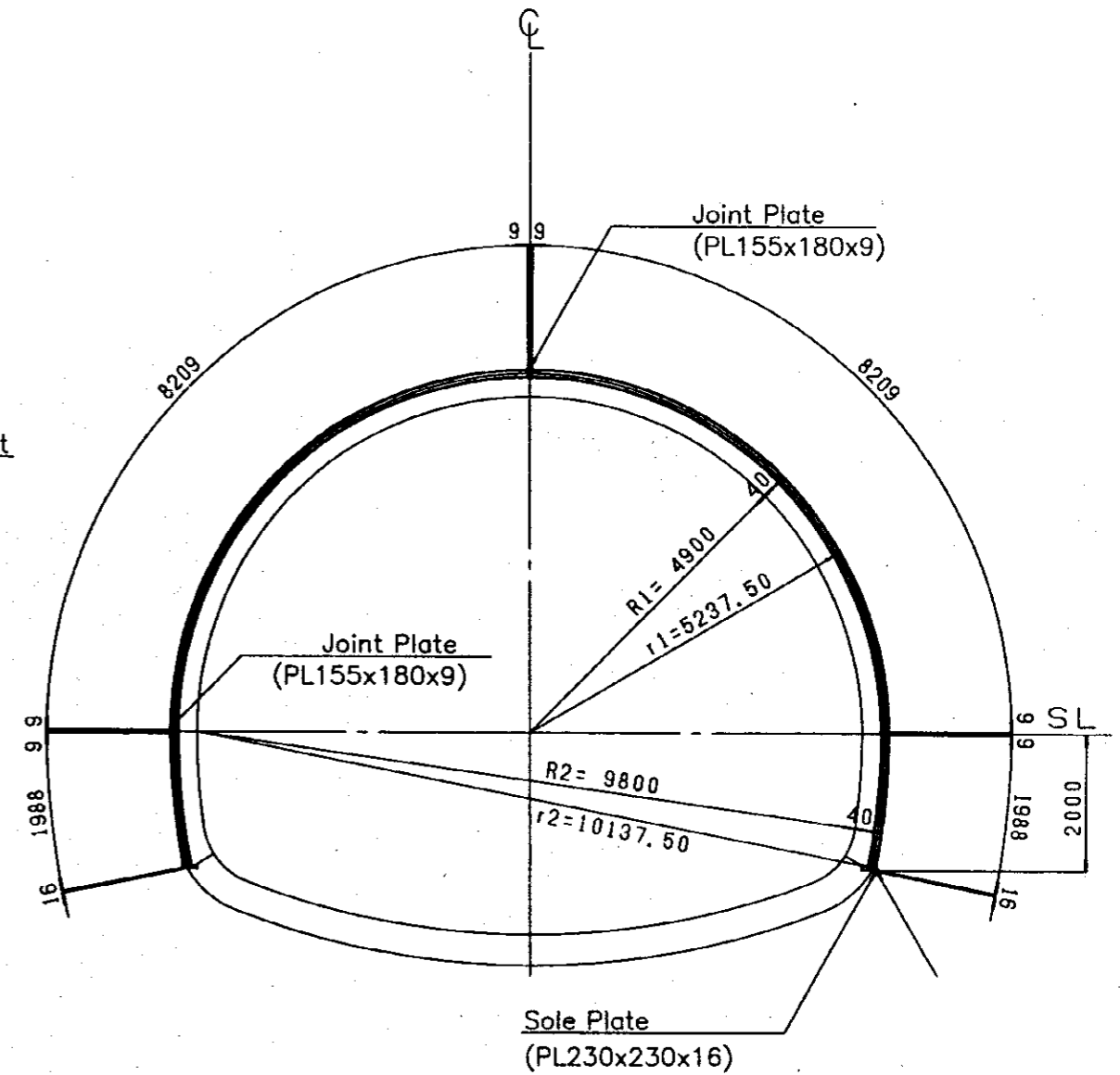
S=1:100


DI

Shortcrete & Rock-Bolt



H-Shape-Steel-Support (H-125x125x6.5x9)

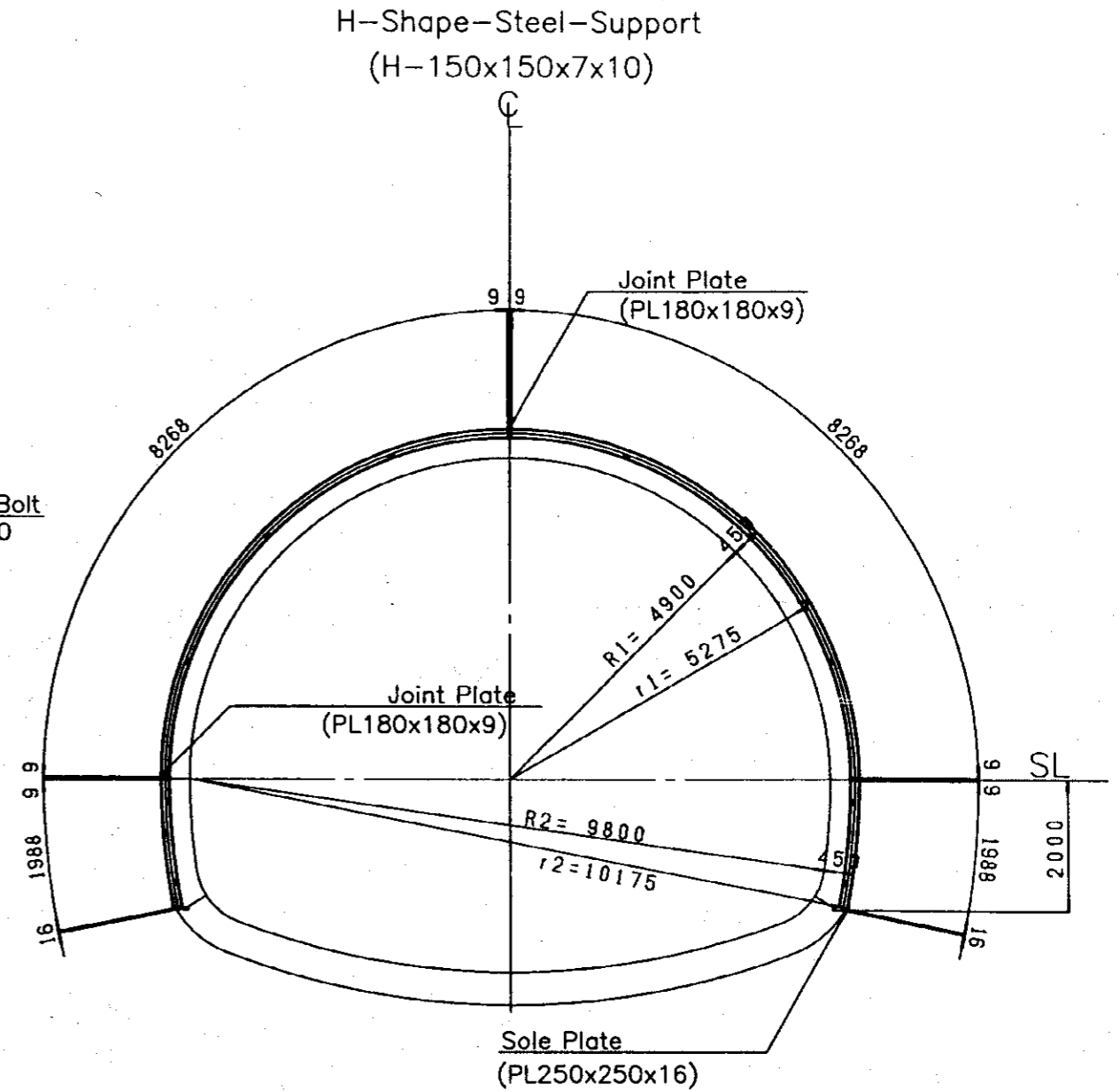
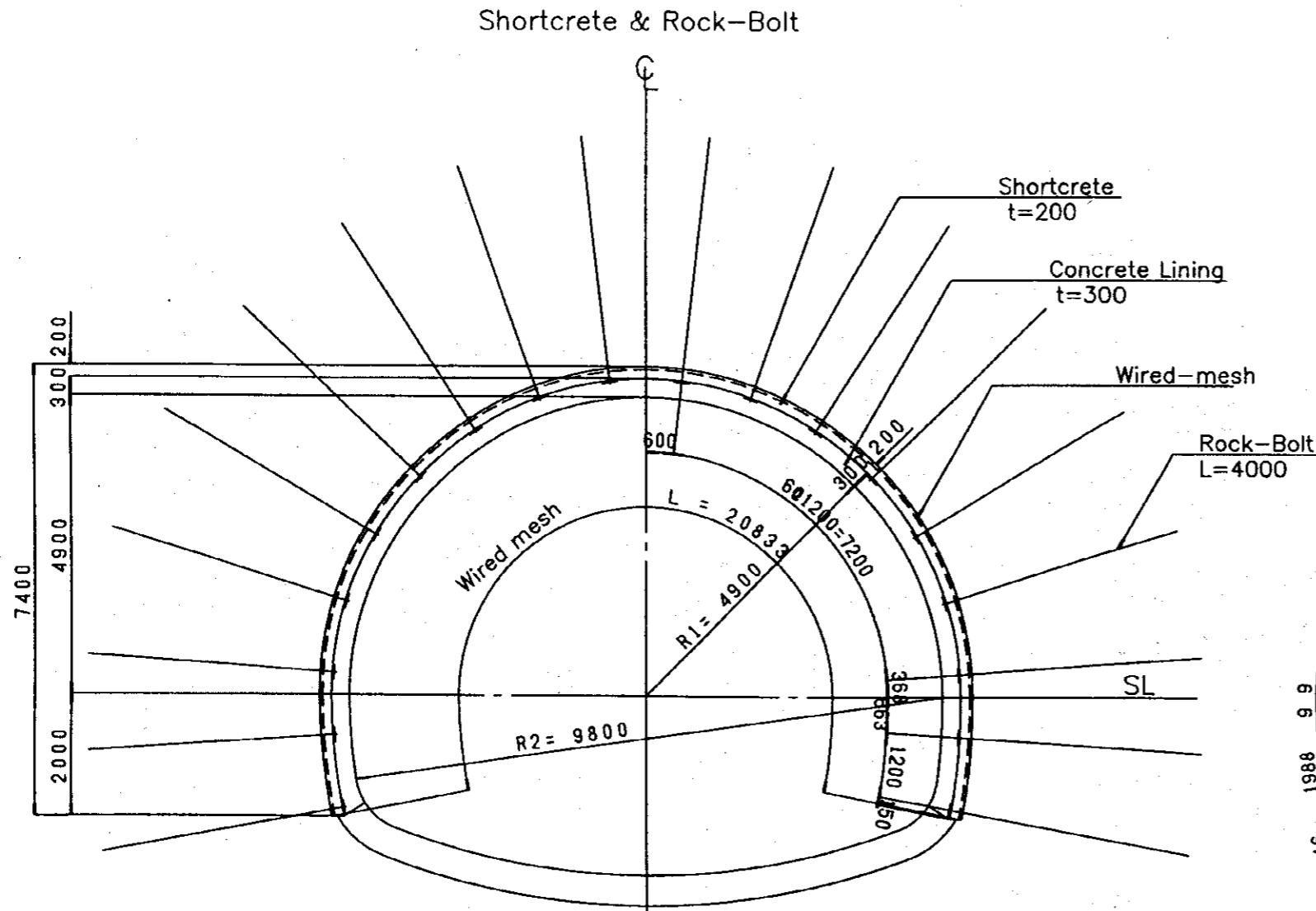



| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|-------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Supporting System | Tn-6 |

Supporting System

S=1:100

DII

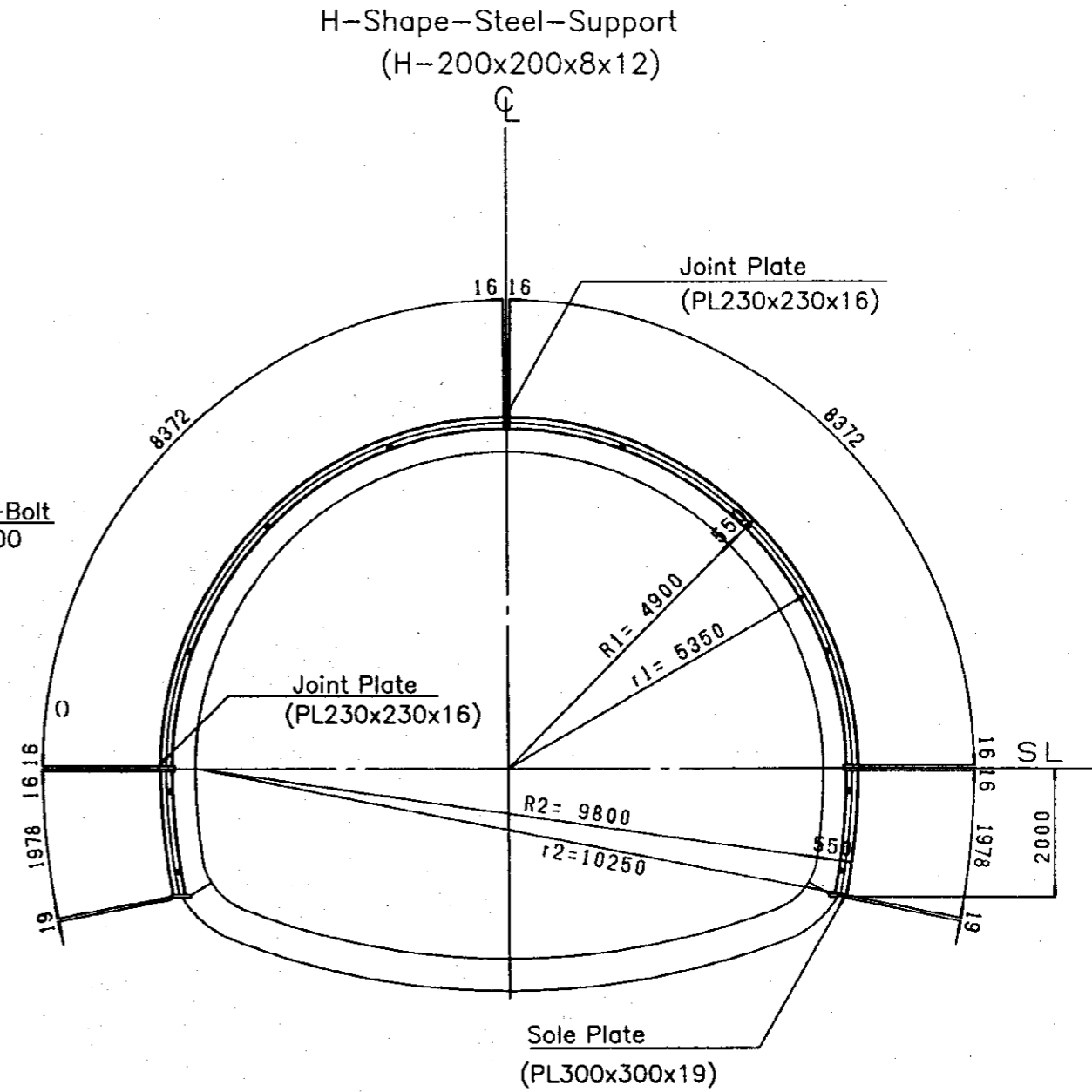
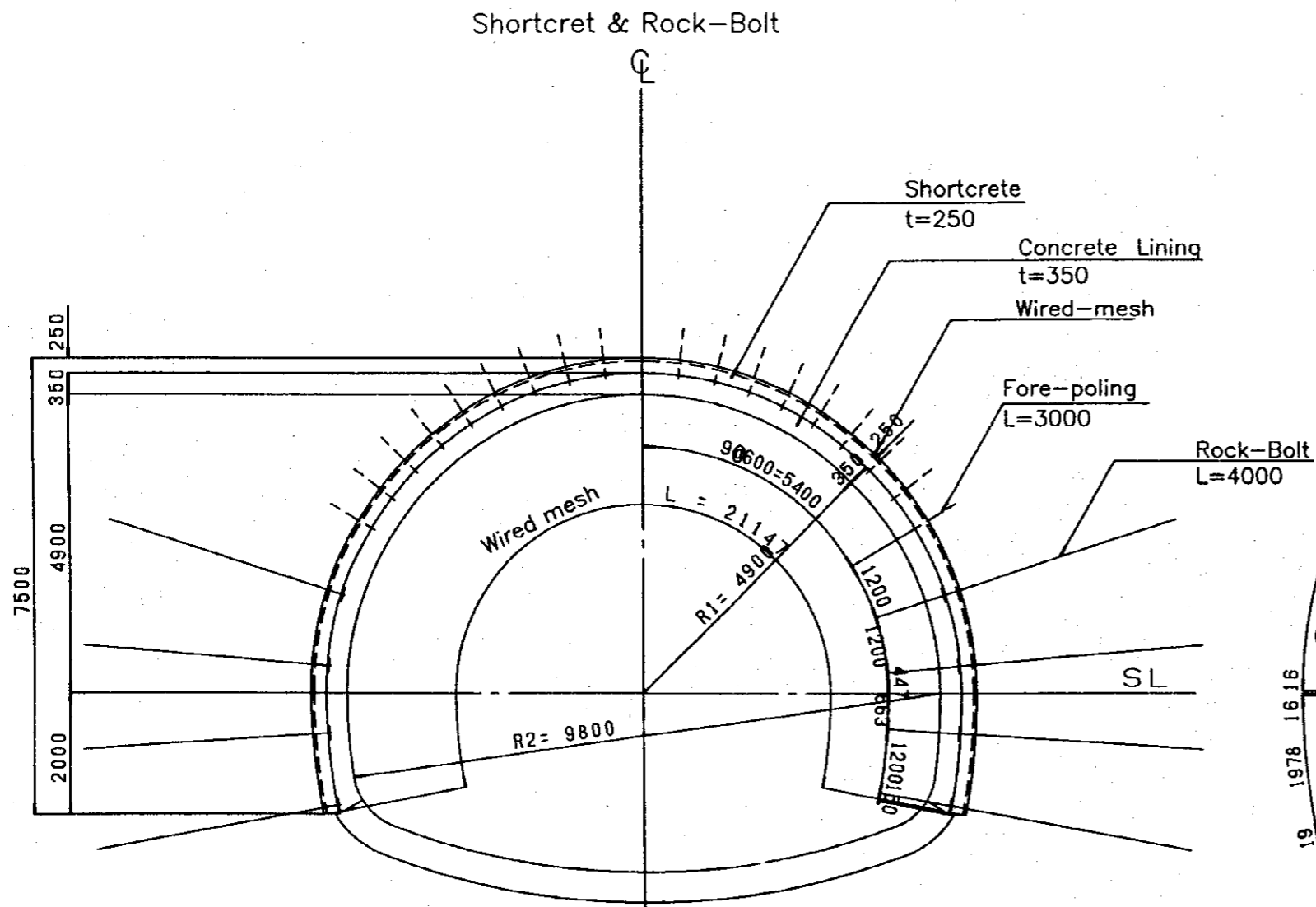



| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|-------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Supporting System | Tn-7 |

Supporting System

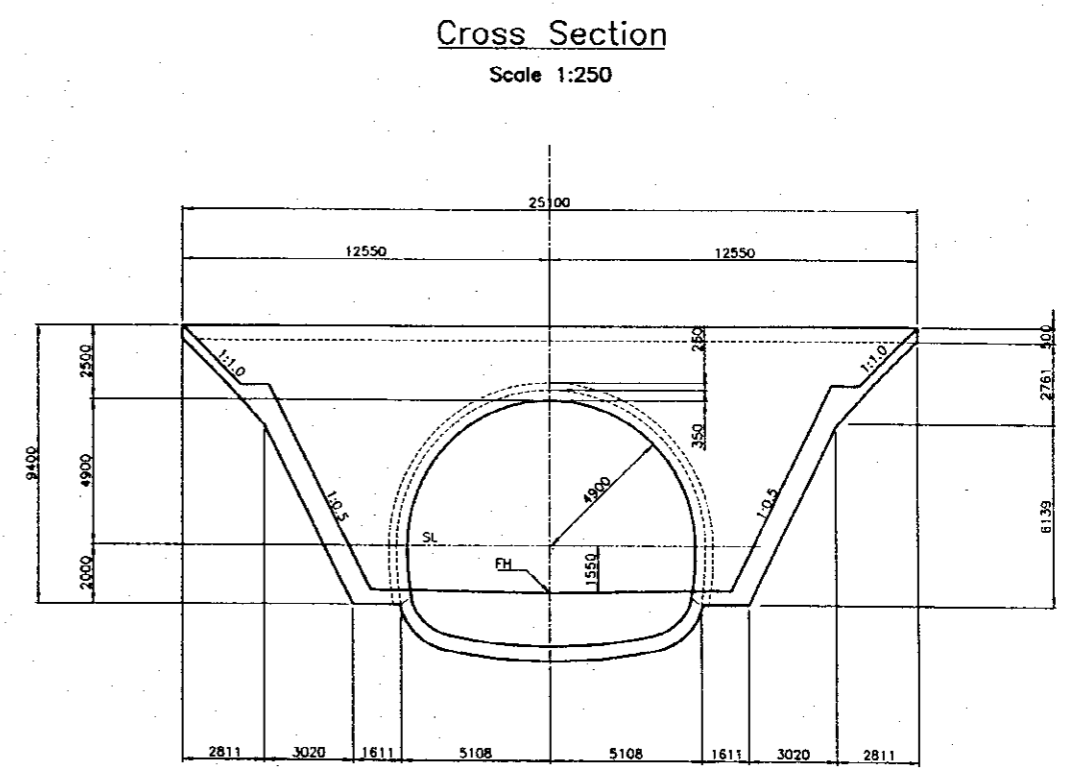
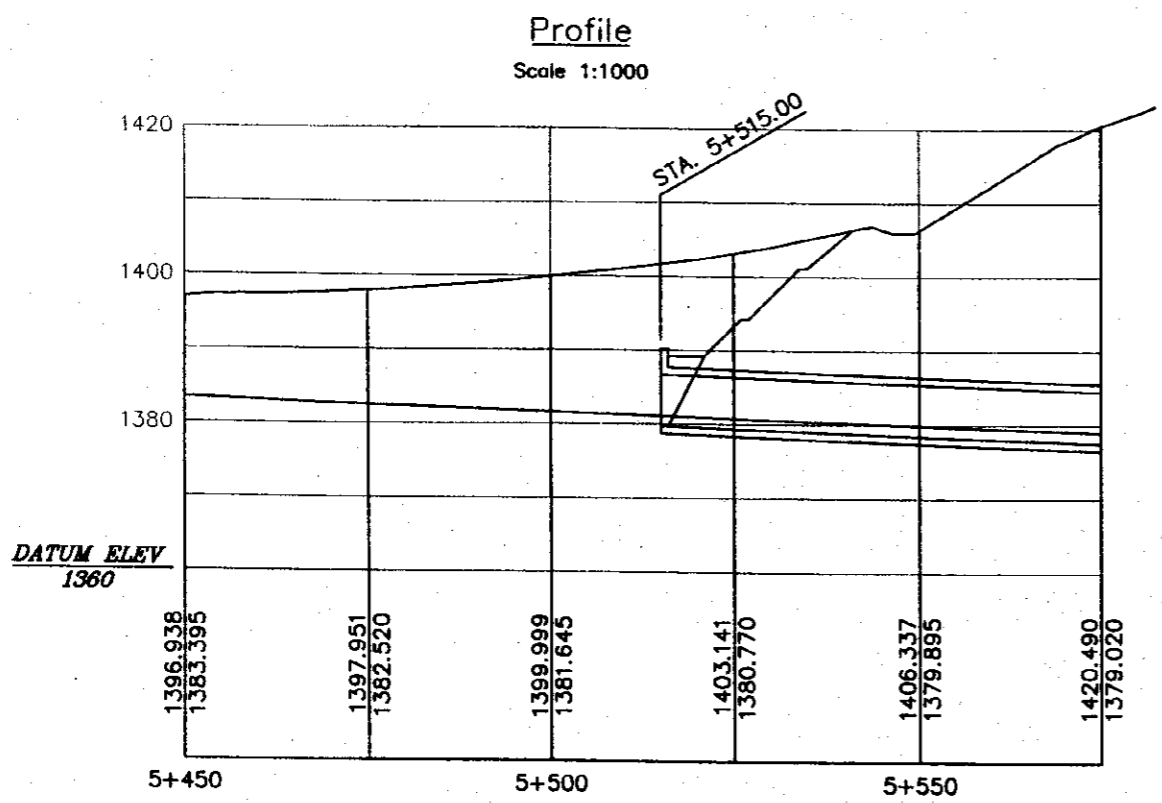
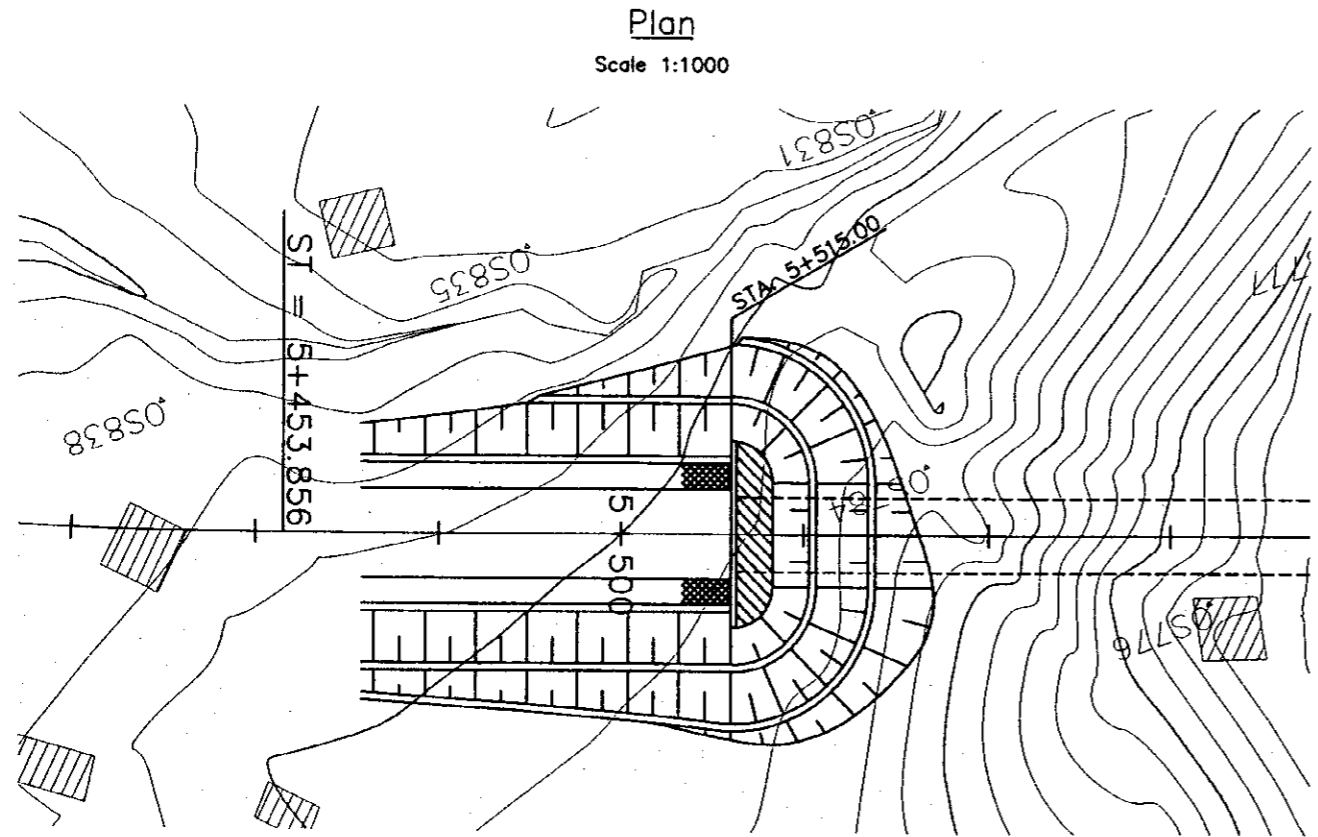
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DIII-a



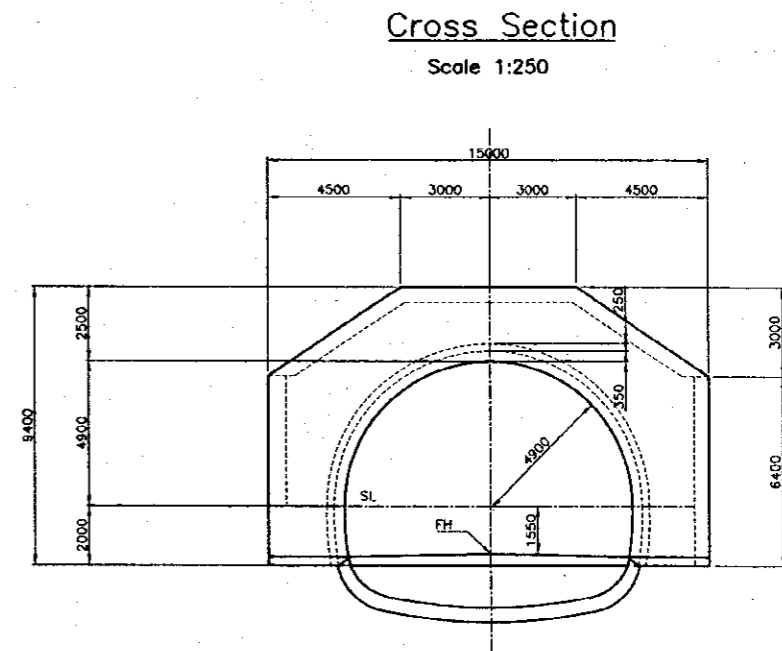
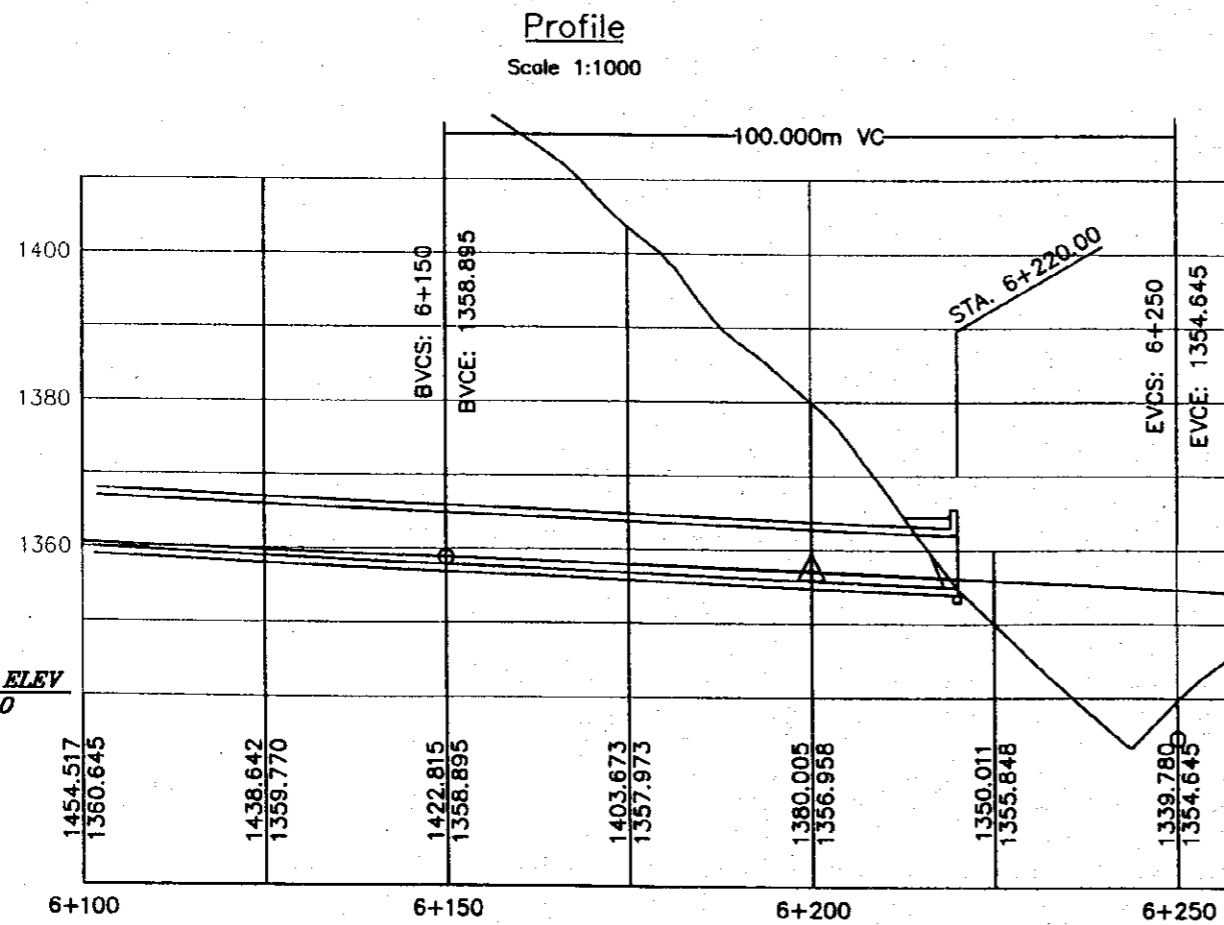
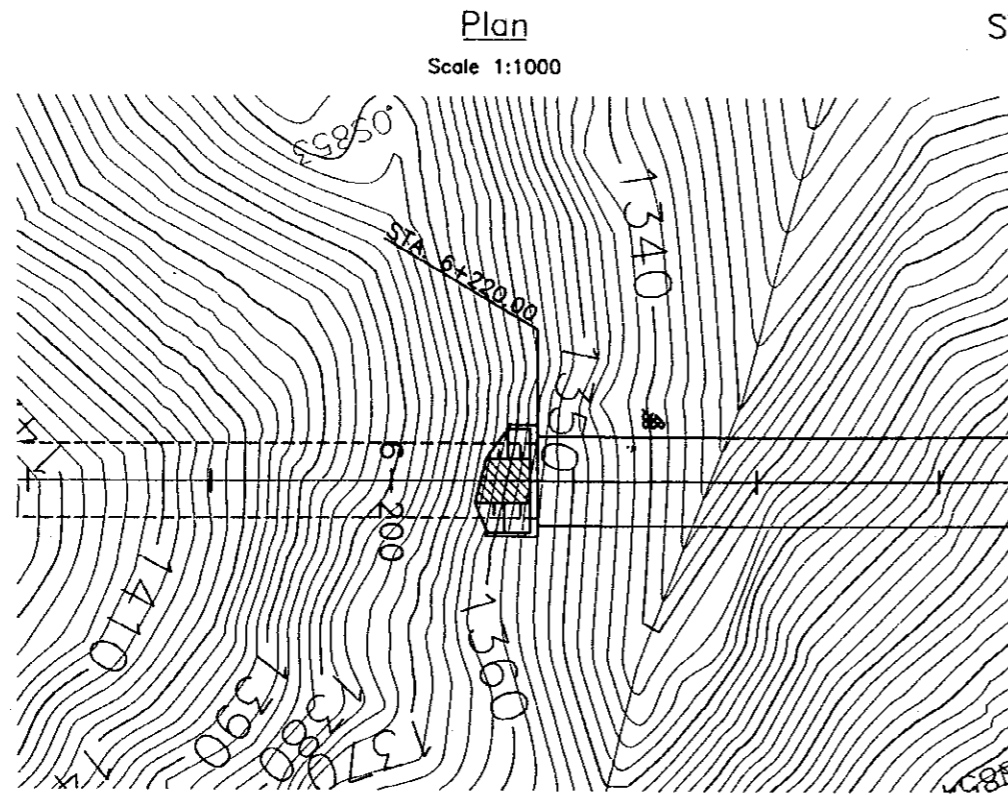
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|-------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Supporting System | Tn-8 |

General Layout of Portal (East Portal) STA. 5+515.00



| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|---|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS | NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | General Layout of Portal (East Portal) STA. 5+515.00 | Tn-9 |

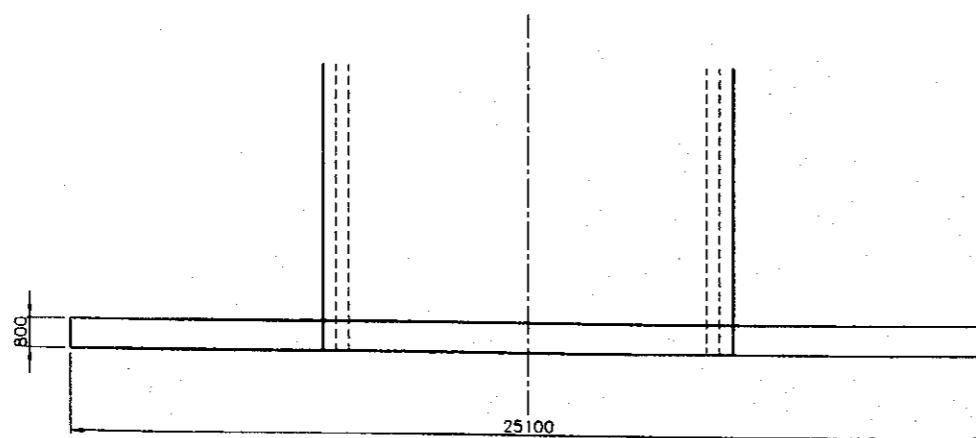
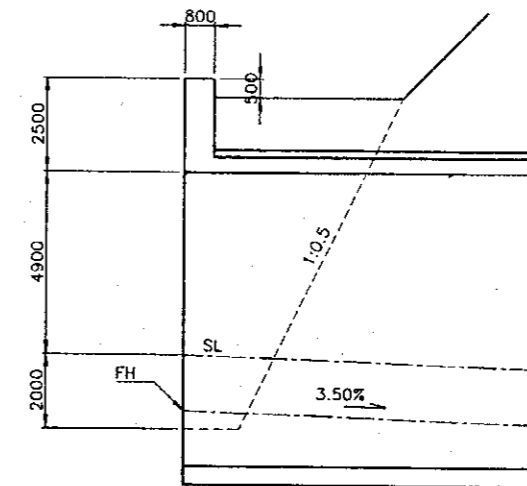
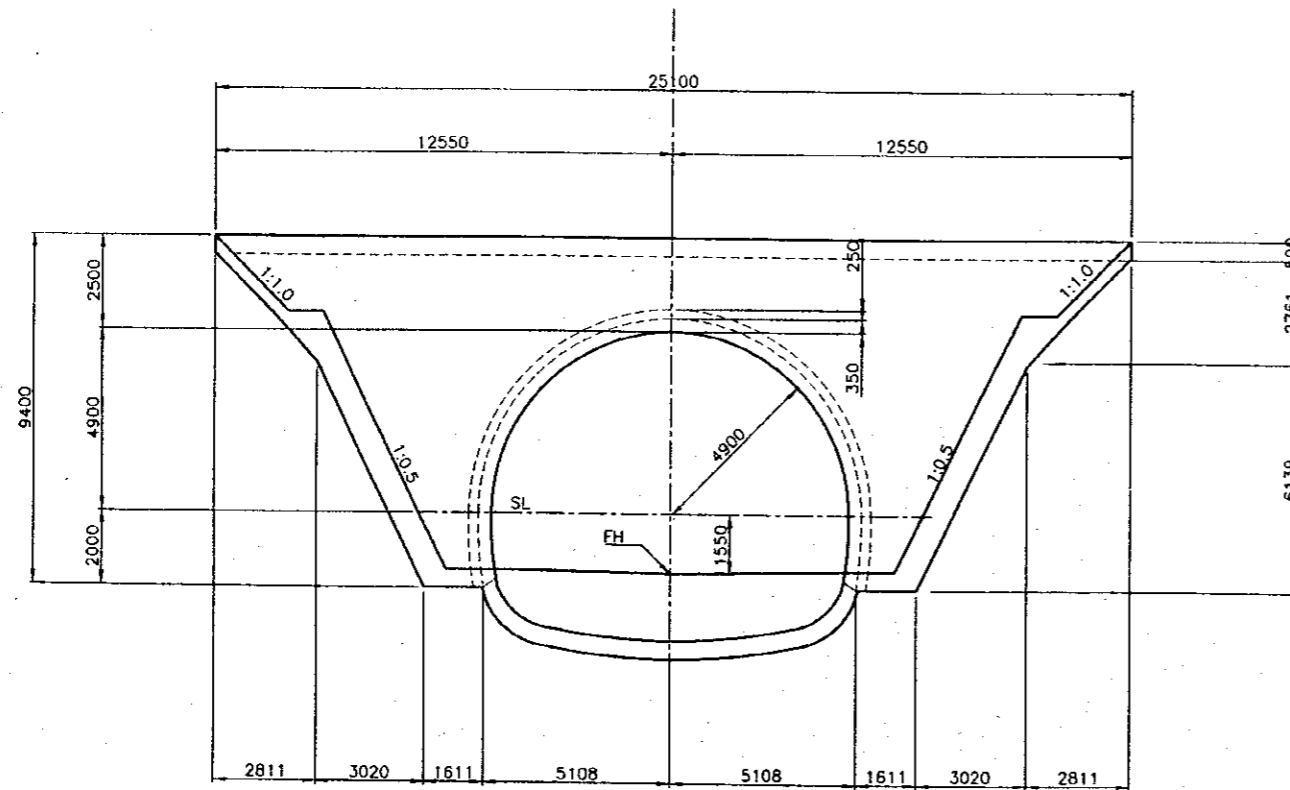
General Plan of Tunnel (West Portal) STA. 6+220.00




| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|---|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS | NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | General Plan of Tunnel (West Portal) STA. 6+220.00 | Tn-10 |

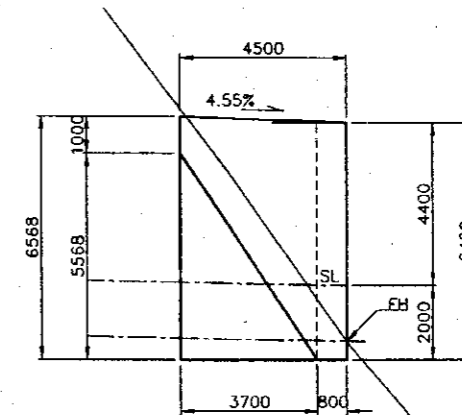
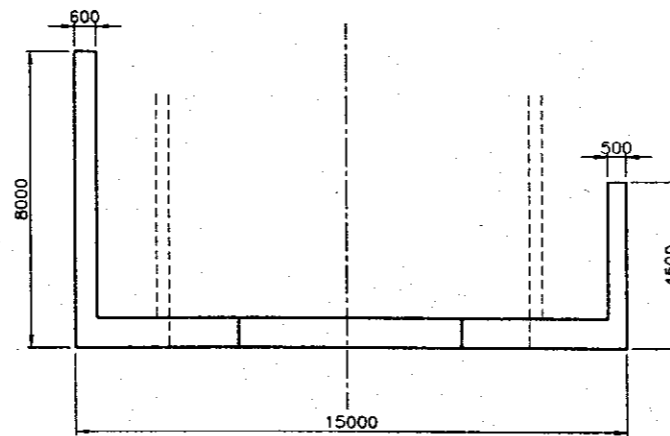
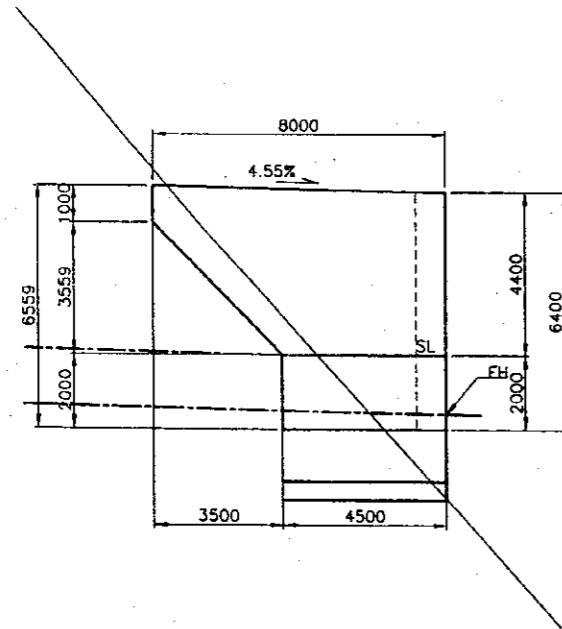
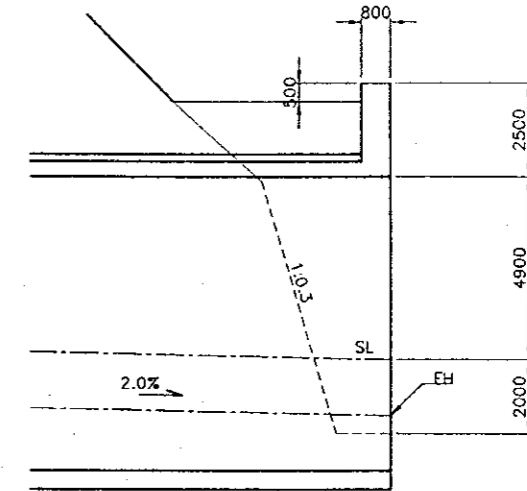
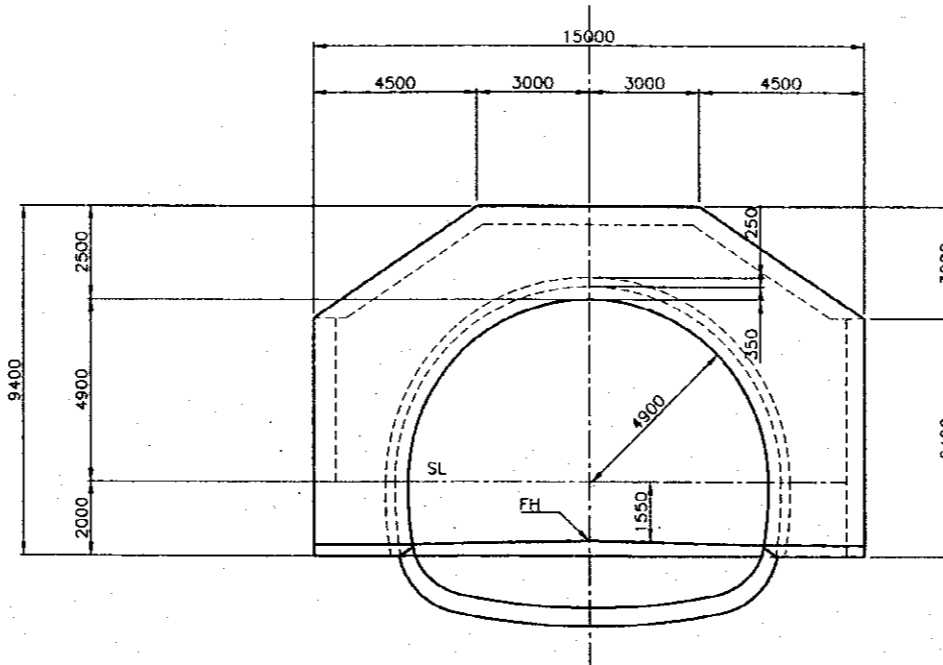
Plan and Elevation of Portal
(East Portal)


Scale 1:200



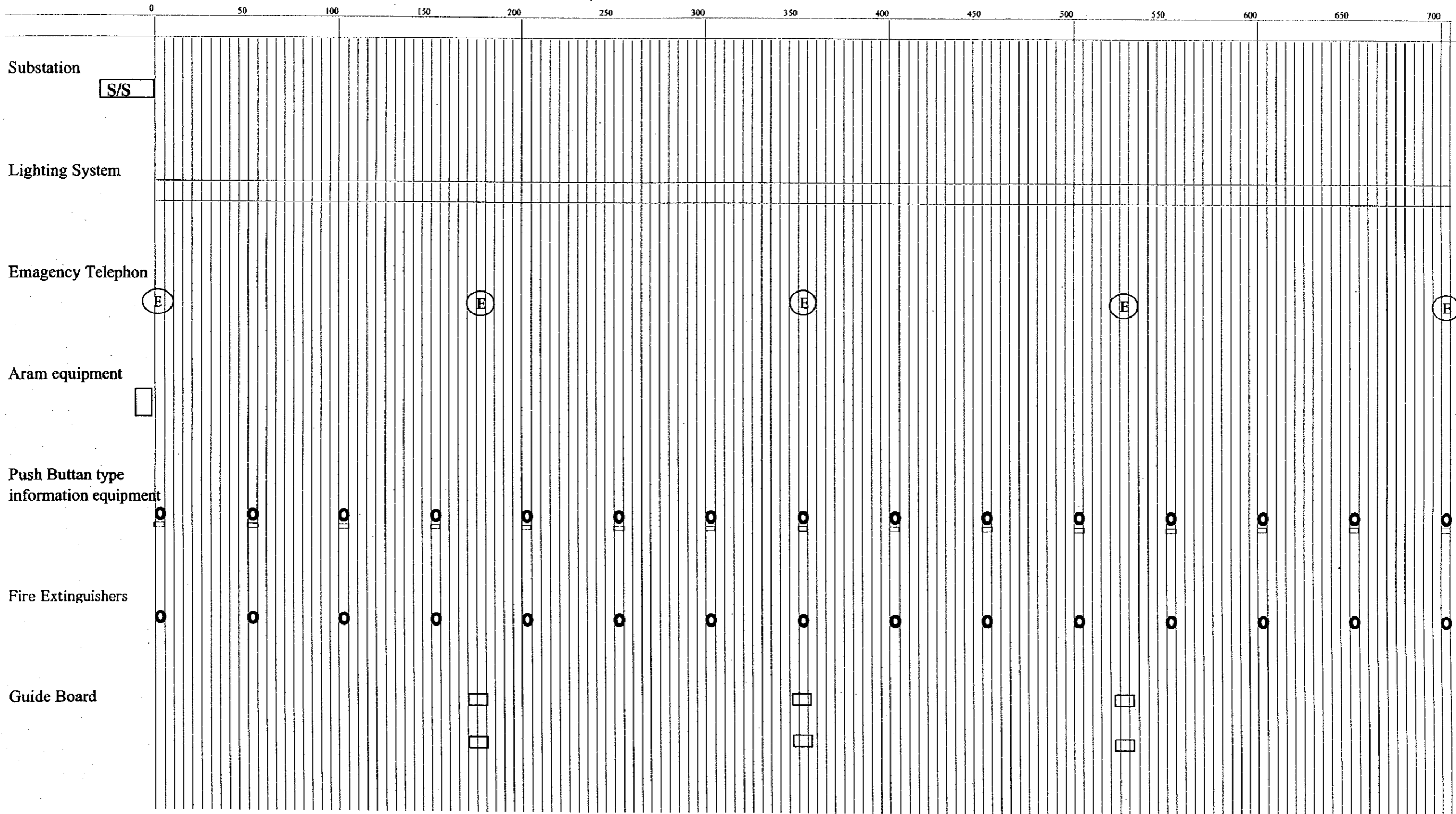
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|---|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Plan and Elevation of Portal East Portal | Tn-11 |


**Plan and Elevation of Portal
(West Portal)**
Scale 1:200



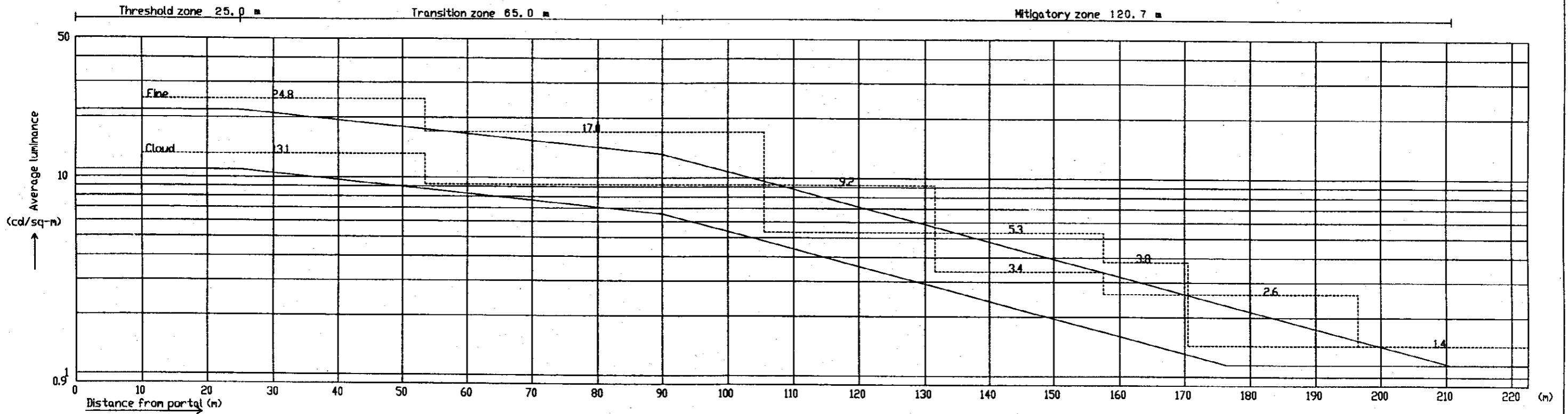
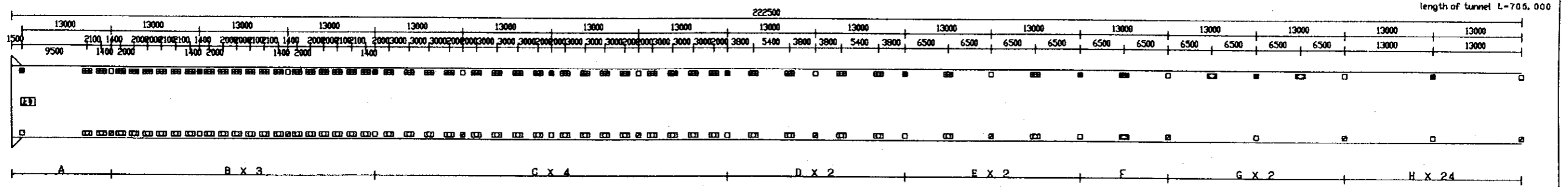
| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|---|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Plan and Elevation of Portal West Portal | Tn-12 |

Arrangement of Tunnel Facilities



| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|----------------------------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS |  NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Arrangement of Tunnel Facilities | Tn-13 |

Lighting System



| Design condition | | |
|---|------------------|---------------------------------|
| Length of tunnel | 705 m | |
| Design speed | 60 km/h | |
| Designed traffic volume | 5000 vehicle/day | |
| Kind of surface | Concrete | |
| | Basic lighting | Lighting in entrance transition |
| Utilization factor | 0.307 | 0.307 |
| Maintenance factor | 0.60 | 0.60 |
| Decrease factor | 0.5 | 0.5 |
| Length of vault section of basic lighting | 13 m | |
| Design luminance of basic lighting | 1.2 cd/sq-m | |
| | East | West |
| Field luminance | 3000 cd/sq-m | 3000 cd/sq-m |
| Design luminance of threshold zone | 21.8 cd/sq-m | 21.8 cd/sq-m |
| Design luminance of transition zone | 13.1 cd/sq-m | 13.1 cd/sq-m |
| Design luminance of mitigatory zone | 1.2 cd/sq-m | 1.2 cd/sq-m |

| Number of lamps (basic lighting) | | | | |
|----------------------------------|-----------------|------|------|------|
| Name | Number of lamps | | | |
| | NX35 | NX35 | NX35 | NX35 |
| day | 55 | | | |
| night | | 27 | | |
| mid-night | | | 13 | |
| (Mid-night includes RT) | | | | 15 |
| Total | 55 | 27 | 13 | 15 |

| Number of lamps (lighting in entrance transition) | | | |
|---|-----------------|------|------|
| Name | Number of lamps | | |
| | NX90 | NX55 | NX35 |
| Fine | 84 | 6 | 0 |
| Cloud | 84 | 2 | 0 |
| Total | 168 | 8 | 0 |

| PROJECT NAME | CLIENT | CONSULTANT | DWG TITLE | DWG NO. |
|---|---|---|-----------------|---------|
| THE FEASIBILITY STUDY ON THE CONSTRUCTION OF KATHMANDU - NAUBISE ALTERNATE ROAD IN THE KINGDOM OF NEPAL | JAPAN INTERNATIONAL COOPERATION AGENCY HIS MAJESTY'S GOVERNMENT OF NEPAL MINISTRY OF PHYSICAL PLANNING AND WORKS DEPARTMENT OF ROADS | NIPPON KOEI CO., LTD. Consulting Engineers Tokyo, JAPAN | Lighting System | Tn-14 |

JICA