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**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

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**1. Member List of the Survey Team**

Assignment	Name	Organization
Team Leader(1 <sup>st</sup> survey)	Mr. Tomohiro Seki	Japan International Cooperation Agency
Team Leader(2 <sup>nd</sup> survey)	Mr. Hiroshi Takeuchi	Japan International Cooperation Agency
Planning Coordinator	Mr. Kiyohito Shimada	Japan International Cooperation Agency
Chief Consultant/ Bridge Planner(1)	Mr. Masataka Fujikuma	Oriental Consultants Global
Deputy Chief/Bridge Planner(2)/Road Designer	Mr. Yasuhisa Suganuma	Oriental Consultants Global
Bridge Designer	Mr. Keigo Konno	Oriental Consultants Global
Social Condition Surveyer/Traffic Planner	Mr. Yoshiyuki Arita	International Development Center of Japan
Natural Condition Surveyer	Mr. Makoto Nozawa	Oriental Consultants Global
Hydrology Specialist	Mr. Naoya Akaishi	Oriental Consultants Global
Environment & Social Impact Specialist	Ms. Mihoko Ogasawara	International Development Center of Japan
Cost Estimator	Mr. Tsutomu Sawaguchi	Oriental Consultants Global
Construction Programmer	Mr. Masaki Sumi	Oriental Consultants Global

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FINAL REPORT**

**2. Survey Schedule**

**(1) 1st Survey**

Date	JICA				Consultants						
	Team Leader Mr. Tomohiro Seki	Planning Coordinator Mr. Kiyohito Shimada	Chief Consultant/ Bridge Planner(1) Mr. Masataka Fujikuma	Deputy Chief/Bridge Planner(2)/Road Designer Mr. Yasuhisa Suganuma	Bridge Designer Mr. Keigo Konno	Social Condition Surveyer/Traffic Planner Mr. Yoshiyuki Arita	Natural Condition Surveyer Mr. Makoto Nozawa	Hydrology Specialist Mr. Naoya Akashi	Environment & Social Impact Specialist Ms. Mihoko Ogasawara	Cost Estimator Mr. Tsutomu Sawaguchi	Construction Programmer Mr. Masaki Sumi
1 4/16 Thu			Tokyo-BKK-VTE								
2 4/17 Fri											
3 4/18 Sat			Data/Information collection								
4 4/19 Sun				Nagoya-BKK-VTE							
5 4/20 Mon											
6 4/21 Tue			Tokyo-BKK-VTE								
7 4/22 Wed											
8 4/23 Thu			AM Meeting@VTE, PM Meeting@VTE								
9 4/24 Fri			VTE-PKS-SVN(Flight) Meeting after arrival								
10 4/25 Sat			Site survey								
11 4/26 Sun			AM Preparation of Minute, PM SVN-PKS-VTE(Flight)								
12 4/27 Mon			AM Meeting@VTE, PM Preparation of Minute								
13 4/28 Tue			AM Preparation of Minute, PM Meeting with JICA office, Embassy								
14 4/29 Wed			Meeting, Data/Information collection								
15 4/30 Thu			BKK-Tokyo								
16 5/1 Fri											
17 5/2 Sat											
18 5/3 Sun			Site survey								
19 5/4 Mon											
20 5/5 Tue											
21 5/6 Wed			SVN-VTE(H-Ace)								
22 5/7 Thu			Meeting with MPWT								
23 5/8 Fri			AM Meeting with MPWT PM Meeting with JICA office VTE-BKK								
24 5/9 Sat			BKK-Tokyo								
25 5/10 Sun											
26 5/11 Mon											
27 5/12 Tue											
28 5/13 Wed											
29 5/14 Thu											
30 5/15 Fri											
31 5/16 Sat											
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71 6/25 Thu											
72 6/26 Fri											
73 6/27 Sat											

**(2) 2nd Survey**

Date	JICA				Consultants						
	Team Leader Mr. Hiroshi TAKEUCHI	Planning Coordinator Mr. Kiyohito Shimada	Chief Consultant/ Bridge Planner(1) Mr. Masataka Fujikuma	Deputy Chief/Bridge Planner(2)/Road Designer Mr. Yasuhisa Suganuma	Bridge Designer Mr. Keigo Konno	Social Condition Surveyer/Traffic Planner Mr. Yoshiyuki Arita	Natural Condition Surveyer Mr. Makoto Nozawa	Hydrology Specialist Mr. Naoya Akashi	Environment & Social Impact Specialist Ms. Mihoko Ogasawara	Cost Estimator Mr. Tsutomu Sawaguchi	Construction Programmer Mr. Masaki Sumi
148 9/10 Thu			Tokyo-BKK-VTE								
149 9/11 Fri											
150 9/12 Sat											
151 9/13 Sun			Tokyo-BKK-VTE								
152 9/14 Mon			Meeting with MPWT								
153 9/15 Tue											
154 9/16 Wed			Meeting with MPWT								
155 9/17 Thu											
156 9/18 Fri			VTE-BKK								
157 9/19 Sat			BKK-Tokyo								
158 9/20 Sun											

3. List of Parties Concerned in the Recipient Country

Organization	Name	Position
DOR, MPWT	Mr. Pheng DOUANGNGEUN	Director General
	Mr. Ngamapasong MUONGMANY	Deputy Director General
	Mr. Phonephana PHROMMALA	DDT
	Mr. akihiko MORI	JICA Expert
DPWTSavannaket	Mr. Prasongsinh CHALEUNSOUK	Director General
	Mr. Sinkapor SAIYAVONG	Deputy Director
	Mrs. Phavanh BOURLOUANGLATH	Deputy Director
	Mr. Souvanh SENGCHAMPHONE	
	Mr. Kiovilaysan SANANUSAN	
	Mr. Phanphasanesay PHETSINERATH	
	Mr. Khammy PHOMPHIUNGAM	
	Mr. Souksangouane SAYAVONG	
	Mr. Xayasone KEOLAYSOUK	



4. Minutes of Discussion

(1) 1st Survey

**MINUTES OF DISCUSSIONS  
ON  
THE PREPARATORY SURVEY  
ON  
THE PROJECT FOR THE REHABILITATION  
OF THE BRIDGES ON NATIONAL ROAD NO.9  
IN  
THE LAO PEOPLE'S DEMOCRATIC REPUBLIC**

In response to the official request of the the Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") in July 2014, Japan International Cooperation Agency (hereinafter referred to as "JICA") in consultation with the Government of Japan had decided to conduct a Preparatory Survey for Outline Design on the Project for the Rehabilitation of the Bridges on National Road No.9 (hereinafter referred to as "the Project"), and dispatch a Preparatory Survey Team (hereinafter referred to as "the Team") to Lao PDR.

The Team is headed by Mr. Tomohiro SEKI, Senior Advisor to the Director General, Financial Cooperation Implementation Department, JICA, and is scheduled to stay in Lao PDR from April 19th to April 29th, 2015.

The Team held a series of discussions with officials concerned in Lao PDR and conducted field surveys in the Project area. In the course of discussions and field surveys, both sides have confirmed the main items described in the attached sheets. The team will proceed to further studies and prepare a Preparatory Survey Report.

Vientiane, April 28<sup>th</sup>, 2015



Tomohiro SEKI  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



Ngamapasong Muongmany  
Deputy Director General  
Department of Roads  
Ministry of Public Works and Transport

## ATTACHMENTS

### 1. Title of the Project

Both sides confirmed that the title of the Project shall be modified from “The Project for the Rehabilitation of the Bridges on National Road No.9” to “The Project for the Reconstruction of the Bridges on National Road No.9”.

### 2. Objective of the Project

Both sides confirmed that the objective of the Project is to reconstruct the Xe Kum Kam Bridge and Xe Tha Mouak Bridge on National Road No.9.

### 3. Project Site

The Project site is located on National Road No.9 in Savannakhet Province, Lao PDR, which is shown in **Annex 1**.

### 4. Objective of the Preparatory Survey

Both sides confirmed the objective of the Survey as follows:

- 4-1. To understand the background and objective of the Project and examine its impacts and appropriateness;
- 4-2. To identify the components, and conduct outline design and cost estimation of the Project, based on the data and information collected from and the results of discussions with the Lao side; and
- 4-3. To study the issues of environmental and social considerations through the Survey.

### 5. Responsible and Implementing Organization

The Responsible Organization of the Project is the Ministry of Public Works and Transport (hereinafter referred to as “MPWT”), Department of Roads (hereinafter referred to as “DOR”). The organization chart is shown in **Annex 2**.

### 6. Items requested by the Government of Lao PDR

- 6-1. It is written on the application form that the Lao side requests for replacement of the Xe Kum Kam Bridge and Xe Tha Mouak Bridge on National Road No.9. JICA will assess the appropriateness of the request that would be examined in accordance with further studies and analysis in Japan and the final components of the Project would be decided by the Japanese side mainly from the viewpoints of necessity, technical and financial viability, sustainability and cost-effectiveness.
- 6-2. Both sides confirmed that there was no duplication for the Project to be conducted by



other development partners or private enterprises.

#### **7. Japan's Grant Aid Scheme**

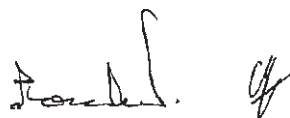
- 7-1. The Lao side understands the Japan's Grant Aid scheme explained by the Team, as described in **Annex 3** and **Annex 4**.
- 7-2. The Lao side will take the necessary measures, as described in **Annex 5**, to facilitate the smooth implementation of the Project, as a condition for the Japan Grant Aid to be implemented.

#### **8. Environmental and Social Considerations**

- 8-1. The Team explained that environmental and social considerations for the Project is categorized as "Category B" according to the JICA Environmental and Social Consideration Guidelines, since the impact on the environment from the Project may be limited.
- 8-2. Both sides confirmed that the Lao side shall conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Initial Environmental Examination (IEE) etc.) and make IEE report of the Project. DOR shall get the IEE approval issued by Department of National Resource and Environment of Savannakhet Province and submitted to JICA Laos office before the tender process of the construction.
- 8-3. The Lao side agreed to arrange the budget allocation for IEE study, land acquisition, resettlement, compensation for the Project Affected Persons (PAPs) or Indigenous People's Plan (IPP) and secure the land for construction including the cost of UXO clearance before the detailed design of the Project.

#### **9. Operation and Maintenance**

- 9-1. The Lao side explained that the maintenance works on the target bridges would be conducted by DOR and DPWT Savannakhet Province.
- 9-2. The Lao side will take every necessary action including securing enough budget and personnel for the operation and maintenance of the facilities implemented by the Project.
- 9-3. The Team explained to the Lao side that overloaded trucks which exceed designed axle loads would cause early failure and shorter life.
- 9-4. The Team also explained to the Lao side that proper asset management will impact greatly on maintenance cost and lifespan.
- 9-5. Both sides confirmed that the techniques/know-how from ongoing Technical Cooperation Project, 'Project for Improvement of the Road Management Capability' would be utilized in maintenance.
- 9-6. Maintenance specification with the breakdown of costs for the items to be replaced by

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periodical maintenance will be provided and the workshop will be organized to let Lao side understand necessary maintenance of bridge before completion of the construction.

**10. Disclosure of Information**

Both sides confirmed that the study results excluding the Project cost will be disclosed to the public after the completion of the Survey. All the study result including the Project cost will be disclosed to the public after the verification of all contracts for the Project by JICA are concluded.

**11. Collaboration among Relevant Organizations**

DOR promised to work closely with relevant organizations, such as the Ministry of Planning and Investment, the Ministry of Finance, the Ministry of Foreign Affairs, JICA and Embassy of Japan with mutual common understanding and cooperation for the Project.

**12. Safety Measures**

12-1. To avoid accidents on site during the implementation of the Project, the Lao side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel, based on “The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects” which has been published on JICA’s URL below.

[http://www.jica.go.jp/activities/schemes/oda\\_safety/ku57pq00001nz4eu-att/guidance\\_en.pdf](http://www.jica.go.jp/activities/schemes/oda_safety/ku57pq00001nz4eu-att/guidance_en.pdf)

12-2. The Team recommended to the Lao side to explain to the residents about the Project (necessity and significance, construction period, sites, impact etc.), so that consensus support can be obtained from them for the smooth operation of the Project.

**13. Misconduct**

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, MPWT and relevant organizations shall provide JICA with additional such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations in Lao PDR.

MPWT and relevant organizations shall not, unfairly or unfavourably treat the person(s) and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

**14. Schedule of the Survey**

Both sides confirmed the schedule of the Survey are as below, the schedule may be subject

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to change during the preparation and the course of the Survey:

14-1. The Team will conduct site survey in Lao PDR until June 17<sup>th</sup> 2015;

14-2. JICA will prepare the Draft Final Report and dispatch a mission team to explain the details of the Project including the final components and cost estimation to the Lao side around September 2015; and

14-3. JICA will finalize the Final Report and send it to the Lao side around January 2016.

### **15. Other Relevant Issues**

#### **15-1. Provision of Conveniences to the Team by the Lao Side**

The Lao side shall, at its own expenses, provide the Team with the following items in collaboration with MPWT and other organizations concerned:

- (1) Security-related information as well as measures to ensure the safety of the Team members;
- (2) Information as well as support in obtaining medical service;
- (3) Data and information related to the Preparatory Survey;
- (4) Traffic data including axle load records collected at the relevant weight stations;
- (5) Provision of office space for the Team;
- (6) Counterpart personnel from relevant authorities in the Lao Government;
- (7) Entry permits necessary for the Team members including the sub-consultants to conduct field surveys; and
- (8) Coordinate and support in obtaining official permission, certificate and approval from the relevant government authorities when necessary.

#### **15-2. Provision of Conveniences to the Project by the Lao Side**

The Lao side confirmed that undertakings described in **Annex 6** should be taken by the Lao side at its own expense if implementation of the Project is approved by the Government of Japan.

#### **15-3. Selection of New Bridge Locations for Two Bridges**

Japanese side explained the results of comparison study on selection of new bridge location based on the site survey. The results of the selection are shown in **Annex 7** and the proposed locations for each bridge are as follows;

- Xe Kum Kam Bridge: Shift the bridge toward north side of the existing location
- Xe Tha Mouak Bridge: Relocate at the existing location

Japanese side requested DOR/MPWT to review the proposal and provide the answer as soon as possible so that JICA Study Team can proceed to the further study without delay. Lao side agreed to provide his answer before 5<sup>th</sup> of May 2015.



**15-4. Cross section of New Bridge (Shoulder and Sidewalk)**

The existing carriageway of National Road No.9 has the road width associated without shoulder that is not satisfied with the standards specified in both the geometric standards of Asian Highways and ASEAN Highway. It is desirable to secure a width of road cross section complying with these international standards. However, it does not require a full width of 2.5m for the shoulder on the bridge considered to economic efficiency of bridge construction refer to the practices in Japan. Thus, both side agreed that it applies the narrower shoulder (0.5m or 1.0m) on the bridge section (but secure 1.5m width of shoulder on approach roads consistent to the width of existing NR-9. On the other hand, due attention must be paid to vulnerable road users (women and children) and secure the width of sidewalk. The minimum required width of sidewalks should be decided taking into account the future demand of pedestrian crossing on the bridges.

**15-5. Treatment of Contract Phasing with Ongoing Rehabilitation Works by Lao side**

Lao side is currently conducting the rehabilitation works on NR-9. The extent of approach roads for the new bridges will be decided after the outline design is completed around September 2015. DOR/ MPWT shall inform the Lao contractor who is being involved in the rehabilitation works to avoid the conflict with the Project.

Also, the DPWT Savannakhet shall take responsibilities to coordinate the contract phasing between the contractors of Lao and Japan during the construction.

**15-6. Installation of Weigh Station for Control of Overloaded Vehicles**

Japanese side explained that the installation of weigh station was excluded from the scope of works for the Project since the preparation of guideline and reinstatement of advanced weigh station by Department of Transport/MPWT, is still under the process.

Annex 1: Project Site

Annex 2: Organization Charts of MPWT


Annex 3: Japan's Grant Aid

Annex 4: Flow Chart of Japan's Grant Aid Procedures

Annex 5: Major Undertakings to be taken by Each Government as a condition for the Japan Grant Aid to be implemented

Annex 6: Major Undertakings to be taken by Each Government after an approval of Project implementation

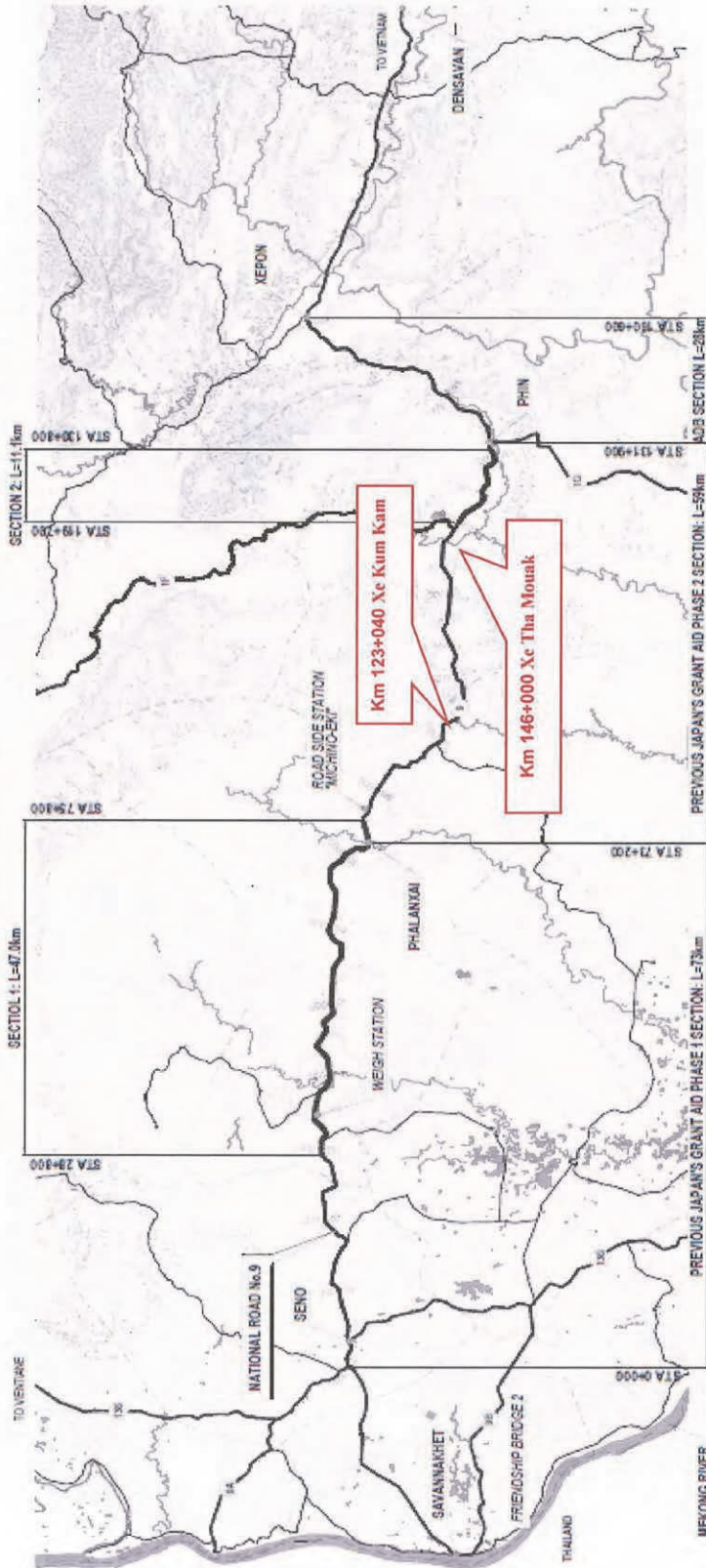
Annex 7: Selection of new bridge location





Annex 1

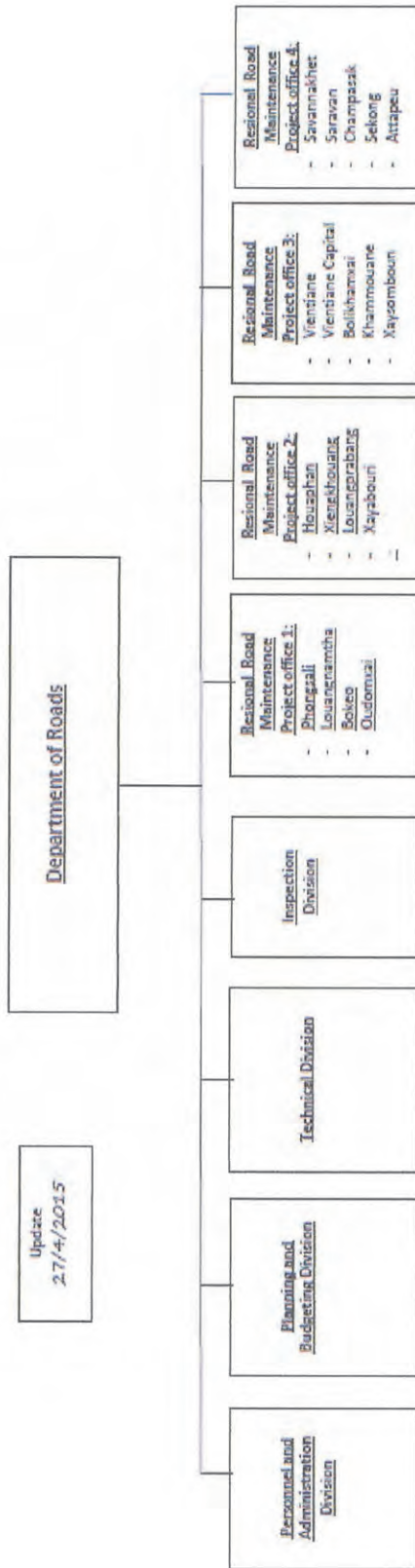
Project Site



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Department of Roads Organization Chart

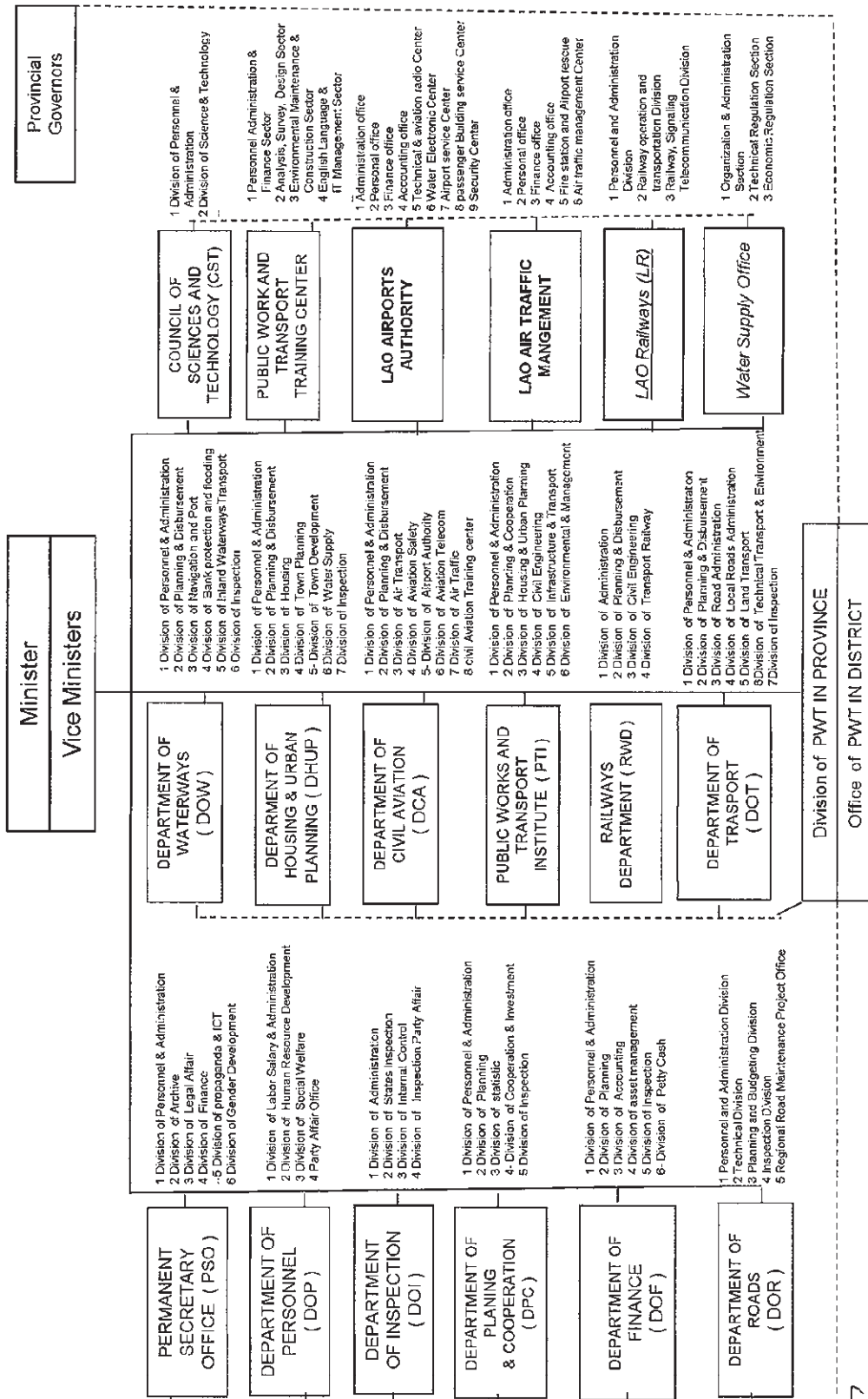


Organization Charts for Department of Roads, Ministry of Public Works and Transport



Ministry of Public Works and Transport (MPWT)

# Ministry of Public Works and Transport



### Japan's Grant Aid

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

#### 1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures:

- a) Preparatory Survey
  - The Survey conducted by JICA
- b) Appraisal and Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- c) Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- d) Grant Agreement (hereinafter referred to as "the G/A")
  - Agreement concluded between JICA and a recipient country
- e) Implementation
  - Implementation of the Project on the basis of the G/A

#### 2. Preparatory Survey

##### (1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.



- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

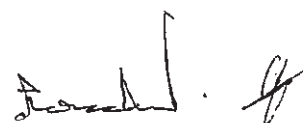
After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the



Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex 6.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

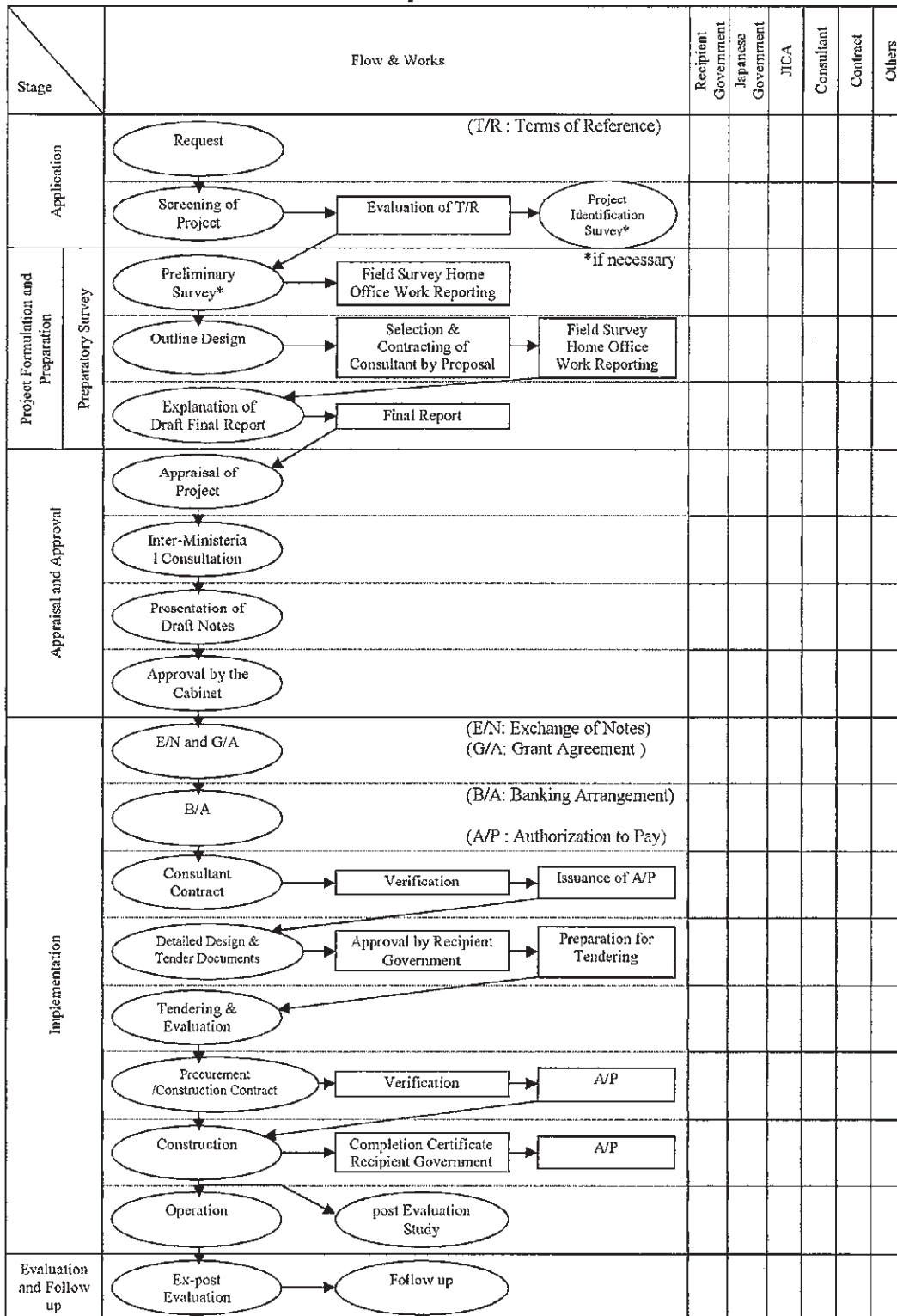


(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

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Flow Chart of Japan's Grant Aid Procedures



**Major Undertakings to be taken by Each Government  
as a condition for the Japan Grant Aid to be implemented**

No.	Items	To be covered by		Remarks
		Grant Aid	Recipient Side	
1	To secure land registration and its property, and permission for the implementation of the Project and to clear the site		•	
2	To bear the following commissions paid to the Japanese bank for banking services based upon the Banking Arrangement (B/A)		•	
	1) Advising commission of Authorization to pay (A/P)		•	
	2) Payment commission		•	
3	To ensure prompt customs clearance of the products and to assist internal transportation of the products in the recipient country			
	1) Marine or Air transportation of the products from Japan and/or third countries to the recipient country	•		
	2) Tax exemption and customs clearance of the products in the recipient country		•	
	3) Internal transportation of the equipment and components from the port(s) of disembarkation to the project site in the recipient country	•		
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be borne by the Authority without using the Grant		•	
5	To accord Japanese physical persons and / or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•	
6	To maintain and use properly and effectively the facilities constructed and the equipment provided under the Grant Aid		•	
7	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project		•	
8	To give due environmental and social consideration in the implementation of the Project		•	

•: denote the side responsible for the work



**Major Undertakings to be taken by Each Government  
after an approval of Project implementation**

No.	Items	To be covered by		Remarks
		Grant Aid	Recipient Side	
1	To secure land with clearance of obstacles necessary for the implementation of the Project		●	
2	To secure sites for material storing yard, temporary construction yard and waste disposal		●	
3	To relocate existing utilities within the Project site to designated area or Project affected area		●	
4	To arrange issuance of license, permission and other necessary procedures for the Project		●	
5	To secure enough budget and personnel necessary for the operation and maintenance of the facilities implemented under the Grant Aid, including routine and periodical maintenance work after the completion of the Project		●	

●: denote the side responsible for the work e for the work



Selection of new bridge location (Xe Kum Kam Bridge)

	Plan A : Shift the bridge toward south side of the existing location	Plan B : Relocate at the existing location	Plan C : Shift the bridge toward north side of the existing location
Overall view			
Road alignment	<ul style="list-style-type: none"> <li>✓ Solving existing broken-back curve is required.</li> <li>✓ Shift the alignment to the south side of existing bridge.</li> <li>✓ West side: Appropriate straight length is secured between transition curves for S-curve.</li> <li>✓ East side: One single curve is applied to avoid broken-back curve.</li> <li>✓ The alignment is slightly worse than that of Plan B.</li> <li>✓ Installation of lighting facilities is needed to secure safe traveling on the bridge.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Solving existing broken-back curve is required.</li> <li>✓ Alignment passes through existing bridge location after reconstruction.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Solving existing broken-back curve is required.</li> <li>✓ Shift the alignment to the north side of the existing bridge.</li> <li>✓ West side: Appropriate straight length is secured between transition curves for S-curve.</li> <li>✓ East side: One single curve is applied to avoid broken-back curve.</li> <li>✓ The alignment is slightly worse than that of Plan B.</li> <li>✓ Installation of lighting facilities is needed to secure safe traveling.</li> </ul>
Travel safety	<ul style="list-style-type: none"> <li>○ Satisfy ASEAN Highway Standard and mostly follow the existing alignment is better than other alternatives.</li> <li>✓ Installation of lighting facilities is needed to secure safe traveling.</li> </ul>	<ul style="list-style-type: none"> <li>○ New abutment structure should be constructed behind the existing abutment but is required for longer bridge than the existing one.</li> <li>✓ Some parts of bridge section are located in curved section.</li> </ul>	<ul style="list-style-type: none"> <li>○ Some parts of bridge section are located in curved section.</li> <li>✓ Bridge length will be longer than the existing one.</li> </ul>
Bridge structure	<ul style="list-style-type: none"> <li>✓ None</li> </ul>	<ul style="list-style-type: none"> <li>✓ None</li> </ul>	<ul style="list-style-type: none"> <li>✓ None</li> </ul>
Affected House	<ul style="list-style-type: none"> <li>✓ Optical fibres cable</li> <li>✓ Electric cable/line</li> </ul>	<ul style="list-style-type: none"> <li>✓ Optical fibres cable</li> </ul>	<ul style="list-style-type: none"> <li>✓ Optical fibres cable (when removing the existing bridge)</li> </ul>
Utility to be relocated	<ul style="list-style-type: none"> <li>✓ The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>✓ Relocation of optical fibres cable and electric cable/line is needed.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Temporary bridge is needed during construction period because new bridge is constructed after the existing bridge is removed.</li> <li>✓ Relocation of optical fibres cable is needed.</li> </ul>	<ul style="list-style-type: none"> <li>✓ The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>✓ Relocation of optical fibres cable is needed.</li> </ul>
Economy	<ul style="list-style-type: none"> <li>✓ Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Construction period is longest among alternatives because removal of existing bridge and construction of temporary bridge are needed.</li> <li>✓ Technical consideration should be required for the demollishment of existing substructures.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge.</li> </ul>
Constructability	<ul style="list-style-type: none"> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○</li> </ul>	<ul style="list-style-type: none"> <li>○</li> </ul>
Evaluation	Recommended by the Study Team		

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Selection of new bridge location (Xe Tha Mouak Bridge)

	Plan A : Shift the bridge toward south side of the existing location	Plan B : Relocate at the existing location	Plan C : Shift the bridge toward north side of the existing location
Overall view			
Road alignment	<ul style="list-style-type: none"> <li>Approach road connects to curve section of the existing road at both the starting point and the end point.</li> <li>Shift the alignment to the south side of the existing bridge.</li> </ul>	<ul style="list-style-type: none"> <li>Alignment passes through existing bridge location after reconstruction.</li> </ul>	<ul style="list-style-type: none"> <li>At the end point, the alignment is shifted to the north by extending the existing curve. And at the starting point, alignment connects to the existing curve by inserting the curve section of 400 m in radius.</li> <li>Shift the alignment to the north side of the existing bridge.</li> </ul>
Travel safety	<ul style="list-style-type: none"> <li>The alignment is slightly worse than that of Plan B.</li> <li>Straight length between the curves is secured only 340m, although minimum straight length for broken-back curve is required more than 500m.</li> <li>Installation of lighting facilities is needed to secure safe traveling on the bridge.</li> </ul>	<ul style="list-style-type: none"> <li>Stiffy ASEAN Highway Standard and mostly follow the existing alignment is better than other location.</li> <li>Installation of lighting facilities is needed to secure safe traveling on the bridge.</li> </ul>	<ul style="list-style-type: none"> <li>Installation of lighting facilities is needed to secure safe traveling on the bridge.</li> </ul>
Bridge structure	<ul style="list-style-type: none"> <li>Some parts of bridge section are in curved section however skew angle of bridge steeper and wider river width need a longer bridge than the existing one.</li> </ul>	<ul style="list-style-type: none"> <li>New abutment structures should be constructed behind the existing abutment that is required for longer bridge than the existing one.</li> <li>Whole bridge section is located in straight section, therefore, the configuration of bridge is almost same as the existing bridge.</li> </ul>	<ul style="list-style-type: none"> <li>Whole bridge section is located in straight section, however skew angle for new bridge is sharper than the existing bridge.</li> </ul>
Affected House	<ul style="list-style-type: none"> <li>Removal of few houses including new house under construction is required and that gives slightly higher impact to social environment.</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Removal of about 10 houses including new house under construction is required and that gives higher impact to social environment.</li> </ul>
Utility to be relocated	<ul style="list-style-type: none"> <li>Optical fibres cable</li> <li>Electric cable/line</li> </ul>	<ul style="list-style-type: none"> <li>Optical fibres cable</li> </ul>	<ul style="list-style-type: none"> <li>Optical fibres cable (when removing the existing bridge)</li> <li>Electric cable/line</li> </ul>
Economy	<ul style="list-style-type: none"> <li>The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>Relocation of optical fibres cable and electric cable/line is needed.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary bridge is needed during construction period because new bridge is constructed after the existing bridge is removed.</li> <li>Relocation of optical fibres cable is needed.</li> </ul>	<ul style="list-style-type: none"> <li>The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>Relocation of optical fibres cable and electric cable/line are needed</li> </ul>
Constructability	<ul style="list-style-type: none"> <li>Resettlement is required for the removal of few houses.</li> <li>Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge.</li> </ul>	<ul style="list-style-type: none"> <li>Construction period is longest among alternatives because removal of existing bridge and construction of temporary bridge are needed</li> <li>Technical consideration should be required for the demolition of existing substructures</li> </ul>	<ul style="list-style-type: none"> <li>Resettlement is required for the removal of about 10 houses.</li> <li>Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge.</li> </ul>
Evaluation		<p style="text-align: center;">Recommended by the Study Team</p>	

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(2) Technical Notes

TECHNICAL NOTES

JICA Study Team (hereinafter referred to as “the Team”) for the Preparatory Survey (hereinafter referred to as “the Survey”) on “The Project for the Reconstruction of the Bridges on National Road No.9” (hereinafter referred to as “the Project”) agreed to the Department of Roads in Ministry of Public Works and Transport (hereinafter referred to as “DOR/MPWT”) who is the responsible and implementing agency for the Project regarding the items described hereunder in this Technical Notes. Based on the Technical Notes, the Team will carry out the outline design for the Project including the project cost estimate through analysis of the field survey findings and discussions with JICA and other concerned authorities in Japan. The results of the analysis and the outline design will be presented in September, 2015.

Vientiane, May 8<sup>th</sup>, 2015



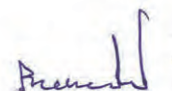
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Mr. Ngamapasong Muongmany  
Deputy Director General  
Department of Roads  
Ministry of Public Works and Transport



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Mr. Masataka Fujikuma  
Chief Consultant,  
Preparatory Survey Team,  
Japan International Cooperation Agency





**1. New Bridge Location**

Based on the recommendation from the Team, DOR/MPWRT agreed to new bridge location for each bridge as follows;

- Xe Kum Kam Bridge: Shift the bridge toward north side of the existing location
- Xe Tha Mouak Bridge: Relocate at the existing location

Regarding removal of Xe Kum Kam Bridge (existing bridge), Lao Government will discuss internally whether the existing bridge will be removed or not after completion of the new bridge. The result will be informed to the Team by DOR in June 2015.

**2. Bridge Design**

**2.1 Design Standards to be applied**

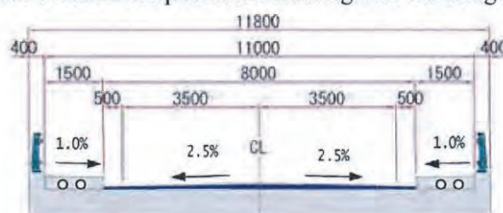
- Specifications for Highway Bridges (Part I – V): Japan Road Association
- AASHTO HL-93 Loading Highway Design

**2.2 Design Method**

The allowable stress method shall be applied for the bridge design.

**2.3 Bridge Formation**

Cross section of new bridge given in Figure-1 is in principle applied. The sidewalk width is subject to the analysis of demands for pedestrian crossing over the bridges.



**Figure-1 Bridge Formation (Same formation of Sekong Bridge)**

**2.4 Sidewalk**

- Width: 1.5m at both sides based on the request from the Lao side but subject to the consent with JICA
- Type: Mount-up type
- \*Utilities will be installed under the sidewalk.

**2.5 Design High Water Level**

- Design Return Period for Flooding: 50-year return period
- Freeboard: 1.2m

**2.6 Design Loads**

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**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

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TECHNICAL NOTES FOR RECONSTRUCTION OF THE BRIDGES ON NATIONAL ROAD NO.9

(1) Live Load

- HS20-44x1.25

(2) Seismic Load

- Minimum level for seismic force:  $K_h=0.06$

(3) Other Loads

The following types of loads shall be considered as required;

- Dead load
- Impact load
- Wind load
- Influence of creep for concrete
- Influence of dry shrinkage for concrete
- Earth pressure
- Static water pressure
- Water pressure during flood
- Buoyancy
- Settlement

2.7 Utilities to be installed at the bridges

- Road lighting
- Optical fiber cable
- Other utility

DOR agreed to confirm with relevant utility authorities whether other utilities, such as water pipe, should be installed for a future plan or not and send an official letter to the Team by 25<sup>th</sup> May 2015.

2.8 Material Strength

(1) Unit Weights of Materials

**Table-1 Unit Weights of Materials**

Designation	Self-weight kN/m <sup>3</sup>	Designation	Self-weight kN/m <sup>3</sup>
Steel	77.0	Cement, mortar	21.0
Concrete reinforced	24.5	Asphalt concrete	22.5
Pre-stressed concrete	24.5	Concrete pavement	23.0
Non-reinforced concrete	23.0	Timber	8.0

TN-2



(2) Strength of Materials

Specifications in terms of strength for concrete, reinforcement and steel plates will be in accordance with Japanese Standards and Specifications.

**Table-2 Minimum Strength of Concrete**

Designation	Minimum Strength (N/mm <sup>2</sup> )
PC Girder (post tension)	40
Slab	24
Abutment & Pier	21
Concrete Pile	30
Lean Concrete	18

**Table-3 Strength of Reinforcement**

Designation	Yield Strength (N/mm <sup>2</sup> )
Round Bar	$\sigma_{py} > 235$
Deformed Bar(SD295)	$295 < \sigma_{py} < 390$
Deformed (SD345)	$345 < \sigma_{py} < 440$

**Table-4 Tensile Strength of Steel**

Designation	Min. Tensile Strength (N/mm <sup>2</sup> )	Remarks
SS400,SM400	410	Normal Steel
SM490,SM490Y	500	Ditto
SM520	530	Ditto

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**3. Approach Road Design**

3.1 Design Standards to be applied

- Road Design Manual (Lao PDR, 1996)
- ASEAN Highway Standards
- Road Structure Ordinance: Japan Road Association

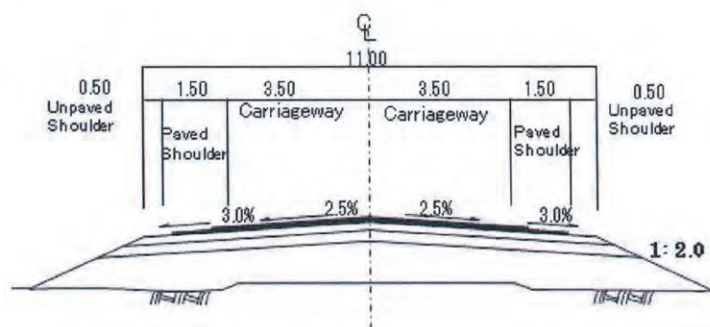
3.2 Geometrical Structure

**Table-5 Road Geometrical Structure**

Road class	Class II (3,000 - 8,000 vehicles per day)	
Terrain	Flat	
Number of lanes	2	
Carriageway width (m)	3.5	
Paved Shoulder width (m)	1.5	
Cross fall	2.5% (carriageway), 3% (shoulder)	
Max. superelevation	10%	
Max. vertical gradient	5%	
Design speed (km/h)	80	
Min. radius of horizontal curve (m)	250	
Min. Radius without superelevation (m)	4,000	
Min. radius of vertical curve (m)	Crest	5,000
	Sag	2,000
Length of vertical curve (m) *	70	
Right of way (m)	50	

Source: Road Design Manual (Lao PDR, 1996) and Japanese standard (marked by \*)

3.3 Typical cross section



**Figure-2 Typical Cross Section for Approach Road**

- 3.4 Pavement Structure: Asphalt Concrete Pavement (in consistency with the pavement structure for adjacent section improved by Lao side).
4. **Design of River Protection**
- 4.1 Necessary river protection length for bridge construction
- Applied standard: Government Ordinance for Structural Standards for River Administration Facilities (Japanese standard)
  - River protection must cover the range of 10m or more upstream and downstream from both ends of abutment (Figure-3).

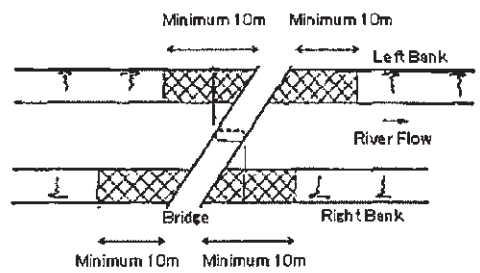


Figure-3 Necessary river protection length for bridge construction

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**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

TECHNICAL NOTES FOR RECONSTRUCTION OF THE BRIDGES ON NATIONAL ROAD NO.9

**5. Environmental Considerations**

**5.1 IEE Study Schedule**

The Lao side will conduct the IEE study in FY2016 and its tentative schedule is as shown in Table 6.

**Table 6 Tentative Schedule of IEE**

Work Items	2015			2016					
	10	11	12	1	2	3	4	5	6
Submission of ECC Application after Consensus Meeting with MONRE	■								
Initial Review by MONRE		■							
Project Scoping		■	■						
IEE Study (Baseline Information Collection)			■	■	■	■			
Stakeholder Meetings and Information Disclosure			■		■				
Preparation of IEE Report and ESMMP Report					■	■	■	■	
Report Reviewing by MONRE (and/or Relevant Agencies)						■	■	■	■
ECC Approval									■

Note: FCC: Environmental Compliance Certification,  
IEE: Initial Environmental Examination  
ESMMP: Environmental and Social Monitoring and Management Plan

**5.2 Policy Framework and Authorization for Land Acquisition and Compensation**

The Lao side will prepare the Land Acquisition and Compensation Report as the necessary of land acquisition or/and resettlements arises. The tentative schedule is as shown in Table 7.

**Table 7 Tentative Schedule of Land Acquisition and Compensation**

Work Items	2015			2016					
	10	11	12	1	2	3	4	5	6
Consensus Meeting with MONRE and Relevant Agencies	■								
Initial Social Assessment		■	■						
Social Assessment (Preparation, Data Collection, Data Analysis and Dissemination of Findings)			■	■	■	■			
Preparation of Land Acquisition and Compensation Report					■	■	■	■	
Submission with IEE Report and Review by Relevant Agencies						■	■	■	■

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**6. Outstanding issues**

**(1) Relocation of optical fiber cable**

Optical fiber cable, which is a property of Unitel, exists in the ground at the downstream side (south side) of both bridges and it is also attached on the existing bridges. During construction when demolishing the existing bridge, optical fiber cable should be temporarily relocated.

DOR agreed to cooperate with the Team via DPWT Savannakhet to arrange a coordination meeting with Unitel on the way and schedule of removal, etc. by 29<sup>th</sup> May 2015. The Team was requested to study on the removal cost and include it in the project cost. The Team will coordinate with JICA if the cost can be included in the project cost or not.

Regarding the way of removal, the Team would like to propose to relocate the cable from the existing bridge to electric pole, which exists at the downstream side of the existing bridge, as a temporary work during construction and attach the cable on the new bridge as a permanent method after completion of the new bridges.

**(2) Tentative Schedule of the Project**

Tentative Schedule of the Project will be as follows;

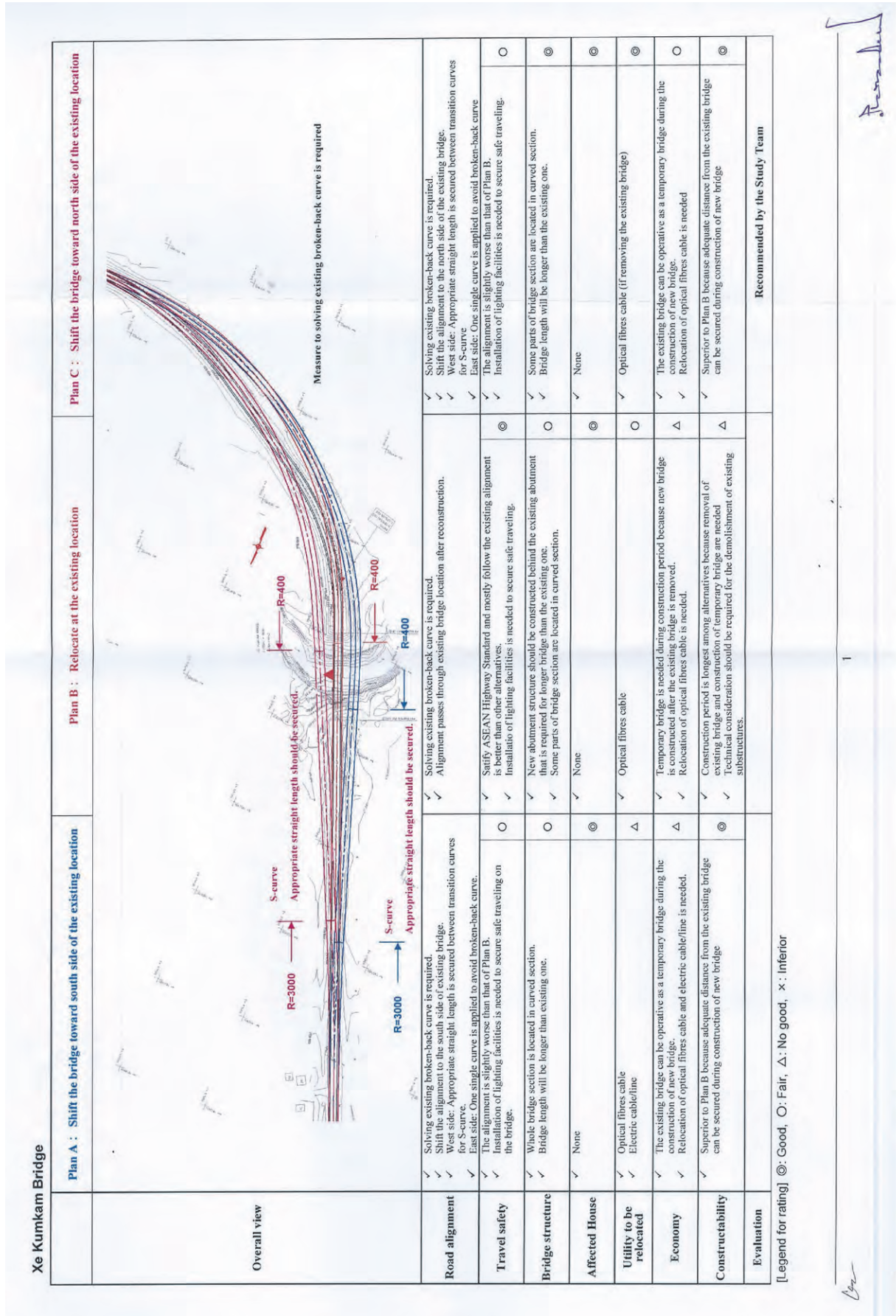
- E/N: December 2015
- G/A: January 2016
- Detailed Design: from January 2016 to May 2016
- Tender: from May 2016 to August 2016
- Construction: starting from October 2016

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Xe Kumkam Bridge		Plan A : Shift the bridge toward south side of the existing location	Plan B : Relocate at the existing location	Plan C : Shift the bridge toward north side of the existing location
Overall view				
<b>Road alignment</b>	<ul style="list-style-type: none"> <li>✓ Solving existing broken-back curve is required.</li> <li>✓ Shift the alignment to the south side of existing bridge.</li> <li>✓ West side: Appropriate straight length is secured between transition curves for S-curve.</li> <li>✓ East side: One single curve is applied to avoid broken-back curve.</li> <li>✓ The alignment is slightly worse than that of Plan B.</li> <li>✓ Installation of lighting facilities is needed to secure safe traveling on the bridge.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Solving existing broken-back curve is required.</li> <li>✓ Alignment passes through existing bridge location after reconstruction.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Solving existing broken-back curve is required.</li> <li>✓ Shift the alignment to the north side of the existing bridge.</li> <li>✓ West side: Appropriate straight length is secured between transition curves for S-curve.</li> <li>✓ East side: One single curve is applied to avoid broken-back curve.</li> <li>✓ The alignment is slightly worse than that of Plan B.</li> <li>✓ Installation of lighting facilities is needed to secure safe traveling.</li> </ul>	
<b>Travel safety</b>	<ul style="list-style-type: none"> <li>○ Whole bridge section is located in curved section.</li> <li>○ Bridge length will be longer than existing one.</li> </ul>	<ul style="list-style-type: none"> <li>○ Satisfy ASEAN Highway Standard and mostly follow the existing alignment is better than other alternatives.</li> <li>○ Installation of lighting facilities is needed to secure safe traveling.</li> </ul>	<ul style="list-style-type: none"> <li>⊙ The alignment is slightly worse than that of Plan B.</li> </ul>	
<b>Bridge structure</b>	<ul style="list-style-type: none"> <li>○ None</li> </ul>	<ul style="list-style-type: none"> <li>○ New abutment structure should be constructed behind the existing abutment that is required for longer bridge than the existing one.</li> <li>○ Some parts of bridge section are located in curved section.</li> </ul>	<ul style="list-style-type: none"> <li>○ Some parts of bridge section are located in curved section.</li> <li>○ Bridge length will be longer than the existing one.</li> </ul>	
<b>Affected House</b>	<ul style="list-style-type: none"> <li>○ None</li> </ul>	<ul style="list-style-type: none"> <li>○ None</li> </ul>	<ul style="list-style-type: none"> <li>○ None</li> </ul>	
<b>Utility to be relocated</b>	<ul style="list-style-type: none"> <li>✓ Optical fibres cable</li> <li>✓ Electric cable/line</li> </ul>	<ul style="list-style-type: none"> <li>✓ Optical fibres cable</li> </ul>	<ul style="list-style-type: none"> <li>✓ Optical fibres cable (if removing the existing bridge)</li> </ul>	
<b>Economy</b>	<ul style="list-style-type: none"> <li>Δ The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>Δ Relocation of optical fibres cable and electric cable/line is needed.</li> </ul>	<ul style="list-style-type: none"> <li>Δ Temporary bridge is needed during construction period because new bridge is constructed after the existing bridge is removed.</li> <li>Δ Relocation of optical fibres cable is needed.</li> </ul>	<ul style="list-style-type: none"> <li>○ The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>○ Relocation of optical fibres cable is needed</li> </ul>	
<b>Constructability</b>	<ul style="list-style-type: none"> <li>✓ Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge</li> </ul>	<ul style="list-style-type: none"> <li>✓ Construction period is longest among alternatives because removal of existing bridge and construction of temporary bridge are needed</li> <li>✓ Technical consideration should be required for the demolition of existing substructures.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge</li> </ul>	
<b>Evaluation</b>				<b>Recommended by the Study Team</b>

[Legend for rating] ⊙: Good, O: Fair, Δ: No good, x: Inferior

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Xe Tha Mouak Bridge		Plan A : Shift the bridge toward south side of the existing location	Plan B : Relocate at the existing location	Plan C : Shift the bridge toward north side of the existing location
Overall view				
Road alignment	<ul style="list-style-type: none"> <li>Approach road connects to curve section of the existing road at both the starting point and the end point.</li> <li>Shift the alignment to the south side of the existing bridge</li> </ul>	<ul style="list-style-type: none"> <li>Alignment passes through existing bridge location after reconstruction.</li> </ul>	<ul style="list-style-type: none"> <li>At the end point, the alignment is shifted to the north by extending the existing curve. And at the starting point, alignment connects to the existing road by inserting the curve section of 450 m in radius.</li> <li>Shift the alignment to the north side of the existing bridge</li> <li>Satisfy ASEAN Highway Standard.</li> <li>Installation of lighting facilities is needed to secure safe traveling on the bridge</li> </ul>	<ul style="list-style-type: none"> <li>At the end point, the alignment is shifted to the north by extending the existing curve. And at the starting point, alignment connects to the existing road by inserting the curve section of 450 m in radius.</li> <li>Shift the alignment to the north side of the existing bridge</li> <li>Satisfy ASEAN Highway Standard.</li> <li>Installation of lighting facilities is needed to secure safe traveling on the bridge</li> </ul>
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Affected House	<ul style="list-style-type: none"> <li>Removal of few houses including new house under construction is required and that gives slightly higher impact to social environment.</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Removal of about 10 houses including new house under construction is required and that gives higher impact to social environment.</li> </ul>	<ul style="list-style-type: none"> <li>Removal of about 10 houses including new house under construction is required and that gives higher impact to social environment.</li> </ul>
Utility to be relocated	<ul style="list-style-type: none"> <li>Optical fibres cable</li> <li>Electric cable/line</li> </ul>	<ul style="list-style-type: none"> <li>Optical fibres cable</li> </ul>	<ul style="list-style-type: none"> <li>Optical fibres cable (when removing the existing bridge)</li> <li>Electric cable/line</li> </ul>	<ul style="list-style-type: none"> <li>Optical fibres cable (when removing the existing bridge)</li> <li>Electric cable/line</li> </ul>
Economy	<ul style="list-style-type: none"> <li>The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>Relocation of optical fibres cable and electric cable/line is needed.</li> <li>Resettlement is required for the removal of few houses.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary bridge is needed during construction period because new bridge is constructed after the existing bridge is removed.</li> <li>Relocation of optical fibres cable is needed.</li> </ul>	<ul style="list-style-type: none"> <li>The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>Relocation of optical fibres cable and electric cable/line are needed.</li> <li>Resettlement is required for the removal of about 10 houses.</li> </ul>	<ul style="list-style-type: none"> <li>The existing bridge can be operative as a temporary bridge during the construction of new bridge.</li> <li>Relocation of optical fibres cable and electric cable/line are needed.</li> <li>Resettlement is required for the removal of about 10 houses.</li> </ul>
Constructability	<ul style="list-style-type: none"> <li>Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge</li> </ul>	<ul style="list-style-type: none"> <li>Construction period is longest among alternatives because removal of existing bridge and construction of temporary bridge are needed</li> <li>Technical consideration should be required for the demolition of existing substructures.</li> </ul>	<ul style="list-style-type: none"> <li>Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge</li> </ul>	<ul style="list-style-type: none"> <li>Superior to Plan B because adequate distance from the existing bridge can be secured during construction of new bridge</li> </ul>
Evaluation	<b>Recommended by the Study Team</b>			
[Legend for rating] ⊙: Good, ○: Fair, △: No good, ×: Inferior				

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(3) 2<sup>nd</sup> Survey

**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**the Rehabilitation of the Bridges on National Road No.9**  
**(Explanation on Draft Preparatory Survey Report)**

On the basis of the discussions and field survey in the Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") in April 2015, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report on the Project for the Reconstruction of the Bridges on National Road No.9 (hereinafter referred to as "the Draft Report").

In order to explain the Draft Report and to consult with the concerned officials of the Government of Lao PDR on its contents, JICA sent to Lao PDR the Preparatory Survey Team for the explanation of the Draft Report (hereinafter referred to as "the Team"), headed by Hiroshi Takeuchi, Director, Infrastructure and Peacebuilding Department, JICA, and is scheduled to stay in the country from September 10th to September 18th, 2015.

As a result of the discussions, both sides confirmed the main items described in the attached sheets.

Vientiane, September 18th, 2015

竹内 博史

Hiroshi Takeuchi  
Leader,  
Preparatory Survey Team,  
Japan International Cooperation Agency

Ngam

Ngampasong Muongmany  
Deputy Director General,  
Department of Roads,  
Ministry of Public Works and Transport

Ngam



## ATTACHEMENT

1. Title of the Preparatory Survey  
Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for the Project for the Rehabilitation of the Bridges on National Road No.9”. However, both sides confirmed that the title of the Project shall be modified from “The Project for the Rehabilitation of the Bridges on National Road No.9” to “The Project for the Reconstruction of the Bridges on National Road No.9” after this survey.
2. Project Site  
Both sides confirmed that the sites of the Project are on National Road No.9 in Savannakhet Province, Lao PDR, which is shown in Annex-1.
3. Executing Agency  
Both sides confirmed the executing agency is the Ministry of Public Works and Transport (hereinafter referred to as “MPWT”), Department of Roads (hereinafter referred to as “DOR”). The executing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the Undertakings are taken by relevant agencies properly and on time. The organization charts are shown in Annex-2.
4. Contents of the Draft Report  
After the explanation of the contents of the Draft Report by the Team, the Lao PDR side agreed in principle to its contents.
5. Cost Estimation  
Both sides confirmed that the Project cost estimation described in Annex-3 is provisional and would be examined further by the Government of Japan for its final approval.
6. Confidentiality of the Cost Estimation and Specifications  
Both sides confirmed that the Project cost estimation and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts of the Project are concluded.

7. Japanese Grant Scheme

The Lao PDR side understands the Japanese Grant Scheme and its procedures as described in Annex-4 and Annex-5, and necessary measures to be taken by the Government of Lao PDR.

8. Project Implementation Schedule

The Team explained to the Lao PDR side that the expected implementation schedule is as attached in Annex-6.

9. Expected outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Lao PDR side has responsibility to monitor the progress of the indicators and achieve the target in year 2022.

[Quantitative Outcome]

Quantitative effects expected from the grant-aid project are summarized below;

Outcome	Indicator (as of 2015)	Indication at target year(2022) [as of 3 years after its completion]
Travelling speed (km/hr)	30	60

[Qualitative Outcome]

Qualitative effect expected from the grant-aid project are summarized below;

Current conditions and matters	Countermeasure	Outcome/ Improvement
Geometric Design(Narrow width)	Introduction of contributable infrastructure to ASEAN integration	Satisfying ASEAN standards (Class II) (widening of shoulder width)
Installation of sidewalk	Installation of protective barrier for pedestrians from roadway	Application of mount-up sidewalk
Improvement of driving conditions and safety travelling on the bridge	Improvement of unusual abrupt bending girder on mid piers	Secure smooth traffic flow on the bridges
Transportation of agriculture products behind the communities	Improvement of transportation conditions of agriculture products grown around the target bridges	Strengthening of river crossing facilities to keep a vital life line against natural disaster

10. Technical assistance (“Soft Component” of the Project)

75

5.



Considering the sustainable operation and maintenance of the provided facility, following technical assistance is planned to be provided under the Project. The Lao PDR side confirmed that it will assign necessary number of counterparts equipped with appropriate competency as described in the Draft Report.

The contents of soft components are described as follows.

- Establishment of implementation plan for soft components activities
- Workshop for the planning, construction and maintenance of the bridges
- Safety control method during the construction
- Monitoring and preparing the evaluation report

11. Undertakings Taken by the Lao PDR Side

Both sides confirmed to undertakings described in Annex-7. The Lao PDR side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage. Contents of Annex-7 will be updated as the Detailed Design progresses, and will finally be the Attachment to the Grant Agreement.

12. Monitoring during the Implementation

The Project will be monitored every 6 months by the executing agency and using the Project Monitoring Report (PMR).

13. Ex-Post Evaluation

JICA will conduct ex-post evaluation three (3) years after the project completion with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability) of the Project. Result of the evaluation will be publicized. The Lao PDR side is required to provide necessary support for them.

14. Issues to be Considered for the Smooth Implementation of the Project

Both sides confirmed to the issues to be considered and taken necessary measures for the smooth implementation of the Project described in Annex 6.

15. Schedule of the Study

JICA will complete the Final Report of the Preparatory Survey in accordance with the confirmed items and send it to the Lao PDR side around end of January 2016.



## 16. Environmental and Social Considerations

### 16-1 General Issues

#### 16-1-1 Environmental Guidelines and Environmental Category

The JICA mission explained that "JICA Guidelines for Environmental and Social Considerations (April 2010)" (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as B because the Project is not located in a sensitive area, nor has it sensitive characteristics, nor falls it into sensitive sectors under the Guidelines, and its potential adverse impacts on the environment are not likely to be significant.

#### 16-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex-8. Both sides confirmed that in case of major modification of the content of the Environmental Checklist, The Lao PDR side shall submit the modified version to JICA in a timely manner.

### 16-2 Environmental Issues

#### 16-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report is not required for the Project in the country's legal system.

#### 16-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex-9, respectively. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

#### 16-2-3 Initial Environmental Examination (IEE)

Both sides confirmed that the IEE report will be approved by Ministry of Natural Resources and Environment (MoNRE) in June 2016.

### 16-3 Social Environment

#### 16-3-1 Land Acquisition and Resettlement

Both sides confirmed the 0.81 ha of land should be acquired and one agriculture hut should be relocated due to the implementation of the Project.

Such land acquisition and resettlement shall be implemented based on the (Abbreviated) Resettlement Action Plan (RAP) prepared in line with JICA Guidelines and authorized by the Lao PDR side in May 2016.

#### 16-4 Environmental and Social Monitoring

##### 16-4-1 Environmental Monitoring

Both sides agreed that the Lao PDR side will submit results of environmental monitoring to JICA by using the monitoring form attached as Annex-10.

##### 16-4-2 Social Monitoring

Both sides confirmed that the Lao PDR side will implement social monitoring about land acquisition and resettlement proposed in the RAP. The Lao PDR side and the JICA mission agreed that MONRE/ DONRE will submit results of social monitoring to JICA by using the monitoring form attached as Annex-10.

##### 16-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that the Lao PDR side will disclose results of environmental and social monitoring to local stakeholders in their field office.

The Lao PDR side agreed JICA will disclose results of environmental and social monitoring submitted by the Lao PDR side as the monitoring forms attached as Annex-10 on its website.

#### 17. Other Relevant Issues

##### 17-1. Operation and Maintenance of the Facilities(Equipment)

The team explained the importance of operation and maintenance of the facilities constructed by the Project considering that proper asset management impacts greatly on life-span of the facilities and its maintenance cost. The Lao PDR side shall secure enough staff and budgets necessary for appropriate operation and maintenance of the facilities. The annual operation and maintenance costs are estimated and shown in Annex-7.

##### 17-2. Safety Measures

To avoid accidents on site during the implementation of the Project, the Lao side agreed to cause the consultant and the contractor to enforce safety measures such as setting safety assurance to the site, providing information for security control to public, and deploying adequate security personnel, based on “The Guidance for the Management of Safety for Construction Works in Japanese ODA Projects” which has been published on JICA’s URL below.

[http://www.jica.go.jp/activities/schemes/oda\\_safety/ku57pq00001nz4eu-alt/guidance\\_en.pdf](http://www.jica.go.jp/activities/schemes/oda_safety/ku57pq00001nz4eu-alt/guidance_en.pdf)

Also, the Team recommended to the Lao side to explain to the residents about the Project (necessity and significance, construction period, sites, impact etc.), so that consensus support can be obtained from them for the smooth operation of the Project.

#### 17-3. Cooperation among Relevant Organizations

DOR promised to work closely with relevant organizations, such as the Ministry of Planning and Investment, the Ministry of Finance, the Ministry of Foreign Affairs, JICA and Embassy of Japan with mutual common understanding and cooperation for the Project.

#### 17-4. Misconduct

If JICA receives information related to suspected corrupt or fraudulent practices in the implementation of the Project, MPWT and relevant organizations shall provide JICA with additional such information as JICA may reasonably request, including information related to any concerned official of the government and/or public organizations in Lao PDR.

MPWT and relevant organizations shall not, unfairly or unfavourably treat the person(s) and/or company which provided the information related to suspected corrupt or fraudulent practices in the implementation of the Project.

#### 17-5. Selection of New Bridge Locations for Two Bridges

Both sides confirmed that the locations for each bridge are as follows;

- Xe Kum Kam Bridge: Relocate at the existing location
- Xe Tha Mouak Bridge: Relocate at the existing location

#### 17-6. Cross section of New Bridge (Shoulder and Sidewalk)

The existing carriageway of National Road No.9 has the road width associated without shoulder that is not satisfied with the standards specified in both the geometric standards of Asian Highways and ASEAN Highway. It is desirable to secure a width of road cross section complying with these international standards. However, it does not require a full width of 2.5m for the shoulder on the bridge considered to economic efficiency of bridge construction refer to the practices in Japan. Thus, both side agreed that it applies the narrower shoulder 0.5m on the bridge section but secure 2.0m width of shoulder on

approach roads consistent to the width of existing National Road No.9.

On the other hand, due attention must be paid to vulnerable road users (women and children) and secure the width of sidewalk at Xe Tha Mouak Bridge. Width of 1.5m is considered applicable here as the safe width allowing two pedestrians to pass by safely ( $1.5m = 0.75m \times 2$ ) and allowing bicycles and wheeled chairs to pass (1.0m or more). The installation of sidewalk at the Xe Kumkam Bridge should not be required taking into account the predicted numbers of pedestrians crossing over the bridge and surrounding environment (none of the existing public facilities around the site). However, as Lao side requested, the necessity of sidewalk will be reviewed during the detailed design.

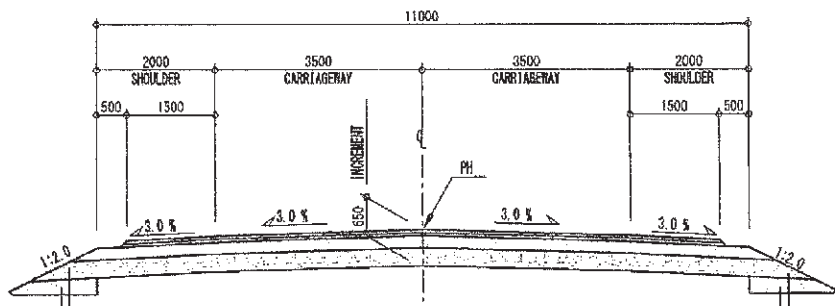


Figure 1. Typical Cross-section for Approach Road

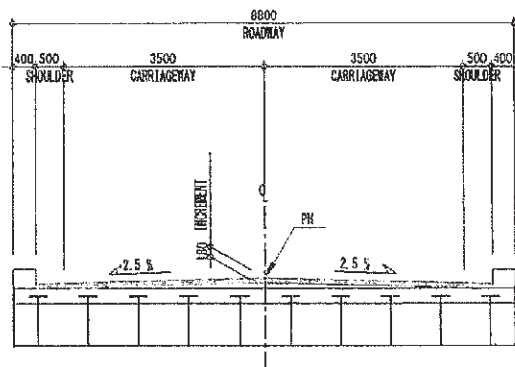


Figure 2. Typical Cross-section for Bridge  
(Xe Kumkam Bridge)

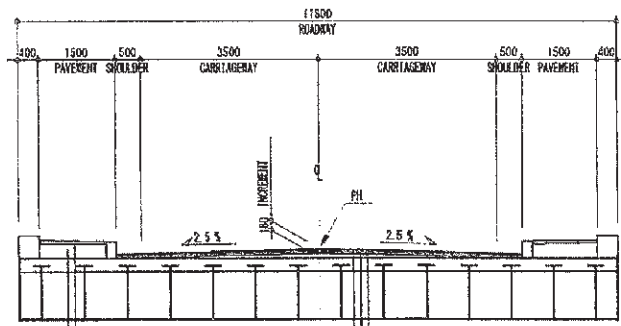


Figure 3. Typical Cross-section for Bridge  
(Xe Thamouak Bridge)

17-7. Treatment of Contract Phasing with Ongoing Rehabilitation Works by Lao side  
Lao side is currently conducting the rehabilitation works on National Road No.9. The extent of approach roads for the new bridges will be decided after the outline design is completed around September 2015. Also, the DPWT Savannakhet shall take

responsibilities to coordinate the contract phasing between the contractors of Lao and Japan during the construction.

17-8. Installation of Weigh Station for Control of Overloaded Vehicles

Japanese side explained that the installation of weigh station was excluded from the scope of works for the Project since the preparation of guideline and reinstatement of advanced weigh station by Department of Transport/MPWT, is still under the process.

17-9. Disclosure of Information

Both sides confirmed that the study results excluding the Project cost will be disclosed to the public after completion of the Preparatory Survey. All the study results including the project cost will be disclosed to the public after all the contracts for the Project are concluded.

【Annex-1: Project Site】

【Annex-2: Organization Chart】

【Annex-3: Project Cost Estimation】

【Annex-4: Japanese Grant】

【Annex-5: Financial Flow of Japanese Grant】

【Annex-6: Project Implementation Schedule】

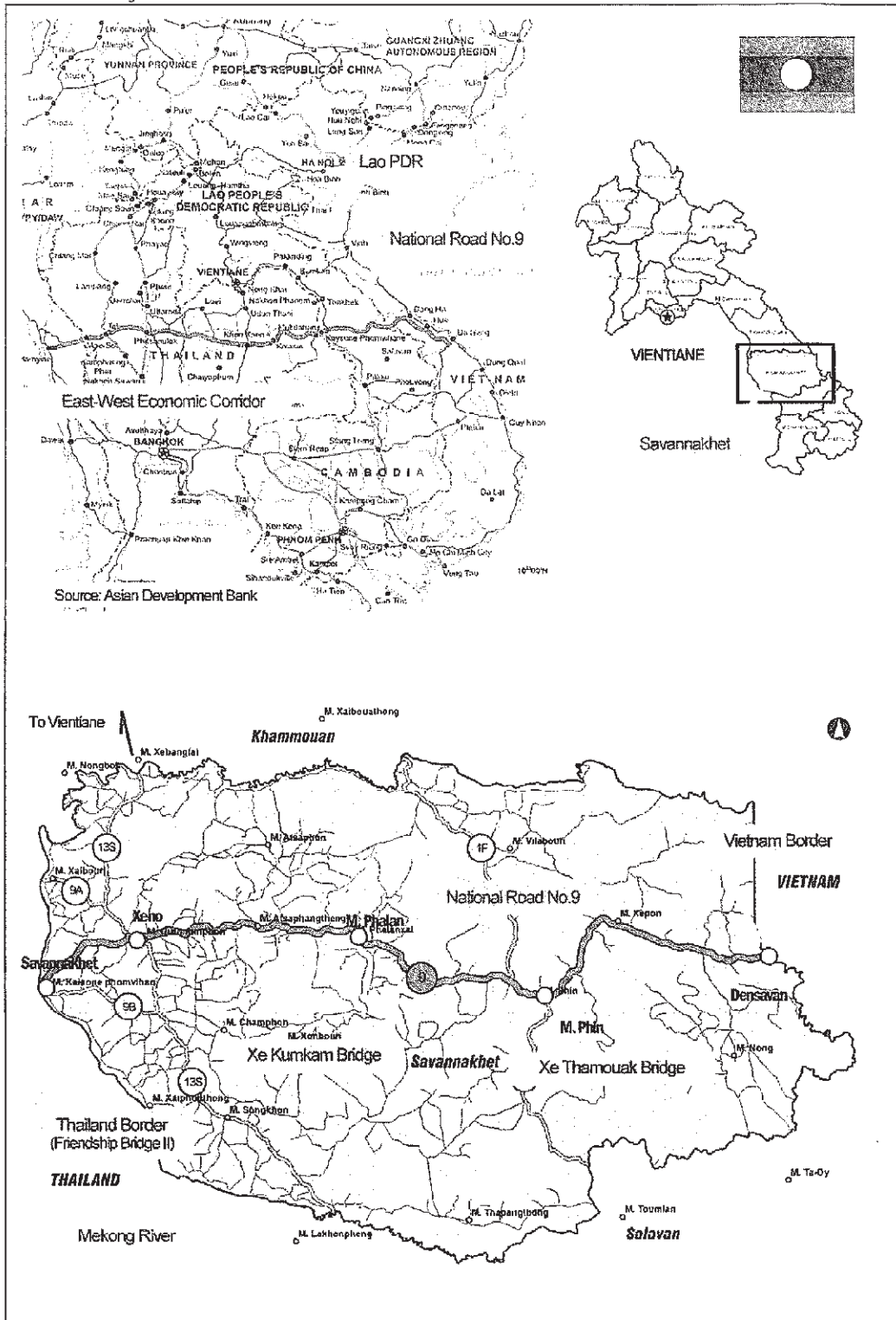
【Annex-7: Major Undertakings to be taken by the Lao PDR Government】

【Annex-8: Environmental Check List】

【Annex-9: Environmental Management Plan/Environmental Monitoring Plan】

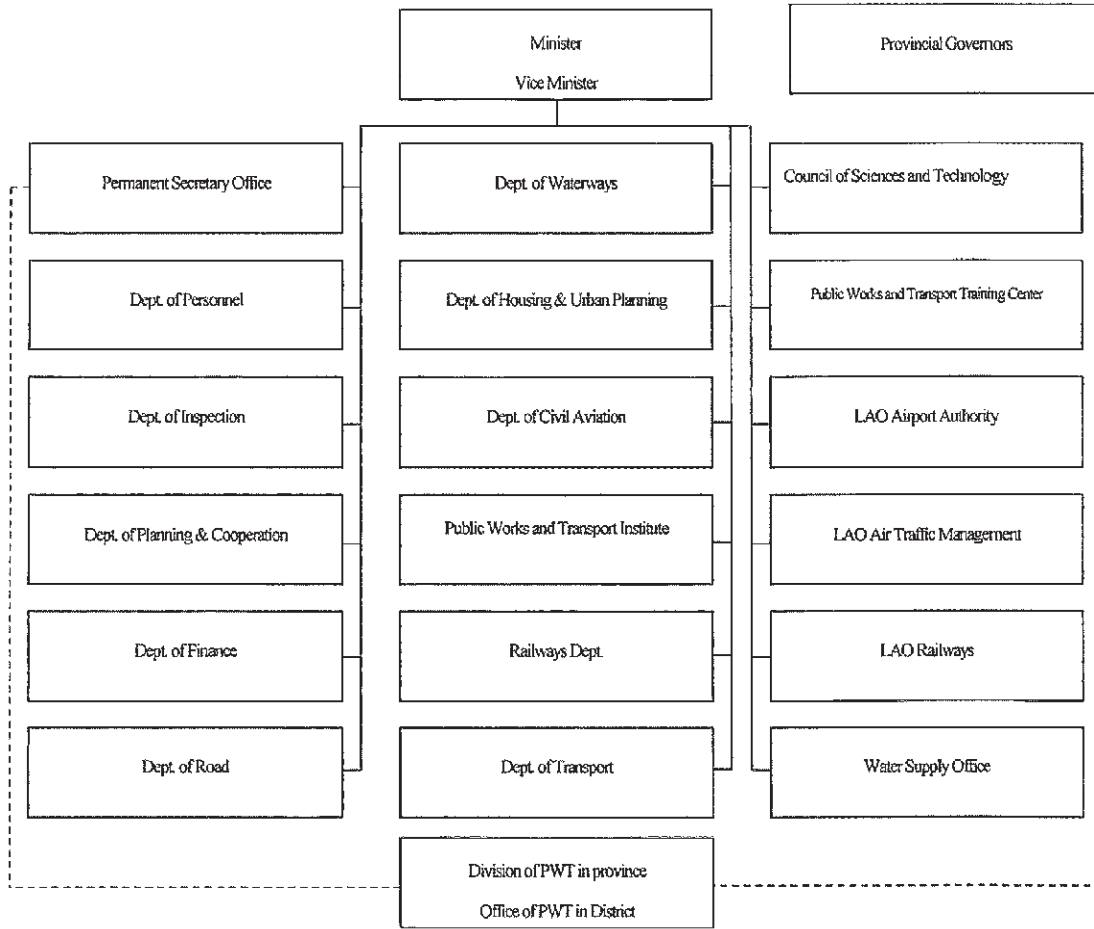
【Annex-10: Environmental and Social Monitoring Form】

Annex-1: Project Site

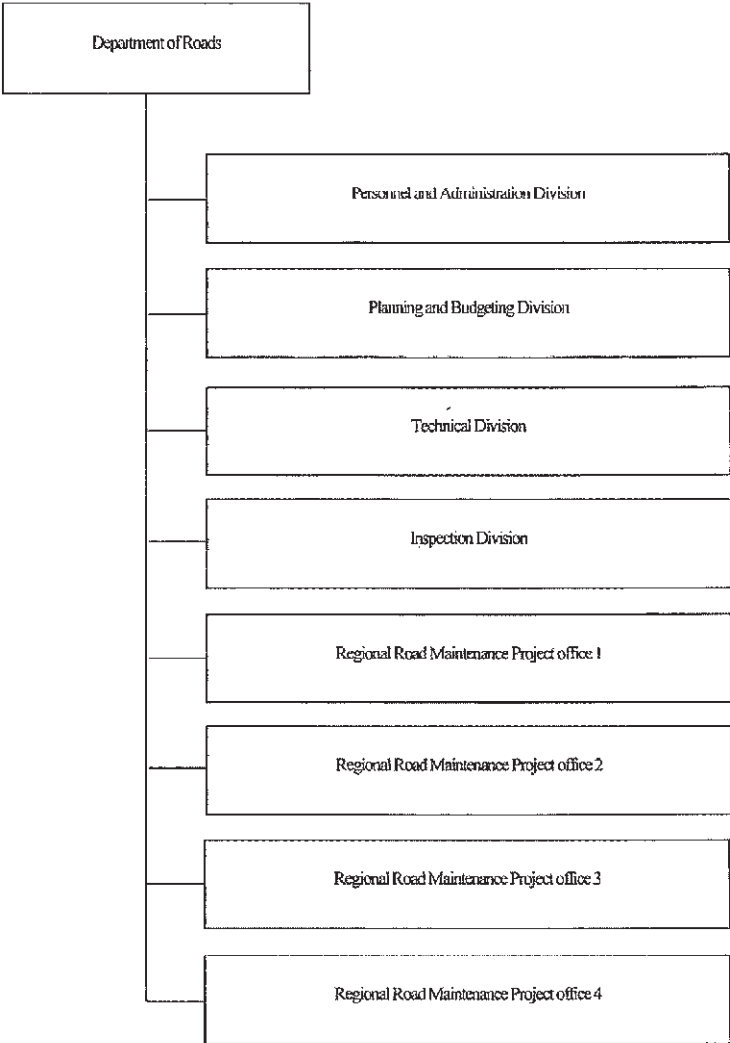


**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

Annex-2: Organization Chart



E  
A.



FE  
J.



Annex-3: Project Cost Estimation

CONFIDENTIAL

(1) Cost Borne by the Government of Japan

Project Cost		Million Japanese Yen
Xe Kunkam Bridge	Substructure Superstructure Approach roads Revetment Other facilities	821
Xe Thamouak Bridge	Substructure Superstructure Approach roads Revetment Other facilities	1,352
Tendering Support & Construction Supervision		293
Total Cost		2,466

(2) Cost Borne by the Lao PDR Government

Items	USD (million Yen)	Remarks
Land acquisition	71,000 (3.0)	
Compensation for loss	2,000 (0.2)	
Construction yard/temporary	25,000 (3.0)	31 month
Removal/relocation of public utilities	64,000 (7.7)	
UXO Survey	42,000 (5.1)	
Bank charges	16,000 (2.0)	
Exemption of VAT/Reimbursable Import duty and custom	1,052,000 (130.4)	83% of Construction cost
Total	1,334,000 (167.1)	

(3) Conditions of Cost Estimation

- Time of estimate : May 2015
- Exchange rate : 1US\$ = JPY120.55
- Implementation period : Tendering process & construction period shown in Implementation Schedule
- Others : On the condition that the Project is implemented with Japanese Grant Aid. The above-mentioned exchange rate is to be reviewed by the Government of Japan.

Annex-4: Japanese Grant

JAPANESE GRANT

The Japanese Grant (hereinafter referred to as the “Grant”) is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant is not supplied through the donation of materials as such.

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

**1. Grant Procedures**

The Grant is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal & Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as “the G/A”)
  - Agreement concluded between JICA and a recipient country
- Implementation
  - Implementation of the Project on the basis of the G/A

**2. Preparatory Survey**

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Scheme from a technical, financial, social and economic point of view.

T=

A.

- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant project. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

#### (3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

### **3. Japanese Grant Scheme**

#### (1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles, in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

#### (2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant fund comes from the Japanese taxpayers.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

(7) "Export and Re-export"

The products purchased under the Grant should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Environmental and Social Considerations

The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010).

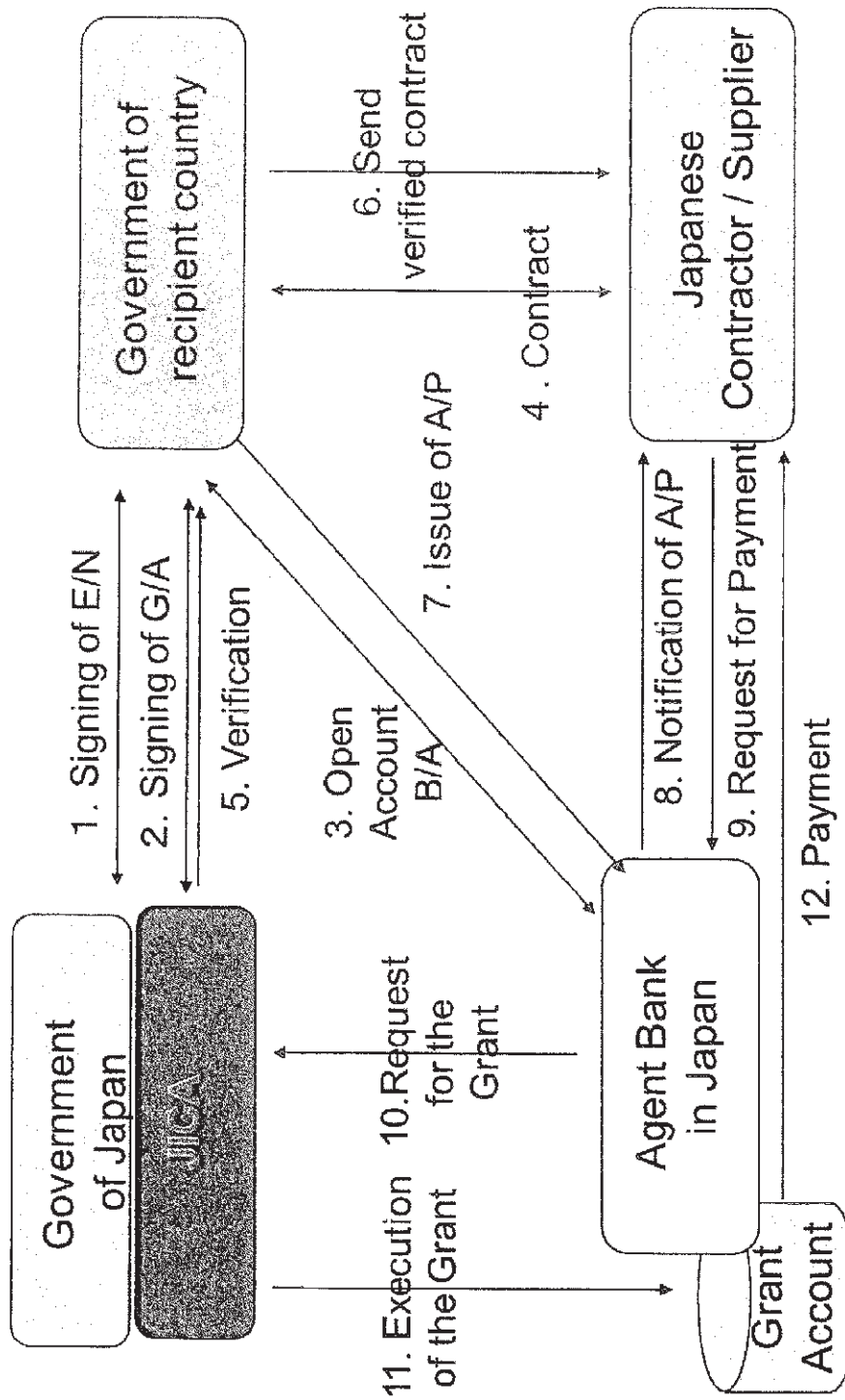
(11) Monitoring

The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

Annex-5: Financial Flow of Japanese Grant



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**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
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Annex-6: Project Implementation Schedule

Year	2016												2017												2018												2019			
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3											
Month																																								
Concluding the Exchange of Notes(E/N)	▽				▽																																			
Grant Agreement(GA)	▽				▽																																			
Consultant Agreement	▽				▽																																			
Site Survey																																								
Detailed Design																																								
Tender Documents																																								
Approval of tender documents																																								
P/Q notification																																								
P/Q evaluation, explanation																																								
Preparation of Tendering																																								
Tendering																																								
Evaluation of tender																																								
Contract with the Consultant																																								
Contract with the Contractor																																								
Construction(31 months)																																								
Xe Kumkham Bridge																																								
Preparation/Detour/Temporary bridge etc.																																								
Removal of existing bridge																																								
Substructure																																								
Superstructure																																								
Approach road/Pavement/Facilities/Cleanup																																								
Xe Thanouak Bridge																																								
Preparation/Detour/Temporary bridge etc.																																								
Removal of existing bridge																																								
Substructure																																								
Superstructure																																								
Approach road/Pavement/Facilities/Cleanup																																								

## Appendices

### Annex-7: Major Undertakings to be taken by the Lao PDR Government

#### (1) Major Undertakings to be taken by Recipient Government

##### 1. Before the Tender

NO	Items	Deadline	In charge	Cost (1,000USD)	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	MOF	NA	
	To exempt tax 1) Preparation and submission of master list for import items necessary for the consultant and the contractor. 2) Necessary coordination with the concerned government agencies to facilitate the process of the tax exemption	ASAP after the contractor submitted the master list	MPWT/MPV/MOF/MOIC	NA	
2	To approve LACR 1) Submission of Initial Social Assessment with ECC Application and Project Scoping to MONRE/DONRE 2) Initial Review by MONRE / DONRE 3) Social Assessment (Baseline Information Collection) 4) Discussion with APs and relevant agencies 5) Preparation of Land Acquisition and Compensation Report (LACR) and Submission with IEE Report to MONRE/DONRE 6) Report Reviewing by MONRE/DONRE	before notice of the tender (Jun 2016)	MONRE/DONRE	37	
3	To approve ECC 1) Submission of ECC Application and Project Scoping to MONRE/DONRE 2) Initial Review by MONRE/DONRE 3) IEE Study (Baseline Information Collection) 4) Stakeholder Meetings and Information Disclosure 5) Preparation of IEE Report and ESMMP Report and Submission 6) Report Reviewing by MONRE/DONRE 7) ECC Approval	before notice of the tender (Jun 2016)	MONRE/DONRE	Ditto	
4	To secure the following lands 1) Permanent Right of Way ( including additional ROW: 8,100m <sup>2</sup> for Xe Kumkam Bridge) 2) Temporary construction yard and stock yard near the Project site 3) Borrow pit and disposal site near the Project area	before the notice of the tender (Jun 2016)	MPWT/DPWT	96	
5	To relocate the obstacles and utilities 1) Completion of UXO survey and clearance 2) Relocation of Public utilities (optical fiber, electric line) including coordination with the concerned agencies	before notice of the tender (Jun 2016)	MPWT/DPWT	106	
6	To secure safety for traffic diversion during the construction 1) DPWT's notice (diversion of traffic)	before start of the construction (Sep 2016)	MPWT/DPWT	-	



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**2. During the Project Implementation**

NO	Items	Deadline	In charge	Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		MPWT	NA	
	1) Advising commission of AVP	within 1 month after the signing of the contract			
	2) Payment commission for AVP	every payment			
2	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country			1,000	
	1) Tax exemption and customs clearance of the products at the port of disembarkation	during the Project	MPWT/ MPV/ MOF		
	2) Internal transportation from the port of disembarkation to the project site	during the Project	MPWT/ MPV/ MOF		
3	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	during the Project	MOFA		
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the recipient country with respect to the purchase of the Products and/or the Services be exempted.	during the Project	MPWT/ MPV/ MOF		
5	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project			
6	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities				
	1) Electricity Removal of the existing distributing line obstacle to the construction of project facilities at the site	before start of the construction	MPWT/ EDL		
	2) Water Supply Removal of the existing water distribution main obstacle to the construction of project facilities at the site (if there is the existing water supply)	before start of the construction	MPWT/ Nampapa		
	3) Drainage Removal of the existing drainage facilities obstacle to the construction of project facilities at the site (if it is not included in the design)	before start of the construction	MPWT		
	4) Furniture and Equipment N/A	N/A	N/A		
7	To implement EMP and EMOp	during the construction	MPWT		
	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	Ditto		
	To implement RAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program	Ditto		
	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MPWT and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) - for two years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided.)	Ditto		

## Appendices

### 3. After the Project

NO	Items	Deadline	In charge	Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	MPWT	45,500/year	
2	To implement EMP and EMoP	for a period based on EMP and EMoP	Ditto		
	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between MPWT and JICA.	for three years after the Project	Ditto		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

### (2) Major Undertakings to be Covered by the Japanese Grant

No	Items	Deadline	Cost Estimated (Million Japanese Yen)*	Ref.	
1	To construct bridges, approach roads and revetment		2,173		
	- Improvement of roads	before end of contract			
1)	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country	During the process			
	a) Marine(Air) transportation of the products from Japan/third country to the recipient country	During the process			
	b) internal transportation from the port of disembarkation to the project site	During the process			
2)	To construct construction roads	Before the end of contract			
3)	To construct the temporary bridge	Before the end of contract			
4)	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities	Before the end of contract			
	a) Electricity	Before the end of contract			
	- The drop wiring and internal wiring within the site	Before the end of contract			
	- The main circuit breaker and transformer	Before the end of contract			
	b) Water Supply	Before the end of contract			
	- The supply system within the site ( receiving and/or elevated tanks )	Before the end of contract			
	c) Drainage	Before the end of contract			
	- The drainage system ( for toilet sewer, ordinary waste, storm drainage and others ) within the site	Before the end of contract			
	d) Furniture and Equipment	Before the end of contract			
	- Project equipment	Before the end of contract			
2	To implement detailed design, tender support and construction supervision (Consultant)	Before the end of contract		293	
	Total (Million Yen)			2,466	

\*: The cost estimates are provisional. This is subject to the approval of the Government of Japan.

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Annex-8: Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N (d) N	(a) IEE survey and reporting shall carry out from Oct.2015 by DOR. (b) DOR shall prepare and submit IEE report to the supervisory agencies, MONRE or DONRE. After submission and review by MONRE/DONRE, the Environmental Compliance Certificate (ECC) expects to be approved by June 2016. . (c) n/a (d) n/a
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) Stakeholder meetings were held in August 2015 by the counterpart agencies and JICA survey team for information sharing to local people. Besides, DOR suppose to hold public relations during the IEE survey. (b) The comments from local residents were reflected to the implementation plan.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Four options, existing, upstream and downstream locations and zero options, were considered to make the basic design.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken? (b) If air quality already exceed country's standards near the route, is there a possibility that the project will make air pollution worse?	(a) N (b) Y	(a) The project implementation does not contribute to increase traffic volume on NR-9. On the other hand, during the construction, the air quality could deteriorate temporarily by the construction vehicles and earthworks. However appropriate environmental management and mitigation measures could minimize the impacts. (b) Air quality test has not been done near the project sites. Since the air quality anticipates to be deteriorated by the construction vehicles and earth works, the mitigation measures such as water sprinkling and introducing low-emission vehicles will be applied. Furthermore, the air quality plans to be monitored by air quality tests.
	(2) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Is there a possibility that the project will contaminate water sources, such as well water?	(a) N (b) N	(a) Deterioration of water quality is not expected because the construction will be done without large scaled filling and cutting earth. (b) Hazardous substance does not use in the construction.
	(3) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards? (b) Do low frequency sound from the vehicle and train traffic comply with the country's standards?	(a) Y (b) Y	(a) Noise and vibration test has not been carried out. Deterioration of noise and vibration is not expected by bridge replacement. Since, during the construction, noise and vibration anticipate to be deteriorated temporarily by the construction vehicles and earth works, the mitigation measures and monitoring

Appendices

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
				shall be applied. (b) Low frequency sound test has not been done because of bridge replacement on the existing site.
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The protected areas are in separated place
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? (e) Is there a possibility that installation of bridges and access roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered?	(a) N (b) N (c) N (d) N (e) N	(a) The project site does not include primeval forests, tropical rain forests, ecologically valuable habitats. (b) The project site does not include protected habitats. (c) Negative impacts on ecosystems are not expected. (d) The project site does not include habitats of wild animals. (e) The project does not encourage land development or disturbance of ecosystems.
	(3) Hydrology	(a) Is there a possibility that hydrologic changes due to the installation of structures will adversely affect surface water and groundwater flows?	(a) N	(a) Hazardous substance does not use for the construction.
	(4) Topography and Geology	(a) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? (c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	(a) N (b) N (c) N	(a) No slope failure or landslides are expected due that the bridge replacement on the existing location. (b) same as above (c) same as above
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d)	(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N	(a) No resettlement is required (b) same as above (c) same as above (d) same as above (e) same as above (f) same as above (g) same as above (h) same as above (i) same as above (j) same as above

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Category	Environment al Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		Is the compensations going to be paid prior to the resettlement?(e) Is the compensation policies prepared in document?(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?(g) Are agreements with the affected people obtained prior to resettlement?(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?(i) Are any plans developed to monitor the impacts of resettlement?(j) Is the grievance redress mechanism established?		
	(2) Living and Livelihood	(a) Where bridges and access roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts? (b) Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary? (c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? (d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)? (e) Is there any possibility that project will impede the movement of inhabitants? (f) Is there any possibility that bridges will cause a sun shading and radio interference?	(a) Y (b) N (c) Y (d) Y (e) N (f) N	(a) Temporary bridges will be provided to mitigate impacts on the bridge users during the construction period. (b) No negative impacts upon living condition are expected. (c) Before construction, the contractor shall have discussions with Local Woman's Union about the construction workers in order to reduce the possibility of infection diseases. (d) Small-scale traffic congestions are expected due to using the temporarily bridge. The impact could be reduced by employment of traffic control staffs. (e) Construction of temporary bridge is included the implementation. (f) No sun shading or radio interference is expected.
4 Social Environment	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) The project site does not include any archeological sites.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) No impacts on landscape is expected.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N (b) N	(a) The project site does not include any habitats of ethnic minorities. (b) same as above
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the	(a) Y (b) Y	(a) The construction works will follow the labor standard in Lao PDR.

f. E



Appendices

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>working conditions of the country which the project proponent should observe in the project?</p> <p>(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?</p> <p>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>(d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>	<p>(c) Y (d) Y</p>	<p>(b) The construction will enhance the safety.</p> <p>(c) Enlightenment about safety and sanitation will conduct to the construction workers.</p> <p>(d) In order to avoid the trouble between the local residents and the construction workers, discussion will be held among the stakeholders prior the construction.</p>
5 Others	(1) Impacts during Construction	<p>(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p>	<p>(a) Y(b) N(c) Y</p>	<p>(a) Mitigation measures will applied during the construction. The environmental monitoring including noise/vibration, water and air qualities, waste shall be conducted.(b) No impacts on the ecosystem caused by the construction is expected.(c) Infection diseases is anticipated, it could be however mitigate by means of enlightenment for the construction workers.</p>
	(2) Monitoring	<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</p>	<p>(a) Y (b) Y (c) Y (d) Y</p>	<p>(a) The environmental monitoring including noise/vibration, water and air qualities, waste plans to be conducted by the contractor. (b) Tests of noise/vibration, water and air quality shall be done once a half year. Waste will be monitored and checked once a month. (c) The monitoring will be conducted by the contractor and the costs will be included in the construction fee. (d) The contractor will report the results to DOR and DPWT regularly. The DOR will check the monitoring report and inform to MPWT, MONRE and Savannakhet Province.</p>
6 Note	Reference to Checklist of Other Sectors	<p>(a) Where necessary, pertinent items described in the Roads, Railways and Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation). (b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).</p>	<p>(a) N (b) N</p>	<p>(a) n/a (b) n/a</p>
	Note on Using Environmental Checklist	<p>(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p>	<p>(a) N</p>	<p>(a) n/a</p>

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1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate

environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.



Annex-9: Environmental Management Plan/Environmental Monitoring Plan

## Environmental Management Plan

	Impact	Mitigation	Implementation Body	Responsible Agency	Cost	
Social Environment	Land Acquisition (only Xe Kumkam Bridge)	Preparation Phase: Appropriate compensation based upon discussion among the land owner and relevant agencies will be carried out.	DOR, DPWT OPWT	DOR	Budget of DOR	
	Local economies	Preparation and Construction Phases: Information distribution of the construction place and schedule for local people will be carried out. Access to the river will be kept during the construction.	Contractor	DOR, DPWT	Including Construction Cost	
	Existing social infrastructures and services	Preparation and Construction Phases: Information distribution of the construction place and schedule will be carried out for the road users. Traffic controllers will be employed for guiding the temporary bridge.	Contractor	DOR, DPWT	Including Construction Cost	
	Infectious diseases such as HIV/AIDS	Preparation and Construction Phases: Condition of construction workers employment is considered based on discussion with the contractor and local Women's Union. Education of health and sanitation to the works is carried out.	Contractor	DOR, DPWT	Including Construction Cost	
	Water right and usage (only Xe Thamouak Bridge)	Preparation Phase: The locations of water Intake will be moved with a basis of discussion with affected households.	Contractor	DOR, DPWT	Including Construction Cost	
	Accidents		Construction Phase: Signboards of construction and night lightings will be installed. Information of the schedule and temporarily bridge will be distributed to the road user before the construction. The fence of construction site will be installed to avoid enter of local people. Construction vehicles are well controlled and managed by contractor. Signboards for traffic speed and road lighting facilities are installed. Traffic management is carried out. Education about UXO to all construction workers is carried out prior the construction. In case UXO is found, professional company is employed for treatment and information is distributed to local residents.	Contractor	DOR, DPWT	Including Construction Cost
			Operation Phase: Signboards for traffic speed and road lighting facilities are installed. Traffic management is carried out.	Contractor	DOR, DPWT	Budget of DOR
		Operation Phase: Signboards for traffic speed and road lighting facilities are installed. Traffic management is carried out.	DPWT, Traffic Police	DOR, MPWT	Budget of Road Maintenance	
Pollution	Air pollution	Construction Phase Routine water sprinkling and management of construction vehicles such as idling off will be conducted.	Contractor	DOR, DPWT	Including Construction Cost	

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Impact		Mitigation	Implementation Body	Responsible Agency	Cost
	Water Pollution	Construction Phase: Oil fence and pollution control net will be applied for the pier construction. Maintenance of construction vehicles will carry out for preventing oil leaking from vehicles. Septic tanks will be installed at the construction yard and contractor camp.	Contractor	DOR, DPWT	Including Construction Cost
	Waste	Construction Phase: The wastes will be disposed according to the rule of solid waste disposal in Lao PDR. Domestic wastes of the contractor camp and drain oil of construction vehicles will be disposed by professional firms.	Contractor	DOR, DPWT	Including Construction Cost
	Noise and vibration	Construction Phase: Construction and earthwork will be forbidden in night time. Using noise and vibration reducing vehicles will be enhanced.	Contractor	DOR, DPWT	Including Construction Cost
		Operation Phase: Traffic signboards will be installed and traffic management will carry out.	DPWT, Traffic Police	DOR, MPWT	Budget of Road Maintenance

9/11  
A5

Annex-10: Environmental and Social Monitoring Form

**MONITORING FORM**

-If environmental reviews indicate the need of monitoring by JICA, JICA undertakes monitoring for necessary items that are decided by environmental reviews. JICA undertakes monitoring based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

-When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

**1. Responses/Actions to Comments and Guidance from Government Authorities and the Public**

Monitoring Item	Monitoring Results during Report Period
- Obtaining the Environmental Compliance Certificate (ECC) - Conducting stakeholder meetings	- To confirm them before the construction

**2. Mitigation Measures**

**- Air Quality (Emission Gas / Ambient Air Quality)**

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
SO <sub>2</sub>				0.3*		Test near the Site 2 times per year
NO <sub>2</sub>				0.32		Test near the Site 2 times per year
CO				30		Test near the Site 2 times per year
TSP				0.12*		Test near the Site 2 times per year
PM10				0.12*		Test near the Site 2 times per year

Note; \* is 24hours test, other is 1 hour test

**- Water Quality (Effluent/Wastewater/Ambient Water Quality)**

*R*  
*A*

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Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH				6-9.5		Test of river water in the Site 2 times per year
SS (Suspended Solid)				Below 30 mg/l		Test of river water in the Site 2 times per year

**- Waste**

Monitoring Item	Monitoring Results during Report Period
Waste transport records	Report 1 time per month

**- Noise / Vibration**

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level				Below 115dB		
Vibration level					Below 75dB**	

Note: Vibration standard at construction site in Japan

**- Odor**

n/a

**3. Natural Environment**

**- Ecosystem**

n/a

**4. Social Environment**

**- Resettlement**

n/a

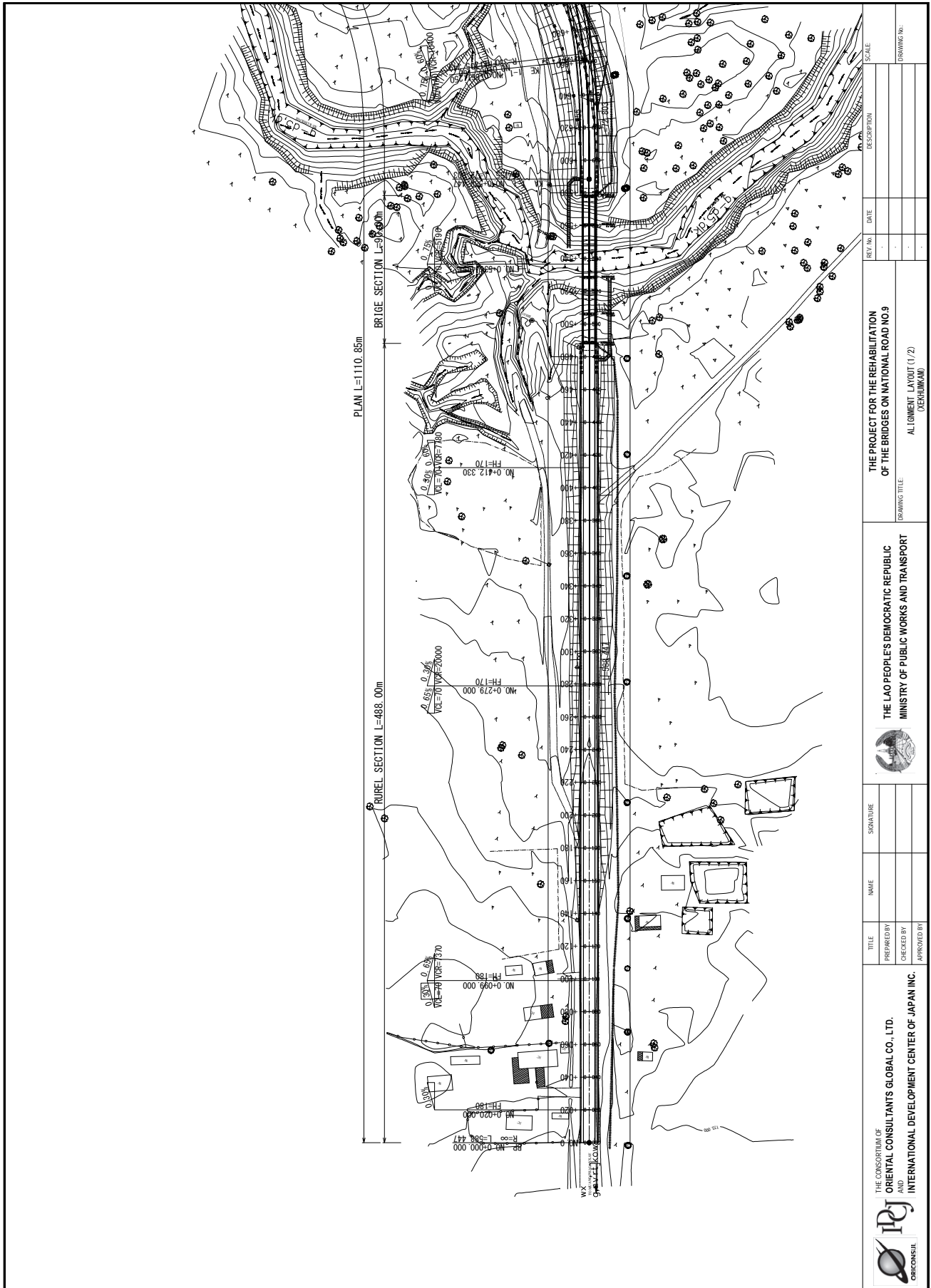
**- Living / Livelihood**

n/a

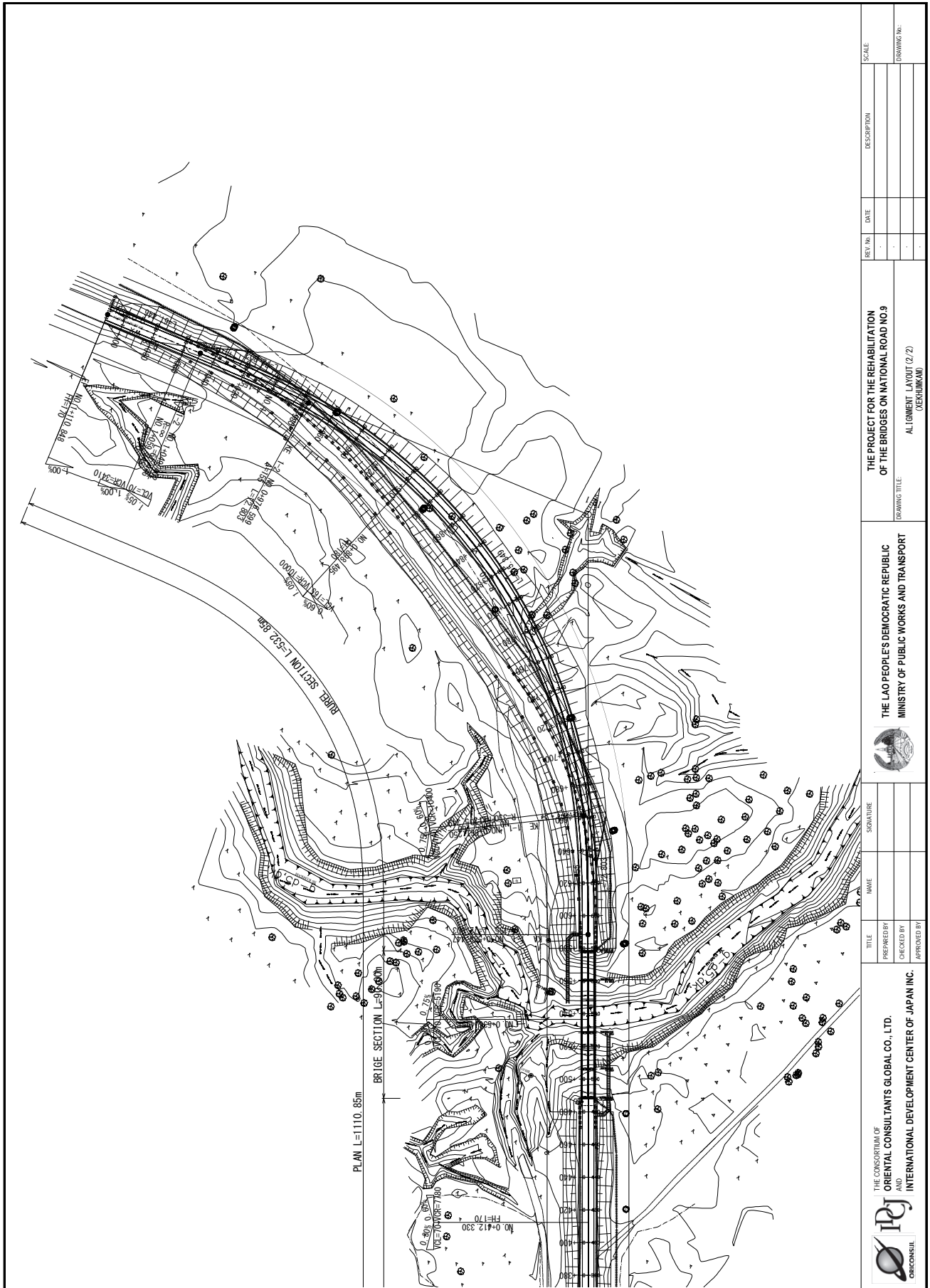
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5. Drawings

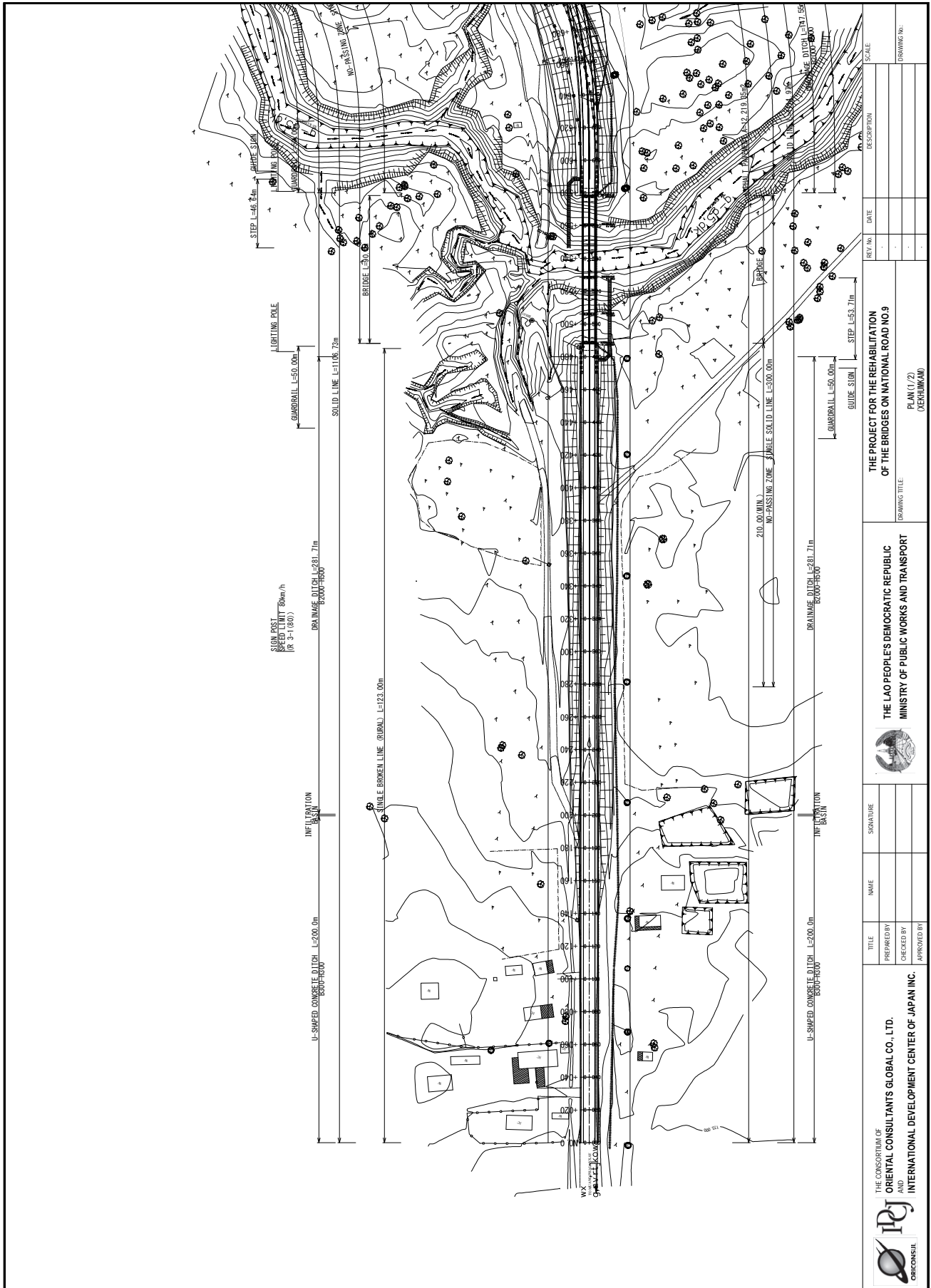




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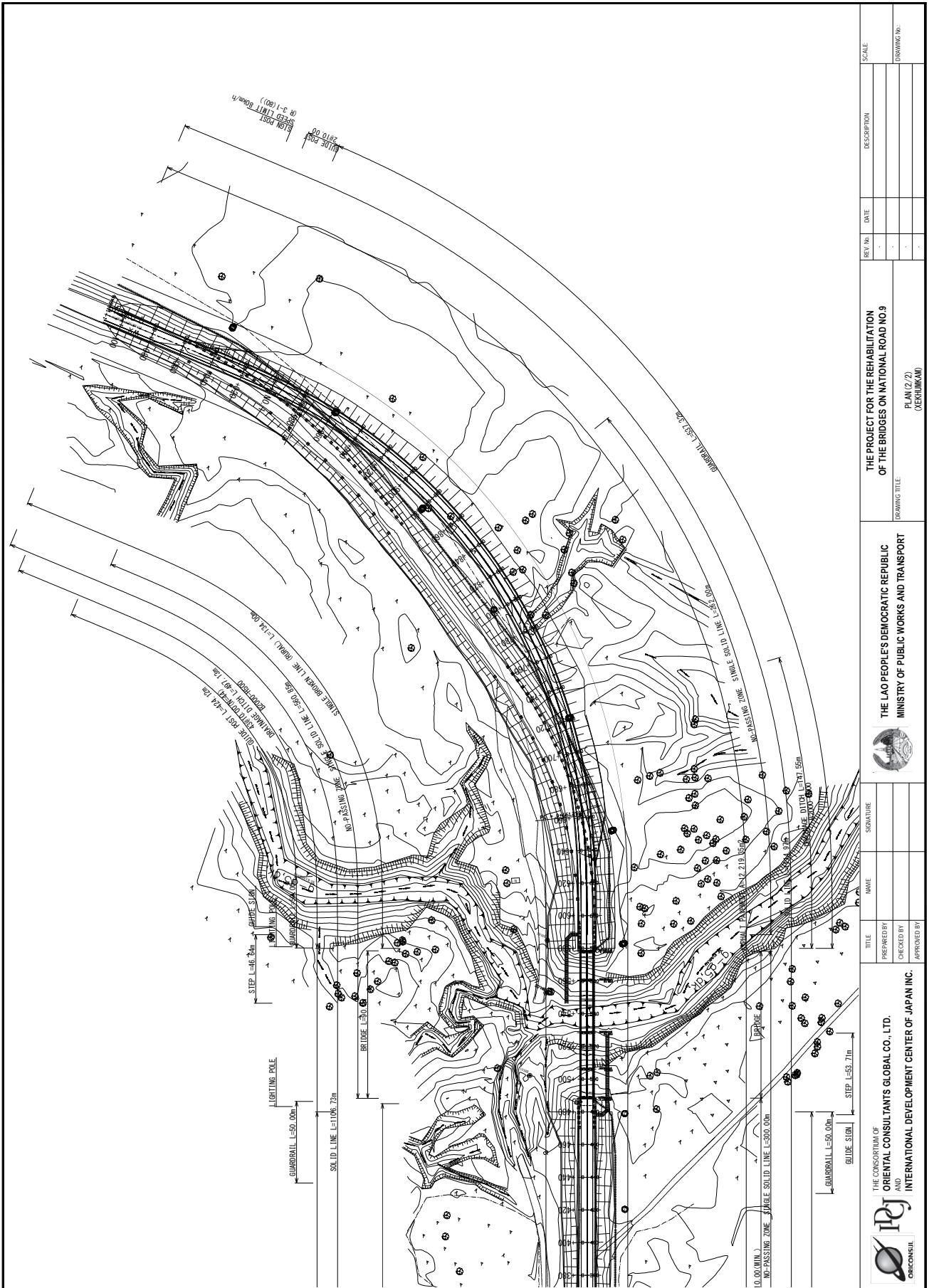



 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE		SIGNATURE		THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT 	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. No.		DATE		DESCRIPTION		SCALE	
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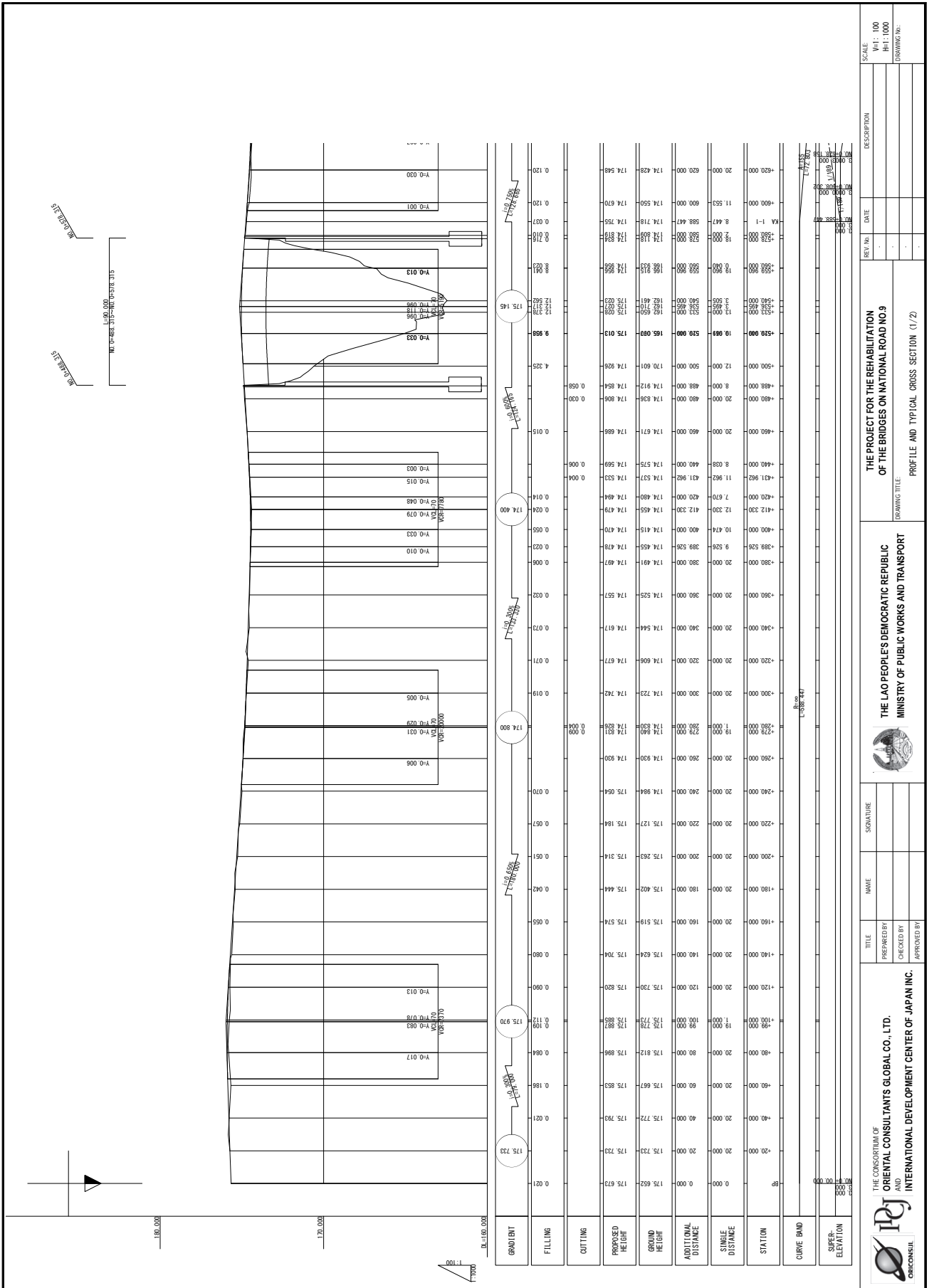


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	DRAWING No.					

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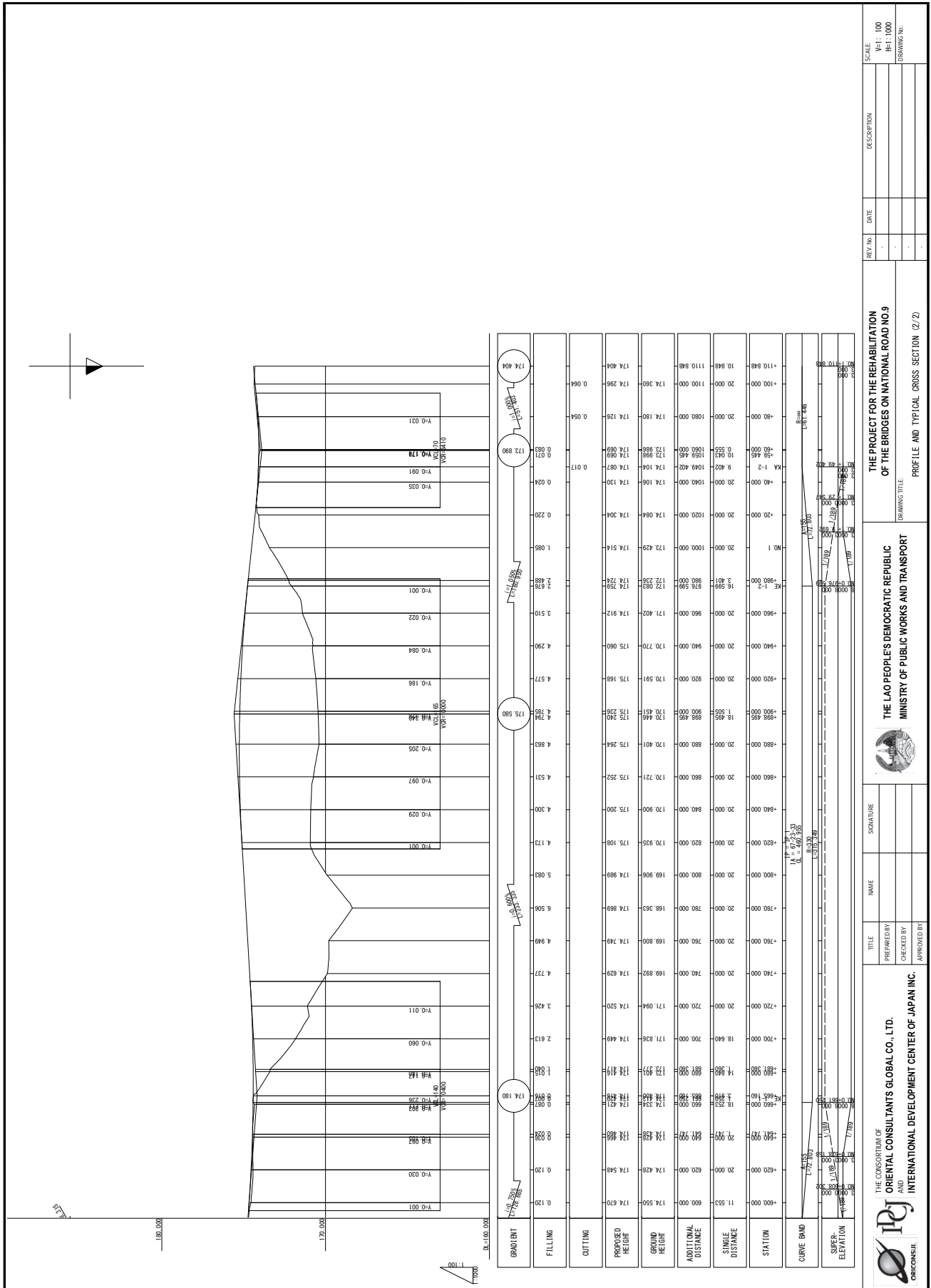


 <p>THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b></p>	TITLE	NAME	SIGNATURE	<p align="center">THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p> 	<p align="center">THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9</p>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY	CHECKED BY	APPROVED BY			DRAWING TITLE	DRAWING No.		





**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**



**THE PROJECT FOR THE REHABILITATION  
OF THE BRIDGES ON NATIONAL ROAD NO.9**

**THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
MINISTRY OF PUBLIC WORKS AND TRANSPORT**

SCALE: V=1:100  
H=1:1000

REV. No. DATE DESCRIPTION

DRAWING TITLE: PROFILE AND TYPICAL CROSS SECTION (2/2)

**THE CONSORTIUM OF  
ORIENTAL CONSULTANTS GLOBAL CO., LTD.  
AND  
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.**

SIGNATURE

NAME

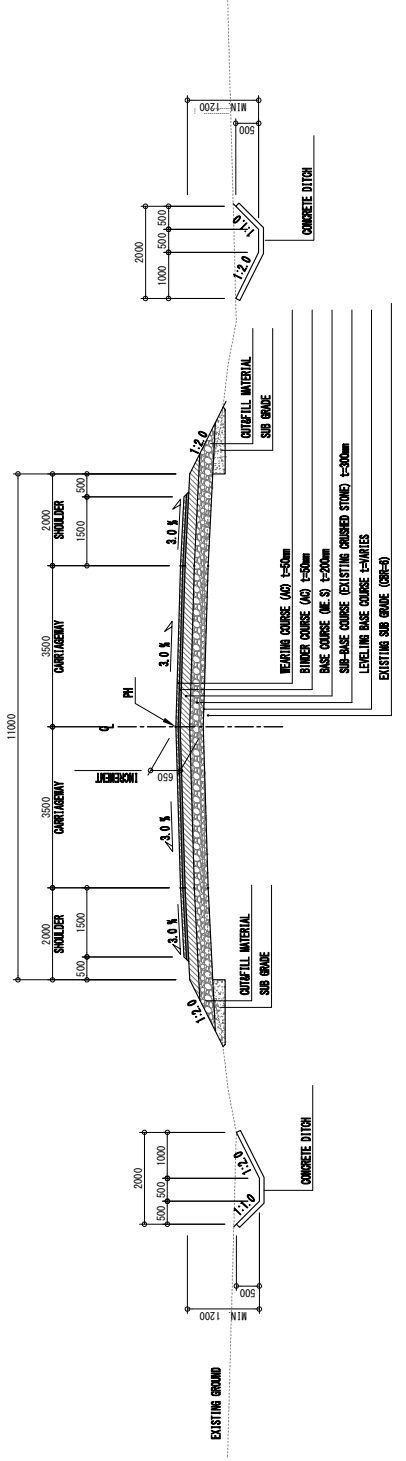
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PREPARED BY

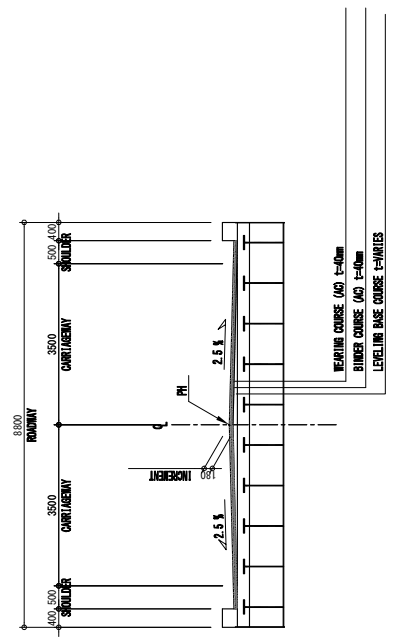
CHECKED BY

APPROVED BY





RUREL SECTION (RR-80)

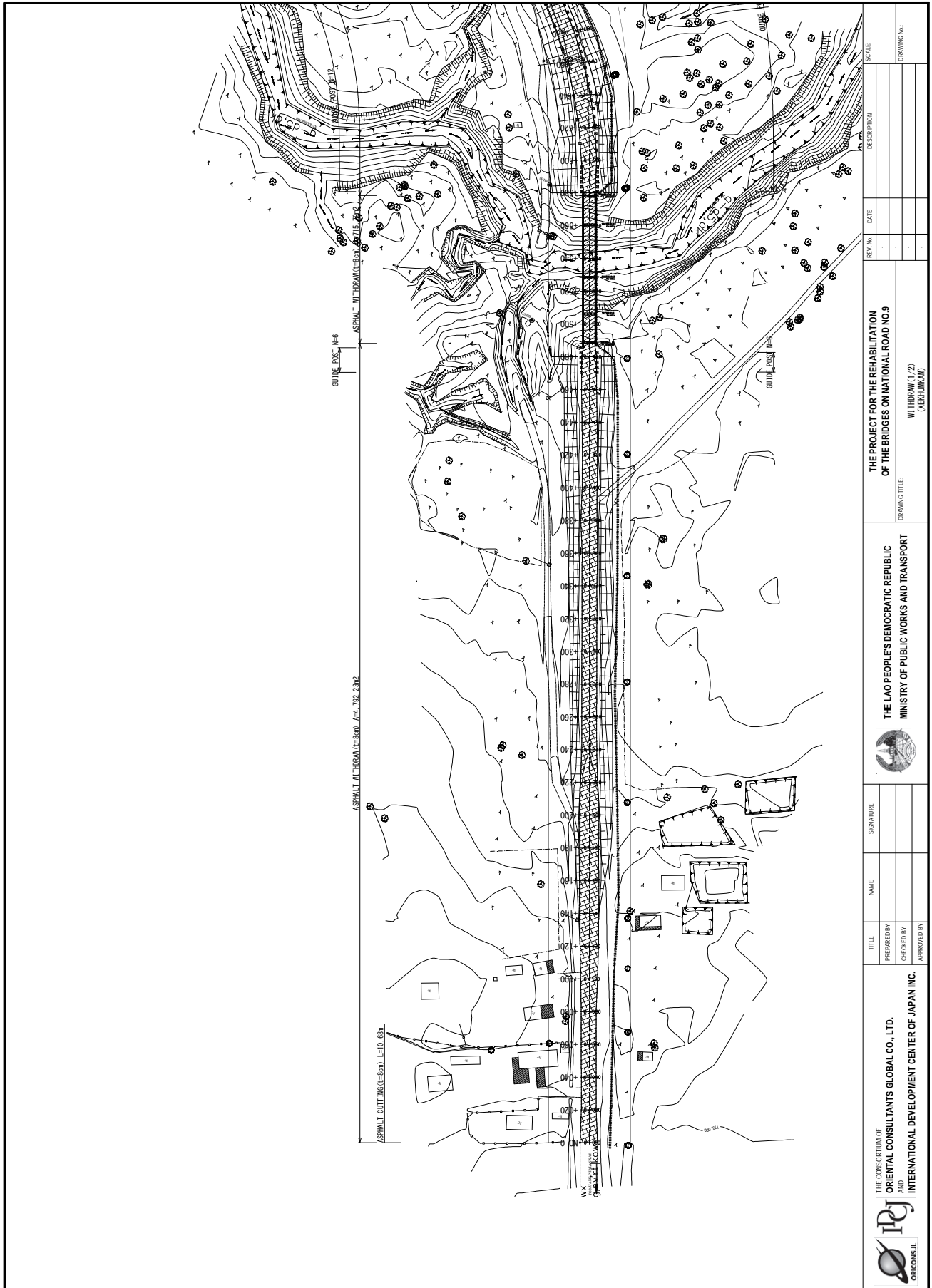


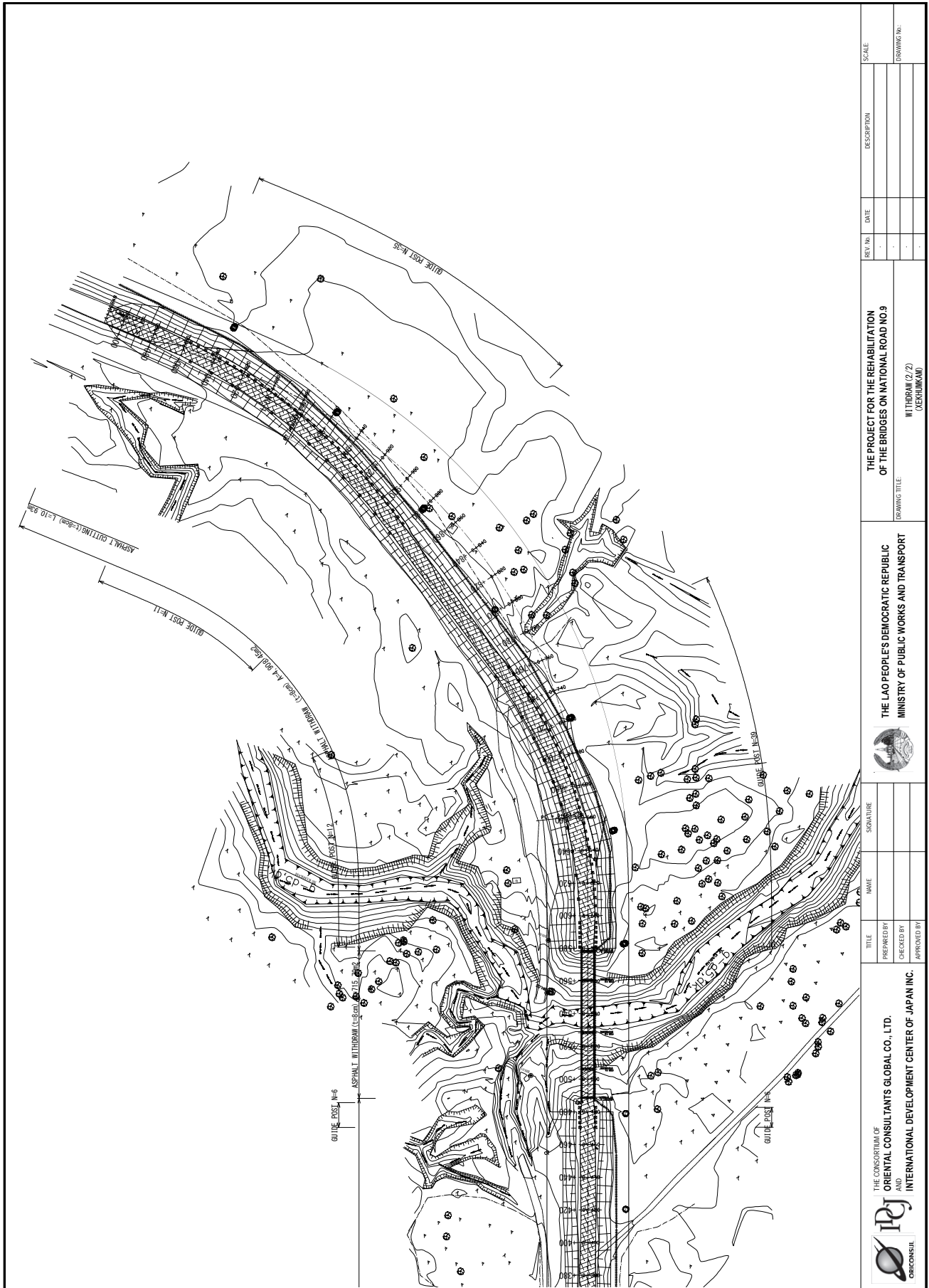
BRIDGE SECTION (RR-80)



NOTE: - PORTION OF DRAINAGE DITCH SHALL BE DETERMINED ON SITE WITH ATTENTION TO THE UNITED CABLE LINE.

<p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	<p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	REV. No. - DATE - DRAWING TITLE TYPICAL CROSS SECTION DRAWING NO. RR-80	SCALE 1:100 DRAWING NO.
	PREPARED BY					
	CHECKED BY					
	APPROVED BY					

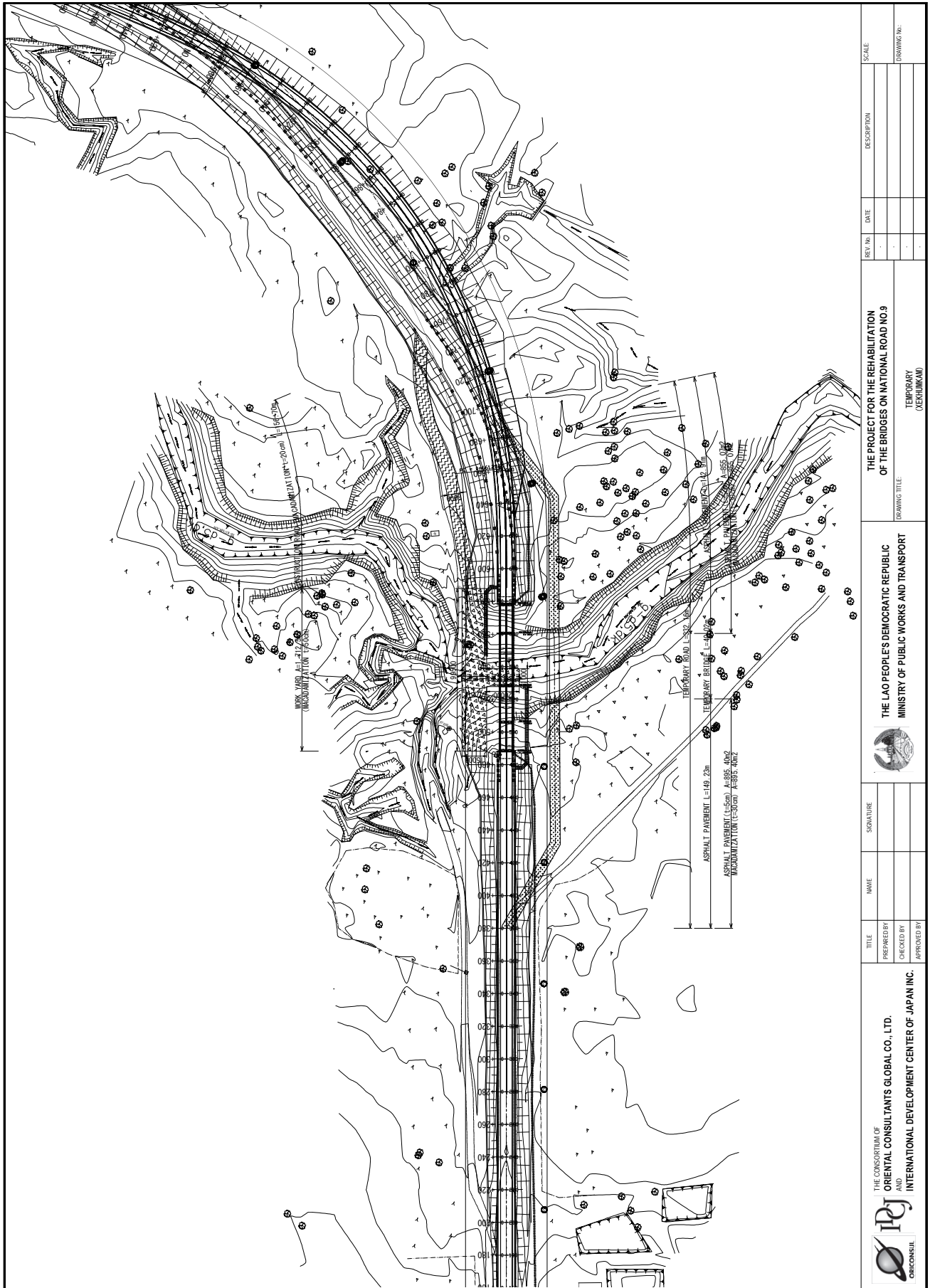
**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

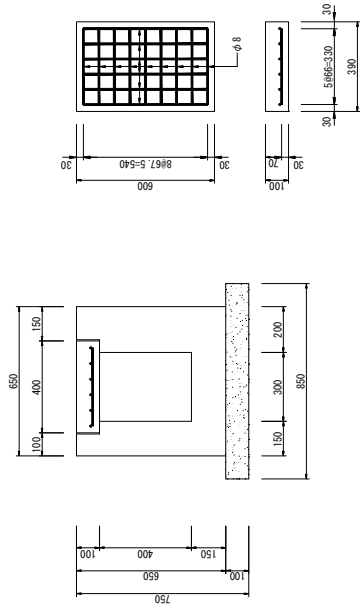




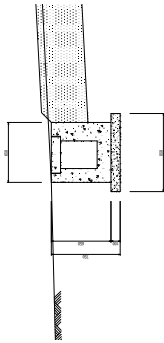
 <p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	 <p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	<p>THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9</p>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY CHECKED BY APPROVED BY						DRAWING No.		

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

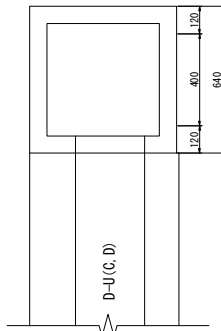




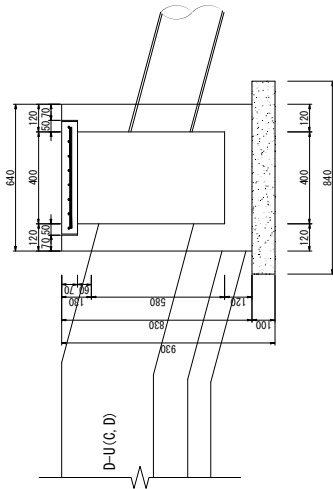
D-U(C)



CONCRETE DITCH D-U(C) , D-U(D)

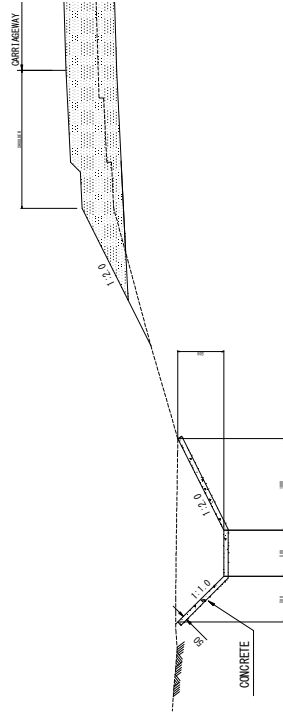


D-U(C, D)



D-U(C, D)

INFILTRATION BASIN

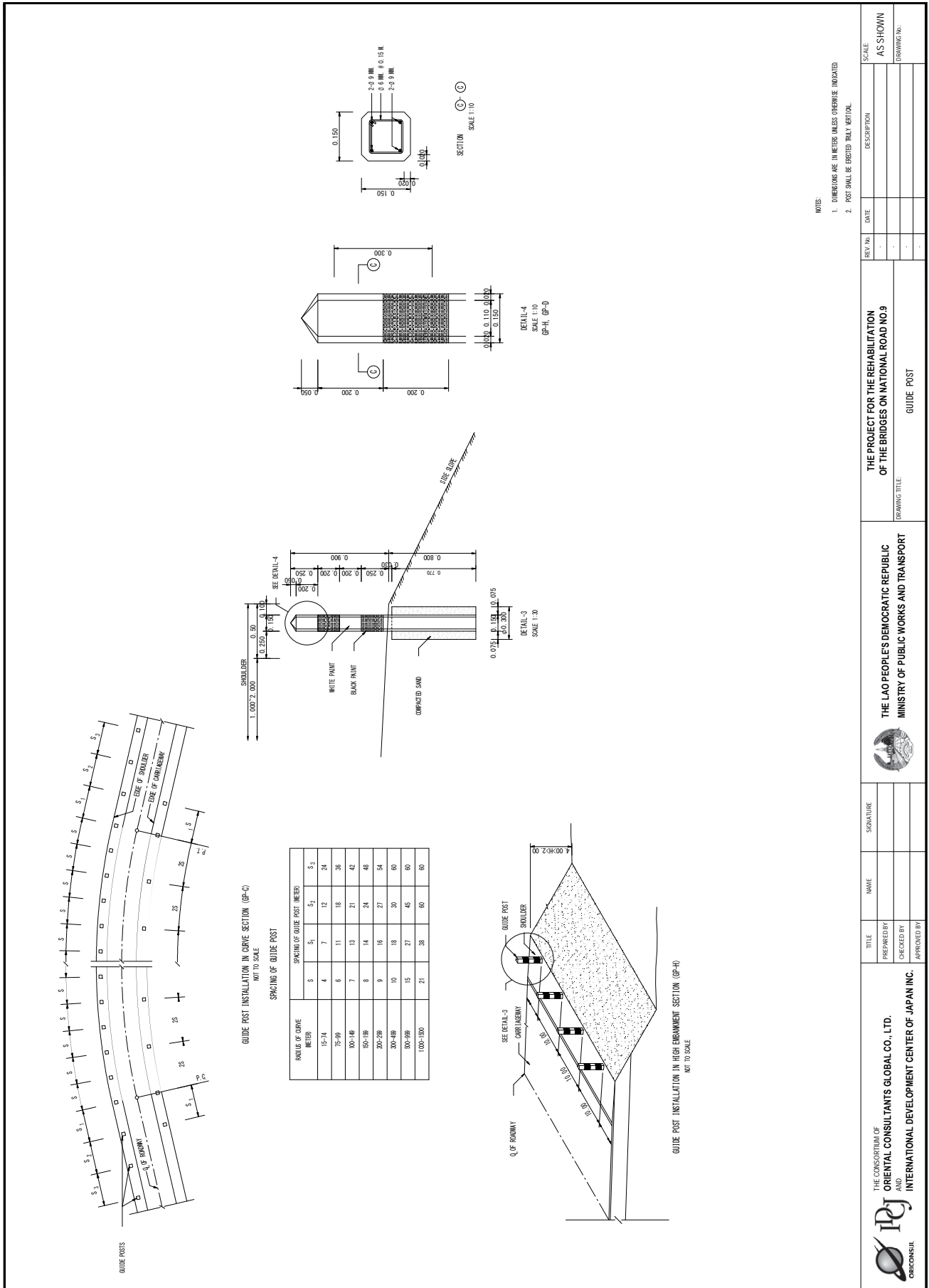


DRAINAGE DITCH, D-U(A)

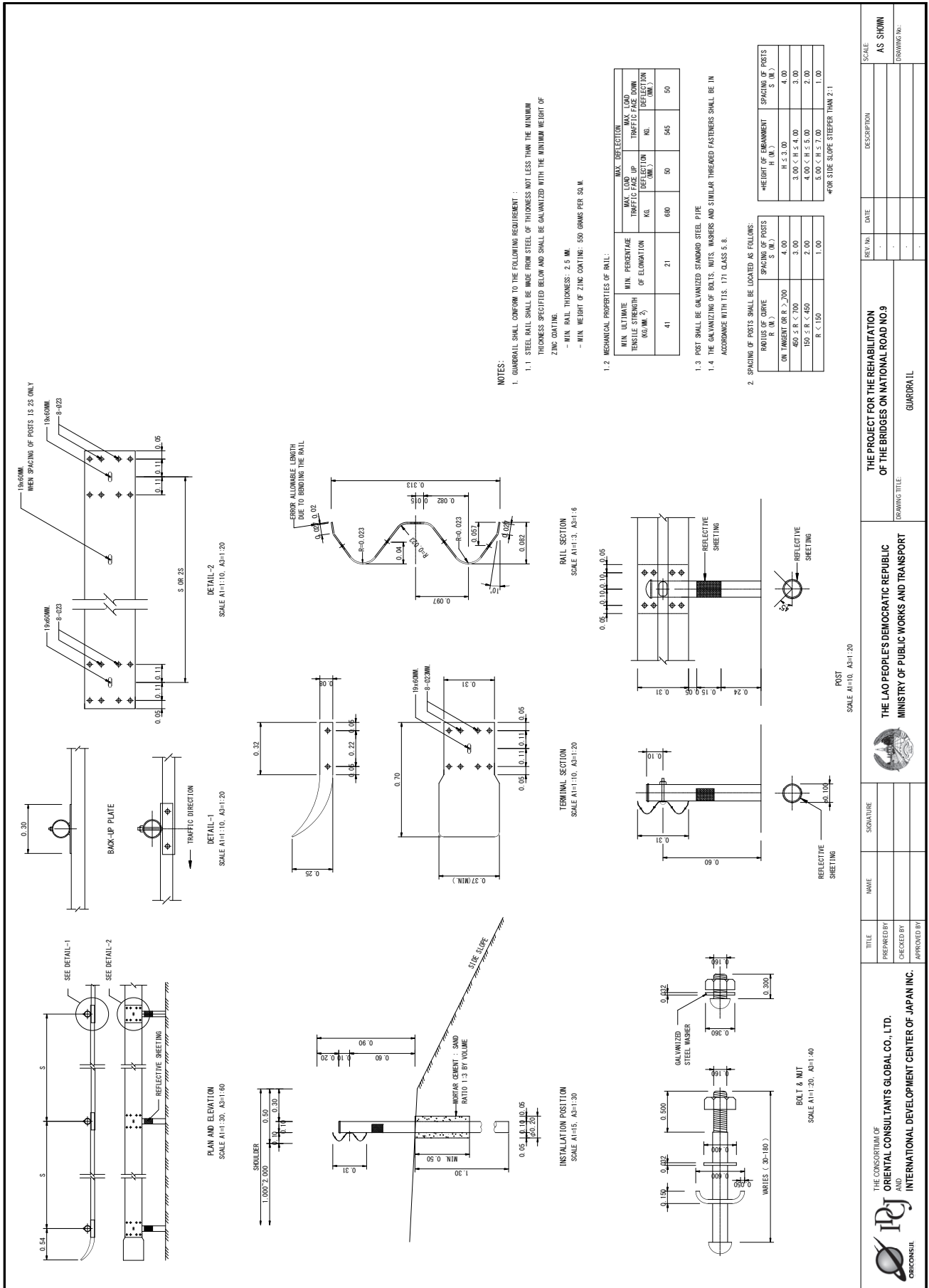
- NOTES:
- POSITION OF DRAINAGE DITCH (D-U(A)) SHALL BE DETERMINED ON SITE WITH ATTENTION TO THE BURIED CABLE LINE.
  - JOINTS OF DRAINAGE DITCH STRUCTURE SHALL BE AT APPROXIMATELY 10 m INTERVAL.
  - CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH IN 18 MPa AT 28 DAYS.

<p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	<p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY CHECKED BY APPROVED BY							
				THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9 DRAWING TITLE: DETAILS OF DRAINAGE DITCH				

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
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**INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.**

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
**MINISTRY OF PUBLIC WORKS AND TRANSPORT**

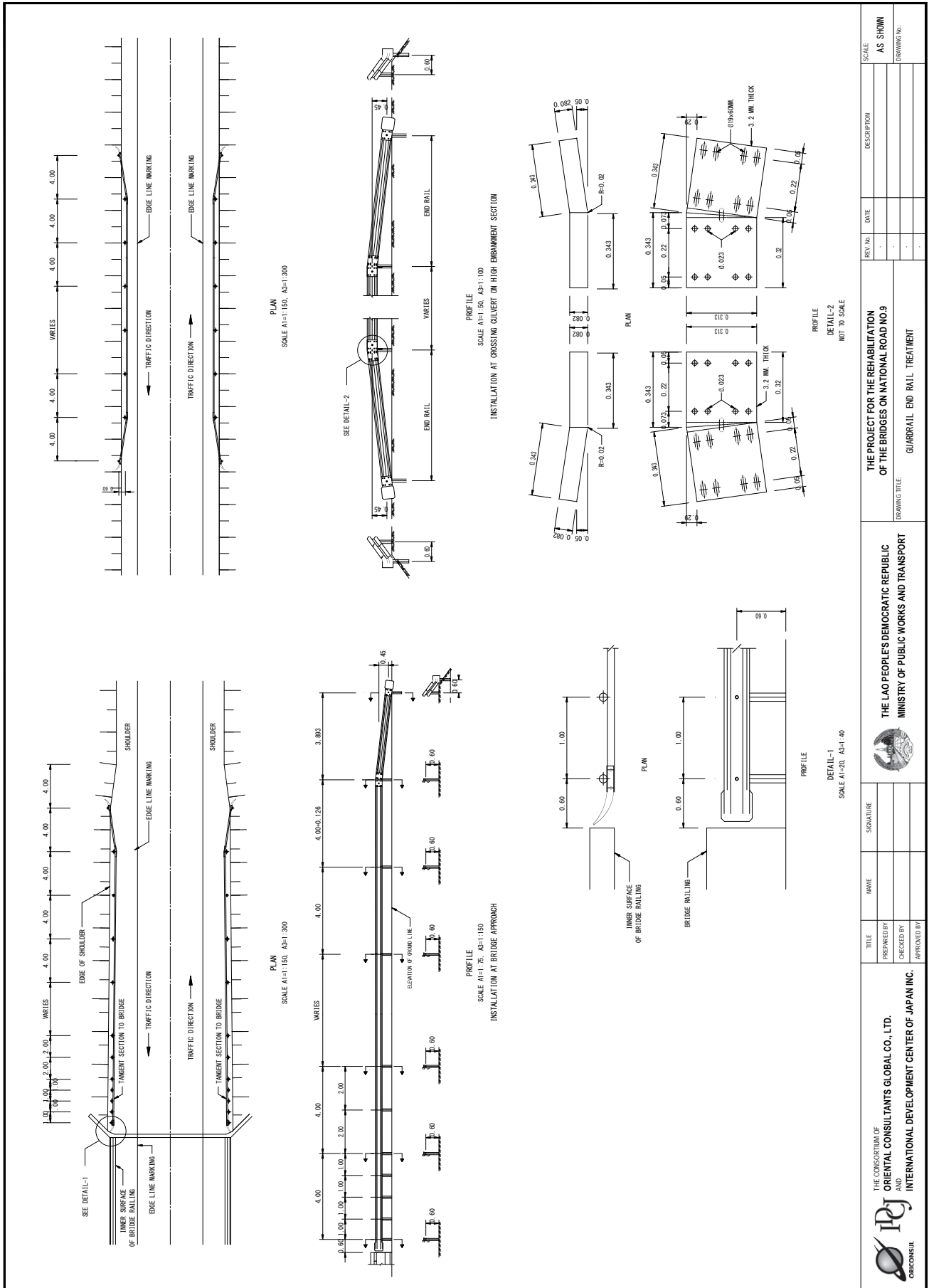
THE PROJECT FOR THE REHABILITATION  
OF THE BRIDGES ON NATIONAL ROAD NO.9

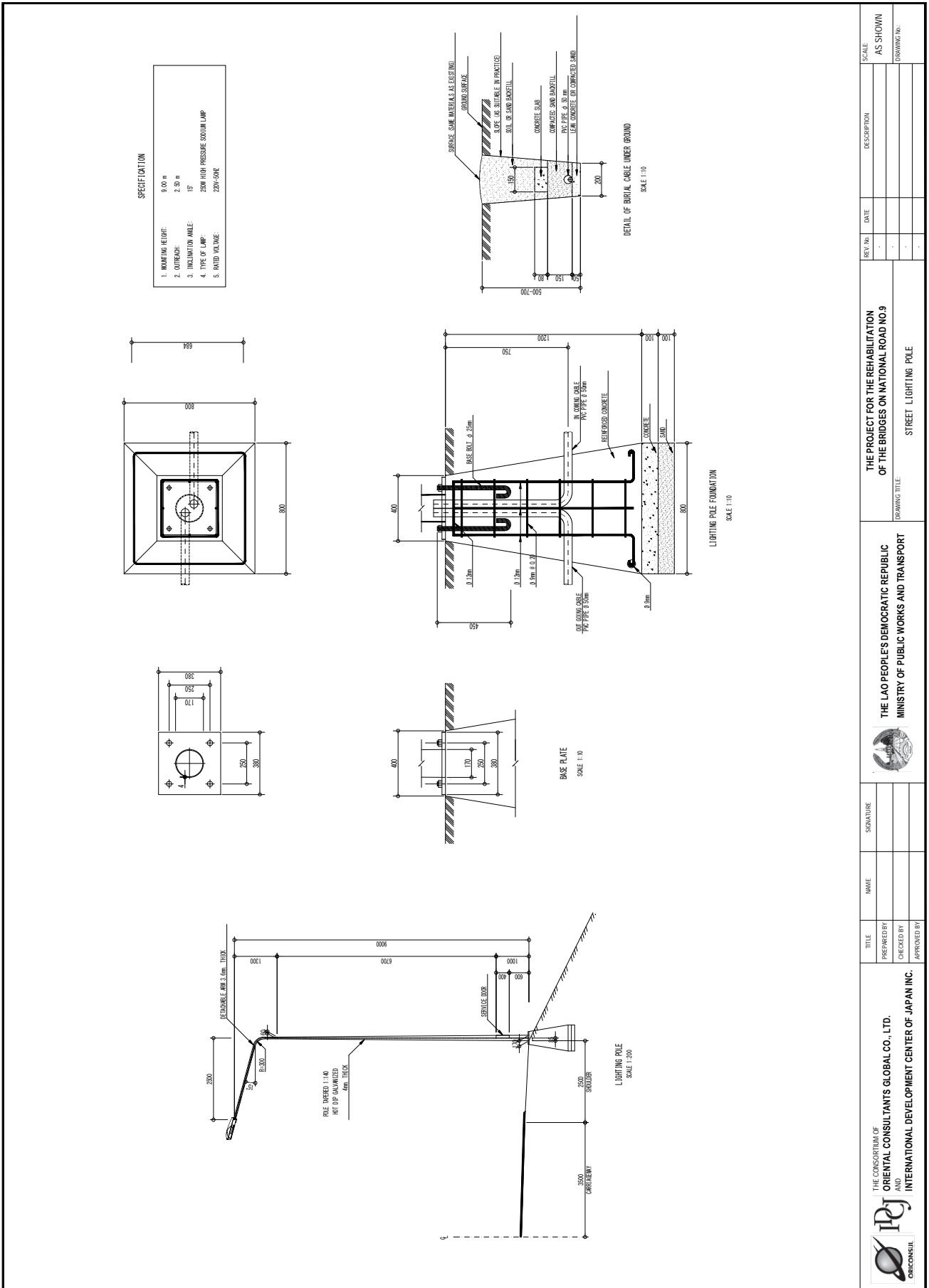
GUARDRAIL



SCALE AS SHOWN

AS SHOWN

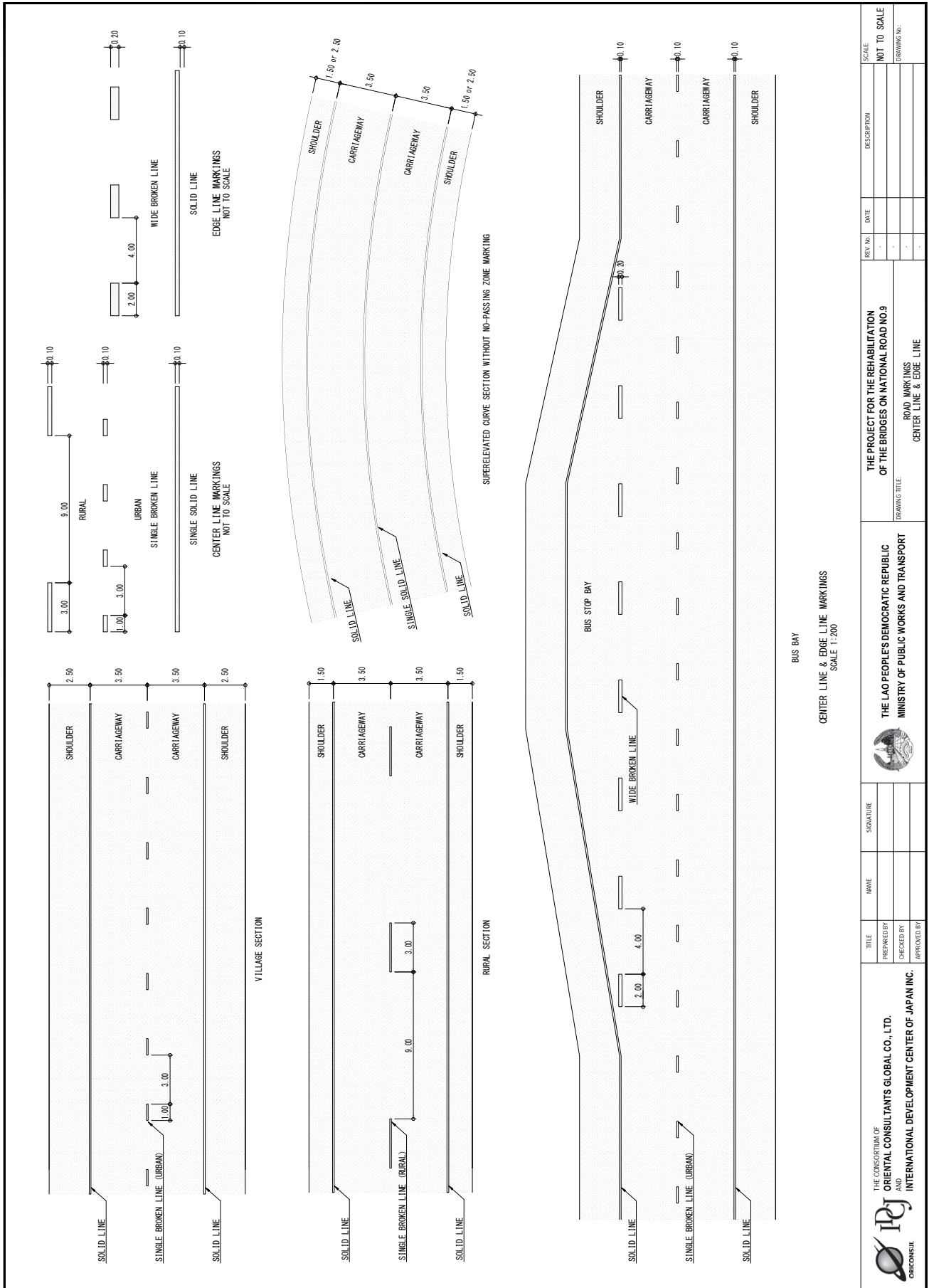
**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**




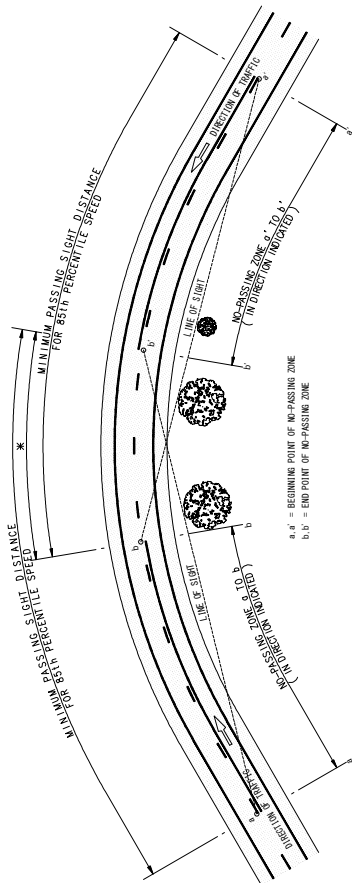


 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE	NAME	SIGNATURE	 THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY					DRAWING TITLE	AS SHOWN		
	CHECKED BY				STREET LIGHTING POLE				DRAWING No.
	APPROVED BY								

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

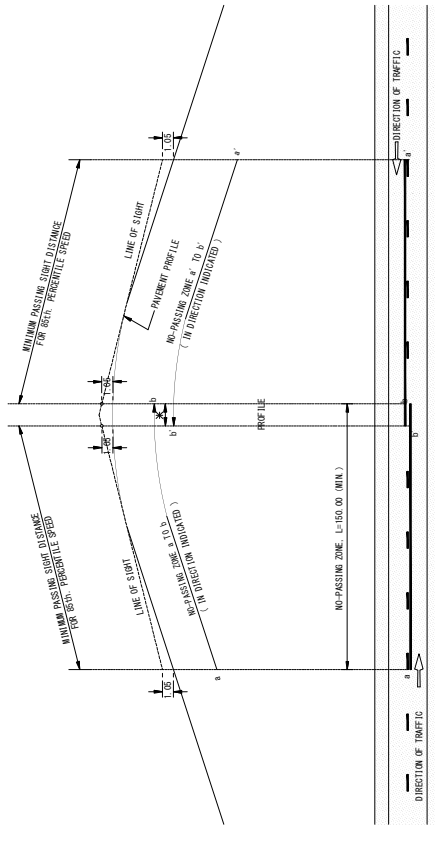


 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE PREPARED BY CHECKED BY APPROVED BY	SIGNATURE NAME	THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	DRAWING TITLE ROAD MARKINGS CENTER LINE & EDGE LINE	REV. No.    DATE .    . .    . .    .	DESCRIPTION THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	SCALE NOT TO SCALE
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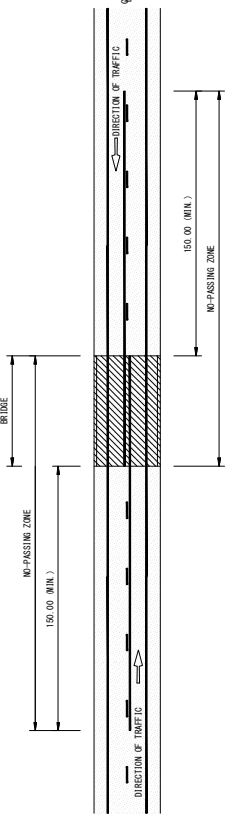
NOTE \* NO-PASSING ZONES IN OPPOSITE DIRECTIONS MAY OR MAY NOT OVERLAP, DEPENDING ON ALIGNMENT.

**NO-PASSING ZONES ON HORIZONTAL CURVES**  
NOT TO SCALE

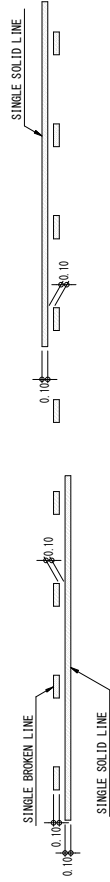


NOTE \* NO-PASSING ZONES IN OPPOSITE DIRECTIONS MAY OR MAY NOT OVERLAP, DEPENDING ON ALIGNMENT.

**NO-PASSING ZONES ON VERTICAL CURVES**  
NOT TO SCALE



**NO-PASSING ZONES ON BRIDGE APPROACH**  
NOT TO SCALE



**NO-PASSING ZONE MARKINGS**  
NOT TO SCALE

**TABLE MINIMUM PASSING SIGHT DISTANCE**

85 PERCENTILE SPEED (km/h)	MINIMUM PASSING SIGHT DISTANCE (m)
20	60
30	90
40	120
50	150
60	180
80	210

SOURCE: STANDARD DRAWING, VERTICAL CURVE, MUNICIPALITY ROAD PROJECT, 2000

**NOTES:**

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. ALL MARKINGS SHALL BE IN ACCORDANCE WITH THE DEPARTMENT OF HIGHWAYS' TRAFFIC CONTROL DEVICE MANUAL, PART 2 ISSUED BE 2533
3. PAVEMENT MARKING FOR THE ASPHALT CONCRETE AND THE REINFORCED CONCRETE PAVEMENTS SHALL BE REFLECTORIZED THERMOPLASTIC PAINT, CONFORMING TO ITS 542. PAVEMENT MARKING FOR THE SURFACE TREATMENT PAVEMENT SHALL BE REFLECTORIZED PAINT, CONFORMING TO ITS 415 AND ITS 543.
4. THIS DRAWING SHALL BE REFERENCED TO THE THAILAND STANDARD DRAWINGS (SING. NO. RS-402).



THE CONSORTIUM OF  
**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**  
AND  
**INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.**

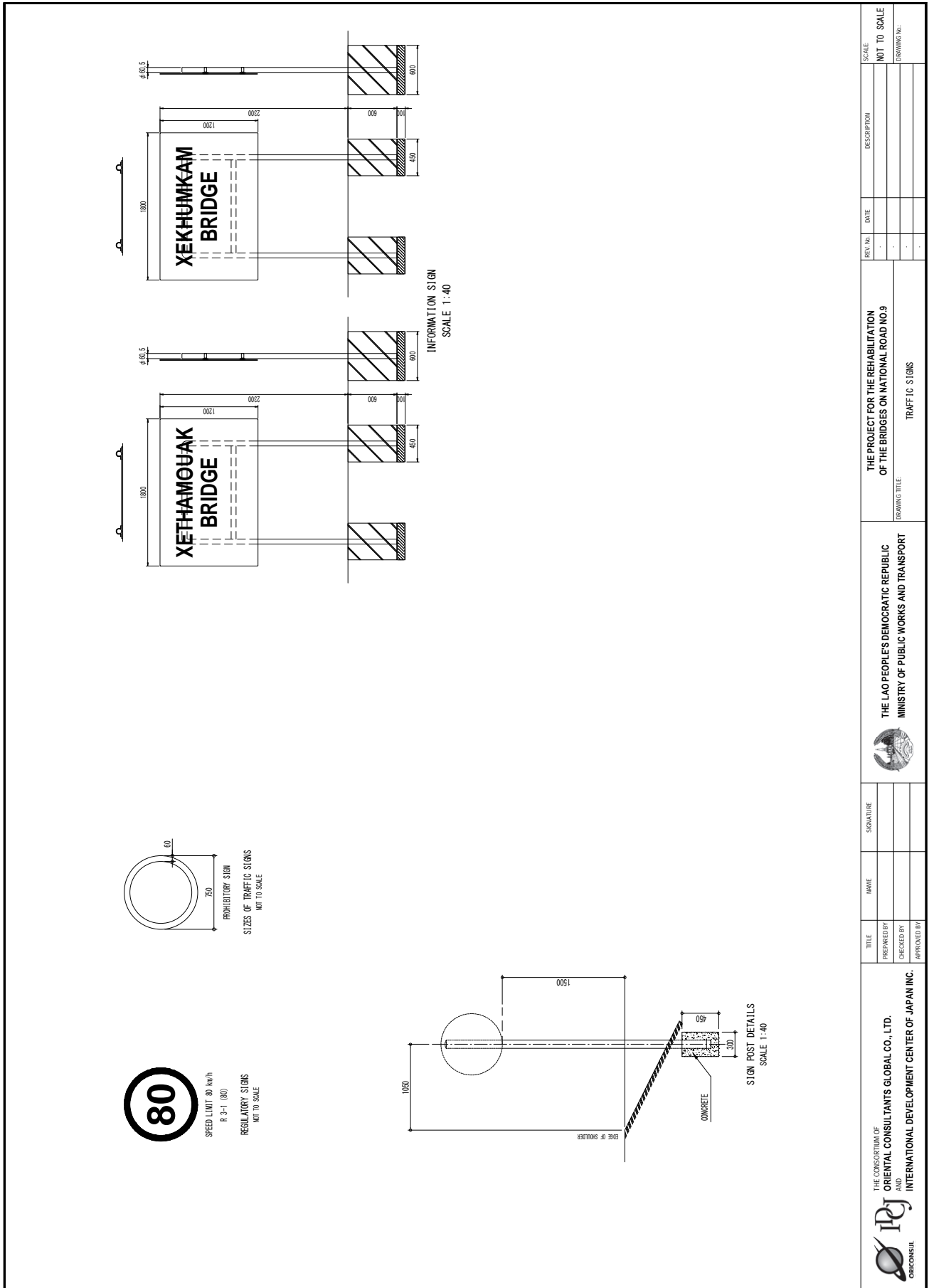
TITLE	NAME	SIGNATURE
PREPARED BY		
CHECKED BY		
APPROVED BY		

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
**MINISTRY OF PUBLIC WORKS AND TRANSPORT**

THE PROJECT FOR THE REHABILITATION  
OF THE BRIDGES ON NATIONAL ROAD NO.9

REV. No.	DATE	DESCRIPTION	SCALE
-	-	-	NOT TO SCALE
DRAWING TITLE			DRAWING No.
ROAD MARKINGS			
NO-PASSING ZONE			

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

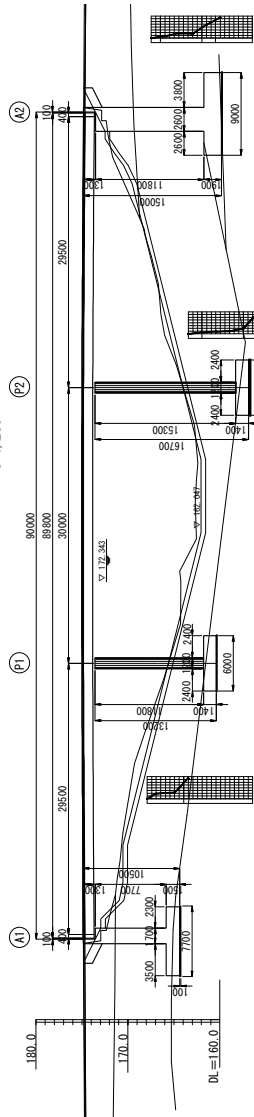




### GENERAL VIEW OF THE BRIDGE (1)

XEKHUMKAM

PROFILE S=1/250

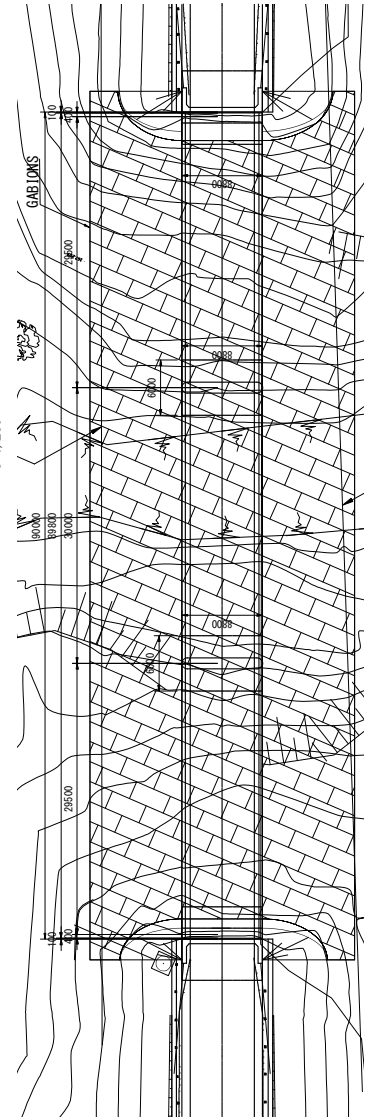


GRADIENT	0.716	0.010	0.716
FILL	8.041	12.562	12.317
CUT	4.325	12.317	12.378
PROPOSED HEIGH	175.145	175.023	175.028
GRAUND LEVEL	174.834	175.023	175.028
STATION	580.000	540.000	533.000
CURVE BAND	L=528.747		

SUPERELEVATION	LEFT SIDE	RIGHT SIDE
+488.000	174.912	174.854
+519.949	165.060	175.013
+520.000	165.077	175.013
+533.000	162.650	175.028
+536.495	162.710	175.027
+540.000	162.461	175.023
+559.960	166.915	174.956
+560.000	166.933	174.956
+578.000	174.118	174.834
+580.000	174.809	174.819

### PLAN S=1/250



THE CONSORTIUM OF  
**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**  
AND  
**INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.**

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
MINISTRY OF PUBLIC WORKS AND TRANSPORT

TITLE	
PREPARED BY	
CHECKED BY	
APPROVED BY	

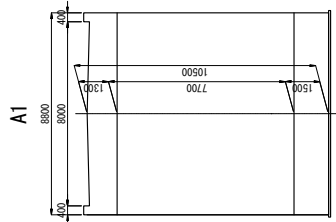
THE PROJECT FOR THE REHABILITATION  
OF THE BRIDGES ON NATIONAL ROAD NO.9

DRAWING TITLE: GENERAL VIEW OF THE BRIDGE (1)  
(XEKHUMKAM)

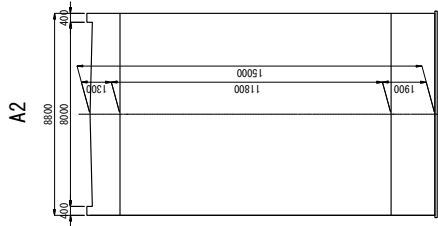
REV. No.	DATE	DESCRIPTION	SCALE

**GENERAL VIEW OF THE BRIDGE (2)**  
XEKHUMKAM

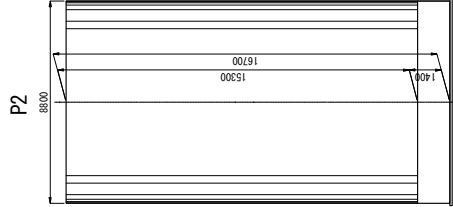
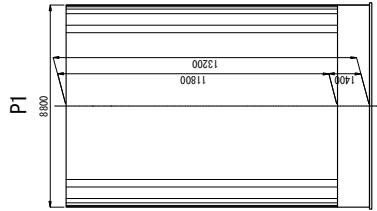
**FRONT VIEW**  
S=1/100



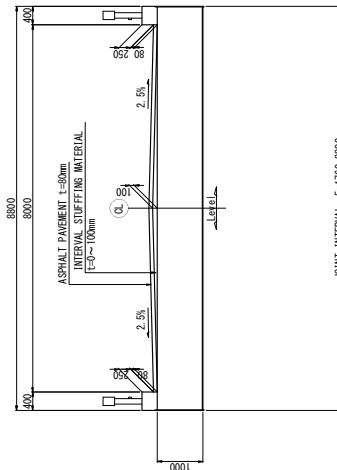
**ABUTMENT**



**PIER**



**SECTION**  
S=1/100



**DESIGN CRITERIA**

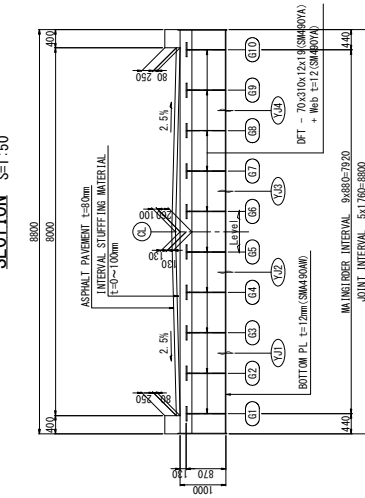
Road Class & Design Speed	Class II (R011) (v=80km/h)
Bridge Length (Span Length)	30.50m (29.50m+30.00m+29.50m)
Bridge Width	Carrilway: 8.00m
Pavement	Asphalt Concrete t=80mm
Longitudinal Gradient	+0.80 % -0.75 %
Cross-fall of Carrilway	2.50 %
Superstructure Type	3 span Continuous Composite Floor Slab Bridge
Substructure Type	Abutment Inverted T-Type
Pier	Multi Type
Foundation Type (Bearing Stratum)	Abutment AI : Spread Foundation (Mud Stone) Pier PI : P2 : Spread Foundation (Mud Stone)
Superstructure	Material Strength
Slab	
Surface Facility	Curb, Adjusting Concrete
Substructure	c25-c28 (N/mm <sup>2</sup> )
Reinforcing Steel	c25c5 (fy=295N/mm <sup>2</sup> )

	TITLE	NAME	SIGNATURE		REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY CHECKED BY APPROVED BY							
THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>				THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9				
				DRAWING TITLE GENERAL VIEW OF THE BRIDGE (2) (XEKHUMKAM)				
								DRAWING No.

**XE KUM KAM BRIDGE STRUCTURE GENERAL DRAWING**  
**XEKUMKAM**  
**REFERENCE DRAWING**

S=1:200

**ELEVATION**

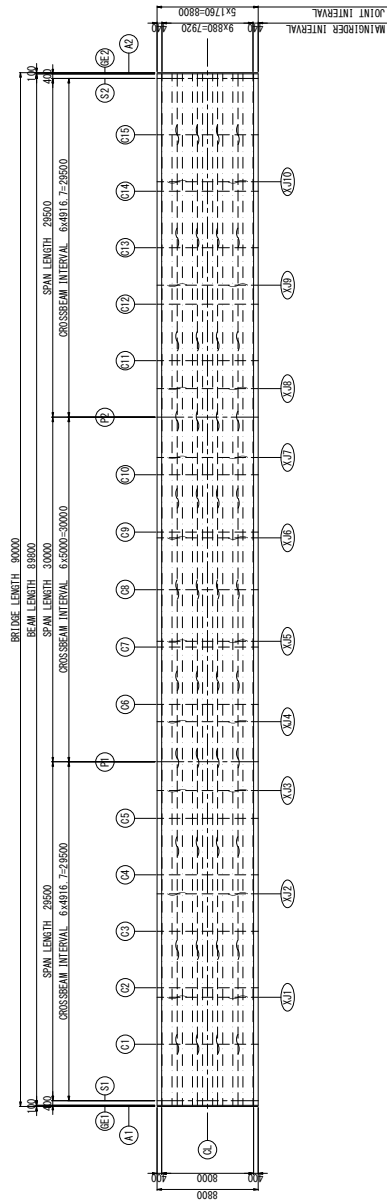


SECTION S=1:50

TO MIANG PREEN



TO MIANG PHALAWAY

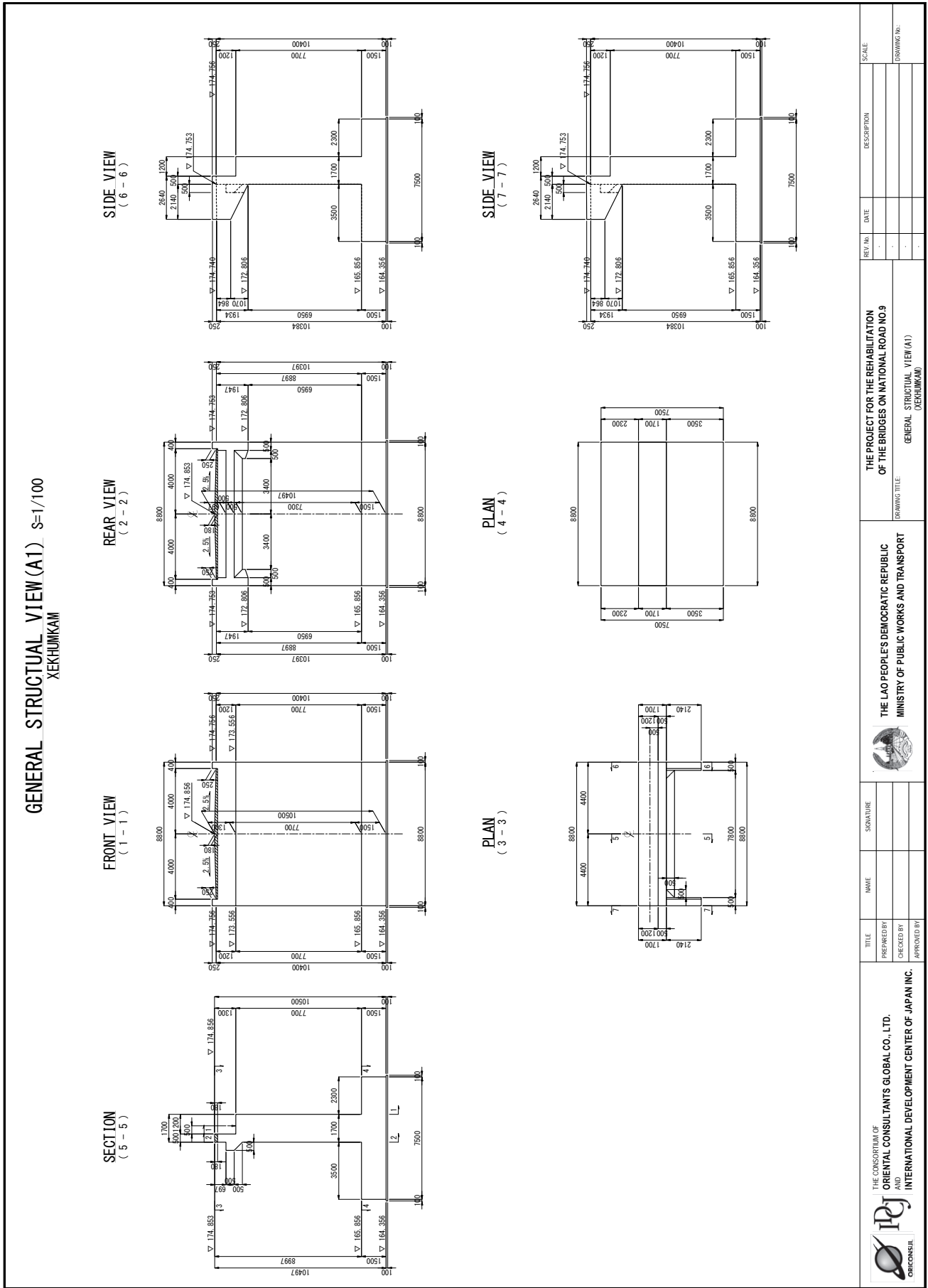
**PLAN**



**DESIGN CONDITIONS**

FORM	COMPOSITE FLOOR SUB BRIDGE
LIVE LOAD	TYPE B
BRIDGE LENGTH	30.000m
BEAM LENGTH	89.800m
SPAN LENGTH	29.500m ± 30.000m ± 29.500m
WIDTH	8.800m
ROAD WIDTH	8.000m
PLANE CURVE	STRAIGHT LINE
ROAD SURFACE	ROAD SURFACE
LONGITUDINAL GRADIENT	BOTTOM PL 2.5% FROM CENTER DOWN TO EDGE
TRANSVERSAL GRADIENT	BOTTOM PL Level
ANGLE OF SKEW	$\theta = 90^\circ 00' 00''$
ASPHALT PAVEMENT	t = 50mm

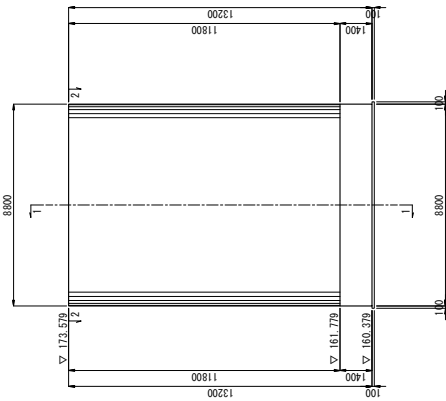
	THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT		THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	BRIDGE STRUCTURE GENERAL DRAWING (REFERENCE DRAWING) (XEKUMKAM)
	TITLE PREPARED BY CHECKED BY APPROVED BY	NAME SIGNATURE	DATE DESCRIPTION SCALE	DRAWING NO.	



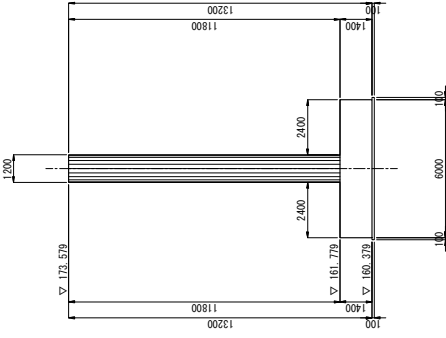
THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.		THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT		THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9		REV. No.	DATE	DESCRIPTION	SCALE
PREPARED BY		TITLE	NAME	SIGNATURE					
CHECKED BY									
APPROVED BY									
				DRAWING TITLE		GENERAL STRUCTURAL VIEW (A1)			
				DRAWING No.		XEKHUMKAM			

GENERAL STRUCTURAL VIEW (P1) S=1/100  
XEKHUMKAM

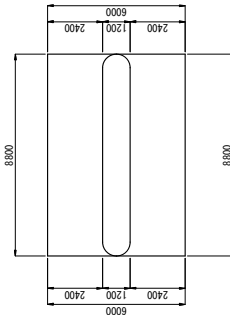
FRONT VIEW



SIDE VIEW  
( 1 - 1 )



PLAN  
( 2 - 2 )

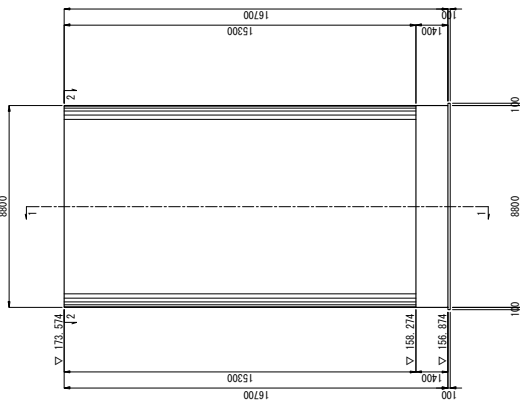


 THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.	TITLE PREPARED BY CHECKED BY APPROVED BY	NAME SIGNATURE	 THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	DRAWING TITLE GENERAL STRUCTURAL VIEW (P1) (XEKHUMKAM)	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. No. DATE	DESCRIPTION SCALE	DRAWING No.
	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. No. DATE		DESCRIPTION SCALE	DRAWING No.			

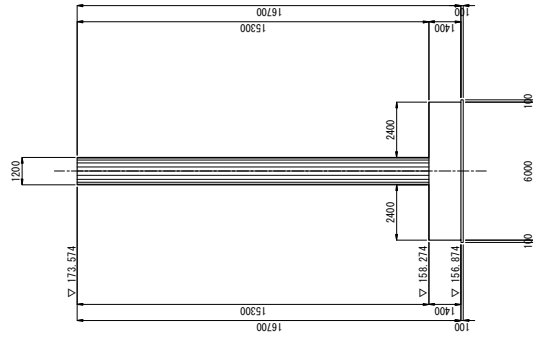
**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

**GENERAL STRUCTURAL VIEW (P2) S=1/100  
XEKHUMKAM**

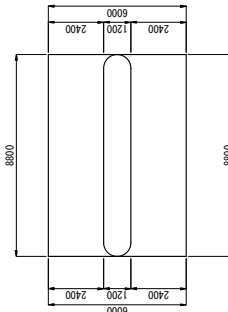
**FRONT VIEW**




**SIDE VIEW  
(1-1)**



**PLAN  
(2-2)**



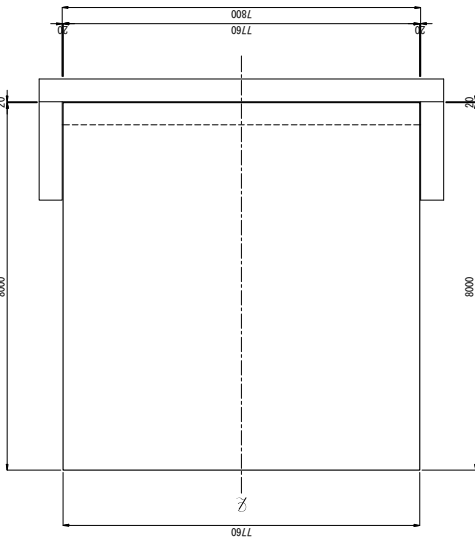
 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE PREPARED BY CHECKED BY APPROVED BY	SIGNATURE NAME	THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	DRAWING TITLE GENERAL STRUCTURAL VIEW (P2) (XEKHUMKAM)	REV. No. DATE DESCRIPTION SCALE
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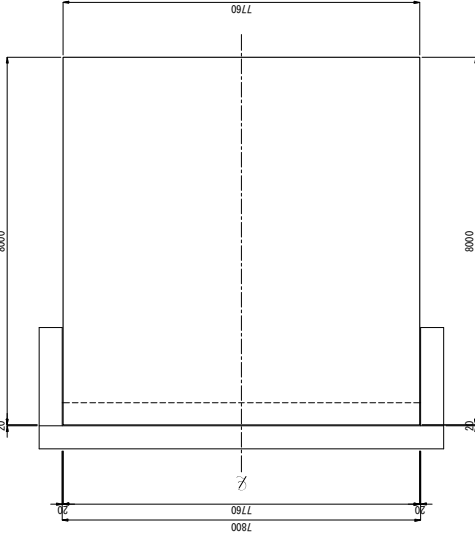


**APPROACH SLAB  
XEKHUMKAM**

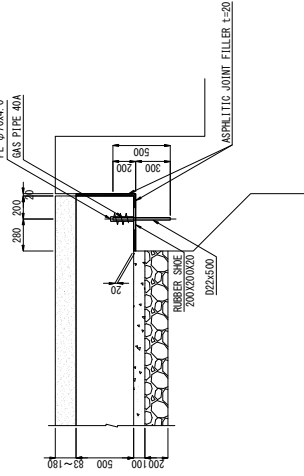
PLAN OF STRUCTURE (A1) S=1/50



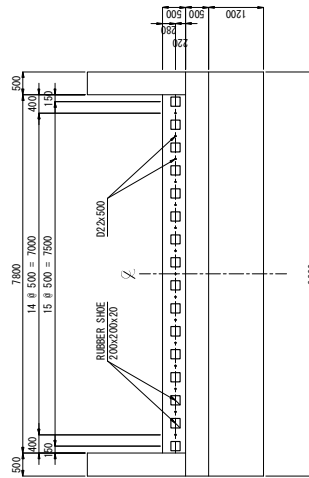
PLAN OF STRUCTURE (A2) S=1/50



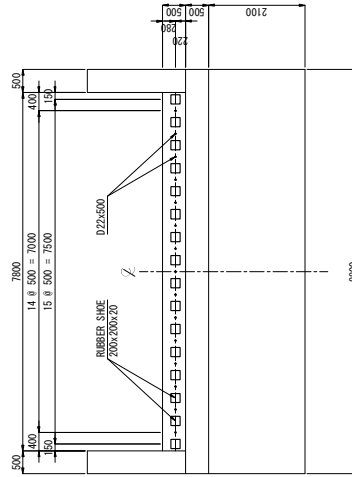
DETAIL OF ANCHOR S=1/20




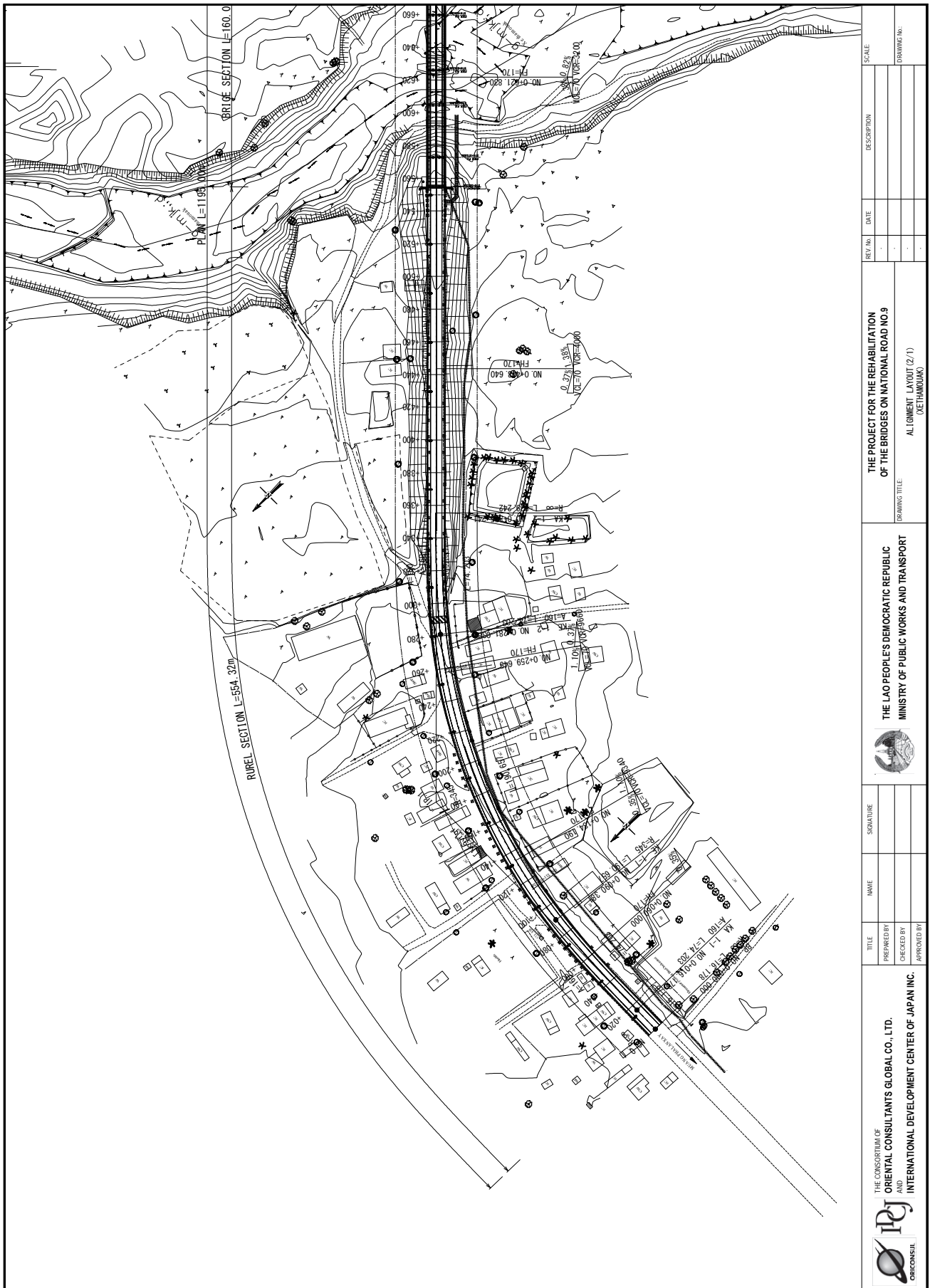
PLAN OF SHOE (A1) S=1/50



PLAN OF SHOE (A2) S=1/50

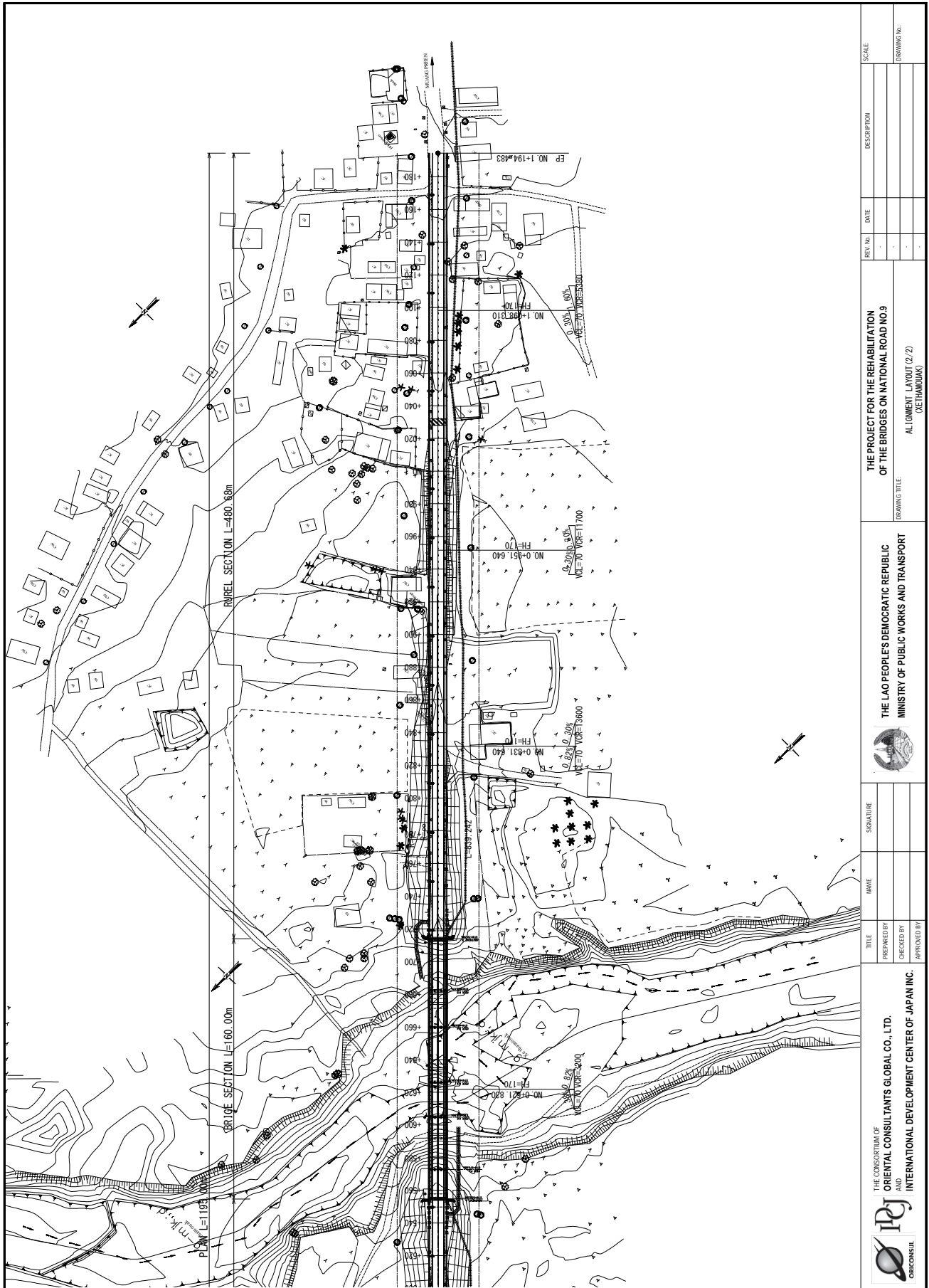


 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE	NAME	SIGNATURE	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9 APPROACH SLAB (XEKHUMKAM)	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY	CHECKED BY	APPROVED BY		DRAWING TITLE			



THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.		TITLE	NAME	SIGNATURE	THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT		THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9			
PREPARED BY							REV. No.	DATE	DESCRIPTION	SCALE
CHECKED BY										
APPROVED BY										
					DRAWING TITLE		DRAWING No.			
					AL (BRIDGE LAYOUT (2/1) (AETIMDUANG))					

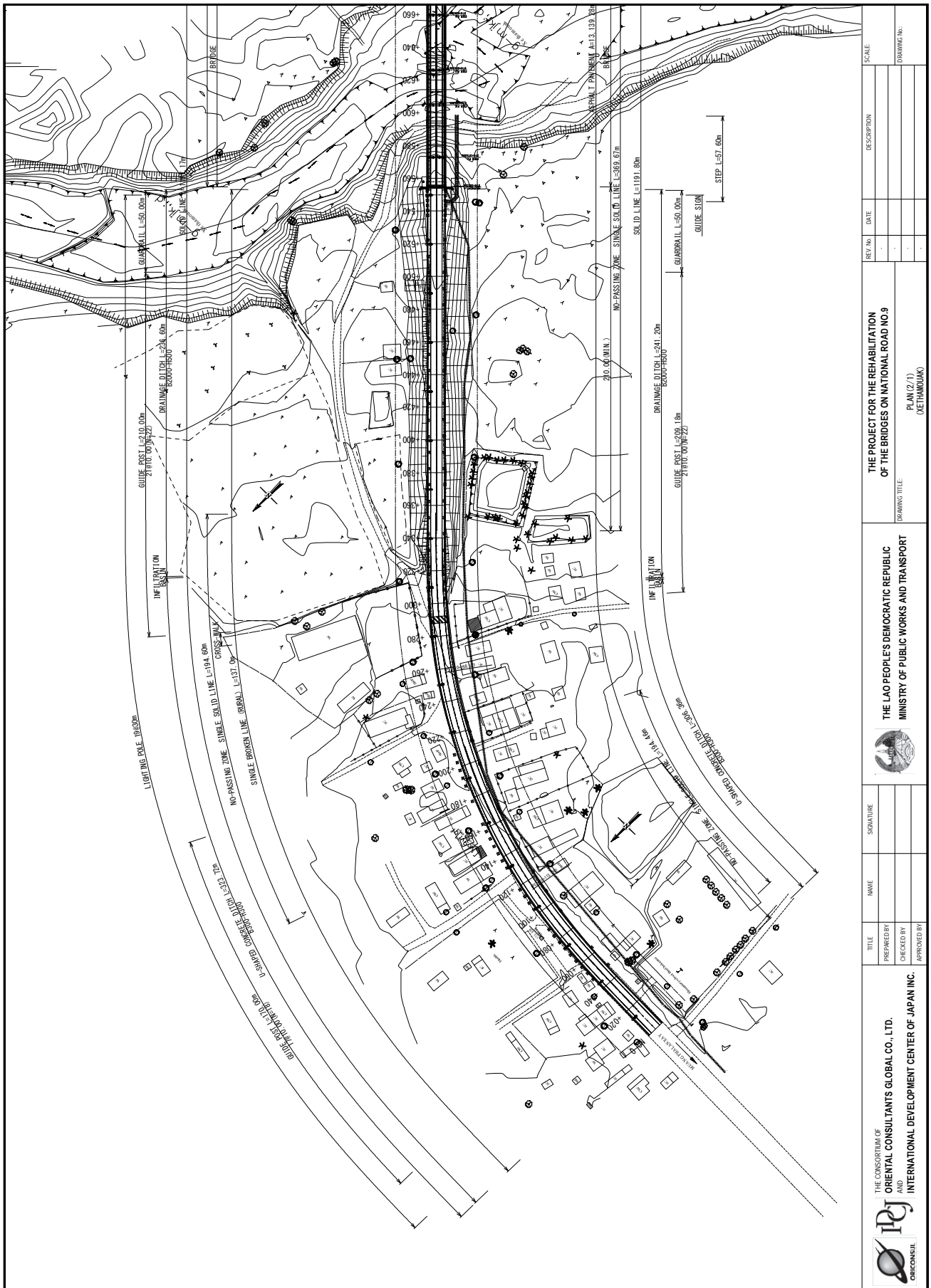
**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**





REV. No.	DATE	DESCRIPTION	SCALE

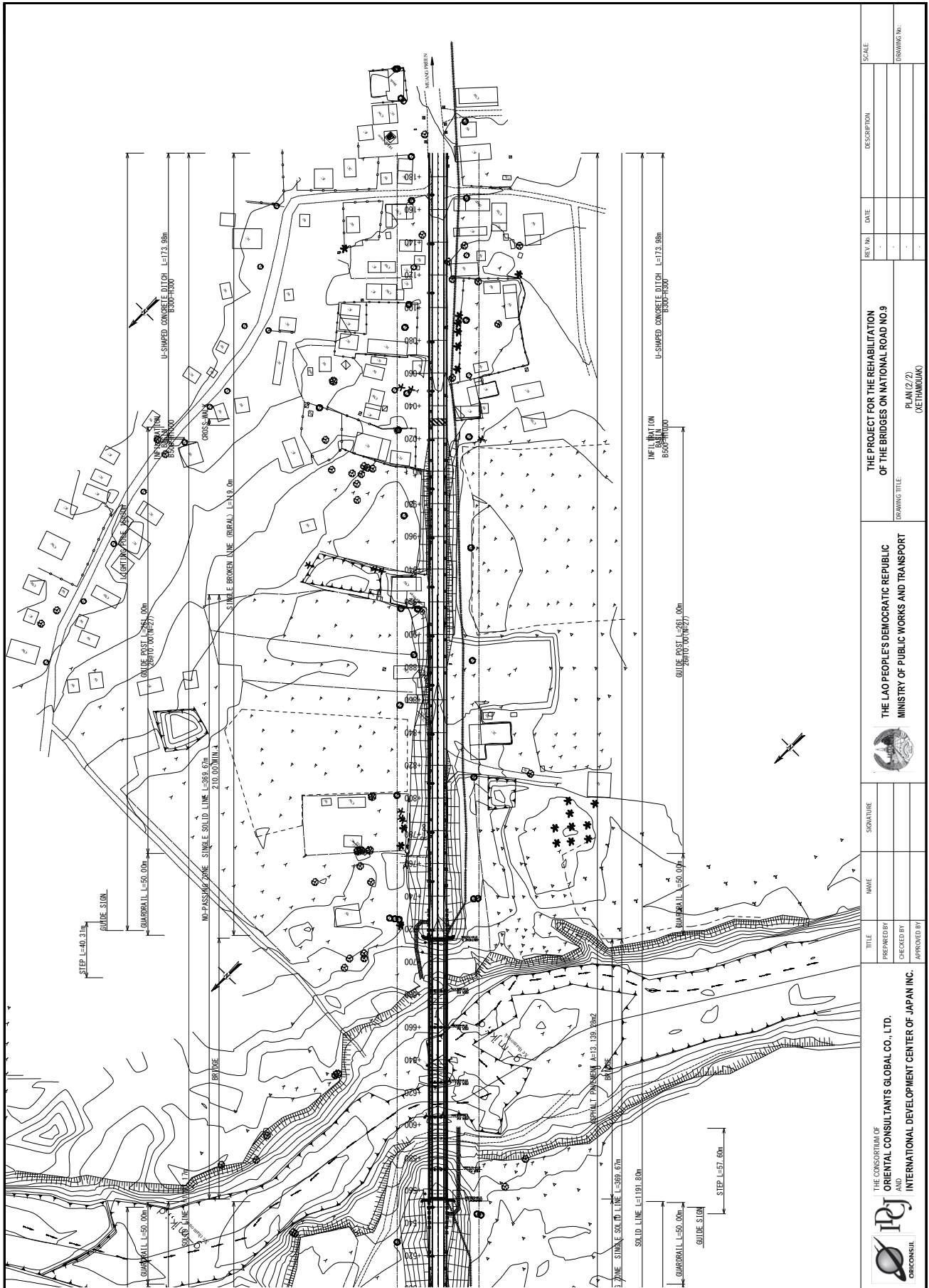
THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9		DRAWING TITLE ALI (BRIDGE) LAYOUT (2 / 2) (CAETHAMDUANG)	
THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT		SIGNATURE	
THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.		NAME	
PREPARED BY		TITLE	
CHECKED BY		PREPARED BY	
APPROVED BY		CHECKED BY	
APPROVED BY		APPROVED BY	





 <p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	 <p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY CHECKED BY APPROVED BY					THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9 PLAN (2/1) (AETIMOUANG)		



**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

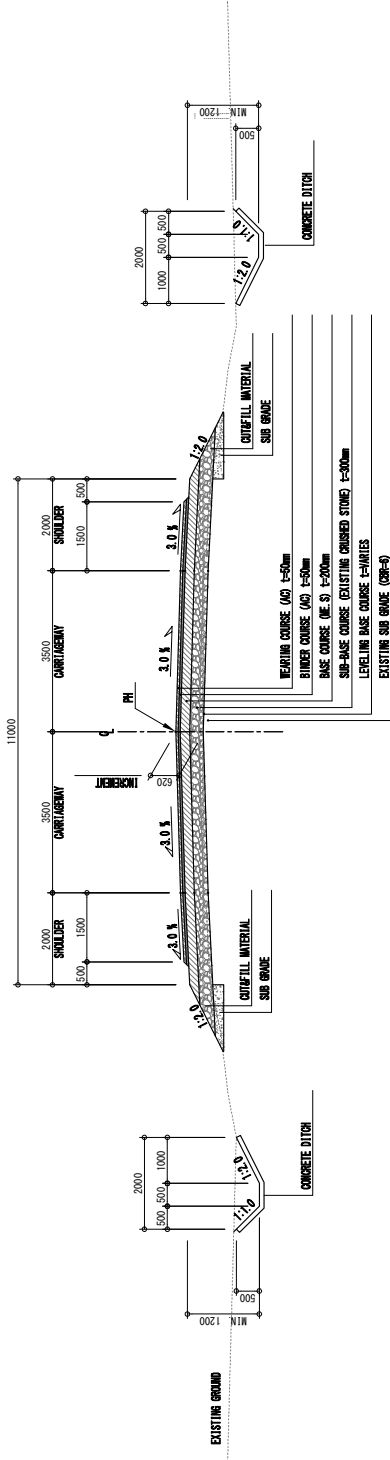


 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE PREPARED BY CHECKED BY APPROVED BY	NAME SIGNATURE	 THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	DRAWING TITLE PLAN (2/2) (AETIMJUNG)	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. NO. DATE DESCRIPTION SCALE
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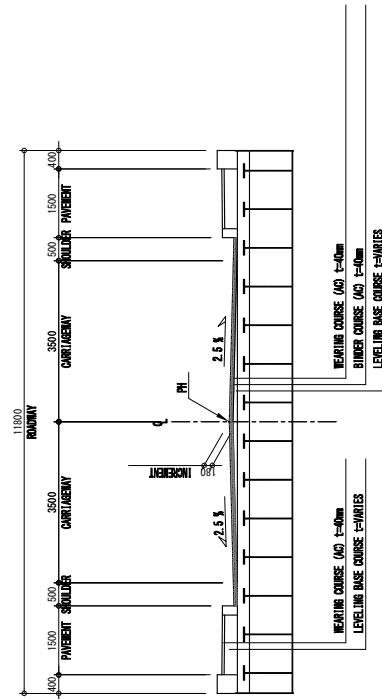








RUREL SECTION (RR-80)



BRIDGE SECTION (RR-80)

NOTE: - PORTION OF DRAINAGE DITCH SHALL BE DETERMINED ON SITE WITH ATTENTION TO THE BRIDGED CABLE LINE.

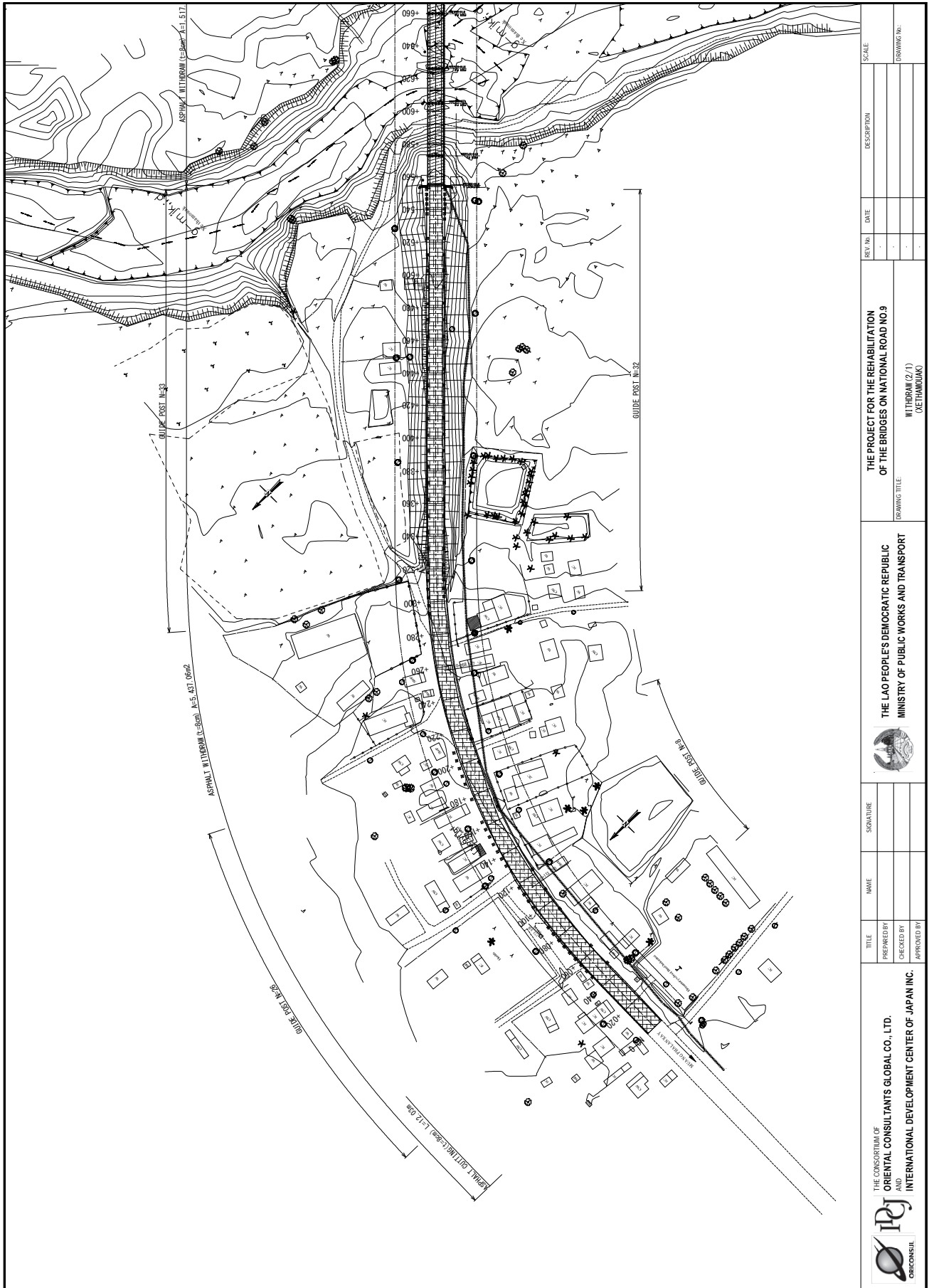
THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9

TYPICAL CROSS SECTION

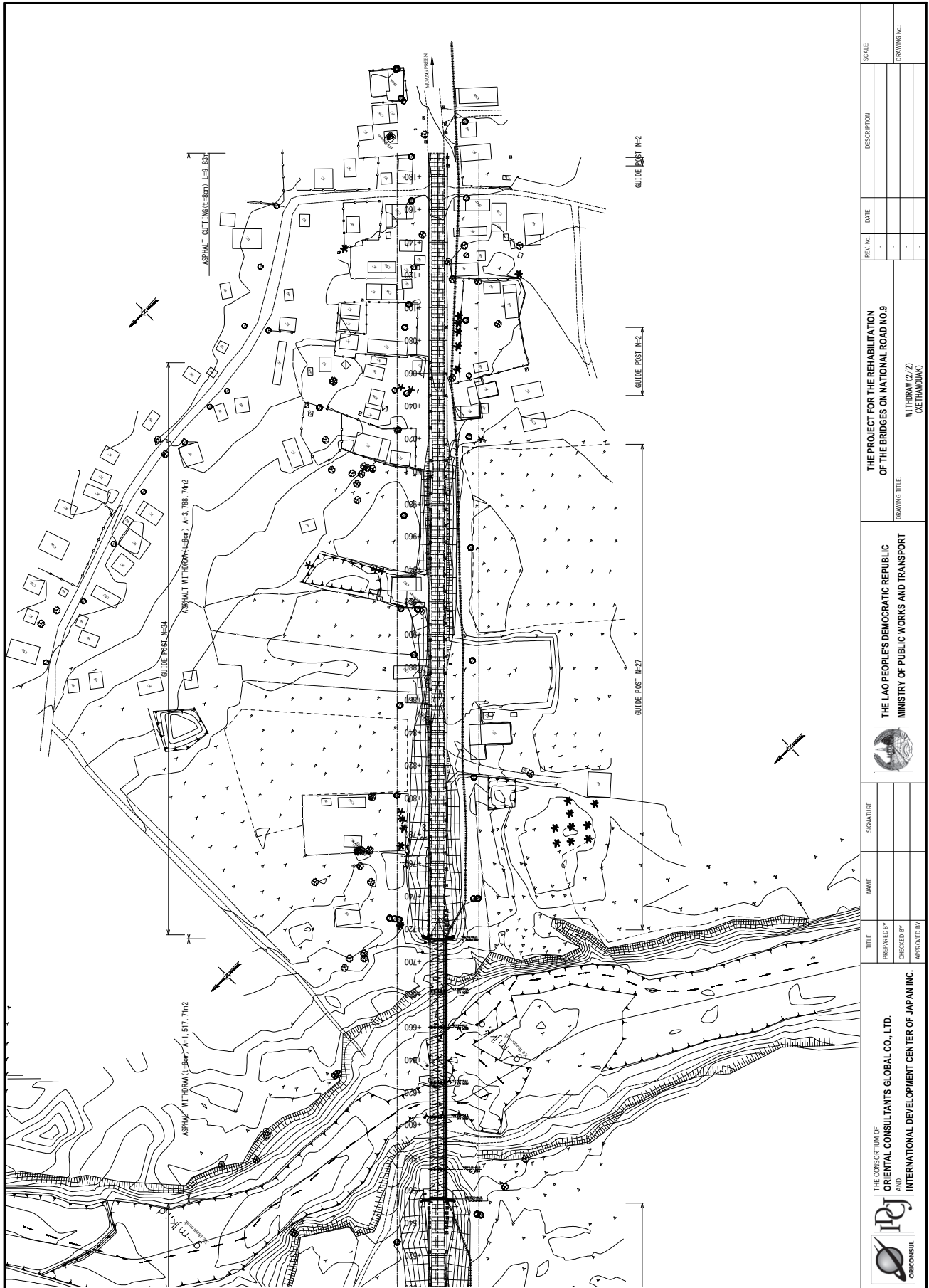
IN-SITU RECYCLING OF BASE COURSE (RR-80)



 <p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	 <p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	REV/No	DATE	DESCRIPTION	SCALE
	PREPARED BY					-	-	-
	CHECKED BY				-	-	-	DRAWING NO.
	APPROVED BY				-	-	-	

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
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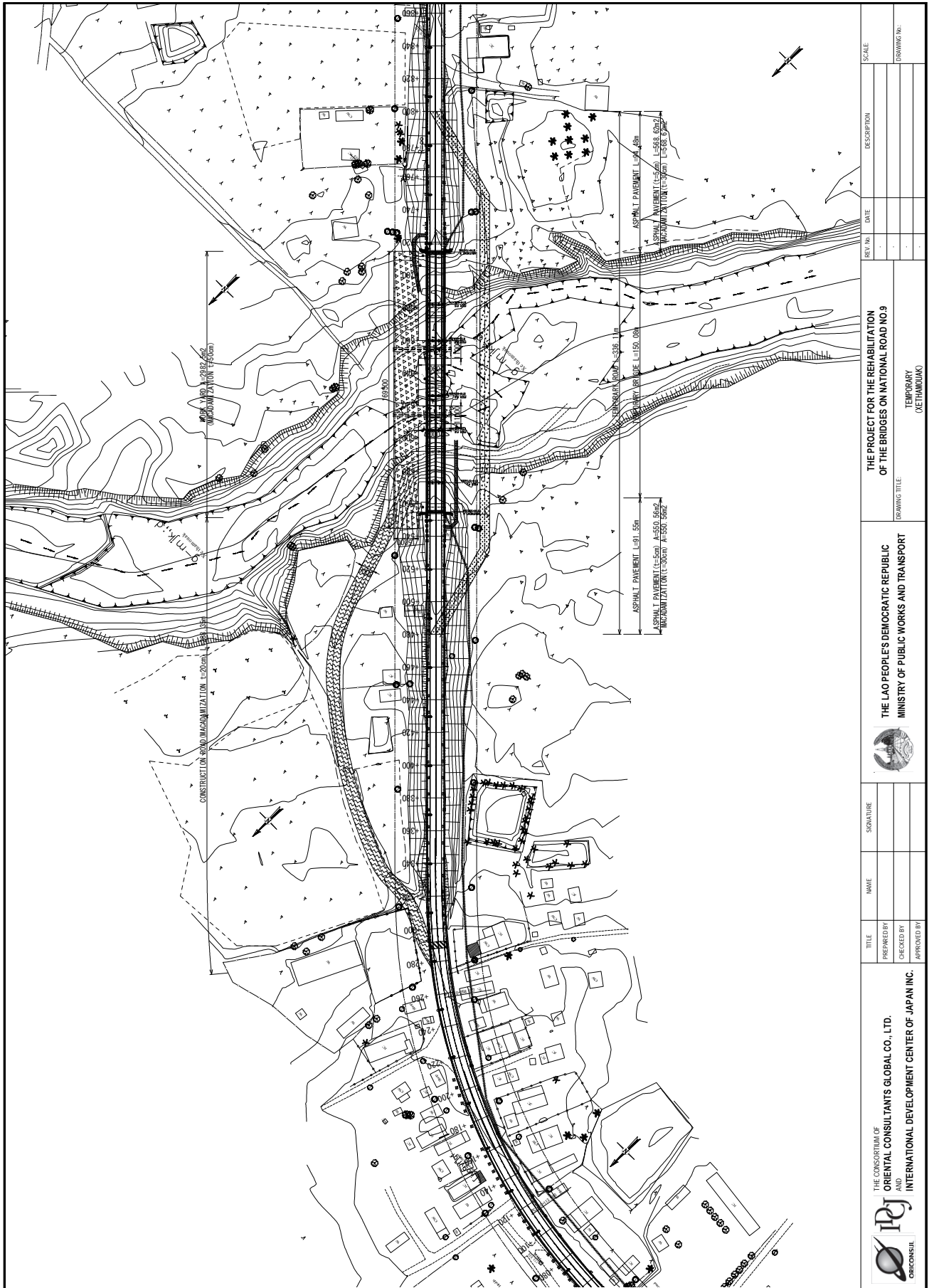


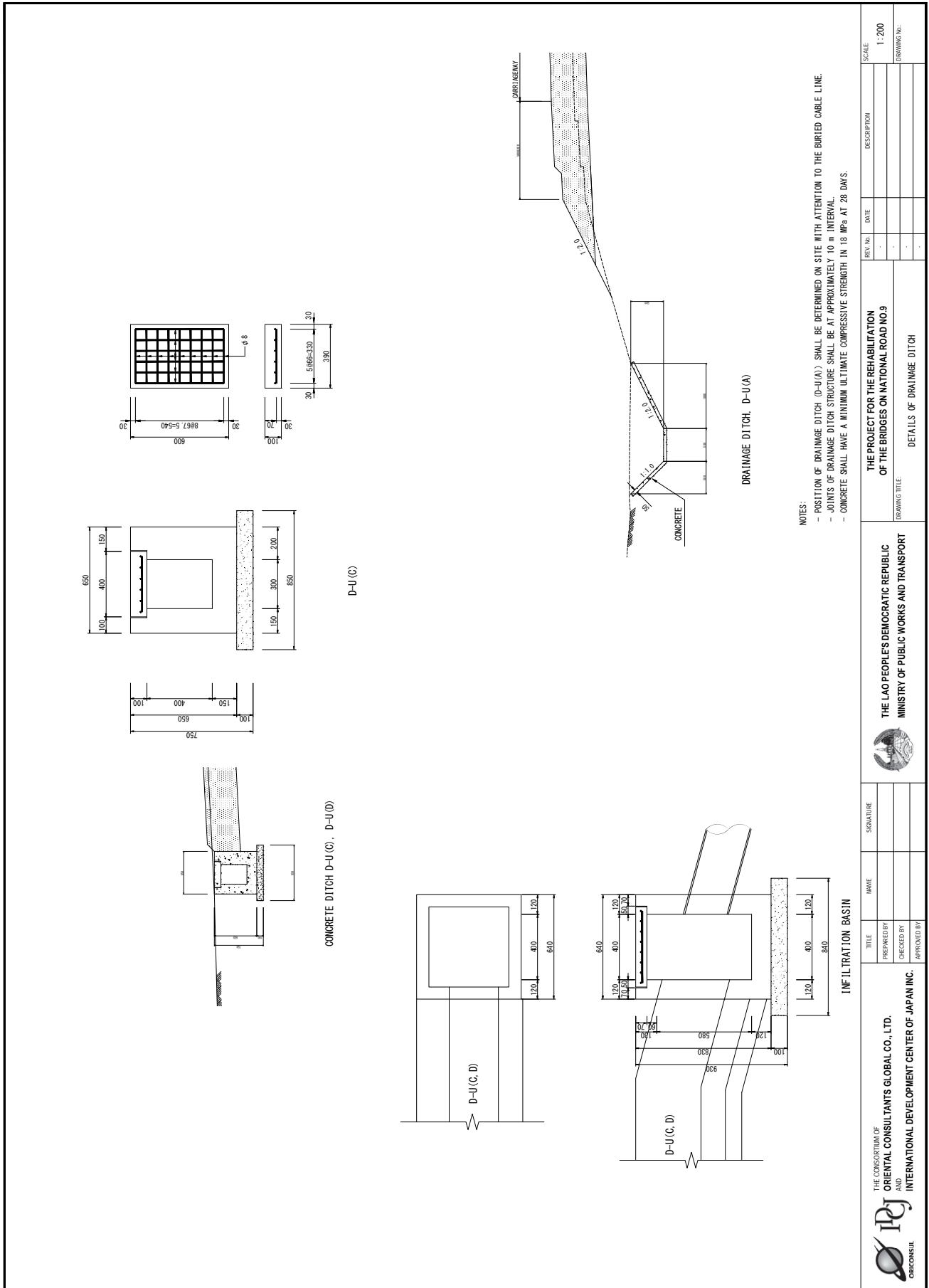
 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE	NAME	SIGNATURE	 THE LAO PEOPLE'S DEMOCRATIC REPUBLIC <b>MINISTRY OF PUBLIC WORKS AND TRANSPORT</b>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY CHECKED BY APPROVED BY					DRAWING TITLE WITHDRAWN (2/1) (AETIMOUANG)		
<b>THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9</b>								



 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE PREPARED BY CHECKED BY APPROVED BY	NAME SIGNATURE	 THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	DRAWING TITLE WITHDRAWN (2/2) (CAETHAMDUANG)	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. NO. DATE	DESCRIPTION SCALE
	DRAWING NO.						

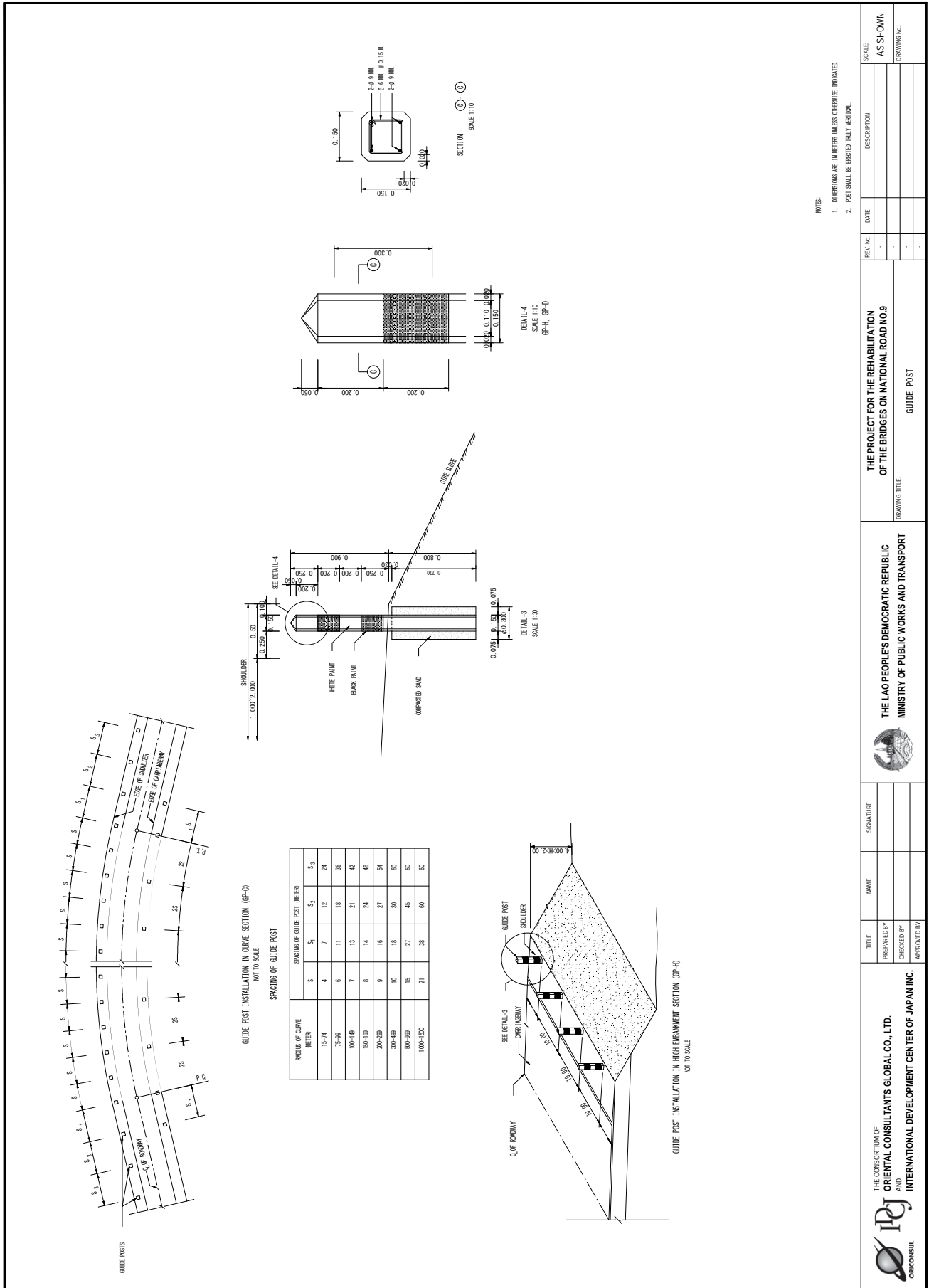
**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**



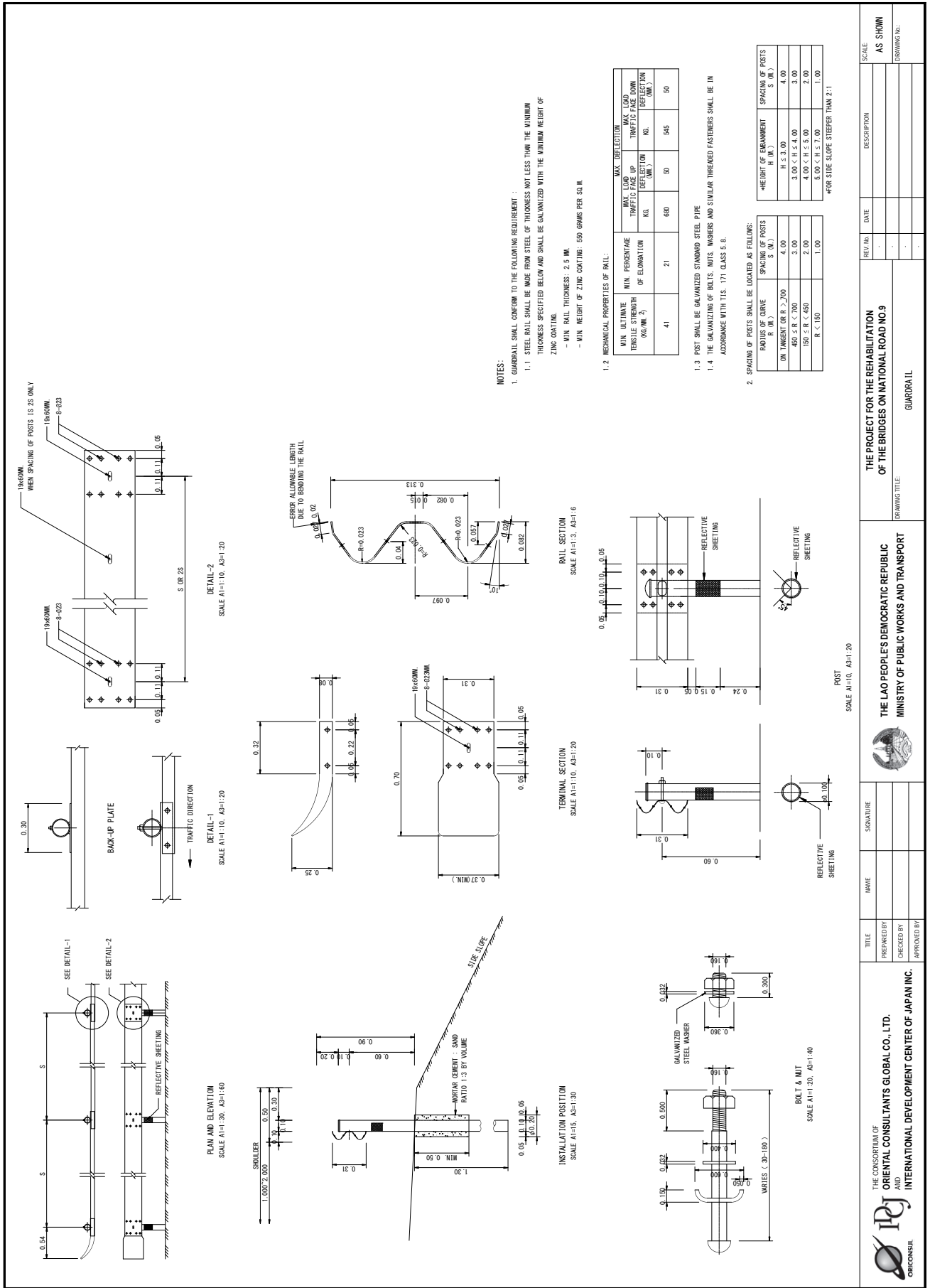




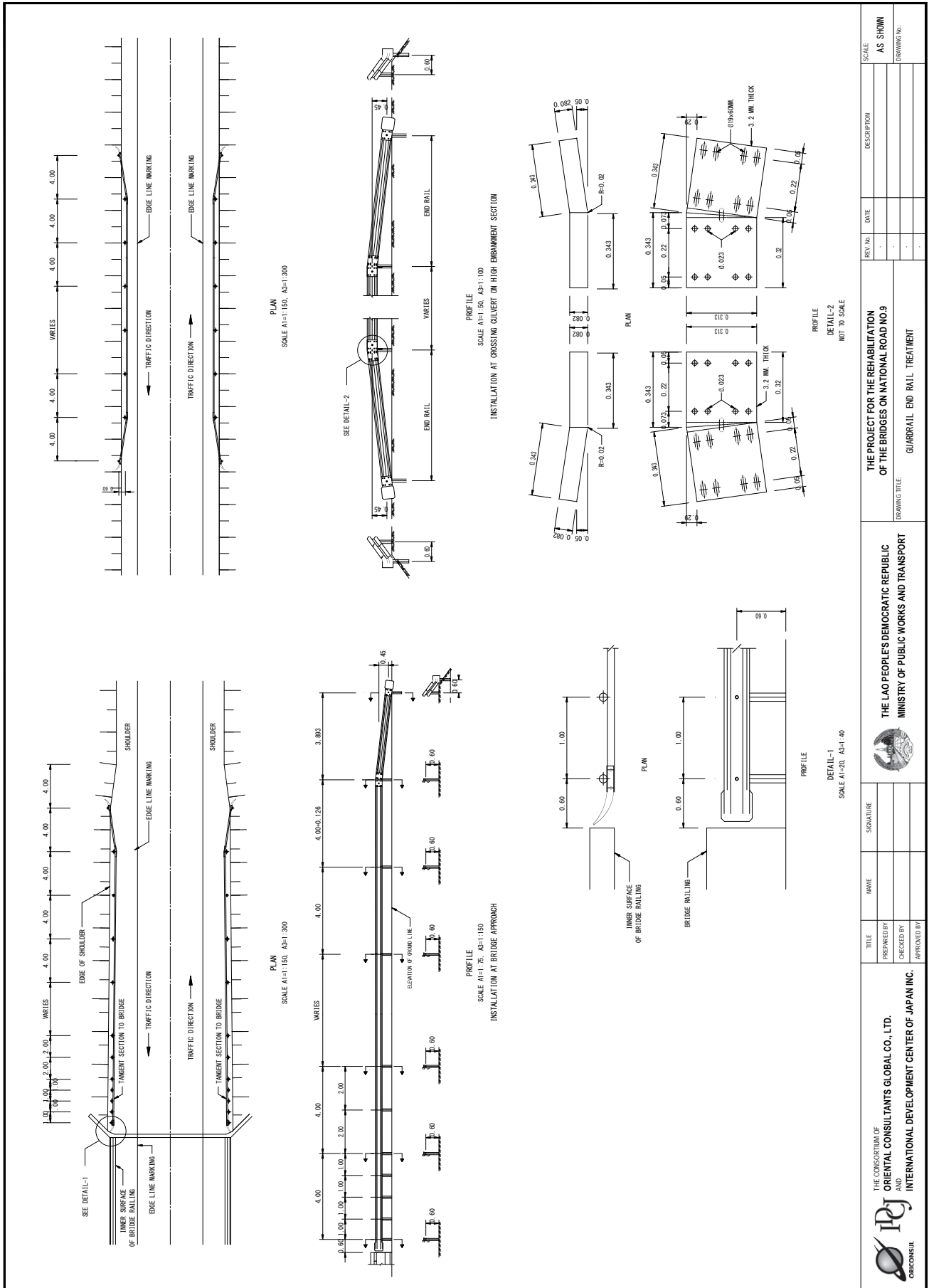
**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

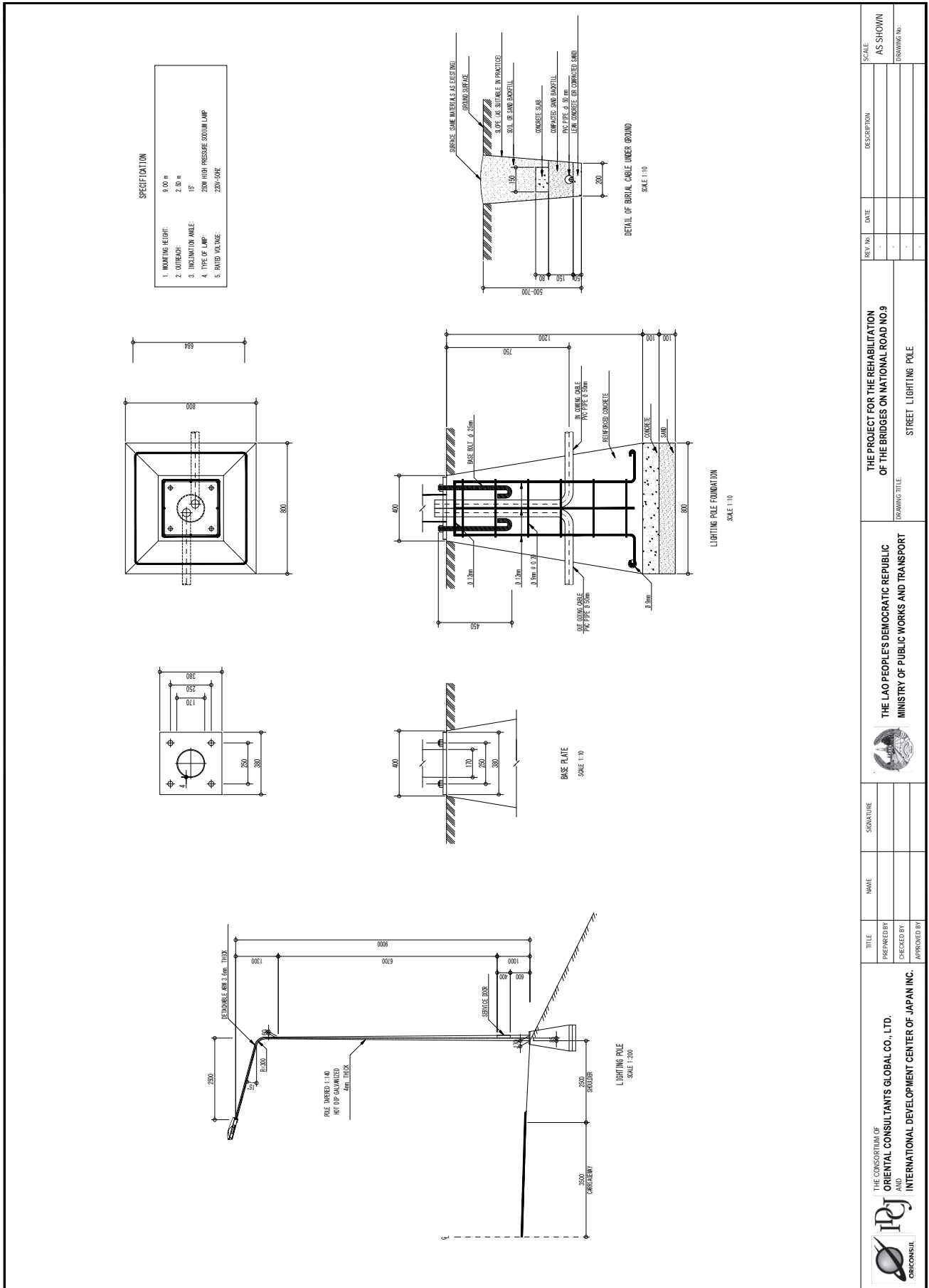







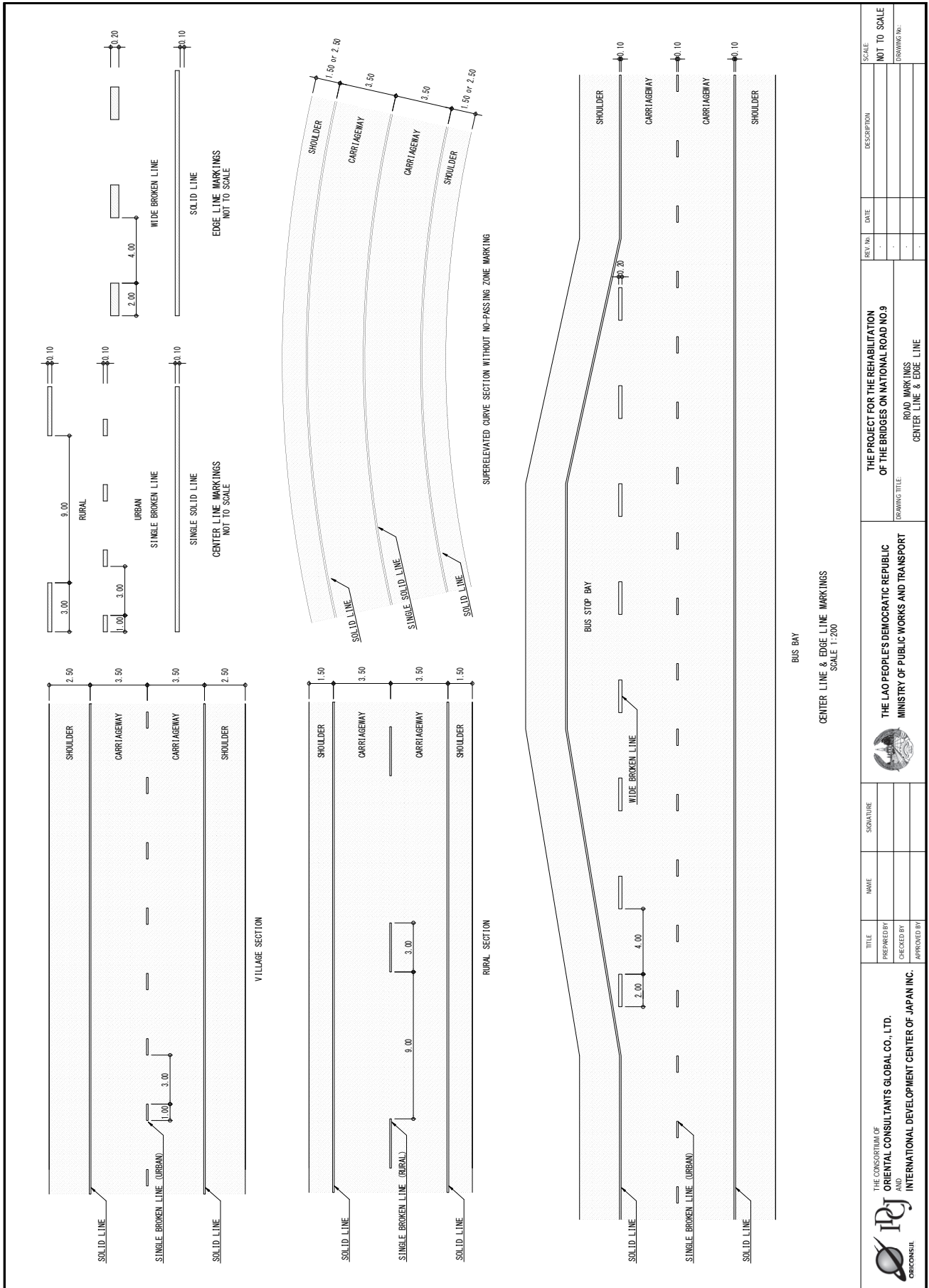
**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**





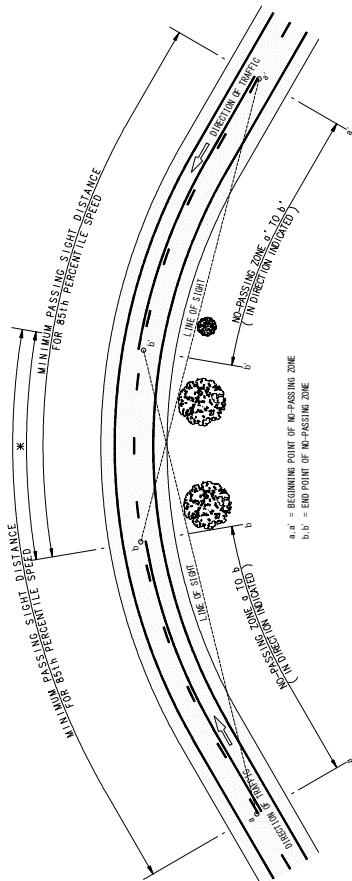


 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. No.	AS SHOWN	SCALE
	PREPARED BY		DATE		DESCRIPTION
CHECKED BY		DRAWING TITLE			DRAWING No.
APPROVED BY		STREET LIGHTING POLE			

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

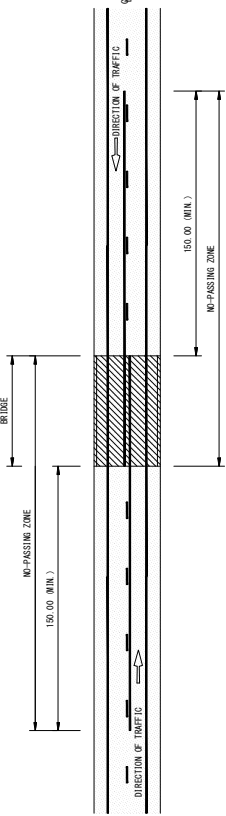


 <p>THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b></p>	TITLE	NAME	SIGNATURE	<p align="center"><b>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC</b> MINISTRY OF PUBLIC WORKS AND TRANSPORT</p> 	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY	CHECKED BY	APPROVED BY		<p align="center"><b>THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9</b></p>	-	-	-
				DRAWING TITLE		ROAD MARKINGS		DRAWING No.
				CENTER LINE & EDGE LINE				

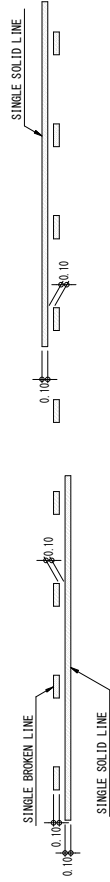


NOTE \* NO-PASSING ZONES IN OPPOSITE DIRECTIONS MAY OR MAY NOT OVERLAP, DEPENDING ON ALIGNMENT.

**NO-PASSING ZONES ON HORIZONTAL CURVES**  
NOT TO SCALE



**NO-PASSING ZONES ON BRIDGE APPROACH**  
NOT TO SCALE



**NO-PASSING ZONE MARKINGS**  
NOT TO SCALE

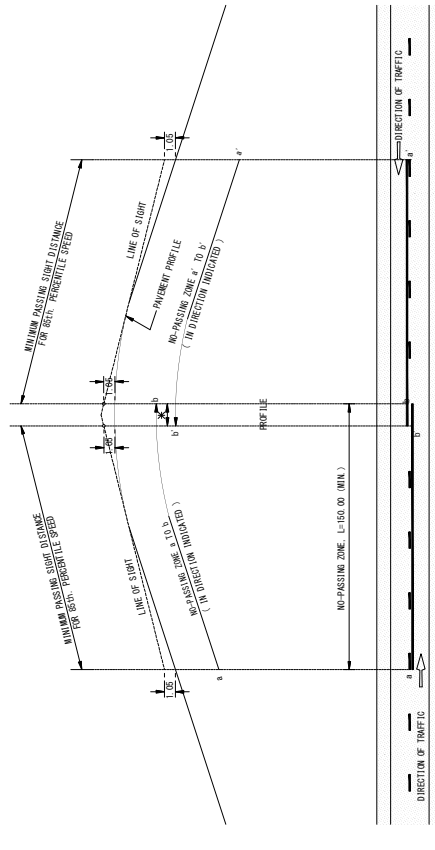
**TABLE MINIMUM PASSING SIGHT DISTANCE**

85 PERCENTILE SPEED (km/h)	MINIMUM PASSING SIGHT DISTANCE (m)
20	60
30	90
40	120
50	150
60	180
80	210

SOURCE: STANDARD DRAWING, VERTICAL/VIEWLINE ROAD PROJECT, 2000

**NOTES:**

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
2. ALL MARKINGS SHALL BE IN ACCORDANCE WITH THE DEPARTMENT OF HIGHWAYS' TRAFFIC CONTROL DEVICE MANUAL, PART 2 ISSUED BE 2533
3. PAVEMENT MARKING FOR THE ASPHALT CONCRETE AND THE REINFORCED CONCRETE PAVEMENTS SHALL BE REFLECTORIZED THERMOPLASTIC PAINT, CONFORMING TO ITS 542. PAVEMENT MARKING FOR THE SURFACE TREATMENT PAVEMENT SHALL BE REFLECTORIZED PAINT, CONFORMING TO ITS 415 AND ITS 543.
4. THIS DRAWING SHALL BE REFERENCED TO THE THAILAND STANDARD DRAWINGS (SING. NO. RS-403).

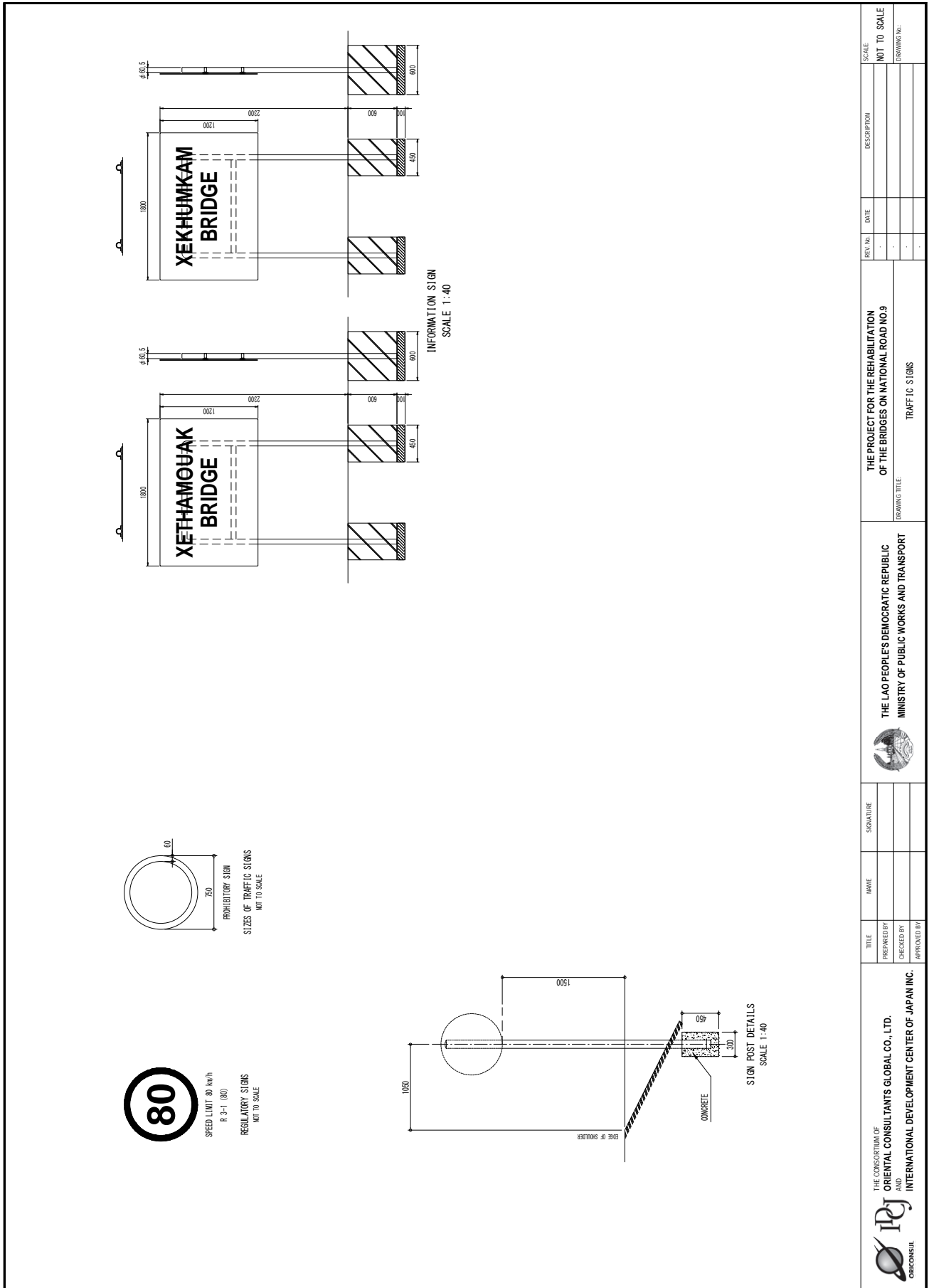


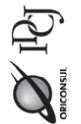
NOTE \* NO-PASSING ZONES IN OPPOSITE DIRECTIONS MAY OR MAY NOT OVERLAP, DEPENDING ON ALIGNMENT.

**NO-PASSING ZONES ON VERTICAL CURVES**  
NOT TO SCALE

<p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	<p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY	CHECKED BY	APPROVED BY		<p>THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9</p>	NOT TO SCALE	DRAWING No.	

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

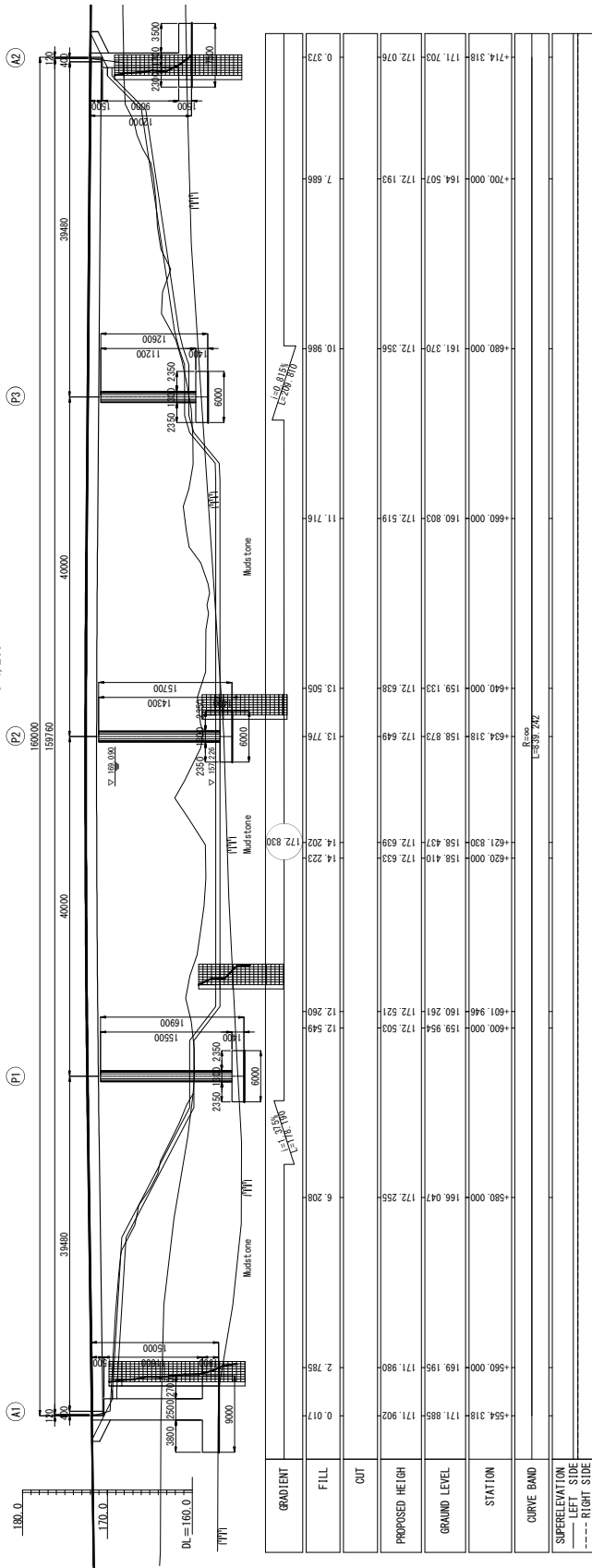


 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE	NAME	SIGNATURE	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9	REV. No.	DATE	DESCRIPTION	SCALE	
	PREPARED BY	CHECKED BY	APPROVED BY	DRAWING TITLE	. . .	. . .	. . .	. . .	
				TRAFFIC SIGNS					NOT TO SCALE
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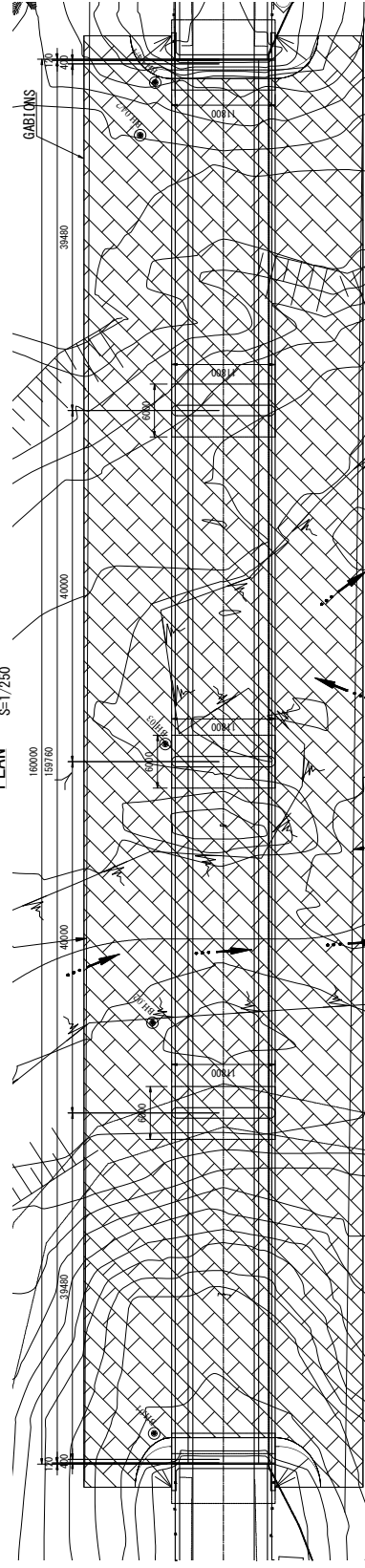
GENERAL VIEW OF THE BRIDGE (1)



XETHAMOUAK

PROFILE S=1/250



PLAN S=1/250

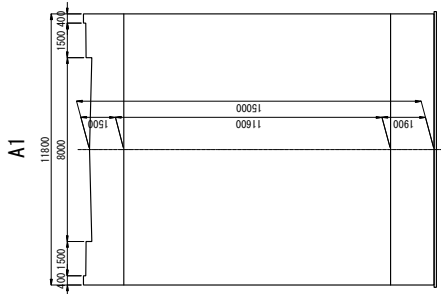


 <p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	 <p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	<p>THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9 XETHAMOUAK</p>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY	CHECKED BY	APPROVED BY			DRAWING TITLE	DRAWING No.		

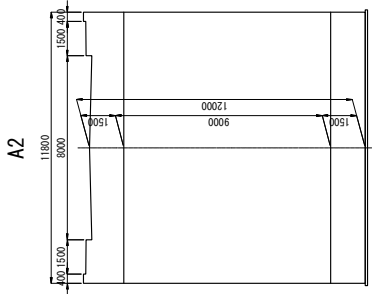


**GENERAL VIEW OF THE BRIDGE (2)**  
XETHAMOUAK

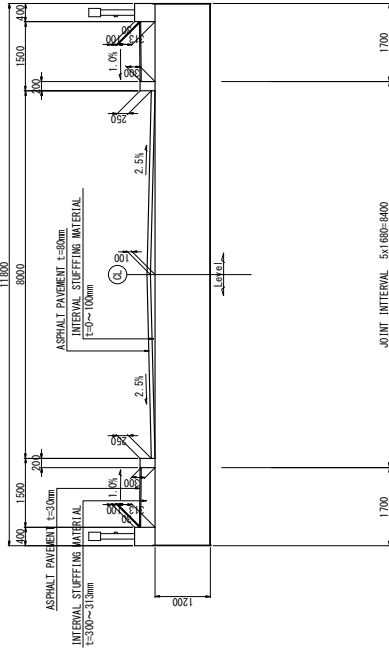
**FRONT VIEW**  
S=1/100



**ABUTMENT**

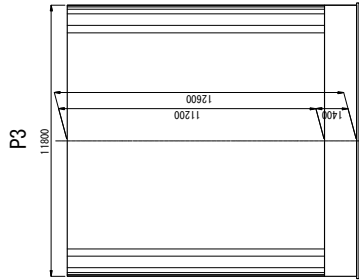
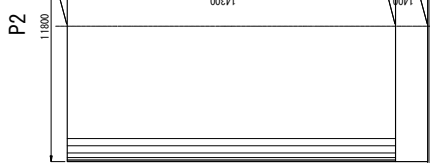
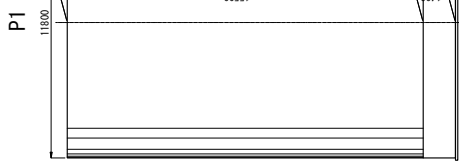


**SECTION S=1/60**



JOINT INTERVAL: 5x1800=8400

**PIER**



**DESIGN CRITERIA**

Road Class & Design Speed	Class II (R611ing), V=80km/h
Bridge Length (Span Length)	160.00m (39.48m+40.00m+40.00m+39.48m)
Bridge Width	Carriageway: 8.00m, Walkway: 1.50m
Pavement	Asphalt Concrete t=80mm
Longitudinal Gradient	+1.375% ~ -0.815%
Cross-fall of Carriageway	2.50%
Superstructure Type	4-span Continuous Composite Floor Slab Bridge
Substructure Type	Abutment, Inverted T-Type
Pier	Wall Type
Foundation Type (Bearing Stratum)	Abutment: A1, A2 : Spread Foundation (Mud Stone) Pier: P1, P2, P3 : Spread foundation (Mud Stone)
Material Strength	
Superstructure	Girder
Slab	
Surface Fecility	Curb Adjusting Concrete
Substructure	$\sigma_{28}=21\text{N/mm}^2$
Reinforcing Steel	$\sigma_{28}=21\text{N/mm}^2$ SD295 ( $\sigma_{p}=285\text{N/mm}^2$ )



THE CONSORTIUM OF  
**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**  
AND  
**INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.**

TITLE	NAME	SIGNATURE
PREPARED BY		
CHECKED BY		
APPROVED BY		

THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
MINISTRY OF PUBLIC WORKS AND TRANSPORT

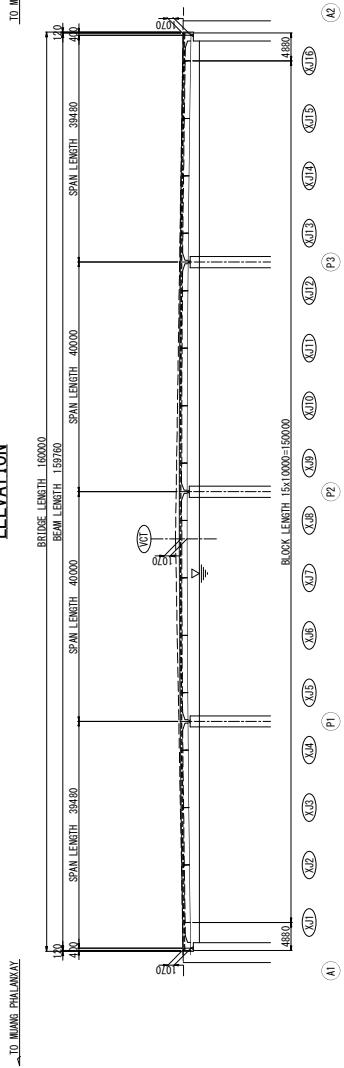
THE PROJECT FOR THE REHABILITATION  
OF THE BRIDGES ON NATIONAL ROAD NO.9  
DRAWING TITLE:  
GENERAL VIEW OF THE BRIDGE (2)  
(XETHAMOUAK)

REV. No.	DATE	DESCRIPTION	SCALE

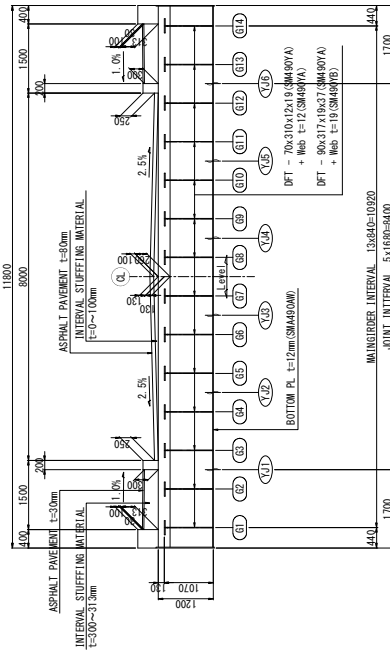
DRAWING No.

**XE THA MOUAK BRIDGE STRUCTURE GENERAL DRAWING S=1:400**  
**XETHAMOUAK**  
**REFERENCE DRAWING**

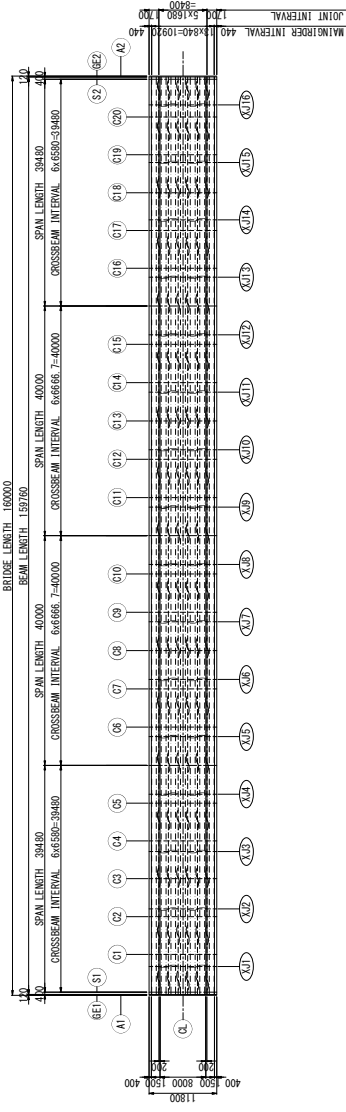
**ELEVATION**



**SECTION S=1:50**



**PLAN**



**DESIGN CONDITIONS**

FORM	COMPOSITE FLOOR SLAB BRIDGE
LIVE LOAD	TYPE-B
BRIDGE LENGTH	160.000m
BEAM LENGTH	159.760m
SPAN LENGTH	39.480m + 40.000m + 40.000m + 39.480m
WIDTH	11.800m
ROAD WIDTH	CARRIAGEWAY: 8.000m, WALKWAY: 1.500m
PLANE CURVE	STRAIGHT LINE
ROAD SURFACE	BOTTOM FL
LONGITUDINAL GRADIENT	ROAD SURFACE 2.5% FROM CENTER DOWN TO EDGE CARRIAGEWAY 1.0% FROM EDGE DOWN TO CENTER WALKWAY Level
TRANSVERSE GRADIENT	BOTTOM FL 9° 00' 00" θ = 90° 00' 00"
ANGLE OF SKEW	CARRIAGEWAY: t = 50mm, WALKWAY: t = 30mm
ASPHALT PAVEMENT	



THE CONSORTIUM OF  
**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**  
 AND  
**INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.**

TITLE	NAME	SIGNATURE
PREPARED BY		
CHECKED BY		
APPROVED BY		

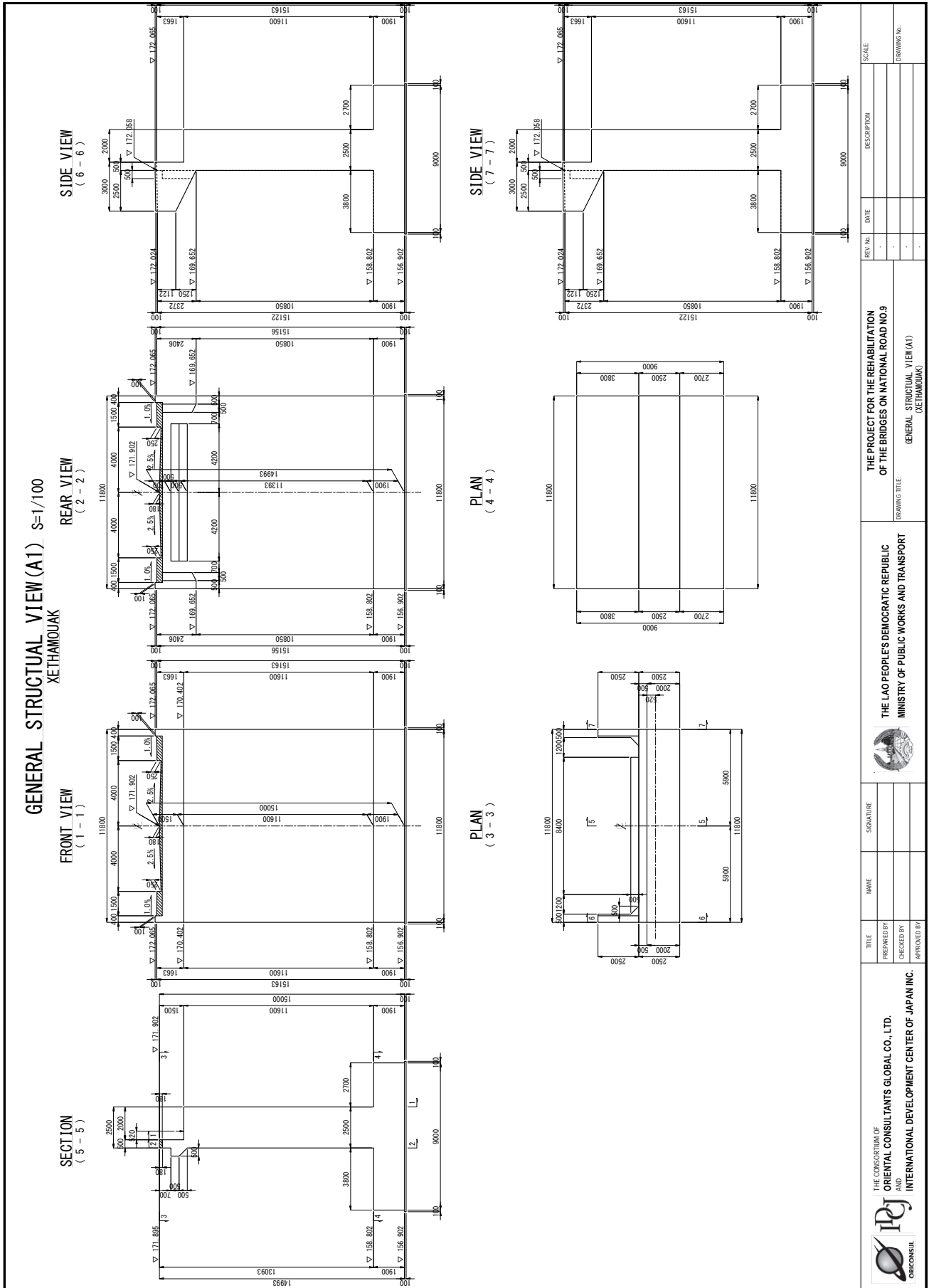


THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
 MINISTRY OF PUBLIC WORKS AND TRANSPORT

THE PROJECT FOR THE REHABILITATION  
 OF THE BRIDGES ON NATIONAL ROAD NO.9  
 DRAWING TITLE: BRIDGE STRUCTURE GENERAL DRAWING (REFERENCE DRAWING)  
 (XETHAMOUAK)

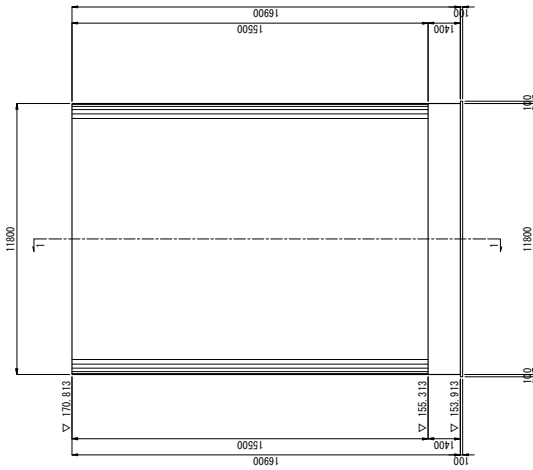
REV. No.	DATE	DESCRIPTION	SCALE

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

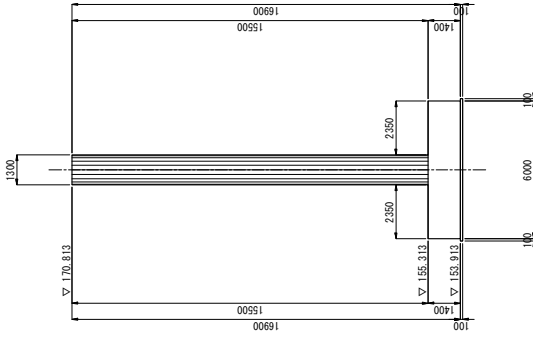


GENERAL STRUCTURAL VIEW (P1) S=1/100  
XETHAMOUAK

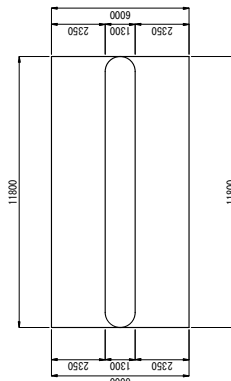
FRONT VIEW





SIDE VIEW  
(1-1)



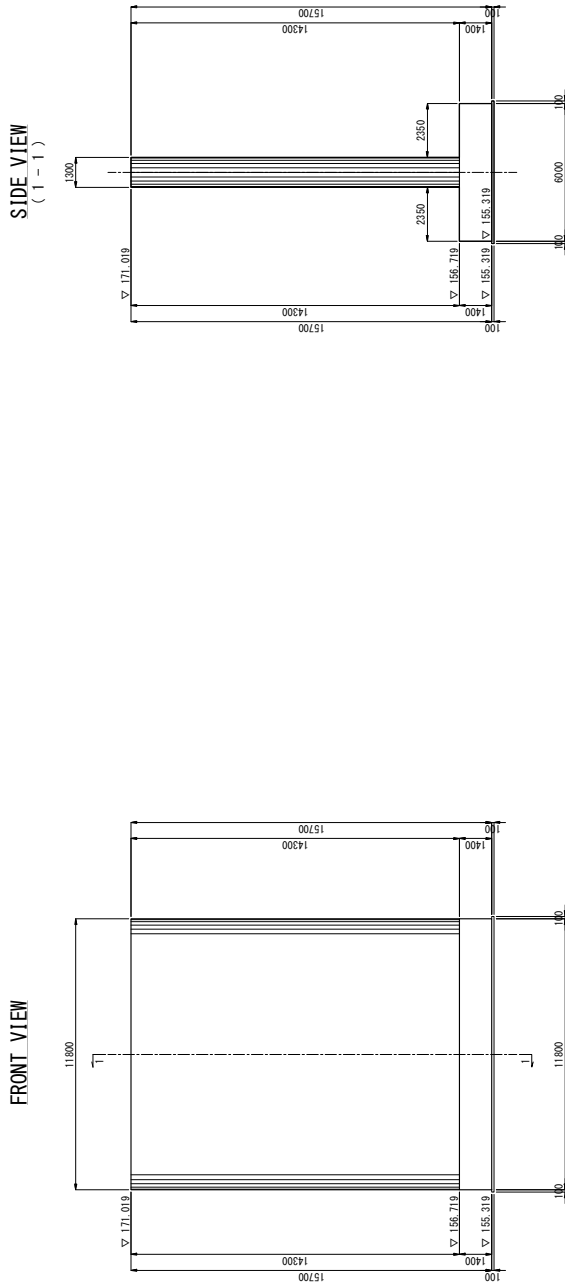
PLAN  
(2-2)





 <p>THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</p>	TITLE	NAME	SIGNATURE	 <p>THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT</p>	<p>THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9</p>	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY	CHECKED BY	APPROVED BY			DRAWING TITLE	DRAWING No.		

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

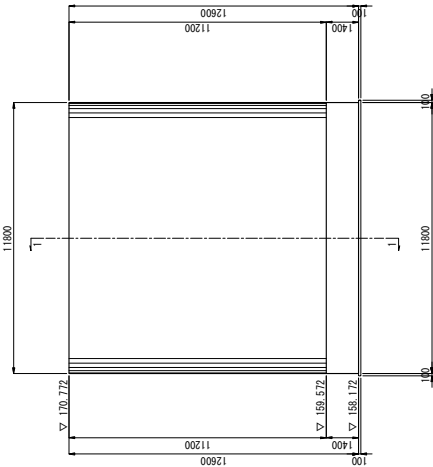
**GENERAL STRUCTURAL VIEW (P2) S=1/100  
XETHAMOUAK**



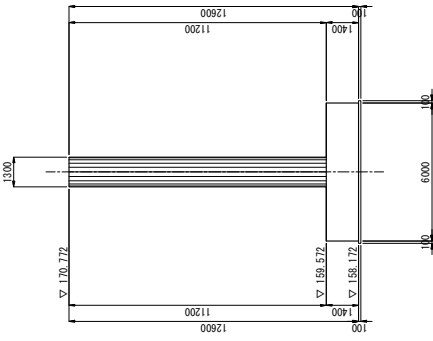
 THE CONSORTIUM OF <b>ORIENTAL CONSULTANTS GLOBAL CO., LTD.</b> AND <b>INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.</b>	TITLE	NAME	SIGNATURE	 THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9  GENERAL STRUCTURAL VIEW (P2) (XETHAMOUAK)
	PREPARED BY				
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	APPROVED BY				SCALE
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GENERAL STRUCTURAL VIEW (P3) S=1/100  
XETHAMOUAK

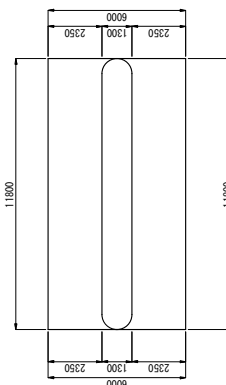
FRONT VIEW




SIDE VIEW  
(1-1)

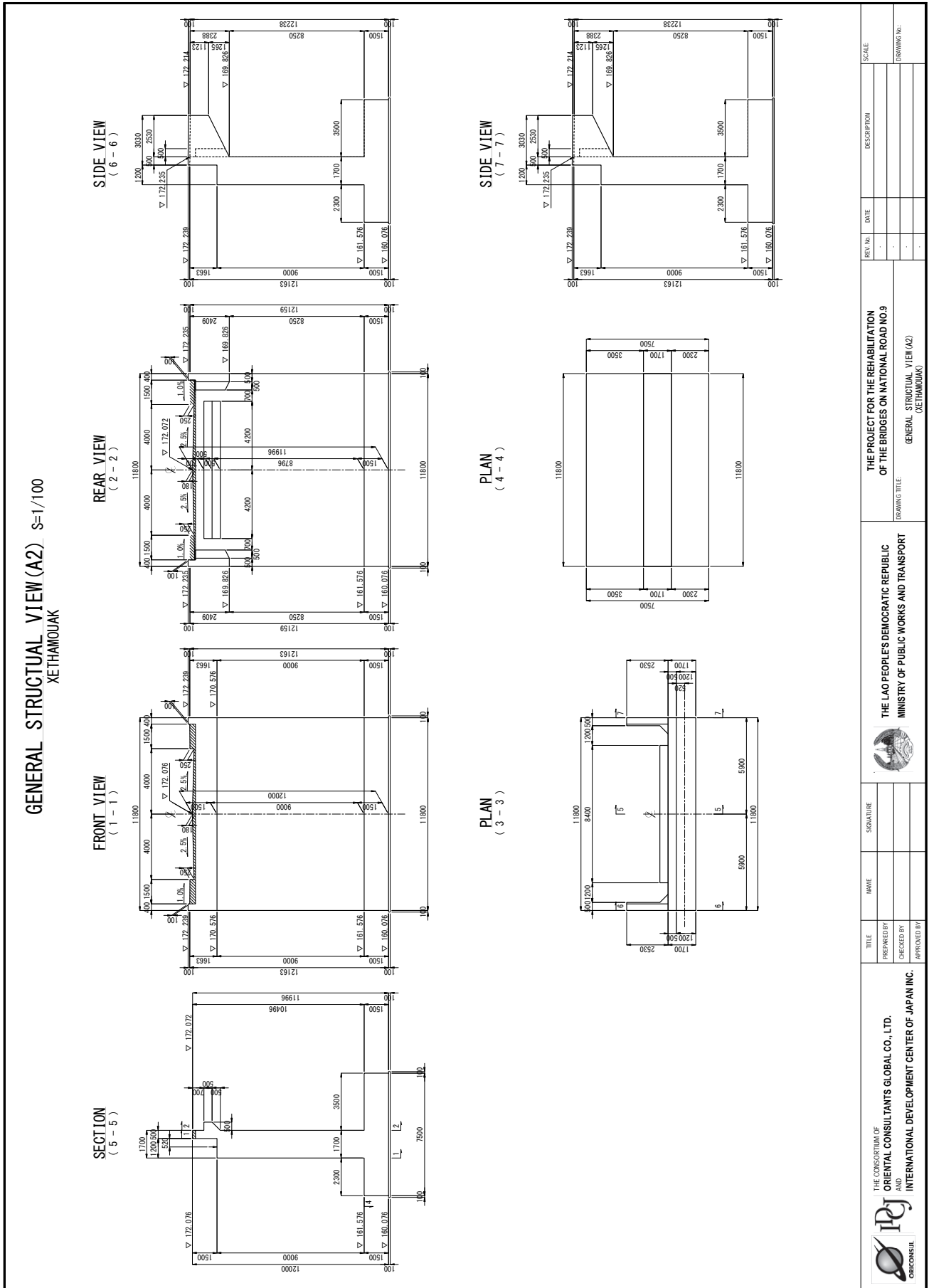


PLAN  
(2-2)



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	APPROVED BY								

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**



REV. No.	DATE	DESCRIPTION	SCALE

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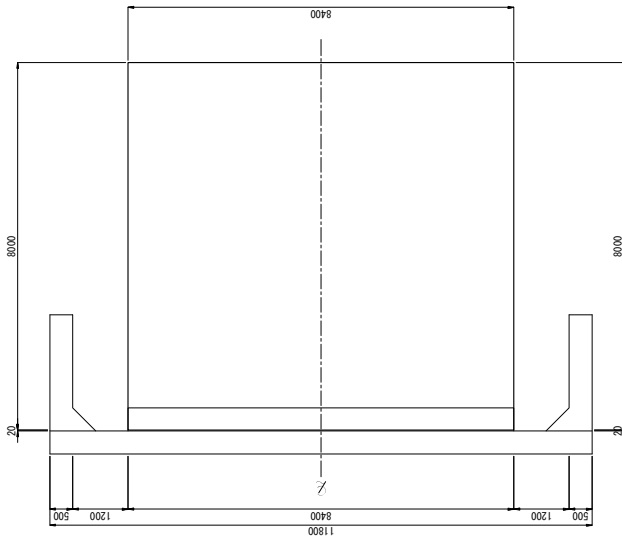
TITLE	NAME	SIGNATURE

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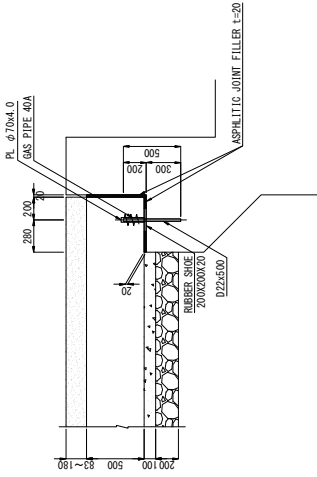


**APPROACH SLAB  
XETHAMOUAK**

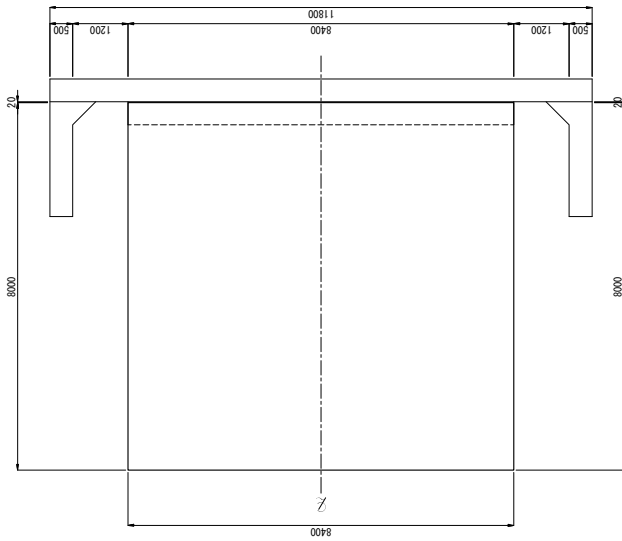
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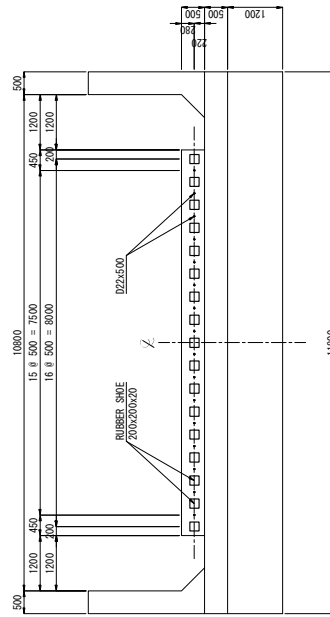
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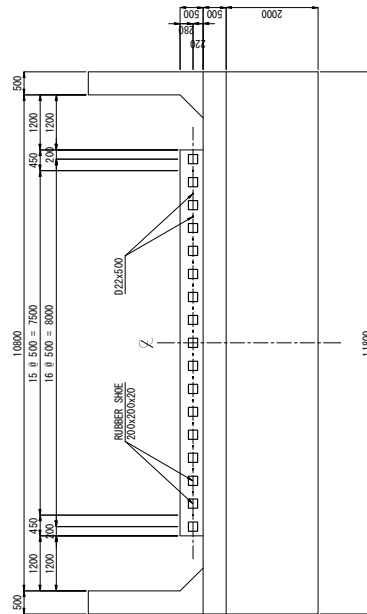
PLAN OF STRUCTURE (A1) S=1/50





PLAN OF SHOE (A2) S=1/50



PLAN OF SHOE (A1) S=1/50



 THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD. AND INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.	TITLE	NAME	SIGNATURE	 THE LAO PEOPLE'S DEMOCRATIC REPUBLIC MINISTRY OF PUBLIC WORKS AND TRANSPORT	THE PROJECT FOR THE REHABILITATION OF THE BRIDGES ON NATIONAL ROAD NO.9 APPROACH SLAB (XETHAMOUAK)	REV. No.	DATE	DESCRIPTION	SCALE
	PREPARED BY	CHECKED BY	APPROVED BY			DRAWING TITLE	DRAWING No.		

6. Soft component plan

**Preparatory Survey on the Project for Reconstruction of  
the bridges on National Road No. 9  
in Lao People's Democratic Republic**

**Soft Component (Technical Assistance) Plan**

September 2015

Oriental Consultants Global Co., Ltd.  
International Development Center of Japan, Inc.

**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
ON NATIONAL ROAD NO. 9 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC  
FINAL REPORT**

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(Basic Information)

Main Project Title	Main Project Title: The Project for Reconstruction of the Bridges on National Road No. 9
E/N Period	
Estimated cost	<u>18,400,000</u> Yen
Implementation Category	Assistance of management/ <u>Assistance of engineering</u> Assistance of self-implementation project of recipient country
Personnel assignment	<u>Yes</u> /No
Implementation period	July 2016–November 2017
Completion date (provisional)	January 2019
Advance payment	Yes/ <u>No</u>

Preparatory Survey on the Project for Reconstruction  
of the bridges on National Road No. 9  
in Lao People’s Democratic Republic

Soft Component (Technical Assistance) Plan

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## **1. Background of the Plan**

### **1.1 Background of the Plan**

Lao PDR is geographically a land-locked country and the traffic flow physically connecting neighboring countries via road transport is vital. Especially, National Road No. 9 (NR9), which is a part of the East-West Economic Corridor (EWEC), is an international trunk road connecting northeastern Thailand and the middle of Vietnam. This is an extremely important position to function as an important infrastructure serving ASEAN integration at the end of this year and the road contributing to the development of regional economic development of the central southern area in Laos.

Many bridges on NR9 were developed under assistance from the former Soviet Union and Vietnam in the 1980s and contain many structural problems that are currently coming to the surface. Xe Kum Kam and Xe Tha Mouak Bridges, the target bridges of this project, were constructed under assistance from the Czech Republic and present issues, such as residual deflection due to the deficient load-carrying capacity of the main girders according to the JICA study the “Preparatory Study for Improvement of Roads and Bridges in the Southern Region in Lao PDR” in 2010. These issues plus other bridge structural failures, such as breakage of main girders (pin bearing) in the middle piers, etc., make these bridges bottlenecks hindering smooth traffic flow. Their reconstruction was determined to be necessary in order to secure traffic safety. Under these circumstances, the Department of Road (DoR) requested grant aid for reconstruction of these two bridges.

The implementation of the project is to reconstruct both the Xe Kum Kam and Xe Tha Mouak bridges that secures safe and stable traffic flow on NR9 that will contribute to the development of infrastructure and economy of the surrounding regions along the EWEC.

### **1.2 Outline of the Project**

The aim of the project is to secure smooth traffic flow on NR9 as an international trunk road, and to instruct to improve capability of the replacement of existing bridges (detours, removal of existing bridges) and maintenance of the bridges.

#### Construction

- Replacement of the 2 existing 2 bridges (including removal of the existing bridges)

#### Procurement of material

- None

### **1.3 Inevitability of Implementation of Soft Component**

There are in total 51 bridges along NR9, 1 bridge on NR9 collapsed in 2009, and it was temporarily impossible to pass through NR9, which is along the East-West Economic Corridor. Interruption due to bridge collapse causes huge damage to economic activity in Lao. Requested by the Lao side in 2010, bridge inspection for NR9 was conducted. As a result of the inspection, it was discovered that these two bridges and others were damaged and required maintenance. Therefore, preparation of a manual and workshop for inspections was conducted under the Capacity Development Project (CaRoL), which was started in 2011. Capacity building for the counterpart is required for a long period of time. Therefore, as a follow up for CaRoL, the soft component plan, which instructs bridge replacement skills in this project, will be conducted to solve the above issue.

## **2. Goal of Soft Component**

The goal of this soft component is described below.

### Goal of Soft Component

MPWT and DPWT will acquire the knowledge of appropriate bridge inspection, planning for appropriate bridge replacement, and improving safety levels during construction.

## **3. Outcome of Soft Component**

The following outcomes are required to achieve the goal.

- MPWR/DPWT will be able to provide appropriate bridge inspection
- MPWR/DPWT will be able to make a plan to replace a bridge (construction of new bridge, removal of existing bridge)
- MPWR/DPWT will be able to secure safety during construction

## **4. Verification Methods to Accomplish Outcomes**

Verification methods to accomplish the outcomes at the end of the component are designated as follows.



**PREPARATORY SURVEY ON THE PROJECT FOR THE RECONSTRUCTION OF THE BRIDGES  
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<b>Outcome</b>		<b>Verification method</b>
(1)	MPWR/DPWT will be able to provide appropriate bridge inspection	Whether or not MPWT/DPWT can evaluate condition of existing bridge
		Whether or not MPWT/DPWT can select appropriate countermeasures
(2)	MPWR/DPWT will be able to make plans to replace bridges (construction of new bridge, removal of existing bridge)	Whether or not MPWT/DPWT can select appropriate bridge type,s
		Whether or not MPWT/DPWT can make appropriate plans for construction yard, equipment, and detours
		Whether or not MPWT/DPWT can treat existing facility, UXOs, etc., appropriately
		Whether or not MPWT/DPWT can make an appropriate waste plan.
(3)	MPWR/DPWT will be able to secure safety during construction	Whether or not MPWT/DPWT can make an appropriate safety management plan
		Whether or not MPWT/DPWT can create a safety plan for nearby residents
		Whether or not MPWT/DPWT can instruct workers

## 5. Activities of Soft Component (Input Program)

Activities of the component (input program) to accomplish the outcomes are as follows.

### **Outcome-1: MPWR/DPWT will be able to provide appropriate bridge inspection**

#### **Activity:**

- 1-1: Bridge inspection
- Instructions for evaluation of countermeasure and inspection of Xe Kum Kam and Xe Tha Mouak bridges by using manuals prepared by CaRoL.
  - Workshop for another bridge along NR9 based on above experience
- Involved group: MPWT (DPWT)
- Japanese side: Expert on bridge maintenance
- Schedule: July 2016 at detailed design (DD) stage (1.0 month)

### **Outcome-2: MPWR/DPWT will be able to make plans to replace bridges (construction of new bridge, removal of existing bridge)**

#### **Activity:**

- 2-1: Planning for replacement of bridges
- Workshop for explanation of replacement plan and construction plan in the project
  - Monitoring/finding issue/making countermeasures in each construction stage
- Involved group: MPWT (DPWT)
- Japanese side: Expert on bridge construction

Schedule

Workshop: October-November 2016 at detailed design (DD) stage (0.5 month)

Detour: November 2016 at supervision (SV) stage (0.5 month)

Supervision: November-December 2016 at supervision (SV) stage (0.5 month)

Removal of existing bridge: March 2017 at supervision (SV) stage (1.0 month)

**Outcome-3: MPWR/DPWT will be able to secure safety during construction**

**Activity:**

3-1: Safety management during construction

- On-the-job training to acquire knowhow for safety management, working with Japanese contractor
- Safety meeting with police and residents in the area to secure safety during construction

Involved group: DPWT

Japanese side: Expert of bridge construction

Schedule: February 2017, November 2017 (2.0 month)

Safety management planning: 0.5 month

Safety meeting: 2 times

**6. Procurement Program of the Implementation Resources for the Soft Component**

The component will be conducted for capacity building of the government and private sectors regarding replacement of bridges, on-the-job training style by 2 Japanese experts of the Consultant at the main project site in NR9. Further, manuals and guidelines will be prepared for applying the activities in collaboration with the counterparts of Lao PDR prior to the commencement of the main project (DD stage). Moreover, local staff, namely 1 translator (interpreter), will be employed to support the Japanese experts. Principal tasks of the Japanese experts are as follows.

(1) Bridg maintenance

- Conduct of workshop
- Training and monitoring of construction supervision
- Prepare monitoring report

(2) Pavement construction

- Conduct of workshop
- Training and monitoring of construction supervision
- Training and monitoring of safety management
- Prepare monitoring report

## **7. Implementation Schedule of the Soft Component**

Implementation schedule of the component is shown in Table-1

## **8. Output of Soft Component**

Outputs of the components are as follows.

- Workshop training report
- Monitoring report
- Work progress report
- Work completion report



## 9. Preliminary Cost Estimate of Soft Components

Preliminary cost for the component sis estimated as shown in Table-2 and Table-3.

**Table-2 Summary of the Cost Estimate**

Item	Amount			Remarks
	Kip	US\$	Yen	
Direct labor cost			5,136,000	
Direct expense		27,579.79	3,339,130	
Indirect expense			6,574,080	
<b>Total</b>		<b>27,579.79</b>	<b>15,049,210</b>	
<b>Convert to Yen</b>		<b>3,354,327</b>	<b>15,049,210</b>	
<b>Grand Total</b>			<b><u>18,403,537</u></b>	

(Exchange rate)

1.0 US\$ = 120.55 Yen

**Table-3 Breakdown of the Cost Estimate**

Item	Spec.	Qty	Unit	Unit rate			Amount			Remarks
				Kip	US\$	Yen	Kip	US\$	Yen	
1. Direct labor cost										
a. DD stage										
Bridge maintenance	Class 3	1.0	M/M			856,000			856,000	
b. SV stage										
Bridge construction	Class 3	5.0	M/M			856,000			4,280,000	
<b>Total-1</b>									<b>5,136,000</b>	
2. Direct expenses										
1) Air fare		1	LS					752,330		
2) Allowance & accommodations		1	LS					2,586,800		
3) Car rental		1	LS			9,825.19			9,825.19	
4) Local staff		1	LS			15,000.00			15,000.00	
5) Reporting		1	LS			3,000.00			3,000.00	
<b>Total-2</b>									<b>27,825.19</b>	
3. Indirect expenses										
1) Sundry expenses		1	LS					4,622,400		90% of direct labor costs
2) Technical expenses		1	LS					9,758,400		20% of direct labor + sundry expenses
<b>Total-3</b>									<b>6,574,080</b>	

## 10. Obligations of Lao PDR

Obligations of Lao PDR for the components are as follows.

- Appropriate appointment of the counterpart personnel
- Provision of training facility
- Provision of administration costs for the component

Further, the following attempts are necessary for implementation by Lao PDR for succession and further development of the outcomes after the component.

- Continuous application of the manuals and guidelines
- Technical transfer of monitoring method
- Raising the budget for road rehabilitation project
- Capacity development of the local contractor