

### 3.2.7. Construction Plan

#### (1) Implementation Policy

The implementation policies that will be introduced, taking into account that the project will be implemented under the Japan's Grant Aid Scheme, are described below:

- to maximize the procurement of local labor and materials in Nepal so as to increase employment opportunities, to facilitate technology transfer and to provide positive impact to the local economy,
- to establish good communication between His majesty Government of Nepal, the consultant and the contractor for the smooth implementation of the Project,
- to prepare a practical construction plan taking into account the local rainfall pattern, the period required for material and equipment procurement and the application of appropriate construction method,
- to adopt construction methods which do not hamper smooth traffic flow, and
- to establish coordination between the maintenance organization and agencies involved.

#### (2) Implementation Condition

##### 1) Construction Work during Rainy Season

The amount of rainfall is high around and upstream of the project site. Rainy days are more than 20 days in a month during the rainy season. Under these weather conditions, earthwork and river works can not be carried out. Hence it is necessary to consider the influence of the rainy season when making a construction schedule.

##### 2) Environmental Consideration

The consultant shall be versed on the Environmental Guideline of Nepal and related procedures for smooth implementation on the Project. The following measures are undertaken considering the environmental aspects of the Project.

- Avoid the encroaching of river bank for collection of aggregates from a river bed
- Minimize fine particles caused by construction equipment
- Avoid diverting muddy water generated during excavation towards paddy fields and other crops.

### 3) Safety and Security

Construction sites also include the handed over section that is open to the public. It is important to safeguard pedestrians and traffic during construction against accidents.

Special security measures need to be provided by the Nepal side to safeguard project personnel and property.

### (3) Scope of Works

The scope of works to be undertaken by the Japanese Government and by the His Majesty Government of Nepal is as follows:

#### 1) Japanese Government Responsibility

- Preparation of Tender Document
- Construction Works

#### 2) HMG/N Responsibility

- Periodical Maintenance of the completed road that is already handed over.

### (4) Consulting Services

Consulting services consist of two stages, namely, pre-construction stage and construction stage. Pre-construction stage consists of preparation of the tender document and tendering.

#### 1) Pre-Construction Stage

##### i) Preparation of Tender Document

After signing the Exchange of Note (E/N) pertaining to the engineering services for the construction supervision and construction between the Japanese Government and His Majesty Government of Nepal, DOR shall procure a Japanese consulting firm following Japan's Grant Aid procedure. The consultant will prepare a tender document based on the design report.

##### ii) Tendering

The consultant will assist the DOR to perform bid announcement, pre-qualification of contractors, pre-bid conferencing, tender, tender evaluation and contract negotiation.

## 2) Construction Stage

### i) Supervision of the Construction

The engineering services for the construction will begin with the issuance of a Notice to Proceed (N/P) to the Contractor by DOR.

The consultant will perform his duties in accordance with criteria and standards applicable to the construction works and shall exercise the powers vested in him as the Engineer under the contract to supervise the field works by the contractor.

The consultant within his capacity as the Engineer shall directly report to the DOR about field activities and shall issue field memo or letters to the contractor regarding the various matters, including progress, quality, safety and payment of the Project.

### ii) Staffing

The required staff and their responsibilities at the pre-construction and construction stages are described below:

**Table 3-10 Staffing for Pre-Construction Stage**

Person in Charge	Responsibility
Team Leader	All aspects of consulting services during the pre-construction stages
Tender Specialist	Preparation of tender document
Tender Assistance	Bid announcement and assistance of tender and tender evaluation

**Table 3-11 Staffing for Construction Stage**

Person in Charge	Responsibility
Team Leader	All aspects of consulting services during the construction stages
Resident Engineer	Supervision of the construction work

## (5) Quality Control Plan

The quality control plan is formulated on the basis of the design concept as shown in Table 3-12.

**Table 3-12 Quality Control Tests Plan**

Item		Test Method	Frequency	
Crushed Rock Base	Mixed material	Liquid Limit, Plastic Index	Every Mixing	
		Sieve Gradation		
		TFV soaked and TFV dry		
		Aggregate Density		
		Maximum Dry Density		
Paving	Field Density (Compaction)	Daily		
Prime Coat	Material	Bitumen	Every Truck	
		Quality Certificate Storage and Spraying Temperature		
Concrete	Material	Cement	Every Mixing	
		Water		
		Admixture		
		Fine Aggregate		Bulk Specific Gravity Dry
				Sieve Gradation, Fineness Modulus
				Clay and Friable Particles
		Course Aggregate		Bulk Specific Gravity Dry
				Flakiness Index
				Sieve Gradation
				Sodium Sulfate Soundness
	Mixing Test	Compressive strength at 7 & 28 days	Every Mixing	
	Casting	Slump(Concrete)	Daily	
		Concrete Temperature before Casting		
	Strength	Compressive strength at 7 & 28 days	Daily or > 50m <sup>3</sup>	
Re-bar	Material	Quality Certificate	Each lot	

(6) Procurement Plan

1) Construction Materials

Most of major construction materials are available in Nepal. The procurement plan for construction materials is shown in Table 3-13.

**Table 3-13 Procurement of Major Construction Materials**

Item	Nepal	Third Country	Japan
Cement			
Concrete Admixture			
Form			
Wood			
Re-bar			
Gabion Mesh			
Prime Coat			
Diesel			
Gasoline			
Oil			
Hume Pipe			

2) Construction Equipment

It is not possible to rent construction equipments in Nepal. The contractor will need to procure this equipment form another country.

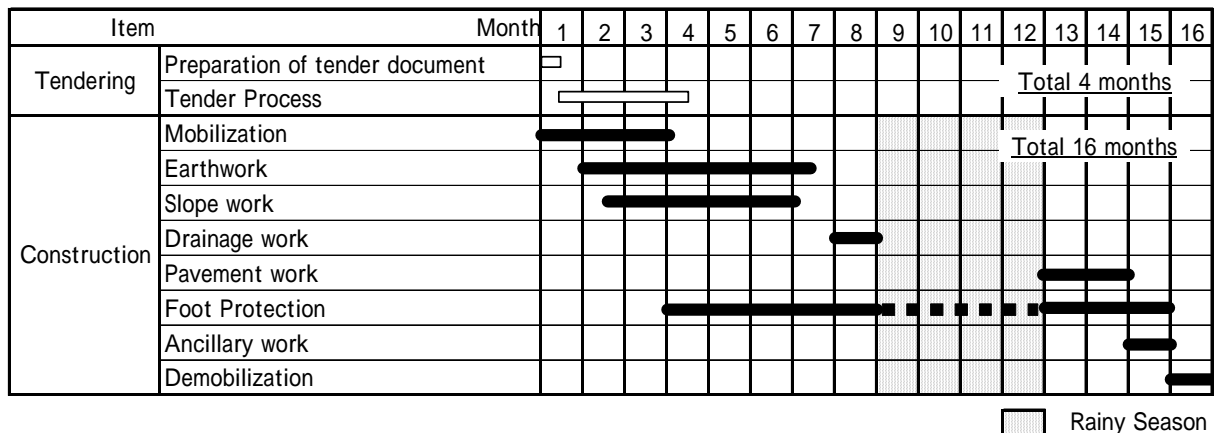
**Table 3-14 Procurement of Major Construction Equipment**

Item	Nepal	Third Country	Japan
All Equipment			

3) Implementation Schedule

The tentative implementation schedule of the project has been prepared taking into account the procedure of Japan’s Grant Aid Scheme. The implementation period is 4 months for the pre-construction and 16 months for the construction work.

**Table 3-15 Tentative Implementation Schedule**



### 3.3. Obligations of Recipient Country

The following necessary measures should be undertaken by HMG/N on condition that the Grant Aid by the Government of Japan is extended to the Project for Urgent Rehabilitation of Section IV:

- To secure quarrying of river gravel, sand and boulder around Roshi River and its tributaries,
- Acquisition of lands for spoil banks before the construction,
- To maintain the handed over road section,
- To take necessary measures in controlling entry of villagers into the site,
- To take necessary measures in securing public peace around the site,
- To bear commissions to a bank in Japan for its banking service based upon the Banking Arrangement, namely the advising commission of the “Authorization to Pay” and payment commission,
- To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed on the supply of the products and services under the verified contracts,
- To accord Japanese nationals, 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 Nepal and stay therein for the performance of their work, and
- To take necessary measures to remove sedimentary sand and gravel of islands/bars in the Roshi river to secure an adequate sectional area for river flow requirements.

### 3.4. Operation and Maintenance Plan

#### (1) Operation and Maintenance Plan

After completion of the Sindhuli Road Construction Project, the Banepa Maintenance Office will maintain the Sindhuli Road Section IV. The operation and maintenance as shown in Table 3-16 are required to keep the structures in sound condition.

**Table 3-16 Maintenance Works for Sindhuli Road Section IV**

Category	Frequency	Items to be Inspected	Scope of Works
Inspection/ Maintenance for Road	Daily Maintenance	Drainage	Cleaning deposit
		Road surface	Repairing cracks and hole
	Periodical Maintenance	Slope	Weeding
		Pavement	Repairing
		Bridge	Repainting & repairing damages
		Roshi River	Removal of Sandbank
	Emergency Maintenance	Surface	Removing / Hauling deposit
		Drainage	Cleaning deposit
		Slope	Arranging slope and replanting
		Pavement	Repairing damages
		Retaining wall	Repairing damages

Equipment procured for Sindhuli Road Construction Project Section I and IV will be used for operation and maintenance works as per the recommendations in the Basic Design study for Section I.

#### (2) Maintenance Cost

Based on the maintenance works mentioned above, the periodical maintenance cost required is estimated to be NRs 17.5 million/every year, which is equivalent to about 28 % of the annual budget allotted to the Sindhuli Road Office by DOR.

*CHAPTER 4*  
*PROJECT EVALUATION*  
*AND RECOMMENDATIONS*



## CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATIONS

### 4.1. Project Effects

With the completion of the Sindhuli Road, many positive effects will be produced. This rehabilitation Project to restore Section IV and to reinforce disaster prevention will enhance the lasting practical use of the Sinduli Road and its effects.

#### (1) Direct Effects

The direct effect of the opening of Section IV will be to reduce the travel time between Dhulikel and Nepalthok and to enable passage of vehicles throughout the year. Comparison of travel times between before and after opening of Section IV is shown in Table 4-1.

**Table 4-1 Travel times before and after opening of Section IV**

Section	Before Opening	After Opening
Bhakundebesi - Dhulikel	3 hours by vehicle (Only dry season)	45 minutes by vehicle
Nepalthok - Bhakundebesi	1 day by foot	1 hour by vehicle

A bus services of 2–4 buses an hour (1 direction, 32 buses per 12 hour, November 2002), has been operated on the partially open section between Dhulikel and Bhakundebesi, and is now an important means of travel for local inhabitants. After opening of the whole of Section IV, it is anticipated that a similar bus service will be operated between Bhakundebesi and Dhulikel.

#### (2) Indirect Effects

Opening of the Sindhuli Road Section IV is expected to:

- expand the sphere of the market economy, encouraging cash crop plantations in areas where market accessibility is expected to be improved due to opening of the project road;
- secure the supply of essential provisions such as salt, rice and oil, to the hilly areas; the supply is unstable at present using such means as porters or animals due to lack of vehicular access;
- reduce the burden of labour on women and children in the transportation of materials such as agriculture products, fuel, feed for domestic animals, and so on;

- enable spherical area development in the areas neighboring the project road with the opening of access roads and bridges connecting to the former in the long term;
- enhance the welfare of rural people with the opening of hospitals and public facilities in areas where none of these facilities currently exist.

### (3) Beneficiary Population

The direct and indirect beneficiary population for the Sindhuli Road Project is estimated to be about 5.54 million. This is equivalent to the estimated total population of the area along the Sindhuli Road and the eastern area of the Kathmandu valley.

## 4.2. Recommendations

As mentioned above, the Sindhuli Road Construction Project will produce great positive impact on the nation and will enhance the supply of basic human needs to the surrounding areas. Therefore, it is recommendable that the Project for Urgent Rehabilitation of Section IV, which will promote the early connection of the whole of the Sindhuli Road, should be implemented under the Japanese Grant Aid Scheme. However, in order to ensure the permanent usage and maintenance of the Sindhuli Road, it is recommended that HMG/N should undertake the following works:

- Maintain the slope protection along the Sindhuli Road in good condition by taking necessary measures, such as prohibition of illegal quarrying of gravel and sand.
- Promote the quarrying of river gravel, sand and boulder on the upstream side of causeways
- Take necessary measures to remove sedimentary sand and gravel of islands/bars in the Roshi river to secure an adequate sectional area for river flow requirements.

## *APPENDICES*

*1. Member List of the Study Team*

*2. Study Schedule*

*3. List of Parties Concerned in the Recipient Country*

*4. Minutes of Discussion*

*5. Tentative Cost Estimation Born by the HMG/N*

*6. Engineering Supporting Data*

## Appendices 1 Member List of the Study Team

(1)Field Survey From 20 Nov.2002 To 4 Dec.2002

Position	Name	Occupation
Leader	Mr. Jyuichi TANAKA	Deputy Director, Office of Technical Coordination and Examination, Grant Aid Management Department, JICA
Technical Advisor	Mr. Shigetada KAYUMI	Technical Advisor for Implementation of Grant Aid Project, JICA
Chief Consultant / Road Planner	Mr. Yoshihisa YAMASHITA	Nippon Koei Co., Ltd.
Proof Design Expert	Mr. Koichi TANUMA	Nippon Koei Co., Ltd.
River / Hydrology Planner	Mr. Tatuya MIYAZATO	Nippon Koei Co., Ltd.
Road Designer / Cost Estimator & Construction Planner	Mr. Koichiro SEKI	Nippon Koei Co., Ltd.

(2)Explanation of Draft Basic Design Study Report From 6 Feb 2003 To 13 Feb.2003

Position	Name	Occupation
Chief Consultant / Road Planner	Mr. Yoshihisa YAMASHITA	Nippon Koei Co., Ltd.

## Appendices 2 Study Schedule

### (1)Field Survey

	Date	Movement	Activities
1	20 Nov. Wed	(A) Osaka Kathmandu	Trip
		(C, D,E) Tokyo Bangkok	Trip
2	21 Thu.	(C, D,E) Bangkok Kathmandu	Trip
		(A, B, C, D,E)	Courtesy call with EOJ & JICA
3	22 Fri.	(A, B, C, D,E)	Courtesy call with DOR
4	23 Sat.	(A,B,C,D,E)	Field Survey
5	24 Sun.	(A,B,C,D,E)	Data Analysis
6	25 Mon	(A,C,D,E)	Discussion with DOR
7	26 Tue	(A, B,C,D,E)	Signing on M/D Report to EOJ & JICA
8	27 Wed	(A,B)	
		(C,D,E)	Site Survey, Data Collection & Analysis
9	28 Thu.	(A,B)	
		(C,D,E)	Data Collection & Analysis
10	29 Fri.	(A) Kathmandu Bangkok	Trip
		(B)	
		(C,D,E)	Site Survey, Data Collection & Analysis
11	30 Sat.	(A) Bangkok Tokyo	Trip
		(B)	
		(C,D,E)	Data Collection & Analysis
12	1 Dec. Sun.	(B)	
		(C,D,E)	Data Collection & Analysis
13	2 Mon	(B)	
		(C,D,E)	Data Collection & Analysis
14	3 Tue	(B) Kathmandu Bangkok	Report to EOJ & JICA, Trip
		(C,D,E) Kathmandu Bangkok	Report to JICA, Trip
15	4 Wed	(B) Bangkok Singapore	Trip
		(C,D,E) Bangkok Tokyo	Trip

Note : (JICA) A : Mr.Tanaka, B : Mr.Kayumi  
(Consultant) C : Mr.Yamashita, D: Miyazato, E: Mr.Seki

(2)Explanation of Draft Basic Design Study Report

	Date	Movement	Activities
1	6 Feb. Thu.	(C)Tokyo Bangkok	Trip
2	7 Feb. Fri.	(C)Bangkok Kathmandu	Trip Courtesy Call to Embassy of Japan, JICA Office Courtesy Call to Department of Roads(DOR)
3	8 Feb. Sat.	(C)	Site survey
4	9 Feb. Sun.	(C)	Document Preparation
5	10 Feb. Mon	(C)	Discussion with DOR Obtaining the letter of agreement to the Draft Report from DOR
6	11 Feb. Tue	(C)	Document Preparation
7	12 Feb. Wes.	(C)Kathmandu Bangkok	Report to Embassy of Japan, JICA Office Trip
8	13 Feb. Thu.	(C) Bangkok Tokyo	Trip

Note : (Consultant) C : Mr.Yamashita

### Appendices 3 List of Parties Concerned in the Recipient Country

Embassy of Japan	Yoshiyuki TOYOGUCHI	Second Secretary
JICA Nepal Office	Eiichiro MITOMA	Resident Representative
	Tadao IMAI	Deputy Resident Representative
	Katsuji MIYATA	Assistant Resident Representative
JICA (DOR)	Naoki SASAJIMA	JICA Expert
DOR	M.G.Maleku	Director General
	K.P.Pokharel	Deputy Director General
	Suresh Regmi	Deputy Director General
	T.L.Yadav	Deputy Director General
	P.J.Shah	Sinner Divisional Engineer
	Wagle	Sinner Divisional Engineer
	B.M.Dongol	Sinner Divisional Engineer
	B.S.Rana	Project Manager

## Appendices 4      Minutes of Discussion

(1)Field Survey

(2)Explanation of Draft Basic Design Study Report



**Minutes of Discussions  
on the Basic Design Study  
on the Project for Urgent Rehabilitation of Sindhuli Road (Section IV)  
in the Kingdom of Nepal**

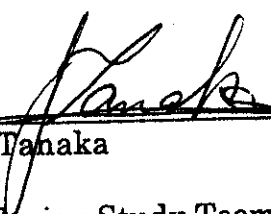
In response to a request from His Majesty's Government of Nepal (hereinafter referred to as "HMG/N"), the Government of Japan decided to conduct a Basic Design Study on the Project for Urgent Rehabilitation of the Sindhuli Road (Section IV) (hereinafter referred to as "this Project"), and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

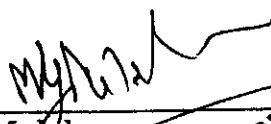
JICA sent to the Kingdom of Nepal (hereinafter referred to as "Nepal") the Basic Design Study Team (hereinafter referred to as "the Team"), which was headed by Mr. Juichi Tanaka, the Deputy Director of the Office of Technical Coordination and Examination, the Grant Aid Management Department, JICA, and is scheduled to stay in the country from November 20 to December 3, 2002.

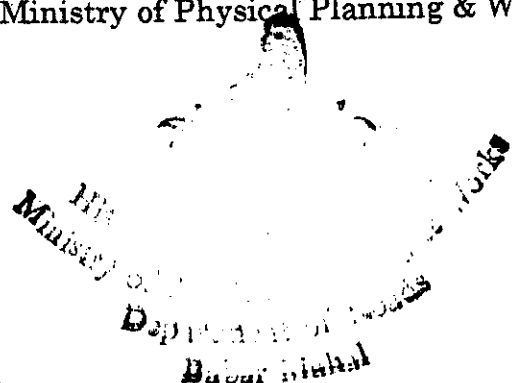
The Team held discussions with the officials concerned of HMG/N and conducted a field survey at the study area.

In the course of discussions and field survey, both sides confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Kathmandu, November 26, 2002

  
\_\_\_\_\_  
Juichi Tanaka  
Leader  
Basic Design Study Team  
Japan International Cooperation  
Agency

  
\_\_\_\_\_  
M. G. Maleku  
Director General  
Department of Roads  
Ministry of Physical Planning & Works

  
DIRECTOR-GENERAL  
Ministry of Physical Planning & Works  
Department of Roads  
Babur Bhattal

## ATTACHMENT

### 1. Objective of this Project

The Project for Construction of the Sindhuli Road (Section IV:Nepalthok-Dhulihel), has been implemented under the Japan's Grant Aid scheme. But before its completion, this section was damaged by the floods, scour of the Rosi River, landslides and etc., which was caused by incessant rain from July 21st to 23rd, 2002.

The objective of this Project is to rehabilitate the damages in the Sindhuli (Section IV) Road and complete the Section IV.

### 2. Project site

The site of this Project is shown in Annex-1.

### 3. Responsible and Implementing Organizations

3-1. The Responsible Ministry is the Ministry of Physical Planning & Works (MPPW).

3-2. The Implementing Agency is the Department of Roads (DOR), MPPW.

The organization charts of MPPW and DOR are shown in Annexes 2-1 and 2-2.

### 4. Items requested by HMG/N

After discussions with the Team, the following components were finally requested by the Nepalese side;

- (1) Rehabilitation of the Sindhuli Road (Section IV) damaged by the heavy rain in July 2002.
- (2) DBST works for remaining sections of the Sindhuli Road (Section IV).
- (3) Completion of the Sindhuli Road (Section IV)

JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.



## 5. Japan's Grant Aid Scheme

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

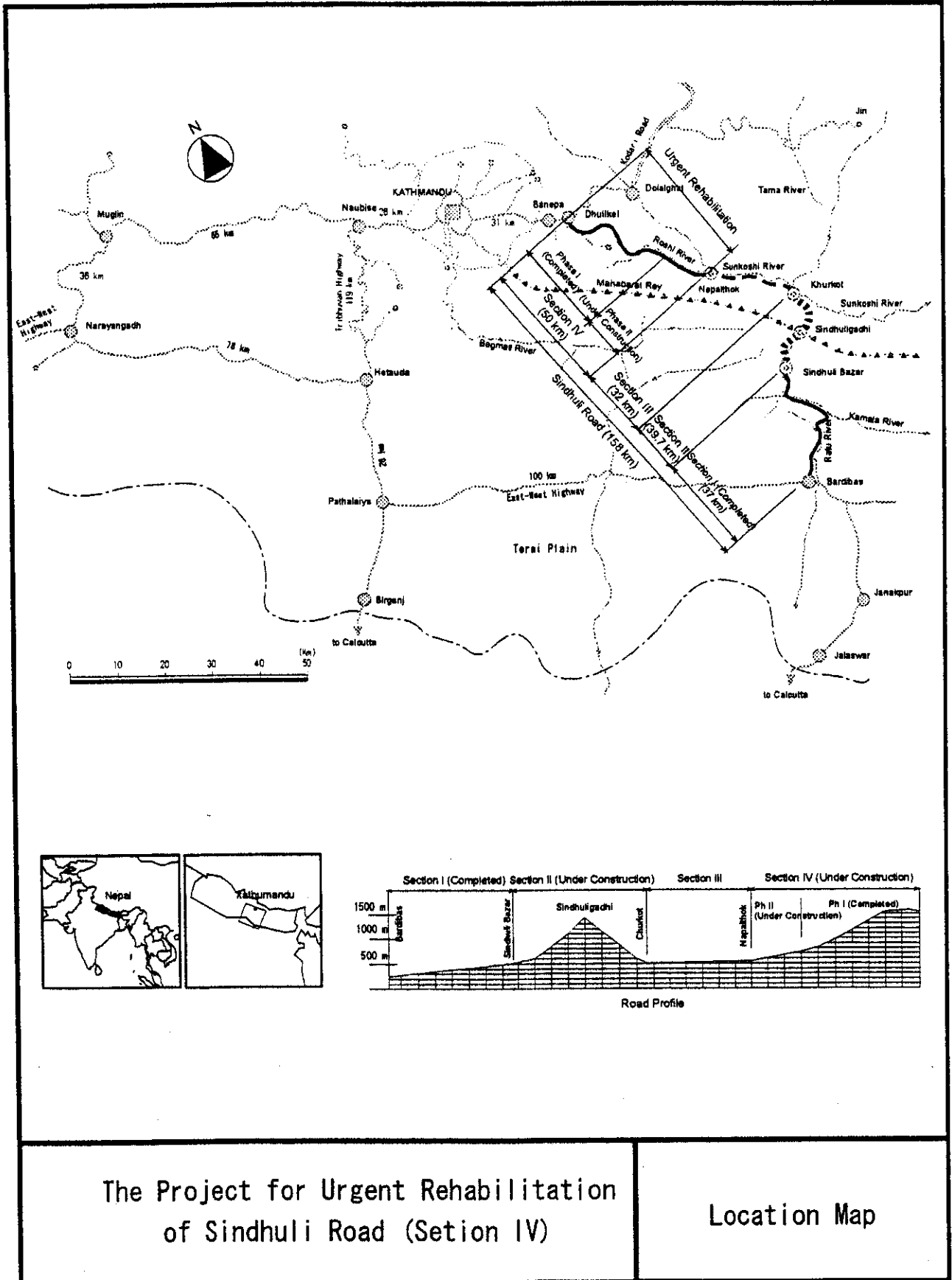
## 6. Schedule of the Study

- 6-1. The consultant will proceed to further studies in Nepal until December 3, 2002.
- 6-2. JICA will prepare the draft final report in English and dispatch a mission to Nepal in order to explain its contents in the middle of January, 2003.
- 6-3. In case that the content of the report is accepted in principle by HMG/N, JICA will complete the final report and send it to HMG/N by March, 2003.

## 7. Other Relevant Issues

- 7-1. The Nepalese side shall provide necessary data and information for the study.
- 7-2. The Nepalese side shall secure personnel and budgetary arrangement necessary for this Project on condition that the Japan's Grant Aid is extended to this Project.
- 7-3. The Nepalese side shall take all possible measures to secure safety of the concerned people during the study and implementation of this Project on condition that the Japan's Grant Aid is extended to this Project.
- 7-4. The Nepalese side shall rehabilitate damages in the Section IV, Phase 1 except the serious damages locating at Sta. 19+730, Sta. 21+030 and Sta. 22+900 along Rosi River, which requires urgent rehabilitation.
- 7-5. Both sides shall take necessary procedures to modify the design, the agreement and the contract for the Project for Construction of the Sindhuli Road (Section IV, Phase 2) as soon as possible.



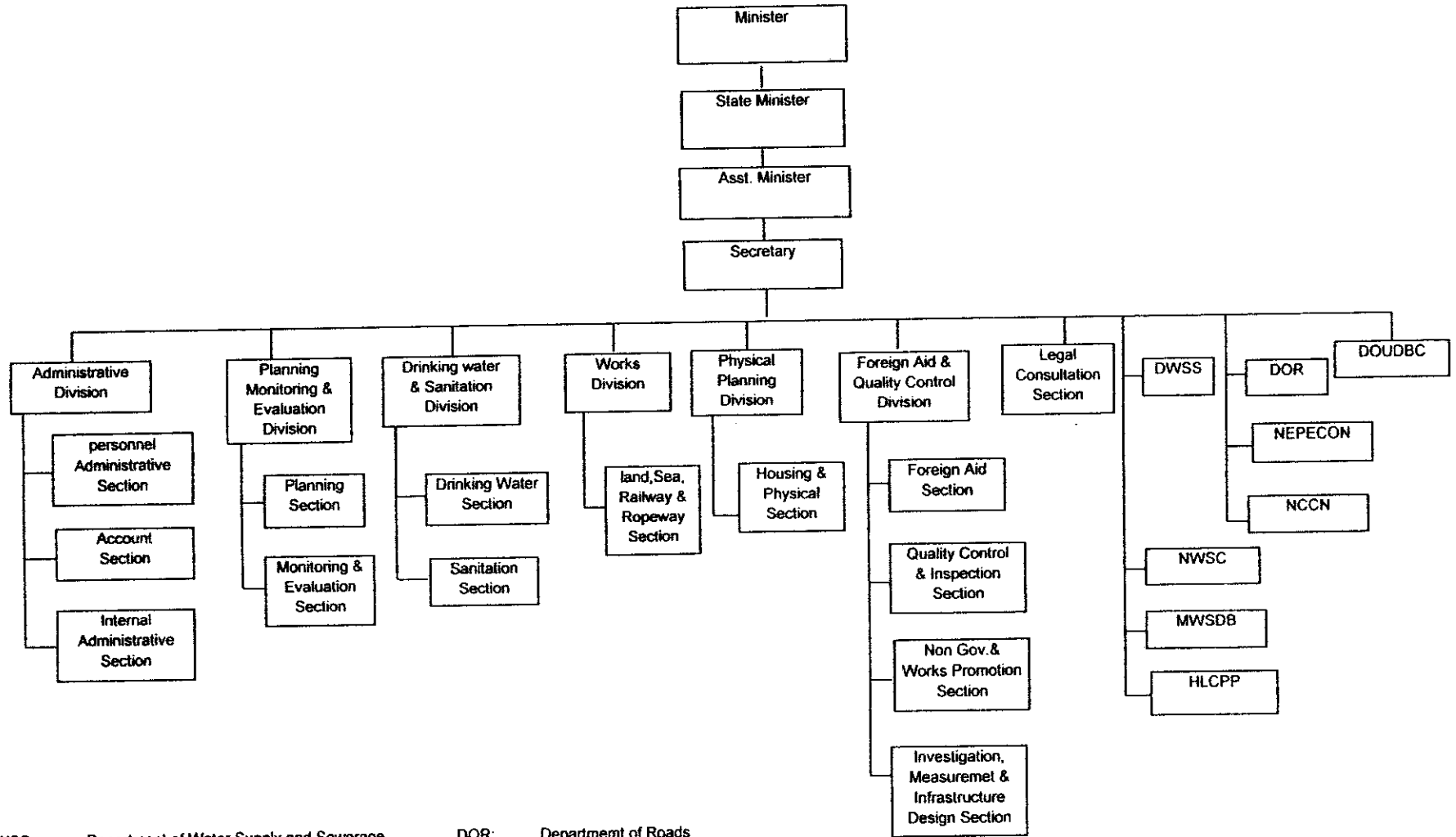


The Project for Urgent Rehabilitation of Sindhuli Road (Setion IV)

Location Map

*M.S.R.*  
*J.S.*

### Ministry of Physical Planning & Works



DWSS: Department of Water Supply and Sewerage  
 NWSC: Nepal Water Supply Corporation  
 MWSDB: Melamuchi Water Supply Development Board  
 HLCPP: High Level Committee on Private Participation

DOR: Department of Roads  
 NEPECON: Nepal Engineering Consultancy  
 NCCN: National Construction Company of Nepal  
 DOUDBC: Department of Urban Development & Building Construction

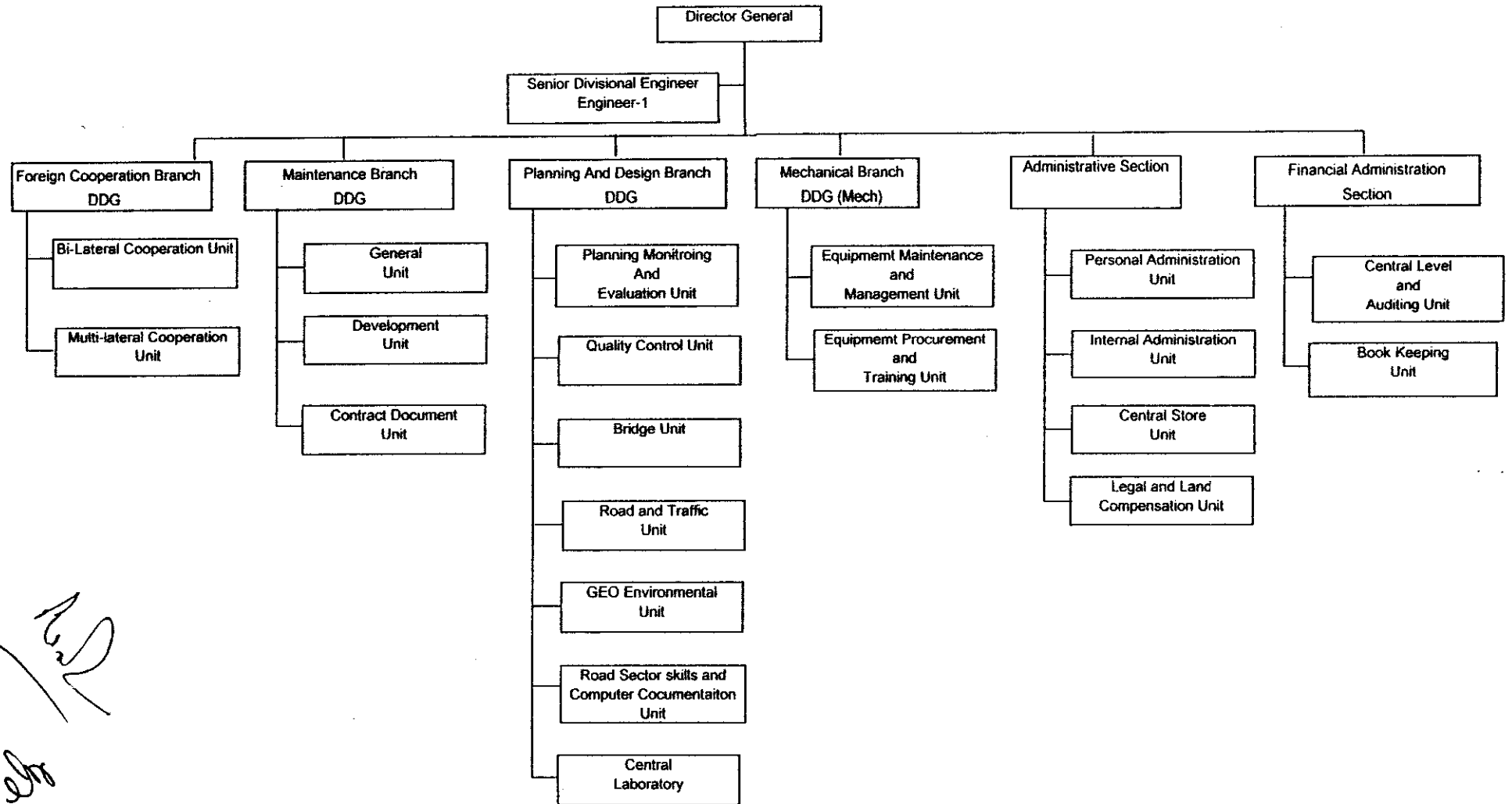
A-9

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# DEPARTMENT OF ROADS

## Organization Chart



A-10

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## Japan's Grant Aid Scheme

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles 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

Japan's Grant Aid scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal &	(Appraisal by the Government of Japan and
Approval	Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

### 2. Basic Design Study

#### 1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid scheme from a technical, social and economic point of view.
- Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project
- Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure 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 in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

## 2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

## 3. Japan's Grant Aid Scheme

### 1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

### 2) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as natural disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

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



When the two Governments 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, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) Necessity of "Verification"

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

5) Undertakings required of 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 the following:

- a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- c) To secure buildings prior to the procurement in case the installation of the equipment.
- d) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- f) To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

6) "Proper Use"

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

7) "Re-export"

The products purchased under the Grant Aid should not be 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 in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan 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 the Government of Japan under an authorization to pay (A/P) issued by the

Government of the recipient country or its designated authority.

9) Authorization to Pay (AP)

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

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## Major Undertaking to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Nepalese Side
1	To secure land.		●
2	To clear, level and reclaim the site when needed.		●
3	To construct gates and fences in and around the site.		●
4	To bear the following commissions to the Japanese bank for banking services based upon the B/A.		
	1) Advising commission of A/P		●
	2) Payment commission		●
5	To ensure unloading and customs clearance at port of disembarkation in recipient country.		
	1) Marine transportation of the products from Japan to the port of the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
6	To accord Japanese nationals, whose service 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.		●
7	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imported in the recipient country with respect to the supply of the products and services under the verified contracts.		●
8	To maintain and use properly and effectively the facilities installed and equipment provided under the Grant Aid.		●
9	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the installation of the facilities as well as for the transportation of the equipment.		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)

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His Majesty's Government  
Ministry of Physical Planning and Works  
Department of Roads

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Ref. No. DG 059/60 Ch.No.129

Ministry of Physical Planning and Works  
Department of Roads  
Babar Mahal

Date: February 10, 2003

Mr. Shozo Matsuura  
Director General  
Grant Aid Management Department  
Japan International Cooperation Agency  
Tokyo, Japan

At the outset I would like to extend my sincere gratitude to the Government of Japan for their valuable contribution for the implementation of Sindhuli Road Project which is really a challenging and beneficial Project from the economical and social point of view to our country.

We are happy to inform you that Mr. Y. Yamashita on behalf of JICA explained us the detail contents of the Draft Basic Design Study Report on the Project for Urgent Rehabilitation of Sindhuli Road (Section-IV) which we have taken into consideration and accepted in principle. Your mission member, Mr. Y. Yamashita has explained us in well manner regarding the Japan's Grant Aid Procedure and the obligations of the recipient country with regard to implementation of Sindhuli Road Project, Section-IV.

We confirm that DOR has understood and accepted to honor the Japan's Grant Aid Procedure and the Obligations of DOR for implementation of restoration/rehabilitation works of their portion with regard to the damages caused by heavy rain of July 2002, and DOR's responsibility to take necessary counter measures for future restoration/rehabilitation of the captioned road structure in the event of any structural damages that may take place due to natural calamities like; heavy rain, earthquake and other natural disaster.

Thanking you and assuring you our best co-operation.

Sincerely Yours,

  
DIRECTOR-GENERAL  
Madan Gopal Maleku

Director General  
Department of Roads (DOR)  
Ministry of Physical Planning and Works  
His Majesty's Government of Nepal



## Tentative Cost Estimation Born by the HMG/N

### I-Project Implimentation Period (20 Months)

#### Administration Cost

##### 1) Man/Month

Position	Man/Month
Project Manager	0.5
Chief Engineer	0.5
Administration Staff	0.5
Other	1
<b>Total Man/Month</b>	<b>2.5</b>

##### 2) Administration Cost

Administration Cost per Year	2,000,000 NRs
------------------------------	---------------

Average salary = 20000 NRs/month

Allowance, office expenditure at 100 % of total salary

Administration Cost = 2.5 Man/Month × 20000 NRs/Month × 20Month × 200 %

### II-Maintenance and Operation Period (Per 1 Year)

#### 1. Maintenance Administration Cost

##### 1) Man/Month

Position	Man/Month
Project Manager	1
Chief Engineer	1
Engineer	4
Supervisor	4
Mechanical Engineer	2
Administration Staff	1
Other	9
<b>Total Man/Year</b>	<b>22</b>

##### 2) Administration Cost

Administration Cost per Year	5,280,000 NRs
------------------------------	---------------

Average salary = 10000 NRs/month

Allowance, office expenditure at 100 % of total salary

Administration Cost = 22 Men/Month × 10000 NRs/Month × 12Month × 200 %

2. Maintenance Material Cost

Material	Cost per Year
Gabion wire	394,000 NRs
Cement	272,700 NRs
Total	666,700 NRs

Average distance of cross drainage = 165 m

Required Gobion Volume: 1sqm/165m/year

Required Riplap Volume : 1sqm/165m/year

Required Gabion Wire Quantity =  $32.5\text{kg}/0.165\text{km} = 197\text{kg}/\text{km}$

Required Cement Quantity =  $150\text{kg}/0.165\text{km} = 909\text{kg}/\text{km}$

Required Gabion Wire Cost =  $197\text{kg}/\text{m} \times 40\text{Nrs} \times 50\text{km}$

Required Cement Cost =  $909\text{kg}/\text{m} \times 6\text{Nrs} \times 50\text{km}$

3. Fuel Cost

Fuel Cost	Cost per Year
Deposit from Mountain side	410,550 NRs
Total	410,550 NRs

According to B/D study, fuel consumption is assumed to be 19.55 litre/hr

Deposit Volume per year

Sandbank Volume per year

700 sqm/km/year of deposits are cleaned at capacity of 40 sqm/hr = 17.5 hr/km/year

1000 sqm/km/year of sandbank are cleaned at capacity of 40 sqm/hr = 25 hr/km/year

Required fuel Cost for Deposit =  $19.55\text{litre}/\text{hr} \times 17.5\text{hr}/\text{km}/\text{year} \times 50\text{km} \times 24\text{Nrs}$

4. Labor cost

Labor cost per year	7,140,000 NRs
---------------------	---------------

Required Labor Cost =  $2\text{person}/\text{km}/\text{day} \times 50\text{km} \times 238\text{NRs}/\text{day} \times 25\text{day} \times 12\text{Month}$

5. Spare Equipment Cost

Spare Equipment Cost per year	4,000,000 NRs
-------------------------------	---------------

Annual spare equipment cost = 5% of equipment cost given in reports of Section I

Required Spare equipment cost =  $80000000\text{NRs} \times 0.05$

6. Total Estimated Maintenance Cost per year by DOR

Item	Cost per year
Administration cost	5,280,000 NRs
Material cost	666,700 NRs
Fuel cost	410,550 NRs
Labor cost	7,140,000 NRs
Spare cost	4,000,000 NRs
Total Estimated Maintenance Cost	17,497,250 NRs

## Appendices 6      Engineering Supporting Data

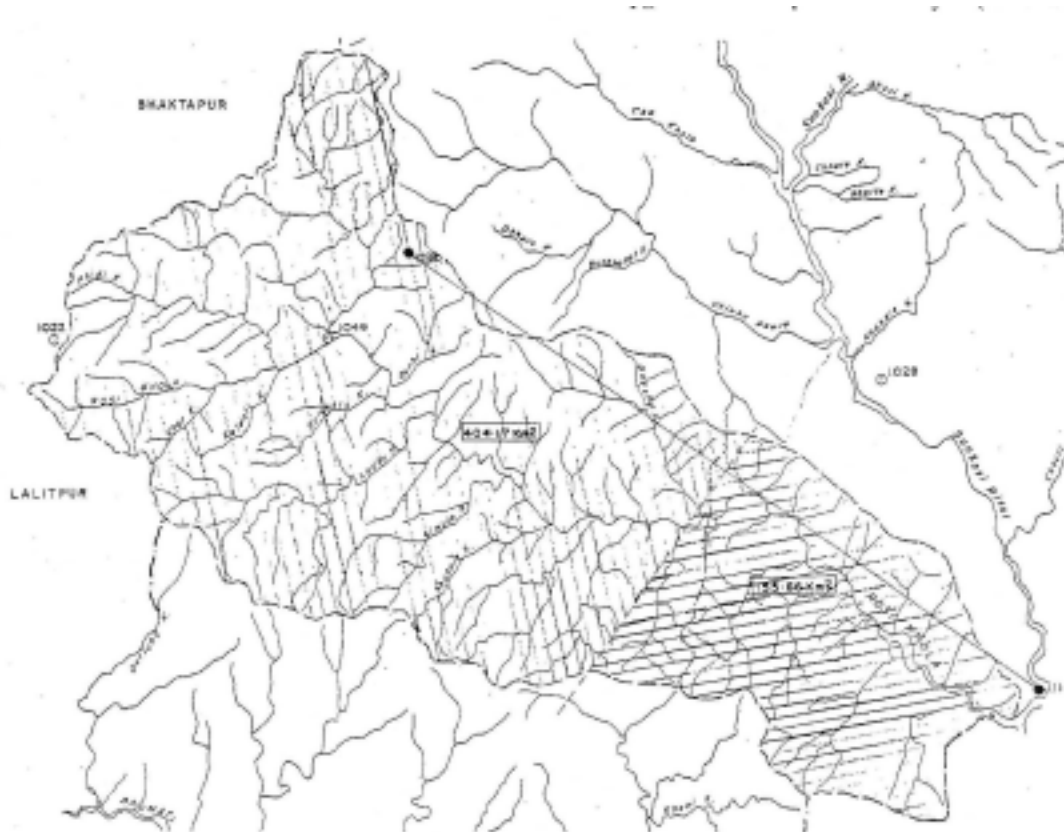
(1) Thiessen Polygons Pattern

(2) Return Period of Precipitation

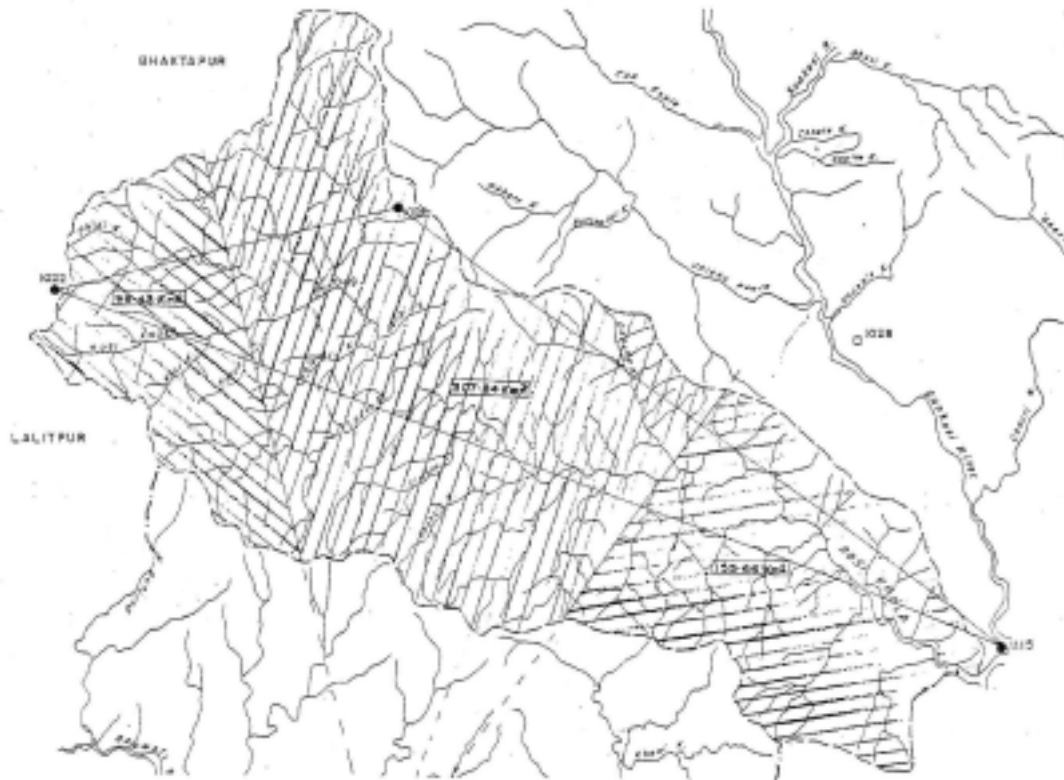
(3) 2.5-Dimension River Bed Fluctuation Analysis



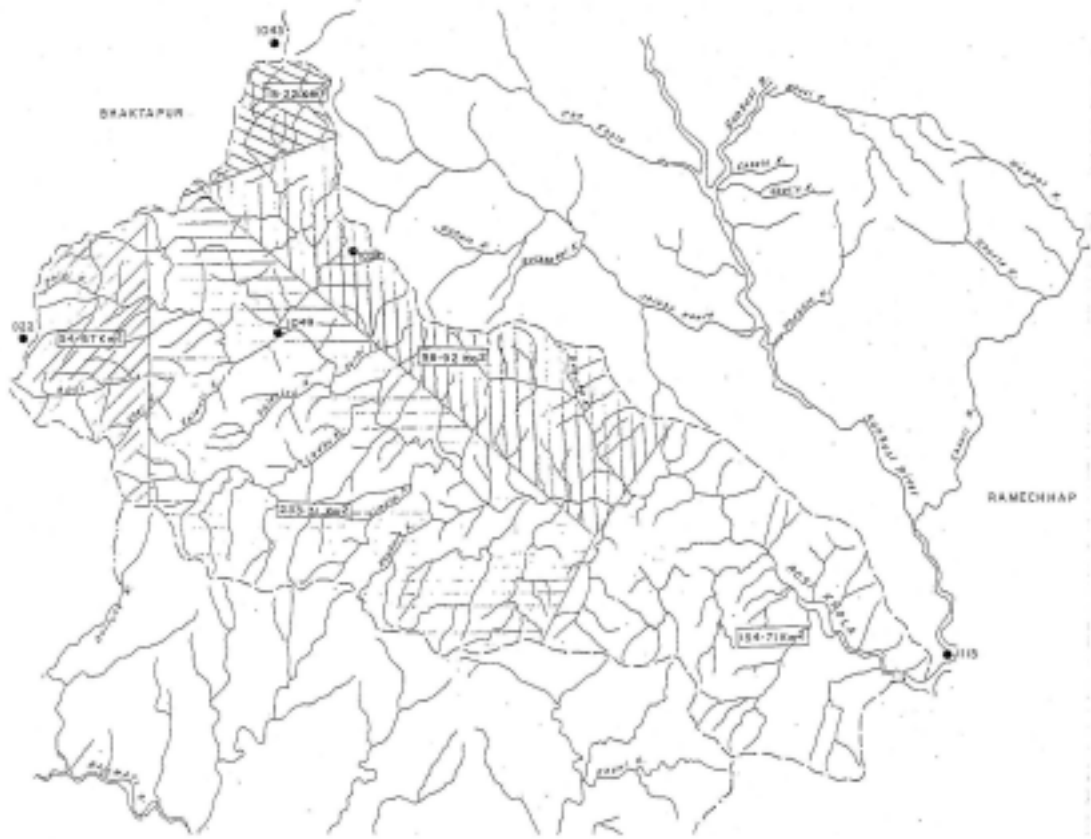
(1). Thiessen Polygons Pattern.



Thiessen Polygons Pattern 1 (1948-1952)



Thiessen Polygons Pattern 2 (1953-1970)



Thiessen Polygons Pattern 3 (1971-2002)

(2)Return.Period.of.Precipitation.

1-day rainfall frequency analysis ( 1948 ~ 2002 )

Unit : mm

Item	Log-normal distribution		Gumbel distribution	GEV distribution	SQRT-ET distribution	Log-Pearson Type III	Exponential moment								
	moment	IWAI													
Probability	1/2	72.59	72.22	72.85	71.56	70.74	71.58	67.64							
	1/5	99.78	99.38	100.36	98.97	98.24	99.01	98.47							
	1/10	117.82	117.76	118.58	118.42	118.63	118.36	121.80							
	1/20	135.16	135.65	136.05	138.10	139.80	137.81	145.12							
	1/30	145.17	146.06	146.10	149.91	152.69	149.42	158.77							
	1/50	157.75	159.23	158.67	165.18	169.54	164.40	175.96							
	1/70	166.05	167.96	166.91	175.51	181.02	174.52	187.28							
	1/100	174.87	177.29	175.62	186.72	193.53	185.49	199.28							
	1/150	184.96	188.00	185.50	199.79	208.19	198.29	212.93							
	1/200	192.16	195.68	192.50	209.30	218.88	207.60	222.61							
Fit index	SLSC	0.0238	0.0217	0.0233	0.0196	0.0215	0.0200	0.0335							
	CORX	0.9947	0.9953	0.9937	0.9950	0.9846	0.9953	0.9872							
	CORP	0.9952	0.9956	0.9947	0.9958	0.9961	0.9960	0.9787							
Stability	1/5	JAC	100.144	99.361	100.364	99.148	98.443	99.008	98.473						
		JACE	6.043	1	6.111	3	6.306	6	6.408	7	6.249	5	6.192	4	6.109
	1/50	JAC	159.316	159.698	158.670	165.141	170.581	164.462	175.957						
		JACE	14.569	2	16.291	5	12.805	1	17.811	7	14.785	3	16.802	6	14.800
	1/150	JAC	187.100	188.522	185.501	198.313	209.714	197.867	212.926						
		JACE	19.499	3	23.390	5	15.906	1	29.837	7	19.823	4	25.826	6	19.099

Fit index SLSC : < 0.04

CORX : >=0.99

CORP : >=0.99

Stability JAC : Estimate Value by Jackknife Moethod

JACE : Deviation of Jakknife Method

2-day rainfall frequency analysis ( 1948 ~ 2002 )

Unit : mm

Item	Log-normal distribution		Gumbel distribution	GEV distribution	SQRT-ET distribution	Log-Pearson Type III	Exponential moment		
	moment	IWAI							
Probability	1/2	109.24	108.48	110.78	107.09	107.07	107.52	102.24	
	1/5	155.18	153.58	155.89	151.63	152.03	152.81	152.79	
	1/10	186.44	185.13	185.76	184.91	185.58	185.84	191.04	
	1/20	216.95	216.48	214.41	220.00	220.56	219.82	229.29	
	1/30	234.76	234.99	230.90	241.71	241.91	240.45	251.66	
	1/50	257.30	258.66	251.50	270.53	269.85	267.42	279.85	
	1/70	272.28	274.50	265.01	290.50	288.93	285.85	298.41	
	1/100	288.29	291.54	279.29	312.58	309.75	306.02	318.09	
	1/150	306.70	311.27	295.49	338.91	334.17	329.80	340.46	
	1/200	319.91	325.50	306.98	358.41	352.00	347.25	356.34	
Fit index	SLSC	0.0255	0.0218	0.0377	0.0260	0.0233	0.0209	0.0316	
	CORX	0.9886	0.9904	0.9851	0.9914	0.9844	0.9914	0.9883	
	CORP	0.9966	0.9971	0.9956	0.9972	0.9972	0.9972	0.9708	
Stability	1/5	JAC	155.848	153.424	155.894	151.887	152.420	152.809	152.794
		JACE	10.690	10.312	11.484	10.184	10.116	10.478	11.086
	1/50	JAC	260.357	243.280	251.499	270.681	271.765	267.312	279.845
		JACE	27.838	39.289	24.444	36.195	24.837	33.422	28.384
	1/150	JAC	310.951	283.153	295.494	336.811	336.955	328.499	340.464
		JACE	37.952	60.286	30.566	61.697	33.633	52.474	36.855

Fit index SLSC : < 0.04

CORX : >=0.99

CORP : >=0.99

Stability JAC : Estimate Value by Jackknife Method

JACE : Deviation of Jackknife Method

3-day rainfall frequency analysis ( 1948 ~ 2002 )

Unit : mm

Item	Log-normal distribution		Gumbel	GEV	SQRT-ET	Log-Pearson	Exponential		
	moment	IWAI	distribution	distribution	distribution	Type III	moment		
Probability	1/2	129.97	128.69	132.08	128.78	127.78	128.07	122.20	
	1/5	184.62	181.85	184.25	180.58	180.43	180.90	180.67	
	1/10	221.79	219.58	218.79	218.22	219.65	219.52	224.90	
	1/20	258.08	257.42	251.93	257.06	260.50	259.33	269.13	
	1/30	279.25	279.91	270.99	280.69	285.42	283.54	295.00	
	1/50	306.06	308.80	294.82	311.63	318.02	315.23	327.60	
	1/70	323.87	328.22	310.44	332.80	340.27	336.92	349.07	
	1/100	342.91	349.19	326.96	355.96	364.54	360.69	371.83	
	1/150	364.80	373.52	345.70	383.27	393.01	388.73	397.70	
	1/200	380.51	391.13	358.98	403.30	413.78	409.33	416.06	
Fit index	SLSC	0.0326	0.0277	0.0512	0.0367	0.0319	0.0289	0.0421	
	CORX	0.9786	0.9828	0.9740	0.9850	0.9788	0.9854	0.9800	
	CORP	0.9935	0.9930	0.9937	0.9931	0.9924	0.9927	0.9656	
Stability	1/5	JAC	185.743	164.310	184.252	181.150	180.910	180.980	180.667
		JACE	13.821	9.331	14.033	11.324	11.726	12.117	13.522
	1/50	JAC	310.733	449.371	294.816	311.606	320.315	315.812	327.598
		JACE	40.193	96.350	30.656	51.445	28.582	46.826	35.708
	1/150	JAC	371.123	629.616	345.696	378.498	396.334	387.563	397.702
		JACE	55.551	162.259	38.507	88.025	38.650	75.785	46.570

Fit index SLSC : < 0.04

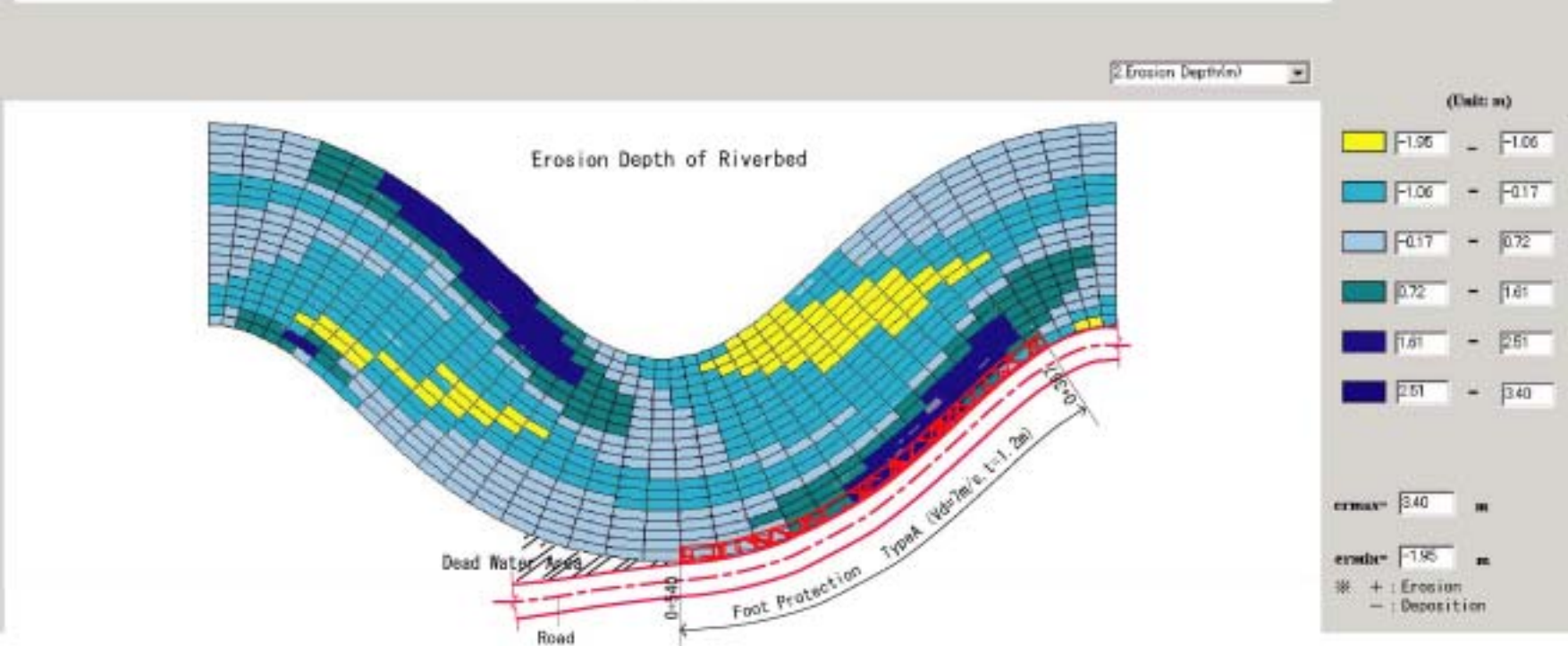
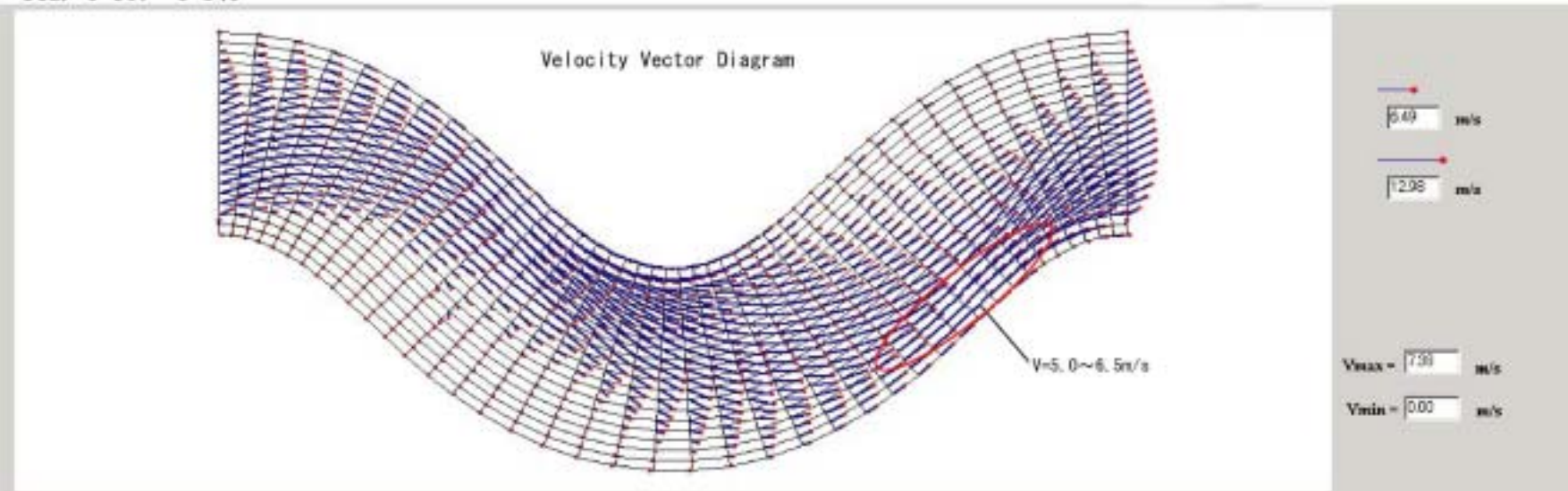
CORX : >=0.99

CORP : >=0.99

Stability JAC : Estimate Value by Jackknife Method

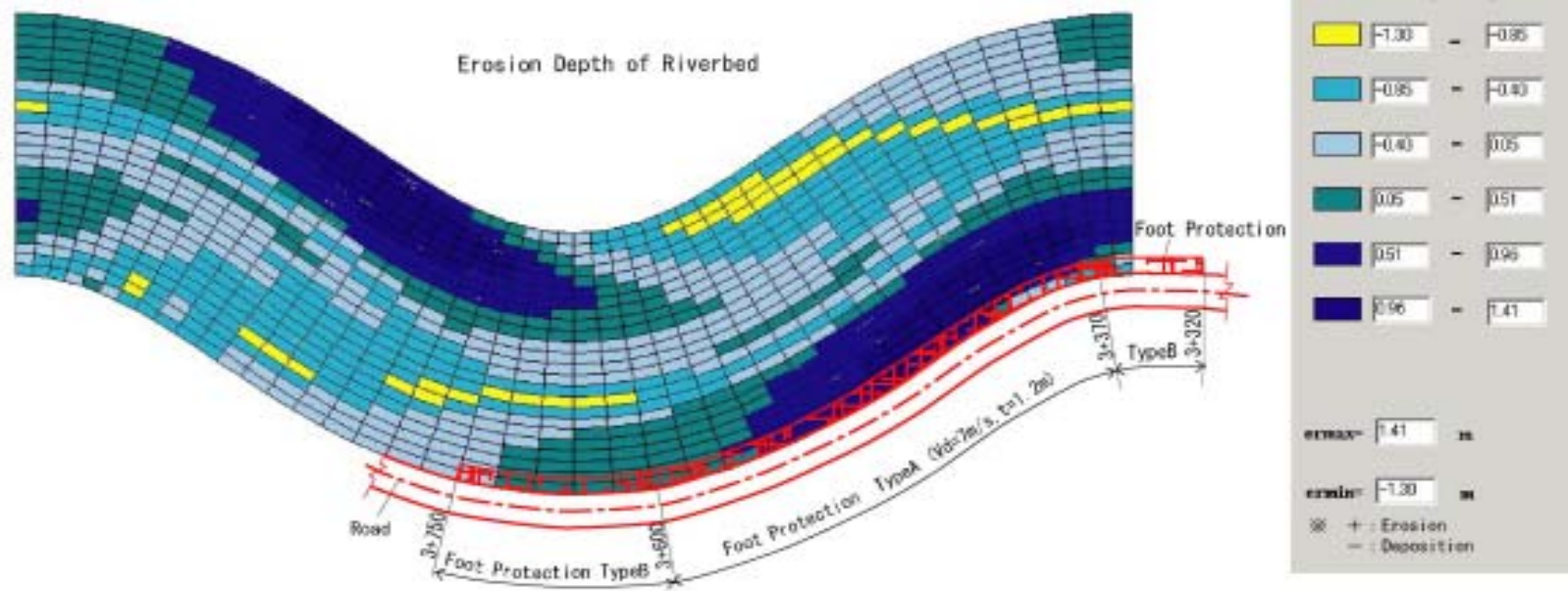
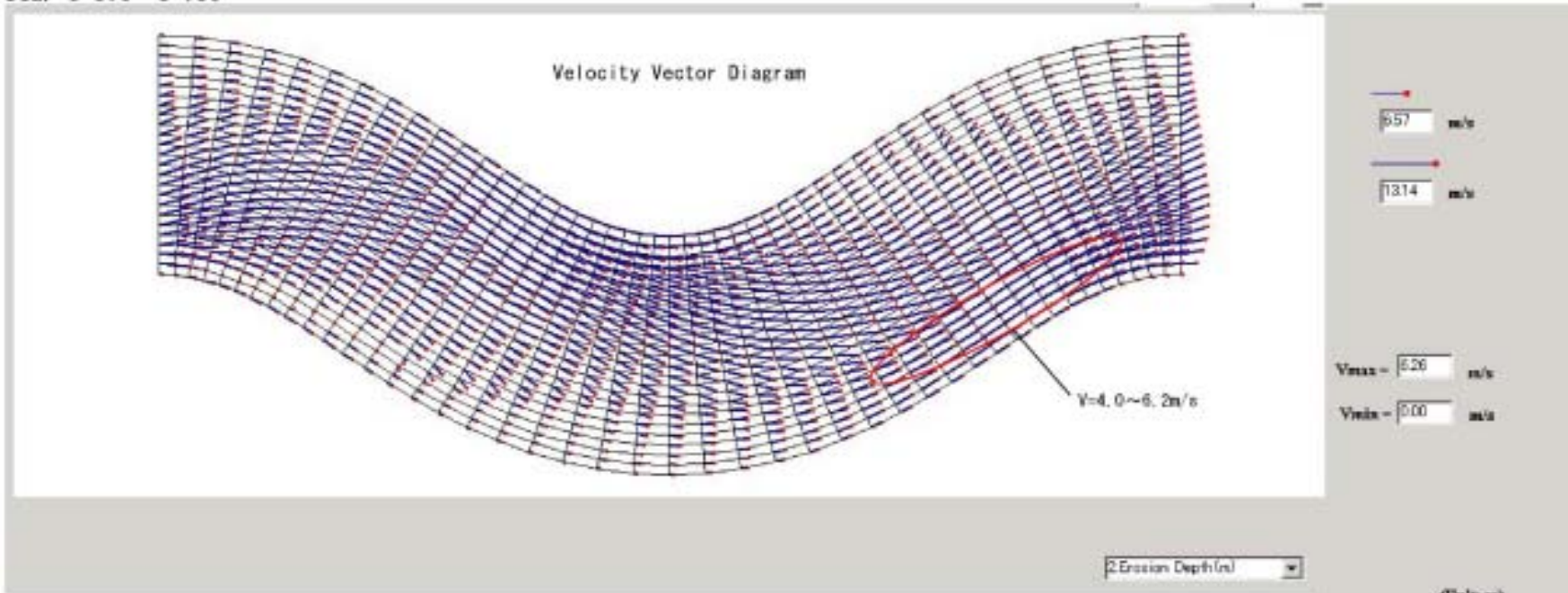
JACE : Deviation of Jackknife Method

Sta. 0+367~0+540

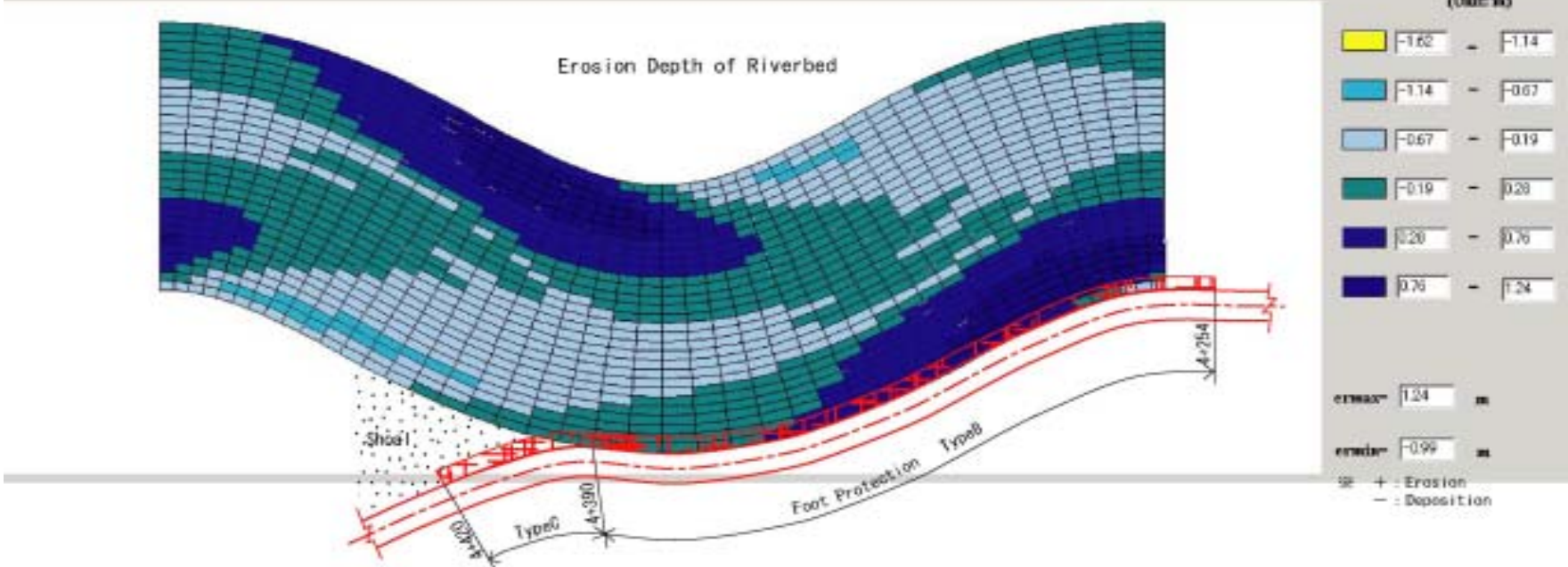
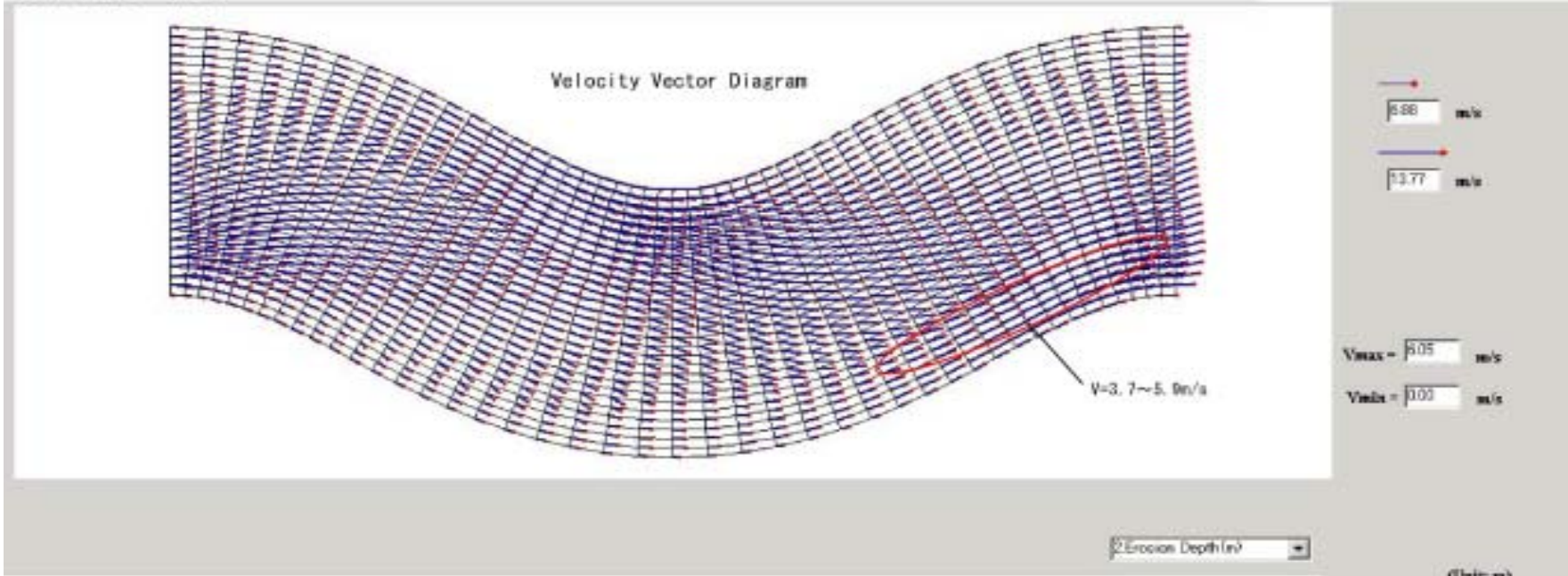


(3). 2.5-Dimension River Bed Fluctuation Analysis.

Sta. 3+370~3+730

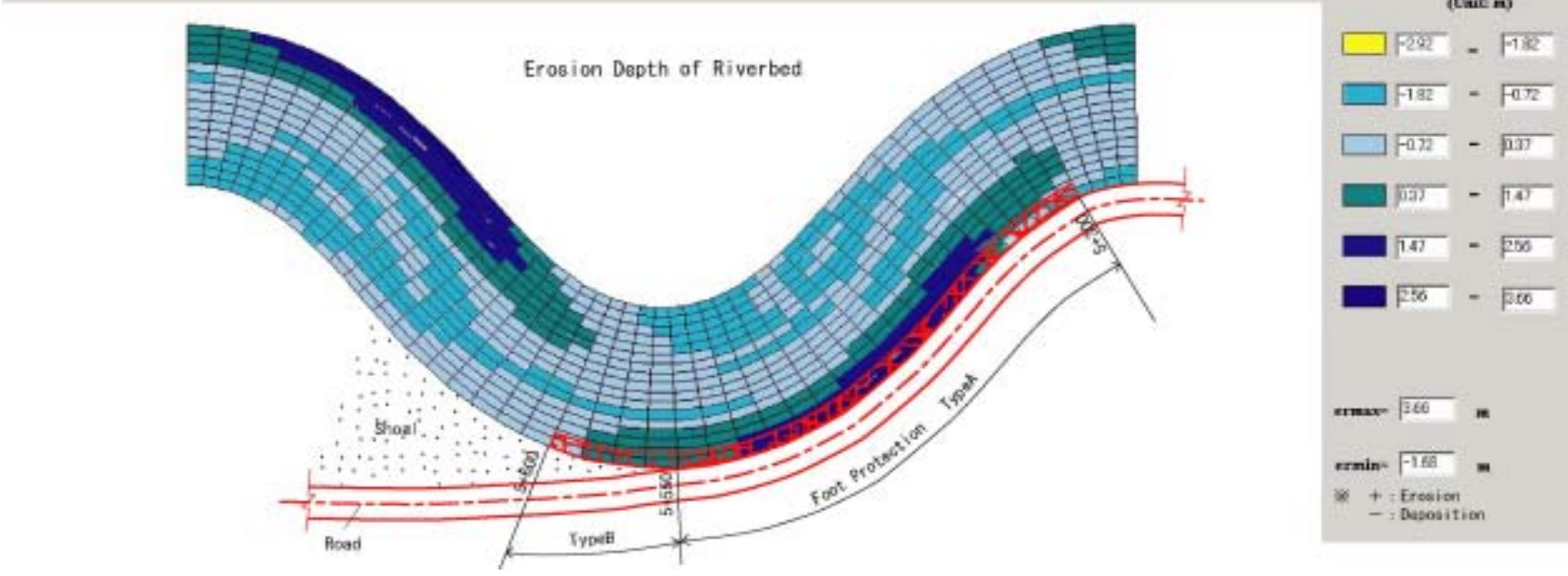
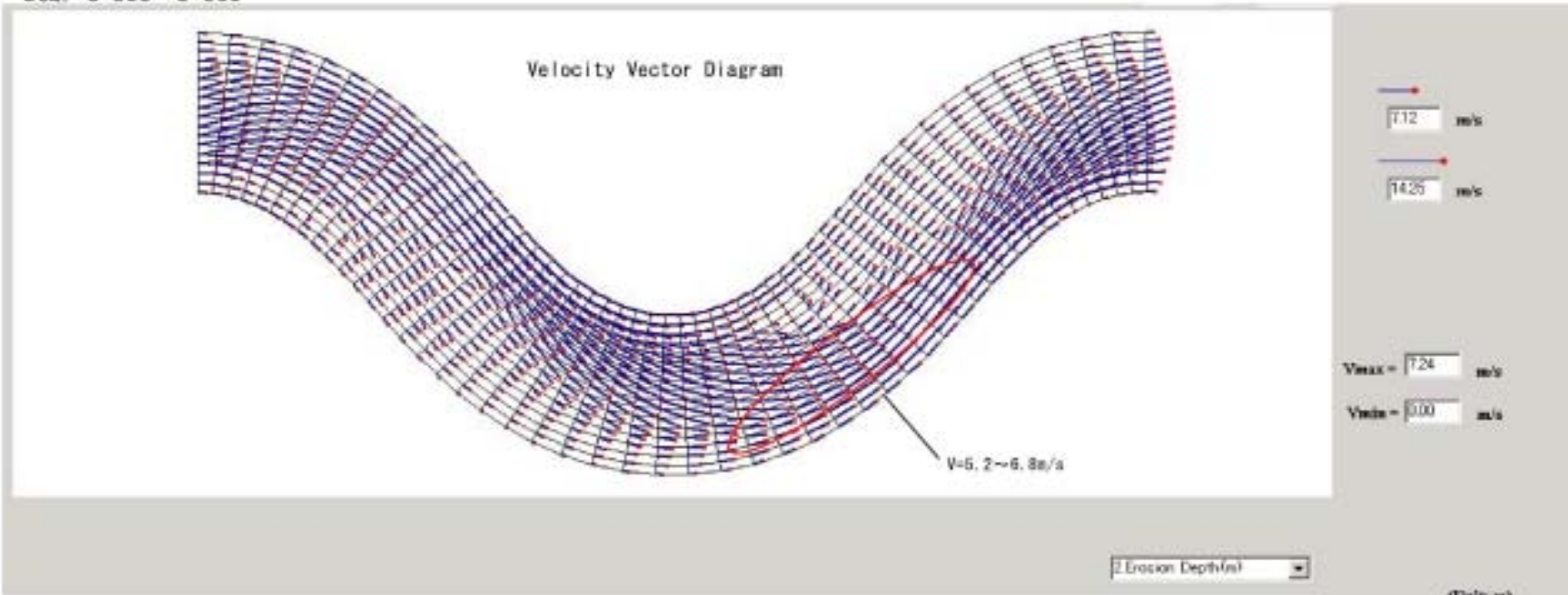


Sta. 4+245~4+360

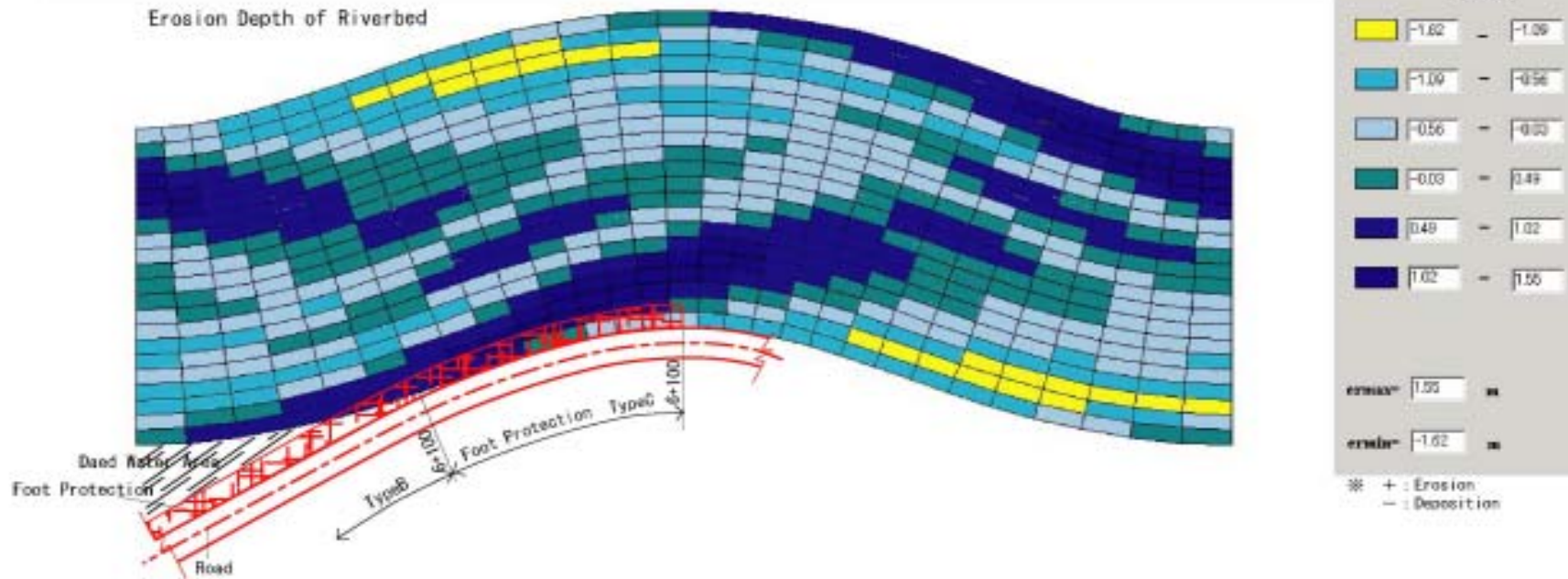
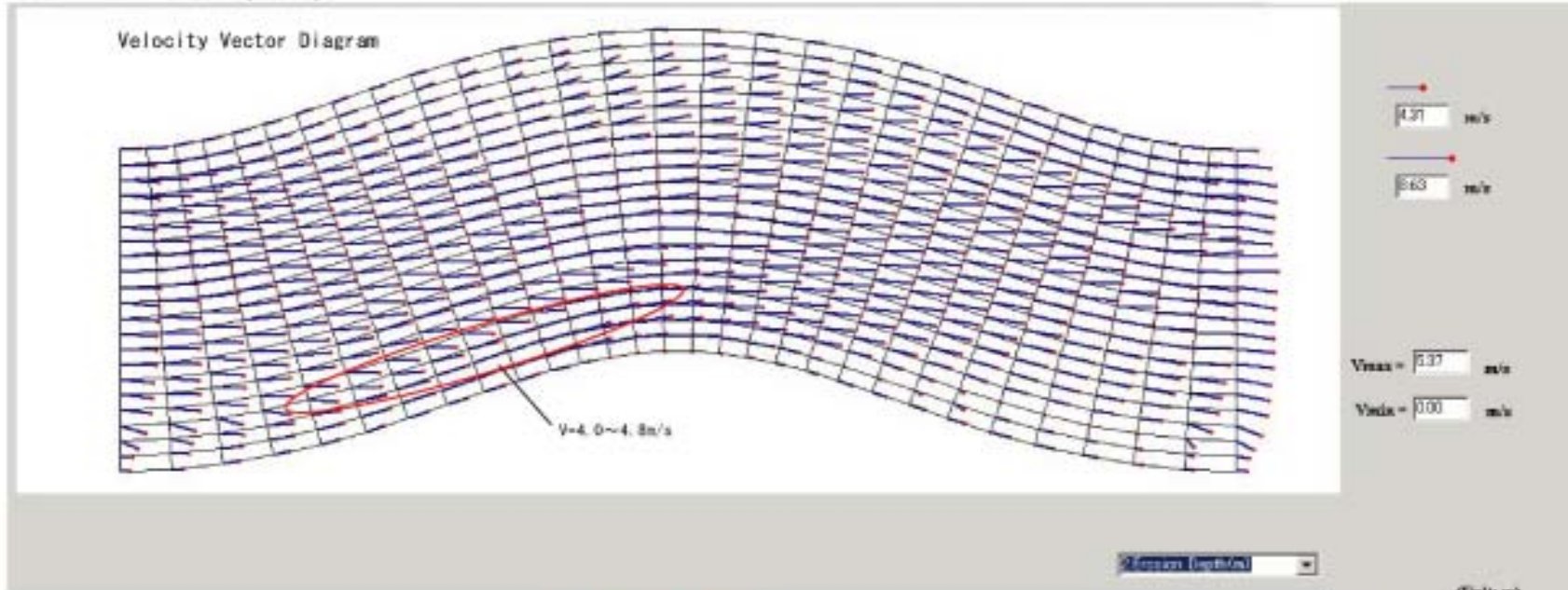




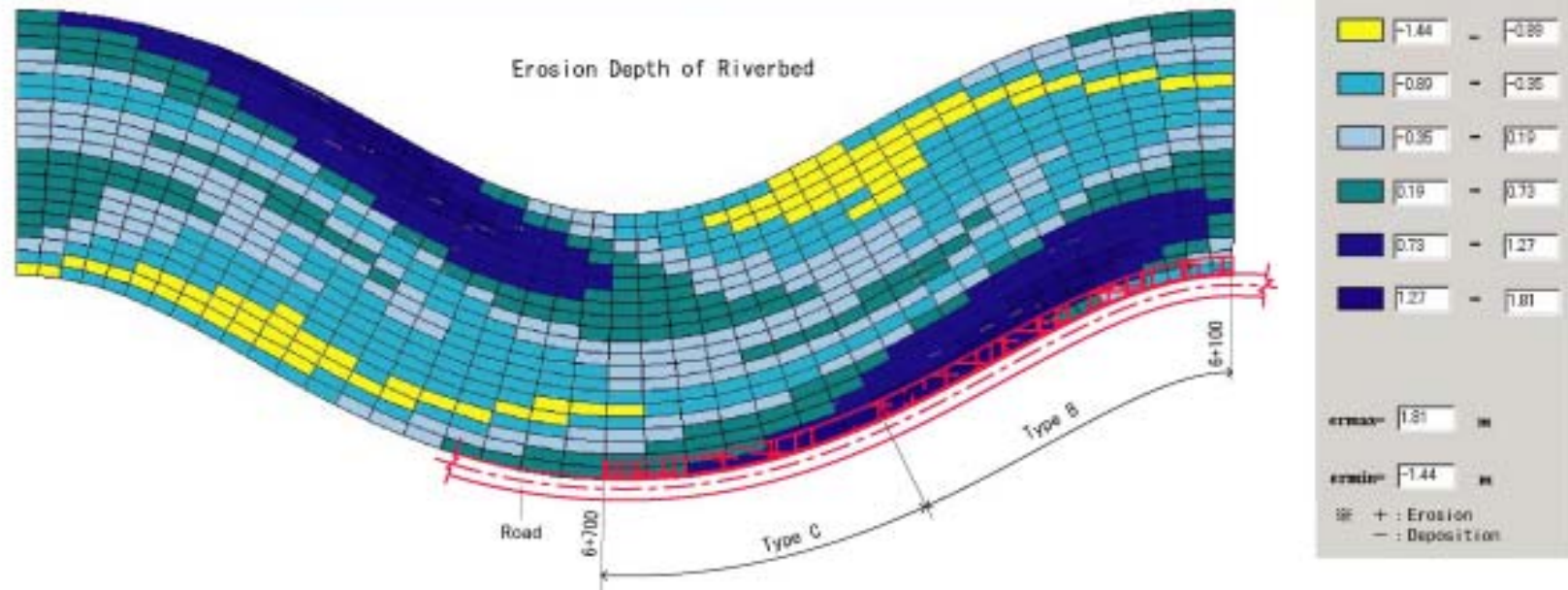
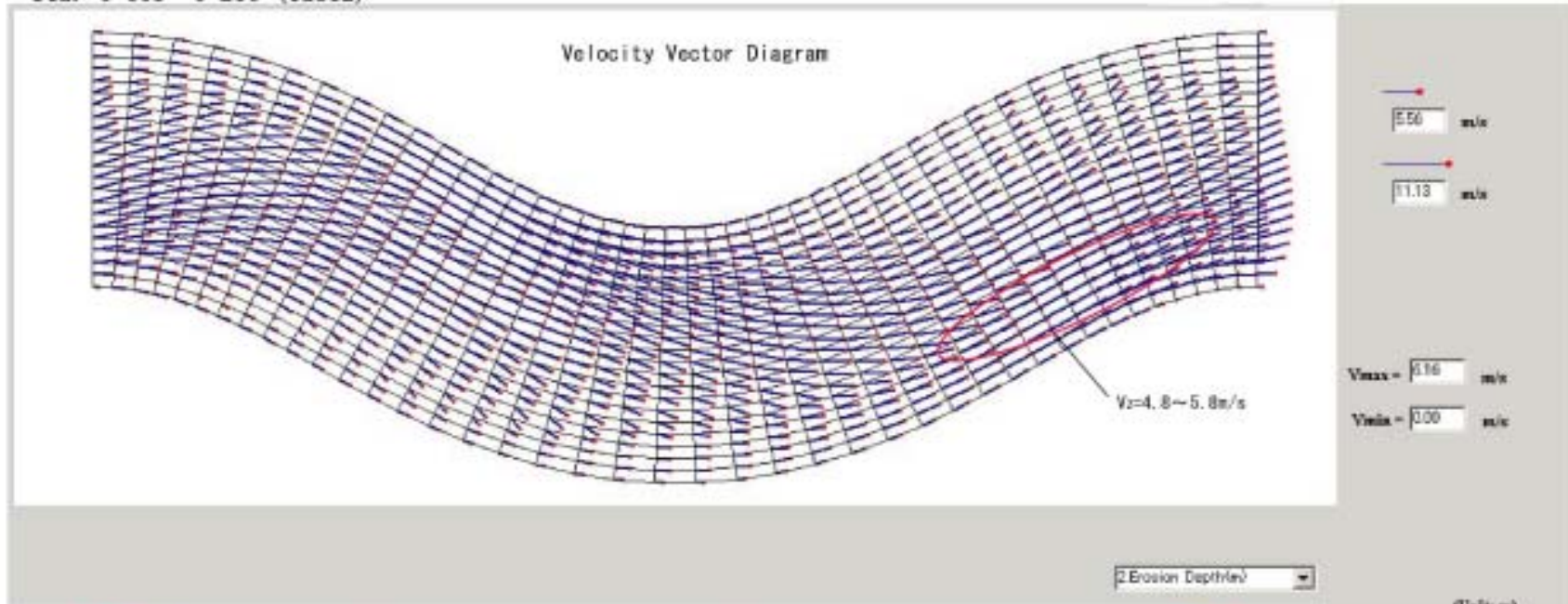
Sta. 5+300~5+461  
 Sta. 5+500~5+560



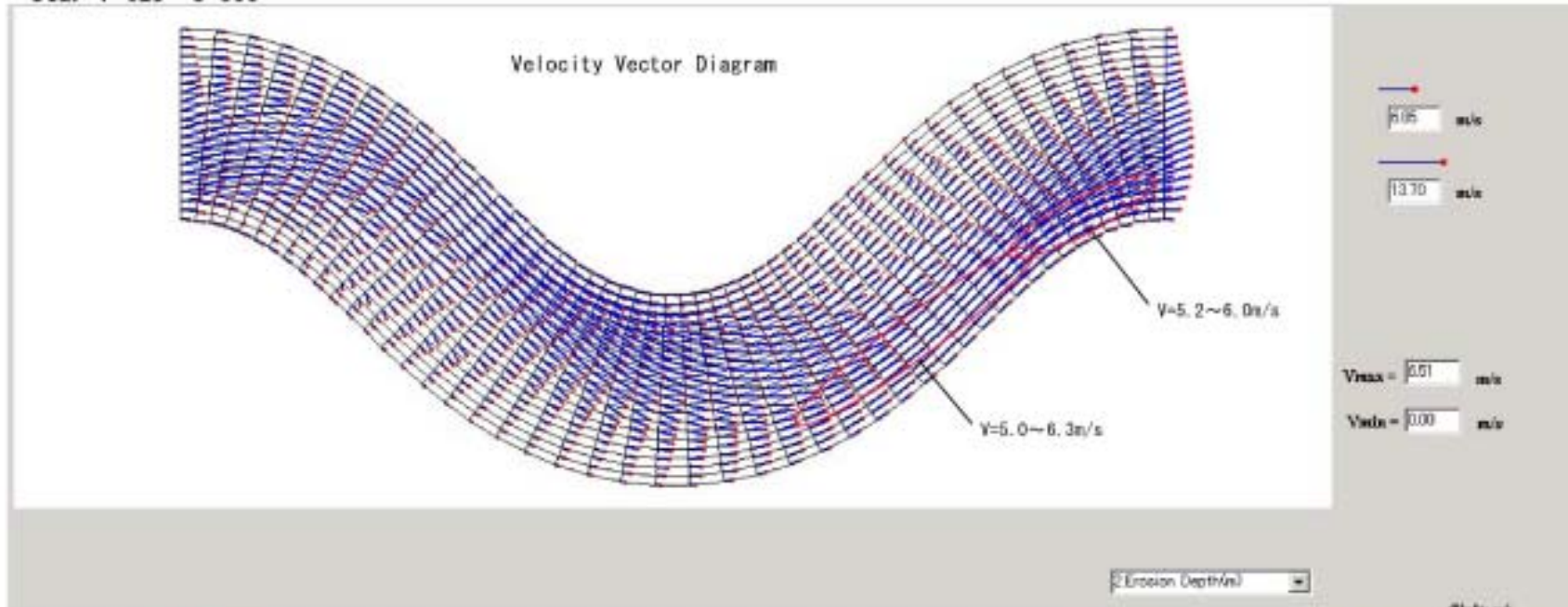
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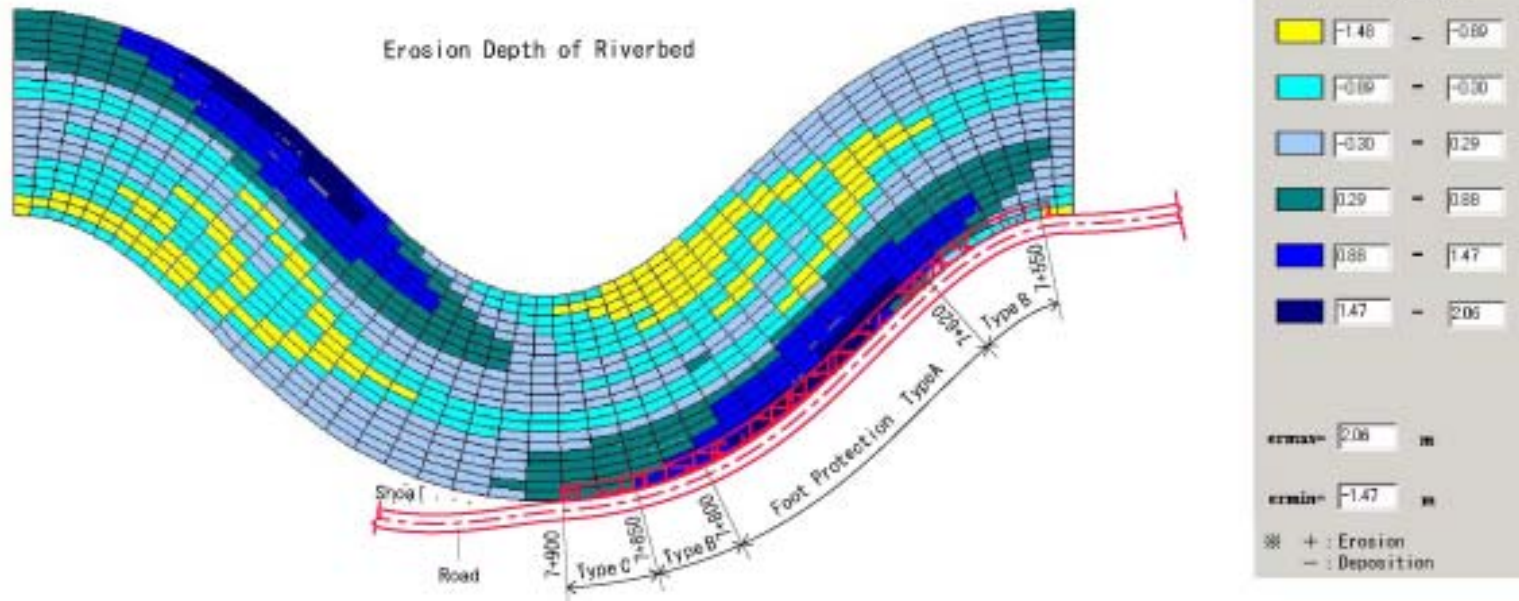
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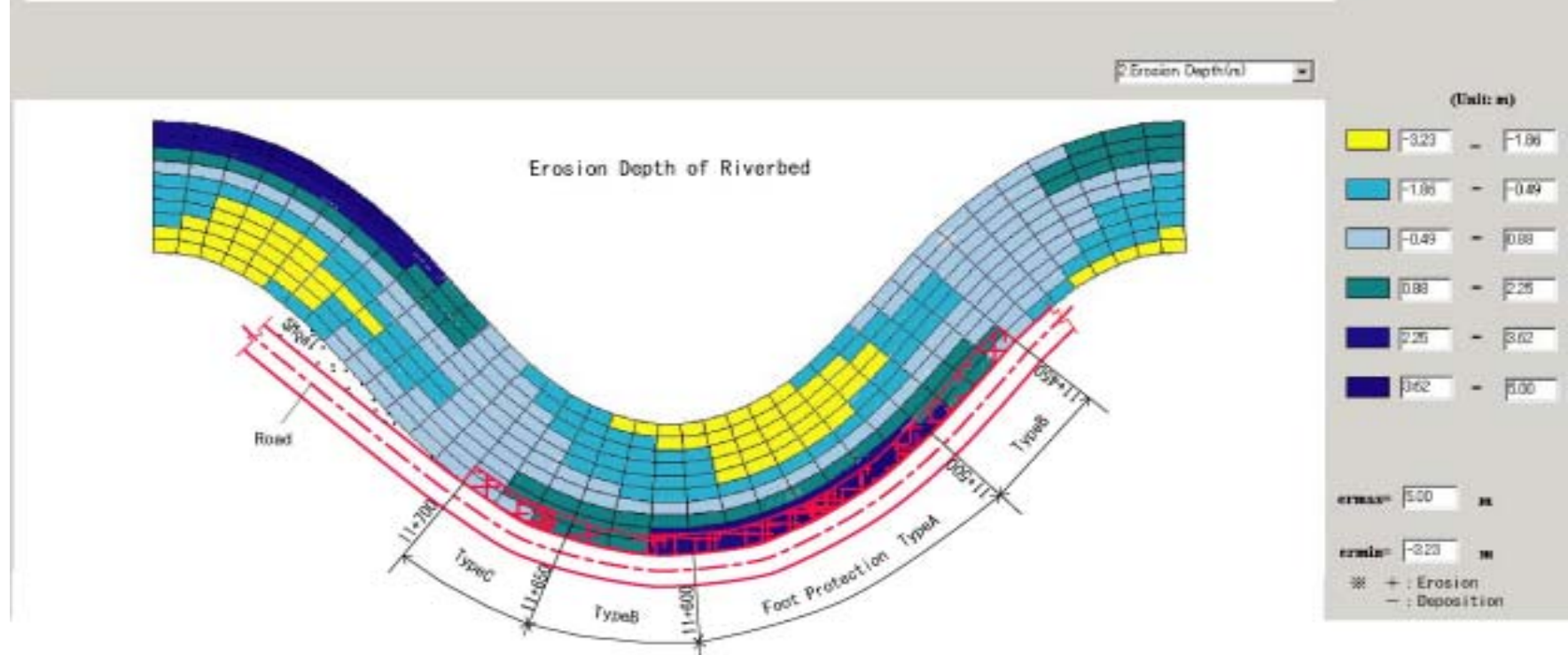
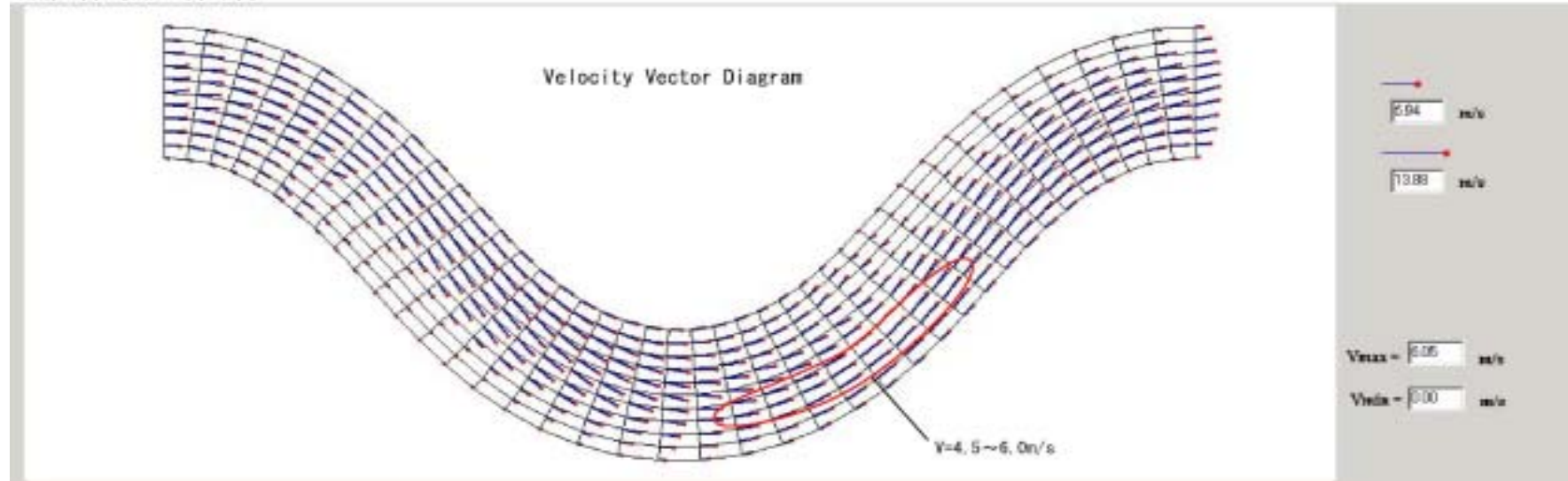
Sta. 7+625~8+000



A-30



Sta. 11+489~11+577



Sta. 14+885~14+925

