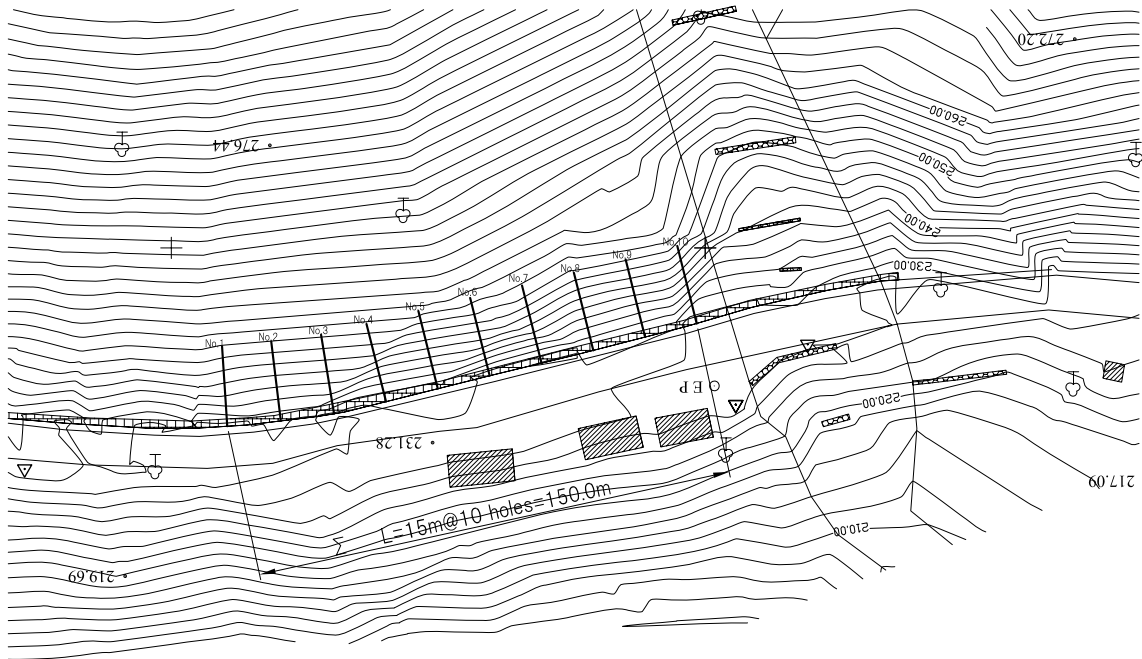


# HORIZONTAL DRAIN HOLES WORK IN 24KM.+235 (LS-4) SITES

PLAN

S=1:1000

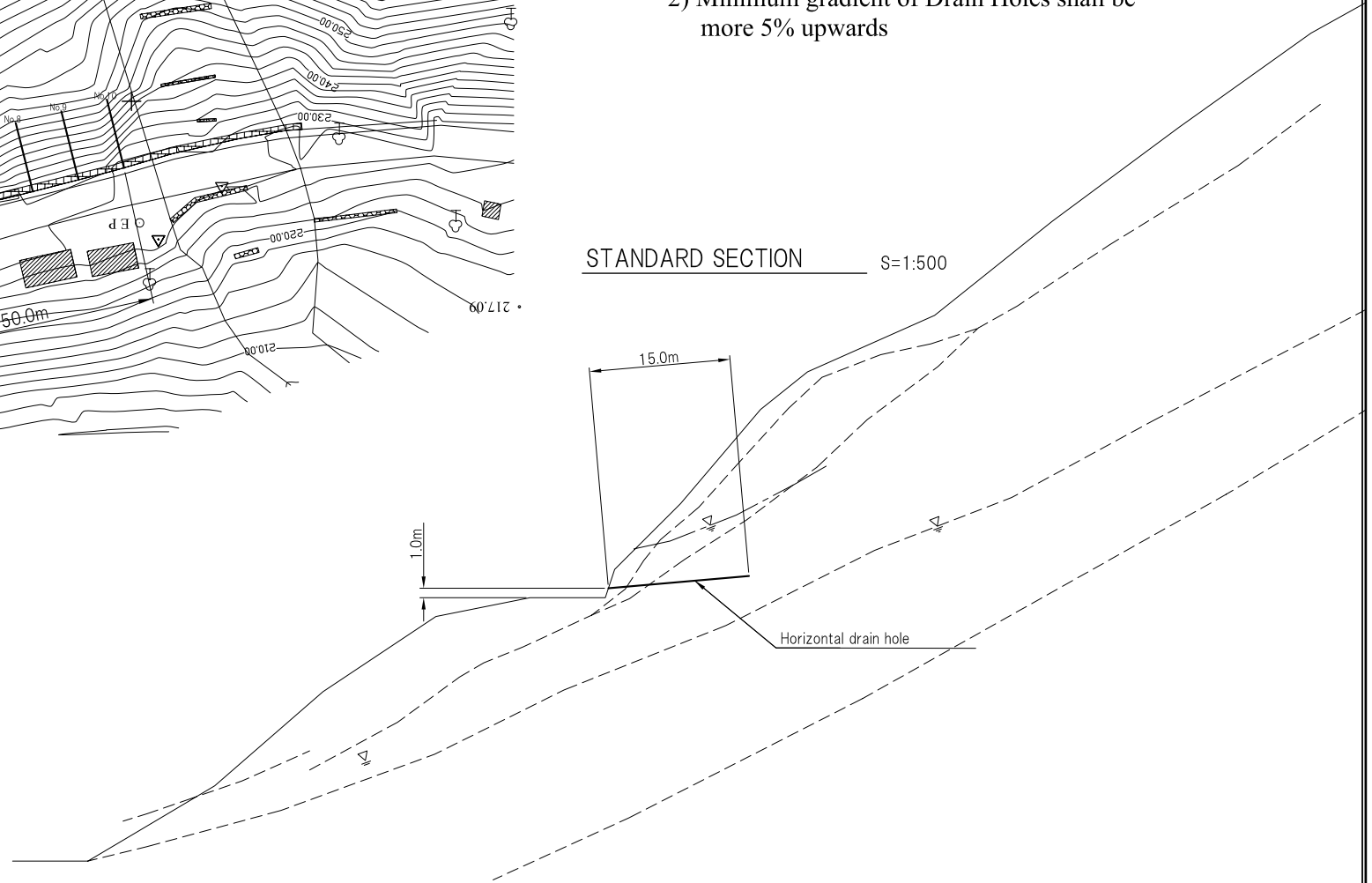


NOTE:

- 1) Location of Horizontal Drain Holes may be changed but within 5.0m
- 2) Minimum gradient of Drain Holes shall be more 5% upwards

STANDARD SECTION

S=1:500



Co-ordinate of Horizontal Drain Holes

No.	X	Y
No.1	547302.66	3076367.81
No.2	547312.70	3076368.82
No.3	547322.67	3076370.15
No.4	547332.41	3076372.42
No.5	547342.11	3076374.85
No.6	547351.81	3076377.27
No.7	547361.53	3076379.63
No.8	547371.24	3076382.03
No.9	547380.93	3076384.52
No.10	547390.60	3076387.04

THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

04			DESIGNED BY	
03			DRAWN BY	
02			ASSISTED BY	
01			RECOMMENDED BY	
REV.	DATE	DESCRIPTION	APPROVED BY	

THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

DATE  
FEBRUARY 2008

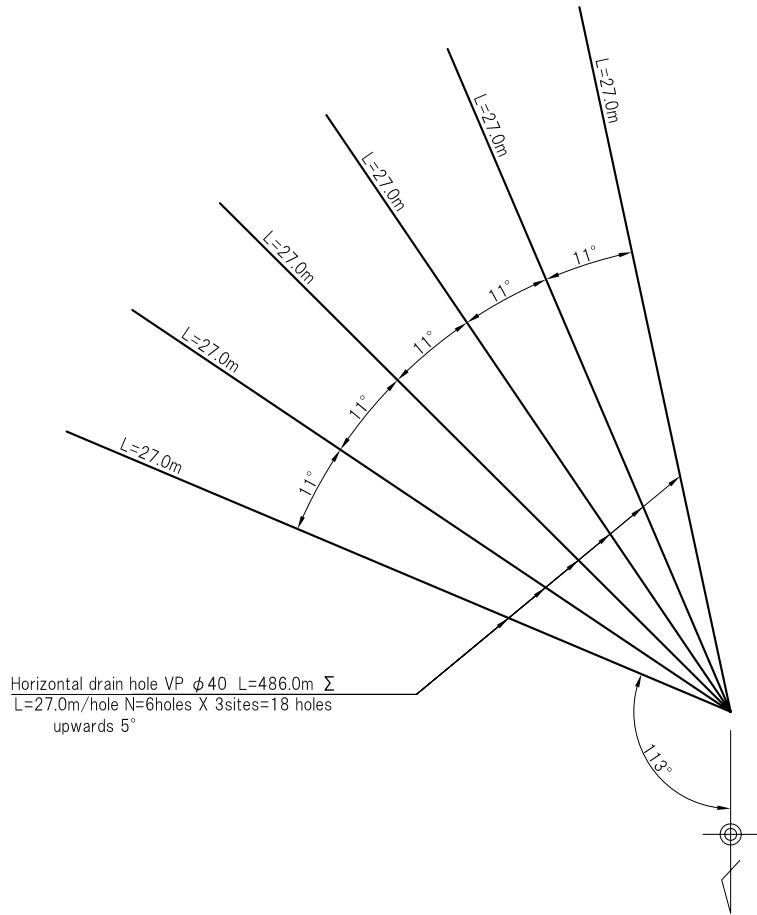
DWG. NO.  
SO8-01

SCALE

# GROUNDWATER DRAINAGE WORKS IN 24KM.+235(LS-4)

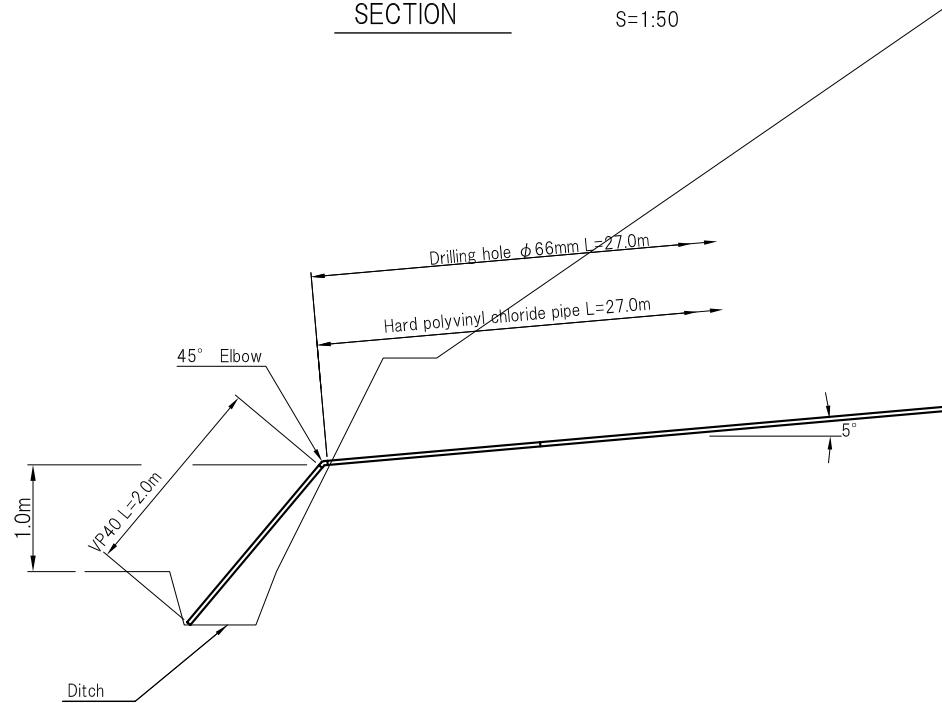
LAYOUT OF HORIZONTAL DRAIN HOLES

S=1:200



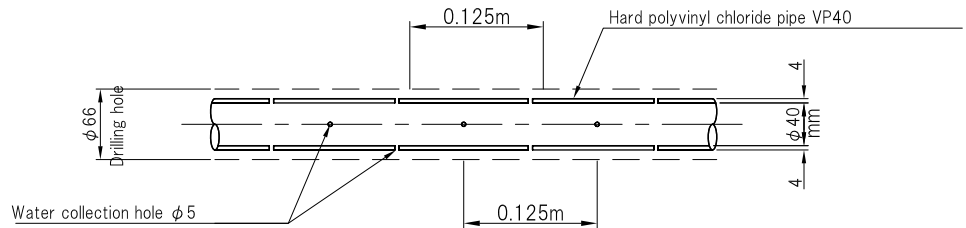
SECTION

S=1:50



DETAIL OF PERFORATED PIPE  $\phi$  40mm

S=1:5



THE DEPARTMENT OF WATER  
 INDUCED DISASTER PREVENTION AND  
 TEH DEPARTMENT OF ROADS  
 THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
 NIPPON KOEI CO., LTD. (NK)

04			DESIGNED BY	
03			DRAWN BY	
02			ASSISTED BY	
01			RECOMMENDED BY	
REV.	DATE	DESCRIPTION	APPROVED BY	

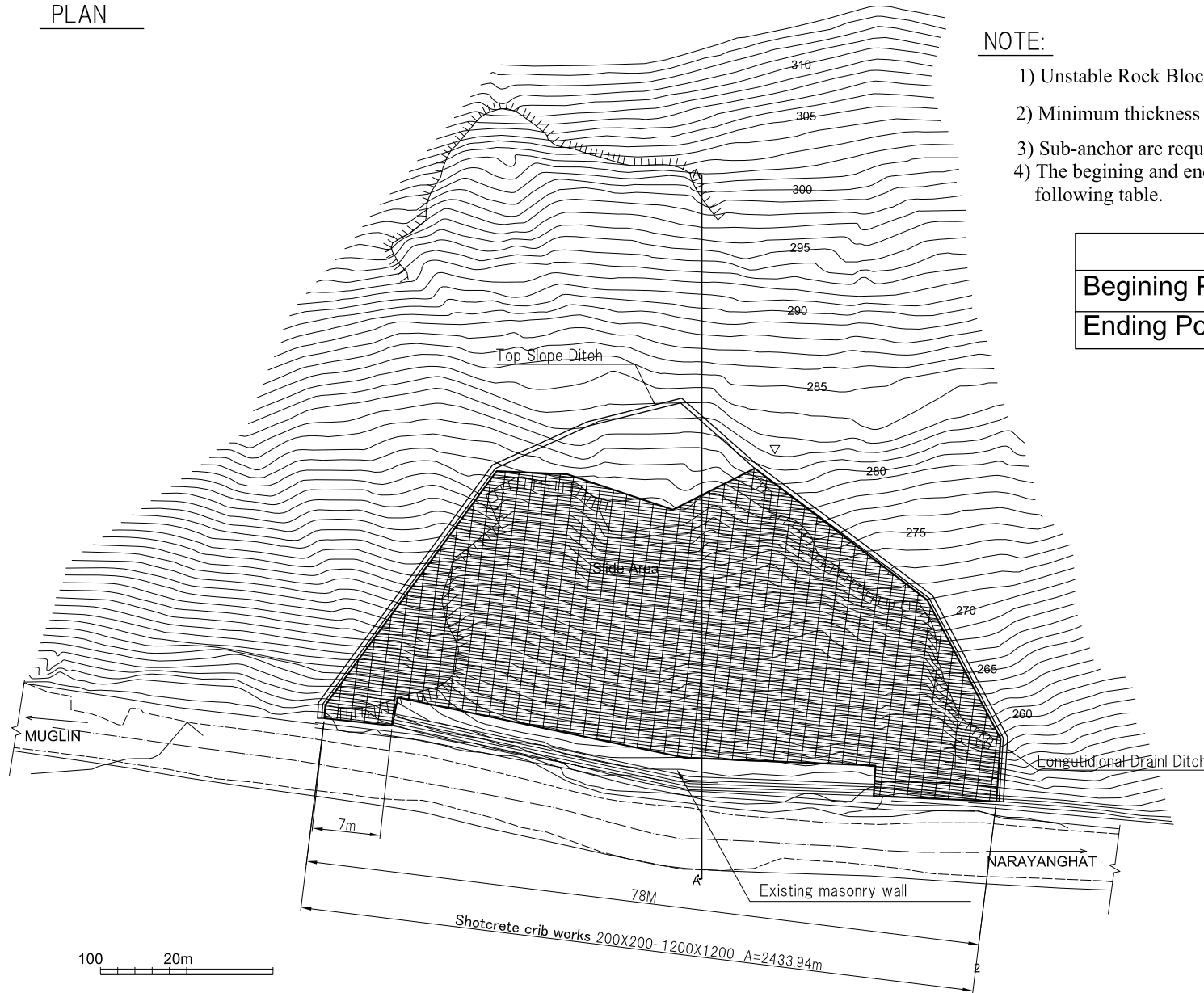
THE STUDY ON  
 DISASTER RISK MANAGEMENT FOR  
 NARAYANGHARH-MULING HIGHWAY

		SCALE
DATE	DWG. NO.	
FEBRUARY 2008	SO8-02	

# SHOTCRETE CRIB WORKS IN 30KM.+690

S=1:500

PLAN

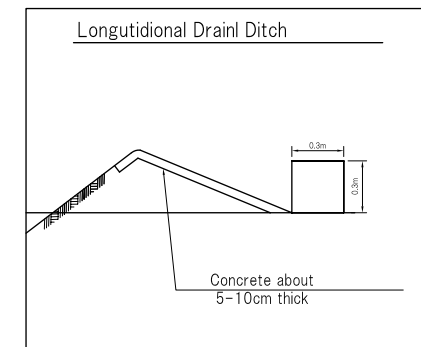
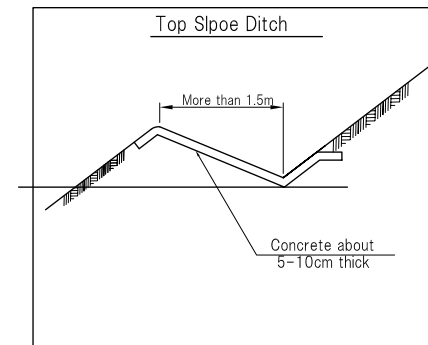


## NOTE:

- 1) Unstable Rock Blocks shall be removed before the construction of crib work.
- 2) Minimum thickness of 30cm shall be kept for shotcrete crib.
- 3) Sub-anchor are required for fixing cribs between Rock bolts but not shown.
- 4) The begining and ending points of shotcrete crib work are shown in the following table.

	X	Y
Begining Point(BP)	1008145	26806
Ending Point (EP)	1086026	17164

## Ditch Detail



THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

04		DESIGNED BY	
03		DRAWN BY	
02		ASSISTED BY	
01		RECOMMENDED BY	
REV.	DATE	DESCRIPTION	APPROVED BY

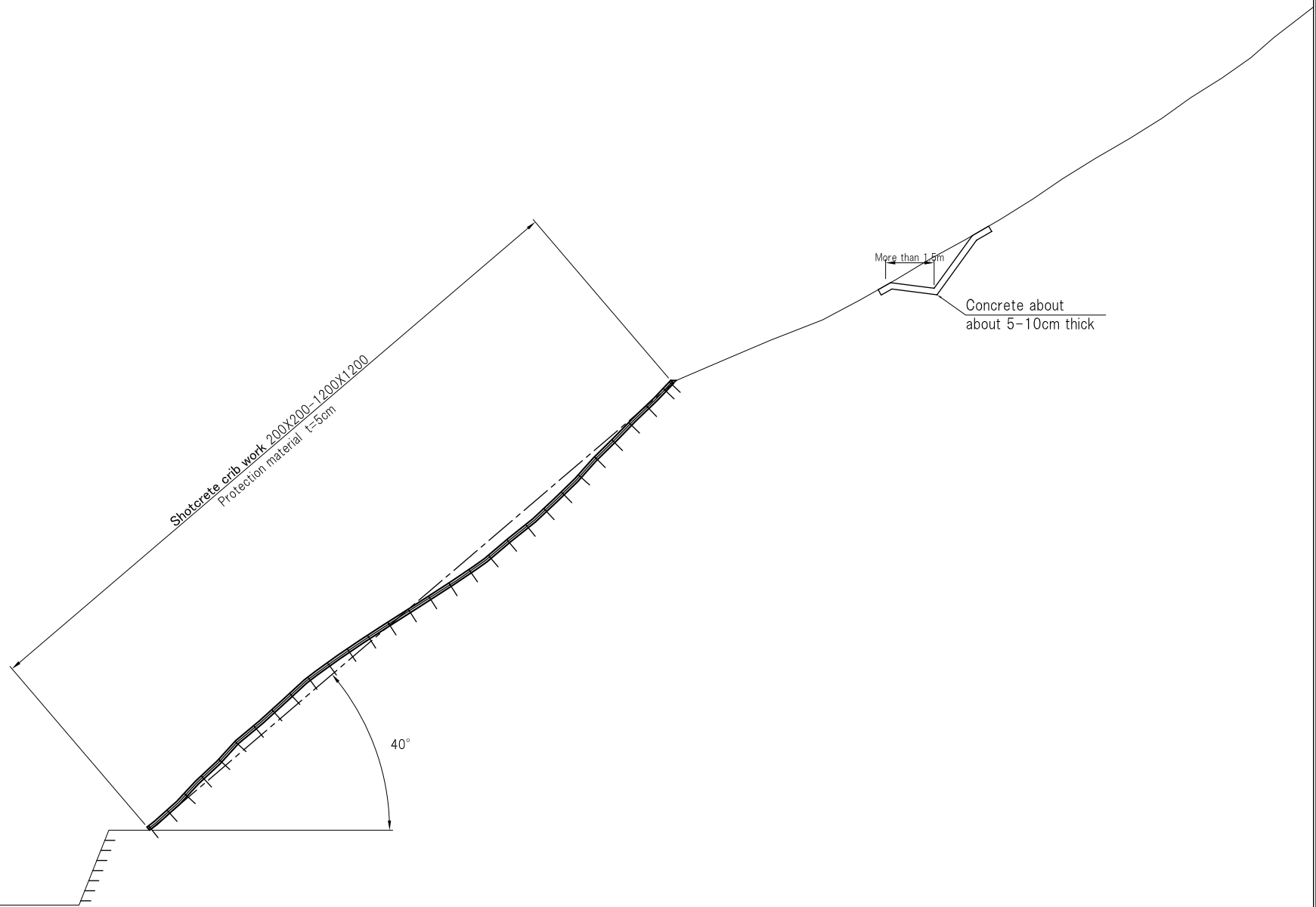
THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

SCALE

DATE  
FEBRUARY 2008

DWG. NO.  
S09-01

# STANDARD SECTION (A-A') S=1:200



THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

04		DESIGNED BY	
03		DRAWN BY	
02		ASSISTED BY	
01		RECOMMENDED BY	
REV.	DATE	DESCRIPTION	APPROVED BY

THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

SCALE

DATE  
FEBRUARY 2008

DWG. NO.  
SO9-02

# DETAIL OF SHORTCRETE CRIB WORK

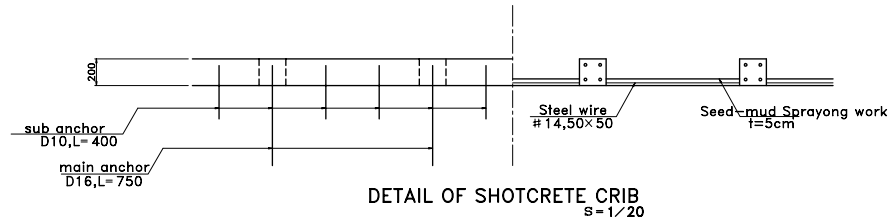
( F200 1,200×1,200 )

SECTION

S=1/20

B-B section

C-C section

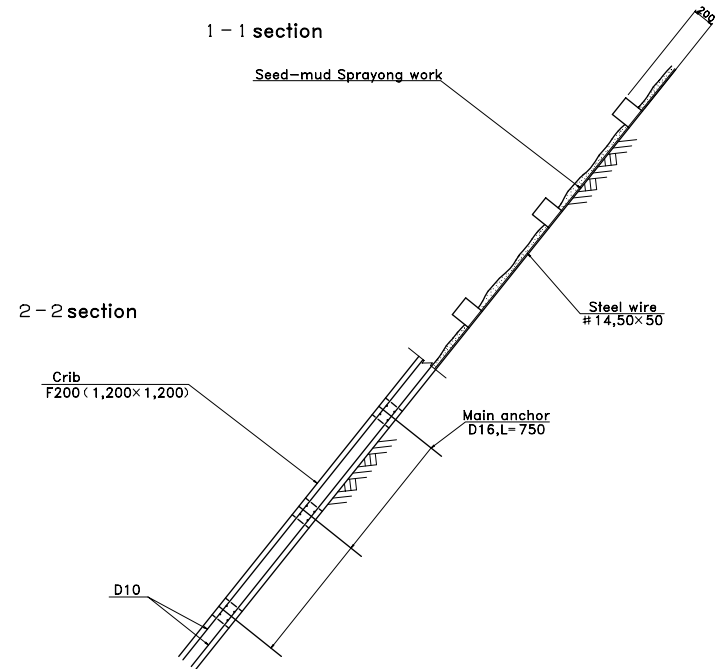


DETAIL OF SHOTCRETE CRIB  
S=1/20

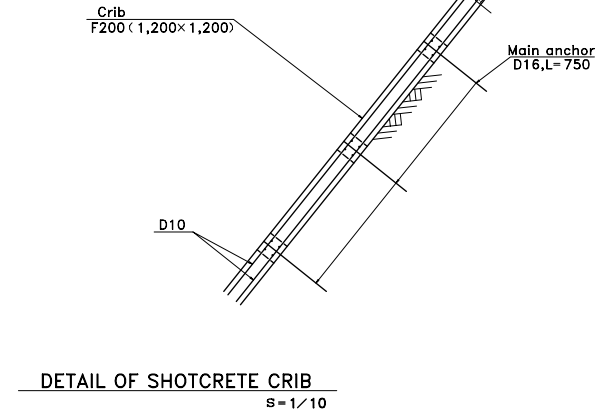
SECTION

S=1/25

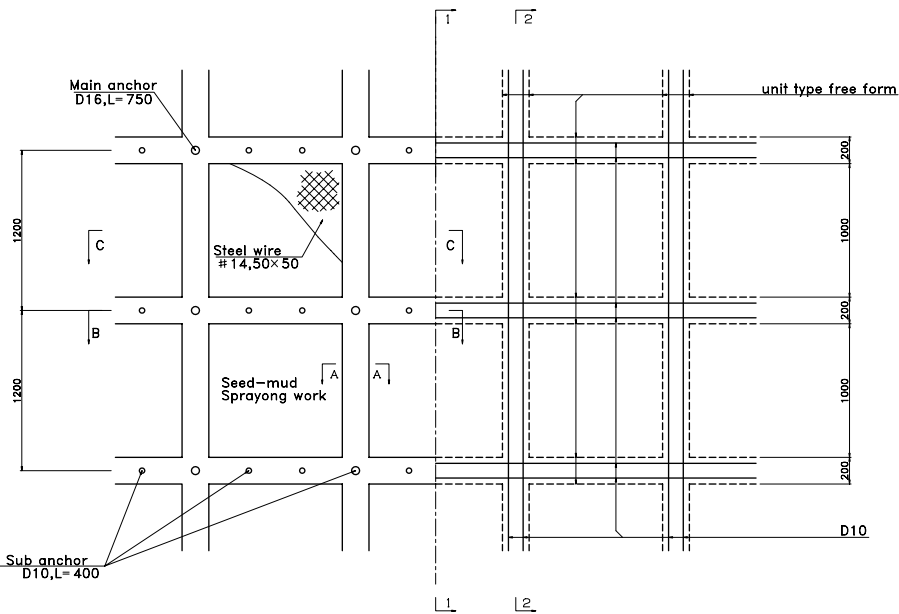
1-1 section



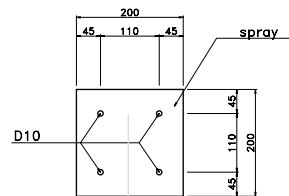
2-2 section



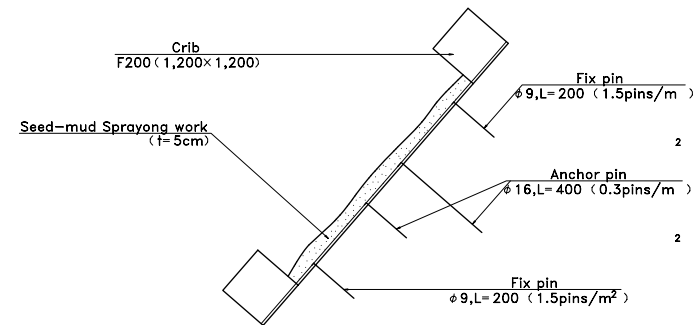
DETAIL OF SHOTCRETE CRIB  
S=1/10



A-A section s=1/5



\* design strength of spray mortar  
 $\sigma_{ck} = 15N/mm^2$   
steel bar SD295



THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

04		DESIGNED BY	
03		DRAWN BY	
02		ASSISTED BY	
01		RECOMMENDED BY	
REV.	DATE	APPROVED BY	

THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

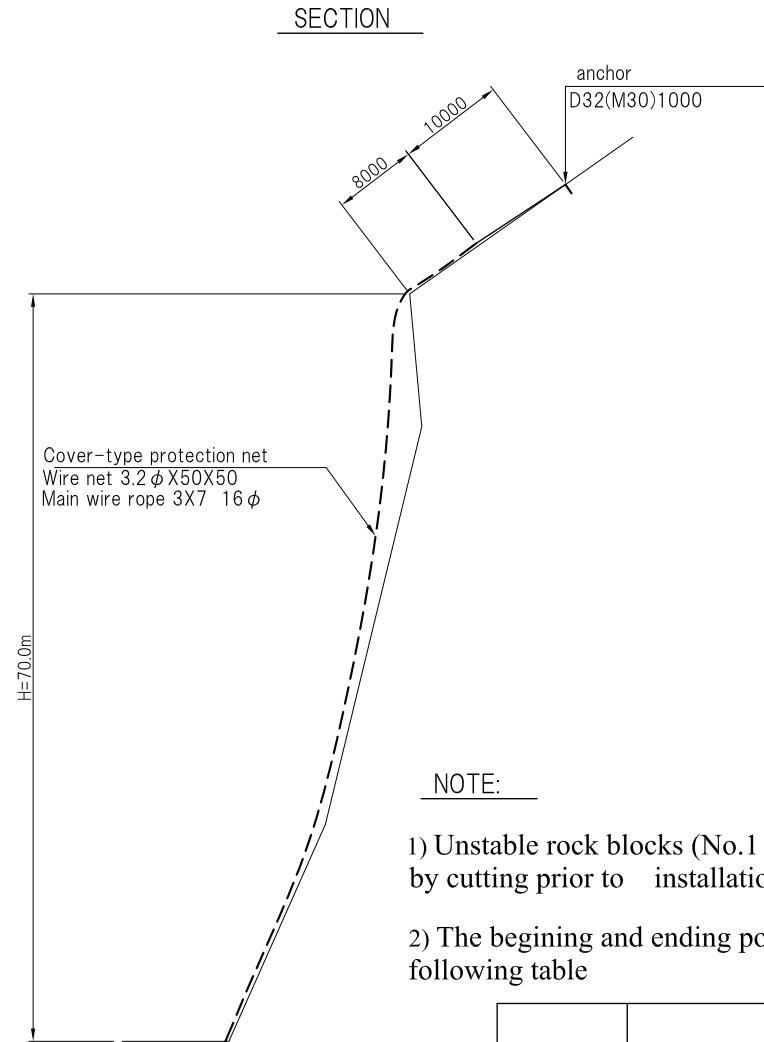
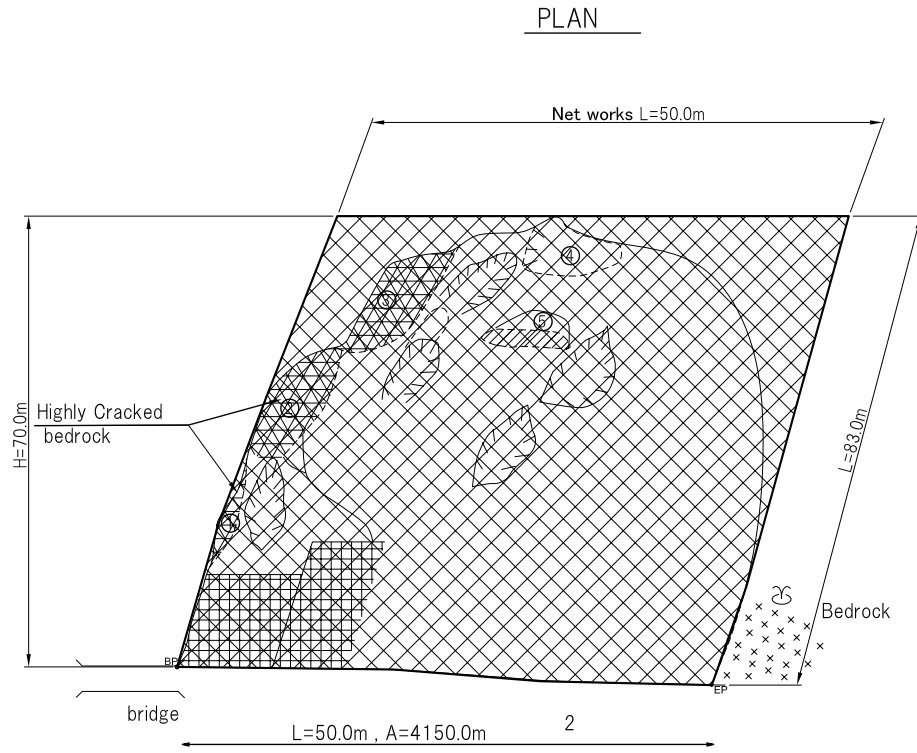
DATE  
FEBRUARY 2008

DWG. NO.  
S09-03

SCALE

# ROCK FALL PROTECTION NET WORK IN 34KM.+200 SITE

S=1:500



NOTE:

- 1) Unstable rock blocks (No.1 to No.5) shall be removed by cutting prior to installation of Net works
- 2) The begining and ending points are shown in the following table

Rock volume to be cut

①	1.5 x 2.0 x 3.0	m <sup>3</sup>
②	6.0 x 2.0 x 6.0	m <sup>3</sup>
③	2.0 x 4.0 x 8.0	m <sup>3</sup>
④	1.5 x 4.0 x 2.0	m <sup>3</sup>
⑤	1.5 x 8.0 x 2.0	m <sup>3</sup>

Net works		X	Y
	Beginning Point (BP)	25565	29903
Ending Point (EP)	75646	28194	

THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

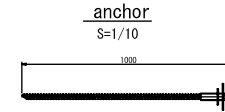
04		DESIGNED BY	
03		DRAWN BY	
02		ASSISTED BY	
01		RECOMMENDED BY	
REV.	DATE	DESCRIPTION	APPROVED BY

THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

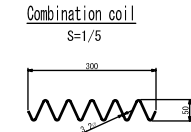
		SCALE
DATE	DWG. NO.	
FEBRUARY 2008	S10-01	

# STRUCTURAL DETAIL OF COVER TYPE ROCK NET

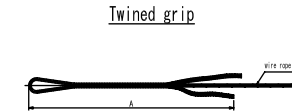
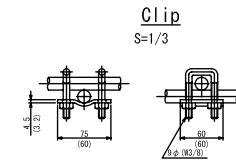
	Wire net	Longitudinal rope	Horizontal support rope	Reinforcement longitudinal rope	Support Horizontal rope	Anchor	Combination coil
TRN-1000	3.2 φ 50X50	3X7X16 φ	3X7X16 φ	3X7X12 φ	3X7X12 φ	D32 (M30) X1000	3.2 φ X50X300



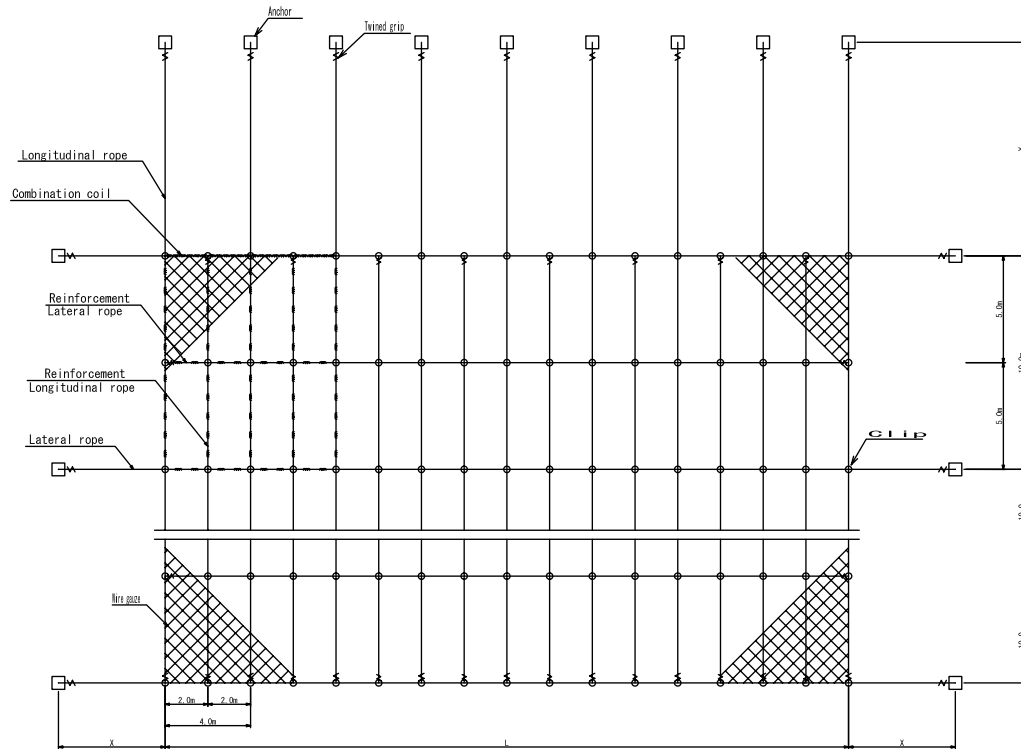
D32 (M30) X1000



Sample



	L(mm)	
	For wire	for pipe
φ 16	1200	1385
φ 12	800	975



THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

REV.	DATE	DESCRIPTION
01		
02		
03		

DESIGNED BY	
DRAWN BY	
ASSISTED BY	
RECOMMENDED BY	
APPROVED BY	

THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

DATE	DWG. NO.
FEBRUARY 2008	S10-02

SCALE

REVTMENT TYPE CONCRETE GUIDE WALL IN RUWA KHOLA

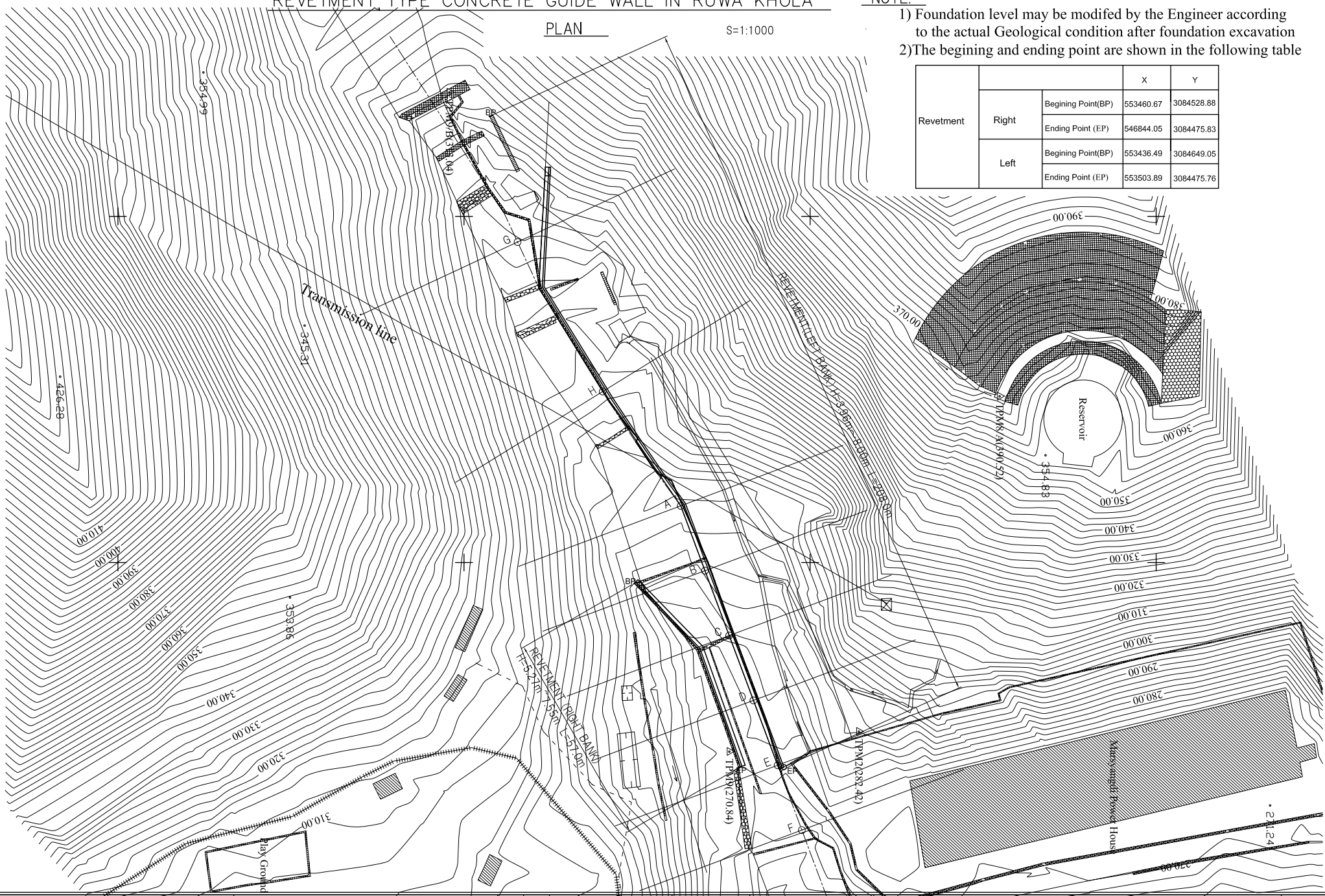
PLAN

S=1:1000

NOTE:

- 1) Foundation level may be modified by the Engineer according to the actual Geological condition after foundation excavation
- 2) The begining and ending point are shown in the following table

Revetment	Right	Beginning Point (BP)	X	Y
		Ending Point (EP)	546844.05	3084475.83
Left	Left	Beginning Point (BP)	X	Y
		Ending Point (EP)	553503.89	3084475.76



THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

DESIGNED BY	
DRAWN BY	
ASSISTED BY	
RECOMMENDED BY	
APPROVED BY	
REV.	DATE
	DESCRIPTION

THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

DATE  
FEBRUARY 2008

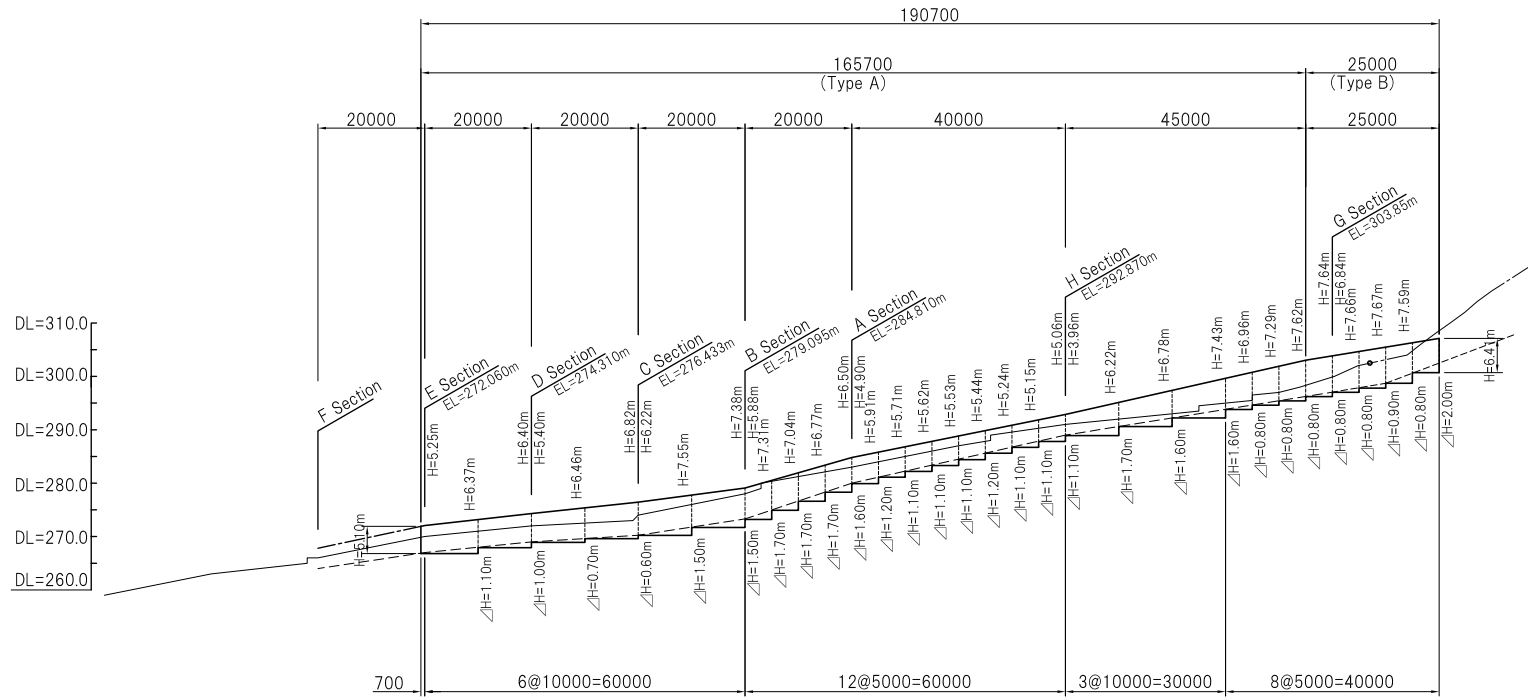
DWG. NO.  
R01-01

SCALE  
1:1000

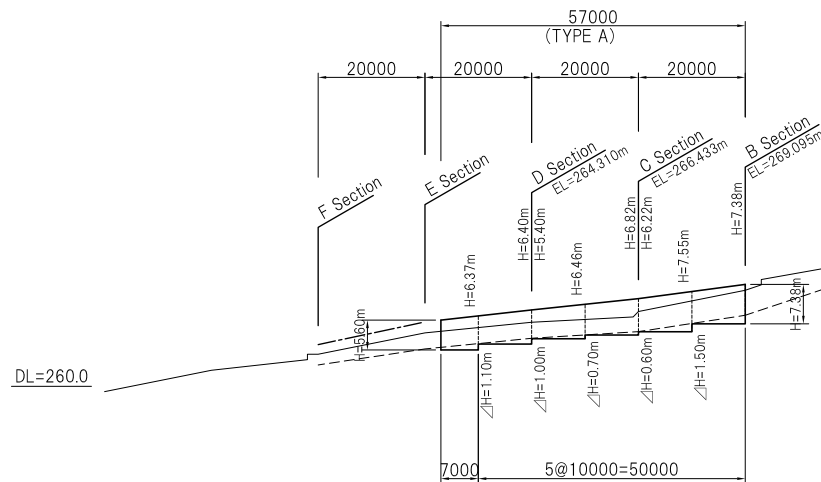


# LONGITUDINAL SECTION

## REVEMENT WORK (LEFT BANK) S=1:1000

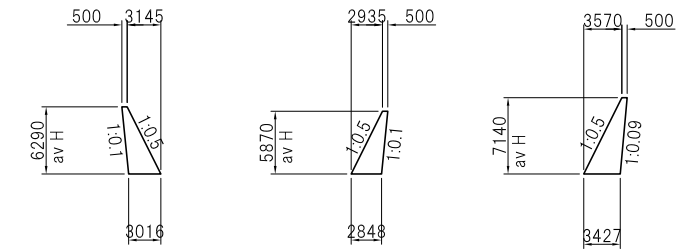


## REVEMENT (RIGHT BANK) S=1:1000



## DETAIL OF REVEMENT WORK S=1:500

### TYPE A: RIGHT BANK    TYPE A: LEFT BANK    TYPE B: LEFT BANK



THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

DESIGNED BY	
DRAWN BY	
ASSISTED BY	
RECOMMENDED BY	
APPROVED BY	

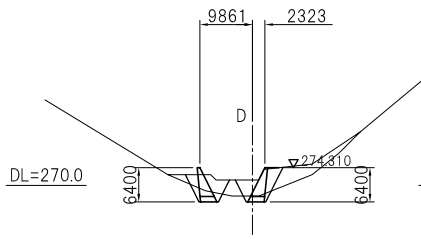
THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

DATE	DWG. NO.
FEBRUARY 2008	RO1-02

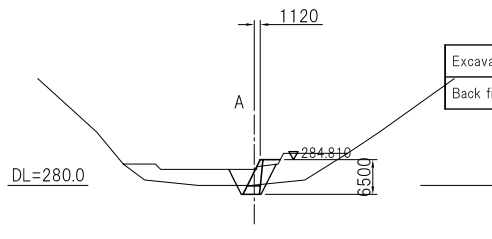
SCALE  
1:1000

SECTIONS

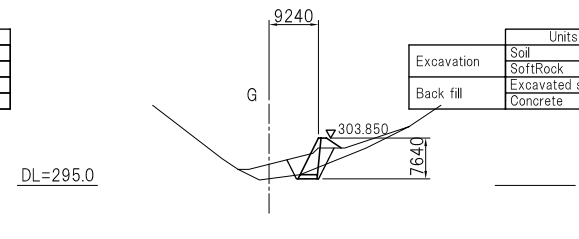
S=1:1000



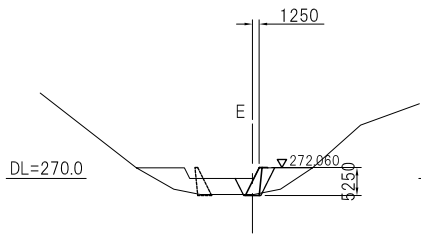
		Units	m <sup>2</sup>
Excavation	Soil		43.5
	SoftRock		15.5
Back fill	Excavated soil		31.2
	Concrete		6.5



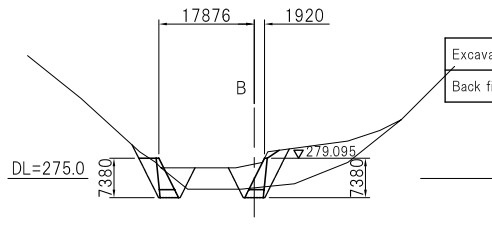
		Units	m <sup>2</sup>
Excavation	Soil		22.7
	SoftRock		8.1
Back fill	Excavated soil		19.9
	Concrete		3.3



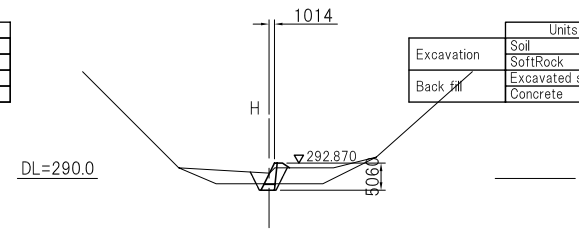
		Units	m <sup>2</sup>
Excavation	Soil		24.0
	SoftRock		7.3
Back fill	Excavated soil		22.6
	Concrete		1.5



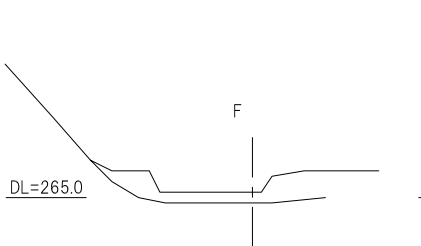
		Units	m <sup>2</sup>
Excavation	Soil		20.3
	SoftRock		0.8
Back fill	Excavated soil		12.8
	Concrete		0.3



		Units	m <sup>2</sup>
Excavation	Soil		55.3
	SoftRock		42.8
Back fill	Excavated soil		44.8
	Concrete		22.3



		Units	m <sup>2</sup>
Excavation	Soil		13.6
	SoftRock		4.4
Back fill	Excavated soil		11.0
	Concrete		1.7



		Units	m <sup>2</sup>
Excavation	Soil		46.8
	SoftRock		7.2
Back fill	Excavated soil		39.8
	Concrete		2.7

THE DEPARTMENT OF WATER  
INDUCED DISASTER PREVENTION AND  
TEH DEPARTMENT OF ROADS  
THE GOVERNMENT OF NEPAL

JAPAN INTERNATIONAL COOPERATION AGENCY  
**JICA** NIPPON KOEI CO., LTD. (NK)

REV.	DATE	DESCRIPTION
03		
02		
01		

DESIGNED BY	
DRAWN BY	
ASSISTED BY	
RECOMMENDED BY	
APPROVED BY	

THE STUDY ON  
DISASTER RISK MANAGEMENT FOR  
NARAYANGHARH-MULING HIGHWAY

DATE	DWG. NO.	SCALE
FEBRUARY 2008	RO1-03	1:1000