MINISTRY OF DISASTER MANAGEMENT AND HUMAN RIGHTS

DEPARTMENT OF IRRIGATION OF THE MINISTRY OF IRRIGATION AND WATER MANAGEMENT

COMPREHENSIVE STUDY ON DISASTER MANAGEMENT IN SRI LANKA

FINAL REPORT

(DATA BOOK)

MARCH 2009

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS CO., LTD. ASIAN DISASTER REDUCTION CENTER



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<u>Data Book 1</u>

River Cross Section Survey

Data Book 1 River Cross Section Survey

1.1 Contractor

The river cross section survey was conducted by the following contractor in Sri Lanka. Company: Gamini B. Dodanwela Associates (Pvt) Ltd. , Colombo, Sri Lanka Address : 213/C-2/2, Anagalika Dharmapala Mawatha, Dehiwala, Sri Lanka Tel : (00911) 2716996 / 4205427 Fax : 4208148 e-mail : bhoomi@isplanka.lk

1.2 Objective

To undertake a comprehensive study on Disaster Management in Sri Lanka by using river cross sections as basic material to be used for further elaboration of rating curves of rivers at main gauging stations and for utilization for pilot projects of early warning systems in the target river basins.

1.3 Scope of the Survey

The Scope of work is to conduct river cross section survey in 4 River Basins at 18 locations as listed below:

River		Site	Note	Purpose
1.	Kelani	Glencourse	G/S	To check rating curves
2.	Kelani	Hanwella	G/S	To check rating curves
3.	Kelani	Kaduwella	G/S	To check rating curves
4.	Kelani	Nagalagam	G/S	To check rating curves
5.	Kalu	Ratnapura	G/S	To check rating curves
6.	Kalu	Ellagawa Bridge	-	To check flow capacity
7.	Kalu	Ellagawa	G/S	To check rating curves
8.	Kalu	Halwatura Bridge	-	To check flow capacity
9.	Kalu	Kuda Ganga Confluence	-	To check flow capacity
10.	Kalu	Putupaura	G/S	To check rating curves
11.	Gin	Tawalama	G/S	To check rating curves
12.	Gin	Agaliya	G/S	To check rating curves
13.	Gin	Ganegama	P/S	To check water levels
14.	Gin	Hegoda	P/S	To check water levels
15.	Nilwala	Pittabeddara	G/S	To check rating curves
16	Nilwala	Bopagoda	G/S	To check rating curves
17.	Nilwala	Akuressa	P/S	To check water levels
18.	Nilwala	Talgahangoda	P/S	To check water levels

 Table I.3.1
 Location of River Cross Section Survey

Note: G/S - Gauging Station (water level observation) P/S - Pumping Station

1.4 Geodetic Datum

The Datum used for the surveys is the Sri Lanka National Datum established by the Survey Department. The Map Projection being the Transverse Mercator Projection as specified by the Survey Dept. having its origin at Pidurutalagala Trig Station is utilized.

Latitude of Origin	7° 00' 01.7290 N		
Longitude of the Central Meridian	80° 46' 18.1600 E		
False Northing	200,000 m		
False Easting 200,000 m			
Scale Factor on Central Meridian	1:0.9999238418		

Table I.4.1 Summary of Geodetic Datum

The National Grid Values for the river cross sections have been obtained using a Hand held /Portable GPS with reference to the above datum.

1.5 Elevation Datum

All elevations are related to the Sri Lanka National Height Datum, which is Mean Sea Level. Leveling is connected with old Survey Dept. bench marks or with reference TBMs and Guage Zero's elevations of which were supplied to the surveyors by the Irrigation Dept. The Table below gives the reference to the leveling connection to the respective sites:

r					
River Site		Site	Levelling Reference		
1.	Kelani	Glencourse	Survey Dept. FBM at Avissawella		
2.	Kelani	Hanwella	Irrigation Dept. TBM		
<u></u>			Survey Dept. BM No.4		
3.	Kelani	Kaduwella	On Kaduwela Bridge		
4.	Kelani	Nagalagam	BM established for Colombo		
4.	Reidili	Nagalagam	Katunayake Expressway Project		
5.	Kalu	Ratnapura	Survey Dept. FBM at Ratnapura		
6.	Kalu	Ellagawa Bridge	Survey Dept. BM No.45 of PL No.LXIII		
7.	Kalu	Ellagawa	-do-		
8.	Kalu	Halwatura Bridge	-do-		
9.	Kalu	Kalu Ganga Confluence	Survey Dept. BM No.19 of SL CXXXIII		
10.	Kalu	Putupaura	Survey Dept. BM No.15 of SL CXXXIII		
11.	Gin	Tawalama	Gauge Zero elevation supplied by the Irrigation Dept.		
12.	Gin	Agaliya	-do-		
13.	Gin	Ganegama	Irrigation Dept. TBM		
14.	Gin	Hegoda	-do-		
15.	Nilwala	Pittabeddara	Survey Dept. BM No.63 of SL LXXXIV		
16	Nilwala	lilwala Bopagoda	Gauge Zero elevation supplied by the		
10	INIIWala		Irrigation Dept.		
17.	Nilwala	Jilwala Akuressa	Survey Dept. BM in Akuressa Police Station		
			Premises (formerly Rest House)		
18.	Nilwala	Talgahangoda	Irrigation Dept. TBM		

Table I.5.1 Elevation Datum

All Survey Marks (Bench Mark) established at each CS Site have been heightened by double- run Spirit leveling with mis-closures closing within the required accuracy.

1.6 River Bed Surveys

All river bed levels have been taken using an Echo Sounder. The Echo Sounder was carried attached to a boat along the Cross Section line. The readings taken from the Echo Sounder were converted to the MSL datum with reference to the MSL elevation of the water level of the river at the time of the bed level survey.

1.7 Period of Survey

Details of the dates of the survey are given below:

River		Site	Date of Survey		
ſ	Kiver	Sile	River Basin	River Bed	
1.	Kelani	Glencourse	20.05.2007	22.06.2007	
2.	Kelani	Hanwella	25.05.2007	20.06.2007	
3.	Kelani	Kaduwella	24.05.2007	14.06.2007	
4.	Kelani	Nagalagam	24.05.2007	17.07.2007	
5.	Kalu	Ratnapura	25.05.2007	21.06.2007	
6.	Kalu	Ellagawa Bridge	25.05.2007	21.06.2007	
7.	Kalu	Ellagawa	25.05.2007	21.06.2007	
8.	Kalu	Halwatura Bridge 19.06.2		19.06.2007	
9.	Kalu	Kalu Ganga Confluence	19.06.2007	19.06.2007	
10.	Kalu	Putupaura	19.06.2007	19.06.2007	
11.	Gin	Tawalama	05.06.2007	15.06.2007	
12.	Gin	Agaliya	16.06.2007	16.06.2007	
13.	Gin	Ganegama	16.06.2007	16.06.2007	
14.	Gin	Hegoda	17.06.2007	17.06.2007	
15.	Nilwala	Pittabeddara	06.06.2007	06.06.2007	
16	Nilwala	Bopagoda	07.06.2007	07.06.2007	
17.	Nilwala	Akuressa	08.06.2007	08.06.2007	
18.	Nilwala	Nilwala Talgahangoda		08.06.2007	

Table I.7.1 Date of Field Survey Conducted

Although the Contractor completed all field works by 21^{st} June 2007, they could not complete the CS No.4 at Nagalagam as the site was strictly restricted to enter for river bed survey without Defense Ministry permission. This caused a unexpected delay and the Contractor should have waited for the security clearance to do the survey. The security clearance was released to the Contractor on 16^{th} July 2007, and soon after the river bed levels were duly measured.

1.8 Surveyed Quantities

The survey quantities and the details of the drawings prepared are listed as follows:.

		. 2010 1101 1	Ourveyeu	2.2.2.100			
			Total	Details of Drawings			
River		Site	Length of	Scales		01	
			CS(m)	Н	V	Sheet Size	
1.	Kelani	Glencourse	165.68	1:500	1:200	A2	
2.	Kelani	Hanwella	173.04	1:500	1:200	A2	
3.	Kelani	Kaduwella	179.10	1:500	1:200	A2	
4.	Kelani	Nagalagam	210.51	1:500	1:200	A2	
5.	Kalu	Ratnapura	148.12	1:500	1:200	A2	
6.	Kalu	Ellagawa Bridge	75.93	1:500	1:200	A2	
7.	Kalu	Ellagawa	119.12	1:500	1:200	A2	
8.	Kalu	Halwatura Bridge	234.53	1:500	1:200	A2	
9.	Kalu	Kalu Ganga Confluence	165.49	1:500	1:200	A2	
10.	Kalu	Putupaura	188.41	1:500	1:200	A2	
11.	Gin	Tawalama	167.91	1:500	1:200	A2	
12.	Gin	Agaliya	275.63	1:1000	1:100	A2	
13.	Gin	Ganegama	420.18	1:1000	1:100	A2	
14.	Gin	Hegoda	737.31	1:1000	1:100	A1	
15.	Nilwala	Pittabeddara	262.95	1:1000	1:100	A2	
16	Nilwala	Bopagoda	112.93	1:500	1:200	A2	
17.	Nilwala	Akuressa	235.69	1:500	1:200	A2	
18.	Nilwala	Talgahangoda	361.21	1:1000	1:100	A2	

Table I.8.1 Surveyed Quantities

In case of CS No.16, it was not able to extend the right bank survey beyond the point due to objections from the people, who prevented the Contractor from entering their lands. The Contractor had constructed the Survey Mark (BM) on the Right Bank but could not survey it because the people objected at the time of survey.

The Contractor submitted a Survey Mark Location Plan below the CS Profile in each sheet to show the location of the Survey Mark (Bench Mark) with reference to the CS line. MSL Elevations at Gauge Zero as obtained by the survey are given in the respective drawings where the CS locations are at Gauging Stations.

1.9 Materials Delivered

 One set of the under mentioned 1:50,000 Topographical Maps showing the locations of CSS.

Lable 1.0.1 Ecoation map Cabinition				
Торо Мар	CS Nos.	River		
1. Avissawella	1&2	Kelani		
2. Colombo	3&4	Kelani		
3. Ratnapura	5 to 10	Kalu		
4. Matugama	11	Gin		
5. Ambalangoda	12 & 13	Gin		
6. Galle	14	Gin		
7. Morawaka	15 to 17	Nilwala		
8. Matara	18	Nilwala		

Table I.9.1 Location Map Submitted

- (2) 3 Sets of 18CS Profile drawings (Hard Copies). For details of drawings
- (3) CD containing 18 CS Profile data in Excel format
- (4) 3 Sets of 35 Survey Mark (Bench Mark) Description forms (Hard Copies), with photo of each point pasted to the form, location sketch of the respective point and other required information. (Form for No.16 RBP is not supplied as this Survey Mark could not be surveyed due to objections from the people in the area)
- (5) CD Containing Digital Photos of the photos pasted on the above description forms of the Survey Marks
- (6) CD Containing the soft copies of the Survey Mark Description Forms
- (7) 3 Copies of this Survey Report and a soft copy of same in a CD

1.10 Equipment Used

Following Equipment were used for the survey:

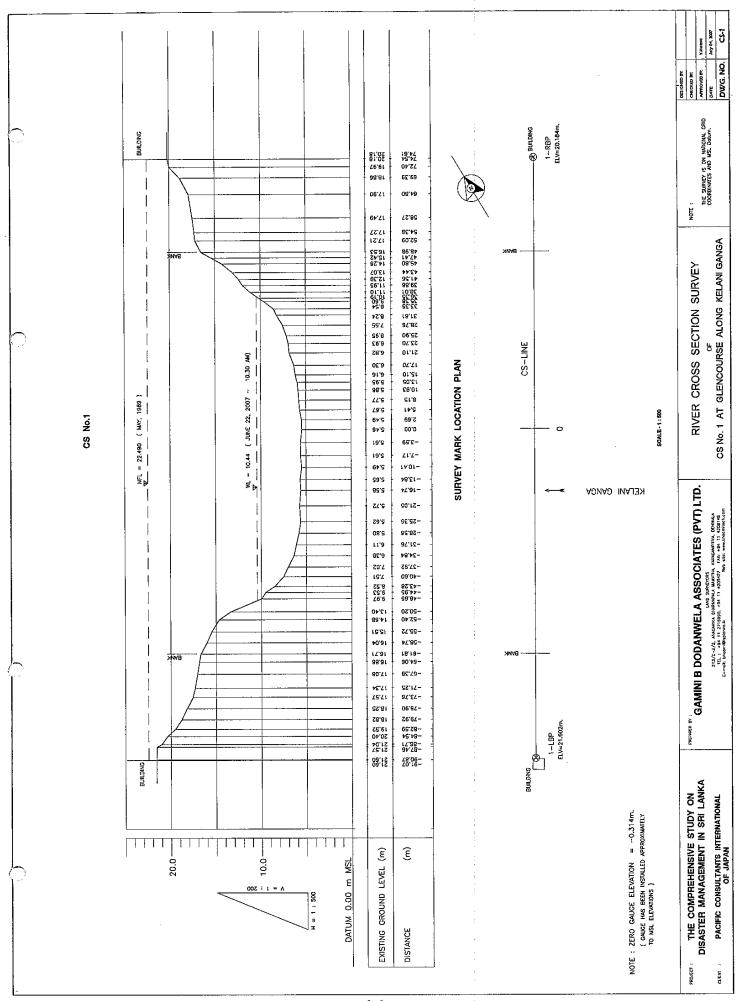
- (1) Hand held / Portable GPS MAGALLAN Explorist 600 14 Channel 3m accuracy.
- (2) SOKKIA Total Stations
- (3) SOKKIA Auto Levels
- (4) SOUTH SDE 28 Echo Sounder Transducer with frequency 200 kHz

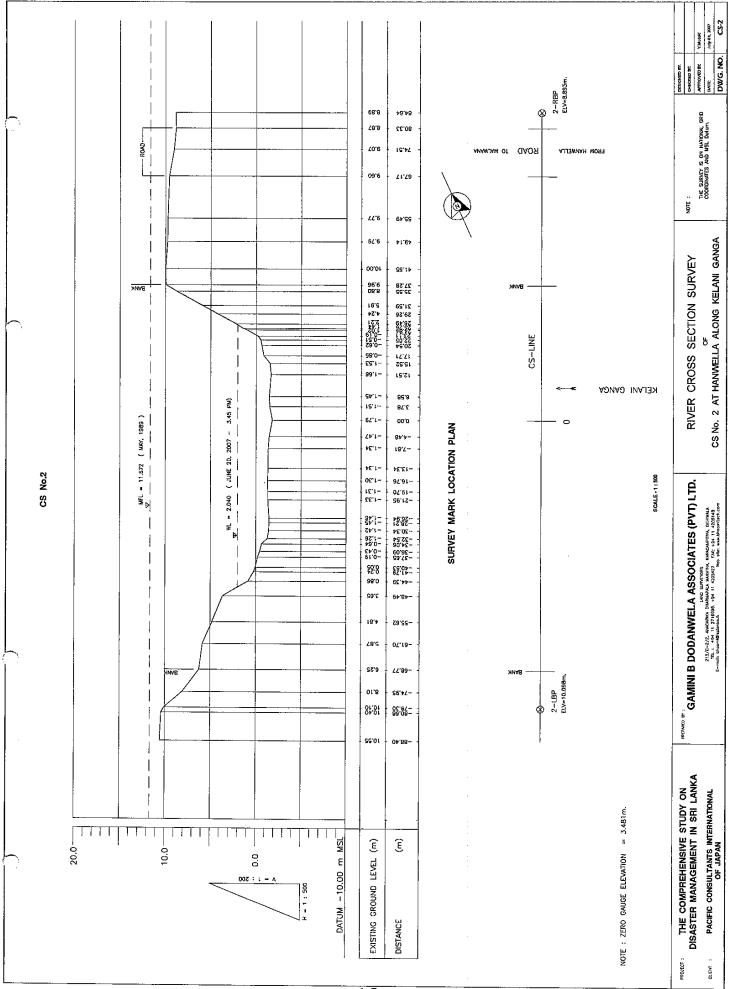
All drawings have been computer drawn to AutoCAD format.

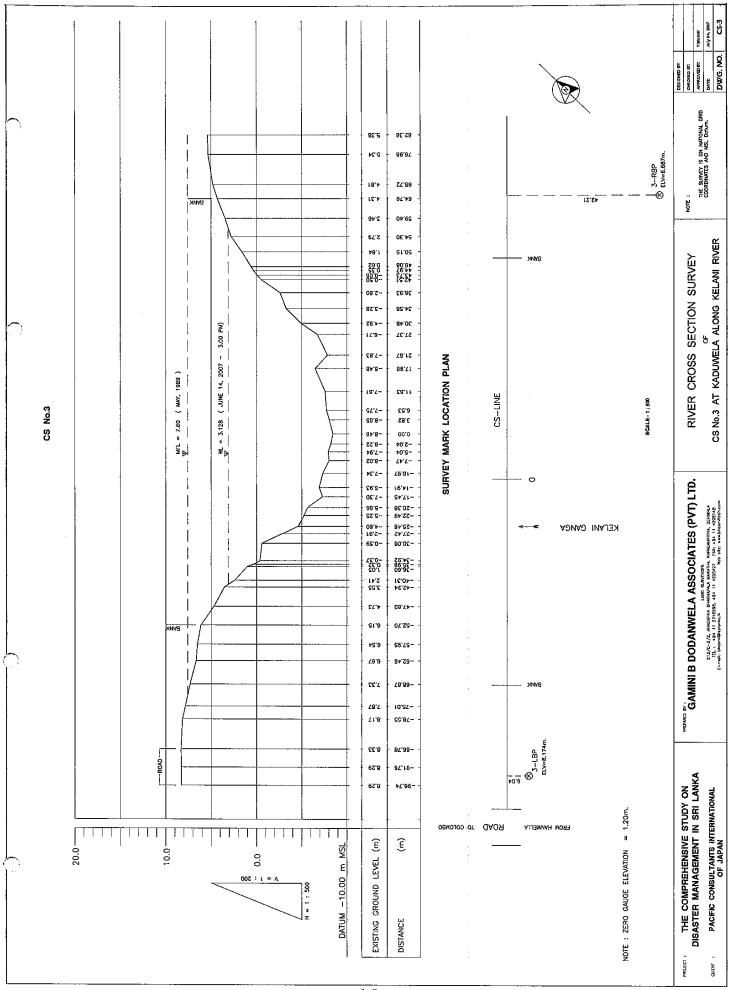
1.11 Staff Engaged

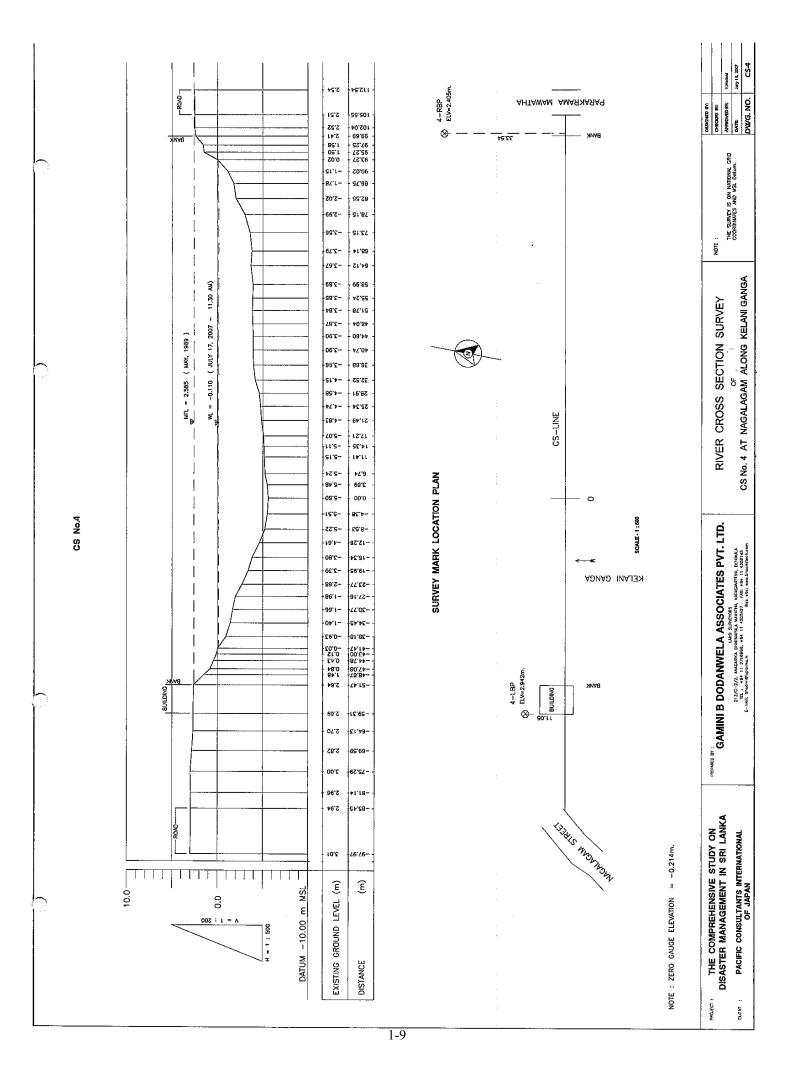
Following are the names of the key personnel who were engaged in the survey work:

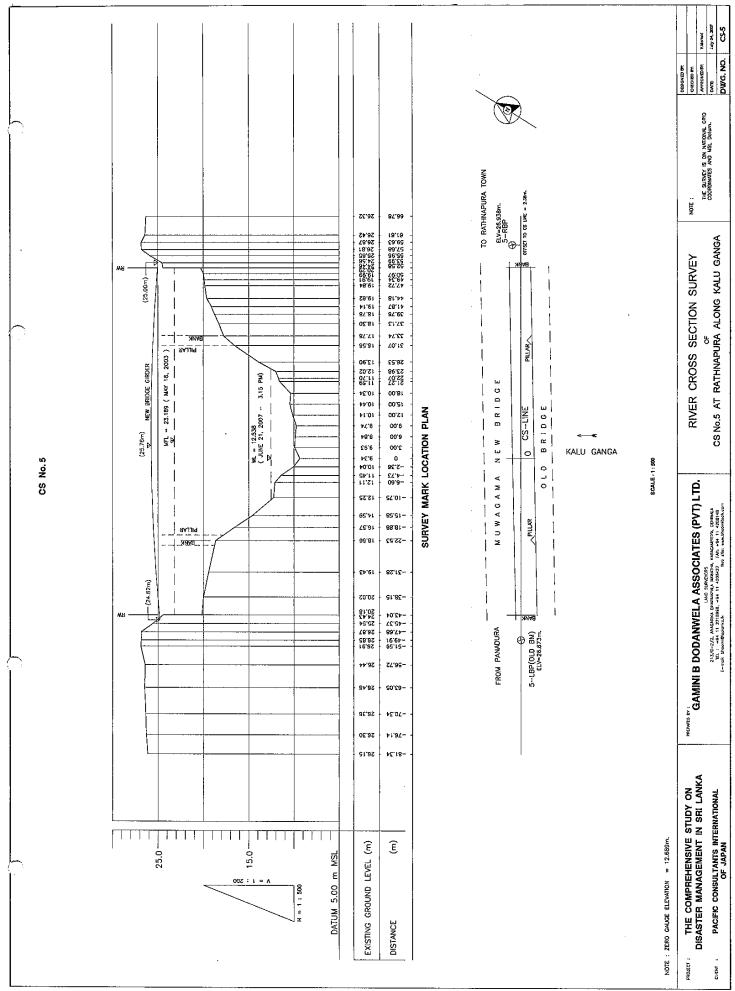
- (1) Mr. Gamini B Dodanwela, Chief Surveyor
- (2) Mr. M.W.Perera, Supervising Surveyor
- (3) Mr. S.R.C.Ranaweera, Surveyor
- (4) Mr. R.A.D.Aruna Kumara, Surveyor

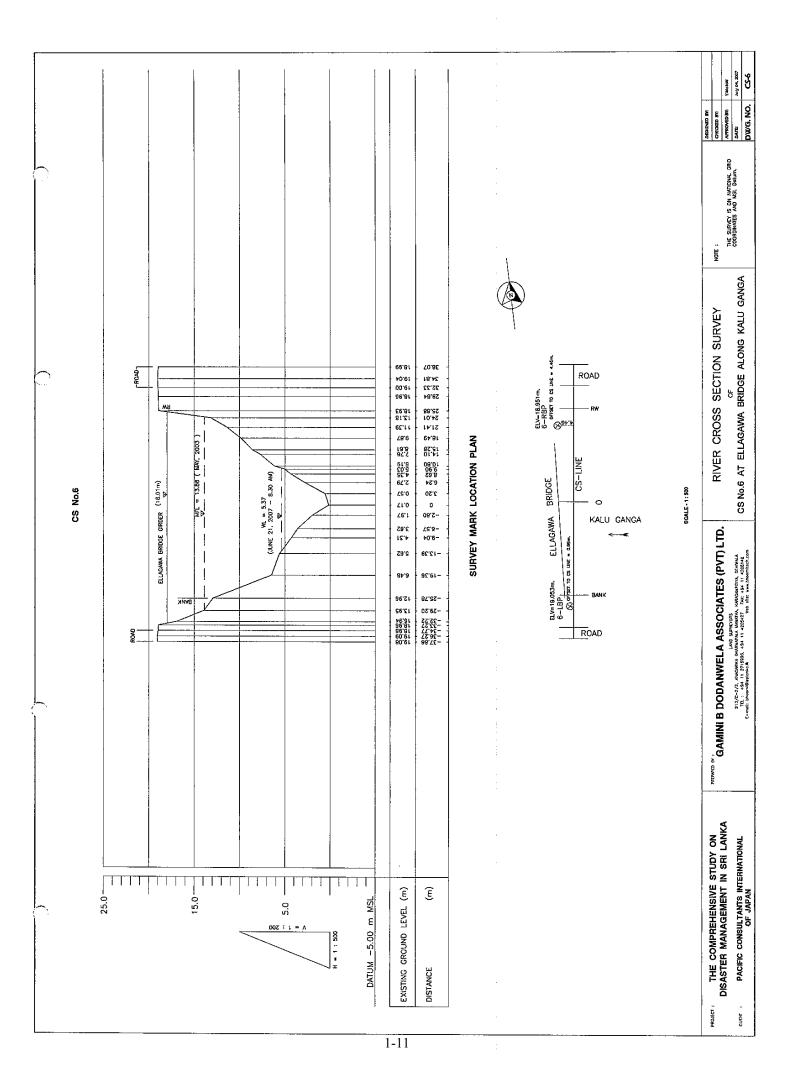


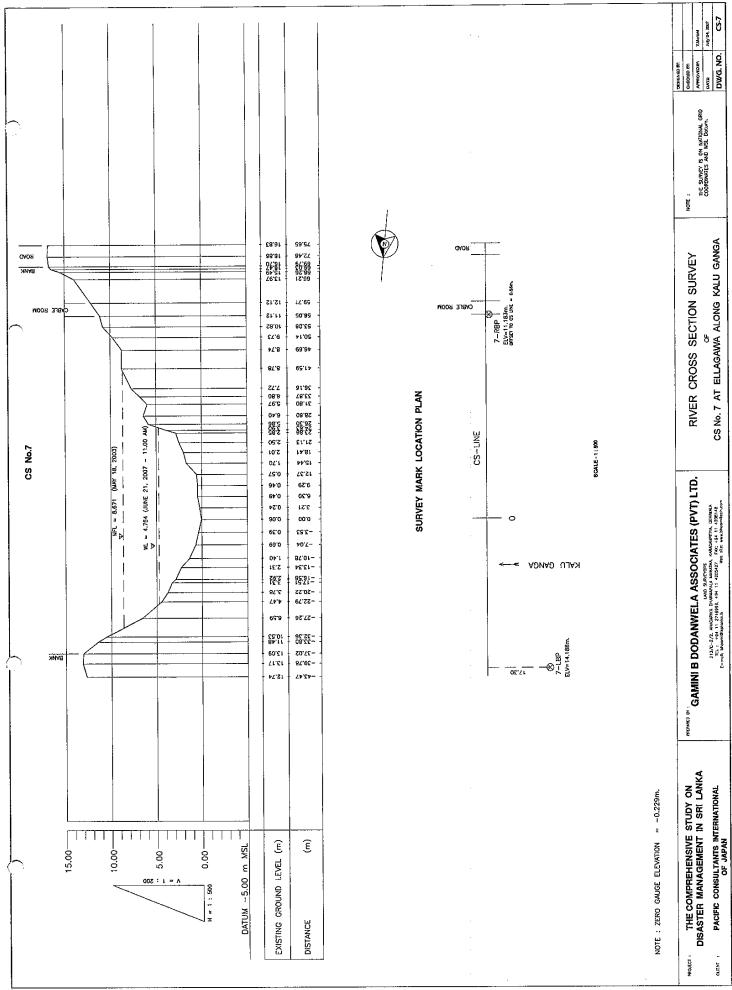


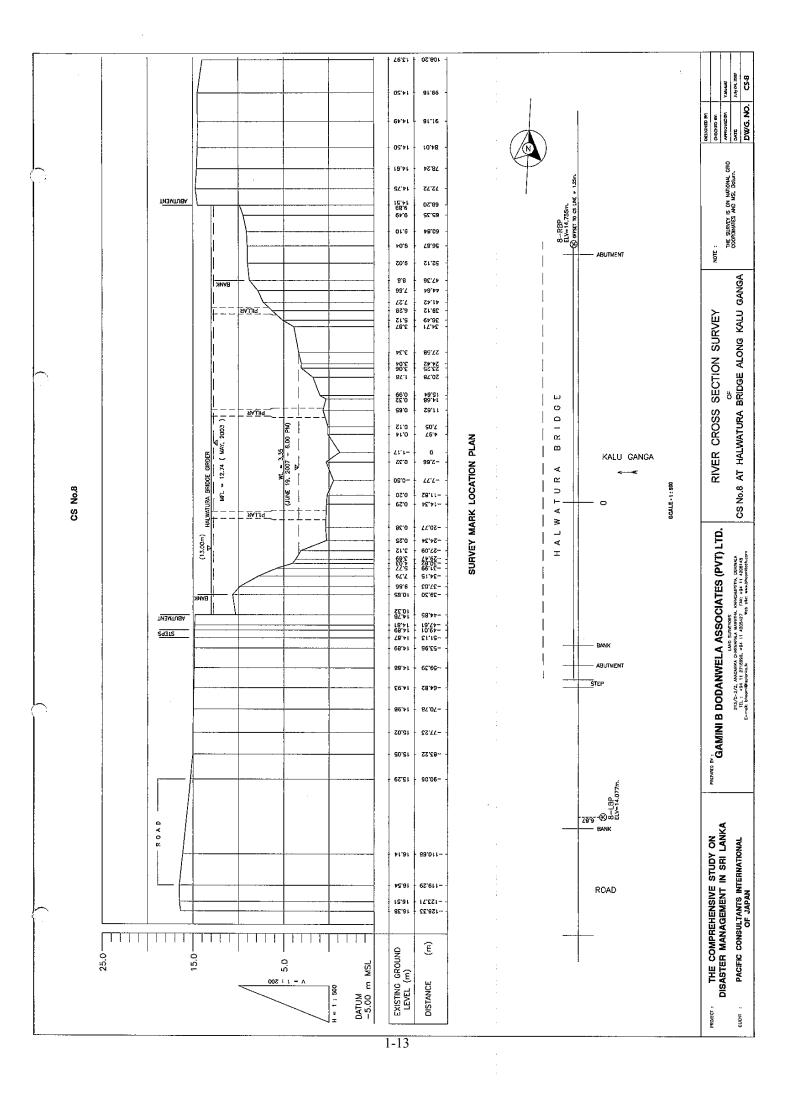


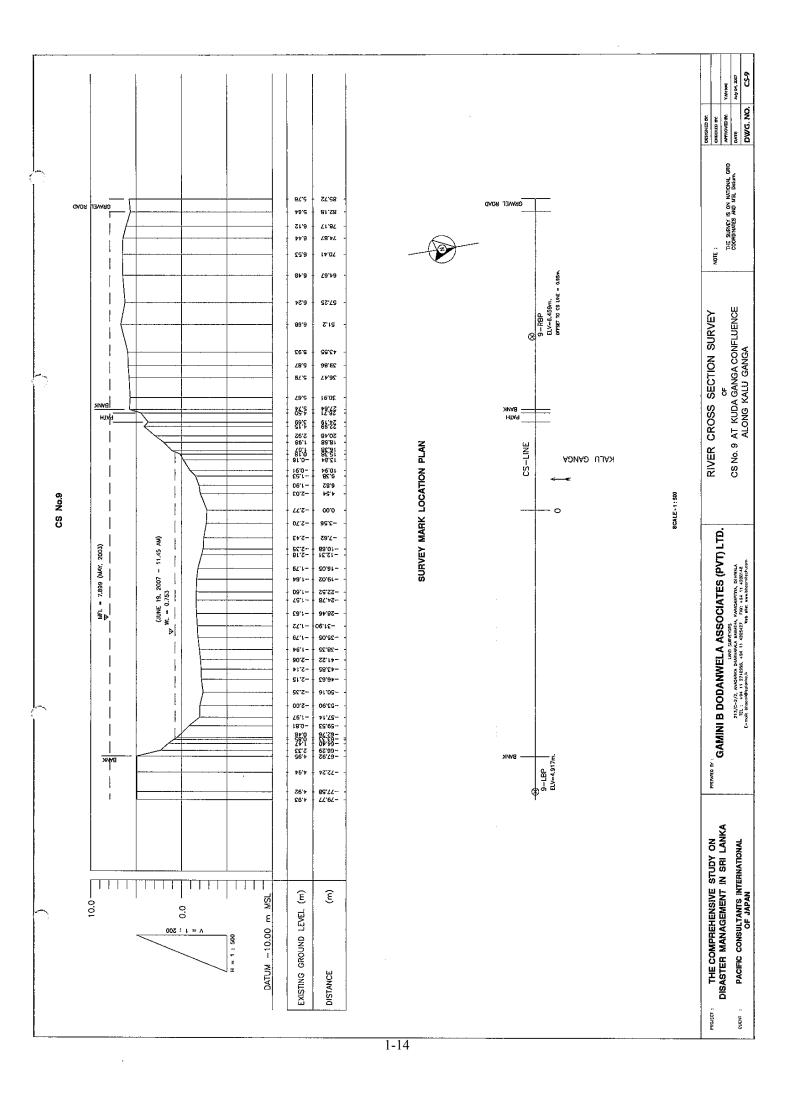


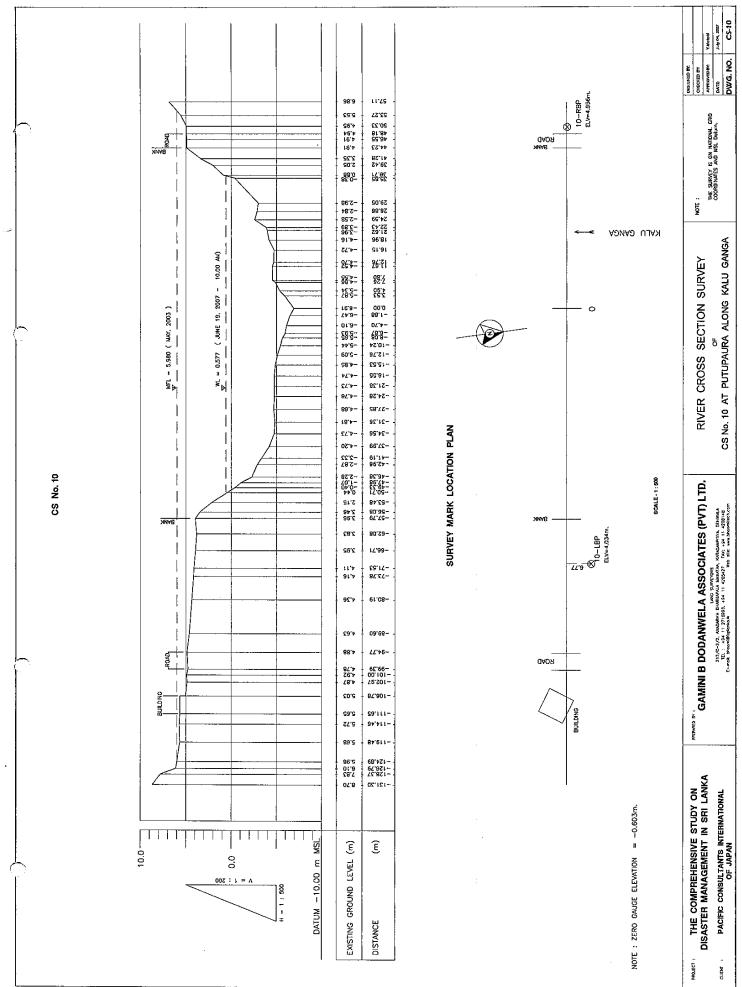


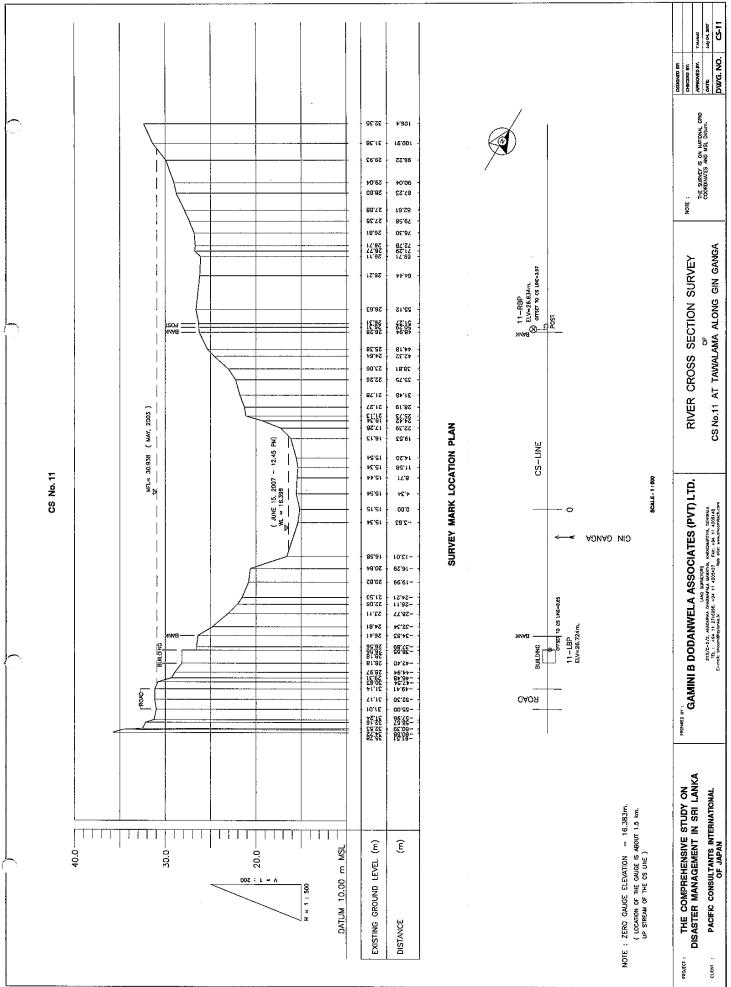


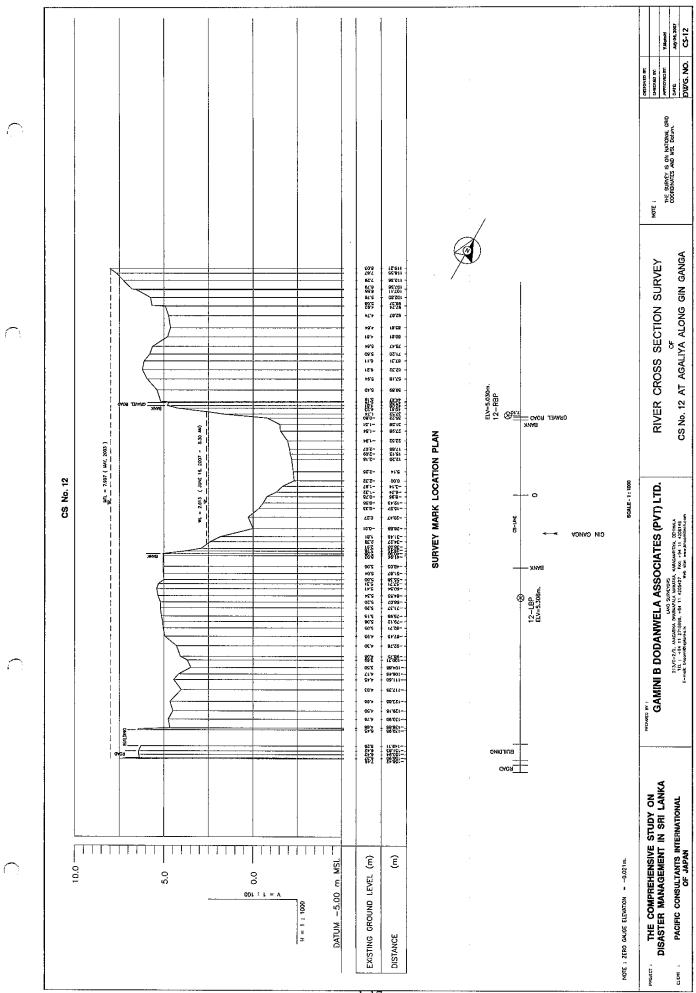


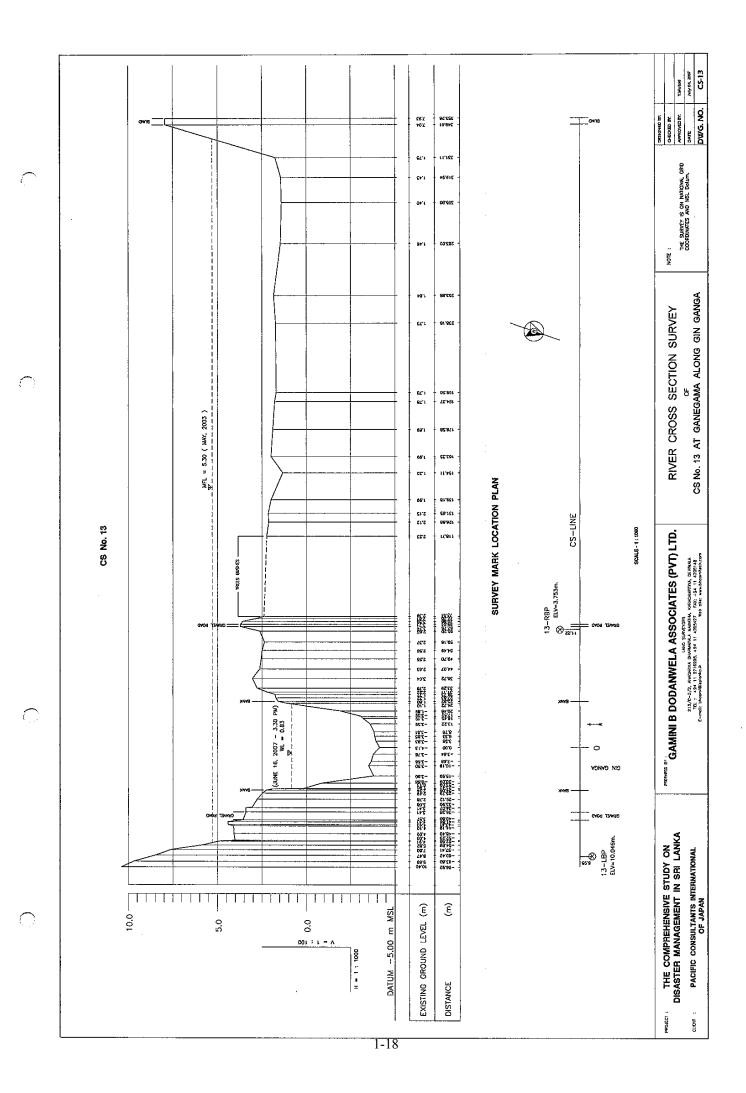


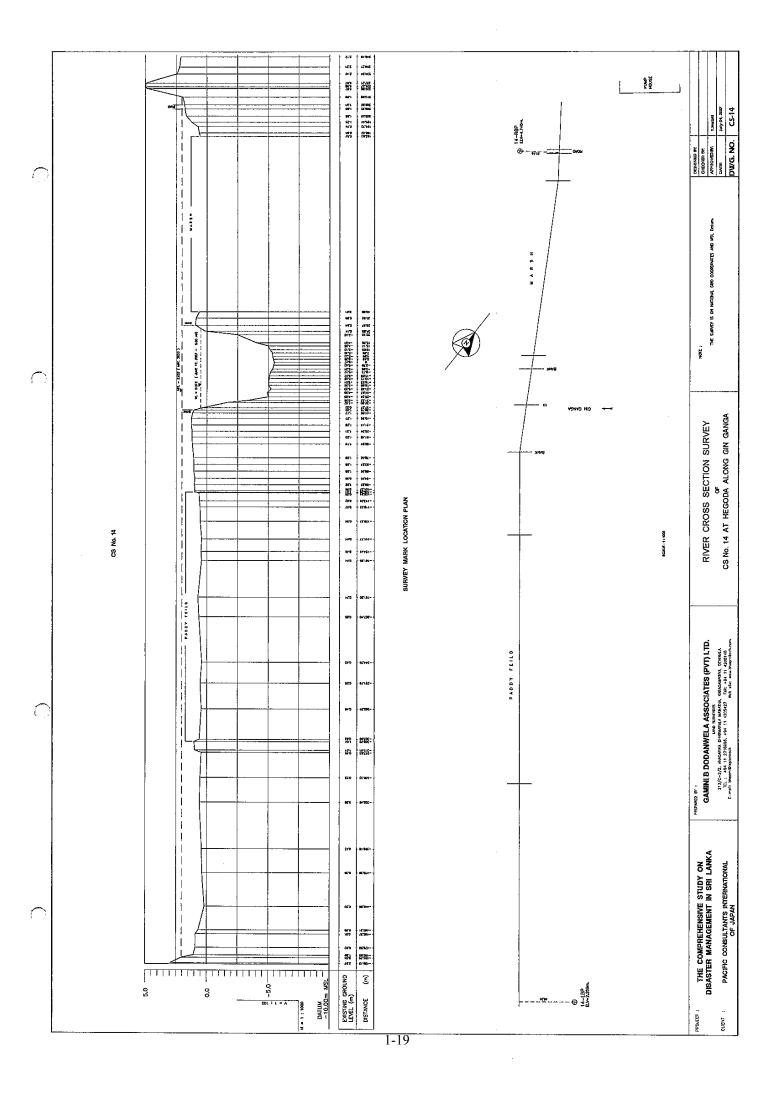


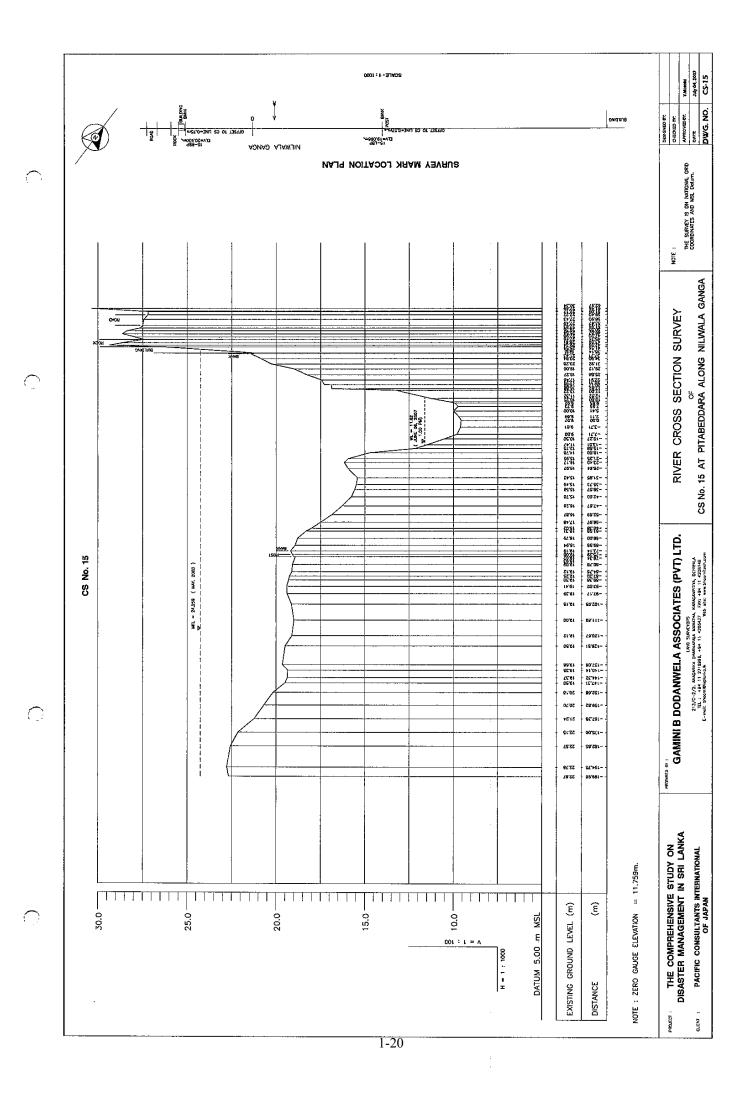


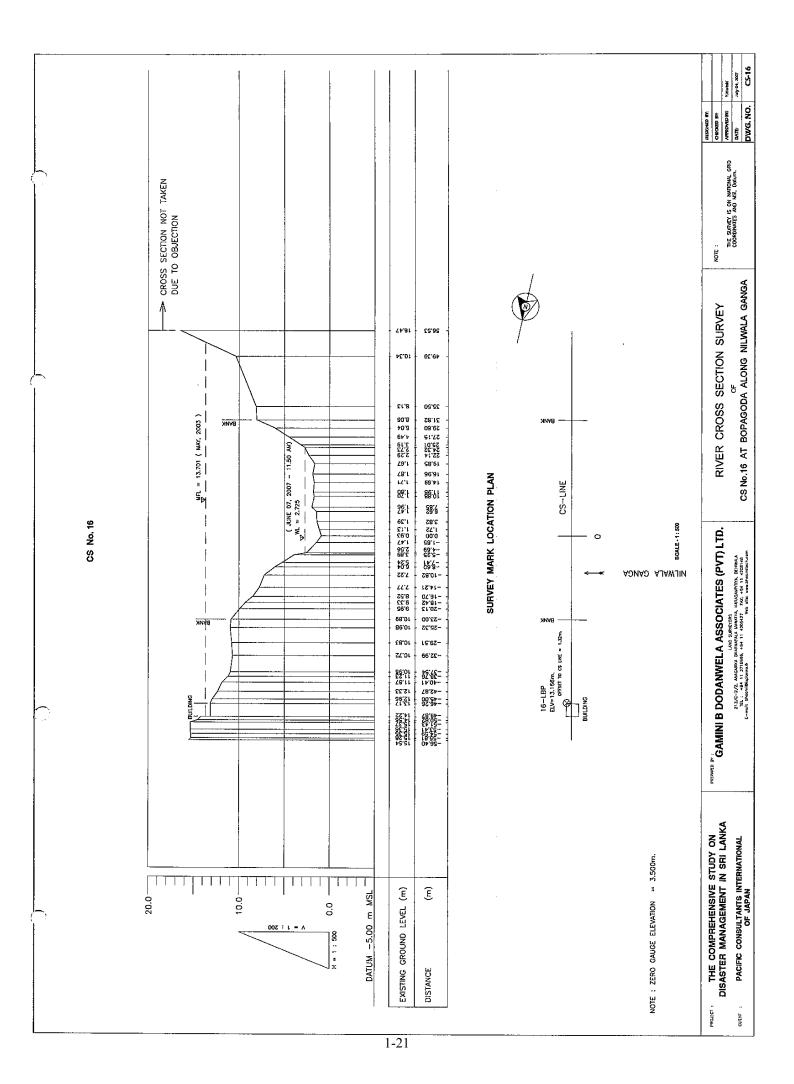


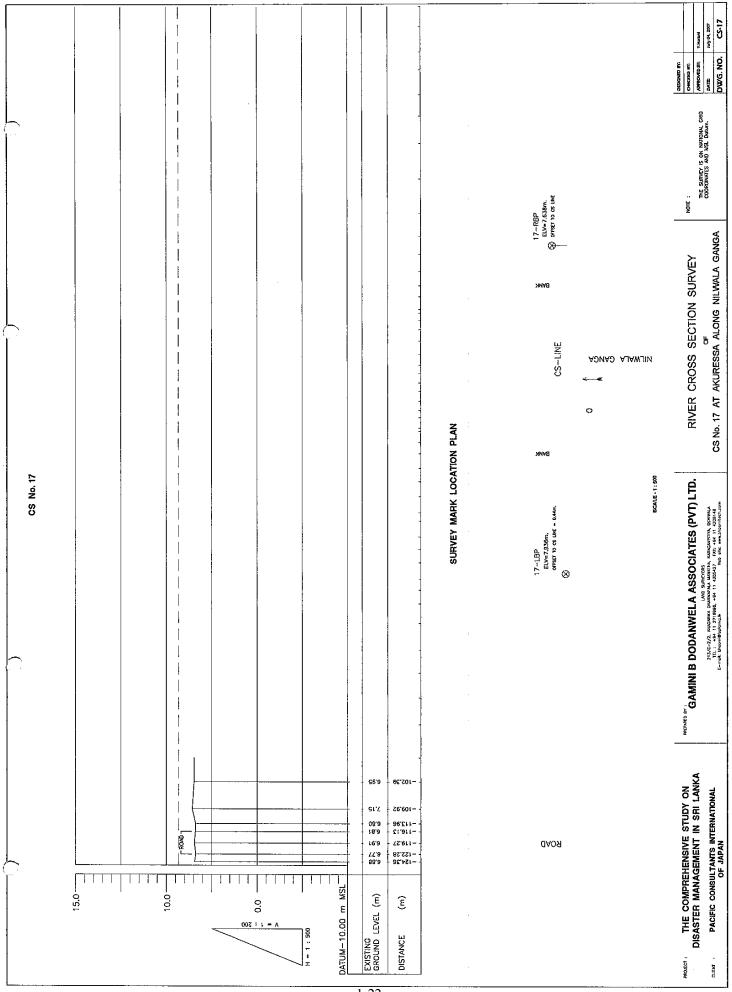


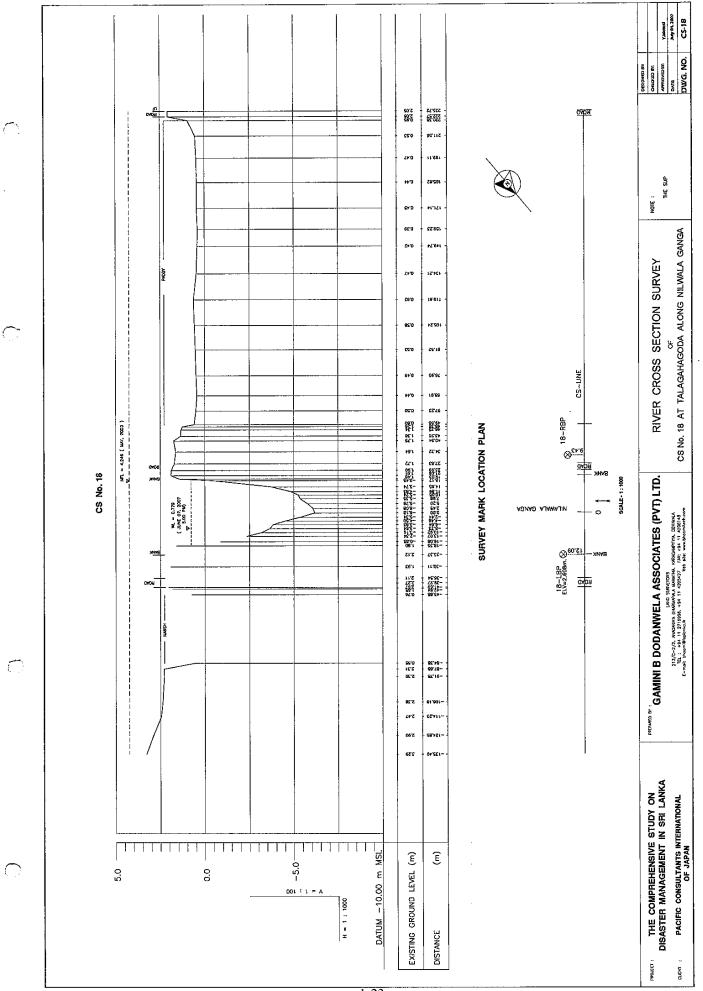












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