

**FAP24**

Government of  
the People's  
Republic of  
Bangladesh

Water Resources  
Planning  
Organization

European  
Commission

Delft  
Hydraulics



Danish  
Hydraulic  
Institute



Hydroland  
Approtech  
Osiris

**RIVER  
SURVEY  
PROJECT**

**Special  
Report  
No.22**

**River Data Book  
January 1993 - March 1995  
Part B. 3 : Aricha**

**October 1996**

**Special Report 22**

**River Data Book  
January 1993 - March 1995**

**Part B.3: Aricha (Teota)**

**October 1996**



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**Part B: Routine gauging January 1993 - March 1995**

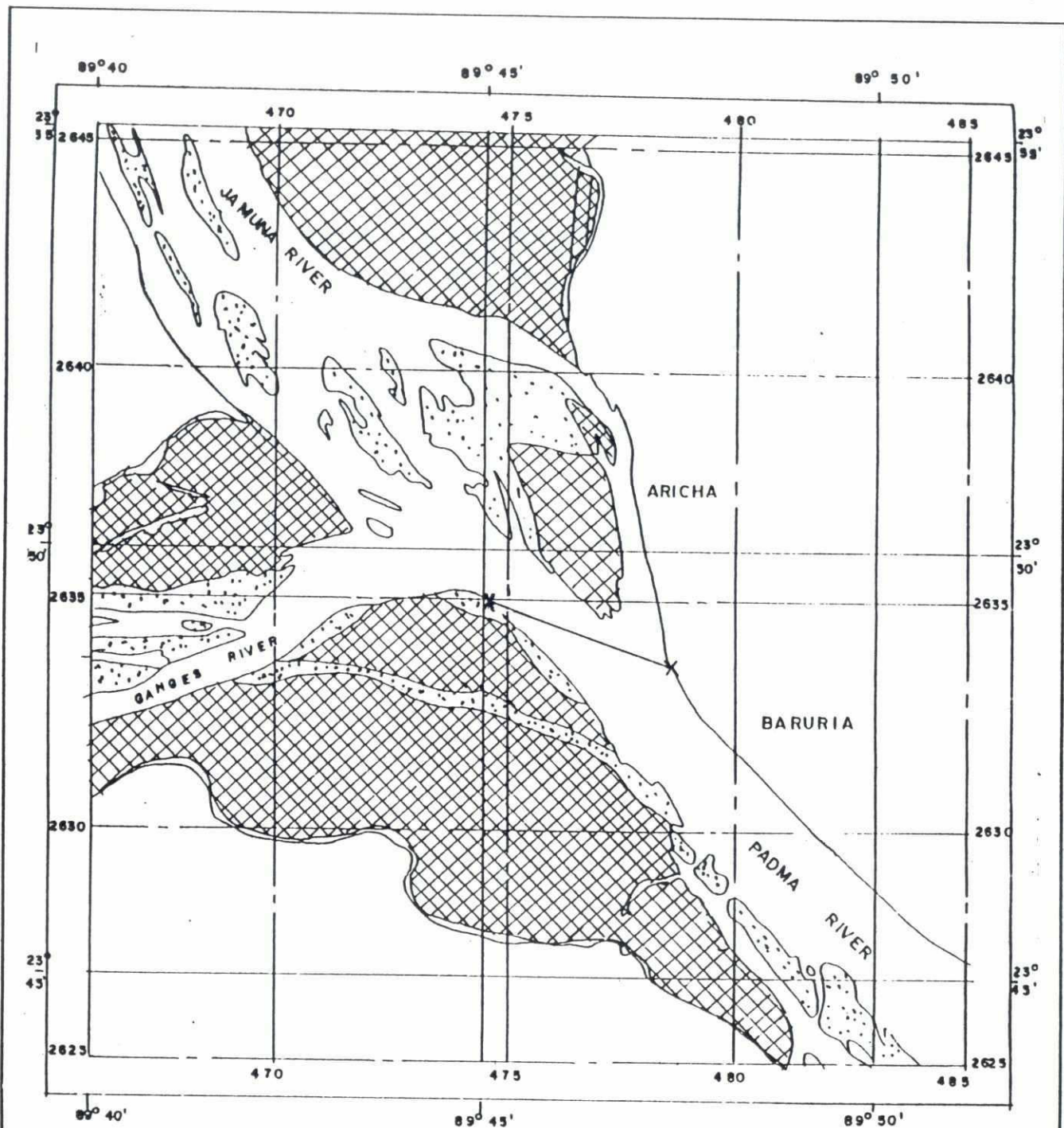
B.1	Bahadurabad
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<b>Survey No.</b>	<b>Time</b>
13	19/9 93
74	6-8/7 94
97	11-13/9 94





**LEGEND:—**

- X—X Measurement Cross Section
-  High land
-  Unstable/Low land
-  BWDB Embankment



5000m 2500m 0

Map is based on most recent  
Satellite image of March 1993



**RIVER SURVEY PROJECT**

Delft Hydraulics/Danish Hydraulic Institute  
in association with Osiris/Approtech/Hydruland

**Survey Bulletin No. 13 - Sep , 1993**

**Location No.3 : Jamuna River at Aricha**

**File:**

**Date:**

**Scale:**

**Init:**

**KEY PLAN**

**Fig.**

River : Brahmaputra-Jamuna  
ADCP/EMF Discharge

Date of Survey : 17 September 1993  
Location : Jamuna River at Aricha  
Station No. 3

Date	Transect	Bank		Water-level (m+PWD)	Width (m)	Area (sq.m)	Discharge (cumec)
		From	To				
19-09-93	A39J1T02	Left	Right	8.68	3920	29780	16215
19-09-93	A39J1T06	Right	Left	8.68	3946	26571	7246
19-09-93	A39J1T07	Right	Left	8.68	850	11130	506
19-09-93	A39J1T08	Right	Left	8.68	2604	32780	8265
19-09-93	A39J1T09	Right	Left	8.68	2920	21844	14575

Table 3.1 SUMMARY OF RESULTS (ADCP/EMF-Discharge)

Type	Time		File Name	Ver. No.	Easting (meter)	Northing (meter)	DISCHARGE GAUGING					SEDIMENT TRANSPORT GAUGING				
	From	To					ADCP	HYDRO	EMF	S4	MEX	Suspended Sediment Samples	Andreasen Tube Samples	Helley Smith Samples	Integrated Sediment Samples	Bottom Samples
Transect	08:36:30	09:13:35	A39J1T02*													
Transect	11:20:36	11:43:54	A39J1T06*													
Transect	11:54:26	12:00:17	A39J1T07													
Transect	12:18:25	12:36:39	A39J1T08													
Transect	13:14:38	13:42:55	A39J1T09													

\* transect in PSD 24 data base

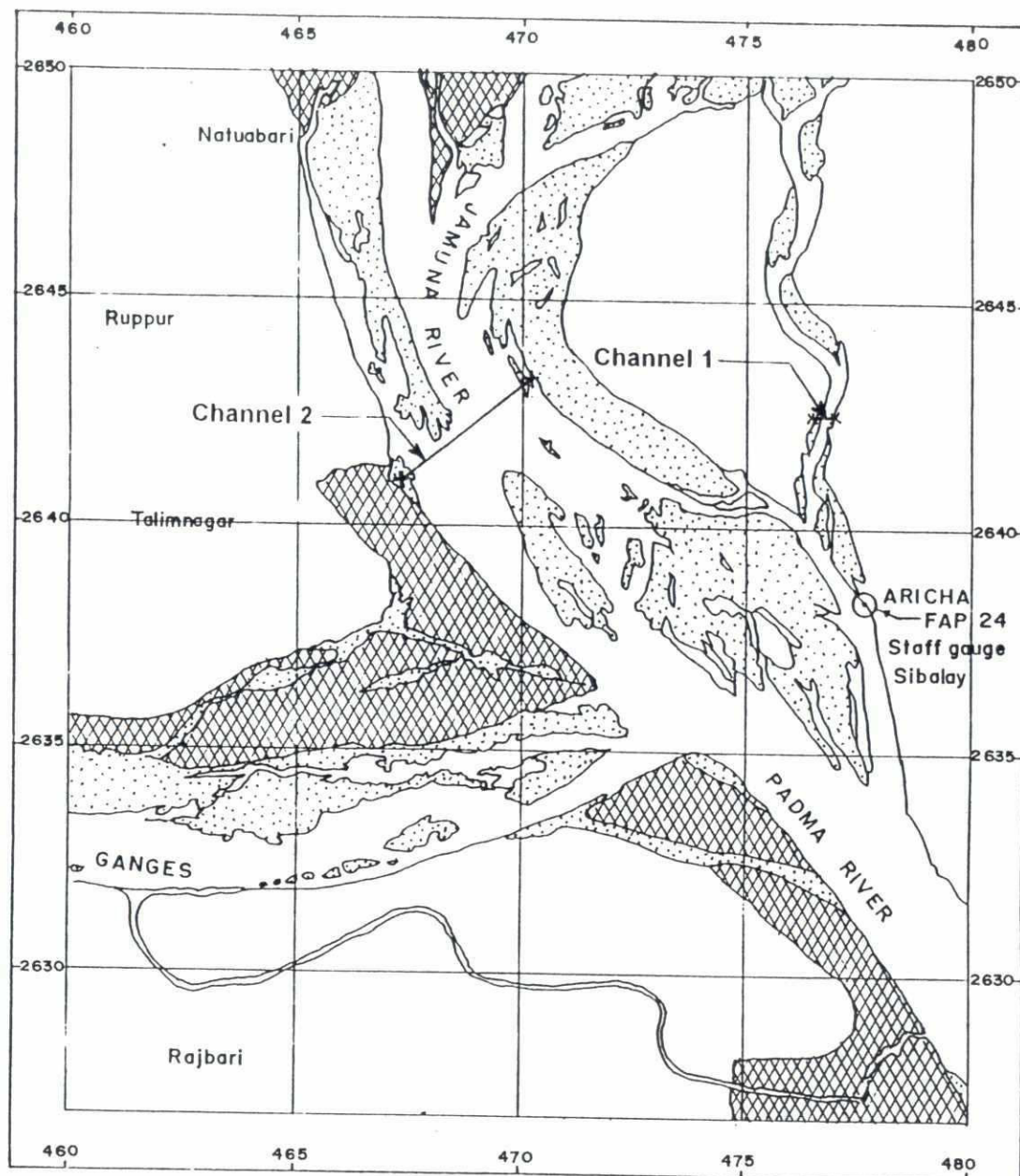
Date of Survey : 19 September 1993  
Location : Jamuna River at Aricha  
Station No. 3

Tabel 2.1 SURVEY PROGRAMME AS MADE



Types of Data	Channel	Format	Filename
ADCP/S4/EMF	1	QUATTRO	A39J1T02 .ase
ADCP/S4/EMF	2	QUATTRO	A39J1T06 .ase
Echosounder	1	QUATTRO	A39J1T02 .ech
Echosounder	2	QUATTRO	A39J1T06 .ech
Sediment transport data	1	QUATTRO	A39J1T02 .sed
Sediment transport data	2	QUATTRO	A39J1T06 .sed
Bed load sediment analysis	1	QUATTRO	A39J1T02 .bdl
Bed load sediment analysis	2	QUATTRO	A39J1T06 .bdl
Suspended sed. conc. analysis	1	QUATTRO	A39J1T02 .ssc
Suspended sed. conc. analysis	2	QUATTRO	A39J1T06 .ssc
Transect plot data	1	QUATTRO	A39J1T02 .trs
Transect plot data	2	QUATTRO	A39J1T06 .trs
Iso-velocity plot data	1	MIKE 21	A39J1T02 .ct2
Iso-velocity plot data	1	MIKE 21	A39J1T02 .dt2
Iso-velocity plot data	2	MIKE 21	A39J1T06 .ct2
Iso-velocity plot data	2	MIKE 21	A39J1T06 .dt2

Table 5.1 PSD 24 Database file description



# LEGEND:

- \*—\* Cross section
- High land
- ▨ Unstable/low char
- FAP 24 Staff gauge



5000m 2500m 0

Map is based on satellite images of March 1994

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT  
Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 74 : 06 - 08 July, 1994

Location 3 : Jamuna River, Aricha

Date : 05 Oct 1994

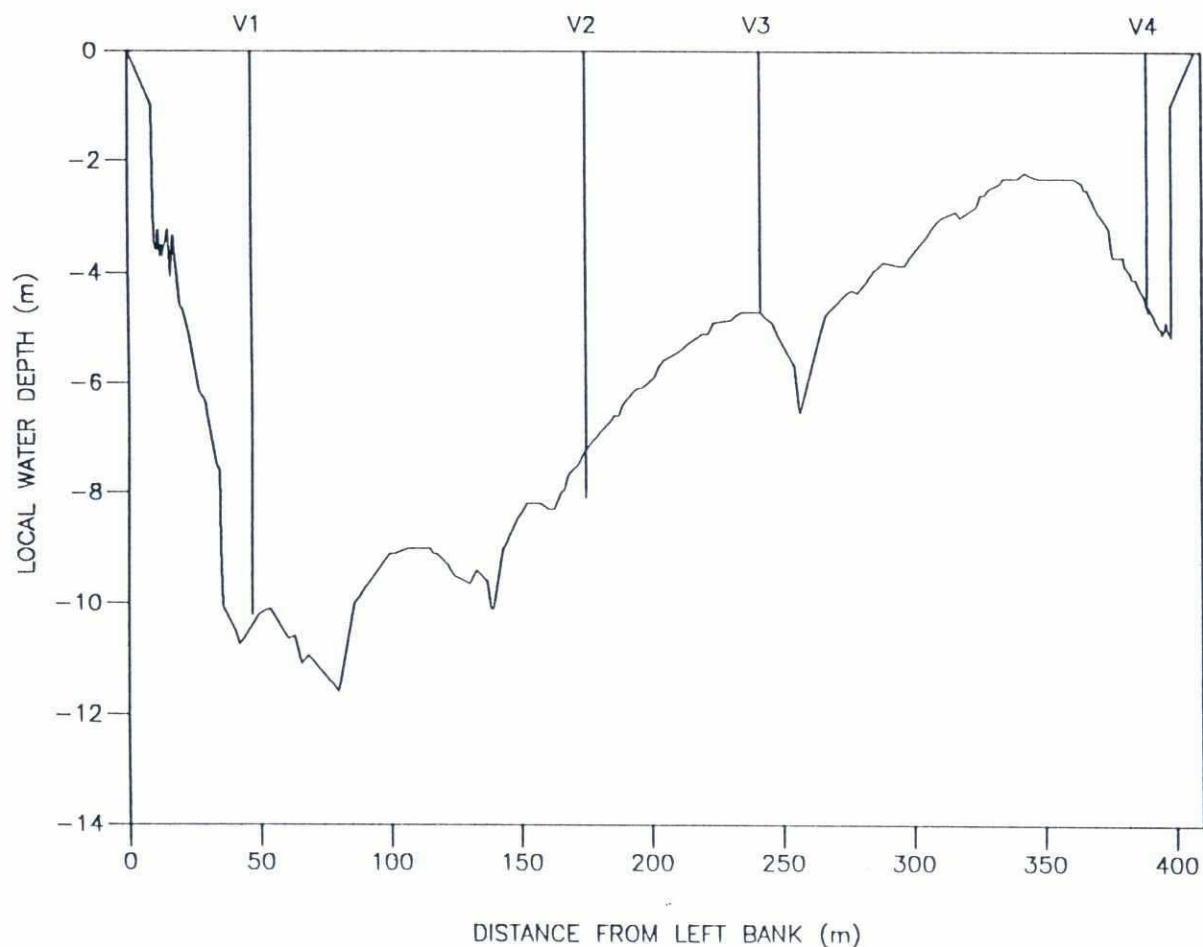
Init : mk

Location map


page

1.1

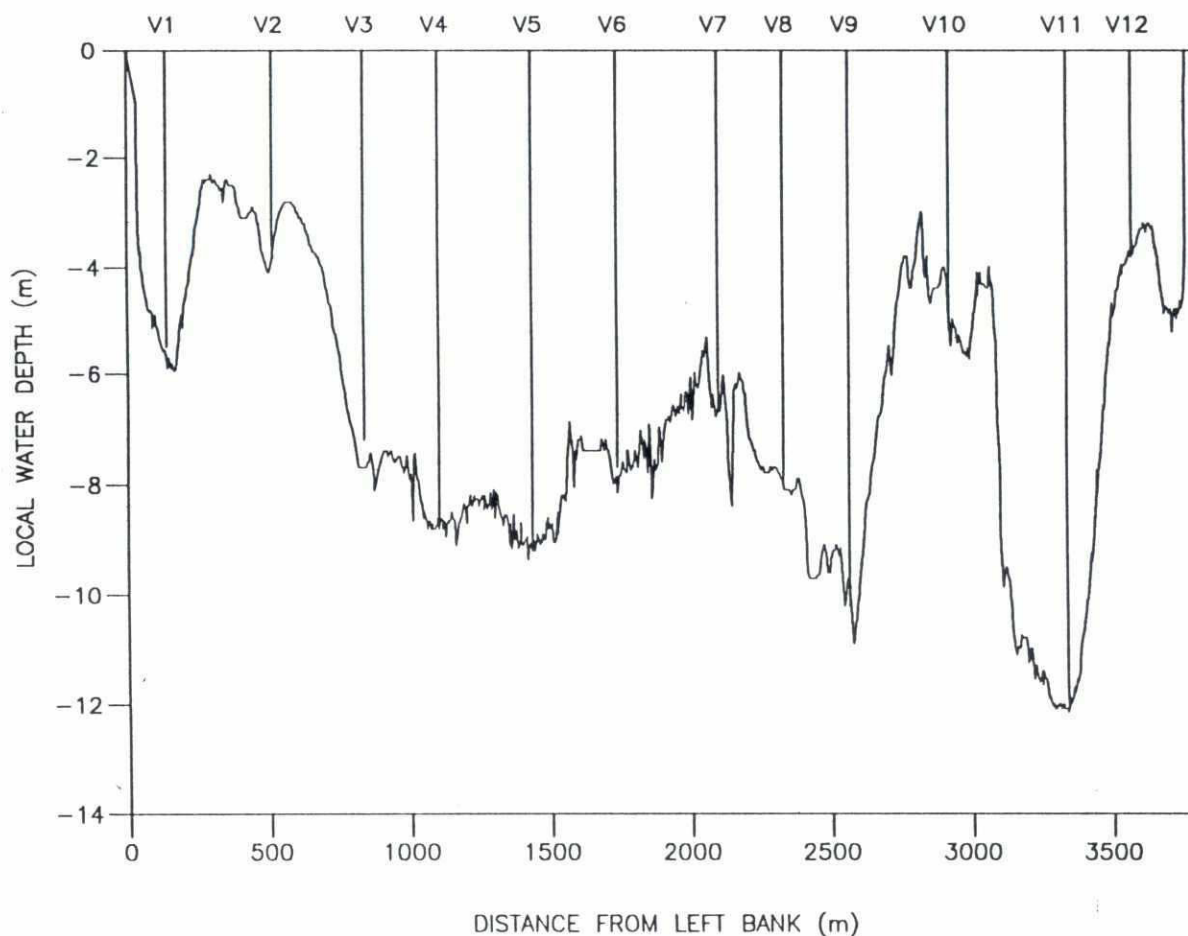
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Water-level : 7.74 m + PWD measured at the station indicated on page 1.1

<b>FAP 24</b>  DELFT - DHI		<b>Survey Bulletin 74 : 06 - 08 July, 1994</b>	
<b>RIVER SURVEY PROJECT</b> Flood Plan Coordination Organization Commission of the European Communities		<b>Location 3 : Jamuna River, Aricha</b>	
File : A4781T02	Date : 05 Oct 1994	<b>Cross-sections and measured verticals</b> <b>Channel 1</b>	page
	Init : mk		1.2






Water-level : 7.64 m + PWD measured at the station indicated on page 1.1

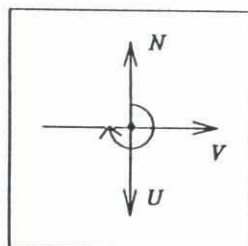
<b>FAP 24</b>  <b>DELFT - DHI</b>		Survey Bulletin 74 : 06 - 08 July, 1994	
		Location 3 : Jamuna River, Aricha	
File : A4761T04	Date : 05 Oct 1994	Cross-sections and measured verticals Channel 2	page
	Init : mk		1.3

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	4	8	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	4	12	-	-
	ADCP	4	12	-	-
	S4 current meter	1	1	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	6	6	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	12	12	-	-
	Integrated bottle sampling	4	12	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	8	24	-	-
	Delft Bottle	-	-	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-
Table 2.1: Survey programme as made					

Channel	Width (m)	Area (m <sup>2</sup> )	Stage h (m+PWD)	Discharge Q (m <sup>3</sup> /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	408	2439	7.74	3228	27	1865
Channel 2	3767	25183	7.64	29551	181	16372
Table 2.2: Key figures						

Gauge Location	Channel	Date	Water level (Daily average) (m+PWD)	Gauge
Aricha	Channel 1	08 Jul 94	7.74	FAP 24
	Channel 2	06 Jul 94	7.64	FAP 24
		07 Jul 94	7.69	FAP 24
Table 2.3: Water-levels				

 <b>FAP 24</b> DELFT - DHI		<b>RIVER SURVEY PROJECT</b> Flood Plan Coordination Organization Commission of the European Communities		<b>Survey Bulletin 74 : 06 - 08 July, 1994</b>	
				<b>Location 3 : Jamuna River, Aricha</b>	
File :	Date : 05 Oct 1994	<b>Survey programme as made and key figures</b>			page
A4781T02 A4761T04	init : mk				2.1

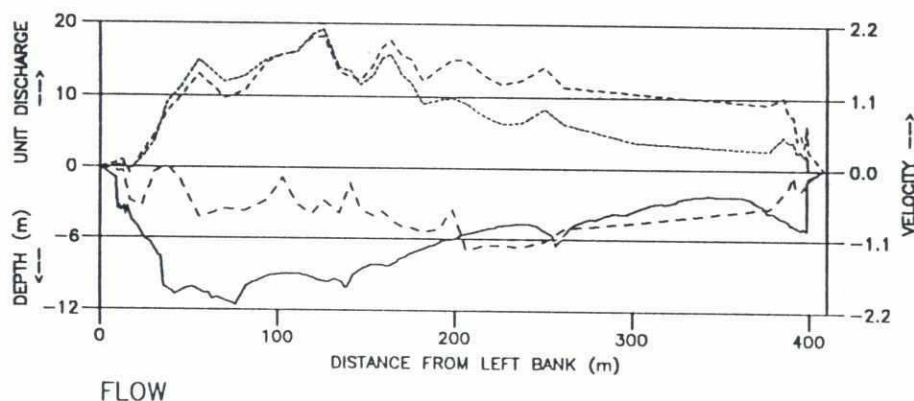


TRANSECT AZIMUTH = 270°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



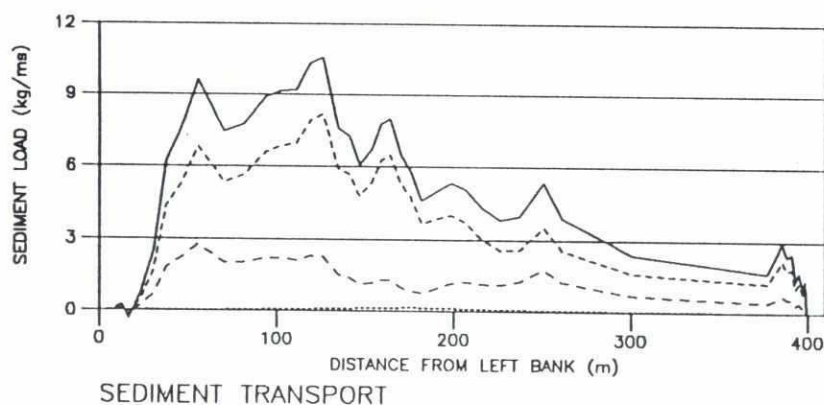
LEGEND :

— WATER DEPTH (m below STAGE)  
 - - - UNIT DISCHARGE (m³/s.m)  
 . . . U - (m/s)  
 . . . V - (m/s)

STAGE = 7.74 (m+PWD)

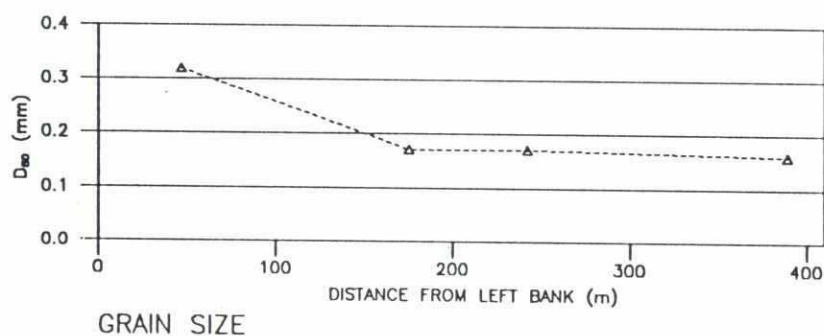
A = 2439 (m³)

Q = 3228 (m³/s)



LEGEND :

— S<sub>TOTAL</sub> 1892 (kg/s)  
 - - - S<sub>WASH LOAD</sub> 1391 (kg/s)  
 . . . S<sub>SUSP. BED</sub> 474 (kg/s)  
 - . - S<sub>BED LOAD</sub> 27 (kg/s)



LEGEND :

♦♦♦♦♦ D<sub>50</sub> SUSP. (mm)  
 ▲▲▲▲▲ D<sub>50</sub> BED LOAD (mm)  
 □□□□□ D<sub>50</sub> BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT  
 Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 74 : 06 - 08 July, 1994

Location 3 : Jamuna River, Aricha

File : A4781T02

Date : 05 Oct 1994

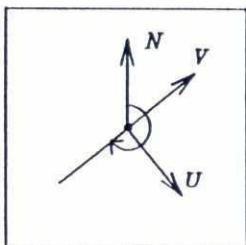
Init : mk

Horizontal distribution of flow and sediments  
 Channel 1

page

3.1



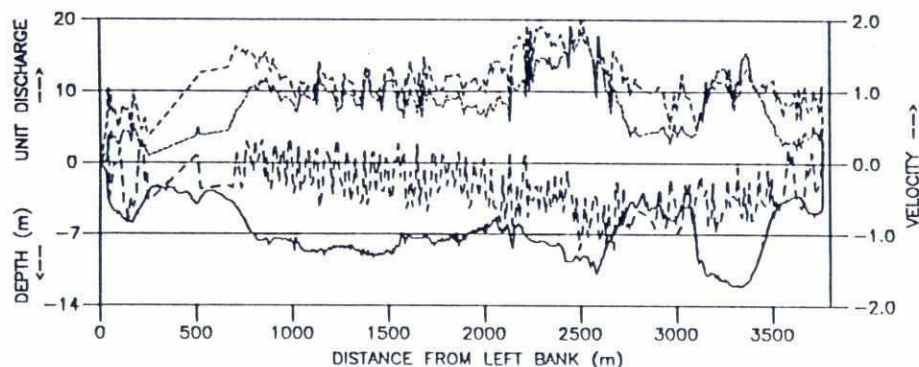


TRANSECT AZIMUTH =  $231^\circ$

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

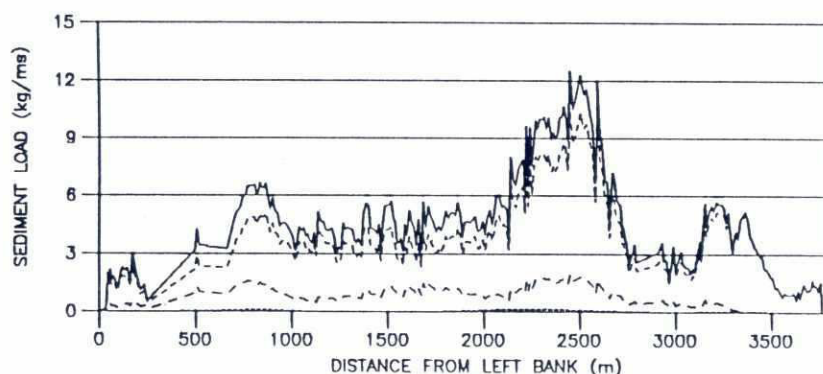
LEGEND :

— WATER DEPTH (m below STAGE)  
 ..... UNIT DISCHARGE (m<sup>3</sup>/s.m)  
 --- U - (m/s)  
 -.- V - (m/s)

STAGE = 7.64 (m+PWD)

A = 25183 (m<sup>3</sup>)

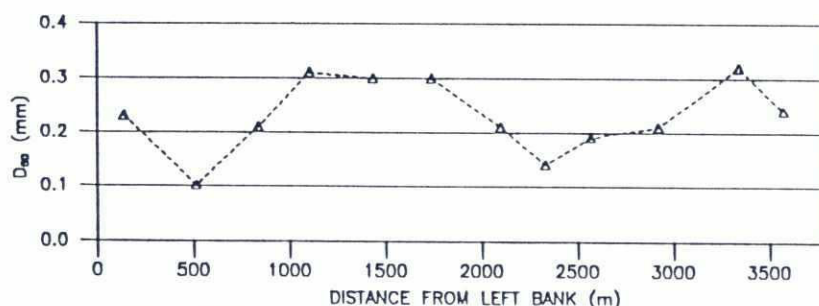
Q = 29551 (m<sup>3</sup>/s)



SEDIMENT TRANSPORT

LEGEND :

— S<sub>TOTAL</sub> 16553 (kg/s)  
 --- S<sub>WASH LOAD</sub> 13454 (kg/s)  
 -.- S<sub>SUSP. BED</sub> 2918 (kg/s)  
 ..... S<sub>BED LOAD</sub> 181 (kg/s)



GRAIN SIZE

LEGEND :

♦♦♦♦♦ D<sub>50</sub> SUSP. (mm)  
 ▲▲▲▲▲ D<sub>50</sub> BED LOAD (mm)  
 □□□□□ D<sub>50</sub> BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT  
 Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 74 : 06 - 08 July, 1994

Location 3 : Jamuna River, Aricha

File : A4761T04

Date : 05 Oct 1994

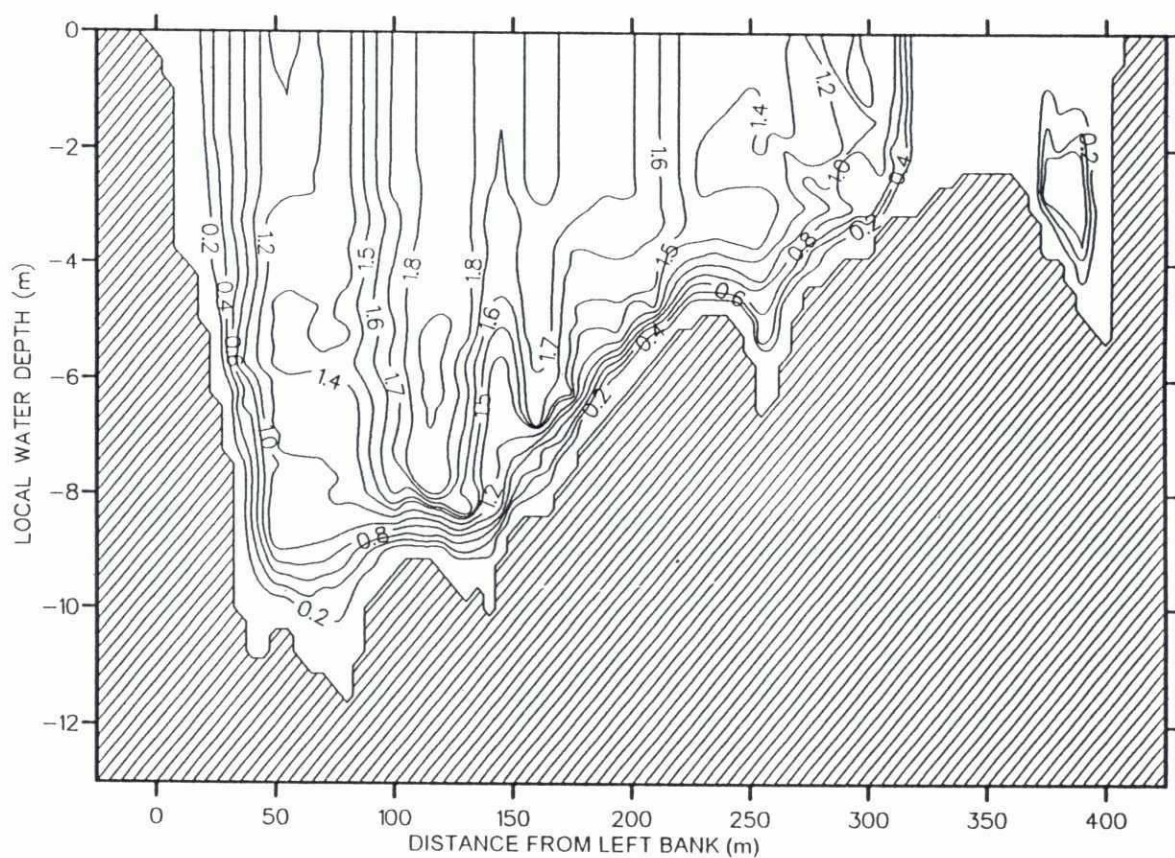
Init : mk

Horizontal distribution of flow and sediments

Channel 2

page

3.2



Iso-velocity contours (m/s)

Water-level : 7.74 m + PWD measured at the station indicated on page 1.1

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT  
Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 74 : 06 - 08 July, 1994

Location 3 : Jamuna River, Aricha

File : A4781T02

Date : 05 Oct 1994

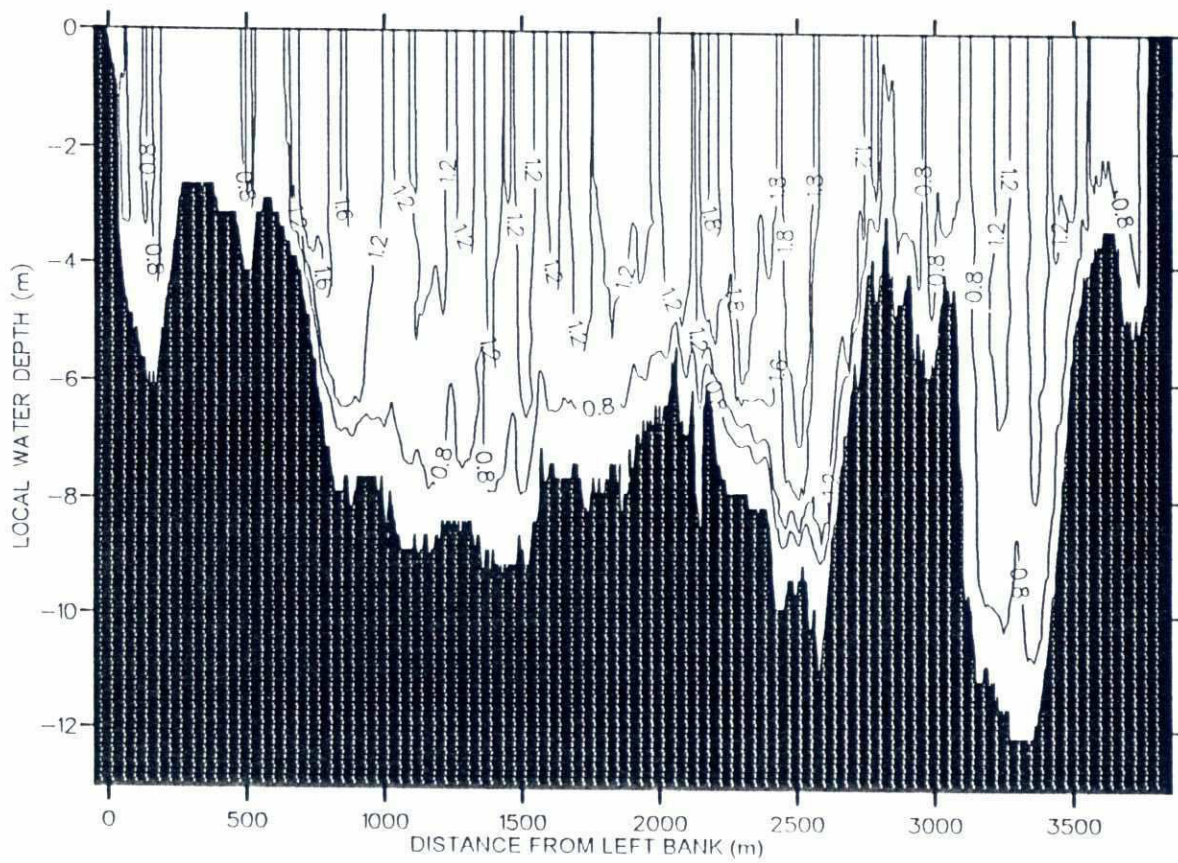
Init : mk

Cross-sectional distribution of flow velocity  
Channel 1

page  
4.1



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Iso-velocity contours (m/s)  
Water-level : 7.64 m + PWD measured at the station indicated on page 1.1



Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth	Weight percent < 0.06 mm > 0.06 mm	D10 (mm)	D50 (mm)	D90 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							

US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth	Weight percent < 0.06 mm > 0.06 mm	D10 (mm)	D50 (mm)	D90 (mm)
Sample not collected							
Table 5.2: Grain size of bed material							

Helley-Smith								
Channel	Vertical	time (YYMMDDHHMM-HHMM)	Depth (m)	Weight percent < 0.06 mm > 0.06 mm		D35 (mm)	D50 (mm)	D65 (mm)
1	1	9407081136-1239	10.2	0.329	99.670	0.278	0.319	0.365
	1	9407081136-1239	10.2	0.203	99.800	0.282	0.322	0.368
	2	9407081244-1356	8.10	1.010	98.990	0.154	0.177	0.203
	2	9407081244-1356	8.10	1.274	98.730	0.146	0.168	0.193
	3	9407081420-1429	4.70	1.500	98.500	0.149	0.172	0.198
	3	9407081420-1429	4.70	2.023	97.980	0.144	0.172	0.206
	4	9407081450-1503	4.60	11.210	88.800	0.145	0.185	0.235
	4	9407081450-1503	4.60	11.160	88.840	0.105	0.142	0.188
2	1	9407071455-1507	5.50	11.300	88.700	0.157	0.214	0.288
	1	9407071455-1507	5.50	3.753	96.250	0.192	0.251	0.314
	2	9407071426-1440	3.60	15.640	84.360	0.079	0.094	0.112
	2	9407071426-1440	3.60	14.080	85.920	0.082	0.099	0.120
	3	9407071355-1404	7.20	6.248	93.750	0.084	0.097	0.113
	3	9407071355-1404	7.20	0.167	99.830	0.286	0.326	0.372
	4	9407071304-1312	8.60	0.486	99.510	0.262	0.305	0.355
	4	9407071304-1312	8.60	0.442	99.560	0.266	0.309	0.359
	5	9407071230-1242	9.20	0.653	99.350	0.266	0.312	0.365
	5	9407071230-1242	9.20	0.542	99.460	0.254	0.298	0.349
	6	9407061604-1618	7.70	0.479	99.520	0.273	0.315	0.363
	6	9407061604-1618	7.70	2.262	97.740	0.226	0.283	0.337
	7	9407071108-1159	6.70	1.497	98.500	0.187	0.230	0.289
	7	9407071108-1159	6.70	1.227	98.770	0.166	0.194	0.225
	8	9407061537-1544	7.90	2.864	97.140	0.110	0.140	0.172
	8	9407061537-1544	7.90	3.609	96.390	0.108	0.138	0.172
	9	9407061446-1454	10.2	2.909	97.090	0.158	0.190	0.228
	9	9407061446-1454	10.2	2.032	97.970	0.157	0.185	0.218
	10	9407061416-1428	5.20	0.623	99.380	0.191	0.234	0.294
	10	9407061416-1428	5.20	0.980	99.020	0.162	0.190	0.222
	11	9407061317-1336	12.0	0.198	99.800	0.292	0.331	0.375
	11	9407061317-1336	12.0	0.125	99.880	0.272	0.313	0.361
	12	9407061236-1300	3.80	0.223	99.780	0.204	0.253	0.311
	12	9407061236-1300	3.80	0.416	99.580	0.188	0.226	0.281
Table 5.3: Grain sizes of bed load								

<div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div>		<div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div>		<div>Survey Bulletin 74 : 06 - 08 July, 1994</div>	
				<div>Location 3 : Jamuna River, Aricha</div>	
		<div>Date 05 Oct 1994</div>		<div>Grain size distributions</div>	
		<div>init mk</div>			
				<div>page</div>	
				<div>51</div>	

Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9407080931-0937	A4781T01
		9407080942-0946	A4781T02 *
		9407081510-1514	A4781T03
		9407081519-1523	A4781T05
	2	9407060906-0937	A4761T01
		9407060952-1024	A4761T02
		9407061636-1706	A4761T03
		9407061710-1739	A4761T04 *
		9407070922-0953	A4771T01
		9407070955-1032	A4771T02
		9407071522-1556	A4771T03
		9407071559-1634	A4771T04

Table 6.1: ADCP & EMF transects

\* : transect in PSD 24 data base and presented in Sections 3 and 4


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9407081136-1239	476573	642048	10.2	A4781P01
		2	9407081244-1356	476444	642058	8.10	A4781P02 *
		3	9407081420-1429	476377	642053	4.70	A4781P04 *
		4	9407081450-1503	476230	642057	4.60	A4781P05 *
	2	1	9407071455-1507	470131	642720	5.50	A4771P07 *
		2	9407071426-1440	469845	642478	3.60	A4771P06 *
		3	9407071355-1404	469585	642284	7.20	A4771P05 *
		4	9407071304-1312	469382	642112	8.60	A4771P04 *
		5	9407071230-1242	469123	641904	9.20	A4771P03 *
		6	9407061604-1618	468889	641711	7.70	A4761P07 *
		7	9407071108-1159	468613	641483	6.70	A4771P01
		8	9407061537-1544	468424	641346	7.90	A4761P06 *
		9	9407061446-1454	468241	641196	10.2	A4761P04 *
		10	9407061416-1428	467968	640971	5.20	A4761P03 *
		11	9407061317-1336	467642	640705	12.0	A4761P02 *
		12	9407061236-1300	467464	640558	3.80	A4761P01 *

Table 6.2: Vertical profiles

\* S4 and MEX not available

Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	6	9407081136-1239	476573	642048	10.2
	2	7	6	9407071108-1159	468613	641483	6.70

Table 6.3: Suspended sediment - point sampled

<b>FAP 24</b>  <b>DELFT - DHI</b>		<b>RIVER SURVEY PROJECT</b> Flood Plan Coordination Organization Commission of the European Communities		<b>Survey Bulletin 74 : 06 - 08 July, 1994</b>	
				<b>Location 3 : Jamuna River, Aricha</b>	
		Date 05 Oct 1994 init mk		<b>Collected data and their storage (1)</b>	
				page 6.1	




Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	1	1	9407081136-1239	476573	642048	10.2
		2	1	9407081244-1356	476444	642058	8.10
		3	1	9407081420-1429	476377	642053	4.70
		4	1	9407081450-1503	476230	642057	4.60
	2	1	1	9407071455-1507	470131	642720	5.50
		2	1	9407071426-1440	469845	642478	3.60
		3	1	9407071355-1404	469585	642284	7.20
		4	1	9407071304-1312	469382	642112	8.60
		5	1	9407071230-1242	469123	641904	9.20
		6	1	9407061604-1618	468889	641711	7.70
		7	1	9407071108-1159	468613	641483	6.70
		8	1	9407061537-1544	468424	641346	7.90
		9	1	9407061446-1454	468241	641196	10.2
		10	1	9407061416-1428	467968	640971	5.20
		11	1	9407061317-1336	467642	640705	12.0
		12	1	9407061236-1300	467464	640558	3.80

Table 6.4: Suspended sediment - depth integrated

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.
Helley-Smith Sample	1	1	9407081136-1239	476573	642048	10.2	A125
		1	9407081136-1239	476573	642048	10.2	A924
		2	9407081244-1356	476444	642058	8.10	A922
		2	9407081244-1356	476444	642058	8.10	A335
		3	9407081420-1429	476377	642053	4.70	A355
		3	9407081420-1429	476377	642053	4.70	A364
		4	9407081450-1503	476230	642057	4.60	A1591
		4	9407081450-1503	476230	642057	4.60	A1378
	2	1	9407071455-1507	470131	642720	5.50	A1367
		1	9407071455-1507	470131	642720	5.50	A58
		2	9407071426-1440	469845	642478	3.60	A351
		2	9407071426-1440	469845	642478	3.60	A918
		3	9407071355-1404	469585	642284	7.20	A59
		3	9407071355-1404	469585	642284	7.20	A60
		4	9407071304-1312	469382	642112	8.60	A1136
		4	9407071304-1312	469382	642112	8.60	A1145
		5	9407071230-1242	469123	641904	9.20	A1142
		5	9407071230-1242	469123	641904	9.20	A466
		6	9407061604-1618	468889	641711	7.70	A100
		6	9407061604-1618	468889	641711	7.70	A916
		7	9407071108-1159	468613	641483	6.70	A66
		7	9407071108-1159	468613	641483	6.70	A33
		8	9407061537-1544	468424	641346	7.90	A1137
		8	9407061537-1544	468424	641346	7.90	A1153
		9	9407061446-1454	468241	641196	10.2	A911
		9	9407061446-1454	468241	641196	10.2	A1377
		10	9407061416-1428	467968	640971	5.20	A887
		10	9407061416-1428	467968	640971	5.20	A895
		11	9407061317-1336	467642	640705	12.0	A708
		11	9407061317-1336	467642	640705	12.0	A113
		12	9407061236-1300	467464	640558	3.80	A72
		12	9407061236-1300	467464	640558	3.80	A109


Table 6.5: Bed load

 <b>FAP 24</b> DELFT - DHI		<b>RIVER SURVEY PROJECT</b> Flood Plan Coordination Organization Commission of the European Communities		<b>Survey Bulletin 74 : 06 - 08 July, 1994</b>	
				<b>Location 3 : Jamuna River, Aricha</b>	
		Date : 05 Oct 1994		<b>Collected data and their storage (2)</b>	
		init : mk			
				page 6.2	

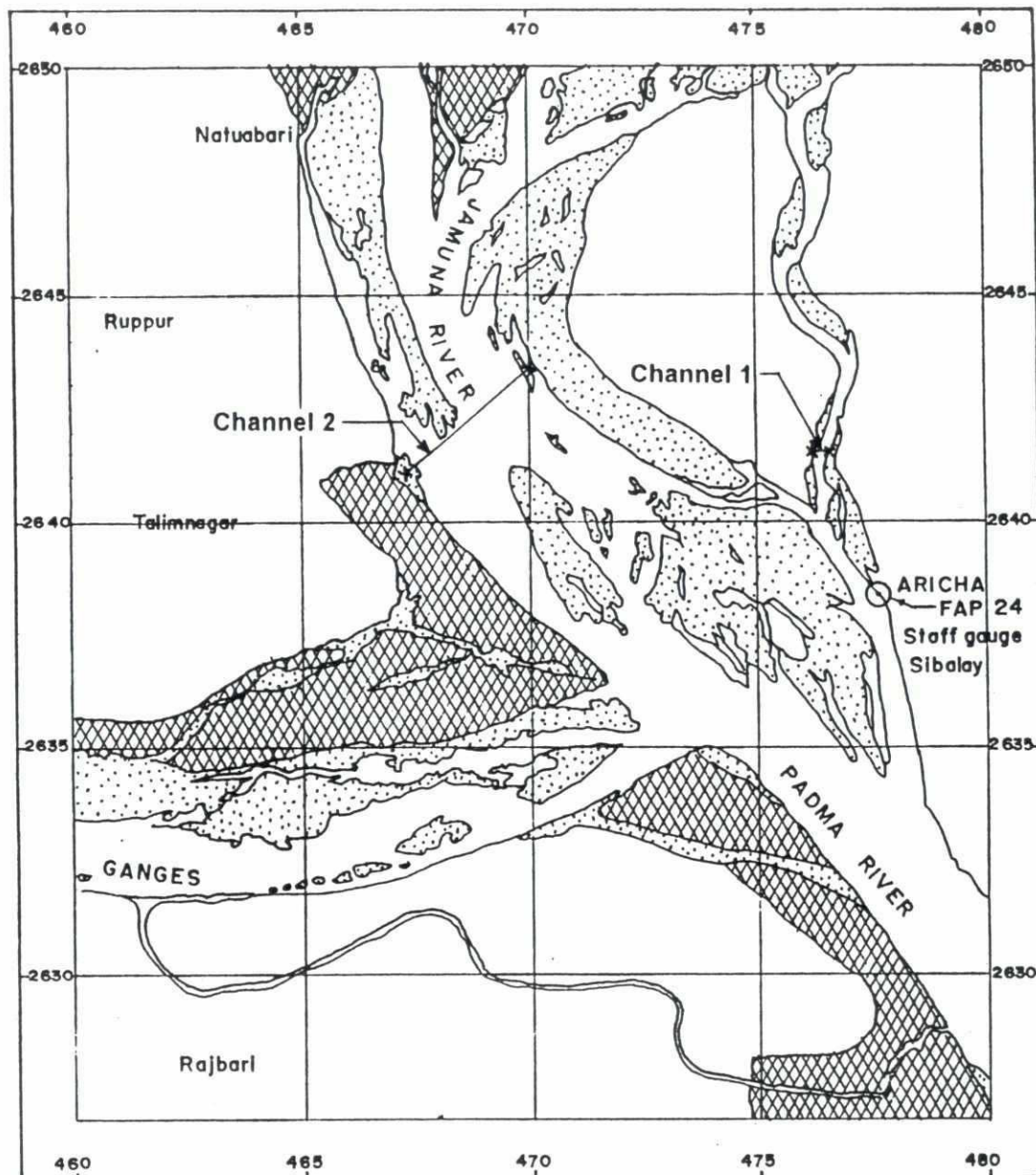
20

Types of Data	Channel	Format	Filename
ADCP/S4/EMF	1	QUATTRO	A4781T02 .ase
ADCP/S4/EMF	2	QUATTRO	A4761T04 .ase
Echosounder	1	QUATTRO	A4781T02 .ech
Echosounder	2	QUATTRO	A4761T04 .ech
Sediment transport	1	QUATTRO	A4781T02 .sed
Sediment transport	2	QUATTRO	A4761T04 .sed
Bed load sieve size	1	QUATTRO	A4781T02 .bdl
Bed load sieve size	2	QUATTRO	A4761T04 .bdl
Suspended sediment conc.	1	QUATTRO	A4781T02 .ssc
Suspended sediment conc.	2	QUATTRO	A4761T04 .ssc
Transect plot data	1	QUATTRO	A4781T02 .trs
Transect plot data	2	QUATTRO	A4761T04 .trs
Iso-velocity plot data	1	MIKE 21	A4781T02 .ct2
			A4781T02 .dt2
Iso-velocity plot data	2	MIKE 21	A4761T04 .ct2
			A4761T04 .dt2

Table 7.1 PSD 24 Database file description

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 74 : 06 - 08 July, 1994	
		Location 3 : Jamuna River, Aricha	
	Date : 05 Oct 1994	PSD 24 Database file description	page 7.1
	Init : mk		





# LEGEND:

- x—x Cross section
- High land
- ▤ Unstable/low char
- FAP 24 Staff gauge



5000m 2500m 0

Map is based on satellite images of March 1994

FAP 24



RIVER SURVEY PROJECT  
Flood Plan Coordination Organization  
Commission of the European Communities

Survey Bulletin 97 : 11 - 13 September, 1994

Location 3 : Jamuna River, Aricha

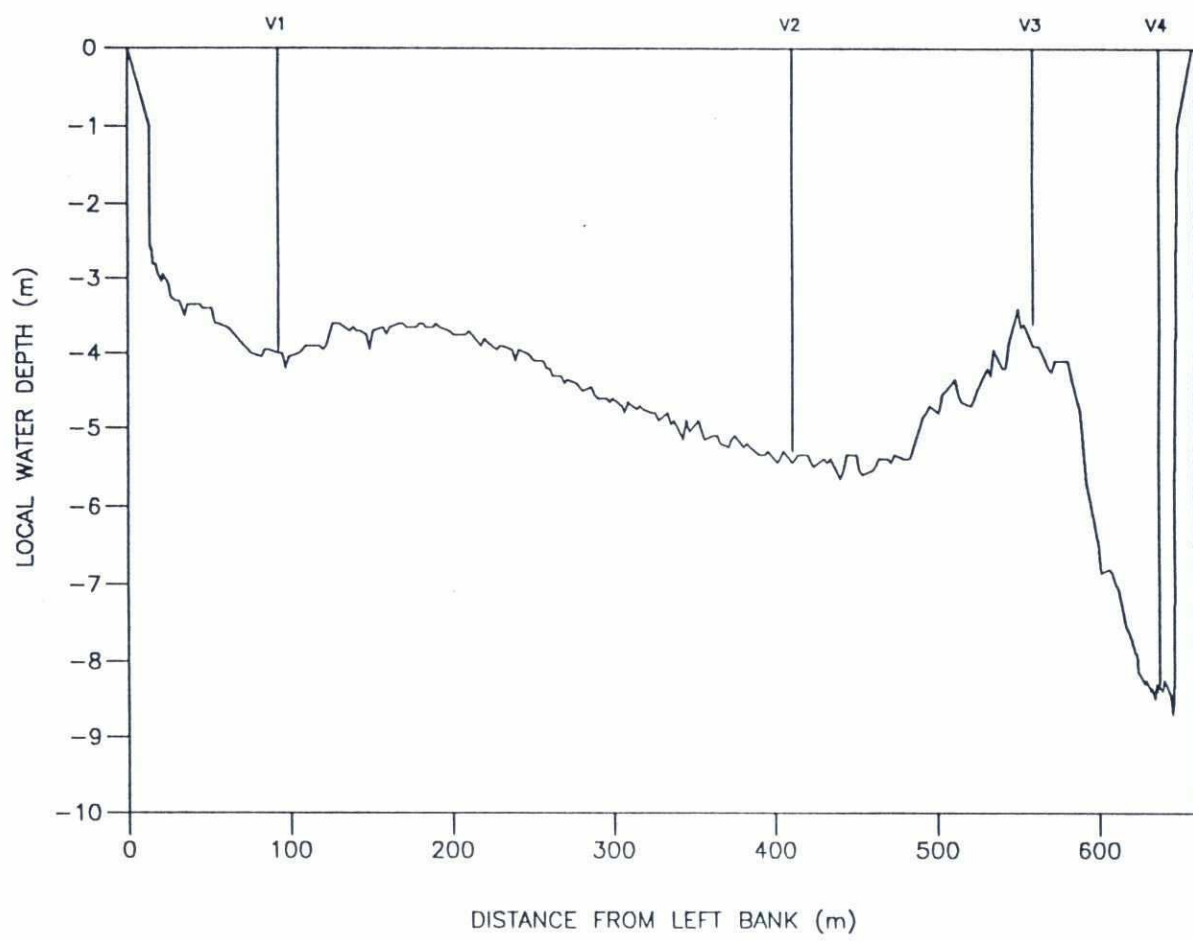
Date : 01 Jan 1995

Init : mk/tr


Location map

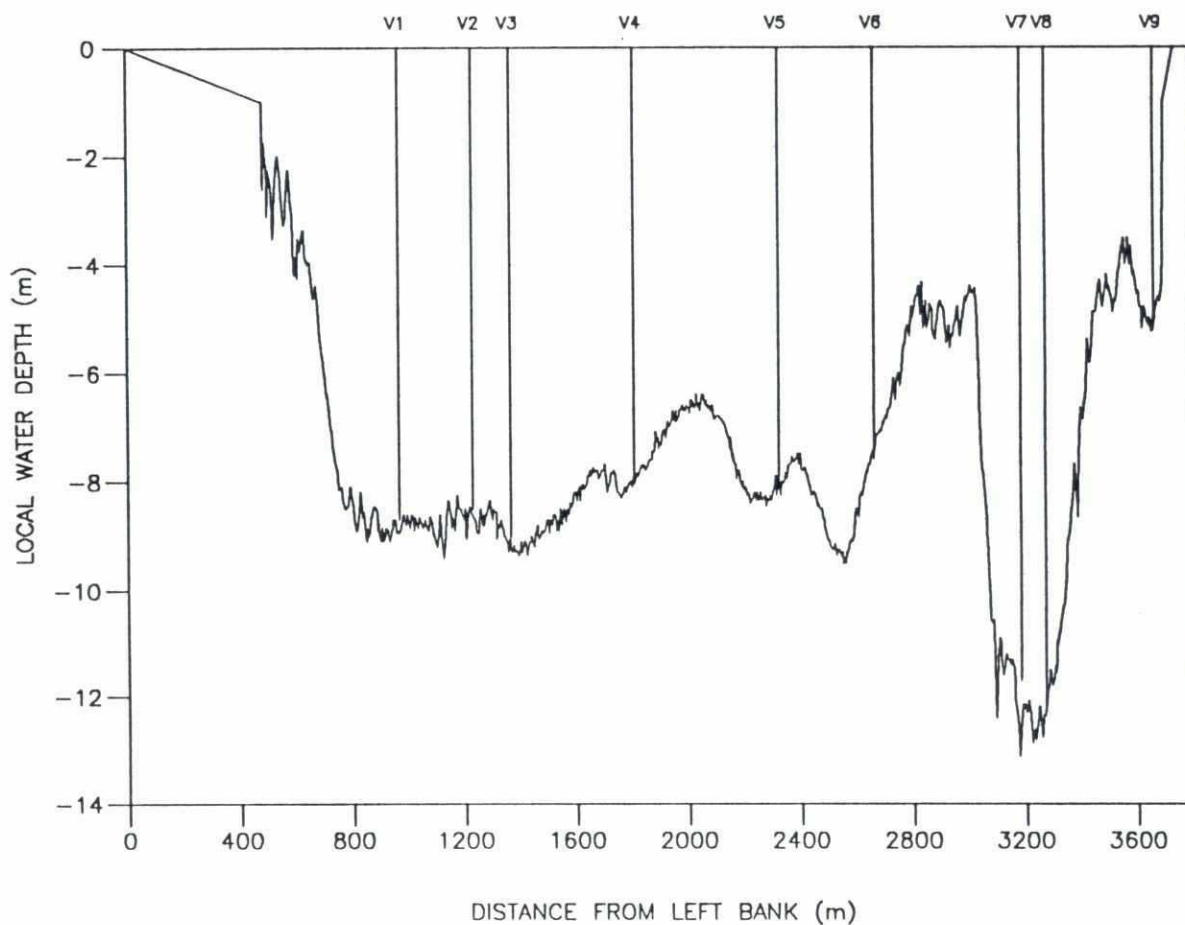
page

1.1




Water-level : 7.86 m + PWD measured at the station indicated on Page 1.1

<div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div>	<div>RIVER SURVEY PROJECT</div> <div>Flood Plan Coordination Organization</div> <div>Commission of the European Communities</div>	<div>Survey Bulletin 97 : 11 - 13 September , 1994</div>	
		<div>Location 3 : Jamuna River, Aricha</div>	
<div>File : A49D1T02</div>	<div>Date : 01 Jan 1995</div>	<div>Cross-sections and measured verticals</div> <div>Channel 1</div>	<div>page</div>
	<div>Init : mk / tr</div>		<div>1.2</div>



Water-level : 7.88 m + PWD measured at the station indicated on Page 1.1

<b>FAP 24</b>  DELFT - DHI		Survey Bulletin 97 : 11 - 13 September , 1994	
RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities		Location 3 : Jamuna River, Aricha	
File : A49B1T01	Date : 01 Jan 1995	Cross-sections and measured verticals Channel 2	page
	Init : mk / tr		1.3

Type of measurement	Method	No. of measurements in channel			
		1	2	3	4
Discharge	ADCP transect	4	8	-	-
	EMF transect	-	-	-	-
	Echo-Sounding	-	-	-	-
Vertical current profile	No. of verticals in channel	4	9	-	-
	ADCP	4	9	-	-
	S4 current meter	1	1	-	-
	Ott current meter	-	-	-	-
Vertical sediment profile	Pump bottle sampling	6	6	-	-
	Andreasen settling tube	-	-	-	-
	MEX turbidity meter	-	-	-	-
	Integrated bottle sampling	4	9	-	-
	Collapsible bag	-	-	-	-
Bed load	Dune tracking	-	-	-	-
	Helley-Smith sampler	8	18	-	-
	Delft Bottle	8	18	-	-
Bed material	US BM-54 bed sampler	-	-	-	-
	Van Veen bed sampler	-	-	-	-


Table 2.1: Survey programme as made

Channel	Width (m)	Area (m <sup>2</sup> )	Stage h (m+PWD)	Discharge Q (m <sup>3</sup> /s)	Bed load transport Sb (kg/s)	Suspended Sediment transport Ss total (kg/s)
Channel 1	659	2950	7.86	2276	4	1748
Channel 2	3747	24496	7.88	19191	23	6587

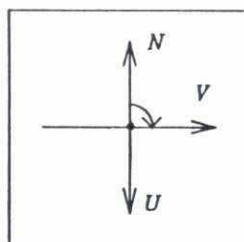
Table 2.2: Key figures

Gauge Location	Channel	Date	Water level (Daily average) (m + PWD)	Gauge
Aricha	Channel 1	13 Sep 94	7.86	FAP 24
	Channel 2	11 Sep 94	7.88	FAP 24
		12 Sep 94	7.86	FAP 24

Table 2.3: Water-levels

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 97 : 11 - 13 September , 1994	
		Location 3 : Jamuna River, Aricha	
File : A49D1T02  A49B1T01	Date : 01 Jan 1995  Init : mk / tr	Survey programme as made and key figures	page  2.1



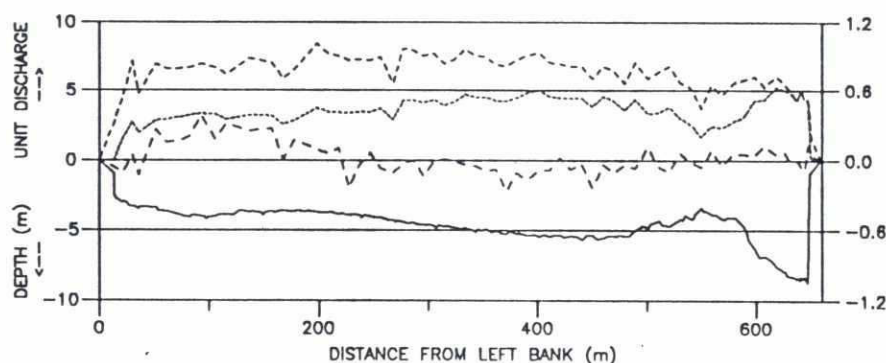


TRANSECT AZIMUTH = 90°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



FLOW

LEGEND :

— WATER DEPTH (m below STAGE)

--- UNIT DISCHARGE (m³/s.m)

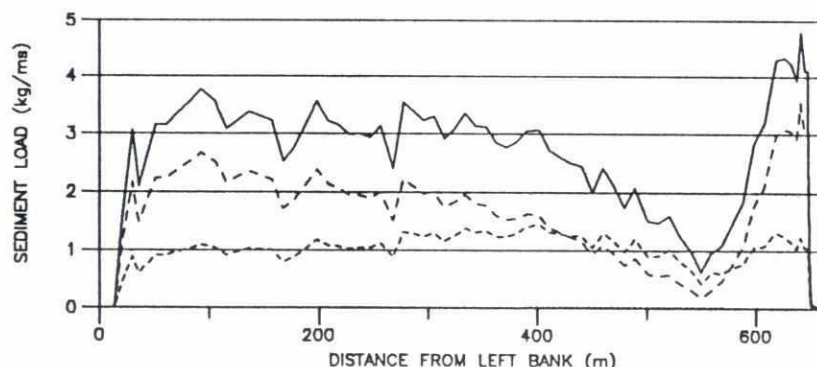
... U - (m/s)

... V - (m/s)

STAGE = 7.88 (m+P.W.D)

A = 2950 (m³)

Q = 2276 (m³/s)



SEDIMENT TRANSPORT

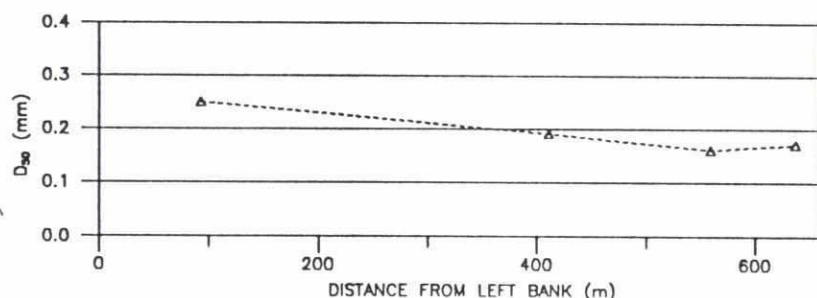
LEGEND :

— S<sub>TOTAL</sub> 1752 (kg/s)

--- S<sub>WASH LOAD</sub> 667 (kg/s)

... S<sub>SUSP. BED</sub> 1081 (kg/s)

-.- S<sub>BED LOAD</sub> 4 (kg/s)



GRAIN SIZE

LEGEND :

... D<sub>50</sub> SUSP. (mm)

-.- D<sub>50</sub> BED LOAD (mm)

-.- D<sub>50</sub> BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 97 : 11 - 13 September, 1994

Location 3 : Jamuna River, Aricha

File : A49D1T02

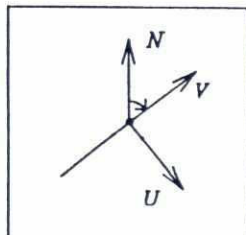
Date : 01 Jan 1995

Init : mk / tr

Horizontal distribution of flow and sediments  
Channel 1

page

3.1

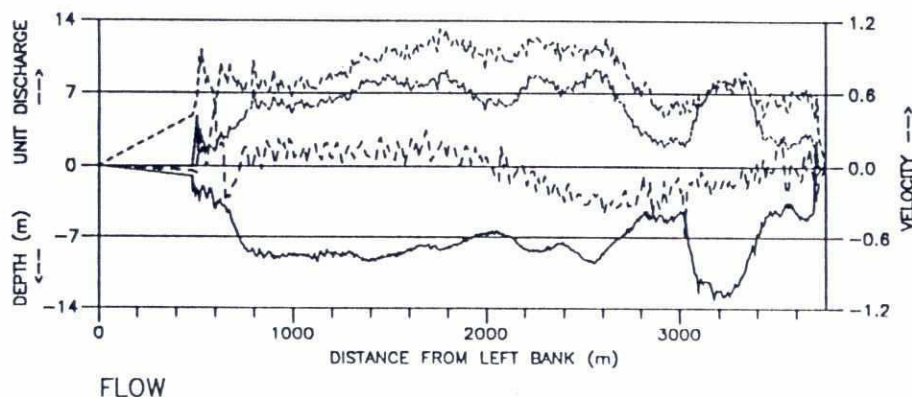


TRANSECT AZIMUTH = 51°

U - VELOCITY NORMAL TO TRANSECT (m/s)

V - VELOCITY PARALLEL TO TRANSECT (m/s)

N - MAGNETIC NORTH



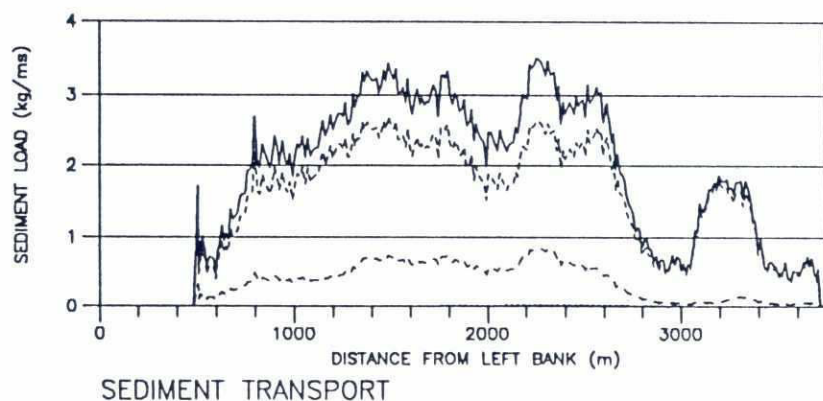
LEGEND :

— WATER DEPTH (m below STAGE)  
 ..... UNIT DISCHARGE (m³/s.m)  
 --- U - (m/s)  
 --- V - (m/s)

STAGE = 7.88 (m+PWD)

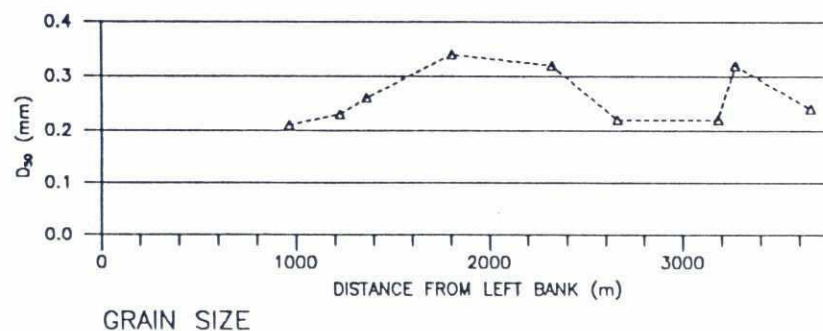
A = 24496 (m³)

Q = 19191 (m³/s)



LEGEND :

— S<sub>TOTAL</sub> 6610 (kg/s)  
 --- S<sub>WASH LOAD</sub> 5355 (kg/s)  
 --- S<sub>SUSP. BED</sub> 1232 (kg/s)  
 ..... S<sub>BED LOAD</sub> 23 (kg/s)



LEGEND :

◇◇◇◇◇ D<sub>50</sub> SUSP. (mm)  
 △△△△△ D<sub>50</sub> BED LOAD (mm)  
 □□□□□ D<sub>50</sub> BED MAT. (mm)

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT  
 Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 97 : 11 - 13 September , 1994

Location 3 : Jamuna River, Aricha

File : A49B1T01

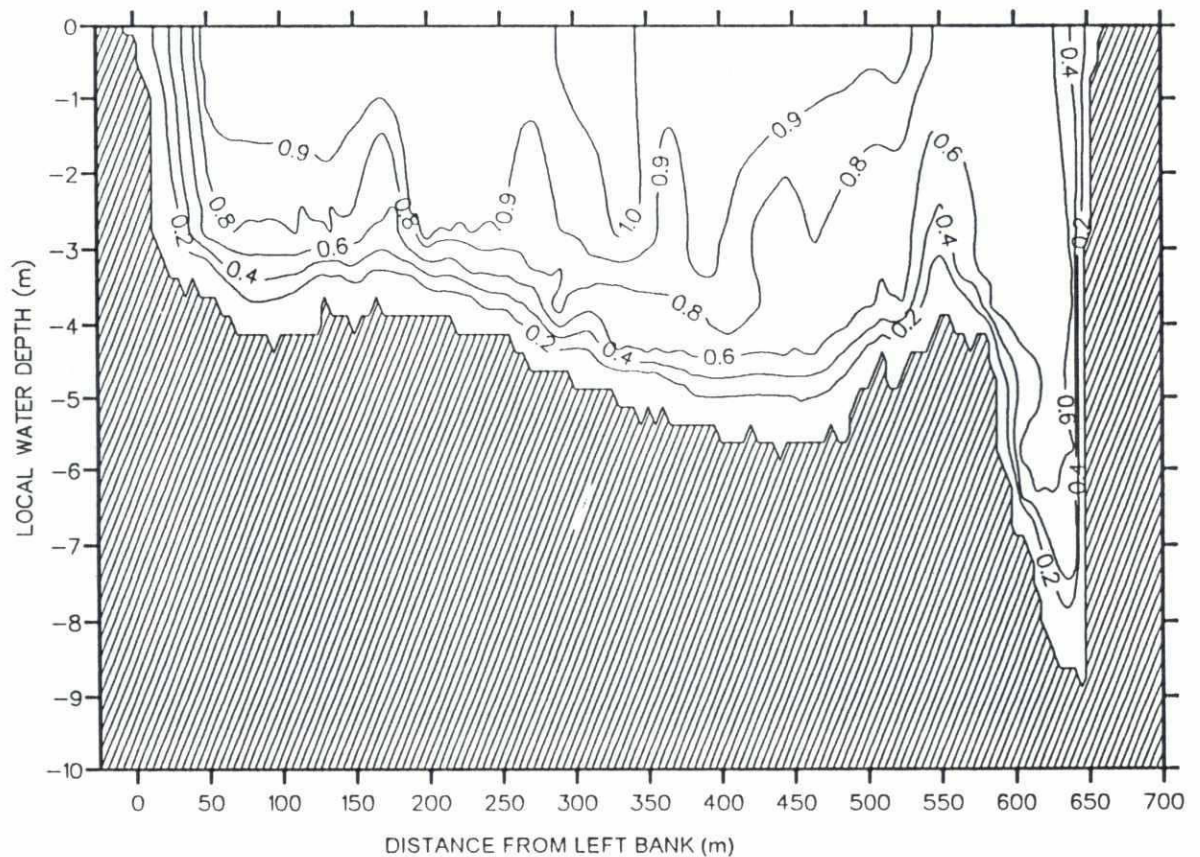
Date : 01 Jan 1995

Init : mk / tr

Horizontal distribution of flow and sediments  
 Channel 2


page

3.2

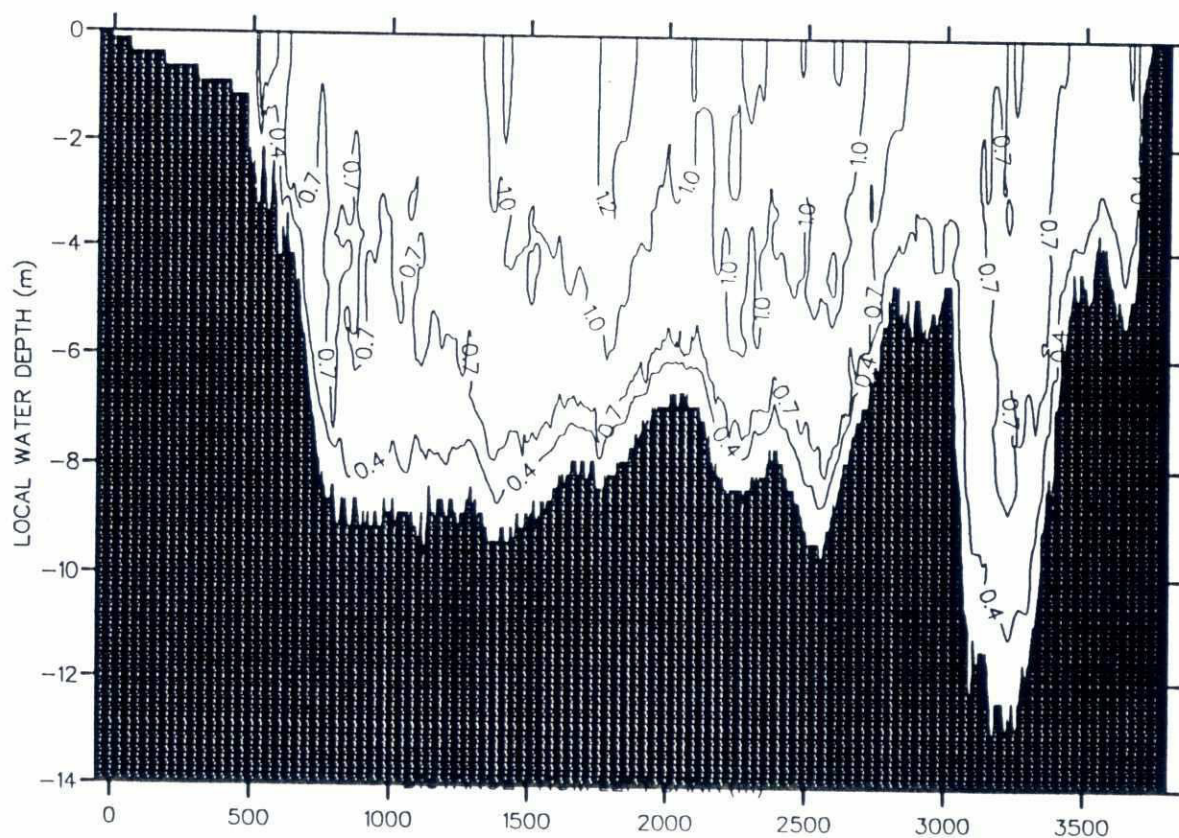


Iso-velocity contours (m/s)

Water-level : 7.86 m + PWD measured at the station indicated on Page 1.1

<p><b>FAP 24</b></p>  <p>DELFT - DHI</p> <p><b>RIVER SURVEY PROJECT</b> Flood Plan Coordination Organization Commission of the European Communities</p>		Survey Bulletin 97 : 11 - 13 September , 1994	
		Location 3 : Jamuna River, Aricha	
File : A49D1T02	Date : 01 Jan 1995	Cross-sectional distribution of flow velocity Channel 1	page 4.1
	Init : mk / tr		





Iso-velocity contours (m/s)

Water-level : 7.88 m + PWD measured at the station indicated on Page 1.1

FAP 24



DELFT - DHI

RIVER SURVEY PROJECT

Flood Plan Coordination Organization

Commission of the European Communities

Survey Bulletin 97 : 11 - 13 September , 1994

Location 3 : Jamuna River, Aricha

File : A49B1T01

Date : 01 Jan 1995

Init : mk / tr

Cross-sectional distribution of flow velocity  
Channel 2

page

4.2




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Andreasen settling tube							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth	Weight percent < 0.06 mm > 0.06 mm	D10 (mm)	D50 (mm)	D90 (mm)
Sample not collected							
Table 5.1: Grain size of near bed suspended sediment (0.3 m above river bed)							


US BM-54 bed samples							
Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Depth	Weight percent < 0.06 mm > 0.06 mm	D10 (mm)	D50 (mm)	D90 (mm)
Sample not collected							
Table 5.2 : Grain size of bed material							

Helley-Smith								
Channel	Vertical	time (YYMMDDHHMM-HHMM)	Depth	Weight percent < 0.06 mm > 0.06 mm		D35 (mm)	D50 (mm)	D65 (mm)
1	1	9409131145-1155	4.00	0.840	99.160	0.200	0.249	0.309
	1	9409131145-1155	4.00	0.490	99.510	0.198	0.243	0.303
	2	9409131221-1230	5.30	0.351	99.649	0.166	0.190	0.218
	2	9409131221-1230	5.30	0.294	99.706	0.163	0.187	0.215
	3	9409131336-1344	3.60	0.615	99.385	0.141	0.162	0.186
	3	9409131336-1344	3.60	0.574	99.426	0.142	0.165	0.191
	4	9409131513-1530	8.30	0.389	99.611	0.153	0.175	0.200
	4	9409131513-1530	8.30	0.329	99.671	1.520	0.174	0.199
2	1	9409121428-1438	8.70	0.382	99.618	0.184	0.220	0.271
	1	9409121428-1438	8.70	3.122	96.878	0.155	0.195	0.244
	2	9409121349-1358	8.50	3.002	96.998	0.180	0.223	0.282
	2	9409121349-1358	8.50	3.446	96.554	0.184	0.228	0.288
	3	9409121313-1322	9.00	2.446	97.554	0.199	0.257	0.317
	3	9409121313-1322	9.00	1.199	98.801	0.202	0.256	0.315
	4	9409121204-1213	8.00	0.109	99.891	0.292	0.331	0.375
	4	9409121204-1213	8.00	0.204	99.796	0.299	0.338	0.381
	5	9409121124-1132	7.90	0.323	99.677	0.275	0.316	0.364
	5	9409121124-1132	7.90	0.151	99.849	0.274	0.316	0.364
	6	9409121032-1041	7.60	0.180	99.820	0.184	0.220	0.271
	6	9409121032-1041	7.60	0.477	99.523	0.180	0.214	0.258
	7	9409111527-1536	11.70	0.467	99.533	0.189	0.227	0.282
	7	9409111527-1536	11.70	0.733	99.267	0.180	0.213	0.253
	8	9409111419-1506	12.20	0.101	99.899	0.283	0.323	0.369
	8	9409111419-1506	12.20	0.062	99.938	0.264	0.306	0.355
	9	9409111227-1237	5.20	0.430	99.570	0.191	0.231	0.287
	9	9409111227-1237	5.20	0.443	99.557	0.199	0.245	0.304
Table 5.3 : Grain sizes of bed load								

<b>FAP 24</b>  <b>DELFT - DHI</b>		<b>RIVER SURVEY PROJECT</b> <small>Flood Plan Coordination Organization</small> <small>Commission of the European Communities</small>		<b>Survey Bulletin-97 : 11 - 13 September , 1994</b>	
		<b>Location 3 : Jamuna River, Aricha</b>		<b>Grain size distributions</b>	
		Date : 01 Jan 1995  Init : mk / tr		page  5.1	

Delft-Bottle								
Channel	Vertical	Time (YYMMDDHHMM)	Depth (m)	Weight percent		D35 (mm)	D50 (mm)	D65 (mm)
				< 0.06 mm	> 0.06 mm			
1	1	9409131145-1155	4.00	20.928	79.072	0.084	0.113	0.147
	1	9409131145-1155	4.00	14.804	85.196	0.093	0.125	0.156
	2	9409131221-1230	5.30	8.090	91.910	0.100	0.129	0.159
	2	9409131221-1230	5.30	10.456	89.544	0.109	0.139	0.168
	3	9409131336-1344	3.60	14.498	85.502	0.089	0.114	0.146
	3	9409131336-1344	3.60	5.115	94.885	0.099	0.125	0.155
	4	9409131513-1530	8.30	3.185	96.815	0.130	0.152	0.178
	4	9409131513-1530	8.30	5.087	94.913	0.102	0.129	0.158
2	1	9409121428-1438	8.70	18.893	81.107	0.075	0.088	0.104
	1	9409121428-1438	8.70	21.099	78.901	0.073	0.086	0.101
	2	9409121349-1358	8.50	32.466	67.534	0.065	0.081	0.100
	2	9409121349-1358	8.50	40.662	59.338	-	0.072	0.088
	3	9409121313-1322	9.00	20.971	79.029	0.073	0.085	0.099
	3	9409121313-1322	9.00	14.483	85.517	0.077	0.089	0.104
	4	9409121204-1213	8.00	13.282	86.718	0.086	0.106	0.137
	4	9409121204-1213	8.00	16.625	83.375	0.080	0.097	0.118
	5	9409121124-1132	7.90	6.686	93.314	0.096	0.121	0.154
	5	9409121124-1132	7.90	6.496	93.504	0.096	0.119	0.151
	6	9409121032-1041	7.60	9.757	90.243	0.102	0.133	0.164
	6	9409121032-1041	7.60	9.422	90.578	0.092	0.116	0.147
	7	9409111527-1536	11.70	12.089	87.911	0.130	0.152	0.178
	7	9409111527-1536	11.70	14.441	85.559	0.104	0.138	0.167
	8	9409111419-1506	12.20	2.045	97.955	0.150	0.171	0.194
	8	9409111419-1506	12.20	14.631	85.369	0.098	0.132	0.163
	9	9409111227-1237	5.20	8.123	91.877	0.095	0.119	0.149
	9	9409111227-1237	5.20	0.878	99.122	0.151	0.172	0.196

Table 5.4 : Grain sizes of bed load

 <p><b>FAP 24</b> RIVER SURVEY PROJECT Flood Plan Coordination Organization Commission of the European Communities</p>		Survey Bulletin 97 : 11 - 13 September , 1994	
		Location 3 : Jamuna River, Aricha	
	Date : 01 Jan 1995	Grain size distributions	page 5.2
	Init : mk / tr		

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Method	Channel	Time (YYMMDDHHMM-HHMM)	File name
ADCP & EMF transect	1	9409131058-1103	A49D1T01
		9409131107-1113	A49D1T02 *
		9409131541-1548	A49D1T03
		9409131600-1606	A49D1T05
	2	9409110926-0950	A49B1T01 *
		9409111000-1024	A49B1T02
		9409111637-1700	A49B1T10
		9409111702-1725	A49B1T11
		9409120931-0953	A49C1T04
		9409120955-1018	A49C1T05
		9409121514-1541	A49C1T06
		9409121548-1611	A49C1T07

Table 6.1: ADCP & EMF transects

\* :transect in PSD 24 data base and presented in Sections 3 and 4

Method	Channel	Vertical	TIME (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	File name
Vertical current & turbidity profiles (ADCP/S4/MEX)	1	1	9409131145-1155	476481	641053	4.00	A49D1P02 *
		2	9409131221-1230	476164	641050	5.30	A49D1P03 *
		3	9409131336-1344	476021	641053	3.60	A49D1P04 *
		4	9409131513-1530	475939	641053	8.30	A49D1P08 **
	2	1	9409121428-1438	469440	642159	8.70	A49C1P07 *
		2	9409121349-1358	469234	641995	8.50	A49C1P06 *
		3	9409121313-1322	469131	641903	9.00	A49C1P05 *
		4	9409121204-1213	468783	641628	8.00	A49C1P04 *
		5	9409121124-1132	468379	641306	7.90	A49C1P02 *
		6	9409121032-1041	468120	641091	7.60	A49C1P01 *
		7	9409111527-1536	467720	640764	11.70	A49B1P04 *
		8	9409111419-1506	467645	640705	12.20	A49B1P03 **
		9	9409111227-1237	467347	640469	5.20	A49B1P02 *


Table 6.2: Vertical profiles

\* S4 and MEX not available

\*\* MEX not available

Method	Channel	Vertical	No. of samples	Time YYMMDDHHMM-HHMM	Easting (m)	Northing (m)	Depth (m)
Suspended sediments (pump bottle)	1	4	6	9409131513-1530	475939	641053	8.30
	2	8	6	9409111419-1506	467645	640705	12.20

Table 6.3: Suspended sediment - point sampled

<div><div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div><div><div>RIVER SURVEY PROJECT</div><div>Flood Plan Coordination Organization</div><div>Commission of the European Communities</div></div></div>		Survey Bulletin 97 : 11 - 13 September , 1994	
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Method	Channel	Vertical	No. of samples	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)
Suspended sediments	1	1	1	9409131145-1155	476481	641053	4.00
		2	1	9409131221-1230	476164	641050	5.30
		3	1	9409131336-1344	476021	641053	3.60
		4	1	9409131513-1530	475939	641053	8.30
	2	1	1	9409121428-1438	469440	642159	8.70
		2	1	9409121349-1358	469234	641995	8.50
		3	1	9409121313-1322	469131	641903	9.00
		4	1	9409121204-1213	468783	641628	8.00
		5	1	9409121124-1132	468379	641306	7.90
		6	1	9409121032-1041	468120	641091	7.60
		7	1	9409111527-1536	467720	640764	11.70
		8	1	9409111419-1506	467645	640705	12.20
		9	1	9409111227-1237	467347	640469	5.20


Table 6.4: Suspended sediment - depth integrated

Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.
Helley-Smith Sample	1	1	9409131145-1155	476481	641053	4.00	A2237
		2	9409131221-1230	476164	641050	5.30	A1972
		3	9409131336-1344	476021	641053	3.60	A1977
		4	9409131513-1530	475939	641053	8.30	A1826
	2	1	9409131145-1155	476481	641053	4.00	A1983
		2	9409131221-1230	476164	641050	5.30	A1903
		3	9409131336-1344	476021	641053	3.60	A2215
		4	9409131513-1530	475939	641053	8.30	A2266
		1	9409121428-1438	469440	642159	8.70	A2221
		2	9409121349-1358	469234	641995	8.50	A361
		3	9409121313-1322	469131	641903	9.00	A1822
		4	9409121204-1213	468783	641628	8.00	A2220
		5	9409121124-1132	468379	641306	7.90	A743
		6	9409121032-1041	468120	641091	7.60	A118
		7	9409111527-1536	467720	640764	11.70	A2330
		8	9409111419-1506	467645	640705	12.20	A70
		9	9409111227-1237	467347	640469	5.20	A1968
	2	1	9409121428-1438	469440	642159	8.70	A2140
		2	9409121349-1358	469234	641995	8.50	A2152
		3	9409121313-1322	469131	641903	9.00	A89
		4	9409121204-1213	468783	641628	8.00	A1833
		5	9409121124-1132	468379	641306	7.90	A90
		6	9409121032-1041	468120	641091	7.60	A1156
		7	9409111527-1536	467720	640764	11.70	A2274
		8	9409111419-1506	467645	640705	12.20	A1368
		9	9409111227-1237	467347	640469	5.20	A1618

Table 6.5: Bed load

<div><div>FAP 24</div><div></div><div>DELFT - DHI</div></div>		<div>RIVER SURVEY PROJECT</div> <div>Flood Plan Coordination Organization</div> <div>Commission of the European Communities</div>	<div>Survey Bulletin 97 : 11 - 13 September , 1994</div>	
		<div>Location 3 : Jamuna River, Aricha</div>		
	<div>Date : 01 Jan 1995</div>	<div>Collected data and their storage (2)</div>		<div>page</div> <div>6.2</div>
	<div>Init : mk / tr</div>			


Method	Channel	Vertical	Time (YYMMDDHHMM-HHMM)	Easting (m)	Northing (m)	Depth (m)	Sample No.
Delft-Bottle Sample	1	1	9409131145-1155	476481	641053	4.00	A672
		1	9409131145-1155	476481	641053	4.00	A642
		2	9409131221-1230	476164	641050	5.30	A375
		2	9409131221-1230	476164	641050	5.30	A595
		3	9409131336-1344	476021	641053	3.60	A500
		3	9409131336-1344	476021	641053	3.60	A649
		4	9409131513-1530	475939	641053	8.30	A387
		4	9409131513-1530	475939	641053	8.30	A493
	2	1	9409121428-1438	469440	642159	8.70	A523
		1	9409121428-1438	469440	642159	8.70	A673
		2	9409121349-1358	469234	641995	8.50	A664
		2	9409121349-1358	469234	641995	8.50	A150
		3	9409121313-1322	469131	641903	9.00	A959
		3	9409121313-1322	469131	641903	9.00	A662
		4	9409121204-1213	468783	641628	8.00	A479
		4	9409121204-1213	468783	641628	8.00	A975
		5	9409121124-1132	468379	641306	7.90	A474
		5	9409121124-1132	468379	641306	7.90	A976
		6	9409121032-1041	468120	641091	7.60	A678
		6	9409121032-1041	468120	641091	7.60	A174
		7	9409111527-1536	467720	640764	11.70	A1040
		7	9409111527-1536	467720	640764	11.70	A1028
		8	9409111419-1506	467645	640705	12.20	A979
		8	9409111419-1506	467645	640705	12.20	A956
		9	9409111227-1237	467347	640469	5.20	A957
		9	9409111227-1237	467347	640469	5.20	A1050
Table 6.6: Bed load							

 <b>FAP 24</b> DELFT - DHI		<b>RIVER SURVEY PROJECT</b> Flood Plan Coordination Organization Commission of the European Communities		<b>Survey Bulletin 97 : 11 - 13 September , 1994</b>	
		<b>Location 3 : Jamuna River, Aricha</b>		<b>Collected data and their storage (3)</b>	
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Types of Data	Channel	Format	Filename
ADCP/S4/EMF data	1	QUATTRO	A49D1T02 .ase
	2	QUATTRO	A49B1T01 .ase
Echosounder data	1	QUATTRO	A49D1T02 .ech
	2	QUATTRO	A49B1T01 .ech
Sus. sed. conc. analysis	1	QUATTRO	A49D1T02 .ssc
	2	QUATTRO	A49B1T01 .ssc
Bed load sed. analysis	1	QUATTRO	A49D1T02 .bdl
	2	QUATTRO	A49B1T01 .bdl
Transect plot data	1	QUATTRO	A49D1T02 .trs
	2	QUATTRO	A49B1T01 .trs
Iso-velocity plot data	1	MIKE 21	A49D1T02 .ct2
			A49D1T02 .dt2
Iso-velocity plot data	2	MIKE 21	A49B1T01 .ct2
			A49B1T01 .dt2

Table 7.1 PSD 24 Database file description

<div><div><p><b>FAP 24</b> DELFIT - DHI</p></div><div><p><b>RIVER SURVEY PROJECT</b> Flood Plan Coordination Organization Commission of the European Communities</p></div></div>		<p><b>Survey Bulletin 97 : 11 - 13 September , 1994</b></p>	
		<p><b>Location 3 : Jamuna River, Aricha</b></p>	
	<p>Date : 01 Jan 1995</p>	<p><b>PSD 24 Database file description</b></p>	<p>page 7.1</p>
	<p>Init : mk / tr</p>		



