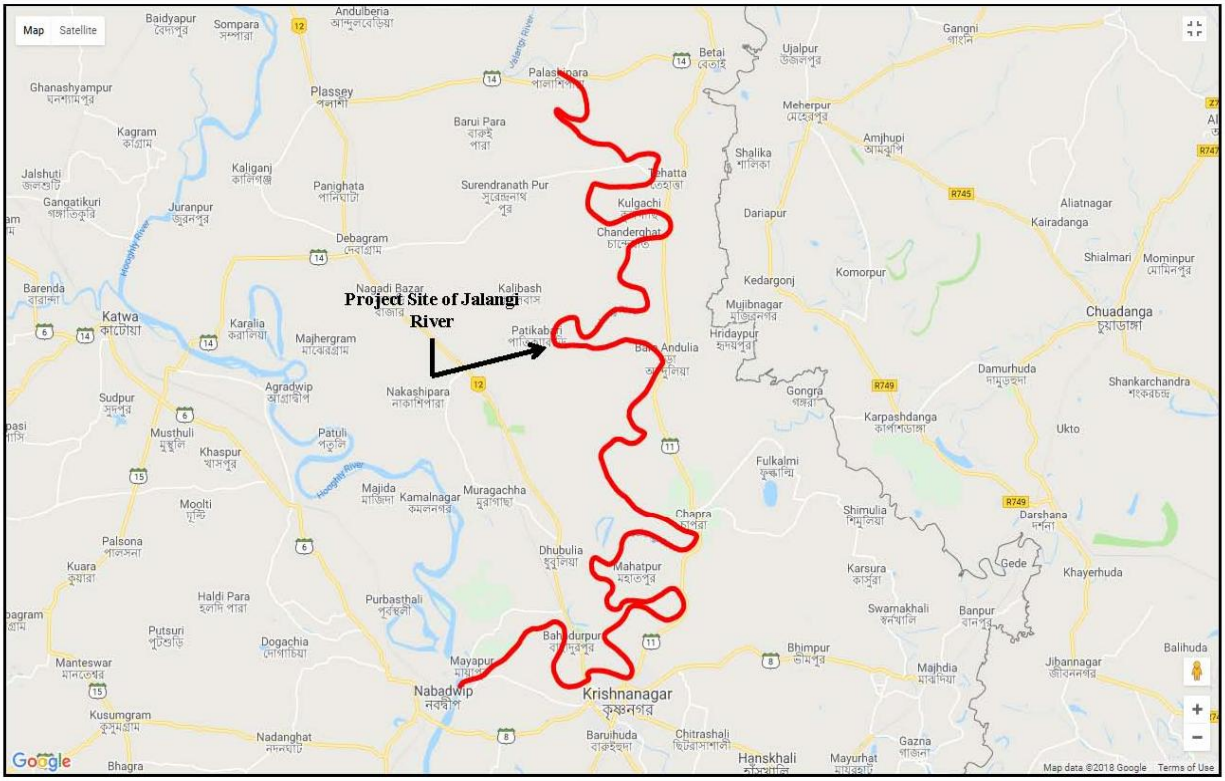
INLAND WATERWAYS AUTHORITY OF INDIA, A-13, SECTOR-1, NOIDA DIST-GAUTAM BUDHA NAGAR, UTTAR PRADESH, PIN- 201 301(UP)

"FINAL FEASIBILITY REPORT ON HYDROGRAPHIC SURVEY

JALANGI RIVER (NW-47) (130.590 km)

FROM "CONFLUENCE OF JALANGI WITH HOOGHLY/BHAGIRATHI RIVER AT NABADWIP TO STATE HIGHWAY # 14 NEAR PALASHIPARA"

Survey Period from 27.08.15 to 10.09.15



FINAL REPORT ON HYDROGRAPHICAL SURVEY OF JALANGI RIVER, WEST BENGAL

REPORT SUBMISSION DATE- 29.03.2019

SUBMITTED BY:

B.S.Geotech PVT.Ltd.

32/B, Pearabagan Bye Lane, Konnagar, Hooghly,712235
Ph: 9331419395, Email:bsgpl@yahoo.com, Web:bsgpl.in

Acknowledgement

B.S.Geotech PVT.Ltd, Konnagar, Hooghly express its sincere gratitude to **IWAI** for awarding the work and guidance for completing this Project of detailed Hydrographic Survey and the Feasibility Report in **Region-VIII (Jalangi River) from confluence of Jalangi with Hooghly/Bhagirathi Rivers at Nabadwip to Bridge on State Highway #14 near palashipara (130.590 km).**

We would like to use this opportunity to pen down our profound gratitude and appreciations to **Shri Jalaj Srivastava, IAS, Chairman, IWAI** for spending their valuable time and guidance for compleing this project of "Detailed Hydrography and Topography survey in Jalangi River." B.S.Geotech would also like to thanks **Shri Pravir Pandey, Vice-Chairman, IA&AS., Shri Shashi Bhushan Shukla, Member (Traffic), Shri Alok Ranjan, Member (Finance) and Shri S.K.Gangwar, Member (Technical).**

B.S.Geotech wishes to express their gratitude to **Capt. Ashish Arya, Hydrographic Chief, IWAI, Cdr. P.K. Srivastava, Ex. Hydrographic Chief, Shri S.V.K Reddy, Chief Engineer-I, IWAI** for his guidance and inspiration for this project. B.S.Geotech would also like to thank **Shri Rajiv Singhal, S.H.S., IWAI** for invaluable support and suggestions provided throughout the survey period. B.S.Geotech is pleased to place on record our sincere thanks to other staff and officers of **IWAI** for their excellent support and co-operation throughout the survey period.

List of Abbreviations

CD	Chart Datum
DGPS	Differential Global Positioning Systems
ETS	Electronic Total Station
GPS	Global Positioning Systems
LBM	Local Bench Mark
MSL	Mean Sea Level
RL	Reference Level
SD	Sounding Datum
SBAS	Satellite-Based Augmentation System
TBC	Trimble Business Centre
FRP	Fiber Reinforced Plastic

Table 1- List of Abbreviations

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Salient Features of Jalangi River

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<tr><td>1.</td><td>Name of Consultant</td><td>B.S. Geotech PVT. LTD</td></tr>
<tr><td>2.</td><td>Region number & State(s)</td><td>Region -VIII, West Bengal</td></tr>
<tr><td>3.</td><td>a) Waterway name
b) NW #
c) Total Stretch and length of declared NW (from…. To….; total length)
d) Survey Period (… to …)</td><td>a) Jalangi River
b) NW-47
c) From Confluence of Jalangi with Hooghly/Bhagirathi rivers at Nabadwip to Bridge on State Highway #14 near Palashipara (130.590 km)
d) 27th August, 2015 to 10th September, 2015</td></tr>
<tr><td>4.</td><td>Tidal & non tidal portions (from… to, length, average tidal variation)</td><td>Non-Tidal River</td></tr>
<tr><td>5.</td><td>LAD status (Least Available Depth)

i) < 1.2 m (km)
ii) 1.2 m to 1.4 m (km)
iii) 1.5 m to 1.7 m (km)
iv) 1.8 m to 2.0 m (km)
v) > 2.0 m (km)</td><td><u>Observed Depth</u>
<table>
<tr><th>Sub Stretch-1 (0.00-10.00 km)</th><th>Sub Stretch-2 (10.00-20.00 km)</th><th>Sub Stretch-3 (20.00 – 30.00 km)</th><th>Sub Stretch-4 (30.00-40.00 km)</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
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<tr><td>0</td><td>1.6</td><td>0</td><td>1.5</td></tr>
<tr><td>0</td><td>1.8</td><td>1.8</td><td>1.9</td></tr>
<tr><td>10</td><td>6.6</td><td>8.2</td><td>6.6</td></tr>
<tr><td>Total-10.0</td><td>Total- 10.0</td><td>Total- 10.00</td><td>Total- 10.00</td></tr>
</table>
<table>
<tr><th>Sub Stretch-5 (40.00-50.00 km)</th><th>Sub Stretch-6 (50.00-60.00 km)</th><th>Sub Stretch-7 (60.00-70.00 km)</th><th>Sub Stretch-8 (70.00-80.00km)</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1.0</td></tr>
<tr><td>0</td><td>1.2</td><td>1.2</td><td>0</td></tr>
<tr><td>1.6</td><td>1.7</td><td>0</td><td>0</td></tr>
<tr><td>1.8</td><td>2.0</td><td>2.0</td><td>1.8</td></tr>
<tr><td>6.6</td><td>5.1</td><td>6.8</td><td>7.2</td></tr>
<tr><td>Total- 10.0</td><td>Total- 10.0</td><td>Total- 10.0</td><td>Total- 10.0</td></tr>
</table></td></tr>
</table>

Sl.	Particulars	Details

	Sub Stretch-9 (80.00-90.00 km)	Sub Stretch-10 (90.00-100.00 km)	Sub Stretch-11 (100.00-110.00 km)	Sub Stretch-12 (110.00-120.00km)
i) < 1.2 m (km)	0	0.9	0	0.9
ii) 1.2 m to 1.4 m (km)	0	1.4	1.4	1.4
iii) 1.5 m to 1.7 m (km)	1.5	1.6	1.5	1.7
iv) 1.8 m to 2.0 m (km)	2.0	1.9	0	1.8
v) > 2.0 m (km)	6.5	4.2	7.1	4.2
	Total- 10.0	Total- 10.0	Totai-10.0	Total- 10.0

	Sub Stretch-13 (120.00-130.590 km)	Total (km)
i) < 1.2 m (km)	2.3	5.1
ii) 1.2 m to 1.4 m (km)	0	6.6
iii) 1.5 m to 1.7 m (km)	1.7	14.4
iv) 1.8 m to 2.0 m (km)	1.8	20.6
v) > 2.0 m (km)	4.790	83.890
	Total- 10.590	Total- 130.590

Reduced Depth

LAD status (Least Available Depth)	Sub Stretch-1 (0.00-10.00 km)	Sub Stretch-2 (10.00-20.00 km)	Sub Stretch-3 (20.00 – 30.00 km)	Sub Stretch-4 (30.00-40.00 km)
i) < 1.2 m (km)	0	2.1	0.5	4.0
ii) 1.2 m to 1.4 m (km)	0	1.2	1.2	1.2
iii) 1.5 m to 1.7 m (km)	0	1.5	1.5	0
iv) 1.8 m to 2.0 m (km)	0	1.8	1.8	0
v) > 2.0 m (km)	10	3.4	5.0	4.8
	Total-10.0	Total-10.0	Total- 10.0	Total- 10.0

	Sub Stretch-5 (40.00-50.00 km)	Sub Stretch-6 (50.00-60.00 km)	Sub Stretch-7 (60.00-70.00 km)	Sub Stretch-8 (70.00-80.00 km)
i) < 1.2 m (km)	7.3	8.8	7.3	8.8
ii) 1.2 m to 1.4 m (km)	1.2	1.2	1.2	1.2
iii) 1.5 m to 1.7 m (km)	1.5	0	1.5	0
iv) 1.8 m to 2.0 m (km)	0	0	0	0
v) > 2.0 m (km)	0	0	0	0
	Total- 10.0	Total- 10.00	Total-10.0	Total-10.0

Sl.	Particulars	Details

	i) < 1.2 m (km) ii) 1.2 m to 1.4 m (km) iii) 1.5 m to 1.7 m (km) iv) 1.8 m to 2.0 m (km) v) > 2.0 m (km)	

Sub Stretch-9 (80.00-90.00 km)	Sub Stretch-10 (90.00-100.00 km)	Sub Stretch-11 (100.00-110.00 km)	Sub Stretch-12 (110.00-120.00 km)
7.3	7.3	8.8	8.7
1.2	1.2	1.2	1.3
1.5	1.5	0	0
0	0	0	0
0	0	0	0
Total- 10.0	Total- 10.0	Total-10.0	Total-10.0

Sub Stretch-13 (120.00-130.590 km)	Total (km)
9.09	79.99
0	13.30
1.5	10.50
0	3.6
0	23.2
Total- 10.590	Total- 130.590

i) < 1.2 m (km)
ii) 1.2 m to 1.4 m (km)
iii) 1.5 m to 1.7 m (km)
iv) 1.8 m to 2.0 m (km)
v) > 2.0 m (km)

6. Cross structures
i) Dams, weirs, barrages etc (total number; with navigation locks or not)
ii) Bridges, Power cables etc [total number; range of horizontal and vertical clearances

i) There is no dam found in this zone of river.

ii) RCC Bridge-2 (two) (Dijendra Setu and NH-34)
Rail Bridge-2 (two) (krishnanagar-Bahadurpur Railway)
Foot Bridge-1 (one)

Clearance w.r.t H.F.L	Min (m)	Max (m)
Horizontal Clearance (m)	37.390	77.67
Vertical Clearance w.r.t. H.F.L (m)	3.308	10.726

iii) High Tension Line-1 (one), Electric Lines-9 (Nine)

Clearance w.r.t H.F.L	Min (m)	Max (m)
Horizontal Clearance (m)	93.138	277.85
Vertical Clearance w.r.t. H.F.L (m)	1.581	9.265

<table>
<tr><th>Sl.</th><th>Particulars</th><th>Details</th></tr>
<tr><td>7.</td><td>Slope (m/km, cm/km)</td><td>
<table>
<tr><th colspan="2" rowspan="2">Reach</th><th rowspan="2">River Level Change (m)</th><th rowspan="2">Distance (km)</th><th>Slope</th><th>Slope</th></tr>
<tr><th>(m/km)</th><th>(cm/km)</th></tr>
<tr><th>From</th><th>To</th><th></th><th></th><th></th><th></th></tr>
<tr><td>0.00</td><td>10.00</td><td>0.037</td><td>10.198</td><td>0.0036</td><td>0.360</td></tr>
<tr><td>10.00</td><td>20.00</td><td>0.035</td><td>9.825</td><td>0.0036</td><td>0.360</td></tr>
<tr><td>20.00</td><td>30.00</td><td>0.036</td><td>10.08</td><td>0.0036</td><td>0.360</td></tr>
<tr><td>30.00</td><td>40.00</td><td>0.04</td><td>10.906</td><td>0.0037</td><td>0.370</td></tr>
<tr><td>40.00</td><td>50.00</td><td>0.033</td><td>9.189</td><td>0.0036</td><td>0.360</td></tr>
<tr><td>50.00</td><td>60.00</td><td>0.139</td><td>9.71</td><td>0.0143</td><td>1.430</td></tr>
<tr><td>60.00</td><td>70.00</td><td>0.232</td><td>10.595</td><td>0.0219</td><td>2.190</td></tr>
<tr><td>70.00</td><td>80.00</td><td>0.21</td><td>9.566</td><td>0.022</td><td>2.200</td></tr>
<tr><td>80.00</td><td>90.00</td><td>0.436</td><td>10.335</td><td>0.0422</td><td>4.220</td></tr>
<tr><td>90.00</td><td>100.00</td><td>0.65</td><td>9.776</td><td>0.0665</td><td>6.650</td></tr>
<tr><td>100.00</td><td>110.00</td><td>0.23</td><td>10.512</td><td>0.0219</td><td>2.190</td></tr>
<tr><td>110.00</td><td>120.00</td><td>0.222</td><td>10.134</td><td>0.0219</td><td>2.190</td></tr>
<tr><td>120.00</td><td>130.590</td><td>0.211</td><td>9.752</td><td>0.0216</td><td>2.160</td></tr>
<tr><td colspan="4">Avg. Slope</td><td>0.019</td><td>1.926</td></tr>
</table>
</td></tr>
<tr><td>8.</td><td>i) Present IWT operations

ii) Ferry services, tourism, cargo, if any</td><td>As Follows

As much as 14 nos of Ferry ghats are available in this zone of river. like Hular ferry ghat (Ch-0.291km), Haranagar ferry ghat (Ch-24.68 km), Panditpur ferry ghat (Ch-34.378 km), Haranagar ferry ghat (Chainage-44.657 km), Kalinagar Dakhin para ferry ghat (Chainage-48.18 km), Kalinagar ferry ghat (Chainage-52.767 km) , Sonatala ferry ghat (Chainage-56.764 km), Gokhurapota ferry ghat (Chainage-57.696 km), poli ferry ghat (58.90 km), Sukhsagar ferry ghat (Chainage-63.64 km) Hatrachar ferry ghat (Chainage-68.467 km), Teghari ferry ghat (Chainage-70.536 km), Bara Andulia ferry ghat (Chainage-72.66 km) and Tehatta ferry ghat (Ch-113.40 km). The cargo is available in those ferry ghats with goods, vehicles like cycle and motor cycle, vegetables etc.
Nabadwip, Mayapur are the prime tourist places located in this zone of river. Iskon temple at mayapur is very famous in india and also in the foreign country. Many foreigners stay there and influenced the God Krishna's name.</td></tr>
<tr><td>9.</td><td>Approx Distance of Rail & Road from Industry</td><td>Nearest Railway station-
i) Bahadurpur Railway Station (0.85 km approx from the waterway)
ii) Krishnanagar Railway Station (3.43 km approx from the waterway)
Name of National highway close to the River-
NH- 34(0.96 km approx from the waterway)
Name of SH- SH-3, SH-6, SH-8, SH-11, SH-14</td></tr>
<tr><td>10.</td><td>Any other information/ comment</td><td>Detailed project Report may develop for the development of the waterway. The Ferry services with cargo passengers available in this zone of river. The Road and Railways are really helpful for the transportation and communication system in this zone of river.</td></tr>
</table>

Section-1: Introductory Considerations

1.1- River Course: Background information, Historical Information, Origin, End:-

Jalangi River is a branch of the Ganges River in Murshidabad and Nadia districts in the Indian state of West Bengal. It flows into the Bhagirathi River and strengthens its lower channel, Hooghly.

The river below the point where the Jalanagi meets the Ganges is known as Hooghly and the course above it from the point of its separation from the main flow of the Ganges to its confluence with the Jalangi, is called Bhagirathi.Ghurni, a neighborhood of Krishnanagar, a centre for the production of clay dolls, often referred to as Krishnanagar clay dolls, is located on the banks of the Jalangi. Mayapur is located at the confluence of the Jalanagi and Bhagirathi.

The Jalangi is a modern stream, but its age is not known. Apparently it opened up long after the Bhairab River ran as a strong stream in a south easterly direction. The Bhairab once flowed from the Ganges, across the present beds of the Jalangi, and further eastwards towards Faridpur. The Mathabhanga is a younger stream than Jalangi and it was not till very recently that the river completed its junction with the Hooghly by adopting the Churni (now its lower reaches) for its main course.

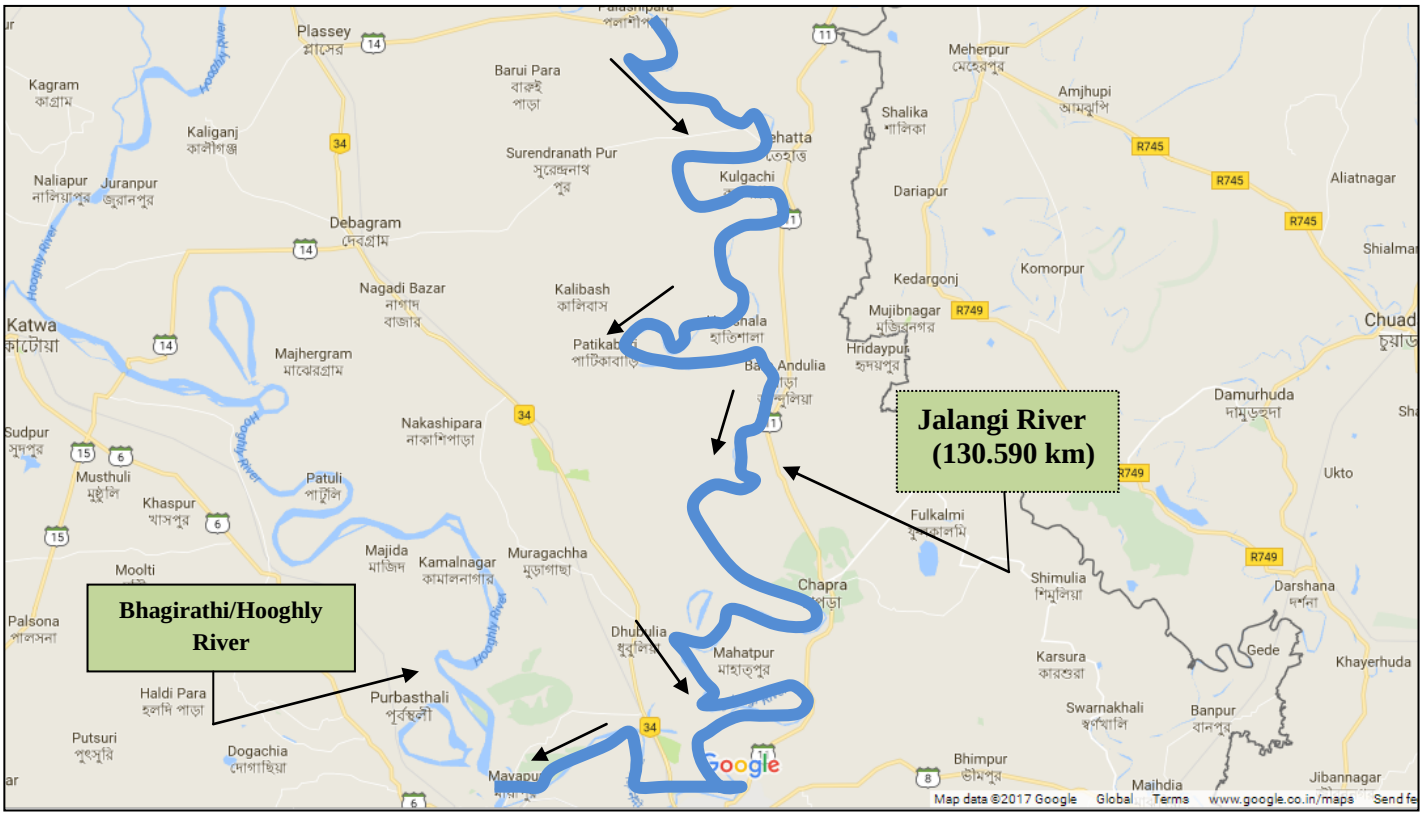

Figure 1- Jalangi River site Location

1.2 - Tributaries / Network of River/ Basin:-

Jalangi is a branch of Bhagirathi/Hooghly River which is started near Swarupganj area.

1.3 - State / District through which river passes:-

The River Jalangi passes through the district of Nadia and Murshidabad in the state of west Bengal.

1.4 – Project Site Google Map:-

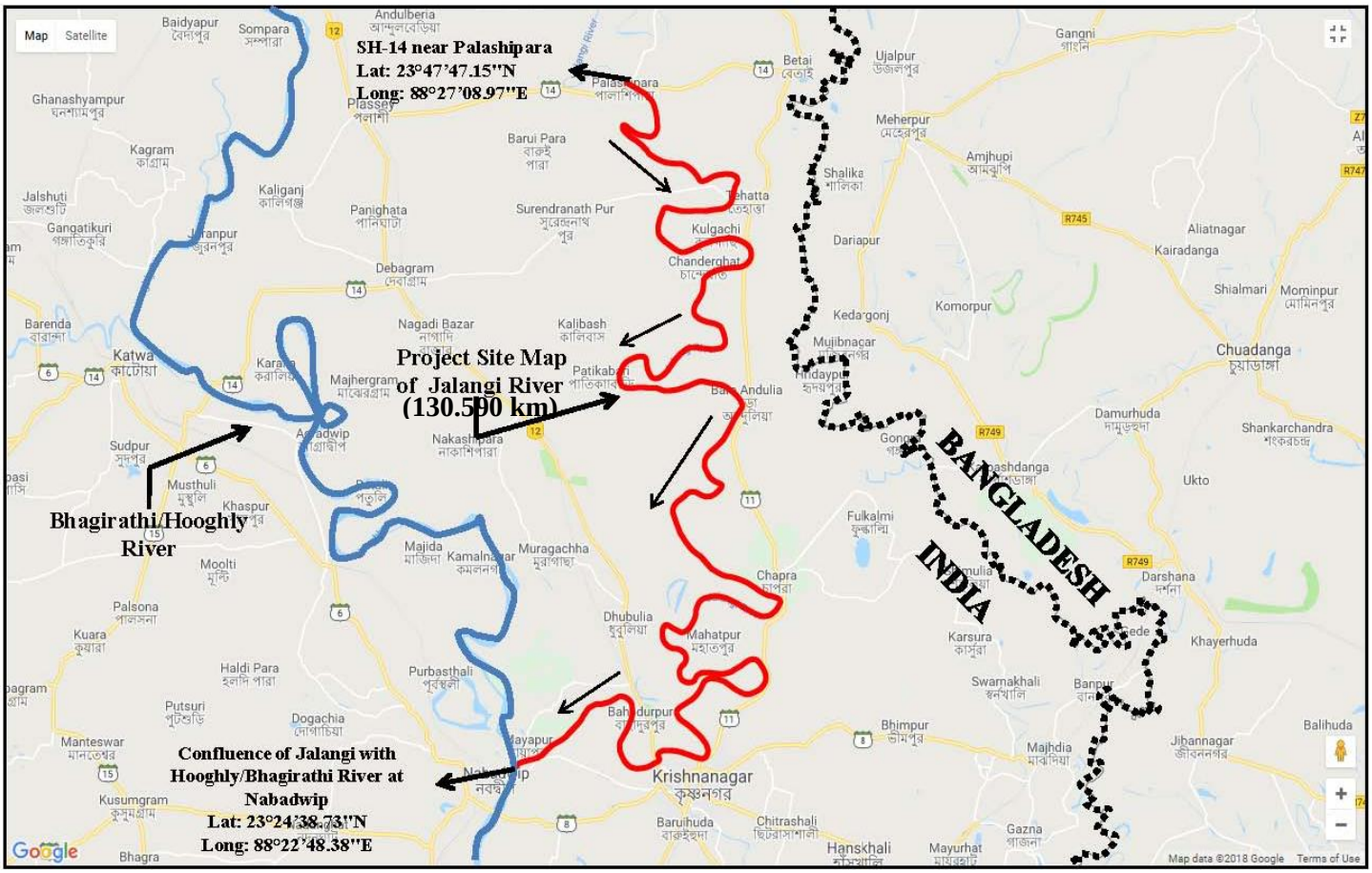

Figure 2 - Project Site Location Map

1.5 - Scope of work:-

The Scope of work shall cover all technical aspects of hydrographic survey at par with International Standards including the following for development of the river/canal for inland navigation.

The detailed hydrographic survey is to be carried out by using Automated Hydrographic Survey System (using digital Echo sounder for depth measurement, DGPS Beacons Receivers for position fixing and Hypackmax or equivalent software for data logging). The survey is to be conducted in WGS"84 datum.

- Detailed Hydrographic Survey to assess the navigability of the waterway.
- To collect Water and bottom samples, current meter observation and discharge from the deepest route at every 10 km interval.
- To identify cross structures which are obstructing navigation.
- To identify the length of bank protection required.
- The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.
- The pillar extends 60.cms above ground level. Inscription "IWAI", "B.S. Geotech" and BM No. can be seen on the face of the pillar.

Section-2: Methodology Adopted to undertake Study

2.1 - Methodology Adopted including Resources and equipment used and calibration: -

Equipment:-

Following equipments are employed for the Bathymetric and Topographic survey:-

Equipment	Make	Version	Qty Employed
Echo sounder	Bathy MF 500	……	1
Current Meter	AEM 213-D	……	1
Tide Gauge	Manual (Pole type)	----------	4
RTK	South S86T	----------	3
GPS Sets	Trimble –Becon Receiver SPS 361	----------	1
Software	HYPACK data acquisition	Version 14	1
Software	AUTOCAD	2013	1
Software	Microsoft Office	2013	1

Table 2 - Equipments

- **Conduct of survey work**

- **Topographic Survey:-**

The Topography survey of Jalangi river has been carried out from "Confluence of Jalangi with Hooghly/Bhagirathi Rivers at Nabadwip (Lat: - 23°24'38.73"N, Long: - 88°22'48.38"E) to Bridge on State Highway #14 near Palashipara (Lat: - 23°47'47.15"N, Long: - 88°27'8.97"E)".

The Topographic survey has been conducted to ascertain following in the survey area:-

- Spot levels
- High bank Line
- Vegetation covered
- Bridges and permanent structures
- Road, culvert and other communication network

GPS RTK (Real Time Kinematic) satellite navigation is a technique used in land survey and in hydrographic survey based on the use of carrier phase measurements of the GPS, GLONASS and / or Galileo signals where a single reference station provides the real-time corrections, providing up to centimeter-level accuracy. When referring to GPS in particular, the system is also commonly referred to as Carrier-Phase Enhancement, CPGPS. RTK systems use a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier that it measured, and the mobile units compare their own phase measurements with the ones received from the base station. There are several ways to transmit a correction signal from base station to mobile station. The most popular way to achieve real-time, low-cost signal transmission is to use a radio modem, typically in the UHF band. This allows the units to calculate their relative position to millimeters, although their absolute position is accurate only to the same accuracy as the position of the base station.

Bathymetry Survey:-

Bathy 500 MF was used to obtain soundings onboard the survey boat. A working frequency of 210 KHz was used for sounding operations. The digital output from the echo sounder was automatically fed to the HYPACK data logging software on a real-time basis for the acquisition of survey data. No breakdown of equipment was reported and the performance of the equipment was found to be satisfactory during the entire duration of the survey.

The sound velocity was set to 1499 m/s on single beam echo sounder during acquisition by the Bar check method process. The Daily bar checks were done prior to the sounding operation and before the closing of the sounding operation for the day. Being very shallow depths, the echo sounder depths were also cross-checked in between by using demarcated sounding poles during the conduct of the survey. The sounding lines were run using Survey boat to identify the design line of the Jalangi River for the possible stretch. The cross lines were run perpendicular to the orientation of river flow (i.e. perpendicular to the orientation of depth contours) in respective stretches. The spot sounding was also carried out in the area where the survey boat cannot be operated due to low depth. The hemisphere DGPS and Sounding Pole were used for Spot sounding at shallow locations in the Jalangi River. The DGPS position along with water depths was recorded simultaneously and the tidal reduction was applied to the obtained depths.

Figure 3-During the Bathymetry Survey

2.2 - Description of Bench Marks (B.M) / authentic Reference Level used:-

For Topographic survey, the horizontal control has been carried out from the G.T.S pillar -S-1, situated at IWAI Port Trust Office at Swarupganj DM Station. The G.T.S position of Swarupganj port is tabulated below-

	Geographic position		UTM position		
Location Name	**Latitude (N)**	**Longitude (E)**	**Northing (m)**	**Easting (m)**	**Elevation w.r.t M.S.L (m)**
Swarupganj Port	23°24'50.049"	88°23'16.854"	2590022.562	641818.063	9.911 meter

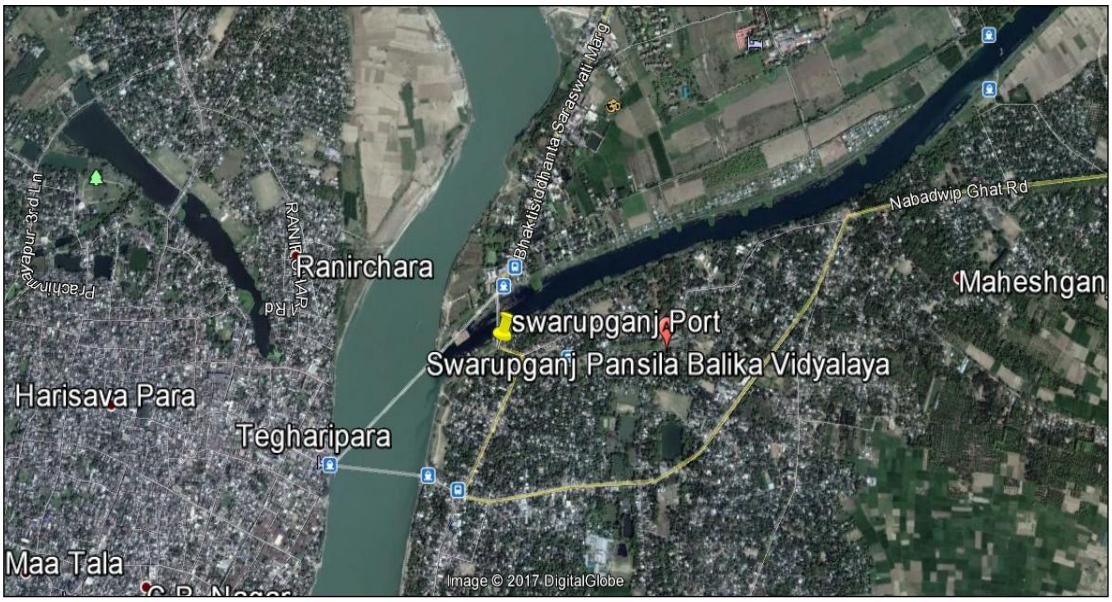

Figure 4- G.T.S location of Jalangi River near Swarupganj Port

2.3 - Tidal Influence Zone and tidal variation in different stretches:-

There are no Tidal influences or effects found in this zone of river.

2.4 - Methodology to fix Chart Datum/ Sounding Datum:-

The six year data of CWC Gauge was provided by IWAI. Average of last six years min. Water level has been adopted as Sounding Datum. IWAI had provided Sounding Datum at Confluence of Jalangi with Hooghly/Bhagirathi River (Chainage-0.000 km), Palashipara (Seasonal) (Chainage-128.628 km) and Chapra (Chainage 54.183 km). The same was used to arrive the Sounding Datum values at BM Pillars and at tide gauges and for dry patches, Lowest M.S.L value is used as Sounding Datum (S.D) at every km.

2.5 - Yearly minimum Water Levels Average of 06 years minimum Water Levels to arrive at Chart Datum (CD) / Sounding Datum (SD):-

Sl. No	Place	Sounding Datum w.r.t MSL (Provided by IWAI)
1	Palashipara (Seasonal) (Chainage- 128.628 km)	5.967 meter
2	Chapra (Chainage-54.183 km)	4.338 meter
3	Confluence of Jalangi with Hooghly/Bhagirathi River (Chainage 0.000 km)	4.143 meter

2.6 -Transfer of Sounding Datum table for Tidal Rivers:-

There is no tidal influence found in this zone of river.

2.7 –Table indicataing tidal variation at different observation points (say at every 10 KM):-

There is no tidal influence found in this zone of river.

2.8 - Salient features of Dam, Barrages, Weirs, Anicut, Locks, Aqueducts etc.:-

There are no Dams, Barrage, weirs, Anicut, Locks, Aqueducts found in this zone of Rivers.

2.9- Description of erected Bench mark Pillars:-

Sl No	BM No	Location	Chainage (km)	Latitude (N)	Longitude (E)	Easting (m)	Northing (m)	BM Height above MSL (m)	BM Height above SD (m)
1	BM 1	Swarupganj	0.283	23°24'43.176"	88°22'56.915"	641254.093	2589805.724	9.009	4.865
2	BM 2	Rui Pukur p	10.196	23°26'24.066"	88°27'13.184"	648497.243	2592980.475	9.465	5.285
3	BM 3	Ghurni	20.000	23°25'16.443"	88°30'20.497"	653835.018	2590955.106	9.865	5.650
4	BM 4	Tarukdaspur	30.137	23°27'19.98"	88°32'23.706"	657291.648	2594791.96	10.03	5.778
5	BM 5	Uttarjhitkip ota	40.915	23°28'55.399"	88°28'40.836"	650937.005	2597660.602	11.711	7.420
6	BM 6	Kalinagar	50.201	23°29'44.049"	88°32'23.81"	657247.158	2599223.48	12.435	8.111
7	BM 7	Gokhurapot a	59.806	23°32'36.941"	88°29'22.771"	652056.069	2604487.31	12.371	7.910
8	BM 8	Gopinathpur	70.555	23°36'12.011"	88°31'19.317"	655290.853	2611137.508	13.376	8.680
9	BM 9	Birur	80.010	23°37'25.923"	88°27'18.003"	648427.547	2613339.789	12.704	7.800
10	BM 10	Hatishala	90.457	23°38'48.79"	88°30'51.541"	654452.425	2615951.605	12.917	7.785
11	BM 11	Paschim Chalkjalia	100.267	23°42'11.678"	88°31'56.097"	656214.682	2622211.988	15.252	9.905
12	BM 12	Boyerbanda	110.737	23°43'22.827"	88°29'45.11"	652481.586	2624361.096	14.628	9.053
13	BM 13	Raghunathp ur	121.048	23°45'20.011"	88°28'15.886"	649917.539	2627939.319	11.301	5.504
14	BM 14	Palashipara	130.543	23°47'43.903"	88°27'09.095"	647981.268	2632345.935	15.279	9.271

Table 3 - Bench Mark Details

2.10- Description of erected Tide Gauges:-

Sl. No	Tide Gauge Name	Chainage (km)	Easting (m)	Northing (m)	Latitude (N)	Longitude (E)	W.L w.r.t MSL (m)	Period of observation
1	GS (TP)- 1	0.295	641262.48	2589829.3	23°24'43.94 "	88°22'57.218 "	5.098	24 hrs
2	GS (TP)- 2	10.198	648598.78	2592971.94	23°26'23.755 "	88°27'16.759 "	5.198	24 hrs
3	GS (TP)-3	10.277	648563.84	2592898.18	23°26'21.369 "	88°27'15.501 "	5.205	24 hrs
4	GS (TP)- 4	20.024	653777.46	2590952.25	23°25'16.37 "	88°30'18.469 "	5.295	24 hrs
5	GS (TP)- 5	20.031	653774.36	2590957.84	23°25'16.553 "	88°30'18.361 "	5.302	24 hrs
6	GS (TP)- 6	30.105	657257.17	2594794.43	23°27'20.072 "	88°32'22.492 "	5.335	24 hrs
7	GS (TP)- 7	30.178	657307.52	2594846.9	23°27'21.76 "	88°32'24.286 "	5.354	24 hrs
8	GS (TP)- 8	41.012	650885.63	2597650.27	23°28'55.08 "	88°28'39.021 "	5.413	24 hrs
9	GS (TP)- 9	41.047	650857.08	2597678.95	23°28'56.022 "	88°28'38.025 "	5.426	24 hrs
10	GS (TP)- 10	50.202	657249.78	2599246.21	23°29'44.787 "	88°32'23.911 "	5.500	24 hrs
11	GS (TP)- 11	50.225	657274.34	2599253.19	23°29'45.006 "	88°32'24.78 "	5.513	24 hrs
12	GS (TP)- 12	59.913	651874.89	2604434.68	23°32'35.291 "	88°29'16.363 "	5.598	24 hrs
13	GS (TP)- 13	59.981	651839.4	2604490.71	23°32'37.124 "	88°29'15.132 "	5.602	24 hrs
14	GS (TP)- 14	70.509	655180.65	2611134.61	23°36'11.955 "	88°31'15.429 "	5.822	24 hrs
15	GS (TP)- 15	70.682	655235.87	2611313.82	23°36'17.762 "	88°31'17.444 "	5.854	24 hrs
16	GS (TP)- 16	80.076	648364.89	2613375.37	23°37'27.1 "	88°27'15.805 "	5.993	24 hrs
17	GS (TP)- 17	90.412	654403.57	2615983.51	23°38'49.844 "	88°30'49.829 "	6.287	24 hrs
18	GS (TP)- 18	100.189	656227.52	2622141.12	23°42'09.37 "	88°31'56.523 "	6.498	24 hrs
19	GS (TP)- 19	100.322	656180.16	2622239.66	23°42'12.59 "	88°31'54.889 "	6.516	24 hrs
20	GS (TP)- 20	110.702	652447.57	2624449.57	23°43'25.715 "	88°29'43.941 "	6.860	24 hrs
21	GS (TP)- 21	120.837	650031.78	2627758.44	23°45'14.093 "	88°28'19.855 "	6.983	24 hrs
22	GS (TP)- 22	130.524	648008.99	2632374.1	23°47'44.809 "	88°27'10.084 "	7.225	24 hrs

Table 4- Tide Gauge Details

2.11- Chart Datum / Sounding Datum and Reductions details:-

Sl no	CWC gauge / Dam / Barrage / Weir / Anicut / Bench Mark / tide gauges	Chainage (km)	Stretch for corrected soundings and topo levels (km)	Established Sounding Datum w.r.t. MSL (m) at col. A.	Sounding Datum of Tide Gauge w.r.t. MSL (m)	Correction in WL data for Bathymetric survey (m)	Topo level data to be converted as depth for volume calculation w.r.t. SD (m)
	A	B	C (50% stretch is to be selected on both side of tide gauge)	D +ve indicates above MSL -ve indicates below MSL	E	F = (E- WL data in MSL)	G = (E- topo levels in MSL)
1	GS- (TP)-22	130.524	124.7-130.590		6.008	-1.217	Jalangi Reduced Topo.xyz
2	Palashipara (Seasonal)	128.628	115.8-124.7	5.967		-1.200	Submitted in Soft copy
3	GS- (TP)-21	120.837	105.5-115.8		5.797	-1.186	
4	GS -(TP)-20	110.702	100.3-105.5		5.575	-1.285	
5	GS- (TP)-19	100.322	95.3-100.3		5.348	-1.168	
6	GS- (TP)-18	100.189	85.2-95.3		5.345	-1.153	
7	GS -(TP)-17	90.412	75.4-85.2		5.131	-1.156	
8	GS- (TP)-16	80.076	70.6-75.4		4.905	-1.088	
9	GS- (TP)-15	70.682	65.2-70.6		4.699	-1.155	
10	GS- (TP)-14	70.509	59.9-65.2		4.695	-1.127	
11	GS- (TP)-13	59.981	57.0-59.9		4.465	-1.137	
12	GS- (TP)-12	59.913	52.2-57.0		4.463	-1.135	
13	Chapra	54.183	50.2-52.2	4.338		-1.225	
14	GS - (TP)-11	50.225	45.6-50.2		4.324	-1.189	
15	GS - (TP)-10	50.202	41.0-45.6		4.324	-1.176	
16	GS - (TP)-9	41.047	35.6-41.0		4.291	-1.135	
17	GS - (TP)-8	41.012	30.1-35.6		4.291	-1.122	
18	GS - (TP)-7	30.178	25.1-30.1		4.252	-1.102	
19	GS - (TP)-6	30.105	20.0-25.1		4.251	-1.084	
20	GS - (TP)-5	20.031	15.2-20.0		4.215	-1.087	
21	GS - (TP)-4	20.024	10.2-15.2		4.215	-1.080	
22	GS - (TP)-3	10.277	5.2-10.2		4.180	-1.025	
23	GS - (TP)-2	10.198	0.1-5.2		4.180	-1.018	
24	GS- (TP)-1	0.295	0.0-0.1		4.144	-0.954	
25	Confluence (284.850)	0.000		4.143		-0.924	

Table 5 - Chart Datum / Sounding Datum & Reduction Details

2.12- High Flood Level (H.F.L.) at known gauge stations and cross-structures:-

MHWS (Mean High Water Springs) is to be taken in tidal stretches and HFL in non-tidal stretches.

Sl. No	Location and description of CWC gauge / Dam / Barrages / Weirs / Anicut / Locks / Aqueducts / BM	Cross-structure details	Chainage (km)	Established HFL / MHWS / FSL / MWL / FRL w.r.t. MSL (m)	Computed HFL at Cross-Structures w.r.t. MSL (m)
1	Palashipara (Seasonal)		130.524	14.430	
2	Chapra		54.183	12.030	

Table 6 - HFL Details

2.13 - Average Slope:-

Reach		River Level Change (m)	Distance (km)	Slope (m/km)	Slope (cm/km)
From	To				
0.00	10.00	0.037	10.198	0.0036	0.360
10.00	20.00	0.035	9.825	0.0036	0.360
20.00	30.00	0.036	10.08	0.0036	0.360
30.00	40.00	0.04	10.906	0.0037	0.370
40.00	50.00	0.033	9.189	0.0036	0.360
50.00	60.00	0.139	9.71	0.0143	1.430
60.00	70.00	0.232	10.595	0.0219	2.190
70.00	80.00	0.21	9.566	0.022	2.200
80.00	90.00	0.436	10.335	0.0422	4.220
90.00	100.00	0.65	9.776	0.0665	6.650
100.00	110.00	0.23	10.512	0.0219	2.190
110.00	120.00	0.222	10.134	0.0219	2.190
120.00	130.590	0.211	9.752	0.0216	2.160
Avg. Slope				0.019	1.926

Table 7 – Average slope

2.14 - Details of Dam, Barrages, Weirs, Anicut, etc. w.r.t. MSL:-

There are no Dams, Barrages, weirs, Anicut found in this zone of River.

2.15 - Details of Locks:-

There are no locks found in this zone of river.

2.16 - Details of Aqueducts:-

There are no aqueducts found in this zone of River.

2.17- Details of existing Bridges and Crossings over waterway:-

Sl. No	Chainage (km)	Location	Cross-Structure details	Latitude (N)	Longitude (E)	Northing (m)	Easting (m)	Length (m)	Width (m)	No of Piers	Horizontal Clearance (m)	Vertical Clearance w.r.t H.F.L (m)
1	15.401	Simultala	Railway Bridge	23°24'50.245"	88°28'10.356"	2590111.00	650149.35	197.58	4.352	3	37.37	10.726
2	15.421	Simultala	Rail Bridge	23°24'47.969"	88°28'12.141"	2590041.69	650200.61	207.51	6.021	2	77.67	10.722
3	15.540	Arobindo Saroni	Dijandral al Setu (NH-34)	23°24'47.319"	88°28'17.528"	2590023.00	650353.73	229.82	10.84	6	37.390	6.700
4	130.591	Palashipara	Dijendral al Setu RCC Bridge	23°47'46.763"	88°27'8.457"	2632433.64	647962.31	177.63	10.95	3	43.00	3.308

Table 8 - Bridge Details

2.18 - Details of other Cross structures, pipe-lines, under water cables:-

There is a foot bridge found in this zone of river. This foot bridge is made of by bamboo and this bridge is not permanent. This bridge is mainly used for the communication of the villagers and sometimes it may collapse due to flood. In this reason the bridge has no clearance, particular pier, length and width.

Sl. No	Chainage (km)	Location	Cross-Structure details	Latitude (N)	Longitude (E)	Northing (m)	Easting (m)	Length (m)	Width (m)	No of Piers	Horizontal Clearance (m)	Vertical Clearance w.r.t H.F.L (m)
1	113.402	Chakbihari ghat bus stand	Foot Bridge	23°43'48.51"	88°31'11.76"	2625177.95	654927.87	-	-	-	-	-

Table 9- Foot Bridge details

2.19 - High Tension Lines / Electric lines / Tele-communication lines:-

Sl. no	Line	Chainage (km)	Location	Position				No of piers	Horizontal Clearance (m)	Vertical Clearance w.r.t H.F.L (m)	Remarks
				Latitude (N)	Longitude (E)	Easting (m)	Northing (m)				
1	Electric Line	0.263	Sridhammayapur	23°24'48.32"	88°22'53.86"	641166.7305	2589963.9049	4	196.63	2.192	Complete
2	Electric Line	13.033	Shaktinagar	23°24'59.28"	88°27'4.43"	648275.0875	2590370.0655	4	277.85	1.714	Complete
3	High Tension Tower	15.350	Near Jalangi Rail Bridge	23°24'48.85"	88°28'9.35"	650121.1325	2590068.2591	8	160.89	9.265	Complete
4	Electric Line	17.124	Near Mayakol Village	23°25'9.00"	88°28'51.56"	651332.6646	2590903.1018	4	203.19	1.646	Complete
5	Electric Line	18.677	Near Shonaporti	23°25'4.06"	88°29'45.97"	652859.4826	2590564.4560	4	173.15	5.460	Complete
6	Electric Line	20.783	GhurnipVillage	23°25'40.68"	88°30'8.09"	653475.0793	2591697.6477	4	276.67	2.677	Complete
7	Electric Line	26.221	KrishnaChandrapur	23°27'36.88"	88°30'18.28"	653727.2351	2595274.3134	4	116.62	1.841	Complete
8	Electric Line	41.477	Devipur Village	23°29'9.29"	88°28'33.87"	650735.5560	2598086.5640	4	158.085	1.234	Complete
9	Electric Line	43.795	PukuriyaVillage	23°29'18.55"	88°29'33.4	652422.0040	2598388.7570	4	196.32	1.955	Complete
10	Electric Line	49.133	GirimariVillage	23°29'57.13"	88°31'47.68"	656218.0470	2599615.4750	4	93.138	1.581	Complete

Table 10 - High Tension Lines / Electric lines

2.20 - Current Meter and Discharge details:-

Stretch No.	Chainage (km)	Position				Observed Depth (m) (D)	Velocity (m/sec.)	Average Velocity (m/sec.)	X-Sectional area (sq. m.)	Discharge (m3/sec)
		Latitude (N)	Longitude (E)	Easting (m)	Northing (m)		0.5 D			
1	0.283	23°24'45.261"	88°22'55.575"	641215.4493	2589869.4893	1.19	0.523	0.523	140.13	73.288
2	10.196	23°26'22.238"	88°27'18.851"	648658.6471	2592925.8823	1.20	0.529	0.529	139.81	73.959
3	20.000	23°25'15.905"	88°30'16.745"	653728.6800	2590937.4300	1.28	0.610	0.610	141.78	86.486
4	30.137	23°27'21.547"	88°32'21.718"	657234.7141	2594839.5491	1.31	0.624	0.624	116.98	72.996
5	40.915	23°28'52.309"	88°28'36.871"	650825.4964	2597564.4180	1.06	0.425	0.425	206.45	87.741
6	50.201	23°29'45.906"	88°32'23.992"	657251.6919	2599280.6528	0.94	0.234	0.234	120.93	28.298
7	59.806	23°32'31.788"	88°29'14.485"	651822.7466	2604326.3935	1.07	0.429	0.429	215.61	92.497
8	70.555	23°36'13.825"	88°31'11.544"	655069.9332	2611190.9373	1.16	0.510	0.510	211.75	107.99
9	80.010	23°37'28.424"	88°27'18.162"	648431.2603	2613416.7661	1.17	0.514	0.514	152.24	78.251
10	90.457	23°38'50.911"	88°30'49.252"	654386.8621	2616016.1694	1.20	0.529	0.529	76.45	40.442
11	100.267	23°42'11.17"	88°31'54.449"	656168.1695	2622195.8410	1.05	0.415	0.415	87.92	36.487
12	110.737	23°43'27.483"	88°29'44.861"	652473.0400	2624504.2305	1.10	0.485	0.485	130.40	63.244
13	121.048	23°45'15.532"	88°28'13.733"	649857.9993	2627800.9148	1.22	0.535	0.535	103.31	55.271
14	130.543	23°47'46.26"	88°27'09.638"	647995.9117	2632418.5949	2.43	0.852	0.852	91.03	77.558

Table 11 - Current Meter Details

2.21 - (a) Soil Sample Locations:-

Sample No.	Chainage (km)	Latitude (N)	Longitude (E)	Easting (m)	Northing (m)	Depth (m)
1	0.283	23°24'45.261"	88°22'55.575"	641215.4493	2589869.4893	1.19
2	10.196	23°26'22.238"	88°27'18.851"	648658.6471	2592925.8823	1.20
3	20.000	23°25'15.905"	88°30'16.745"	653728.6800	2590937.4300	1.28
4	30.137	23°27'21.547"	88°32'21.718"	657234.7141	2594839.5491	1.31
5	40.915	23°28'52.309"	88°28'36.871"	650825.4964	2597564.4180	1.06
6	50.201	23°29'45.906"	88°32'23.992"	657251.6919	2599280.6528	0.94
7	59.806	23°32'31.788"	88°29'14.485"	651822.7466	2604326.3935	1.07
8	70.555	23°36'13.825"	88°31'11.544"	655069.9332	2611190.9373	1.16
9	80.010	23°37'28.424"	88°27'18.162"	648431.2603	2613416.7661	1.17
10	90.457	23°38'50.911"	88°30'49.252"	654386.8621	2616016.1694	1.20
11	100.267	23°42'11.17"	88°31'54.449"	656168.1695	2622195.8410	1.05
12	110.737	23°43'27.483"	88°29'44.861"	652473.0400	2624504.2305	1.10
13	121.048	23°45'15.532"	88°28'13.733"	649857.9993	2627800.9148	1.22
14	130.543	23°47'46.26"	88°27'09.638"	647995.9117	2632418.5949	2.43

Table 12 - Soil Sample Locations

(b) Water Sample Locations:-

Sample No.	Chainage (km)	Latitude (N)	Longitude (E)	Easting (m)	Northing (m)	Total Depth (d) (m)	Mid-Depth (0.5d) (m)
1	0.283	23°24'45.261"	88°22'55.575"	641215.4493	2589869.4893	1.19	0.595
2	10.196	23°26'22.238"	88°27'18.851"	648658.6471	2592925.8823	1.20	0.600
3	20.000	23°25'15.905"	88°30'16.745"	653728.6800	2590937.4300	1.28	0.640
4	30.137	23°27'21.547"	88°32'21.718"	657234.7141	2594839.5491	1.31	0.655
5	40.915	23°28'52.309"	88°28'36.871"	650825.4964	2597564.4180	1.06	0.530
6	50.201	23°29'45.906"	88°32'23.992"	657251.6919	2599280.6528	0.94	0.470
7	59.806	23°32'31.788"	88°29'14.485"	651822.7466	2604326.3935	1.07	0.535
8	70.555	23°36'13.825"	88°31'11.544"	655069.9332	2611190.9373	1.16	0.580
9	80.010	23°37'28.424"	88°27'18.162"	648431.2603	2613416.7661	1.17	0.585
10	90.457	23°38'50.911"	88°30'49.252"	654386.8621	2616016.1694	1.20	0.600
11	100.267	23°42'11.17"	88°31'54.449"	656168.1695	2622195.8410	1.05	0.525
12	110.737	23°43'27.483"	88°29'44.861"	652473.0400	2624504.2305	1.10	0.550
13	121.048	23°45'15.532"	88°28'13.733"	649857.9993	2627800.9148	1.22	0.610
14	130.543	23°47'46.26"	88°27'09.638"	647995.9117	2632418.5949	2.43	1.215

Table 13 - Water Sample Locations

Note: - The Soil and water sample Report details have been shown in Annexure-14

Section-3: Description of waterway

3.1- From Chainage 0.00 Km to Chainage 10.00 Km. (Swarup Ganj village to Bahadurpur village):-

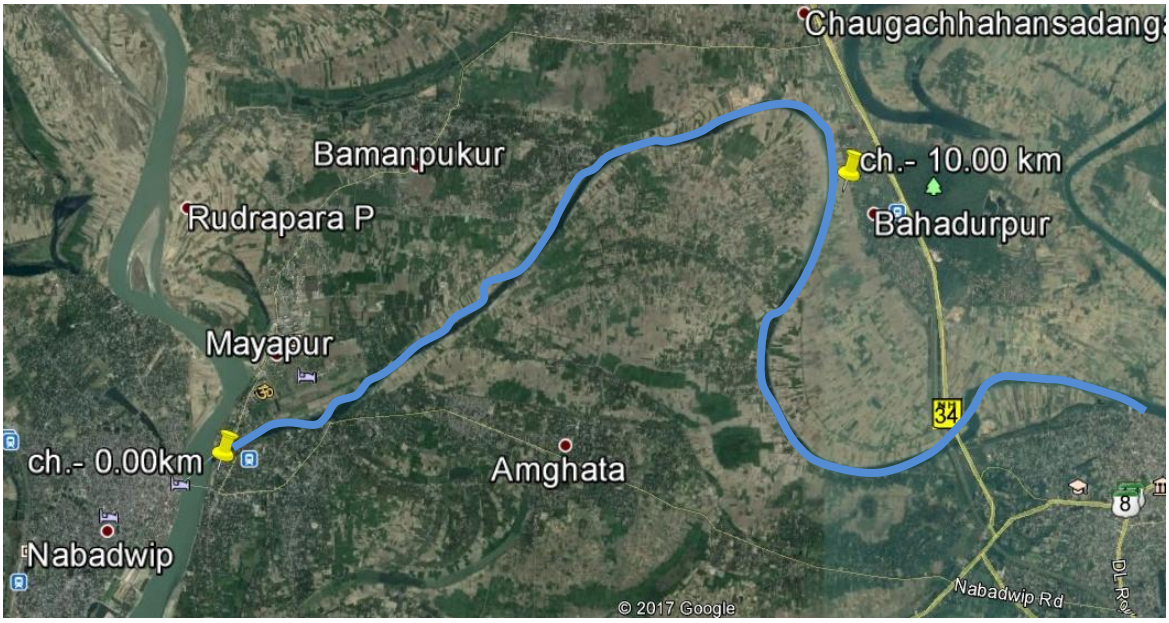

Figure 5- Chainage 0.00 km to Chainage 10.00 km

The width of Jalangi River from Chainage 0.00 Km. to Chainage 10.00 Km is approximately 200.00 m to 87.430 m. The average width portion of the river is approximately 143.715 m.

The GTS piller (S-1) is situated near Chainage of 0.817 km and 600 m far from BM-1 in east. The Ganga-Jalangi confluenve is approximately 276 m far from the BM-1 in the west direction. Mayapur village is situated near 1km Chainage and approximately 1.37 km far from the north-east direction from BM-1.

Two important ferry services named Hular Ghat through Nabadwip- Mayapur and Maheshganj ferry ghat are available near Chainage of 0.398 km and 2.278 km respectively. This ferry ghat is really helpful for daily passengers and also for the tourist. Swarupganj, Maheshganj, Tiorkhali, Amghata, Shyamnagar, Ghasighata, Ruipukur etc. villages are situated right bank side of the river and Mayapur, Sardanga, Taranpur, Mathpara, Rajapur etc. villages are situated left bank side of the river. BM-1 is situated near Chainage of 0.283 km right bank side of the river. An electric line is located near Chainage of 0.213 km. Paddy lands are also found both bank side of the river.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	0.00	10.00	3.2	10.2	0	0.00	2.2	8.9	0	0.00
II	0.00	10.00	3.0	10.3	0	0.00	1.2	9.0	1200	2088.18
III	0.00	10.00	2.8	10.4	0	0.00	1.1	9.3	2810	3937.56
IV	0.00	10.00	2.6	10.5	0	0.00	0.9	9.6	4920	9061.55

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Hular Ghat	Villagers/Tourists	23°24'49.32"	88°22'57.86"	Heavy goods, vehicle	0.291	0.398	Boat and vessels available
2	Maheshganj Ghat	Villagers	23°25'9.24"	88°24'0.29"	Heavy goods, vehicle	2.278	2.398	Boat and vessels available

Figure 6- Hular Ghat (left bank Chainage- 0.398 km)

Figure 7- Maheshganj Ferry Ghat (Right bank Chainage- 2.278 km)

3.2 - From Chainage 10.00 Km to Chainage 20.00 Km (Bahadurpur to Parmedia village):-

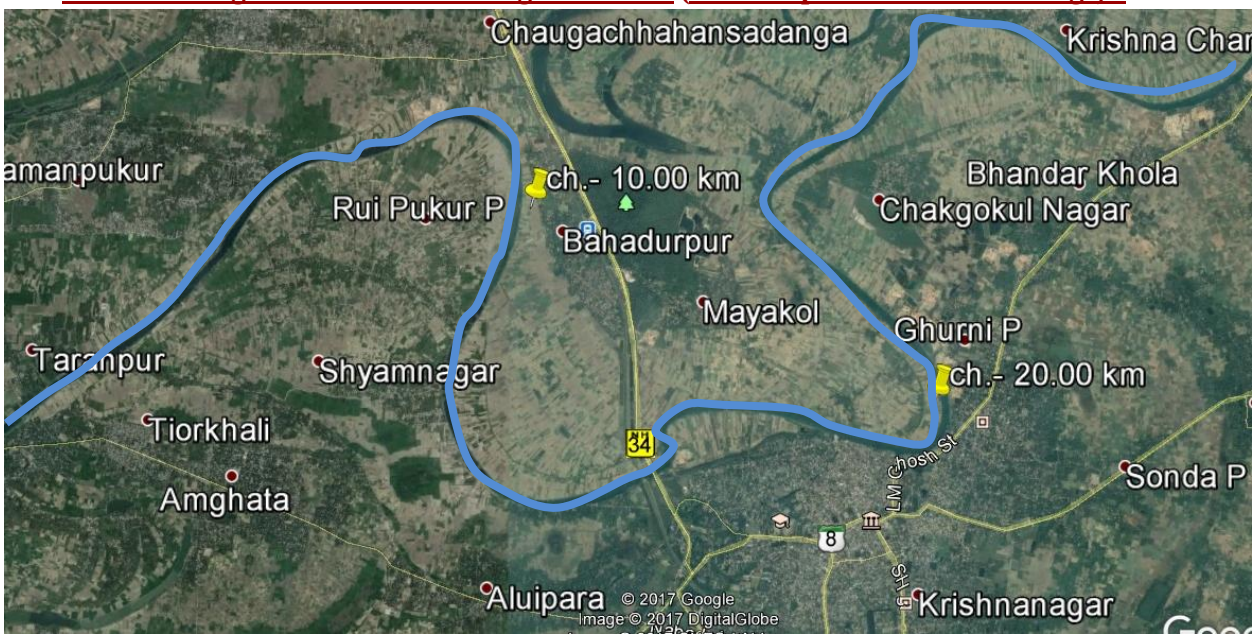

Figure 8 – Chainage 10.00 km to Chainage 20.00 km

The width of Jalangi River from Chainage 10.00 Km. to Chainage 20.00 Km is approximately 87.430 m to 80.550 m. The average width portion of the river is approximately 83.99 m.

Two Important Railway Bridges (Krishnanagar- Bahadurpur) are situated near Chainage of 15.401 km and 15.421 km in this stretches. The Bridges position are (Lat: - 23°24'50.245"N, Long: - 88°28'10.356"E), (Lat:- 23°24'47.969"N, Long: - 88°28'12.141"E) respectively. A RCC bridge (NH-34) is also situated near Chainage of 15.540 km which is connected with Dijendralal Setu. One high tension line and three electric lines are also located near Chainage of 13.030 km, 15.350 km, 17.130 km and 18.680 km respectively. Kadamtala ghat and Masarada ghat are situated near Chainage of 18.454 km and 18.700 km respectively. BM-2 and BM-3 are situated near Chainage of 10.196 km and 20.000 km respectively. Bahadurpur, Mayakol etc. villages are located left bank side of the river and Aluipara, Ghurni, Krishnanagar etc. village/city are located right bank side of the river. Besides, Maniktala Bridge Ghat, Sasitala ghat, Khora ghat, Ghurnidaspara ghat, piadapara ghat, Baxiparar ghat and Ghurnikumorpara ghat are situated in this zone of river near Chainage of 15.600 km, 19.87 km, 19.344 km, 19.459 km, 19.530 km, 19.680 km and 19.820 km respectively on the right bank side of the river. These ghats are not ferry ghat but these ghats are used for bathing and other useful purposes.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	10.00	20.00	1.6	12.1	0	0.00	1.0	11.3	750	996.52
II	10.00	20.00	1.3	12.2	200	302.84	0.8	11.4	4350	17809.33
III	10.00	20.00	1.0	12.3	1100	1869.92	0.5	11.5	8000	43412.99
IV	10.00	20.00	0.7	12.4	1400	3091.89	0.2	11.6	8000	65200.50

Figure 9- Rail Bridges (Krishnanagar - Bahadurpur) - 15.401 km and 15.421 km

Figure 10- Dijendra Setu RCC Bridge-(NH-34) (Chainage- 15.540 km)

Figure 11- Masarada Ghat (Chainage-18.700 km)

Figure 12-Kadamtala Ghat (Chainage- 18.454 km)

3.3- From Chainage 20.00 Km to Chainage 30.00 Km (Parmedia Village to Java Village):-

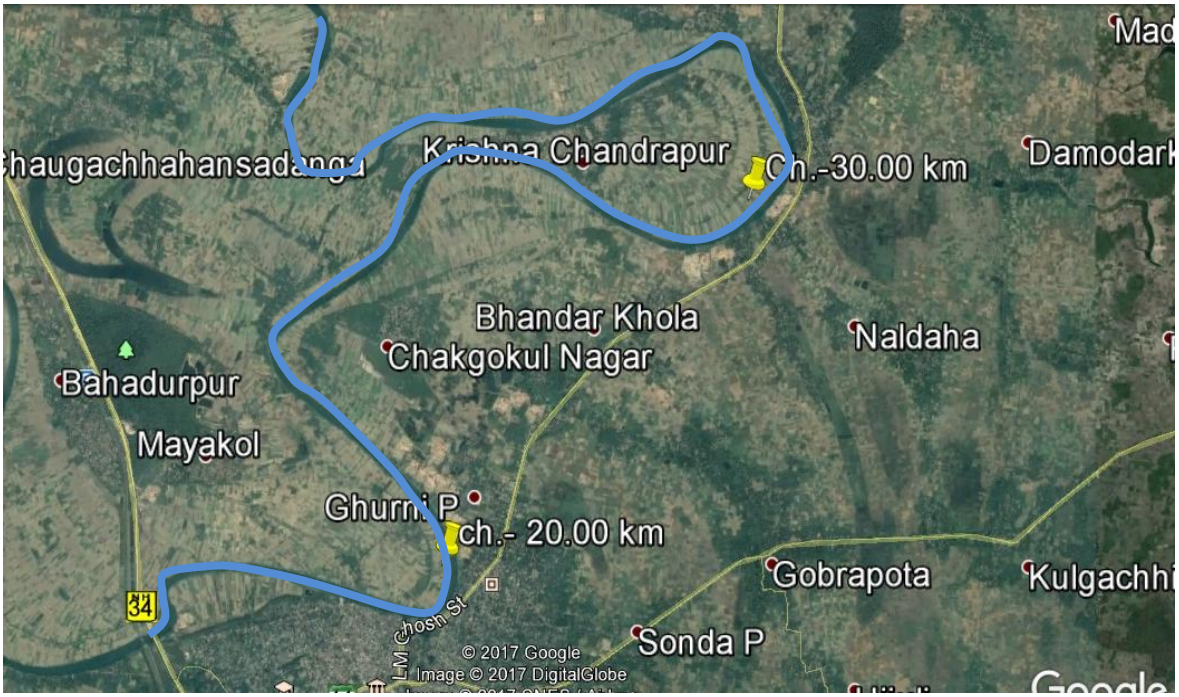

Figure 13 - Chainage 20.00 to Chainage 30.00 km

The width of Jalangi River from Chainage 20.00 Km. to Chainage 30.00 Km is approximately 80.550 m to 74.620 m. The average width portion of the river is approximately 77.585 m.

Ghurni p, Hara nagar, Chakgokulnagar, Gokul nagar,, Naldaha, Bhandar khola, Java etc. villages are located right bank side of the river and Parmedia, Sahebnagar, Anandanagar, Barnagram, Krishna Chandrapur etc. villages are located left bank side of the river. Two electric lines are situated near Chainage of 20.800 km and 26.220 km in this zone of river. Bent curve is noticed in this stretch of river. Brick field is located right bank side of the river and Haranagar Ferry ghat is available in this zone of river near Chainage of 24.680 km.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	20.00	30.00	1.8	9.4	0	0.00	1.1	8.7	160	236.58
II	20.00	30.00	1.6	9.6	0	0.00	1.1	8.8	2530	2945.07
III	20.00	30.00	1.4	9.8	500	587.43	1.0	8.9	5860	15107.18
IV	20.00	30.00	1.2	10.0	1400	1509.41	0.8	9.0	7200	28634.32

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Haranagar ghat	Villagers	23°27'1.48"	88°29'43.77"	Light goods, vehicle and vegetables	29.430	24.680	Boat is available

Figure 14- Haranagar Ferry ghat (left bank Chainage 24.680 km)

3.4- From Chainage 30.00 Km to Chainage 40.00 Km (Java village to Uttar Jhitkipota village):-

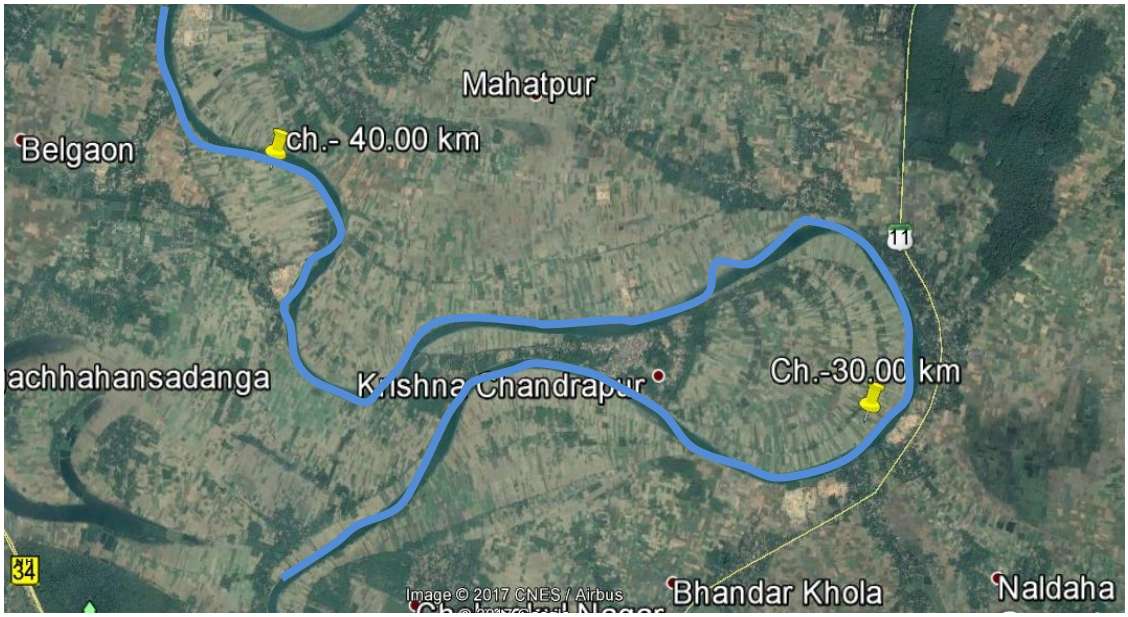

Figure 15 - Chainage 30.00 km to Chainage 40.00 km

The width of Jalangi River from Chainage 30.00 Km. to Chainage 40.00 Km is approximately 74.620 m to 90.00 m. The average width portion of the river is approximately 82.31 m.

In this stretches, the river channel is completely turned right side to left side. BM-4 is situated near Chainage of 30.137 km right bank side of the river. Tarukdaspur, Dohi Bazar , Mahatpur etc. villages are situated right bank side of the river and Purba panditpur, Paschim Panditpur, Krishnapur, Dalai molla, Uttarjhitkipota etc. villages are situated left bank side of the river. Panditpur Ferry ghat is situated near Chainage of 34.378 km.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	30.00	40.00	1.5	10.3	0	0.00	0.4	9.8	2100	7532.55
II	30.00	40.00	1.4	10.31	0	0.00	0.3	9.81	8450	40809.24
III	30.00	40.00	1.2	10.32	310	174	0.2	9.82	10000	62428.78
IV	30.00	40.00	1.0	10.33	1100	764.94	0.1	9.83	10000	87003.97

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Panditpur ghat	Villagers	23°27'48.87"	88°30'58.88"	Light goods, vehicle and vegetables	34.265	34.378	Boat is available

3.5- From Chainage 40.00 Km to Chainage 50.00 Km. (Uttar Jhitkipota village to Kalinagar village):-

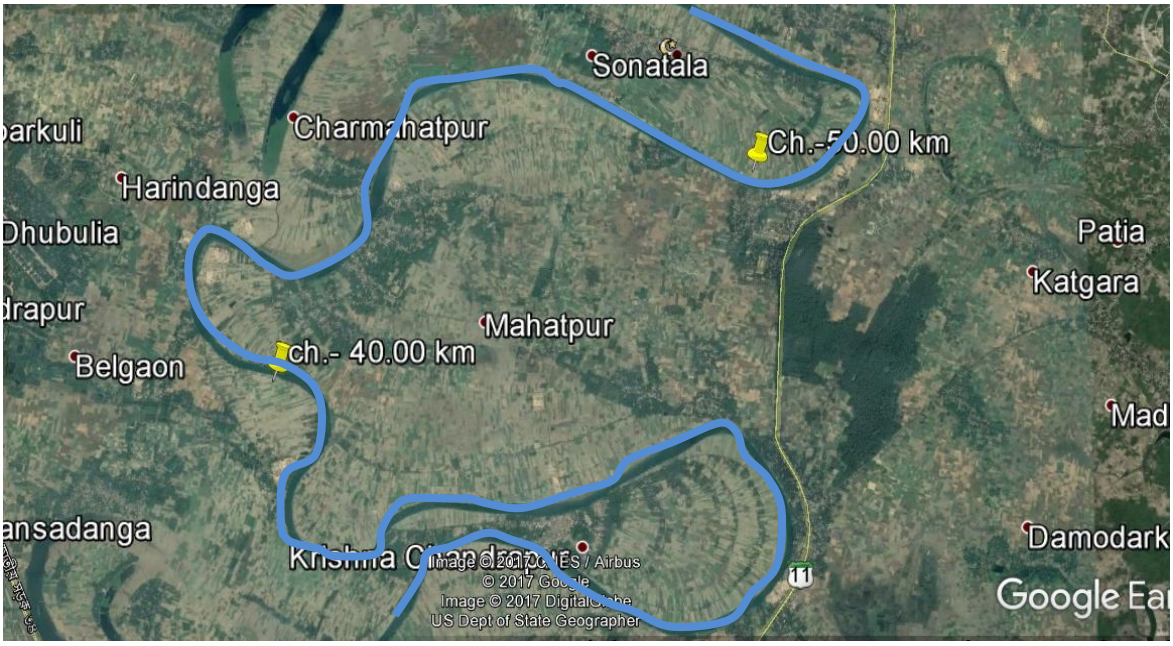

Figure 16- Chainage 40.00 km to Chainage 50.00 km

The width of Jalangi River from Chainage 40.00 Km. to Chainage 50.00 Km is approximately 90.00 m to 78.180 m. The average width portion of the river is approximately 84.09 m.

BM-5 is situated near Chainage of 40.915 km right bank side of the river. Three electric lines are also situated near Chainage of 41.440 km, 43.800 km and 49.140 km in this stretches of river. Belgaon, Dhubulia, Debipur, Harindanga, Armia, Charmahatpur etc. villages are situated left bank side of the river and Dakshin sonatala, Tilakpur, pukuria, Girimari etc. villages are situated right bank side of the river. Charmahatpur ferry ghat and Kalinagar Dakhin para ferry ghat is situated near Chainage of 44.657 km and 48.18 km.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	40.00	50.00	1.6	8.4	0	0.0	0.5	7.1	2650	8867.21
II	40.00	50.00	1.5	8.41	0	0.0	0.3	7.11	8200	39697.71
III	40.00	50.00	1.4	8.42	470	432.77	0.1	7.3	9700	93116.56
IV	40.00	50.00	1.2	8.43	1350	1497.33	0.1	7.5	10000	140307.8

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Haranagar ghat	Villagers	23°29'45.82"	88°29'43.37"	Light goods, vehicle and vegetables	44.578	44.657	Boat is available
2	Kalinagar Dakhin para	Villagers	23°30'16.18"	88°31'21.43"	Light goods, vehicle and vegetables	48.210	48.180	Boat is available

Figure 17-Kalinagar Dakhin para ferry ghat (left bank Chainage 44.657 km)

3.6- From Chainage 50.00 Km to Chainage 60.00 Km (Kalinagar village to Gokhurapota village):-

Figure 18- Chainage 50.00 km to Chainage 60.00 km

The width of Jalangi River from Chainage 50.00 Km. to Chainage 60.00 Km is approximately 78.180 m to 127.920 m. The average width portion of the river is approximately 103.05 m.

BM-6 and BM-7 are situated near Chainage of 50.201 km and 59.806 km right bank side of the river respectively. Chapra, Durgapur, Mandia, Pitambarpur, Gokhurapota etc. villages are situated right bank side of the river and Kalinagar, Sonatala, Pathradaha, Rupdaha, Chuakhali, Nowpara etc. villages are located left bank side of the river. Three Brick fields are located right bank side of the river. Kalinagar ferry ghat is situated near Chainage of 52.813 km. Sonatala ferry ghat is also situated near Chainage of 56.764 km. Gokhurapota Ferry ghat and Poli ferry ghat are available in this zone of river near Chainage of 57.696 km and 58.90 km respectively.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	50.00	60.00	1.2	8.2	200	714.13	0.5	7.4	2600	24707.62
II	50.00	60.00	1.0	8.3	7000	1805.1	0.3	7.5	9400	78021.85
III	50.00	60.00	0.8	8.4	1500	4646.53	0.1	7.6	10000	121338.14
IV	50.00	60.00	0.6	8.5	2450	7402.51	0.1	7.7	10000	152821.88

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Kalinagar Ghat	Villagers	23°30'27.32"	88°32'35.62"	Light goods, vehicle and vegetables	52.767	52.813	Boat is available
2	Sonatala Ghat	Villagers	23°31'19.07"	88°30'26.59"	Light goods, vehicle and vegetables	56.770	56.764	Boat is available
3	Gokhurapota Ghat	Villagers	23°31'41.03"	88°30'7.83"	Light goods, vehicle and vegetables	57.696	57.700	Boat is available
4	Poli Ghat	Villagers	23°32'7.95"	88°29'34.25"	Light goods, vehicle and vegetables	58.90	58.885	Boat is available

Figure 19- Kalinagar Ferry ghat (left bank Chainage- 52.813 km)

Figure 20- Sonatala Ferry ghat (left bank Chainage 56.764 km)

3.7- From Chainage 60.00 Km to Chainage 70.00 Km (Gokhurapota village to Gopinathpur village):-

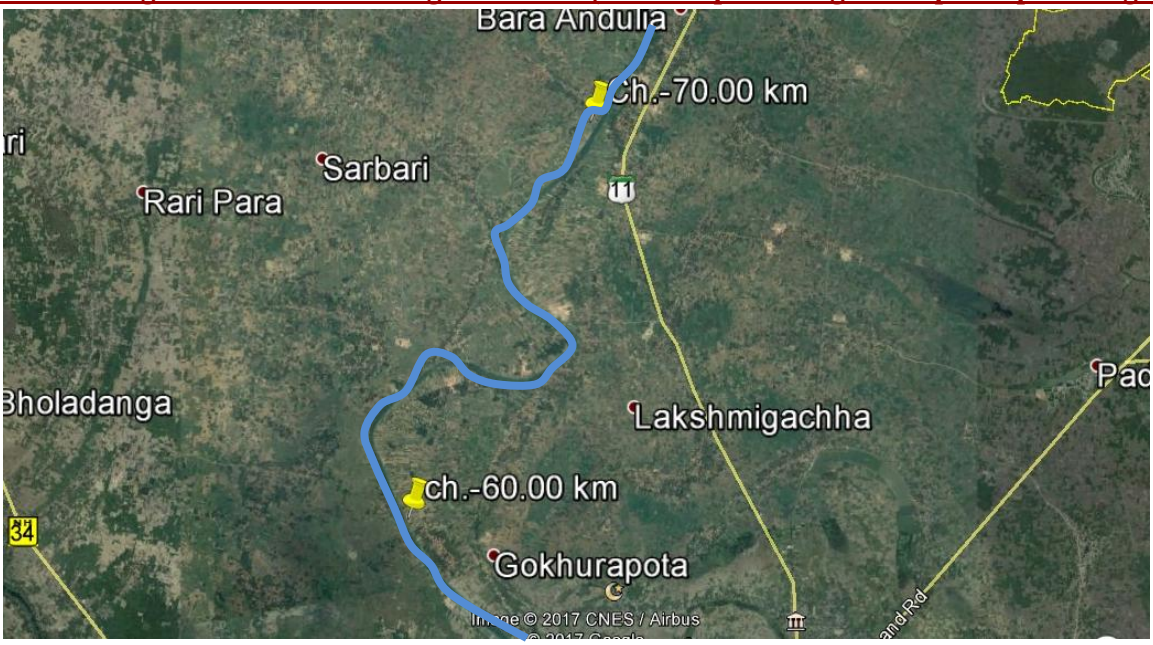

Figure 21- Chainage 60.00 km to Chainage 70.00 km

The width of Jalangi River from Chainage 60.00 Km. to Chainage 70.00 Km is approximately 127.920 m to 100 m. The average width portion of the river is approximately 113.96 m.

Dogachia, Miraipur, Digha, Mota, Bargachhi, Paduma, Sorbari etc. villages are situated left bank side of the river and Lakshmigachha, Talukhuda, Hatra, Baniakhari, Dompukur etc. villages are situated right bank side of the river. SH-11 is an important communication way that is located right bank side of the river. Sukhsagar Ferry ghat and Hatrachar Ferry ghat are available in this zone of river near Chainage of 63.64 km and 68.467 km respectively.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	60.00	70.00	1.2	11.40	30.00	2.91	0.4	10.40	1500	9009.86
II	60.00	70.00	1.1	11.41	160	397.19	0.2	10.41	5350	31910.62
III	60.00	70.00	1.0	11.42	2570	4385.68	0.1	10.42	9500	85802.49
IV	60.00	70.00	0.9	11.43	2800	7880.53	0.1	10.43	10000	136038.98

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Sukhsagar Ghat	Villagers	23°33'54.28"	88°29'49.10"	Light goods, vehicle and vegetables	63.640	63.635	Boat is available
2	Hatrachar Ghat	Villagers	23°35'22.56"	88°30'24.22"	Light goods, vehicle and vegetables	68.462	68.467	Boat is available

Figure 22- Sukhsagar Ferry ghat (Right bank Chainage 63.640 km)

3.8- From Chainage 70.00 Km to Chainage 80.00 Km (Gopinathpur village to Birpur Village):-

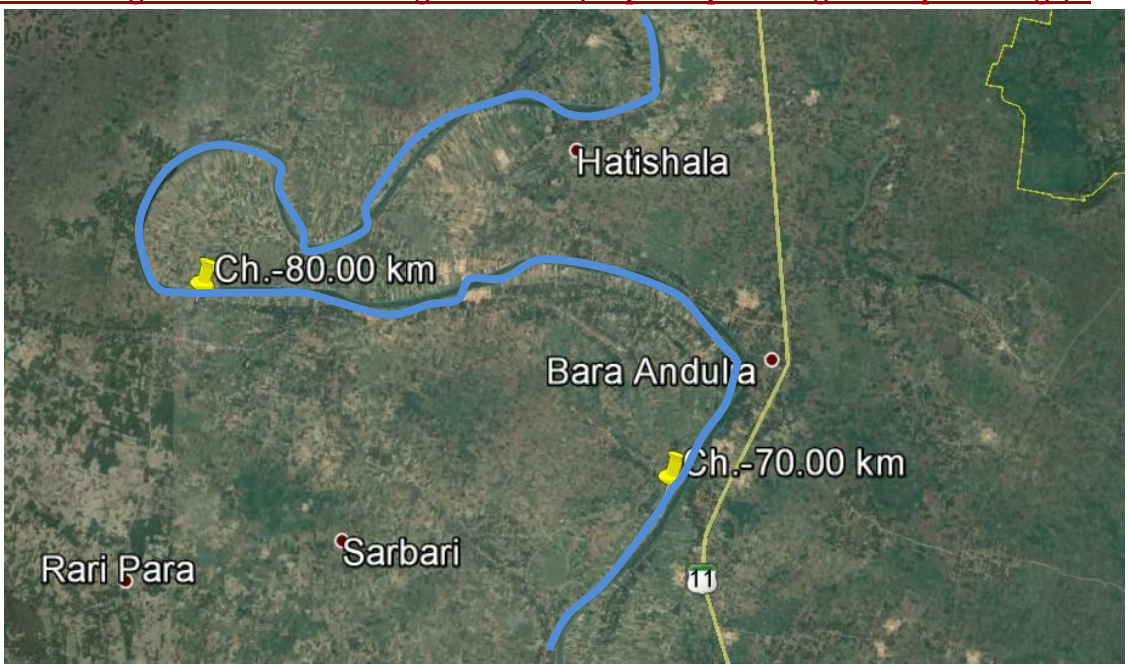

Figure 23- Chainage 70.00 km to Chainage 80.00 km

The width of Jalangi River from Chainage70.00 Km. to Chainage 80.00 Km is approximately 100.00 m to 102.390 m. The average width portion of the river is approximately 101.195 m.

BM-8 is situated near Chainage of 70.555 km right bank side of the river. Gopinathpur, Bara Andulia, Natungram, Jidha etc. villages are situated right bank side of the river and Teghori, Petuabhanga, Birpur etc. villages are situated left bank side of the river. Teghari Ferry ghat and Beroanduliya ferry ghat ate available in this zone of river near Chainage of 70.536 km and 72.66 km respectively.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	70.00	80.00	1.0	6.4	700	1226.45	0.4	5.1	4900	47284.47
II	70.00	80.00	0.8	6.6	1000	2515.61	0.2	5.2	10000	166592.02
III	70.00	80.00	0.6	6.8	1620	6018.61	0.1	5.3	10000	268839.5
IV	70.00	80.00	0.4	7.0	3900	10651.5	0.1	5.4	10000	346651.44

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Teghari Ghat	Villagers	23°36'14.20"	88°31'9.86"	Light goods, vehicle and vegetables	70.558	70.536	Boat is available
2	Bara Andulia Ghat	Villagers	23°37'14.53"	88°31'24.28"	Light goods, vehicle and vegetables	72.660	72.655	Boat is available

Figure 24- Teghari Ferry ghat (left bank Chainage- 70.536 km)

3.9- From Chainage 80.00 Km to Chainage 90.00 Km (Birpur Village to Hatishala village):-

Figure 25- Chainage 80.00 km to Chainage 90.00 km

The width of Jalangi River from Chainage 80.00 Km. to Chainage 90.00 Km is approximately 102.390 m to 83.200 m. The Average width portion of the river is approximately 92.795 m.

Patikabri Village is located near 81km Chainage towards East at 1.75 km distance approximately. Bara Simulia village is located on the left side of river at a distance of 1.5km.Radhanagar and Maheshnagar villages are situated on the both side of river within 1 km radius at 84 km chainge. Hatisala village is located near BM-10 at a distance of 300 m towards South side. The inter-connected mud road is located on the left portion of the river.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	80.00	90.00	1.5	6.4	0	0.0	0.8	5.9	2000	3189.26
II	80.00	90.00	1.3	6.5	100	58.15	0.7	5.91	9150	71547.25
III	80.00	90.00	1.29	6.6	3230	3293.88	0.6	5.92	10000	129983.04
IV	80.00	90.00	1.1	6.7	5050	7419	0.5	5.93	10000	197389.31

3.10- From Chainage 90.00 Km to Chainage 100.00 Km (Hatishala village to Paschim Chalkjalia village):-

Figure 26-Chainage 90.00 km to Chainage 100.00 km

The width of Jalangi River from Chainage 90.00 Km. to Chainage 100.00 Km is approximately 83.200 m to 61.990 m. The average width portion of the river is approximately 72.595 m.

Puthimari Village is located near 95 km Chainage towards East at 1.2 km distance approximately. Tarinipur village is located to the east of Puthimari village at a distance of 1.5km.Paschim chalkjalia village is situated on the left side of river within 1 km radius at 108km chainge. Salua village is near BM-11 at a distance of 300m towards South. The SH-11 is situated at an avg. distance of 1.5 km far from the river Chainage on the left portion of the river.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	90.00	100.00	0.9	6.7	25.00	5.58	0.3	5.6	2000	2826.69
II	90.00	100.00	0.7	6.8	385	516.19	0.2	5.8	1000	87047.47
III	90.00	100.00	0.5	7.1	6840	8542.34	0.1	6.0	10000	156737.77
IV	90.00	100.00	0.3	7.4	8800	18499.86	0.1	6.2	10000	236706.81

3.11- From Chainage 100.00 Km to Chainage 110.00 Km (Paschim Chalkjalia village to Boyerbanda village):-

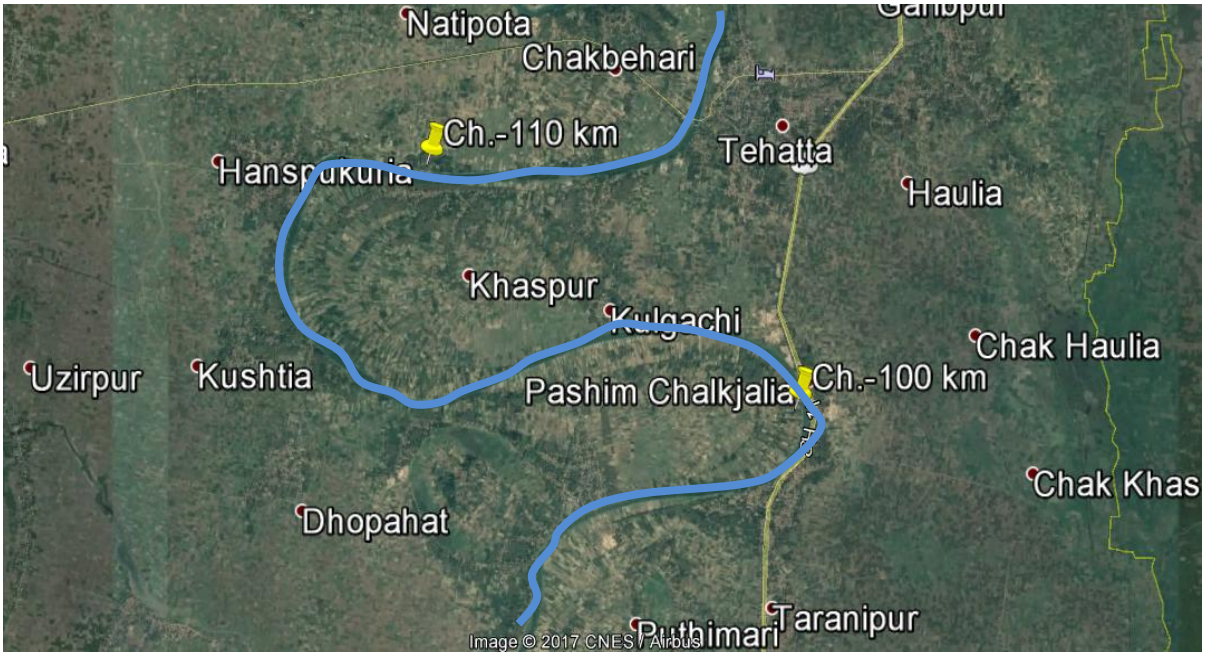

Figure 27-Chainage 100 km to Chainage 110.00 km

The width of Jalangi River from Chainage100.00 Km. to Chainage 110.00 Km is approximately 61.990 m to 93.240 m width. The average width portion of the river is approximately 77.615.m.

Kulgachi Village is located near 103km Chainage towards North at 200 m distance approximately. Khustia village is located at 106 km Chainage on the left bank of river at a distance of 1.5 km.Hanspukuria village is situated on the left side of river within 1 km radius at 108 km chainge. Boyerbanda village is situated near BM-12 at a distance of 300 m towards South bank side of the river. Another ferry service is located near the Chainage of 108.34 km between Boyerbanda and Hanspukuria village. The village's inter connected road is located on the both bank of the river and the SH-11 is situated at an avg. distance on the left portion of the river.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	100.00	110.00	1.4	6.7	0	0.0	0.5	6.0	5750	12521.76
II	100.00	110.00	1.2	6.9	925	865.91	0.4	6.2	9700	242393.46
III	100.00	110.00	1.0	7.1	7450	16703.74	0.2	6.4	10000	326352.57
IV	100.00	110.00	0.8	7.3	10000	30625.67	0.1	6.6	10000	413909.56

3.12- From Chainage 110.00 Km to Chainage 120.00 Km (Boyerbanda village to Iswarchandrapur village):-

Figure 28- Chainage 110.00 km to Chainage 120.00 km

The width of Jalangi River from Chainage 110.00 Km. to Chainage 120.00 Km is approximately 93.240 m to 64.820 m . The average width portion of the river is approximately 79.03 m.

Chakbehari Village is located near 113 km Chainage towards west at 675 m distance approximately. Tehatta village is located at 114 km Chainage on the left bank of river at a distance of 1.5 km.Jitpur and Natipota village are situated on the both side of river within 1 km radius at 117km chainge. Raghunathpur village is near BM13 at a distance of 1 km towards North-East. The village's inter connected is locate on the both bank of the river. Tehatta ferry service and a foot bridge are located in this stretches of river near Chainages of 113.40 km and 113.402 km.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	110.00	120.00	0.9	5.3	200	131.88	0.2	11.3	4650	23702.71
II	110.00	120.00	0.7	12.4	1750	2359.05	0.1	11.4	10000	207589.27
III	110.00	120.00	0.5	12.5	8700	18885.43	0.1	11.5	10000	317437.48
IV	110.00	120.00	0.3	12.6	9250	38497.71	0.1	11.6	10000	438810.04

Sl. No	Name of Ferry Ghat	Passenger Details	Latitude (N)	Longitude (E)	Cargo Details	Right Bank Chainage (km)	Left Bank Chainage (km)	Details of Available boat and vessels
1	Tehatta Ghat	Villagers	23°43'48.42"	88°31'10.56"	Light goods, vehicle and vegetables	113.40	113.40	Boat is available

Figure 29- Tehatta ferry ghat and Foot Bridge (Chainage-113.40 km and 113.402 km)

3.13- From Chainage 120.00 Km to Chainage 130.590 Km (Iswarchandrapur village to Ramnagar village Chainage):-

Figure 30- Chainage 120.00 km to Chainage 130.590 km

The width of Jalangi River from Chainage 120.00 Km. to Chainage 130.590 Km is approximately 64.820 m to 69.140 m . The average width portion of the river is approximately 66.98 m.

Iswarchandrapur Village is located near BM-13 towards west at 675 m distance approximately. Chak Rudranagar village is located at 122 km Chainage on the left bank of river at a distance of 1.5 km.

Ramnagar and Rudranagar village are situated on the both bank sides of river within 1 km radius at 124 km chainge. Palashipara is a small town, located near BM-14 within 200m. This town is mostly populated and developed. A concrete bridge linked with SH-14 is crossed over the river near Palashipara.

A RCC Bridge (Dwijendralal Setu) is located near Chainage of 130.591 km. It was noticed that a fishing hazari is located on the left bank of the canal at a distance of approximately 120mt from RCC Bridge. The right side area of the canal was covered up by the fishing area.

Class	Chainage (km)		Observed				Reduced w.r.t. Sounding Datum			
	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)
I	120.00	130.590	0.8	11.5	2420	9237.99	0.3	10.9	7290	144113.31
II	120.00	130.590	0.7	11.6	5260	20914.85	0.2	11.00	10000	304060.98
III	120.00	130.590	0.6	11.7	10200	66575.53	0.1	11.10	10000	625654.64
IV	120.00	130.590	0.4	11.8	11000	116869.63	0.1	11.20	10000	836202.26

Figure 31- RCC Bridge (Chainage- 130.591 km)

- **Bathymetry Survey:-**

a) Length of the stretch for which the Bathymetric survey has been carried out:-

The Bathymetry survey of the Jalangi River has been carried out from the Chainage 0.00 km to Chainage 130.590 km. The layer of water is sufficient for the entire survey stretches.

Date of Survey	Type of survey	Chainage	
		From (km)	To (km)
09.09.15	Bathymetry Survey	0.00	8.00
10.09.15	Bathymetry Survey	8.00	19.00
11.09.15	Bathymetry Survey	19.00	31.00
12.09.15	Bathymetry Survey	31.00	42.200
13.09.15	Bathymetry Survey	42.200	52.00
14.09.15	Bathymetry Survey	52.00	63.800
15.09.15	Bathymetry Survey	63.800	75.00
16.09.15	Bathymetry Survey	75.00	86.400
17.09.15	Bathymetry Survey	86.400	100.100
18.09.15	Bathymetry Survey	100.100	115.800
19.09.15	Bathymetry Survey	115.800	130.590

- **Topographic Survey:-**

a) Length of the stretch for which the Topographic survey has been carried out:-

The Topographic survey has been carried out from From Confluence of Jalangi with Hooghly/Bhagirathi River (Chainage - 0.00 km) at Nabadwip to Bridge on State Highway #14 near Palashipara (Chainage - 130.590 km). The Topography survey has been carried out only on Banks of the river.

a) Prominent Dams / Barrage:-

There are no Dams, Barrage found in this zone of River.

b) Tidal stretch, tidal range. Pondage stretch / length of Dam, Barrages, Weirs, Anicut, Locks:-

There are no Dams, Barrages, weirs, Anicut; Locks are found in this zone of river.

c) Conditions of banks (protected, un-protected):-

The bank of the river includes with villages, Roads, Ferry Ghats, Jetty etc. The Bank of the River Jalangi has been affected by floods, sometimes it become dangerous during the monsoon. As a result, short as well as long embankments are needed in the both bank side of the river. Sometimes Bolder Pitching is also used for protecting the both bank side of the river. Most of the river portions are covered with embankment.

d) Hindrances - Hyacinth, rocks, rapid waterfalls, steep gradient, forest, wild-life sanctuary, security issues. Obstruction (if any) for navigation, e.g. fishing stakes:-

There is a foot bridge found in this zone of river near Chainage of 113.4 km. The foot bridge is used for the daily communication among the villagers. Though the foot bridge (made of bamboo) is located in this zone of river but sometimes it may collapse due to flood.

e) Details of Protected Area- Wildlife, Defence, Atomic Power Plants and any other issue attached to it:-

No wildlife defense, power plants are noticed in this zone of river.

f) NH/SH/MDR along and/or within 5 km from the waterways:-

NH-34 is the major communication way in this zone of river. Besides, SH-11, SH-8 is also communicative way for the local villagers.

g) Railway Line and Stations in the vicinity:-

Two important Railway services are located in this zone of river near Chainage of 15.401km and 15.421 km respectively. Bahadurpur and Krishnanagar city are linked with this Railway service. Tourist can easily go to their destination through this railway services.

h) Land Use Pattern along Waterway on visual assessment:-

During the period of the survey it was noticed that the maximum land on the both bank of the river is used as an agricultural land. Besides Krishnanagar is famous for its clay dolls. The soil of in this area is really helpful for making clay dolls which become a daily demand in this area.

i) Crops / Agriculture in the region on visual assessment:-

West Bengal is the major state for all aspect in agriculture. The major crops Paddy, jute, Tea, Rice, Wheat, Maize, Sorghum, gram, Millets, Sugarcane and Spices are cultivated in this region.

j) Availability of Bulk / Construction Material:-

The availability of the construction materials is too easy for construction & any kind of structure. There are many cementing factories and brick fields are located and the sand is also available from the river.

k) Existing Industries along Waterway with their types and details:-

Ghurni, a famous area is located in this zone of river. The soil of in this area is really good for making clay dolls and it's become a daily profession in this zone. Krishnanagar market provides a good business by sold out the clay dolls. The Earthen pot is also famous in this zone of river.

l) Existing Ghats, Jetties and Terminals (with conditions and facilities). Existing navigation facilities (if any):-

As much as 14 no's of Jetty services are available in this zone of river where a large number of people communicate daily for transportation and also tourist attraction like Iskon Temple situated at Mayapur. The passengers are mainly from the villages situated on the both bank of the river. The Jetty services are really very helpful for growing the local businesses with supplying their goods. The Jetty services are also become helpful for the daily communication system for the local public and also for the tourist. Transporting system is become easier through ferry services.

Sl No	Chainage (km)	Latitude (N)	Longitude (E)	Name of Ferry Ghat
1	0.291	23°24'49.32"	88°22'57.86"	HULAR FERRY GHAT
2	24.68	23°27'1.48"	88°29'43.77"	HARANAGAR FERRY GHAT
3	34.378	23°27'48.87"	88°30'58.88"	PANDITPUR FERRY GHAT
4	44.657	23°29'45.82"	88°29'43.37"	HARANAGAR FERRY GHAT
5	48.18	23°30'16.18"	88°31'21.43"	KALINAGAR DAKHIN PARA FERRY GHAT
6	52.767	23°30'27.32"	88°32'35.62"	KALINAGAR FERRY GHAT
7	56.764	23°31'19.07"	88°30'26.59"	SONATALA FERRY GHAT
8	57.696	23°31'41.03"	88°30'7.83"	GOKHURAPOTA FERRY GHAT
9	58.90	23°32'7.95"	88°29'34.25"	POLI FERRY GHAT
10	63.64	23°33'54.28"	88°29'49.10"	SUKHSAGAR FERRY GHAT
11	68.467	23°35'22.56"	88°30'24.22"	HATRACHAR FERRY GHAT
12	70.536	23°36'14.20"	88°31'9.86"	TEGHARI FERRY GHAT
13	72.66	23°37'14.53"	88°31'24.28"	BARA ANDULIA FERRY GHAT
14	113.40	23°43'48.42"	88°31'10.56"	TEHATTA FERRY GHAT

m) Existing Cargo Movement:-

The Cargo transportation system is depends upon by the waterways system. As much as 14 nos of passenger ferry services are available in this zone of river. Hular ghat communicates through Nabadwip and Mayapur. Besides, some important passengers ferry services like Tehatta, Sukhsagar, Teghari, Kalinagar, Panditpur etc. are available in this zone of river. The cargo details are tabulated below:-

Sl No	Name of Ferry Ghat	Chainage (km)	Latitude (N)	Longitude (E)	Passenger Details	Cargo Details	Details of Available Boat and vessels
1	HULAR FERRY GHAT	0.291	23°24'49.32"	88°22'57.86"	Villagers/Tourists	Heavy goods, vehicle	Boat and vessels available
2	HARANAGAR FERRY GHAT	24.68	23°27'1.48"	88°29'43.77"	Villagers	Heavy goods, vehicle	Boat and vessels available
3	PANDITPUR FERRY GHAT	34.378	23°27'48.87"	88°30'58.88"	Villagers	Light goods, vehicle and vegetables	Boat is available
4	HARANAGAR FERRY GHAT	44.657	23°29'45.82"	88°29'43.37"	Villagers	Light goods, vehicle and vegetables	Boat is available
5	KALINAGAR DAKHIN PARA	48.18	23°30'16.18"	88°31'21.43"	Villagers	Light goods, vehicle and	Boat is available

Sl No	Name of Ferry Ghat	Chainage (km)	Latitude (N)	Longitude (E)	Passenger Details	Cargo Details	Details of Available Boat and vessels
6	KALINAGAR FERRY GHAT	52.767	23°30'27.32"	88°32'35.62"	Villagers	Light goods, vehicle and vegetables	Boat is available
7	SONATALA FERRY GHAT	56.764	23°31'19.07"	88°30'26.59"	Villagers	Light goods, vehicle and vegetables	Boat is available
8	GOKHURAPOTA FERRY GHAT	57.696	23°31'41.03"	88°30'7.83"	Villagers	Light goods, vehicle and vegetables	Boat is available
9	POLI FERRY GHAT	58.90	23°32'7.95"	88°29'34.25"	Villagers	Light goods, vehicle and vegetables	Boat is available
10	SUKHSAGAR FERRY GHAT	63.64	23°33'54.28"	88°29'49.10"	Villagers	Light goods, vehicle and vegetables	Boat is available
11	HATRACHAR FERRY GHAT	68.467	23°35'22.56"	88°30'24.22"	Villagers	Light goods, vehicle and vegetables	Boat is available
12	TEGHARI FERRY GHAT	70.536	23°36'14.20"	88°31'9.86"	Villagers	Light goods, vehicle and vegetables	Boat is available
13	BARA ANDULIA FERRY GHAT	72.66	23°37'14.53"	88°31'24.28"	Villagers	Light goods, vehicle and vegetables	Boat is available
14	TEHATTA FERRY GHAT	113.40	23°43'48.42"	88°31'10.56"	Villagers	Light goods, vehicle and vegetables	Boat is available

n) Prominent City / Town / Places of Worship / Historical places for Tourism:-

Nabadwip, Mayapur, Swarupganj etc. small towns are located in this zone of river. Iskon temple at Mayapur and Nabadwip Dham(Birth place of Shri Chaitanya) are both the major places of worship. Foreigners are also come in these places every year. Krishnanagar, Ghurni etc. are the historical places located in this zone of river.

o) Village / colonies along the sub-stretch and approx. Population:-

Jalangi River mainly includes with many villages like Sonatala, Dakhin Kalinagar, Panditpur, Tehatta, Teghari, Sukhsagar etc. located in this zone of River. The villager can easily access with the surrounding villages by the Railways and road services.

p) Availability of Passenger Ferry Services with facilities and Annual movement data:-

As much as 14 nos ferry services are available in this zone of river. The passengers are mainly from the villages situated on the both bank of the river and the ferry services are really very helpful for growing the local businesses and transportation with the both bank of the river. The Ferry services are also helpful for the daily communication system**.** Ferry services are also important for pollution less travels.

Sl No	Chainage (km)	Latitude (N)	Longitude (E)	Name of Ferry Ghat
1	0.291	23°24'49.32"	88°22'57.86"	HULAR FERRY GHAT
2	24.68	23°27'1.48"	88°29'43.77"	HARANAGAR FERRY GHAT
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13	72.66	23°37'14.53"	88°31'24.28"	BARA ANDULIA FERRY GHAT
14	113.40	23°43'48.42"	88°31'10.56"	TEHATTA FERRY GHAT

q) Available and probable Water Sport Recreational Facilities:-

There are no water sport recreational facilities available in this zone of river.

r) Fishing activities:-

Fish and fishing business are an important sector in this region. Cast nets, Scoop nets, Gill nets, Fishing lines and Traditional Bamboo Trap used for catching the fishes here. Fishing plays an important role in supporting livelihood for the inhabitants of this Region. Fishes are one of the main occupations in this region of people where so many people are engaged with this profession for the demand of fish.

s) Sand mining:-

The bank of the River Jalangi is also used for the sand mines. The Sand Mining helps the people for collection sand which is the major component for Building purposes. The Motor vehicles can easily collect the sand and move for transportation. Sand Mines is an important sector where so many people are engaged and these activities help them to get their daily livelihood. Besides this, sand is also exported to other states as it becomes demandful for making Building or Industries.

t) Tributaries:-

The Jalangi River is a branch of Bhagirathi, Hooghly River.

u) Details of Irrigation Canals and Outlets:-

There is no Canal or outlet found in this zone of river.

v) Details of Nalas. Polluted water discharge in to the rivers and treatment plants (if any):-

There are no Nalas found in this zone of river.

w) Usage of water (drinking, irrigation, industries, navigation etc.) Water quality:-

In Recent time's man avoid drinking the water of the river but the water is essential for cultivation which is the main occupation for the villagers of this region. The water is also used in the industrial hubs. Ferry services are also navigable in this region of river. The water is used as irrigation purposes. With the help of the irrigation system, the cultivation can easily accessible. As much as 14 no's of passenger ferry services are available in this zone of river.

Section 4: Terminals

There is no existing terminal found in this zone of river.

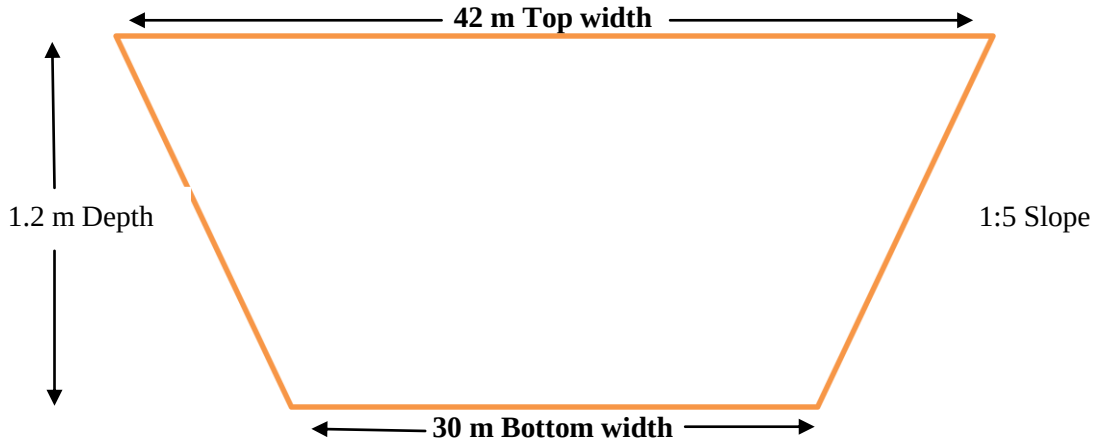
4.4 Details of Land use, owner etc.:-

The both sides bank of the River Jalangi used for cultivation. The Farmers are cultivated their crops with using this fertile land and grows a huge amount of crops every year. Besides, some portions of the land are surrounded by small industries and Forests. Though bolder pitching is found in some places, But in Recent times, the bank of the river has been worn away in some places for lack of trees. Sometimes, the land of the river has been changed into a heap of garbage. As a result, the river side becomes polluted land. In the Monsoon period, Flood and erosion has been affected both side of the river bank.

Section 5: Fairway development:-

Dredging sections, summary of depths and dredging quantity for different classification of waterways (stretch-wise)

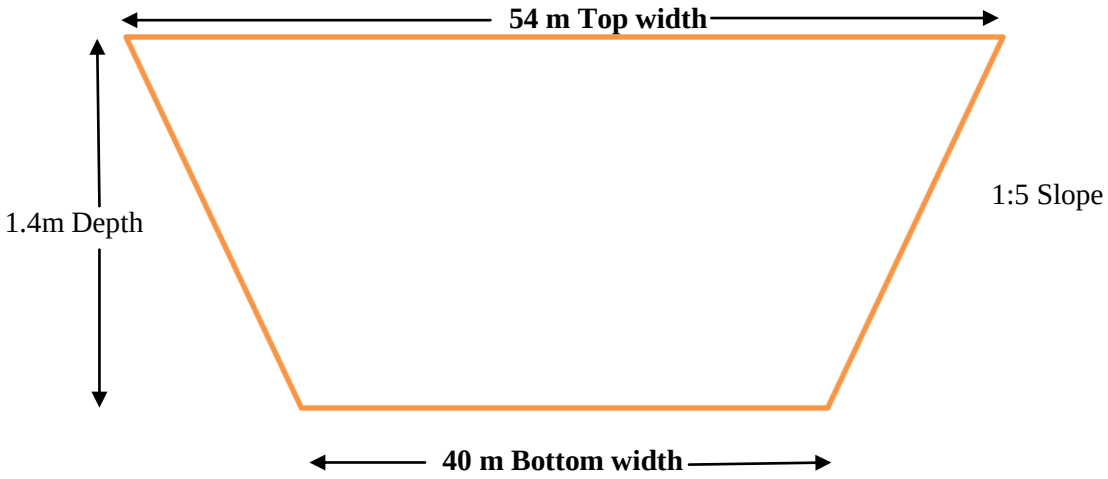
Class-I:-



Location		Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m)	Min Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m)
Swarupganj	Bahadurpur	0	10	3.2	10.2	0	0	0	2.2	8.9	0	0	0
Bahadurpur	Parmedia	10	20	1.6	12.1	0	0	0	1.0	11.3	750	996.52	996.52
Parmedia	Java	20	30	1.8	9.4	0	0	0	0.5	8.7	160	236.58	1233.1
Java	Uttar Jhitkipota	30	40	1.5	10.3	0	0	0	0.4	9.8	2100	7532.55	8765.65
Uttar Jhitkipota	Kalinagar	40	50	1.6	8.4	0	0	0	0.5	7.1	2650	8867.21	17632.86
Kalinagar	Gokhurapota	50	60	1.2	8.2	200	714.13	714.13	0.5	7.4	2600	24707.62	42340.48
Gokhurapota	Gopinathpur	60	70	1.2	11.4	30	2.91	717.04	0.4	10.4	1500	9009.86	51350.34
Gopinathpur	Birpur	70	80	1.0	6.4	700	1226.45	1943.49	0.4	5.1	4900	47284.47	98634.81
Birpur	Hatishala	80	90	1.5	6.4	0	0	1943.49	0.8	5.9	2000	3189.26	101824.07
Hatishala	Paschim chalkajalia	90	100	0.9	6.7	25	5.58	1949.07	0.3	5.6	2000	2826.69	104650.76
Paschim chalkajalia	Boyerbanda	100	110	1.4	6.7	0	0	1949.07	0.5	6.0	5750	12521.76	117172.52
Boyerbanda	Iswachandrapur	110	120	0.9	5.3	200	131.88	2080.95	0.2	11.3	4650	23702.71	140875.23
Iswachandrapur	Ramnagar	120	130.59	0.8	11.5	2420	9237.99	11318.94	0.3	10.9	7290	144113.31	284988.54
Total						3575	11318.94		Total		36350	284988.54	

Table 14- Dredging quantity in class-I

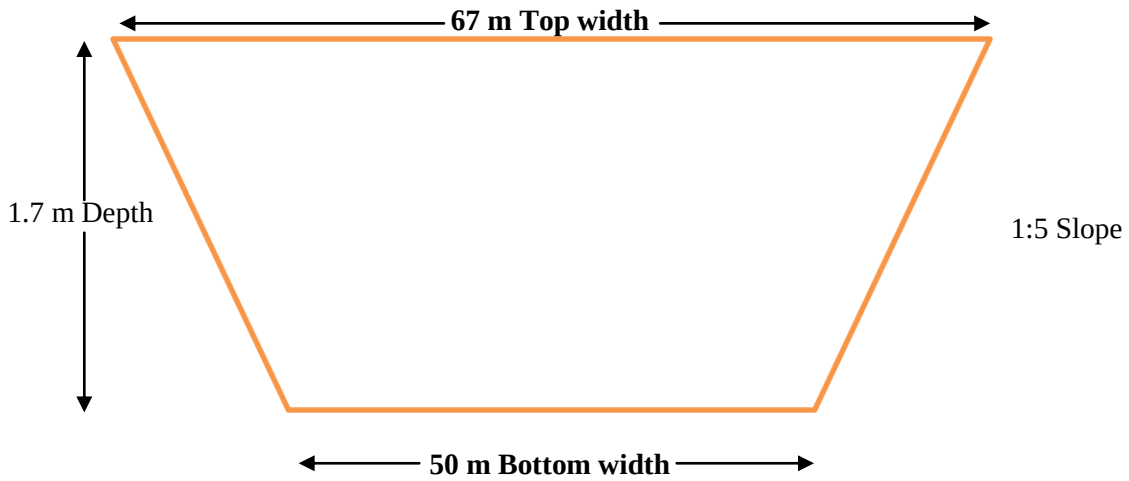
Class-II:-



Location		Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	From	To	Min depth (m)	Max.depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (Cu.m)	Min Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (Cu.m)
Swarupganj	Bahadurpur	0	10	3.0	10.3	0	0	0	1.2	9.0	1200	2088.18	2088.18
Bahadurpur	Parmedia	10	20	1.3	12.2	200	302.84	302.84	0.8	11.4	4350	17809.33	19897.51
Parmedia	Java	20	30	1.6	9.6	0	0	302.84	1.1	8.8	2530	2945.07	22842.58
Java	Uttar Jhitkipota	30	40	1.4	10.31	0	0	302.84	0.3	9.81	8450	40809.24	63651.82
Uttar Jhitkipota	Kalinagar	40	50	1.5	8.41	0	0	302.84	0.3	7.11	8200	39697.71	103349.53
Kalinagar	Gokhurapota	50	60	1.0	8.3	700	1805.1	2107.94	0.3	7.5	9400	78021.85	181371.38
Gokhurapota	Gopinathpur	60	70	1.1	11.41	160	397.19	2505.13	0.2	10.41	5350	31910.62	213282
Gopinathpur	Birpur	70	80	0.8	6.6	1000	2515.61	5020.74	0.2	5.2	10000	166592.02	379874.02
Birpur	Hatishala	80	90	1.3	6.5	100	58.15	5078.89	0.7	5.91	9150	71547.25	451421.27
Hatishala	Paschim chalkajalia	90	100	0.7	6.8	385	516.19	5595.08	0.2	5.8	1000	87047.47	538468.74
Paschim chalkajalia	Boyerbanda	100	110	1.2	6.9	925	865.91	6460.99	0.4	6.2	9700	242393.46	780862.2
Boyerbanda	Iswachandrapur	110	120	0.7	12.4	1750	2359.05	8820.04	0.1	11.4	10000	207589.27	988451.47
Iswachandrapur	Ramnagar	120	130.59	0.7	11.6	5260	20914.85	29734.89	0.2	11.0	11000	304060.98	1292512.45
Total						10480	29734.89		Total		98830	1292512.45	

Table 15- Dredging quantity in class-II

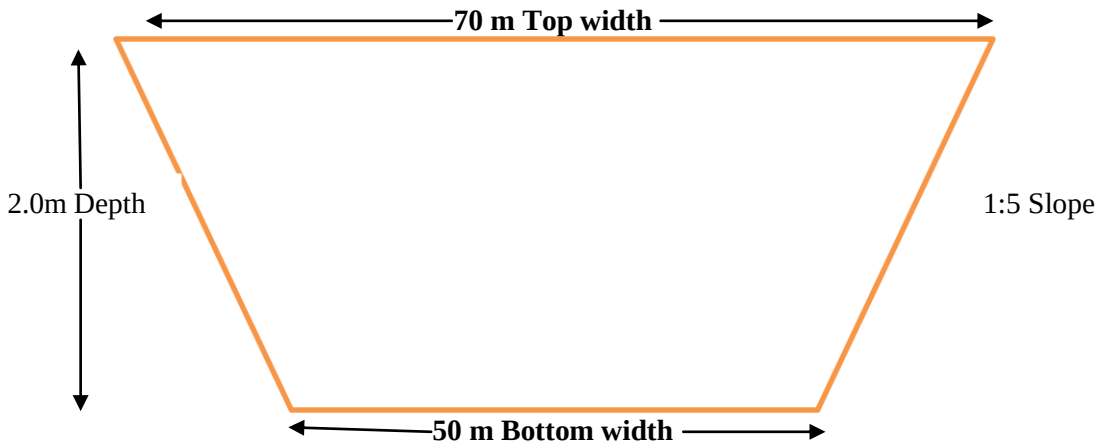
Class-III:-



Location		Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	From	To	Min. depth (m)	Max.depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty. (cu.m.)	Min Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty. (cu.m.)
Swarupganj	Bahadurpur	0	10	2.8	10.4	0	0	0	1.1	9.3	2810	3937.56	3937.56
Bahadurpur	Parmedia	10	20	1.0	12.3	1100	1869.92	1869.92	0.5	11.5	8000	43412.99	47350.55
Parmedia	Java	20	30	1.4	9.8	500	587.43	2457.35	1.0	8.9	5860	15107.18	62457.73
Java	Uttar Jhitkipota	30	40	1.2	10.32	310	174	2631.35	0.2	9.82	10000	62428.78	124886.51
Uttar Jhitkipota	Kalinagar	40	50	1.4	8.42	470	432.77	3064.12	0.1	7.3	9700	93116.56	218003.07
Kalinagar	Gokhurapota	50	60	0.8	8.4	1500	4646.53	7710.65	0.1	7.6	10000	121338.14	339341.21
Gokhurapota	Gopinathpur	60	70	1.0	11.42	2570	4385.68	12096.33	0.1	10.42	9500	85802.49	425143.7
Gopinathpur	Birpur	70	80	0.6	6.8	1620	6018.61	18114.94	0.1	5.3	10000	268839.5	693983.2
Birpur	Hatishala	80	90	1.29	6.6	3230	3293.88	21408.82	0.6	5.92	10000	129983.04	823966.24
Hatishala	Paschim chalkajalia	90	100	0.5	7.1	6840	8542.34	29951.16	0.1	6.0	10000	156737.77	980704.01
Paschim chalkajalia	Boyerbanda	100	110	1.0	7.1	7450	16703.74	46654.9	0.2	6.4	10000	326352.57	1307056.58
Boyerbanda	Iswachandrapur	110	120	0.5	12.5	8700	18885.43	65540.33	0.1	11.5	10000	317437.48	1624494.06
Iswachandrapur	Ramnagar	120	130.59	0.6	11.7	10200	66575.53	132115.86	0.1	11.1	11000	625654.64	2250148.7
Total						44500	132115.86		Total		116870	2250148.7	

Table 16- Dredging quantity in class-III

Class-IV:-



Location		Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	From	To	Min depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty. (cu.m.)	Min Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty. (cu.m.)
Swarupganj	Bahadurpur	0	10	2.6	10.5	0	0	0	0.9	9.6	4920	9061.55	9061.55
Bahadurpur	Parmedia	10	20	0.7	12.4	1400	3091.89	3091.89	0.2	11.6	8000	65200.5	74262.05
Parmedia	Java	20	30	1.2	10.0	1400	1509.41	4601.3	0.8	9.0	7200	28634.32	102896.37
Java	Uttar Jhitkipota	30	40	1.0	10.33	1100	764.94	5366.24	0.1	9.83	10000	87003.97	189900.34
Uttar Jhitkipota	Kalinagar	40	50	1.2	8.43	1350	1497.33	6863.57	0.1	7.5	10000	140307.8	330208.14
Kalinagar	Gokhurapota	50	60	0.6	8.5	2450	7402.51	14266.08	0.1	7.7	10000	152821.88	483030.02
Gokhurapota	Gopinathpur	60	70	0.9	11.43	2800	7880.53	22146.61	0.1	10.43	10000	136038.98	619069
Gopinathpur	Birpur	70	80	0.4	7.0	3900	10651.5	32798.11	0.1	5.4	10000	346651.44	965720.44
Birpur	Hatishala	80	90	1.1	6.7	5050	7419	40217.11	0.5	5.93	10000	197389.31	1163109.75
Hatishala	Paschim chalkajalia	90	100	0.3	7.4	8800	18499.86	58716.97	0.1	6.2	10000	236706.81	1399816.56
Paschim chalkajalia	Boyerbanda	100	110	0.8	7.3	10000	30625.67	89342.64	0.1	6.6	10000	413909.56	1813726.12
Boyerbanda	Iswachandrapur	110	120	0.3	12.6	9250	38497.71	127840.35	0.1	11.6	10000	438810.04	2252536.16
Iswachandrapur	Ramnagar	120	130.59	0.4	11.8	11000	116869.63	244709.98	0.1	11.2	11000	836202.26	3088738.42
Total						58500	244709.98		Total		121120	3088738.42	

Table 17- Dredging quantity in class- IV

Section 6: Conclusion

The Survey stretch of Jalangi River is 130.590 km, branches of the Bhagirathi/Hooghly River, situated near Nadia, west Bengal. As much as 14 no's of passenger Ferry Ghats including Hular Ghat (Nabadwip-Mayapur ferry service), Kalinagar, Panditpur, Haranagar, Poli ferry ghat etc available in this zone of river. Ghurni, a famous place is located at Krishnanagar which is famous for clay dolls. The waterway of the Jalangi River includes with many villages, Rail and Road, Ferry Ghats, Jetty etc. There are two Railway Bridges crossing over the river which is very communicative for the native villagers and the foreigners. The Railway line is connected with Krishnanagar, Bahadurpur etc Railway station. Two RCC bridges are situated in this zone of river which is named Dwijendralal setu and also linked with Palashipara and NH-34. Tourists can have beautiful view of the river and its natural surroundings from the bridges situated on NH no- 34. Krishnanagar, Bahadurpur, Swarupganj, Nabadwip, Mayapur, Ghurni, Palashipara etc. places are situated in this zone. NH-34 is the major communicative way in this zone and other state-Highways like SH-4, SH-11 are situated for a better communication system and good transportation.

Nabadwip, Mayapur, Ghurni etc places are tourist places situated in this zone of river. Iskon Temple at Mayapur, Birth place of sri chaitanya Dev at Nabadwip are really a memorable tourist places in this zone of river. SH-8, SH-11 are connected through this river. NH-34 is really helpful for daily transportation and good communication in this zone of river.

6.1 Min width/Max width and Avg. Width of waterway:-

Sl. No	From Chainage (km)	To Chainage (km)	Min. width (m)	Max. width (m)	Avg. width of waterway (m)
1	0	10	200.000	87.430	143.715
2	10	20	87.430	80.550	83.99
3	20	30	80.550	74.620	77.585
4	30	40	74.620	90.000	82.31
5	40	50	90.000	78.180	84.09
6	50	60	78.180	127.920	103.05
7	60	70	127.920	100.000	113.96
8	70	80	100.000	102.390	101.195
9	80	90	102.390	83.200	92.795
10	90	100	83.200	61.990	72.595
11	100	110	61.990	93.240	77.615
12	110	120	93.240	64.820	79.03
13	120	130.590	64.820	69.140	66.98

6.2 Avg. Slope:-

Reach		River Level Change (m)	Distance (km)	Slope (m/km)	Slope (cm/km)
From	To				
0.00	10.00	0.037	10.198	0.0036	0.360
10.00	20.00	0.035	9.825	0.0036	0.360
20.00	30.00	0.036	10.08	0.0036	0.360
30.00	40.00	0.04	10.906	0.0037	0.370
40.00	50.00	0.033	9.189	0.0036	0.360
50.00	60.00	0.139	9.71	0.0143	1.430
60.00	70.00	0.232	10.595	0.0219	2.190
70.00	80.00	0.21	9.566	0.022	2.200
80.00	90.00	0.436	10.335	0.0422	4.220
90.00	100.00	0.65	9.776	0.0665	6.650
100.00	110.00	0.23	10.512	0.0219	2.190
110.00	120.00	0.222	10.134	0.0219	2.190
120.00	130.590	0.211	9.752	0.0216	2.160
Avg. Slope				0.019	1.926

6.3 Min. Average Reduced Depth/ Max. Average Reduced Depth:-

Sl. No	From Chainage (km)	To Chainage (km)	Minimum Avg. Reduced Depth/Percentage				Maximum Avg. Reduced Depth/percentage			
			Class-I	Class-II	Class-III	Class-IV	Class-I	Class-II	Class-III	Class-IV
1	0.00	10.00	3.68/0.0368	2.67/0.0267	2.40/0.0240	2.29/0.0289	8.18/0.0818	8.30/0.0830	8.43/0.0843	8.55/0.0855
2	10.00	20.00	1.72/0.0172	1.37/0.0137	1.27/0.0127	1.17/0.0117	11.3/0.113	7.98/0.0798	8.09/0.0809	8.22/0.0822
3	20.00	30.00	1.46/0.0146	1.43/0.0143	1.33/0.0133	1.25/0.0125	7.33/0.0733	7.46/0.0746	7.57/0.0757	7.69/0.0769
4	30.00	40.00	0.96/0.0096	0.84/0.0084	0.72/0.0072	0.60/0.0060	9.8/0.098	6.50/0.0650	6.62/0.0662	6.73/0.0673
5	40.00	50.00	0.96/0.0096	0.87/0.0087	0.75/0.0075	0.66/0.0066	5.13/0.0513	5.24/0.0524	5.36/0.0536	5.47/0.0547
6	50.00	60.00	1.01/0.0101	0.90/0.0090	0.78/0.0078	0.70/0.0070	4.73/0.0473	4.84/0.0484	4.95/0.0495	5.06/0.0506
7	60.00	70.00	1.12/0.0112	1.01/0.0101	0.90/0.0090	0.81/0.0081	5.9/0.059	6.01/0.0601	6.12/0.0612	6.24/0.0624
8	70.00	80.00	0.82/0.0082	0.69/0.0069	0.57/0.0057	0.48/0.0048	3.53/0.0353	3.67/0.0367	3.79/0.0379	3.92/0.0392
9	80.00	90.00	1.13/0.0113	1.03/0.0103	0.92/0.0092	0.82/0.0082	4.74/0.0474	4.84/0.0484	4.94/0.0494	5.04/0.0504
10	90.00	100.00	1.05/0.0105	0.86/0.0086	0.71/0.0071	0.59/0.0059	4.74/0.0474	4.89/0.0489	5.04/0.0504	5.19/0.0519
11	100.00	110.00	0.77/0.0077	0.64/0.0064	0.51/0.0051	0.38/0.0038	4.46/0.0446	4.60/0.0460	4.72/0.0472	4.85/0.0485
12	110.00	120.00	0.66/0.0066	0.68/0.0068	0.58/0.0058	0.51/0.0051	4.52/0.0452	4.63/0.0463	4.73/0.0473	4.82/0.0482
13	120.00	130.590	0.74/0.0074	0.70/0.0070	0.58/0.0058	0.50/0.0050	3.90/0.0390	4.62/0.0462	4.13/0.0413	4.24/0.0424

6.4 Range of Depths:-

Sl No	From Chainage (km)	To Chainage (km)	Reduced Depth (w.r.t LAD)				
			<1.2 m	1.2 m to 1.4 m	1.5 m to 1.7 m	1.8 m to 2.0 m	>2.0 m
			(km)	(km)	(km)	(km)	(km)
1	0.00	10.00	0	0	0	0	10
2	10.00	20.00	2.1	1.2	1.5	1.8	3.4
3	20.00	30.00	0.5	1.2	1.5	1.8	5.0
4	30.00	40.00	4.0	1.2	0	0	4.8
5	40.00	50.00	7.3	1.2	1.5	0	0
6	50.00	60.00	8.8	1.2	0	0	0
7	60.00	70.00	7.3	1.2	1.5	0	0
8	70.00	80.00	8.8	1.2	0	0	0
9	80.00	90.00	7.3	1.2	1.5	0	0
10	90.00	100.00	7.3	1.2	1.5	0	0
11	100.00	110.00	8.8	1.2	0	0	0
12	110.00	120.00	8.7	1.3	0	0	0
13	120.00	130.590	9.09	0	1.5	0	0

6.5 Dredging Summary:-

Class	Sounding Observed w.r.t Sounding Datum (Cu.m)	Sounding Reduced w.r.t Sounding Datum (Cu.m)
Class-I	11318.94	284988.54
Class-II	29734.89	1292512.50
Class-III	132115.86	2250148.70
Class-IV	244709.98	3088738.42

As much as 14 no's of passenger ferry services are available in this zone of river. The cargo transportation like vegetables, goods, bamboo, vehicles etc. are also available in most of the ferry ghats. Nabadwip, Mayapur are the important places located in this zone of river. The Detailed project report may develop in this zone of river for the IWT operation and also for the navigation. The water level is sufficient for the entire stretches of the river.

Annexure:-

Annexure-1 Source and type of data collected from various agencies:-

The Chart Datum value and HFL values of Palashipara (Seasonal), Chapra and Confluence with Bhagirathi/Hooghly River has been provided by IWAI office.

Annexure-2 Min. / max. Depth, length of shoal per km-wise for different classification in the designed dredged channel:-

Class-I:-

Class-I											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
0	1	3.5	10.2	0	0	0	2.2	8.6	0	0	0
1	2	6.7	9.7	0	0	0	4.1	8.7	0	0	0
2	3	5.6	9.6	0	0	0	4.4	8.7	0	0	0
3	4	6.5	9.4	0	0	0	4.3	8.6	0	0	0
4	5	5.3	7.5	0	0	0	4.2	6.8	0	0	0
5	6	3.2	8.6	0	0	0	2.4	7.8	0	0	0
6	7	4.1	9.1	0	0	0	3.4	8.7	0	0	0
7	8	4.3	7.7	0	0	0	3.2	6.2	0	0	0
8	9	4.5	10.2	0	0	0	3.8	8.9	0	0	0
9	10	5.3	9.3	0	0	0	4.8	8.8	0	0	0
10	11	4.3	7.6	0	0	0	3.5	6.2	0	0	0
11	12	3.1	8.2	0	0	0	1.2	7.1	0	0	0
12	13	3.1	7.8	0	0	0	2.1	6.7	0	0	0
13	14	2.1	9.2	0	0	0	1.7	8.7	0	0	0
14	15	3.2	9.2	0	0	0	1.8	8	0	0	0
15	16	1.8	12.1	0	0	0	1	11.3	250	452.61	452.61
16	17	2.1	8.4	0	0	0	1.2	7.4	0	0	452.61
17	18	2	9.2	0	0	0	2.1	7.8	0	0	452.61
18	19	2.2	8.3	0	0	0	1.5	7.2	0	0	452.61
19	20	1.6	9.3	0	0	0	1.1	8.1	500	543.91	996.52
20	21	2.2	9.2	0	0	0	1.2	7.8	0	0	996.52
21	22	2.1	7.3	0	0	0	2.1	6.2	0	0	996.52

Class-I											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
22	23	2.5	9.4	0	0	0	1.8	8.2	0	0	996.52
23	24	3.1	8.2	0	0	0	1.2	7.9	0	0	996.52
24	25	2.3	7.3	0	0	0	1.3	6.2	0	0	996.52
25	26	1.8	9.2	0	0	0	1.5	8.7	0	0	996.52
26	27	1.8	9.3	0	0	0	0.5	8.1	160	236.58	1233.1
27	28	2.3	7.4	0	0	0	1.6	6.3	0	0	1233.1
28	29	2	9.3	0	0	0	1.3	8.1	0	0	1233.1
29	30	2	6.8	0	0	0	2.1	5.8	0	0	1233.1
30	31	2	8.3	0	0	0	1.2	7.9	0	0	1233.1
31	32	2.3	7.4	0	0	0	0.6	6.4	200	347.26	1580.36
32	33	2.1	7.4	0	0	0	1	6.9	700	1479.32	3059.68
33	34	1.5	7.5	0	0	0	1.2	6.8	0	0	3059.68
34	35	1.9	4.2	0	0	0	0.4	3.6	200	375.56	3435.24
35	36	2	8.2	0	0	0	1.3	7.1	0	0	3435.24
36	37	2.3	10.3	0	0	0	1.2	9.8	0	0	3435.24
37	38	2.2	5.6	0	0	0	1.2	4.7	0	0	3435.24
38	39	2.1	6.4	0	0	0	0.6	5.2	200	670.15	4105.39
39	40	1.5	6.3	0	0	0	0.9	5.3	800	4660.26	8765.65
40	41	2.1	7.4	0	0	0	1.5	6.2	0	0	8765.65
41	42	2	7.5	0	0	0	0.5	6.1	100	193.94	8959.59
42	43	2.1	6.2	0	0	0	0.7	3.2	800	4769.65	13729.24
43	44	2.2	8.4	0	0	0	1	7.1	300	432.21	14161.45
44	45	1.8	4.3	0	0	0	0.9	3.3	150	187.5	14348.95
45	46	1.7	8.2	0	0	0	0.5	7.1	300	192.22	14541.17
46	47	2	7.2	0	0	0	1.2	6.9	0	0	14541.17
47	48	2.1	5.2	0	0	0	1.3	4.8	0	0	14541.17
48	49	2.1	4.2	0	0	0	1.5	3.4	0	0	14541.17
49	50	1.6	5.1	0	0	0	0.5	3.2	1000	3091.69	17632.86
50	51	1.2	5.3	200	714.13	714.13	0.6	3.2	1000	20237.4	37870.29
51	52	1.7	8.2	0	0	714.13	0.8	7.4	200	419.82	38290.11
52	53	2	7.1	0	0	714.13	0.5	5.3	1000	3100.2	41390.31
53	54	2.1	5.1	0	0	714.13	1.3	4.6	0	0	41390.31
54	55	2.1	6.3	0	0	714.13	1	5.1	200	603.41	41993.72
55	56	2.2	5.3	0	0	714.13	1.3	4.4	0	0	41993.72
56	57	2	6.2	0	0	714.13	1.2	5	0	0	41993.72
57	58	2.1	3.5	0	0	714.13	1	2.9	200	324.44	42318.16
58	59	2.2	4.1	0	0	714.13	1.2	3.6	0	0	42318.16
59	60	2	6.3	0	0	714.13	1.2	5.8	0	22.32	42340.48

Class-I											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
60	61	2.1	4.8	0	0	714.13	1.3	4	0	0	42340.48
61	62	1.2	7.4	30	2.91	717.04	0.6	7.3	1000	8206.29	50546.77
62	63	2.2	7.4	0	0	717.04	1.5	6.7	0	0	50546.77
63	64	2.1	6.3	0	0	717.04	1.2	5.1	0	0	50546.77
64	65	2.2	6.2	0	0	717.04	0.4	5.9	200	373.21	50919.98
65	66	2.3	11.4	0	0	717.04	1.3	10.4	0	0	50919.98
66	67	2.1	6.2	0	0	717.04	1.2	5.3	0	0	50919.98
67	68	1.4	7.4	0	0	717.04	1.2	6.8	0	0	50919.98
68	69	2.1	4.6	0	0	717.04	1	3.9	300	430.36	51350.34
69	70	2	4.2	0	0	717.04	1.5	3.6	0	0	51350.34
70	71	2.1	5.6	0	0	717.04	1	3.2	500	1233.35	52583.69
71	72	2	6.2	0	0	717.04	0.7	5.1	400	2662.62	55246.31
72	73	1.8	4.5	0	0	717.04	0.4	3.1	300	562.98	55809.29
73	74	2	6.2	0	0	717.04	1.1	4.2	400	2154.08	57963.37
74	75	2.1	6.4	0	0	717.04	1	3.5	400	713.56	58676.93
75	76	1.8	5.4	0	0	717.04	0.7	3.2	500	1305.71	59982.64
76	77	2	4.9	0	0	717.04	1	3.2	700	2430.4	62413.04
77	78	1	4.5	700	1226.45	1943.49	0.5	3.5	800	35107.7	97520.75
78	79	1.8	4.5	0	0	1943.49	0.8	3.5	400	366.5	97887.25
79	80	2.1	3.2	0	0	1943.49	1	2.8	500	747.56	98634.81
80	81	1.5	6.2	0	0	1943.49	0.8	5.6	600	692.93	99327.74
81	82	1.6	5.6	0	0	1943.49	1.2	5.3	0	0	99327.74
82	83	1.9	5.2	0	0	1943.49	1.3	4.1	0	0	99327.74
83	84	1.8	6.4	0	0	1943.49	0.8	5.2	100	80.26	99408
84	85	2	6.2	0	0	1943.49	0.9	5.3	600	1092.73	100500.73
85	86	2.1	5.2	0	0	1943.49	1.2	4.3	0	0	100500.73
86	87	1.7	4.6	0	0	1943.49	1.2	3.8	0	0	100500.73
87	88	2.3	6.4	0	0	1943.49	1	5.9	700	1323.34	101824.07
88	89	1.6	5.3	0	0	1943.49	1.4	4.6	0	0	101824.07
89	90	2.1	4.2	0	0	1943.49	1.5	3.3	0	0	101824.07
90	91	2.3	6.3	0	0	1943.49	1.7	5.2	0	0	101824.07
91	92	1.4	6.7	0	0	1943.49	1.1	5.6	850	1719.81	103543.88
92	93	1.8	5.9	0	0	1943.49	1.1	5.6	100	42.58	103586.46
93	94	1.9	5.4	0	0	1943.49	0.3	4.9	0	0	103586.46
94	95	1.6	4.7	0	0	1943.49	1.2	4.1	0	0	103586.46
95	96	2.1	6.3	0	0	1943.49	1.5	5.2	0	0	103586.46
96	97	2.3	6.5	0	0	1943.49	1.1	4.5	100	41.67	103628.13
97	98	1.7	6.4	0	0	1943.49	1.1	5	200	62.08	103690.21

Class-I											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
98	99	1	4.5	15	2.82	1946.31	0.9	3.7	400	485.91	104176.12
99	100	0.9	3.7	10	2.76	1949.07	0.5	3.6	350	474.64	104650.76
100	101	1.6	5.3	0	0	1949.07	1	4.2	900	2395.18	107045.94
101	102	1.5	6.1	0	0	1949.07	0.6	5.1	400	372.11	107418.05
102	103	1.4	3.6	0	0	1949.07	0.7	2.9	850	3725.27	111143.32
103	104	2.1	4.2	0	0	1949.07	0.8	3.7	700	2385.44	113528.76
104	105	1.4	5.3	0	0	1949.07	0.8	4.9	550	1001.05	114529.81
105	106	2.1	4.6	0	0	1949.07	0.5	3.6	400	451.22	114981.03
106	107	1.7	6.2	0	0	1949.07	0.6	5.8	600	365.33	115346.36
107	108	2.1	6.6	0	0	1949.07	1	5.9	200	177.92	115524.28
108	109	1.5	6.7	0	0	1949.07	1	6	500	574.75	116099.03
109	110	1.6	2.9	0	0	1949.07	0.7	2.5	650	1073.49	117172.52
110	111	2.1	3.2	0	0	1949.07	1.1	2.4	150	91.17	117263.69
111	112	1	3.5	100	81.32	2030.39	0.2	1.1	1000	9020.14	126283.83
112	113	1.4	6.4	0	0	2030.39	0.8	5.7	600	640.57	126924.4
113	114	1.7	4.5	0	0	2030.39	0.3	3.6	500	430.93	127355.33
114	115	1.8	6.2	0	0	2030.39	0.2	5.9	200	159.17	127514.5
115	116	1.7	5.9	0	0	2030.39	1.1	5.3	700	3474.22	130988.72
116	117	0.9	4.6	100	50.56	2080.95	0.5	3.8	900	6420.64	137409.36
117	118	1.8	12.3	0	0	2080.95	1	11.3	200	2673.43	140082.79
118	119	1.9	4.6	0	0	2080.95	1.1	3.4	300	453.82	140536.61
119	120	2.1	3.2	0	0	2080.95	0.3	2.7	100	338.62	140875.23
120	121	2.1	5.2	0	0	2080.95	0.7	4.3	500	1975.31	142850.54
121	122	1.7	4.2	0	0	2080.95	0.4	3.4	650	1874.54	144725.08
122	123	2	4.2	0	0	2080.95	1	3.4	100	89.03	144814.11
123	124	2.2	11.5	0	0	2080.95	1.1	10.9	660	3947.73	148761.84
124	125	1.9	3.4	0	0	2080.95	0.8	2.2	850	6735.48	155497.32
125	126	1.8	6.5	300	342.9	2423.85	1	5.5	750	9802.05	165299.37
126	127	1	4.2	800	6499.54	8923.39	0.5	3.2	1000	50396.3	215695.63
127	128	1.1	3.6	10	2.4	8925.79	0.8	3.3	650	16399.3	232094.92
128	129	1	3.5	700	1384.2	10309.99	0.7	3.1	780	27382.5	259477.44
129	130	1.1	2.7	10	0.05	10310.04	0.9	2.1	700	18189.4	277666.88
130	130.59	0.8	2.5	600	1008.9	11318.94	0.3	1.6	650	7321.66	284988.54
Total				3575	11318.94		Total		36350	284988.54	

Table 18- Minimum & Maximum depth per km wise (Class-I)

Class-II:-

Class-II											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
0	1	3.4	10.3	0	0	0	2.1	8.7	0	0	0
1	2	6.5	9.9	0	0	0	3.9	8.9	0	0	0
2	3	5.59	9.61	0	0	0	4.39	8.71	0	0	0
3	4	6.48	9.42	0	0	0	1.3	8.62	100	35.5	35.5
4	5	5.2	7.6	0	0	0	4.1	6.9	0	0	35.5
5	6	3	8.8	0	0	0	2.2	8	0	0	35.5
6	7	3.8	9.4	0	0	0	3.1	9	0	0	35.5
7	8	4.2	7.8	0	0	0	3.1	6.3	0	0	35.5
8	9	4.49	10.21	0	0	0	1.2	8.91	100	75.1	110.6
9	10	5.1	9.5	0	0	0	1.3	9	1000	1977.58	2088.18
10	11	4.2	7.7	0	0	0	1.2	6.3	1000	1760.49	3848.67
11	12	3	8.3	0	0	0	1.1	7.2	1000	5971.77	9820.44
12	13	3	7.9	0	0	0	2	6.8	0	0	9820.44
13	14	2.09	9.21	0	0	0	1.69	8.71	0	0	9820.44
14	15	3	9.4	0	0	0	1.6	8.2	0	0	9820.44
15	16	1.7	12.2	0	0	0	0.9	11.4	200	156.13	9976.57
16	17	2.09	8.41	0	0	0	1.19	7.41	1000	1549.7	11526.27
17	18	2	9.3	0	0	0	2	7.9	0	0	11526.27
18	19	2	8.5	0	0	0	1.3	7.4	150	121.55	11647.82
19	20	1.3	9.6	200	302.84	302.84	0.8	8.4	1000	8249.69	19897.51
20	21	2.1	9.3	0	0	302.84	1.1	7.9	250	31.82	19929.33
21	22	2	7.4	0	0	302.84	2	6.3	0	0	19929.33
22	23	2.3	9.6	0	0	302.84	1.6	8.4	0	0	19929.33
23	24	3	8.3	0	0	302.84	1.1	8	260	64.68	19994.01
24	25	2.2	7.4	0	0	302.84	1.2	6.3	1000	1310.39	21304.4
25	26	1.7	9.3	0	0	302.84	1.3	8.8	10	3.29	21307.69
26	27	1.6	9.5	0	0	302.84	1.2	8.3	10	1.16	21308.85
27	28	2.3	7.41	0	0	302.84	1.59	6.31	0	0	21308.85
28	29	2	9.4	0	0	302.84	1.2	8.2	1000	1533.73	22842.58
29	30	2	7	0	0	302.84	2	6	0	0	22842.58
30	31	2	8.5	0	0	302.84	1	8.1	1000	2122.01	24964.59
31	32	2.3	7.6	0	0	302.84	0.4	6.6	1000	3507.48	28472.07

Class-II											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
32	33	2.1	7.5	0	0	302.84	0.9	7	250	2187.62	30659.69
33	34	1.49	7.51	0	0	302.84	1.19	6.81	200	26.35	30686.04
34	35	1.8	4.3	0	0	302.84	0.3	3.7	1000	4107.63	34793.67
35	36	1.9	8.3	0	0	302.84	1.2	7.2	1000	5654.36	40448.03
36	37	2.29	10.31	0	0	302.84	1.19	9.81	1000	5678.64	46126.67
37	38	2	5.8	0	0	302.84	1	4.9	1000	3765.07	49891.74
38	39	2	6.5	0	0	302.84	0.5	5.3	1000	3625.29	53517.03
39	40	1.4	6.5	0	0	302.84	0.7	5.5	1000	10134.79	63651.82
40	41	2.1	7.5	0	0	302.84	1.4	6.3	1000	11629.59	75281.41
41	42	2	7.7	0	0	302.84	0.3	6.3	1000	7428.59	82710
42	43	2.09	6.21	0	0	302.84	0.69	3.21	1000	13689.78	96399.78
43	44	2.19	8.41	0	0	302.84	0.99	7.11	1000	108.51	96508.29
44	45	1.6	4.5	0	0	302.84	0.7	3.5	1000	486.87	96995.16
45	46	1.69	8.21	0	0	302.84	0.49	7.11	1000	1996.3	98991.46
46	47	2	7.4	0	0	302.84	1	7.1	1000	1792.68	100784.14
47	48	2.1	5.21	0	0	302.84	1.29	4.81	200	127.38	100911.52
48	49	2.1	4.5	0	0	302.84	1.4	3.7	0	0	100911.52
49	50	1.5	5.2	0	0	302.84	0.4	3.3	1000	2438.01	103349.53
50	51	1	5.5	700	1805.1	2107.94	0.4	3.4	1000	25433.59	128783.12
51	52	1.6	8.3	0	0	2107.94	0.7	7.5	1000	8830.18	137613.3
52	53	1.8	7.3	0	0	2107.94	0.3	5.5	1000	24578.87	162192.17
53	54	2.09	5.11	0	0	2107.94	1.29	4.61	1000	4959.36	167151.53
54	55	2	6.4	0	0	2107.94	0.9	5.2	1000	5967.85	173119.38
55	56	2.2	5.5	0	0	2107.94	1.1	4.6	1000	1196.37	174315.75
56	57	2	6.3	0	0	2107.94	1.1	5.1	1000	1554.23	175869.98
57	58	2.1	3.6	0	0	2107.94	0.9	3	400	321.08	176191.06
58	59	2.2	4.2	0	0	2107.94	1.1	3.7	1000	1221.94	177413
59	60	2	6.31	0	0	2107.94	1.19	5.81	1000	3958.38	181371.38
60	61	2.1	5	0	0	2107.94	1.1	4.2	700	750.12	182121.5
61	62	1.1	7.5	150	396.93	2504.87	0.5	7.4	1000	22408.61	204530.11
62	63	2.19	7.41	0	0	2504.87	1.49	6.71	0	0	204530.11
63	64	2	6.4	0	0	2504.87	1.1	5.2	200	227.08	204757.19
64	65	2	6.4	10	0.26	2505.13	0.2	6.1	300	448.02	205205.21
65	66	2.29	11.41	0	0	2505.13	1.29	10.41	1000	1146.8	206352.01
66	67	2	6.3	0	0	2505.13	1.1	5.4	1000	4338.48	210690.49
67	68	1.4	7.6	0	0	2505.13	1	7	1000	2560.25	213250.74
68	69	2.1	4.7	0	0	2505.13	0.9	4	150	31.26	213282
69	70	2	4.3	0	0	2505.13	1.4	3.7	0	0	213282
70	71	1.9	5.8	0	0	2505.13	0.8	3.4	1000	13061.32	226343.32

Class-II											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
71	72	1.9	6.3	0	0	2505.13	0.6	5.2	1000	17129.21	243472.53
72	73	1.7	4.7	0	0	2505.13	0.2	3.3	1000	1520.13	244992.66
73	74	1.9	6.3	0	0	2505.13	1	4.3	1000	18614.98	263607.64
74	75	2.1	6.6	0	0	2505.13	0.8	3.7	1000	6537.9	270145.54
75	76	1.79	5.41	0	0	2505.13	0.69	3.21	1000	12279.67	282425.21
76	77	1.9	5	0	0	2505.13	0.9	3.3	1000	20705.75	303130.96
77	78	0.8	4.7	1000	2515.61	5020.74	0.3	3.7	1000	54475.6	357606.56
78	79	1.7	4.6	0	0	5020.74	0.7	3.6	1000	9219.54	366826.1
79	80	2	3.3	0	0	5020.74	0.9	2.9	1000	13047.92	379874.02
80	81	1.4	6.3	0	0	5020.74	0.7	5.7	1000	4667.16	384541.18
81	82	1.59	5.61	0	0	5020.74	1.19	5.31	1000	1581.14	386122.32
82	83	1.7	5.4	0	0	5020.74	1.1	4.3	1000	1937.86	388060.18
83	84	1.7	6.5	0	0	5020.74	0.7	5.3	150	172.64	388232.82
84	85	1.99	6.21	0	0	5020.74	0.89	5.31	1000	24653.55	412886.37
85	86	2	5.3	0	0	5020.74	1.1	4.4	1000	19598.32	432484.69
86	87	1.5	4.8	0	0	5020.74	1	4	1000	1098.85	433583.54
87	88	1.3	6.41	100	58.15	5078.89	0.99	5.91	1000	10893.83	444477.37
88	89	1.5	5.4	0	0	5078.89	1.3	4.7	1000	6125.54	450602.91
89	90	1.9	4.4	0	0	5078.89	1.3	3.5	1000	818.36	451421.27
90	91	2.2	6.4	0	0	5078.89	1.2	5.3	1000	10606.7	462027.97
91	92	1.3	6.8	10	1.47	5080.36	1	5.7	1000	28775.83	490803.8
92	93	1.6	6.1	0	0	5080.36	0.9	5.8	1000	10784.86	501588.66
93	94	1.8	5.5	0	0	5080.36	0.2	5	1000	3865.18	505453.84
94	95	1.5	4.8	0	0	5080.36	1.1	4.2	1000	18204.07	523657.91
95	96	1.9	6.5	0	0	5080.36	1.3	5.4	1000	975.17	524633.08
96	97	1.3	6.8	10	0.26	5080.62	0.8	4.8	1000	4870.63	529503.71
97	98	1.6	6.5	15	0.25	5080.87	1	5.1	1000	1714.19	531217.9
98	99	0.9	4.6	150	261.23	5342.1	0.8	3.8	500	314.08	531531.98
99	100	0.7	3.9	200	252.98	5595.08	0.3	3.8	1000	6936.76	538468.74
100	101	1.5	5.4	0	0	5595.08	0.9	4.3	1000	32011.49	570480.23
101	102	1.4	6.2	0	0	5595.08	0.5	5.2	1000	28464.84	598945.07
102	103	1.3	3.7	250	303.48	5898.56	0.6	3	1000	54856.85	653801.92
103	104	1.3	4.4	150	183.82	6082.38	0.6	3.9	1000	44517.88	698319.8
104	105	1.39	5.31	250	249.72	6332.1	0.79	4.91	1000	30778.52	729098.32
105	106	1.2	4.7	25	10.32	6342.42	0.4	3.7	1000	16604.73	745703.05
106	107	1.3	6.4	100	63.93	6406.35	0.4	6	700	816.94	746519.99
107	108	1.2	6.8	150	54.64	6460.99	0.8	6.1	1000	4901.79	751421.78
108	109	1.5	6.9	0	0	6460.99	0.8	6.2	1000	16216.72	767638.5
109	110	1.4	3	0	0	6460.99	0.6	2.6	1000	13223.7	780862.2

Class-II											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
110	111	2.09	3.21	0	0	6460.99	1.09	2.41	1000	234.14	781096.34
111	112	0.9	3.6	250	391.97	6852.96	0.1	1.2	1000	18538.08	799634.42
112	113	1.4	6.5	0	0	6852.96	0.7	5.8	1000	14949.19	814583.61
113	114	1.69	4.51	0	0	6852.96	0.29	3.61	1000	16848.09	831431.7
114	115	1.4	6.4	200	105.78	6958.74	1.2	6.1	1000	11729.89	843161.59
115	116	1.4	6	200	341.75	7300.49	1	5.4	1000	46650.37	889811.96
116	117	0.7	4.8	1000	1517.91	8818.4	0.3	4	1000	47987.85	937799.81
117	118	1.7	12.4	0	0	8818.4	0.9	11.4	1000	12803.55	950603.36
118	119	1.3	4.8	100	1.64	8820.04	0.9	3.6	1000	21492.2	972095.56
119	120	2.09	3.21	0	0	8820.04	0.29	2.71	1000	16355.91	988451.47
120	121	2.09	5.21	0	0	8820.04	0.69	4.31	1000	19966.93	1008418.4
121	122	1.3	4.4	100	37.27	8857.31	0.9	3.6	1000	16184.62	1024603
122	123	1.99	4.21	0	0	8857.31	0.99	3.41	1000	16759.26	1041362.3
123	124	1.2	11.6	700	772.46	9629.77	1	11	1000	6766.12	1048128.4
124	125	1.3	3.6	10	18.29	9648.06	0.6	2.4	1000	13842.78	1061971.2
125	126	1.2	6.7	1000	1414.65	11062.71	0.8	5.7	1000	14358.2	1076329.4
126	127	0.8	4.4	1000	11910.86	22973.57	0.3	3.4	1000	73854.29	1150183.7
127	128	1	3.7	200	285.52	23259.09	0.7	3.4	1000	28542.92	1178726.6
128	129	0.99	3.51	1000	4316.34	27575.43	0.69	3.11	1000	50320.46	1229047.1
129	130	1	2.8	250	377.09	27952.52	0.8	2.2	1000	42254.57	1271301.6
130	130.59	0.7	2.6	1000	1782.37	29734.89	0.2	1.7	1000	21210.83	1292512.5
Total				10480	29734.89		Total		98830	1292512.5	

Table 19 - Minimum & Maximum depth per km wise (Class II)

Class-III:-

Class-III											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
0	1	3.3	10.4	0	0	0	2	8.8	10	1.52	1.52
1	2	6.3	10.1	0	0	0	3.7	9.1	1000	1049.11	1050.63
2	3	5.58	9.62	0	0	0	4.38	8.72	0	4.12	1054.75
3	4	6.46	9.44	0	0	0	1.28	8.64	150	35.49	1090.24
4	5	5.1	7.7	0	0	0	4	7	0	0	1090.24
5	6	2.8	9	0	0	0	2	8.2	0	0	1090.24
6	7	3.5	9.7	0	0	0	2.8	9.3	0	0	1090.24
7	8	4.1	7.9	0	0	0	1.6	6.4	500	719.64	1809.88
8	9	4.48	10.22	0	0	0	1.19	8.92	150	119.8	1929.68
9	10	4.9	9.7	0	0	0	1.1	9.2	1000	2007.88	3937.56
10	11	4.1	7.8	0	0	0	1.1	6.4	1000	1901.74	5839.3
11	12	2.9	8.4	0	0	0	1	7.3	1000	6534.24	12373.54
12	13	2.9	8	0	0	0	2	6.9	0	0	12373.54
13	14	2.08	9.22	0	0	0	1.68	8.72	1000	1297.63	13671.17
14	15	2.8	9.6	0	0	0	1.4	8.4	1000	8904.11	22575.28
15	16	1.6	12.3	100	174.4	174.4	0.8	11.5	1000	6485.23	29060.51
16	17	2.08	8.42	0	0	174.4	1.18	7.42	1000	2113.57	31174.08
17	18	2	9.4	0	0	174.4	2	8	0	0	31174.08
18	19	2	8.7	0	0	174.4	1.1	7.6	1000	1264.55	32438.63
19	20	1	9.9	1000	1695.52	1869.92	0.5	8.7	1000	14911.92	47350.55
20	21	2	9.4	0	0	1869.92	1	8	1000	1303.14	48653.69
21	22	2	7.5	0	0	1869.92	2	6.4	0	0	48653.69
22	23	2.1	9.8	0	0	1869.92	1.4	8.6	200	213.94	48867.63
23	24	2.9	8.4	0	0	1869.92	1	8.1	160	64.68	48932.31
24	25	2.1	7.5	0	0	1869.92	1.1	6.4	1000	1458.03	50390.34
25	26	1.6	9.4	200	118.61	1988.53	1.2	8.9	1000	1472.7	51863.04
26	27	1.4	9.7	300	468.82	2457.35	1	8.5	1000	8337.74	60200.78
27	28	2.3	7.42	0	0	2457.35	1.58	6.32	500	585.71	60786.49
28	29	2	9.5	0	0	2457.35	1.1	8.3	1000	1671.24	62457.73
29	30	2	7.2	0	0	2457.35	2	6.2	0	0	62457.73
30	31	2	8.7	0	0	2457.35	0.8	8.3	1000	2397.38	64855.11
31	32	2.3	7.8	0	0	2457.35	0.2	6.8	1000	4493.73	69348.84

Class-III											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
32	33	2.1	7.6	0	0	2457.35	0.8	7.1	1000	7929.82	77278.66
33	34	1.48	7.52	160	54.96	2512.31	1.18	6.82	1000	786.23	78064.89
34	35	1.7	4.4	0	0	2512.31	0.2	3.8	1000	5330.51	83395.4
35	36	1.8	8.4	150	109.41	2621.72	1.1	7.3	1000	6080.37	89475.77
36	37	2.28	10.32	0	0	2621.72	1.18	9.82	1000	8430.88	97906.65
37	38	2.2	6	0	0	2621.72	0.8	5.1	1000	3898.86	101805.51
38	39	2.1	6.6	0	0	2621.72	0.4	5.4	1000	6082.62	107888.13
39	40	1.2	6.7	10	9.63	2631.35	0.5	5.7	1000	16998.38	124886.51
40	41	2.1	7.6	0	0	2631.35	1.3	6.4	1000	12997.01	137883.52
41	42	2	7.9	0	0	2631.35	0.1	6.5	1000	8629.07	146512.59
42	43	1.6	6.22	300	292.82	2924.17	0.68	3.22	1000	21463.51	167976.1
43	44	2.18	8.42	0	0	2924.17	0.98	7.12	1000	14910.72	182886.82
44	45	1.4	4.7	10	6.76	2930.93	0.5	3.7	1000	7306.47	190193.29
45	46	1.68	8.22	10	7.11	2938.04	0.48	7.12	1000	8944.36	199137.65
46	47	2	7.6	0	0	2938.04	0.8	7.3	1000	2016.26	201153.91
47	48	2.1	5.22	0	0	2938.04	1.28	4.82	1000	1134.87	202288.78
48	49	2.1	4.8	0	0	2938.04	1.1	4	700	517.69	202806.47
49	50	1.4	5.3	150	126.08	3064.12	0.3	3.4	1000	15196.6	218003.07
50	51	0.8	5.7	1000	3905.48	6969.6	0.2	3.6	1000	47474.06	265477.13
51	52	1.5	8.4	300	528.26	7497.86	0.6	7.6	1000	10420.97	275898.1
52	53	1.6	7.5	200	212.79	7710.65	0.1	5.7	1000	33246.03	309144.13
53	54	2.08	5.12	0	0	7710.65	1.28	4.62	1000	5851.59	314995.72
54	55	1.9	6.5	0	0	7710.65	0.8	5.3	1000	6783.09	321778.81
55	56	2.2	5.7	0	0	7710.65	0.9	4.8	1000	3023.15	324801.96
56	57	2	6.4	0	0	7710.65	1	5.2	1000	1792.94	326594.9
57	58	2.1	3.7	0	0	7710.65	0.8	3.1	1000	6595.45	333190.35
58	59	2.2	4.3	0	0	7710.65	1	3.8	1000	1500.99	334691.34
59	60	2	6.32	0	0	7710.65	1.18	5.82	1000	4649.87	339341.21
60	61	2.1	5.2	0	0	7710.65	0.9	4.4	1000	1107.76	340448.97
61	62	1	7.6	1000	2495.35	10206	0.4	7.5	1000	34063.77	374512.74
62	63	2.18	7.42	150	132.05	10338.05	1.48	6.72	1000	4383.91	378896.65
63	64	1.9	6.5	160	191.62	10529.67	1	5.3	1000	3627.74	382524.39
64	65	1.8	6.6	1000	1158.41	11688.08	0.1	6.3	1000	14763.2	397287.59
65	66	2.28	11.42	0	0	11688.08	1.28	10.42	1000	2215.4	399502.99
66	67	1.9	6.4	0	0	11688.08	1	5.5	1000	5875.04	405378.03
67	68	1.2	7.8	260	408.25	12096.33	0.8	7.2	1000	10187.85	415565.88
68	69	2.1	4.8	0	0	12096.33	0.8	4.1	1000	9366.36	424932.24
69	70	2	4.4	0	0	12096.33	1.3	3.8	500	211.46	425143.7

Class-III											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
70	71	1.7	6	150	41.83	12138.16	0.6	3.6	1000	14364.7	439508.4
71	72	1.8	6.4	170	52.32	12190.48	0.5	5.3	1000	26178.97	465687.37
72	73	1.7	4.9	0	0	12190.48	0.2	3.5	1000	4800.52	470487.89
73	74	1.6	6.4	200	402.28	12592.76	0.9	4.4	1000	28054.83	498542.72
74	75	2.1	6.8	0	0	12592.76	0.6	3.9	1000	19566.74	518109.46
75	76	1.78	5.42	0	0	12592.76	0.68	3.22	1000	29438.6	547548.06
76	77	1.8	5.1	100	69.52	12662.28	0.8	3.4	1000	28765.54	576313.6
77	78	0.6	4.9	1000	5452.66	18114.94	0.1	3.9	1000	89319.76	665633.36
78	79	1.7	4.7	0	0	18114.94	0.6	3.7	1000	11579.7	677213.06
79	80	1.9	3.4	0	0	18114.94	0.8	3	1000	16770.14	693983.2
80	81	1.3	6.4	400	399.81	18514.75	0.6	5.8	1000	10907.5	704890.7
81	82	1.58	5.62	150	86.54	18601.29	1.18	5.32	1000	7436.51	712327.21
82	83	1.8	5.6	0	0	18601.29	0.9	4.5	1000	6674.51	719001.72
83	84	1.6	6.6	200	259.45	18860.74	0.6	5.4	1000	9040.58	728042.3
84	85	1.6	6.22	1000	953.59	19814.33	0.88	5.32	1000	31129.89	759172.19
85	86	1.5	5.4	200	23.42	19837.75	1	4.5	1000	23348.66	782520.85
86	87	1.3	5	20	31.41	19869.16	0.8	4.2	1000	4714.26	787235.11
87	88	1.29	6.42	1000	1179.42	21048.58	0.98	5.92	1000	20363.25	807598.36
88	89	1.4	5.5	260	360.24	21408.82	1.2	4.8	1000	13367.74	820966.1
89	90	1.8	4.6	0	0	21408.82	1.1	3.7	1000	3000.14	823966.24
90	91	1.6	6.5	10	9.99	21418.81	1.1	5.4	1000	17443.81	841410.05
91	92	1.2	6.9	1000	1331.16	22749.97	0.9	5.8	1000	30742.69	872152.74
92	93	1.4	6.3	700	510.88	23260.85	0.7	6	1000	13407.09	885559.83
93	94	1.5	5.6	1000	1141.01	24401.86	0.1	5.1	1000	15646.61	901206.44
94	95	1.4	4.9	170	142.86	24544.72	1	4.3	1000	24772.55	925978.99
95	96	1.5	6.7	160	126.21	24670.93	1.1	5.6	1000	3477.83	929456.82
96	97	1	7.1	1000	1705.99	26376.92	0.5	5.1	1000	17029.55	946486.37
97	98	1.5	6.6	800	745.17	27122.09	0.9	5.2	1000	12899.19	959385.56
98	99	0.8	4.7	1000	950.05	28072.14	0.7	3.9	1000	6514.02	965899.58
99	100	0.5	4.1	1000	1879.02	29951.16	0.1	4	1000	14804.43	980704.01
100	101	1.4	5.5	180	149.07	30100.23	0.8	4.4	1000	40528.84	1021232.9
101	102	1.3	6.3	600	455.72	30555.95	0.4	5.3	1000	30731.23	1051964.1
102	103	1.2	3.8	1000	5358.02	35913.97	0.5	3.1	1000	58330.89	1110295
103	104	1.1	4.6	1000	2469.07	38383.04	0.4	4.1	1000	49026.77	1159321.7
104	105	1.38	5.32	1000	2162.01	40545.05	0.78	4.92	1000	34804.71	1194126.5
105	106	1.1	4.8	1000	2034.41	42579.46	0.3	3.8	1000	25412.17	1219538.6
106	107	1.1	6.6	1000	1985.67	44565.13	0.2	6.2	1000	18275.42	1237814
107	108	1	7	1000	1566	46131.13	0.6	6.3	1000	22179.83	1259993.9

Class-III											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
108	109	1.3	7.1	400	301.06	46432.19	0.6	6.4	1000	22851.77	1282845.6
109	110	1.3	3.1	270	222.71	46654.9	0.5	2.7	1000	24210.94	1307056.6
110	111	2.08	3.22	0	0	46654.9	1.08	2.42	1000	7065.45	1314122
111	112	0.8	3.7	1000	1597.73	48252.63	0.1	1.3	1000	45384.05	1359506.1
112	113	1.3	6.6	700	514.28	48766.91	0.6	5.9	1000	24235.46	1383741.5
113	114	1.68	4.52	1000	1876.11	50643.02	0.28	3.62	1000	28531.19	1412272.7
114	115	1.2	6.6	1000	925.23	51568.25	1	6.3	1000	28851.37	1441124.1
115	116	1.3	6.1	1000	3653.13	55221.38	0.9	5.5	1000	50478.46	1491602.6
116	117	0.5	5	1000	7186.74	62408.12	0.1	4.2	1000	56894.66	1548497.2
117	118	1.6	12.5	1000	678.22	63086.34	0.8	11.5	1000	23522.57	1572019.8
118	119	1.1	5	1000	1583.34	64669.68	0.7	3.8	1000	29265.84	1601285.6
119	120	1.5	3.22	1000	870.65	65540.33	0.28	2.72	1000	23208.43	1624494.1
120	121	1.6	5.22	1000	783.9	66324.23	0.68	4.32	1000	31652.61	1656146.7
121	122	1.1	4.6	1000	1813.3	68137.53	0.7	3.8	1000	36342.02	1692488.7
122	123	1.5	4.22	200	126.59	68264.12	0.98	3.42	1000	28811.34	1721300
123	124	1.1	11.7	1000	5432.34	73696.46	0.9	11.1	1000	50515.59	1771815.6
124	125	1.1	3.8	1000	1565.98	75262.44	0.4	2.6	1000	33881.64	1805697.3
125	126	1	6.9	1000	7635.12	82897.56	0.6	5.9	1000	65701.54	1871398.8
126	127	0.6	4.6	1000	25394.34	108291.9	0.1	3.6	1000	122184.45	1993583.3
127	128	0.9	3.8	1000	3502.51	111794.41	0.6	3.5	1000	62472.31	2056055.6
128	129	0.98	3.52	1000	12125.72	123920.13	0.68	3.12	1000	82449.57	2138505.1
129	130	0.9	2.9	1000	4040.11	127960.24	0.7	2.3	1000	76964.87	2215470
130	130.59	0.6	2.7	1000	4155.62	132115.86	0.1	1.8	1000	34678.7	2250148.7
Total				44500	132115.86		Total		116870	2250148.7	

Table 20 - Minimum & Maximum depth per km wise (Class III)

Class - IV:-

Class-IV											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
0	1	3.2	10.5	0	0	0	1.9	8.9	200	177.52	177.52
1	2	6.1	10.3	0	0	0	3.5	9.3	1000	3526.22	3703.74
2	3	5.57	9.63	0	0	0	4.37	8.73	260	207.23	3910.97
3	4	6.44	9.46	0	0	0	1.26	8.66	150	35.5	3946.47
4	5	5	7.8	0	0	0	3.9	7.1	0	0	3946.47
5	6	2.6	9.2	0	0	0	1.8	8.4	150	40.66	3987.13
6	7	3.2	10	0	0	0	2.5	9.6	160	18.27	4005.4
7	8	4	8	0	0	0	1.5	6.5	1000	2296.36	6301.76
8	9	4.47	10.23	0	0	0	1.18	8.93	1000	748.84	7050.6
9	10	4.7	9.9	0	0	0	0.9	9.4	1000	2010.95	9061.55
10	11	4	7.9	0	0	0	1	6.5	1000	2021.07	11082.62
11	12	2.8	8.5	0	0	0	0.9	7.4	1000	7057.79	18140.41
12	13	2.8	8.1	0	0	0	2	7	0	0	18140.41
13	14	2.07	9.23	0	0	0	1.67	8.73	1000	2909.26	21049.67
14	15	2.6	9.8	0	0	0	1.2	8.6	1000	17023.6	38073.27
15	16	1.5	12.4	400	494.56	494.56	0.7	11.6	1000	11134.9	49208.17
16	17	2.07	8.43	0	0	494.56	1.17	7.43	1000	3042.54	52250.71
17	18	2	9.5	0	0	494.56	2	8.1	0	0	52250.71
18	19	2	8.9	0	0.15	494.71	0.9	7.8	1000	2898.27	55148.98
19	20	0.7	10.2	1000	2597.18	3091.89	0.2	9	1000	19113.07	74262.05
20	21	2	9.5	0	0	3091.89	0.9	8.1	1000	2707.6	76969.65
21	22	2	7.6	0	0	3091.89	2	6.5	0	0	76969.65
22	23	2.1	10	0	0	3091.89	1.2	8.8	1000	1221.76	78191.41
23	24	2.9	8.5	0	0	3091.89	0.9	8.2	200	279.16	78470.57
24	25	2.1	7.6	0	0	3091.89	1	6.5	1000	1841.38	80311.95
25	26	1.5	9.5	400	366.8	3458.69	1.1	9	1000	3731.52	84043.47
26	27	1.2	9.9	1000	1142.61	4601.3	0.8	8.7	1000	14622.51	98665.98
27	28	2.3	7.43	0	0	4601.3	1.57	6.33	1000	2437.09	101103.07
28	29	2	9.6	0	0	4601.3	1	8.4	1000	1793.3	102896.37
29	30	2	7.4	0	0	4601.3	2	6.4	0	0	102896.37

Class-IV											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
30	31	2	8.9	0	0	4601.3	0.6	8.5	1000	3412.3	106308.67
31	32	2.3	8	0	0	4601.3	0.1	7	1000	5868.65	112177.32
32	33	2.1	7.7	0	0	4601.3	0.7	7.2	1000	12967.4	125144.72
33	34	1.47	7.53	200	168.88	4770.18	1.17	6.83	1000	1828.34	126973.06
34	35	1.6	4.5	0	0.14	4770.32	0.1	3.9	1000	8006.93	134979.99
35	36	1.7	8.5	400	309.96	5080.28	1	7.4	1000	6792.33	141772.32
36	37	2.27	10.33	0	0.02	5080.3	1.17	9.83	1000	11358.39	153130.71
37	38	2.2	6.2	0	0	5080.3	0.6	5.3	1000	4026.37	157157.08
38	39	2.1	6.7	0	0	5080.3	0.3	5.5	1000	7933.57	165090.65
39	40	1	6.9	500	285.94	5366.24	0.3	5.9	1000	24809.69	189900.34
40	41	2.1	7.7	0	0	5366.24	1.2	6.5	1000	14337.99	204238.33
41	42	2	8.1	0	0	5366.24	0.1	6.7	1000	10191.52	214429.85
42	43	1.59	6.23	700	822.39	6188.63	0.67	3.23	1000	26977.25	241407.1
43	44	2.17	8.43	0	0	6188.63	0.97	7.13	1000	25257.5	266664.6
44	45	1.2	4.9	200	96.44	6285.07	0.3	3.9	1000	16077.72	282742.32
45	46	1.67	8.23	150	101.7	6386.77	0.47	7.13	1000	15529.1	298271.42
46	47	2	7.8	0	0	6386.77	0.6	7.5	1000	2978.75	301250.17
47	48	2.1	5.23	0	0	6386.77	1.27	4.83	1000	4842.53	306092.7
48	49	2.1	5.1	0	0	6386.77	0.8	4.3	1000	1951.98	308044.68
49	50	1.3	5.4	300	476.8	6863.57	0.2	3.5	1000	22163.46	330208.14
50	51	0.6	5.9	1000	5828.49	12692.06	0.1	3.8	1000	56833.72	387041.86
51	52	1.4	8.5	600	888.05	13580.11	0.5	7.7	1000	12384.94	399426.8
52	53	1.4	7.7	700	593.99	14174.1	0.1	5.9	1000	40542.22	439969.02
53	54	2.07	5.13	0	0	14174.1	1.27	4.63	1000	8222.36	448191.38
54	55	1.8	6.6	150	91.98	14266.08	0.7	5.4	1000	7821.72	456013.1
55	56	2.2	5.9	0	0	14266.08	0.7	5	1000	5892.03	461905.13
56	57	2	6.5	0	0	14266.08	0.9	5.3	1000	2044.16	463949.29
57	58	2.1	3.8	0	0	14266.08	0.7	3.2	1000	11692.01	475641.3
58	59	2.2	4.4	0	0	14266.08	0.9	3.9	1000	1972.79	477614.09
59	60	2	6.33	0	0	14266.08	1.17	5.83	1000	5415.93	483030.02
60	61	2.1	5.4	0	0	14266.08	0.7	4.6	1000	3433.48	486463.5
61	62	0.9	7.7	1000	4319.34	18585.42	0.3	7.6	1000	43259.16	529722.66
62	63	2.17	7.43	250	349.31	18934.73	1.47	6.73	1000	9628.24	539350.9
63	64	1.8	6.6	300	364.37	19299.1	0.9	5.4	1000	8362.31	547713.21
64	65	1.6	6.8	1000	1952.68	21251.78	0.1	6.5	1000	24449.37	572162.58
65	66	2.27	11.43	0	0	21251.78	1.27	10.43	1000	3746.86	575909.44
66	67	1.8	6.5	0	6.23	21258.01	0.9	5.6	1000	7928.82	583838.26
67	68	1	8	250	888.6	22146.61	0.6	7.4	1000	16370.37	600208.63

Class-IV											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
68	69	2.1	4.9	0	0	22146.61	0.7	4.2	1000	15353.03	615561.66
69	70	2	4.5	0	0	22146.61	1.2	3.9	1000	3507.34	619069
70	71	1.5	6.2	200	255.15	22401.76	0.4	3.8	1000	16055.38	635124.38
71	72	1.7	6.5	300	462.59	22864.35	0.4	5.4	1000	34173.01	669297.39
72	73	1.5	5.1	100	1.66	22866.01	0.1	3.7	1000	7886.38	677183.77
73	74	1.5	6.5	1000	1013.51	23879.52	0.8	4.5	1000	34448.97	711632.74
74	75	2.1	7	0	0	23879.52	0.4	4.1	1000	30866.53	742499.27
75	76	1.77	5.43	200	40.41	23919.93	0.67	3.23	1000	42709.8	785209.07
76	77	1.7	5.2	600	531.66	24451.59	0.7	3.5	1000	36425.46	821634.53
77	78	0.4	5.1	1000	8277.62	32729.21	0.1	4.1	1000	105896.78	927531.31
78	79	1.6	4.8	200	42.22	32771.43	0.5	3.8	1000	15954.23	943485.54
79	80	1.8	3.5	300	26.68	32798.11	0.7	3.1	1000	22234.9	965720.44
80	81	1.2	6.5	400	860.05	33658.16	0.5	5.9	1000	15040.85	980761.29
81	82	1.57	5.63	250	392.72	34050.88	1.17	5.33	1000	16281.37	997042.66
82	83	1.6	5.8	100	1.1	34051.98	0.7	4.7	1000	12615.57	1009658.2
83	84	1.5	6.7	1000	1050.43	35102.41	0.5	5.5	1000	18852.2	1028510.4
84	85	1.59	6.23	1000	1737.77	36840.18	0.87	5.33	1000	38885.11	1067395.5
85	86	1.4	5.5	300	322.73	37162.91	0.9	4.6	1000	27815.01	1095210.6
86	87	1.1	5.2	200	129.52	37292.43	0.6	4.4	1000	11078.13	1106288.7
87	88	1.28	6.43	1000	2170.99	39463.42	0.97	5.93	1000	26568.56	1132857.2
88	89	1.3	5.6	700	736.9	40200.32	1.1	4.9	1000	22811.09	1155668.3
89	90	1.6	4.8	100	16.79	40217.11	0.9	3.9	1000	7441.42	1163109.8
90	91	1.5	6.6	500	365.79	40582.9	1	5.5	1000	26150.75	1189260.5
91	92	1.1	7	1000	2415.07	42997.97	0.8	5.9	1000	33048.54	1222309
92	93	1.2	6.5	1000	1150.4	44148.37	0.5	6.2	1000	20387.06	1242696.1
93	94	1.4	5.7	1000	3254.09	47402.46	0.1	5.2	1000	25999.71	1268695.8
94	95	1.3	5	1000	898.02	48300.48	0.9	4.4	1000	32307.64	1301003.5
95	96	1.3	6.9	300	262.88	48563.36	0.9	5.8	1000	7564.81	1308568.3
96	97	0.7	7.4	1000	3713.21	52276.57	0.2	5.4	1000	27397.86	1335966.1
97	98	1.4	6.7	1000	2068.74	54345.31	0.8	5.3	1000	24493.24	1360459.4
98	99	0.7	4.8	1000	1459.12	55804.43	0.6	4	1000	17794.4	1378253.8
99	100	0.3	4.3	1000	2912.54	58716.97	0.1	4.2	1000	21562.8	1399816.6
100	101	1.3	5.6	1000	1016.51	59733.48	0.7	4.5	1000	46782.89	1446599.5
101	102	1.2	6.4	1000	1016.33	60749.81	0.3	5.4	1000	35024.76	1481624.2
102	103	1.1	3.9	1000	8240.98	68990.79	0.4	3.2	1000	62764.16	1544388.4
103	104	0.9	4.8	1000	5228.21	74219	0.2	4.3	1000	54590.56	1598978.9
104	105	1.37	5.33	1000	3397.69	77616.69	0.77	4.93	1000	39908.85	1638887.8
105	106	1	4.9	1000	3437.4	81054.09	0.2	3.9	1000	35764.33	1674652.1

Class-IV											
Chainage (km)		Observed Dredging Qty.w.r.t Sounding Datum					Reduced Dredging Qty w.r.t. Sounding Datum				
From	To	Min. depth (m)	Max. depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)	Min. Depth (m)	Max. Depth (m)	Length of Shoal (m)	Dredging Qty. (cu.m.)	Cumulative Dredging Qty (cu.m.)
106	107	0.9	6.8	1000	3920.04	84974.13	0.1	6.4	1000	32205.06	1706857.2
107	108	0.8	7.2	1000	2897.08	87871.21	0.4	6.5	1000	34545.96	1741403.1
108	109	1.1	7.3	1000	964.07	88835.28	0.4	6.6	1000	32789.52	1774192.7
109	110	1.2	3.2	1000	507.36	89342.64	0.4	2.8	1000	39533.47	1813726.1
110	111	2.07	3.23	250	157.47	89500.11	1.07	2.43	1000	18363.9	1832090
111	112	0.7	3.8	1000	4532.73	94032.84	0.1	1.4	1000	66913.7	1899003.7
112	113	1.2	6.7	1000	1258.73	95291.57	0.5	6	1000	35729.44	1934733.2
113	114	1.67	4.53	1000	4059.05	99350.62	0.27	3.63	1000	40280.98	1975014.1
114	115	1	6.8	1000	1992.49	101343.11	0.8	6.5	1000	44322.9	2019337
115	116	1.2	6.2	1000	5866.66	107209.77	0.8	5.6	1000	56915.51	2076252.6
116	117	0.3	5.2	1000	11881.12	119090.89	0.1	4.4	1000	66520.81	2142773.4
117	118	1.5	12.6	1000	2536.03	121626.92	0.7	11.6	1000	33137.22	2175910.6
118	119	0.9	5.2	1000	3819.34	125446.26	0.5	4	1000	40215.56	2216126.1
119	120	1.49	3.23	1000	2394.09	127840.35	0.27	2.73	1000	36410.02	2252536.2
120	121	1.59	5.23	1000	2089.89	129930.24	0.67	4.33	1000	44505.6	2297041.8
121	122	0.9	4.8	1000	4042.16	133972.4	0.5	4	1000	54138.86	2351180.6
122	123	1.49	4.23	1000	678.09	134650.49	0.97	3.43	1000	40911.93	2392092.6
123	124	1	11.8	1000	8607.89	143258.38	0.8	11.2	1000	72815.61	2464908.2
124	125	0.9	4	1000	4807.59	148065.97	0.2	2.8	1000	50109.28	2515017.4
125	126	0.8	7.1	1000	11930.71	159996.68	0.4	6.1	1000	91436.7	2606454.1
126	127	0.4	4.8	1000	36379.42	196376.1	0.1	3.8	1000	149468.92	2755923.1
127	128	0.8	3.9	1000	10045.04	206421.14	0.5	3.6	1000	85301.15	2841224.2
128	129	0.97	3.53	1000	20222.13	226643.27	0.67	3.13	1000	103724.35	2944948.6
129	130	0.8	3	1000	11636.9	238280.17	0.6	2.4	1000	99219.33	3044167.9
130	130.6	0.5	2.8	1000	6429.81	244709.98	0.1	1.9	1000	44570.53	3088738.4
Total				58500	244709.98		Total		121120	3088738.4	

Table 21- Minimum & Maximum depth per km wise (Class IV)

Annexure-3 Details of collected Water level of different gauge stations w.r.t. MSL (CWC, Irrigation, Ports, Maritime Boards, Observed stations during survey etc.) – Table indicating Chainage (zero at downstream) and following:-

Date	Tide Pole name	Chainage (km)	Time	T. Reading (m)	Zero of TP w.r.t. MSL (m)	W.L w.r.t. MSL (m)	SD value (m)	Corrected Tide (m)
				A	B	C = A+B	D	E = D-C
19.09.15	GS- (TP)-22	130.524	24 hrs	0.25	6.975	7.225	6.008	-1.217
19.09.15	GS- (TP)-21	120.837	24 hrs	0.28	6.703	6.983	5.797	-1.186
18.09.15	GS -(TP)-20	110.702	24 hrs	0.31	6.55	6.860	5.575	-1.285
18.09.15	GS- (TP)-19	100.322	24 hrs	0.35	6.166	6.516	5.348	-1.168
17.09.15	GS- (TP)-18	100.189	24 hrs	0.40	6.098	6.498	5.345	-1.153
17.09.15	GS -(TP)-17	90.412	24 hrs	0.43	5.857	6.287	5.131	-1.156
16.09.15	GS- (TP)-16	80.076	24 hrs	0.46	5.533	5.993	4.905	-1.088
16.09.15	GS- (TP)-15	70.682	24 hrs	0.48	5.374	5.854	4.699	-1.155
15.09.15	GS- (TP)-14	70.509	24 hrs	0.49	5.332	5.822	4.695	-1.127
15.09.15	GS- (TP)-13	59.981	24 hrs	0.51	5.092	5.602	4.465	-1.137
14.09.15	GS- (TP)-12	59.913	24 hrs	0.55	5.048	5.598	4.463	-1.135
14.09.15	GS - (TP)-11	50.225	24 hrs	0.58	4.933	5.513	4.324	-1.189
13.09.15	GS - (TP)-10	50.202	24 hrs	0.61	4.89	5.500	4.324	-1.176
13.09.15	GS - (TP)-9	41.047	24 hrs	0.65	4.776	5.426	4.291	-1.135
12.09.15	GS - (TP)-8	41.012	24 hrs	0.69	4.723	5.413	4.291	-1.122
12.09.15	GS - (TP)-7	30.178	24 hrs	0.71	4.644	5.354	4.252	-1.102
11.09.15	GS - (TP)-6	30.105	24 hrs	0.75	4.585	5.335	4.251	-1.084
11.09.15	GS - (TP)-5	20.031	24 hrs	0.79	4.512	5.302	4.215	-1.087
10.09.15	GS - (TP)-4	20.024	24 hrs	0.81	4.485	5.295	4.215	-1.080
10.09.15	GS - (TP)-3	10.277	24 hrs	0.83	4.375	5.205	4.180	-1.025
09.09.15	GS - (TP)-2	10.198	24 hrs	0.85	4.348	5.198	4.180	-1.018
09.09.15	GS- (TP)-1	0.295	24 hrs	0.89	4.208	5.098	4.144	-0.954

Table 22- Details of Collected water level at different gauge stations

Annexure-4 Details of Bathymetric surveys carried out:-

Date of Survey	Type of survey	Chainage	
		From (km)	To (km)
09.09.15	Bathymetry Survey	0.00	8.00
10.09.15	Bathymetry Survey	8.00	19.00
11.09.15	Bathymetry Survey	19.00	31.00
12.09.15	Bathymetry Survey	31.00	42.200
13.09.15	Bathymetry Survey	42.200	52.00
14.09.15	Bathymetry Survey	52.00	63.800
15.09.15	Bathymetry Survey	63.800	75.00
16.09.15	Bathymetry Survey	75.00	86.400
17.09.15	Bathymetry Survey	86.400	100.100
18.09.15	Bathymetry Survey	100.100	115.800
19.09.15	Bathymetry Survey	115.800	130.590

Table 23- Details of Bathymetry survey

Annexure-5 Bank Protection along the Bank:-

The River had a tendency to break its boundary. So for this reason some short and as well as long embankments are needed in the both banks of the river. The river at the edge of its end it get more the Embankment and the Bolder pitching are also located for protecting the banks of the river and also prevent for soil erosion. RCC Bridge, Railway Bridge position, Ferry ghat portions are highly protected in this zone of river. Most of the portions of this river are well protected by Boulder pitching and embankment.

Annexure-6 Details of Features across the Bank:-

The bank of the river includes villages, Ferry ghat, Irrigation canals and outlets, Rail Bridges, RCC Bridges etc. The both side river bank are highly protected by embankment and bolder pitching due to flood, erosion etc. The villagers are also situated near the bank side of the river. Recently different kinds of industries are also located near the bank side of the river. Iskon temple at Mayapur, Birth place of sri Chaitanya Dev at Nabadwip, Krishnanagar city are situated near the bank side of the river.

Annexure-7 Detailed methodology adopted for carrying out survey. Horizontal Control and Vertical Details Control:-

- **Establishment of Horizontal Control:-**

The Horizontal control for Topography survey: - High precision RTK DGPS in fix mode using UHF Radio Modem with IHO accuracy standards, with minimum 24 hours observations at some permanent platform/base by the topographic survey Equipments like South (S86T) GNSS RTK, Total Station was used for conducting the topographic survey on UTM Projection at Zone 45 N as directed in the contract specifications.

The Horizontal control for Bathy surveys: - DGPS is receiving corrections from Beacons from the base stations.

- **Establishment of Vertical Control:-**

Vertical control from CP-S-1 is used for the entire survey work. Its value is 9.009 meter w.r.t. MSL has been considered for calculating the vertical levels. Total 14 no. BM was established along the 130.590 km Jalangi River with the reference of CP-S-1 which is situated near Swarupganj Village.

Topography Survey:-

The survey was commenced on 27th August, 2015 and completed on 10th September, 2015. Then the days were autumn season and arrival of winter season. The climate become normal which reached about 20◦ C. Mostly day weather was sunny and was very favorable for the conduct of survey and the weather condition remains same for the entire duration of the survey.

The survey was undertaken as per the line plan provided and the spot level points in the cross line were spaced at 40 m interval. The plotting of the chart was done on UTM Projection at Zone 45 N as directed in the contract specifications. The spot levels along the river were obtained by using Trimble DGPS. The data was post processed using Trimble Business Center to get the precise position and MSL height values of the rover locations. The topographic survey for the entire survey stretch was conducted to collect the following data:-

- Spot levels
-Delineation of Islands
-Fixing of bridges and marks
-Assess the type of river bank
-Extending the vertical and horizontal control throughout the survey area
-Collection of local information along the river Banks

Topographic survey Equipments: South (S86T) GNSS RTK, Total Station was used for conducting the topographic survey.

South RTK (S86T) satellite navigation is a technique used in land survey and in hydrographic survey based on the use of carrier phase measurements of the GPS, GLONASS and / or Galileo signals where a single reference station provides the real-time corrections, providing up to centimeter-level accuracy. When referring to GPS in particular, the system is also commonly referred to as Carrier-Phase Enhancement, CPGPS. RTK systems use a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier that it measured, and the mobile units compare their own phase measurements with the ones received from the base station. There are several ways to transmit a correction signal from base station to mobile station. The most popular way to achieve real-time, low-cost signal transmission is to use a radio modem, typically in the UHF band. This allows the units to calculate their relative position to millimeters, although their absolute position is accurate only to the same accuracy as the position of the base station.

RTK systems are available in dual-frequency and single-frequency versions. Dual-frequency systems deliver greater precision, faster and over longer baselines than single-frequency systems. Leica GS09 & GS12 GNSS RTK that used for the survey contains dual-frequency requires antenna and controller to suit any surveying task with a wide range of functionality. Leica GS09 & GS12 GNSS RTK Rover is extremely light-weight and cable free rover is comfortable to use and withstand even for rough use and topple over. It uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier that it measured, and the mobile units compare their own phase measurements with the ones received from the base station. So, that centimeter level accuracy can be achieved from latitude, longitude and altitude. RTK technique in terms of general navigation, it is perfectly suited to roles like surveying. In this case, the base station is located at a known surveyed location, often a benchmark, and the mobile units can then produce a highly accurate map by taking fixes relative to that point. RTK has also found uses in auto drive/autopilot systems, precision farming and similar roles.

Figure 32- Topography Survey Instruments

- **Bathymetry Survey:-**

The bathymetry survey was carried out using Bathy 500 portable shallow water Echosounder supported by DGPS Beacon Receiver and HYPACK Data collection and processing software. The survey equipment was installed as per the standard procedure the survey vessel equipped with safety gears.

Bathy- 500MF Echosounder: The Bathy- 500MF echosounder is an electronic hydrographic survey instrument used for measuring depths with precision chart recordings and digital data output manufactured by Syqwest Incorporated, USA. The Bathy-500 echo sounding systems are based on the principle that when a sound signal is sent into the water it will be reflected back when it strikes an object. The Bathy-500 is technologically sophisticated, utilizing modern, micro processor based electronics and a thermal chart recorder mechanism. Digital processing enables the instrument to offer fully automatic digitizing capabilities. When interfaced to a NMEA 0183 compatible position sensor, it provides user with a complete, integrated hydrographic survey environment. The instrument front panel consists of a high contrast, backlit four line LCD displays and a fully sealed input keypad. The front panel encompassing system data, status and setup parameters with RS232/RS422 output format. All operating functions are set via the front panel interface. Setup selections are stored within internal, non-volatile memory for instant availability upon power-up. The instrument decodes and processes the NMEA 0183 formatted sentence GGA or GLL from GPS/DGPS using variable Baud rates for communication.

Figure 33- Bathymetry Survey Instruments

Annexure-8 Photographs of Equipment:-

Following equipment was employed for the bathymetric and topographic survey:-

Equipment	Make	Version	Qty Employed
Echo sounder	Bathy MF 500	……	1
Current Meter	AEM 213-D	……	1
Tide Gauge	Manual (Pole type)	-	4
RTK	South S86T		3
GPS Sets	Trimble –Becon Rover SPS 361		1
Software	HYPACK data acquisition	Version 14	1
Software	AUTOCAD	2013	1
Software	Microsoft Office	2013	1

- **Survey vessel :-**

Figure 34- Survey Vessel

- **Positioning System:-**
  - 1 no Trimble DGPS system (SPS361)

Figure 35- DGPS Survey Instrument

- **Navigation & Data Logging System:-**
  - To provide on-line route guidance, log navigation data, provide QC of navigation data, etc. The system comprises the following equipment:
  - 1 no. DELL Laptop
  - 1 no. Hypack version 2014 Navigation & Data Logging Software
  - 1 no. Positioning & sensor interfaces
  - Sufficient Paper Rolls

- **Single Beam Echo Sounder System:-**
  - 1 no. Bathy 500MF multi frequency Echo sounder
  - 1 no. transducer 210 kHz + mounting bracket & base plate

Figure 36- Echo Sounder Instrument

- **Current Meter:-**
  - 1 no. current meter (AEM 213-D) was used during water velocity
  - observation

Figure 37- Current Meter Reading

- **Calibration:-**

All the equipments of Machinery details are attached in **Annexure** portion

Annexure-9 Bench Mark Forms:-

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-1	2589805.724	641254.093	9.009	23°24'43.176"	88°22'56.915"	4.865

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment: 30.08.15

Station Description :-

Benchmark is located near Swarupganj Ghat, beside mud Road. The Bench mark is on the west portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-1 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

West from Road - 8.5 m

South From Electric Post–25 m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

Figure 38- BM Form & Google image view of BM-1

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-2	2592980.475	648497.243	9.465	23°26'24.066"	88°27'13.184"	5.285

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment: 30.08.15

Station Description :-

Benchmark is located near Bahadurpur village, beside mud Road. The Bench mark is on the north portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cm X 30cm X 150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-2 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

North from Road - 6.1m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

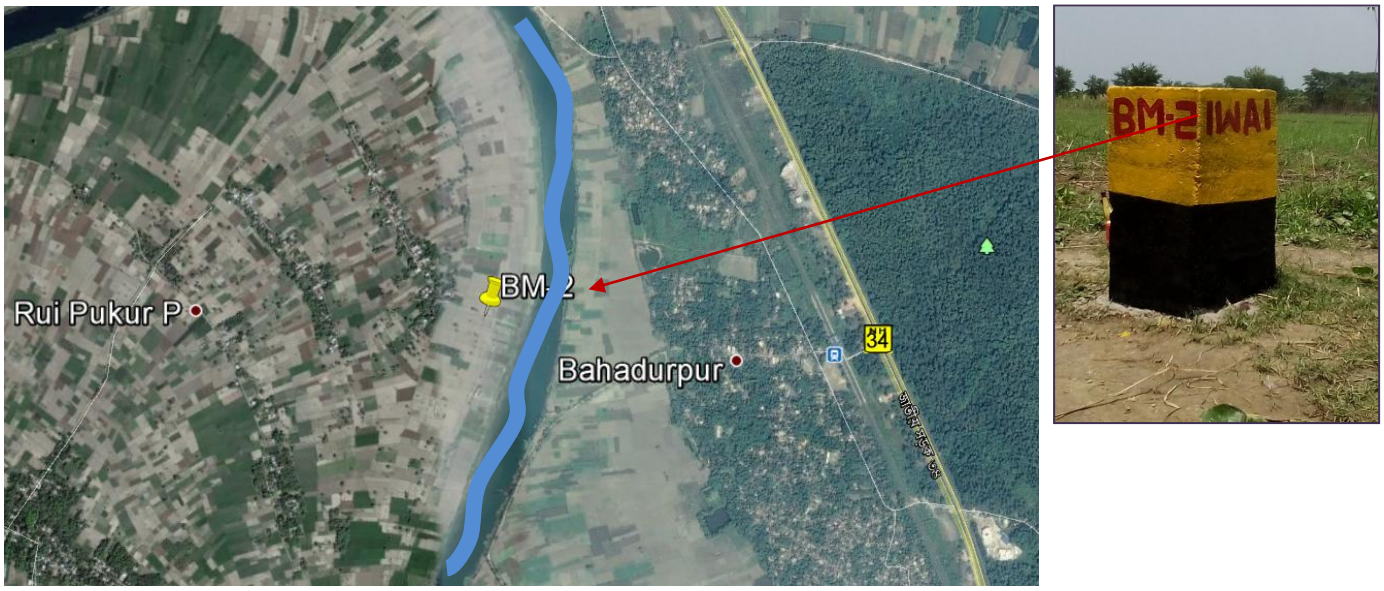


Figure 39- BM Form & Google image view of BM-2

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-3	2590955.106	653835.018	9.865	23°25'16.443"	88°30'20.497"	5.650

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment: 02.09.15

Station Description :-

Benchmark is located near Ghurni Village, beside Mud Road. The Bench mark is on the south portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-3 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

South from Road - 3 m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

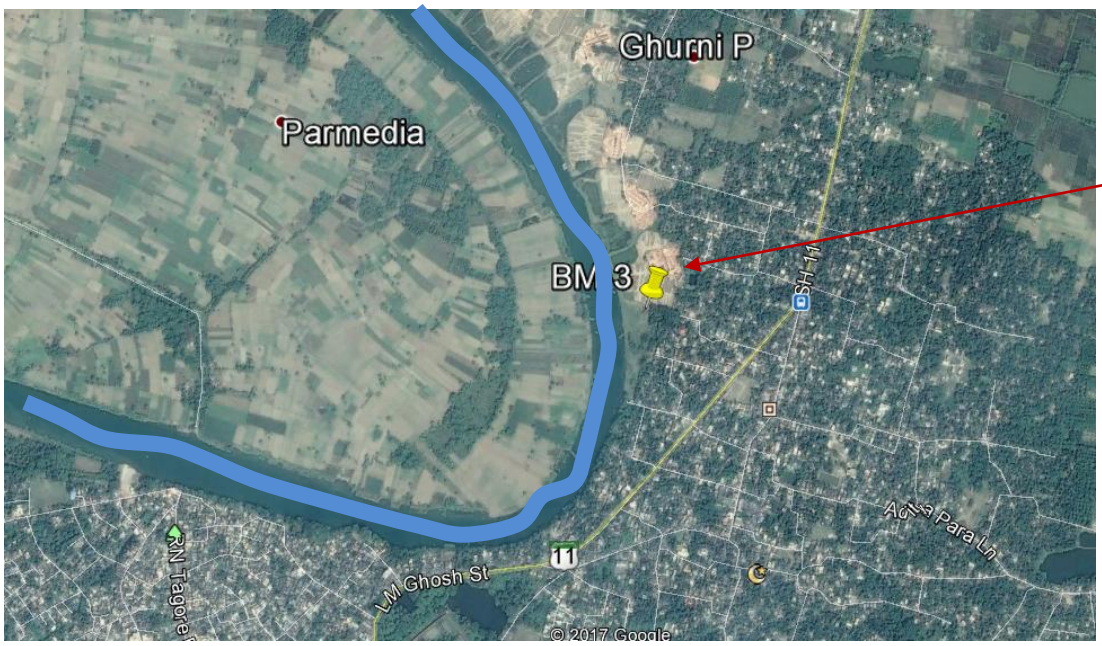


Figure 40- BM Form & Google image view of BM-3

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-4	2594791.96	657291.648	10.03	23°27'19.98"	88°32'23.706"	5.778

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment: 02.09.15

Station Description :-

Benchmark is located near Java village, beside Bituminous Road. The Bench mark is on the south portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-4 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

West from Main Road - 138m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

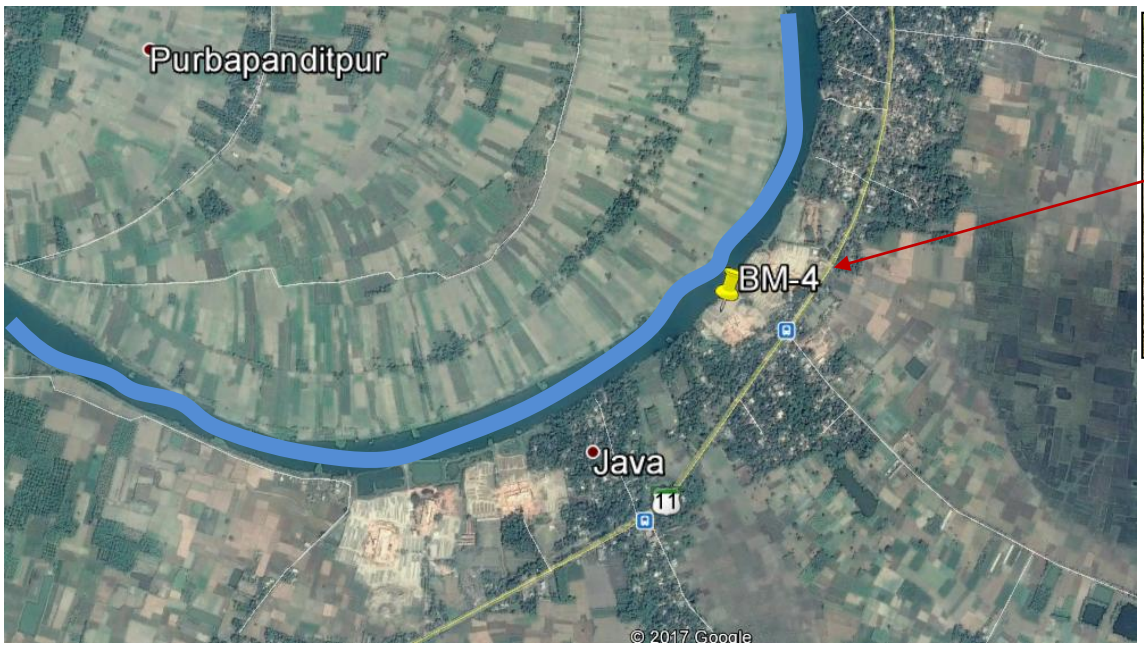


Figure 41-BM Form & Google image view of BM-4

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-5	2597660.602	650937.005	11.711	23°28'55.399"	88°28'40.836"	7.420

Pillar Established by : - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment – 04.09.15

Station Description :-

Benchmark is located near Uttar Jhitkipota village, beside Bituminous Road. The Bench mark is on the North-West corner of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-5 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

SouthEast from Road - 2.5m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

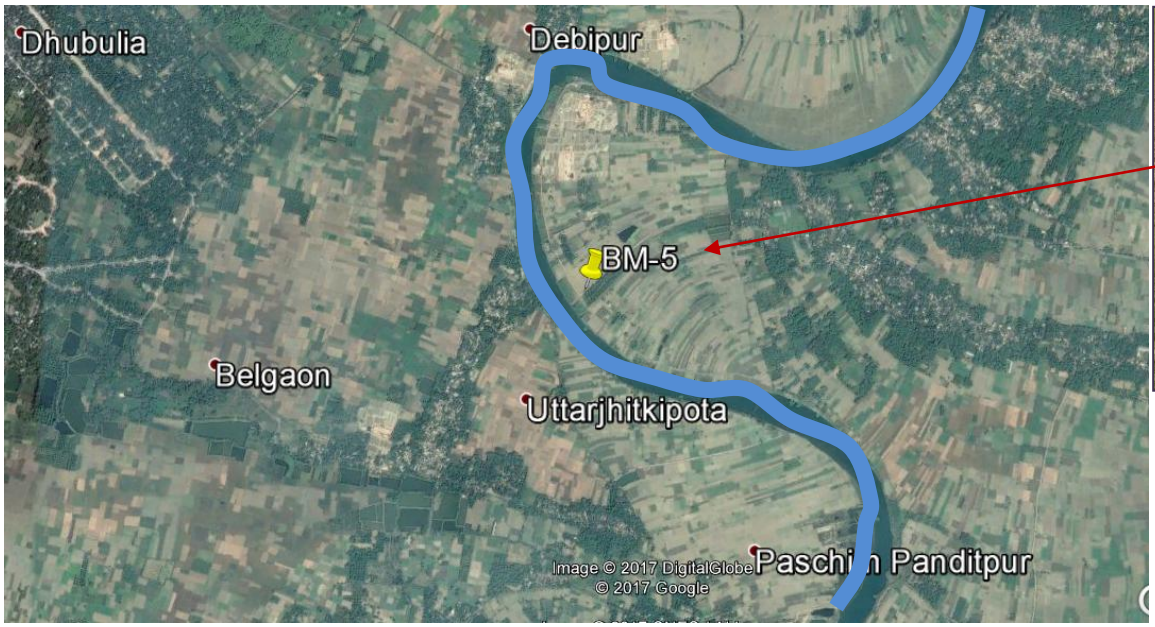


Figure 42-BM Form & Google image view of BM-5

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-6	2599223.48	657247.158	12.435	23°29'44.049"	88°32'23.81"	8.111

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment – 04.09.15

Station Description :-

Benchmark is located near Girimari village, beside of concrete Road. The Bench mark is on the north portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-6 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

North from Mud Road - 2.5m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

Figure 43-BM Form & Google image view of BM-6

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-7	2604487.31	652056.069	12.371	23°32'36.941"	88°29'22.771"	7.910

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment – 04.09.15

Station Description :-

Benchmark is located near Gokhuraputa village, beside project canal site. The Bench mark is on the right bank portion of the river.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-7 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

East from Mud Road - 3.5m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

Figure 44-BM Form & Google image view of BM-7

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-8	2611137.508	655290.853	13.376	23°36'12.011"	88°31'19.317"	8.680

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment: 06.09.15

Station Description :-

Benchmark is located near Teghari village, beside mud Road. The Bench mark is on the North portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cm X 30cm X 150 cm. The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-8 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

North from Mud Road - 2 m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

Figure 45- BM Form & Google image view of BM-8

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-9	2613339.7890	648427.547	12.704	23°37'25.90"	88°27'17.98"	7.800

Pillar Established by : - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment: 06.09.15

Station Description :-

Benchmark is located near Birpur village, beside Mud Road. The Bench mark is on the south of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-9 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

south from Road - 2.5m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

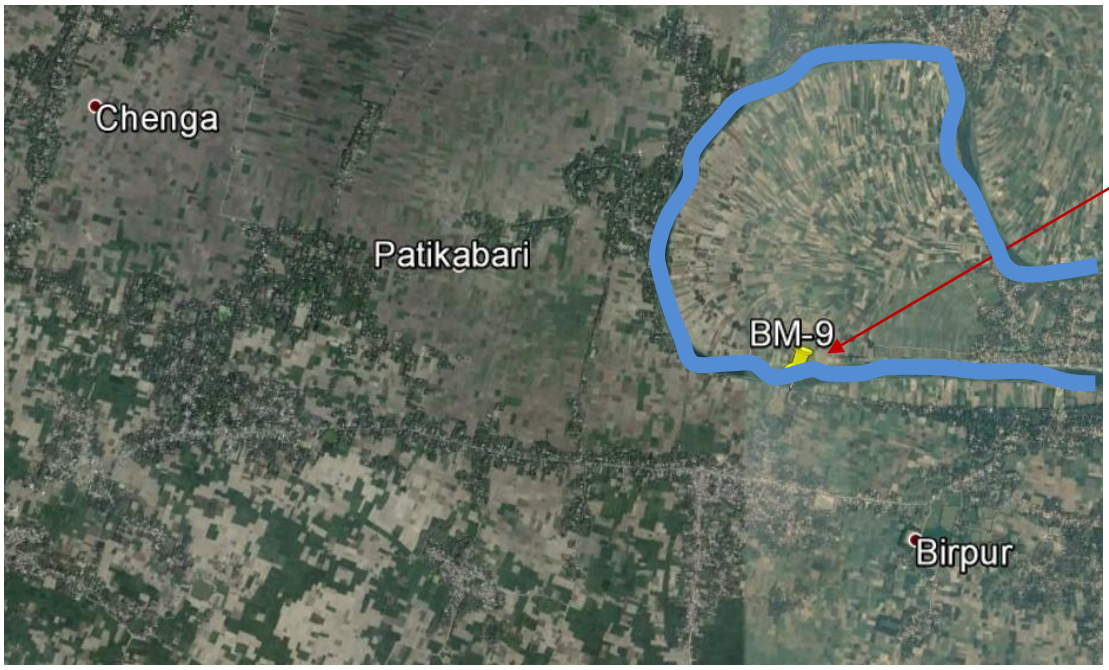


Figure 46-BM Form & Google image view of BM-9

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-10	2615951.605	654452.425	12.917	23°38'48.79"	88°30'51.541"	7.785

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment:07.09.15

Station Description :-

Benchmark is located near Hatishala village, beside the river bank. The Bench mark is on the right bank portion of the canal.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-10 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

North from Earthen Road - 8.5m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

Figure 47-BM Form & Google image view of BM-10

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-11	2622211.988	656214.682	15.252	23°42'11.678"	88°31'56.097"	9.905

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment – 07.09.15

Station Description :-

Benchmark is located near Pashim Chakjalia village, beside SH11 Road. The Bench mark is on the west portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm. The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-11 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

South-West from Road - 4 m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

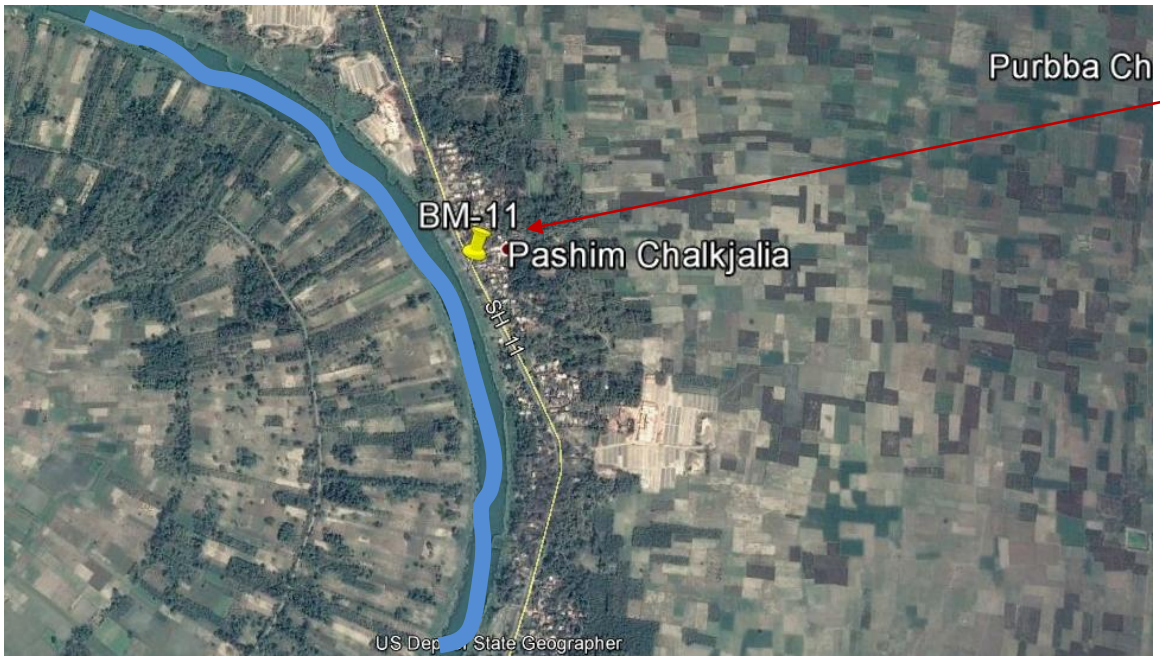


Figure 48-BM Form & Google image view of BM-11

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-12	2624361.096	652481.586	14.628	23°43'22.827"	88°43'45.11"	9.053

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment – 08.09.15

Station Description :-

Benchmark is located near Boyerbanda village, beside the Boyerbandha road. The Bench mark is on the right bank of the river.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-12 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

North from Road - 2 m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

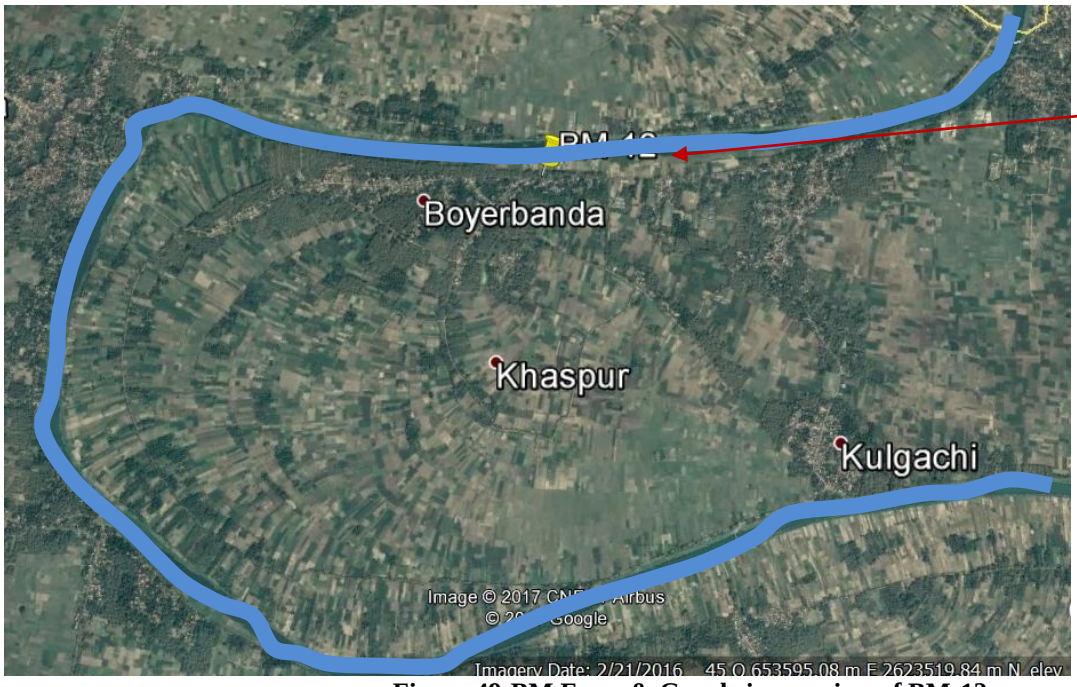


Figure 49-BM Form & Google image view of BM-12

BM Name	Northing (m)	Easting (m)	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-13	2627939.319	649917.539	11.301	23°45'20.011"	88°28'15.886"	5.504

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment – 09.09.15

Station Description :-

Benchmark is located near Iswarchandrapur village, beside mud Road. The Bench mark is on the North-West portion of the road.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-13 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

South-West from Road - 2.5 m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

Figure 50-BM Form & Google image view of BM-13

BM Name	Northing	Easting	BM Heights above M.S.L (m)	Latitude (N)	Longitude (E)	BM Heights above S.D (m)
BM-14	2632345.935	647981.268	15.279	23°47'43.903"	88°27'9.095"	9.271

Pillar Established by: - B.S Geotech Pvt. Ltd. Surveyor – Mr. Bimal Das
Date of Establishment: 09.09.15

Station Description :-

Benchmark is located near PalashiPara village, beside the palashipara bridge (SH14). The Bench mark is on the left bank of the river.

The BM is denoted by a "." mark engraved on a plate. The plate is fixed on a 5cm diameter GI pipe. The GI pipe is cemented with construction pillar of 30cmX30cmX150cm.The pillar extends 60.cms above ground level. Inscription "IWAI", and BM-14 No. can be seen on the face of the pillar.

The measurements of the bench mark pillar from notable locations / edges as follows:

North -West from (SH 14) Palashipara bridge – 65 m

Life of Station : 15Yrs	Datum: - WGS 84	**ZONE :** 45N

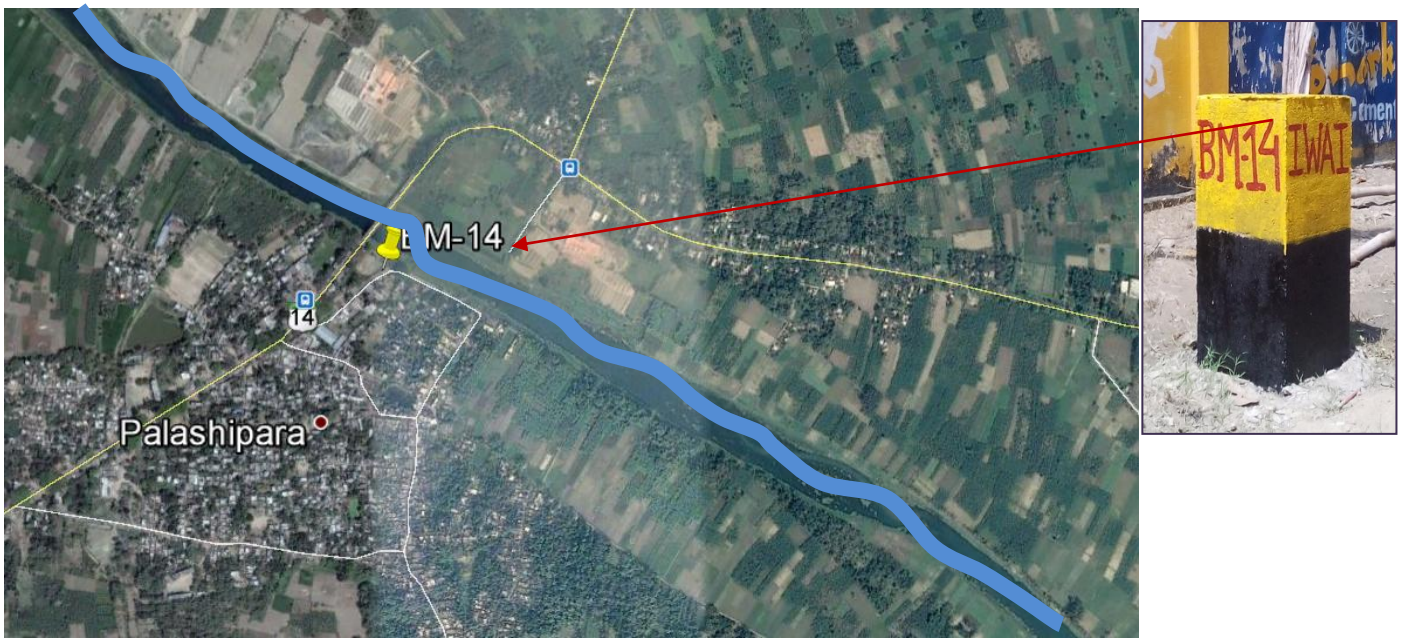
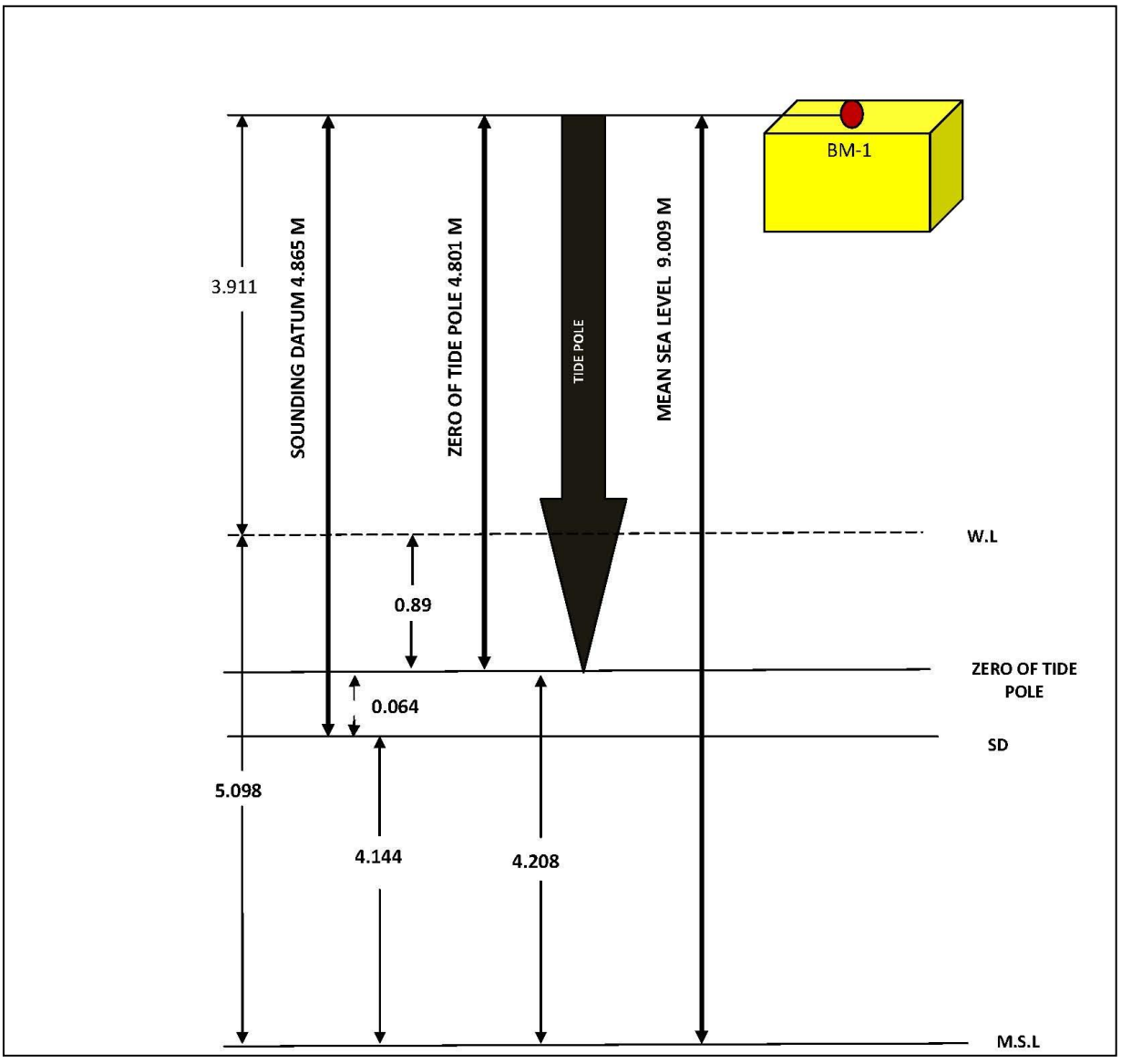


Figure 51-BM Form & Google image view of BM-14

Annexure-10 Levelling Calculation and Levelling Diagram:-

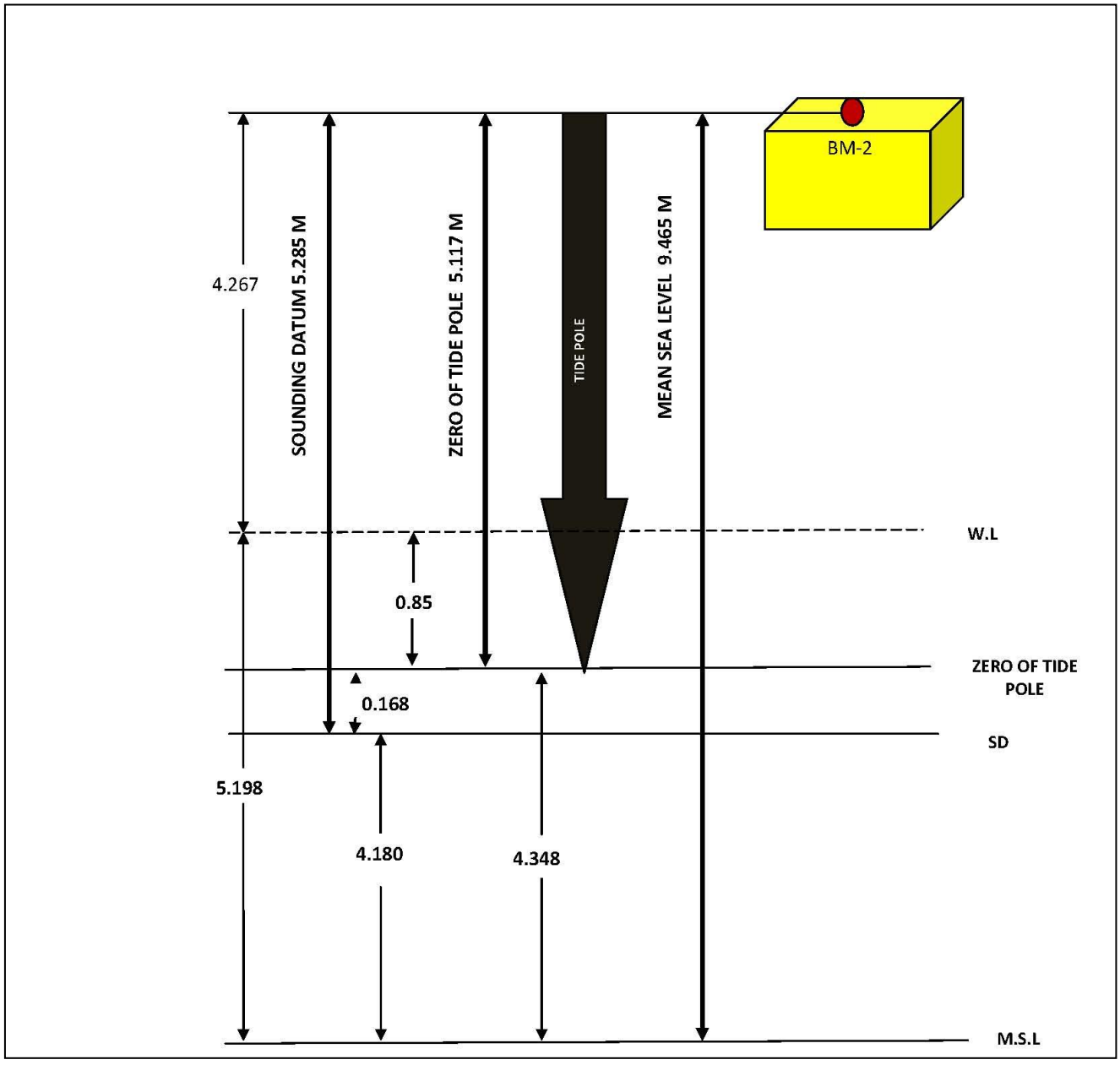
Levelling from BM-1 to GS-1

BS	IS	FS	RISE (+)	FALL (-)	RL (m)	REMARKS
0.855					9.009	BM-1
0.425		1.680		0.825	8.184	
0.635		1.500		1.075	7.109	
0.545		1.765		1.130	5.979	
		1.426		0.881	5.098	GS-1



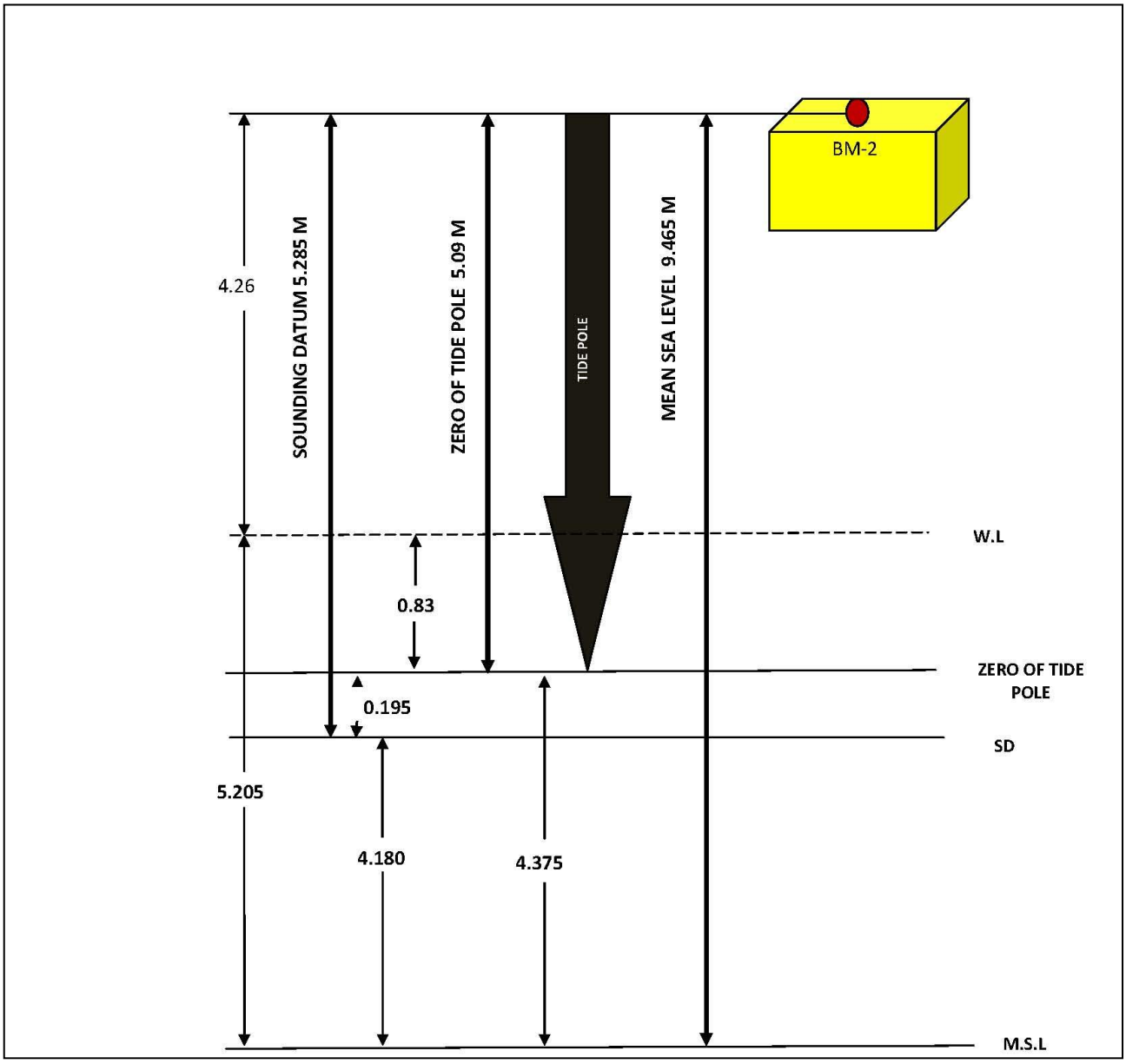
Levelling from BM-2 to GS-2

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.665					9.465	BM-2
0.525		1.388		0.723	8.742	
0.635		1.680		1.155	7.587	
0.345		1.420		0.785	6.802	
		1.949		1.604	5.198	GS-2



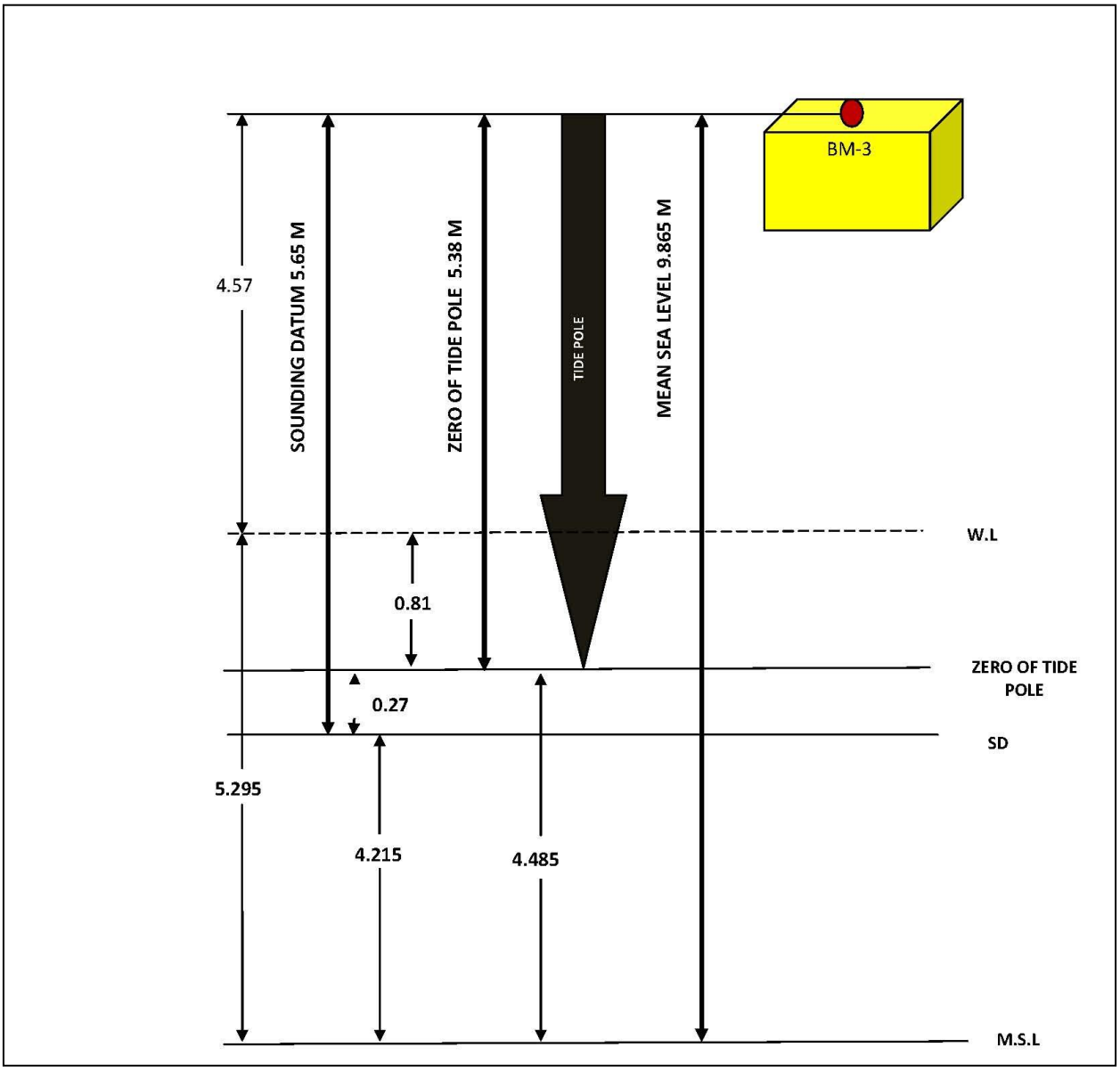
Levelling from BM-2 to GS-3

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.545					9.465	BM-2
0.384		1.550		1.005	8.460	
0.882		1.335		0.951	7.509	
0.458		1.684		0.802	6.707	
		1.960		1.502	5.205	GS-3



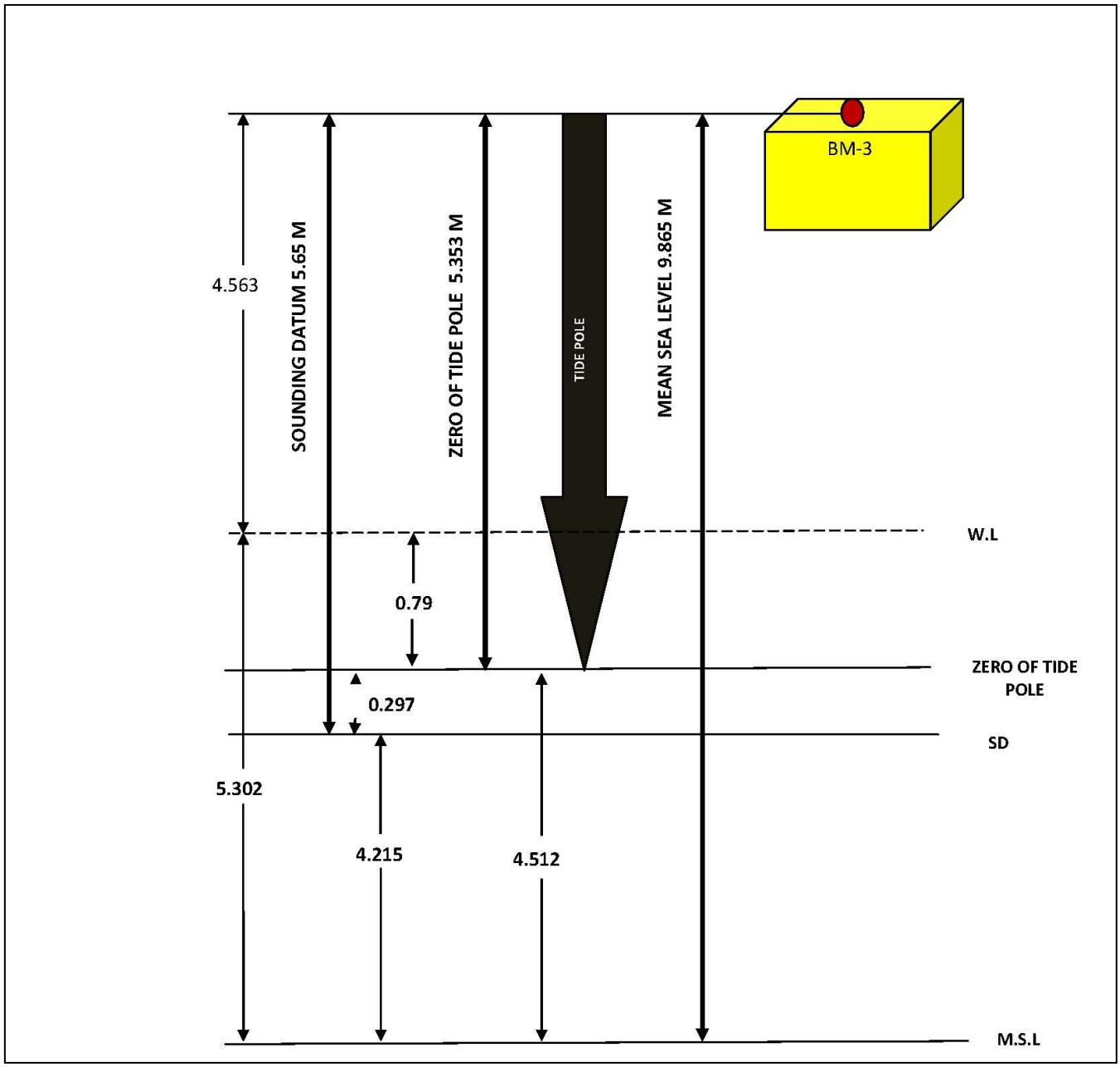
Levelling from BM-3 to GS-4

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.635					9.865	BM-3
0.495		1.677		1.042	8.823	
0.552		1.528		1.033	7.790	
0.485		1.850		1.298	6.492	
		1.682		1.197	5.295	GS-4



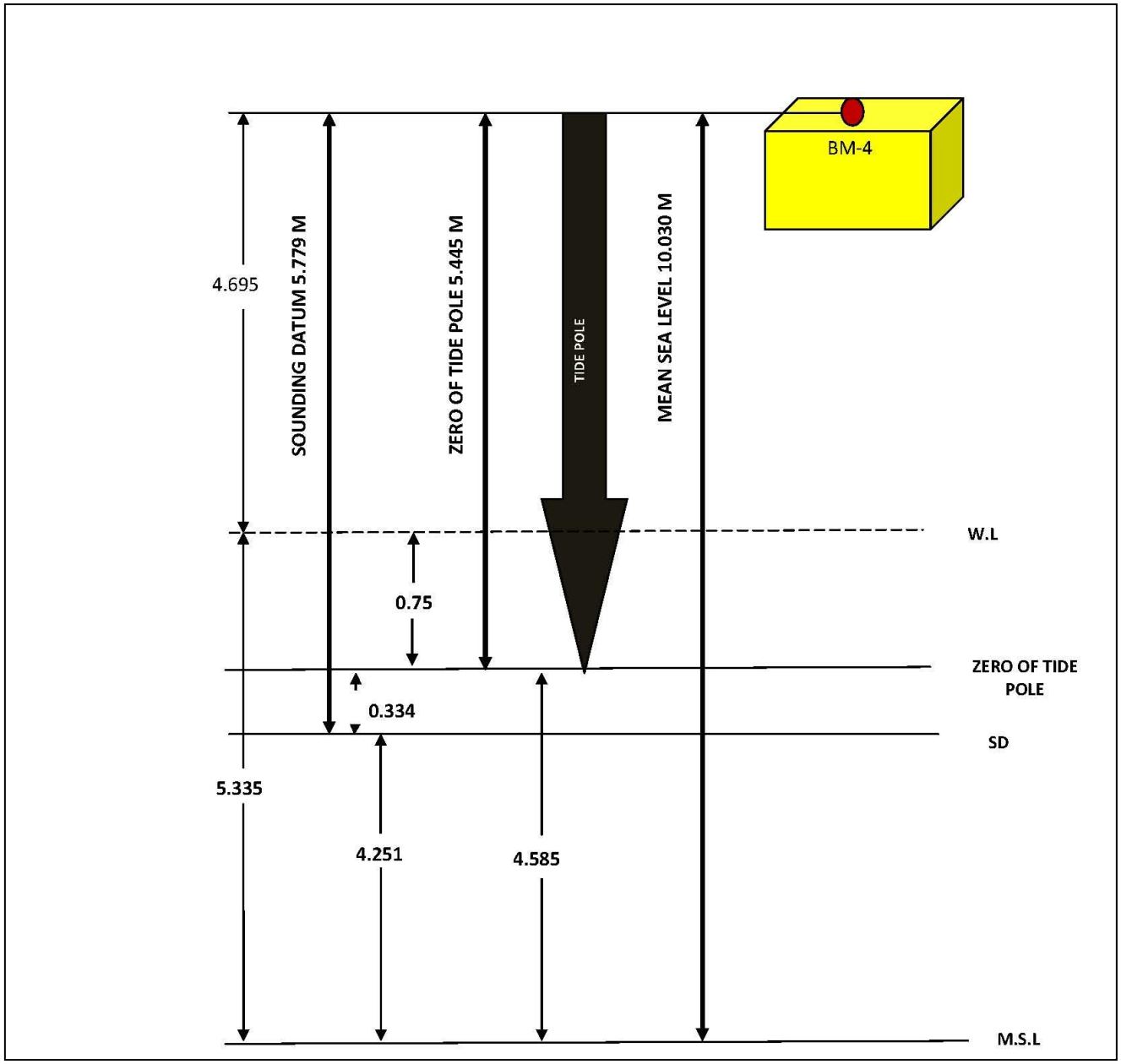
Levelling from BM-3 to GS-5

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.385					9.865	BM-3
0.499		1.669		1.284	8.581	
0.685		1.835		1.336	7.245	
0.458		1.558		0.873	6.372	
		1.528		1.070	5.302	GS-5



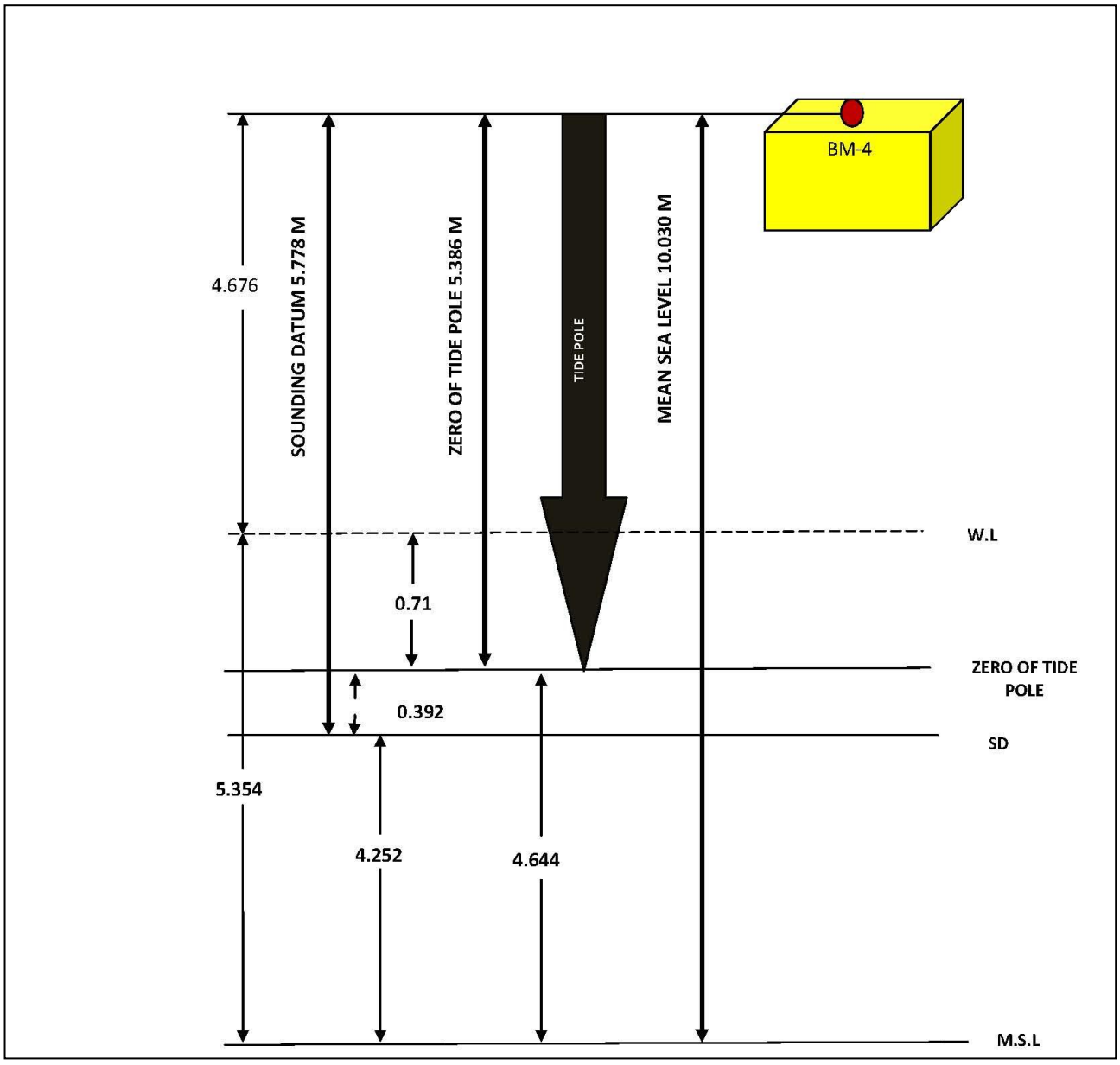
Levelling from BM-4 to GS-6

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.285					10.030	BM-4
0.428		1.755		1.470	8.560	
0.886		1.882		1.454	7.106	
0.645		1.640		0.754	6.352	
		1.662		1.017	5.335	GS-6



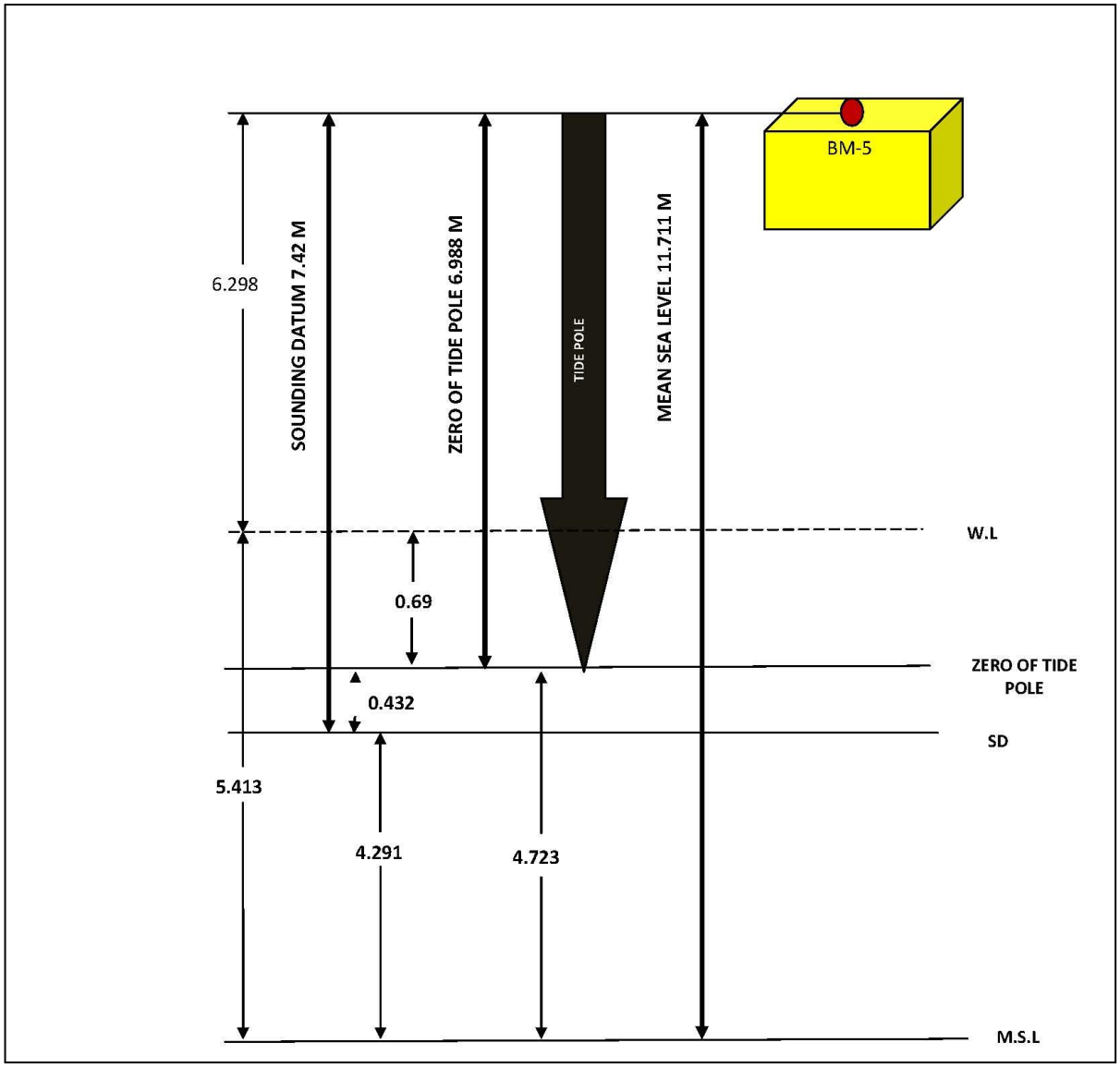
Levelling from BM-4 to GS-7

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.383					10.030	BM-4
0.553		1.885		1.502	8.528	
0.735		1.565		1.012	7.516	
0.480		1.677		0.942	6.574	
		1.700		1.220	5.354	GS-7



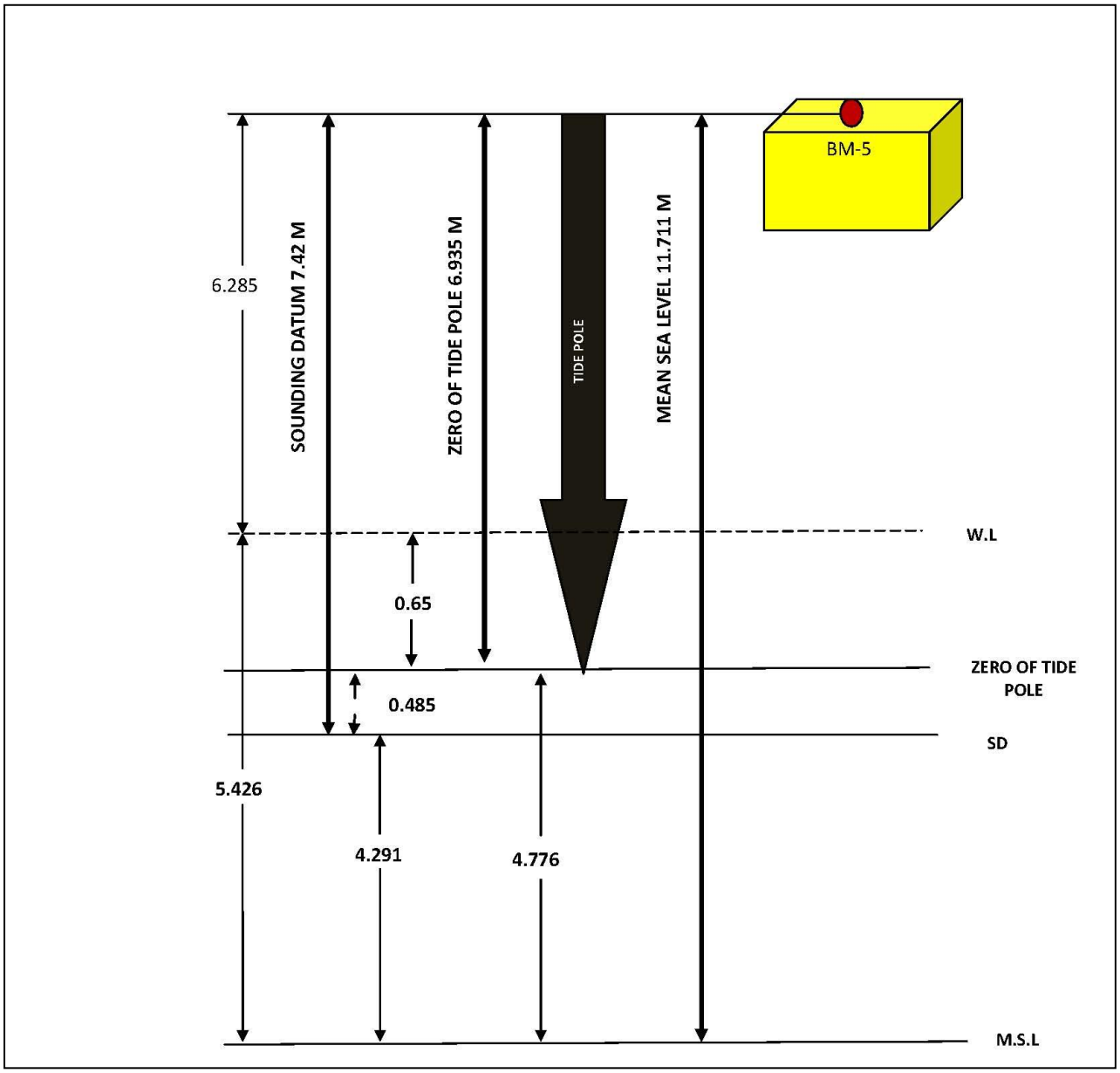
Levelling from BM-5 to GS-8

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.455					11.711	BM-5
0.585		1.622		1.167	10.544	
0.345		1.338		0.753	9.791	
0.473		1.985		1.640	8.151	
0.643		1.558		1.085	7.066	
0.373		1.235		0.592	6.474	
		1.434		1.061	5.413	GS-8



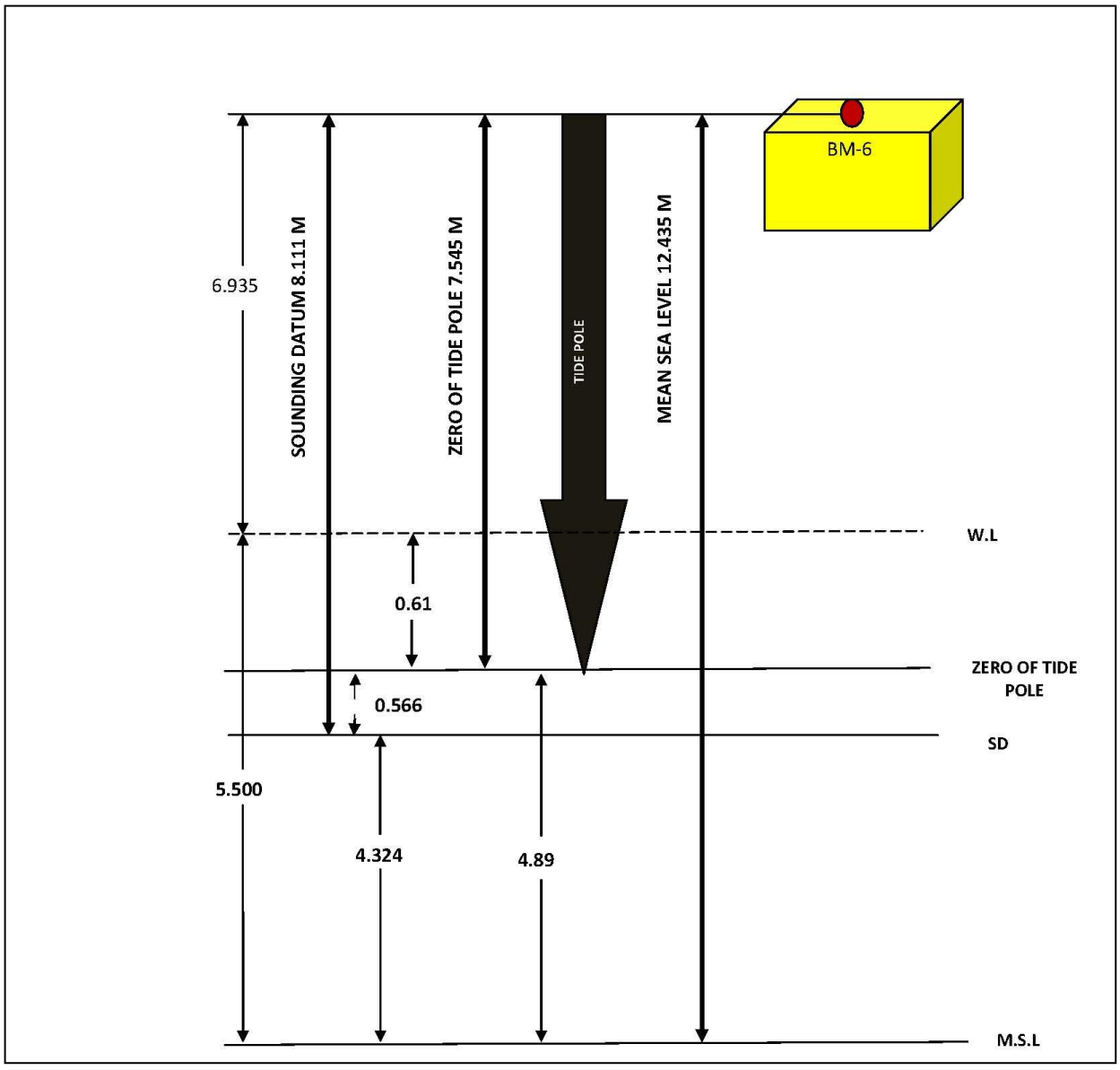
Levelling from BM-5 to GS-9

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.455					11.711	BM-5
0.532		1.570		1.115	10.596	
0.455		1.660		1.128	9.468	
0.754		1.388		0.933	8.535	
0.643		1.558		0.804	7.731	
0.770		1.988		1.345	6.386	
		1.730		0.960	5.426	GS-9



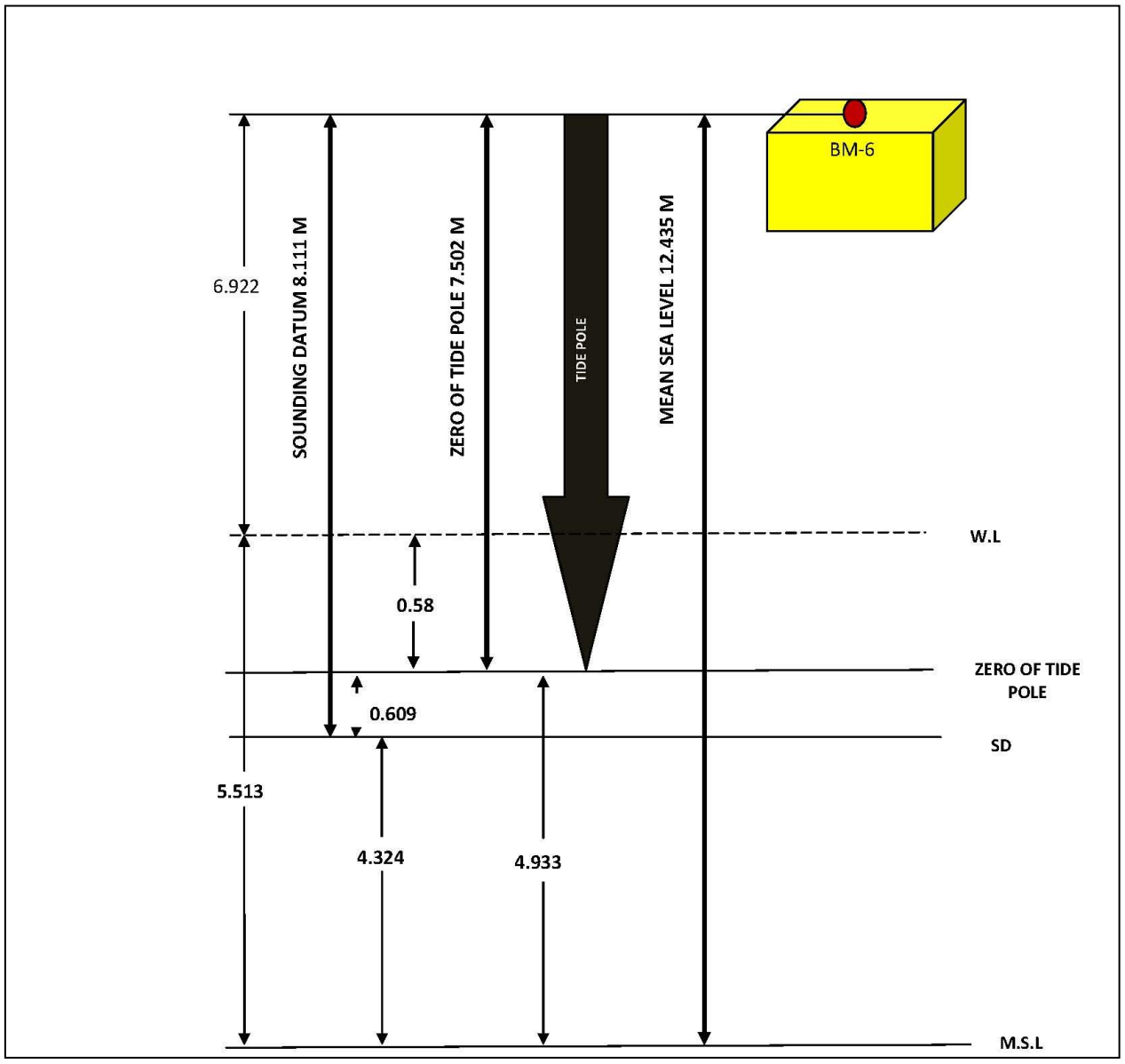
Levelling from BM-6 to GS-10

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.455					12.435	BM-6
0.532		2.454		1.999	10.436	
0.455		1.988		1.456	8.980	
0.754		1.558		1.103	7.877	
0.643		1.388		0.634	7.243	
0.770		1.660		1.017	6.226	
		1.496		0.726	5.500	GS-10



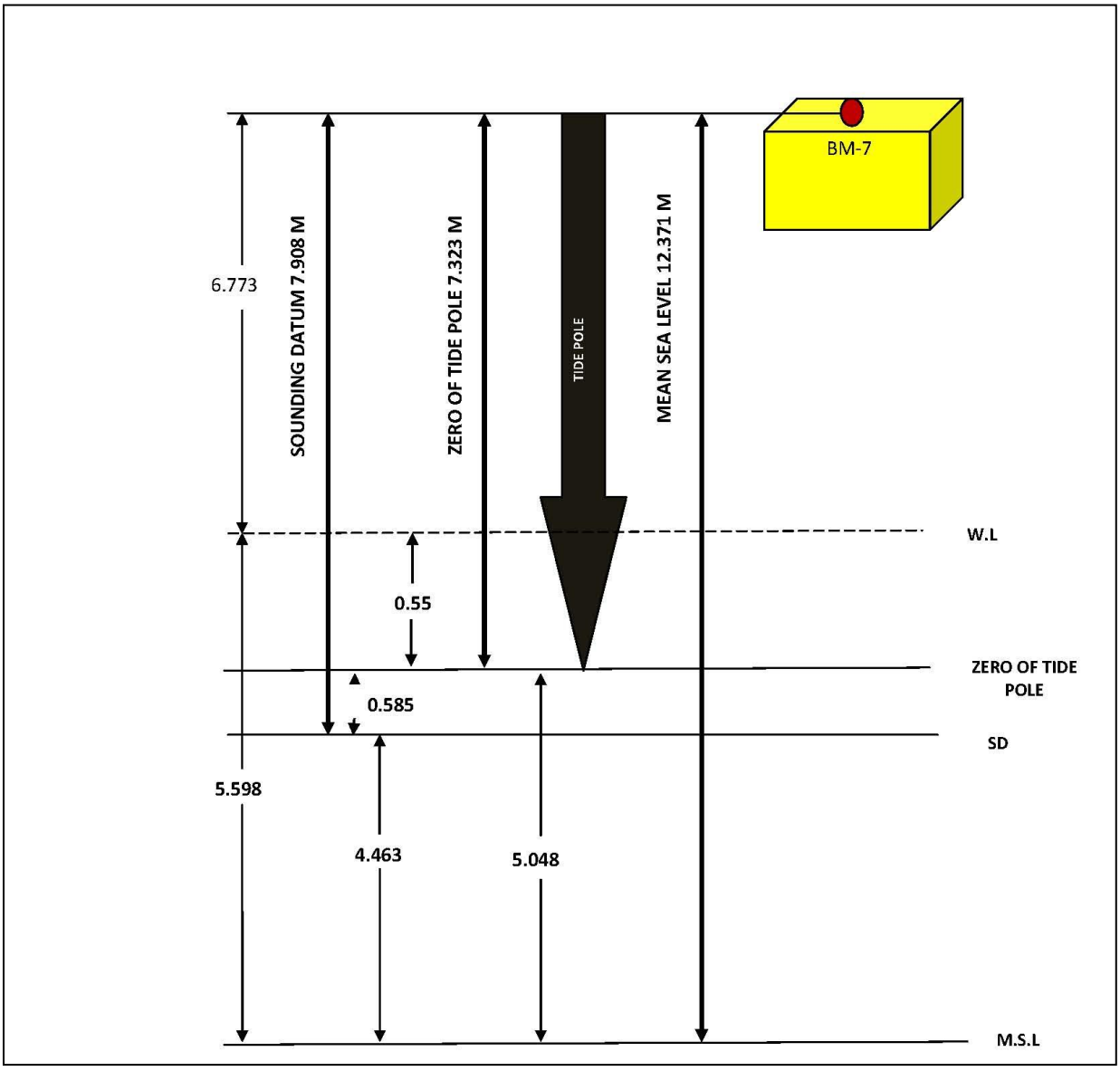
Levelling from BM-6 to GS-11

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.455					12.435	BM-6
0.532		2.346		1.891	10.544	
0.455		1.338		0.806	9.738	
0.754		1.985		1.530	8.208	
0.643		1.558		0.804	7.404	
0.380		1.235		0.592	6.812	
		1.679		1.299	5.513	GS-11



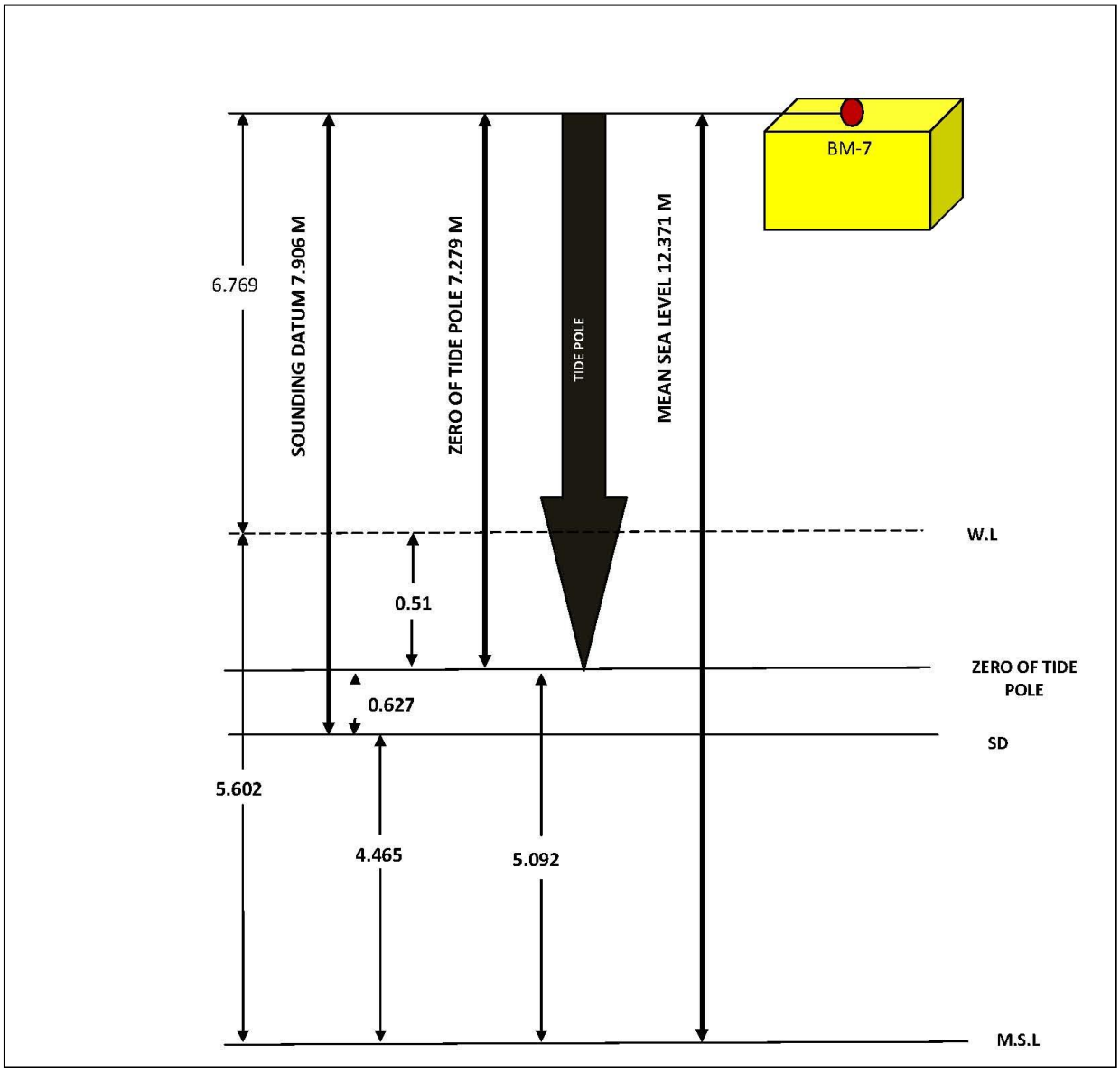
Levelling from BM-7 to GS-12

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.677					12.371	BM-7
0.385		1.680		1.003	11.368	
0.499		1.500		1.115	10.253	
0.685		1.765		1.266	8.987	
0.458		1.426		0.741	8.246	
0.348		1.835		1.377	6.869	
		1.619		1.271	5.598	GS-12



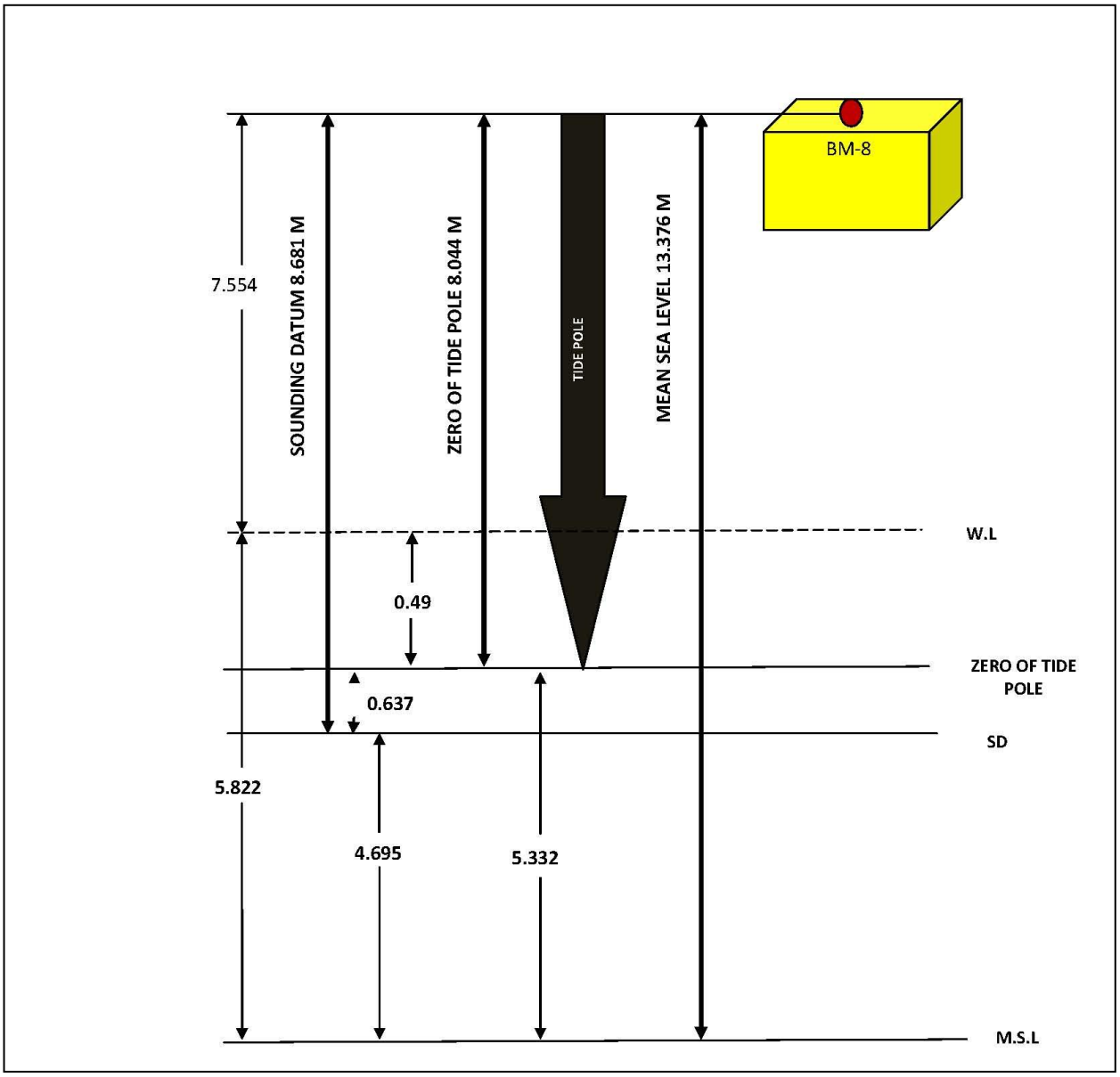
Levelling from BM-7 to GS-13

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.455					12.371	BM-7
0.532		1.730		1.275	11.096	
0.455		1.988		1.456	9.640	
0.754		1.558		1.103	8.537	
0.643		1.388		0.634	7.903	
0.770		1.660		1.017	6.886	
		2.054		1.284	5.602	GS-13



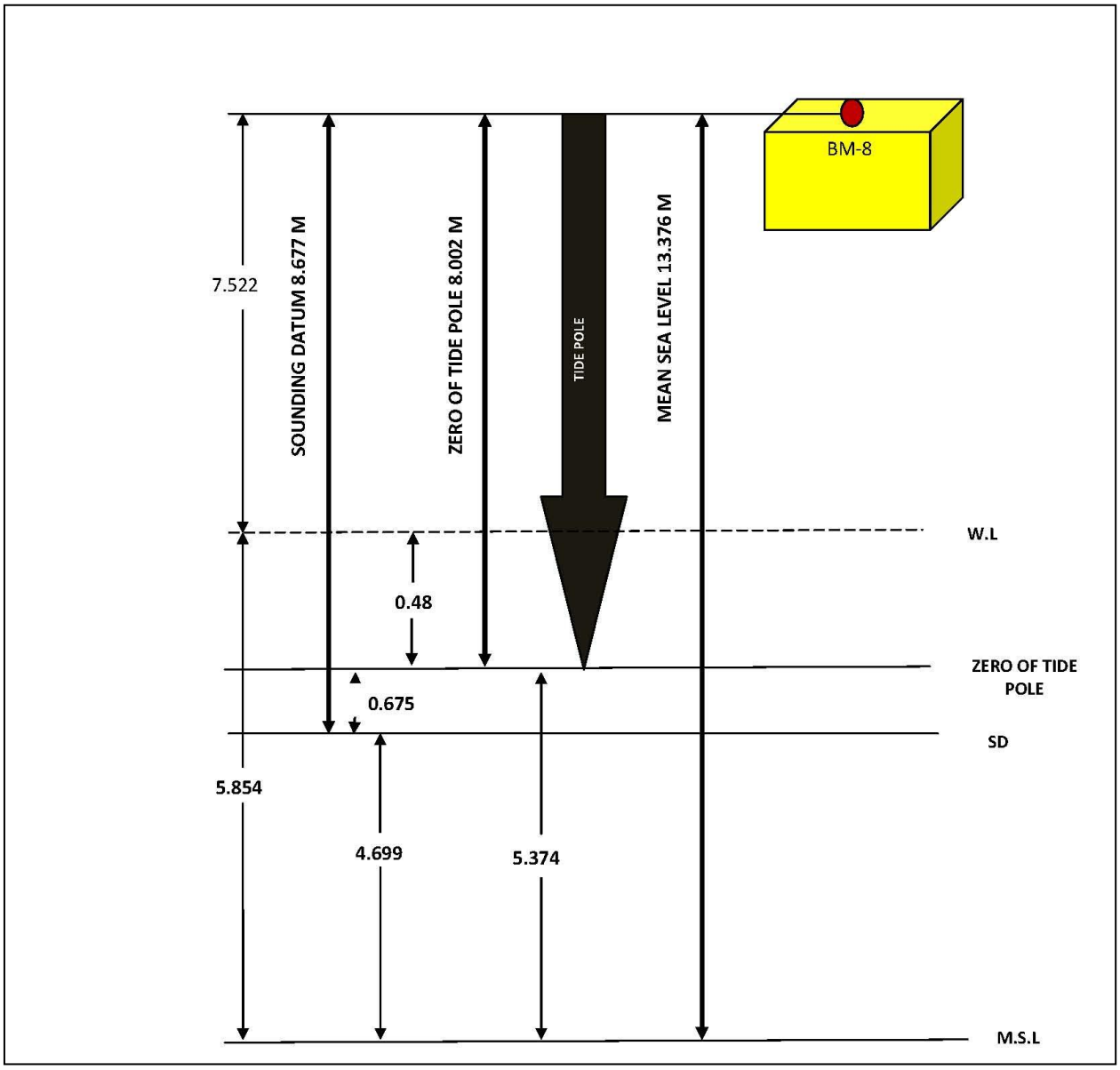
Levelling from BM-8 to GS-14

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.455					13.376	BM-8
0.585		1.622		1.167	12.209	
0.345		1.638		1.053	11.156	
0.473		1.985		1.640	9.516	
0.643		1.558		1.085	8.431	
0.373		1.855		1.212	7.219	
		1.770		1.397	5.822	GS-14



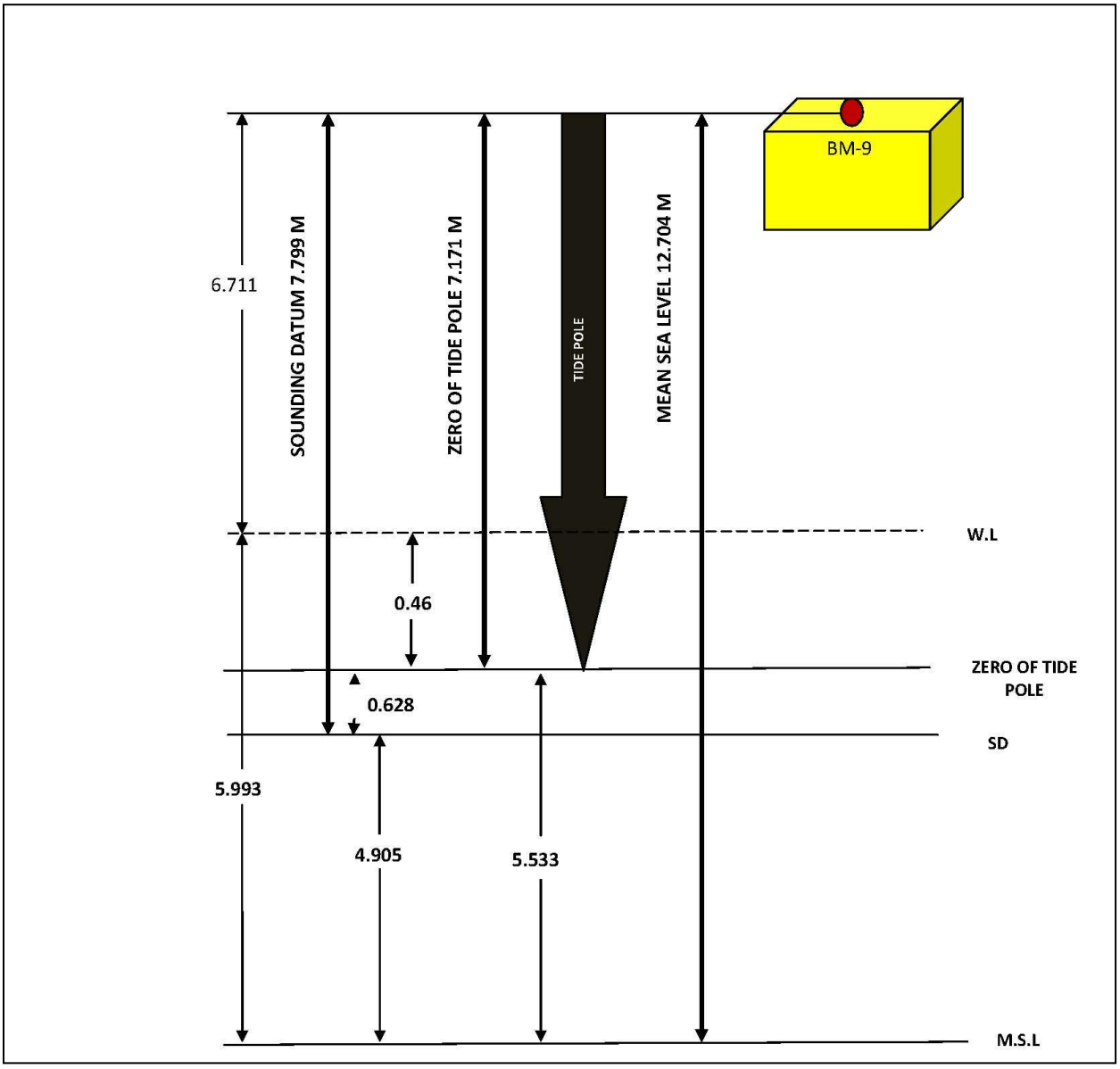
Levelling from BM-8 to GS-15

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.345					13.376	BM-8
0.473		1.558		1.213	12.163	
0.643		1.755		1.282	10.881	
0.495		1.669		1.026	9.855	
0.552		1.558		1.063	8.792	
0.485		1.855		1.303	7.489	
		2.120		1.635	5.854	GS-15



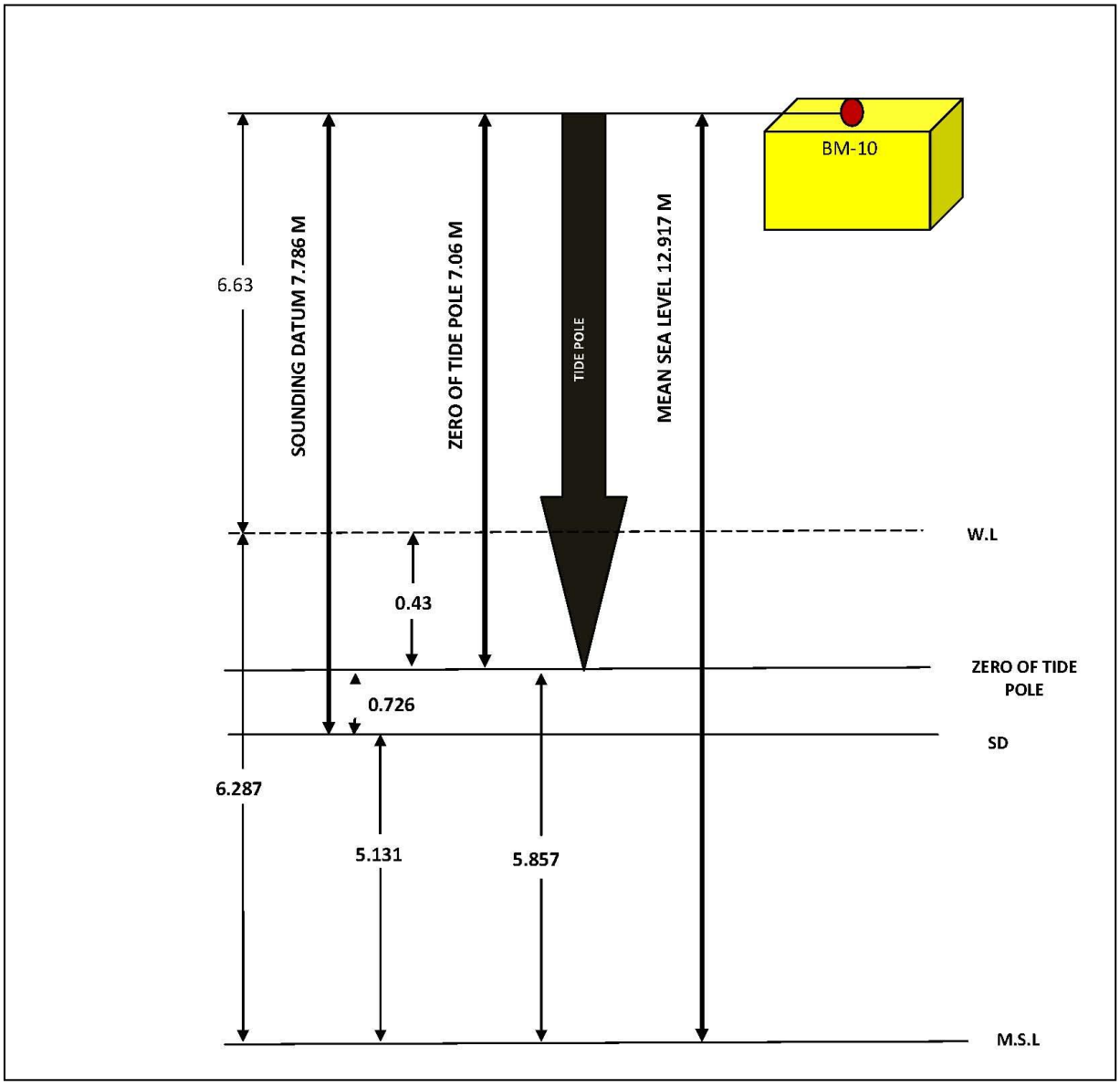
Levelling from BM-9 to GS-16

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.855					12.704	BM-9
0.425		1.840		0.985	11.719	
0.635		1.680		1.255	10.464	
0.499		1.500		0.865	9.599	
0.685		1.765		1.266	8.333	
0.458		1.926		1.241	7.092	
		1.557		1.099	5.993	GS-16



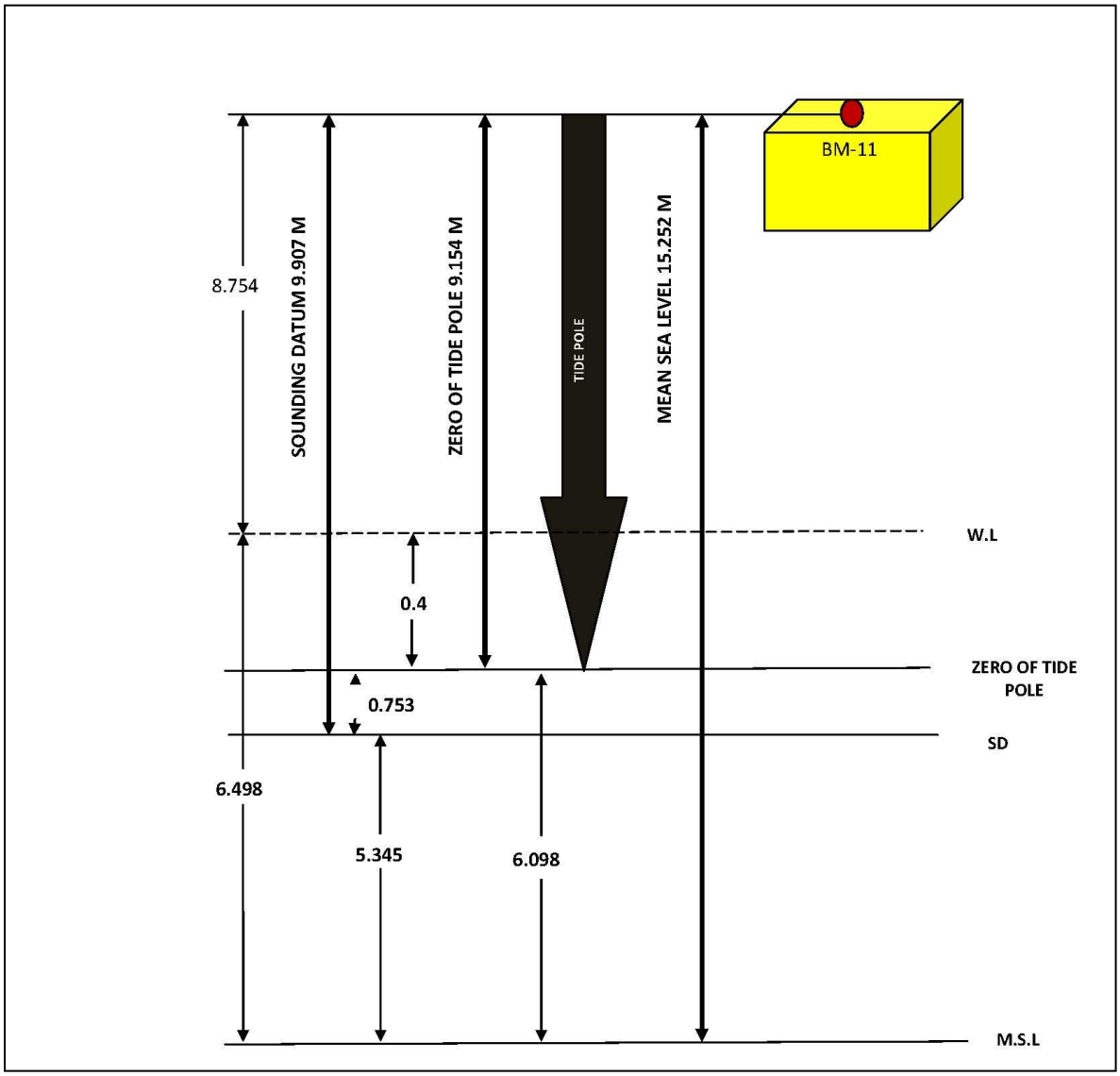
Levelling from BM-10 to GS-17

BS	IS	FS	RISE (+)	FALL (-)	RL (m)	REMARKS
0.532					12.917	BM-10
0.455		1.679		1.147	11.557	
0.754		1.395		0.940	10.617	
0.525		2.042		1.288	9.329	
0.635		1.615		1.090	8.239	
0.345		1.692		1.057	7.182	
		1.240		0.895	6.287	GS-17



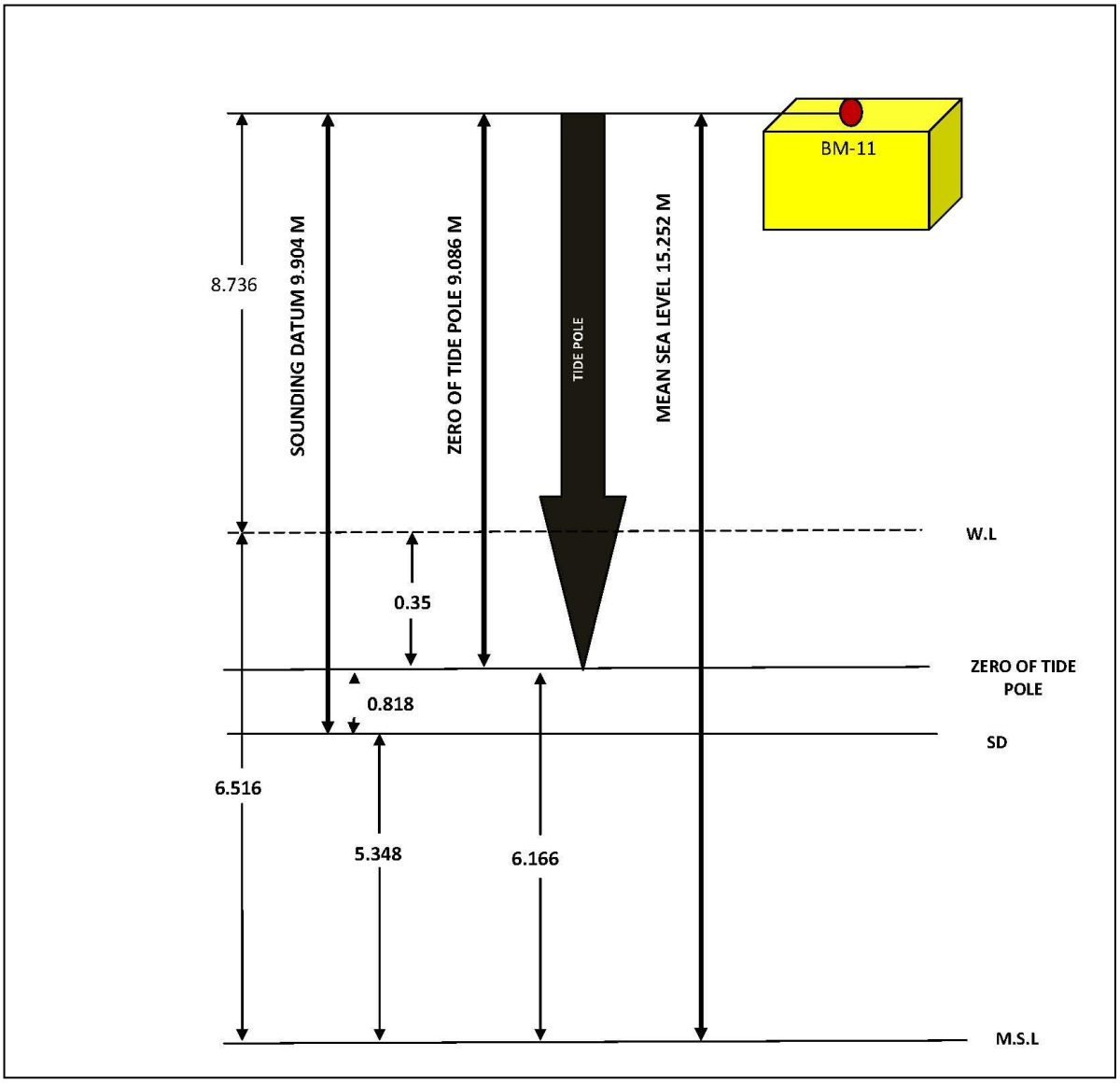
Levelling from BM-11 to GS-18

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.682					15.252	BM-11
0.435		1.679		0.997	14.255	
0.554		2.395		1.960	12.295	
0.525		2.042		1.488	10.807	
0.635		1.915		1.390	9.417	
0.345		1.762		1.127	8.290	
		2.137		1.792	6.498	GS-18



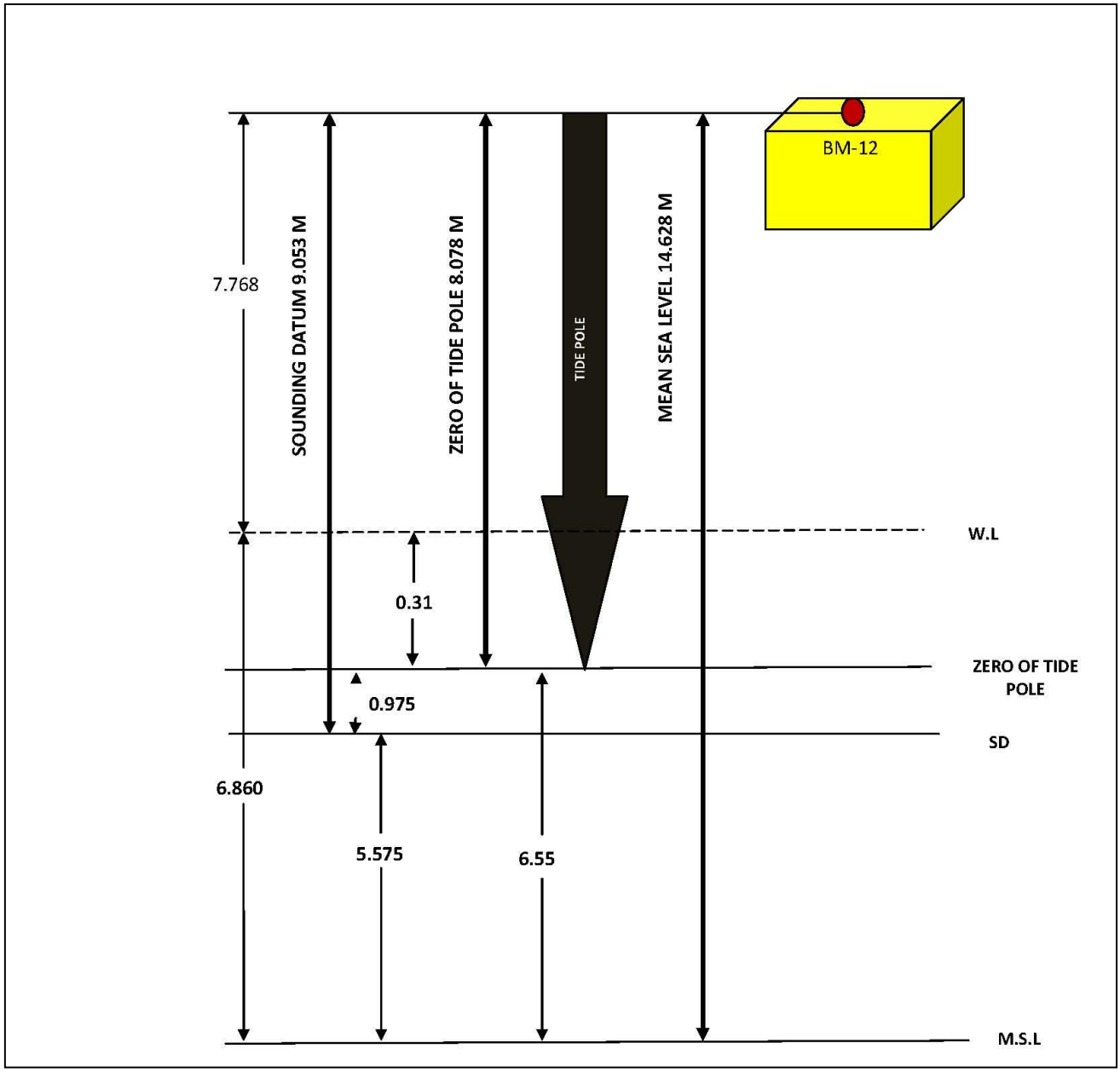
Levelling from BM-11 to GS-19

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.771					15.252	BM-11
0.524		1.775		1.005	14.248	
0.643		2.350		1.827	12.421	
0.614		2.305		1.663	10.759	
0.724		2.035		1.422	9.337	
0.434		1.855		1.132	8.206	
		2.123		1.690	6.516	GS-19



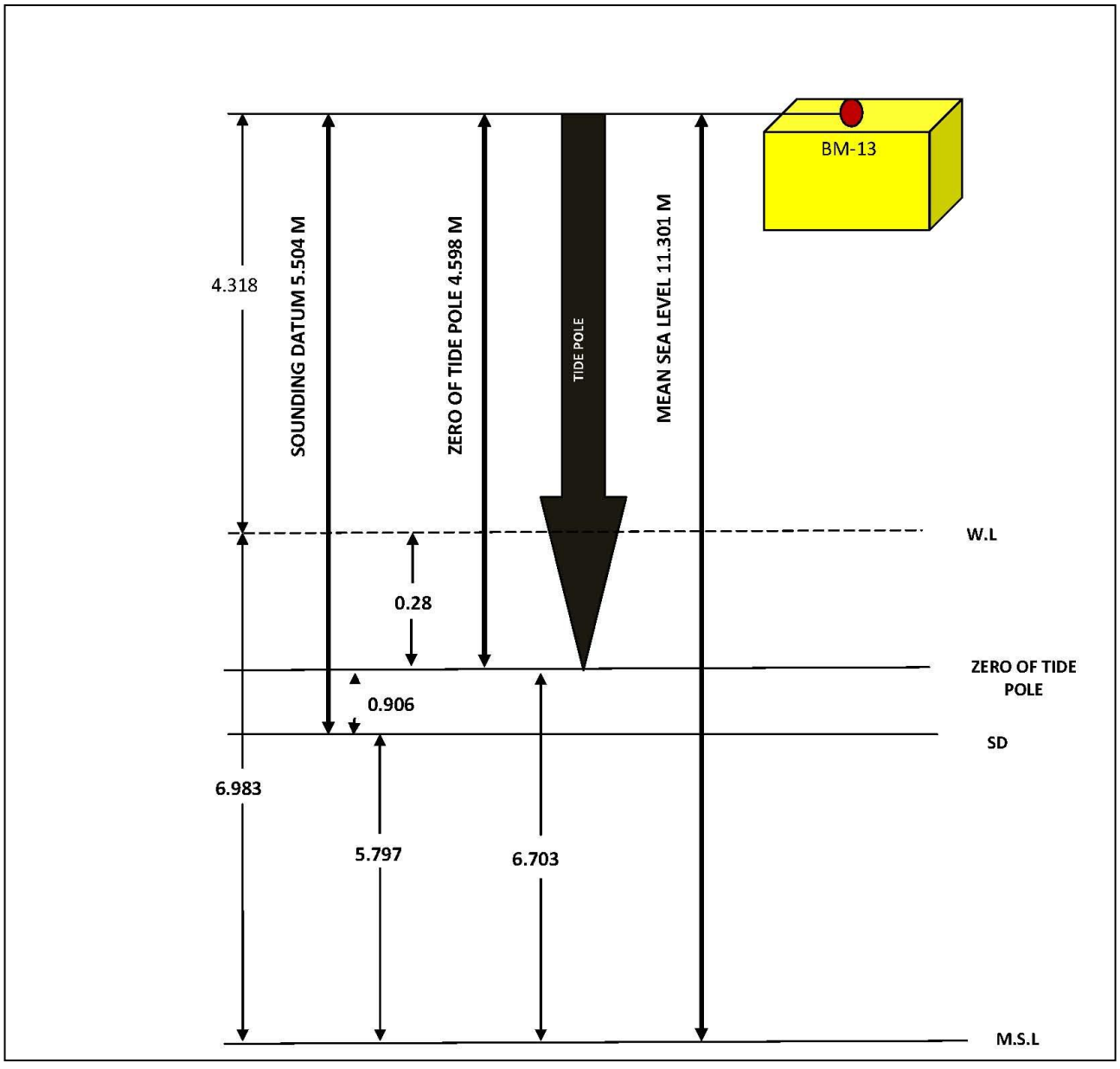
Levelling from BM-12 to GS-20

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.455					14.628	BM-12
0.585		1.775		1.320	13.308	
0.345		2.035		1.450	11.858	
0.473		1.905		1.560	10.298	
0.643		1.885		1.412	8.886	
0.680		1.855		1.212	7.674	
		1.494		0.814	6.860	GS-20



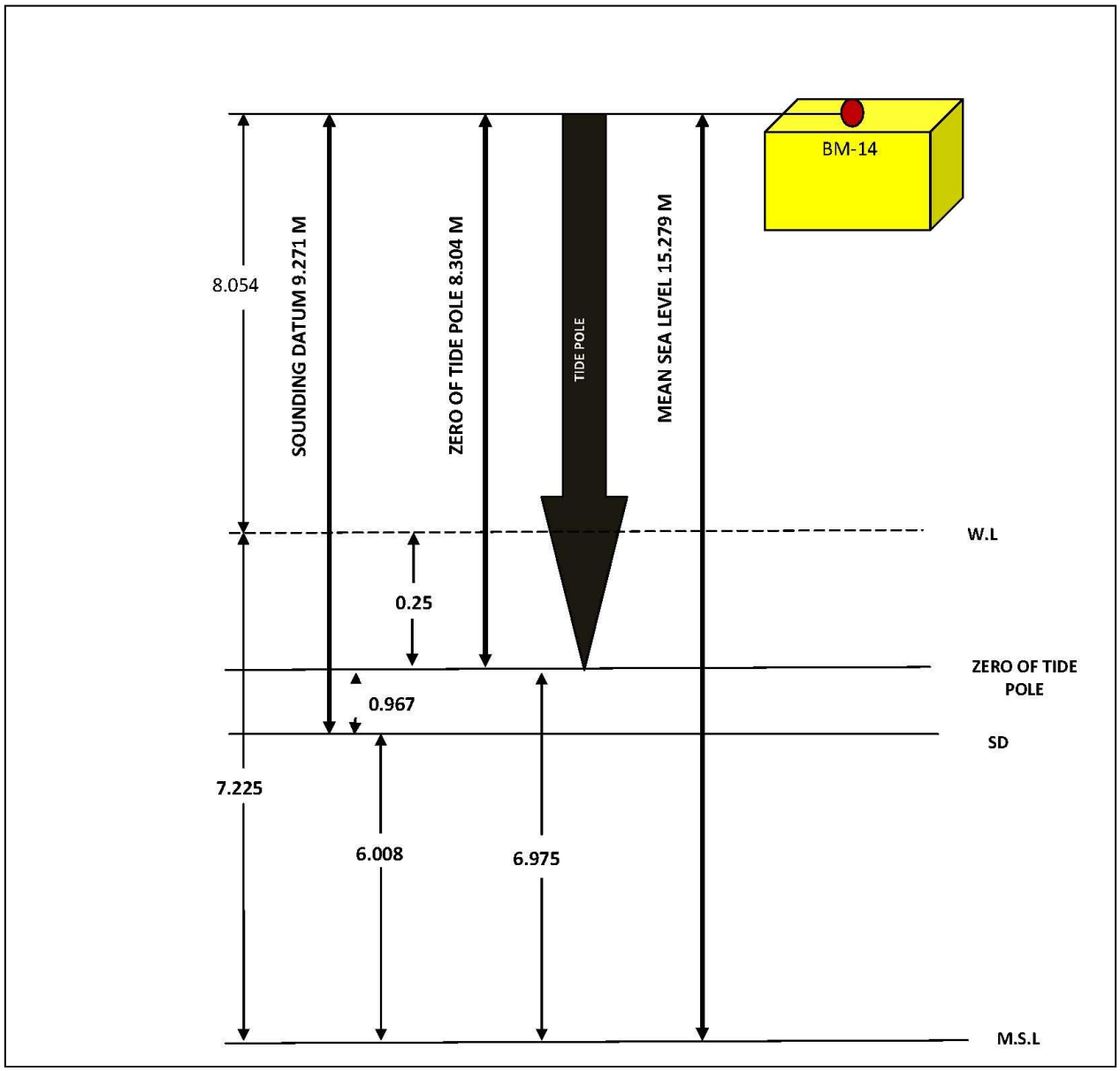
Levelling from BM-13 to GS-21

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.540					11.301	BM-13
0.670		1.775		1.235	10.066	
0.430		1.635		0.965	9.101	
0.765		1.855		1.425	7.676	
		1.458		0.693	6.983	GS-21



Levelling from BM-14 to GS-22

BS	IS	FS	RISE (+)	FALL (-)	RL	REMARKS
0.611					15.279	BM-14
0.319		1.664		1.053	14.226	
0.433		1.922		1.603	12.623	
0.619		1.892		1.459	11.164	
0.392		1.922		1.303	9.861	
0.282		1.800		1.408	8.453	
		1.510		1.228	7.225	GS-22



Annexure-11 Soil Sample Report:

RESULTS OF TEST OF SOIL SAMPLES

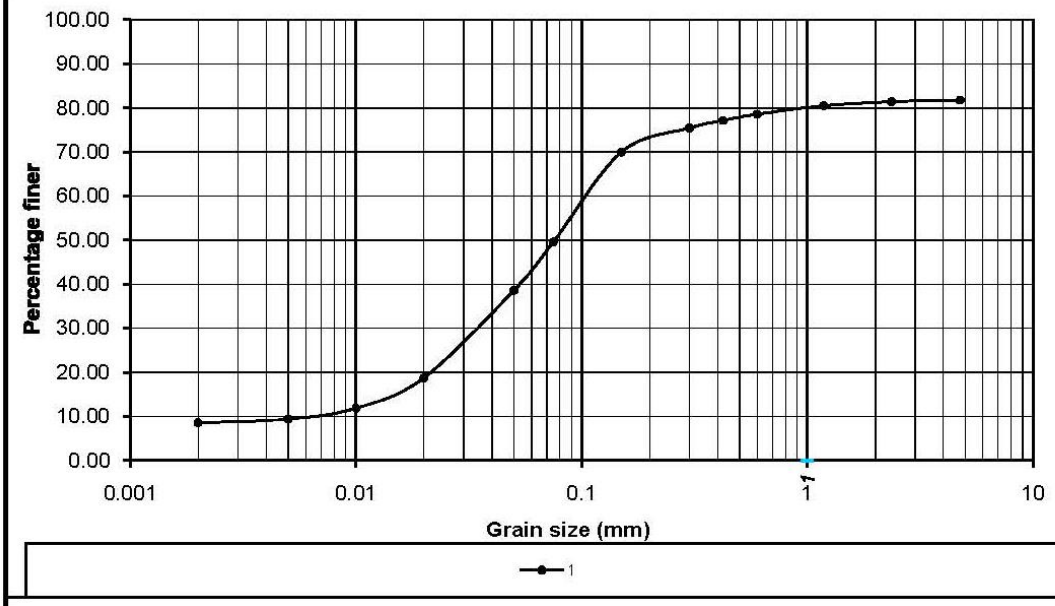
SITE – JALANGI RIVER,WEST BENGAL

PHYSICAL ANALYSIS OF SOIL

Sl.No.	LOCATION	GRAVEL (%)	SAND (%)	SILT+CLAY (%)	SPECIFIC GRAVITY	pH VALUE	SILT (%)	CLAY (%)	Cu	Cc
1	NEAR BM 1	18.25	32.15	49.60	2.62	7.50	41.00	8.60	16.00	1.21
2	NEAR BM 2	14.81	27.40	57.79	2.64	7.40	47.90	9.89	3.47	8.04
3	NEAR BM 3	16.95	21.94	61.11	2.65	7.40	51.60	9.51	5.87	12.80
4	NEAR BM 4	14.78	30.45	54.77	2.62	7.60	44.98	9.79	17.04	1.36
5	NEAR BM 5	20.79	27.87	51.34	2.62	7.20	42.50	8.84	1.97	9.67
6	NEAR BM 6	14.90	34.05	51.05	2.63	7.30	42.60	8.45	17.36	1.36
7	NEAR BM 7	10.25	24.00	65.75	2.65	7.30	57.50	8.25	10.00	2.36
8	NEAR BM 8	21.96	30.38	47.66	2.66	7.50	38.00	9.66	3.40	11.31
9	NEAR BM 9	19.87	34.08	46.05	2.63	7.30	39.00	7.05	4.06	18.85
10	NEAR BM 10	19.75	25.40	54.85	2.65	7.40	46.20	8.65	1.61	16.52
11	NEAR BM 11	26.04	15.89	58.07	2.66	7.20	48.50	9.57	16.40	2.50
12	NEAR BM 12	19.37	27.60	53.03	2.63	7.50	43.20	9.83	17.86	1.72
13	NEAR BM 13	6.68	68.50	24.82	2.65	6.90	19.60	5.22	7.00	2.29
14	NEAR BM 14	19.20	22.98	57.82	2.63	7.30	49.40	8.42	12.43	2.01

Note: - The Soil sample Positions have been shown in 2.21 (a) portion in the report, page no-26

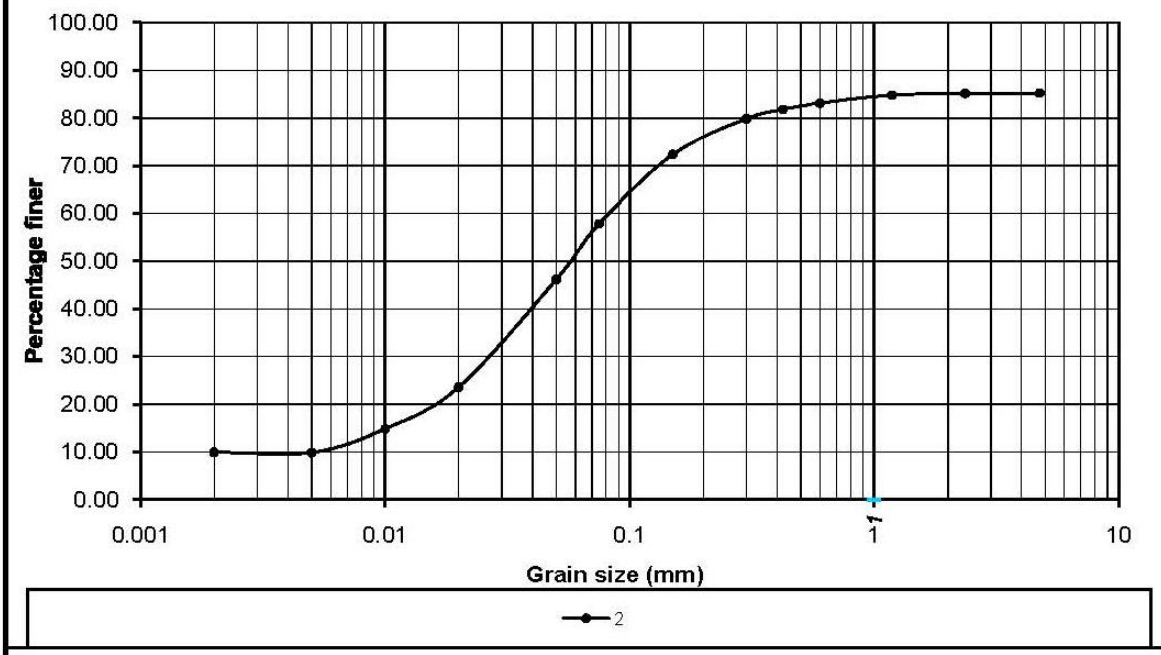
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
1	8.60	41.00	32.15	18.25

*Silt & Clay

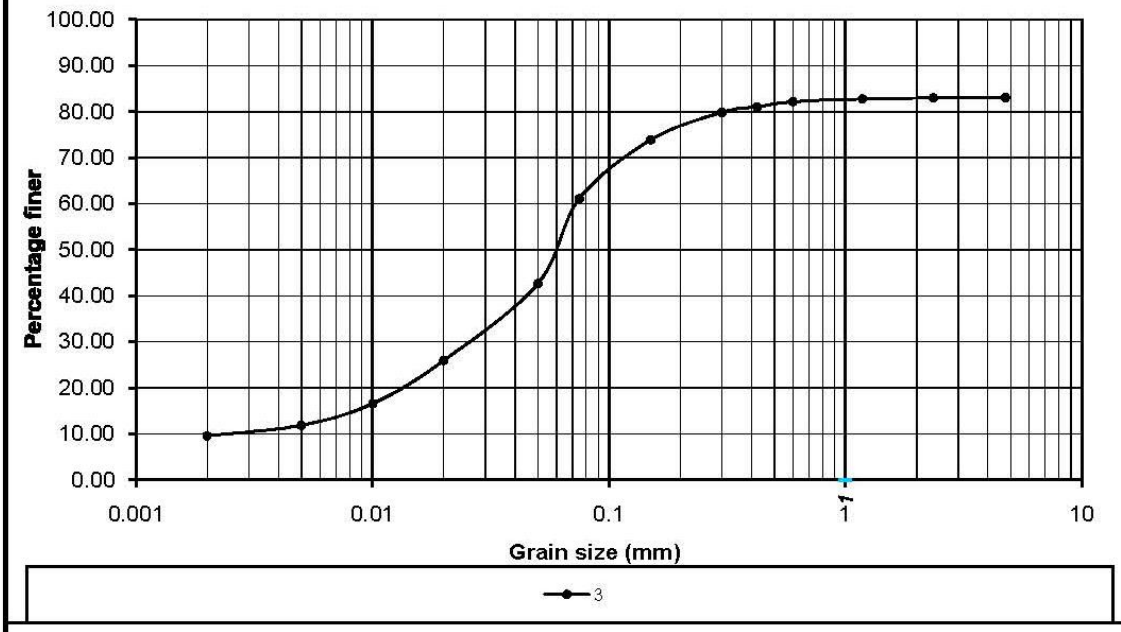
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
2	9.89	47.90	27.40	14.81

*Silt & Clay

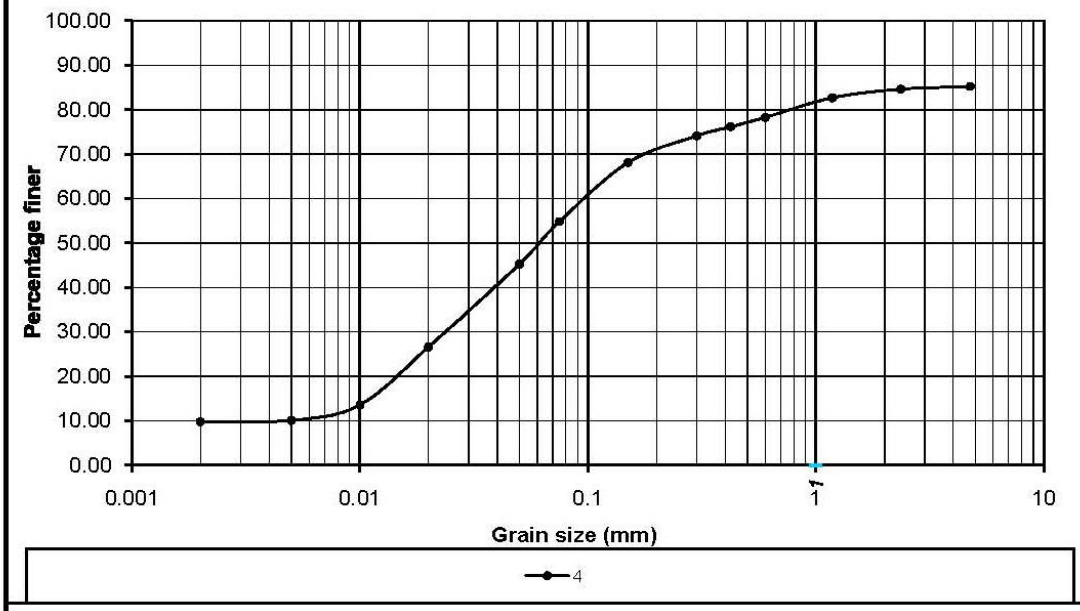
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
3	9.51	51.60	21.94	16.95

*Silt & Clay

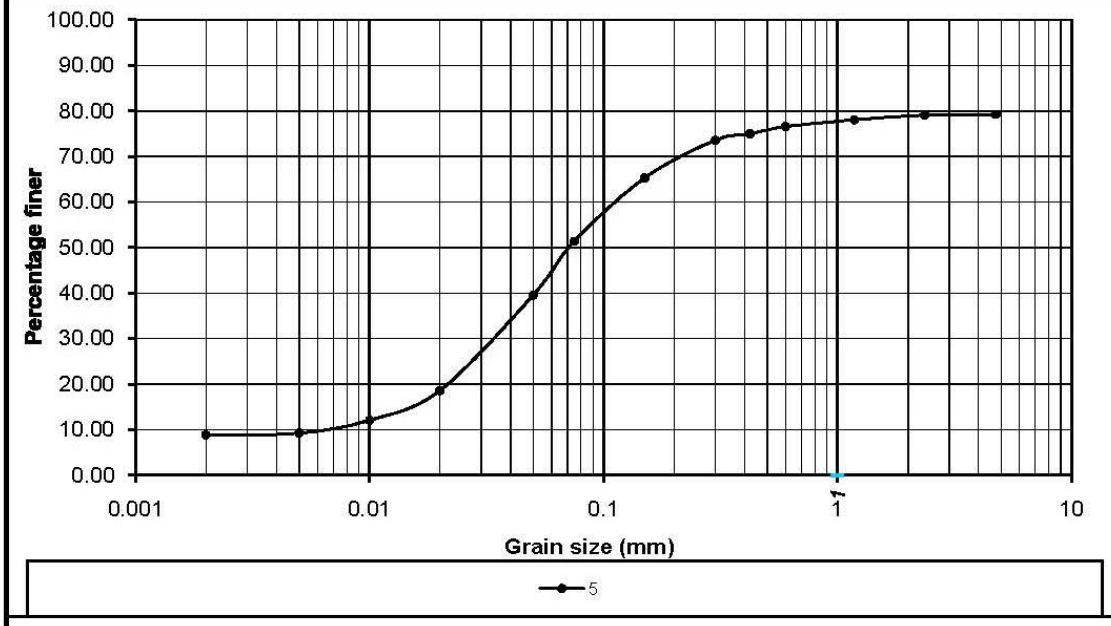
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
4	9.79	44.98	30.45	14.78

*Silt & Clay

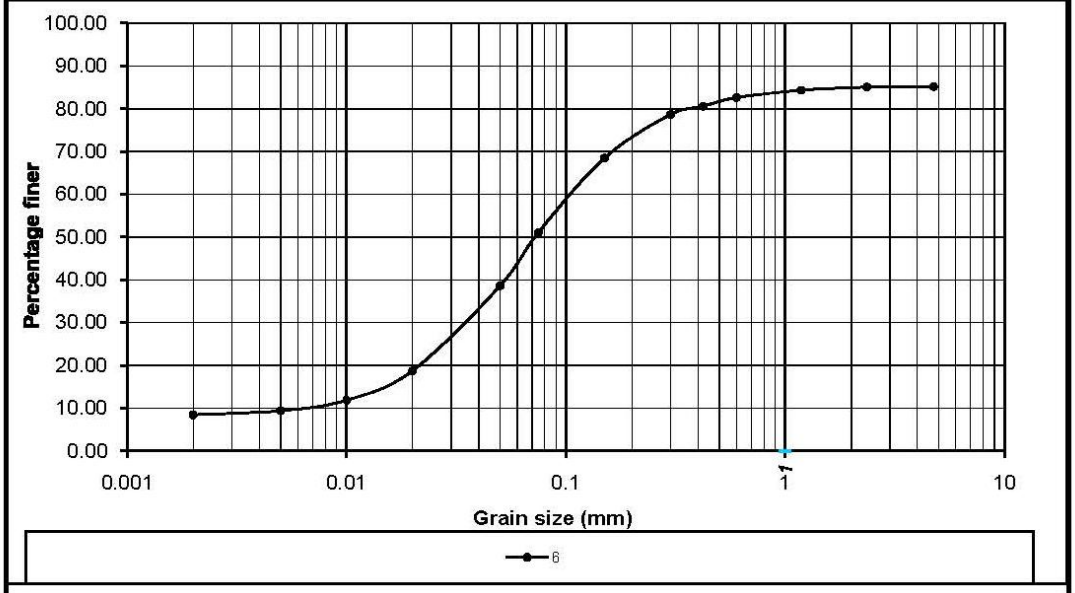
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
5	8.84	42.50	27.87	20.79

*Silt & Clay

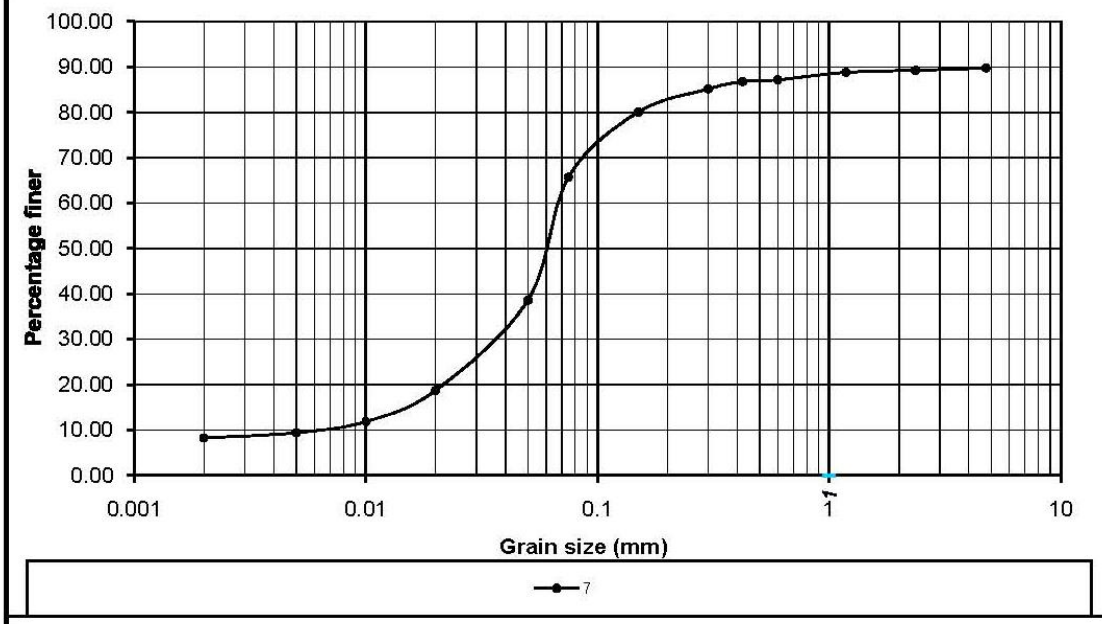
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
6	8.45	42.60	34.05	14.90

*Silt & Clay

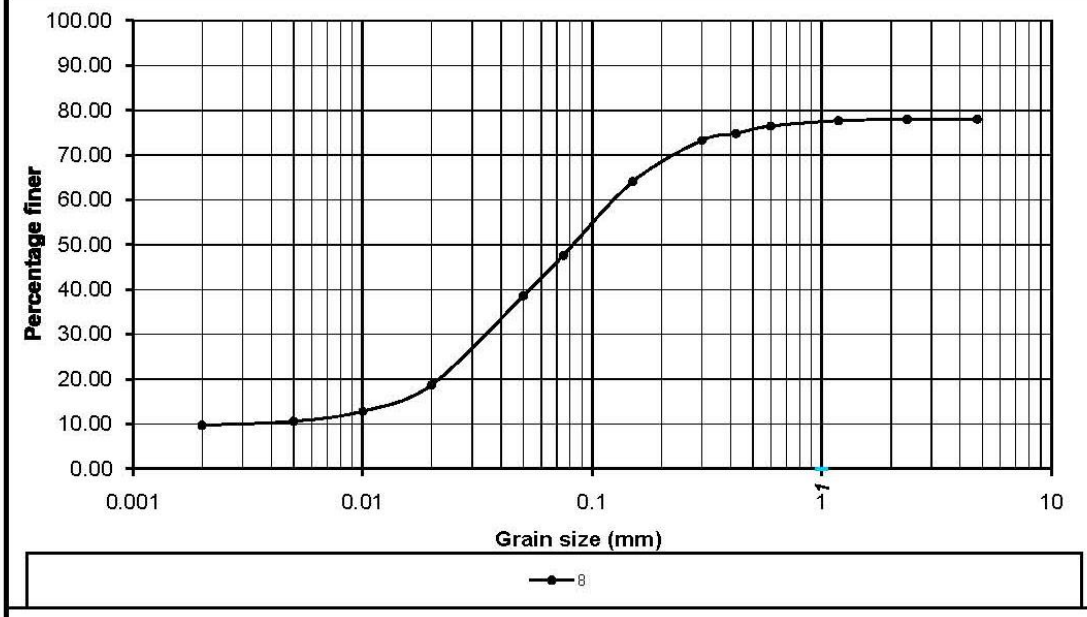
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
7	8.25	57.50	24.00	10.25

*Silt & Clay

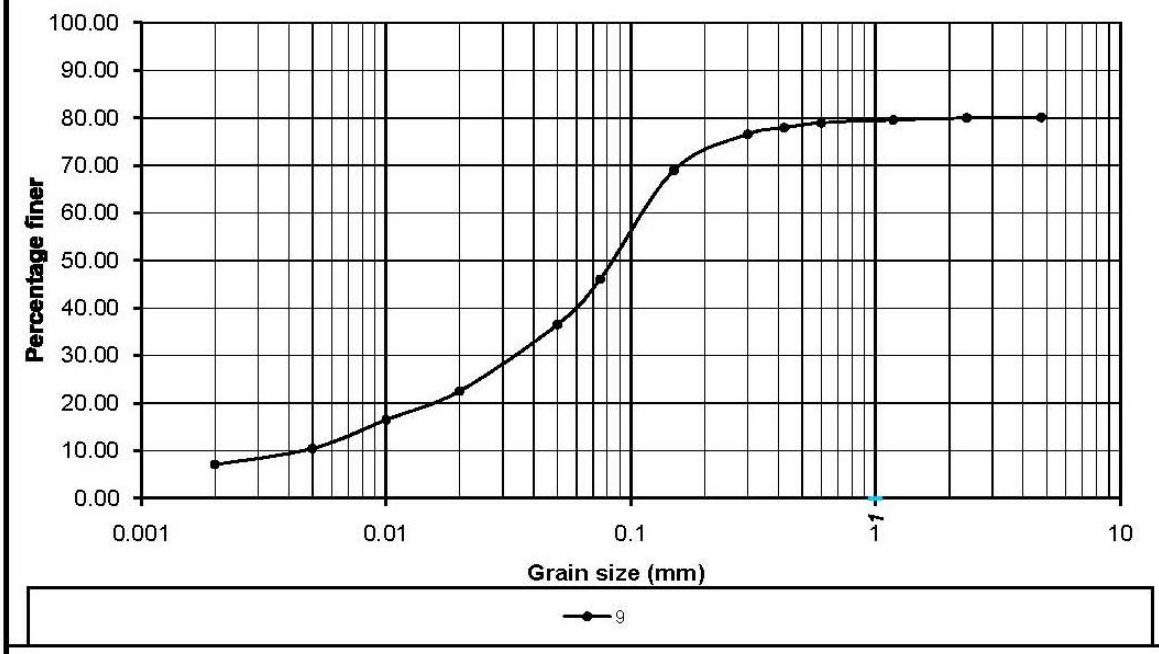
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
8	9.66	38.00	30.38	21.96

*Silt & Clay

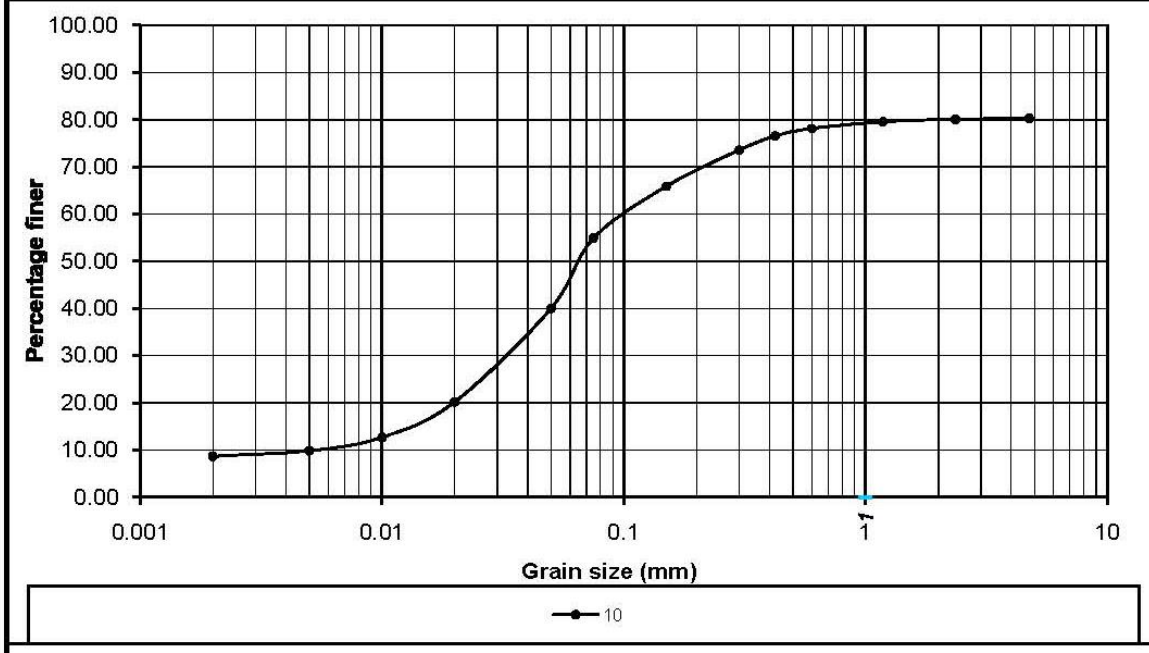
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
9	7.05	39.00	34.08	19.87

*Silt & Clay

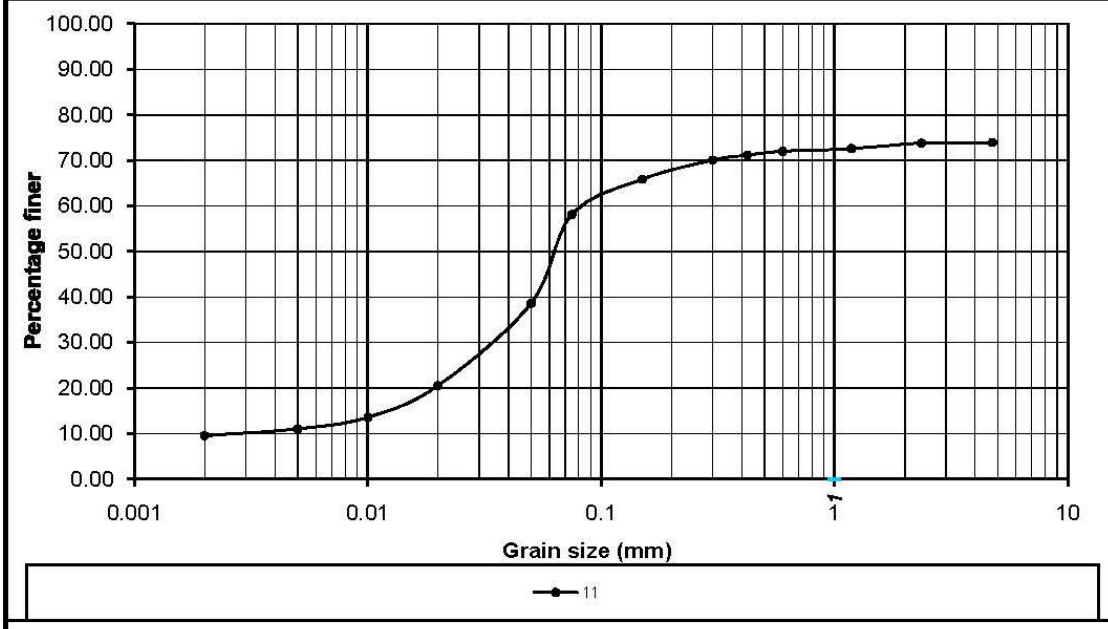
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
10	8.65	46.20	25.40	19.75

*Silt & Clay

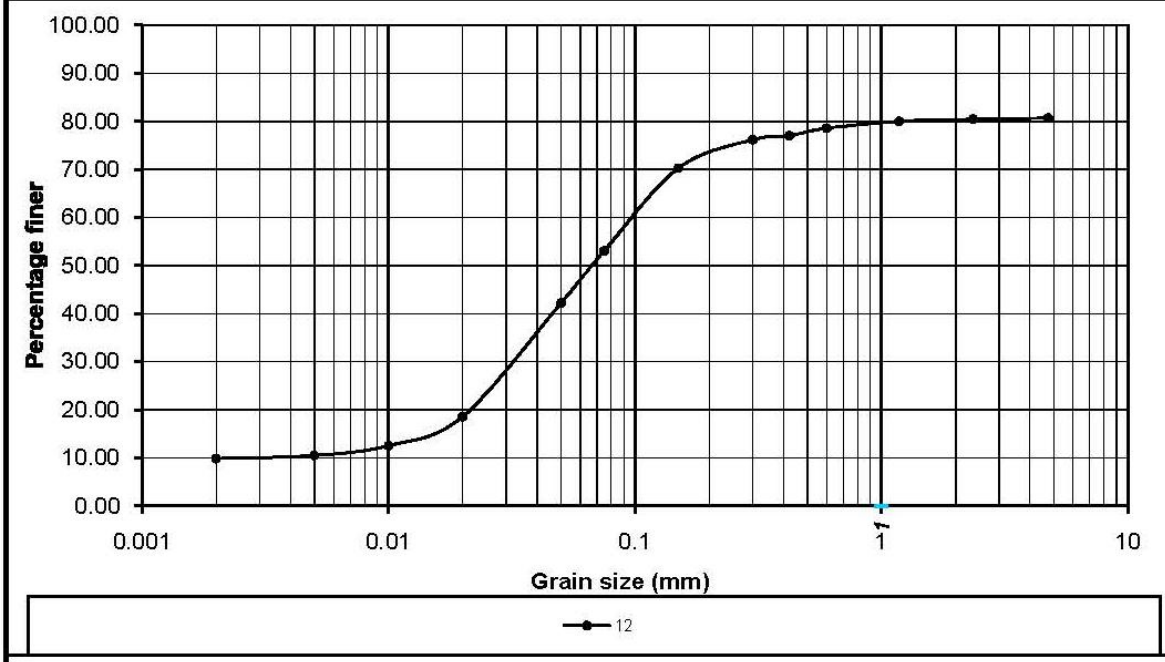
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
11	9.57	48.50	15.89	26.04

*Silt & Clay

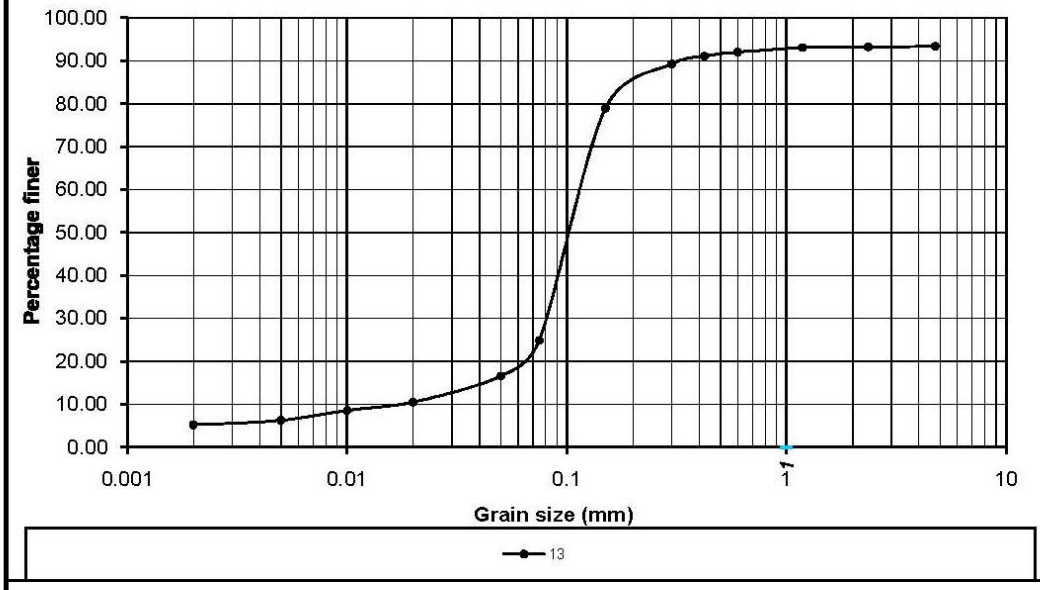
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
12	9.83	43.20	27.60	19.37

*Silt & Clay

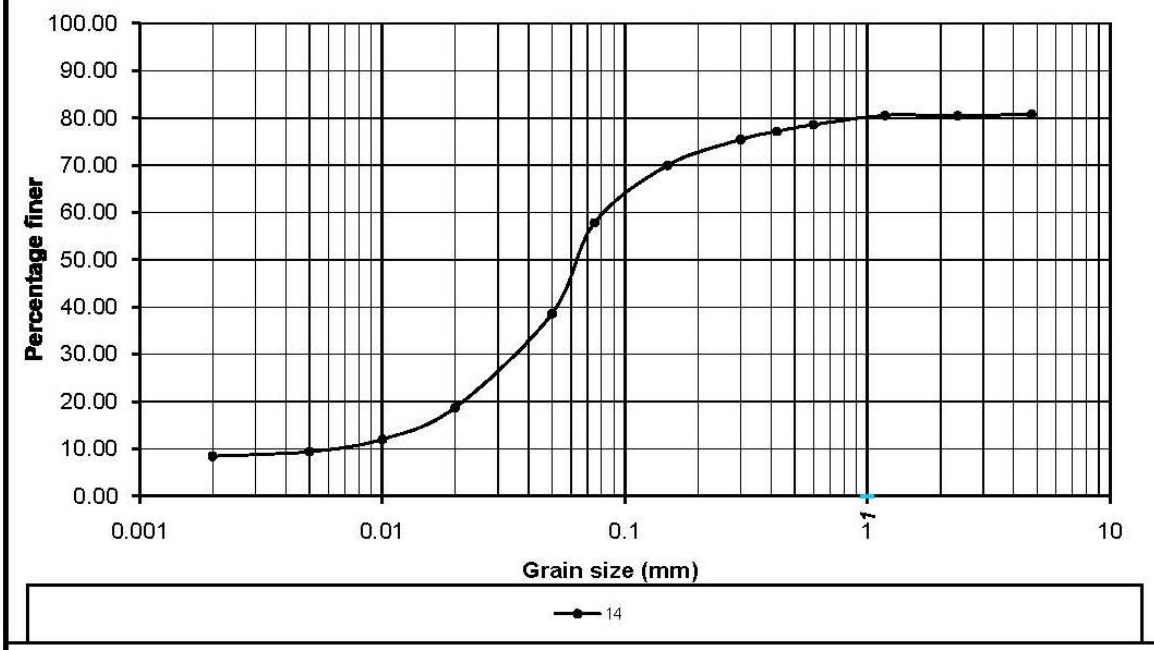
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
13	5.22	19.60	68.50	6.68

*Silt & Clay

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-4.75*	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Sand (%)**	**Gravel (%)**
14	8.42	49.40	22.98	19.20

*Silt & Clay

Annexure-12 Water Sample Report:

RESULTS OF EXAMINATION OF SAMPLES OF WATER

SITE : JALANGI RIVER, WEST BENGAL

PARAMETR - pH Value at 25°C

SL. NO	DATE	DEPTH	LOCATION	PARAMETER	WATER SAMPLE RESULTS	PERMISSIBLE LIMITS IS: 456-2000
1	30-09-2015	D	NEAR BM-01	pH at 25°C	6.6	6.5-8.5
2	30-09-2015	0.3D			6.5	
3	30-09-2015	0.5D			6.7	
4	30-09-2015	D	NEAR BM-02		6.7	
5	30-09-2015	0.3D			6.6	
6	30-09-2015	0.5D			6.5	
7	30-09-2015	D	NEAR BM-03		6.9	
8	30-09-2015	0.3D			6.7	
9	30-09-2015	0.5D			6.6	
10	30-09-2015	D	NEAR BM-04		6.8	
11	30-09-2015	0.3D			6.6	
12	30-09-2015	0.5D			6.6	
13	29-09-2015	D	NEAR BM-05		6.7	
14	29-09-2015	0.3D			6.7	
15	29-09-2015	0.5D			6.6	
16	29-09-2015	D	NEAR BM-06		6.6	
17	29-09-2015	0.3D			6.8	
18	29-09-2015	0.5D			6.7	
19	29-09-2015	D	NEAR BM-07		6.7	
20	29-09-2015	0.3D			6.8	
21	29-09-2015	0.5D			6.6	
22	29-09-2015	D	NEAR BM-08		6.9	
23	29-09-2015	0.3D			7.0	
24	29-09-2015	0.5D			6.8	
25	29-09-2015	D	NEAR BM-09		6.8	
26	29-09-2015	0.3D			6.7	
27	29-09-2015	0.5D			6.8	
28	29-09-2015	D	NEAR BM-10		6.6	
29	29-09-2015	0.3D			6.5	
30	29-09-2015	0.5D			6.9	
31	29-09-2015	D	NEAR BM-11		6.7	
32	29-09-2015	0.3D			6.6	
33	29-09-2015	0.5D			6.7	
34	28-09-2015	D	NEAR BM-12		6.7	
35	28-09-2015	0.3D			6.8	
36	28-09-2015	0.5D			6.7	
37	28-09-2015	D	NEAR BM-13		7.0	
38	28-09-2015	0.3D			6.9	
39	28-09-2015	0.5D			6.9	
40	28-09-2015	D	NEAR BM-14		7.1	
41	28-09-2015	0.3D			6.8	
42	28-09-2015	0.5D			6.8	

Note: - The water sample Position have been shown in 2.21 (b) portions in the report, page no-26

PARAMETR - Sulphates as SO_4(mg/l)

SL. NO	DATE	DEPTH	LOCATION	PARAMETER	WATER SAMPLE RESULTS(mg/l)	PERMISSIBLE LIMITS IS: 456-2000
1	30-09-2015	D	NEAR BM-01	Sulphates as SO_4(mg/l)	15	400(mg/l)
2	30-09-2015	0.3D			18	
3	30-09-2015	0.5D			16	
4	30-09-2015	D	NEAR BM-02		14	
5	30-09-2015	0.3D			16	
6	30-09-2015	0.5D			16	
7	30-09-2015	D	NEAR BM-03		15	
8	30-09-2015	0.3D			17	
9	30-09-2015	0.5D			17	
10	30-09-2015	D	NEAR BM-04		16	
11	30-09-2015	0.3D			14	
12	30-09-2015	0.5D			16	
13	29-09-2015	D	NEAR BM-05		16	
14	29-09-2015	0.3D			18	
15	29-09-2015	0.5D			16	
16	29-09-2015	D	NEAR BM-06		17	
17	29-09-2015	0.3D			17	
18	29-09-2015	0.5D			16	
19	29-09-2015	D	NEAR BM-07		18	
20	29-09-2015	0.3D			18	
21	29-09-2015	0.5D			16	
22	29-09-2015	D	NEAR BM-08		16	
23	29-09-2015	0.3D			15	
24	29-09-2015	0.5D			16	
25	29-09-2015	D	NEAR BM-09		17	
26	29-09-2015	0.3D			18	
27	29-09-2015	0.5D			17	
28	29-09-2015	D	NEAR BM-10		16	
29	29-09-2015	0.3D			18	
30	29-09-2015	0.5D			17	
31	29-09-2015	D	NEAR BM-11		19	
32	29-09-2015	0.3D			18	
33	29-09-2015	0.5D			18	
34	28-09-2015	D	NEAR BM-12		21	
35	28-09-2015	0.3D			22	
36	28-09-2015	0.5D			20	
37	28-09-2015	D	NEAR BM-13		24	
38	28-09-2015	0.3D			21	
39	28-09-2015	0.5D			23	
40	28-09-2015	D	NEAR BM-14		22	
41	28-09-2015	0.3D			24	
42	28-09-2015	0.5D			24	

PARAMETR - Sediment Concentration(mg/l)

SL. NO	DATE	DEPTH	LOCATION	PARAMETER	WATER SAMPLE RESULTS(mg/l)	PERMISSIBLE LIMITS IS: 456-2000
1	30-09-2015	D	NEAR BM-01	Sediment Concentration (mg/l)	40	2000mg/l
2	30-09-2015	0.3D			30	
3	30-09-2015	0.5D			30	
4	30-09-2015	D	NEAR BM-02		40	
5	30-09-2015	0.3D			30	
6	30-09-2015	0.5D			30	
7	30-09-2015	D	NEAR BM-03		30	
8	30-09-2015	0.3D			20	
9	30-09-2015	0.5D			20	
10	30-09-2015	D	NEAR BM-04		30	
11	30-09-2015	0.3D			20	
12	30-09-2015	0.5D			20	
13	29-09-2015	D	NEAR BM-05		30	
14	29-09-2015	0.3D			30	
15	29-09-2015	0.5D			20	
16	29-09-2015	D	NEAR BM-06		40	
17	29-09-2015	0.3D			30	
18	29-09-2015	0.5D			30	
19	29-09-2015	D	NEAR BM-07		40	
20	29-09-2015	0.3D			40	
21	29-09-2015	0.5D			40	
22	29-09-2015	D	NEAR BM-08		30	
23	29-09-2015	0.3D			30	
24	29-09-2015	0.5D			20	
25	29-09-2015	D	NEAR BM-09		30	
26	29-09-2015	0.3D			20	
27	29-09-2015	0.5D			30	
28	29-09-2015	D	NEAR BM-10		40	
29	29-09-2015	0.3D			40	
30	29-09-2015	0.5D			40	
31	29-09-2015	D	NEAR BM-11		40	
32	29-09-2015	0.3D			40	
33	29-09-2015	0.5D			30	
34	28-09-2015	D	NEAR BM-12		30	
35	28-09-2015	0.3D			40	
36	28-09-2015	0.5D			40	
37	28-09-2015	D	NEAR BM-13		20	
38	28-09-2015	0.3D			30	
39	28-09-2015	0.5D			30	
40	28-09-2015	D	NEAR BM-14		30	
41	28-09-2015	0.3D			40	
42	28-09-2015	0.5D			40	

Annexure-13 Calibration Certificate:-

PAN INDIA CONSULTANTS PVT. LTD.

SALES DEPARTMENT

CORPORATE ADDRESS : 105, PHASE IV, UDYOG VIHAR, GURGAON-122015, HARYANA, INDIA
PHONES : +91 124 4300950, 4013954, FAX : +91 124 2346646, 2342880, CIN - U74899DL1985PTC021177
e-mail : paie@panindiagroup.com, paie@vsnl.com, www.panindiagroup.com

CALIBRATION CERTIFICATE

CUSTOMER NAME	:	PRECISION SURVEY CONSUTLANCY
ADDRESS	:	Vichitra SP-45, KWIC Bankra, P.S.- Domjur, Dist. –Howrah, Pin: 711 403 (W.B)
INSTRUMENT	:	DGPS EQUIPMENT
SERIES	:	SPS-361
SERIAL NUMBER	:	5308K59587
CALIBRATION DATE	:	05/05/2015
VALIDITY	:	04/05/2016

THIS IS TO CERTIFY THAT THE ABOVE INSTRUMENT WAS CHECKED AND CALIBRATED IN ACCORDANCE WITH THE APPLICABLE FACTORY PROCEDURES.

For **PAN INDIA CONSULTANTS PVT. LTD.**

AUTHORISED SIGNATORY

REGD. OFFICE : OFFICE NO. 1, D-4, COMMERCIAL AREA, VASANT KUNJ, NEW DELHI-110070, INDIA
PHONES : +91 11 26137657, 26137659, 26899952, 26899962, 26132214 FAX : +91 11 26138633
e-mail : nmspl@panindiagroup.com URL : www.panindiagroup.com

Table 24-- Calibration Certificate of DGPS

PAN INDIA CONSULTANTS PVT. LTD.
SALES DEPARTMENT
CORPORATE ADDRESS : 105, PHASE IV, UDYOG VIHAR, GURGAON-122015, HARYANA, INDIA
PHONES : +91 124 4300950, 4013954, FAX : +91 124 2346646, 2342880, CIN - U74899DL1985PTC021177
e-mail : paie@panindiagroup.com, paie@vsnl.com, www.panindiagroup.com

CALIBRATION CERTIFICATE

CUSTOMER NAME	:	PRECISION SURVEY CONSUTLANCY
ADDRESS	:	P.O. –SALAP, P.S.-Vichitra SP-45,KWIC NH-6, Dist. –Howrah Pin: 711 403 W.B
INSTRUMENT	:	Echo Sounder
SERIES	:	Bathy 500 MF
SERIAL NO.	:	B5MF0560
CALIBRATION DATE	:	17/12/2014
VALIDITY	:	16/12/2015

THIS IS TO CERTIFY THAT THE ABOVE INSTRUMENT WAS CHECKED AND CALIBRATED IN ACCORDANCE WITH THE APPLICABLE FACTORY PROCEDURES.

for PAN INDIA CONSULTANTS PVT. LTD.

Pan India Consultants Pvt. Ltd. Gurgaon

AUTHORISED SIGNATORY

REGD. OFFICE : OFFICE NO. 1, D-4, COMMERCIAL AREA, VASANT KUNJ, NEW DELHI-110070, INDIA
PHONES : +91 11 26137657, 26137659, 26899952, 26899962, 26132214 FAX : +91 11 26138633
e-mail : nmspl@panindiagroup.com URL : www.panindiagroup.com

Table 25- Calibration Certificate of Eco Sounder

SOUTH

SOUTH PRECISION INSTRUMENT PVT. LTD.
FA - 229 B, Ground Floor, Mansarover Garden, New Delhi-110015
Ph. : 011- 45544114, 65568870 Fax: 011- 45530854 Mob.: 9999999255

Calibration Certificate

SOUTH Precision Instrument Pvt. Ltd. Calibration laboratory certifies that the instrument has been inspected, tested and calibrated in accordance with the documented procedures using measuring and test equipment, which are traceable to national standards and of the international accepted standard.

We hereby certify that the instrument mentioned below meet the specification and result of the traceability is carried out in accordance to our company's standard.

INSTRUMENT TYPE	:	GPS RTK
MODEL	:	S-86
MAKE	:	SOUTH
INSTRUMENT SR. NO.	:	H0986214510 (Accuracy –RTK Mode-Horizontal = 10mm +: PPm RMS, Vertical = 20mm +: PPm RMS H0986214519 (Static Mode – Horizontal = 2.5 mm + 1 PPm Vertical = 5mm + PPm)
CALIBRATION DATE	:	11/02/2015
VALID UPTO	:	10/02/2016
ISSUED TO	:	PRECISION SURVEY CONSULTANCY

For SOUTH PRECISION INSTRUMENT PVT. LTD.
For SOUTH PRECISION INSTRUMENT PVT. LTD.
Authorised Signatory

Authorised Signatory

Table 26- Calibration Certificate of GPS RTK

Annexure-14 Site Picture:-

Figure 52- During Topographic Survey near Swarupganj Port (Chainage-0.00 km)

Figure 53- Topographic Survey near Rail Bridge (Chainage-15.405 km)

Figure 54- Bathymetry Survey near sashitala ghat (Chainage- 19.000 km)

Figure 55- Topography survey near Chainage 130.590 km

Figure 56-Kalitala Ghat (Chainage-127.823 km)

Figure 57- Tide Gauge Reading near Chainage 130.300 km

Figure 58- Bathy-500 MF Instrument

Figure 59-Electric Post (Chainage-15.348 km)

Figure 60- Radhamadhav Temple near Chainage 40.00 km

Figure 61- Electric Post near Chainage- 17.124 km

Annexure-15 Survey Charts:-

Sl. No.	Chart No.	Chainage (from ..... km to .... km)	Location (from .... to .....)	Scale	Size of the Chart
1	1	0.00 km to 1.649 km	Nabadwip to Maheshganj village	1:2000	A-1
2	2	1.649 km to 3.000 km	Maheshganj village to Taranpur village	1:2000	A-1
3	3	3.000 km to 4.690 km	Taranpur village to Ghasighata village	1:2000	A-1
4	4	4.690 km to 6.00 km	Ghasighata village to Sardanga village	1:2000	A-1
5	5	6.00 km to 7.775 km	Sardanga village to Kanthaliamath village	1:2000	A-1
6	6	7.775 km to 9.706 km	Kanthaliamath village to Bahadurpur village	1:2000	A-1
7	7	9.706 km to 10.150 km	Bahadurpur village to Bahadurpur village	1:2000	A-1
8	8	10.150 km to 13.00 km	Bahadurpur village to Saktinagar village	1:2000	A-1
9	9	13.00 km to 14.652 km	Saktinagar village to Jalangi Bridge area	1:2000	A-1
10	10	14.652 km to 16.176 km	Jalangi Bridge area to Mayakol village	1:2000	A-1
11	11	16.176 km to 17.701 km	Mayakol village to Shona porti village	1:2000	A-1
12	12	17.701 km to 19.219 km	Shona porti village to Ghurni village	1:2000	A-1
13	13	19.219 km to 21.00 km	Ghurni village to Parmedia village	1:2000	A-1
14	14	21.00 km to 22.564 km	Parmedia village to Haranagar village	1:2000	A-1
15	15	22.564 km to 24.490 km	Haranagar village to Anandanagar village	1:2000	A-1
16	16	24.490 km to 26.100 km	Anandanagar village to panditpur Natunpara village	1:2000	A-1
17	17	26.100 km to 27.743 km	Panditpur Natunpara village to Krishna Chandrapur village	1:2000	A-1
18	18	27.743 km to 29.341 km	Krishna Chandrapur village to Java village	1:2000	A-1

Sl. No.	Chart No.	Chainage (from ..... km to .... km)	Location (from .... to .....)	Scale	Size of the Chart
19	19	29.341 km to 31.154 km	Java village to Dayer Bazar village	1:2000	A-1
20	20	31.154 km to 33.00 km	Dayer Bazar village to Purbapanditpur village	1:2000	A-1
21	21	33.00 km to 34.590 km	Purbapanditpur village to panditpur village	1:2000	A-1
22	22	34.590 km to 37.380 km	panditpur village to Paschim panditpur village	1:2000	A-1
23	23	37.380 km to 39.00 km	Paschim panditpur village to Jhitkipota village	1:2000	A-1
24	24	39.00 km to 40.313 km	Jhitkipota village to Uttarjhitkipota village	1:2000	A-1
25	25	40.313 km to 41.558 km	Uttarjhitkipota village to Debipur village	1:2000	A-1
26	26	41.558 km to 43.392 km	Debipur village to Pukhuria village	1:2000	A-1
27	27	43.392 km to 45.65 km	Pukhuria village to Dakhin sonatala village	1:2000	A-1
28	28	45.65 km to 46.887 km	Dakhin sonatala village to Sonatala village	1:2000	A-1
29	29	46.887 km to 48.493 km	Sonatala village to Kalinagar Dakhinpara village	1:2000	A-1
30	30	48.493 km to 50.89 km	Kalinagar Dakhinpara village to Seemanagar village	1:2000	A-1
31	31	50.89 km to 51.668 km	Seemanagar village to Nababganj village	1:2000	A-1
32	32	51.668 km to 53.525 km	Nababganj village to Durgapur village	1:2000	A-1
33	33	53.525 km to 55.163 km	Durgapur village to Mandia village	1:2000	A-1
34	34	55.163 km to 56.700 km	Mandia village to Puratan pitambarpur village	1:2000	A-1
35	35	56.700 km to 57.970 km	Puratan pitambarpur village to Gokhurapota village	1:2000	A-1
36	36	57.970 km to 59.500 km	Gokhurapota village to Saligram village	1:2000	A-1
37	37	59.500 km to 60.642 km	Saligram village to Dogachhia village	1:2000	A-1
38	38	60.642 km to 62.282 km	Dogachhia village to Brittihuda village	1:2000	A-1
39	39	62.282 km to 63.824 km	Brittihuda village to Sukhsagar village	1:2000	A-1
40	40	63.824 km to 65.547 km	Sukhsagar village to Talukhuda village	1:2000	A-1

Sl. No.	Chart No.	Chainage (from ..... km to .... km)	Location (from .... to .....)	Scale	Size of the Chart
41	41	65.547 km to 67.199 km	Talukhuda village to Mota village	1:2000	A-1
42	42	67.199 km to 69.00 km	Mota village to Hatra village	1:2000	A-1
43	43	69.00 km to 70.422 km	Hatra village to Teghari village	1:2000	A-1
44	44	70.422 km to 72.49 km	Teghari village to Bara Andulia village	1:2000	A-1
45	45	72.49 km to 73.348 km	Bara Andulia village to Natungram village	1:2000	A-1
46	46	73.348 km to 74.900 km	Natungram village to Natungram village	1:2000	A-1
47	47	74.900 km to 76.433 km	Natungram village to Petuabhanga village	1:2000	A-1
48	48	76.433 km to 78.60 km	Petuabhanga village to Birpur village	1:2000	A-1
49	49	78.60 km to 79.517 km	Birpur village to Maheshnagar village	1:2000	A-1
50	50	79.517 km to 81.240 km	Maheshnagar village to patikabari village	1:2000	A-1
51	51	81.240 km to 82.665 km	patikabari village to Radhanagar village	1:2000	A-1
52	52	82.665 km to 84.532 km	Radhanagar village to Maheshnagar village	1:2000	A-1
53	53	84.532 km to 86.472 km	Maheshnagar village to Hatisala village	1:2000	A-1
54	54	86.472 km to 88.00 km	Hatisala village to Shibpur Dakhinpara village	1:2000	A-1
55	55	88.00 km to 89.365 km	Shibpur Dakhinpara village to Hatisala village	1:2000	A-1
56	56	89.365 km to 91.246 km	Hatisala village to Shibpur village	1:2000	A-1
57	57	91.246 km to 93.59 km	Shibpur village to Mejpota village	1:2000	A-1
58	58	93.59 km to 94.775 km	Mejpota village to Kamalapur village	1:2000	A-1
59	59	94.775 km to 96.436 km	Kamalapur village to Chander ghat	1:2000	A-1
60	60	96.436 km to 97.960 km	Chander ghat to Baliura village	1:2000	A-1

Sl. No.	Chart No.	Chainage (from ..... km to .... km)	Location (from .... to .....)	Scale	Size of the Chart
61	61	97.960 km to 99.522 km	Baliura village to Paschim Chalkjalia village	1:2000	A-1
62	62	99.522 km to 101.247 km	Paschim Chalkjalia village to Kulgachi village	1:2000	A-1
63	63	101.247 km to 102.840km	Kulgachi village to Kulgachi village	1:2000	A-1
64	64	102.840 km to 104.315 km	Kulgachi village to Chak Hanspukuria village	1:2000	A-1
65	65	104.315 km to 106.00 km	Chak Hanspukuria village to Kushtia village	1:2000	A-1
66	66	106.00 km to 107.575 km	Kushtia village to Hanspukuria village	1:2000	A-1
67	67	107.575 km to 109.248 km	Hanspukuria village to Boyerbanda village	1:2000	A-1
68	68	109.248 km to 110.754 km	Boyerbanda village to Tehatta village	1:2000	A-1
69	69	110.754 km to 112.204 km	Tehatta village to Jhinuk ghata village	1:2000	A-1
70	70	112.204 km to 113.725 km	Jhinuk ghata village to Bargidangapara village	1:2000	A-1
71	71	113.725 km to 115.828 km	Bargidangapara village to Jitpur village	1:2000	A-1
72	72	115.828 km to 117.423 km	Jitpur village to Ghosh para village	1:2000	A-1
73	73	117.423 km to 118.926 km	Ghosh para village to Krishnachandrapur village	1:2000	A-1
74	74	118.926 km to 120.474 km	Krishnachandrapur village to Iswarchandrapur village	1:2000	A-1
75	75	120.474 km to 121.916 km	Iswarchandrapur village to Majhipara village	1:2000	A-1
76	76	121.916 km to 123.390 km	Majhipara village to Rudranagar village	1:2000	A-1
77	77	123.390 km to 125.657 km	Rudranagar village to Taranagar village	1:2000	A-1
78	78	125.657 km to 127.613 km	Taranagar village to Suruppur village	1:2000	A-1
79	79	127.613 km to 129.170 km	Suruppur village to Ramnagar village	1:2000	A-1
80	80	129.170 km to 130.590 km	Ramnagar village to Palashipara village	1:2000	A-1

Table 27- Survey Charts