

Preface

India is the largest peninsula in the world with a coastline of about 7517 km with 12 major ports and 185 non-major / intermediate ports with a very impressive water network consisting of rivers, lakes, creeks and canals.

An efficient transport sector is vital for development of the economy to stimulate optimum competitive business environment. Indian transport system comprises various modes, viz. Railways, Roadways, Inland Waterways, Coastal Shipping and Airways. Integrated development of waterways can generate waterway grid that may in future help shift cargo traffic from road transport to the cheaper and eco-friendly inland waterways.

The first national waterways were established in India in mid 1980s & 1993 with a combined length of 2,716 km:

NW 1 (1620 km): Ganga - Bhagirathi- Hooghly river system between Haldia & Allahabad declared as National waterway in 1986

NW 2 (891 Km): Brahmaputra River between Bangladesh Border and Sadiya declared as National waterway in 1988

NW 3 (205 km): West coast canal (168 km) - Udyogmandal canal (23 km) - Champakara canal (14 km) declared as National waterway in 1993

The government also declared the following two inland waterways as national waterways during 2008:

NW 4 (1078 km): Kakinada-Pondicherry canal - Godavari and Krishna rivers

NW 5 (588 km): East Coast Canal - Brahmani River and Mahanadi delta

Given the untapped potential of India's inland waterways, the Govt. of India desires to explore the commercial navigation potential on year round basis. Ministry of Shipping (MoS), Govt. of India has directed Inland Waterways Authority of India (IWAI) to identify the viable waterways in India for their phased development.

Accordingly, to make provisions for existing national waterways and to provide for the declaration of certain inland waterways to be national waterways and also to provide for the regulation and development of the said waterways for the purposes of shipping and navigation, National waterway act, 2016 has received the assent of the President on the 25th March, 2016 declaring a total of 111 National Waterways.

IWAI, a statutory body under MoS, Govt. of India, has entrusted WAPCOS with the responsibility for preparation of two stages DPR of six waterways in Tamilnadu and Andhra Pradesh: **National waterway No's 55 (Kaveri Kollidam), 75 (Palar), 77 (Pazhyar), 79 (Pennar), 80 (Ponniyar) and 99 (Tamaraparani)** for a total length of 763 km.

This Final Feasibility report (Stage-I) covers the review of data, reconnaissance survey, preliminary traffic and market analysis and navigation development feasibility for Kaveri river. The consultant team has physically visited the 310 km river stretch and gathered all requisite information.

Acknowledgement

This final feasibility report (stage-1) is the outcome of review of existing infrastructure along the Kaveri Kollidam River, present state of affairs and the probability of development for Inland waterway. This vision is shared jointly by IWAI and WAPCOS Limited.

This report gives the present status of water-ways assets, topographic features, climatic variability, land use / land cover pattern, details of all cross structures, socio-economic information of the waterways and the feasibility of its development for navigation as per classification by Govt. of India (Gazette Notification).

We, WAPCOS project team acknowledge Cdr. P. K. Srivastava, Hydrographic Chief, Sh R.P.Khare, Advisor, IWAI, IWAI; Sh Rajiv Singhal, AHS, IWAI for constant encouragement and guidance, technical discussions and for evincing keen interest in the project and this report.

WAPCOS Team

Sector -18, Gurgaon
Haryana- 122015

List of Abbreviations

ATT	Admiralty Tide Table
BM	Bench Mark / Local Reference Level
CH	Chainage
CM	Central Meridian
CRZ	Coastal Regulation Zone
CWC	Central Water Commission
CVT	Calibration, Verification & Test
DF	Dual Frequency
DGPS	Differential Global Positioning System
DPR	Daily Progress Report
GPS	Global Positioning System
HFL	Highest Flood Level
HC	Horizontal Clearance
HSE	Health, Safety and Environment
kHz	kiloHertz
km	kilometer
m	meter
MHWS	Mean High Water Spring
mmtpa	million metric tonnes per annum
MN	million
m/s	meter per second
ms	milliseconds
MSL	Mean Sea Level
PWD	Public Works Department
QA/QC	Quality Assurance / Quality Control
QMS	Quality Management System
Rev	Revision
Rep.	Representative
SBES	Single Beam Echo sounder
SD	Standard Deviation
Sr	Senior
UTM	Universal Transverse Mercator
VC	Vertical Clearance
WGS	World Geodetic System

Table of Contents

Preface	1
Acknowledgement	2
List of Abbreviations	3
Table of Contents.....	4
SUMMARY: SALIENT FEATURES AT A GLANCE	13
1. About the Studies	18
2. Introductory Considerations	21
2.1 Name of River: Kaveri kollidam.....	21
2.2 Length of River	21
2.3 States, District through which river passes.....	21
2.4 Maps.....	21
2.5 River Characteristics.....	21
2.5.1 River Course	21
2.5.2 River Basin (Catchment Area)	21
2.5.3 Tributaries	22
2.5.4 Topography	22
2.5.5 Climate, Temperature & Humidity.....	22
2.5.6 Rainfall	23
2.5.7 Land Use.....	23
2.5.8 Soil.....	23
2.5.9 Demography.....	23
.....	24
2.5.10 Dams, Barrages/ Weirs/ Anicuts in River Basin	27
2.5.11 Tourism	27
2.6 Methodology and Data collection.....	27
2.6.1 Importance of Hydrological and Topographical data	27
2.6.2 Data Requirement.....	27
2.6.3 Primary Data- Sources.....	28
2.6.4 Secondary Data- Sources	29
2.6.5 Methodology.....	30
2.6.6 Classification of Waterways	31
3. Analysis of present state of affairs	34

3.1	Existing Dams, Weir, Barrage, Anicuts and Locks	34
3.2	Existing Bridges and Crossing Over River	35
3.3	Pipelines and cables	37
3.4	Details of High Tension and Electric Lines	38
3.5	Horizontal and Vertical Clearances	40
3.6	Hindrances in conducting the reconnaissance survey	42
3.7	Encroachment to the waterway	42
3.8	Details of Protected Area, Wildlife, Defense	42
3.9	NH/SH/MDR along and/or in Vicinity	42
3.10	Railway Line and stations in the vicinity	42
4.	Reconnaissance Survey	44
4.1	Resources, Equipment used and Methodology adopted	44
4.1.1	Resources & Equipment used	44
4.1.2	Detailed methodology adopted for survey	45
4.2	Description of bench marks (B.M.)/ Authentic reference level used	47
4.3	Tidal Influence Zone and Tidal Variation in different stretches.....	63
4.4	Chart datum / Sounding datum and reduction details	63
4.4.1	Horizontal control	63
4.4.2	Vertical control.....	63
4.5	Hydrographic/Topographic Survey	64
4.5.1	Hydrographic Survey.....	64
4.5.2	Topographic Survey.....	71
4.6	Observed and reduced bed profile along the river.....	189
4.6.1	Observed bed profile along the river	189
4.6.2	Reduced bed profile along the river	190
4.7	Results from Hydrographic/Topographic Survey	191
4.8	Soil characteristics	191
4.9	Water characteristics	191
4.10	Condition of banks	191
4.11	Details of collected water level and Discharge data.....	191
4.12	Methodology for analysis of Gauge- Discharge Data	196
4.13	Bed Slope	197
4.14	River Cross sections	197

4.15	Ten- Daily average Discharges	198
4.16	Monthly minimum and maximum Water levels	208
4.17	Yearly minimum and maximum Water levels	213
4.18	Chart Datum/ Sounding Datum	216
4.19	High Flood Levels	217
4.20	Monthly minimum and maximum Discharges (in cumecs)	219
4.21	Yearly minimum and maximum Discharges.....	224
5.	Preliminary Traffic studies and Market Analysis	228
5.1	Land use Pattern along waterway	228
5.1.1	Land Utilization Pattern	228
5.1.2	Districts along the river	230
5.2	Crops/Agriculture in the region	231
5.2.1	Agriculture.....	231
5.3	Availability of Bulk / Construction Material.....	238
5.3.1	Minerals	238
5.3.2	Commodities Opportunities.....	243
5.3.3	Coal	246
5.4	Existing Industries along Waterway.....	247
5.5	Existing Jetties and Terminals (with conditions and facilities).....	256
5.5.1	Karaikal Port.....	256
5.5.2	Thirukkadaiyur Port.....	259
5.5.3	Nagapattinam Port.....	259
5.6	Preliminary traffic identified – within 50km	259
5.7	Existing cargo movement.....	259
5.8	Prominent City / Town / Places of Worship / Historical places for Tourism	260
5.9	Availability of Passenger Ferry Services	265
5.10	Available and probable Water Sport Recreational Facilities	265
6.	Observations, Inferences and Conclusions	266
6.1	Waterway.....	266
6.2	Length	266
6.3	LAD	266
6.4	Cross-Structures.....	267
6.5	Water availability	268

6.6	Cargo / Passenger / Tourism / Ro-Ro Facility.....	275
6.7	Classification of waterway: Suitable for Navigation	275
6.8	Proposed alternative methods for making waterway feasible.....	277
6.9	SWOT Analysis.....	279
6.10	Recommendation for going to Stage II	280

List of Tables

Table 1: National Waterways in Tamilnadu and Andhra Pradesh	18
Table 2: Kaveri River Catchment	22
Table 3: SOI Toposheets & Hydrographic charts	28
Table 4: Gauge Discharge Sediment data collected from CWC	29
Table 5: Inland Waterway classification for Rivers	31
Table 6: Inland Waterway classification for Canals	31
Table 7: Type of vessels to be used in different class of waterways	32
Table 8: Details of existing Dams, Weir, Barrage, Anicut, Locks	35
Table 9: Details of existing Bridges and Crossing	37
Table 10: Details of High Tension and Electric Lines	39
Table 11: Details of Horizontal and Vertical clearance	42
Table 12: Survey Personnel	44
Table 13: Equipments for data acquisition	45
Table 14: Global Positioning System Geodetic Parameters	45
Table 15: Details of Bench Marks used	47
Table 16: Details of Chart Datum Used for Reduction of Soundings	63
Table 17: Bathymetry Water levels (Observed, Reduction factor and Reduced)	71
Table 18: Topographic survey Water levels (Observed, Reduction factor and Reduced)	188
Table 19: Location details of gauging stations	191
Table 20: Urachikottai GD site- General details	192
Table 21: Urachikottai GD site- Jurisdiction details	192
Table 22: Urachikottai GD site- Establishment details	193
Table 23: Urachikottai GD site - Data availability	193

Table 24: Kodumudi GD site- General details	193
Table 25: Kodumudi GD site- Jurisdiction details	194
Table 26: Kodumudi GD site- Establishment details	194
Table 27: Kodumudi GD site - Data availability	194
Table 28: Musiri GD site- General details	195
Table 29: Musiri GD site- Jurisdiction details	195
Table 30: Musiri GD site- Establishment details	195
Table 31: Musiri GD site - Data availability	196
Table 32: Bed Slopes of Kaveri Kollidam River	197
Table 33: River cross-sections over different years	197
Table 34: Mean 10 daily discharges (in cumecs) for Urachikottai	204
Table 35: Mean 10 daily discharges (in cumecs) for Kodumudi	206
Table 36: Mean 10 daily discharges (in cumecs) for Musiri	207
Table 37: Monthly Minimum and Maximum Water levels at Urachikottai	209
Table 38: Monthly Minimum and Maximum Water levels at Kodumudi	211
Table 39: Monthly Minimum and Maximum Water levels at Musiri	212
Table 40: Yearly minimum and maximum Water Levels at Urachikottai	213
Table 41: Yearly minimum and maximum Water Levels at Kodumudi	215
Table 42: Yearly minimum and maximum Water Levels at Musiri	216
Table 43: CD at gauging sites	217
Table 44: Monthly minimum and maximum Discharges (in Cumecs) at Urachikottai	220
Table 45: Monthly minimum and maximum Discharges (in Cumecs) at Kodumudi	222
Table 46: Monthly minimum and maximum Discharges (in Cumecs) at Musiri	223
Table 47: Yearly minimum and maximum Discharges at Urachikottai	225
Table 48: Yearly minimum and maximum Discharges at Kodumudi	226
Table 49: Yearly minimum and maximum Discharges at Musiri	227
Table 50: Land use Pattern (in hectares) of Districts along the Kaveri River	228
Table 51: Major crops in Fasli1234 (Jul'13 – Jun'14)	231
Table 52: Various types of Soil in Cuddalore district	232
Table 53: Major Crops in the Ariyalur district Fy'11	233

Table 54: Major Crops in the Tiruchirapalli district	233
Table 55: Major Crops in the Namakkal district	234
Table 56: Various types of Soil in Namakkal district	234
Table 57: Major Crops in the Erode district	235
Table 58: Major crops in the Karur district	236
Table 59: Various types of Soil in Karur district	236
Table 60: Major crops in the Nagapattinam district	237
Table 61: Major Crops in the Thanjavur district	237
Table 62: Production of minerals in Fy11	239
Table 63: Number of quarrying operations conducted in Fy15	240
Table 64: Total Reserves of Minerals in the district as in Fy'13	240
Table 65: Production of minerals	241
Table 66: Mining and quarrying operations in the district in Fy'11	241
Table 67: Production of Major Minerals	241
Table 68: Production of Minor Minerals	242
Table 69: Numbers of Mining and quarrying activities in the district in Fy'14	242
Table 70: Production of Minerals in Fy'11	243
Table 71: Production of Minerals	243
Table 72: District wise minerals production and opportunity for Kaveri river movement	245
Table 73: Coal requirement in Thermal Power Plants of Tamil Nadu	246
Table 74: Distance Comparison between Roadways & Waterways (Kaveri River)	249
Table 75: Industrial Estates in the district	249
Table 76: Major Industrial Clusters	249
Table 77: Product wise major Industrial Clusters	250
Table 78: Major Industrial Areas in the district	251
Table 79: Commodities wise major Industrial clusters in the district	251
Table 80: Major Industrial Areas in the district	251
Table 81: Total units and its turnover in the district	252
Table 82: Production of poultry birds in the districts in Fy'11	252
Table 83: Major industrial Areas in the district	253

Table 84: Commodities wise major Industrial Clusters	253
Table 85: Major Industrial Areas in district	253
Table 86: Major Clusters of Industries	254
Table 87: Major Industrial Areas in the district	254
Table 88: Major Industrial Clusters in the district	254
Table 89: Major Industrial Areas in the district	255
Table 90: Major Industrial Clusters in the district	255
Table 91: Opportunity for river movement of commodities handled at Karaikal Port	257
Table 92: Potential Opportunity for Kaveri River	260
Table 93: Water availability in Kaveri Kollidam River at Urachikottai	268
Table 94: Water availability in Kaveri Kollidam River at Kodumudi	269
Table 95: Water availability in Kaveri Kollidam River at Musiri	270
Table 96: Availability for days for discharge at Urachikottai on Kaveri Kollidam River	271
Table 97: Availability for days for discharge at Kodumudi on Kaveri Kollidam River	273
Table 98: Availability for days for discharge at Musiri on Kaveri Kollidam River	274

List of Figures

Figure 1: Google Map showing six rivers in Andhra Pradesh & Tamilnadu	19
Figure 2: Kaveri River Basin	24
Figure 3: Kaveri basin showing River stretch under present studies (From Urachikottai to Bay of Bengal)	25
Figure 4: Google image showing Kaveri Kollidam River stretch under present studies	26
Figure 5: Feasibility Studies (Stage 1)	30
Figure 6: Route map of Kaveri Kollidam River from its mouth	44
Figure 7: Equipment layout diagram	47
Figure 8: Details of GTS Benchmark at Kodumudi	48
Figure 9: Benchmark details by Fugro	49
Figure 10: TBM Benchmark at Kodumudi	50
Figure 11: Benchmark Details by Fugro	51
Figure 12: CWC MTBM Benchmark at Kodumudi	52

Figure 13: Descriptions of Benchmarks on Kaveri Bank	53
Figure 14: MTBM TO TBM leveling record	54
Figure 15: CWC MTBM at Musiri	55
Figure 16: Benchmark Details by Fugro	56
Figure 17: Description of CWC MTBM Musiri	57
Figure 18: GTS Benchmark at Perundurai	58
Figure 19: Benchmark details by Fugro	59
Figure 20: CWC MTBM at Urachikottai	60
Figure 21: Benchmark details	61
Figure 22: Benchmark details at Urachikottai and Perundurai	62
Figure 23: Kaveri Kollidam River from CH 0.0 to CH 5.0	64
Figure 24: Kaveri Kollidam River from CH 5.0 to CH 10.0	65
Figure 25: Kaveri Kollidam River from CH 10.0 to CH 16.43	66
Figure 26: Riverbed profile from the Estuary (CH-16) up to (CH-310)	189
Figure 27: Depth profile from river mouth (CH-0 to CH-16.4), up to the end of tidal influence.	190
Figure 28: Comparison of Kaveri river cross-section in different years at Urachikottai gauging station	199
Figure 29: Comparison of Kaveri river cross-section in different years at Kodumudi gauging station	199
Figure 30: Comparison of Kaveri river cross-section in different years at Musiri gauging station	200
Figure 31: Average 10 daily discharges at Urachikottai gauging site on Kaveri River	200
Figure 32: Average 10 daily discharges at Kodumudi gauging site on Kaveri River	201
Figure 33: Average 10 daily discharges at Musiri gauging site on Kaveri River	201
Figure 34: Gauge discharge curve for River Kaveri at Urachikottai gauge station	202
Figure 35: Gauge discharge curve for River Kaveri at Kodumudi gauge station	202
Figure 36: Gauge discharge curve for River Kaveri at Musiri gauge station	203
Figure 37: Minerals exported from Tamil Nadu	239
Figure 38: Coal based Thermal Power Plants in Tamil Nadu	246
Figure 39: Port connectivity of Major Industrial Clusters via Kaveri River	247
Figure 40: Commodity wise cargo growth of Karaikal Port	256
Figure 41: Potential Trade Traffic for Bulk Commodities	258

Figure 42: Period of exceedance of discharge in percentage of days in year for Kaveri Kollidam River at Urachikottai gauging station	268
Figure 43: Period of exceedance of discharge in percentage of days in year for Kaveri Kollidam River at Kodumudi gauging station	269
Figure 44: Period of exceedance of discharge in percentage of days in year for Kaveri Kollidam River at Musiri gauging station	270

List of Annexure

Annexure 1: Inventory of all structures on Kaveri Kollidam River	282
Annexure 2 : Collected Data Kaveri River	Seperate Bound
Annexure 3: Soil characterstics	300
Annexure 4: Site photographs of cross-structures	Seperate Bound
Annexure 5: Source Data table (<i>Figure 26: Riverbed profile from the Estuary (CH-16) up to (CH-310)</i>)	301

SUMMARY: SALIENT FEATURES AT A GLANCE

Sr. No.	Particulars	Details																																																																																																																														
1.	Name of Consultant	WAPCOS Limited																																																																																																																														
2.	Cluster number and State(s)	Cluster-5, Tamilnadu and Maharashtra																																																																																																																														
3.	Waterway stretch, NW	310 km length from Urachikottai Barrage to confluence with Bay of Bengal at Pazhaiyar (National Waterway 55)																																																																																																																														
4.	<u>Navigability status</u>																																																																																																																															
a)	Tidal & non-tidal portions (from...to, length, average tidal variation)	<p>The tidal reach of the Kaveri-Kollidam River is about 26 km as seen from Survey of India toposheet no 58 M15 and 58 M11. The tidal reach ends at about 9 km upstream of Kollidam Railway Bridge.</p> <p>The Nearest Ports are Karaikal and Cuddalore. As per data from Porto Nova the tidal variation is about 1 m.</p> <p>The coordinates of the port and the value of Chart Datum (CD) used in this survey are given below:</p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Location</th> <th>Latitude (N)</th> <th>Longitude (E)</th> <th>Z0 (m)</th> <th>Source</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PORTO NOVO</td> <td>11° 29' 00"</td> <td>79°46' 00"</td> <td>0.71</td> <td>ATT -3</td> </tr> </tbody> </table> <p>Dertails are also provided in Para 4.3 & 4.4</p>	Sr. No.	Location	Latitude (N)	Longitude (E)	Z0 (m)	Source	1	PORTO NOVO	11° 29' 00"	79°46' 00"	0.71	ATT -3																																																																																																																		
Sr. No.	Location	Latitude (N)	Longitude (E)	Z0 (m)	Source																																																																																																																											
1	PORTO NOVO	11° 29' 00"	79°46' 00"	0.71	ATT -3																																																																																																																											
b)	LAD status (w.r.t. CD) i) Survey period (Feb to March 2016)	<table border="1"> <thead> <tr> <th>LAD</th> <th>0-16</th> <th>16-30</th> <th>30-50</th> <th>50-75</th> <th>75-100</th> <th>100-125</th> <th>125-150</th> <th>Total km (0-150)</th> </tr> </thead> <tbody> <tr> <td><1.0</td> <td>1.93</td> <td>7.72</td> <td>3.73</td> <td>20.74</td> <td>15.79</td> <td>20.15</td> <td>14.63</td> <td>84.69</td> </tr> <tr> <td>1 - 1.2</td> <td>0.44</td> <td>1.32</td> <td>2.06</td> <td>1.33</td> <td>3.18</td> <td>2.70</td> <td>2.35</td> <td>13.38</td> </tr> <tr> <td>1.2 - 1.4</td> <td>1.01</td> <td>1.39</td> <td>3.84</td> <td>0.66</td> <td>2.35</td> <td>1.59</td> <td>1.10</td> <td>11.95</td> </tr> <tr> <td>1.4 - 1.7</td> <td>1.03</td> <td>2.02</td> <td>6.24</td> <td>1.46</td> <td>2.00</td> <td>0.35</td> <td>2.09</td> <td>15.19</td> </tr> <tr> <td>1.7 - 2.0</td> <td>1.88</td> <td>0.87</td> <td>1.28</td> <td>0.81</td> <td>0.37</td> <td>0.19</td> <td>1.74</td> <td>7.13</td> </tr> <tr> <td>> 2.0 m</td> <td>10.09</td> <td>0.00</td> <td>2.20</td> <td>0.74</td> <td>1.54</td> <td>0.00</td> <td>2.90</td> <td>17.47</td> </tr> </tbody> </table> <p>Chainage (Km)</p> <table border="1"> <thead> <tr> <th>LAD</th> <th>150-175</th> <th>175-200</th> <th>200-225</th> <th>225-250</th> <th>250-275</th> <th>275-310</th> <th>Total km (150-310)</th> <th>Grand Total (0-310)km</th> </tr> </thead> <tbody> <tr> <td><1.0</td> <td>16.76</td> <td>19.01</td> <td>11.54</td> <td>18.33</td> <td>14.34</td> <td>16.56</td> <td>96.52</td> <td>181.21</td> </tr> <tr> <td>1 - 1.2</td> <td>1.83</td> <td>1.34</td> <td>0.93</td> <td>1.59</td> <td>2.21</td> <td>2.45</td> <td>10.35</td> <td>23.73</td> </tr> <tr> <td>1.2 - 1.4</td> <td>0.85</td> <td>2.07</td> <td>0.70</td> <td>1.24</td> <td>1.95</td> <td>1.95</td> <td>8.76</td> <td>20.71</td> </tr> <tr> <td>1.4 - 1.7</td> <td>0.30</td> <td>1.81</td> <td>2.14</td> <td>1.15</td> <td>2.46</td> <td>3.63</td> <td>11.50</td> <td>26.69</td> </tr> <tr> <td>1.7 - 2.0</td> <td>0.51</td> <td>0.87</td> <td>2.81</td> <td>1.34</td> <td>1.37</td> <td>2.75</td> <td>9.65</td> <td>24.6</td> </tr> <tr> <td>> 2.0 m</td> <td>4.03</td> <td>0.73</td> <td>6.94</td> <td>1.19</td> <td>2.29</td> <td>7.15</td> <td>22.33</td> <td>25.23</td> </tr> </tbody> </table>	LAD	0-16	16-30	30-50	50-75	75-100	100-125	125-150	Total km (0-150)	<1.0	1.93	7.72	3.73	20.74	15.79	20.15	14.63	84.69	1 - 1.2	0.44	1.32	2.06	1.33	3.18	2.70	2.35	13.38	1.2 - 1.4	1.01	1.39	3.84	0.66	2.35	1.59	1.10	11.95	1.4 - 1.7	1.03	2.02	6.24	1.46	2.00	0.35	2.09	15.19	1.7 - 2.0	1.88	0.87	1.28	0.81	0.37	0.19	1.74	7.13	> 2.0 m	10.09	0.00	2.20	0.74	1.54	0.00	2.90	17.47	LAD	150-175	175-200	200-225	225-250	250-275	275-310	Total km (150-310)	Grand Total (0-310)km	<1.0	16.76	19.01	11.54	18.33	14.34	16.56	96.52	181.21	1 - 1.2	1.83	1.34	0.93	1.59	2.21	2.45	10.35	23.73	1.2 - 1.4	0.85	2.07	0.70	1.24	1.95	1.95	8.76	20.71	1.4 - 1.7	0.30	1.81	2.14	1.15	2.46	3.63	11.50	26.69	1.7 - 2.0	0.51	0.87	2.81	1.34	1.37	2.75	9.65	24.6	> 2.0 m	4.03	0.73	6.94	1.19	2.29	7.15	22.33	25.23
LAD	0-16	16-30	30-50	50-75	75-100	100-125	125-150	Total km (0-150)																																																																																																																								
<1.0	1.93	7.72	3.73	20.74	15.79	20.15	14.63	84.69																																																																																																																								
1 - 1.2	0.44	1.32	2.06	1.33	3.18	2.70	2.35	13.38																																																																																																																								
1.2 - 1.4	1.01	1.39	3.84	0.66	2.35	1.59	1.10	11.95																																																																																																																								
1.4 - 1.7	1.03	2.02	6.24	1.46	2.00	0.35	2.09	15.19																																																																																																																								
1.7 - 2.0	1.88	0.87	1.28	0.81	0.37	0.19	1.74	7.13																																																																																																																								
> 2.0 m	10.09	0.00	2.20	0.74	1.54	0.00	2.90	17.47																																																																																																																								
LAD	150-175	175-200	200-225	225-250	250-275	275-310	Total km (150-310)	Grand Total (0-310)km																																																																																																																								
<1.0	16.76	19.01	11.54	18.33	14.34	16.56	96.52	181.21																																																																																																																								
1 - 1.2	1.83	1.34	0.93	1.59	2.21	2.45	10.35	23.73																																																																																																																								
1.2 - 1.4	0.85	2.07	0.70	1.24	1.95	1.95	8.76	20.71																																																																																																																								
1.4 - 1.7	0.30	1.81	2.14	1.15	2.46	3.63	11.50	26.69																																																																																																																								
1.7 - 2.0	0.51	0.87	2.81	1.34	1.37	2.75	9.65	24.6																																																																																																																								
> 2.0 m	4.03	0.73	6.94	1.19	2.29	7.15	22.33	25.23																																																																																																																								

<p>c)</p>	<p>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)</p>	<p>Pillur Dam, Kolar barrage, Lower Bhavani Dam and Nerunjipettai Barrage, Upper Bhavani Weir, Lower Coleroon Anicut and Grand Anicut are some of 10 dams/ weir / Barrages on Kaveri River. Navigational lock is not provided in any of the dams/weir/Anicuts/Barrages in the present study stretch.</p> <p>24 bridges exist crosses Kaveri River V.C. from H.F.L. for bridges varies from 0.5 m to 7.0 m. H.C. for bridges varies from 15m to 50m</p> <p>26 High Tension and Electric Lines cross Kaveri river</p> <p>V.C. from H.F.L. Varying from 0.5 to 17 meters H.C. Varying from 20 to 350 meters</p>																						
<p>d)</p>	<p>Avg discharge & no. of days</p>	<p>No of Gauge Stations: Three (Musiri, Kodumudi, Uratchikottai)</p> <p>Musiri</p> <p>June - Begins at 20 and increase to 160 m³/s July to September - Begins at 250 and increase to 500 m³/s October to January - Begins at 450 and decrease to 200 m³/s February to May - Begins at 90 and decrease to 20 m³/s</p> <p>Kodumudi</p> <p>June - Begins at 50 and increase to 180 m³/s July to September - Begins at 300 and increase to 500 m³/s October to January - Begins at 400 and decrease to 200 m³/s February to May - Begins at 110 and decrease to 45 m³/s</p> <p>Uratchikottai</p> <p>June - Begins at 35 and increase to 185 m³/s July to September - Begins at 260 and increase to 500 m³/s October to January - Begins at 400 and decrease to 200 m³/s February to May - Begins at 70 and decrease to 30 m³/s</p>																						
<p>e)</p>	<p>Slope (1 in)</p>	<table border="1"> <thead> <tr> <th colspan="2">Reach</th> <th rowspan="2">River Bed Level Change</th> <th rowspan="2">Distance</th> <th rowspan="2">Slope</th> </tr> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>Urachikottai RBL 152.45 m</td> <td>Kodumudi RBL 121.50 m</td> <td>30.95 m</td> <td>51.98 km</td> <td>1/1680</td> </tr> <tr> <td>Kodumudi RBL 121.50 m</td> <td>Misuri RBL 81.265 m</td> <td>40.235 m</td> <td>68.80 km</td> <td>1/1710</td> </tr> <tr> <td>Musiri RBL 81.265 m</td> <td>Mouth RBL 0.0 m</td> <td>81.265 m</td> <td>182.25 km</td> <td>1/2242</td> </tr> </tbody> </table>	Reach		River Bed Level Change	Distance	Slope	From	To	Urachikottai RBL 152.45 m	Kodumudi RBL 121.50 m	30.95 m	51.98 km	1/1680	Kodumudi RBL 121.50 m	Misuri RBL 81.265 m	40.235 m	68.80 km	1/1710	Musiri RBL 81.265 m	Mouth RBL 0.0 m	81.265 m	182.25 km	1/2242
Reach		River Bed Level Change	Distance	Slope																				
From	To																							
Urachikottai RBL 152.45 m	Kodumudi RBL 121.50 m	30.95 m	51.98 km	1/1680																				
Kodumudi RBL 121.50 m	Misuri RBL 81.265 m	40.235 m	68.80 km	1/1710																				
Musiri RBL 81.265 m	Mouth RBL 0.0 m	81.265 m	182.25 km	1/2242																				

f)	<p>Consultant's inference</p>	<p>0-30 km This reach can be developed as Class I waterway with little dredging (since horizontal clearance is 30 m at Kollidam railway bridge) or Class II waterway with little modification of existing Kollidam railway bridge and dredging.</p> <p>30-59 km Lower Anicut exists at upstream end of this stretch at chainage 59 km. Modification/reconstruction of Lower anicut will lead to continuous discharges in this stretch resulting in increase in water depths. Hence, the navigation period can be extended up to 9-10 months after modification/reconstruction of Lower anicut which may be worked out after detailed studies.</p> <p>59-108.3 km Lower Anicut exists at downstream end of this stretch at chainage 59 km. Raising of its storage by about 2-3 m after modification will lead to additional depth of about 0.7-0.5 m in most of the reach. Water depths of up to 1.0m were observed during survey (in lean season).</p> <p>108.3 – 142.9 km Grand Anicut is located at upstream end of this stretch. Modification / reconstruction of Grand anicut may lead to addition in water depths in this reach and may increase navigation duration. This can be worked out after detailed studies in Stage II.</p> <p>142.9 – 173.6 km This reach starts from Upper anicut and goes up to Grand Anicut. Upper anicut was constructed to save Grand anicut from Kaveri floods. It diverts the excess floods into the Kollidam River. The navigation in this stretch can be improved by additional measures of regulated flows and raising the storage (Ponding levels). These details may be worked out after detailed studies in second stage and mathematical modelling studies.</p> <p>173.6-213.6 km Mayanur barrage and Upper anicut forms the upstream and downstream end of this stretch. Modification/raising the height of Mayanur barrage will lead to more discharges (regulated) into this stretch.</p> <p>213.6 – 244.9 km Mayanur barrage forms the downstream end of this stretch. Raising the height of mayanur barrage will lead to more ponding and increased water depth in this reach.</p> <p>244.9– 277.8 km Bhavani Kattalai –III barrage is located at start of this reach. Raising the gate heights by about 2-4 m will significantly improve the navigation potential in this stretch the details of which can be worked out after detailed studies in stage 2.</p>
----	-------------------------------	--

		<p>277.8-293.5 km This reach is bounded by Bhavani Kattlai II and Bhavani Kattlai III at downstream and upstream respectively. Raising the height of gates of both the barrages will result in more water depth and more discharges into this stretch. The navigability period can be improved along with depth.</p> <p>293.5 – 310 km Urachikottai barrage and Bhavani Kattlai II forms the extreme ends of this stretch. Raising the height of gates of both the barrages will result in more water depth and more discharges into this stretch. The navigability period and depths can be significantly improved after working out the details for which detailed cross-section survey and modelling studies are required.</p>
5.	<u>Traffic Potential</u>	
a)	Present IWT operations, ferry services, tourism, cargo, if any	<p>Cargo There exists opportunity for transportation of Coal from Karaikal port to Mettur TPP power plant using Kaveri river. This coal can further be loaded into barges and moved through Kaveri River to reach Mettur. Sophisticated infrastructure like conveyor belts can be constructed to transport the coal from river point to the power plant. This can act as alternative to the railways which in turn will decongest the Chennai-Trivendram and Tuticorin-Mysuru railways.</p> <p>Ferry services Potential exists for Recreational development, passenger ferry services and Ro-Ro facilities for many major towns exists along the river such as Erode, Tiruchirapalli, Srirangam, Urachikottai, Karur, Chidambaram, Kodumudi etc. At Pichavaram, there are row boats & motor boats available. Ferry services can be further developed near above towns.</p> <p>Tourism The district administration of Cuddalore district and Tamil Nadu Tourism Development Corporation has initiated an ecotourism festival at Pichavaram. The year 2015 saw the third edition of this festival. Among the various activities of the festival are water sports, such as boating, rowing, kayaking and canoeing.</p>
b)	Important Industries within 50 km	<p>Kaveri River flows in the north of Karaikal port at a distance of about 45 km from the port. Kaveri is one of the longest rivers of Tamil Nadu. Erode, Karur, Tiruchirapalli, Cuddalore, Thanjavur, Nagapattinam are among the major industrialized districts along the river.</p> <p>There are about 25 industrial locations located along the bank of the river. Karaikal port can act as a gateway for exim trade to most of these locations. NanjaiUthukkuli industrial area in Erode is about 4 km from the river. Ariyamangalam and Thiruverumbur industrial areas in Tiruchirapalli are located within 10 km from the river. All the industrial areas in the land</p>

		locked districts along the traverse path of the river are located within 25 km from the river. SIDCO, Semmandalam, SIDCO, Vadalur, Ceramic Industrial Estate, Vridhachalam SIPCOT, Kudikadu in Cuddalore District, SIDCO, Ariyamangalam SIDCO, Thuvakudi SIDCO, Thiruverumbur SIDCO, Thuvakudi (WCR) SIDCO, Vazhavanthankottai–WIP SIDCO, Vazhavanthankottai–P II SIDCO, Vazhavanthankottai–P III SIDCO, Kumbakudi in Tiruchirapalli, and SIDCO units in Namakkal, Erode, Karur, Nagapattinam, Thanjavur, Tiruvannamalai districts along the Kaveri river.
c)	Distance of Rail & Road from industry	All the industrial towns are well connected by Roadways. Railway connectivity is there for most of the towns. Presently all goods are transported by Roadways.
6.	Consultant's recommendation for going ahead with Stage-II (DPR preparation)	WAPCOS recommend carrying out detailed studies and investigations in the total stretch of 310 km length to examine the additional measures to improve navigability period.
7.	Any other information/comment	-----

1. About the Studies

M/s Inland Waterways authority of India (IWAI), a statutory body under ministry of shipping, Govt. of India, has entrusted WAPCOS with the responsibility for preparation of two stage DPR for 6 inland waterways of rivers Pennar, Kaveri kollidam, Palar, Pazhyar, Ponnayar, Tamaraparani in Tamilnadu and Andhra Pradesh. The approximate length and approx. average width of all six rivers are given in the table below:

Sl. No.	Name of the River / Canal	Description of Inland Waterway	From:	Upto:
1.	Pennar River, Andhra Pradesh	29 km length of the river from Penna Barrage, Pothireddypalem to confluence with Bay of Bengal near Kudithipalem (NATIONAL WATERWAY 79)	14°28'8.38"N, 79°59'9.31"E	14°35'36.75"N, 80°11'30.61"E
2.	Palar River, Tamilnadu	141 km length of the river from rail bridge at Virudampattu, Vellore to confluence with Bay of Bengal at Sadurangapattinam (NATIONAL WATERWAY 75)	12°56'14.07"N 79° 7'29.70"E	12°27'52.16"N, 80° 9'13.47"E
3.	Ponnayar River, Tamilnadu	125 km length of the river from Sathanur Dam to Cuddalore at confluence of Bay of Bengal (NATIONAL WATERWAY 80)	12°11'0.06"N, 78°51'1.25"E	11°46'21.76"N, 79°47'41.70"E
4.	Kaveri / Kollidam, Tamilnadu	364 km length of the river from Uratchikottai Barrage to confluence with Bay of Bengal at Pazhaiyar (NATIONAL WATERWAY 55)	11°29'3.09"N 77°42'13.68"E	11°21'37.97"N 79°49'53.23"E
5.	Tamaraparani River, Tamilnadu	64 km length of the river from Sulochana Mudalir bridge, Tirunelveli to confluence with Bay of Bengal near Punnaikayal (NATIONAL WATERWAY 99)	8°43'43.17"N, 77°42'53.94"E	8°38'24.90"N, 78° 7'37.85"E
6.	Pazhyar River, Tamilnadu	20 km length of the river from Bridge near Veeranarayana Mangalam village to confluence with Arabian Sea at Manakudi (NATIONAL WATERWAY 77)	8°13'48.97"N 77°26'27.34"E	8°5'15.01"N 77°29'7.61"E

Table 1: National Waterways in Tamilnadu and Andhra Pradesh

The Google Map showing all river stretches is enclosed as **Figure 1**.

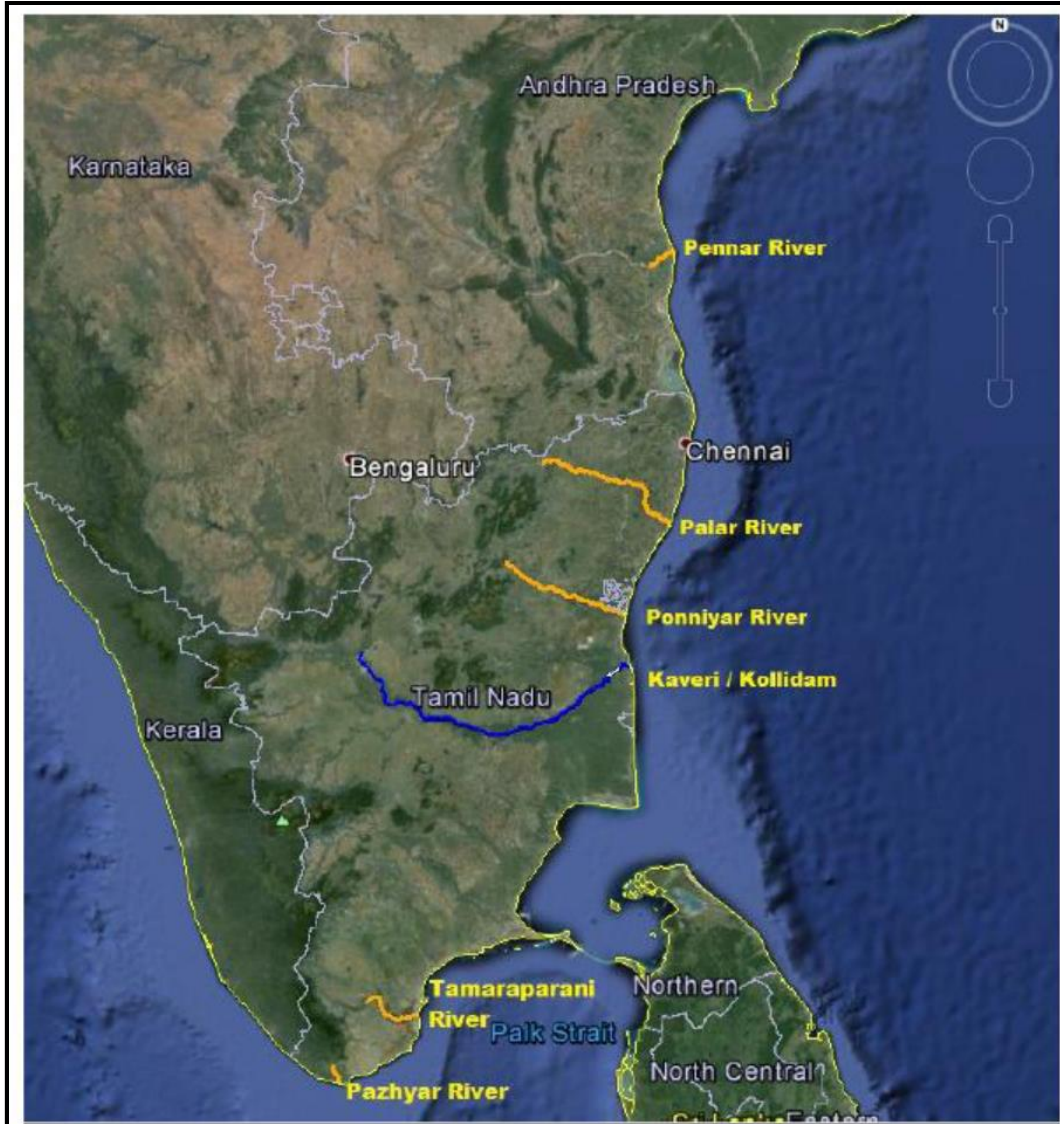


Figure 1: Google Map showing six rivers in Andhra Pradesh & Tamilnadu

Accordingly, WAPCOS Ltd. has undertaken the studies for 6 national waterways (Pennar, Palar, Ponnaiyar, Kaveri Kollidam, Tamaraparani and Pazhyar) in Tamilnadu and Andhra Pradesh. The brief scope of work is depicted as under:

Stage-1

- A. Reconnaissance Survey
- B. Collection and Review of available data
- C. Feasibility Report

Stage-2

- A. Hydrographic Survey & Hydro-morphological survey
- B. Traffic Survey & Techno economic feasibility
- C. Preparation of Detailed Project Report

The present studies are limited to establish the feasibility of waterways for Inland navigation i.e. up to Stage 1 only.

The present **Final Feasibility Report** covers the review of data, reconnaissance survey, present state of affairs, traffic analysis, possible navigable stretches for Kaveri River as detailed below:

- ✓ **Introductory Considerations**
- ✓ **Classification of waterways**
- ✓ **Details of existing structures**
- ✓ **Reconnaissance survey & site visit**
- ✓ **Single Line Longitudinal Survey**
- ✓ **Bed Profile**
- ✓ **Soil Texture**
- ✓ **Hydrological Data collection and analysis**
- ✓ **Preliminary Traffic studies and Market analysis**
- ✓ **Results and feasibility of waterways**

2. Introductory Considerations

As discussed in previous chapter, Cluster 5 consists of six rivers in the states of Tamilnadu and Andhra Pradesh. This chapter covers the introductory considerations, origin, hydrological parameters like altitude, length, catchment area, Annual rainfall, major dams, and barrages along the river, tributaries, and major cities along their bank, historical and religious places for Kaveri Kollidam River.

2.1 Name of River: Kaveri kollidam

2.2 Length of River

364 km length of Kaveri Kollidam River is declared as National Waterway 55 as per the Gazette Notification published by Govt. of India on 26 March 2016. The total length of the river from origin to its outfall in the Bay of Bengal is 765 km. The length under present studies is detailed below:

310 km length from Urachikottai Barrage to confluence with Bay of Bengal at Pazhaiyar (as per survey) (NATIONAL WATERWAY 55)	From: 11°29'3.09"N 77°42'13.68"E	Upto: 11°21'37.97"N 79°49'53.23"E
---	---	--

2.3 States, District through which river passes

The Kaveri River traverses through 8 districts of Tamil Nadu namely Erode, Nammakal, Karur, Tiruchirapalli, Tanjavur, Ariyalur, Cuddalore and Nagapattinam.

The main towns in the vicinity of Kaveri River are Chidambaram, Kattumannarkoli, Sirkali, Mayiladuhurai, Udayarpalayam, Ariyalur, Thiruvaidaimarudur, Kumbakonam, Papanasam, Thiruvaiyaru, Lalgudi, Manachanallur, Srirangam, Musiri, Thottiyam, Kulithalai, Krishnarayapuram, Karur, Namakkal, Paramthivelur, Tiruchengode and Erode in its 310 km stretch.

2.4 Maps

A Map showing Kaveri Sub basin (Source: CWC) and Present study stretch is attached as Figure 2, Figure 3 and Figure 4.

2.5 River Characteristics

2.5.1 River Course

The Cauvery River is one of the major rivers of the peninsular India. It rises at an elevation of 1,341 m at Talakaveri on the Brahmagiri range near Cherangala village of Kodagu district of Karnataka and drains into the Bay of Bengal. The total length of the river from origin to outfall is 765 km. In size, it is smaller than the Godavari, the Mahanadi and the Krishna.

2.5.2 River Basin (Catchment Area)

The Kaveri basin extends over states of Tamil Nadu, Karnataka, Kerala and Union Territory of Puducherry and drains a total area of 87,900 Sq.km. It falls in peninsular India and lies between 75°27'E to 79°54'E and 10°9'N to 13°30'N. It is bounded by the Western Ghats on the west, by the Eastern Ghats on the east and south and by the ridges separating it from Krishna basin and Pennar basin on the north.

The three main physiographic division of the basin are the Western Ghats, the plateau of Mysore and the Delta. The Western Ghat region is mountainous and covered with thick vegetation. The delta is the most fertile tract in the basin and covers some portion of Tamil Nadu and is eminently suited for intensive cultivation.

State	Drainage Area (sq. km.)	% of Total
Tamilnadu	48,730	55
Karnataka	36,240	41
Kerala	2,930	3
Total	87,900	100

Table 2: Kaveri River Catchment

The major part of basin is covered with agricultural land accounting to 66.21% of the total area and 20.50 % of the basin is covered by forest area. The basin spreads over three sub-basins and a total population of 3, 18, 89,280 spread across the basin area.

2.5.3 Tributaries

The Kaveri river system consists of 21 principal tributaries each with catchment area around 250 sq. km. The important tributaries joining from left are the Harangi, the Hemavathi, the Shimsha and the Arkavati. The Lakshmantirtha, the Kabbani, the Suvarnavati, the Bhavani, the Noyil and the Amaravati joins river Kaveri from right.

The river Bhavani is one of the largest and the second longest river in the basin is one of the tributaries of Kaveri River. Hemavathi is the longest tributary joining Kaveri.

All the distributaries in the region are non-perennial and flow is mainly due to Kaveri water release during June to January. No considerable flow occurs due to South-West monsoon and for most of the months in the year, the flow available are the regulated flows from upper regulators maintained by Tamil Nadu.

2.5.4 Topography

Kaveri River rises at an elevation of 1,341 m at Talakaveri on the Brahmagiri range near Cherangala village in Kodagu district of Karnataka. The total length of the river from origin to outfall is 765 km. The plateau of Mysore with an average elevation of 750 m slopes gently towards the east/south-east. The maximum elevation of about 2000-3000m is observed in the basin.

2.5.5 Climate, Temperature & Humidity

Winter, summer, South-West Monsoon, and North-East Monsoon occurs in the Kaveri Basin. The climate generally remains dry except from monsoon months. There is considerable variation in the mean daily maximum and minimum temperatures across the basin.

The mean monthly temperature over the basin varies from 22.98° C to 28.43° C. The northern part of basin experience lower temperatures than southern. Temperatures are moderate in the monsoon and post-monsoon seasons and vary from 25° C to 27.5° C.

2.5.6 Rainfall

The average rainfall is low ranging from 500 mm to 1000 mm (for Tamilnadu region) and is semi-arid. The highest rainfall in the Kaveri basin usually occurs in July or early August. The basin is mainly influenced by South-West monsoon in the Karnataka & Kerala and North-East monsoon in Tamil Nadu.

2.5.7 Land Use

Agricultural land is dominant in this basin followed by forest area and Wastelands. The land use/land cover in the basin also include fallow land, scrub land, scrub forest, river/stream/canal, rural, urban mining, swamp/mangrove and coconut trees.

2.5.8 Soil

The principal soil types found in the basin are clay, loamy clay, sandy clay, silty clay, loamy sand, sand, loam, silt loam, silt, sandy loam and rocky. The soil productivity of the basin is categorized into highly productive, low productive, non-productive and moderately productive. The soil in the basin is classified into moderate, slight and severe and the major soil slope classes are gently, steep, moderately and nearly leveled.

2.5.9 Demography

Kaveri Kollidam River traverses through Dharmapuri district, Hogenakkal, Mettur, Erode, Namakkal, Karur and Tiruchirapalli in its course to bay of Bengal. Tiruchirapalli is an important town along with Erode.



Figure 2: Kaveri River Basin



Figure 3: Kaveri basin showing River stretch under present studies (From Urachikottai to Bay of Bengal)



Figure 4: Google image showing Kaveri Kollidam River stretch under present studies

2.5.10 Dams, Barrages/ Weirs/ Anicuts in River Basin

Pillur Dam, Kolar barrage, Lower Bhavani Dam, Nerunjipettai Barrage, Bhavani kattalai Power stations, Upper Bhavani Weir, Lower Colleron Anicut and Grand Anicut are some of the important cross structures over Kaveri River in its entire stretch of 765km. Bhavani kattalai Power stations, Upper Bhavani Weir, Lower Colleron Anicut and Grand Anicut exist in present study stretch. The details of structures in present study stretch and the existence of navigational locks is provided in chapter 3.

2.5.11 Tourism

A number of water tourism sites, Wildlife sanctuaries and National Parks, namely Bannerghatta National Park, Biligiri Rangaswamy Temple (BRT) Wildlife Sanctuary, Point Calimere Wildlife Sanctuary, Wayanad Wildlife Sanctuary, Adichunchanagiri Peacock Sanctuary etc. are located in the basin. Kuruvadweep and Mananthavady islands are also situated here. The Velankanni Matha Church, Shettihalli Submerged Church, Nagore Dargha, Ayappa Temple, Somnathpur Temple, Lakshmi Kantha Swamy Temple, Bhagamandala etc. are the religious places. Kovai Kuttralam Fall, Iruppu Falls, Abbey Falls and Catherine Falls are some of the waterfalls located inside the basin.

2.6 Methodology and Data collection

2.6.1 Importance of Hydrological and Topographical data

Navigability of a natural river channel or tidal creek will primarily depend upon hydraulic parameters water discharge, velocity, sediment load, flow depth and width of river channel. These parameters are function of topography/bathymetry of river bed and discharge in river during different seasons. Apart from these important parameters, there are other natural factors such as tidal range and length of tidal reach. type/nature of river bed (rocky, sandy, silty, clayey), bends in river course and stability of alignment of deep channel of river over long period. Apart from above natural factors, information on other factors such as various structures across (Dams/weirs/barrages/bridges) and along the river bank (river training and bank protection works).

2.6.2 Data Requirement

The following data was required for Stage-1 feasibility report:

1. Type of crops (in different seasons) and industries along the waterway
2. Availability of passenger ferry services. Prominent towns / City along the waterway.
3. Historical and tourist places.
4. Existing water sport and recreational activities and future probability.
5. Details of cross-structures (bridges, aqueducts, electric lines, telephone lines, pipe lines, cables) and their clearances. Salient features of Dams / Barrages / Weirs.
6. Availability of water in different seasons. Also to correlate this with CWC / Irrigation datum's.
7. Ponding level and limit of Dams / Barrages / Weirs.
8. Encroachment in the waterway, width of the waterway, sharp bends.
9. Environmental impacts. CRZ or wildlife clearances.
10. Local/pronounced name of the rivers in different stretches.
11. Any Border issue with other country.
12. Incorporation of topographical features (outside survey limits) from Google Earth imageries.
13. Obstructions to the navigation and un-approachable areas.

14. Photographs of all cross-structures, gauges, obstructions - annotated with location & chainage. In report with lat/long, easting/northing, chainage details
15. Permanent structures located within this corridor.
16. All prominent shore features (locks, bridges, aqueducts, survey pillars if available etc) and other conspicuous objects shall be fixed and indicated on the chart and included in the report.
17. Details of water intake/ structures shall be collected and shown on the charts and include in the report.
18. Availability of berthing place, existing jetty, ferry ghats, approach roads etc. in the area shall be indicated on the charts and include in the report.
19. During the survey, condition of the banks shall also be collected, whether that banks are pitched (protected) or not protected. The length of bank protection, where banks erosion is taking place shall also be estimated.
20. Positions and levels of corners of permanent structures within the corridor shall be physically surveyed and marked on survey charts.

2.6.3 Primary Data- Sources

A. Survey of India (SOI) Dehradun, during February & March 2016

Toposheets and satellite imageries are useful to obtain information such as extent of tidal reach, HTL & LTL, width of river and deep channel, important places, nature of river bed and bank along reach, channel bends, slope of river channel, and locations of various structures across and along river course and tendency of shifting of deep channel (general morphology of the deep channel of the river course).

As the coastal zone falls under restricted category, the restricted and non-restricted Toposheets of Survey of India /hydrographic charts and satellite imageries has been collected after taking approval from **Ministry of Water Resources, Govt. of India**. A total of 43 toposheets were procured from Survey of India (SOI) (39 no.'s toposheets of 1: 50000 scale and 04 No's toposheets of 1:25000 scale) for all six rivers and analyzed to study various aspects mentioned above. The satellite imageries of different years from Google are also analyzed. The details of toposheets for Kaveri River as collected from SOI are given as under:

Kaveri	58 E/11, 58 E/14, 58 E/15, 58 E/16, 58 I/4, 58 J/1, 58 J/5, 58 J/9,
Kollidam	58J/13, 58 M/8, 58 M/11, 58 M/12, 58 M/15, 58 N/1, 58 N/5
River	Hydrographic chart No. 357

Table 3: SOI Toposheets & Hydrographic charts

B. Data from Site Visit and Reconnaissance survey during March & April 2016

The site visit and reconnaissance survey was carried out in March and April 2016.

The details of existing cross-structures, Weirs, Barrages, Anicut, Dams, HT/ LT line, Type of Crops, Soils, shore protection along the waterway, Historical and tourist places, existing ferry services were collected. The collected data and photographs have been detailed in Chapter 3.

The details of existing industries, major commodities, production were also collected from various industries located around main industrial clusters, important towns in the vicinity of waterways and important ports near river mouth. These details have been presented in Chapter 5.

2.6.4 Secondary Data- Sources

A. Central Water Commission (CWC), Govt of India and Water Resource Division (WRD), Chennai during February, March and April 2016

These data give most vital information on water availability in river reach and sediment concentration in river water.

Gauge- discharge, sediment and river cross section data (at gauging site) was collected from CWC for three gauging stations on Kaveri River. Following Table gives details of gauging stations and data collected.

River	Gauging station	Data type	From	To	Frequency
Kaveri Kollidam	Urachikottai, Dist. Erode, TN 11° 28' 40" N 77° 42' 00" E	Gauge- discharge	1979	2012	daily
		Sediment	2001	2012	daily
		Cross-section	2001	2012	2 days/year
	Kodumudi, Dist Erode, TN 11° 04' 52" N 77° 53' 25" E	Gauge- discharge	1971	2012	daily
		Sediment	2072	2011	daily
		Cross-section	1999	2012	2 days/year
	Musiri, Dist Trichi, TN 10° 56' 36" N 78° 16' 06" E	Gauge- discharge	1971	2012	daily
		Sediment	2072	2011	daily
		Cross-section	1999	2012	2 days/year

Table 4: Gauge Discharge Sediment data collected from CWC

2.6.5 Methodology

The studies are being carried out as detailed below:

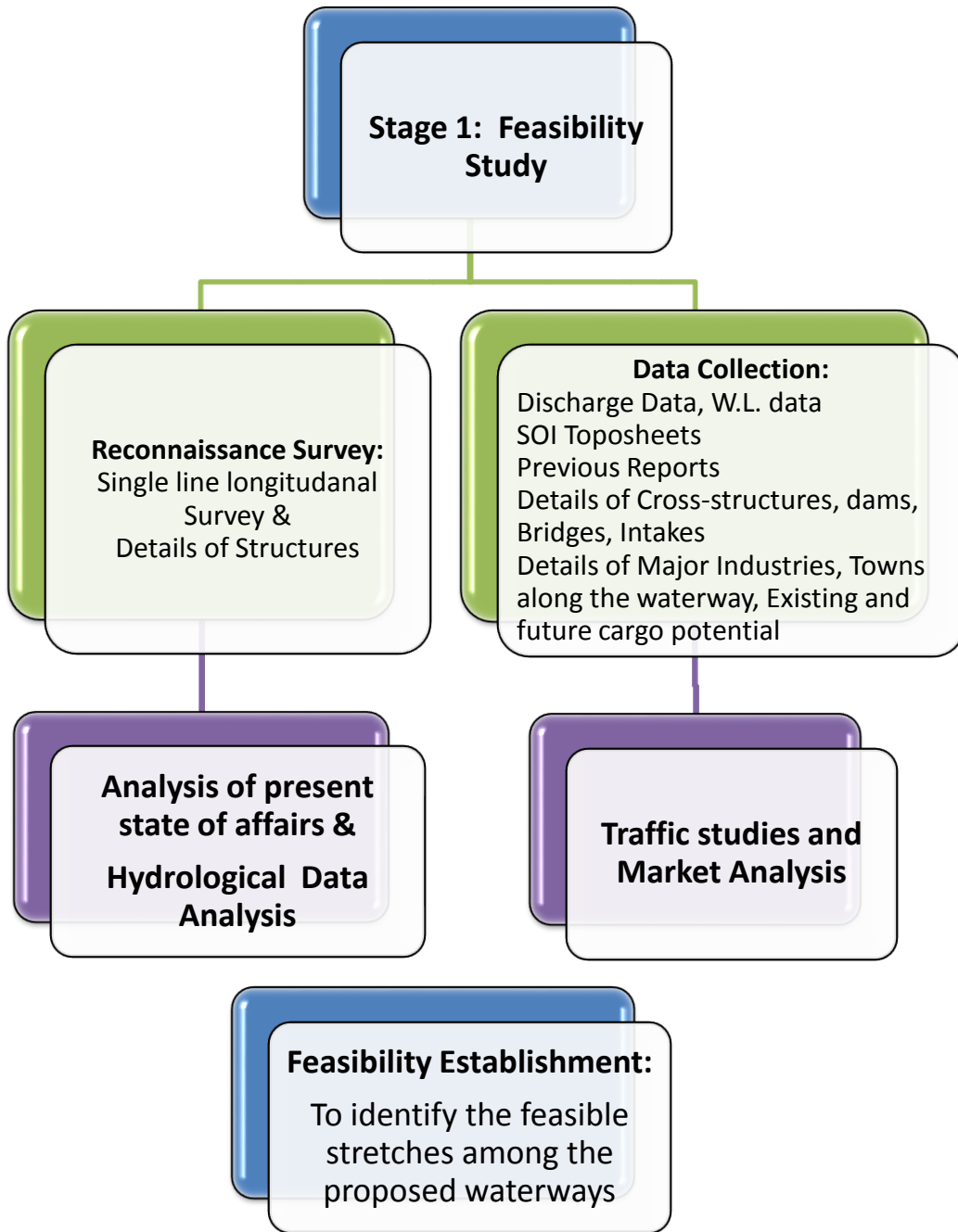


Figure 5: Feasibility Studies (Stage 1)

The detail methodology for reconnaissance survey, Hydrological data analysis and Traffic studies is given in their respective chapters. The feasibility of waterways is established after hydrological and traffic studies and analysis. Based on hydraulic conditions (depth, width, curvatures etc.) of the navigation channel, the class of the waterway is established in accordance with the classification notified by Inland Waterways Authority of India (IWAI) vides Gazette Notification dated 26 January 2007. The same has been detailed below:

2.6.6 Classification of Waterways

In India, the inland waterways are classified into seven categories for rivers as well as canals by Inland Waterway Authority of India (IWAI) vide Gazette Notification dated 26 January 2007 for safe passage of self-propelled vessels up to 2000 dead weight tonnage (DWT) and tug barge formation in push tow units of carrying capacity upto 8000 tonnes.

The classification of waterways is discussed below.

A. Classification of Inland waterways for Rivers

Class of Waterway	Rivers				
	Minimum Depth	Bottom Width	Bend Radius	Vertical Clearance	Horizontal Clearance
I.	1.2 m	30 m	300 m	4 m	30 m
II.	1.4 m	40 m	500 m	5 m	40 m
III.	1.7 m	50 m	700 m	7 m	50 m
IV.	2.0 m	50 m	800 m	10 m	50 m
V.	2.0 m	80 m	800 m	10 m	80 m
VI.	2.75 m	80 m	900 m	10 m	80 m
VII.	2.75 m	100 m	900 m	10 m	100 m

Table 5: Inland Waterway classification for Rivers

B. Classification of Inland waterways for Canals

Class of Waterway	Canals				
	Minimum Depth	Bottom Width	Bend Radius	Vertical Clearance	Horizontal Clearance
I.	1.5 m	20 m	300 m	4 m	20 m
II.	1.8 m	30 m	500 m	5 m	30 m
III.	2.2 m	40 m	700 m	7 m	40 m
IV.	2.5 m	50 m	800 m	10 m	50 m
V.	-	-	-	-	-
VI.	3.50 m	60 m	900 m	10 m	60 m
VII.	-	-	-	-	-

Table 6: Inland Waterway classification for Canals

The above classification for Rivers and Canals shall be effective if:

- Minimum depth of channel should be available for about 330 days in a year (about 90% days in a year).
- Vertical clearance at cross structures over the waterway should be available at least in central 75% portion of each of the spans in entire width of the waterway.

C. Vertical Clearance for Power Cables / Telephone Lines for all Classes

- Telephone lines and Low Voltage lines 16.5 m
- High Voltage Transmission lines not exceeding 110 KV – 19 m
- High Voltage Transmission lines exceeding 110 KV – 19 m + 1 cm per each KV

In case of underground pipe / power lines and other cables norms to be decided as per conditions and navigational requirement

D. Reference level for vertical clearance for different types of channels

- For rivers – over navigational HFL which is highest flood level at frequency of 5% in any year over a period of last 20 years
- HTL for tidal channels
- For channels design FSL

E. Type of vessels to be used in different class waterways

Class	Self-propelled vessel	Tug with barges
I.	Self-propelled, carrying capacity 100 DWT, Size (32m X 5m), Loaded draft 1m	1 Tug + 2 barges – 200 DWT, length 80m X breadth 5m , loaded draft 1m
II.	Self-propelled, carrying capacity 300 DWT, Size (45m X 8m), Loaded draft 1.2m	1 Tug + 2 barges – 600 DWT, length 110m X breadth 8m , loaded draft 1.2m
III.	Self-propelled, carrying capacity 500 DWT, Size (58m X 9m), Loaded draft 1.5m	1 Tug + 2 barges – 1000 DWT, length 141m X breadth 9m , loaded draft 1.5m
IV.	Self-propelled, carrying capacity 1000 DWT, Size (70m X 12m), Loaded draft 1.8m	1 Tug + 2 barges – 2000 DWT, length 170m X breadth 12m , loaded draft 1.8m
V.	Self-propelled, carrying capacity 1000 DWT, Size (70m X 12m), Loaded draft 1.8m	1 Tug + 2 barges – 2000 DWT, length 170m X breadth 24m , loaded draft 1.8m (moulded with 24 m)
VI.	Self-propelled, carrying capacity 2000 DWT, Size (86m X 14m), Loaded draft 2.5m	1 Tug + 2 barges – 4000 DWT, length 210m X breadth 14m , loaded draft 2.5m
VII.	Self-propelled, carrying capacity 4000 DWT, Size (86m X 14m), Loaded draft 2.9m	1 Tug + 4 barges – 8000 DWT, length 210m X breadth 28m , loaded draft 2.5m

Table 7: Type of vessels to be used in different class of waterways

All structures to be constructed across waterway classified should conform to respective requirement of vertical clearance and horizontal clearance before construction of any structure across the national waterway.

WAPCOS has carried out hydrological studies to establish the feasibility of development of National Waterway 55 for Inland Navigation. In cases where minimum depth (of 1.2m as per Govt. of India notification) is not available round the year, the no. of days of availability and available depth is calculated and presented in chapter 4. The project authorities may review the waterway classification for navigation. The feasibility of these stretches may be established for some part of the year after detailed studies in stage 2 after the approval. Measures to improve the depth are also stressed upon.

3. Analysis of present state of affairs

This chapter identifies the existing cross-structures viz. Dams, Weirs, Barrages, Locks, Bridges, Crossings, pipelines, cables, HT/LT line, National and State highways including railway lines in the river stretch collected during the site visit and reconnaissance survey. The details of all structures are tabulated in **Annexure 1**.

3.1 Existing Dams, Weir, Barrage, Anicuts and Locks

The details of all dams/weir/Anicuts/Barrages are collected from CWC and irrigation Department Govt. of Tamilnadu. These collected data and details are attached as **Annexure 2**. It may be noted that navigational lock is not provided in any of the dams/weir/Anicuts/Barrages in the present study stretch.

Sl No	Structure Name	Chainage (km)	Location	Position (Above survey track)			
				WGS84 Datum; UTM Projection: Zone43N			
				Latitude(N)	Longitude(E)	Easting(m)	Northing(m)
1	Coleroon North Branch (Lower Anicut) (NH 45C)	59	Kandiankollai	11-08-36.4	79-27-02.4	330808.028	1232282.415
2	Coleroon South Branch (Lower Anicut) (NH 45C)	59	Kandiankollai	11-08-10.4	79-27-12.2	331101.204	1231482.019
3	Cauvery Regulators (Grand Anicut)	142.9	Kowththarasanallur	10-49-54.9	78-49-08.3	261548.289	1198247.696
4	Vennar Regulators (Grand Anicut)		Kowththarasanallur	10-49-46.3	78-49-06.1	261479.554	1197983.857
5	Coleroon Regulators (Grand Anicut) SH 22	142.7	Kowththarasanallur	10-50-01.7	78-49-01.6	261346.219	1198458.148
6	Kambarasampettai Check Dam	161.5	Mambazhasalai	10-50-51.94	78-40-54.23	246549.572	1200111.777
7	Mukombu Barrage (Upper Anicut SH 25)	173.6	Thirupparaithurai	10-52-57.40	78-34-41.53	235255.719	1204056.557
8	Mayanur barrage	213.3	Mayanur	10-57-28.20	78-14-05.01	197758.271	1212704.261
9	Mayanur Check Dam	213.6	Mayanur	10-57-24.36	78-13-57.48	197528.403	1212588.293
10	Mariammapadugai Check Dam	267.6	Kullagoundanpudur	11-09-27.83	77-52-49.66	159235.223	1235216.319
11	Passur Barrage (Bhawani Kattalai III)	277.8	Solasiramani	11-14-35.23	77-51-57.20	157742.623	1244687.999

12	Vendipalayam Barrage (Bhawani Kattalai II)	293.5	Odappali	11-19-59.97	77-45-36.56	146295.411	1254802.517
13	Pallipalayam Barrage (Bhawani Kattalai I)	301.8	Samayarangili, agraharaam	11-22-59.45	77-42-45.97	796068.435	1259732.754
14	Uratchikottai Barrage	310	Uratchikottai	11-29-02.79	77-42-14.72	140358.421	1271569.537

Table 8: Details of existing Dams, Weir, Barrage, Anicut, Locks

3.2 Existing Bridges and Crossing Over River

Sl No	Structure Name	Chainage (km)	Location	Position (Above survey track)				Vertical clearance above H.F.L. (m)	Horizontal Clearance (m)
				WGS84 Datum; UTM Projection: Zone43N					
				Latitude(N) Deg Min Sec	Longitude(E) Deg Min Sec	Easting(m)	Northing(m)		
1	Kollidam Rly Bridge	17	Hanumanthapuram	11-20-15.32	79-43-51.84	361526.463	1253608.698	2.0	30
2	Coleroon Bridge (NH 45A)	18	Hanumanthapuram	11-20-08.3	79-42-43.4	359450.582	1253402.133	0.5	50
3	Mannarkudi Bridge	43	Muttam	11-12-57.12	79-34-42.34	344801.263	1240222.627	3.0	30
4	Neelathannalur Bridge	73.8	Valaikurichi	11-02-58.4	79-21-35.3	320826.025	1221950.447	5.0	25
5	Pipeline bridge under construction	103	Veeramangudi	10-56-15.5	79-08-47.4	297441.086	1209705.969	7.0	10
6	Thirumanur Bridge SH 27	108.3	Vilangudi	10-55-35.72	79-06-11.02	292687.178	1208922.671	4.0	50
7	Poondi-Sengaraiyur Bridge	128.4	Sengaraiyur	10-52-26.29	78-55-59.71	274079.406	1202813.162	2.5	25
8	Trichi-Chennai Highway Bridge NH 45B	157.6	Saravana Nagar	10-50-05.5	78-42-46.9	249962.207	1198658.462	1.0	50
9	Trichi-Chennai Highway New Bridge NH 45B	157.62	Saravana Nagar	10-50-05.5	78-42-46.9	249962.207	1198658.462	1.0	50

SI No	Structure Name	Chainage (km)	Location	Position (Above survey track)				Vertical clearance above H.F.L. (m)	Horizontal Clearance (m)
				WGS84 Datum; UTM Projection: Zone43N					
				Latitude(N) Deg Min Sec	Longitude(E) Deg Min Sec	Easting(m)	Northing(m)		
10	Mambazha - salai Rail Bridge	159.2	Mambazhasalai	10-50-31.38	78-42-01.82	248598.456	1199464.243	1.0	18
11	Salem - Namakkal Road Bridge (Trichi Chennai Trunk Road, NH 45 WB)	159.5	Mambazhasalai	10-50-33.09	78-41-50.07	248241.836	1199519.502	0.5	25
12	Thandai Periyar Bridge SH 30	192.8	Kulithalai	10-57-01.59	78-25-04.12	217775.495	1211708.432	0.5	40
13	Mayanur Bridge/ Barrage (Nil Clearance)	213.3	Mayanur	10-57-28.20	78-14-05.01	197758.271	1212704.261	-	-
14	Vangal Bridge	230	Vangal Agraharam	11-02-54.69	78-07-27.33	185771.342	1222857.045	0.5	30
15	Vangal Rail Bridge	230.4	Vangal Agraharam	11-03-03.36	78-07-19.24	185528.167	1223126.016	3.0	20
16	Velur New Bridge NH 7	244.9	Velur	11-05-55.59	78-00-16.67	172744.785	1228548.892	0.5	15
17	Kokkarayanapettai Bridge	290.3	Kokkarayanpettai	11-18-37.83	77-46-47.15	148410.312	1252252.142	4.5	20
18	Pallipalayam Rail Bridge	295.4	Odappali	11-20-57.82	77-45-16.05	145692.653	1256588.946	6	17
19	Pallipalayam New Bridge under Construction	297	Pallipaalyam	11-21-43.09	77-44-46.21	144802.462	1257991.609	3.0	25
20	Pallipalayam Old Bridge SH 79	297	Pallipaalyam	11-21-43.34	77-44-45.58	144783.425	1257999.513	2.5	10
21	Bhavai kumaraplalayam bridge 3 NH 47	302	Gandhi Nagar	11-25-53.52	77-41-15.45	138493.129	1265767.768	-	-
22	Bhavai kumaraplalayam	302.1	Gandhi Nagar	11-25-52.63	77-41-15.35	138489.78	1265740.424	-	-

SI No	Structure Name	Chainage (km)	Location	Position (Above survey track)				Vertical clearance above H.F.L. (m)	Horizontal Clearance (m)
				WGS84 Datum; UTM Projection: Zone43N					
				Latitude(N) Deg Min Sec	Longitude(E) Deg Min Sec	Easting(m)	Northing(m)		
	bridge 4 NH 47								
23	Bhavani kumarapalayam bridge2 NH 47	308.51	Palanipuram	11-26-28.03	77-41-05.43	138201.239	1266832.877	-	-
24	Bhavani Kumarapalayam Bridge	309.53	Palanipuram	11-27-05.85	77-41-31.41	139002.986	1267987.265	3.0	17

Table 9: Details of existing Bridges and Crossing

Note: All bridges are to be considered as road bridges unless specified.

Note: Vertical clearance is measured above H.F.L. The HFL for tidal reach is MHWS (ATT- Vol 3) and HFL at gauge site is calculated as maximum water level in last twenty years Gauge Discharge Data as collected from CWC.

3.3 Pipelines and cables

Sl. No.	Structure Name	Chainage (km) as per Field Survey	Location	Position		Vertical clearance above HFL (m)	Horizontal clearance(m)
				Latitude (N)	Longitude (E)		
1	Coleroon Bridge	18 km	Hanumanthapuram	11°20'08.3"N,	79°42'43.4"E	0.5	50 m
2	Under Construction Pipeline Bridge	103 km	Veeramangudi	10°56'15.5"N,	79°08'47.4"E	7.00	10 m
3	Pipeline Bridge Thirumanur Bridge	108.3 km	Vilangudi	10°55'49.05"N,	79°06'11.02"E	4	15 m
4	Pipe line Bridge.	156.8 km	Saravana Nagar	10°50'16.6"N,	78°42'50.2"E	1.0	10 m
5	Pipe line Bridge.	159.5 km	Mambazhasalai	10°50'32.5"N,	78°41'51.0"E	1.0	10 m
6	Pipe line Bridge	160.9 km	Mambazhasalai	10°50'48.88"N,	78°41'15.55"E	1.0	10 m

Note: Vertical clearance is measured above H.F.L. The HFL for tidal reach is MHWS (ATT- Vol 3) and HFL at gauge site is calculated as maximum water level in last twenty years Gauge Discharge Data as collected from CWC.

3.4 Details of High Tension and Electric Lines

Sl No	Structure Name	Chainage (km)	Location	Position (Above survey track)				Vertical clearance HFL (m)	Horizontal Clearance (m)
				WGS84 Datum; UTM Projection: Zone43N					
				Latitude(N)	Longitude(E)	Easting(m)	Northing(m)		
1	HT Line	51.8	Vettamangalam	11-10-21.7	79-30-29.5	337107.892	1235485.419	4.7	350
2	2 HT Line	64.9	Kodalikaruppur	11-06-44.4	79-25-33.6	328095.476	1228855.402	12.5	350
3	HT Line	130	Sengaraiyur	10-51-55.7	78-55-34.6	273310.223	1201878.254	12.0	300
4	Electric line	160.86	Mambazhasalai	10-50-48.88	78-41-15.55	247196.648	1200012.792	6.5	70
5	HT Line	162.6	Mambazhasalai	10-50-16.57	78-41-45.26	248091.844	1199012.833	1.5	350
6	Electric line	163.2	Mambazhasalai	10-51-20.11	78-40-08.57	245168.858	1200988.251	4	100
7	3 Set of HT line	163.4	Mambazhasalai	10-51-22.97	78-40-03.86	245026.425	1201077.258	5.00	350
8	Electric line	213.6	Mayanur	10-57-24.36	78-13-57.48	197528.403	1212588.293	2.00	60
9	HT Line	228.5	Vangal Agraharam	11-02-28.36	78-08-05.93	186936.096	1222036.131	15.75	350
10	HT Line	234.1	Nanniyur	11-04-22.69	78-05-51.05	182873.01	1225591.413	14.50	300
11	Electric Line	246.3	Velur	11-05-36.90	77-59-26.92	171227.852	1227989.362	3.00	20
12	HT Line	250.9	Agrahara Kondalam	11-04-03.99	77-57-31.53	167693.662	1225167.598	6.50	350
13	Electric Line	258.3	Kodumudi	11-04-37.70	77-53-23.65	160174.044	1226282.074	3.75	60
14	HT Line	267.5	Kullagoundanpudur	11-09-26.35	77-52-51.28	159283.944	1235170.28	4.50	300
15	HT Line	284.3	Kangayampalayam	11-15-53.27	77-48-38.07	151722.349	1247153.479	13.50	350
16	HT Line	288.2	Kokkarayanpettai	11-17-37.33	77-47-23.99	149508.235	1250378.871	11.75	350
17	HT Line	288.3	Kokkarayanpettai	11-17-39.83	77-47-22.29	149457.469	1250456.337	11.75	350
18	HT Line	293.3	Odappali	11-19-55.11	77-45-39.86	146393.924	1254651.907	17.00	350
19	HT Line	293.6	Odappali	11-20-05.09	77-45-32.22	146165.419	1254961.476	14.5	350

Sl No	Structure Name	Chainage (km)	Location	Position (Above survey track)				Vertical clearance HFL (m)	Horizontal Clearance (m)
				WGS84 Datum; UTM Projection: Zone43N					
				Latitude(N)	Longitude(E)	Easting(m)	Northing(m)		
20	HT Line	297.5	Pallipaalyam	11-21-53.44	77-44-31.21	144350.732	1258315.087	15.5	350
21	HT Line	300.7	Gandhi Nagar	11-22-29.34	77-43-26.68	142404.49	1259441.455	15.5	350
22	HT Line	301.79	Gandhi Nagar	11-23-02.0	77-42-52.71	141384.787	1260457.79	6.00	300
23	Electric Line	303.59	Suriyampalayam	11-23-56.30	77-42-10.80	140131.739	1262142.61	0.5	80
24	HT Line	304.44	Suriyampalayam	11-24-08.2	77-41-59.22	139784.476	1262514.837	2.0	300
25	Electric Line	309.5	Palanipuram	11-27-04.62	77-41-30.82	138984.648	1267949.632	4.00	60

Table 10: Details of High Tension and Electric Lines

Note: Vertical clearance is measured above H.F.L. The HFL for tidal reach is MHWS (ATT- Vol 3) and HFL at gauge site is calculated as maximum water level in last twenty years Gauge Discharge Data as collected from CWC.

3.5 Horizontal and Vertical Clearances

SI No	Structure Name	Chainage (km)	Location	Vertical clearance above HFL (m)	Horizontal Clearance(m)
1	Kollidam Rly Bridge	17	Hanumanthapuram	2.0	30
2	Colerron Bridge	18	Hanumanthapuram	0.5	50
4	Mannarkudi Bridge	43	Muttam	3.0	30
5	HT Line	51.8	Vettamangalam	4.7	350
6	2 HT Line	64.9	Kodalikaruppur	12.5	350
7	Neelathannalur Bridge	73.8	Valaikurichi	5.5	25
8	Pipeline bridge under construction	103	Veeramangudi	7.00	10
10	Thirumanur Bridge	108.3	Vilangudi	4	50
11	Pipeline Bridge Thirumanur Bridge	108.3 km	Vilangudi	4	15 m
12	Poondi-Sengaraiyur Bridge	128.4	Sengaraiyur	2.5	25
13	HT Line	130	Sengaraiyur	12.0	300
14	Pipe line Bridge.	156.8 km	Saravana Nagar	1.0	10 m
15	Trichi-Chennai Highway Bridge	157.6	Saravana Nagar	1.0	50
16	Trichi-Chennai Highway New Bridge	157.62	Saravana Nagar	1.0	50
17	Mambazha - salai Rail Bridge	159.2	Mambazhasalai	1.0	18
18	Salem - Namakkal Road Bridge	159.5	Mambazhasalai	0.5	25
19	Pipe line Bridge.	159.5 km	Mambazhasalai	0.5	10 m
20	Electric line	160.86	Mambazhasalai	6.5	70
21	Pipe line Bridge	160.9 km	Mambazhasalai	3.75	10 m
22	HT Line	162.6	Mambazhasalai	1.5	350
23	Electric line	163.2	Mambazhasalai	4	100

24	3 Set of HT line	163.4	Mambazhasalai	5.00	350
25	Thandai Periyar Bridge	192.8	Kulithalai	0.5	40
26	Mayanur Bridge/ Barrage (Nil Clearance)	213.3	Mayanur	-	-
27	Electric line	213.6	Mayanur	2.00	60
28	HT Line	228.5	Vangal Agraharam	15.75	350
29	Vangal Bridge	230	Vangal Agraharam	0.5	30
30	Vangal Rail Bridge	230.4	Vangal Agraharam	3.00	20
31	HT Line	234.1	Nanniyur	14.50	300
32	Velur New Bridge	244.9	Velur	1.0	15
33	Electric Line	246.3	Velur	3.00	20
34	HT Line	250.9	Agrahara Kondalam	6.50	350
35	Electric Line	258.3	Kodumudi	3.75	60
36	HT Line	267.5	Kullagoundanpudur	4.50	300
37	HT Line	284.3	Kangayampalayam	13.5	350
38	HT Line	288.2	Kokkarayanpettai	11.75	350
39	HT Line	288.3	Kokkarayanpettai	11.75	350
40	Kokkarayanapettai Bridge	290.3	Kokkarayanpettai	4.5	20
41	HT Line	293.3	Odappali	17.0	350
42	HT Line	293.6	Odappali	14.5	350
43	Pallipalayam Rail Bridge	295.4	Odappali	5.7	17
44	Pallipalayam New Bridge under Construction	297	Pallipaalyam	3.1	25
45	Pallipalayam Old Bridge	297	Pallipaalyam	2.5	10
46	HT Line	297.5	Pallipaalyam	15.5	350
47	HT Line	300.7	Gandhi Nagar	15.5	350
48	HT Line	301.79	Gandhi Nagar	6.00	300
49	Bhavai kumaraplalayam bridge 3 NH 47	302	Gandhi Nagar	-	-
50	Electric Line	303.59	Suriyampalayam	0.5	80
51	HT Line	304.44	Suriyampalayam	2.0	300

52	Bhavai kumarapalayam bridge 4 NH 47	308.01	Gandhi Nagar	-	-
53	Bhavani kumarapalayam bridge2	308.51	Palanipuram	-	-
54	Electric Line	309.5	Palanipuram	4.00	60
55	Bhavani Kumarapalayam Bridge	309.53	Palanipuram	3.0	17
56	HT Line & Electric Line	314.73	Uratchikottai		350

Table 11: Details of Horizontal and Vertical clearance

Note: Vertical clearance is measured above H.F.L. The HFL for tidal reach is MHWS (ATT- Vol 3) and HFL at gauge site is calculated as maximum water level in last twenty years Gauge Discharge Data as collected from CWC.

3.6 Hindrances in conducting the reconnaissance survey

No hindrance was encountered in the river stretch while carrying out the reconnaissance survey.

Rocky river bed was found at chainage 230 to 250 km and near Urachikottai and bhawani kattalai barrages near chainage 300-310.

3.7 Encroachment to the waterway

There is no encroachment in the waterway in the reach under consideration in this study.

3.8 Details of Protected Area, Wildlife, Defense

There are no such areas present in the vicinity of river.

3.9 NH/SH/MDR along and/or in Vicinity

Twenty four (24) bridges cross Kaveri Kollidam River in its 310 km long stretch. The main national highways near the vicinity of Kaveri Kollidam River are NH 7, NH47, NH 67, NH 227, NH 45C, NH 45, NH 45A. Main state highways near Kaveri Kollidam River include SH 15, SH 140, SH 20, SH 79, SH 99, SH 25, SH 62, SH 22, SH 198 SH 84, SH 84A, SH 27 and SH 49.

Apart from these, there are the major roads along both bank passing through the town of Erode, Velur, Urachikottai, Pasur, Kodumudi, Bhavani, Vijiyathottam, Palapatti, Mohanur, Kokkarayanampettai, Molasi, Pather, Kombupalayam, Mayanur Lalapettai, Thottiyam, Jedarplayam, Tiruchirapalli, Nangavaram, Kulithalai, Paluvur, Denanancheri, Manalmedu, Eyyalur, Mullangndi, Tiruparanthal, Muttam, Alanganatham, Pattiyamedu, Karuppur, Chidambaram and Pazhaiyar.

3.10 Railway Line and stations in the vicinity

The main railway stations present along the river are Vallampadugai, Chidambaram, Kollidam, Lalgudi, Valadi, Tiruverumbur, Tiruchirapalli town rly stn, Trichy fort rly stn,

Srirangam, Pichandarkovil, Uthamer Kovil, Mutharasanallur, Mekkudi, Jeeyapuram, Elamanur, Perugamani, Pettavaithalai, Marudur, Musiri, Kulithalai, Lalapettai, Mohanur, Mahadanapuram, Krishnarayapuram, Mayanur, Veerarakkiyerm, Unjalur, Pasur, Cauvery and Erode Junction.

4. Reconnaissance Survey

This chapter gives the stretch wise description (20-30 km stretch) of entire river stretch and presents the observed water level during survey. This chapter also covers the Hydrological analysis of the collected data viz. Minimum and maximum water levels, discharges, average 10 daily discharges, change in cross-section over the years and establishment of sounding datum in river. The Survey report is attached separately as **Annexure 5**. The route map of River is given below:



Figure 6: Route map of Kaveri Kollidam River from its mouth

4.1 Resources, Equipment used and Methodology adopted

4.1.1 Resources & Equipment used

Personnel Name (Team 1)	Function
Deepak Jana	Surveyor , Fugro Limited
Abhijeet Kulkarni	Asst. Surveyor, Fugro Limited
Personnel Name (Team 2)	Function
T. Suresh Kumar	Surveyor , Fugro Limited
Arun Balaji	Asst. Surveyor, Fugro Limited

Table 12: Survey Personnel

Following equipment and systems were mobilised for the data acquisition.

Equipment / System	Description / Make / Model/Resolution /Accuracy
Software / Navigation	Starfix.Seis V. 10.1 PC based data acquisition and survey vessel navigation package and accessories
Positioning	12 Channel Single frequency (L1 & L2) DGPS System and accessories
Echo Sounder	ODOM Hydrotrac single Frequency Echo sounder, 210KHz Transducer and accessories
Soil sample collection	Grab Sampler with accessories
Trimble Total station with accessories & Laser Distometer	

Table 13: Equipments for data acquisition

Survey Vessel

Locally Hired boat 'Devan' was used for carrying out the bathymetry survey.

4.1.2 Detailed methodology adopted for survey

a) Specifications for survey: Survey Geodesy

The survey was conducted in WGS84 datum; UTM Projection (Zone 44 N, CM 081° E). The geodetic parameters used during the survey are as follows:

Global Positioning System Geodetic Parameters	
Datum:	World Geodetic System 1984
Spheroid:	World Geodetic System 1984
Semi major axis:	a = 6 378 137.000 m
Inverse Flattening:	1/f = 298.257 223 563
Map Projection:	Universal Transverse Mercator
Grid System:	UTM Zone 44 N;
Central Meridian:	081° 00' 00" East
Latitude of Origin:	0° 00' 00" North
False Easting:	500 000 m
False Northing:	0 m
Scale factor on Central Meridian:	0.9996
Units:	Meter

Table 14: Global Positioning System Geodetic Parameters

b) Field Calibrations & Verifications

All survey equipments used for the survey were calibrated and bench tested prior to their mobilisation for this task. After installation on the survey vessel, field verification and tests were carried out as per standard survey methods. On completion of successful Mobilization, Calibration, Verification and Testing of all equipment as per the relevant work practices, the survey task was commenced.

c) DGPS Calibrations

In order to ensure the integrity of the horizontal control of survey the DGPS system was bench checked against a known point, prior to mobilisation to site, at workshop and found to be satisfactory.

d) ***Single Beam Echo Sounder (SBES)***

Odom Hydrotrac single frequency (210 kHz) echo sounder was used for measuring water depths. The echo sounder system was bench calibrated at workshop prior to mobilization for the survey. The echo sounder transducer was side mounted on the survey vessel and its draft below the water-line was measured and recorded. The echo sounder system was interfaced with the Starfix.Seis navigation and survey system for logging the depth vs position data.

e) ***Data Acquisition & Survey Run-Line Logs***

The Navigation and depth data from the Starfix.HP DGPS was logged continuously and monitored using the Starfix.Seis navigation suite. A survey run-line log book was maintained where the quality of data was noted. Details such as horizontal and vertical clearances above high flood level of bridges, aqueducts, electric lines, telephone lines, pipe lines, cables en-route were assessed on the spot and recorded, and their coordinates and location were plotted on the chart and included in the report. Photographs of important structures along the route are included as part of this report.

f) ***Soil Sampling and Visual Analysis***

Soil samples were collected from the river bed along the surveyed route at about 10 km intervals, and the nature and texture of the samples collected were visually analyzed and reported.

g) ***On-line QC of Data Logged***

Real Time Graphs and QC Plots as provided by the Starfix survey software suite were used by experienced surveyors to monitor and control the quality of sensor data on-line, before they are logged. Time stamping on all the data was done by means of Starfix Timing Module through Navigation network synchronized with the GPS (high precision) 1PPS time signal. The data / record obtained from each survey sensor such as Navigation, Heading, SBES and Motion Sensor etc. were quality checked and an extract of the same were made available for verification and confirmation to proceed further.

h) ***Survey of Data Processing and interpretation methods***

The survey data was logged in Binary Format (BF), and processed using the Starfix.Proc software. Heading, motion and position data were processed and checked to ensure good data quality.

The measured offsets for all survey sensors was entered into the navigation system and processed using Starfix.Proc to enable track charts was plotted and 'corrected' navigation files was integrated with other sensor data at a later stage. These included:

- GPS position absolute of the primary & secondary positioning systems.
- Common Reference Point.
- Single beam echo sounder.

i) ***Bathymetry Data Analysis and Presentation***

Starfix.Proc and Starfix. Workbench were used to import and process the navigation, bathymetry, tides and sound velocity data. The data was filtered, cleaned, and combined to create geographically positioned bathymetric data set that has been corrected for tides and sound speed.

j) **Equipment Layout Diagram**

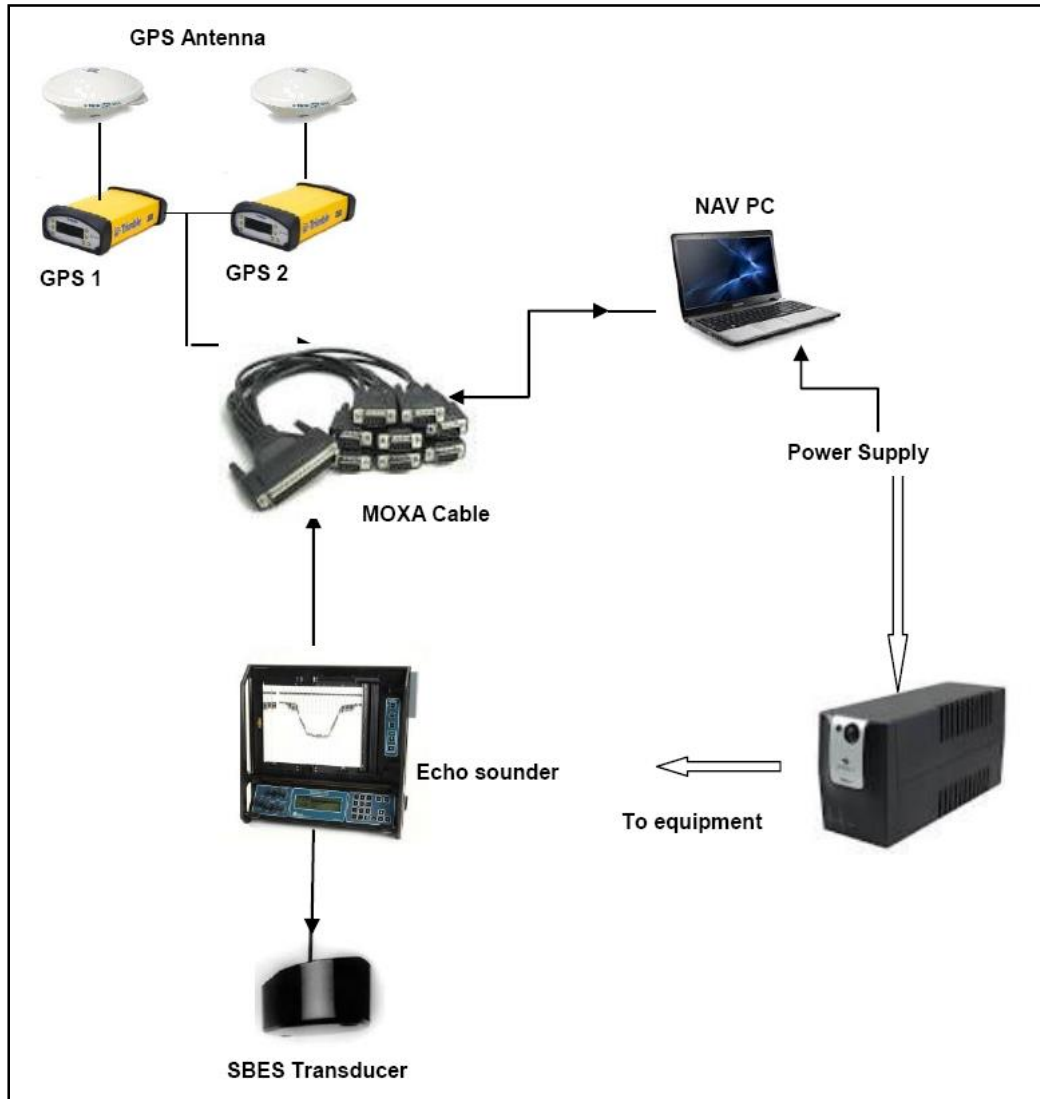


Figure 7: Equipment layout diagram

4.2 Description of bench marks (B.M.)/ Authentic reference level used

Two CWC Musto Type bench marks and one GTS bench mark were successfully recovered on the river stretch at the below mentioned locations. All the heights of the riverbed in this report are referenced to these BMs for obtaining their height above the MSL. The details of this BM and the TBM established by survey team are given in Table 15.

Sr. No.	Location	Type of BM	Latitude (N)	Longitude (E)	Height above MSL (m)	Used for River stretch KPs
1	Musiri	CWC MTBM	10° 57' 00.05"	78°26' 44.19"	90.555	16.41 to 220
2	Kodumudi	GTSBM	11° 04' 39.38"	77°53' 20.56"	128.446	220.1 to 254
3	Urachikottai	CWC MTBM	11°28' 47.90"	77°41' 57.44"	166.870	254.1 to 310

Table 15: Details of Bench Marks used

<p>Fugro Survey (India) Pvt. Ltd. D-222/30, TTC Industrial Area, MIDC, Nerul, Navi Mumbai Pin - 400 075 (India)</p>	Reccee report on Geodetic Station/Bench Mark		
	Job No. :	J-MAR-16-020	Station Name/ID:
	Client :	WAPCOS LTD	
	Location :	KODUMUDI, TAMILNADU	GTS BM
Date of Reccee:	28-Apr-16		
Brief Narrative on the Recovery of the Station			
a) What is the Source of Station Description Data;	CWC Site Office, Kodumudi		
b) Was the station recovered successfully?	Yes		
c) What were the differences in Coordinates after verification using Starfix.HP?	No earlier coordinates available		
d) Give Link to Starfix Mean Posn/Final Fix Report.	Mean Position Report_GTSBM_KODUMUDI.pdf		
Final Coordinates in WGS84 Datum after verification using Starfix.HP			
GEOGRAPHICAL COORDINATES:		UTM COORDINATES:	
LATITUDE :	11°03'54.9352" N	EASTING:	155 286.48 m (+/-0.08 m)
LONGITUDE :	77°50'43.2269" E	NORTHING:	1 225 017.97 m (+/- 0.01 m)
ELLIPSOIDAL HEIGHT :	94.95 m	Ht above MSL/CD	188.619 m
Describe the General Location & Access to the Station :	The GTS BM.12, topo sheet no. 58 E is situated on top of rectangular protecting pillar of Yettimalai village. This is a principal station of the great arc meridional series section 8' to 18" and is situated on the small rocky mound so called, rising about 50 ft above the surrounding village named Malaikkattuthottam, Taluk Kodumudi, District - Erode. A temple named Kannimaar Karuppanaar is built on the mount 10 mtrs SE of the station. The station can be approached by an autorickshaw from Kodumudi Bus stop/ railway station.		
Describe how the Stn is marked on the Ground	The station is engraved on the rock as + sign.		
Expected durability of the Station (in Years) :	10		
DETAILED DIAGRAM :			
<p style="text-align: center;">GTSBM</p>	<p style="text-align: center;">TEMPLE</p>	<p style="text-align: center;">GTSBM</p>	<p style="text-align: right;">10</p> <p style="text-align: right;">SE</p>

Prepared By: Bhanu Prakash
FSINPVT Party Chief: Bhanu Prakash
Date: 28 Apr 16

Figure 8: Details of GTS Benchmark at Kodumudi

Starfix Mean Position Report v5.02.24

Vessel

Vessel Name
 Project Name RIVER RECCEE SURVEY
 Project Number J_MAR_16_020
 Offset Name MainVessel_CRP
 Sampling Started 28-Apr-2016 14:21:31 (UTC+05:30)
 Sampling Ended 28-Apr-2016 14:36:32 (UTC+05:30)
 Comment GTSBM IS SITUATED ON TOP OF A HILL IN THE VILLAGE OF MALAIKATTUTHOTTAM

Results

	Mean	Standard Deviation
Local Latitude	11°03'54.9352"N	
Local Longitude	77°50'43.2269"E	
Ellipsoidal Height	96.10 m	
Local Easting	155286.48 m	0.08 m
Local Northing	1225017.97 m	0.01 m
Orthometric Height	96.10 m	0.06 m
WGS84 Latitude	11°03'54.9352"N	
WGS84 Longitude	77°50'43.2269"E	
Ellipsoidal Height	96.10 m	
Quality	0.83	0.05 m
Depth	0.00 m	0.00 m
Heading	0.61°G	0.00°

Line Navigation Data

Line Name N/A
 Chainage N/A
 Cross Track N/A

Point Navigation Data

Point Name N/A
 Easting N/A
 Northing N/A
 Range N/A
 Bearing TO N/A
 FROM N/A







Observations

Used 264 out of 264

Geodetic Parameters

Geodetic Datum	WGS84		
Ellipsoid	WGS84		
Semi-Major Axis	6378137.000		
Inverse Flattening	298.2572235630		
Eccentricity^2	0.006694379990141		
DX	0.0000m	RX	0.0000 arc seconds
DY	0.0000m	RY	0.0000 arc seconds
DZ	0.0000m	RZ	0.0000 arc seconds
D Scale	0.0000ppm		
Rotation Convention	+RZ=-RLongitude		
Projection	Transverse Mercator (UTM) Zone: 44		
Latitude of Origin	0°00'00.0000"N		
Longitude of Origin	81°00'00.0000"E		
False Easting	500000.000m		
False Northing	0.000m		
Convergence	- 0°36'21.8362"		
Calculation Mode	Grid		

Figure 9: Benchmark details by Fugro

 <p>Fugro Survey (India) Pvt. Ltd. D-222/30, TTC Industrial Area, MIDC, Nerul, Navi Mumbai Pin - 400 075 (India)</p>	Geodetic Station/Bench Mark description			
	Job No. :	J-MAR-16-020	Station Name/ID:	
	Client :	WAPCOS LTD		
	Location :	KODUMUDI, TAMILNADU	TBM	
Date of Observation:	28-Apr-16			
Brief description on the Survey execution				
1. Purpose of Establishing the station		To find the ellipsoidal height and coordinates of CWC MTBM, Kodumudi		
2. Equipment / Method used		Trimble SPS 461, Static Observation		
3. Give Link to Starfix Mean Posn/Final Fix Report.		Mean Position Report_TBM_CWC_KODUMUDI.pdf		
Final Coordinates in WGS84 Datum				
GEOGRAPHICAL COORDINATES:		UTM COORDINATES:		
LATITUDE :	11°04'39.3801" N	EASTING:	160 080.75 m	Zone No: 44 CM: 081 °E (+/-0.01 m)
LONGITUDE :	77°53'20.5614" E	NORTHING:	1 226 334.73 m	(+/- 0.01 m)
ELLIPSOIDAL HEIGHT :	34.69 m	Ht above MSL/GB	128.446 m	
Describe the General Location & Access to the Station :	TBM is established on a concrete wall inside the premises of the CWC Office, Kodumudi. The station is 40 mtrs SW from the MTBM. The wall is on the west side of the climatic station. The station is 5.87 m South of the NE corner of the wall. CWC site office is situated about 400 mtrs NE of the famous Magudeshwar Temple, Kodumudi. The station is easily accessible by autorickshaw from the Musiri bus stop/ railway station.			
Describe how the Stn is marked on the Ground	The station is marked by a dot and circle in red colour.			
Expected durability of the Station (in Years):				2
DETAILED DIAGRAM :				
				
				
				

Prepared By: Bhanu Prakash
 FSINPVT Party Chief: Bhanu Prakash
 Date: 28 Apr 16

Figure 10: TBM Benchmark at Kodumudi



Starfix Mean Position Report v5.02.24

Vessel

Vessel Name
 Project Name RIVER RECCEE SURVEY
 Project Number J_MAR_16_020
 Offset Name MainVessel_CRP
 Sampling Started 28-Apr-2016 11:40:45 (UTC+05:30)
 Sampling Ended 28-Apr-2016 11:50:48 (UTC+05:30)
 Comment TBM WAS ESTABLISHED IN THE PREMISES OF CWC SITE OF FICE AT KODUMUDI

Results

	Mean	Standard Deviation
Local Latitude	11°04'39.3801"N	
Local Longitude	77°53'20.5614"E	
Ellipsoidal Height	34.73 m	
Local Easting	160080.75 m	0.01 m
Local Northing	1226334.73 m	0.01 m
Orthometric Height	34.73 m	0.07 m
WGS84 Latitude	11°04'39.3801"N	
WGS84 Longitude	77°53'20.5614"E	
Ellipsoidal Height	34.73 m	
Quality	0.90	0.00 m
Depth	0.00 m	0.00 m
Heading	0.60°G	0.00°

Line Navigation Data

Line Name N/A
 Chainage N/A
 Cross Track N/A

Point Navigation Data

Point Name N/A
 Easting N/A
 Northing N/A
 Range N/A
 Bearing TO N/A

Observations

Used 145 out of 145

FROM N/A

Geodetic Parameters

Geodetic Datum WGS84
 Ellipsoid WGS84
 Semi-Major Axis 6378137.000
 Inverse Flattening 298.2572235630
 Eccentricity² 0.006694379990141
 DX 0.0000m RX 0.0000 arc seconds
 DY 0.0000m RY 0.0000 arc seconds
 DZ 0.0000m RZ 0.0000 arc seconds
 D Scale 0.0000ppm
 Rotation Convention +RZ=-RLongitude
 Projection Transverse Mercator (UTM) Zone: 44
 Latitude of Origin 0°00'00.0000"N
 Longitude of Origin 81°00'00.0000"E
 False Easting 500000.000m
 False Northing 0.000m
 Convergence - 0°35'53.9211"
 Calculation Mode Grid

Figure 11: Benchmark Details by Fugro

 Fugro Survey (India) Pvt. Ltd. D-222/30, TTC Industrial Area, MIDC, Nerul, Navi Mumbai Pin - 400 075 (India)		Recce report on Geodetic Station/Bench Mark						
		Job No. :	J-MAR-16-020	Station Name/ID:				
		Client :	WAPCOS LTD					
		Location :	KODUMUDI, TAMILNADU	CWC MTBM				
Date of Recce:	28-Apr-16							
Brief Narrative on the Recovery of the Station								
a) What is the Source of Station Description Data:		CWC Site Office, Kodumudi						
b) Was the station recovered successfully?		Yes						
c) What were the differences in Coordinates after verification using Starfix.HP?		No earlier coordinates available						
d) Give Link to Starfix Mean Posn/Final Fix Report.		GPS observation could not be carried out on top of the MTBM view obstructions. However, position derived by the range & bearing from the observed TBM position. Ellipsoidal height is derived by the levelling from the TBM.						
Final Coordinates in WGS84 Datum after verification using Starfix.HP								
GEOGRAPHICAL COORDINATES:		UTM COORDINATES:		Zone No:	44	CM:	081	°E
LATITUDE :	11°04'40.8579" N	EASTING:	180 091.50	m				(+/-0.30 m)
LONGITUDE :	77°53'20.9017" E	NORTHING:	1 228 373.92	m				(+/- 0.30 m)
ELLIPSOIDAL HEIGHT :	33.71	Ht above MSL/GD	127.47	m				
Describe the General Location & Access to the Station :	The station is situated on a stone inside a concrete well (1.30m x 1.30m x 0.2m). The well is filled with sand. The well is situated inside the campus of CWC site office, Kodumudi. The station is 3.4 mtrs East of the CWC site office building. CWC site office is situated about 400 mtrs NE of the famous Magudeshwar Temple, Kodumudi. The station is easily accessible by autorickshaw from the Musiri bus stop/ railway station.							
Describe how the Stn is marked on the Ground	The station is marked by a stone on ground.							
Expected durability of the Station (in Years) :							10	
DETAILED DIAGRAM :								

Prepared By: Bhanu Prakash
 FSINPVT Party Chief: Bhanu Prakash
 Date: 28 Apr 16

Figure 12: CWC MTBM Benchmark at Kodumudi

Client: WAPCOS LTD. Date: 28-Apr-16
 Location: CAUVERY RIVER, KODUMUDI Job No.: J-MAR-16-020
 Job Type: BATHYMETRY AND TOPOGRAPHIC SURVEY ALONG INLAND WATERWAYS



SL	RIVER	POINT	DESCRIPTION	WGS 84 COORDINATES			LOCAL COORDINATES (UTM ZONE 44)		OTHER INFORMATION	REMARKS
				LATITUDE (N)	LONGITUDE (E)	ELLIPSOIDAL HEIGHT (M)	EASTING (M)	NORTHING (M)		
1	CAUVERY	CWC MTBM, KODUMUDI	MTBM IS ESTABLISHED BY CWC AND SITUATED IN FRONT OF THE OFFICE BUILDING (3.4 M) INSIDE THE PREMISES OF CWC SITE OFFICE, KODUMUDI, DISTT.-ERODE. FAMOUS MAGUDESHWAR TEMPLE IS SITUATED APPROX 400 MTRS SW OF CWC OFFICE.	11°04'40.6579"	77°53'20.9017"	33.71	160 091.50	1 226 373.92	VALUE OF MTBM IS 127.470 MTRS ABOVE MSL (PROVIDED BY THE CWC SITE OFFICE, KODUMUDI)	POSITION DERIVED BY RANGE&BEARING FROM TBM. ELLIPSOIDAL HEIGHT DERIVED BY THE LEVELLING FROM THE TBM ESTABLISHED BY FSINPVT.
2	CAUVERY	TBM, KODUMUDI	TBM WAS ESTABLISHED ON A CONCRETE WALL INSIDE THE PREMISES OF THE CWC OFFICE. TBM IS 40 MTRS FROM THE MTBM ON BEARING 200°.	11°04'39.3801"	77°53'20.5614"	34.69	160 080.75	1 226 334.73	VALUE OF TBM IS 128.446 MTRS ABOVE MSL (DERIVED BY LEVELLING FROM THE MTBM)	DERIVED BY STARFIX MEAN POSITION. ANTENNA HEIGHT (0.04 M) IS REDUCED TO THE OBSERVED ELLIPSOIDAL HEIGHT.
3	CAUVERY	GTS BENCH MARK 12 (58 E)	GTS BM IS SITUATED ON THE SMALL ROCKY MOUND SO CALLED. THIS MOUND IS PLACED ON TOP OF A RECTANGULAR PROTECTING PILLAR OF VILLAGE MALAIKATTUTHOTAM (YETTIMALAI).	11°03'54.9352"	77°50'43.2269"	94.95	155 286.48	1 225 017.97	VALUE OF BM IS 188.619 MTRS ABOVE MSL (PROVIDED BY THE CWC SITE OFFICE, KODUMUDI)	DERIVED BY STARFIX MEAN POSITION. ANTENNA HEIGHT (1.15 M) IS REDUCED TO THE OBSERVED ELLIPSOIDAL HEIGHT.

Figure 13: Descriptions of Benchmarks on Kaveri Bank

Job No :	J-MAR-16-020	Client Name :	WAPCOS LTD.
Location:	KODUMUDI, TAMILNADU	Equipment & Sl. No.	Leica No. 5 Dumpy/ 432992
Benchmark Location:	MTBM IS ESTABLISHED BY CWC AND SITUATED IN FRONT OF THE OFFICE BUILDING (3.4 M) INSIDE THE PREMISES OF CWC SITE OFFICE, KODUMUDI, DISTT.- ERODE. FAMOUS MAGUESHWAR TEMPLE IS SITUATED APPROX 400 MTRS SW OF CWC OFFICE.		
TBM Location:	TBM WAS ESTABLISHED ON A CONCRETE WALL IN SIDE THE PREMISES OF THE CWC OFFICE. TBM IS 40 MTRS FROM THE MTBM ON BEARING 200°.		
Date of Observation:	28-Apr-16	Observer's Name:	Bhanu Prakash
		Staff Holder's Name :	Abhijeet Kulkarni

MTBM Value (RI)	127.470	TBM VALUE	128.445
MTBM Reference (CD/MSL)	MSL	Tachy Staff to TBM	0.000

MTBM TO TBM					
Point No	Back Sight	Fore Sight	Reduced Level	Rise (+) Fall (-)	Instrument Height
1	1.556	0.581	128.445	0.975	129.026
2			128.445	0.000	128.445
3			128.445	0.000	128.445
4			128.445	0.000	128.445
5			128.445	0.000	128.445
6			128.445	0.000	128.445
7			128.445	0.000	128.445
8			128.445	0.000	128.445
9			128.445	0.000	128.445
10			128.445	0.000	128.445
11			128.445	0.000	128.445
12			128.445	0.000	128.445
13			128.445	0.000	128.445
14			128.445	0.000	128.445
15			128.445	0.000	128.445
16			128.445	0.000	128.445
17			128.445	0.000	128.445
18			128.445	0.000	128.445
19			128.445	0.000	128.445
20			128.445	0.000	128.445
21			128.445	0.000	128.445
22			128.445	0.000	128.445
23			128.445	0.000	128.445
24			128.445	0.000	128.445
25			128.445	0.000	128.445
26			128.445	0.000	128.445
27			128.445	0.000	128.445
28			128.445	0.000	128.445
29			128.445	0.000	128.445
30			128.445	0.000	128.445
31			128.445	0.000	128.445
32			128.445	0.000	128.445
33			128.445	0.000	128.445
34			128.445	0.000	128.445

TBM TO MTBM					
Point No	Back Sight	Fore Sight	Reduced Level	Rise (+) Fall (-)	Instrument Height
1	0.568	1.545	127.468	-0.977	129.013
2			127.468	0.000	127.468
3			127.468	0.000	127.468
4			127.468	0.000	127.468
5			127.468	0.000	127.468
6			127.468	0.000	127.468
7			127.468	0.000	127.468
8			127.468	0.000	127.468
9			127.468	0.000	127.468
10			127.468	0.000	127.468
11			127.468	0.000	127.468
12			127.468	0.000	127.468
13			127.468	0.000	127.468
14			127.468	0.000	127.468
15			127.468	0.000	127.468
16			127.468	0.000	127.468
17			127.468	0.000	127.468
18			127.468	0.000	127.468
19			127.468	0.000	127.468
20			127.468	0.000	127.468
21			127.468	0.000	127.468
22			127.468	0.000	127.468
23			127.468	0.000	127.468
24			127.468	0.000	127.468
25			127.468	0.000	127.468
26			127.468	0.000	127.468
27			127.468	0.000	127.468
28			127.468	0.000	127.468
29			127.468	0.000	127.468
30			127.468	0.000	127.468
31			127.468	0.000	127.468
32			127.468	0.000	127.468
33			127.468	0.000	127.468
34			127.468	0.000	127.468

Misclosure = -0.002 meters
Adjusted Tide Gauge Height = 128.446 meters
Hence, the Zero of Tide Gauge is 128.446m metres Above MSL

Checked by:
Surveyor's Name: Bhanu Prakash
Date: 28-Apr-16

Note:

1. Subtract 0.003m from all the heights of tide recorded by ATG, to obtain the heights of observed tides above CD.

Figure 14: MTBM TO TBM leveling record

<p>Fugro Survey (India) Pvt. Ltd. D-222/30, TTC Industrial Area, MIDC, Nerul, Navi Mumbai Pin - 400 075 (India)</p>	Recce report on Geodetic Station/Bench Mark		
	Job No. :	J-MAR-16-020	Station Name/ID:
	Client :	WAPCOS LTD	
	Location :	MUSIRI, TAMILNADU	CWC MTBM
Date of Reccee:	27-Apr-16		
Brief Narrative on the Recovery of the Station			
a) What is the Source of Station Description Data;	CWC Site Office, Musiri		
b) Was the station recovered successfully?	Yes		
c) What were the differences in Coordinates after verification using Starfix.HP?	No earlier coordinates available		
d) Give Link to Starfix Mean Posn/Final Fix Report.	Mean Position Report_MTBM_CWC_MUSIRI.pdf		
Final Coordinates in WGS84 Datum after verification using Starfix.HP			
GEOGRAPHICAL COORDINATES:		UTM COORDINATES:	Zone No: 44 CM: 081 °E
LATITUDE :	10°57'00.0547" N	EASTING:	220 815.01 m (+/-0.05 m)
LONGITUDE :	78°26'44.1859" E	NORTHING:	1 211 635.33 m (+/- 0.04 m)
ELLIPSOIDAL HEIGHT :	-2.75 m	Ht above MSL/CD	90.555 m
Describe the General Location & Access to the Station :	The station is situated on a stone inside a concrete well (1.50m x 1.50m x 0.75m). The well is filled with sand. The well is situated inside the campus of CWC site office, Musiri. The station is 2.4 mtrs North of the climatic station boundary wall and 10 mtrs South of the fencing of the CWC site office campus. CWC site office is 20 mtrs SE of the MTBM. CWC site office is situated behind the Government Hospital, Musiri. The station is easily accessible by autorickshaw from the Musiri bus stop. Nearest city is Kulithalai, 10 Kms south of Musiri.		
Describe how the Stn is marked on the Ground	The station is marked by a stone on ground.		
Expected durability of the Station (in Years):	10		
DETAILED DIAGRAM :	S ↑	S ↑	
MTBM			

Prepared By: Bhanu Prakash
FSINPVT Party Chief: Bhanu Prakash
Date: 27 Apr 16

Figure 15: CWC MTBM at Musiri



Starfix Mean Position Report v5.02.24

Vessel

Vessel Name
 Project Name RIVER RECCEE SURVEY
 Project Number J_MAR_16_020
 Offset Name MainVessel_CRP
 Sampling Started 27-Apr-2016 15:16:41 (UTC+05:30)
 Sampling Ended 27-Apr-2016 15:31:41 (UTC+05:30)
 Comment CWC MTBM IS SITUATED INSIDE THE PREMISES OF CWC OF FICE, MUSIRI

Results

	Mean	Standard Deviation
Local Latitude	10°57'00.0547"N	
Local Longitude	78°26'44.1859"E	
Ellipsoidal Height	-0.63 m	
Local Easting	220815.01 m	0.05 m
Local Northing	1211635.33 m	0.04 m
Orthometric Height	-0.63 m	0.05 m
WGS84 Latitude	10°57'00.0547"N	
WGS84 Longitude	78°26'44.1859"E	
Ellipsoidal Height	-0.63 m	
Quality	1.16	0.32 m
Depth	0.00 m	0.00 m
Heading	0.49°G	0.00°

Line Navigation Data	Point Navigation Data
Line Name N/A	Point Name N/A
Chainage N/A	Easting N/A
Cross Track N/A	Northing N/A
	Range N/A
	Bearing TO N/A
	FROM N/A

Observations
 Used 443 out of 443

Geodetic Parameters

Geodetic Datum	WGS84		
Ellipsoid	WGS84		
Semi-Major Axis	6378137.000		
Inverse Flattening	298.2572235630		
Eccentricity^2	0.006694379990141		
DX	0.0000m	RX	0.0000 arc seconds
DY	0.0000m	RY	0.0000 arc seconds
DZ	0.0000m	RZ	0.0000 arc seconds
D Scale	0.0000ppm		
Rotation Convention	+RZ=-RLongitude		
Projection	Transverse Mercator (UTM) Zone: 44		
Latitude of Origin	0°00'00.0000"N		
Longitude of Origin	81°00'00.0000"E		
False Easting	500000.000m		
False Northing	0.000m		
Convergence	- 0°29'07.9066"		
Calculation Mode	Grid		

Figure 16: Benchmark Details by Fugro

Client: WAPCOS LTD. Date : 27-Apr-16
 Location : CAUVERY RIVER, MUSIRI Job No. : J-MAR-16-020
 Job Type: BATHYMETRY AND TOPOGRAPHIC SURVEY ALONG INLAND WATERWAYS



SL	RIVER	POINT	DESCRIPTION	WGS 84 COORDINATES			LOCAL COORDINATES (UTM ZONE 44)		OTHER INFORMATION	REMARKS
				LATITUDE (N)	LONGITUDE (E)	ELLIPSOIDAL HEIGHT (M)	EASTING (M)	NORTHING (M)		
1	CAUVERY	CWC MTBM, MUSIRI	MTBM IS ESTABLISHED BY CWC AND SITUATED INSIDE THE PREMISES OF CWC SITE OFFICE, MUSIRI. CWC SITE OFFICE IS SITUATED BEHIND THE GOVERNMENT HOSPITAL, MUSIRI.	10°57'00.0547"	78°26'44.1859"	-2.75	220 815.01	1 211 635.33	VALUE OF MTBM IS 90.555 MTRS ABOVE MSL (PROVIDED BY THE CWC SITE OFFICE, MUSIRI)	DERIVED BY STARFIX MEAN POSITION. ANTENNA HEIGHT (2.12 M) IS REDUCED TO THE OBSERVED ELLIPSOIDAL HEIGHT.

Figure 17: Description of CWC MTBM Musiri

<p>Fugro Survey (India) Pvt. Ltd. D-222/30, TTC Industrial Area, MIDC, Nerul, Navi Mumbai Pin - 400 075 (India)</p>	Recce report on Geodetic Station/Bench Mark			
	Job No. :	J-MAR-16-020	Station Name/ID:	
	Client :	WAPCOS LTD		
	Location :	PERUNDURAI, TAMILNADU	GTS BM	
Date of Reccee:	29-Apr-16			
Brief Narrative on the Recovery of the Station				
a) What is the Source of Station Description Data;	CWC Site Office, Kodumudi			
b) Was the station recovered successfully?	Yes			
c) What were the differences in Coordinates after verification using Starfix.HP?	No earlier coordinates available			
d) Give Link to Starfix Mean Posn/Final Fix Report.	Mean Position Report_GTSBM_PERUNDURAI.pdf			
Final Coordinates in WGS84 Datum after verification using Starfix.HP				
GEOGRAPHICAL COORDINATES:		UTM COORDINATES:		Zone No: 44 CM: 081 °E
LATITUDE :	11°15'14.2865" N	EASTING:	131 861.11 m	(+/-0.02 m)
LONGITUDE :	77°37'44.4277" E	NORTHING:	1 246 176.40 m	(+/- 0.02 m)
ELLIPSOIDAL HEIGHT :	167.02 m	Ht above MSL/CD	NOT KNOWN	m
Describe the General Location & Access to the Station :	The GTS BM AD 1885 is situated on the platform no. 1 of the Perundurai Railway Station. Bench Mark is situated 3.26 m West of platform no. 1 edge, 4.87 mtrs North of the station store office northern wall, 4 mtrs East of the fencing of station and 5 mtrs South East of a light post.			
Describe how the Stn is marked on the Ground	The station is engraved on a rectangular stone.			
Expected durability of the Station (in Years) :	10			
DETAILED DIAGRAM :		N ↑		
<p>GTSBM PLATFORM NO. 1</p>		<p>GTS BM</p> <p style="text-align: right;">NW ↑</p>		
<p style="text-align: right;">29/04/2016</p>		<p style="text-align: right;">29/04/2016</p>		

Prepared By: Bhanu Prakash
FSINPVT Party Chief: Bhanu Prakash
Date: 29 Apr 16

Figure 18: GTS Benchmark at Perundurai



Starfix Mean Position Report v5.02.24

Vessel

Vessel Name
 Project Name RIVER RECCEE SURVEY
 Project Number J_MAR_16_020
 Offset Name MainVessel_CRP
 Sampling Started 29-Apr-2016 16:35:52 (UTC+05:30)
 Sampling Ended 29-Apr-2016 16:45:55 (UTC+05:30)
 Comment GTS BM AD 1885 IS SITUATED CLOSE TO THE PLATFORM 1
 OF PERUNDURAI RLY STN, NEAR ERODE

Results

	Mean	Standard Deviation
Local Latitude	11°15'14.2865"N	
Local Longitude	77°37'44.4277"E	
Ellipsoidal Height	168.57 m	
Local Easting	131861.11 m	0.02 m
Local Northing	1246176.40 m	0.02 m
Orthometric Height	168.57 m	0.05 m
WGS84 Latitude	11°15'14.2865"N	
WGS84 Longitude	77°37'44.4277"E	
Ellipsoidal Height	168.57 m	
Quality	1.10	0.07 m
Depth	0.00 m	0.00 m
Heading	0.66°G	0.00°

Line Navigation Data	Point Navigation Data
Line Name N/A	Point Name N/A
Chainage N/A	Easting N/A
Cross Track N/A	Northing N/A
	Range N/A
	Bearing TO N/A
	FROM N/A

Observations
 Used 138 out of 138

Geodetic Parameters

Geodetic Datum	WGS84		
Ellipsoid	WGS84		
Semi-Major Axis	6378137.000		
Inverse Flattening	298.2572235630		
Eccentricity ²	0.006694379990141		
DX	0.0000m	RX	0.0000 arc seconds
DY	0.0000m	RY	0.0000 arc seconds
DZ	0.0000m	RZ	0.0000 arc seconds
D Scale	0.0000ppm		
Rotation Convention	+RZ=-RLongitude		
Projection	Transverse Mercator (UTM) Zone: 44		
Latitude of Origin	0°00'00.0000"N		
Longitude of Origin	81°00'00.0000"E		
False Easting	500000.000m		
False Northing	0.000m		
Convergence	- 0°39'31.0407"		
Calculation Mode	Grid		

Figure 19: Benchmark details by Fugro

<p>Fugro Survey (India) Pvt. Ltd. D-222/30, TTC Industrial Area, MIDC, Nerul, Navi Mumbai Pin - 400 075 (India)</p>	Reccee report on Geodetic Station/Bench Mark			
	Job No. :	J-MAR-16-020	Station Name/ID:	
	Client :	WAPCOS LTD		
	Location :	URACHIKOTTAI, TAMILNADU	CWC MTBM	
Date of Reccee:	29-Apr-16			
Brief Narrative on the Recovery of the Station				
a) What is the Source of Station Description Data;	CWC Site Office, Urachikottai			
b) Was the station recovered successfully?	Yes			
c) What were the differences in Coordinates after verification using Starfix.HP?	No earlier coordinates available			
d) Give Link to Starfix Mean Posn/Final Fix Report.	Mean Position Report_MTBM_URACHIKOTTAI.pdf			
Final Coordinates in WGS84 Datum after verification using Starfix.HP				
GEOGRAPHICAL COORDINATES:		UTM COORDINATES:		Zone No: 44
LATITUDE :	11°28'47.9020" N	EASTING:	139 828.94 m	CM: 081 °E
LONGITUDE :	77°41'57.4425" E	NORTHING:	1 271 117.56 m	(+/- 0.03 m)
ELLIPSOIDAL HEIGHT :	74.1 m	Ht above MSL/GD	166.87 m	
Describe the General Location & Access to the Station :	The station is situated on a stone inside a concrete well (1.30m x 1.30m x 0.65m). The well is filled with sand. The well is situated 12 mtrs South of the CWC site office, Urachikottai. MTBM is situated close to the western bank of the river Cauvery. The station is situated at Urachikottai, Bhavani taluk, distt Erode. CWC site office is situated about 200 mtrs E of the Urachikottai Bus Stop.			
Describe how the Strn is marked on the Ground	The station is marked by a stone on ground.			
Expected durability of the Station (in Years) :				10
DETAILED DIAGRAM :				

Prepared By: Bhanu Prakash
FSINPVT Party Chief: Bhanu Prakash
Date: 29 Apr 16

Figure 20: CWC MTBM at Urachikottai



Starfix Mean Position Report v5.02.24

Vessel

Vessel Name
 Project Name RIVER RECCEE SURVEY
 Project Number J MAR_16_020
 Offset Name MainVessel_CRP
 Sampling Started 29-Apr-2016 12:52:39 (UTC+05:30)
 Sampling Ended 29-Apr-2016 13:07:45 (UTC+05:30)
 Comment CWC MTBM IS SITUATED SOUTH OF THE CWC OFFICE, URAC
 HIKOTTAI

Results

	Mean	Standard Deviation
Local Latitude	11°28'47.9020"N	
Local Longitude	77°41'57.4425"E	
Ellipsoidal Height	76.44 m	
Local Easting	139828.94 m	0.03 m
Local Northing	1271117.56 m	0.03 m
Orthometric Height	76.44 m	0.05 m
WGS84 Latitude	11°28'47.9020"N	
WGS84 Longitude	77°41'57.4425"E	
Ellipsoidal Height	76.44 m	
Quality	0.80	0.00 m
Depth	0.00 m	0.00 m
Heading	0.66°G	0.00°

Line Navigation Data	Point Navigation Data
Line Name N/A	Point Name N/A
Chainage N/A	Easting N/A
Cross Track N/A	Northing N/A
	Range N/A
	Bearing TO N/A
	FROM N/A

Observations
 Used 230 out of 230

Geodetic Parameters

Geodetic Datum	WGS84		
Ellipsoid	WGS84		
Semi-Major Axis	6378137.000		
Inverse Flattening	298.2572235630		
Eccentricity^2	0.006694379990141		
DX	0.0000m	RX	0.0000 arc seconds
DY	0.0000m	RY	0.0000 arc seconds
DZ	0.0000m	RZ	0.0000 arc seconds
D Scale	0.0000ppm		
Rotation Convention	+RZ=-RLongitude		
Projection	Transverse Mercator (UTM) Zone: 44		
Latitude of Origin	0°00'00.0000"N		
Longitude of Origin	81°00'00.0000"E		
False Easting	500000.000m		
False Northing	0.000m		
Convergence	- 0°39'27.4956"		
Calculation Mode	Grid		

Figure 21: Benchmark details

Client: WAPCOS LTD.
 Location : CAUVERY RIVER, URACHIKOTTAI
 Job Type: BATHYMETRY AND TOPOGRAPHIC SURVEY ALONG INLAND WATERWAYS

Date : 29-Apr-16
 Job No. : J-MAR-16-020



SL	RIVER	POINT	DESCRIPTION	WGS 84 COORDINATES			LOCAL COORDINATES (UTM ZONE 44)		OTHER INFORMATION	REMARKS
				LATITUDE (N)	LONGITUDE (E)	ELLIPSOIDAL HEIGHT (M)	EASTING (M)	NORTHING (M)		
1	CAUVERY	CWC MTBM, URACHIKOT TAI	MTBM IS ESTABLISHED BY CWC AND SITUATED 12 MTRS SOUTH OF THE CWC SITE OFFICE BUILDING AT URACHIKOTTAI, TALUK BHAVANI, DISTT.- ERODE. MTBM IS SITUATED ON THE WESTERN BANK OF THE RIVER CAUVERY. URACHIKOTTAI IS 5 KMS FROM THE BHAVANI BUS STOP.	11°28'47.9020"	77°41'57.4425"	74.1	139 828.94	1 271 117.56	VALUE OF MTBM IS 166.870 MTRS ABOVE MSL (PROVIDED BY THE CWC SITE OFFICE, URACHIKOTTAI)	DERIVED BY STARFIX MEAN POSITION. ANTENNA HEIGHT (2.34 M) IS REDUCED TO THE OBSERVED ELLIPSOIDAL HEIGHT.
2	CAUVERY	GTS BENCH MARK (AD 1885)	GTS BM IS SITUATED ON THE PLATFORM NO. 1 OF THE PERUNDURAI RAILWAY STATION. BM IS SITUATED 3.26 M WEST OF PLATFORM EDGE, 4.87 M NORTH OF STATION STORE OFFICE WALL, 4 M EAST OF FENCING AND 5 M SE OF A LIGHT POST. PERUNDURAI RAILWAY STATION IS IN DISTT. ERODE. ERODE IS ABOUT 25 KMS FROM THE BM.	11°15'14.2865"	77°37'44.4277"	167.02	131 861.11	1 246 176.40	NOT KNOWN	DERIVED BY STARFIX MEAN POSITION. ANTENNA HEIGHT (1.55 M) IS REDUCED TO THE OBSERVED ELLIPSOIDAL HEIGHT.

Figure 22: Benchmark details at Urachikottai and Perundurai

4.3 Tidal Influence Zone and Tidal Variation in different stretches

The tidal reach of the Kollidam River is about 26 km as seen from Survey of India toposheet no 58 M15 and 58 M11. The tidal reach ends at about 9 km upstream of Kollidam Railway Bridge. There is formation of sand bars at the river mouth. The Mouth of Kollidam River is open due to breakwater provided. However, during the reconnaissance survey, Tidal effect was found predominant upto 16.43 kms. The Nearest Ports are Karaikal and Cuddalore. The tidal variation is about 1 m at the nearest port PORTO NOVA, obtained from Admiralty Tide Table (ATT) Vol-3. The coordinates of the port and the value of Chart Datum (CD) used in this survey are given below:

Sr. No.	Location	Latitude (N)	Longitude (E)	Z0 (m)	Source
1	PORTO NOVO	11° 29' 00"	79°46' 00"	0.71	ATT -3

4.4 Chart datum / Sounding datum and reduction details

4.4.1 Horizontal control

Worldwide Starfix.HP DGPS was used for positioning the survey vessel during this survey. The accuracy of the x, y, z position data obtained from the Starfix.HP DGPS system is +/- 10 cms at 95% assurance levels. Starfix software suite was used for navigation, data logging, and online quality control of the survey data logged.

4.4.2 Vertical control

a) Chart Datum at the River Estuary

From KP 0.0 to KP 16.4 which have tidal influence, the soundings were reduced to Chart Datum using real time tidal observations and applying $MSL \sim CD$ value of 0.706 m for the nearest port PORTO NOVA, obtained from Admiralty Tide Table (ATT) Vol-3. The coordinates of the port and the value of Chart Datum (CD) used in this survey are given below:

Sr. No.	Location	Latitude (N)	Longitude (E)	Z0 (m)	Source
1	PORTO NOVO	11° 29' 00"	79°46' 00"	0.71	ATT -3

Table 16: Details of Chart Datum Used for Reduction of Soundings

Value of Z0 is taken below M.S.L.

b) Chart Datum for the upstream part of the River

The gauge discharge data of CWC's gauge stations at Musiri, Kodumudi and Urachikottai gauging station was collected by WAPCOS. Chart datum/ Sounding Datum at this gauge station were taken as average of minimum water level of last six years. This is detailed in Para 4.18.

4.5 Hydrographic/Topographic Survey

4.5.1 Hydrographic Survey

a) *Length of stretch for which bathymetry survey has been carried out*

The bathymetry survey has been carried out in the stretch of 16.43 km from Kaveri Kollidam river mouth.

b) *Minimum and Maximum Depths*

River Stretch (From CH 0.0 to CH 5.0)

This is the estuary portion of the river where it meets the Bay of Bengal at Lat. 11° 21'.40"N, Long. 79° 49' 46"E. There was continuous flow of water in the river from CH 0.0 till CH 19. The water depth in this stretch varies with the height of tides at sea. Hence, the depths shown in the diagram below are reduced to Chart Datum which is -0.7 m below the MSL. There are agricultural fields seen on either side of the river bank and on the delta.



Figure 23: Kaveri Kollidam River from CH 0.0 to CH 5.0

River Stretch (From CH 5.0 to CH 10.0)

In this section there was continuous flow of water in the river from CH 5.0 till CH 10. The water depth in this stretch varies with the height of tides at sea. Hence, the depths shown in the diagram below are reduced to Chart Datum which is -0.7 m below the MSL. There are agricultural fields seen on either side of the river bank and on the delta.



Figure 24: Kaveri Kollidam River from CH 5.0 to CH 10.0

River Stretch (From CH 10.0 to CH 16.43)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields. The river meanders towards the south.



Figure 25: Kaveri Kollidam River from CH 10.0 to CH 16.43

c) Water levels Bathymetric Survey

Chainage (Km) A	Easting (m) B	Northing (m) C	Raw Water Depth(m) D	Tide(m) E	Reduced Depth wrt CD (m) F = D-E
-0.01	372513.34	1256108.13	4.22	0.37	3.85
0.00	372455.86	1256026.20	4.35	0.37	3.98
0.04	372374.57	1255967.42	5.01	0.37	4.64
0.06	372415.41	1256087.66	5.28	0.37	4.91
0.10	372284.12	1255924.68	4.33	0.36	3.97
0.10	372336.79	1256025.79	5.57	0.36	5.21
0.17	372186.10	1255904.43	4.24	0.36	3.88
0.27	372088.07	1255925.40	4.28	0.35	3.93
0.35	371993.83	1255919.60	4.01	0.35	3.66
0.45	371893.80	1255918.70	4.24	0.35	3.89

Chainage (Km) A	Easting (m) B	Northing (m) C	Raw Water Depth(m) D	Tide(m) E	Reduced Depth wrt CD (m) F = D-E
0.55	371895.36	1255978.77	4.10	0.35	3.75
0.65	371796.20	1255940.49	3.61	0.34	3.27
0.66	371797.81	1256000.89	4.34	0.34	4.00
0.75	371697.66	1255957.90	3.41	0.34	3.07
0.76	371700.13	1256024.38	4.41	0.34	4.07
0.84	371620.16	1256021.29	3.67	0.34	3.33
0.89	371596.84	1256118.76	4.39	0.33	4.06
0.96	371507.73	1256078.60	4.04	0.33	3.71
0.99	371502.40	1256151.74	4.11	0.33	3.78
1.07	371414.05	1256104.88	3.71	0.32	3.39
1.16	371317.58	1256077.34	2.98	0.32	2.66
1.23	371230.56	1256028.05	1.61	0.32	1.29
1.33	371130.49	1256024.92	1.55	0.32	1.23
1.42	371060.64	1256042.81	3.25	0.31	2.94
1.47	370991.10	1256058.11	1.85	0.31	1.54
1.57	370890.86	1256059.97	1.63	0.31	1.32
1.62	370840.75	1256082.59	3.40	0.31	3.09
1.67	370804.15	1256111.87	2.90	0.30	2.60
1.68	370839.37	1256347.11	3.47	0.30	3.17
1.72	370820.03	1256409.77	3.42	0.30	3.12
1.79	370739.00	1256337.73	3.69	0.30	3.39
1.82	370692.41	1256340.26	3.56	0.29	3.27
1.90	370636.50	1256342.02	3.83	0.29	3.54
1.99	370537.35	1256344.17	4.11	0.28	3.83
2.09	370437.69	1256361.11	4.01	0.28	3.73
2.19	370338.43	1256374.15	3.88	0.28	3.60
2.29	370238.98	1256385.24	3.94	0.27	3.67
2.38	370142.66	1256356.07	4.57	0.27	4.30
2.49	370041.06	1256372.05	4.77	0.27	4.50
2.59	369941.08	1256394.58	4.90	0.26	4.64
2.69	369842.85	1256419.00	4.87	0.26	4.61
2.79	369764.87	1256482.09	3.94	0.26	3.68
2.88	369672.06	1256516.95	3.53	0.26	3.27
2.97	369579.25	1256551.81	3.15	0.26	2.89
3.08	369486.44	1256586.66	2.97	0.26	2.71
3.18	369393.63	1256621.52	2.83	0.26	2.57
3.28	369294.18	1256653.98	2.87	0.25	2.62
3.38	369193.73	1256688.04	3.02	0.25	2.77
3.47	369088.15	1256727.98	3.15	0.24	2.91
3.57	368996.30	1256734.60	4.37	0.24	4.13

Chainage (Km) A	Easting (m) B	Northing (m) C	Raw Water Depth(m) D	Tide(m) E	Reduced Depth wrt CD (m) F = D-E
3.65	368933.51	1256741.22	5.04	0.24	4.80
3.70	368855.14	1256756.31	5.57	0.24	5.33
3.78	368776.77	1256771.40	5.95	0.23	5.72
3.88	368645.52	1256798.06	5.78	0.23	5.55
3.97	368540.64	1256825.91	5.69	0.23	5.46
4.07	368435.75	1256876.38	5.74	0.23	5.51
4.17	368330.87	1256925.10	5.23	0.23	5.00
4.26	368225.99	1257008.64	5.37	0.23	5.14
4.36	368137.21	1257071.29	5.16	0.23	4.93
4.44	368042.80	1257148.20	4.84	0.23	4.61
4.53	367996.66	1257174.81	3.68	0.22	3.46
4.62	367957.26	1257200.23	5.06	0.22	4.84
4.72	367887.52	1257272.02	4.70	0.21	4.49
4.81	367839.30	1257360.08	4.27	0.21	4.06
4.90	367806.46	1257455.76	3.77	0.21	3.56
4.99	367743.36	1257533.55	3.75	0.21	3.54
5.05	367708.52	1257566.08	2.74	0.20	2.54
5.09	367664.98	1257595.75	3.54	0.20	3.34
5.15	367613.87	1257615.20	1.85	0.20	1.65
5.18	367570.51	1257628.77	3.51	0.20	3.31
5.28	367464.51	1257654.16	2.71	0.20	2.51
5.38	367385.59	1257715.62	1.33	0.20	1.13
5.46	367340.72	1257809.75	2.19	0.19	2.00
5.53	367306.47	1257867.17	2.31	0.19	2.12
5.59	367272.21	1257924.58	2.48	0.19	2.29
5.69	367222.82	1258011.60	2.04	0.19	1.85
5.78	367195.12	1258108.42	2.78	0.19	2.59
5.88	367160.38	1258209.30	4.12	0.19	3.93
5.98	367114.70	1258302.72	5.08	0.19	4.89
6.08	367051.99	1258385.69	5.28	0.19	5.09
6.15	367010.62	1258430.05	5.39	0.19	5.20
6.20	366948.64	1258489.97	5.48	0.19	5.29
6.29	366891.27	1258533.59	5.79	0.19	5.60
6.37	366833.90	1258577.21	4.35	0.19	4.16
6.47	366747.76	1258628.46	2.82	0.19	2.63
6.57	366657.61	1258671.86	1.45	0.19	1.26
6.67	366564.51	1258708.58	0.98	0.19	0.79
6.77	366492.13	1258777.92	1.80	0.20	1.60
6.87	366414.42	1258841.04	2.39	0.20	2.19
6.96	366346.09	1258914.12	3.22	0.20	3.02

Chainage (Km) A	Easting (m) B	Northing (m) C	Raw Water Depth(m) D	Tide(m) E	Reduced Depth wrt CD (m) F = D-E
7.06	366260.35	1258965.78	3.10	0.20	2.90
7.15	366165.73	1258998.51	2.65	0.20	2.45
7.25	366066.45	1259012.41	2.35	0.20	2.15
7.35	365966.14	1259016.13	2.22	0.20	2.02
7.45	365866.04	1259015.15	2.40	0.21	2.19
7.54	365767.21	1258999.46	2.49	0.21	2.28
7.64	365669.51	1258977.76	2.70	0.21	2.49
7.73	365623.22	1258958.63	2.82	0.21	2.61
7.83	365576.93	1258939.50	2.94	0.21	2.73
7.90	365537.43	1258908.60	2.99	0.21	2.78
7.99	365497.93	1258877.70	2.94	0.21	2.73
8.09	365408.07	1258833.71	3.15	0.21	2.94
8.16	365312.16	1258803.76	2.89	0.21	2.68
8.24	365224.33	1258753.80	2.64	0.21	2.43
8.34	365157.74	1258678.78	2.45	0.21	2.24
8.42	365169.39	1258579.25	4.05	0.21	3.84
8.49	365199.51	1258483.83	4.23	0.21	4.02
8.59	365171.85	1258387.08	4.15	0.21	3.94
8.69	365107.55	1258310.34	5.30	0.21	5.09
8.80	365074.87	1258215.24	5.85	0.22	5.63
8.90	365029.85	1258125.79	6.75	0.22	6.53
9.00	365003.48	1258028.96	7.22	0.22	7.00
9.10	364984.52	1257929.84	7.22	0.22	7.00
9.20	364968.46	1257828.03	7.03	0.22	6.81
9.31	364958.49	1257727.41	6.35	0.22	6.13
9.40	364928.55	1257631.72	2.47	0.22	2.25
9.50	364925.36	1257531.69	2.28	0.22	2.06
9.59	364975.27	1257444.82	3.71	0.22	3.49
9.69	365008.26	1257350.36	4.87	0.23	4.64
9.78	365019.96	1257250.62	4.58	0.23	4.35
9.88	365000.76	1257152.40	3.56	0.23	3.33
9.97	364949.81	1257066.16	3.26	0.23	3.03
10.02	364859.47	1257023.19	2.07	0.23	1.84
10.11	364831.18	1256927.25	2.01	0.23	1.78
10.21	364825.40	1256827.39	2.78	0.23	2.55
10.32	364778.56	1256738.94	2.60	0.24	2.36
10.41	364736.50	1256648.14	2.14	0.24	1.90
10.51	364687.23	1256561.08	2.12	0.24	1.88
10.61	364600.14	1256510.44	1.96	0.24	1.72
10.70	364510.90	1256465.28	1.94	0.24	1.70

Chainage (Km) A	Easting (m) B	Northing (m) C	Raw Water Depth(m) D	Tide(m) E	Reduced Depth wrt CD (m) F = D-E
10.78	364418.31	1256427.17	2.17	0.24	1.93
10.85	364324.58	1256391.80	2.57	0.24	2.33
10.94	364275.56	1256381.78	2.17	0.24	1.93
11.03	364226.53	1256371.75	1.91	0.25	1.66
11.13	364127.03	1256360.16	1.88	0.25	1.63
11.23	364027.02	1256351.58	2.24	0.25	1.99
11.33	364003.67	1256351.39	2.31	0.25	2.06
11.42	363976.99	1256350.69	2.12	0.25	1.87
11.51	363953.70	1256350.37	2.29	0.25	2.04
11.57	363926.96	1256349.79	2.22	0.25	1.97
11.66	363827.03	1256358.39	2.59	0.25	2.34
11.76	363731.74	1256327.58	1.64	0.25	1.39
11.86	363645.93	1256276.09	1.05	0.25	0.80
11.92	363560.65	1256223.76	1.20	0.25	0.95
11.98	363499.37	1256144.67	1.18	0.25	0.93
12.06	363454.27	1256055.34	0.84	0.25	0.59
12.15	363396.14	1255973.86	0.82	0.25	0.57
12.24	363340.72	1255890.51	1.00	0.26	0.74
12.31	363308.38	1255795.74	1.41	0.26	1.15
12.38	363275.73	1255701.18	1.48	0.26	1.22
12.46	363238.09	1255608.32	1.21	0.26	0.95
12.53	363206.99	1255513.01	1.33	0.26	1.07
12.59	363177.57	1255417.30	1.67	0.26	1.41
12.67	363137.06	1255325.76	1.21	0.26	0.95
12.75	363082.50	1255241.94	1.04	0.26	0.78
12.83	363029.70	1255156.98	1.45	0.27	1.18
12.93	362981.66	1255069.28	1.28	0.27	1.01
13.02	362937.63	1254979.45	0.67	0.27	0.40
13.12	362848.65	1254933.74	0.91	0.27	0.64
13.22	362766.05	1254877.14	1.68	0.27	1.41
13.32	362689.27	1254812.75	2.46	0.27	2.19
13.41	362636.55	1254727.47	2.23	0.27	1.96
13.50	362584.77	1254641.83	2.01	0.27	1.74
13.58	362542.23	1254551.02	1.71	0.27	1.44
13.67	362494.94	1254462.80	2.14	0.27	1.87
13.75	362464.48	1254367.53	2.64	0.28	2.36
13.79	362474.22	1254267.93	1.56	0.28	1.28
13.89	362384.94	1254222.74	2.93	0.28	2.65
13.99	362310.61	1254155.62	2.17	0.28	1.89
14.09	362232.45	1254093.13	1.98	0.28	1.70

Chainage (Km) A	Easting (m) B	Northing (m) C	Raw Water Depth(m) D	Tide(m) E	Reduced Depth wrt CD (m) F = D-E
14.20	362193.20	1254001.12	0.79	0.28	0.51
14.27	362179.44	1253902.01	2.42	0.28	2.14
14.36	362114.51	1253825.89	2.50	0.28	2.22
14.46	362035.77	1253763.58	2.03	0.29	1.74
14.56	361940.18	1253733.65	1.63	0.29	1.34
14.62	361840.46	1253724.04	2.59	0.29	2.30
14.62	361740.31	1253722.96	2.58	0.29	2.29
14.64	361640.66	1253713.83	1.99	0.29	1.70
14.74	361540.75	1253708.94	2.09	0.29	1.80
14.83	361440.70	1253711.06	1.69	0.29	1.40
14.93	361340.40	1253712.97	2.13	0.29	1.84
14.99	361273.60	1253711.63	2.10	0.29	1.81
15.06	361224.85	1253701.45	2.30	0.30	2.00
15.08	361190.60	1253688.90	0.75	0.30	0.45
15.12	361157.32	1253680.19	0.88	0.30	0.58
15.17	361118.55	1253671.44	1.59	0.30	1.29
15.18	361095.18	1253658.74	1.01	0.30	0.71
15.21	361042.27	1253653.94	1.25	0.30	0.95
15.27	360996.01	1253645.25	0.69	0.30	0.39
15.30	360944.73	1253643.94	1.31	0.30	1.01
15.37	360896.30	1253637.33	0.60	0.30	0.30
15.47	360796.26	1253635.25	0.93	0.30	0.63
15.56	360696.16	1253634.79	1.82	0.30	1.52
15.66	360596.19	1253631.50	1.89	0.31	1.58
15.76	360496.22	1253637.44	2.11	0.31	1.80
15.86	360397.53	1253653.98	1.54	0.31	1.23
15.95	360310.95	1253704.13	1.71	0.31	1.40
16.02	360215.14	1253732.84	0.72	0.31	0.41
16.07	360131.45	1253787.72	0.68	0.31	0.37
16.16	360031.31	1253788.60	0.79	0.31	0.48
16.24	359956.35	1253748.39	0.75	0.31	0.44
16.33	359881.39	1253708.17	0.69	0.31	0.38
16.43	359793.36	1253660.56	0.73	0.31	0.42

Table 17: Bathymetry Water levels (Observed, Reduction factor and Reduced)

4.5.2 Topographic Survey

a) Length of stretch for which topographic survey has been carried out

Since the water depths are shallow for chainage above 16.43km from river mouth, therefore the topography survey has been carried out from chainage 16.4 km to 310.0 km from Kaveri Kollidam river mouth.

b) Minimum and Maximum Depths

The following sign convention is adopted

- (+) : Riverbed below CD
- (-) : Riverbed above CD
- (+) : Water Depth below CD
- (-) : Water Depth above CD

River Stretch (From CH 16.43 to CH 30.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields. The river bed meanders towards the south with very little flowing water and many pools of trapped stagnant water.



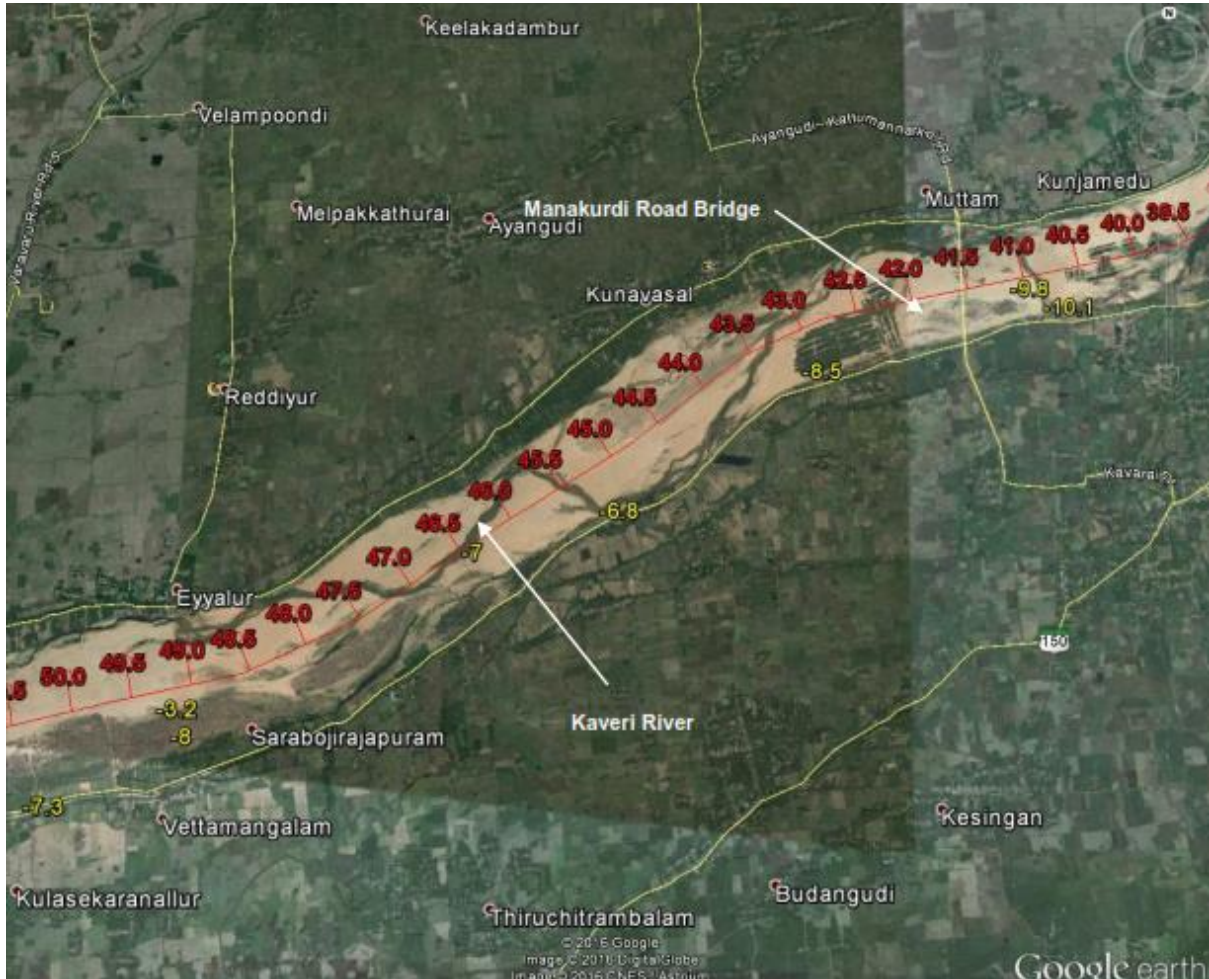
River Stretch (From CH 30.0 to CH 40.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields. The river meanders towards the south



River Stretch (From CH 40.0 to CH 50.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields. The Manarkurdi Road Bridge crosses the river at CH 41.5.



River Stretch (From CH 50.0 to CH 60.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields. The Manarkurdi Road Bridge crosses the river at CH 41.5. The Coleroon Road Bridge crosses the river at CH 58.0.



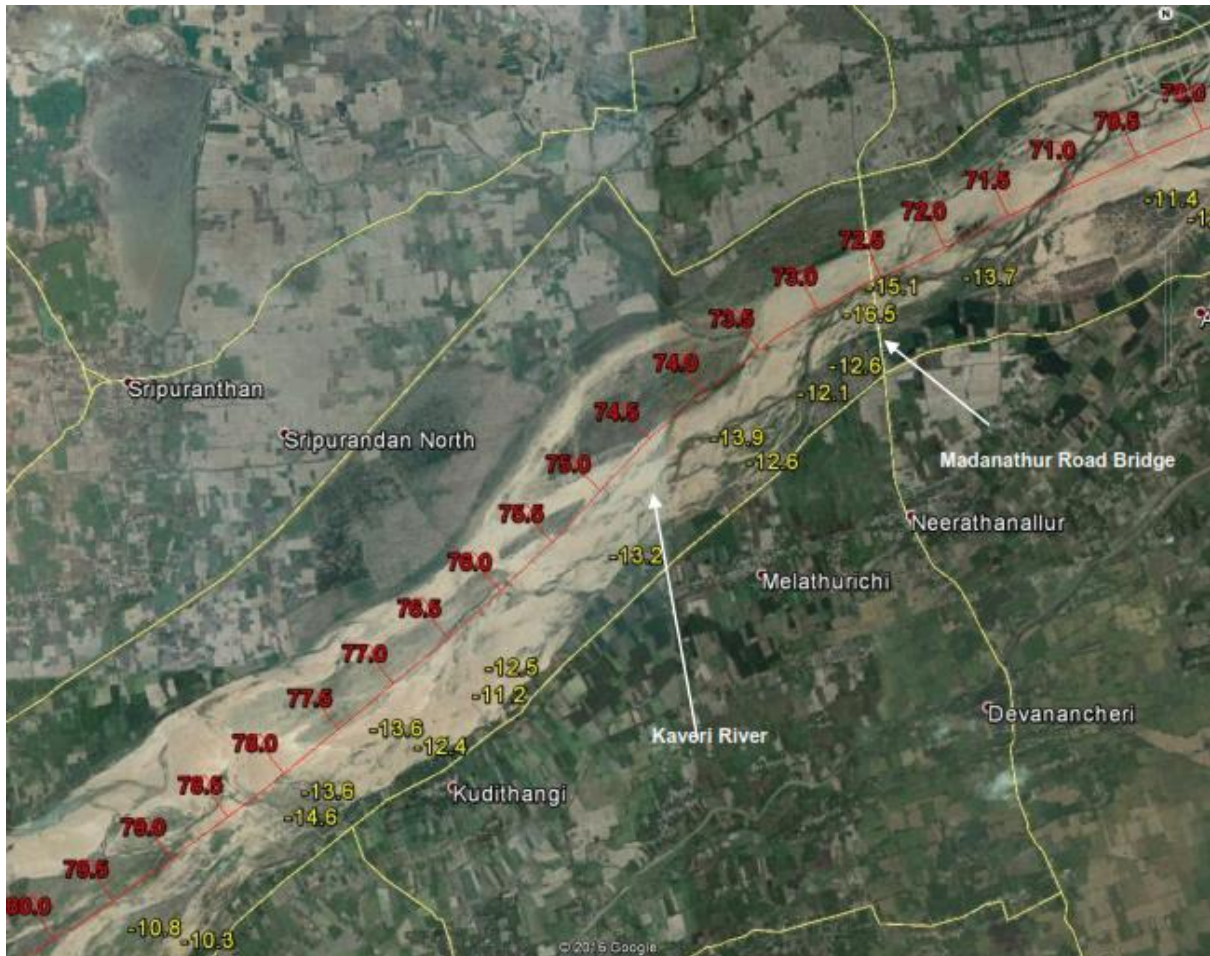
River Stretch (From CH 60.0 to CH 70.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields.



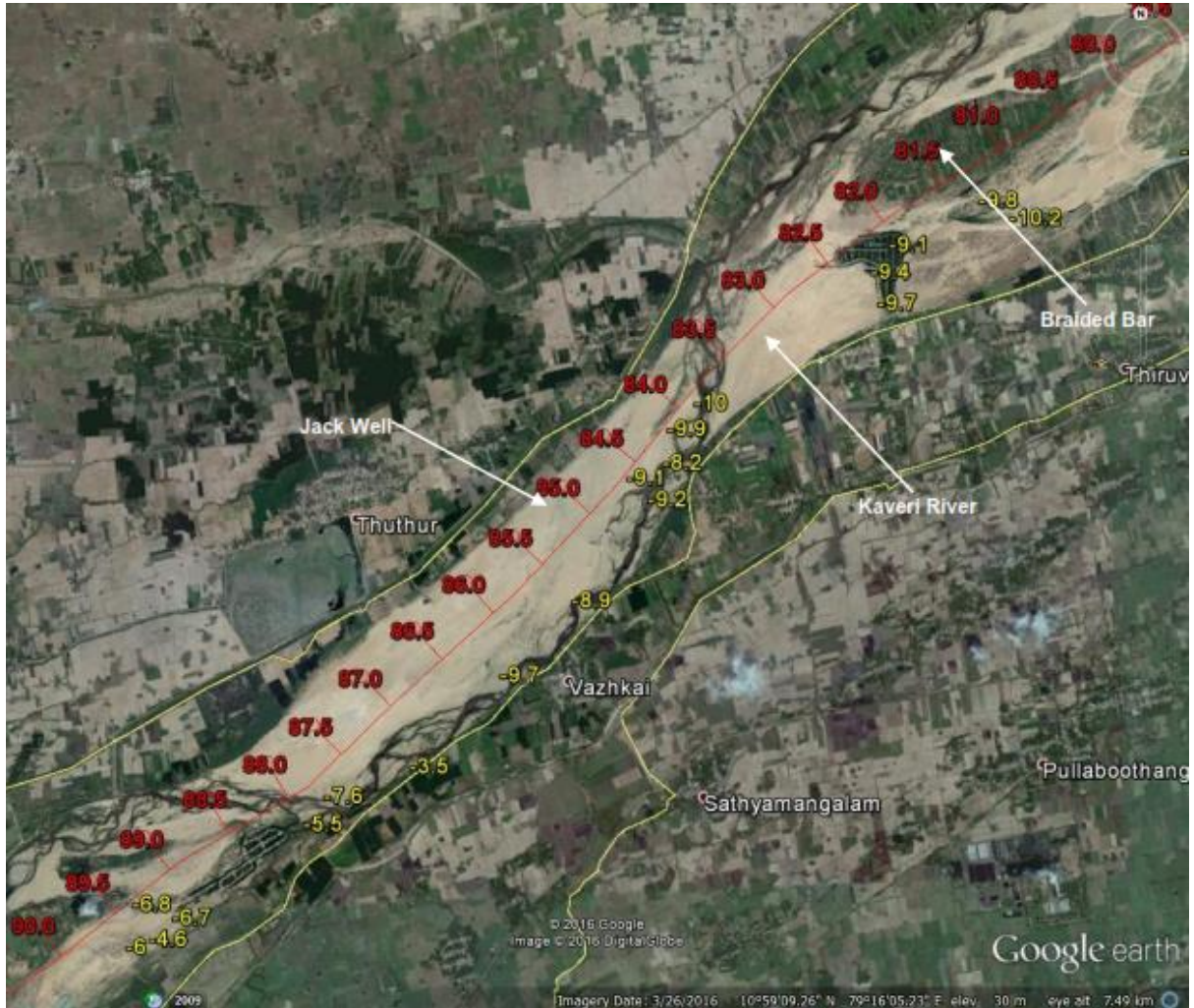
River Stretch (From CH 70.0 to CH 80.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields. The Madanathur Road Bridge crosses the river at CH 72.5.



River Stretch (From CH 80.0 to CH 90.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields. One Jack well is observed on the centre of the river at CH 85.0.



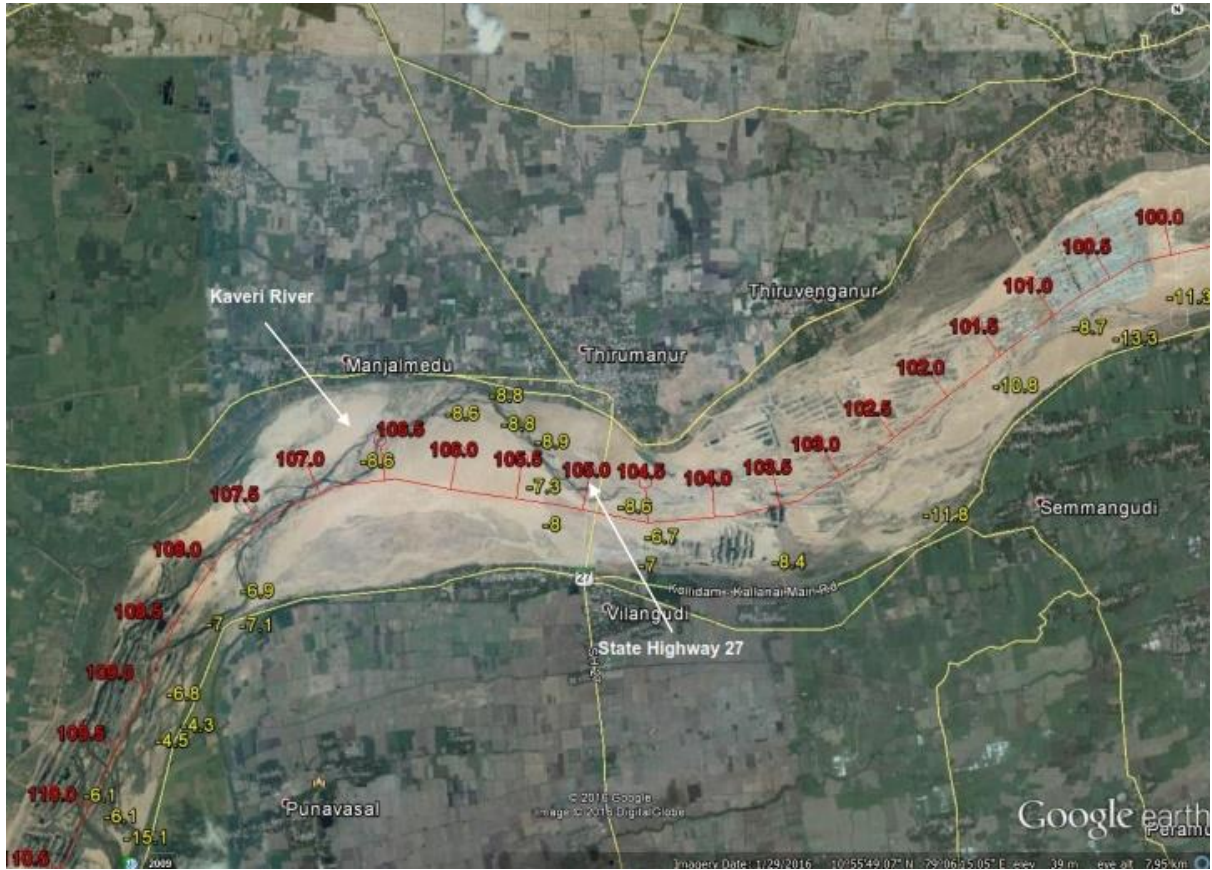
River Stretch (From CH 90.0 to CH 100.0)

In this section, the banks of the river are mostly covered with vegetation and agricultural fields.



River Stretch (From CH 100.0 to CH 110.0)

State Highway 27 Road Bridge from Vilangudi to Thirumanur crosses the Kaveri River at CH 104.48. There are fields seen on both side and vegetation cover in the middle of the river.



River Stretch (From CH 110.0 to CH 120.0)

Meandering channels were observed all along the stretch from CH 112.0 to CH 120.0. There are fields seen on both side and vegetation cover in the middle of the river.



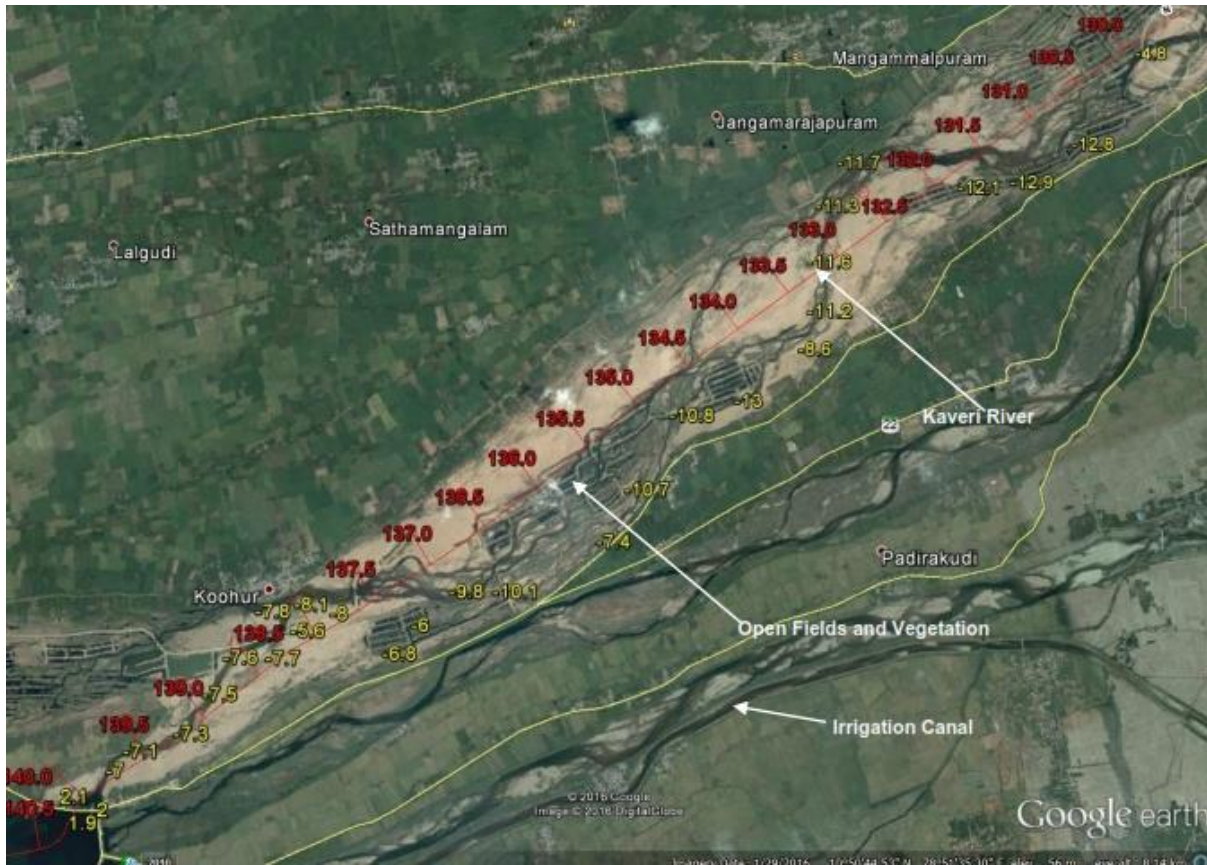
River Stretch (From CH 120.0 to CH 130.0)

Sengariyur – Poondi Bridge crosses Kaveri River at CH 126.5. Meandering channels were observed all along the stretch from CH 112.0 to CH 127.0. There are fields seen on both side and vegetation cover in the middle of the river.



River Stretch (From CH 130.0 to CH 140.0)

There are fields seen on both side and vegetation cover in the middle of the river. Irrigation canal was observed on the south of riverbank.



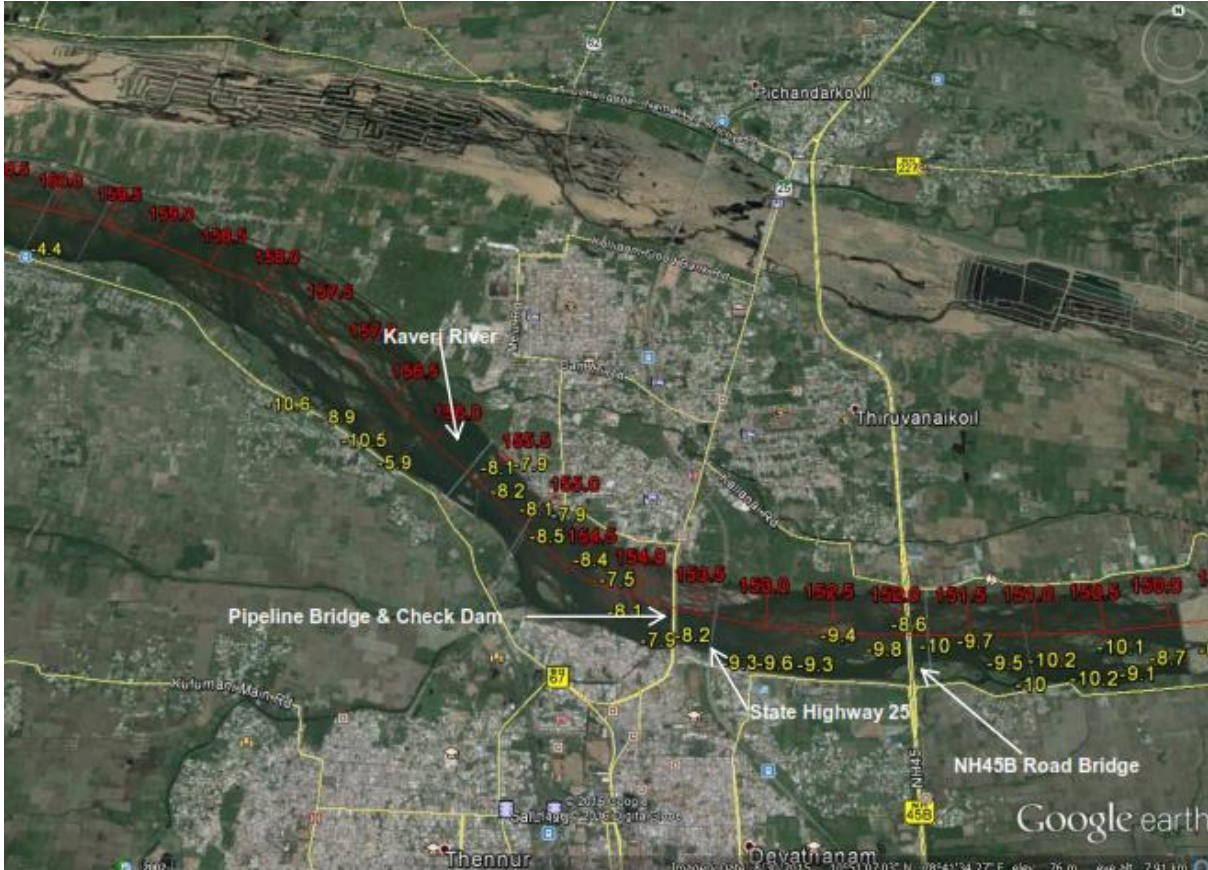
River Stretch (From CH 140.0 to CH 150.0)

Shallow Patches were recorded between CH 142.0 to CH 148.0. A Jack Well was recorded along the river at CH 145.0. There are fields seen on both side and vegetation cover in the middle of the river.



River Stretch (From CH 150.0 to CH 160.0)

National Highway 45B Road Bridge crosses the river at CH 152.0. State Highway 25 Bridge crosses the river at CH 153.0 connecting Thennur to Thiruvanaikoil. A pipeline bridge crosses the river at CH 155.5. There are fields seen on both side and vegetation cover in the middle of the river.



River Stretch (From CH 160.0 to CH 170.0)

In this section, the banks of the river are mostly covered with vegetation with few agricultural fields. A barrage crosses the river at CH 168.0.



River Stretch (From CH 180.0 to CH 190.0)

Thanndi Periyar Bridge (State Highway 71) is crossing Kaveri River at CH 187.48. Few farm lands can be seen in the middle of river bed.



River Stretch (From CH 190.0 to CH 200.0)

In this section, there are mostly vegetation fields seen along both the banks. The flood plains are covered with vegetation and open fields. Braided Riverbed noticed along the surveyed stretch from CH 191.0 to CH 195.0.



River Stretch (From CH 200.0 to CH 210.0)

In this section, Mayanur dam were recorded at CH 208.0. On the east side of dam, flood plains are covered with vegetation and open fields.



River Stretch (From CH 210.0 to CH 220.0)

Confluence of Amravathi River and Kaveri was observed at CH 213.0. The flood plains are covered with vegetation and open fields. The shallow patches were recorded at CH 211.81.



River Stretch (From CH 220.0 to CH 230.0)

In this section, Vengal (road and rail) bridge were observed at CH 224.93 & CH 225.31 with a vertical clearance of 6.0 m & 8.0 m and horizontal clearance in between the pillars of 30 m & 20 m. The flood plains are covered with vegetation and open fields.



River Stretch (From CH 230.0 to CH 240.0)

In this section, Vellur–Velayuthampalayam–Noyyal Road Bridge was recorded at CH 239.90. The flood plains are covered with vegetation and open fields. The flood plains are covered with vegetation and open fields.



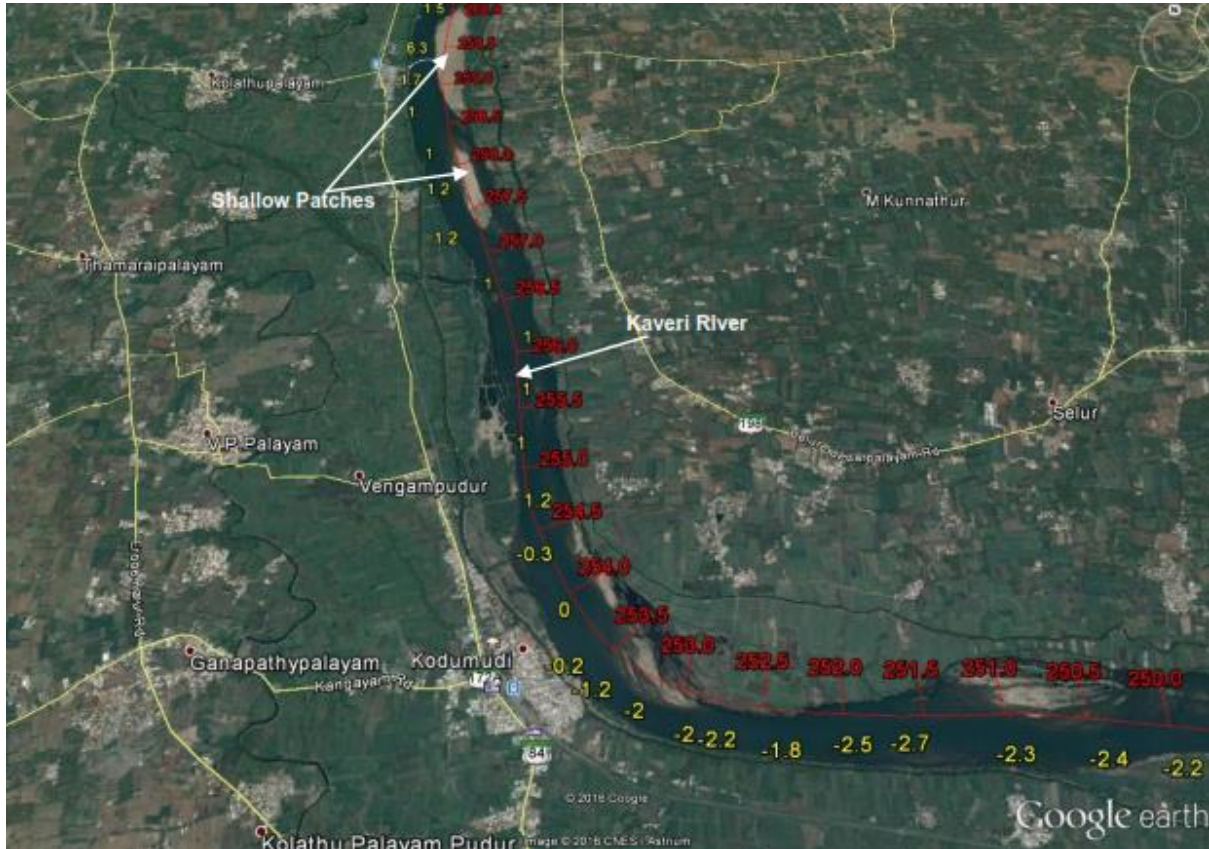
River Stretch (From CH 240.0 to CH 250.0)

Few patches of rocks were observed in the middle of river and on either side of the banks at CH 242.70. Shallow Patches with fields and vegetation can be seen in middle of the river. A High tension line crosses the river at CH 246.04 with vertical clearance of 12 m and horizontal clearance in between columns 100 m.



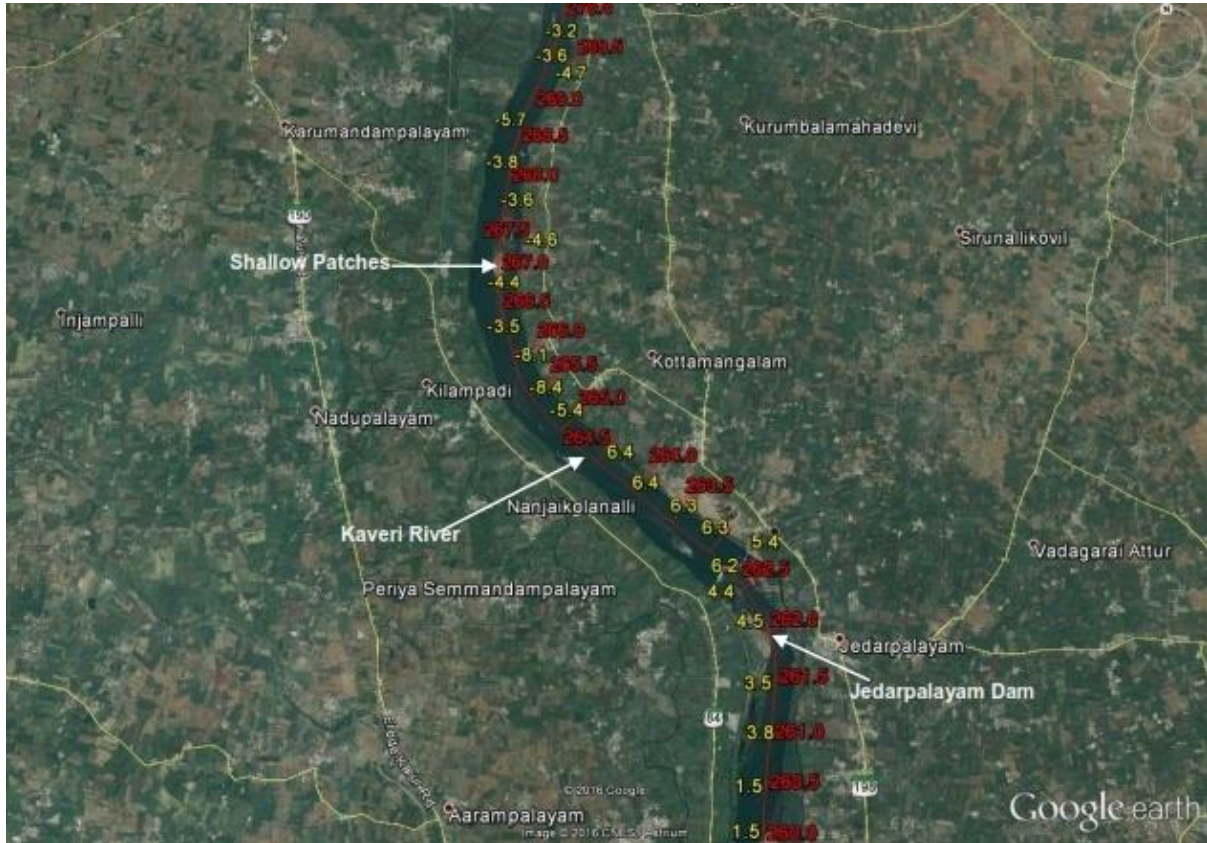
River Stretch (From CH 250.0 to CH 260.0)

Town of Kodumudi lies on south bank at CH 254.0. State highway 172A & 84 runs parallel to the river on south and west banks respectively. Meandering of river was observed at CH 253.5. Shallow patches were recorded at CH 258.0 & CH 259.5. An electric line crosses the river at CH 253.53 with vertical clearance of 12 m and distance of 150 m between the columns. Kodumudi tide gauge station was recorded at CH 253.66. There are fields seen on both side and vegetation cover in the middle of the river.



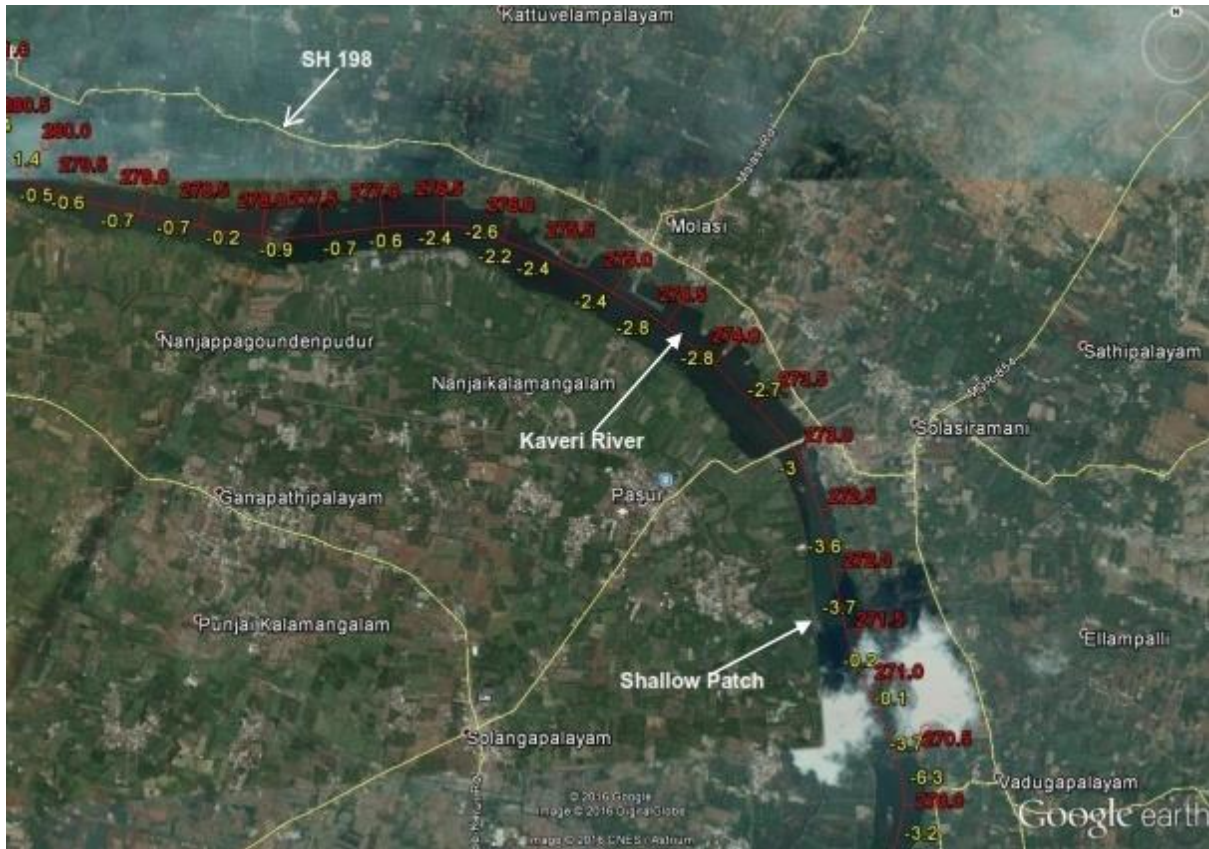
River Stretch (From CH 260.0 to CH 270.0)

Jedarpalayam Dam crosses the river at CH 262.70. There are mostly fields seen along both the banks. The flood plains are covered with vegetation and open fields. Shallow patches were recorded at CH 263.5 & CH 267.5. A high tension line crosses the river at CH 262.63 with vertical clearance of 10 m.



River Stretch (From CH 270.0 to CH 280.0)

There are mostly fields and vegetation seen along both the banks. Shallow patch was recorded at CH 271.5.



River Stretch (From CH 280.0 to CH 290.0)

In this section, the banks of the river are mostly covered with vegetation with few agricultural fields. Pallipalayam – Velur – Tiruchengode Road Bridge crosses the river at CH 286.0. There are mostly fields and dense vegetation seen along both the banks in this segment. Shallow patch was recorded at CH 281.3. Vendipalayam barrage was recorded at CH 289.20. Two (2) high tension lines are crossing the river at CH 289.02 and CH 289.46 with vertical clearance of 15 m.



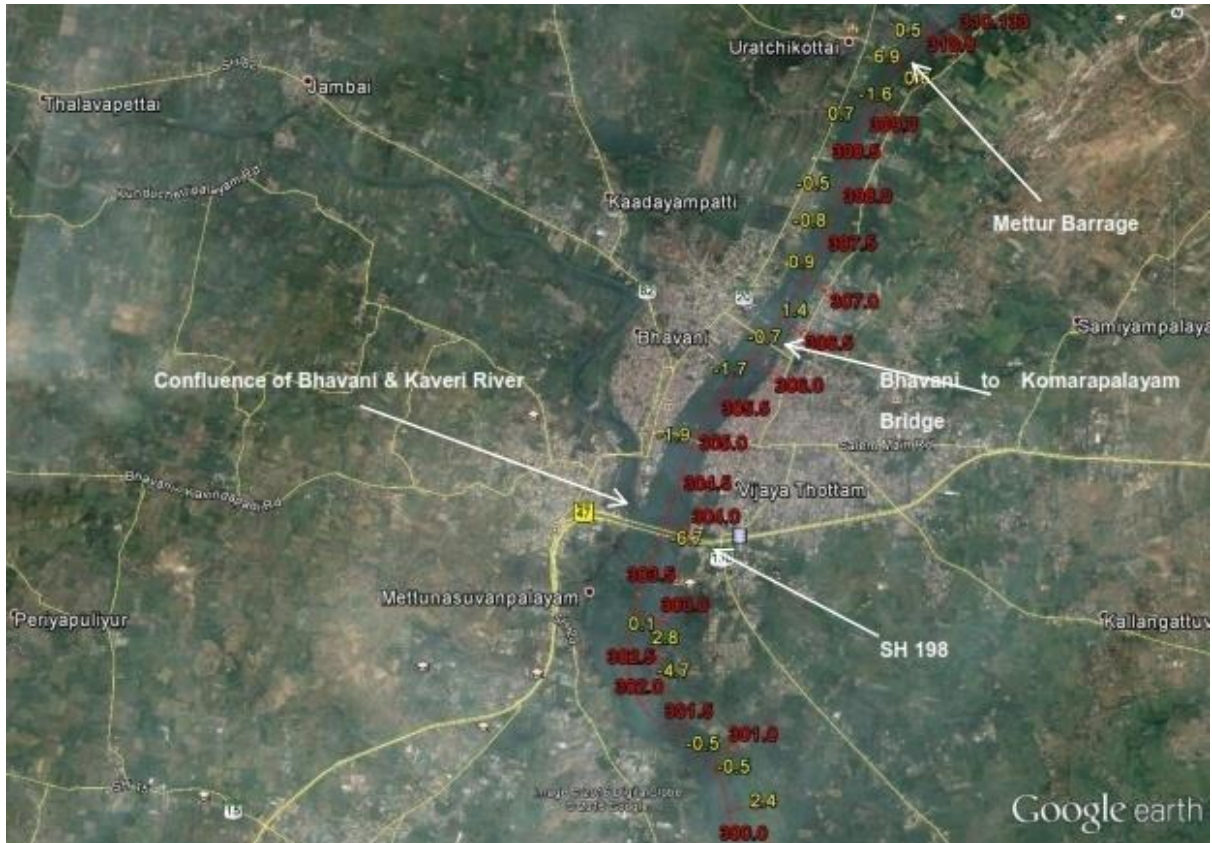
River Stretch (From CH 290.0 to CH 300.0)

There are mostly fields and dense vegetation seen along both the banks in this segment. Marshy land and shallow patches was observed between CH 294.0 and CH 295.89. The Barrage road is crossing Kaveri River at CH 297.3.



River Stretch (From CH 300.0 to CH 310.133)

Dense vegetation was observed on both the sides of bank. Confluence of Bhavani River and Kaveri River were seen at CH 304.0. Salem – Coimbatore Highway (National Highway 47) crosses the River at CH 304.0. Bhavani to Komarapalayam Bridge road crosses the river at CH 306.3. Lower Mettur Barrage was recorded at CH 310.16.



c) *Water levels Topographic survey*

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
16.766	2.64	0.5	2.650	0.010
16.84	2.49	0.5	2.668	0.178
16.915	2.28	0.5	2.686	0.406
16.989	2.25	0.5	2.703	0.453
17.063	2.16	0.4	2.721	0.561
17.138	2.09	0.5	2.739	0.649
17.241	2	0.4	2.764	0.764
17.302	1.82	0.3	2.778	0.958
17.368	1.71	0.5	2.794	1.084
17.458	1.68	0.5	2.816	1.136
17.512	1.65	0.4	2.829	1.179
17.652	1.52	0.5	2.862	1.342
17.755	1.48	0.3	2.887	1.407
17.862	1.531	0.3	2.913	1.382
17.95	1.617	0.3	2.934	1.317
18.047	1.72	0.4	2.957	1.237
18.147	1.79	0.5	2.981	1.191
18.227	1.82	0.6	3.000	1.180
18.329	1.962	0.5	3.025	1.063
18.431	2.048	0.7	3.049	1.001
18.536	2.134	0.8	3.074	0.940
18.642	2.21	0.7	3.100	0.890
18.745	2.307	0.7	3.124	0.817
18.852	2.393	0.7	3.150	0.757
18.949	2.45	0.8	3.173	0.723
19.048	2.565	0.8	3.197	0.632
19.121	2.651	0.9	3.214	0.563
19.207	2.73	0.9	3.235	0.505
19.278	2.823	0.7	3.252	0.429
19.355	2.91	1	3.271	0.361
19.447	3.02	1	3.293	0.273
19.546	3.082	1.1	3.316	0.234
19.646	3.168	1.1	3.340	0.172
19.745	3.254	1	3.364	0.110
19.844	3.32	0.9	3.388	0.068
19.944	3.427	0.9	3.412	0.000
20.043	3.513	1	3.435	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
20.143	3.58	1.1	3.459	0.000
20.241	3.71	1.2	3.483	0.000
20.337	3.72	1	3.506	0.000
20.433	3.75	1	3.529	0.000
20.529	3.74	1	3.552	0.000
20.624	3.71	0.9	3.575	0.000
20.72	3.71	0.8	3.598	0.000
20.816	3.72	0.8	3.621	0.000
20.884	3.71	0.8	3.637	0.000
20.976	3.79	0.8	3.659	0.000
21.068	3.75	0.7	3.681	0.000
21.16	3.71	0.8	3.703	0.000
21.252	3.72	0.8	3.725	0.005
21.343	3.76	0.7	3.747	0.000
21.435	3.75	0.9	3.769	0.019
21.527	3.8	0.8	3.791	0.000
21.586	3.761	0.9	3.805	0.044
21.658	3.688	0	3.823	0.135
21.745	3.6	0	3.843	0.243
21.832	3.541	0	3.864	0.323
21.92	3.48	0	3.885	0.405
22.007	3.394	0	3.906	0.512
22.094	3.32	0	3.927	0.607
22.182	3.21	0	3.948	0.738
22.269	3.173	0	3.969	0.796
22.357	3.099	0	3.990	0.891
22.444	3.01	0	4.011	1.001
22.531	2.952	0	4.032	1.080
22.601	2.879	0	4.049	1.170
22.617	2.8	0	4.052	1.252
22.662	2.99	0	4.063	1.073
22.719	2.94	0	4.077	1.137
22.754	2.873	0.3	4.085	1.212
22.778	2.84	0.2	4.091	1.251
22.805	2.85	0.3	4.097	1.247
22.832	2.84	0.3	4.104	1.264
22.882	2.84	0.2	4.116	1.276
22.936	2.82	0.2	4.129	1.309
23.013	2.803	0.3	4.147	1.344
23.082	2.78	0.2	4.164	1.384

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
23.163	2.79	0.2	4.183	1.393
23.246	2.79	0.3	4.203	1.413
23.311	2.75	0.2	4.219	1.469
23.431	2.71	0.2	4.248	1.538
23.531	2.74	0.3	4.271	1.531
23.627	2.75	0.2	4.294	1.544
23.736	2.73	0.3	4.321	1.591
23.836	2.72	0.2	4.345	1.625
23.986	2.68	0.3	4.381	1.701
24.084	2.69	0.3	4.404	1.714
24.183	2.68	0.3	4.428	1.748
24.282	2.64	0.2	4.451	1.811
24.401	2.65	0.2	4.480	1.830
24.501	2.628	0.3	4.504	1.876
24.596	2.617	0.3	4.527	1.910
24.693	2.9	0.3	4.550	1.650
24.789	3.15	0.2	4.573	1.423
24.88	3.16	0.2	4.595	1.435
24.96	3.16	0.2	4.614	1.454
25.036	3.17	0.2	4.632	1.462
25.136	3.12	0.2	4.656	1.536
25.236	3.1	0.2	4.680	1.580
25.336	3.06	0.2	4.704	1.644
25.446	3.08	0.2	4.730	1.650
25.553	3.04	0.2	4.756	1.716
25.657	3.118	0.2	4.781	1.663
25.757	3.22	0.3	4.805	1.585
25.85	3.304	0.5	4.827	1.523
25.943	3.41	0.6	4.850	1.440
26.032	3.49	0.7	4.871	1.381
26.126	3.56	0.7	4.893	1.333
26.235	3.676	0.7	4.920	1.244
26.338	3.74	0.7	4.944	1.204
26.44	3.74	0.7	4.969	1.229
26.564	3.861	0.6	4.998	1.137
26.681	3.94	0.5	5.026	1.086
26.821	4.047	0.5	5.060	1.013
26.931	4.1	0.5	5.086	0.986
27.031	4.233	0.5	5.110	0.877
27.129	4.35	0.6	5.134	0.784

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
27.209	4.35	0.6	5.153	0.803
27.324	4.419	0.7	5.181	0.762
27.416	4.5	0.7	5.203	0.703
27.514	4.81	0.9	5.226	0.416
27.613	4.9	0.9	5.250	0.350
27.723	5.048	1	5.276	0.228
27.816	5.092	1.2	5.299	0.207
27.895	5.12	1.3	5.317	0.197
27.992	5.179	1.3	5.341	0.162
28.099	5.2	1.5	5.366	0.166
28.206	5.266	1.5	5.392	0.126
28.309	5.309	1.5	5.417	0.108
28.428	5.36	1.8	5.445	0.085
28.541	5.396	1.7	5.472	0.076
28.643	5.44	1.8	5.497	0.057
28.745	5.46	1.9	5.521	0.061
28.821	5.527	1.8	5.539	0.012
28.912	5.57	1.7	5.561	0.000
28.967	5.6	1.8	5.574	0.000
29.082	5.657	1.9	5.602	0.000
29.205	5.71	1.9	5.631	0.000
29.283	5.744	2	5.650	0.000
29.361	5.787	2	5.669	0.000
29.459	5.82	1.8	5.692	0.000
29.569	5.874	1.7	5.719	0.000
29.672	5.9	1.7	5.743	0.000
29.741	5.961	1.6	5.760	0.000
29.823	6.01	1.6	5.780	0.000
29.921	6.048	1.5	5.803	0.000
30.007	6.1	1.5	5.824	0.000
30.157	5.968	1.5	5.860	0.000
30.244	5.79	1.6	5.880	0.090
30.35	5.632	1.5	5.906	0.274
30.45	5.45	1.6	5.930	0.480
30.545	5.297	1.7	5.953	0.656
30.617	5.14	1.7	5.970	0.830
30.69	4.962	1.7	5.987	1.025
30.811	4.815	1.8	6.016	1.201
30.902	4.854	1.7	6.038	1.184
30.967	4.874	1.8	6.054	1.180

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
31.035	4.894	1.7	6.070	1.176
31.131	4.992	1	6.093	1.101
31.223	5.012	0.5	6.115	1.103
31.304	5.032	0.2	6.135	1.103
31.386	5.052	0.3	6.154	1.102
31.482	5.052	0.3	6.177	1.125
31.577	5.071	0.2	6.200	1.129
31.716	5.091	0.2	6.245	1.154
31.862	5.111	0.2	6.292	1.181
32.001	5.131	0.2	6.338	1.207
32.104	5.131	0.2	6.371	1.240
32.178	5.15	0.2	6.395	1.245
32.289	5.17	0.2	6.431	1.261
32.429	5.19	0.2	6.477	1.287
32.531	5.21	0.2	6.510	1.300
32.631	5.229	0.2	6.542	1.313
32.743	5.249	0.2	6.578	1.329
32.842	5.269	0.2	6.611	1.342
32.938	5.289	0.2	6.642	1.353
33.044	5.308	0.2	6.676	1.368
33.153	5.328	0.2	6.711	1.383
33.262	5.348	0.2	6.747	1.399
33.357	5.368	0.2	6.778	1.410
33.468	5.387	0.2	6.814	1.427
33.581	5.407	0.2	6.850	1.443
33.679	5.407	0.2	6.882	1.475
33.78	5.427	0.2	6.915	1.488
33.882	5.427	0.2	6.948	1.521
33.977	5.486	0.2	6.979	1.493
34.088	5.506	0.2	7.015	1.509
34.187	5.526	0.2	7.047	1.521
34.292	5.545	0.2	7.081	1.536
34.395	5.69	0.2	7.115	1.425
34.485	5.81	0.3	7.144	1.334
34.576	6	0.2	7.173	1.173
34.714	6.15	0.2	7.218	1.068
34.834	6.04	0.2	7.257	1.217
34.934	5.98	0.2	7.289	1.309
35.039	5.84	0.2	7.324	1.484
35.089	5.725	0.3	7.340	1.615

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
35.119	6.08	0.3	7.350	1.270
35.18	6.84	0.5	7.369	0.529
35.223	7.98	1	7.383	0.000
35.27	8	1.2	7.399	0.000
35.324	7.56	1	7.416	0.000
35.392	7.02	1	7.438	0.418
35.458	6.59	0.5	7.460	0.870
35.536	6.23	0.3	7.485	1.255
35.617	5.99	0.3	7.511	1.521
35.624	6.015	0.3	7.513	1.498
35.693	6.09	0.3	7.536	1.446
35.76	6.15	0.2	7.558	1.408
35.841	6.17	0.2	7.584	1.414
35.971	6.11	0.3	7.626	1.516
36.068	6.16	0.3	7.657	1.497
36.164	6.14	0.2	7.689	1.549
36.261	6.15	0.2	7.720	1.570
36.358	6.16	0.3	7.752	1.592
36.491	6.18	0.2	7.795	1.615
36.589	6.17	0.2	7.827	1.657
36.688	6.17	0.2	7.859	1.689
36.788	6.215	0.3	7.891	1.676
36.811	6.256	0.3	7.899	1.643
36.91	6.32	0.2	7.931	1.611
37.009	6.337	0.2	7.963	1.626
37.111	6.39	0.3	7.996	1.606
37.186	6.418	0.3	8.020	1.602
37.267	6.458	0.2	8.047	1.589
37.329	6.51	0.3	8.067	1.557
37.389	6.539	0.2	8.086	1.547
37.475	6.59	0.3	8.114	1.524
37.562	6.62	0.3	8.142	1.522
37.649	6.66	0.3	8.171	1.511
37.723	6.701	0.3	8.195	1.494
37.815	6.76	0.3	8.224	1.464
37.906	6.782	0.3	8.254	1.472
37.997	6.81	0.3	8.284	1.474
38.095	6.863	0.3	8.315	1.452
38.194	6.91	0.3	8.347	1.437
38.293	6.944	0.3	8.380	1.436

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
38.393	6.97	0.3	8.412	1.442
38.49	7.1	0.4	8.444	1.344
38.583	7.16	0.4	8.474	1.314
38.691	7.22	0.4	8.509	1.289
38.795	7.25	0.4	8.543	1.293
38.894	7.34	0.4	8.575	1.235
38.993	7.39	0.5	8.607	1.217
39.102	7.44	0.5	8.642	1.202
39.217	7.41	0.4	8.679	1.269
39.316	7.38	0.4	8.712	1.332
39.416	7.35	0.4	8.744	1.394
39.516	7.31	0.3	8.776	1.466
39.631	7.3	0.3	8.814	1.514
39.73	7.31	0.4	8.846	1.536
39.825	7.29	0.4	8.877	1.587
39.92	7.24	0.4	8.908	1.668
40.015	7.16	0.4	8.938	1.778
40.11	7.1	0.4	8.969	1.869
40.204	7.05	0.3	9.000	1.950
40.299	7.09	0.3	9.031	1.941
40.39	7.08	0.3	9.060	1.980
40.488	7.12	0.3	9.092	1.972
40.556	7.08	0.3	9.114	2.034
40.654	7.07	0.3	9.146	2.076
40.742	7.21	0.3	9.174	1.964
40.801	7.38	0.3	9.194	1.814
40.83	7.405	0.3	9.203	1.798
40.87	7.464	0.3	9.216	1.752
40.965	7.522	0.4	9.247	1.725
41.064	7.57	0.4	9.279	1.709
41.163	7.64	0.4	9.311	1.671
41.262	7.698	0.4	9.343	1.645
41.361	7.757	0.3	9.375	1.618
41.46	7.81	0.3	9.407	1.597
41.559	7.874	0.3	9.440	1.566
41.658	7.933	0.4	9.472	1.539
41.757	7.991	0.4	9.504	1.513
41.857	8.08	0.4	9.536	1.456
41.956	8.109	0.4	9.568	1.459
42.055	8.167	0.5	9.600	1.433

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
42.153	8.21	0.4	9.632	1.422
42.252	8.285	0.5	9.664	1.379
42.351	8.343	0.4	9.697	1.354
42.45	8.402	0.4	9.729	1.327
42.549	8.45	0.4	9.761	1.311
42.648	8.519	0.4	9.793	1.274
42.836	8.578	0.4	9.854	1.276
42.935	8.67	0.4	9.886	1.216
43.035	8.767	0.5	9.919	1.152
43.134	8.838	0.4	9.951	1.113
43.232	8.91	0.4	9.982	1.072
43.341	8.99	0.3	10.018	1.028
43.441	9.054	0.2	10.050	0.996
43.635	9.125	0.3	10.113	0.988
43.733	9.197	0.3	10.145	0.948
43.827	9.26	0.3	10.176	0.916
43.927	9.341	0.3	10.208	0.867
44.026	9.412	0.3	10.240	0.828
44.126	9.484	0.3	10.273	0.789
44.226	9.54	0.3	10.305	0.765
44.326	9.628	0.3	10.338	0.710
44.426	9.699	0.3	10.370	0.671
44.525	9.771	0.3	10.402	0.631
44.625	9.85	0.3	10.435	0.585
44.725	9.915	0.3	10.467	0.552
44.802	10	0.3	10.492	0.492
44.889	10.058	0.3	10.520	0.462
44.988	10.15	0.3	10.552	0.402
45.088	10.202	0.3	10.585	0.383
45.188	10.29	0.3	10.617	0.327
45.286	10.31	0.3	10.649	0.339
45.382	10.32	0.3	10.680	0.360
45.478	10.31	0.4	10.711	0.401
45.574	10.34	0.4	10.743	0.403
45.67	10.32	0.4	10.774	0.454
45.766	10.32	0.4	10.805	0.485
45.862	10.34	0.4	10.836	0.496
45.958	10.31	0.5	10.867	0.557
46.054	10.28	0.5	10.898	0.618
46.15	10.24	0.5	10.929	0.689

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
46.245	10.22	0.5	10.960	0.740
46.341	10.25	0.4	10.991	0.741
46.439	10.21	0.4	11.023	0.813
46.536	10.21	0.3	11.055	0.845
46.636	10.22	0	11.087	0.867
46.736	10.18	0	11.120	0.940
46.836	10.04	0	11.152	1.112
46.936	10.08	0	11.185	1.105
47.036	10.02	0	11.217	1.197
47.136	10	0	11.249	1.249
47.236	9.82	0	11.282	1.462
47.336	9.81	0	11.314	1.504
47.436	9.87	0	11.347	1.477
47.539	9.74	0	11.380	1.640
47.638	9.8	0	11.412	1.612
47.737	9.71	0	11.445	1.735
47.837	9.7	0	11.477	1.777
47.936	9.64	0	11.509	1.869
48.035	9.52	0	11.541	2.021
48.134	9.51	0	11.573	2.063
48.233	9.56	0	11.605	2.045
48.338	9.5	0	11.640	2.140
48.44	9.48	0	11.673	2.193
48.542	9.47	0	11.706	2.236
48.644	9.41	0	11.739	2.329
48.733	9.4	0	11.768	2.368
48.811	9.32	0	11.793	2.473
48.884	9.23	0	11.817	2.587
48.941	9.39	0	11.835	2.445
49.003	9.31	0	11.855	2.545
49.062	9.28	0	11.875	2.595
49.121	9.21	0	11.894	2.684
49.179	9.185	0	11.912	2.727
49.263	9.259	0	11.940	2.681
49.369	9.333	0	11.974	2.641
49.455	9.407	0	12.002	2.595
49.532	9.48	0	12.027	2.547
49.612	9.54	0	12.053	2.513
49.694	9.628	0	12.080	2.452
49.8	9.702	0	12.114	2.412

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
49.902	9.79	0	12.147	2.357
49.967	9.85	0	12.168	2.318
50.039	9.924	0	12.192	2.268
50.112	10.02	0	12.215	2.195
50.181	10.071	0	12.238	2.167
50.254	10.145	0	12.261	2.116
50.327	10.21	0	12.285	2.075
50.402	10.293	0	12.309	2.016
50.484	10.367	0	12.336	1.969
50.568	10.41	0	12.363	1.953
50.656	10.51	0	12.392	1.882
50.743	10.589	0	12.420	1.831
50.814	10.662	0	12.443	1.781
50.898	10.736	0	12.470	1.734
51.006	10.84	0	12.505	1.665
51.316	10.884	0	12.606	1.722
51.421	10.958	0	12.640	1.682
51.536	11.04	0	12.677	1.637
51.665	11.106	0	12.719	1.613
51.784	11.18	0	12.758	1.578
51.905	11.23	0	12.797	1.567
51.996	11.327	0.3	12.827	1.500
52.091	11.401	0.3	12.858	1.457
52.205	11.475	0.3	12.895	1.420
52.287	11.585	0.3	12.921	1.336
52.385	11.71	0.5	12.953	1.243
52.501	11.806	0.5	12.991	1.185
52.607	11.917	0.5	13.025	1.108
52.675	12.04	0.5	13.047	1.007
52.747	12.138	0.5	13.070	0.932
52.848	12.248	0.5	13.103	0.855
52.948	12.35	0.5	13.136	0.786
53.067	12.469	0.5	13.174	0.705
53.185	12.579	0.5	13.213	0.634
53.314	12.65	0.5	13.254	0.604
53.409	12.8	0.5	13.285	0.485
53.519	12.911	0.5	13.321	0.410
53.609	13.01	0.5	13.350	0.340
53.721	13.131	0.5	13.387	0.256
53.828	13.242	0.5	13.421	0.179

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
53.897	13.352	0.5	13.444	0.092
53.978	13.48	0.5	13.470	0.000
54.06	13.573	0.5	13.497	0.000
54.156	13.684	0.5	13.528	0.000
54.233	13.8	0.5	13.553	0.000
54.349	13.904	0.5	13.590	0.000
54.461	14.015	0.5	13.627	0.000
54.551	14.15	0.5	13.656	0.000
54.651	14.236	0.5	13.688	0.000
54.755	14.346	0.5	13.722	0.000
54.831	14.44	0.5	13.747	0.000
54.956	14.567	0.5	13.787	0.000
55.075	14.677	0.5	13.826	0.000
55.206	14.8	0.5	13.868	0.000
55.319	14.898	0.5	13.905	0.000
55.428	15.009	0.5	13.941	0.000
55.599	15.11	0.5	13.996	0.000
55.691	15.229	0.3	14.026	0.000
55.791	15.32	0.3	14.058	0.000
55.891	15.45	0.3	14.091	0.000
55.991	15.561	0.3	14.123	0.000
56.101	15.64	0.3	14.159	0.000
56.208	15.782	0.3	14.194	0.000
56.308	15.892	0.3	14.226	0.000
56.408	16.02	0.3	14.259	0.000
56.508	16.113	0.3	14.291	0.000
56.608	16.223	0.3	14.323	0.000
56.708	16.334	0.3	14.356	0.000
56.807	16.44	0.3	14.388	0.000
56.907	16.555	0.3	14.421	0.000
57.006	16.58	0.3	14.453	0.000
57.103	16.59	0.3	14.484	0.000
57.201	16.69	0.3	14.516	0.000
57.298	16.68	0.3	14.547	0.000
57.395	16.86	0.3	14.579	0.000
57.492	16.84	0.3	14.610	0.000
57.59	16.98	0.3	14.642	0.000
57.687	16.9	0.3	14.674	0.000
57.784	17.05	0.3	14.705	0.000
57.882	17.13	0.3	14.737	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
57.979	17.16	0.5	14.768	0.000
58.015	17.19	0.3	14.780	0.000
58.107	17.28	0.3	14.810	0.000
58.207	17.31	0.3	14.842	0.000
58.307	17.3	0.3	14.875	0.000
58.407	17.42	0.5	14.907	0.000
58.506	17.48	0.5	14.939	0.000
58.606	17.52	0.5	14.972	0.000
58.706	17.55	0.5	15.004	0.000
58.806	17.58	0.5	15.037	0.000
58.906	17.63	0.5	15.069	0.000
59.006	17.62	0.5	15.102	0.000
59.106	17.6	0.6	15.134	0.000
59.206	17.61	0.6	15.167	0.000
59.326	17.52	0.7	15.206	0.000
59.425	16.31	0.6	15.238	0.000
59.52	16.19	0.7	15.269	0.000
59.617	16.07	0.8	15.300	0.000
59.617	16.08	0.8	16.258	0.178
59.715	16.11	0.8	16.300	0.190
59.813	16.18	0.8	16.342	0.162
59.91	16.29	0.8	16.383	0.093
60.007	16.29	0.8	16.424	0.134
60.125	16.28	0.8	16.475	0.195
60.254	16.19	0.8	16.530	0.340
60.363	16.26	0.8	16.576	0.316
60.463	16.29	0.8	16.619	0.329
60.562	16.31	0.8	16.661	0.351
60.661	16.3	0.8	16.703	0.403
60.76	16.26	0.8	16.746	0.486
60.86	16.24	0.8	16.788	0.548
60.982	16.34	0.8	16.840	0.500
61.08	16.33	0.8	16.882	0.552
61.168	16.39	0.8	16.920	0.530
61.248	16.43	0.7	16.954	0.524
61.327	16.44	0.7	16.988	0.548
61.406	16.38	0.7	17.021	0.641
61.492	16.31	0.6	17.058	0.748
61.578	16.26	0.6	17.095	0.835
61.663	16.18	0.6	17.131	0.951

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
61.753	16.01	0.5	17.169	1.159
61.847	15.94	0.5	17.209	1.269
61.941	16.86	0.6	17.250	0.390
62.033	16.81	0.5	17.289	0.479
62.118	15.8	0.4	17.325	1.525
62.201	15.96	0.3	17.361	1.401
62.284	16.02	0.3	17.396	1.376
62.367	16.09	0.3	17.431	1.341
62.441	16.18	0.3	17.463	1.283
62.492	16.26	0.3	17.485	1.225
62.539	16.59	0.3	17.505	0.915
62.633	16.68	0.3	17.545	0.865
62.733	16.73	0.3	17.588	0.858
62.833	16.89	0.3	17.630	0.740
62.933	16.99	0.3	17.673	0.683
63.033	17.06	0.3	17.716	0.656
63.109	17.09	0.3	17.748	0.658
63.209	17.16	0.3	17.791	0.631
63.308	17.28	0.3	17.833	0.553
63.408	17.39	0.3	17.876	0.486
63.508	17.43	0.3	17.918	0.488
63.607	17.39	0.3	17.960	0.570
63.708	17.46	0.3	18.004	0.544
63.779	17.4	0.3	18.034	0.634
63.857	17.46	0.3	18.067	0.607
63.931	17.49	0.2	18.099	0.609
64.03	17.42	0.2	18.141	0.721
64.129	17.465	0.2	18.183	0.718
64.229	17.52	0.2	18.226	0.706
64.329	17.585	0.2	18.268	0.683
64.439	17.64	0.2	18.315	0.675
64.541	17.705	0.2	18.359	0.654
64.641	17.75	0.2	18.402	0.652
64.74	17.825	0.2	18.444	0.619
64.84	17.885	0.2	18.487	0.602
64.94	17.945	0.2	18.529	0.584
65.039	18.03	0	18.571	0.541
65.139	18.065	0	18.614	0.549
65.239	18.125	0	18.657	0.532
65.338	18.185	0	18.699	0.514

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
65.438	18.28	0	18.742	0.462
65.536	18.305	0	18.783	0.478
65.622	18.365	0	18.820	0.455
65.722	18.41	0	18.863	0.453
65.822	18.485	0	18.906	0.421
65.921	18.56	0	18.948	0.388
66.003	18.69	0	18.983	0.293
66.072	18.82	0	19.012	0.192
66.132	18.99	0	19.038	0.048
66.232	19.2	0	19.080	0.000
66.331	19.34	0	19.123	0.000
66.431	19.39	0	19.165	0.000
66.53	19.5	0	19.208	0.000
66.63	19.68	0	19.250	0.000
66.729	19.72	0	19.293	0.000
66.829	19.79	0	19.335	0.000
66.883	19.86	0	19.358	0.000
66.976	19.84	0	19.398	0.000
67.073	19.99	0	19.439	0.000
67.169	20.46	0	19.480	0.000
67.266	20.82	0	19.522	0.000
67.363	21.24	0	19.563	0.000
67.463	21.2	0	19.606	0.000
67.563	21.16	0	19.648	0.000
67.662	21.14	0	19.691	0.000
67.762	21.1	0	19.733	0.000
67.862	21.09	0	19.776	0.000
67.94	21.16	0	19.809	0.000
68.04	21.14	0	19.852	0.000
68.139	21.08	0	19.894	0.000
68.239	21.04	0	19.937	0.000
68.339	20.13	0	19.979	0.000
68.439	20.17	0	20.022	0.000
68.538	20.19	0	20.064	0.000
68.638	20.28	0	20.107	0.000
68.738	20.32	0	20.150	0.000
68.837	20.42	0	20.192	0.000
68.937	20.38	0	20.235	0.000
69.037	20.49	0	20.277	0.000
69.137	20.56	0	20.320	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
69.236	20.66	0	20.362	0.000
69.263	20.69	0	20.374	0.000
69.36	20.98	0	20.415	0.000
69.431	21.19	0	20.445	0.000
69.503	21.46	0	20.476	0.000
69.551	21.59	0	20.497	0.000
69.613	21.61	0	20.523	0.000
69.69	21.73	0	20.556	0.000
69.768	21.94	0	20.589	0.000
69.854	22.18	0	20.626	0.000
69.939	22.08	0	20.662	0.000
70.025	22.29	0	20.699	0.000
70.115	22.34	0	20.737	0.000
70.221	22.99	0	20.782	0.000
70.285	23.55	0	20.810	0.000
70.338	23.34	0	20.832	0.000
70.394	23.16	0	20.856	0.000
70.46	23.08	0	20.884	0.000
70.544	23	0	20.920	0.000
70.637	22.99	0	20.960	0.000
70.747	22.79	0	21.007	0.000
70.838	22.72	0	21.046	0.000
70.943	22.61	0	21.091	0.000
71.045	22.51	0	21.134	0.000
71.171	22.42	0	21.188	0.000
71.303	22.3	0	21.244	0.000
71.405	22.04	0	21.288	0.000
71.508	21.86	0	21.332	0.000
71.641	21.62	0	21.388	0.000
71.765	21.46	0	21.441	0.000
71.883	21.22	0	21.492	0.272
71.94	21.13	0	21.516	0.386
72.037	20.93	0	21.557	0.627
72.134	20.84	0	21.599	0.759
72.232	20.68	0	21.641	0.961
72.322	20.51	0	21.679	1.169
72.421	20.34	0	21.721	1.381
72.519	20.22	0	21.763	1.543
72.625	20.11	0	21.808	1.698
72.708	19.26	0	21.844	2.584

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
72.756	18.98	0	21.864	2.884
72.843	19.24	0	21.901	2.661
72.932	19.85	0	21.939	2.089
73.021	20.32	0	21.977	1.657
73.109	20.84	0	22.015	1.175
73.198	21.39	0	22.053	0.663
73.282	22.72	0	22.089	0.000
73.425	22.85	0	22.150	0.000
73.528	22.74	0	22.193	0.000
73.625	22.71	0	22.235	0.000
73.722	22.62	0	22.276	0.000
73.819	22.59	0	22.318	0.000
73.907	22.52	0	22.355	0.000
73.965	21.43	0	22.380	0.950
73.993	21.38	0	22.392	1.012
74.093	21.29	0.2	22.435	1.145
74.193	21.29	0.2	22.477	1.187
74.293	21.41	0.2	22.520	1.110
74.393	21.52	0.2	22.563	1.043
74.502	21.62	0.2	22.609	0.989
74.625	21.57	0.2	22.662	1.092
74.748	21.53	0.2	22.714	1.184
74.866	21.84	0.2	22.764	0.924
74.964	21.74	0.2	22.806	1.066
75.061	21.73	0.2	22.848	1.118
75.162	21.8	0.3	22.891	1.091
75.235	21.942	0.2	22.922	0.980
75.335	22.049	0.2	22.965	0.916
75.434	22.156	0.2	23.007	0.851
75.506	22.25	0.2	23.037	0.787
75.606	22.371	0.2	23.080	0.709
75.705	22.478	0.2	23.122	0.644
75.805	22.62	0.2	23.165	0.545
75.905	22.692	0.2	23.208	0.516
76.005	22.81	0.2	23.250	0.440
76.105	22.906	0.2	23.293	0.387
76.205	23.05	0.2	23.336	0.286
76.305	23.121	0.2	23.378	0.257
76.405	23.32	0.2	23.421	0.101
76.483	23.52	0	23.454	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
76.506	23	0	23.464	0.464
76.524	23.11	0	23.472	0.362
76.542	22.89	0	23.480	0.590
76.626	22.81	0	23.515	0.705
76.725	22.71	0	23.558	0.848
76.823	22.7	0	23.599	0.899
76.902	22.68	0	23.633	0.953
77.004	22.71	0	23.677	0.967
77.082	22	0	23.710	1.710
77.173	21.23	0	23.749	2.519
77.273	21.13	0	23.791	2.661
77.37	21.05	0	23.833	2.783
77.469	20.94	0	23.875	2.935
77.569	20.86	0	23.918	3.058
77.668	20.75	0	23.960	3.210
77.768	20.65	0	24.003	3.353
77.867	20.61	0	24.045	3.435
77.967	20.52	0	24.088	3.568
78.066	21	0	24.130	3.130
78.118	21.64	0.1	24.152	2.512
78.18	21.845	0.1	24.178	2.333
78.253	22.03	0.1	24.210	2.180
78.352	22.255	0.1	24.252	1.997
78.45	22.43	0.1	24.294	1.864
78.549	22.665	0.1	24.336	1.671
78.648	22.88	0.1	24.378	1.498
78.746	23.075	0.1	24.420	1.345
78.845	23.3	0.1	24.462	1.162
78.944	23.485	0.1	24.504	1.019
79.042	23.72	0.1	24.546	0.826
79.141	23.895	0.1	24.588	0.693
79.24	24.13	0.1	24.631	0.501
79.313	24.5	0.1	24.662	0.162
79.373	24.99	0.1	24.687	0.000
79.457	24.87	0.1	24.723	0.000
79.511	24.82	0.1	24.746	0.000
79.599	25.02	0.5	24.784	0.000
79.689	24.8	0.4	24.822	0.022
79.777	24.54	0.5	24.860	0.320
79.868	24.56	0.5	24.899	0.339

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
79.966	24.59	0.4	24.940	0.350
80.064	24.63	0.4	24.982	0.352
80.162	24.68	0.4	25.024	0.344
80.26	24.74	0.4	25.066	0.326
80.358	24.72	0.3	25.108	0.388
80.456	24.7	0.3	25.150	0.450
80.533	24.68	0.3	25.182	0.502
80.632	24.71	0.2	25.225	0.515
80.73	24.73	0.2	25.266	0.536
80.829	24.78	0.2	25.309	0.529
80.928	24.82	0.2	25.351	0.531
81.026	24.86	0	25.393	0.533
81.117	25.03	0	25.432	0.402
81.193	25.35	0	25.464	0.114
81.291	25.39	0	25.506	0.116
81.389	25.41	0	25.548	0.138
81.487	25.52	0	25.589	0.069
81.585	25.59	0	25.631	0.041
81.683	25.68	0	25.673	0.000
81.781	25.76	0	25.715	0.000
81.901	25.84	0	25.766	0.000
82.004	25.89	0	25.810	0.000
82.099	25.94	0	25.851	0.000
82.184	25.89	0	25.887	0.000
82.283	25.6	0	25.929	0.329
82.364	25.41	0	25.964	0.554
82.413	25.5	0	25.985	0.485
82.479	25.46	0	26.013	0.553
82.55	25.41	0	26.043	0.633
82.628	25.39	0	26.076	0.686
82.713	25.36	0	26.113	0.753
82.81	25.38	0	26.154	0.774
82.941	25.32	0	26.210	0.890
83.057	25.22	0	26.259	1.039
83.153	25.21	0	26.300	1.090
83.248	25.19	0	26.341	1.151
83.344	25.17	0	26.382	1.212
83.44	25.13	0	26.423	1.293
83.536	25.09	0.2	26.464	1.374
83.631	25.06	0.2	26.504	1.444

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
83.727	25.08	0.2	26.545	1.465
83.835	25.09	0.2	26.591	1.501
83.929	25.11	0.3	26.631	1.521
84.026	25.26	0.2	26.673	1.413
84.124	25.63	0.3	26.715	1.085
84.222	26.17	0.3	26.756	0.586
84.32	25.99	0.4	26.798	0.808
84.419	25.54	0.4	26.840	1.300
84.507	25.98	0.4	26.878	0.898
84.599	26.03	0.3	26.917	0.887
84.698	26.09	0.3	26.959	0.869
84.778	26.17	0.3	26.994	0.824
84.877	26.19	0.3	27.036	0.846
84.975	26.09	0.3	27.078	0.988
85.074	26.07	0.3	27.120	1.050
85.172	26.08	0.4	27.162	1.082
85.271	26.14	0.4	27.204	1.064
85.37	26.18	0.4	27.246	1.066
85.468	26	0.4	27.288	1.288
85.568	25.8	0.3	27.331	1.531
85.668	25.68	0.3	27.373	1.693
85.768	25.62	0.3	27.416	1.796
85.837	25.43	0.3	27.445	2.015
85.937	25.31	0.3	27.488	2.178
86.036	25.1	0.3	27.530	2.430
86.136	25.19	0.3	27.573	2.383
86.236	26	0.5	27.616	1.616
86.336	26.32	0.5	27.658	1.338
86.436	26.94	0.5	27.701	0.761
86.536	27.24	0.4	27.744	0.504
86.635	27.56	0.4	27.786	0.226
86.735	28.03	0.4	27.829	0.000
86.835	28.99	0.4	27.871	0.000
86.945	29.68	0.5	27.918	0.000
87.051	30.72	0.5	27.963	0.000
87.151	31.02	0.5	28.006	0.000
87.244	30.72	0.4	28.046	0.000
87.337	30.25	0.4	28.085	0.000
87.43	29.59	0.4	28.125	0.000
87.523	29.01	0.4	28.165	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
87.616	28.61	0.4	28.205	0.000
87.709	28.16	0.4	28.244	0.084
87.799	27.84	0.3	28.283	0.443
87.845	27.8	0.3	28.302	0.502
87.916	27.84	0.4	28.333	0.493
88.01	27.92	0.2	28.373	0.453
88.11	27.99	0.2	28.415	0.425
88.21	28.03	0.2	28.458	0.428
88.31	28.02	0.2	28.501	0.481
88.41	28.11	0.2	28.543	0.433
88.51	28.13	0.2	28.586	0.456
88.61	28.28	0.2	28.629	0.349
88.71	28.15	0.2	28.671	0.521
88.81	28.19	0.2	28.714	0.524
88.928	28.2	0.2	28.764	0.564
89.047	28.31	0.2	28.815	0.505
89.146	28.28	0.2	28.857	0.577
89.242	28.3	0.2	28.898	0.598
89.319	29.13	0	28.931	0.000
89.401	30.01	0	28.966	0.000
89.492	29.44	0	29.005	0.000
89.589	29	0	29.046	0.046
89.688	28.81	0	29.089	0.279
89.788	28.71	0	29.131	0.421
89.887	28.62	0.2	29.173	0.553
89.987	28.51	0.2	29.216	0.706
90.086	28.43	0.2	29.258	0.828
90.159	28.41	0.2	29.290	0.880
90.257	28.32	0.3	29.331	1.011
90.356	28.38	0.3	29.374	0.994
90.454	28.39	0.2	29.415	1.025
90.553	28.46	0.2	29.458	0.998
90.651	28.52	0.3	29.499	0.979
90.75	28.44	0.3	29.542	1.102
90.848	28.4	0.1	29.584	1.184
90.947	28.36	0.2	29.626	1.266
91.043	28.36	0.2	29.667	1.307
91.135	28.4	0.2	29.706	1.306
91.226	28.86	0.3	29.745	0.885
91.267	28.99	0.3	29.762	0.772

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
91.36	30.28	0.4	29.802	0.000
91.453	31.26	0.4	29.842	0.000
91.546	31.8	0.3	29.881	0.000
91.644	31.12	0.4	29.923	0.000
91.744	30.65	0.3	29.966	0.000
91.844	29.56	0.3	30.009	0.449
91.943	29	0.4	30.051	1.051
92.032	29	0.3	30.089	1.089
92.113	28.99	0.3	30.123	1.133
92.191	29.76	0.3	30.157	0.397
92.269	29.86	0.4	30.190	0.330
92.351	29.9	0.4	30.225	0.325
92.43	29	0.5	30.259	1.259
92.519	28.74	0.5	30.297	1.557
92.619	28.72	0.5	30.339	1.619
92.719	28.86	0.5	30.382	1.522
92.818	28.92	0.5	30.424	1.504
92.918	29.98	0.6	30.467	0.487
93.018	29.97	0.6	30.509	0.539
93.05	29.89	0.6	30.523	0.633
93.062	29.82	0.6	30.528	0.708
93.159	30.06	0.6	30.570	0.510
93.259	30.18	0.5	30.612	0.432
93.359	30.76	0.5	30.655	0.000
93.459	30.99	0.5	30.698	0.000
93.558	31	0.4	30.740	0.000
93.658	31.15	0.4	30.782	0.000
93.758	31.29	0.4	30.825	0.000
93.858	31.84	0.3	30.868	0.000
93.958	31.89	0.3	30.910	0.000
94.057	31.96	0.2	30.953	0.000
94.149	31.86	0.2	30.992	0.000
94.285	31.71	0.2	31.050	0.000
94.305	31.62	0.3	31.059	0.000
94.397	31.49	0.3	31.098	0.000
94.489	31.26	0.2	31.137	0.000
94.581	30.88	0.2	31.176	0.296
94.669	30.23	0.2	31.214	0.984
94.764	30.07	0.2	31.254	1.184
94.853	30.22	0.2	31.292	1.072

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
94.945	30.26	0.3	31.332	1.072
95.039	30.271	0.3	31.372	1.101
95.118	30.297	0.3	31.405	1.108
95.19	30.33	0.2	31.436	1.106
95.288	30.348	0.2	31.478	1.130
95.385	30.373	0.3	31.519	1.146
95.483	30.46	0.3	31.561	1.101
95.58	30.424	0.2	31.603	1.179
95.678	30.449	0.3	31.644	1.195
95.775	30.48	0.3	31.686	1.206
95.873	30.5	0.3	31.728	1.228
95.97	30.51	0.3	31.769	1.259
96.054	30.551	0.3	31.805	1.254
96.153	30.576	0.3	31.847	1.271
96.252	30.602	0.3	31.889	1.287
96.351	30.68	0.3	31.932	1.252
96.45	30.653	0.3	31.974	1.321
96.549	30.678	0.3	32.016	1.338
96.649	30.72	0.3	32.059	1.339
96.748	30.729	0.3	32.101	1.372
96.847	30.754	0.3	32.143	1.389
96.946	30.8	0.3	32.185	1.385
97.045	30.805	0.3	32.228	1.423
97.144	30.831	0.3	32.270	1.439
97.243	30.89	0.3	32.312	1.422
97.346	30.882	0.3	32.356	1.474
97.426	30.907	0.3	32.390	1.483
97.488	30.94	0.2	32.417	1.477
97.567	30.958	0.2	32.450	1.492
97.598	31.085	0.3	32.464	1.379
97.621	31.375	0.3	32.473	1.098
97.654	31.46	0.3	32.487	1.027
97.711	31.48	0.3	32.512	1.032
97.809	31.59	0.2	32.554	0.964
97.907	31.58	0.3	32.595	1.015
98.005	31.59	0.2	32.637	1.047
98.103	31.68	0.3	32.679	0.999
98.2	31.82	0.3	32.720	0.900
98.298	31.84	0.2	32.762	0.922
98.396	31.99	0.3	32.804	0.814

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
98.494	32.09	0.3	32.846	0.756
98.592	32.16	0.3	32.888	0.728
98.695	32.18	0.3	32.932	0.752
98.794	32.35	0.3	32.974	0.624
98.892	32.56	0.3	33.016	0.456
98.99	32.64	0.3	33.058	0.418
99.087	32.54	0.3	33.099	0.559
99.187	32.48	0.3	33.142	0.662
99.287	32.42	0.3	33.184	0.764
99.387	32.41	0.3	33.227	0.817
99.486	32.4	0.3	33.269	0.869
99.614	32.36	0.3	33.324	0.964
99.731	34.41	0.1	33.374	0.000
99.827	34.56	0.2	33.415	0.000
99.927	34.59	0.2	33.457	0.000
100.027	34.84	0.2	33.500	0.000
100.127	34.99	0.2	33.550	0.000
100.234	34.99	0.2	33.604	0.000
100.345	35	0.2	33.659	0.000
100.442	35.02	0.2	33.708	0.000
100.538	35.06	0.2	33.756	0.000
100.635	35.1	0.1	33.804	0.000
100.73	35.98	0.1	33.852	0.000
100.838	35.95	0.1	33.906	0.000
100.933	35.36	0.2	33.953	0.000
101.028	35.46	0.2	34.001	0.000
101.128	35.84	0.2	34.051	0.000
101.228	35.94	0.2	34.101	0.000
101.332	35.52	0.2	34.153	0.000
101.432	35.22	0	34.203	0.000
101.532	35.28	0	34.253	0.000
101.628	35.22	0	34.301	0.000
101.72	35.29	0	34.347	0.000
101.811	35.19	0	34.392	0.000
101.902	35.33	0	34.438	0.000
101.995	35.16	0	34.484	0.000
102.086	35.39	0	34.530	0.000
102.178	35.64	0	34.576	0.000
102.269	35.48	0	34.621	0.000
102.361	35.29	0	34.667	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
102.452	35.36	0	34.713	0.000
102.544	35.42	0	34.759	0.000
102.636	35.31	0	34.805	0.000
102.729	35.36	0	34.851	0.000
102.768	35.42	0	34.871	0.000
102.864	35.41	0	34.919	0.000
102.961	35.49	0	34.967	0.000
103.057	35.52	0	35.015	0.000
103.154	35.51	0	35.064	0.000
103.25	35.56	0	35.112	0.000
103.347	35.59	0	35.160	0.000
103.42	35.52	0	35.197	0.000
103.52	35.64	0	35.247	0.000
103.623	35.62	0	35.298	0.000
103.698	35.61	0	35.336	0.000
103.78	35.69	0	35.377	0.000
103.863	35.61	0	35.418	0.000
103.935	35.68	0	35.454	0.000
104.02	35.69	0	35.497	0.000
104.073	35.46	0	35.523	0.063
104.115	35.4	0	35.544	0.144
104.16	35.46	0	35.567	0.107
104.208	35.35	0	35.591	0.241
104.268	35.64	0	35.621	0.000
104.319	35.49	0	35.646	0.156
104.373	35.4	0	35.673	0.273
104.423	35.48	0	35.698	0.218
104.486	36.41	0	35.730	0.000
104.504	37.08	0	35.739	0.000
104.551	37.01	0	35.762	0.000
104.614	36.69	0	35.794	0.000
104.714	36.85	0	35.844	0.000
104.814	36.59	0	35.894	0.000
104.914	36.62	0	35.944	0.000
105.014	36.61	0.3	35.994	0.000
105.113	36.38	0.3	36.043	0.000
105.212	36.18	0.3	36.093	0.000
105.299	36.55	0.2	36.136	0.000
105.333	36.08	0.3	36.153	0.073
105.367	36	0.3	36.170	0.170

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
105.404	35.62	0.5	36.189	0.569
105.442	35.2	0.5	36.208	1.008
105.48	35.26	0.5	36.227	0.967
105.541	35.21	0.5	36.257	1.047
105.602	35.26	0.5	36.288	1.028
105.677	35.24	0.7	36.325	1.085
105.77	35.25	0.8	36.372	1.122
105.863	35.29	0.8	36.418	1.128
105.971	35.35	0.5	36.472	1.122
106.06	35.4	0.3	36.517	1.117
106.144	35.41	0.3	36.559	1.149
106.231	35.46	0.3	36.602	1.142
106.323	35.48	0.3	36.648	1.168
106.415	35.41	0.3	36.694	1.284
106.421	35.4	0.2	36.697	1.297
106.482	35.46	0.2	36.728	1.268
106.565	35.54	0.2	36.769	1.229
106.644	35.51	0.2	36.809	1.299
106.721	35.54	0.2	36.847	1.307
106.797	35.38	0.2	36.885	1.505
106.889	35.59	0.2	36.931	1.341
106.982	35.18	0.2	36.978	1.798
107.074	35.68	0.2	37.024	1.344
107.166	35.98	0.2	37.070	1.090
107.259	36.21	0.2	37.116	0.906
107.351	36.23	0.2	37.162	0.932
107.467	36.43	0.2	37.220	0.790
107.591	36.62	0.2	37.282	0.662
107.693	36.71	0.2	37.333	0.623
107.792	36.88	0.2	37.383	0.503
107.907	36.88	0.2	37.440	0.560
108.001	37	0.3	37.487	0.487
108.101	36.91	0.3	37.537	0.627
108.195	36.89	0.2	37.584	0.694
108.283	36.94	0.2	37.628	0.688
108.371	37.11	0.2	37.672	0.562
108.501	37.06	0.2	37.737	0.677
108.601	37.09	0.2	37.787	0.697
108.701	37.12	0.2	37.837	0.717
108.801	37.19	0.2	37.887	0.697

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
108.901	37.15	0.2	37.937	0.787
108.998	38	0.2	37.986	0.000
109.091	39	0.2	38.032	0.000
109.186	39.71	0	38.080	0.000
109.285	39.64	0	38.129	0.000
109.381	39.41	0	38.177	0.000
109.475	39.03	0	38.224	0.000
109.569	38.82	0	38.271	0.000
109.663	38.51	0	38.318	0.000
109.757	38.13	0	38.365	0.235
109.85	37.91	0	38.412	0.502
109.932	37.86	0.2	38.453	0.593
109.983	37.92	0.2	38.478	0.558
110.007	37.9	0.2	38.490	0.590
110.037	37.81	0.3	38.505	0.695
110.137	37.76	0.2	38.555	0.795
110.255	37.64	0.2	38.614	0.974
110.362	37.58	0.2	38.668	1.088
110.458	37.55	0.2	38.716	1.166
110.549	37.6	0.3	38.761	1.161
110.646	37.59	0.3	38.810	1.220
110.745	37.58	0.3	38.859	1.279
110.844	37.52	0.3	38.909	1.389
110.922	37.55	0.3	38.948	1.398
111.002	37.54	0.3	38.988	1.448
111.101	37.54	0.3	39.037	1.497
111.198	37.42	0.3	39.086	1.666
111.293	37.34	0.3	39.133	1.793
111.371	38.59	0.2	39.172	0.582
111.429	38.82	0.2	39.201	0.381
111.482	38.97	0.2	39.228	0.258
111.522	39	0.2	39.248	0.248
111.604	38.82	0.2	39.289	0.469
111.692	38.68	0.2	39.333	0.653
111.781	38.46	0.2	39.377	0.917
111.869	38.29	0.2	39.421	1.131
111.942	38.14	0.2	39.458	1.318
112.036	38.16	0.3	39.505	1.345
112.128	38.28	0.2	39.551	1.271
112.22	38.39	0.3	39.597	1.207

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
112.295	38.55	0.3	39.634	1.084
112.391	38.59	0.3	39.682	1.092
112.487	38.64	0.2	39.730	1.090
112.584	38.62	0.2	39.779	1.159
112.671	38.61	0.2	39.822	1.212
112.77	38.72	0.2	39.872	1.152
112.869	38.74	0.2	39.921	1.181
112.963	38.79	0.2	39.968	1.178
113.063	38.78	0.2	40.018	1.238
113.162	38.82	0.2	40.068	1.248
113.262	38.95	0.2	40.118	1.168
113.361	39.01	0.2	40.167	1.157
113.453	39.07	0.3	40.213	1.143
113.551	39.28	0.2	40.262	0.982
113.64	39.39	0.3	40.307	0.917
113.73	39.69	0.3	40.352	0.662
113.822	39.85	0.3	40.398	0.548
113.914	39.84	0.2	40.444	0.604
113.995	39.86	0.2	40.484	0.624
114.094	39.89	0.2	40.534	0.644
114.194	39.98	0.3	40.584	0.604
114.29	39.99	0.2	40.632	0.642
114.381	40.02	0.2	40.677	0.657
114.455	39.98	0.2	40.714	0.734
114.544	39.89	0.2	40.759	0.869
114.633	39.88	0.2	40.803	0.923
114.716	40	0.2	40.845	0.845
114.77	41.25	0.2	40.872	0.000
114.839	41.29	0.2	40.906	0.000
114.937	41.42	0.2	40.955	0.000
115.035	41.49	0.2	41.004	0.000
115.09	41.56	0.2	41.032	0.000
115.187	41.69	0.2	41.080	0.000
115.287	41.74	0.2	41.130	0.000
115.386	41.08	0.2	41.180	0.100
115.484	40.71	0.2	41.229	0.519
115.568	40.42	0.2	41.277	0.857
115.667	40.28	0.2	41.334	1.054
115.765	40.29	0.2	41.390	1.100
115.864	40.38	0.3	41.447	1.067

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
115.962	40.46	0.3	41.503	1.043
116.06	40.66	0.3	41.560	0.900
116.156	40.7	0.2	41.615	0.915
116.253	40.76	0.2	41.671	0.911
116.347	40.89	0.1	41.725	0.835
116.461	40.9	0.1	41.790	0.890
116.575	41.16	0.1	41.856	0.696
116.672	41.32	0.2	41.912	0.592
116.772	41.32	0.2	41.969	0.649
116.872	41.31	0.2	42.027	0.717
116.972	41.39	0.2	42.084	0.694
117.072	41.58	0.2	42.142	0.562
117.172	41.52	0.2	42.199	0.679
117.272	41.59	0.2	42.257	0.667
117.372	41.62	0.2	42.314	0.694
117.472	41.74	0.2	42.372	0.632
117.591	41.98	0.2	42.440	0.460
117.712	42.21	0.2	42.509	0.299
117.813	42.23	0.2	42.568	0.338
117.896	42.33	0.2	42.615	0.285
117.979	42.38	0.2	42.663	0.283
118.062	42.35	0.2	42.711	0.361
118.161	42.26	0.2	42.768	0.508
118.261	42.22	0.2	42.825	0.605
118.361	42.29	0.2	42.883	0.593
118.457	42.56	0.2	42.938	0.378
118.552	42.69	0.2	42.992	0.302
118.648	42.88	0.2	43.048	0.168
118.743	43.16	0.3	43.102	0.000
118.845	43.16	0.3	43.161	0.001
118.915	43.19	0.3	43.201	0.011
119.014	43.21	0.3	43.258	0.048
119.114	43.29	0.3	43.316	0.026
119.214	43.3	0.3	43.373	0.073
119.311	43.3	0.2	43.429	0.129
119.394	43.22	0.2	43.477	0.257
119.477	43.11	0.2	43.524	0.414
119.56	43.2	0.2	43.572	0.372
119.658	43.28	0.2	43.628	0.348
119.758	43.38	0.3	43.686	0.306

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
119.852	43.46	0.3	43.740	0.280
119.942	43.52	0.2	43.792	0.272
120.046	43.55	0.2	43.851	0.301
120.137	43.59	0.2	43.904	0.314
120.226	43.7	0.2	43.955	0.255
120.31	43.73	0.2	44.003	0.273
120.393	43.77	0.2	44.051	0.281
120.476	43.79	0.3	44.099	0.309
120.562	43.88	0.3	44.148	0.268
120.653	43.98	0.2	44.200	0.220
120.752	44.01	0.2	44.257	0.247
120.842	44.19	0.2	44.309	0.119
120.936	44.29	0.3	44.363	0.073
121.035	44.49	0.3	44.420	0.000
121.134	44.42	0.3	44.477	0.057
121.232	44.48	0.3	44.533	0.053
121.33	44.5	0.3	44.590	0.090
121.428	44.53	0.3	44.646	0.116
121.528	44.59	0.4	44.704	0.114
121.62	44.54	0.5	44.756	0.216
121.72	44.6	0.5	44.814	0.214
121.82	44.7	0.5	44.871	0.171
121.92	44.79	0.4	44.929	0.139
122.019	44.82	0.2	44.986	0.166
122.113	44.77	0.2	45.040	0.270
122.219	44.77	0.2	45.101	0.331
122.277	44.78	0.2	45.134	0.354
122.366	44.9	0.2	45.185	0.285
122.458	45.09	0.2	45.238	0.148
122.56	45.19	0.2	45.297	0.107
122.657	45.29	0.2	45.353	0.063
122.756	45.38	0.2	45.410	0.030
122.86	45.56	0.2	45.469	0.000
122.948	45.56	0.2	45.520	0.000
123.046	45.59	0.2	45.576	0.000
123.144	45.62	0.2	45.633	0.013
123.237	45.77	0.2	45.686	0.000
123.348	45.85	0.2	45.750	0.000
123.457	45.85	0.2	45.813	0.000
123.556	45.85	0.2	45.870	0.020

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
123.701	45.89	0.2	45.953	0.063
123.841	45.8	0.2	46.033	0.233
123.971	45.88	0.2	46.108	0.228
124.086	46.02	0.2	46.174	0.154
124.159	46	0.2	46.216	0.216
124.22	45.99	0.2	46.251	0.261
124.283	46.02	0.3	46.287	0.267
124.368	46.07	0.3	46.336	0.266
124.454	46.16	0.2	46.386	0.226
124.541	46.24	0.3	46.436	0.196
124.628	46.29	0.3	46.486	0.196
124.715	46.33	0.3	46.536	0.206
124.783	46.45	0.4	46.575	0.125
124.871	46.62	0.5	46.626	0.006
124.955	46.61	0.5	46.674	0.064
125.039	46.69	0.3	46.722	0.032
125.123	46.72	0.3	46.770	0.050
125.213	46.75	0.4	46.822	0.072
125.308	46.72	0.4	46.877	0.157
125.403	46.8	0.3	46.931	0.131
125.499	46.99	0.3	46.987	0.000
125.594	47.2	0.3	47.041	0.000
125.719	47.29	0.4	47.113	0.000
125.811	47.42	0.4	47.166	0.000
125.914	47.55	0.4	47.225	0.000
126.025	47.46	0.4	47.289	0.000
126.126	47.4	0.4	47.347	0.000
126.229	47.32	0.3	47.406	0.086
126.329	47.23	0.3	47.464	0.234
126.429	47.14	0.3	47.521	0.381
126.528	47.1	0.3	47.578	0.478
126.607	47.08	0.3	47.624	0.544
126.701	47.09	0.3	47.678	0.588
126.8	47.03	0.3	47.735	0.705
126.899	47.04	0.3	47.792	0.752
126.986	47.12	0.3	47.842	0.722
127.07	47.26	0.3	47.890	0.630
127.154	47.29	0.3	47.938	0.648
127.238	47.3	0.3	47.986	0.686
127.322	47.28	0.3	48.035	0.755

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
127.402	47.29	0.2	48.081	0.791
127.498	47.3	0.2	48.136	0.836
127.595	47.48	0.2	48.192	0.712
127.681	47.52	0.2	48.241	0.721
127.758	47.7	0.3	48.285	0.585
127.852	47.71	0.3	48.340	0.630
127.947	47.69	0.2	48.394	0.704
128.041	47.62	0.2	48.448	0.828
128.135	47.59	0.2	48.502	0.912
128.202	47.64	0.2	48.541	0.901
128.292	47.7	0.2	48.592	0.892
128.385	47.8	0.2	48.646	0.846
128.484	49.24	0.3	48.703	0.000
128.584	49	0.3	48.760	0.000
128.684	48.5	0.3	48.818	0.318
128.784	48	0.5	48.875	0.875
128.884	47.96	0.5	48.933	0.973
128.984	47.9	0.5	48.990	1.090
129.084	47.89	0.5	49.048	1.158
129.184	47.93	0.5	49.105	1.175
129.282	47.78	0.5	49.162	1.382
129.379	47.71	0.5	49.217	1.507
129.476	47.62	0.6	49.273	1.653
129.573	47.53	0.8	49.329	1.799
129.67	47.44	0.8	49.385	1.945
129.767	47.27	0.9	49.441	2.171
129.864	48.26	1	49.496	1.236
129.959	48.38	0.8	49.551	1.171
130.052	48.49	0.8	49.604	1.114
130.144	48.56	0.7	49.657	1.097
130.237	48.66	0.7	49.711	1.051
130.33	48.71	0.7	49.764	1.054
130.437	48.78	0.7	49.826	1.046
130.531	48.84	0.7	49.880	1.040
130.625	48.92	0.7	49.934	1.014
130.72	49.03	0.7	49.988	0.958
130.815	49.1	0.5	50.043	0.943
130.914	49.08	0.3	50.100	1.020
131.014	49.09	0.3	50.157	1.067
131.114	49.07	0.3	50.215	1.145

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
131.214	49.06	0.3	50.272	1.212
131.313	49.03	0.3	50.329	1.299
131.413	49.19	0.3	50.387	1.197
131.503	49.38	0.3	50.439	1.059
131.593	49.55	0.3	50.490	0.940
131.672	49.86	0.2	50.536	0.676
131.738	49.81	0.2	50.574	0.764
131.804	49.91	0.2	50.612	0.702
131.87	49.93	0.2	50.650	0.720
131.936	49.94	0.2	50.688	0.748
132.002	49.98	0.2	50.726	0.746
132.068	49.99	0.2	50.763	0.773
132.134	50.1	0.2	50.801	0.701
132.201	50.12	0.3	50.840	0.720
132.267	50.19	0.3	50.878	0.688
132.352	50.26	0.2	50.927	0.667
132.451	50.39	0.2	50.984	0.594
132.55	50.44	0.2	51.041	0.601
132.649	50.49	0.2	51.098	0.608
132.747	50.54	0.3	51.154	0.614
132.835	50.5	0.3	51.204	0.704
132.907	50.42	0.3	51.246	0.826
132.981	50.4	0.3	51.288	0.888
133.053	50.35	0.3	51.330	0.980
133.125	50.39	0.4	51.371	0.981
133.19	50.52	0.4	51.409	0.889
133.251	50.59	0.4	51.444	0.854
133.313	50.68	0.5	51.479	0.799
133.375	51.16	0.5	51.515	0.355
133.453	51.29	0.5	51.560	0.270
133.538	52	0.5	51.609	0.000
133.623	52.53	0.5	51.658	0.000
133.714	53	0.5	51.710	0.000
133.814	52.62	0.5	51.767	0.000
133.914	52.49	0.5	51.825	0.000
134.014	50.89	0.6	51.882	0.992
134.114	50.22	0.7	51.940	1.720
134.213	49.38	0.7	51.997	2.617
134.313	49.28	0.8	52.054	2.774
134.409	49.39	0.8	52.109	2.719

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
134.502	49	0.8	52.163	3.163
134.595	49.75	0.8	52.216	2.466
134.688	50.62	0.8	52.270	1.650
134.781	51.16	0.8	52.323	1.163
134.873	51.15	0.8	52.376	1.226
134.996	51.26	0.8	52.447	1.187
135.092	51.18	0.7	52.502	1.322
135.187	51.39	0.7	52.557	1.167
135.282	51.23	0.7	52.611	1.381
135.377	51.2	0.7	52.666	1.466
135.473	51.97	0.5	52.721	0.751
135.569	52.52	0	52.776	0.256
135.665	53.64	0	52.832	0.000
135.761	53.69	0	52.887	0.000
135.857	54	0	52.942	0.000
135.913	53.81	0	52.974	0.000
136.011	53.68	0	53.031	0.000
136.11	53.41	0	53.087	0.000
136.208	53.28	0	53.144	0.000
136.307	53	0	53.201	0.201
136.405	52.51	0	53.257	0.747
136.503	52.21	0	53.313	1.103
136.602	52	0.2	53.370	1.370
136.693	51.96	0.2	53.423	1.463
136.773	52.03	0.2	53.469	1.439
136.85	52.46	0.2	53.513	1.053
136.946	52.8	0.2	53.568	0.768
137.02	53.16	0.2	53.611	0.451
137.075	53.29	0.2	53.642	0.352
137.154	53.81	0.2	53.688	0.000
137.26	54.38	0	53.749	0.000
137.331	54.9	0	53.789	0.000
137.398	55.27	0	53.828	0.000
137.459	55.62	0	53.863	0.000
137.511	55.41	0	53.893	0.000
137.561	55	0	53.922	0.000
137.635	54.71	0	53.964	0.000
137.708	54.21	0	54.006	0.000
137.774	54	0.5	54.044	0.044
137.831	53.9	0.5	54.077	0.177

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
137.893	53.72	0.4	54.113	0.393
138	53.8	0.4	54.174	0.374
138.088	53.99	0.4	54.225	0.235
138.154	55.1	0.3	54.263	0.000
138.21	55.8	0.3	54.295	0.000
138.279	55.03	0.2	54.335	0.000
138.378	54.23	0.2	54.391	0.161
138.476	54.29	0.3	54.448	0.158
138.573	54.36	0.3	54.504	0.144
138.666	54.39	0.3	54.557	0.167
138.757	54.4	0.4	54.609	0.209
138.849	54.44	0.4	54.662	0.222
138.943	54.49	0.4	54.716	0.226
139.039	54.54	0.3	54.771	0.231
139.134	54.6	0.3	54.826	0.226
139.231	54.7	0.2	54.882	0.182
139.329	54.76	0.2	54.938	0.178
139.426	54.82	0.2	54.994	0.174
139.524	54.83	0.3	55.050	0.220
139.624	54.88	0.3	55.108	0.228
139.723	54.9	0.4	55.165	0.265
139.815	54.94	0.4	55.218	0.278
139.9	54.98	0.4	55.267	0.287
140.004	54.95	0.4	55.326	0.376
140.102	54.91	0.6	55.383	0.473
140.213	54.92	2.5	55.446	0.526
140.3	54.99	2.5	55.497	0.507
140.359	60.01	3	61.567	1.557
140.428	60	3	61.567	1.567
140.467	59.94	3	61.567	1.627
140.556	59.81	2.7	61.567	1.757
140.636	59.52	2.7	61.567	2.047
140.732	59.6	2.6	61.567	1.967
140.808	59.88	2.5	61.567	1.687
140.908	60.16	2.5	61.568	1.408
141.008	60.89	2.3	61.568	0.678
141.108	60.12	2	61.568	1.448
141.213	58.56	2	61.568	3.008
141.333	57.92	1	61.568	3.648
141.433	57.9	1	61.568	3.668

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
141.538	58	0.2	61.568	3.568
141.647	58.06	0.3	61.568	3.508
141.755	58.12	0.3	61.568	3.448
141.834	58.64	0.3	61.568	2.928
141.912	58.99	0.3	61.569	2.579
141.98	58.99	0.3	61.569	2.579
142.043	58.96	0.3	61.569	2.609
142.101	59	0.3	61.569	2.569
142.199	59.1	0.2	61.569	2.469
142.288	59.26	0.2	61.569	2.309
142.356	59.1	0.2	61.569	2.469
142.402	59.05	0.2	61.569	2.519
142.436	59.06	0.3	61.569	2.509
142.479	59.07	0.3	61.569	2.499
142.512	59.1	0.3	61.569	2.469
142.559	59.12	0.3	61.569	2.449
142.62	59.14	0.2	61.569	2.429
142.665	59.18	0.2	61.569	2.389
142.746	59.258	0.2	61.569	2.311
142.803	59.321	0.2	61.569	2.248
142.864	59.383	0.2	61.570	2.187
142.915	59.41	0.2	61.570	2.160
143.026	59.509	0.2	61.570	2.061
143.144	59.572	0.2	61.570	1.998
143.261	59.65	0.2	61.570	1.920
143.381	59.697	0.2	61.570	1.873
143.491	59.76	0.2	61.570	1.810
143.597	59.88	0.2	61.570	1.690
143.697	59.886	0.2	61.570	1.684
143.797	59.948	0.2	61.570	1.622
143.875	60.06	0.2	61.571	1.511
143.974	60.074	0.2	61.571	1.497
144.079	60.137	0.2	61.571	1.434
144.178	60.199	0.2	61.571	1.372
144.204	60.29	0.2	61.571	1.281
144.296	60.77	0.3	61.571	0.801
144.393	60.84	0.3	61.571	0.731
144.467	60.97	0.3	61.571	0.601
144.515	60.68	0.3	61.571	0.891
144.559	60.12	0.3	61.571	1.451

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
144.58	59.6	0.3	61.571	1.971
144.601	59.6	0.3	61.571	1.971
144.621	59.53	0.3	61.571	2.041
144.674	59.7	0.3	61.571	1.871
144.744	59.75	0.3	61.571	1.821
144.843	59.73	0.4	61.571	1.841
144.943	59.66	0.4	61.572	1.912
145.042	59.62	0.4	61.572	1.952
145.142	59.49	0.5	61.572	2.082
145.251	59.52	0.5	61.572	2.052
145.343	59.55	0.5	61.572	2.022
145.432	59.63	0.5	61.572	1.942
145.507	59.69	0.5	61.572	1.882
145.58	59.77	0.5	61.572	1.802
145.652	59.9	0.5	61.572	1.672
145.75	59.92	0.6	61.572	1.652
145.848	59.87	0.6	61.572	1.702
145.948	59.92	0.6	61.573	1.653
146.046	59.99	0.6	61.573	1.583
146.142	59.99	0.5	61.573	1.583
146.229	60.21	0.4	61.573	1.363
146.283	60.48	0.4	61.573	1.093
146.345	60.49	0.4	61.573	1.083
146.445	60.68	0.4	61.573	0.893
146.516	60.94	0.4	61.573	0.633
146.616	61.06	0.4	61.573	0.513
146.716	61.19	0.5	61.609	0.419
146.816	61.27	0.5	61.645	0.375
146.916	61.3	0.5	61.681	0.381
147.002	61.23	0.5	61.712	0.482
147.102	61.88	0.6	61.748	0.000
147.198	62.31	0.6	61.783	0.000
147.295	62.2	0.5	61.818	0.000
147.401	62	0.5	61.856	0.000
147.498	61.73	0.5	61.891	0.161
147.599	61.37	0.4	61.927	0.557
147.686	61.33	0.3	61.959	0.629
147.806	61.39	0.2	62.002	0.612
147.895	61.4	0.3	62.034	0.634
147.997	61.51	0.3	62.071	0.561

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
148.092	61.52	0.3	62.105	0.585
148.185	61.55	0.3	62.138	0.588
148.279	61.74	0.3	62.172	0.432
148.374	61.86	0.3	62.207	0.347
148.473	61.88	0.3	62.242	0.362
148.573	61.84	0.4	62.278	0.438
148.675	61.86	0.4	62.315	0.455
148.785	62.66	0.5	62.355	0.000
148.894	62.32	0.5	62.394	0.074
148.994	62.18	0.4	62.430	0.250
149.094	62.08	0.4	62.466	0.386
149.201	61.99	0.4	62.504	0.514
149.312	61.6	0.3	62.544	0.944
149.422	61.36	0.3	62.584	1.224
149.519	61.48	0.4	62.619	1.139
149.623	61.65	0.4	62.656	1.006
149.716	61.7	0.5	62.690	0.990
149.81	62	0.5	62.724	0.724
149.908	62.19	0.5	62.759	0.569
150.007	62.66	0.3	62.795	0.135
150.105	63	0.3	62.830	0.000
150.204	63.18	0.3	62.866	0.000
150.302	63.28	0.3	62.901	0.000
150.401	63.05	0.2	62.937	0.000
150.497	62.03	0.2	62.971	0.941
150.562	62.07	0.3	62.995	0.925
150.632	62.07	0.3	63.020	0.950
150.71	62.04	0.4	63.048	1.008
150.799	62.13	0.4	63.080	0.950
150.894	61.17	0.4	63.114	1.944
150.99	61.2	0.5	63.149	1.949
151.087	62.44	0.5	63.184	0.744
151.18	62.58	0.4	63.217	0.637
151.275	62.5	0.3	63.252	0.752
151.37	62.54	0.3	63.286	0.746
151.447	62.46	0.3	63.313	0.853
151.537	62.4	0.3	63.346	0.946
151.637	62.31	0.4	63.382	1.072
151.736	62.85	0.4	63.418	0.568
151.829	63.06	0.3	63.451	0.391

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
151.926	63	0.3	63.486	0.486
152.026	62.5	0.4	63.522	1.022
152.125	62.55	0.5	63.558	1.008
152.225	62.7	0.4	63.594	0.894
152.32	62.72	0.4	63.628	0.908
152.412	62.77	0.3	63.661	0.891
152.505	62.83	0.3	63.695	0.865
152.589	62.86	0.4	63.725	0.865
152.658	62.78	0.4	63.750	0.970
152.746	62.7	0.3	63.781	1.081
152.846	62.7	0.3	63.817	1.117
152.946	62.8	0.4	63.853	1.053
153.04	63.02	0.5	63.887	0.867
153.126	63.09	0.5	63.918	0.828
153.224	63.37	0.5	63.954	0.584
153.321	63.59	0.5	63.989	0.399
153.419	63.57	0.6	64.024	0.454
153.516	63.85	0.6	64.059	0.209
153.594	64.1	0.6	64.087	0.000
153.684	64.19	0.6	64.119	0.000
153.775	64.2	0.4	64.152	0.000
153.866	64.18	0.4	64.185	0.005
153.957	64.19	0.4	64.218	0.028
154.048	64.29	0.4	64.250	0.000
154.115	64.48	0.4	64.275	0.000
154.171	64.36	0.3	64.295	0.000
154.227	63.92	0.3	64.315	0.395
154.297	63.72	0.3	64.340	0.620
154.431	63.61	0.3	64.388	0.778
154.531	63.6	0.4	64.424	0.824
154.645	63.65	0.4	64.465	0.815
154.75	63.84	0.4	64.503	0.663
154.848	64.02	0.5	64.539	0.519
154.947	64.19	0.4	64.574	0.384
155.04	64.07	0.3	64.608	0.538
155.138	64.05	0.3	64.643	0.593
155.235	64.09	0.3	64.678	0.588
155.334	64.18	0.4	64.714	0.534
155.432	64.2	0.3	64.749	0.549
155.53	64.25	0.2	64.784	0.534

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
155.607	64.38	0.2	64.812	0.432
155.684	64.45	0.2	64.840	0.390
155.761	64.86	0.3	64.867	0.007
155.837	65.11	0.3	64.895	0.000
155.914	65.29	0.3	64.923	0.000
155.981	65.41	0.4	64.947	0.000
156.055	65.89	0.4	64.973	0.000
156.129	65.98	0.4	65.000	0.000
156.226	63.24	0.4	66.500	3.260
156.325	62.83	0.4	66.548	3.718
156.424	62	0.4	66.597	4.597
156.523	62.45	0.4	66.645	4.195
156.623	62.96	0.5	66.694	3.734
156.743	62.84	0.6	66.753	3.913
156.86	62.02	0.7	66.810	4.790
156.944	61.799	0.7	66.851	5.052
157.049	62.03	0.7	66.903	4.873
157.152	62.226	0.7	66.953	4.727
157.251	62.44	0.6	67.002	4.562
157.345	62.654	0.6	67.048	4.394
157.437	62.82	0.6	67.093	4.273
157.554	63.082	0.5	67.150	4.068
157.666	63.295	0.5	67.205	3.910
157.764	63.295	0.5	67.253	3.958
157.903	63.54	0.5	67.321	3.781
158.026	63.723	0.5	67.381	3.658
158.147	63.937	0.5	67.440	3.503
158.266	64.151	0.5	67.498	3.347
158.365	64.39	0.5	67.547	3.157
158.461	64.578	0.5	67.594	3.016
158.543	64.792	0.5	67.634	2.842
158.653	64.97	0.5	67.688	2.718
158.76	65.219	0.4	67.740	2.521
158.815	65.433	0.4	67.767	2.334
158.897	65.647	0.4	67.807	2.160
159.009	65.74	0.4	67.862	2.122
159.118	65.74	0.4	67.915	2.175
159.211	66.075	0.4	67.961	1.886
159.338	66.288	0.4	68.023	1.735

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
159.429	66.84	0.4	68.067	1.227
159.515	66.716	0.4	68.109	1.393
159.581	66.9	0.4	68.142	1.242
159.705	67.144	0.4	68.202	1.058
159.807	67.31	0.4	68.252	0.942
159.895	67.571	0.4	68.295	0.724
159.909	67.785	0.4	68.302	0.517
159.938	67.8	0.4	68.316	0.516
159.961	67.75	0.4	68.328	0.578
160.065	67.8	0.4	68.378	0.578
160.205	67.7	0.4	68.447	0.747
160.27	67.65	0.5	68.479	0.829
160.392	67.8	0.5	68.538	0.738
160.528	67.45	0.5	68.605	1.155
160.654	67.56	0.5	68.667	1.107
160.814	67.56	0.5	68.745	1.185
160.872	67.553	0.4	68.773	1.220
160.983	67.922	0.4	68.828	0.906
161.112	68.29	0.3	68.891	0.601
161.176	68.658	0.2	68.922	0.264
161.212	69.395	0.2	68.940	0.000
161.319	69.45	0.1	68.992	0.000
161.409	69.55	0.2	69.036	0.000
161.508	69.75	0.3	69.085	0.000
161.508	69.75	0.3	69.085	0.000
161.561	68.845	0.3	69.110	0.265
161.603	68.845	0.4	69.131	0.286
161.701	68.845	0.4	69.179	0.334
161.799	68.845	0.4	69.227	0.382
161.896	68.66	0.4	69.274	0.614
161.992	68.9	0.4	69.321	0.421
162.089	68.9	0.4	69.369	0.469
162.198	68.905	0.4	69.422	0.517
162.307	68.8	0.3	69.476	0.676
162.36	68.845	0.3	69.501	0.656
162.405	68.45	0.2	69.523	1.073
162.499	68.55		69.569	1.019
162.593	68.78		69.615	0.835
162.687	69		69.661	0.661
162.782	69.25		69.708	0.458

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
162.876	69.25		69.754	0.504
162.97	69.3		69.800	0.500
163.065	69.45		69.846	0.396
163.158	69.45	0.2	69.892	0.442
163.251	69.45	0.2	69.937	0.487
163.345	69.3	0.2	69.983	0.683
163.39	69.265	0.3	70.005	0.740
163.442	69.5	0.3	70.031	0.531
163.542	69.45	0.3	70.080	0.630
163.641	69.4	0.4	70.128	0.728
163.732	69.455	0.4	70.173	0.718
163.835	69.5	0.2	70.223	0.723
163.936	69.25	0.2	70.273	1.023
164.032	69.35	0.3	70.320	0.970
164.087	69.495	0.3	70.346	0.851
164.129	69.3	0.3	70.367	1.067
164.229	69.3	0.2	70.416	1.116
164.284	69.355	0.2	70.443	1.088
164.328	69.25	0.2	70.464	1.214
164.428	69.25	0.2	70.513	1.263
164.47	69.355	0.3	70.534	1.179
164.528	69.3	0.3	70.562	1.262
164.628	69.3	0.3	70.611	1.311
164.682	69.305	0.3	70.638	1.333
164.726	69.25	0.4	70.659	1.409
164.821	69.3	0.4	70.706	1.406
164.869	69.395	0.4	70.729	1.334
164.914	69.45	0.4	70.751	1.301
165.013	69.25	0.4	70.800	1.550
165.074	69.405	0.4	70.829	1.424
165.12	69.75	0.4	70.852	1.102
165.204	71	0.4	70.893	0.000
165.303	71.5	0.4	70.941	0.000
165.346	72	0.4	70.963	0.000
165.39	72.2	0.4	70.984	0.000
165.45	72.5	0.4	71.013	0.000
165.493	73.355	0.4	71.034	0.000
165.537	73	0.4	71.056	0.000
165.634	72.69	0.4	71.103	0.000
165.732	72.5	0.4	71.151	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
165.79	72.935	0.4	71.180	0.000
165.83	72.5	0.4	71.199	0.000
165.927	72.25	0.4	71.247	0.000
166.025	72.45	0.4	71.295	0.000
166.123	72.25	0.4	71.343	0.000
166.159	72.445	0.4	71.360	0.000
166.184	72	0.2	71.373	0.000
166.238	71.945	0.2	71.399	0.000
166.272	71.875	0.3	71.416	0.000
166.303	71.85	0.2	71.431	0.000
166.378	72	0.2	71.467	0.000
166.418	72.2	0.2	71.487	0.000
166.449	72.04	0.3	71.502	0.000
166.476	72.1	0.3	71.515	0.000
166.486	72.205	0.3	71.520	0.000
166.494	72	0.4	71.524	0.000
166.514	71.885	0.4	71.534	0.000
166.53	71.25	0.4	71.542	0.292
166.616	71.55	0.4	71.584	0.034
166.657	71.45	0.4	71.604	0.154
166.723	71.55	0.4	71.636	0.086
166.796	71.36	0.4	71.672	0.312
166.849	71.56	0.4	71.698	0.138
166.887	71.515	0.4	71.717	0.202
166.927	69.355	0.3	71.736	2.381
166.971	69.3	0.3	71.758	2.458
167.072	69.3	0.3	71.807	2.507
167.107	69.3	0.2	71.824	2.524
167.187	69.3	0.2	71.863	2.563
167.215	69.3	0.2	71.877	2.577
167.227	69.36	0.2	71.883	2.523
167.24	71	0.1	71.889	0.889
167.275	72.445	0.1	71.906	0.000
167.341	72.45	0.1	71.939	0.000
167.407	72.5	0.2	71.971	0.000
167.49	72.6	0.2	72.012	0.000
167.59	72.65	0.2	72.061	0.000
167.69	72.7	0.3	72.109	0.000
167.742	72.75	0.3	72.135	0.000
167.816	72.8	0.3	72.171	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
167.913	72.85	0.4	72.219	0.000
167.94	72.855	0.4	72.232	0.000
167.973	73.325	0.4	72.248	0.000
168.009	73.5	0.4	72.266	0.000
168.107	73.25	0.4	72.314	0.000
168.197	73.55	0.4	72.358	0.000
168.295	73.45	0.4	72.406	0.000
168.393	73	0.4	72.453	0.000
168.491	73.25	0.4	72.501	0.000
168.535	73.505	0.4	72.523	0.000
168.587	73.5	0.4	72.548	0.000
168.682	73.45	0.4	72.595	0.000
168.776	73.25	0.4	72.641	0.000
168.868	73.45	0.4	72.686	0.000
168.956	73.5	0.4	72.729	0.000
169.041	73.25	0.4	72.771	0.000
169.096	73.445	0.3	72.797	0.000
169.156	73.25	0	72.827	0.000
169.285	73.26	0	72.890	0.000
169.431	73.25	0	72.961	0.000
169.537	73.16	0	73.013	0.000
169.588	73.25	0	73.038	0.000
169.615	73.445	0	73.051	0.000
169.676	74	0	73.081	0.000
169.768	74.1	0	73.126	0.000
169.874	74.25	0	73.178	0.000
169.96	74.36	0	73.220	0.000
170.023	74.25	0	73.251	0.000
170.086	74.5	0	73.282	0.000
170.148	74.26	0	73.312	0.000
170.211	74.26	0	73.343	0.000
170.274	74.8	0	73.374	0.000
170.37	74.85	0	73.421	0.000
170.426	75.8	0	73.448	0.000
170.465	74.815	0	73.467	0.000
170.511	74.8	0	73.490	0.000
170.596	74.85	0	73.531	0.000
170.681	75.9	0.1	73.573	0.000
170.768	74.825	0.1	73.616	0.000
170.869	74.25	0.1	73.665	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
170.969	74.1	0.1	73.714	0.000
171.069	74.25	0.1	73.763	0.000
171.118	73.905	0.1	73.787	0.000
171.168	73.75	0.1	73.811	0.061
171.268	74.25	0.1	73.860	0.000
171.367	73.25	0.1	73.909	0.659
171.467	73.5	0.1	73.958	0.458
171.513	73.965	0.1	73.980	0.015
171.564	73.5	0.1	74.005	0.505
171.661	73.45	0.1	74.053	0.603
171.758	73.25	0.1	74.450	1.200
171.854	73.25	0.1	74.498	1.248
171.935	73.955	0.1	74.539	0.584
172.041	74	0	74.592	0.591
172.145	74.25	0	74.644	0.394
172.249	74.2	0	74.696	0.495
172.347	75.5	0	74.745	0.000
172.445	76	0	74.794	0.000
172.51	76.425	0	74.826	0.000
172.625	76.4	0	74.884	0.000
172.712	76.25	0	74.927	0.000
172.8	76.4	0	74.971	0.000
172.893	76.405	0	75.018	0.000
172.99	76.25	0	75.066	0.000
173.089	76.5	0	75.116	0.000
173.188	76.55	0	75.165	0.000
173.236	76.3	0	75.189	0.000
173.313	76.45	0	75.228	0.000
173.364	76.325	0	75.253	0.000
173.412	76.5	0	75.277	0.000
173.51	76.25	0	75.326	0.000
173.609	76.33	0	75.376	0.000
173.707	76.4	0	75.425	0.000
173.806	76.24	0	75.474	0.000
173.905	76.36	0	75.524	0.000
174.016	76.485	0	75.579	0.000
174.03	76.105	0	75.586	0.000
174.095	75.5	0	75.619	0.118
174.195	75.82	0	75.669	0.000
174.295	74	0	75.719	1.718

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
174.399	73.495	0	75.771	2.275
174.495	73.25	0	75.819	2.569
174.595	73.5	0	75.869	2.369
174.65	73.765	0	75.896	2.131
174.693	73.24	0	75.918	2.678
174.79	73.5	0	75.966	2.466
174.887	73.935	0	76.015	2.080
174.992	74	0.2	76.067	2.067
175.092	74	0.2	76.117	2.117
175.185	74.085	0.3	76.164	2.079
175.284	74	0.3	76.213	2.213
175.383	74.2	0.3	76.263	2.063
175.429	74.195	0.5	76.286	2.091
175.482	74.5	0.5	76.312	1.812
175.581	74.5	0.4	76.362	1.861
175.68	74.25	0.3	76.411	2.161
175.753	75.305	0.3	76.448	1.142
175.848	75.25	0.3	76.495	1.245
175.944	75.26	0.3	76.543	1.283
175.997	75.235	0.3	76.570	1.335
176.041	75	0.3	76.592	1.592
176.141	75.1	0.3	76.642	1.542
176.241	75	0.3	76.692	1.692
176.283	75.085	0.3	76.713	1.628
176.34	75	0.3	76.741	1.741
176.44	75.12	0.3	76.791	1.671
176.539	75	0.3	76.841	1.840
176.647	75.105	0.3	76.895	1.789
176.737	75	0.3	76.940	1.940
176.835	75.12	0.3	76.989	1.869
176.934	74.9	0.3	77.038	2.138
177.043	75.105	0.2	77.093	1.988
177.132	75.5	0.2	77.137	1.637
177.247	75.8	0.3	77.195	1.395
177.347	75.9	0.2	77.245	1.345
177.447	76	0.2	77.295	1.295
177.547	77.5	0.2	77.345	0.000
177.614	78.405	0.2	77.378	0.000
177.681	78.2	0.2	77.412	0.000
177.735	78	0.2	77.439	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
177.788	77.8	0.2	77.465	0.000
177.842	77.45	0.2	77.492	0.042
177.912	77.2	0.2	77.527	0.327
177.952	77.3	0.3	77.547	0.247
178	77.25	0.3	77.571	0.321
178.061	77.395	0.3	77.602	0.207
178.139	77.45	0.3	77.641	0.191
178.187	77.4	0.3	77.665	0.264
178.248	77.625	0.3	77.695	0.070
178.307	78	0.3	77.725	0.000
178.358	78.325	0.2	77.750	0.000
178.42	78.25	0.3	77.781	0.000
178.509	78.5	0.3	77.826	0.000
178.564	78.2	0.3	77.853	0.000
178.642	78.5	0.3	77.892	0.000
178.7	78.25	0.3	77.921	0.000
178.802	78.12	0.3	77.972	0.000
178.885	78.23	0.3	78.014	0.000
178.967	78.14	0.3	78.055	0.000
179.049	78.5	0.3	78.096	0.000
179.132	78.5	0.3	78.137	0.000
179.214	78.5	0.3	78.178	0.000
179.297	78.6	0.3	78.220	0.000
179.379	78.7	0.3	78.261	0.000
179.462	78.8	0.3	78.302	0.000
179.551	78.9	0.3	78.347	0.000
179.629	78.805	0.3	78.386	0.000
179.731	78.4	0.2	78.437	0.036
179.837	78.6	0.2	78.490	0.000
179.937	78.3	0.2	78.540	0.240
180.036	78.6	0.2	78.589	0.000
180.136	78.5	0.2	78.639	0.139
180.236	78.6	0.2	78.689	0.089
180.336	78.3	0.2	78.739	0.439
180.436	78.4	0.2	78.789	0.389
180.536	78.6	0.3	78.839	0.239
180.572	78.9	0.3	78.857	0.000
180.68	78.795	0.3	78.911	0.116
180.769	78.82	0.3	78.956	0.136
180.869	78.78	0.3	79.006	0.225

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
180.969	78.75	0.3	79.056	0.305
181.069	78.65	0.3	79.106	0.455
181.169	78.795	0.3	79.156	0.361
181.269	78.795	0.3	79.206	0.410
181.368	78.795	0.3	79.255	0.460
181.468	78.75	0.2	79.305	0.555
181.568	78.795	0.2	79.355	0.560
181.614	78.815	0.2	79.378	0.563
181.668	78.2	0.2	79.405	1.205
181.768	78.1	0.2	79.455	1.355
181.868	78.5	0.2	79.505	1.005
181.904	78.9	0.2	79.523	0.623
182.019	79.835	0.2	79.581	0.000
182.103	79.5	0.2	79.623	0.123
182.203	79.6	0.2	79.673	0.073
182.302	79.8	0.2	79.722	0.000
182.402	79.8	0.2	79.772	0.000
182.513	79.815	0.3	79.828	0.013
182.59	79.5	0.3	79.866	0.366
182.679	79.815	0.4	79.911	0.096
182.768	79.815	0.4	79.955	0.140
182.857	79.6	0.5	80.000	0.400
182.931	79.805	0.5	80.037	0.231
183.037	79.6	0.5	80.090	0.490
183.137	79.5	0.5	80.140	0.639
183.237	79.4	0.5	80.190	0.789
183.337	79.3	0.7	80.240	0.939
183.393	79.775	0.8	80.268	0.492
183.437	79.5	0.8	80.290	0.790
183.537	79.4	0.8	80.340	0.939
183.637	79.6	0.9	80.390	0.790
183.737	79.8	0.9	80.440	0.639
183.837	79.6	0.9	80.490	0.889
183.884	79.785	1	80.513	0.728
183.937	80	0.9	80.540	0.540
184.037	80.1	0.9	80.590	0.490
184.137	79.5	0.9	80.640	1.140
184.237	79.5	0.9	80.690	1.190
184.284	79.985	0.9	80.713	0.728
184.337	80.1	0.8	80.740	0.639

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
184.437	80.2	0.8	80.790	0.590
184.521	80.1	0.8	80.832	0.731
184.621	80	0.6	80.882	0.882
184.677	79.945	0.6	80.910	0.965
184.72	80	0.6	80.931	0.931
184.818	80.1	0.6	80.980	0.880
184.916	80.2	0.6	81.029	0.829
185.014	80.3	0.6	81.078	0.778
185.057	79.885	0.5	81.100	1.214
185.109	80.3	0.4	81.126	0.826
185.204	80.7	0.4	81.173	0.473
185.298	81	0.4	81.220	0.220
185.393	81.5	0.4	81.268	0.000
185.487	82.645	0.4	81.315	0.000
185.589	82.6	0.5	81.366	0.000
185.589	82.6	0.5	81.863	0.000
185.689	82.5	0.5	81.922	0.000
185.789	82.6	0.5	81.982	0.000
185.831	82.615	0.5	82.007	0.000
185.899	82.6	0.5	82.047	0.000
186.008	82.7	0.5	82.112	0.000
186.115	82.6	0.5	82.176	0.000
186.168	82.635	0.5	82.207	0.000
186.213	82.5	0.5	82.234	0.000
186.313	82.6	0.5	82.293	0.000
186.399	82.585	0.5	82.344	0.000
186.504	82.6	0.5	82.407	0.000
186.585	82.565	0.4	82.455	0.000
186.671	82.7	0.4	82.506	0.000
186.76	82.6	0.3	82.559	0.000
186.802	82.485	0.2	82.584	0.099
186.858	82	0.2	82.617	0.617
186.958	81.9	0.1	82.677	0.777
187.058	81.8	0.1	82.736	0.936
187.164	81.925	0.1	82.799	0.874
187.271	83.2	0.1	82.863	0.000
187.321	84.235	0.1	82.893	0.000
187.36	83.5	0.2	82.916	0.000
187.467	82.9	0.2	82.979	0.079
187.499	82.525	0.2	82.998	0.473

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
187.557	82.6	0.3	83.033	0.433
187.656	82.5	0.3	83.092	0.592
187.756	82.3	0.3	83.151	0.851
187.855	82.4	0.3	83.210	0.810
187.94	82.585	0.3	83.260	0.675
188.018	82.2	0.4	83.307	1.107
188.052	81.995	0.5	83.327	1.332
188.091	82.5	0.5	83.350	0.850
188.191	82.6	0.5	83.410	0.810
188.341	82.3	0.5	83.499	1.199
188.441	82.5	0.5	83.558	1.058
188.541	82.4	0.3	83.618	1.218
188.59	82.525	0.2	83.647	1.122
188.64	82.5	0.2	83.677	1.177
188.738	82.3	0.2	83.735	1.435
188.837	82.4	0.3	83.794	1.394
188.935	82.4	0.4	83.852	1.452
189.002	82.3	0.4	83.892	1.592
189.092	82.6	0.5	83.945	1.345
189.137	82.575	0.5	83.972	1.397
189.19	82.4	0.5	84.004	1.604
189.289	82.6	0.5	84.062	1.462
189.388	82.7	0.5	84.121	1.421
189.486	82.5	0.5	84.179	1.679
189.585	82.6	0.5	84.238	1.638
189.684	82	0.5	84.297	2.297
189.732	82.4	0.4	84.326	1.926
189.784	83	0.4	84.357	1.357
189.881	83.705	0.4	84.414	0.709
190.185	83.6	0.4	84.595	0.995
190.284	84	0.4	84.654	0.654
190.327	84.385	0.4	84.679	0.294
190.382	84.4	0.4	84.712	0.312
190.48	84.3	0.4	84.770	0.470
190.579	83.2	0.4	84.829	1.629
190.624	84.365	0.4	84.856	0.491
190.677	84.5	0.4	84.887	0.387
190.775	84.3	0.4	84.946	0.646
190.873	84.6	0.4	85.004	0.404
191.01	84.6	0.4	85.085	0.485

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
191.129	84.2	0.4	85.156	0.956
191.23	84.825	0.4	85.216	0.391
191.328	84.3	0.4	85.274	0.974
191.427	84.2	0.4	85.333	1.133
191.527	84.4	0.4	85.393	0.993
191.634	84.6	0.4	85.456	0.856
191.734	84.9	0.4	85.516	0.616
191.834	84.7	0.4	85.575	0.875
191.933	84.6	0.4	85.634	1.034
192.033	84.3	0.4	85.693	1.393
192.132	84.1	0.4	85.752	1.652
192.18	84.775	0.4	85.781	1.006
192.232	84.9	0.4	85.812	0.912
192.332	84.5	0.4	85.871	1.371
192.431	84.6	0.4	85.930	1.330
192.531	84.7	0.4	85.989	1.289
192.641	84.5	0.4	86.055	1.555
192.752	84.3	0.4	86.121	1.821
192.851	84.9	0.4	86.180	1.280
192.951	84.9	0.4	86.239	1.339
193.05	85	0.4	86.298	1.298
193.149	85.6	0.4	86.357	0.757
193.253	85.895	0.4	86.419	0.524
193.348	85.4	0.4	86.475	1.075
193.447	85.6	0.4	86.534	0.934
193.546	85.9	0.4	86.593	0.693
193.65	85.4	0.4	86.655	1.255
193.768	85.1	0.4	86.725	1.625
193.867	85.6	0.4	86.784	1.184
193.965	85.3	0.5	86.842	1.542
194.064	85.4	0.5	86.901	1.501
194.162	85.7	0.5	86.959	1.259
194.217	85.865	0.6	86.992	1.127
194.261	86	0.6	87.018	1.018
194.361	86.3	0.6	87.077	0.777
194.461	86.2	0.6	87.137	0.937
194.561	86.9	0.5	87.196	0.296
194.611	87.805	0.4	87.226	0.000
194.66	87	0.4	87.255	0.255
194.759	87.2	0.4	87.314	0.114

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
194.858	87.6	0.5	87.373	0.000
194.957	87.4	0.5	87.432	0.032
195.002	87.655	0.5	87.462	0.000
195.05	87.3	0.5	87.495	0.195
195.143	87.2	0.5	87.559	0.359
195.202	87.565	0.5	87.599	0.034
195.232	87.4	0.5	87.620	0.220
195.33	87.6	0.5	87.686	0.086
195.428	87.3	0.4	87.753	0.453
195.478	87.555	0.4	87.788	0.233
195.526	87.9	0.4	87.820	0.000
195.624	87.5	0.4	87.887	0.387
195.723	87.8	0.4	87.955	0.155
195.773	88.205	0.4	87.989	0.000
195.822	88.2	0.4	88.023	0.000
195.921	88.45	0.4	88.090	0.000
195.965	88.205	0.5	88.120	0.000
196.021	88.2	0.5	88.159	0.000
196.121	88.3	0.5	88.227	0.000
196.167	88.195	0.5	88.259	0.064
196.221	88.9	0.5	88.295	0.000
196.293	88.56	0.5	88.345	0.000
196.393	89	0.5	88.413	0.000
196.492	89.1	0.5	88.481	0.000
196.552	89.045	0	88.522	0.000
196.592	89	0	88.549	0.000
196.691	89.5	0	88.617	0.000
196.79	88.9	0	88.684	0.000
196.889	88.8	0	88.752	0.000
196.983	89.045	0	88.816	0.000
197.088	89.5	0	88.888	0.000
197.187	89.4	0	88.956	0.000
197.286	89.2	0	89.023	0.000
197.386	89	0	89.092	0.092
197.43	89.045	0	89.122	0.077
197.485	89	0	89.159	0.159
197.584	89.1	0	89.227	0.127
197.683	89.1	0.2	89.295	0.195
197.782	89.2	0.2	89.362	0.162
197.837	89.045	0.2	89.400	0.355

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
197.881	90.1	0.2	89.430	0.000
197.981	90.5	0.2	89.498	0.000
198.094	90.6	0.2	89.576	0.000
198.194	90.5	0.2	89.644	0.000
198.294	90.8	0.2	89.712	0.000
198.341	90.955	0.2	89.744	0.000
198.393	91	0.2	89.780	0.000
198.492	91.1	0.2	89.848	0.000
198.592	90.5	0.2	89.916	0.000
198.691	90.9	0.2	89.984	0.000
198.744	90.995	0.2	90.020	0.000
198.797	92.065	0.3	90.056	0.000
198.87	92	0.3	90.106	0.000
198.965	91.5	0.3	90.171	0.000
199.038	91.6	0.3	90.221	0.000
199.107	91.8	0.3	90.268	0.000
199.156	90.405	0.3	90.301	0.000
199.205	90.3	0.3	90.335	0.035
199.302	90.2	0.3	90.401	0.201
199.399	90.3	0.3	90.467	0.167
199.496	90.4	0.3	90.534	0.134
199.548	90.365	0.2	90.569	0.204
199.589	90.2	0.2	90.597	0.397
199.672	90.3	0.2	90.654	0.354
199.755	90.4	0.2	90.711	0.311
199.798	90.615	0	90.740	0.125
199.848	91.4	0	90.774	0.000
199.891	91.745	0	90.804	0.000
199.947	90.56	0	90.842	0.282
200.047	90.8	0	90.910	0.110
200.147	91.1	0	90.979	0.000
200.233	91.5	0	91.037	0.000
200.333	92.1	0	91.106	0.000
200.387	92.395	0	91.143	0.000
200.433	92.3	0	91.174	0.000
200.532	92.4	0	91.242	0.000
200.63	92.5	0	91.309	0.000
200.729	92.4	0	91.376	0.000
200.828	92.7	0	91.444	0.000
200.927	92.3	0	91.512	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
200.962	92.295	0	91.536	0.000
200.988	92.1	0	91.553	0.000
201.047	92.5	0.2	91.594	0.000
201.08	92.095	0.2	91.616	0.000
201.136	92.4	0.2	91.655	0.000
201.236	92.5	0.2	91.723	0.000
201.336	92.3	0.2	91.791	0.000
201.435	92.5	0.2	91.859	0.000
201.535	92.8	0.2	91.927	0.000
201.586	92.765	0.2	91.962	0.000
201.635	92.5	0	91.996	0.000
201.735	92.6	0	92.064	0.000
201.833	92.3	0	92.131	0.000
201.933	92.4	0	92.199	0.000
202.033	92.8	0	92.268	0.000
202.133	92.5	0	92.336	0.000
202.184	92.715	0	92.371	0.000
202.233	91.9	0	92.404	0.504
202.333	91.8	0	92.473	0.673
202.433	92.5	0	92.541	0.041
202.533	92.8	0.4	92.609	0.000
202.639	92.8	0.5	92.682	0.000
202.738	92.4	0.5	92.749	0.349
202.793	92.805	0.5	92.787	0.000
202.837	93	0.5	92.817	0.000
202.935	93.5	0.5	92.884	0.000
203.033	93.6	0.5	92.951	0.000
203.131	93.4	0.5	93.018	0.000
203.229	93.45	0.6	93.085	0.000
203.32	93.8	0.6	93.147	0.000
203.417	93.8	0.6	93.213	0.000
203.46	93.725	0.6	93.243	0.000
203.504	93.5	0.6	93.273	0.000
203.584	93.5	0.6	93.328	0.000
203.677	93.1	0.6	93.391	0.291
203.768	93.5	0.6	93.453	0.000
203.87	93.8	0.6	93.523	0.000
203.985	93.2	0.6	93.602	0.402
204.043	94.025	0.6	93.641	0.000
204.081	93.8	0.7	93.667	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
204.088	93.555	0.7	93.672	0.117
204.121	93.5	0.7	93.695	0.195
204.218	93.4	0.7	93.761	0.361
204.316	93.8	0.7	93.828	0.028
204.413	93.5	0.7	93.894	0.394
204.51	93.4	0.7	93.960	0.560
204.608	93.2	0.8	94.027	0.827
204.662	93.165	0.8	94.064	0.899
204.741	93.1	0.8	94.118	1.018
204.841	93.2	0.9	94.187	0.987
204.941	93.6	0.9	94.255	0.655
205.04	93.4	0.9	94.323	0.923
205.14	93.2	0.9	94.391	1.191
205.24	93	1	94.459	1.459
205.34	93.5	1	94.528	1.028
205.439	93.5	1	94.595	1.095
205.49	93.005	1	94.630	1.625
205.538	93	0.9	94.663	1.663
205.637	92.5	0.9	94.731	2.231
205.745	92.5	0.9	94.804	2.304
205.863	93.2	0.8	94.885	1.685
205.963	93.5	0.7	94.953	1.453
206.062	93.3	0.7	95.021	1.721
206.161	93.5	0.6	95.089	1.589
206.261	93	0.6	95.157	2.157
206.36	93.8	0.6	95.225	1.425
206.459	93.5	0.5	95.292	1.792
206.559	93.4	0.4	95.361	1.961
206.655	93.4	0.4	95.426	2.026
206.771	93.2	0.4	95.506	2.306
206.847	93.485	0.4	95.558	2.073
206.89	93.5	0.4	95.587	2.087
206.986	93.4	0.4	95.653	2.253
207.082	93.8	0.3	95.718	1.918
207.178	93.8	0.3	95.784	1.984
207.274	94.1	0.3	95.849	1.749
207.37	93.5	0.3	95.915	2.415
207.457	94.225	0.3	95.975	1.750
207.504	94.2	0.3	96.007	1.807
207.601	94.4	0.3	96.073	1.673

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
207.698	94.5	0.3	96.139	1.639
207.75	94.545	0.3	96.175	1.630
207.794	94.722	0.3	96.205	1.483
207.875	94.8	0.3	96.260	1.460
207.955	95.075	0.3	96.315	1.240
208.036	95.252	0.3	96.370	1.118
208.116	95.6	0.3	96.425	0.825
208.196	95.605	0.3	96.480	0.875
208.276	95.9	0.3	96.534	0.634
208.355	95.958	0.3	96.588	0.630
208.434	96.135	0.3	96.642	0.507
208.513	96.5	0.3	96.696	0.196
208.592	96.488	0.3	96.750	0.262
208.671	96.4	0.3	96.804	0.404
208.75	96.842	0.3	96.858	0.016
208.869	97.018	0.4	96.940	0.000
209	97.5	0.4	97.029	0.000
209.099	97.372	0.4	97.097	0.000
209.197	97.4	0.4	97.164	0.000
209.32	97.725	0.4	97.248	0.000
209.444	97.902	0.4	97.333	0.000
209.488	98.255	0.4	97.363	0.000
209.527	98.5	0.4	97.389	0.000
209.586	98.6	0.4	97.430	0.000
209.682	98.4	0.4	97.495	0.000
209.781	98.2	0.3	97.563	0.000
210	98.6	0.3	97.713	0.000
210.087	98.3	0.3	97.772	0.000
210.196	98.4	0.3	97.846	0.000
210.244	98.285	0.2	97.879	0.000
210.296	98.5	0.2	97.915	0.000
210.395	98.4	0.2	97.982	0.000
210.496	98.4	0.2	98.052	0.000
210.622	98.6	0.2	98.138	0.000
210.722	98.4	0.3	98.206	0.000
210.819	98.8	0.3	98.272	0.000
210.865	98.975	0.3	98.304	0.000
210.915	99	0.3	98.338	0.000
211.013	99.1	0.3	98.405	0.000
211.109	98.9	0.3	98.470	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
211.174	98.3	0.4	98.515	0.215
211.24	98.7	0.4	98.560	0.000
211.297	98.935	0.4	98.599	0.000
211.398	98.7	0.4	98.668	0.000
211.477	98.8	0.4	98.722	0.000
211.477	98.6	0.4	98.722	0.122
211.526	98.4	0.4	98.755	0.355
211.611	98.6	0.4	98.814	0.214
211.672	98.6	0.4	98.855	0.255
211.717	98.7	0.4	98.886	0.186
211.741	98.2	0.4	98.902	0.702
211.762	98.715	0.4	98.917	0.202
211.783	98.8	0.3	98.931	0.131
211.791	98.6	0.3	98.937	0.337
211.802	98.7	0.3	98.944	0.244
211.819	98.785	0.3	98.956	0.171
211.847	98.2	0.3	98.975	0.775
211.879	98.6	0.3	98.997	0.397
211.946	98.6	0.3	99.043	0.443
211.964	98.715	0.4	99.055	0.340
211.983	98.8	0.4	99.068	0.268
212	98.5	0.4	99.079	0.579
212.034	98.6	0.4	99.103	0.503
212.064	99.1	0.4	99.123	0.023
212.138	99.2	0.5	99.174	0.000
212.339	99.5	0.5	99.311	0.000
212.413	98.8	0.5	99.362	0.562
212.475	98.6	0.5	99.404	0.804
212.507	99.4	0.5	99.426	0.026
212.546	99.015	0.5	99.453	0.438
212.584	99.1	0.5	99.479	0.379
212.724	99.5	0.5	99.574	0.074
212.822	99.2	0.5	99.641	0.441
212.9	99.1	0.5	99.695	0.595
213	99	0.6	99.763	0.763
213.02	99.015	0.6	99.777	0.762
213.045	99.2	0.6	99.794	0.594
213.144	99.2	0.6	99.861	0.661
213.242	99.4	0.6	99.928	0.528
213.347	99.1	0.6	100.000	0.900

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
213.347	99.1	0.6	101.2	2.100
213.444	98.6	0.6	101.251	2.651
213.524	98.8	0.6	101.292	2.492
213.626	98.6	0.6	101.346	2.746
213.672	98.995	0.6	101.370	2.375
213.701	99.5	0.5	101.385	1.885
213.771	99.4	0.5	101.421	2.021
213.834	99.3	0.5	101.454	2.154
213.903	99.6	0.5	101.490	1.890
213.954	99.8	0.5	101.517	1.717
214	99.5	0.5	101.541	2.041
214.069	99.5	0.5	101.577	2.077
214.131	99.3	0.5	101.609	2.309
214.185	99.4	0.5	101.637	2.237
214.202	99.365	0.5	101.646	2.281
214.222	98.935	0.4	101.656	2.721
214.257	99.8	0.4	101.675	1.875
214.352	99	0.4	101.724	2.724
214.448	99.2	0.4	101.774	2.574
214.543	99.5	0.4	101.824	2.324
214.639	99.5	0.4	101.874	2.374
214.698	100.285	0.4	101.905	1.620
214.742	100.2	0.4	101.928	1.728
214.842	100.3	0.5	101.980	1.680
214.942	100.5	0.5	102.032	1.532
215.041	100.3	0.5	102.084	1.784
215.141	100.4	0.5	102.136	1.736
215.239	100.3	0.5	102.187	1.887
215.29	100.295	0.5	102.213	1.918
215.335	100.1	0.5	102.237	2.137
215.431	100.2	0.6	102.287	2.087
215.527	100.5	0.6	102.337	1.837
215.623	100.6	0.7	102.387	1.787
215.737	100.4	0.8	102.447	2.047
215.791	100.265	0.9	102.475	2.210
215.834	100.2	0.9	102.497	2.297
215.932	100.4	1	102.548	2.148
216.03	100.2	1	102.599	2.399
216.128	100.2	1	102.651	2.451
216.226	100.3	1	102.702	2.402

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
216.323	100.4	1	102.752	2.352
216.378	100.295	1	102.781	2.486
216.417	100.4	1	102.801	2.401
216.495	100.5	1	102.842	2.342
216.582	100.8	1	102.887	2.087
216.654	101	1	102.925	1.925
216.728	101.2	1	102.963	1.763
216.804	102	1	103.003	1.003
216.861	102.3	0.9	103.033	0.733
216.902	102.4	0.8	103.054	0.654
216.92	102.595	0.8	103.064	0.469
216.945	100.155	0.8	103.077	2.922
216.992	100.2	0.8	103.101	2.901
217.092	101.4	0.8	103.153	1.753
217.192	101.2	0.8	103.206	2.006
217.291	101.3	0.8	103.257	1.957
217.39	101.2	0.8	103.309	2.109
217.436	101.165	0.7	103.333	2.168
217.484	101.5	0.7	103.358	1.858
217.579	102.1	0.6	103.407	1.307
217.678	101.995	0.6	103.459	1.464
217.689	101.6	0.6	103.465	1.865
217.744	101.135	0.6	103.493	2.358
217.78	101.5	0.7	103.512	2.012
217.875	101.8	0.7	103.562	1.762
217.909	101.965	0.8	103.579	1.614
217.973	101.8	0.8	103.613	1.813
218.072	101.5	0.8	103.664	2.164
218.171	101.6	0.8	103.716	2.116
218.215	101.965	0.9	103.739	1.774
218.266	101.2	0.9	103.766	2.566
218.361	101.3	0.9	103.815	2.515
218.469	101.4	0.9	103.872	2.472
218.586	101.5	0.9	103.933	2.433
218.684	101.2	0.9	103.984	2.784
218.727	101.925	1	104.006	2.081
218.782	101.6	1	104.035	2.435
218.88	101.3	1	104.086	2.786
218.979	101.4	1	104.138	2.738
219.077	101.84	1	104.189	2.349

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
219.163	101.835	1	104.234	2.399
219.204	101.2	1	104.255	3.055
219.302	101.3	1	104.306	3.006
219.401	101.4	1	104.358	2.958
219.499	101.23	1	104.409	3.179
219.598	101.5	1	104.460	2.960
219.648	101.725	1	104.487	2.762
219.698	101.6	0.9	104.513	2.913
219.798	101.5	0.9	104.565	3.065
219.897	101.8	0.9	104.616	2.816
219.997	101.6	0.8	104.669	3.069
220.097	101.4	0.8	104.721	3.321
220.144	102.919	0.8	104.745	1.826
220.199	102.4	0.7	104.774	2.374
220.298	102.6	0.7	104.826	2.226
220.398	102.3	0.7	104.878	2.578
220.498	102.5	0.5	104.930	2.430
220.597	102.9	0.5	104.982	2.082
220.649	102.949	0.5	105.009	2.060
220.695	102.1	0.4	105.033	2.933
220.813	102.8	0.4	105.094	2.294
220.944	102.6	0.4	105.162	2.562
221.063	102.8	0.4	105.225	2.425
221.163	102.3	0.4	105.277	2.977
221.222	102.959	0.4	105.307	2.348
221.263	103.1	0.4	105.329	2.229
221.362	103.5	0.4	105.381	1.881
221.461	103.6	0.4	105.432	1.832
221.561	103.4	0.4	105.484	2.084
221.658	103.7	0.4	105.535	1.835
221.757	103.5	0.4	105.587	2.087
221.805	104.549	0.4	105.612	1.063
221.857	104.5	0.4	105.639	1.139
221.957	104.6	0.4	105.691	1.091
222.057	104.2	0.4	105.743	1.543
222.157	104.3	0.4	105.795	1.495
222.257	104.8	0.4	105.847	1.047
222.347	104.5	0.4	105.894	1.394
222.465	104.3	0.4	105.956	1.656
222.585	104.8	0.5	106.018	1.218

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
222.701	104.5	0.5	106.079	1.579
222.801	104.3	0.5	106.131	1.831
222.9	104.5	0.5	106.183	1.683
223	104	0.5	106.235	2.235
223.027	104.489	0.5	106.249	1.760
223.068	104.479	0.5	106.270	1.791
223.1	104.7	0.5	106.287	1.587
223.2	104.5	0.5	106.339	1.839
223.3	104.6	0.5	106.391	1.791
223.399	104.9	0.5	106.443	1.543
223.454	105.129	0.5	106.472	1.343
223.499	105.2	0.5	106.495	1.295
223.612	105.3	0.5	106.554	1.254
223.712	105.4	0.5	106.606	1.206
223.811	105.8	0.5	106.658	0.858
223.911	105.2	0.4	106.710	1.510
224.011	105.6	0.4	106.762	1.162
224.111	106.3	0.4	106.814	0.514
224.211	106.2	0.4	106.867	0.667
224.311	106.2	0.4	106.919	0.719
224.411	106	0.4	106.971	0.971
224.511	106.8	0.4	107.023	0.223
224.611	106.2	0.4	107.075	0.875
224.711	107.8	0.4	107.127	0.000
224.811	107.2	0.4	107.179	0.000
224.911	107.5	0.4	107.232	0.000
224.958	107.199	0.4	107.256	0.057
225.008	107.5	0.4	107.282	0.000
225.106	107.2	0.4	107.333	0.133
225.203	107.6	0.4	107.384	0.000
225.295	107.8	0.5	107.432	0.000
225.401	107.6	0.5	107.487	0.000
225.504	107.1	0.5	107.541	0.441
225.6	107.4	0.6	107.591	0.191
225.697	107.6	0.6	107.642	0.042
225.794	107.5	0.7	107.692	0.192
225.891	107.6	0.7	107.743	0.143
225.988	107.5	0.8	107.793	0.293
226.085	108	0.8	107.844	0.000
226.182	108.2	0.8	107.895	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
226.279	108.3	0.8	107.945	0.000
226.318	108.009	0.8	107.966	0.000
226.384	108.2	0.8	108.000	0.000
226.483	108.009	0.8	108.052	0.043
226.583	108.3	0.8	108.104	0.000
226.682	108.009	0.9	108.155	0.146
226.782	108.009	0.9	108.208	0.199
226.881	108.4	0.9	108.259	0.000
226.981	108.6	1	108.311	0.000
227.08	108.009	1	108.363	0.354
227.18	108.2	1	108.415	0.215
227.274	108.009	1	108.464	0.455
227.373	108.009	1	108.516	0.507
227.473	108.2	1	108.568	0.368
227.572	108.009	1	108.620	0.611
227.671	108.009	1.1	108.671	0.662
227.771	108.4	1.1	108.723	0.323
227.856	108.009	1.1	108.768	0.759
227.955	108.2	1.1	108.819	0.619
228.054	108.009	1.1	108.871	0.862
228.152	108.009	1.1	108.922	0.913
228.281	108.3	1.2	108.989	0.689
228.409	108.009	1.2	109.056	1.047
228.509	108.2	1.2	109.108	0.908
228.608	108.009	1.2	109.160	1.151
228.752	108.009	1.2	109.235	1.226
228.88	108.4	1.2	109.302	0.902
228.979	108.009	1.2	109.353	1.344
229.015	108.149	1.2	109.372	1.223
229.047	108.139	1.2	109.389	1.250
229.062	108.149	1.2	109.397	1.248
229.076	108.1	1.2	109.404	1.304
229.193	108.3	1.2	109.465	1.165
229.312	108.2	1.2	109.527	1.327
229.411	107.5	1.5	109.579	2.079
229.51	107.8	1.5	109.630	1.830
229.558	107.149	1.5	109.655	2.506
229.61	107.5	1.2	109.683	2.183
229.709	107.6	1.2	109.734	2.134
229.803	107.3	1.2	109.783	2.483

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
229.919	107.8	1	109.844	2.044
230.028	108	1	109.901	1.901
230.127	108.2	1	109.952	1.752
230.226	108.3	0.9	110.004	1.704
230.332	108.3	0.8	110.059	1.759
230.451	109.1	0.7	110.121	1.021
230.556	109.2	0.6	110.176	0.976
230.616	109.019	0.5	110.207	1.188
230.635	108.979	0.5	110.217	1.238
230.649	109.2	0.4	110.224	1.024
230.678	109.3	0.4	110.240	0.940
230.704	109.5	0.3	110.253	0.753
230.754	110.2	0.3	110.279	0.079
230.78	110.2	0.2	110.293	0.093
230.839	110.5	0.2	110.324	0.000
230.851	110.249	0.2	110.330	0.081
230.864	110.3	0.2	110.337	0.037
230.884	110.2	0.2	110.347	0.147
230.905	110.3	0.2	110.358	0.058
230.925	110.5	0.2	110.368	0.000
230.945	110.6	0.2	110.379	0.000
230.965	110.4	0.3	110.389	0.000
230.986	110.3	0.3	110.400	0.100
231.006	110.4	0.3	110.411	0.011
231.035	110.489	0.3	110.426	0.000
231.081	110.2	0.3	110.450	0.250
231.195	110.3	0.3	110.509	0.209
231.298	110.4	0.3	110.563	0.163
231.401	110.5	0.3	110.617	0.117
231.452	110.489	0.3	110.643	0.154
231.54	110.2	0.3	110.689	0.489
231.633	110.3	0.4	110.738	0.438
231.732	110.1	0.4	110.789	0.689
231.832	109.4	0.4	110.842	1.442
231.884	109.119	0.4	110.869	1.750
231.932	109.4	0.4	110.894	1.494
232.026	109.2	0.4	110.943	1.743
232.118	109.3	0.4	110.991	1.691
232.21	109.1	0.4	111.039	1.939
232.303	109.2	0.4	111.087	1.887

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
232.354	109.119	0.4	111.114	1.995
232.388	110.1	0.8	111.132	1.032
232.402	111.069	0.9	111.139	0.070
232.421	111.119	1.5	111.149	0.030
232.487	110.9	1.2	111.183	0.283
232.581	110.6	1.3	111.232	0.632
232.632	110.1	1.2	111.259	1.159
232.691	109.5	1.2	111.290	1.790
232.724	109.119	1.2	111.307	2.188
232.764	109.1	1.2	111.328	2.228
232.857	109.2	1.2	111.376	2.176
232.968	109.3	1.2	111.434	2.134
233.066	110	1.2	111.485	1.485
233.104	109.109	1.2	111.505	2.396
233.139	109.1	1.2	111.523	2.423
233.156	110.3	1.2	111.532	1.232
233.24	110.9	1.2	111.576	0.676
233.301	111.889	1.2	111.608	0.000
233.347	111.769	1.1	111.632	0.000
233.371	110.6	1.1	111.644	1.044
233.428	109.4	0.8	111.674	2.274
233.467	109.5	0.8	111.694	2.194
233.513	109.2	0.7	111.718	2.518
233.551	109.149	0.7	111.738	2.589
233.578	109.8	0.7	111.752	1.952
233.6	109.6	0.6	111.764	2.164
233.693	109.9	0.6	111.812	1.912
233.823	110.2	0.5	111.880	1.680
233.921	110.5	0.5	111.931	1.431
233.974	110.979	0.5	111.959	0.980
234.02	110.6	0.5	111.983	1.383
234.12	110.9	0.5	112.035	1.135
234.218	111	0.5	112.086	1.086
234.336	110.5	0.5	112.148	1.648
234.444	110.6	0.5	112.204	1.604
234.541	111.3	0.5	112.255	0.955
234.584	111.169	0.4	112.277	1.108
234.65	111.2	0.4	112.311	1.111
234.746	111.3	0.4	112.361	1.061
234.842	111.2	0.4	112.412	1.212

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
234.938	111.2	0.4	112.462	1.262
235.034	111	0.4	112.512	1.512
235.074	111.009	0.4	112.533	1.524
235.119	111.4	0.4	112.556	1.156
235.201	111.3	0.4	112.599	1.299
235.315	111.6	0.4	112.658	1.058
235.425	112.1	0.4	112.716	0.616
235.461	112.2	0.4	112.734	0.534
235.48	112.119	0.4	112.744	0.625
235.508	112.119	0.4	112.759	0.640
235.536	112.3	0.4	112.773	0.473
235.608	112	0.4	112.811	0.811
235.652	112.4	0.4	112.834	0.434
235.696	112	0.4	112.857	0.857
235.741	112.1	0.4	112.880	0.780
235.847	112.139	0.4	112.936	0.797
235.944	112.2	0.4	112.986	0.786
236.009	112.1	0.4	113.020	0.920
236.052	112.2	0.4	113.043	0.843
236.093	112.4	0.4	113.064	0.664
236.142	112	0.4	113.090	1.090
236.194	112.4	0.4	113.117	0.717
236.247	112.3	0.4	113.144	0.844
236.299	112.5	0.4	113.171	0.671
236.352	112.6	0.4	113.199	0.599
236.393	112.469	0.4	113.220	0.751
236.435	112.5	0.4	113.242	0.742
236.534	112.3	0.4	113.294	0.994
236.589	112.329	0.5	113.323	0.994
236.631	112.6	0.5	113.345	0.745
236.723	112.9	0.5	113.393	0.493
236.814	113	0.5	113.440	0.440
236.859	113.269	0.5	113.464	0.195
236.899	113.4	0.5	113.484	0.084
236.981	113.8	0.5	113.527	0.000
237.054	113.1	0.5	113.565	0.465
237.093	112.819	0.5	113.586	0.767
237.139	112.7	0.5	113.610	0.910
237.238	112.6	0.5	113.661	1.061
237.296	112.869	0.4	113.691	0.822

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
237.338	112.6	0.4	113.713	1.113
237.437	112.5	0.4	113.765	1.265
237.537	112.3	0.4	113.817	1.517
237.636	112.7	0.4	113.869	1.169
237.736	112.56	0.4	113.921	1.361
237.787	112.839	0.4	113.948	1.109
237.83	112.938	0.4	113.970	1.032
237.919	113.2	0.4	114.016	0.816
238.006	113.135	0.4	114.062	0.927
238.096	113.234	0.4	114.109	0.875
238.185	113.4	0.4	114.155	0.755
238.275	113.432	0.4	114.202	0.770
238.364	113.53	0.4	114.249	0.719
238.494	113.6	0.4	114.316	0.716
238.601	113.728	0.4	114.372	0.644
238.716	113.827	0.4	114.432	0.605
238.811	113.827	0.4	114.482	0.655
238.901	114.123	0.5	114.529	0.406
239.022	114.4	0.5	114.592	0.192
239.132	114.4	0.5	114.649	0.249
239.272	114.321	0.5	114.722	0.401
239.388	114.419	0.5	114.783	0.364
239.449	114.6	0.5	114.814	0.214
239.549	114.617	0.5	114.867	0.250
239.65	114.716	0.5	114.919	0.203
239.75	114.26	0.5	114.971	0.711
239.85	114.913	0.5	115.024	0.111
240	115.012	0.5	115.102	0.090
240.09	115.5	0.6	115.149	0.000
240.141	115.6	0.6	115.175	0.000
240.244	115.6	0.6	115.229	0.000
240.369	115.6	0.6	115.294	0.000
240.509	115.7	0.6	115.367	0.000
240.648	115.704	0.6	115.440	0.000
240.748	115.802	0.6	115.492	0.000
240.834	116	0.6	115.537	0.000
240.885	116.198	0.6	115.563	0.000
240.99	116.198	0.6	115.618	0.000
241.095	116.198	0.6	115.673	0.000
241.24	116.2	0.6	115.749	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
241.347	116.395	0.7	115.804	0.000
241.446	116.494	0.7	115.856	0.000
241.495	116.5	0.7	115.882	0.000
241.604	116.5	0.7	115.938	0.000
241.708	116.5	0.7	115.993	0.000
241.852	116.691	0.7	116.068	0.000
242	114.3	0.7	116.145	1.845
242.116	114.9	0.7	116.206	1.306
242.229	114.9	0.7	116.264	1.364
242.354	114.9	0.7	116.330	1.430
242.485	113.519	0.7	116.398	2.879
242.605	114.5	0.7	116.461	1.961
242.717	115.6	0.8	116.519	0.919
242.761	115.9	0.8	116.542	0.642
242.861	116.659	0.8	116.594	0.000
242.961	116.4	0.6	116.646	0.246
243.015	116.2	0.5	116.674	0.474
243.061	116.3	0.5	116.698	0.398
243.158	116.4	0.5	116.749	0.349
243.257	116.609	0.5	116.801	0.192
243.314	116.26	0.5	116.830	0.570
243.354	116.45	0.5	116.851	0.401
243.453	117	0.5	116.903	0.000
243.553	117.25	0.6	116.955	0.000
243.653	117.099	0.6	117.007	0.000
243.704	117.1	0.7	117.034	0.000
243.753	117.25	0.7	117.059	0.000
243.849	117.36	0.7	117.109	0.000
243.943	117.099	0.7	117.158	0.059
244.038	117.1	0.6	117.208	0.108
244.086	116.9	0.6	117.233	0.333
244.118	116.5	0.6	117.250	0.750
244.217	116.8	0.6	117.301	0.501
244.316	116.7	0.7	117.353	0.653
244.367	117.089	0.7	117.380	0.291
244.415	117.1	0.7	117.405	0.305
244.514	117.2	0.8	117.456	0.256
244.612	117.4	0.8	117.507	0.107
244.712	117.1	0.8	117.560	0.460
244.81	117.029	0.8	117.611	0.582

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
244.851	117.1	0.8	117.632	0.532
244.904	117.1	0.7	117.660	0.560
244.995	117.2	0.6	117.707	0.507
245.086	117.1	0.6	117.755	0.655
245.177	117.089	0.6	117.802	0.713
245.21	117.2	0.6	117.819	0.619
245.27	117.1	0.6	117.851	0.751
245.37	117.2	0.6	117.903	0.703
245.47	117.15	0.6	117.955	0.805
245.58	117.229	0.6	118.012	0.783
245.627	117.4	0.7	118.037	0.637
245.68	117.25	0.6	118.064	0.814
245.778	117.6	0.6	118.116	0.516
245.876	117.9	0.6	118.167	0.267
245.974	118.2	0.5	118.218	0.018
246.025	118.529	0.5	118.244	0.000
246.072	118.2	0.5	118.269	0.069
246.178	118.3	0.5	118.324	0.024
246.278	118.6	0.5	118.376	0.000
246.342	118.4	0.5	118.410	0.010
246.442	118.2	0.5	118.462	0.262
246.486	118.599	0.5	118.485	0.000
246.533	118.7	0.5	118.509	0.000
246.566	118.6	0.5	118.527	0.000
246.665	118.4	0.5	118.578	0.178
246.74	118.8	0.5	118.617	0.000
246.787	118.9	0.5	118.642	0.000
246.835	119	0.5	118.667	0.000
246.882	119.1	0.6	118.691	0.000
246.982	119.219	0.6	118.744	0.000
247.04	119.2	0.6	118.774	0.000
247.139	119.1	0.6	118.825	0.000
247.238	119.23	0.6	118.877	0.000
247.321	119.3	0.7	118.920	0.000
247.41	119.219	0.7	118.967	0.000
247.457	119.2	0.7	118.991	0.000
247.5	119.5	0.7	119.014	0.000
247.568	119.6	0.7	119.049	0.000
247.635	120.5	0.7	119.084	0.000
247.703	120.539	0.7	119.120	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
247.722	120.1	0.7	119.130	0.000
247.755	120.5	0.7	119.147	0.000
247.849	120.3	0.7	119.196	0.000
247.944	120.539	0.7	119.245	0.000
248.039	120.1	0.7	119.295	0.000
248.09	119.8	0.8	119.321	0.000
248.135	119.6	0.8	119.345	0.000
248.224	119.3	0.8	119.391	0.091
248.321	118.979	0.8	119.442	0.463
248.374	119.2	0.8	119.470	0.270
248.418	119.3	0.8	119.493	0.193
248.509	119.5	0.7	119.540	0.040
248.608	119.9	0.7	119.592	0.000
248.708	120.499	0.6	119.644	0.000
248.749	120.3	0.6	119.665	0.000
248.802	120.4	0.6	119.693	0.000
248.913	120.1	0.6	119.751	0.000
249.01	120.4	0.5	119.801	0.000
249.108	120.499	0.5	119.852	0.000
249.159	120.3	0.5	119.879	0.000
249.208	120.5	0.5	119.905	0.000
249.308	120.3	0.5	119.957	0.000
249.433	120.4	0.5	120.022	0.000
249.477	120.409	0.5	120.045	0.000
249.548	120.499	0.5	120.082	0.000
249.612	120.5	0.5	120.115	0.000
249.755	120.3	0.6	120.190	0.000
249.859	120.4	0.6	120.244	0.000
249.962	120.5	0.6	120.298	0.000
250.007	120.409	0.6	120.321	0.000
250.055	120.1	0.6	120.346	0.246
250.15	120.3	0.6	120.396	0.096
250.245	120.3	0.6	120.446	0.146
250.343	120.4	0.6	120.497	0.097
250.4	120.219	0.6	120.526	0.307
250.443	120.3	0.5	120.549	0.249
250.54	120.5	0.5	120.599	0.099
250.639	120.4	0.5	120.651	0.251
250.736	120.3	0.5	120.702	0.402
250.865	120.5	0.5	120.769	0.269

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
250.962	120.3	0.5	120.819	0.519
251.011	120.369	0.5	120.845	0.476
251.061	120.2	0.6	120.871	0.671
251.16	120.3	0.6	120.923	0.623
251.259	120.3	0.6	120.974	0.674
251.359	120.4	0.7	121.027	0.627
251.458	120.1	0.8	121.078	0.978
251.557	119.8	0.8	121.130	1.330
251.614	119.929	0.7	121.160	1.231
251.642	119.6	0.7	121.174	1.574
251.742	120.1	0.7	121.226	1.126
251.841	120.5	0.7	121.278	0.778
251.941	120.5	0.7	121.330	0.830
251.993	120.129	0.7	121.357	1.228
252.041	120.3	0.7	121.382	1.082
252.14	120.6	0.8	121.434	0.834
252.239	120.4	0.8	121.486	1.086
252.338	120.7	0.8	121.537	0.837
252.383	120.799	0.8	121.561	0.762
252.396	120.4	0.8	121.567	1.167
252.496	120.5	0.8	121.620	1.120
252.596	120.3	0.8	121.672	1.372
252.696	120.4	0.7	121.724	1.324
252.736	120.389	0.7	121.745	1.356
252.78	120.5	0.6	121.768	1.268
252.88	120.6	0.6	121.820	1.220
252.932	120.649	0.6	121.847	1.198
252.979	120.1	0.6	121.872	1.772
253.04	120.5	0.6	121.903	1.403
253.102	120.3	0.6	121.936	1.636
253.202	120.4	0.6	121.988	1.588
253.252	120.649	0.6	122.014	1.365
253.302	120.9	0.6	122.040	1.140
253.345	120.6	0.7	122.043	1.443
253.423	121.1	0.7	122.090	0.990
253.476	121.419	0.8	122.122	0.703
253.519	122.3	0.8	122.148	0.000
253.541	122.429	0.8	122.161	0.000
253.593	122.5	0.8	122.192	0.000
253.645	122.3	0.7	122.223	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
253.738	122.5	0.7	122.279	0.000
253.828	122.6	0.7	122.333	0.000
253.879	122.629	0.7	122.364	0.000
253.916	122.45	0.7	122.386	0.000
254.016	122.3	0.7	122.446	0.146
254.105	122.3	0.7	122.500	0.200
254.205	122.4	0.7	122.560	0.160
254.305	122.3	0.7	122.620	0.320
254.343	122.349	0.7	122.643	0.294
254.387	122.4	0.7	122.669	0.269
254.479	122.3	0.7	122.725	0.425
254.571	122.9	0.7	122.780	0.000
254.666	123.2	0.7	122.837	0.000
254.72	123.849	0.7	122.870	0.000
254.766	123.6	0.7	122.897	0.000
254.868	123.5	0.7	122.959	0.000
254.968	123.4	0.7	123.019	0.000
255.067	123.8	0.7	123.078	0.000
255.165	123.4	0.7	123.137	0.000
255.194	123.589	0.7	123.155	0.000
255.264	123.6	0.6	123.197	0.000
255.363	123.5	0.6	123.256	0.000
255.462	123.6	0.7	123.316	0.000
255.56	123.8	0.7	123.375	0.000
255.647	123.669	0.5	123.427	0.000
255.659	123.4	0.6	123.434	0.034
255.761	123.5	0.7	123.495	0.000
255.86	123.4	0.7	123.555	0.155
255.959	123.6	0.8	123.614	0.014
256.037	123.8	0.8	123.661	0.000
256.091	123.629	0.8	123.694	0.065
256.137	123.4	0.9	123.721	0.321
256.236	123.6	1	123.781	0.181
256.336	123.4	1	123.841	0.441
256.428	123.1	1	123.896	0.796
256.511	123.4	1.1	123.946	0.546
256.566	123	1.2	123.979	0.979
256.582	123.199	1.2	123.989	0.790
256.604	123.4	1.1	124.002	0.602
256.671	123.6	1	124.043	0.443

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
256.677	123.629	0.9	124.046	0.417
256.747	123.5	0.9	124.088	0.588
256.834	123.6	0.9	124.140	0.540
256.938	123.4	0.9	124.203	0.803
257.035	123.7	0.9	124.261	0.561
257.125	123.7	0.9	124.315	0.615
257.218	123.8	0.9	124.371	0.571
257.262	123.839	0.8	124.398	0.559
257.319	123.7	0.8	124.432	0.732
257.396	123.6	0.8	124.478	0.878
257.5	123.4	0.8	124.541	1.141
257.604	123.8	0.8	124.603	0.803
257.709	123.5	0.8	124.667	1.167
257.773	123.789	0.8	124.705	0.916
257.809	123.6	0.8	124.727	1.127
257.909	123.5	0.8	124.787	1.287
258.005	123.7	0.8	124.844	1.144
258.105	123.6	0.8	124.905	1.305
258.162	123.659	0.9	124.939	1.280
258.205	123.6	0.9	124.965	1.365
258.304	123.5	0.9	125.024	1.524
258.398	123.4	0.9	125.081	1.681
258.476	123.6	0.9	125.128	1.528
258.574	123.7	0.9	125.187	1.487
258.673	123.5	0.9	125.246	1.746
258.691	123.649	0.9	125.257	1.608
258.773	123.4	1	125.306	1.906
258.872	123.5	0.9	125.366	1.866
258.972	123.2	0.9	125.426	2.226
259.023	123.3	0.8	125.456	2.156
259.046	124.379	0.8	125.470	1.091
259.122	124.5	0.8	125.516	1.016
259.222	126.2	0.8	125.576	0.000
259.322	127.6	0.8	125.636	0.000
259.422	128	0.8	125.696	0.000
259.476	128.949	0.8	125.729	0.000
259.52	127.2	0.7	125.755	0.000
259.599	126.9	0.7	125.803	0.000
259.698	126.1	0.7	125.862	0.000
259.797	126	0.6	125.922	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
259.896	125.6	0.6	125.981	0.381
259.996	125	0.5	126.041	1.041
260.01	124.119	0.5	126.050	1.931
260.096	124.1	0.5	126.102	2.002
260.196	124.3	0.5	126.162	1.862
260.291	124.6	0.5	126.219	1.619
260.387	124.5	0.5	126.276	1.776
260.433	124.139	0.5	126.304	2.165
260.486	125.2	0.5	126.336	1.136
260.585	125.4	0.5	126.395	0.995
260.684	125.9	0.5	126.455	0.555
260.778	126	0.8	126.512	0.512
260.878	126.2	0.8	126.572	0.372
260.943	126.399	0.9	126.611	0.212
260.977	126.3	1	126.631	0.331
261.077	126.5	1.2	126.691	0.191
261.177	126.4	1.2	126.751	0.351
261.276	126.1	1.3	126.811	0.711
261.375	126.2	1.3	126.870	0.670
261.446	126.129	1.5	126.913	0.784
261.473	126.2	1.4	126.929	0.729
261.581	126.3	1.4	126.994	0.694
261.68	126.8	1.3	127.054	0.254
261.803	126.5	1.2	127.128	0.628
261.902	126.9	1.2	127.187	0.287
262.001	127	1.1	127.247	0.247
262.089	127.2	1.2	127.300	0.100
262.143	127.089	1.2	127.332	0.243
262.19	126.9	1.2	127.360	0.460
262.263	126.8	1.2	127.404	0.604
262.358	126.3	1.2	127.461	1.161
262.414	126.4	1.2	127.495	1.095
262.489	126.3	1.2	127.540	1.240
262.531	126.5	1.2	127.565	1.065
262.605	127	1.2	127.610	0.610
262.625	127.6	1.2	127.622	0.022
262.635	127.009	1.3	127.628	0.619
262.646	127.5	1.4	127.635	0.135
262.651	127.6	1.4	127.638	0.038
262.655	127.4	1.5	127.640	0.240

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
262.666	128.5	1.5	127.647	0.000
262.674	128.409	1.5	127.651	0.000
262.686	128.059	1.4	127.659	0.000
262.695	129.519	1.2	127.664	0.000
262.711	128.869	1.4	127.674	0.000
262.756	128.5	1.3	127.701	0.000
262.854	128.3	1.3	127.760	0.000
262.931	128.5	1.3	127.806	0.000
263.024	128.9	1.3	127.862	0.000
263.076	128.969	1.3	127.893	0.000
263.12	128.7	1.2	127.919	0.000
263.22	128.3	1.2	127.980	0.000
263.32	128.6	1.2	128.040	0.000
263.42	128.7	1.2	128.100	0.000
263.469	128.979	1.2	128.129	0.000
263.519	128.7	1.3	128.159	0.000
263.624	128.6	1.4	128.222	0.000
263.722	127.9	1.4	128.281	0.381
263.821	128.5	1.4	128.341	0.000
263.92	128.6	1.5	128.400	0.000
263.97	128.989	1.5	128.430	0.000
264.018	128.5	1.4	128.459	0.000
264.109	128.6	1.4	128.514	0.000
264.206	128.4	1.4	128.572	0.172
264.303	128.9	1.3	128.631	0.000
264.357	129.049	1.3	128.663	0.000
264.402	129.1	1.3	128.690	0.000
264.502	129.2	1.3	128.750	0.000
264.601	129.4	1.3	128.810	0.000
264.701	129.1	1.3	128.870	0.000
264.753	129.049	1.2	128.901	0.000
264.829	128.9	1.2	128.947	0.047
264.929	128.6	1.2	129.007	0.407
265.029	128.9	1.2	129.067	0.167
265.088	128.979	1	129.103	0.124
265.129	127.9	1	129.127	1.227
265.222	126.5	1	129.183	2.683
265.334	126.2	1	129.250	3.050
265.441	126	1	129.315	3.315
265.491	125.989	0.9	129.345	3.356

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
265.594	126.1	0.9	129.407	3.307
265.71	126.2	0.9	129.477	3.277
265.809	126.4	0.9	129.536	3.136
265.908	126.3	0.9	129.596	3.296
265.937	126.329	0.8	129.613	3.284
266.006	127.5	0.8	129.654	2.154
266.106	127.9	0.8	129.715	1.815
266.206	128.6	0.8	129.775	1.175
266.306	129.7	0.8	129.835	0.135
266.368	130.919	0.8	129.872	0.000
266.403	130.45	0.8	129.893	0.000
266.526	130.4	0.8	129.967	0.000
266.625	130.2	0.8	130.027	0.000
266.754	130.6	0.8	130.104	0.000
266.878	130.1	0.8	130.179	0.079
266.93	130.059	0.7	130.210	0.151
266.978	130.5	0.7	130.239	0.000
267.078	129.2	0.7	130.299	1.099
267.178	129.8	0.7	130.359	0.559
267.278	129.7	0.7	130.419	0.719
267.376	129.6	0.7	130.478	0.878
267.4	129.799	0.7	130.492	0.693
267.478	129.6	0.7	130.539	0.939
267.57	129.8	0.7	130.595	0.795
267.662	130.1	0.7	130.650	0.550
267.716	130.789	0.8	130.682	0.000
267.76	130.4	0.8	130.698	0.298
267.86	130.8	0.8	130.734	0.000
267.959	130.4	0.8	130.769	0.369
268.014	130.589	0.8	130.789	0.200
268.059	130.2	0.8	130.805	0.605
268.172	129.8	0.8	130.846	1.046
268.272	129.6	0.8	130.881	1.281
268.372	129.3	0.8	130.917	1.617
268.471	128	0.8	130.953	2.953
268.516	128.759	0.6	130.969	2.210
268.568	128.9	0.6	130.987	2.087
268.684	128.6	0.6	131.029	2.429
268.789	129	0.6	131.066	2.066
268.888	129.5	0.6	131.102	1.602

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
268.988	129.4	0.6	131.138	1.738
269.088	129.8	0.6	131.173	1.373
269.146	129.759	0.6	131.194	1.435
269.187	129.6	0.7	131.209	1.609
269.287	129.7	0.7	131.245	1.545
269.382	129.5	0.7	131.279	1.779
269.471	130.5	0.7	131.311	0.811
269.518	130.789	0.6	131.327	0.538
269.571	130.9	0.7	131.346	0.446
269.671	130.8	0.8	131.382	0.582
269.746	131.4	0.8	131.409	0.009
269.797	131.169	0.8	131.427	0.258
269.846	130.5	0.8	131.445	0.945
269.945	130.9	0.8	131.480	0.580
270.009	129.4	0.8	131.503	2.103
270.109	128	0.8	131.539	3.539
270.18	128.4	0.8	131.564	3.164
270.209	128.089	0.8	131.575	3.486
270.262	128.5	0.8	131.594	3.094
270.358	128.9	0.8	131.628	2.728
270.455	129.6	0.8	131.663	2.063
270.492	130.709	0.8	131.676	0.967
270.542	131.5	0.8	131.694	0.194
270.642	132.2	0.8	131.730	0.000
270.742	133.6	0.8	131.765	0.000
270.84	134	0.8	131.801	0.000
270.883	134.269	0.8	131.816	0.000
270.937	134.1	0.8	131.835	0.000
271.034	134.2	0.8	131.870	0.000
271.129	134.6	0.8	131.904	0.000
271.225	134	0.8	131.938	0.000
271.235	134.209	0.8	131.942	0.000
271.321	133.5	0.8	131.973	0.000
271.417	132.4	0.8	132.007	0.000
271.523	132.1	0.8	132.045	0.000
271.622	130	0.8	132.080	2.080
271.663	130.739	0.8	132.095	1.356
271.722	130.2	0.8	132.116	1.916
271.825	130.5	0.8	132.153	1.653
271.924	130.6	0.8	132.188	1.588

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
272.024	130.6	0.8	132.224	1.624
272.124	130.2	0.8	132.260	2.060
272.175	130.769	0.9	132.278	1.509
272.216	130.8	0.9	132.293	1.493
272.308	130.4	0.9	132.326	1.926
272.404	130.5	0.9	132.360	1.860
272.5	130.7	0.9	132.395	1.695
272.596	130.9	0.9	132.429	1.529
272.691	131	0.9	132.463	1.463
272.802	131.2	0.9	132.503	1.303
272.9	131.4	0.9	132.538	1.138
272.935	131.369	1	132.550	1.181
273.045	131.4	0.9	132.590	1.190
273.135	132	0.9	132.622	0.622
273.225	131.6	0.8	132.654	1.054
273.316	131.4	0.8	132.687	1.287
273.406	131.6	0.8	132.719	1.119
273.492	131.7	0.8	132.750	1.050
273.538	131.689	0.8	132.766	1.077
273.584	131.2	0.8	132.783	1.583
273.678	131.5	0.8	132.816	1.316
273.772	131.6	0.8	132.850	1.250
273.866	131.8	0.8	132.883	1.083
273.959	131.6	0.8	132.917	1.317
274.053	131.2	0.8	132.950	1.750
274.122	131.589	0.8	132.975	1.386
274.166	131.4	0.8	132.991	1.591
274.264	131.2	0.8	133.026	1.826
274.362	131.5	0.8	133.061	1.561
274.46	131.5	0.8	133.096	1.596
274.558	131.6	0.8	133.131	1.531
274.656	131.8	0.8	133.166	1.366
274.73	131.609	0.9	133.193	1.584
274.776	131.7	0.9	133.209	1.509
274.876	131.6	0.9	133.245	1.645
274.976	131.5	0.9	133.281	1.781
275.076	131.9	0.9	133.317	1.417
275.126	132.039	1	133.334	1.295
275.176	132.5	1	133.352	0.852
275.298	132.4	1	133.396	0.996

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
275.398	132.6	1	133.432	0.832
275.498	132.7	1	133.468	0.768
275.597	132.2	1	133.503	1.303
275.655	132.049	1	133.524	1.475
275.712	132.1	1.4	133.544	1.444
275.812	132.2	1.3	133.580	1.380
275.865	132.249	1.5	133.599	1.350
275.909	132	1.6	133.615	1.615
276.004	131.5	1.6	133.649	2.149
276.098	131.6	1.6	133.682	2.082
276.192	131.4	1.6	133.716	2.316
276.233	131.769	1.6	133.731	1.962
276.282	131.8	1.3	133.748	1.948
276.404	131.6	1.3	133.792	2.192
276.517	131.9	1.3	133.832	1.932
276.572	132.029	1.3	133.852	1.823
276.616	132.4	1.2	133.868	1.468
276.716	132.5	1.2	133.903	1.403
276.816	132.6	1.2	133.939	1.339
276.932	132.8	1.2	133.981	1.181
276.991	133.769	1.2	134.002	0.233
277.032	133.45	1	134.017	0.567
277.131	133.56	1	134.052	0.492
277.231	133.8	1	134.088	0.288
277.338	133.9	1	134.126	0.226
277.389	133.669	1	134.144	0.475
277.438	133.7	0.9	134.162	0.462
277.527	133.8	0.9	134.194	0.394
277.627	133.5	0.9	134.229	0.729
277.724	133.6	0.9	134.264	0.664
277.824	133.9	0.9	134.300	0.400
277.824	133.9	0.9	134.5	0.600
277.88	133.519	0.9	134.523	1.004
277.905	133.5	0.8	134.533	1.033
277.994	133.6	0.8	134.569	0.969
278.093	133.8	0.8	134.609	0.809
278.193	133.9	0.8	134.649	0.749
278.293	134	0.8	134.689	0.689
278.335	134.189	0.8	134.706	0.517
278.384	133.5	1	134.726	1.226

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
278.484	133.6	1	134.766	1.166
278.584	133.4	1	134.807	1.407
278.684	133.6	1	134.847	1.247
278.736	133.749	1	134.868	1.119
278.785	133.2	1	134.888	1.688
278.884	133.5	1	134.928	1.428
278.984	133.6	1	134.968	1.368
279.084	133.4	1	135.009	1.609
279.182	133.2	1	135.048	1.848
279.233	133.749	1	135.069	1.320
279.286	133.5	1	135.090	1.590
279.385	133.4	1	135.130	1.730
279.483	133.7	1.1	135.170	1.470
279.564	133.6	1.1	135.202	1.602
279.619	133.829	0.9	135.224	1.395
279.664	133.9	0.9	135.243	1.343
279.72	133.939	0.9	135.265	1.326
279.758	133.25	0.8	135.281	2.031
279.839	133.54	0.8	135.313	1.773
279.933	134.5	0.8	135.351	0.851
280.027	135	0.7	135.389	0.389
280.085	135.819	0.7	135.413	0.000
280.136	135.8	0.7	135.433	0.000
280.235	135.6	0.7	135.473	0.000
280.334	135.4	0.7	135.513	0.113
280.433	135.2	0.7	135.553	0.353
280.47	135.819	0.7	135.568	0.000
280.558	135.6	0.7	135.603	0.003
280.656	135.2	0.7	135.643	0.443
280.754	134.9	0.7	135.683	0.783
280.869	134.7	0.7	135.729	1.029
280.925	134.699	0.8	135.752	1.053
280.976	135	0.8	135.772	0.772
281.049	135.6	0.8	135.802	0.202
281.147	135.8	0.8	135.841	0.041
281.195	136.099	0.8	135.860	0.000
281.245	136.2	0.8	135.881	0.000
281.343	136.4	0.8	135.920	0.000
281.441	133.3	0.8	135.960	2.660
281.498	136.079	0.8	135.983	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
281.537	136.5	0.8	135.999	0.000
281.635	136.2	0.8	136.038	0.000
281.732	136.1	0.8	136.077	0.000
281.77	136.079	0.9	136.093	0.014
281.819	135.9	0.9	136.112	0.212
281.919	135.5	0.9	136.153	0.653
282.018	135.6	0.9	136.193	0.593
282.079	135.65	0.9	136.217	0.567
282.118	135.2	1	136.233	1.033
282.218	134.8	1	136.273	1.473
282.318	134.5	1	136.314	1.814
282.373	134.62	1	136.336	1.716
282.417	135.5	1	136.354	0.854
282.52	135.4	1	136.395	0.995
282.617	134.6	1	136.434	1.834
282.678	134.58	0.9	136.459	1.879
282.716	134.8	0.9	136.474	1.674
282.815	134.9	0.9	136.514	1.614
282.915	135	0.9	136.555	1.555
283.015	135.5	0.9	136.595	1.095
283.067	135.93	0.9	136.616	0.686
283.115	135.8	0.9	136.635	0.835
283.214	135.7	0.9	136.675	0.975
283.274	135.63	0.8	136.700	1.070
283.314	135.7	0.7	136.716	1.016
283.414	135.6	0.7	136.756	1.156
283.514	135.6	0.7	136.796	1.196
283.614	135.4	0.7	136.837	1.437
283.648	135.23	0.7	136.850	1.620
283.671	135.19	0.8	136.860	1.670
283.714	135.2	0.9	136.877	1.677
283.812	135.1	0.9	136.917	1.817
283.91	135.4	0.9	136.956	1.556
284.009	135.2	0.9	136.996	1.796
284.066	135.18	0.9	137.019	1.839
284.111	135.4	1	137.037	1.637
284.211	135.6	1.1	137.078	1.478
284.311	135.4	1.2	137.118	1.718
284.427	135.1	1.2	137.165	2.065
284.481	135.09	1.2	137.187	2.097

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
284.526	135.4	1.2	137.205	1.805
284.626	135.6	1.2	137.245	1.645
284.726	135.8	1.2	137.286	1.486
284.826	135.7	1.2	137.326	1.626
284.926	136	1.2	137.366	1.366
284.976	136.39	1.2	137.386	0.996
285.03	136.2	1.2	137.408	1.208
285.13	136.4	1.2	137.449	1.049
285.229	136.8	1.2	137.489	0.689
285.328	136.7	1.2	137.529	0.829
285.382	136.37	1.1	137.550	1.180
285.428	136.4	1.1	137.569	1.169
285.528	136.6	1.1	137.609	1.009
285.628	136.5	1.1	137.650	1.150
285.728	136.2	1.1	137.690	1.490
285.828	136.3	1.1	137.730	1.430
285.893	136.4	1.1	137.757	1.357
285.908	136.36	1.1	137.763	1.403
285.927	140.52	1.2	137.770	0.000
285.946	136.4	1	137.778	1.378
285.982	136.2	0.9	137.792	1.592
286.055	136.5	0.9	137.822	1.322
286.146	136.5	0.8	137.859	1.359
286.243	136.2	0.8	137.898	1.698
286.287	136.88	0.8	137.916	1.036
286.343	136.8	0.8	137.938	1.138
286.436	136.7	0.8	137.976	1.276
286.489	136.88	0.8	137.997	1.117
286.536	136.5	0.9	138.016	1.516
286.644	136.4	0.9	138.060	1.660
286.744	136.4	1	138.100	1.700
286.82	136.81	1.1	138.131	1.321
286.866	136.5	1	138.149	1.649
286.966	136.4	1	138.190	1.790
287.066	136.4	1	138.230	1.830
287.121	138.88	1	138.252	0.000
287.161	137.5	0.9	138.268	0.768
287.261	137.9	0.9	138.309	0.409
287.355	138	0.8	138.347	0.347
287.384	138.78	0.8	138.358	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
287.449	137	0.8	138.385	1.385
287.551	137.8	0.8	138.426	0.626
287.677	137.6	0.8	138.477	0.877
287.801	137.4	0.8	138.527	1.127
287.902	136.8	0.8	138.567	1.767
287.936	136.06	0.8	138.581	2.521
288.012	136	0.9	138.612	2.612
288.093	136.2	0.9	138.644	2.444
288.193	136.2	0.9	138.685	2.485
288.292	136.4	0.9	138.725	2.325
288.391	136.2	0.9	138.765	2.565
288.45	136	0.9	138.789	2.789
288.497	136.1	0.9	138.807	2.707
288.597	136.1	0.9	138.848	2.748
288.697	136.2	0.9	138.888	2.688
288.759	136	0.9	138.913	2.913
288.797	137.1	0.8	138.929	1.829
288.886	137.8	0.8	138.964	1.164
288.974	138.5	0.8	139.000	0.500
289.022	139.01	0.8	139.019	0.009
289.022	139.01	0.8	143.000	3.990
289.066	139.4	0.9	143.004	3.604
289.157	139.6	0.9	143.014	3.414
289.269	140.2	0.9	143.025	2.825
289.364	140.3	1	143.034	2.734
289.502	140.6	1	143.048	2.448
289.683	141.2	1.1	143.066	1.866
289.781	141.9	1.2	143.076	1.176
289.874	142.5	1.2	143.085	0.585
289.916	142.88	1.2	143.089	0.209
289.976	143.5	1.2	143.095	0.000
290.077	143.2	1.2	143.106	0.000
290.21	143.6	1.2	143.119	0.000
290.246	143.32	1.3	143.122	0.000
290.283	143.2	1.3	143.126	0.000
290.383	143.1	1.3	143.136	0.036
290.5	142.8	1.3	143.148	0.348
290.605	142.6	1.3	143.158	0.558
290.711	142.7	1.3	143.169	0.469
290.759	142.73	1.3	143.174	0.444

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
290.815	142.6	1.2	143.179	0.579
290.918	142.4	1.2	143.190	0.790
291.007	142.3	1.2	143.199	0.898
291.112	142.5	1.2	143.209	0.709
291.227	142.3	1.2	143.221	0.920
291.27	142.51	1.2	143.225	0.715
291.328	142.5	1.2	143.231	0.731
291.427	142.6	1.2	143.241	0.641
291.484	142.51	1.2	143.246	0.736
291.507	142.5	1.1	143.249	0.749
291.607	142.3	1	143.259	0.958
291.661	141.9	1	143.264	1.364
291.732	141.46	1	143.271	1.811
291.757	141.6	1	143.274	1.674
291.811	141.5	1	143.279	1.779
291.908	142	1	143.289	1.289
291.977	142.3	1	143.296	0.995
292.027	142.61	0.9	143.301	0.690
292.07	142.3	0.9	143.305	1.005
292.162	142.4	0.9	143.314	0.914
292.245	142.5	0.9	143.322	0.822
292.298	142.61	0.9	143.328	0.718
292.337	142.3	0.8	143.332	1.031
292.423	142.6	0.8	143.340	0.740
292.511	142.8	0.8	143.349	0.549
292.557	142.9	0.8	143.354	0.453
292.599	142.2	0.8	143.358	1.158
292.691	141.9	0.8	143.367	1.467
292.764	141.5	0.8	143.374	1.874
292.846	141.7	0.8	143.382	1.682
292.905	141.81	0.8	143.388	1.578
292.928	141.9	0.8	143.391	1.491
292.949	147.59	1	143.393	0.000
292.974	142.5	0.7	143.395	0.895
293.042	143.2	0.7	143.402	0.202
293.135	144.1	0.7	143.411	0.000
293.243	144.6	0.7	143.422	0.000
293.327	144.8	0.7	143.431	0.000
293.383	144.91	0.7	143.436	0.000
293.416	142.6	0.8	143.439	0.839

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
293.51	142.5	0.8	143.449	0.949
293.588	142.1	0.8	143.457	1.357
293.677	141.8	0.8	143.466	1.665
293.749	141.6	0.8	143.473	1.873
293.798	141.59	0.8	143.478	1.888
293.848	141.6	0.9	143.483	1.883
293.895	141.5	0.9	143.487	1.987
294	142	1	143.498	1.498
294.046	142.91	1	143.502	0.592
294.049	142.5	1.1	143.503	1.003
294.113	142.3	1.1	143.509	1.209
294.22	141.9	1.1	143.520	1.620
294.274	141.5	1.1	143.525	2.025
294.362	141.3	1.1	143.534	2.234
294.411	141.18	1.1	143.539	2.359
294.464	141	1.1	143.544	2.544
294.585	141.2	1.1	143.556	2.356
294.729	141.3	1.1	143.571	2.271
294.843	141.2	1.1	143.582	2.382
294.872	141.09	1.1	143.585	2.495
294.923	142.2	1	143.590	1.390
295.051	142.9	1	143.603	0.703
295.142	142.6	1	143.612	1.012
295.228	143.5	1	143.812	0.312
295.289	144.6	1	143.954	0.000
295.349	146.72	1	144.093	0.000
295.416	146.5	1	144.249	0.000
295.537	146.2	1	144.531	0.000
295.634	146.8	1	144.756	0.000
295.691	146.52	1	144.889	0.000
295.732	146	1	144.984	0.000
295.83	145.9	1	145.212	0.000
295.884	145.39	1	145.338	0.000
295.93	145.4	1	145.445	0.045
296.029	146.2	1	145.675	0.000
296.148	147	1	145.951	0.000
296.248	147.6	1	146.184	0.000
296.32	147.2	1	146.351	0.000
296.417	148	1	146.577	0.000
296.478	148.77	1	146.719	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
296.538	148.2	1	146.858	0.000
296.634	147.5	1	147.082	0.000
296.738	145.2	1	147.324	2.124
296.797	146.51	1	147.461	0.951
296.856	147	1.2	147.598	0.598
296.956	147.2	1.3	147.830	0.630
297.085	147.5	1.4	148.130	0.630
297.2	147.9	1.5	148.398	0.498
297.307	148.5	1.6	148.647	0.147
297.415	149.6	1.7	148.898	0.000
297.52	149.5	1.8	149.142	0.000
297.63	150.6	1.9	149.398	0.000
297.713	150.9	2.2	149.591	0.000
297.813	151.6	2.6	149.823	0.000
297.866	152.6	2.9	149.947	0.000
297.922	152.7	3	150.077	0.000
297.965	153	2.9	150.177	0.000
298.065	153.2	2.8	150.409	0.000
298.165	153.9	2.5	150.642	0.000
298.261	153.4	2.5	150.865	0.000
298.361	154.2	2.4	151.098	0.000
298.461	154.3	2.3	151.330	0.000
298.561	154.1	2.1	151.563	0.000
298.619	154.5	2	151.698	0.000
298.654	154.9	2	151.779	0.000
298.744	154.8	2	151.988	0.000
298.844	155.2	2	152.221	0.000
298.898	155.79	2	152.347	0.000
298.945	155.2	2.3	152.456	0.000
299.058	155.3	2.4	152.719	0.000
299.156	155.4	2.5	152.947	0.000
299.279	155.2	2.8	153.233	0.000
299.342	155.43	3	153.379	0.000
299.392	155.2	3	153.495	0.000
299.503	154.3	3	153.754	0.000
299.597	154.5	3	153.972	0.000
299.711	154.36	3	154.237	0.000
299.818	154.6	3	154.486	0.000
299.876	154.59	3	154.621	0.031
299.943	154.9	2.9	154.777	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
300.038	155.3	2.5	154.998	0.000
300.143	156.3	2.2	155.242	0.000
300.222	157.3	2.1	155.426	0.000
300.313	157.8	1.9	155.637	0.000
300.417	159	1.5	155.879	0.000
300.469	160.21	1	156.000	0.000
300.469	160.21	1	157.5	0.000
300.514	159.8	1	157.509	0.000
300.625	158.3	1	157.531	0.000
300.708	158.4	1	157.548	0.000
300.8	157.5	1	157.567	0.067
300.858	157.34	1	157.578	0.238
300.885	157.2	1	157.584	0.384
301	157.1	1	157.607	0.507
301.061	157.3	1	157.619	0.319
301.104	157.32	1	157.628	0.308
301.147	156.2	1	157.637	1.437
301.217	156.4	1	157.651	1.251
301.332	155.8	1	157.674	1.874
301.443	155.2	1	157.696	2.496
301.527	154	1	157.713	3.713
301.616	154.9	1	157.731	2.831
301.736	154.9	1	157.755	2.855
301.858	154.6	1	157.780	3.180
301.885	153.8	1	157.785	3.985
302.018	153.09	1	157.812	4.722
302.144	154.2	1	157.837	3.637
302.286	155.6	1	157.866	2.266
302.417	157	1	157.892	0.892
302.548	158.5	1	157.919	0.000
302.603	160.62	1	157.930	0.000
302.646	159.5	1	157.938	0.000
302.741	158.2	1	157.958	0.000
302.842	157.93	1	157.978	0.048
302.925	157.3	1	157.995	0.695
303.019	157.9	1	158.014	0.114
303.123	158.5	1	158.035	0.000
303.18	158.7	1	158.046	0.000
303.226	157.2	1	158.055	0.855
303.333	156.4	1	158.077	1.677

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
303.406	155.9	1	158.092	2.192
303.514	154.5	1	158.113	3.613
303.615	153.4	1	158.134	4.734
303.709	153.2	1	158.153	4.953
303.803	152.2	1	158.172	5.972
303.899	151.3	1	158.191	6.891
303.933	151.07	1	158.198	7.128
303.995	152.3	1	158.210	5.910
304.084	152.8	1	158.228	5.428
304.174	152.6	1	158.246	5.646
304.263	153.4	1	158.264	4.864
304.353	153.9	1	158.282	4.382
304.442	154	1	158.300	4.300
304.531	154.6	1	158.318	3.718
304.627	154.8	1	158.338	3.538
304.723	155	1	158.357	3.357
304.816	155.6	1	158.376	2.776
304.855	155.95	1	158.383	2.433
304.888	155.46	1	158.390	2.930
304.97	156.2	1	158.407	2.207
305.055	156.1	1	158.424	2.324
305.144	156.4	1	158.442	2.042
305.242	156.3	1	158.461	2.161
305.34	156	1	158.481	2.481
305.424	155.9	1	158.498	2.598
305.524	155.5	1	158.518	3.018
305.624	155.2	1	158.538	3.338
305.724	156.2	1	158.558	2.358
305.761	156.08	1	158.566	2.486
305.82	156.2	1	158.578	2.378
305.92	156.3	1	158.598	2.298
306.019	156.4	1	158.618	2.218
306.119	156.3	1	158.638	2.338
306.225	157	1	158.659	1.659
306.254	157.09	1.2	158.665	1.575
306.325	158.2	1.3	158.680	0.480
306.425	158.8	1.4	158.700	0.000
306.525	159.2	1.5	158.720	0.000
306.568	159.18	1.5	158.728	0.000
306.624	159.1	1.5	158.740	0.000

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
306.723	158.8	1.5	158.760	0.000
306.826	158.4	1.5	158.780	0.380
306.926	158.6	1.5	158.801	0.201
307.029	158.1	1.5	158.821	0.721
307.126	158.5	1.5	158.841	0.341
307.156	158.68	1.5	158.847	0.167
307.219	157.2	1.4	158.860	1.660
307.261	156.88	1.5	158.868	1.988
307.319	156.4	1.5	158.880	2.480
307.425	157.2	1.5	158.901	1.701
307.525	156.8	1.5	158.921	2.121
307.624	156.3	1.5	158.941	2.641
307.649	157.04	1.5	158.946	1.906
307.73	157.2	1.5	158.963	1.763
307.829	157.9	1.5	158.982	1.082
307.921	157.33	1.5	159.001	1.671
307.928	158.2	1.5	159.002	0.802
308.028	158.6	1.5	159.023	0.423
308.13	158.4	1.5	159.043	0.643
308.23	158.6	1.5	159.063	0.463
308.33	159.1	1.5	159.083	0.000
308.358	159.52	1.5	159.089	0.000
308.425	159.2	1.5	159.102	0.000
308.524	159.1	1.5	159.122	0.022
308.624	159	1.5	159.143	0.143
308.724	158.4	1.5	159.163	0.763
308.817	158.6	1.5	159.181	0.581
308.851	158.49	1.5	159.188	0.698
308.901	158	1.6	159.198	1.198
309	157.4	1.7	159.218	1.818
309	157.4	1.7	159.218	1.818
309.064	157.2	1.8	159.231	2.031
309.148	156.8	1.9	159.248	2.448
309.236	156.7	2	159.266	2.566
309.299	156.24	2	159.279	3.039
309.347	157.2	2	159.288	2.088
309.404	158.6	2	159.300	0.700
309.448	158	2	159.309	1.309
309.477	164.69	2	159.314	0.000
309.506	158.4	2	159.320	0.920

Chainage (km) A	River Bed Level w.r.t M.S.L. (m) B	Observed Water Depths (m) C	Adopted C.D. w.r.t. M.S.L. D	Reduced Depth (LAD) E = D - B
309.532	158.2	2	159.325	1.125
309.609	158.35	2	159.341	0.991
309.686	158.29	2	159.356	1.066
309.762	158.27	2	159.372	1.102
309.839	158.3	2	159.387	1.087

Table 18: Topographic survey Water levels (Observed, Reduction factor and Reduced)

Note: Negative (-) ive depths are reduced to zero as per discussion with IWAI officials.

4.6 Observed and reduced bed profile along the river

4.6.1 Observed bed profile along the river

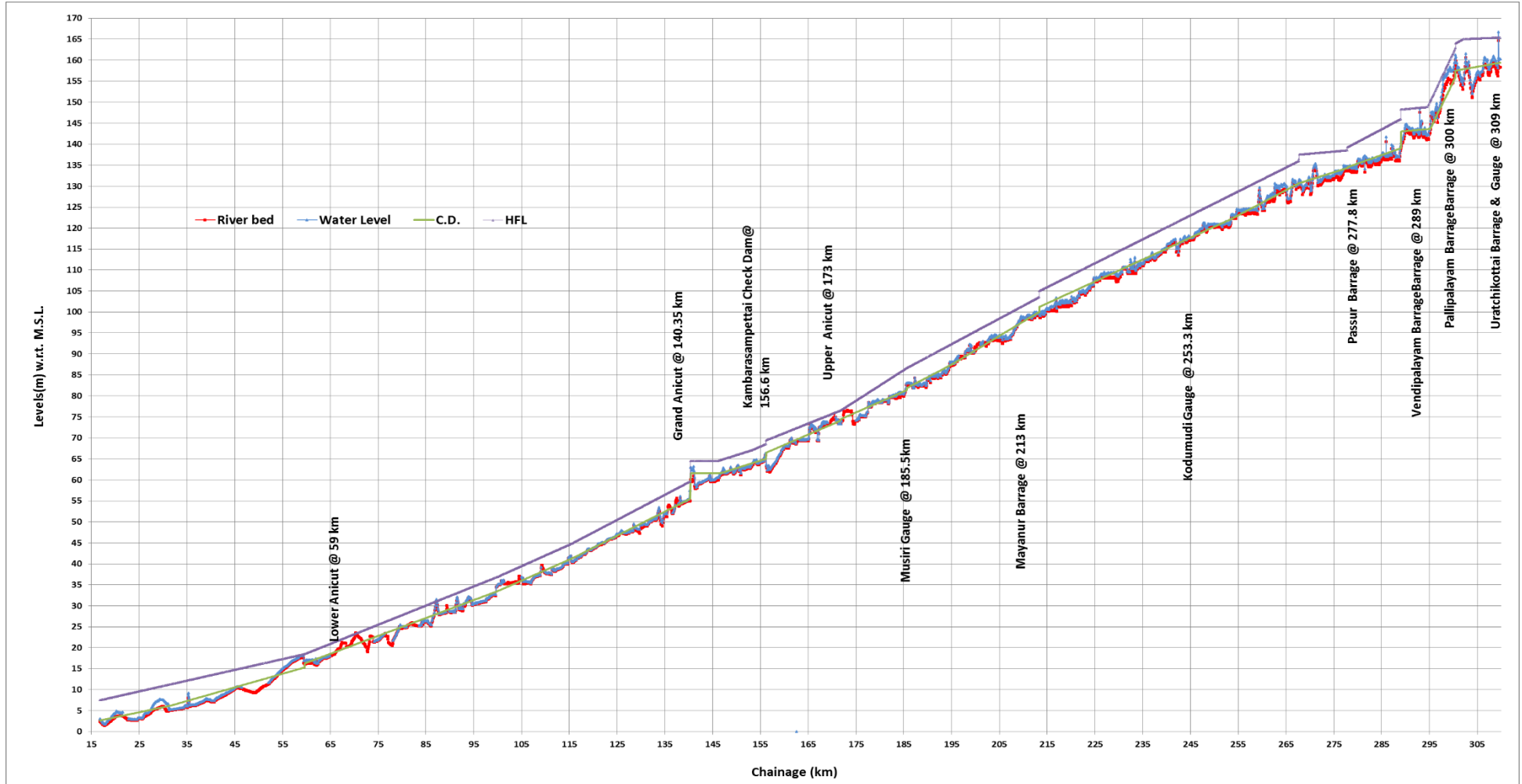


Figure 26: Riverbed profile from the Estuary (CH-16) up to (CH-310)

Surece: Deepest level single line longitudinal survey carried out at site during March-April 2016 and Collected Guage discharge data from CWC. Source Data table is attached as Annexure 5.

4.6.2 Reduced bed profile along the river

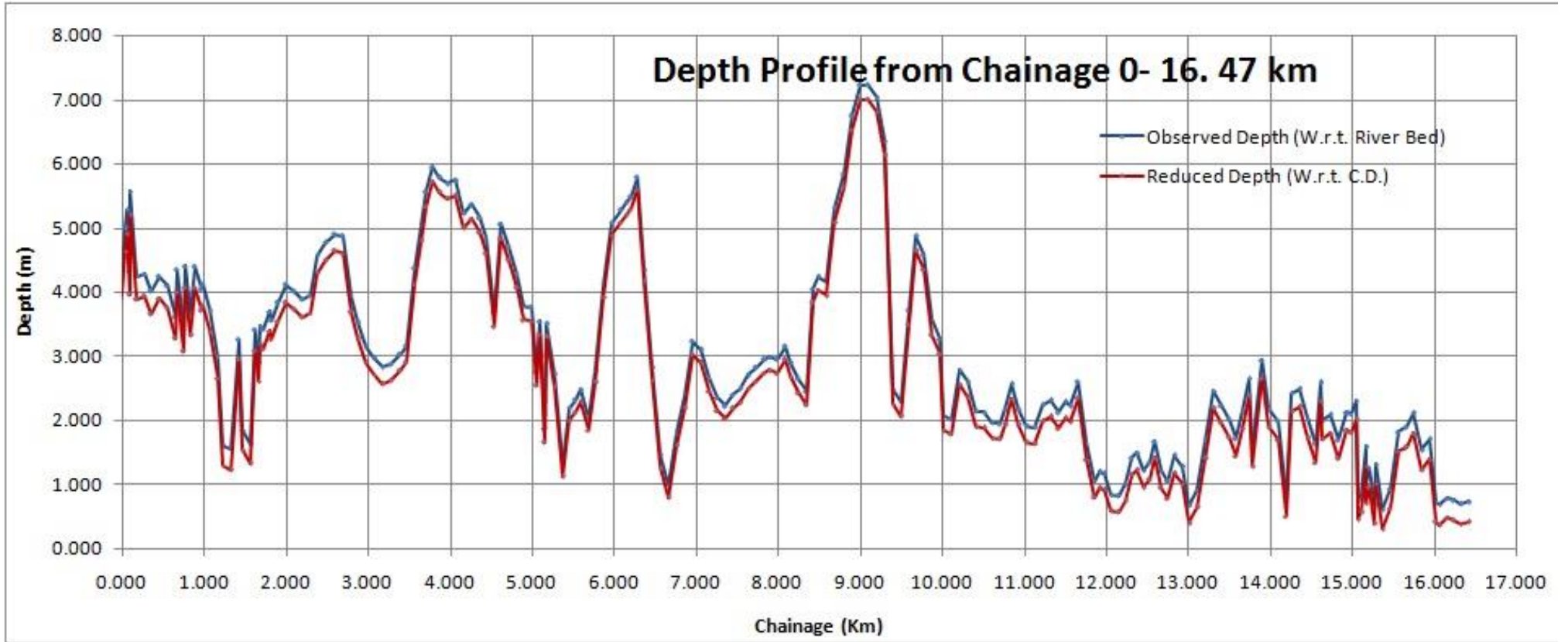


Figure 27: Depth profile from river mouth (CH-0 to CH-16.4), up to the end of tidal influence.

4.7 Results from Hydrographic/Topographic Survey

The surveyed stretches along the Kaveri River have water depth in most portions and only a few localized shallow water patches were observed along the surveyed stretches.

4.8 Soil characteristics

At thirty three (33) locations soil samples were collected and the details of CH vs depth & soil textures are tabulated in **Annexure 3**.

From visual observation, it can be seen that sand was present in riverbed from CH-16.4 to CH-310 (complete stretch). Rocky River bed was found at chainage 230 to 250 km and near Urachikottai and bhawani kattalai barrages near chainage 300-310. However this will be critically identified in stage 2.

Critical areas requiring detailed investigations

Detailed investigations shall be required at proposed ferry locations nearby temples, Existing boating points and Ghats.

4.9 Water characteristics

From visual observation, clear water was found from chainage 0 to 17 km and after 17 km, water mixed with sand was observed up to CH-310.

4.10 Condition of banks

Condition of banks was depicted in inventory of structures (refer **Annexure 1**). Natural banks were observed from chainage 0 to 310 km. The condition of banks was found good. The photographs along the river during Stage-1 survey are also attached at **Annexure 4**.

4.11 Details of collected water level and Discharge data

The details of gauging stations and collected data as detailed in chapter 2 (refer 2.6.3 and 2.6.4):

Name	Chainage	Location	
		Km from River mouth	Lat.
Urachikottai, Dist. Erode, TN	309	11 ⁰ 28' 40" N	77 ⁰ 42' 00" E
Kodumudi, Dist Erode, TN	254	11 ⁰ 04' 52" N	77 ⁰ 53' 25" E
Musiri, Dist Trichi, TN	185.5	10 ⁰ 56' 36" N	78 ⁰ 16' 06" E

Table 19: Location details of gauging stations

The details of Gauge stations, jurisdiction, establishment and data availability are presented in the tables below:

General Details Urachikottai	
Station Name	Urachikottai
Station Code	CC000K5

Operational Status	Existing
Activity	HO
Station Type (Current)	GDSQ
Tehsil/Taluk	Bhavani
District	Erode
State	Tamil Nadu
Latitude (DMS)	11°28'43"N
Longitude (DMS)	77°42'00"E
Altitude (m)	168.00
Distance to Outlet (km)	-
Toposheet No.	58E11
Catchment Area (sq. km)	44100.00

Table 20: Urachikottai GD site- General details

Jurisdiction Details Urachikottai	
Owner Agency	CWC
State/Regional Office	C&S RO, Coimbatore
Circle Office	S.E.(C&SR), Bangalore
Divisional Office	SR Division, Coimbatore
Sub Divisional Office	Middle Cauvery SD, Coimbatore
Section Office	Urachikottai
Nearest Airport	Coimbatore-93 km
Town	Bhavani-5 km
Railway Station	Erode-23 km
Bus Stand	Bhavani
Station Bank	Right
Zero of Gauge (m)	179.00

Table 21: Urachikottai GD site- Jurisdiction details

Establishment Details Urachikottai		
Date of establishment	1/6/1978	
Date of closure	-	
Parameters	Start Date	End Date
Gauge	1/6/1978	
Discharge	1/6/1979	
Sediment	4/1/2001	
Water Quality	1/11/1979	
Rainfall(ORG)	28/12/1991	
Rainfall(SRG)	20/7/2000	
Temperature	6/8/1979	
Wind Velocity	6/8/1979	
Evaporation	1/1/2003	

Humidity	1/10/2003	
Sunshine	10/1/2003	

Table 22: Urachikottai GD site- Establishment details

Data availability Urachikottai		
Parameters	Start Date	End Date
Water Level	1/6/1978	31/5/2012
Discharge	1/6/1979	31/5/2012
Sediment	4/1/2001	31/5/2012
Water Quality	1/6/1979	1/5/2012
Rainfall	29/12/1991	31/5/2008
Temperature	1/6/1978	31/5/2009
Climatic	Not Available	

Table 23: Urachikottai GD site - Data availability

General Details Kodumudi	
Station Name	Kodumudi
Station Code	CC00017
Operational Status	Existing
Activity	HO
Station Type (Current)	GDSQ
Tehsil/Taluk	Erode
District	Erode
State	Tamil Nadu
Latitude (DMS)	11°05'05"N
Longitude (DMS)	77°53'18"E
Altitude (m)	130.00
Distance to Outlet (km)	0
Toposheet No.	58E16
Catchment Area (sq. km)	53233.00

Table 24: Kodumudi GD site- General details

Jurisdiction Details Kodumudi	
Owner Agency	CWC
State/Regional Office	C&S RO, Coimbatore
Circle Office	S.E.(C&SR), Bangalore
Divisional Office	SR Division, Coimbatore
Sub Divisional Office	Lower Cauvery SD, Trichy
Section Office	Kodumudi
Nearest Airport	Trichy 100 km
Town	Erode
Railway Station	Kodumudi 25 km

Bus Stand	Kodumudi
Station Bank	Right
Zero of Gauge (m)	122.00

Table 25: Kodumudi GD site- Jurisdiction details

Establishment Details Kodumudi		
Date of establishment	5/5/1971	
Date of closure	-	
Parameters	Start Date	End Date
Gauge	5/5/1971	
Discharge	21/6/1971	
Sediment	11/7/1972	
Water Quality	1/6/1978	
Rainfall(ORG)	23/4/1976	
Temperature	1/4/1976	
Wind Velocity	1/6/1972	
Evaporation	1/8/2000	

Table 26: Kodumudi GD site- Establishment details

Data availability Kodumudi		
Parameters	Start Date	End Date
Water Level	5/5/1971	31/5/2012
Discharge	21/6/1971	31/5/2012
Sediment	11/7/1972	31/5/2011
Water Quality	1/6/1978	1/5/2012
Rainfall	1/6/1988	31/5/2008
Temperature	1/6/1988	31/5/2009
Climatic	1/6/2002	31/8/2004

Table 27: Kodumudi GD site - Data availability

General Details Musiri	
Station Name	Musiri
Station Code	CC000G4
Operational Status	Existing
Activity	HO
Station Type (Current)	GDSQ
Tehsil/Taluk	Musiri
District	Thiruchirapalli
State	Tamil Nadu
Latitude (DMS)	10°56'40"N
Longitude (DMS)	78°26'01"E
Altitude (m)	89.00

Distance to Outlet (km)	0
Toposheet No.	58J5
Catchment Area (sq. km)	66243.00

Table 28: Musiri GD site- General details

Jurisdiction Details	
Owner Agency	CWC
State/Regional Office	C&S RO, Coimbatore
Circle Office	S.E.(C&SR), Bangalore
Divisional Office	SR Division, Coimbatore
Sub Divisional Office	Lower Cauvery SD, Trichy
Section Office	Musiri
Nearest Airport	Trichy 40 km
Town	Musiri
Railway Station	Kulithali 3 km
Bus Stand	Musiri
Station Bank	Left
Zero of Gauge (m)	82.00

Table 29: Musiri GD site- Jurisdiction details

Establishment Details		
Date of establishment	26/2/1971	
Date of closure	-	
Parameters	Start Date	End Date
Gauge	26/2/1971	
Discharge	1/6/1972	
Sediment	31/3/1973	
Water Quality	1/6/1978	
Rainfall(ORG)	1/9/2000	
Rainfall(SRG)	1/9/2000	
Temperature	1/9/2000	
Wind Velocity	12/9/2000	
Evaporation	11/9/2000	
Humidity	12/9/2000	
Sunshine	12/9/2000	

Table 30: Musiri GD site- Establishment details

Data availability		
Parameters	Start Date	End Date
Water Level	26/2/1971	9/9/2012
Discharge	2/6/1972	9/9/2012
Sediment	31/3/1973	9/9/2012
Water Quality	1/6/1978	1/5/2012
Rainfall	1/8/2000	30/4/2009
Temperature	1/12/1973	31/5/2009

Table 31: Musiri GD site - Data availability

4.12 Methodology for analysis of Gauge- Discharge Data

The gauge-discharge data available for number of years for all gauging stations were analyzed in different ways as given below:

10 Daily average discharges

The ten daily average discharges in each month for each year were worked out and then the average of average 10 daily discharges over the entire period of data were worked out to get idea about availability of 10 daily average discharge during different months of the year. Based on these average 10 daily discharges it will be possible to work out available depth of flow for natural or design cross section of river. These data analysis will be helpful for navigation feasibility in given stretch of river. The outcome from this analysis will also be useful for mathematical model studies (to be carried out in stage II) to predict longitudinal water surface profiles for different discharges along given reach of river and also to design section of navigation channel on river bed.

Maximum minimum discharges and water levels

The yearly maximum discharge and water level for the entire period of data were extracted and then these data were statistically analyzed using Gumbel extreme value distribution to estimate flood discharges for different return periods such as 2,5, 10, 25 ,50 and 100 years. Similarly high flood levels were analyzed. The minimum flow and minimum water level data was also analyzed. The estimated HFLs and Minimum water levels will be useful for planning navigation as well as for design of terminals for cargo and passenger traffic.

Gauge discharge curves

Using available gauge discharge data G-Q curves were developed for each gauge station. These will be helpful to compute water level for any discharge. Also for calibration and validation of mathematical model (studies required in stage II) this data will be very useful.

Comparison of River Cross Section Data:

The river cross sections at gauging stations on different station were available for different years. For a given gauging station the cross sections for different years including the latest cross section were superimposed to study changes in river bed levels and shifting of the deep channel if any over the period of data.

Period of availability for range of discharges

For a navigation channel to be feasible it is necessary that adequate discharge is available to maintain required depth/draft for fairly longer duration during the year. The data for each gauge station was analyzed to find out period of availability for the different range of discharges. Based on past 20 to 30 years of data, % of days in a year for availability of different range of discharges were worked out. These data will be very useful to estimate number of days for which minimum discharge required to facilitate navigation will be available in different rivers.

Discharge- sediment flow data

These data was analyzed to prepare discharge v/s sediment concentration plot for each gauging station. This analysis will be useful to understand sediment concentration in reach for range of discharges.

4.13 Bed Slope

The average bed slopes for Kaveri Kollidam River for the reach under consideration are given in table below:

River	Reach		River Bed Level Change	Distance	Slope
	From	To			
Kaveri Kollidam	Urachikottai RBL 152.45 m	Kodumudi RBL 121.50 m	30.95 m	51.98 km	1/1680
	Kodumudi RBL 121.50 m	Misuri RBL 81.265 m	40.235 m	68.80 km	1/1710
	Musiri RBL 81.265 m	Mouth RBL 0.0 m	81.265 m	182.25 km	1/2242

Table 32: Bed Slopes of Kaveri Kollidam River

RBL – River Bed Level (These are taken from CWC river cross sections at gauging sites)

4.14 River Cross sections

The CWC data of river cross sections at gauging sites on Kaveri river was available for number of years. The river cross sections at a gauging site for different years were compared to understand morphological changes over the longer period. *Figure 28 to Figure 30* shows plots for Kaveri Kollidam River at three gauging stations indicating comparison of cross sections in different years. Following table shows abstract of review of these studies.

River & Gauge location	General Description & Bank to Bank width	River bed level in 2012	Bank Levels	Comments/ observations
Kaveri at Urachikottai	Well defined c/s, width 330 m. deep channel in central part with width 100m (<i>Figure 28</i>)	152.45 m	167 m to 168 m	As compare to 2004 the deep channel levels lowered by 2 m as per 2007 data and erosion of left bank (may be result of 2005 high flood). No major changes till 2012
Kaveri at Kodumudi	Well defined c/s , width 680 m, deep channel at right bank with width 200m (<i>Figure 29</i>)	121.5 m	129.0 m	2012 bed levels 0.5 to 1 m lower
Kaveri at Musiri	Well defined c/s, width 1570 m, deep channel (200 m)near left bank (<i>Figure 30</i>)	81.265 m	87 to 89 m	2012 bed levels about 2 m lower than earlier years. No shift in deep channel positions

Table 33: River cross-sections over different years

4.15 Ten- Daily average Discharges

Urachikottai:

Analysis of 10 daily average discharges is presented in **Table 34**. *Figure 31* shows bar chart indicating variation in 10 daily average discharges round the year. The results of this analysis indicate range of average 10 daily discharges in different period of year as following.

- June - Begins at 35 and increase to 185 m³/s
- July to September - Begins at 260 and increase to 500 m³/s
- October to January - Begins at 400 and decrease to 200 m³/s
- February to May - Begins at 70 and decrease to 30 m³/s

The gauge- discharge curve derived from the daily flow data during periods of high floods is presented vide *Figure 34*.

Kodumudi:

Analysis of 10 daily average discharges is presented in **Table 35**. *Figure 32* shows bar chart indicating variation in 10 daily average discharges round the year. The results of this analysis indicate range of average 10 daily discharges in different period of year as following.

- June - Begins at 50 and increase to 180 m³/s
- July to September - Begins at 300 and increase to 500 m³/s
- October to January - Begins at 400 and decrease to 200 m³/s
- February to May - Begins at 110 and decrease to 45 m³/s

The gauge- discharge curve derived from the daily flow data during periods of high floods is presented vide *Figure 35*.

Musiri: Analysis of 10 daily average discharges is presented in **Table 36**. *Figure 33* shows bar chart indicating variation in 10 daily average discharges round the year. The results of this analysis indicate range of average 10 daily discharges in different period of year as following.

- June - Begins at 20 and increase to 160 m³/s
- July to September - Begins at 250 and increase to 500 m³/s
- October to January - Begins at 450 and decrease to 200 m³/s
- February to May - Begins at 90 and decrease to 20 m³/s

The gauge- discharge curve derived from the daily flow data during periods of high floods is presented vide *Figure 36*.

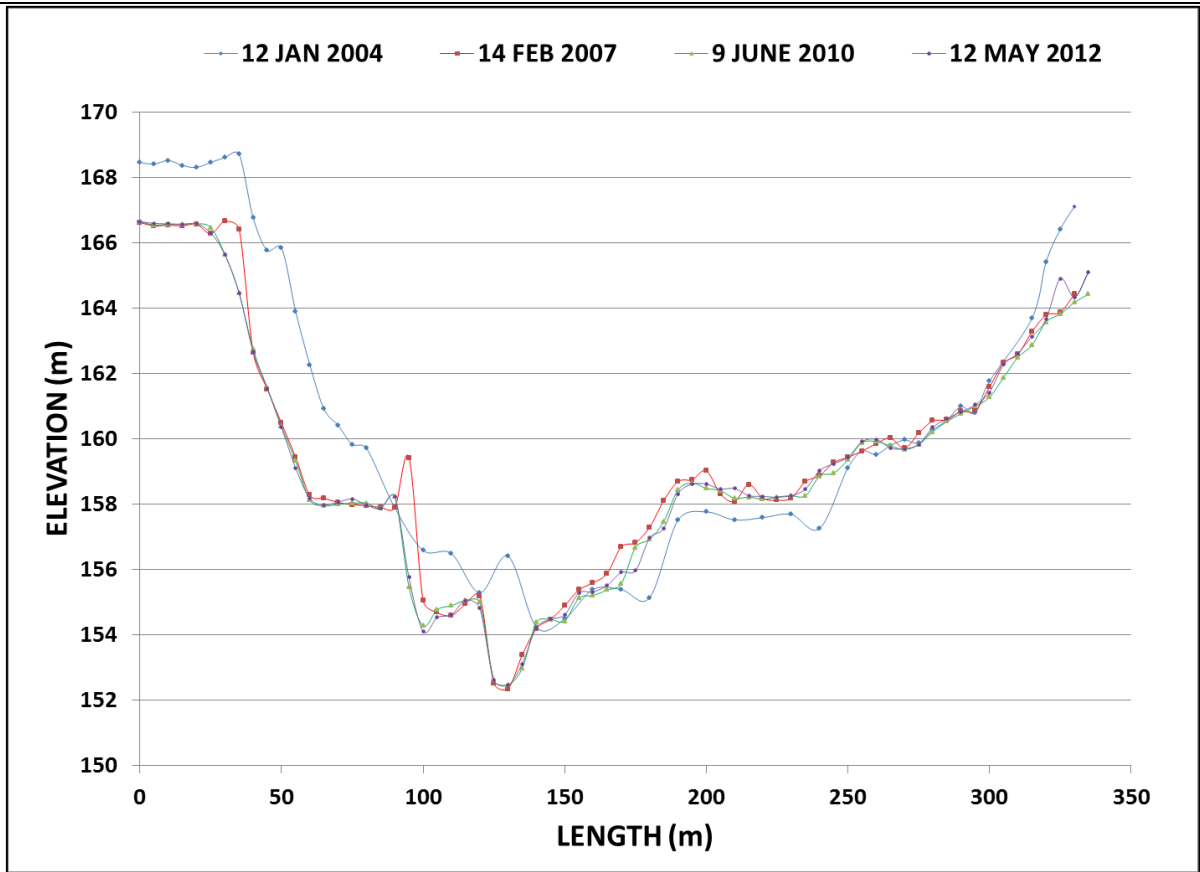


Figure 28: Comparison of Kaveri river cross-section in different years at Urachikottai gauging station

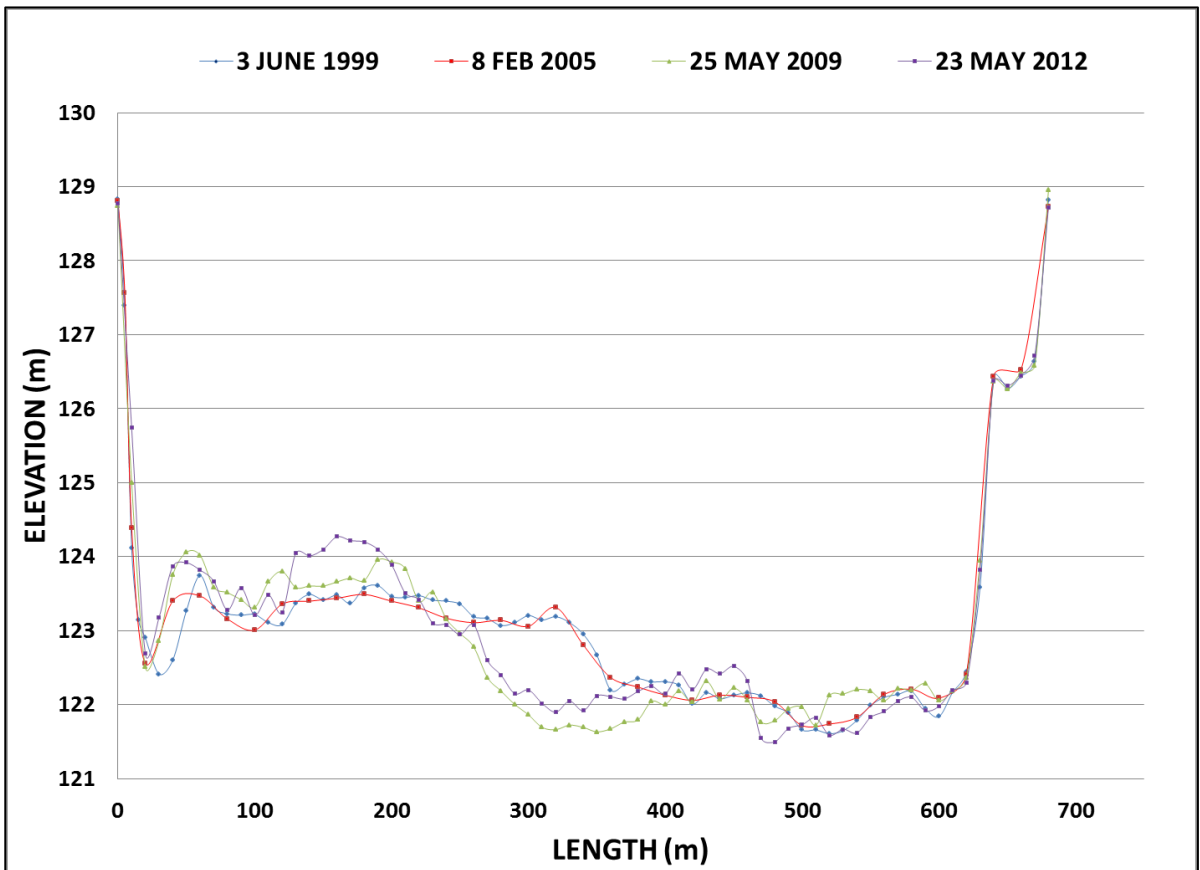


Figure 29: Comparison of Kaveri river cross-section in different years at Kodumudi gauging station

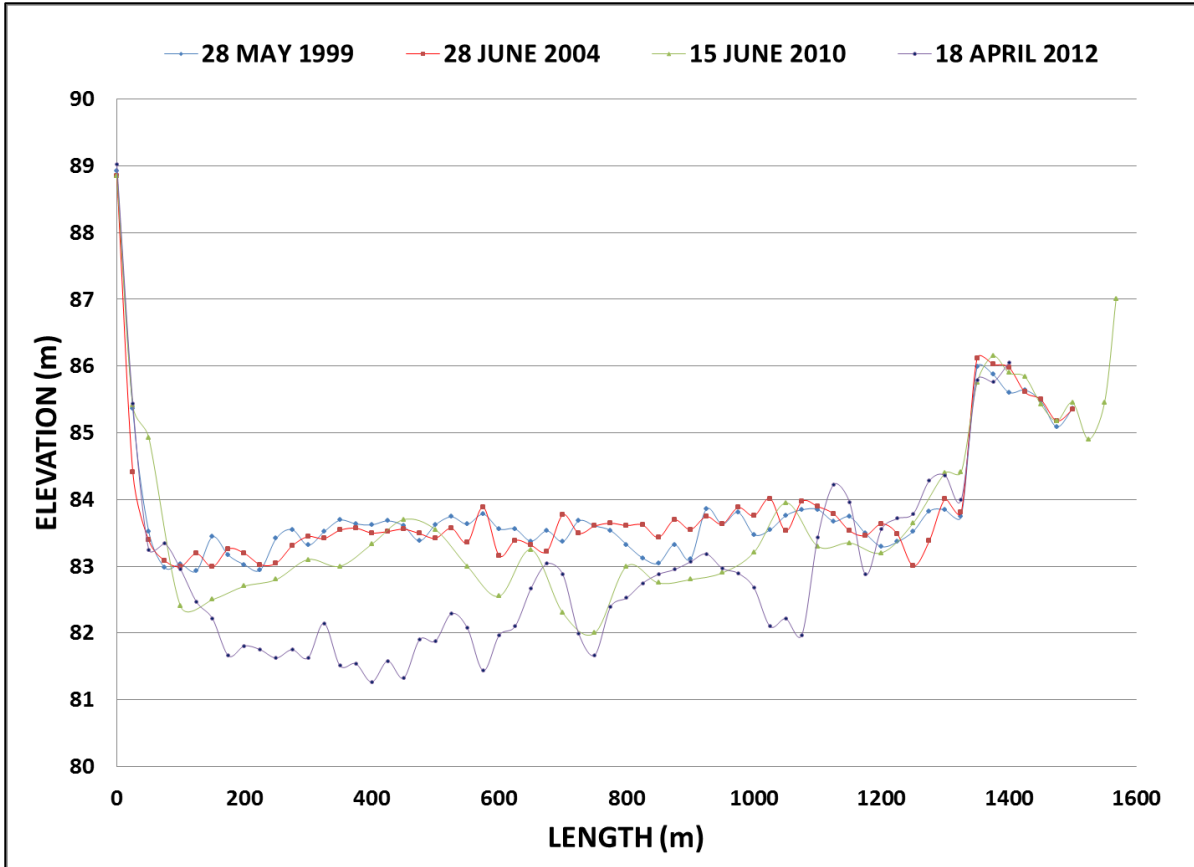


Figure 30: Comparison of Kaveri river cross-section in different years at Musiri gauging station

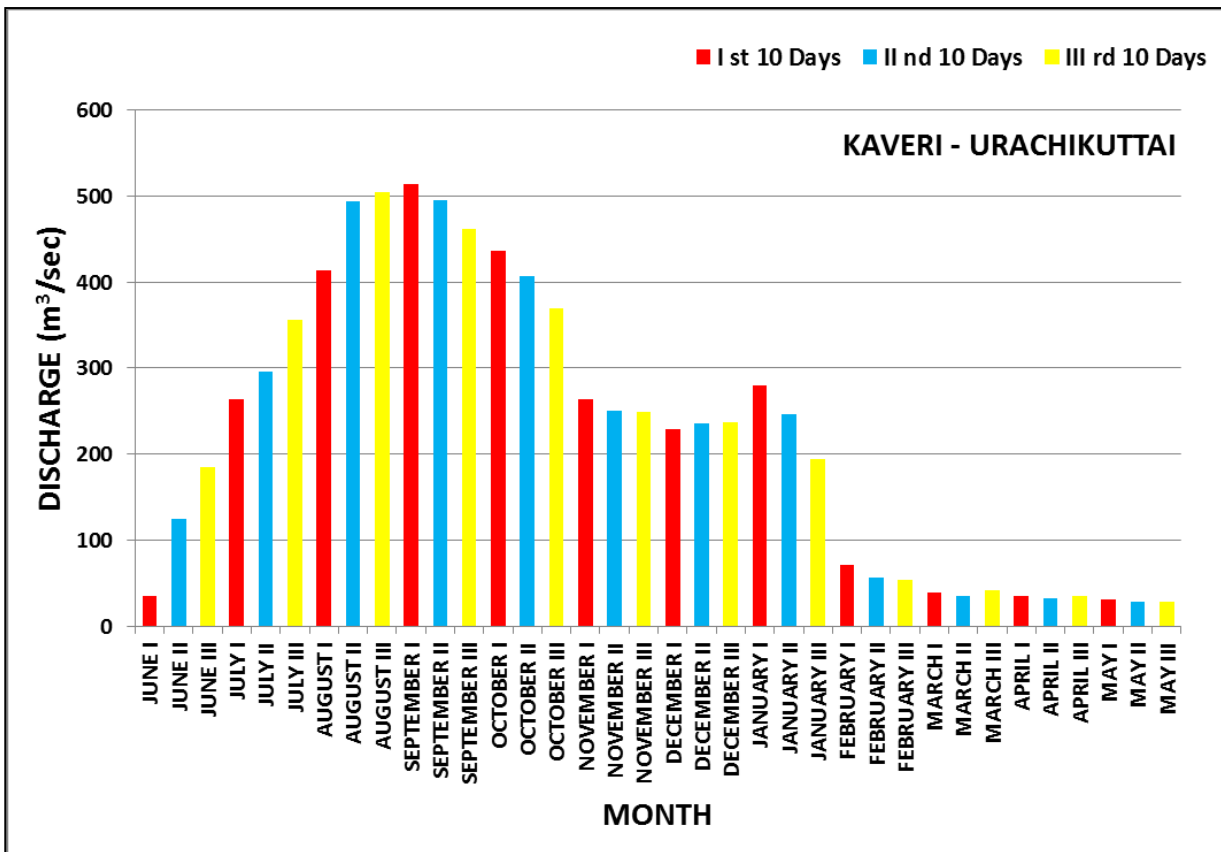


Figure 31: Average 10 daily discharges at Urachikottai gauging site on Kaveri River

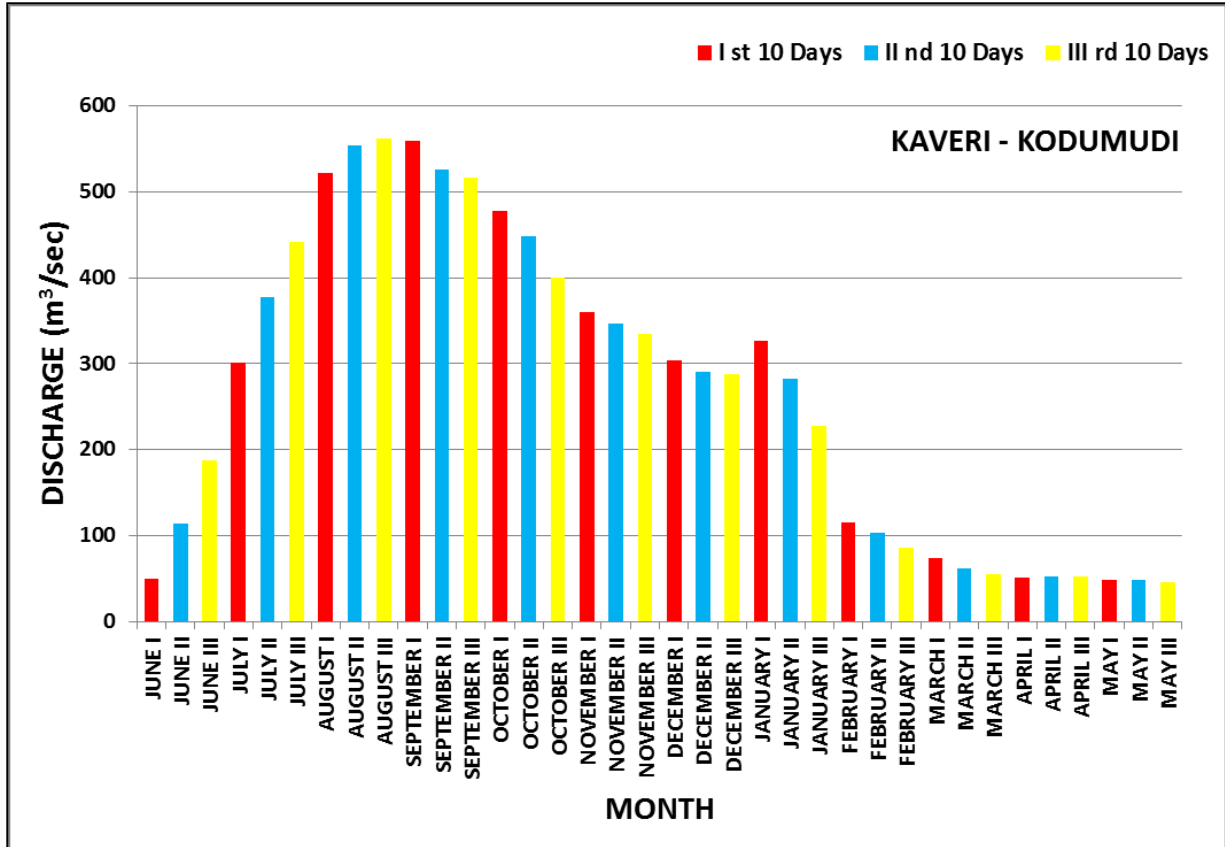


Figure 32: Average 10 daily discharges at Kodumudi gauging site on Kaveri River

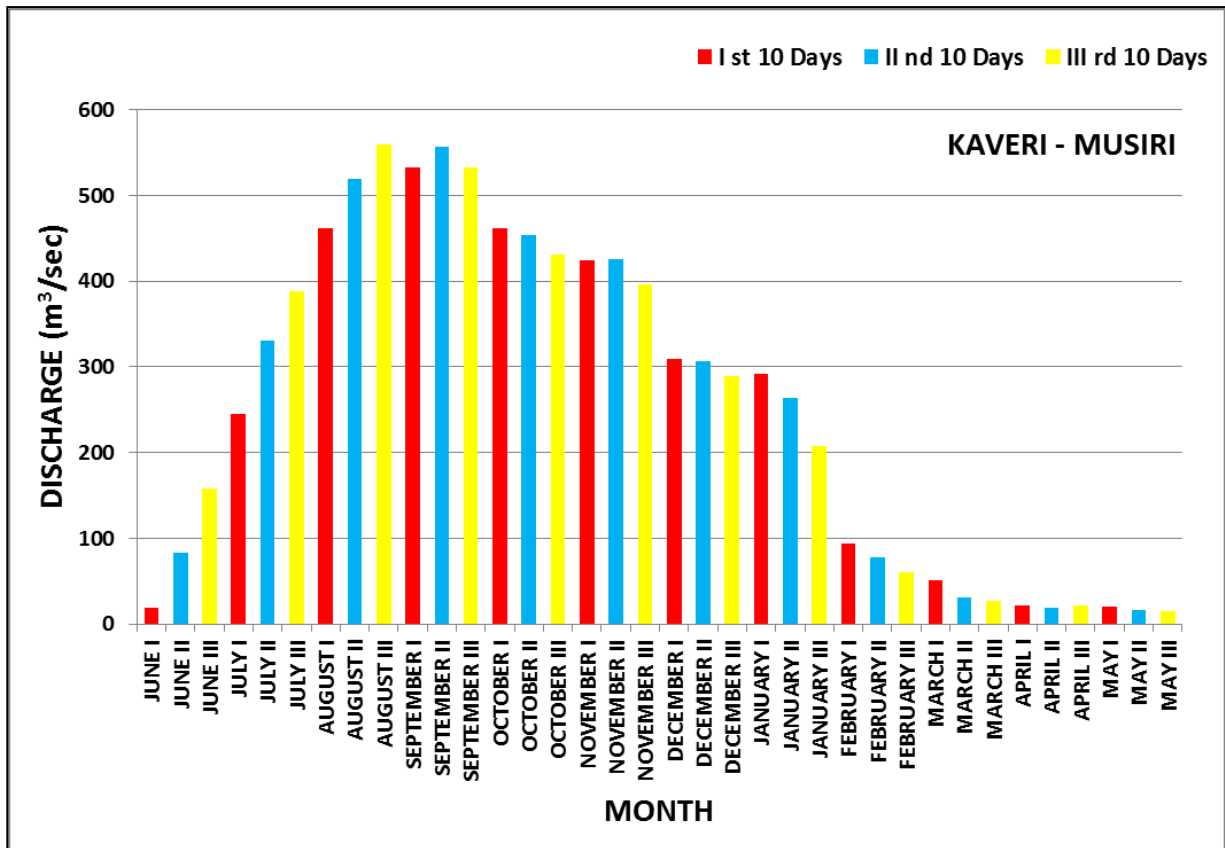


Figure 33: Average 10 daily discharges at Musiri gauging site on Kaveri River

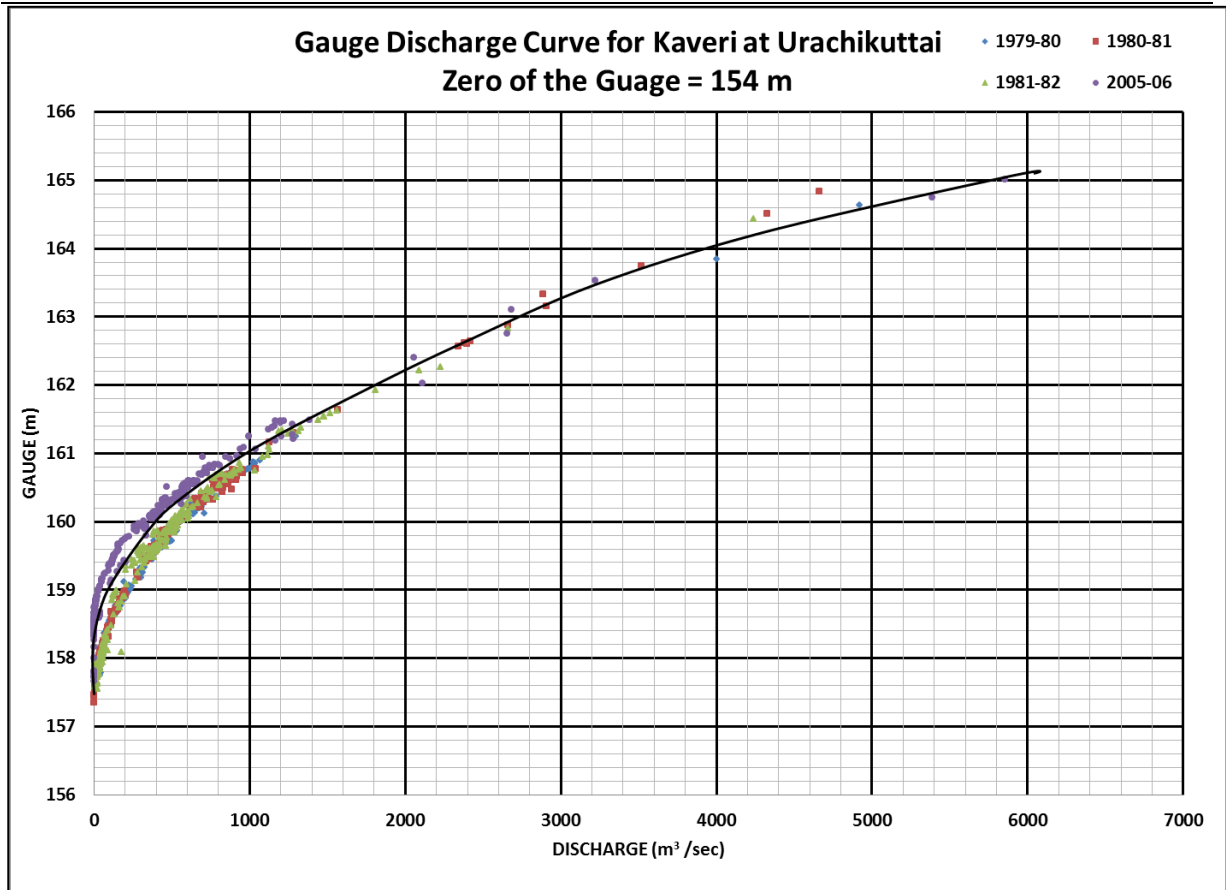


Figure 34: Gauge discharge curve for River Kaveri at Urachikottai gauge station

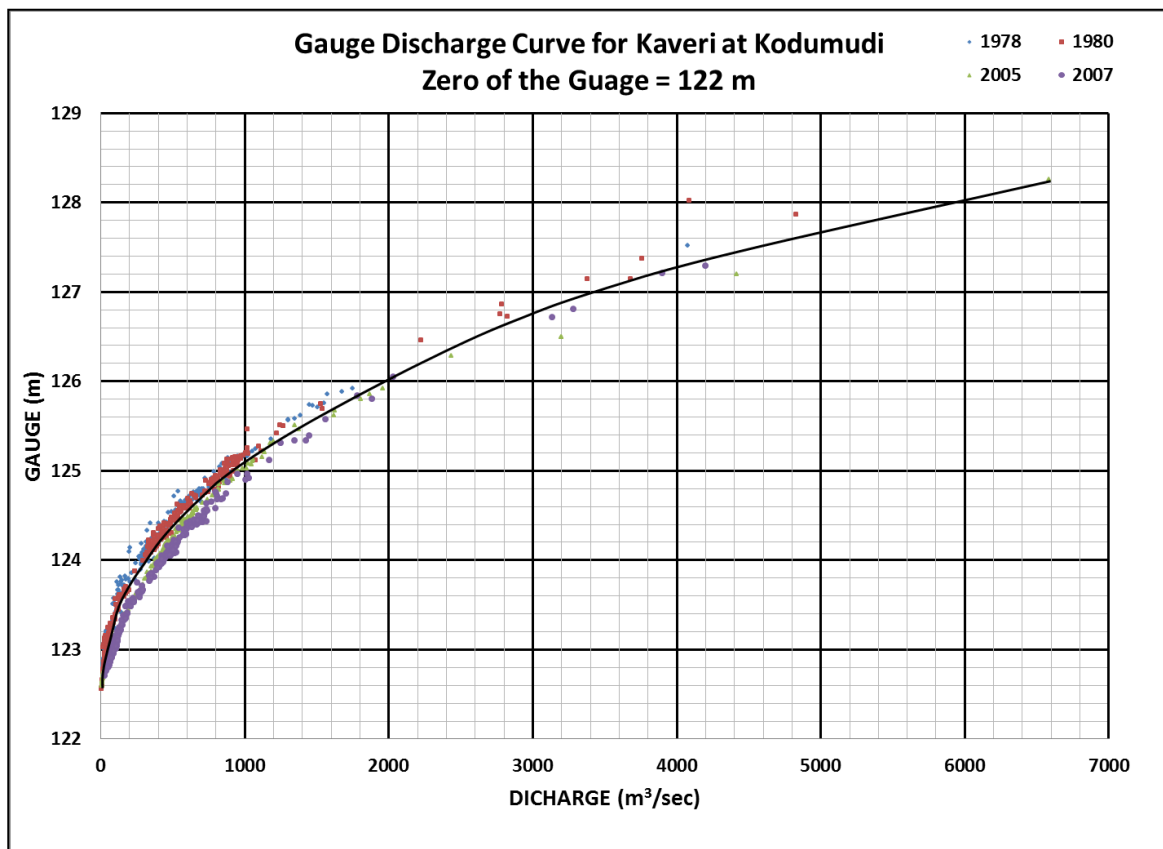


Figure 35: Gauge discharge curve for River Kaveri at Kodumudi gauge station

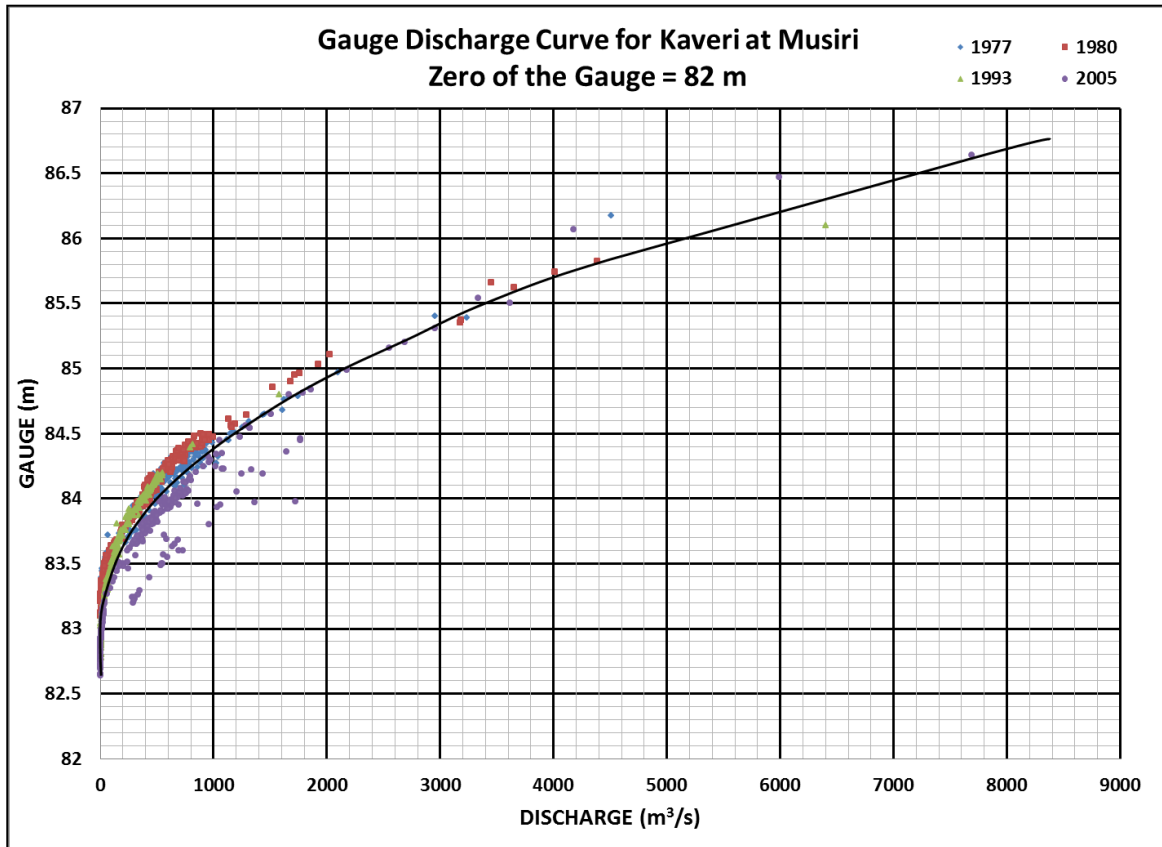


Figure 36: Gauge discharge curve for River Kaveri at Musiri gauge station

2003-2004	0.29	0.06	-	-	-	-	41.05	7.71	0.43	-	-	-	67.08	476.18	124.74	330.83	106.94	23.28	7.34	3.98	219.38	194.13	60.14	86.36	1.83	0.26	78.18	5.50	0.15	-	-	-	-	-	2.72	1.34		
2004-2005	1.78	0.18	0.00	1.47	1.53	106.22	54.38	238.03	506.34	461.58	339.43	345.40	219.66	518.41	159.24	122.01	195.27	121.56	278.87	378.79	289.67	342.11	342.28	272.31	18.51	5.46	3.40	4.24	25.55	10.35	75.31	24.01	2.85	18.55	5.70	2.39		
2005-2006	9.18	1.54	0.78	1.02	2.81	84.78	442.03	477.30	589.73	879.36	722.62	697.41	652.59	438.85	2394.89	1400.01	311.51	1673.72	943.41	1106.82	384.94	323.73	228.17	149.38	11.47	9.26	14.04	12.72	14.77	25.69	19.20	38.52	24.62	22.94	19.34	41.04		
2006-2007	10.96	307.12	423.47	503.43	552.22	624.12	585.48	606.04	954.17	469.71	428.37	620.35	522.29	484.22	188.37	301.58	241.75	286.20	374.85	288.46	416.10	319.57	241.52	228.36	37.70	33.54	19.94	18.40	14.25	10.10	11.26	24.38	18.56	6.70	5.50	9.74		
2007-2008	5.33	4.61	7.58	11.80	92.04	893.87	739.89	2006.21	577.93	692.56	831.54	809.39	841.48	851.16	663.14	896.54	583.87	548.38	533.98	611.41	507.29	332.25	280.59	208.78	26.23	33.66	5.14	19.23	31.92	132.66	36.46	9.91	10.02	10.27	9.43	19.49		
2008-2009	41.79	336.33	434.95	490.09	509.19	482.38	440.00	527.48	560.97	579.85	575.64	740.44	767.29	500.77	373.67	499.85	579.32	462.34	245.43	244.55	253.69	356.73	326.26	187.17	17.05	18.40	13.09	12.54	26.31	8.58	6.49	5.86	7.56	6.01	15.43	8.41		
2009-2010	4.54	3.80	8.98	6.52	5.33	88.92	268.65	470.72	545.55	533.29	701.79	776.56	773.64	923.91	620.56	236.05	249.01	102.25	135.05	224.24	99.68	380.88	198.91	277.98	26.30	23.98	19.99	14.77	16.07	12.07	11.78	10.77	9.32	67.04	17.87	11.54		
2010-2011	10.21	28.21	30.06	19.37	60.89	50.75	174.25	171.01	272.04	341.62	481.97	405.30	317.81	423.96	559.63	206.94	268.74	584.48	541.47	303.34	231.78	174.46	342.04	213.72	17.53	27.82	33.30	35.24	28.11	19.28	15.00	14.37	82.80	18.00	7.56	17.80		
2011-2012	109.57	430.48	451.70	579.35	389.91	395.39	462.66	502.56	366.16	458.99	569.17	509.31	465.03	484.17	254.96	322.90	279.91	348.74	290.37	364.71	249.79	195.00	269.43	230.02	118.84	68.17	49.50	46.75	47.52	33.47	25.22	24.43	29.40	27.41	15.72	21.23		
2012-2013	-	-	-	-	-	-	-	-	-	22.18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM	109.57	430.48	583.89	1810.43	2019.48	1054.22	1560.07	2006.21	1554.36	1337.64	1887.91	1462.80	841.48	1623.56	2394.89	1400.01	1973.47	1673.72	943.41	1106.82	731.10	855.19	634.79	460.57	451.81	455.18	416.38	439.22	196.74	248.33	104.60	57.41	112.67	67.04	74.42	57.95		
MINIMUM	0.29	0.06	0	0.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.77	0.08	0.03	0.13	0.24	0.12	0.02	3	0.01		
AVERAGE	18.65	83.46	158.39	245.02	331.11	387.54	461.53	519.62	559.74	533.10	556.33	532.97	461.23	453.69	431.60	424.43	425.72	395.95	308.73	306.09	289.52	291.46	263.76	207.78	93.79	77.42	60.01	51.10	30.95	27.57	21.38	19.28	21.96	20.53	16.43	15.02		

- Stands for Data Not Available

Table 36: Mean 10 daily discharges (in cumecs) for Musiri

4.16 Monthly minimum and maximum Water levels

Urachikottai

YEAR	JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1978-1979	158.975	158.75	161.57	159.46	162.67	161.545	162.67	159.9	161.275	159.06	161.53	159.055	160.915	159.08	161.07	159.05	161.235	160.145	160.74	159.905	-	-	-	-
1979-1980	185.02	182.89	185.16	184.45	189.64	182.91	185.72	182.84	185.56	182.83	185.33	182.82	184.88	183.42	184.88	183.00	183.78	182.73	183.80	182.72	183.15	182.83	183.33	182.90
1980-1981	185.33	182.55	189.83	185.32	187.56	185.01	185.61	183.99	185.10	182.92	185.04	182.81	184.83	183.25	184.66	182.85	183.70	182.78	183.73	183.11	183.14	182.89	183.19	182.35
1981-1982	183.23	182.94	185.18	182.96	189.44	184.60	187.83	185.02	185.72	182.97	185.75	183.40	185.23	182.72	184.88	183.74	184.87	183.01	184.00	182.55	183.34	182.94	182.97	182.63
1982-1983	184.88	182.78	184.87	184.23	185.10	184.20	185.08	184.03	184.58	182.39	184.23	182.36	184.26	182.52	184.30	182.41	183.95	182.37	183.67	182.95	183.23	182.95	183.20	182.32
1983-1984	183.00	182.19	183.43	182.82	185.18	183.38	185.30	184.02	185.68	183.89	185.21	182.94	183.55	182.56	184.55	182.55	183.10	182.50	183.25	182.47	183.19	183.13	183.23	183.12
1984-1985	185.18	183.12	185.64	184.82	185.60	185.19	185.20	182.70	185.25	182.66	185.20	182.83	184.85	182.65	184.93	182.63	183.13	182.42	183.14	183.03	183.24	183.13	183.23	183.15
1985-1986	183.78	183.56	185.18	183.59	185.43	185.13	185.41	184.38	185.16	184.00	185.03	182.85	185.05	182.72	184.66	182.68	184.60	183.22	183.73	183.42	183.66	183.58	183.85	182.87
1986-1987	183.62	182.70	184.54	183.58	185.50	183.39	185.70	185.35	185.71	184.05	185.41	182.58	185.59	182.95	185.35	183.20	184.94	183.43	183.97	183.58	183.87	183.50	183.89	183.50
1987-1988	183.69	183.30	184.38	182.88	183.90	183.55	183.85	183.72	183.85	182.95	185.47	183.35	185.50	182.84	185.19	183.71	184.82	182.50	184.06	182.82	183.77	183.25	183.87	182.80
1988-1989	183.87	182.74	184.54	183.53	185.52	183.39	185.61	184.29	185.90	185.06	185.36	182.99	185.35	183.25	184.96	183.20	184.56	183.15	184.08	183.19	183.66	183.00	184.01	183.06
1989-1990	183.73	183.00	183.66	183.05	185.77	183.18	185.96	184.93	185.62	184.85	184.78	183.15	185.26	184.03	185.13	182.61	184.74	183.21	184.07	183.27	183.88	183.68	183.80	183.46
1990-1991	183.70	183.21	184.38	183.24	185.60	183.71	185.62	185.01	185.31	182.80	185.28	182.83	185.29	182.83	184.78	183.59	183.82	183.60	183.78	183.25	183.91	183.69	183.81	183.38
1991-1992	183.64	182.91	186.39	183.33	187.22	185.65	186.29	184.96	185.73	183.21	186.92	183.20	185.43	183.80	185.27	183.66	184.63	183.66	183.77	183.51	183.87	183.66	183.77	183.33
1992-1993	185.35	183.09	186.00	185.19	188.15	185.43	186.09	183.91	186.95	183.12	186.28	183.24	185.52	183.07	185.43	183.52	184.96	183.56	183.89	183.27	183.98	183.63	183.82	183.57
1993-1994	185.41	183.27	185.56	185.28	185.60	185.31	185.63	184.85	185.49	182.99	184.71	182.86	185.04	182.98	185.30	183.13	183.95	183.00	184.23	183.11	183.83	183.04	183.96	183.67
1994-1995	185.45	183.02	187.50	185.25	188.30	185.82	186.03	185.46	185.75	183.11	186.80	183.24	186.23	184.93	185.83	182.89	183.80	182.93	183.95	183.31	183.79	183.37	183.60	182.60
1995-1996	183.80	183.30	185.32	183.43	185.48	184.58	185.72	184.87	185.51	183.03	185.70	183.13	185.42	183.94	184.70	182.98	183.95	182.96	183.93	183.31	183.80	183.38	183.93	183.46
1996-1997	183.77	183.28	185.17	183.33	185.28	184.32	185.44	183.85	185.63	182.95	185.60	183.02	185.20	183.07	185.12	182.99	184.82	182.97	183.85	183.60	183.84	183.52	183.94	183.66
1997-1998	185.17	183.75	185.58	184.90	185.70	185.34	186.19	185.24	185.96	183.00	184.24	182.86	185.72	183.99	185.19	183.03	184.04	183.05	184.14	183.34	184.37	183.69	183.92	183.45
1998-1999	185.16	183.70	185.76	184.74	185.58	183.69	185.86	184.52	186.01	184.42	185.98	183.10	185.30	182.95	185.17	182.90	184.80	182.90	183.60	183.30	183.86	183.40	183.63	183.34
1999-2000	184.03	183.41	185.80	183.40	186.26	185.37	185.55	184.64	185.41	182.81	186.09	182.98	185.42	183.09	185.32	183.04	184.80	183.06	184.32	183.43	183.49	183.46	184.17	183.35
2000-2001	185.72	183.30	185.86	185.08	185.42	184.43	185.72	183.25	188.89	184.48	185.70	183.23	186.19	183.28	185.08	183.45	183.54	183.44	183.54	183.44	183.90	182.89	184.59	183.46
2001-2002	185.40	183.95	185.66	184.50	185.45	183.46	185.20	184.30	185.47	183.48	185.36	183.30	185.41	183.20	185.16	184.60	185.02	183.45	184.23	183.45	184.14	183.46	184.13	183.47

2002-2003	183.50	183.40	183.88	183.47	183.97	183.76	185.41	183.95	184.80	183.05	184.94	183.21	185.37	183.18	185.19	183.12	184.74	183.14	183.77	183.19	183.72	183.15	183.48	182.72
2003-2004	183.65	182.66	183.90	182.46	184.05	182.53	184.08	182.50	185.48	182.85	185.17	183.28	185.10	183.27	184.85	182.75	184.63	182.80	183.25	182.65	182.73	182.02	183.90	182.03
2004-2005	183.79	182.68	185.44	182.73	185.54	182.86	185.39	183.47	185.41	182.52	184.82	182.65	185.10	184.48	185.18	182.90	183.63	182.72	183.80	183.42	183.80	183.35	183.71	183.02
2005-2006	183.53	183.00	185.13	183.49	185.84	184.41	186.49	185.49	190.01	184.09	188.11	184.35	185.83	184.49	185.14	183.40	183.49	182.66	184.17	182.73	184.24	183.16	183.90	182.72
2006-2007	185.42	183.62	185.71	185.04	187.22	185.40	185.75	184.73	185.69	183.30	184.66	183.20	185.35	183.32	185.05	183.25	184.19	183.05	183.90	183.65	184.32	182.93	183.70	182.97
2007-2008	183.18	183.02	187.00	183.05	189.20	184.78	186.20	185.25	186.55	183.34	185.98	184.41	185.29	183.02	185.28	182.78	184.65	182.73	183.81	182.70	183.48	182.90	183.62	182.90
2008-2009	185.26	182.80	185.20	184.90	185.32	184.95	185.68	185.09	185.70	182.98	185.39	182.88	184.85	183.14	184.94	182.90	184.17	182.90	184.37	182.95	184.13	183.10	184.07	183.25
2009-2010	183.37	182.74	185.20	183.14	185.51	184.42	185.91	185.35	186.18	184.36	184.30	183.00	184.95	183.02	185.75	182.90	184.20	182.87	183.85	183.13	184.24	183.18	184.03	182.98
2010-2011	183.82	183.02	185.07	183.42	185.04	184.12	185.40	184.72	185.53	184.05	184.51	183.10	185.04	183.07	185.00	183.00	184.22	183.00	183.99	183.15	183.99	182.95	183.49	182.90
2011-2012	185.42	183.45	185.66	185.05	185.46	184.90	185.70	185.02	185.52	183.12	185.21	183.20	185.36	183.15	184.94	183.25	184.37	182.78	183.87	183.67	183.80	183.64	183.77	183.15
MAXIMUM	185.72	183.95	189.83	185.32	189.64	185.82	187.83	185.49	190.01	185.06	188.11	184.41	186.23	184.93	185.83	184.60	185.02	183.66	184.37	183.67	184.37	183.69	184.59	183.67
MINIMUM	158.98	158.75	161.57	159.46	162.67	161.55	162.67	159.90	161.28	159.06	161.53	159.06	160.92	159.08	161.07	159.05	161.24	160.15	160.74	159.91	182.73	182.02	182.97	182.03

- Stands for Data Not Available

Table 37: Monthly Minimum and Maximum Water levels at Urachikottai

Kodumudi

YEAR	JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1971-1972	124.555	122.67	125.135	124.815	125.16	123.61	125.28	124.26	124.895	123.8	125.03	123.745	124.945	123.395	124.93	123.085	124.545	123.035	124	123.065	123.44	122.82	124.82	123.03
1972-1973	123.575	123.06	125.21	123.22	125.26	124.98	124.985	123.16	124.86	122.88	125.01	123.475	127.6	124	124.975	124.23	124.545	124.135	124.47	123.47	124.232	123.38	123.76	123.17
1973-1974	124.608	123.23	123.23	122.505	125.15	124.88	125.166	124.235	125.01	123.745	125.02	123.4	124.75	123.375	124.133	122.63	124.44	122.93	122.575	122.377	123.358	122.985	122.863	122.38
1974-1975	123.19	122.96	124.82	122.98	125.2	124.91	125.405	123.348	125.42	123.69	124.823	123.12	124.775	122.87	124.38	122.705	124.495	122.685	123.713	122.745	123.07	122.71	123.28	122.88
1975-1976	123.06	122.755	125.263	122.685	125.635	124.86	126.372	124.556	125.7	124.135	126.16	123.355	124.802	123.47	124.713	123.44	124.705	123.28	123.35	123.25	123.55	123.09	123.51	123.09
1976-1977	123.245	123.01	124.92	123.05	125.858	124.97	125.925	124.095	125.245	123.51	127.515	123.62	124.62	123.305	124.68	123.485	124.415	123.62	123.985	122.95	123.325	123.075	123.13	122.8
1977-1978	123.245	123.01	124.92	123.05	125.858	124.97	125.925	124.095	125.245	123.51	127.515	123.62	124.62	123.305	124.68	123.485	124.415	123.62	123.985	122.95	123.325	123.075	123.13	122.8
1978-1979	123.245	123.01	124.92	123.05	125.858	124.97	125.925	124.095	125.245	123.51	127.515	123.62	124.62	123.305	124.68	123.485	124.415	123.62	123.985	122.95	123.325	123.075	123.13	122.8
1979-1980	124.63	123.02	124.84	124.365	126.87	122.585	125.11	123.48	125.115	123.39	126.375	123.45	124.575	123.78	124.535	123.42	123.65	122.955	123.87	123.035	123.35	123.115	123.49	123.025
1980-1981	123.413	122.988	124.645	122.955	126.99	124.545	127.05	124.57	125.235	123.248	125.045	123.54	124.585	123.37	124.45	123.475	124.405	123.445	124.23	122.82	123.25	122.96	123.085	122.85
1981-1982	123.413	122.988	124.645	122.955	126.99	124.545	127.05	124.57	125.235	123.248	125.045	123.54	124.585	123.37	124.45	123.475	124.405	123.445	124.23	122.82	123.25	122.96	123.085	122.85

1982-1983	124.42	122.84	124.435	124.015	124.58	124.32	124.573	123.945	124.26	122.69	124.013	122.8	124.058	122.84	124	122.78	123.74	122.7	123.715	122.61	123.125	122.84	123.145	122.635
1983-1984	122.93	122.505	123.3	122.63	124.75	123.225	124.725	123.9	125.013	123.81	124.643	123.18	124.48	122.765	124.17	122.85	123.6	122.6	123.538	122.66	123.14	122.97	123.22	122.95
1984-1985	124.6	122.99	124.945	124.46	124.98	124.693	124.67	123.29	124.93	122.835	124.75	123.01	124.49	122.955	124.325	122.96	123.16	122.76	123.13	123.04	123.2	123.02	123.13	123.02
1985-1986	123.465	122.56	123.605	122.79	124.65	122.85	124.579	123.63	124.77	124.305	124.36	122.81	124.35	122.825	124.01	122.9	123.722	122.67	123.23	122.8	123.025	122.64	122.98	122.63
1986-1987	123.465	122.56	123.605	122.79	124.65	122.85	124.579	123.63	124.77	124.305	124.36	122.81	124.35	122.825	124.01	122.9	123.722	122.67	123.23	122.8	123.025	122.64	122.98	122.63
1987-1988	123.465	122.56	123.605	122.79	124.65	122.85	124.579	123.63	124.77	124.305	124.36	122.81	124.35	122.825	124.01	122.9	123.722	122.67	123.23	122.8	123.025	122.64	122.98	122.63
1988-1989	123.465	122.56	123.605	122.79	124.65	122.85	124.579	123.63	124.77	124.305	124.36	122.81	124.35	122.825	124.01	122.9	123.722	122.67	123.23	122.8	123.025	122.64	122.98	122.63
1989-1990	122.935	122.49	122.99	122.55	124.57	122.64	124.865	123.97	124.525	123.95	124.05	122.71	124.205	123.22	124.155	122.66	123.74	122.74	123.06	122.67	122.995	122.88	123.095	122.72
1990-1991	122.92	122.695	123.475	122.71	124.44	122.88	124.585	124.18	124.38	122.66	124.38	122.565	124.185	122.6	123.85	122.86	122.98	122.82	122.94	122.6	123.11	122.83	122.97	122.78
1991-1992	123.012	122.525	125.086	122.68	125.748	124.713	124.975	124.118	124.635	123.525	125.774	122.84	124.427	123.27	124.257	122.91	123.683	122.563	123.19	122.763	123.077	122.87	122.947	122.677
1992-1993	124.332	122.79	124.865	124.255	126.23	124.402	124.822	123.561	123.893	123.561	125.203	123.052	124.49	122.843	124.34	122.807	124	122.84	123.037	122.69	123.13	122.863	123.11	122.877
1993-1994	124.367	122.737	124.455	124.268	124.525	124.239	124.561	123.893	124.5	122.704	123.671	122.765	123.822	122.783	124.273	122.72	123.223	122.647	123.203	122.703	123.29	122.65	123.047	122.83
1994-1995	124.42	122.64	126.077	124.332	126.639	124.667	124.848	124.59	124.65	123.66	126.03	123.3	124.85	123.99	124.67	122.74	123.085	122.64	123.2	122.725	123.02	122.69	123.1	122.54
1995-1996	123	122.73	124.14	122.78	124.362	123.67	124.594	123.676	124.603	123.01	124.46	123.12	124.315	123.155	123.92	122.63	123.16	122.565	123.03	122.57	123.31	122.655	122.9	122.56
1996-1997	122.85	122.61	123.983	122.6	124.232	123.5	124.44	123.08	124.77	122.98	124.6	122.75	124.18	122.83	124.04	122.79	123.95	122.63	123	122.75	123	122.68	122.71	122.32
1997-1998	124.04	122.85	124.49	123.9	124.62	124.3	125.01	124.11	124.8	122.95	123.967	122.6	124.875	123.5	124.24	122.83	123.11	122.625	123.02	122.66	123.2	122.78	123.15	122.64
1998-1999	124.83	122.74	124.92	123.97	124.61	123.53	124.91	123.71	124.865	123.465	124.64	122.83	124.33	122.7	124.145	122.69	123.1	122.64	123.125	122.82	123.11	122.7	123.345	122.68
1999-2000	123.065	122.7	124.59	122.7	125.02	124.34	124.515	123.825	124.24	122.8	125.245	123.03	124.44	122.77	124.31	122.71	123.75	122.67	123.03	122.79	123.02	122.77	123.08	122.68
2000-2001	124.35	122.66	124.82	124.1	124.35	123.57	124.59	123.13	127.52	123.73	124.94	122.76	124.95	122.91	124.055	122.885	122.96	122.84	122.92	122.745	123.2	122.7	123.15	122.77
2001-2002	124.23	122.84	124.53	123.37	124.24	122.71	123.945	123.19	124.225	122.945	124.2	122.82	124.28	122.79	123.97	122.72	123.82	122.53	122.955	122.5	122.93	122.81	122.95	122.73
2002-2003	122.85	122.56	122.83	122.565	122.97	122.77	124.26	122.88	123.75	122.55	123.78	122.66	124.2	122.55	124.075	122.38	123.65	122.35	123.03	122.33	122.85	122.25	122.72	122.19
2003-2004	122.68	122.1	122.765	122.1	123.08	122.13	122.99	122.11	124.36	122.62	124.05	122.58	123.965	122.55	123.75	122.28	123.56	122.1	122.43	122.16	122.763	122.1	122.95	122.3
2004-2005	122.69	122.12	124.26	122.53	124.38	122.51	124.32	122.94	124.29	122.84	123.75	122.57	124.07	123.46	124.05	122.67	123.33	122.48	123.03	122.65	124.14	122.46	123.12	122.43
2005-2006	122.96	122.63	124.05	122.6	124.89	122.955	125.31	124.33	128.26	123.45	126.29	123.52	124.86	123.65	124	122.89	123.05	122.8	123.33	122.88	123.35	122.81	123.22	122.63
2006-2007	122.95	122.85	125.57	122.93	127.29	123.82	124.965	123.98	125.34	123.33	124.96	123.605	124.915	123.12	124.06	122.71	123.18	122.8	123.53	122.75	123.22	122.86	123.15	122.85
2007-2008	122.95	122.85	125.57	122.93	127.29	123.82	124.965	123.98	125.34	123.33	124.96	123.605	124.915	123.12	124.06	122.71	123.18	122.8	123.53	122.75	123.22	122.86	123.15	122.85
2008-2009	124.08	122.7	124.02	123.85	124.175	123.85	124.48	124.02	124.48	122.965	124.2	123.25	123.86	122.9	123.87	122.58	123.07	122.6	123.5	122.6	122.95	122.79	123.16	122.6
2009-2010	122.99	122.6	123.94	122.7	124.19	123.35	124.51	124.02	124.77	123.745	123.94	122.695	123.8	122.74	123.905	122.63	123.03	122.52	123.12	122.85	123.01	122.86	123.2	122.63
2010-2011	123.1	122.63	123.99	122.72	124	123.24	124.19	123.64	124.44	123.26	123.995	123.13	124.04	123.14	123.85	122.6	123.15	122.58	123.1	122.94	123.35	122.64	123.14	122.65

2011-2012	124.28	122.96	124.49	124.01	124.43	123.845	124.62	123.87	124.5	122.89	124.215	122.94	124.23	123.1	123.92	122.68	123.48	122.89	123.12	122.75	123.02	122.75	122.96	122.7
MAXIMUM	124.83	123.23	126.077	124.815	127.29	124.98	127.05	124.59	128.26	124.305	127.515	123.745	127.6	124	124.975	124.23	124.705	124.135	124.47	123.47	124.232	123.38	124.82	123.17
MINIMUM	122.68	122.1	122.765	122.1	122.97	122.13	122.99	122.11	123.75	122.55	123.671	122.565	123.8	122.55	123.75	122.28	122.96	122.1	122.43	122.16	122.763	122.1	122.71	122.19

Table 38: Monthly Minimum and Maximum Water levels at Kodumudi

Musiri

YEAR	JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1970-1971	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	83.795	82.855	83.785	82.965	83.235	82.92	83.275	83
1971-1972	83.72	83.075	84.305	84	84.335	83.025	84.42	83.795	84.24	83.64	84.275	83.505	84.96	83.21	84.18	83.235	83.945	83.13	83.625	82.915	83.34	82.925	84.47	83.085
1972-1973	83.455	83.16	84.41	83.335	84.42	84.23	84.435	83.16	84.295	83.5	84.45	83.48	85.935	83.65	84.075	83.71	83.965	83.665	83.985	83.445	83.84	83.195	83.455	83.19
1973-1974	83.99	83.22	84.375	83.96	84.335	84.142	84.405	83.73	84.455	83.675	84.27	83.425	84.165	83.45	84.09	83.26	83.97	83.105	83.05	82.91	83.475	83.005	83.35	83
1974-1975	83.2	82.95	84.115	83.14	84.415	84.220	84.58	83.355	84.53	83.585	84.195	83.29	84.13	83.08	83.9	82.825	83.925	82.74	83.61	82.78	82.965	82.785	83.25	82.85
1975-1976	83.15	82.845	84.46	82.92	84.65	84.14	85.265	84.055	84.58	83.64	85.16	83.285	84.11	83.21	84.1	83.1	84.06	82.75	83.57	82.72	83.74	83.17	83.5	83.1
1976-1977	83.45	83.07	83.97	83.28	84.26	83.92	84.11	83.82	84.02	83.2	84.013	83.225	83.545	83.175	84.1	83.24	83.365	83.215	83.46	83.205	83.55	83.225	83.285	83.2
1977-1978	83.32	83.2	84.275	83.295	84.435	83.375	84.31	83.615	84.783	83.68	86.175	84.12	84.32	83.66	84.28	83.925	83.96	83.795	83.9	83.235	83.595	83.16	83.475	83.17
1978-1979	83.41	83.185	84.34	83.29	84.798	84.345	84.88	83.59	84.59	83.52	85.313	83.52	84.76	83.51	84.23	83.64	84.13	83.835	83.875	83.15	83.5	83.265	83.38	83.1
1979-1980	84.195	83.09	84.38	84.075	85.64	83.51	84.473	83.41	84.5	83.71	86.05	83.783	84.243	83.67	84.09	83.5	83.67	83.11	83.655	83.1	83.5	83.26	83.595	83.235
1980-1981	84.35	83.21	85.825	84.343	85.035	84.285	84.613	83.68	84.38	83.42	84.285	83.303	84.13	83.445	83.945	83.45	83.53	83.04	83.58	83.09	83.3	83.03	83.44	83
1981-1982	83.59	83.275	84.225	83.32	85.84	84.16	85.8	84.135	84.62	83.43	84.705	83.65	84.173	83.595	84.14	83.665	84.11	83.4	84.12	82.96	83.318	82.9	83.32	82.945
1982-1983	84.065	82.9	84.13	83.92	84.21	84.045	84.195	83.79	84.025	83.39	83.945	83.145	83.92	83.17	83.895	83.185	83.728	83.055	83.728	83.13	83.23	83.12	83.52	83.128
1983-1984	83.415	83.13	83.535	83.13	84.31	83.485	84.283	83.875	84.503	83.7	84.24	83.4	84.498	83.1	84.02	83.23	83.85	83.11	84.04	83.06	83.5	83.325	83.39	83.23
1984-1985	84.19	83.22	84.46	84.115	84.42	84.245	84.26	83.73	84.53	83.34	84.275	83.35	84.285	83.3	84.08	83.32	83.42	83.17	83.32	83.17	83.35	83.12	83.32	83.11
1985-1986	83.55	83.15	84.05	83.35	84.19	84.01	84.19	83.96	84.11	83.66	83.975	83.24	83.975	83.59	83.87	83.09	83.81	83.06	83.35	83.07	83.34	83.07	83.48	83.11
1986-1987	83.25	83.06	83.56	83.11	84.15	83.31	84.33	84.1	84.3	83.88	84.13	83.37	84.12	83.19	84.03	83.25	83.9	83.11	83.52	83.2	83.5	83.18	83.42	83.17
1987-1988	83.53	83.05	83.725	83.03	83.72	83.21	83.495	83.23	83.72	83.29	84.25	83.39	84.03	83.285	84.065	83.61	83.955	83.205	83.81	83.12	83.5	83.26	83.675	83.215
1988-1989	83.653	83.19	83.77	83.21	84.27	83.38	84.27	83.83	84.39	84.12	84.13	83.4	84.11	83.26	83.95	83.24	83.84	83.2	83.58	83.24	83.645	83.22	83.43	83.2
1989-1990	83.49	83.04	83.875	83.205	84.13	83.23	84.34	84.01	84.25	84.02	84.12	83.36	84.055	83.65	84.125	83.28	83.89	83.375	83.545	83.31	83.425	83.3	83.46	83.185
1990-1991	83.4	83.21	83.37	83.16	84.12	83.36	84.2	83.98	84.09	83.36	84.12	83.27	84	83.215	83.9	83.355	83.49	83.24	83.365	83.23	83.43	83.215	83.46	83.27

1991-1992	83.76	83.21	84.24	83.315	85.13	84.25	84.44	83.945	84.26	83.98	85.14	83.35	84.12	83.55	84.02	83.59	83.81	83.405	83.535	83.29	83.47	83.29	83.34	83.17
1992-1993	84.1	83.245	84.34	84.07	85.39	84.13	84.38	83.78	84.81	83.655	84.75	83.47	84.16	83.18	84.08	83.38	83.89	83.12	83.33	82.78	83.16	82.89	83.3	82.96
1993-1994	84.09	83.02	84.14	84.02	84.18	84	84.195	83.8	84.16	83.24	86.1	83.23	84.18	83.31	84	83.37	83.61	83.1	83.37	83.115	83.35	83.04	83.35	83.11
1994-1995	84.06	83.1	84.76	84	85.4	84.19	84.41	84.24	84.27	83.86	85.33	83.79	84.33	83.86	84.235	83.38	83.23	83.06	84.04	83	83.14	82.94	83.19	82.85
1995-1996	83.2	82.97	83.95	83.14	84.04	83.82	84.15	83.77	84.2	83.39	84.1	83.45	84.1	83.52	83.8	83.43	83.36	83.15	83.3	83.1	83.49	83.1	83.24	83.13
1996-1997	83.29	83.19	83.78	83.175	84.035	83.605	84.145	83.38	84.27	83.39	84.14	83.38	84.32	83.35	83.96	83.6	83.85	83.18	83.22	83.1	83.25	82.94	83.34	83.02
1997-1998	83.87	83.13	84.08	83.84	84.125	84	84.42	83.9	84.25	83.27	84.44	83.24	84.75	83.48	83.93	83.3	83.29	82.99	83.17	83.02	83.175	83.04	83.45	83.06
1998-1999	83.94	83.055	84.31	83.86	84.21	83.62	84.28	83.68	84.24	83.57	84.26	83.36	84.48	83.27	83.9	83.46	83.35	83.18	83.25	83.14	83.43	83.16	83.65	83.08
1999-2000	83.35	83.11	84	83.27	84.28	83.97	84.08	83.86	83.99	83.2	84.57	83.28	84.37	83.16	83.98	83.13	83.75	83.17	83.35	83.12	83.29	83.08	83.3	82.94
2000-2001	83.98	82.96	84.15	83.89	84.15	83.66	84.1	83.56	85.845	83.71	84.25	83.12	84.31	83.4	83.85	83.28	83.31	83.17	83.29	83.05	83.32	83.08	83.34	83.08
2001-2002	83.965	83.12	84.08	83.56	83.99	83.27	83.86	83.4	84.04	83.35	84.04	83.25	84.02	83.22	83.81	83.18	83.77	83.03	83.26	82.95	83.16	82.94	83.16	83.03
2002-2003	83.19	83	82.99	82.95	83.28	82.95	83.95	83.19	83.78	83.13	83.74	83.15	83.93	83.1	83.82	82.91	83.61	82.74	82.96	82.68	82.79	82.68	82.75	82.6
2003-2004	82.86	82.57	-	-	83.29	82.56	-	-	84	83.08	83.8	83.1	83.77	82.9	83.66	82.93	83.53	82.8	83.15	82.79	-	-	83.09	82.85
2004-2005	83.01	82.8	83.9	82.93	83.99	83.03	83.92	83.41	83.98	83.11	83.8	83.08	83.81	83.51	83.81	83.21	83.27	82.82	83.19	82.7	83.62	82.76	83.13	82.64
2005-2006	83.1	82.76	83.85	82.77	84.04	83.51	84.54	83.9	86.64	83.48	86.47	83.31	84.45	83.2	83.48	82.75	82.66	82.41	82.63	82.5	82.81	82.51	82.89	82.38
2006-2007	83.65	82.48	83.88	83.48	84.61	83.7	83.9	83.3	84.01	82.98	83.85	82.9	83.76	82.95	83.62	82.92	82.94	82.73	82.81	82.67	82.83	82.67	82.75	82.64
2007-2008	82.71	82.645	84.66	82.65	85.75	83.32	84.13	83.28	84.05	83.27	84.36	83.08	85.15	82.81	83.53	82.75	82.8	82.6	83.2	82.59	82.82	82.615	82.82	82.61
2008-2009	83.55	82.64	83.55	83.35	83.61	83.32	83.72	83.48	83.97	82.86	83.88	83.25	83.61	82.87	83.39	82.98	82.87	82.68	83	82.64	82.75	82.65	82.88	82.63
2009-2010	82.81	82.61	83.43	82.62	83.66	83	83.75	83.49	84	83.34	83.87	82.7	83.28	82.76	83.37	82.79	82.74	82.67	82.67	82.63	82.65	82.61	82.88	82.6
2010-2011	82.9	82.56	83.4	82.6	83.44	82.99	83.67	83.25	83.75	82.94	83.92	83.17	83.73	82.97	83.295	82.7	82.75	82.35	82.7	82.46	82.98	82.33	82.48	82.17
2011-2012	83.43	82.39	83.61	83.2	83.49	83.03	83.42	83.035	83.37	82.51	83.42	82.37	83.4	82.4	82.89	82.21	82.495	82.01	82.11	81.9	82.13	81.81	82.08	81.81
2012-2013	82.06	81.78	-	-	-	-	81.85	81.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM	84.35	83.275	85.825	84.343	85.84	84.345	85.8	84.24	86.64	84.12	86.47	84.12	85.935	83.86	84.28	83.925	84.13	83.835	84.12	83.445	83.84	83.325	84.47	83.27
MINIMUM	82.06	81.78	82.99	82.6	83.28	82.56	81.85	81.85	83.37	82.51	83.42	82.37	83.28	82.4	82.89	82.21	82.495	82.01	82.11	81.9	82.13	81.81	82.08	81.81

- Stands for Data Not Available

Table 39: Monthly Minimum and Maximum Water levels at Musiri

4.17 Yearly minimum and maximum Water levels

Below table shows yearly maximum and minimum water levels at Urachikottai gauging site.

YEAR	MAXIMUM W.L. (m)	MINIMUM W.L. (m)
1978	162.670	158.750
1979	164.640	158.820
1980	165.830	158.550
1981	165.435	158.345
1982	161.100	158.360
1983	161.680	158.185
1984	161.640	158.465
1985	160.930	157.720
1986	160.710	157.580
1987	160.495	157.840
1988	160.900	157.500
1989	160.961	158.000
1990	160.620	157.610
1991	162.224	157.907
1992	163.149	158.068
1993	160.625	157.859
1994	163.300	158.000
1995	160.830	157.600
1996	160.628	157.950
1997	161.188	157.860
1998	161.011	157.950
1999	161.260	157.810
2000	163.885	158.040
2001	160.660	157.890
2002	160.405	158.050
2003	160.480	157.460
2004	160.540	157.020
2005	165.010	157.720
2006	162.220	157.660
2007	164.200	157.930
2008	160.700	157.700
2009	161.180	157.740
2010	160.750	157.870
2011	160.700	157.900
2012	159.940	157.780
2013	164.160	157.880
2014	159.655	157.900
MAXIMUM	165.830	158.068
MINIMUM	159.655	157.020

Table 40: Yearly minimum and maximum Water Levels at Urachikottai

Below table shows yearly maximum and minimum water levels at Kodumudi gauging site.

YEAR	MAXIMUM W.L. (m)	MINIMUM W.L. (m)
1971	124.280	121.670
1972	126.600	121.820
1973	124.250	122.170
1974	124.420	121.377
1975	125.372	121.685
1976	123.790	121.550
1977	124.388	121.280
1978	126.515	121.910
1979	125.870	121.585
1980	127.020	121.955
1981	126.050	121.565
1982	123.580	121.690
1983	124.013	121.505
1984	123.980	121.600
1985	123.470	121.600
1986	123.630	121.540
1987	124.125	121.680
1988	124.340	122.070
1989	124.435	122.060
1990	124.155	122.135
1991	125.344	122.095
1992	125.800	122.133
1993	124.131	122.260
1994	126.209	122.210
1995	124.240	122.110
1996	124.340	122.130
1997	124.580	122.170
1998	124.490	122.195
1999	124.815	122.210
2000	127.090	122.230
2001	124.100	122.270
2002	123.830	122.070
2003	123.930	121.570
2004	123.950	121.670
2005	127.830	122.000
2006	125.170	122.200
2007	126.860	122.340
2008	124.050	122.270
2009	124.340	122.150
2010	124.010	122.090
2011	124.190	122.150

2012	123.490	122.250
2013	126.460	121.650
2014	123.140	121.970
MAXIMUM	127.830	122.340
MINIMUM	123.140	121.280

Table 41: Yearly minimum and maximum Water Levels at Kodumudi

Below table shows yearly maximum and minimum water levels at Musiri gauging site.

YEAR	MAXIMUM W.L. (m)	MINIMUM W.L. (m)
1971	84.96	82.855
1972	85.935	82.915
1973	84.455	83.19
1974	84.580	82.910
1975	85.265	82.74
1976	84.260	82.72
1977	86.175	83.200
1978	85.313	83.16
1979	86.05	83.09
1980	85.825	83.1
1981	85.84	83.00
1982	84.210	82.9
1983	84.503	83.055
1984	84.53	83.06
1985	84.19	83.110
1986	84.33	83.06
1987	84.25	83.03
1988	84.390	83.120
1989	84.340	83.040
1990	84.200	83.160
1991	85.140	83.210
1992	85.390	83.170
1993	86.100	82.780
1994	85.400	83.040
1995	84.235	82.850
1996	84.320	83.100
1997	84.750	82.940
1998	84.480	82.990
1999	84.570	83.080
2000	85.845	82.940
2001	84.080	83.050
2002	83.950	82.940
2003	83.990	82.570
2004	83.660	82.790

2005	86.640	82.640
2006	84.610	82.380
2007	85.750	82.640
2008	83.970	82.590
2009	84.000	82.610
2010	83.920	82.170
2011	83.610	82.70
2012	82.890	81.780
2013	84.700	81.140
2014	80.920	82.150
MAXIMUM	86.640	83.210
MINIMUM	82.150	80.920

Table 42: Yearly minimum and maximum Water Levels at Musiri

4.18 Chart Datum/ Sounding Datum

As per discussion with IWAI, Chart Datum has been taken as following for different reaches

Tidal Reach:

C.D. is taken as C.D. of nearest port from Admiralty Tide Table (ATT- Volume 3) or Navigational charts

Non-Tidal Reach

As per discussion with IWAI, Sounding datum in rivers is taken as Average of minimum yearly water level for Last six years at all gauging sites. The gauge-discharge data of Musiri, Kodumudi and Urachikottai site was collected from CWC. Accordingly, the C.D. at these G.D. Sites has been arrived as below:

C.D. at Musiri G.D. Site

Although CWC data from 1971-2014 was available for Musiri, Data for the recent six years 2009, 2010, 2011, 2012, 2013 and 2014 was used for computing C.D. since the data for above years only was available for the maximum period in a year.

$$= [82.610 + 82.560 + 82.170 + 81.780 + 81.140 + 80.920] / 6$$

$$= \mathbf{81.863 \text{ m}}$$

C.D. at Kodumudi G.D. Site

Although CWC data from 1971-2014 was available for Kodumudi, Data for the recent six years 2009, 2010, 2011, 2012, 2013 and 2014 was used for computing C.D. since the data for above years only was available for the maximum period in a year.

$$= [122.150 + 122.090 + 122.150 + 122.250 + 122.650 + 121.970] / 6$$

$$= \mathbf{122.043 \text{ m}}$$

C.D. at Urachikottai G.D. Site

Although CWC data from 1978-2014 was available for Musiri, Data for the recent six years 2007, 2008, 2009, 2011, 2012 and 2013 was used for computing C.D. since the data for above years only was available for the maximum period in a year.

$$= [157.700 + 157.740 + 157.870 + 157.900 + 157.780 + 157.880] / 6$$

$$= \mathbf{157.812 \text{ m}}$$

Sr. No.	Gauging station (Kaveri)	Latitude (N)	Longitude (E)	Height of CD from MSL (m)	Used for River stretch KPs
1	Musiri	10° 56' 36"	78°16' 06"	81.863	16.41 to 220
2	Kodumudi	11° 04' 52"	77°53' 25"	122.043	220.1 to 254
3	Urachikottai	11°28' 40"	77°42' 00"	157.812	254.1 to 310

Table 43: CD at gauging sites

In case of Dams/ Bridges/ Barrages/ Check Dam, the C.D. has been taken as Ponding level or MDDL.

4.19 High Flood Levels

Tidal Reach

In Tidal reach, MHWS at Porto Nova as per Admiralty Tide Table (ATT-Vol 3) has been adopted as High Flood Level.

MHWS: 1.1 (w.r.t. C.D.)

MSL : 0.7 (W.r.t. C.D.)

MHWS (w.r.t. M.S.L.) : 1.1 - 0.7 = 0.4 m (w.r.t. M.S.L.)

Non Tidal Reach

Gauge Sites: High flood levels are computed from last twenty years Gauge discharge data collected from CWC for gauge sites. The maximum water level in last twenty years from the collected data has been adopted as H.F.L.

Urachikottai: Maximum flood discharge & HFL (during period of data) were 5854 m³/s and 165.01 m respectively in October 2005.

Frequency Analysis of yearly maximum flood data using Gumbel distribution indicate following flood discharges for different return periods.

Return Period in years	2	5	10	20	25	50	75	100	200
Discharge (m ³ /s)	1243.35	2595.91	3491.42	4350.42	4622.9	5462.3	5950.19	6295.5	7125.66

The 100 year return flood at Urachikottai is calculated as 6295 m³/s.

Kodumudi: Maximum flood discharge & HFL (during period of data) were 6584 m³/s and 127.83 m respectively in October 2005.

Frequency Analysis of yearly maximum flood data using Gumbel distribution indicate following flood discharges for different return periods.

Return Period in years	2	5	10	20	25	50	75	100	200
Discharge (m ³ /s)	738.8	2012.12	2855.16	3663.83	3920.35	4710.58	5169.88	5494.96	6276.48

The 100 year return flood at Kodumudi is calculated as 5495 m³/s.

Musiri: Maximum flood discharge & HFL (during period of data) were 7690 m³/s and 86.64 m respectively in October 2005.

Frequency Analysis of yearly maximum flood data using Gumbel distribution indicate following flood discharges for different return periods.

Return Period in years	2	5	10	20	25	50	75	100	200
Discharge (m ³ /s)	688.64	2000.66	2869.33	3702.58	3966.9	4781.14	5254.4	5589.36	6394.64

The 100 year return flood at Musiri is calculated as 5589 m³/s.

4.20 Monthly minimum and maximum Discharges (in cumecs)

YEAR	JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1978-1979	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1979-1980	568.00	13.00	625.00	350.00	4920.00	18.00	936.30	12.00	844.10	10.00	691.20	10.00	530.00	87.90	535.50	35.50	168.90	12.00	166.00	11.00	54.30	19.00	74.00	25.00
1980-1981	714.50	5.00	4663.50	697.60	2340.00	540.00	883.00	200.00	580.00	18.00	555.00	11.00	476.40	62.00	411.00	22.50	139.00	17.50	153.80	39.20	47.80	26.00	53.00	0.40
1981-1982	60.00	30.00	600.00	39.00	4240.00	373.60	2660.30	550.00	908.00	29.20	1036.20	85.00	578.50	18.00	507.30	156.80	458.80	44.00	175.20	6.40	89.00	33.00	40.00	12.00
1982-1983	460.00	19.80	462.00	234.00	581.00	223.20	600.50	187.00	354.60	4.80	230.10	4.50	249.80	8.20	283.60	5.00	130.40	5.40	93.60	30.90	46.70	29.90	47.50	2.60
1983-1984	42.70	0.90	87.00	23.40	749.20	79.50	771.40	210.00	1010.40	188.90	696.00	38.30	124.00	8.00	414.00	9.50	39.50	4.30	33.00	3.80	31.00	28.00	32.00	28.00
1984-1985	678.50	25.00	1119.60	494.50	1108.60	700.30	730.00	10.00	780.00	9.70	745.00	13.00	486.50	10.60	490.00	8.00	36.00	5.20	36.50	27.00	44.00	36.00	44.00	37.00
1985-1986	46.00	26.50	410.00	29.00	562.00	362.30	539.80	149.00	412.00	116.00	381.20	4.00	382.40	4.00	245.20	4.00	240.80	10.00	41.00	20.00	34.00	28.00	56.00	4.50
1986-1987	34.00	0.00	184.60	31.00	544.90	23.40	606.60	486.00	624.00	114.70	545.00	10.00	529.50	5.00	484.50	11.00	313.00	25.70	82.00	32.00	66.50	25.50	69.50	24.80
1987-1988	40.30	15.50	181.50	0.90	64.10	35.20	57.10	43.40	56.00	2.00	487.30	18.00	532.10	5.00	431.80	57.90	291.70	3.80	105.00	4.70	60.10	20.00	63.10	4.50
1988-1989	78.20	0.00	192.00	34.00	517.40	21.20	548.30	138.00	666.30	349.40	434.40	3.00	443.80	0.00	331.40	0.00	227.10	0.00	116.40	0.00	50.20	0.00	98.00	0.00
1989-1990	54.60	0.00	47.80	0.00	647.60	0.00	708.60	312.00	571.60	288.00	263.20	0.00	441.10	99.90	380.70	0.00	274.50	0.00	108.00	0.00	76.00	46.20	63.00	0.00
1990-1991	47.30	0.00	161.80	0.00	564.20	49.70	570.00	340.00	448.90	340.00	444.80	0.00	442.40	0.00	303.10	41.20	68.00	42.00	63.30	0.00	79.40	48.30	65.80	0.00
1991-1992	44.00	12.90	1002.00	20.10	1536.00	603.30	916.60	326.50	627.00	15.60	1287.00	15.00	498.90	66.60	436.60	46.20	237.40	46.00	64.30	30.10	77.60	46.80	61.60	12.30
1992-1993	464.50	45.30	754.20	397.50	2281.00	497.20	807.00	80.30	1329.00	45.30	907.00	45.30	529.80	29.90	497.50	39.60	337.60	40.50	77.70	29.90	93.30	46.50	68.40	41.30
1993-1994	546.30	0.00	1723.00	410.20	2386.00	667.00	787.30	524.20	648.20	0.00	1322.20	0.00	887.50	328.00	684.00	0.00	65.60	0.00	89.60	0.00	69.20	0.00	41.50	0.00
1994-1995	71.30	0.00	435.20	0.00	545.40	216.80	637.10	278.40	546.40	0.00	667.00	0.00	490.00	79.00	263.70	0.00	77.10	0.00	77.10	0.00	41.70	0.00	77.10	0.00
1995-1996	49.20	0.00	449.90	0.00	485.00	168.20	574.30	61.90	612.60	0.00	626.90	0.00	519.60	0.00	453.20	0.00	346.90	0.00	42.50	33.40	42.80	26.40	44.30	34.40
1996-1997	49.20	0.00	449.90	0.00	485.00	168.20	574.30	61.90	612.60	0.00	626.90	0.00	519.60	0.00	453.20	0.00	346.90	0.00	42.50	33.40	42.80	26.40	44.30	34.40
1997-1998	414.00	39.60	578.10	5.90	633.10	473.30	855.00	439.70	801.90	0.00	146.20	0.00	540.00	104.00	403.90	0.00	116.00	0.00	140.50	0.00	197.00	37.00	88.00	0.00
1998-1999	417.60	39.30	666.90	248.00	586.40	37.80	729.20	185.40	815.00	180.30	830.00	0.00	472.30	0.00	457.90	0.00	284.00	0.00	0.00	0.00	46.00	0.00	0.00	0.00
1999-2000	87.00	0.00	621.50	0.00	797.60	466.00	535.50	221.30	480.00	0.00	767.10	0.00	481.00	0.00	445.50	0.00	277.70	0.00	143.10	0.00	0.00	0.00	110.00	0.00
2000-2001	622.50	0.00	692.10	343.60	484.20	164.90	605.60	0.00	3720.00	176.50	596.80	0.00	894.10	0.00	359.90	0.00	0.00	0.00	0.00	0.00	64.10	0.00	206.20	0.00
2001-2002	475.50	72.80	573.30	198.10	493.60	9.40	395.00	139.50	504.30	10.90	455.90	1.10	501.30	3.00	380.00	214.50	359.60	8.00	119.90	8.00	101.60	8.60	96.90	9.30

2002-2003	0.00	0.00	67.50	0.00	77.90	50.80	501.20	74.80	274.60	0.00	321.90	0.00	491.10	0.00	427.30	0.00	264.00	0.00	47.20	0.00	38.50	0.00	0.00	0.00
2003-2004	37.60	0.00	68.20	0.00	86.40	0.00	91.60	0.00	580.90	0.00	429.30	0.00	382.10	0.00	298.00	0.00	251.00	0.00	0.00	0.00	0.00	0.00	75.60	0.00
2004-2005	50.00	0.00	494.20	0.00	580.60	0.00	475.20	0.00	486.10	0.00	303.10	0.00	361.70	162.50	401.40	0.00	0.00	0.00	47.40	0.00	33.80	0.00	37.00	0.00
2005-2006	0.00	0.00	417.90	0.00	798.10	206.30	1387.80	565.70	5854.50	102.60	2681.00	169.90	809.30	125.60	392.70	0.00	0.00	0.00	56.00	0.00	69.40	0.00	18.70	0.00
2006-2007	554.00	0.00	715.90	379.10	560.50	307.30	633.80	373.40	543.60	0.00	467.50	0.00	466.90	0.00	364.40	0.00	174.60	0.00	74.90	49.20	67.40	44.40	56.00	0.00
2007-2008	0.00	0.00	1398.20	0.00	3422.00	296.90	807.60	437.40	935.20	0.00	732.40	254.30	477.60	0.00	451.10	0.00	276.20	0.00	63.80	0.00	0.00	0.00	49.60	0.00
2008-2009	399.20	0.00	388.30	337.60	411.90	341.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2009-2010	0.00	0.00	404.20	0.00	510.70	156.90	767.10	428.90	838.80	219.70	140.10	0.00	342.20	0.00	574.30	0.00	144.60	0.00	70.70	0.00	153.10	0.00	102.50	0.00
2010-2011	73.40	0.00	380.40	0.00	377.90	128.90	503.90	293.40	588.90	129.50	215.00	0.00	392.10	0.00	366.20	0.00	152.30	0.00	105.10	0.00	103.90	0.00	0.00	0.00
2011-2012	554.00	0.00	715.90	379.10	560.50	307.30	633.80	373.40	543.60	0.00	467.50	0.00	466.90	0.00	364.40	0.00	174.60	0.00	74.90	49.20	67.40	44.40	56.00	0.00
MAXIMUM	714.50	72.80	4663.50	697.60	4920.00	700.30	2660.30	565.70	5854.50	349.40	2681.00	254.30	894.10	328.00	684.00	214.50	458.80	46.00	175.20	49.20	197.00	48.30	206.20	41.30
MINIMUM	0.00	0.00	47.80	0.00	64.10	0.00	57.10	0.00	56.00	0.00	140.10	0.00	124.00	0.00	245.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

- Stands for Data Not Available

Table 44: Monthly minimum and maximum Discharges (in Cumecs) at Urachikottai

YEAR	JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1971-1972	522.9	3.7	1040	727.4	1103.4	193.9	1200	466.8	830.7	189.1	828.8	146.8	861.8	39.3	855.5	31.3	578.6	30.8	169.4	17.5	83.7	10.1	737.5	23.9
1972-1973	66.6	12.9	1149.4	28.3	1150	804.2	817.4	25	707.4	84.1	860	82.2	3900	190.1	786.9	273.4	558.4	267.5	429.3	63.4	329.4	45.7	135.5	23.3
1973-1974	544	37.6	990.1	37.6	915.2	593.4	818.2	593.4	785.8	127.7	866.1	62.7	685	72.7	691.7	40.4	453.1	18.5	40.2	18.4	69.2	20.1	81.7	19.1
1974-1975	38.6	16.4	720	18.6	1045.8	790	1175.5	69.9	1231.2	144.6	801	64.4	733.4	39.6	524	17.5	502.3	16.7	207.5	14.5	40.7	9.9	88.1	22.9
1975-1976	44	11.9	1012.3	6.3	1301.4	707.9	2274.7	489.3	1450	290.1	2000	104	720.8	72.8	621.6	43.8	566.8	23.1	59.7	25	106.3	15.8	60.7	12.5
1976-1977	44.3	6	466.7	22.9	697.8	288.8	530.2	206.4	372.7	18.2	316.2	6	163.5	3.3	542.3	18.9	37.1	14.7	45.2	28.8	84.6	24.3	35.5	6.5
1977-1978	41.9	5.8	704.3	23.4	919	32.9	670.9	81.1	642.8	62.5	1143.3	188.9	836.7	188.3	779	430	487.8	323.2	366.6	31	157.8	44.1	72.9	14.2
1978-1979	52.9	21.7	818.6	23.6	1571.6	825.8	1747	195.2	1075.5	83.6	4078.6	120.1	549	79.6	608.7	118.1	473.3	162.3	336.6	32	1.325	1.075	53.7	16.3
1979-1980	578.5	35.1	799.9	425.6	3750	63.2	939	132.3	868.7	110	2094.7	142.5	613.9	237.1	609.3	95	172	19.3	276.3	23.7	76.5	27.4	114	21.6
1980-1981	734.5	19.1	4828.7	736.5	2826.8	750	1115.9	320	791.8	101.8	620	30	539.5	100.4	458.1	29.2	166	20	195.5	44.3	89.2	29	81	7.8
1981-1982	526.8	15.9	547.3	303.5	617	461	611.5	264.8	432.3	8	300.3	13	321.2	20.3	302.9	14	188.4	12	184.6	8.8	55	22.8	58	10

1982-1983	526.8	15.9	547.3	303.5	617	461	611.5	264.8	432.3	8	300.3	13	321.2	20.3	302.9	14	188.4	12	184.6	8.8	55	22.8	58	10
1983-1984	31.9	1.2	99.9	7.5	770	79.1	785	267	1081.5	232	678.3	68	602	9.3	375.5	18.8	149	6.4	144.6	8.7	57.6	35	75.1	36.5
1984-1985	583.3	33.5	879.8	486.5	884.9	663	630	79	858	15.3	700	34.4	533.5	30.8	444	22.6	51	8	48	36.5	54.1	35.4	46.6	33.2
1985-1986	97	21.2	389.4	24.6	480.2	350.7	448	263.9	367	100	383.5	5.3	354.3	70.8	252.4	4.2	204.6	12.6	47	13	55.3	26.7	61.5	4.8
1986-1987	40.7	2.9	166.1	24	509	12	644.1	418	628	160.4	533.7	30	491.6	15.1	416.3	13.5	305	17	83.7	26.6	66.3	19	45.4	11.6
1987-1988	43.2	9.5	153.4	8	52	22.6	64	34.8	159	6.2	573	34	410.5	9.3	423	68.5	328.9	4	296.6	4.7	57.9	27	88	6.5
1988-1989	152.8	4.2	194.3	24.4	658	29	638.2	192	739.8	488	523.7	25	516.4	23	350	34.4	239.8	13.5	95.9	22.1	55.8	8.8	51.1	7.7
1989-1990	43.7	1.4	53.1	4	630	9.6	781	338	595.2	330	404.9	15.8	459.5	113.8	419	8.2	259.8	16.2	64.3	12	51	31.8	73.8	15.7
1990-1991	39.6	15.2	182	18.1	520	35.8	596.8	403.5	485.8	10.8	496	5	415	5.9	295.5	33.2	53	28.4	46	8	82	27.7	50.8	21.1
1991-1992	72.5	0	999.6	7.4	1621	717.8	891	400	662.4	200.2	1643	38.1	553.5	118.7	471.4	43.9	240.2	45.6	99.7	22	75	37.4	50.2	10.8
1992-1993	482.5	39	801.5	444	2122	519.6	772.6	179.3	1278	134.8	1064	67.8	590.9	34.4	513.5	29.9	357.8	33.9	66.3	15.4	84.8	37.3	80.8	39.2
1993-1994	543.6	32.5	596	496.7	635.4	481.8	657.2	325	622.2	29.7	244	33.9	320.4	29.7	480.6	19	130.1	8.9	124.7	16.3	148.7	8.4	86.2	38.2
1994-1995	548.5	9.4	1963	486.7	2766	662.3	821	637.5	684.1	204.7	1896	114.7	817.6	357.3	689.3	22.5	84.9	10.3	110	20.8	66.8	15.3	86.3	5.3
1995-1996	66.6	24.6	424.4	30.4	525.9	242.3	659.1	243.6	663.3	67	581.9	91.3	517.1	98.5	338.9	10.7	102.1	5.5	71.3	7	139.5	12	49.1	6.5
1996-1997	39.8	8.5	358.7	7.2	461.5	187.2	589.5	79.8	761.7	63	668.5	26.3	443.2	36.3	380.2	34.8	341.8	13.2	68.3	23.7	65	16.3	96.5	22.6
1997-1998	388.4	34	596	324.8	670.5	502.3	890.4	445	763.7	59.7	361	6	832.7	192.9	482.5	44	90	17.5	65.6	20	107.4	35	107	21
1998-1999	767	28.8	786.8	314.7	194.7	194.7	760.9	257.6	793.5	213	630.3	37.9	490.2	27.5	405.7	26.1	96.6	19.7	100.1	46.5	95.1	27.5	167.2	24.8
1999-2000	81.1	26.7	566	27.7	833.1	483.1	558.2	287.4	422.7	31.8	924	99.3	510.3	40	466.2	26.2	271	19.3	88.6	40.9	86.4	34.2	99.4	21
2000-2001	484.7	11.7	712.6	377.2	474.5	222.7	582.6	117.4	3140	256.9	817.6	28.4	792	61.4	385.6	57.2	77.4	49.5	66.3	32.2	121.4	25.9	123.2	35.5
2001-2002	464	50.9	602.4	188.5	481.1	20.8	365.4	132	455.9	66	443.8	44.1	522.8	33.7	380.6	23.7	322.4	2.1	68.9	0.7	57.6	33.4	61.7	18.3
2002-2003	42	1.7	36.5	2.4	67.3	24.3	529.5	47.8	304.5	1.2	317.6	8.3	500.6	4.1	436.8	0.2	275.7	0.1	90.5	0	43.5	0	17.5	0
2003-2004	9.5	0	24.6	0	101.1	0	78.9	0	562	6.4	431.2	3.7	393.9	3.2	313.7	0	243.1	0	0.7	0	24.8	0	70.3	0
2004-2005	13.1	0	518.8	2.6	565.8	2.2	545.9	66.5	518.3	41	305.1	6.5	436.2	219.2	445.9	12.9	172.8	1.8	92.8	10.5	458.2	1.4	113.7	0.2
2005-2006	74.4	9.2	407	6.4	854.7	72	1180.1	544.3	6584.9	190.3	2432.6	221	859	259.5	399.5	46.4	86.2	29.5	151.1	47.2	160.5	35.5	125	10.2
2006-2007	534.3	68.5	641.3	368.1	1612.9	515.1	627	186	710.2	108.5	473.6	88	492.4	128.5	357	55.1	114.9	30.1	98.9	82.4	118.5	62.6	116.5	55.1
2007-2008	66.1	51.5	1560.9	64.3	4201.8	339.1	1018.3	399.5	1345.2	162	953.3	267.4	1029.8	101.3	480.6	28.7	132.6	50.2	234.5	33.8	142.1	57.3	124.1	59.1
2008-2009	486.5	27.8	459.1	344.8	544.1	374.7	700.5	429.3	719.8	82.1	563.3	150.9	373.8	64.2	390.1	26.4	121	29.2	190.3	28.8	94.8	52.3	143.4	29.2
2009-2010	120.4	26.7	395.3	44.5	548.9	173.8	697.9	439	864.1	303.9	398.6	46.9	355.1	51.9	387.1	43.7	118	30.4	135.8	79.6	117	81.5	153.8	33.9

2010-2011	135.6	34	385.1	49.8	412.8	156.4	504.9	273	642.5	138.4	403	135.7	457.4	143.3	375.5	29.5	144.3	26.4	141.4	102.9	206.4	35.1	158.8	37.2
2011-2012	585.6	101.8	720.5	433.1	651.5	346.3	780	382.8	707.5	91.1	554.9	91.9	569.6	124.5	409.5	40.3	228.2	83.9	129	50.8	107.3	52	97.5	44
MAXIMUM	767	101.8	4828.7	736.5	4201.8	825.8	2274.7	637.5	6584.9	488	4078.6	267.4	3900	357.3	855.5	430	578.6	323.2	429.3	102.9	458.2	81.5	737.5	59.1
MINIMUM	9.5	0	24.6	0	52	0	64	0	159	1.2	244	3.7	163.5	3.2	252.4	0	37.1	0	0.7	0	1.325	0	17.5	0
- Stands for Data Not Available																								

Table 45: Monthly minimum and maximum Discharges (in Cumecs) at Kodumudi

YEAR	JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL		MAY	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1970-1971	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1971-1972	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1972-1973	52.5	10	42.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234	0	510	14.7	59.1	9.2
1973-1974	389	13.5	1343.5	335	1049	522.5	1725	252.5	2115	211.6	975	60.8	620	45	567.8	20	403.1	9.8	13	5.1	63.8	4.9	32.9	5.3
1974-1975	17.4	1.8	624.2	10.5	1116.5	683.1	1334.4	84.1	1225.5	45	738.5	33.4	665.3	3.5	512.1	1.5	493.7	1.6	227.9	2.3	6.7	1.2	39.4	2.3
1975-1976	18.2	2.2	1083	3.1	1287.4	724.5	2494	599.3	1279.7	200	2097.7	22.5	677	27.5	597.6	3.5	595.9	15	19	6	78	4.9	65.1	4.6
1976-1977	35.4	6.4	460.9	12.1	590.4	306.4	523	225.3	360.2	13.5	465.8	8	92	4.6	488.1	8	34.1	4.7	30	4.9	56	5.1	14.8	2.9
1977-1978	12	2.5	638.5	11	987.3	63.9	913.1	137.4	1667.9	130	4510	667.7	1040.7	227.5	975.8	414.4	547.8	360.1	504.4	44.4	164.8	32.5	119.4	15.5
1978-1979	49	10	940.3	14.6	1420	792.6	2110	224.7	905.6	85	3595.3	83.4	1977.4	108.5	911.5	168.9	630.9	261.9	338.1	7.5	68.3	15.8	32.5	5.2
1979-1980	572.1	5.2	878	465.7	3180	80	1065.96	40	960.8	180.4	4050	184.1	771.7	132	500	66	132	10	129.3	4.6	42.2	6	79.8	4.8
1980-1981	680	6.2	4383.4	671.4	1926	628.9	1131.9	150	790	67.1	742.3	40	544	69	401.3	78.1	70.4	6.9	110.6	16.4	44.6	8.2	38.4	5.5
1981-1982	83	6.1	610	12	3943.9	467.7	4150	490	1543.9	30	1473.4	83.4	700.8	91.9	590	116.9	528	46	546	5.3	27.4	4	33	5
1982-1983	462	4.3	547.9	320	632	423.7	665.6	198	416	40	359.4	9.8	331	8	296.4	9.4	160.2	2	169.5	2.7	12	2.6	67	3
1983-1984	30.3	1	40	1	684	30.3	692.4	195.8	965.3	106	616.7	19	1011.7	8	428	12.4	205.2	10.2	457.7	5.9	44	14.5	24.8	8.5
1984-1985	543.7	8.8	891.2	420.6	848.1	569.1	626.3	138	967.7	22.2	625	20	697	23	442.8	28	46.2	15.6	27.3	10	28	6.5	19.8	7.8
1985-1986	58	7.5	419.7	18.7	556	338	556	252.9	382	95	332.8	13	299	70.9	231.6	6	192.7	6.4	31.9	4.2	28	4.4	52.5	5.2
1986-1987	11.6	2.5	46.6	3	488	11.4	646.2	448.5	697.8	234	542.4	15	441.8	10	361.8	17	251.5	5	62	11.5	67.7	6.3	40	7
1987-1988	39	1.34	100.8	0.35	103.3	5.164	30.6	6.063	97.35	6.848	533.2	16.78	356.7	10	364.3	70.36	269.7	7.052	147.7	2.616	32	6.5	83	4.813
1988-1989	67.34	2.714	117	3.528	650	12.96	691.4	152	778.9	414.9	442	26.97	362.9	11.57	280.3	7	179.2	5.816	56.32	7	74.81	6.311	23.44	4.183

1989-1990	32.61	0.491	184.2	3	405.9	4	684.8	280.3	550	282	362.7	13	370	83.86	503.3	11.5	262.3	21	56.13	10.79	24	10.2	37.19	4.694
1990-1991	23.41	5.204	18	1.789	534.5	20	636.3	336	531.7	27.09	487.3	11.43	396.7	3.5	288	14.75	41	5	15.81	5	26	3.359	32	6.531
1991-1992	94.45	5.027	577.5	7.13	1825	589.2	809.3	314.1	602.4	343.3	1856	62.11	467.3	79.24	375.6	87.49	200.9	31.87	70.91	9.881	50.75	9.881	18.01	0.449
1992-1993	456.4	7.662	767	429.8	2456	487.8	782.8	209.5	1529	132	1338	69.13	553.8	25	443.2	57.14	264.3	19.48	51.01	10.84	23.76	11.12	45.29	12.28
1993-1994	455.6	2.102	502.8	394	548.1	379.3	554	248.1	524.8	38	6400	37.34	528.3	58.07	399.6	69.73	144.3	56.34	69.73	56.35	66.94	56.35	65.58	56.35
1994-1995	489.1	7.825	1379	398.1	2561	598.2	858.2	656.7	686.1	296.6	2517	293	819.2	367.1	675.6	146	55.45	21.78	56.28	14.38	37.57	7.237	44.45	2.707
1995-1996	42.32	9.532	367	31.67	500.5	267.5	590.6	242.4	668.7	107	588.7	130	589.6	113.4	286.5	72.58	44.52	7.532	32.94	5.309	89	5.45	20.35	4.897
1996-1997	28.86	12.22	299.2	10.69	550.7	218.4	656.9	56.44	796.2	81.01	622.8	58.07	769.9	71	452.4	181.1	351.3	20.86	38.64	15.38	40	7	55.8	7.864
1997-1998	367.8	16.46	591.1	313.2	676.2	492.5	1053	424.3	801.9	49	994.4	41	1477	170	442.7	99.34	105.1	22.41	67.58	19.61	71.36	21.29	157	19.32
1998-1999	424.9	15.65	841.3	360.3	664.4	193.3	831.8	253.7	684.9	168.2	734.3	77.86	981.2	40	400.6	122.5	45	9.71	29.4	13.23	61.84	18.5	174.6	6.5
1999-2000	36.5	5.46	485.5	23.08	757.2	476.2	585.8	363.6	442.8	55.44	1324	62.19	962.9	17.5	465.3	13.9	295.8	18.9	76.73	12.51	41.71	9.082	51.85	4.4
2000-2001	441.9	4.489	653.2	326.7	596.7	224.4	612	172.2	4232	239	819.9	22.1	865.1	126.9	393.5	53.23	55	17.95	51.83	4.218	61.64	8.256	62.2	5.462
2001-2002	446.1	9.462	638.443	122.377	530.063	25.485	386.722	79.53	536.227	64.88	548.273	31.5	512.611	24.49	310.356	23.805	248.68	4.708	33.878	1.225	20.224	1.003	15.77	3.069
2002-2003	18.559	1.38	1.119	0.397	30.76	0.335	450	14.073	325.572	8.792	274.834	7.781	453.7	6.638	394.786	1.828	203.423	0.125	3.207	0	0.378	0	0.162	0
2003-2004	1.401	0	-	-	53.38	0	-	-	594.196	0	387.1	8.889	405.1	1.208	306.783	1.871	205.061	0.125	18.194	0.083	-	-	10.267	0.48
2004-2005	3.263	0	397.718	0	583.8	4.549	536.224	132.1	632.266	11.91	498.623	8.542	452.919	196.027	436.6	42.103	53.97	2.619	36.14	0.36	254.934	1.15	32.28	0.05
2005-2006	24.46	0.632	465.7	0.804	714.241	164.032	1324	549.776	7690.263	168.2	5990.598	89.27	1768.652	285	480.5	64.897	34.18	3.554	31.825	8.838	70.25	12.54	99.79	2.156
2006-2007	590.281	7.947	732.201	356.501	1717.473	523.9	722.078	203.58	847.829	102.976	655.277	85.95	532.37	60.95	424.252	65.838	58.05	16.641	29.757	6.268	30.774	6.268	16.25	4.491
2007-2008	9.586	3.582	1667.066	4.185	3940.147	291.823	1217	391.617	1122	380.7	1691.866	267.203	2760.372	151.6	596.9	65.53	65.53	4.169	340.3	2.858	74.81	6.581	56.617	4.782
2008-2009	591.58	9.142	599.577	411.3	650.617	378.4	799.625	527.403	984.862	79.927	923.6	303.632	588.339	75.119	383.168	59.962	40.15	6.352	66.52	6.826	13.568	4.601	37.507	3.349
2009-2010	25.676	3.179	464.294	3.691	703.287	113.157	823.695	490.765	1283.292	384.642	861.098	31.509	365.1	41.238	439.508	56.21	33.596	19.42	20.163	10.421	13.182	7.557	160.202	7.012
2010-2011	43.438	4.16	333.472	8.906	359.191	103.285	539.575	215.658	725.461	124.691	870.604	127.598	699.969	98.296	396.591	51.401	40.394	9.614	41.783	15.601	172.652	8.386	29.407	6.63
2011-2012	605.549	17.213	646.25	325.274	693.601	326.123	630.945	321.128	583.39	116.272	687.698	95.052	615.693	96.525	317.867	65.028	149.402	32.561	59.27	23.65	50.07	11.005	44.219	10.572
2012-2013	-	-	-	-	-	-	22.18	22.18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MAXIMUM	680	17.213	4383.4	671.4	3943.9	792.6	4150	656.7	7690.263	414.9	6400	667.7	2760.372	367.1	975.8	414.4	630.9	360.1	546	56.35	510	56.35	174.6	56.35
MINIMUM	1.401	0	1.119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.207	0	0.378	0	0.162	0

- Stands for Data Not Available

Table 46: Monthly minimum and maximum Discharges (in Cumecs) at Musiri

4.21 Yearly minimum and maximum Discharges

Below table shows yearly maximum and minimum discharges at Urachikottai gauging site.

YEAR	MAXIMUM Q (m ³ /sec)	MINIMUM Q (m ³ /sec)
1978-1979	-	-
1979-1980	4920	10
1980-1981	4663.5	0.4
1981-1982	4240	6.4
1982-1983	600.5	2.6
1983-1984	1010.4	0.9
1984-1985	1119.6	5.2
1985-1986	562	4
1986-1987	624	0
1987-1988	532.1	0.9
1988-1989	666.3	0
1989-1990	708.6	0
1990-1991	570	0
1991-1992	1536	12.3
1992-1993	2281	29.9
1993-1994	2386	0
1994-1995	667	0
1995-1996	626.9	0
1996-1997	626.9	0
1997-1998	855	0
1998-1999	830	0
1999-2000	797.6	0
2000-2001	3720	0
2001-2002	573.3	1.1
2002-2003	501.2	0
2003-2004	580.9	0
2004-2005	580.6	0
2005-2006	5854.5	0
2006-2007	715.9	0
2007-2008	3422	0
2008-2009	411.9	0
2009-2010	838.8	0
2010-2011	588.9	0
2011-2012	715.9	0

MAXIMUM	5854.5	29.9
MINIMUM	411.9	0

Table 47: Yearly minimum and maximum Discharges at Urachikottai

Below table shows yearly maximum and minimum discharges at Kodumudi gauging site.

YEAR	MAXIMUM Q (m³/sec)	MINIMUM Q (m³/sec)
1971-1972	1200	3.7
1972-1973	3900	12.9
1973-1974	990.1	18.4
1974-1975	1231.2	9.9
1975-1976	2274.7	6.3
1976-1977	697.8	3.3
1977-1978	1143.3	5.8
1978-1979	4078.6	1.075
1979-1980	3750	19.3
1980-1981	4828.7	7.8
1981-1982	617	8
1982-1983	617	8
1983-1984	1081.5	1.2
1984-1985	884.9	8
1985-1986	480.2	4.2
1986-1987	644.1	2.9
1987-1988	573	4
1988-1989	739.8	4.2
1989-1990	781	1.4
1990-1991	596.8	5
1991-1992	1643	0
1992-1993	2122	15.4
1993-1994	657.2	8.4
1994-1995	2766	5.3
1995-1996	663.3	5.5
1996-1997	761.7	7.2
1997-1998	890.4	6
1998-1999	793.5	19.7
1999-2000	924	19.3
2000-2001	3140	11.7
2001-2002	602.4	0.7
2002-2003	529.5	0
2003-2004	562	0

2004-2005	565.8	0
2005-2006	6584.9	6.4
2006-2007	1612.9	30.1
2007-2008	4201.8	28.7
2008-2009	719.8	26.4
2009-2010	864.1	26.7
2010-2011	642.5	26.4
2011-2012	780	40.3
MAXIMUM	6584.9	40.3
MINIMUM	480.2	0

Table 48: Yearly minimum and maximum Discharges at Kodumudi

Below table shows yearly maximum and minimum discharges at Musiri gauging site.

YEAR	MAXIMUM Q (m ³ /sec)	MINIMUM Q (m ³ /sec)
1970-1971	-	-
1971-1972	-	-
1972-1973	510	0
1973-1974	2115	4.9
1974-1975	1334.4	1.2
1975-1976	2494	2.2
1976-1977	590.4	2.9
1977-1978	4510	2.5
1978-1979	3595.3	5.2
1979-1980	4050	4.6
1980-1981	4383.4	5.5
1981-1982	4150	4
1982-1983	665.6	2
1983-1984	1011.7	1
1984-1985	967.7	6.5
1985-1986	556	4.2
1986-1987	697.8	2.5
1987-1988	533.2	0.35
1988-1989	778.9	2.714
1989-1990	684.8	0.491
1990-1991	636.3	1.789
1991-1992	1856	0.449
1992-1993	2456	7.662
1993-1994	6400	2.102
1994-1995	2561	2.707

1995-1996	668.7	4.897
1996-1997	796.2	7
1997-1998	1477	16.46
1998-1999	981.2	6.5
1999-2000	1324	4.4
2000-2001	4232	4.218
2001-2002	638.443	1.003
2002-2003	453.7	0
2003-2004	594.196	0
2004-2005	632.266	0
2005-2006	7690.263	0.632
2006-2007	1717.473	4.491
2007-2008	3940.147	2.858
2008-2009	984.862	3.349
2009-2010	1283.292	3.179
2010-2011	870.604	4.16
2011-2012	693.601	10.572
2012-2013	22.18	22.18
MAXIMUM	7690.263	22.18
MINIMUM	22.18	0

Table 49: Yearly minimum and maximum Discharges at Musiri

- DATA NOT AVAILABLE
- 0 NO FLOW IN THE RIVER

5. Preliminary Traffic studies and Market Analysis

This chapter deals with the status of land use pattern, crops, agriculture, existing industries, cargo, jetties and terminals, passenger ferry services along the river route.

5.1 Land use Pattern along waterway

5.1.1 Land Utilization Pattern

Of the total area in the Cuddalore district, a vast proportion or 59% comes under the net sown category. This is followed by non-agricultural land and fallow land, each at 16%. Forests take up less than 1% of the total land in the Cuddalore district. The district has more than 300,000 farmers. Out of these, more than 78% have only less than 1 hectare land each. The combined area held by these farmers is around 87,500 hectares or 38% of the total area. In contrast, over 36% of the land or 84,985 hectares is held by some 23,500 farmers who have an area of more than 2.01 hectares each.

District	Forest	Non Agriculture	Net Sown Area	Uncultivable Barren Land	Fallow lands	Cultivable waste	Others	Total Area
Cuddalore	1,414	58,792	217,331	14,623	53,288	5,869	16,463	367,781
Nagapattinam	4,600	47,700	153,300	33,400	19,100	3,500	10,000	271,600
Ariyalur	739	32,321	107,608	8,523	19,869	3,223	21,114	193,398
Thanjavur	3,390	81,676	192,030	2,149	39,317	14,700	6,395	339,657
Tiruchirappalli	32,246	84,791	191,347	13,599	102,954	8,856	2,590	440,383
Karur	6,187	37,535	87,905	2,785	76,940	65,536	12,665	289,553
Namakkal	43,909	38,302	176,544	24,743	37,518	4,781	10,538	336,335
Erode	228,749	80,708	300,982	7,074	196,575	556	1,547	816,191

Table 50: Land use Pattern (in hectares) of Districts along the Kaveri River

In Nagapattinam district, more than 55% of the area is net sown. This is followed by non-agriculture land (17%) and uncultivable barren land (12 %.) The district also has fallow lands (7%), and land under miscellaneous, tree crops, etc. is 3%. Less than 2% of the area in the district is occupied by forests. The most important wildlife areas and forests of the district are Point Calimere Wildlife Sanctuary and the Muthupet mangroves. With respect to the land distribution pattern of the Nagapattinam district, land holding is skewed. 48% of marginal farmers occupy only 22% of the total land. Medium and large farmers (19% of total farmers) take up 50% of the total land in the district.

Ariyalur district is the smallest of all districts around Kaveri River. Over 55% of the area in the district is net sown area. Apart from this, other major uses of land in the district are non-agricultural land (17%), fallow lands (10%) and uncultivable barren land (5

%) Nearly 10% of the land in Ariyalur district comes under miscellaneous, tree crops, etc. The district has a very small area (less than 1%) as forests.

Thanjavur district has nearly 57% of its land as net sown area. Non-agricultural land takes up 24% and fallow lands take up 12% of the district. The district has the second largest amount of cultivable land (14,700 hectares) among all the other districts. Forests occupy 1% of the land in Thanjavur district.

In Tiruchirappalli district, nearly 40% of the land is net sown area. This is followed by fallow lands (26%) and area not available for cultivation (21%). Tiruchirappalli has the second largest fallow lands among all the other districts around Kaveri River. Nearly 6% of the land in the district is taken up by forests. The remaining land fell under the category of groves and orchards. Most of the farmers in wet landing farming in Tiruchirappalli district are poor with average land holding of 0.80 to 0.90 hectares. Because of the small size of land holding, farmers cannot utilize farm machinery.

In Karur district, net sown area takes up around 30% of the total land. This is followed by fallow lands at 27%. At more than 65,000 hectares, Karur has the largest amount of cultivable waste land; this takes up 23% of the total land in the district. The other prominent land use category is non-agriculture land (13%). Karur district also has nearly 11,000 hectares of permanent grazing land, which is the highest among all the other districts around Kaveri River. The district has only 2% of its area covered under forests.

Namakkal district has more than 52% of its total land as net sown area. This is followed by forests at 13%; the district has the second largest forest area among all the other districts. Non-agriculture land and fallow lands at 11% each are other prominent land uses in the district. The district also has a large area as uncultivable barren land (7%). Within the Namakkal town, of the total urban land, a majority of it (around 50%) is used for residential purposes. Some areas around Namakkal town are also seeing high density residential development. While the newly developed areas of Namakkal town are well-planned and have adequate public spaces, the older areas do not have public spaces and a street pattern.

Erode is the largest district in terms of land area, among all the districts around Kaveri river. It has a net sown area of 37%. The district has a vast forest area at 28% of the total area. These forests have various items of commercial importance, like teak, sandalwood, rosewood, vogai, pillaimaruthu, etc. Highland forest areas have diversified flora. Fallow lands (24%) are the third largest category of land use in Erode district. And around 10% of the total land in the district is non-agriculture land.

5.1.2 Districts along the river

Cuddalore

Cuddalore is a coastal district of Tamil Nadu. It has a total geographical area of 3,678 sq. km. Villupuram and Pudduchery surround the district in the north, Perambalur in the south-west and Ariyalur, Thanjavur and Nagapattinam in the south. The coastal length of the district is 68 km stretching from GunduUppalavadi in Cuddaloretaluka to Pichavaram in Parangipettaitaluka. The district is drained by Gaddilam and Pennaiyar in the north and Vellar and Kaveri in the south.

Ariyalur

Ariyalur District is located in central Tamil Nadu at a distance of 265 km away from Chennai. The District has a geographical area of 1,949 Sq.Km. It is bounded by Cuddalore district in the north and north-east and Thanjavur in south and south-east. Perambalur and Tiruchirappalli are located in the west of the district. Vellar River flows in the north and Kollidam River in the south of the district.

Tiruchirappalli

Tiruchirappalli is located centrally in Tamil Nadu with its borders touching Perambalur and Salem in the north, Namakkal in the west, Karur and Dindigul in the south-west, Pudukottai, Sivaganga and Madurai in the south and Ariyalur and Thanjavur in the east. Agriculture is the main occupation of the district. The total geographical area of the district is 4,403 sq km. Kaveri is the main river of the district. Aiyar River, a tributary of Kaveri confluences with the main river in the district.

Namakkal

The district is bounded by Salem on the north and north-east, Tiruchirappalli on the east, Karur on the south and Erode on the west. The northern region of the district is mountainous and the southern region is plain. Kaveri is the main river of the district. Other rivers include Aiyaru, Karipottan Aaru and Thirumanimutharu.

Erode

Erode lies in the north-west of Tamil Nadu with its northern region sharing borders with Karnataka. It is bounded by Karur, Namakkal and Salem in the east. The Nilgiris and Coimbatore districts lie in the west and Dindigul district in the south. The total geographical area of the district is 5,722 sq km. Kaveri is the primary river of the district. Other rivers include Bhavani, Noyyal, Perumpallam and Gunderipalam.

Karur

Karur is centrally located district in Tamil Nadu. It is bounded by Namakkal in the north, Tiruchirappalli in the east, Tiruchirappalli and Dindigul in the south and Erode in the west. It has a total geographical area of 2896 sq km. Kaveri is the principal river of the district.

Amaravathi, Kodagnar and Noyyal are the other rivers which conjugate with Kaveri in the district. Karur has rich potential due to its location as it lies in between the Manchester of South (Coimbatore) in the east, Paddy land (Thanjavur) in the west, Steel city (Salem) in the north and Temple city (Madurai) in the south.

Nagapattinam

Nagapattinam is a coastal district of Tamil Nadu with a coastal line of 187 km starting from Pazhayar in the north to Porayar and Nagore in the south of Pudduchery to Kodikkarai on the southern tip. It has total geographical area of 2,569 sq km. It is bounded by Cuddalore district in the north, Thanjavur and Thiruvarur in the west. Bay of Bengal flows in the east of the district and Palk Strait in the south. Kaveri and Kollidam are the major rivers flowing through the district. There are numerous tributaries of Kaveri and Kollidam including Uppanar and Coleroon rivers which bifurcate before falling in Bay of Bengal.

Thanjavur

Thanjavur district is located in the south east of Tamil Nadu. The district is bounded by Cuddalore and Ariyalur in the north, Nagapattinam and Thiruvarur in the east, Pudukottai in the south-east and Tiruchirapalli in the north-east. The south of the district is bounded by Palk Strait. The geographical area of the district is 3397 sq km. The district is popularly known as rice bowl of Tamil Nadu. Kaveri and Kollidam are the main rivers of the district. Other chief rivers traversing the district are Arasalam, Vennar, TR Patnam, Kudamurti, Vadavaaru and Pazhaya Kollidam.

5.2 Crops/Agriculture in the region

5.2.1 Agriculture

Cuddalore

Cereals and millets dominate nearly half of the production of the district. These were sown in an area of 1.3 MN hectares during Fasli 1423. Pulses contributed to another share of nearly 16% of the total area. It accounts for a production of nearly 24,000 tonnes.

Major Crops	Area ('000' Hect.)	Production in ('000 tonnes)	% to the total area sown
Cereals & Millets	131,503	371	48
Pulses	43,056	24	16
Oil Seeds	16,263	42	6
Other Crops	83,853	NA	31

Table 51: Major crops in Fasli 1234 (Jul'13 – Jun'14)

Source: Department of Economics and Statistics, Chennai

Paddy, cumbu, pulses are the major food crops cultivated in the area while major cash crops are sugarcane, groundnut, gingelly and coconut.

Tamil Nadu Warehousing Corporation has developed 5 warehouses in Cuddalore port. 4 of them, each having a capacity of 3,000 metric tonnes, are used for agricultural products. One of them, having a capacity of 1,000 tonnes, is used for non-agricultural goods.

The district receives an annual rainfall of 1,207 mm. Most of the rainfall comes from northeast monsoons, which account for 58% of the total rainfall in the district. It receives 383 mm of rainfall from southwest monsoons which is 32% of the total precipitation. It also receives few showers in summer and winter which account for 7% and 3% of the total precipitation respectively.

Majorly, four types of soil are present in the district – Red loam, Laterite Soil, Black Soil and Coastal Alluvium. Red loam is mainly present in Panruti, Kurinjipadi and parts of Virudhachalam. Laterite soil is found in parts of Virudhachalam and Thittakudi. Black soil is found in KM Koil, Chidambaram and interiors of Cuddalore while sandy alluvium is found in the coastal region of Cuddalore, Kurinjipadi and Parangipettai.

Type of Soil	Places in District
Red Loam	Panruti, Kurinjipadi & Virudhachalam
Lateritic Soil	Virudhachalam & Thittakudi
Black Soil	K.M.Koil, Cuddalore, Chidambaram.
Sandy Coastal Alluvium	Cuddalore, Kurinjipadi, Parangipettai

Table 52: Various types of Soil in Cuddalore district

Source: Directorate of Economics and Statistics, Chennai

Ariyalur

Rice is majorly cultivated food crop in the district. More than 92 million tonnes of rice was grown in the district in an area of 25,000 hectares. Sugarcane was the major cash crop grown in the year with a production of 2123 mn tonnes. Other cash crops grown in the district are gingelly, cotton, cashew, chillies etc.

Crops	Area in ('000 Hect.)	Production (in '000 tonnes)
Rice	25	92,292
Sugarcane	8	2,122,538
Groundnut	12	29,592
Gingelly	1	239
Cotton (Bales of 170 Kg lint each)	6	5

Onion	-	52,331
Tapioca	-	92,332
Cashew	30	7,237
Chillies	1	2
Maize	10	15

Table 53: Major Crops in the Ariyalur district Fy'11

The average rainfall in the district is 1,043 mm per annum. North-east monsoons contribute nearly half of the total precipitation in the district followed by south-west monsoons contributing to one third of total rainfall. Winters have a share of 3% and summers experience nearly 10% of the total precipitation.

Tiruchirappalli

Agriculture is the main occupation of the district. It has a total cultivable area of 1,85,985 hectares out of which 15,000 hectares are sown more than once. Rice is the major crop grown in the district. It is cultivated in 62,000 hectares and had a production of more than 2 lakh tonnes in Fy15. Pulses, millets and other cereals are the other food crops cultivated in the district. Millets and other cereals accounted for production of 47,000 tonnes in an area of 48,000 hectares.

Major Crops	Area ("000 Hect)	Production ("000 tonnes)
Rice	62	201
Millets and Other Cereals	48	47
Pulses	9	4
Sugarcane (Gur)	5	43
Groundnut	15	30
Gingili	1	-
Cotton (BL)	10	3

Table 54: Major Crops in the Tiruchirappalli district

Sugarcane is the major non-food crop grown in the district. It was cultivated in 5,000 hectares and produced an amount of 43,000 tonnes. Groundnut was widely grown in a span of 15,000 hectares and grew 30,00 tonnes. Cotton and gingelly are the other major commercial crops grown in the area.

Namakkal

Pulses, cereals and millets are majorly grown food crops of the district. In Fy13, cereals and millets were sown in 23% of the total agricultural land which resulted in production of 1.7 million tonnes. Pulses were sown in nearly 13 mn hectares and resulted in productivity of 5,000 tonnes from the district. Major cash crops sown in the district are oil seeds, cotton and sugarcane. In Fy13, cash crops occupied nearly 22% of the total land which led to a production of 3,000 tonnes of oil seeds, 10,575 lint bales of cotton and 2.6 mn tonnes of sugarcane.

Category	Crops	Area '000' Hect.	Production ('000 tonnes)	% to the total area sown
Food grains	Cereals & Millets	68,816	1,689	23
	Pulses	12,565	5	4
Oil Seeds	Oil seeds	1,861	3	14
Other cash crops	Cotton	2,897	10575 Lint Bales	1
	Sugarcane	19,732	258	7

Table 55: Major Crops in the Namakkal district

Source: Directorate of Economics and Statistics, Chennai

The district receives 794 mm of normal rainfall throughout the year. South-west and north-east monsoons are the major contributors. South east monsoons account for 43% of the total precipitation while north-east monsoons supply 37% of the total rainfall in the district. Summers also have a major contribution with 19% share of precipitation. Winters provide a mere 1% rainfall. However, as per Directorate of Economics and Statistics, the district has seen major deviation in the rainfall from the monsoons in Fy12 and Fy13 specially south-west monsoons.

Red soil is majorly found in the district followed by black soil. Lateritic soil is mostly found in kolli hills. Sandy coastal alluvium is mainly found in Kabilarmalai while red sandy soil is found in Puduchatram. Clay loam in majorly found in Sendamangalam, Vennandur and Erumapatti

Type of Soil	Places in District
Red Loam	Namakkal, Elachipalayam, Puduchatram, Mallasamud-Ram, Rasipuram, Tiruchengode, Paramathi & Parts of Palliplalayam
Lateritic Soil	Kollihills
Black Soil	Erumapatti, Kabilaramalai, Mohanur, Namagiripet & Parts of Palliplalayam
Sandy Coastal Alluvium	Kabilarmalai
Red Sandy Soil	Puduchatram
Clay Loam	Sendamangalam, Vennandur, Erumapatti

Table 56: Various types of Soil in Namakkal district

Source: Directorate of Economics and Statistics, Chennai

Erode

Total cultivable area in the district is 183,250 hectares. Paddy, millets and other cereals are majorly grown in the district covering an area of nearly one-third of the total sown area. Pulses are also produced significantly in the district. Non-food crops include sugarcane, groundnut, gingelly and cotton.

Major crops	Area (Hect.)
Paddy	30,890
Millets and other cereals	23,989
Pulses	4,703
Sugarcane	23,540
Groundnut	17,111
Gingelly	5,712
Cotton	568

Table 57: Major Crops in the Erode district

Source: Deputy Director of Statistics, Erode

The district generally observes dry climate throughout the year. Northern hilly region of Bhavani and Gobichettipalayam taluka receive the highest rainfall. The district receives an average of 703 mm of normal rainfall throughout the year. North-east monsoons contribute majorly accounting to 45% of the total rainfall. It receives a total precipitation of 230 mm from south-west monsoons which forms one third of the share. During summers, it receives 20% of the total precipitation while in winter it account for a share of nearly 2%.

Red sand and gravel with moderate amount of red and black loam tracts is majorly found in the district. Sathyamangalam and Gobichettipalayam is red loam soil region while lateritic soil is mainly found in Bhavani and parts of Sathyamangalam. Red sandy soil is mainly found in eastern part of the district covering Erode, Perundurai, Bhavani.

Karur

Total cultivable area in the district is nearly one lakh hectares which is one third of the total geographical area. Paddy is cultivated throughout the district and occupy a land mass of 11,000 hectares. The district produces an annual volume of nearly 66,000 tonnes. Millets is the next major crop with an annual production of 19,000 tonnes. Apart from this, pulses and maize is also grown. Groundnut is the major commercial crop of the district with an annual production of 10,000 tonnes. Other commercial crops mainly grown in the district are gingelly, sunflower and sugarcane with a cumulative production of nearly 6,000 tonnes per year.

Principal Crops	Area Sown ('000 Hect.)	Production ('000 tonnes)
Paddy	11	66
Millets	17	19
Pulses	8	4
Groundnut	4	10
Gingelly	2	1
Sunflower	3	4
Sugarcane	6	1

Table 58: Major crops in the Karur district
Source: Joint Director of Agriculture, Karur

The district receives an annual rainfall of 615mm. The district gets most of its rainfall from north-east monsoon which amounts to 342 mm from late September to mid November. It receives total precipitation of 210 mm from the south-west monsoon. Summers and winters receive a minimal rainfall of 10%.

The soil is generally sandy loam and clay type. Karur soil is majorly fine loamy with yellowish and fine loamy nature. Irugur soil is slightly dark red with fine loam and slightly acidic. The Tulukkanur soil is brownish, fine loamy and well drained. Other soil series are clay loamy, greyish brown, fine texture, brownish clay loam etc.

Type of Soil	Places in District
Yellowish Red, Fine Loamy Soils	Karur, Thanthoni, Aravakurichi, Paramathy, Kulithalai, Krishnarapuram, Thogamalai, Kadavur.
Reddish Brown, Fine Loamy Soils	Karur, Thanthoni, Aravakurichi, K. Paramathy
Reddish Brown, Coarse Loamy Soils	Karur, Thanthoni, Aravakurichi, K. Paramathy.
Dark Brown, Clay Loamy Soils	Karur, Paramathy, Kulithalai, Krishnarapuram.
Dark Brown, Coarse Loamy Soils	Thanthoni, Aravakurichi, Paramathy.
Dark Grayish Brown, Fine Texture Soils	Kulithalai
Dark Red Coarse Loamy Soils	Kulithalai, K.R. Puram, Thogamalai, Kadavur.
Yellowish Red Fine Loamy Soils	Krishnarapuram, Kadavur.
Dark Clay, Sandy Clay Loam	Krishnarapuram, Thogamalai, Kadavur.
Dark Grayish, Brown Fine Clay Loam	Thogamalai, Kadavur.

Table 59: Various types of Soil in Karur district

Nagapattinam

The total cultivable area in the district is 150,680 hectares which forms near 55% of the total geographical area. Rice is the principal crop of the district. It is sown in 1,55,000 hectares of land. Pulses are the next major crops grown in the district. Other cereal crops sown in the district are cumbu, ragi, maize, varagu and korra. Major commercial

crops grown in the district are sugarcane, cotton, groundnut, gingelly and coconut. Following table shows the sown area of major crops in the district.

Major Crops	Area ('000 Hect)
Rice	155
Sugar cane	9
Cotton	1
Groundnut	6
Gingerly	3
Green gram	17
Black gram	48
Coconut	3

Table 60: Major crops in the Nagapattinam district

Source: Government of Tamil Nadu

The North-east monsoons contribute to 60% of the total precipitation. This region is the most vulnerable in terms of cyclones specially Nagapattinam and Vedaranyam. The district forms a major part of the coastal line of the state due to which soil in major part of the district is sandy in nature. Sandy coastal alluvium is found in nearly 90% of the district. 6% of the district is covered by black soil. Soil in Nagapattinam and Tirutturaippundi talukas are saline in nature. Rich soil is found majorly in the north eastern part of the district.

Thanjavur

The economy of the district is driven by agriculture which involves 75% of the total work force of the district. The district falls in Kaveri delta zone which is very fertile. Net sown area in the district is 194,000 hectares out of which 58,000 hectares are sown more than once in the year. Rice is the major crop of the district making it own the title 'rice bowl of Tamil Nadu'. It is majorly grown in Rabi season however to some extent it is also sown in Karif season and during summers. Nearly one sixth of the production is during Kharif season and nearly 2% is sown during summers. Thus we can say that rice has become an all season crop in the district. Other major food crop sown in the district is pulses. It accounts for a production of nearly 6,000 tonnes throughout the district.

Crops	Production ('000 tonnes)
Rice	492
Pulses	6
Groundnut	18
Sesame	3
Sugarcane	1,713,788 canes
Coconut	4608 lakh nuts

Table 61: Major Crops in the Thanjavur district

Major cash crops sown in the district are groundnut, sesame and sugarcane. Nearly 18,000 tonnes of groundnut is produced all over the district. Coconut is also grown in substantial amount. The district accounts for production of about 46 Cr nuts every year.

The district gets an annual rainfall of 938 mm throughout the year. The north-east monsoons have the major contribution which account for 462 mm from October to December. South west monsoon winds bring a rainfall of 329 mm from June to September which is 35% of the total precipitation. Winters contribute a share of 7% and summers bring 9% of the total rainfall.

Major part of the district has deep red soil. Nearly 37% of the soil, which is 125,000 hectares, is very deep red soil. 4% of the area falls under deep red soil region. Nearly 6% area forms moderately deep red soil. 11% of the total agricultural area is moderately deep black soil. About 4% of the soil i.e. nearly 136,000 hectares of area is very shallow black soil. 7,800 hectares of land is shallow black soil. Thus we see that nature of the soil in the district varies from deep red to moderate deep black throughout the region.

5.3 Availability of Bulk / Construction Material

River transportation would be viable for movement of bulk commodities like coal and minerals. Coal is a major import commodity from Tamil Nadu ports. Kamarajar Port and VOC Port act as gateway for import of indigenous and foreign coal to the state. Major share of the coal is consumed in the power plants located in the state. Tamil Nadu is a mineral rich state. There is abundant reserve of limestone, rough stone, silica and granite in the state. There is huge volume of export of minerals from VOC Port. The minerals are mostly sourced from the southern part of the state. They are exported to Maldives, Sri Lanka and other South East Asian countries.

5.3.1 Minerals

There are a significant number of mining and quarrying operations of limestone, sand and rough stone in these land locked districts. Kaveri River can be proposed as an alternate medium of transport rather than the traditional roadways. The river does not offer business potential for coastal districts like Nagapattinam and Cuddalore, as most of the industrial estates in these districts are closer to the port. They can rather move their goods directly to the port. Also these districts have their own ports, which make the river transportation redundant to the industrial areas located in these districts.

Following map shows location of mineral belt of Tamil Nadu with respect to Kaveri River as well as the port infrastructure of Tamil Nadu and Puducherry. Mines located closer to rivers would have potential for shift of minerals to river route from existing road route.

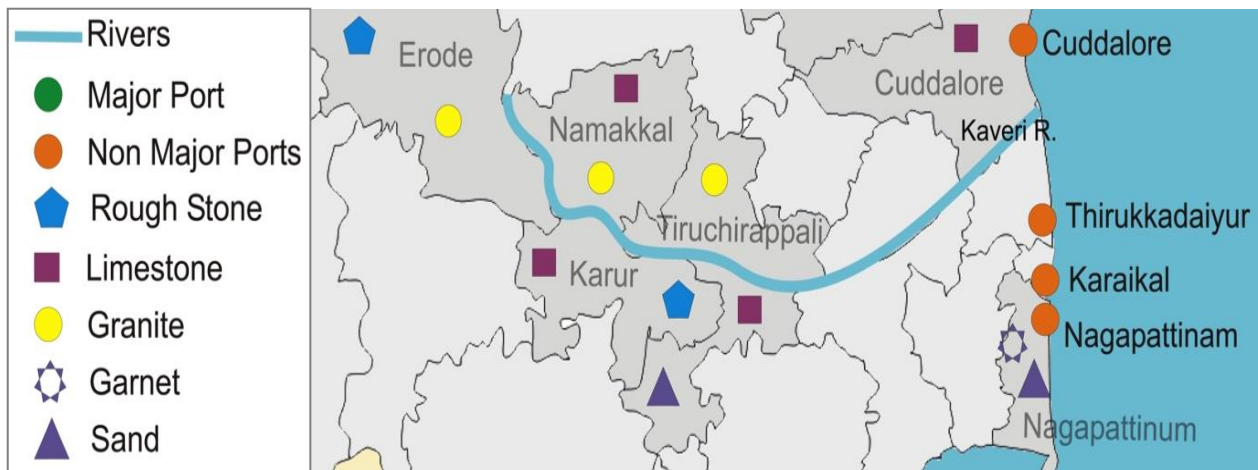


Figure 37: Minerals exported from Tamil Nadu

Road is considered to be most expensive mode of transportation for those industries which are located far away from ports, with uncertainty in delivery of cargo due to congestion at Road. Hence, the potential to shift cargo from Road to Rivers would be maximum in case of road.

Cuddalore

Lignite is majorly found in the district. Major chunks of the mineral is available in Chidambaram, Panruti, Virudhachalam and Cuddalore, most of which is under the lease of Neyveli Lignite Corporation Ltd (a Government of India undertaking) In Fy11, the district produced 62 million tones of lignite from these area. In minor mineral category, the district produces minimal quantity of limestone and white clay.

Mineral Category	Mineral	Production (M.T)
Major Minerals	Lignite	62,287,000
Minor Minerals	Limestone	1,000
	White Clay	1,000

Table 62: Production of minerals in Fy11

There were 41 quarrying activities in Cuddalore in Fy15. Panruti followed it with 21 quarries. Other areas that were utilized for quarrying operations in the district are Chidambaram, Kattumannarkoil, Virudhachalam, Tittagudi and Kurinjipadi. Most of these areas have been used for lignite quarrying.

Talukas	No of quarries
Cuddalore	41
Panruti	20
Chirdambaram	6
Kattumannarkoil	1
Virudhachalam	5

Tittagudi	1
Kurinjpadi	4

Table 63: Number of quarrying operations conducted in Fy15

Source: District Collectorate, Cuddalore

Out of these, only Chidambaram and Kattumannarkoil are in proximity to Kaveri. They are located within a distance of 10 km from the river. However, Kurinjipadi and Panruti are located at a distance of 30 km from Cuddalore port.

Ariyalur

Limestone of sedimentary origin is found in Ariyalur and Sendurai talukas. Major lessees of limestone include Tamil Nadu Cements Ltd, Tamil Nadu Minerals Ltd, Madras Cements Ltd., India Cements, Grasim Cements, Dalmia Cements, and Chettinad Cements. Jayamkondam in Udayarpalayam Taluk is rich in lignite and oil & gas reserves. Red gravel, brick clay, Kankar etc. are also available in this District.

Public Works Department (PWD) in Thirumulapadi and Thalavai Villages in Kollidam and Vellar rivers respectively do Sand quarrying. Fire Clay is used for the manufacture of floor tiles, stoneware pipes, fire bricks and Chemical industry. Jayamkondam in Udayarpalayam Taluk is rich in Lignite, Oil and Gas reserves. This area has a total reserve of 1,168 million tonnes of lignite, most of which is leased by Neyveli Lignite Corp.

Tiruchirapalli

The district has large reserve of limestone which accounts for a value of more than Rs 4 lakh. Rough stone, sand, colored granite and black granite are the other minerals found in the state. In Fy13, the district had a total reserve 120,490 LL of sand which accounted for around Rs 2 lakhs.

Minerals	Quantity ('000 tonnes)
Limestone	836
FireClay	1
Gypsum	3
Quartz	2
Rough Stone	4,020 LL
Sand	120,490 LL
Brick Earth	70 LL
Colour Granite	4,312 cum
Black Granite	103 cum

Table 64: Total Reserves of Minerals in the district as in Fy'13

Namakkal

Rough stone, limestone and granite are the main minerals found in the district. In Fy13, they contributed to a production of Rs 18 million in the district.

Minerals	Production ('000 tonnes)	Value (Rs '000)
Magnesite	1	104
Quartz	6	538
Feldspar	NA	346
Limestone	31	2,070
Roughstone	316,818 Cum	10,210
Granite	34.987 Cum	6,855

Table 65: Production of minerals

Source: Assistant Director of Geology

Namakkal, Thiruchengode and Paramthi Velur are the major mining destinations of the district. However, there are limited activities in Rasipuram also. In Fy11, there were 222 mining and quarrying operations in the district out of which more than half were concentrated in Thiruchengode block. There were 10 mining activities for major minerals and 55 quarrying for minor minerals in Namakkal block. Thiruchengode is hub for major minerals followed by Paramthi Velur in the district. For minor mineral quarrying, Thiruchengode followed by Namakkal are the major concentrations.

Name of Block	Number of mining & Quarrying	
	Major minerals	Minor minerals
Namakkal	10	55
Rasipuram	2	12
Thiruchengode	45	72
Paramthi Velur	14	12
Total	71	151

Table 66: Mining and quarrying operations in the district in Fy'11

Source: Assistant Director of Geology

Erode

In major mineral category, feldspar and quartz are found in the district. The district produced 620 tonnes of quartz and 1280 tonnes of feldspar in Fy14. The total value of the major minerals produced in the district was Rs 2.24 lakhs.

Mineral	Production (tonnes)	Value (Rs '000)
Quartz	620	135
Feldspar	1,280	79

Table 67: Production of Major Minerals

Source: Assistant Director of Geology and Mines, Erode

In minor mineral category, gravel topped the list in terms of quantity of production while value wise, rough stone was the leader with revenue of nearly Rs 33 mn for the district. The district produced an amount of 725 cu m of rough stone in Fy14.

Mineral	Production (Cum)	Value (Rs '000)
Black Granite	1,302	4,822
Rough Stone	725	32,616
Gravel	323,050	8,076

Table 68: Production of Minor Minerals

Source: Assistant Director of Geology and Mines, Erode

In Fy14, three mining operations were carried out in the district for Quartz and feldspar in Gobichettipalayam that generated revenue of more than Rs 2 lakh for the district. In minor segment, 126 quarryings were done for rough stone most of which were concentrated in Gobichettipalayam followed by Sathiyamangalam. There were significant quarryings at Perundurai, Erode and Anthiyur for the mineral. The mineral accounted for revenue of nearly Rs 33 mn for the district, which was the highest in mineral category. Gravel quarrying mainly concentrated in Anthiyur and Perundurai generated revenue of Rs 8 mn for the district.

Taluka	Major minerals	Minor minerals			
	Quartz & Feldspar	Rough Stone	Black Granite	Colour Granite	Gravel
Erode	NA	16	NA	NA	2
Perundurai	NA	21	NA	2	4
Bhavani	NA	8	NA	NA	NA
Anthiyur	NA	15	6	NA	5
Gobichettipalayam	3	35	NA	NA	2
Sathiyamangalam	NA	31	14	NA	1
Total	3	126	20	2	14

Table 69: Numbers of Mining and quarrying activities in the district in Fy'14

Source: Assistant Director of Geology and Mines, Erode

Karur

Quartz is majorly produced in the district in major mineral category. It had an annual production of more than 13,000 tonnes in Fy11. Feldspar also had an annual production of 4,200 tonnes in the year. However, there is significant production of minor minerals. Limestone and rough stone have substantial production share in the mineral map of the district. Magnesite and Dolomite are the other minerals majorly produced in the district.

Mineral Category	Mineral	Production ('000 tonnes)
Major	Quartz	13.44
Minor	Feldspar	4.2
	Limestone	57.135
	Rough Stone	86,000 Unit
	Magnesite	1.2
	Dolomite	1.25

Table 70: Production of Minerals in Fy'11

Nagapattinam

There are two main mineral belts in the region – Pudupuram-Poompuhar-Tharangampad belt and Tharangampadi-Nagore belt. The district has Silica sand concentrates of nearly 5 mn tonnes. Lime shell is the next prominent mineral found in the district with a total reserve of nearly two lakh tonnes. Ilmenite and garnet are the other types of minerals found substantially in the district.

Mineral Category	Mineral	Availability ('000 T)	Area
Major	Crude Oil & Natural Gas		Narinamam, Kuthalam
	Silica Sand	4860	Vadamalai Manakadu, Vanduvancheri, Thanikottagam,
	Lime Shell	187.00	Sirkali & Nagapattinam Taulk
	Ilmentie	8.67	TharangamPadi & Sirkali Taulks
	Garnet	8.45	TharangamPadi & Sirkali Taulks
	Zircon	0.43	TharangamPadi & Sirkali Taulks
	Monozilte	0.33	TharangamPadi & Sirkali Taulks
	Rutile	0.11	TharangamPadi & Sirkali Taulks
	Leucozyme	0.43	TharangamPadi & Sirkali Taulks
	Maganetile	0.42	TharangamPadi & Sirkali Taulks
Minor	Sand, Brick earth		Kolidam River, Thirumalairajan River and Vetar

Table 71: Production of Minerals

Source: Department of Science and Geology

5.3.2 Commodities Opportunities

Limestone

Karur, Namakkal and Cuddalore are the districts with limestone reserves. Limestone production in Karur is about 57,000 tonnes, 1,000 in Cuddalore & 31,000 in Namakkal. However, these have significantly low volume, hence cannot be considered for movement via river.

Roughstone

Namakkal, Erode, Karur, Tiruvannamalai and Tiruchirapalli are the places, which have deposits of roughstone. However, the volume of production from these places is quite low which does not make it feasible to be transported to the ports via waterways.

Sand

Tiruchirapalli is the major centre for sand excavation in Tamil Nadu. Kancheepuram district has a reserve of about 4.5 mn tonnes of river sand. Nagapattinam district contains nearly 5 mn tonnes of silica sand reserve. Most of these is transported to Maldives by sea. Kanniyakumari majorly produces ilmenite sand. It accounts for about 70,000 tonnes of production every year. Ilmenite is majorly used in production of Titanium di oxide. Europe and North America are the major consumers of Titanium dioxide. China and India are growing rapidly as consumers of the compound. Ilmenite can be transported to VOC Port.

Granite

Granite is produced in numerous districts in Tamil Nadu. Some major districts into production of granite are Tiruvannamalai, Tiruchirappalli, Erode, and Kancheepuram etc. However the volume is not enough so that rivers to nearby ports can transport it.

Following table describes location of mines with respect to the port exporting and the Kaveri River

District	Minerals	Units	Production	Nearby Port	Distance from Industrial Area (Km)			Opportunity	Reasoning
					To River	River-Port	Direct to Port		
Cuddalore	Limestone	Tonnes	1,000	Cuddalore	NA	NA	20	No	Minerals mines are located adjacent to port
Erode	Granite	Cubic M.	1,302	Karaikal	5	320	284	No	Volume is quite low. Hence, there does not exist economy of scale for barge movement to port
	Rough Stone	Cubic M.	725						
Karur	Limestone	Tonnes	57,135	Karaikal	18	310	225	May be	High Volume, Difference between roadways and waterways is less
	Rough Stone	Units	86,000						
Nagapattinam	Sand	Tonnes	4,868,670	Karaikal	NA	NA	11	No	Minerals mines are located adjacent to port
	Garnet	Tonnes	8450*						
	Sand	Tonnes	NA						
Namakkal	Limestone	Tonnes	31,000	Karaikal	18	253	264	May be	Difference between roadways and waterways is less
	Rough Stone	Cubic M.	316,818						
	Granite	Cubic M.	35						
Tiruchirappalli	Limestone	Tonnes	836,000	Karaikal	5	220	145	May be	High Volume, Difference bet roadways and waterways is less
	Rough Stone	LL	4,020						
	Sand	LL	120,490						
	Granite	Cubic M.	4,415						

Note: * marked numbers are availability of minerals

Table 72: District wise minerals production and opportunity for Kaveri river movement

5.3.3 Coal

Coal is one of the prime commodities imported in the state. There are 6 coal based thermal power plants in Tamil Nadu. Out of which 1 power plant is located at the end of Kaveri River and remaining 5 are located close to the ports. Indigenous coal is transported from states like Orissa, Jharkhand and West Bengal by sea to karaikal Port.

Sr. No	TPS	Capacity (MW)	Requirement ('000 T)	Nearby Port	Distance from Industrial Area (km)			Opportunity
					To River	River-Port	Direct to Port	
1	Mettur	1440	7,555	Karaikal	35	370	322	May be

Table 73: Coal requirement in Thermal Power Plants of Tamil Nadu

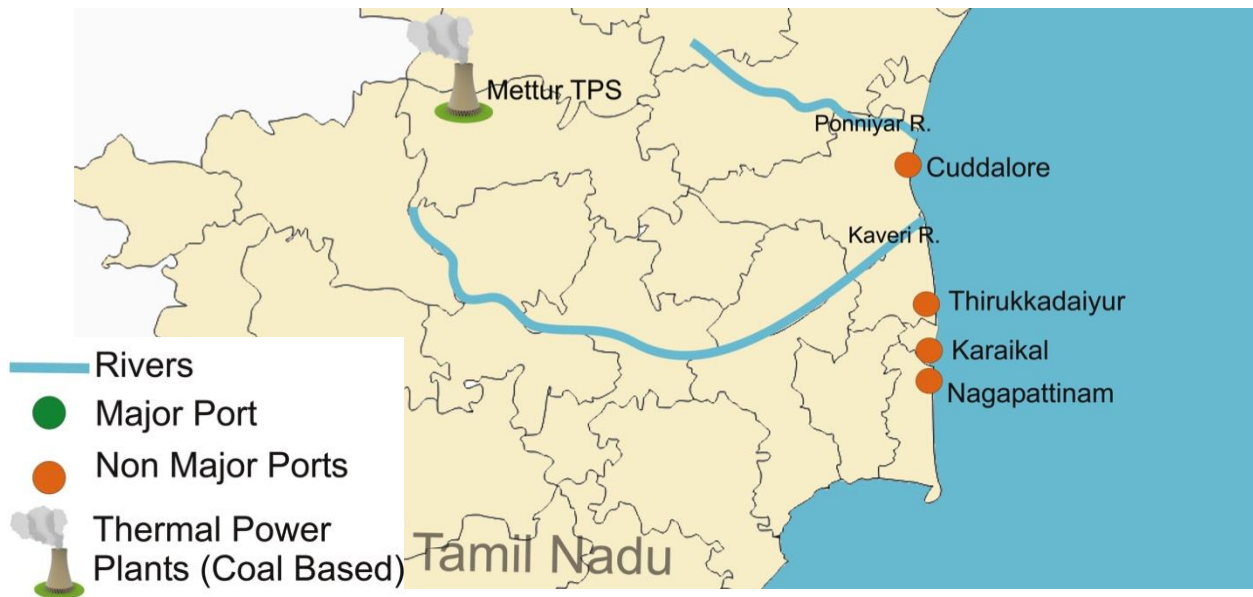


Figure 38: Coal based Thermal Power Plants in Tamil Nadu

Mettur TPS

Mettur TPS consumes close to 7.5 mn tonnes of coal every year. It uses close to 2.2 mn tonnes of imported coal and 5.3 mn tonnes of indigenous coal. Indigenous coal from the mines of Talcher and Ib Valley of MCL and Raniganj and Mugma of ECL is transported to the ports of Paradip (Orissa), Vizag (Andhra Pradesh) and Haldia (West Bengal) respectively through rail. Thereafter, coal is transported via coastal waterways to Ennore and VOC ports. It is further transported to the power plant by railways.

Mettur TPS is located close to Kaveri River at Mettur. Karaikal Port can act as coal discharge point for the power plant. This coal can further be loaded into barges and moved through Kaveri River to reach Mettur. Sophisticated infrastructure like conveyer

belts can be constructed to transport the coal from river point to the power plant. This can act as alternative to the railways which in turn will decongest the Chennai-Trivandrum and Tuticorin-Mysuru railway lines.

5.4 Existing Industries along Waterway

The industrial areas in Tamil Nadu are located in the hinterlands far off from the ports. The industries transport their cargo via roadways to the ports in the state. The objective of the study is to show the linkage of industrial areas located on the banks of the rivers in Tamil Nadu with the ports in the state via waterways. In this section, we shall discuss the strategic location and infrastructural advantages of the ports in brief and analyze the amalgamation of river routes with these ports. Kaveri River is discussed in the study do not have adequate water. Hence, it has been assumed that Government would either themselves or through help of institutional investors makes necessary investments to maintain water depth of at least 2.5 m in all the rivers throughout the year.



Figure 39: Port connectivity of Major Industrial Clusters via Kaveri River

District	Industrial Area	Nearby Port	Distance from Industrial Area (km)			Opportunity
			To River	River-Port	Direct to Port	
Cuddalore	SIDCO, Semmandalam	Cuddalore	1	12	9	No
	SIDCO, Vadalur	Cuddalore	34	40	31	No
	Ceramic Industrial Estate, Vridhachalam	Cuddalore	50	53	57	No
	SIPCOT, Kudikadu	Cuddalore	9	12	5	No

	SIPCOT, KudikaduPhase 2	Cuddalore	9	12	5	No
Ariyalur	NA	Karaikal	NA		NA	No
Tiruchirapalli	SIDCO, Ariyamangalam	Karaikal	5	220	145	May be
	SIDCO, Thuvakudi	Karaikal	15	190	128	May be
	SIDCO, Thiruverumbur	Karaikal	7	190	135	May be
	SIDCO, Thuvakudi (WCR)	Karaikal	16	190	130	May be
	SIDCO, Vazhavanthankottai -WIP	Karaikal	16	190	130	May be
	SIDCO, Vazhavanthankottai -P II	Karaikal	16	190	130	May be
	SIDCO, Vazhavanthankottai -P III	Karaikal	16	190	130	May be
	SIDCO, Kumbakudi	Karaikal	24	190	140	No
Namakkal	SIDCO, Tiruchengode	Karaikal	18	353	264	No
	SIDCO, Namakkal	Karaikal	21	220	227	No
Erode	SIDCO, Erode	Karaikal	31	340	290	No
	SIDCO, Nanjai Uthukkuli	Karaikal	4	320	284	May be
Karur	SIDCO, Athur	Karaikal	18	310	236	No
	SIDCO, Vellaptti	Karaikal	25	260	208	No
Nagapattinam	SIDCO, Nagore	Karaikal	50	110	5	No
	Kulichar Village, Mayiladuthurai	Karaikal	31	80	50	No
Thanjavur	SIDCO, Thanjavur	Karaikal	12	150	90	May be
	SIDCO, Nanjikottai	Karaikal	26	150	18	No
	SIDCO, Pilayarpatti	Karaikal	11	150	107	May be
	SIDCO, Thirubuvanam	Karaikal	33	140	100	No
Tiruvannamalai	SIPCOT, Cheyyar	Cuddalore	114	62	131	No
	SIDCO,	Cuddalore	40	100	122	No

	Thiruvannamalai					
	SIDCO, Cheyyar (Upcoming)	Cuddalore	114	62	131	No

Table 74: Distance Comparison between Roadways & Waterways (Kaveri River)

Cuddalore

TIDCO has developed three industrial areas in the district at Semmandalam, Vadalur and Virudhachalam. At Virudhachalam, it has developed a ceramic industrial estate in a span of 42 acres. There are 64 units operating in the industrial estate. Semmandalam and Vadalur span in an area of 16 acres and 22 acres respectively. SIPCOT has developed an industrial area of 518 acres in Kudikadu in Phase-I with 61 units in operation. In Phase-II, it has acquired land of 159 acres with 7 units in operation.

Industrial Estate	Land acquired (acres)	No of Plots
TIDCO, Semmandalam	16	42
TIDCO, Vadalur	26	52
Ceramic Industrial Estate, Vridhachalam	42	64
SIPCOT Industrial Estate, Kudikadu	518	61
SIPCOT Industrial Estate, KudikaduPhase –II	159	7

Table 75: Industrial Estates in the district

All the industrial estates are located far off from Kaveri River. However, Semmandalam and Kudikadu are located within 15 km from Cuddalore port.

There are two major clusters of coir and ceramics in Cuddalore. Coir cluster is located in Cuddalore with an annual turnover of Rs 30 Cr. There are 200 coir units operating in the cluster. Ceramics business is concentrated in Virudhachalam region. There are 100 units operational in the region with an annual turnover of Rs 50 lakhs.

Products	Major Clusters	No of Units	Turnover (in cr)
Coir	Cuddalore	200	30
Ceramic	Vridhachalam	100	1

Table 76: Major Industrial Clusters

Both the clusters are significantly far from Kaveri River. However, coir cluster at Cuddalore is in the vicinity of Cuddalore port.

Tamil Nadu Warehousing Corporation has developed 5 warehouses in Cuddalore port. 4 of them, each having a capacity of 3,000 metric tonnes, are used for agricultural products. One of them, having a capacity of 1,000 tonnes, is used for non-agricultural goods.

Major products being exported from the district are cashew kernal, organic chemical and marine products.

Ariyalur

There has been limited industrialization in the district. There are no identified industrial estates. However, there are three clusters located at Udarpalayam, Ariyalur and Udayanatham. Silk sari manufacturing is mostly done Udarpalayam. There are 150 units operating in the district have a cumulative turnover of Rs 125 Cr per annum.

Products	Major Clusters	No of Units	Turnover (in cr)
Silk sarees/ Dodities	Udayarpalayam	150	125
Chalk Crayon	Ariyalur	NA	NA
Brass Utensils	Udayanatham	NA	NA

Table 77: Product wise major Industrial Clusters

More than 1500 people are involved in Silk Saree weaving activity. The occupation is hereditary in most of the villages. Both wholesale and retail trades of these silk saris are undertaken in Udarpalayam town. The silk saris weaved here are sold to the major clothing emporia in other parts of the state.

Tiruchirapalli

Trichy is a major engineering hub and energy equipment and fabrication center of India. BHEL has established one unit in the district for manufacturing high pressure boilers. A number of small scale industries have also sprung up in Trichy, mostly around Thuvakudi and Mathur. Manachanallur has numerous rice mills supplying polished rice all over Tamil Nadu.

There are 8 industrial estates developed by SIDCO in the district. Thuvakudi is the largest one spanning in an area of 479 acres. It has 378 plots and 25 sheds in it. Thiruverumbur industrial estate covers an area 75 acres with 36 plots developed in it. Vazhavanthankotta is developed in three phases by SIDCO. In the first phase, SIDCO acquired land of 86 acres to develop 200 plots. In the second phase, it acquired 56 acres and developed 40 plots and in the third phase, it acquired 38 acres to develop 72 plots. 12 plots are still to be allotted from the land acquired in third phase. Ariyamangalam, Thiruverumbur, Vazhavanthankottai and Thuvakudi are located within a distance of 15 km from Kaveri River. However, Kumbakudi is at a distance of more than 25 km from the river.

Name of the Estate	Extent (acres)	No developed		No. Allotted	
		Plots	Sheds	Plots	Sheds
SIDCO, Ariyamangalam	18	NA	33		33
SIDCO, Thuvakudi	479	378	25	378	25

SIDCO, Thiruverumbur	75	36	36	36	36
SIDCO, Thuvakudi (WCR)	14	147	NA	46	NA
SIDCO, Vazhavanthankottai–WIP	86	200	NA	200	NA
SIDCO, Vazhavanthankottai–P II	56	40	NA	40	NA
SIDCO, Vazhavanthankottai–P III	38	72	NA	60	NA
SIDCO, Kumbakudi	87	50	NA	50	NA

Table 78: Major Industrial Areas in the district

Source: District Industries Centre, Tiruchirapalli

Tiruchirapalli has numerous fabrication and engineering clusters in the district. There are 500 units operating in the town with an annual turnover of Rs 150 Cr. There are 300 units operating in engineering segment with an annual turnover of Rs 70 Cr. Artificial gem processing is concentrated in the town with 2000 units in operation. The town is home to RMG goods manufacturing with an annual turnover of Rs 2 Cr. It has an annual turnover of Rs 25 Cr. Korai Mat manufacturing is concentrated in Santhapalayam.

Product	Cluster	Commodities	Turnover (in cr)	Units
Fabrication	Tiruchirappalli	Fabrication Job work for BHEL	150	500
Engineering	Tiruchirappalli	Boilers, Heat exchangers, Pressure vessels,	70	300
		Assemblies, Sub-assemblies, Boiler components windmill accessories		
Artificial Gem Cutting and Polishing	Tiruchirappalli	Semi precious stones – artificial gems – cutting and polishing	25	2,000
Korai Mat	Santhapalayam	Korai Mat	5	100
RMG	Tiruchirapally	RMG	2	50

Table 79: Commodities wise major Industrial clusters in the district

All the clusters are located in Tiruchirapalli and Santhapalayam which are located on the banks of the river.

Namakkal

There are two industrial estates in the district developed by SIDCO – Thiruchengode and Namakkal. Both these industrial areas are located more than 30 km from Kaveri River.

Industrial Area	No. of Sheds
SIDCO, Tiruchengode	36
SIDCO, Namakkal	54

Table 80: Major Industrial Areas in the district

Namakkal is also known as 'Transport City'. Lorry body building has an important place in the industrial map of Namakkal. There are numerous fabrication workshops working as subsidiaries of lorry body building industries. Rasipuram is known for its weaving industry and Sago production. It also contributes majorly in production of starch and dairy products.

Tiruchengode is home to textile industry in the district. There are about 37 spinning mills and more than 10,000 handlooms concentrated in the taluka. Tiruchengode, Suriyampalayam, Suriyampalayam Thiruvalluvar, Tiruchengodu and Pudur are the major handloom centers in the taluka.

One paper mill and one sugar mill are functioning in the city. Mohanur Co-operative sugar mill is located in Mohanur block of the district.

Product	Turnover (in cr)	Units
Power Loom	75	500
Lorry Body Builder	63	120

Table 81: Total units and its turnover in the district

Namakkal is also known for its egg production due to which it is also called the 'Egg City' of South India. Major poultry farms are concentrated in the city

Name of Taluka	No. of Farms	No. of Birds ('000)
Namakkal	368	24,115
Rasipuram	124	6,171
Paramathi-Velur	54	3,022
Tiruchencode	150	6,821

Table 82: Production of poultry birds in the districts in Fy'11

Source: District Poultry Development Office

There are 3 godowns developed by Tamil Nadu Warehousing Corporation in the city. 2 of them have a capacity of 3,000 metric tonnes each while one has a capacity of 500 metric tonnes. There are no cold storages in the district. Major exportable items from the district are raw granite, cotton fabrics, towels, bed spreads, rigs and egg.

Erode

SIDCO has developed two industrial estates at Erode and Nanjai Uthukkuli. Government Industrial Estate in Erode spans in an area of 10 acres and 23 units are operating in the area. Nanjai Uthukkuli industrial area is developed in an area of 5 acres with 26 units operating in it.

Industrial Estate	Total area (Hect.)	No of Plots	No of units
Govt. Indl. Estate, Erode	10	30	23
SIDCO Indl. Estate, Nanjai Uthukkuli	5	26	26
Total	15	56	49

Table 83: Major industrial Areas in the district

There are three major clusters in the district. Leather, textile and coir units are concentrated in Erode taluka while oil mills are located mostly in Kangeyam and Vellakovil. Gevangapuram has moon stone processing units while rice mills are concentrated in Kangeyam.

Product	Cluster	Commodities
Leather	Erode	Leather Footwear, Leather Tanning
Oil Mill	Kangeyam, Vellakovil	Extraction of Coconut Oil, Groundnut Oil
Coir	Erode	Coir Product
Moon Stone	Gevangapuram	Moon Stone
RMG	Erode town & 25km radius	Shirts Barmudas, Pyjamas, Ladies/Kids wear & Made-ups home furnishing items
Rice Mill	Kangeyam	Rice

Table 84: Commodities wise major Industrial Clusters

Textile, turmeric, sugar and edible oil is majorly exported from the district. Major import commodities are dyes fabric and chemicals

Karur

There are two industrial estates in the district developed by SIDCO – Athur and Vellapatti. The total area of Athur industrial estate is 15 acres while Vellapatti is comparatively smaller with an area of 11 acres. Athur industrial area is located in the vicinity of Amaravathi River, a major tributary of Kaveri. However, it is located within 15 km from Kaveri River at Punjai Thottakurichi. Vellapatti industrial estate is located at a distance of 25 km south of the main river.

Industrial Estate	Area (acres)	No of Plots
SIDCO, Athur	15	101
SIDCO, Vellapatti	11	26

Table 85: Major Industrial Areas in district

Textile is a flourishing business in the district. There are more than 700 units operating in textile segment. Other major industries in the district are mineral based, engineering and fabrication and agro based companies. Cement pipe manufacturing is concentrated in Chinnadharapuram. Karur is mainly known for its home furnishing textile products and mosquito knitted fabric. Fabrication industry is mainly located in Thanthoni block which is famous for its bus body building work.

Product	Cluster	Major items manufactured
Cement Pipes	Chinnadhara puram	Cement Pipes, RCC Pipes.
Home Furnishing Textile	Karur	Cotton made- ups, Home furnishing.
Bus Body Building	Thanthoni Block	Bus and van Body building
Mosquito (HDPE) Knitted Fabric	Karur	Mosquito (HDPE) knitted fabric

Table 86: Major Clusters of Industries

Karur is located in between Kaveri and its major tributary – Amaravathi River. Kaveri is at a distance of 12 km from the industrial clusters of Karur. Other clusters are significantly far from the river.

Nagapattinam

SIDCO has developed two industrial areas in the district at Nagore and Kulichar village in Maviladuthurai. Nagore industrial area covers 21 acres and there are salable 41 plots in the estate. SIDCO industrial area at Kulichal spans in an area of 13 acres with 19 plots in it. Kulichar industrial area is 4 km away from Kaveri River while Nagore is substantially far from the river.

Industrial Area	Area (acres)	No. of Plots
SIDCO, Nagore	21	41
Kulichar Village, Mayiladuthurai	13	19

Table 87: Major Industrial Areas in the district

Source: BM, SIDCO, Nagapattinam

Salt pans are majorly located on the southern tip of the district. It is the largest salty swamp of the country. The major cluster for salt lies in Vedaranyam which account for an annual turnover of Rs 11 Cr. Coir cluster is located in Malliyam, Thiruvelvikudi which are in proximity to the tributaries of Kaveri. Kollidam has many cane products based units which lie on the bank of Kollidam River.

Product	Cluster	Commodities	Turnover (in cr)	Units
Salt	Vedaranyam	Common Salt	11	1400
Coir	Malliyam, Thiruvelvikudi	Coir yarn & De-fibering	1	100
Cane Products	Thulasendrapuram, Kollidam	cane chairs, baskets and other cane products	2	500
Korai Mat Weaving,	Thulasendrapuram	Mats	1	40
Wax Candle Cluster	Vedaranyam	Wax Candle	2	50

Table 88: Major Industrial Clusters in the district

Thanjavur

There are four industrial areas in the district. Thirubhuvanam expands in an area of 32 acres with 32 plots in the estate. Nanjikottai is the second largest industrial estate with an area of 26 acres. Thanjavur and Pilayarpatti are in a span of 22 acres and 11 acres respectively. All the four industrial areas lie in the delta region formed by Kaveri and Kollidam rivers.

SIDCO Industrial Estate	Land acquired (acres)	No. of Plots allotted
Thanjavur	22	24
Nanjikottai	26	18
Pilayarpatti	11	
Thirubhuvanam	32	32

Table 89: Major Industrial Areas in the district

Salt pans are located in the southern part of the district in Pattukotti and Peravurani. Coir clusters are mainly located in Malliyam and Thiruvelvikudi region. There are 100 units operating in the cluster and the total turnover of the cluster is 1 Cr. Cane products are majorly manufactured in Kollidam region which is located in the deep forest region near Kollidam River. Other major clusters in the district are wax candle cluster mainly located near Vedaranyam and Korai mat manufacturing concentrated in Thulasendrapuram.

Product	Cluster	Commodities	Turnover (in cr)	Units
Salt	Vedaranyam	Common Salt	11	1400
Coir	Malliyam, Thiruvelvikudi	Coir yarn & De-fibering	1	100
Cane Products	Thulasendrapuram, Kollidam	cane chairs, baskets and other cane products	2	500
Korai Mat Weaving,	Thulasendrapuram	Mats	1	40
Wax Candle Cluster	Vedaranyam	Wax Candle	2	50

Table 90: Major Industrial Clusters in the district

5.5 Existing Jetties and Terminals (with conditions and facilities)

5.5.1 Karaikal Port

The Port is located at Vanjore Village, Karaikal Taluk in the Union Territory of Pondicherry. UT of Pondicherry, Tamil Nadu, Kerala and parts of Andhra Pradesh, Telangana and Karnataka are the major hinterlands of the port. It has an annual handling capacity of 27 MT of cargo. However, the port has not been able to increase the cargo as expected and has reported loss year on year. Karaikal Port remains versatile in handling different types of cargo like coal, fertilizer, cement, raw sugar, project cargo, gypsum, containers, steel pipes, scrap, bagged sugar, construction material etc. In Fy15, it handled about 3.3 mn coal, 0.3 mn iron ore and 0.3 mn containerized products. A major part of the cargo is destined to Tamil Nadu region. These can be diverted to the industrial areas located along the rivers.

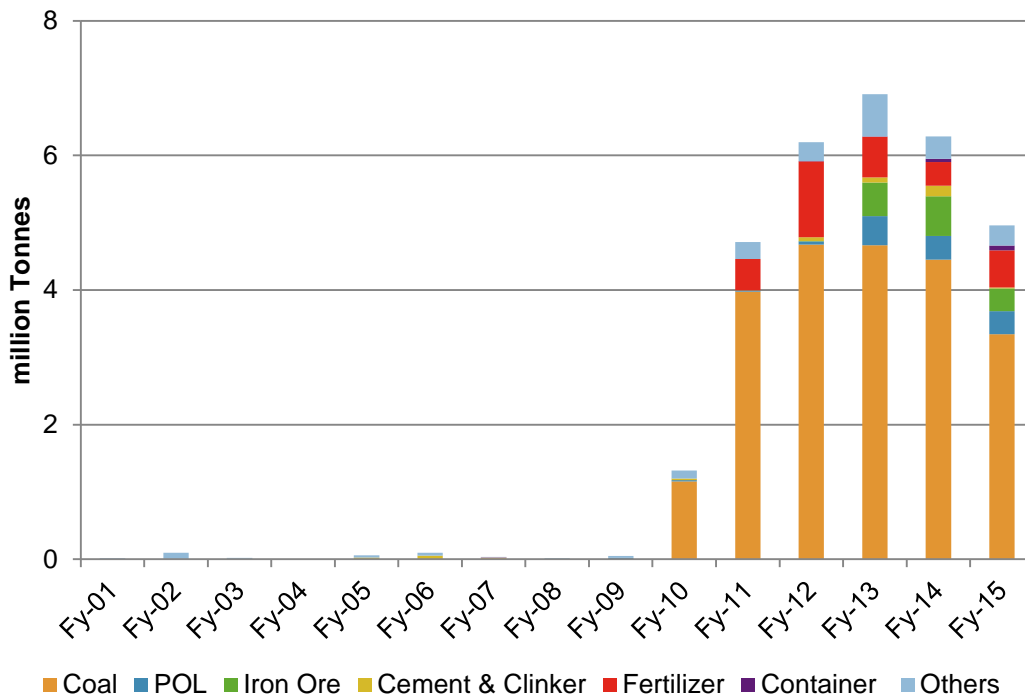
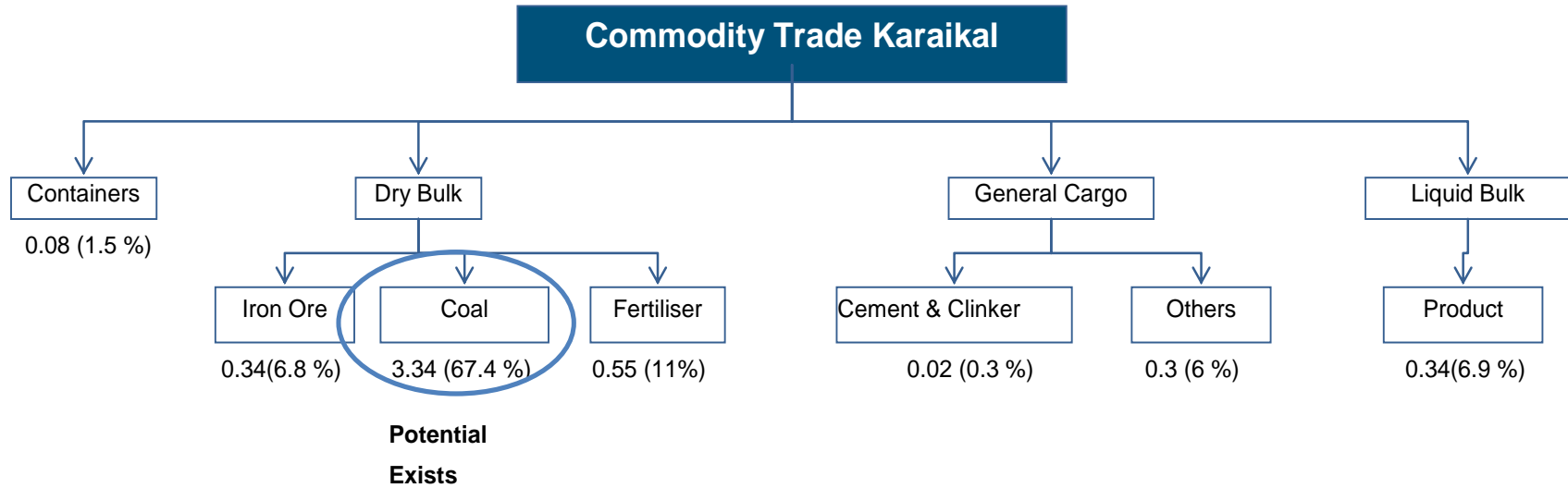


Figure 40: Commodity wise cargo growth of Karaikal Port

Commodity	Volume (mn T)	Attractive	Reasoning
Pol & Product	0.34	No	Liquid commodities evacuates from port using pipeline, hence shifting is not possible
Iron Ore	0.34	No	Iron Ore mines are not located on river routes; hence no opportunity exists for iron ore water movement.
Cement & Clinker	0.02	No	Very low annual shipment volume, hence river movement is not commercially attractive
Coal	3.34	May Be	Power plant is located at the end of the river which imports coal at very good volume; hence coal can be moved from port to power plant by kaveri river.
Fertilizer & FRM	0.55	No	Very low annual shipment volume, hence river movement is not commercially attractive
Container	0.07	No	
Others	0.30	May Be	
Total	4.96		

Table 91: Opportunity for river movement of commodities handled at Karaikal Port



Karaikal has been handling more than 5 mnTonnes of cargo. The traffic volume of port has reduced from 7 mntonnes recently.

Container being fast moving cargo is not possible to shift to Karveri River, which located very close by.

Iron Ore mines are not located in the river route. Hence, shift of iron ore traffic from land to river route has been discarded.

There exist potential for shifting Coal movement. MetturTPS power is located at the End of Kaveri river. The Mettur dam on Kaveri river falls after crossing the power plant location. This opens up opportunity for movement of Coal from Karaikal Port to Mettur Power Plant using Kaveri River. The total volume potential for river movement could range between 3 mnTonnes to 5 mntonnes depending upon competitive nature of Karaikal port to compete with VOC port.

Other cargo including Fertiliser , cement, products, etc has every low annual shipment volume. River route is commercially attractive for large volume of cargo, small shipments do not create any cost advantage.

Figure 41: Potential Trade Traffic for Bulk Commodities

5.5.2 Thirukkadaiyur Port

Thirukkadaiyur Port is located at Thirukkadaiyur in Tharangambaditaluka, Nagapattinam. It is a captive port of PPN Power Generating Company situated 34 km in the north of Karaikal port. It is used for handling Naphtha through Single Point Mooring and Natural Gas from PY-01 Oil field (developed by M/s Hindustan Oil Exploration Company Ltd) for its 330 MW Gas Combined Cycle Power Project Plant at Pillaiperumalnallur.

The port is a captive liquid port. Hence, cargo meant for the hinterlands close to rivers cannot be moved via the port.

5.5.3 Nagapattinam Port

The port is situated in Nagapattinam district. It is an anchorage port located at the mouth of Kaduvayur in the Bay of Bengal. The port has a minimum anchorage depth of 7.1 m. Barges with a capacity of 200-300 tonnes ply between the berth and the anchorage. In Fy15, the port handled a volume of about 0.2 mn tonnes.

Nagapattinam Port is located at a distance of about 70 km from the mouth of Kaveri River. Industrial areas located in Nagapattinam and Pondicherry doesn't need to move cargo to the river and come down to the port via waterways. They can directly move down to the ports as the distance between these industrial areas and the ports is quite less.

5.6 Preliminary traffic identified – within 50km

Kaveri River flows in the north of Karaikal port at a distance of about 45 km from the port. Kaveri is one of the longest rivers of Tamil Nadu. Erode, Karur, Tiruchirapalli, Cuddalore, Thanjavur, Nagapattinam are among the major industrialized districts along the river. There are several industrial areas located near the river. There are about 25 industrial locations located along the bank of the river. Karaikal port can act as a gateway for exim trade to most of these locations. NanjaiUthukkuli industrial area in Erode is about 4 km from the river. Ariyamangalam and Thiruverumbur industrial areas in Tiruchirapalli are located within 10 km from the river. All the industrial areas in the land locked districts along the traverse path of the river are located within 25 km from the river. They all transport their goods to the nearest port by roadways.

5.7 Existing cargo movement

Mines are located adjacent to Port in the districts Cuddalore. Hence it is commercially not viable to transport minerals using river route to nearest port Karaikal.

Following table describes potential for cargo movement in the Kaveri River of Tamil Nadu.

River	Commodity	Port	Production ('000 tonnes)	Volume ('000 Tonnes)	Reasoning
Kaveri	Coal	Karaikal	7,555	3,500	Coal required for Mettur TPP

Table 92: Potential Opportunity for Kaveri River

At present no cargo movement is happening. All the trade between Industries & Port is carried out via roadways only. However, there exists opportunity for transportation of Coal from Karaikal port to Mettur TPP power plant using Kaveri river. The power plant is located before Mettur Dam. Though the location of power plant near Mettur dam is at the end of river and outside the limits of river defined for this study, the logistics option could be evaluated.

5.8 Prominent City / Town / Places of Worship / Historical places for Tourism

Pichavaram

The place has the second largest mangrove forest in the world. The forest has waterscape and backwater cruises. One of the attractions of this place is the rare sight of mangrove forest trees, being permanently rooted in water. Boating, rowing and kayaking are possible at Pichavaram. The place is also a favorite of bird watchers, with more than 170 species of birds being recorded in the area. Pichavaram is nearly 5 kilometers away from the Kaveri River.

Veeranam Lake

It's a vast stretch of water, used for drinking and irrigation purposes. The lake is one of the sources of water for people of Chennai. The lake has historical significance as it was built in the 10th century, from 907–955 AD during the time of Great Cholas. The lake is 10 kilometers away from Kaveri River.

Kodikkarai Wildlife Sanctuary

The sanctuary has a mix of salt swamps, mangroves, backwaters, mudflats, grasslands and tropical dry evergreen forests. The feet of Ramar are found in the sanctuary. There is also an old lighthouse here, from where visitors can see Sri Lanka. This wonderful bird sanctuary is spread across a protected area of 21.47 square kilometers. It was created in 1967. Kodikkarai Wildlife Sanctuary is 96 kilometers from the river.

Poompuhar Beach

The beach has historical significance as 2000 years ago, foreign trade was carried out from here during the Karikal Cholan period. The beach also has the Silappathikara Art Gallery, which shows the artistic history of the Poompuhar Beach. Other popular

landmarks near the beach are the Zion Church and Thirupallavaneesvaram Temple. Poompuhar Beach is 25 kilometers from Kaveri River.

Kodikkarai Beach

The beach is known for its bird sanctuary, coral reefs, and rare species of marine life like dolphins. Around the beach is a dry and evergreen tropical forest, stretching across 25 kilometers. The forest has a wide variety of flora and fauna. Visitors can also see animals like bluebuck, semi wild ponies, spotted deer, bonnet macaque and wild boar in the forest. Some of the birds spotted in the sanctuary are flamingos, spoonbills, ibises, olive edielly and herons. Kodikkarai Beach is 98 kilometers away from Kaveri River.

Masilamani Nathar Temple

This ancient temple was built by Maravarma Kulasekara Pandiyan in the year 1305. One of the highlights of this temple is its ancient architectural design. However, tidal erosion has destroyed the front portion of this temple, and today one can only see ruins. Maravarma Kulasekara Pandiyan is 33 kilometers from Kaveri River.

Ziegenbalg Museum

The museum was originally a house that was purchased in the 18th century to accommodate the growing Lutheran mission. Ziegenbalg Museum also features a prayer hall and living quarters. Ziegenbalg Museum Complex houses the first printing press of India. The first book printed in India, Bible in Tamil, was printed here. Ziegenbalg Museum is about 33 kilometers from Kaveri River.

Elakurichi

It is a pilgrimage place of Roman Catholics. The place was built by Constantine Beschi who came from Italy to spread Christianity from A.D. 1710 to 1742. Constantine Beschi cured a dangerous disease of the Ariyalur region. Pleased by his service, the Chief granted 60 acres of land to the place. The church has an inscription engraved on a stone slab, which mentions this grant. The inscription, written in A.D. 1763, is preserved in this church. It's about 1 km away from river.

Vettakudi-Karaivetti Bird Sanctuary

The bird sanctuary is spread across an area of 453 hectares. The sanctuary is primarily an irrigation tank. It is one of the most important fresh water feeding ground for migratory water birds. The tank is one of the largest in the state. Among all the tanks in Tamil Nadu, the place has the largest congregation of water birds (82.) One of the important birds visiting here is the endangered Bar Headed Goose. Vettakudi-Karaivetti Bird Sanctuary is 8 kilometers from Kaveri River.

Gangaikondacholisvarar Temple

The Siva temple, declared as a world heritage site by UNESCO, was built between A.D. 1023 and 1036. The temple was built by Rajendra-I to commemorate his conquest of the gigantic plains. Along with the temple, he had built a city named

Gangaikondacholapuram and Lake Chola Gangam. The temple is situated 6 kilometers from Kaveri River.

Thirumalapadi

The temple is known for the festival that celebrates the marriage for Nandi (nandi kalyanam). It is believed that witnessing the marriage festival can remove all hindrances in getting married. The temple is only 1 kilometer away from Kaveri River.

Siva temple, Kilaiyur

This ancient temple was built by Paluvettaraiyar chief Kumaran Kandan in A.D. 884. The temple is known as one of the finest stone temples. It offers a wide variety of architectural styles and beautiful structures. The Siva temple is 65 kilometers away from Kaveri River.

Brahadeeswara Temple

In the year 2010, this ancient temple celebrated 1000 years of its existence. The fortified walls surrounding the temple are believed to have been built in the 16th century. The tower above the sanctum sanctorum is 216 feet tall, making it one of the tallest towers of its type across the globe. Brahadeeswara Temple is 15 kilometers from Kaveri River.

Thanjavur Art Gallery

Established in 1951, the Thanjavur Art Gallery is famous for its bronze icons. There's a huge building adjacent to the art gallery that's home to the Saraswati Mahal Library and the Sangeetha Sabha (music hall). The gallery has some of the unique and priceless stone sculptures. There is also a glass painting of Thanjavur, which is covered with gold sheets, pearls and other gem stones. The art gallery is 15 kilometers away from Kaveri River.

Saraswathi Mahal Library

The library is one among the few medieval libraries existing in the world. The Nayak kings had established this library in the 16th century. Successive dynasties have developed the library, making it a unique repository of cultural antiques and a vast treasure house of knowledge. Saraswathi Mahal Library is 14 kilometers from Kaveri River.

Gangaikonda Cholapuram Temple

The temple, which is spread around 6 acres of land, is situated at the centre of Gangaikondacholapuram city. Most of the walls of this ancient temple are destroyed. During the British rule, the lower anicut of the temple was constructed using granite rocks. The Srivimana, or the structure above the linga, has been renovated and painted beautifully by the Archeological Survey of India. It's about 6 kilometers away from river.

Anjaneya Temple

Anjaneya Temple is situated in Namakkal. It has a 13 feet high idol of Anjenya. Opposite the Anjaneya temple, at a distance of 100 meters, is a Lord Narasimha temple. Anjaneya Temple is situated 2 kilometers from the Kaveri River.

Kolli Hills

As part of the Namakkal region, this is a tiny mountain range. The mountains cover an area of 280 square kilometers and have a height of approximately 1000 to 1300 meters. To reach the top of the hills, one has to deal with 70 curvy bends. There's a lake near Kolli Hills with a permanent water source, which serves as boat house. Koli Hills are 30 kilometers from Kaveri River.

Ardhanareeshwara Temple

Ardhanareeshwara temple of Tiruchengodu is situated at an altitude of 900 meters, atop a hillock. There's a mythological story of Lord Shiva behind the temple.

Narasimha Temple

This is one of the oldest temples, located at the foothills. In this temple, Lord Narsimha is carved out from the rock. There are two other popular spots near the foothills -- Kamalalayam tank and Amman temple. Narasimha Temple is 20 kilometers away from Kaveri River.

Rock Fort

Located at the top of the hill, the Rock Fort stands at a height of 75 meters. The fort is a retreat. There's a temple and a mosque within the fort; thousands of devotees come to the fort each year. Girivalam, a popular procession, attracts a lot of devotees. Rock Fort is 2 kilometers from Kaveri River.

Botanical Garden

There's a botanical Garden in Kolli Hills. The Government of Tamil Nadu maintains it. Visitors find a number of plant species such as herbal, floral and several varieties of hybrid plants at the botanical garden. There is also a research centre within the garden for growing hybrid plants. The distance between the botanical garden and Kaveri River is 30 kilometers.

Muthugapatty Periya Swamy Temple

Situated at the bottom of the Kolli Hills is the Muthugapatty Periya Swamy temple. A very popular place of this region, this temple has a wide open space. The idol of the God is situated under the banyan tree. Every Sunday, numerous devotees gather here to worship the Lord of farmers. Muthugapatty Periya Swamy Temple is 15 kilometers from Kaveri River.

Naina-Malai

The hill is found at a distance of 10 kilometers from Namakkal. Atop the hill is a temple of Swami Venkatajalapathi. For reaching the top of the hill, one has to take

over 2500 steps. Several devotees visit the temple, particularly on Saturday during September and October. Kaveri River is 30 kilometers from Naina Malai.

Namakkal Dhurgam Fort

Built by Ramchandra Nayaka, Namakkal Dhurgam fort is located on the peak of Namagiri. The fort also has the ruins of Vishnu temple. The fort is spread across an area of 1.5 acres. Namakkal Dhurgam fort is 20 kilometers away from Kaveri River.

Bannari Amman Temple

Bannari Amman temple is one of the most prominent Amman temples in the state of Tamil Nadu. During the Tamil Month of Panguni (March - April), Kundam Festival is celebrated in the Bannari Amman temple. The festival is very famous and attracts thousands of devotees to witness the festivities. Bannari Amman temple is 78 kilometers from Kaveri River.

Sangameswarar Temple

In the Erode district, Tamil Nadu is the Sangameswarar alayam, a temple in Bhavani. The Hindu temple is dedicated to Lord Shiva. The temple was made at the confluence of three water sources -- Kaveri River, Bhavani River and 'agaya gangai', an invisible water source from underground.

Sangameswarar alayam is a popular tourism spot in Tamil Nadu. The temple has a large hall for social events. Other attractions of the event are a lovely river side garden, round boat ride, swim and bath area, and an elephant. Locals refer to the temple as Kooduthurai. Sangameswarar alayam is less than 1 kilometer from Kaveri River.

Pariyur Kondathu Kaliyamman Temple

This 1500-temple is based in Pariyur, nearly 3 kilometers from Gobichettipalayam. Every year, in January, a Fire Walking Ceremony', known as Kundam, is held here. Also, the temple attracts a large number of devotees during the annual Temple Car festival, which is celebrated with grandeur. Black marble has been used to make the inner sanctum of the temple. Pariyur Kondathu Kaliyamman Temple is 25 kilometers from Kaveri River.

Amarapaneeswarar Temple

Situated in Pariyur, this temple is dedicated to Lord Shiva and his consort Soundaranayaki Amman. This beautiful temple is made entirely of white marble. Festivals like Maha Shivaratri and Pradhosam are celebrated here with a lot of grandeur. The temple also has a lot of shrines dedicated to other Hindu gods. Amarapaneeswarar Temple is 27 kilometers from Kaveri River.

Adinarayana Swamy Temple

This temple is dedicated to Lord Vishnu. The chief deity of the temple is Adhi Narayana Perumal who can be seen along with his companions Sri Devi and Bhudevi. One of the highlights of the temple is a separate shrine dedicated to Lord

Hanuman. The temple is known for the celebration of Vaikunta Ekadashi and other festivals of Lord Vishnu. Adinarayana Swamy Temple is located at a distance of 28 kilometers from Kaveri River.

5.9 Availability of Passenger Ferry Services

At Pichavaram, there are row boats & motor boats available for hire. Row boats can accommodate up to 5 people and motor boats can accommodate up to 8 people in a single boat. Both the boats can be hired for varying duration ranging from 40 minutes to 4 hours. Boat hiring charges for row boats range from Rs. 160 to Rs. 650, and the hiring charges for motor boats are in the range of Rs. 1,100 to Rs. 2,300.

5.10 Available and probable Water Sport Recreational Facilities

The district administration of Cuddalore district and Tamil Nadu Tourism Development Corporation has initiated an ecotourism festival at Pichavaram. The year 2015 saw the third edition of this festival. Among the various activities of the festival are water sports, such as boating, rowing, kayaking and canoeing.

6. Observations, Inferences and Conclusions

6.1 Waterway

The total length of the river under present studies is detailed below:

310 km length from Urachikottai Barrage to confluence with Bay of Bengal at Pazhaiyar (National Waterway 55)	From: 11°29'3.09"N 77°42'13.68"E	Upto: 11°21'37.97"N 79°49'53.23"E
---	---	--

6.2 Length

The length of waterway under present studies under consideration is 310 km.

6.3 LAD

LAD	0-16	16-30	30-50	50-75	75-100	100-125	125-150	Total (0-150)
<1.0	1.93	7.72	3.73	20.74	15.79	20.15	14.63	84.69
1 - 1.2	0.44	1.32	2.06	1.33	3.18	2.70	2.35	13.38
1.2 - 1.4	1.01	1.39	3.84	0.66	2.35	1.59	1.10	11.95
1.4 - 1.7	1.03	2.02	6.24	1.46	2.00	0.35	2.09	15.19
1.7 - 2.0	1.88	0.87	1.28	0.81	0.37	0.19	1.74	7.13
> 2.0 m	10.09	0.00	2.20	0.74	1.54	0.00	2.90	17.47

LAD	150-175	175-200	200-225	225-250	250-275	275-310	Total (150-310)	Grand Total (0-310)
<1.0	16.76	19.01	11.54	18.33	14.34	16.56	96.52	181.21
1 - 1.2	1.83	1.34	0.93	1.59	2.21	2.45	10.35	23.73
1.2 - 1.4	0.85	2.07	0.70	1.24	1.95	1.95	8.76	20.71
1.4 - 1.7	0.30	1.81	2.14	1.15	2.46	3.63	11.50	26.69
1.7 - 2.0	0.51	0.87	2.81	1.34	1.37	2.75	9.65	24.6
> 2.0 m	4.03	0.73	6.94	1.19	2.29	7.15	22.33	25.23

0-30 km

As seen from Survey of India toposheets, the tidal reach of Kaveri Kollidam River is 26 km. During survey, Bathymetry survey is carried out for 17km. As the water depths are shallow, Depths are manually measured in rest of the reach. The maximum and minimum water depths of 7m and 0.4m w.r.t. CD in 0-17 km respectively were observed. For 17-30km, maximum water depths of 2m and minimum dry river bed were observed.

30-59 km

During survey, maximum and minimum water depths of 1.8m and nil were observed. The minimum and maximum riverbed heights of -3.2m (Chainage 49.17 km) and -14.7m (Ch 52.23 km) w.r.t. CD were observed.

59-108.3 km

During survey, maximum and minimum water depths of 1.0m (Ch 69) and dry bed were observed. The minimum and maximum riverbed heights of -3.5m (Chainage 87.12 km) and -16.5m (Ch 65.72 km) w.r.t. CD were observed.

108.3 – 142.9 km

During survey, maximum and minimum water depths of 3.0m (Ch 140) and 0.1 (ch 116) were observed. The minimum and maximum heights of -0.3 m (Ch 141 km) and -15.5 m (Ch 110 km) w.r.t. CD were observed.

142.9 – 173.6 km

During survey, maximum and minimum water depths of 0.7m (Ch 157) and 0.1 (ch 171) were observed. The minimum and maximum riverbed heights of 4.2 m (Ch 173 km) and -10.6m (Ch 157 km) w.r.t. CD were observed.

173.6-213.6 km

During survey, maximum and minimum water depths of 1.0m (Ch 184 and 205 km) and nil (ch 197 km) were observed. The minimum and maximum riverbed heights of 5.5 m (Ch 194.6 km) and -8.2m (Ch 175.19 km) w.r.t. CD were observed.

213.6 – 244.9 km

During survey, maximum and minimum water depths of 1.5m (Ch 229.53 km) and nil (ch 231 km) were observed. The minimum and maximum riverbed heights of 8.0 m (Ch 216.93 km) and -3.6m (Ch 230.65 km) w.r.t. CD were observed.

244.9– 277.8 km

During survey, maximum and minimum water depths of 1.6m (Ch 276 km) and 0.4 (ch 252.95 km) were observed. The minimum and maximum riverbed heights of 6.9 m (Ch 262.70 km) and -8.4m (Ch 265 km) w.r.t. CD were observed.

277.8-293.5 km

During survey, maximum and minimum water depths of 1.3m (Ch 290 km) and 0.7(ch 283.67 km) were observed. The minimum and maximum riverbed heights of 1.7 m (Ch 281.50 km) and -8.2m (Ch 282.69 km) w.r.t. CD were observed.

293.5 – 310km

During survey, maximum and minimum water depths of 3.0m (Ch 299 km) and 0.5 (ch 303.91 km) were observed. The minimum and maximum riverbed heights of 6.9 m (Ch 298.92km) and -7.8m (Ch 294.87 km) w.r.t. CD were observed.

6.4 Cross-Structures

Nos.	Horizontal clearance	Vertical clearance
24 bridges between chainage 17 to 310 km	Varying from 15 to 50 meters	Varying from 0.5 to 7 meters
High Tension and Electric Lines		
Nos.	Horizontal clearance	Vertical clearance
26 High Tension and Electric Lines between chainage 51 to 310 km	Varying from 20 to 350 meters	Varying from 0.5 to 17 meters

Existing Dams, Weir, Barrage, Anicuts and Locks

Pillur Dam, Kolar barrage, Lower Bhavani Dam and Nerunjipttai Barrage, Upper Bhavani Weir, Lower Coleroon Anicut and Grand Anicut are some of the important cross structures over Kaveri River.

6.5 Water availability

Urachikottai: -

Results of analysis of data for assessing period of availability (% days in year) for different discharge ranges is presented in Table 92. Percentage of days in year for availability of discharge at this gauge site in excess of certain values is presented on a plot in figure 48. These results indicate the following:

Sr	Discharge (m ³ /s) in excess of	Availability period in % days in year	Likely depth available(m) computed from gauge zero and water level
1	60 m ³ /s	54 % (at least 200 days in a year)	1.8 m
2	100 m ³ /s	47 % (at least 175 days in a year)	2.1m
3	150 m ³ /s	45 % (at least 165 days in a year)	2.3 m
4	200 m ³ /s	42% (at least 155 days in a year)	2.4 m

Table 93: Water availability in Kaveri Kollidam River at Urachikottai

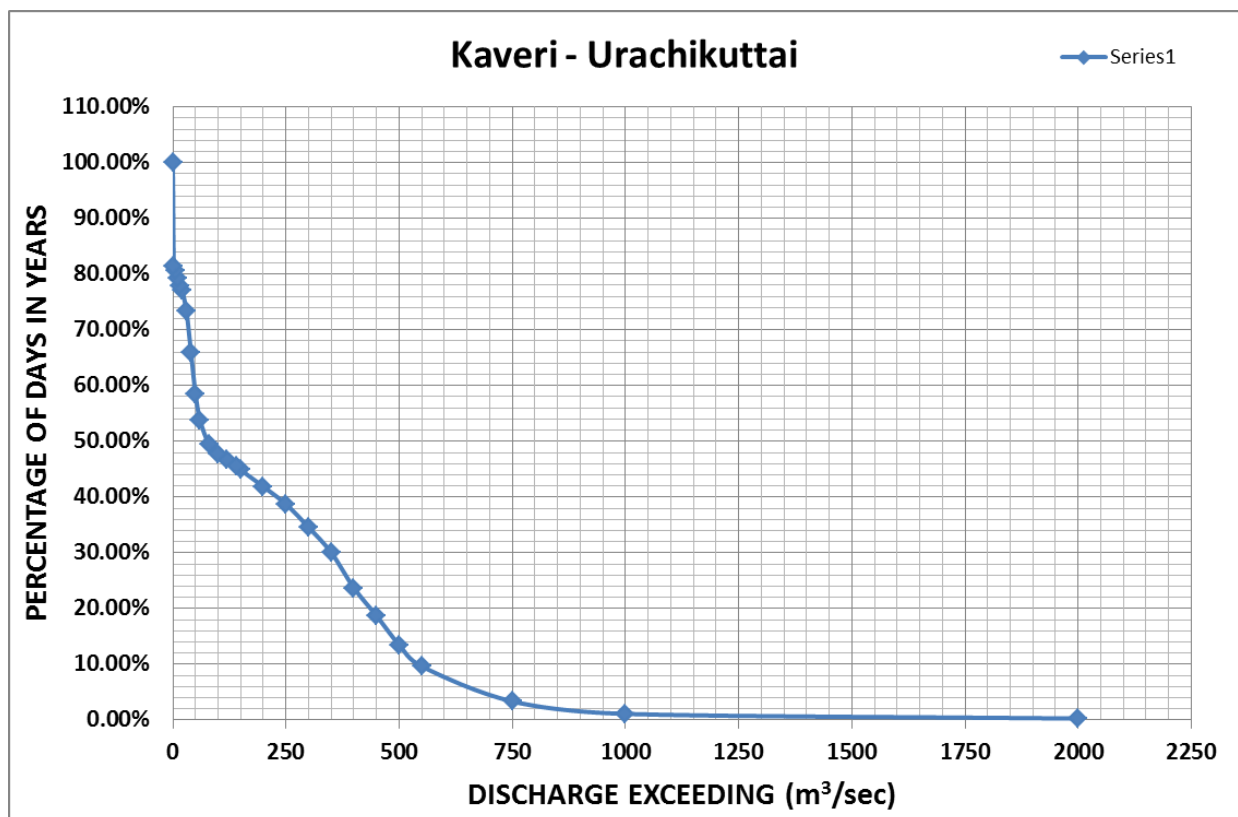


Figure 42: Period of exceedance of discharge in percentage of days in year for Kaveri Kollidam River at Urachikottai gauging station

Kodumudi: -

Results of analysis of data for assessing period of availability (% days in year) for different discharge ranges is presented in Table 93. Percentage of days in year for availability of discharge at this gauge site in excess of certain values is presented on a plot in figure 49. These results indicate the following:

Sr	Discharge (m ³ /s) in excess of	Availability period in % days in year	Likely depth available(m) computed from gauge zero & water level
1	60 m ³ /s	64 % (at least 240 days in a year)	1.0 m
2	100 m ³ /s	54 % (at least 200 days in a year)	1.4 m
3	150 m ³ /s	49 % (at least 180 days in a year)	1.6 m
4	200 m ³ /s	46% (at least 170 days in a year)	1.7 m

Table 94: Water availability in Kaveri Kollidam River at Kodumudi

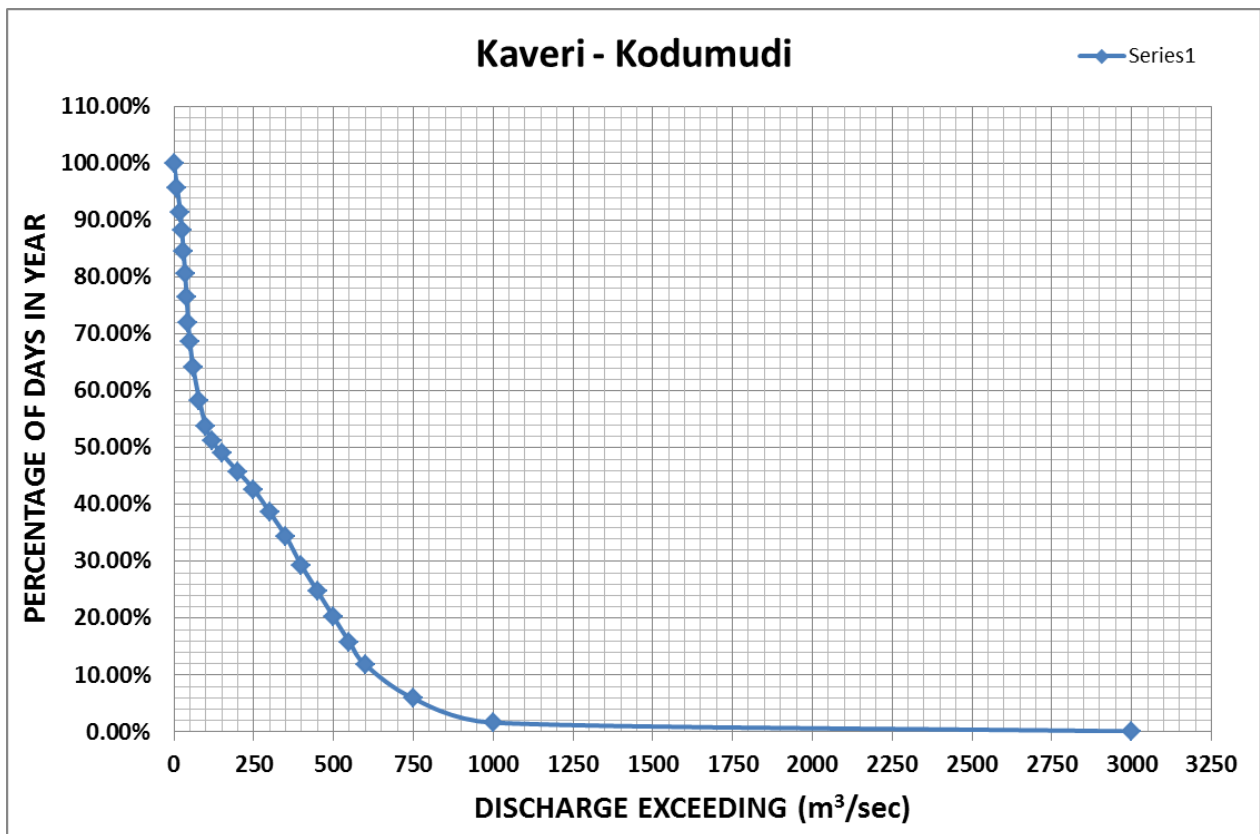


Figure 43: Period of exceedance of discharge in percentage of days in year for Kaveri Kollidam River at Kodumudi gauging station

Musiri: -

Results of analysis of data for assessing period of availability (% days in year) for different discharge ranges is presented in Table 94. Percentage of days in year for availability of discharge at this gauge site in excess of certain values is presented on a plot in figure 50. These results indicate the following:

Sr	Discharge (m ³ /s) in excess of	Availability period in % days in year	Likely depth available(m) computed from gauge zero & water level
1	60 m ³ /s	55 % (at least 205 days in a year)	1.3 m
2	100 m ³ /s	51 % (at least 190 days in a year)	1.4 m
3	150 m ³ /s	45 % (at least 165 days in a year)	1.5 m
4	200 m ³ /s	43%(at least 160 days in a year)	1.6 m

Table 95: Water availability in Kaveri Kollidam River at Musiri

The table 95 shows that discharge in excess of 60 cumecs occurs for 55 % of days in a year. Similarly, discharges in excess of 100 cumecs, 150 cumecs and 200 cumecs occurs for 51 %, 45%, and 43% of days in a year respectively. The estimated depths for 60, 100, 150 and 200 cumecs are also shown in the above table 95. Table 96 and Taable 97 shows the breakup of discharges in a particular year from 1979 to 2012. It shows a range of discharge eg. 5-10 occurring for a no. of days in a particular year. As the data is not available for whole year, Total no of days for some years does not add up to 365

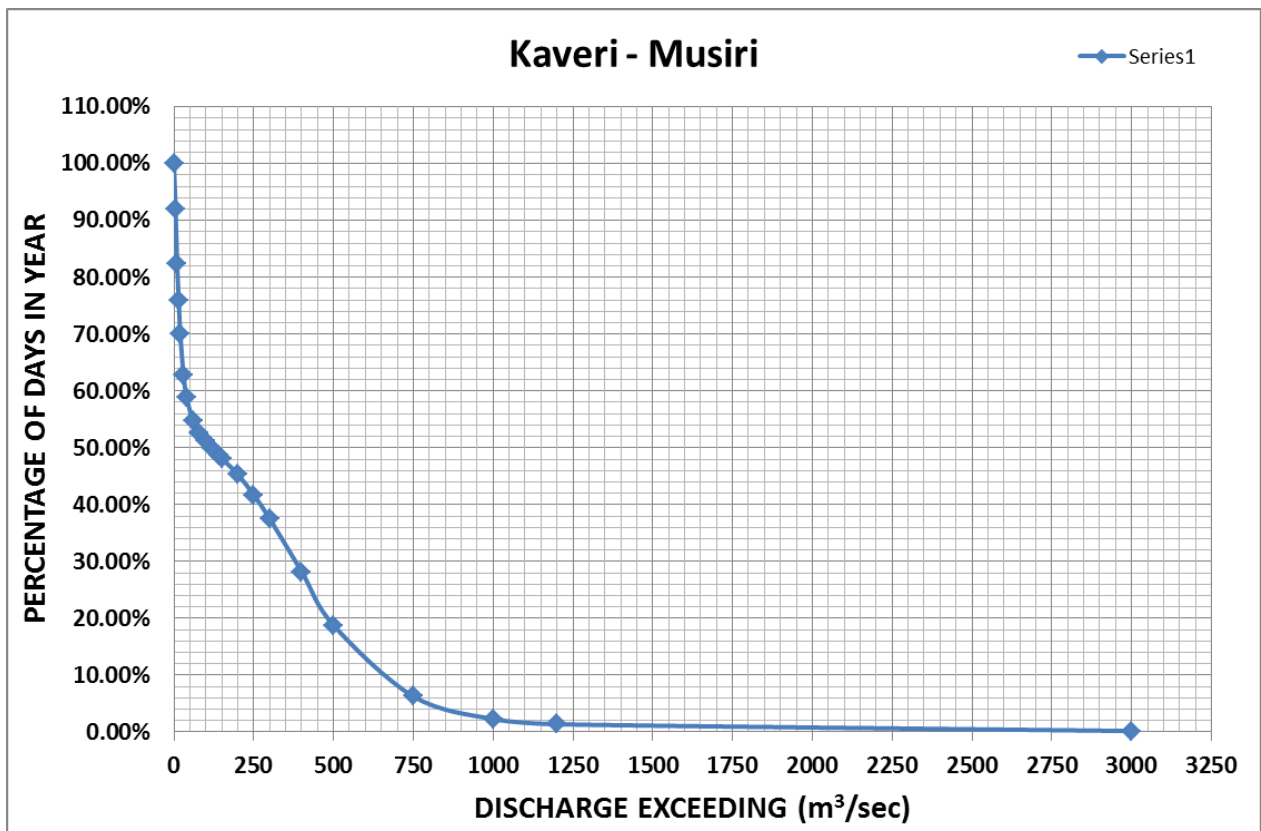


Figure 44: Period of exceedance of discharge in percentage of days in year for Kaveri Kollidam River at Musiri gauging station

No of Days Year	Range of Discharge (m ³ /s)																									
	0 to 2	2 to 5	5 to 10	10 to 15	15 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 80	80 to 100	100 to 120	120 to 140	140 to 150	150 to 200	200 to 250	250 to 300	300 to 350	350 to 400	400 to 450	450 to 500	500 to 550	550 to 750	750 to 1000	1000 to 2000	2000 to 6000
1979	0	0	7	4	3	8	4	8	5	2	4	4	3	4	12	9	4	7	12	10	11	11	49	22	9	0
1980	0	1	3	17	12	25	37	8	5	7	8	8	2	4	18	1	2	15	22	28	31	16	30	52	4	10
1981	2	2	0	1	11	12	33	76	11	10	11	4	4	2	2	1	2	9	43	23	13	15	34	22	18	4
1982	0	4	28	16	8	37	16	16	20	8	3	3	5	1	14	45	17	20	30	32	12	16	14	0	0	0
1983	4	3	8	7	11	40	91	33	5	10	18	4	8	1	8	17	4	2	17	1	2	15	36	17	3	0
1984	0	11	16	14	6	70	34	3	4	3	9	1	8	2	12	3	5	18	19	13	15	7	38	40	15	0
1985	0	10	9	4	1	29	96	38	1	0	3	7	7	4	14	29	9	13	53	10	10	17	1	0	0	0
1986	4	16	13	14	11	66	83	19	7	1	2	4	5	6	9	14	2	6	5	1	20	40	17	0	0	0
1987	5	8	28	7	3	49	49	75	51	28	2	6	0	2	3	3	9	12	10	8	6	1	0	0	0	0
1988	18	21	11	5	8	9	53	39	14	13	1	2	4	1	7	4	20	39	26	17	26	23	5	0	0	0
1989	76	0	0	0	0	9	14	54	28	29	13	7	10	1	10	9	16	4	19	17	20	12	17	0	0	0
1990	56	0	0	0	0	0	22	78	61	28	3	1	0	2	6	7	9	11	23	29	21	5	3	0	0	0
1991	5	0	0	10	8	28	7	45	69	26	4	1	8	4	7	10	8	8	11	9	33	6	29	20	9	0
1992	0	0	0	2	0	4	19	45	59	16	2	3	7	0	15	10	11	9	15	26	22	16	50	29	5	1
1993	7	0	0	0	0	2	11	42	34	32	2	0	2	0	6	8	5	33	18	16	28	24	56	24	13	2
1994	59	0	0	0	0	1	38	28	22	14	1	0	1	0	11	10	32	38	28	21	24	15	22	0	0	0
1995	79	0	0	0	0	41	62	17	2	9	1	2	1	0	22	16	6	14	18	25	21	18	12	0	0	0
1996	64	0	0	0	0	16	60	59	0	2	1	2	1	0	10	19	8	23	22	25	23	18	12	0	0	0
1997	45	0	0	1	0	2	53	57	2	4	1	3	5	1	7	21	15	31	14	10	10	9	66	8	0	0
1998	45	0	4	3	0	2	13	45	12	19	20	5	2	1	6	8	19	19	19	16	22	39	43	3	0	0
1999	154	0	0	1	3	0	4	13	3	6	2	1	2	3	7	12	15	24	29	23	27	13	21	2	0	0
2000	121	0	0	0	0	0	2	6	8	8	3	2	2	5	8	21	25	17	28	21	32	18	23	5	7	4
2001	102	2	10	10	1	2	1	2	2	13	15	2	2	7	23	16	35	22	39	31	20	3	5	0	0	0
2002	65	0	17	25	1	1	5	7	27	54	27	29	1	1	9	10	35	20	15	4	11	1	0	0	0	0
2003	251	0	0	0	0	6	22	6	1	6	15	0	0	2	10	10	8	6	7	7	3	3	2	0	0	0
2004	224	0	0	0	0	2	1	2	4	6	1	4	2	1	15	14	21	25	19	8	12	3	2	0	0	0
2005	127	0	0	0	0	1	50	1	0	0	0	2	4	1	11	4	17	11	19	13	10	9	51	12	15	7
2006	106	7	10	16	9	4	3	1	4	2	4	6	11	3	9	1	14	10	29	28	31	23	34	0	0	0
2007	85	0	0	0	0	0	0	30	38	33	0	1	3	1	9	1	19	13	10	29	33	30	14	8	4	5
2008	125	0	0	0	0	0	0	12	16	8	0	0	0	0	8	14	28	22	76	33	24	0	0	0	0	0
2009	188	0	0	0	0	0	0	0	0	3	11	0	0	3	17	19	20	18	8	22	10	12	29	5	0	0
2010	101	0	0	0	0	0	0	2	12	83	3	1	21	12	13	9	33	6	25	18	15	3	8	0	0	0
2011	113	0	0	0	0	0	0	0	4	15	18	9	3	4	14	4	14	18	33	28	31	23	34	0	0	0
2012	18	0	0	0	0	0	0	30	37	32	0	1	3	1	9	0	14	3	4	0	0	0	0	0	0	0
N	2249	85	164	157	96	466	883	897	568	530	208	125	137	80	361	379	501	546	765	602	629	464	757	269	102	33
EN	12053																									
% occurrence	18.66%	0.71%	1.36%	1.30%	0.80%	3.87%	7.33%	7.44%	4.71%	4.40%	1.73%	1.04%	1.14%	0.66%	3.00%	3.14%	4.16%	4.53%	6.35%	4.99%	5.22%	3.85%	6.28%	2.23%	0.85%	0.27%

Table 96: Availability for days for discharge in different range at Urachikottai gauge station on Kaveri Kollidam River

No of Days Year	Range of Discharge (m ³ /s)																									
	0 to 10	10 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 45	45 to 50	50 to 60	60 to 80	80 to 100	100 to 120	120 to 150	150 to 200	200 to 250	250 to 300	300 to 350	350 to 400	400 to 450	450 to 500	500 to 550	550 to 600	600 to 750	750 to 1000	1000 to 3000	3000 to 7000
1971	2	1	0	1	0	1	1	3	2	10	2	1	2	8	13	5	2	4	7	6	4	8	24	58	29	0
1972	0	14	16	24	23	18	24	10	14	10	10	11	10	16	8	5	6	4	8	9	12	11	38	37	26	2
1973	0	0	1	1	1	1	1	8	5	53	24	15	24	7	2	14	9	6	11	11	13	25	69	64	0	0
1974	0	30	39	24	27	22	13	6	13	22	8	3	5	1	2	2	6	6	4	8	13	15	46	43	7	0
1975	4	37	24	31	23	19	10	4	4	4	3	6	1	6	7	5	5	13	5	9	12	10	46	46	31	0
1976	13	22	18	23	25	24	42	23	20	18	0	1	1	8	10	18	20	6	17	16	20	13	8	0	0	0
1977	13	32	16	16	41	26	13	6	12	11	7	6	4	6	16	3	7	8	7	15	19	28	31	19	3	0
1978	0	3	13	11	12	11	16	2	13	11	16	7	14	8	4	8	16	23	22	15	11	15	40	54	19	1
1979	0	4	8	5	7	10	10	15	18	23	4	4	6	10	7	15	24	26	19	14	10	29	47	36	13	1
1980	0	3	10	16	7	17	16	4	9	10	9	9	16	18	2	2	8	16	26	20	27	18	21	60	17	5
1981	4	17	23	17	9	6	25	16	26	20	3	3	5	16	8	22	22	37	15	28	14	25	4	0	0	0
1982	7	38	41	28	14	8	19	13	9	5	1	1	5	9	16	33	22	20	8	25	14	25	4	0	0	0
1983	35	40	29	24	18	8	16	11	8	14	16	4	6	13	12	15	5	13	5	5	10	12	23	18	5	0
1984	7	12	4	6	8	22	33	27	21	14	5	5	10	9	7	14	9	15	23	10	18	17	31	39	0	0
1985	3	5	7	12	15	47	46	27	5	7	14	5	4	12	26	22	26	48	27	7	0	0	0	0	0	0
1986	17	33	11	37	40	36	19	16	12	11	5	2	2	17	13	9	7	1	12	34	13	6	12	0	0	0
1987	21	48	34	32	18	63	34	16	18	18	4	4	4	2	4	7	14	4	8	5	6	1	0	0	0	0
1988	23	18	17	24	28	15	18	4	14	19	7	3	3	10	6	13	25	27	19	7	20	23	23	0	0	0
1989	18	19	24	32	25	33	32	12	16	11	5	6	10	5	7	11	12	8	16	14	12	23	13	1	0	0
1990	10	36	27	27	35	42	23	19	18	10	2	0	2	6	6	8	6	15	35	23	8	7	0	0	0	0
1991	18	9	11	26	40	31	28	12	8	4	6	3	11	6	12	7	4	14	9	12	25	9	27	24	9	0
1992	0	4	1	2	10	15	21	42	24	11	5	2	7	17	12	10	6	13	20	24	26	14	33	39	8	0
1993	0	2	1	6	13	15	23	31	40	32	10	5	7	18	10	3	16	11	6	21	52	31	12	0	0	0
1994	6	16	2	1	0	3	11	10	23	29	17	14	5	2	10	6	3	27	16	22	37	11	35	44	15	0
1995	2	10	10	13	17	13	16	24	16	30	7	2	0	4	17	19	42	27	30	19	20	8	19	0	0	0
1996	36	61	9	27	16	14	8	7	3	9	9	5	7	11	11	20	22	6	31	13	19	11	10	1	0	0
1997	1	7	15	4	23	14	20	4	35	15	12	4	4	13	29	15	17	23	2	13	10	28	49	8	0	0
1998	0	5	4	9	3	11	13	26	47	25	10	5	3	6	12	9	14	21	27	35	29	22	24	5	0	0
1999	0	1	2	8	8	9	11	14	40	53	16	8	4	13	5	22	23	24	22	30	21	7	15	8	0	0
2000	0	8	6	5	6	2	13	22	22	42	13	8	2	5	13	34	19	29	34	19	22	16	7	6	12	1
2001	0	0	2	3	6	16	13	16	44	44	5	5	10	17	18	27	45	30	33	22	3	4	2	0	0	0
2002	28	42	17	16	26	24	26	11	34	27	3	2	1	10	10	24	44	5	8	3	3	0	0	0	0	0
2003	222	21	5	3	4	3	7	1	2	9	12	1	0	10	8	9	7	11	6	4	1	1	0	0	0	0
2004	96	21	8	0	6	5	5	2	7	12	6	2	7	10	11	23	22	22	12	11	10	4	0	0	0	0
2005	40	26	18	17	13	14	18	13	5	9	3	1	1	3	3	15	18	21	22	14	8	25	24	12	18	4
2006	0	2	0	1	1	3	0	5	4	34	60	21	13	21	22	14	14	38	16	12	27	34	19	1	3	0
2007	0	0	0	0	1	0	0	0	22	41	91	16	7	7	3	27	9	8	11	26	21	15	33	11	12	4
2008	0	0	0	2	1	2	1	1	14	42	44	28	13	21	18	19	5	38	39	19	26	10	23	0	0	0
2009	0	0	0	6	6	3	9	4	9	53	78	22	14	29	5	16	11	24	6	16	11	9	30	4	0	0
2010	0	0	0	0	4	2	1	2	5	15	78	62	13	38	24	34	16	27	14	19	10	0	1	0	0	0
2011	0	0	0	3	0	6	0	1	1	3	23	47	47	17	28	9	8	45	18	31	25	21	31	1	0	0
2012	0	0	0	0	0	0	2	0	12	25	39	19	19	4	8	6	8	9	1	0	0	0	0	0	0	0
N	626	647	473	543	580	634	657	490	674	865	692	378	329	469	465	599	624	773	677	666	662	591	874	639	227	18
EN	14872																									

% occurrence	4.21%	4.35%	3.18%	3.65%	3.90%	4.26%	4.42%	3.29%	4.53%	5.82%	4.65%	2.54%	2.21%	3.15%	3.13%	4.03%	4.20%	5.20%	4.55%	4.48%	4.45%	3.97%	5.88%	4.30%	1.53%	0.12%
--------------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Table 97: Availability for days for discharge in different range at Kodumudi gauge station on Kaveri Kollidam River

No of Days Year	Range of Discharge (m ³ /s)																					
	0 to 5	5 to 10	10 to 15	15 to 20	20 to 30	30 to 40	40 to 60	60 to 80	80 to 100	100 to 120	120 to 140	140 to 150	150 to 200	200 to 250	250 to 300	300 to 400	400 to 500	500 to 750	750 to 1000	1000 to 1200	1200 to 3000	3000 to 8000
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	172	1	4	2	3	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	50	2	4	16	25	19	13	11	12	10	7	4	7	9	6	17	10	52	58	12	8	0
1974	14	51	38	33	21	11	15	5	3	3	4	0	4	5	6	14	10	75	34	9	2	0
1975	84	43	11	10	7	5	1	4	1	4	1	0	4	8	3	13	26	47	50	20	19	0
1976	9	57	53	26	33	12	15	12	2	2	2	1	3	11	18	39	36	24	0	0	0	0
1977	16	73	32	12	18	4	7	6	1	1	2	1	4	4	9	17	24	65	35	6	12	2
1978	0	1	12	18	10	17	17	14	10	9	7	3	3	4	6	19	53	71	52	17	19	1
1979	0	29	7	7	17	24	9	3	2	3	3	1	8	9	14	43	33	82	43	15	8	3
1980	4	19	20	14	23	11	16	10	11	9	2	1	6	3	11	38	56	49	43	4	7	6
1981	0	33	26	28	28	21	5	4	15	8	3	0	4	1	15	31	34	51	24	5	21	2
1982	11	60	19	19	14	6	11	3	4	7	5	2	12	12	20	54	47	55	0	0	0	0
1983	72	52	22	19	15	17	11	5	2	7	3	1	8	27	17	9	16	42	11	1	0	0
1984	0	8	27	31	38	14	12	12	12	4	7	1	11	10	11	43	33	56	31	0	0	0
1985	0	38	29	27	38	15	8	6	8	9	5	4	12	24	23	64	34	5	0	0	0	0
1986	27	78	24	22	30	16	12	11	6	7	4	2	18	9	5	10	44	29	0	0	0	0
1987	32	66	47	44	46	28	18	9	9	4	2	1	5	10	11	13	8	2	0	0	0	0
1988	15	50	25	23	29	12	13	12	5	6	5	1	12	21	32	33	23	43	1	0	0	0
1989	19	55	44	25	24	22	16	9	6	7	6	2	16	12	11	42	23	16	0	0	0	0
1990	12	49	37	41	53	16	17	5	4	0	3	1	5	12	10	42	33	14	0	0	0	0
1991	6	94	24	21	14	4	6	9	6	7	8	2	10	5	9	28	37	42	10	2	6	0
1992	6	16	26	26	16	13	9	11	7	7	3	2	18	12	8	40	39	70	21	5	5	0
1993	2	1	58	17	16	12	17	14	9	5	13	6	19	8	22	40	83	11	2	0	1	1
1994	0	1	7	3	3	0	101	20	1	0	1	1	6	4	6	42	44	89	17	7	12	0
1995	6	20	27	24	27	20	23	0	0	2	3	1	2	18	37	64	46	37	0	0	0	0
1996	2	43	42	35	30	10	12	5	5	6	4	1	8	19	28	26	29	53	3	0	0	0
1997	0	12	10	36	31	22	15	4	7	2	3	0	16	21	11	48	19	81	19	3	1	0
1998	0	0	0	9	73	25	14	18	9	3	2	3	9	7	11	47	66	65	4	0	0	0
1999	0	16	22	29	60	18	7	9	5	0	2	3	9	10	22	42	61	41	3	2	1	0
2000	3	20	21	25	30	13	15	6	4	1	2	0	8	21	24	55	54	44	5	3	9	1
2001	1	29	27	24	20	19	17	13	4	8	7	4	19	19	40	52	38	17	0	0	0	0
2002	104	52	13	21	33	10	9	4	3	7	2	1	15	41	23	14	5	0	0	0	0	0
2003	167	29	9	7	5	8	6	5	2	2	1	1	11	6	3	17	5	4	0	0	0	0
2004	109	16	4	5	5	1	9	3	5	4	4	5	14	20	15	37	25	19	0	0	0	0
2005	96	30	10	7	14	9	3	0	1	1	1	2	4	5	8	30	29	58	15	8	21	5
2006	7	21	27	18	29	5	8	9	4	9	4	3	9	25	14	33	29	93	2	0	4	0
2007	19	55	10	27	29	12	6	1	0	0	0	0	5	16	16	12	11	69	42	8	12	4

2008	10	36	12	11	17	11	13	11	3	2	1	2	13	12	23	23	58	86	11	0	0	0
2009	49	68	32	8	9	3	9	9	6	7	8	7	21	11	5	25	7	46	28	2	1	0
2010	2	24	42	21	35	18	14	3	3	9	10	2	16	21	23	43	37	23	2	0	0	0
2011	0	17	19	26	31	21	9	1	3	4	9	3	19	13	12	56	73	48	0	0	0	0
2012	0	0	10	17	24	19	35	7	3	0	5	6	3	10	8	5	0	0	0	0	0	0
N	1126	1365	933	834	1023	555	585	303	203	186	164	81	396	515	596	1320	1338	1774	566	129	169	25
EN	14186																					
% occurrence	7.94%	9.62%	6.58%	5.88%	7.21%	3.91%	4.12%	2.14%	1.43%	1.31%	1.16%	0.57%	2.79%	3.63%	4.20%	9.30%	9.43%	12.51%	3.99%	0.91%	1.19%	0.18%

Table 98: Availability for days for discharge in different range at Musiri gauge station on Kaveri Kollidam River

6.6 Cargo / Passenger / Tourism / Ro-Ro Facility

There exists opportunity for transportation of Coal from Karaikal port to Mettur TPP power plant using Kaveri river. This coal can further be loaded into barges and moved through Kaveri River to reach Mettur. Sophisticated infrastructure like conveyor belts can be constructed to transport the coal from river point to the power plant. This can act as alternative to the railways which in turn will decongest the Chennai-Trivendram and Tuticorin-Mysuru railways.

It is again clarified that none of the Dam/Weir/barrages/Anicut has navigational locks. Navigational lock has to be provided for thorough navigation in the river.

Potential exists for Recreational development, passenger ferry services and Ro-Ro facilities for many major towns exists along the river such as Erode, Tiruchirapalli, Srirangam, Urachikottai, Karur, Chidambaram, Kodumudi etc. At Pichavaram, there are row boats & motor boats available. Ferry services can be further developed near above towns. The district administration of Cuddalore district and Tamil Nadu Tourism Development Corporation has initiated an ecotourism festival at Pichavaram. The year 2015 saw the third edition of this festival. Among the various activities of the festival are water sports, such as boating, rowing, kayaking and canoeing.

6.7 Classification of waterway: Suitable for Navigation

0-30 km

As seen from Survey of India toposheets, the tidal reach of Kaveri Kollidam River is 26 km. Water depths upto 7m were observed in this river stretch with mean depths of about 4 m for 0-10 km, 2m for 11-17 km and 1.2m for 17-30 km. Hence this reach can be developed as Class I waterway with little dredging which may be improved to Class II waterway for round the year navigation.

30-59 km

Maximum water depths of 1.8m along with dry patches were observed during survey. As average depths of about 0.7-1m are available even during lean season, this stretch can be developed for Class I navigation with little dredging for about 6 months monsoon period. With additional measures (refer 6.8), the navigation period can be extended upto 9-10 months which may be worked out after detailed studies.

59-108.3 km

Water depths of up to 1.0m were observed along with some dry patches in this stretch. Average depth is about 0.4-0.5m during the survey. This stretch can be developed for Class I navigation for about 6 months. With additional measures (refer 6.8), this period can be extended for another 3-4 months.

108.3 - 142.9 km

Maximum and minimum water depths of 3.0m (Ch 140) and 0.1 (ch 116) were observed during the reconnaissance survey with average depth of about 0.6m. Grand Anicut is located at upstream end of this stretch. Grand anicut was constructed to use the floods for irrigation in the Kaveri delta. The excess discharges are diverted into Kollidam River. Therefore this stretch is feasible for class I navigation for about 6 months during monsoon season. The class and duration of Navigation can be extended by additional measures as proposed in para 6.8.

142.9 - 173.6 km

During survey, maximum and minimum water depths of 0.7m (Ch 157) and 0.1 (ch 171) were observed. Grand anicut is located at downstream end of this stretch and Upper Anicut at Upstream end. As can be seen from Gauge data analysis, depths of the order of 1.3 m are possible for 7-8 months. Hence, Class I waterway is feasible in this stretch for about 7-8 months with minimal dredging. The navigation can be improved by additional measures (refer 6.8) after detailed studies.

173.6-213.6 km

Maximum and minimum water depths of 1.0m were observed during survey with average depth of about 0.6 m. Musiri gauge exists in this stretch at ch 185.5 km. Mayanur barrage and Upper anicut forms the upstream and downstream end of this stretch. Upper anicut was constructed to save Grand anicut from Kaveri floods. As depicted from Gauge data analysis, depths of the order of 1.3 m are possible for 7-8 months. Hence, Class I waterway is feasible in this stretch for about 7-8 months with minimal dredging. The navigation can be improved by additional measures (refer 6.8) after detailed studies.

213.6 - 244.9 km

During survey, maximum water depths of 1.5m were observed with average depth of about 0.7m. Hydrological gauge data studies show the water depths of about 1-1.3 m for about 10-8 months. Hence this stretch is feasible for Class I navigation for 9-10 months with little dredging. The navigability period can be improved along with depth with some additional measures (refer 6.8).

244.9- 277.8 km

During survey, maximum and minimum water depths of 1.6m and 0.4 were observed. Bhavani Kattalai –III barrage is located at start of this reach. Water depths of about 1.3m for about 9 months are available from hydrological studies. Hence this reach may be developed for Class I navigation for about 9 months. The navigation can be improved by additional measures (refer 6.8) after detailed studies.

277.8-293.5 km

Maximum and minimum water depths of 1.3m and 0.7 were observed. This reach is bounded by Bhavani Kattlai II and Bhavani Kattlai III at downstream and upstream respectively. Average Water depths of about 1.3 m are available during reconnaissance survey in lean season. Gauge data analysis shows the availability of 1.8 m depth for about seven months. Hence this stretch may be developed for class I navigation for about 10

months. The navigability period can be improved along with depth with some additional measures (refer 6.8).

293.5 – 310 km

During survey, maximum and minimum water depths of 3.0m and 0.5 were observed. Urachikottai barrage and Bhavani Kattlai II forms the extreme ends of this stretch. Gauge data analysis shows the availability of about 1.8 m depth for about seven months. Hence this stretch may be developed for class I navigation for approx. 10 months. The navigability period can be improved along with depth with some additional measures (refer 6.8).

6.8 Proposed alternative methods for making waterway feasible

0-30 km

One road bridge (coleroon road bridge) and one railway bridge (Kollidam rly bridge) exists in this reach with horizontal clearance of 50m and 30m respectively. Hence this reach can be developed as Class I waterway with little dredging (since horizontal clearance is 30 m at Kollidam railway bridge) or Class II waterway with little modification of existing Kollidam railway bridge and dredging.

30-59 km

Lower Anicut exists at upstream end of this stretch at chainage 59 km. Modification/reconstruction of Lower anicut will lead to continuous discharges in this stretch resulting in increase in water depths. Hence, the navigation period can be extended up to 9-10 months after modification/reconstruction of Lower anicut which may be worked out after detailed studies.

59-108.3 km

Lower Anicut exists at downstream end of this stretch at chainage 59 km. Raising of its storage by about 2-3 m after modification will lead to additional depth of about 0.7-0.5 m in most of the reach. Water depths of up to 1.0m were observed during survey (in lean season). This stretch may be developed for Class I navigation and the navigation period can be extended up to 9-10 months with the measures/modifications that can be developed after detailed studies in Stage 2.

108.3 – 142.9 km

As written earlier, Grand Anicut is located at upstream end of this stretch. Grand anicut was constructed to use the floods for irrigation in the Kaveri delta. The excess discharges are diverted into Kollidam River. Modification / reconstruction of Grand anicut may lead to addition in water depths in this reach and may increase navigation duration. This can be worked out after detailed studies in Stage II.

142.9 – 173.6 km

This reach starts from Upper anicut and goes up to Grand Anicut. Upper anicut was constructed to save Grand anicut from Kaveri floods. It diverts the excess floods into the Kollidam River. The navigation in this stretch can be improved by additional measures of regulated flows and raising the storage (Ponding levels). These details may be

worked out after detailed studies in second stage and mathematical modelling studies.

173.6-213.6 km

Mayanur barrage and Upper anicut forms the upstream and downstream end of this stretch. Upper anicut was constructed to save Grand anicut from Kaveri floods. Modification/raising the height of Mayanur barrage will lead to more discharges (regulated) into this stretch. Thus the navigation can be improved but the details can only be worked out after detailed survey in stage 2.

213.6 - 244.9 km

Mayanur barrage forms the downstream end of this stretch. Raising the height of mayanur barrage will lead to more ponding and increased water depth in this reach. The navigation can be improved in this stretch after detailed studies and survey in stage 2.

244.9- 277.8 km

Bhavani Kattalai –III barrage is located at start of this reach. Raising the gate heights by about 2-4 m will significantly improve the navigation potential in this stretch the details of which can be worked out after detailed studies in stage 2.

277.8-293.5 km

This reach is bounded by Bhavani Kattalai II and Bhavani Kattalai III at downstream and upstream respectively. Raising the height of gates of both the barrages will result in more water depth and more discharges into this stretch. The navigability period can be improved along with depth. The details can only be worked out after detailed studies and surveys in Stage 2.

293.5 - 310 km

Urachikottai barrage and Bhavani Kattalai II forms the extreme ends of this stretch. Raising the height of gates of both the barrages will result in more water depth and more discharges into this stretch. The navigability period and depths can be significantly improved after working out the details for which detailed cross-section survey and modelling studies are required.

6.9 SWOT Analysis

<p>Strength</p> <p><i>0-30 km</i> This reach is tidal reach and can be developed as Class I /Class II waterway for round the year navigation. (365 days)</p> <p><i>30-59 km, 59-108.3 km, 108.3 – 142.9 km</i> Avg Depths of about 0.7-1m are available for at least 205 days in a year. Can be developed for Class I navigation with little dredging for about 6 months monsoon period which can be extended upto 300 days with additional measures.</p> <p><i>142.9 – 173.6 km, 173.6-213.6 km,</i> Avg depths of about 1.3 m are possible for 7-8 months. Class I waterway is feasible for about 7-8 months (240 days) with minimal dredging. The navigation can be improved by additional measures for duration upto 300 days</p> <p><i>213.6 – 244.9 km, 244.9– 277.8 km, 277.8-293.5 km, 293.5 – 310 km</i> Avg water depths of about 1-1.3 m for about 10-8 months for at least 270-300 days in a year. This stretch is feasible for Class I navigation for 300 days with little dredging. The navigability period can be improved along with depth with some additional measures Various Anicut, Barrages already exist along the reach so stretch wise development is possible. Existing ferry services near Kunjalur.</p>	<p>Weakness</p> <ul style="list-style-type: none"> • A total of 24 bridges and 7 main Anicuts, Barrages exist across the river that may need to be modified. • It may lead to high infrastructure modification / reconstruction cost • Provision of locks will be essential at Weir/Barrages.
<p>Opportunities</p> <ul style="list-style-type: none"> • Coal for Mettur TPS (near Urachikottai) from Karaikal Port. (3-5 Mn Tonnes) • Potential exists for Recreational development, passenger ferry services and Ro-ro facilities for many major towns exists along the river (eg Erode, Tiruchirapalli, srirangam, urachikottai, karur, chidambaram, kodumudi exist) 	<p>Threats</p> <ul style="list-style-type: none"> • Less water in lean season.

6.10 Recommendation for going to Stage II

0-30 km reach (26 km is tidal reach) can be developed as Class I /Class II waterway for round the year navigation. (365 days). (*refer para 4.3, From SOI toposheets, tidal length is 26km. However while carrying out the bathymetry survey at estuary, tidal influence was found only up to 16.42 km. After 16.42, shallow depths are observed and topographic survey has been carried out.*)

From **30-59 km, 59-108.3 km, 108.3 – 142.9 km**, Avg Depths of about 0.7-1m are available for about 6 months monsoon period which can be extended upto 300 days with additional measures.

In **142.9 – 173.6 km, 173.6-213.6 km**, Avg depths of about 1.3 m are possible for 7-8 months which can be improved by additional measures for duration upto 300 days. From **213.6 – 244.9 km, 244.9– 277.8 km, 277.8-293.5 km, 293.5 – 310 km**, Avg water depths of about 1-1.3 m exist for about 10-8 months.

WAPCOS recommend carrying out detailed studies and investigations in the total stretch of 310 km length to examine the additional measures to improve navigability period.

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Tows City/ Jetty/ Terminal	Position	Remarks	Other Details
1	0													Good											Mouth was open, one breakwater exists right bank at mouth, littoral drift shifted the opening away from breakwater, small fishing boats as well as big motorboats are observed entering through mouth.	
2	1	4 m	0.5 m											Good									Pazhaiyar Fishing Jetty	11°21' 28.8"N , 79°49' 28.7"E		
3	2 to 10												Bank Restoration in progress on the south bank (Kattur Village), North bank barren with sandy beach and occasional Mangroves				Kollidam									
4	13.5 to 21											Concrete bunding and road on the south bank (Alakkudi Village)		Good											Coconut Plantation along the south bank	
5	17	water patches 1.5 m	Dry height with water patches 0.3 m					Kollidam Rly Bridge (V/C-7 m, H/C-30 m)	11°20'15.32"N, 79°43'51.84"E					Good	Not approachable due to bridge foundation and scattered boulders beneath both bridges	11-20-15.32N, 79-43-51.84E to 11-20-08.3N, 79-42-43.4E				Kollidam Rly Bridge (HFL-7m)	11°20'15.32"N , 79°43'51.84"E	Coconut Plantation along the south bank			Water flowing through half of river width, Dense bushes and sandy strata in between the creeks and also bushes on both banks	Water flowing in a width of 400m (120+150+130m, 3creeks)
6	18							Coleroon Bridge (V/C-6m, H/C-50m)	11°20'08.3"N, 79°42'43.4"E					Good										Paddy crop and scattered Bahaguni,	LT line, pipeline on the bridge, Water flows	Water flowing in a width of

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Tows City/ Jetty/ Terminal	Position	Remarks	Other Details
																						Banana, Mango Plantation			through half river width, Dense bushes at bank and sandy river bed	310m (140+170m, 2creeks) Coleroon Bridge(NH-45A)
7	29.8											Venugopals wami Temple at Vadarangam Village	11°15'51.6"N, 79°39'09.9"E	Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
8	31 to 33.5											Bunding on the south bank at Vadarangam Village		Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
9	37.9			Non Ops Jackwell	11°14'58.7"N, 79°36'55.5"E									Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
10	43							Mannarkudi Bridge (v/c-8m, h/c-30m)	11°12'57.12"N, 79°34'42.34"E					Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation			Water flowing in patches with dry sandy bed as well as slight bushes, Intake located 2km downstream	Water flowing in a width of 350m Road Bridge @7.5+1.5x2
11	45.6			Jackwell (South Bank)	11°12'06.1"N, 79°33'34.9"E									Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
12	47.2			Broken Jackwell (South Bank)	11°11'42.4"N, 79°33'04.0"E									Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
13	48.5			Jackwell Construction in Progress	11°11'30.6"N, 79°32'29.2"E									Good								Paddy crop and scattered Bahaguni, Banana,				

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Tows City/ Jetty/ Terminal	Position	Remarks	Other Details
				s (South Bank)	3"E																	Mango Plantation				
14	51.8									HT Line 1 (v/c-10m)	11°10' 21.7" N, 79°30' 29.5" E			Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
15	59													Good				Coleroon North and South Branch (Lower Anicut)	11-08-36.4N, 79-27-02.4E (North Branch) and 11-08-10.4N, 79-27-12.2E (South Branch)			Paddy crop and scattered Bahaguni, Banana, Mango Plantation			Arch type Coleroon Regulator fitted with lift shutter, road bridge, Offtaking Coleroon North Branch canal and north undersluices, one more canal on other side of bridge	Sandy islands in bed of river (just u/s and d/s of river), Market on one bank of river, people were seen fishing
16	62.5			Jackwell I	11°06'57.2"N, 79°25'55"E									Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
17	63.6			Jackwell I	11°06'26.3"N, 79°25'39.7"E									Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation				
18	64.9									HT Line 2 (v/c-15m), HT Line 3 (v/c-15m)	11°06' 44.4" N, 79°25' 33.6" E			Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation			HT Line passing through the river from one bank to another, sandy bed in u/s and d/s of the river	
19	73.8							Neelathannalur Bridge (v/c-8m, h/c-25m)	11°02'58.4"N, 79°21'35.3"E					Good								Paddy crop and scattered Bahaguni, Banana, Mango Plantation			Water flowing in a width of 110m Madanthur Neelathanullur Road Bridge@7.5+1.5x2	Dry sandy bed with dense bushes and trees, old service

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Tows City/ Jetty/ Terminal	Position	Remarks	Other Details
20	78			Jackwell (South Bank)	11°01'29.5"N, 79°19'56.3"E									Good								Paddy Crop , Groundnut and Arospadi, Bahugni Plantation. Scattered Banana and Mango plantation.				road
21	79.2			Jackwell (South Bank)	10°59'28.0"N, 79°16'32.8"E									Good								Paddy Crop , Groundnut and Arospadi, Bahugni Plantation. Scattered Banana and Mango plantation.				
22	80			Jackwell (North Bank)	10°59'19.3"N, 79°16'02.1"E									Good								Paddy Crop , Groundnut and Arospadi, Bahugni Plantation. Scattered Banana and Mango plantation.				
23	81 to 82.4											Bunding on the south bank Vazkhai Village	As per chainage	Good								Paddy Crop , Groundnut and Arospadi, Bahugni Plantation. Scattered Banana and Mango plantation.				
24	84.5			Jackwell I	10°59'43.8"N, 79°16'59.0"E									Good								Paddy Crop , Groundnut and Arospadi, Bahugni Plantation.				

SI No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Tows City/ Jetty/ Terminal	Position	Remarks	Other Details				
25	98 to 100.5																					Scattered Banana and Mango plantation.								
																Good	Not approachable due to deep forest, brick quarries	10-56-17.6N, 79-11-28.1E to 10-56-25.3N, 79-09-53.4E						Paddy Crop , Groundnut and Arospadi, Bahugni Plantation. Scattered Banana and Mango plantation.						
											Pipeline bridge under construction (v/c-10m, h/c-10m)	10°56'15.5"N, 79°08'47.4"E																	Dry bed with dense bushes	
								Jackwell (South Bank)	10°56'07.2"N, 79°07'59.9"E																					
27	104.7			Jackwell (South Bank)	10°55'43.6"N, 79°07'32.9"E																									
28	105.5			Jackwell (South Bank)	10°55'43.6"N, 79°07'32.9"E																									
29	108							Thirumanur Bridge (v/c-8m, h/c-50m)	10°55'35.72"N, 79°06'11																Pipeline 50m u/s of road bridge, Intake	Water flowing in a				

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details	
									.56"E																200m from one bank, dry sandy bed with less vegetation, Kabristan nearby at one bank	width of 100m	
30	108.3			Jackwell I	10°55'49.05"N, 79°06'11.02"E			Pipeline Bridge (v/c-8m, h/c-15m)	10°55'49.05"N, 79°06'11.02"E					Good												Paddy Crop and heavy Coconut Plantation. Scattered Banana plantations observed.	
31	114											Vaidhyanat haswami Temple	10°53'58.1"N, 79°03'31.6"E	Good												Paddy Crop and heavy Coconut Plantation. Scattered Banana plantations observed.	
32	115			Jackwell I (North Bank)	10°53'35.2"N, 79°03'26.1"E							Bunding on the south bank (Vaidhyana than pettai Village)	10°53'35.8"N, 79°03'26.5"E	Good												Paddy Crop and heavy Coconut Plantation. Scattered Banana plantations observed.	
33	128.4							Poondi-Sengaraiyur Bridge (v/c-7m, h/c-25m)	10°52'26.29"N, 78°55'59.71"E					Good												Paddy Crop and scattered Banana, Mango, Coconut Plantations.	Dry sandy bed with less vegetation
34	130									HT Line 4 (v/c-16m)	10°51'55.7"N, 78°55'34.6"E			Good												Paddy Crop and scattered Banana, Mango, Coconut Plantations.	
35	132			Jackwell I (South)	10°51'31."									Good												Paddy Crop and	

SI No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details	
				Bank)	3"N, 78°54'-28.6" E																	scattered Banana, Mango, Coconut Plantations.					
36	142.9					Grand Anicut (All regulators constructed during the British Era)	10°49'54.9" N, 78°49'08.3"E							Good				Coleroon, Cauvery and Vennar Regulators (Grand Anicut)	10°49'54.9"N, 78°49'08.3"E (Cauvery Regulator centre), 10°49'46.3"N, 78°49'06.1"E (Vennar Regulator)			Paddy Crop and scattered Banana, Mango, Coconut Plantations.			Cauveri,Vennar Regulators, Coleroon regulators (Arch type), Scouring Sluices with Shutters, Cauveri River Interpretation Center, Guage Well, Full Climatic Station, Automatic Rainuage Station, Buildings, Water available for feeding canals but d/s side is dry sandy bed, vegetation on both sides		
37	142.7												Good				Coleroon, Cauvery and Vennar Regulators (Grand Anicut)	10°50'01.7"N, 78°49'01.6"E (Coleroon Regulator centre point),			Paddy Crop and scattered Banana, Mango, Coconut Plantations.						
38	152.5			Jackwell	10°50'14.3"N, 78°45'02.1"E								Good									Paddy Crop and scattered Banana, Mango, Coconut Plantations.					
39	154.7			Jackwell	10°50'13.3"N, 78°43'59.9"E								Good									Paddy Crop and scattered Banana, Mango, Coconut Plantations.					
40	156			Jackwell	10°50'10.4"N, 78°43'12.7"E								Good				Kaveri						Paddy Crop and scattered Banana, Mango, Coconut Plantations.				

SI No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details
					9°05.28"E																	Coconut Plantations.				
55	166			Jackwel I. VC - 7m, HC - 12m	10°52'04.20"N, 78°38'48.95"E																	Paddy Crop and scattered Banana, Mango, Coconut Plantations.				
56	166.6			Jackwel I. VC - 7m, HC - 12m	10°52'11.16"N, 78°38'29.84"E																	Paddy Crop and scattered Banana, Mango, Coconut Plantations.				
57	169			Jackwel I. VC - 8m, HC - 8m	10°52'35.29"N, 78°37'16.40"E																	Paddy Crop and scattered Banana, Mango, Coconut Plantations.				
58	170.8			Jackwel I. VC - 8m, HC - 8m	10°52'36.73"N, 78°36'15.51"E																	Paddy Crop and scattered Banana, Mango, Coconut Plantations.				
59	173.6																	Mukombu Barrage	10°52'57.40"N, 78°34'41.53"E			Paddy Crop and scattered Banana, Mango, Coconut Plantations.			Flow Monitoring Room, Gauge Well, PWD Hydrology Project meant for silt analysis, water quality and store for site equipments, Very little water flowing through barrages, sandy strata	PWD Upper Anicut along with sandy islands 1. Upper Barrage- 594m 2) Barrage- 632m 3) Regulator- 143m 4) Regulator- 20m
60	175.3			Jackwel I. VC -	10°52'36.																	Paddy Crop and				

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details
				7m, HC - 10m	73''N , 78°36'15.51''E																	scattered Banana, Mango, Coconut Plantations.				
61	182.7			Jackwel I. VC - 7m, HC - 10m	10°54'58.46''N , 78°30'05.60''E																	Paddy Crop and scattered Banana, Mango, Coconut Plantations.				
62	192.8							Thandai Periyar Bridge (V/C- 6m, H/C- 40m)	10°57'01.59''N, 78°25'04.12''E													Paddy Crop and scattered Banana, Mango, Coconut Plantations.		Water flowing in patches with dry sandy bed as well as slight bushes	Road Bridge@ 7.5+1.5x 2	
63	193.5			Jackwel I. VC - 7m, HC - 10m	10°57'02.13''N , 78°24'39.35''E																	Paddy Crop and scattered Banana, Mango, Coconut Plantations.				
64	204.1			Jackwel I. VC - 6m, HC - 8m	10°57'24.15''N , 78°18'57.45''E																	Scattered Banana, Coconut Plantations.				
65	205.2			Jackwel I. VC - 6m, HC - 8m	10°57'37.28''N , 78°18'20.63''E																	Scattered Banana, Coconut Plantations.				
66	206.2			Jackwel I. VC - 6m, HC - 8m	10°57'43.22''N , 78°17'46.05''E																	Scattered Banana, Coconut, Sugarcane Plantations.				
67	209.3			Jackwel I. VC - 6m, HC - 8m	10°57'44.72''N , 78°1																	Scattered Banana, Coconut, Sugarcane Plantation				

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details
					6°04.59"E																	s.				
68	210.3			Construction of Jackwell I	10°57'47.54"N , 78°15'31.45"E																	Scattered Banana, Coconut, Sugarcane Plantations.				
69	213.3							Mayanur Bridge/ Barrage (Nil Clearance)	10°57'28.20"N, 78°14'05.01"E									Mayanur Bridge/ Barrage (Nil Clearance)	10°57'28.20"N, 78°14'05.01"E			Scattered Banana, Coconut, Sugarcane Plantations.			Road Bridge@ 7.5+1.5x2	
70	213.6									Electric line. VC - 8m	10°57'24.36"N, 78°13'57.48"E							Mayanur Check Dam	10°57'24.36"N, 78°13'57.48"E			Scattered Banana, Coconut, Sugarcane Plantations.				
71	216.9			Jackwell I. VC - 8m, HC - 8m	10°57'33.68"N , 78°11'59.82"E																	Scattered Banana, Coconut, Sugarcane Plantations.				
72	217.2			Jackwell I. VC - 8m, HC - 8m	10°57'35.93"N , 78°11'51.26"E																	Scattered Banana, Coconut, Sugarcane Plantations.				
73	222.2			Jackwell I. VC - 6m, HC - 8m	10°59'39.62"N , 78°10'05.93"E																	Scattered Banana, Coconut, Sugarcane Plantations.				
74	222.9			Jackwell I. VC - 7m, HC - 8m	11°00'03.38"N , 78°10'01.55"E																	Scattered Banana, Coconut, Sugarcane Plantations.				
75	223.1			Jackwell I. VC - 7m, HC - 8m	11°00'09.99"N , 78°09'58.																	Scattered Banana, Coconut, Sugarcane Plantations.				

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details	
					31"E																						
76	228.5									High Tension line. VC - 20m	11°02'28.36" N, 78°08'05.93" E											Scattered Banana, Coconut, Sugarcane Plantations.					
77	230							Vangal Bridge (VC - 6m, HC - 30m)	11°02'54.69" N, 78°07'27.33" E													Scattered Banana, Coconut, Sugarcane Plantations.					
78	230.4							Vangal Rail Bridge (VC - 8m, HC - 20m)	11°03'03.36" N, 78°07'19.24" E													Scattered Banana, Coconut, Sugarcane Plantations.					
79	234.1									High Tension line. VC - 20m	11°04'22.69" N, 78°05'51.05" E												Scattered Banana, Coconut, Sugarcane Plantations.				
80	244.9							Velur New Bridge (VC - 5m, HC - 15m)	11°05'55.59" N, 78°00'16.67" E													Scattered Banana, Coconut, Sugarcane Plantations.					
81	246.3									Electric Line VC - 8m, HC-20m	11°05'36.90" N, 77°59'26.92" E												Scattered Banana, Coconut, Sugarcane Plantations.				
82	250.9									High Tension Line VC - 12m.	11°04'03.99" N, 77°57'31.53" E												Scattered Banana, Coconut, Sugarcane Plantations.				
83	252.4							Jackweli. VC - 7m, HC - 8m	11°03'44.87" N, 77°56'41.01" E														Scattered Banana, Coconut, Sugarcane Plantations.				
84	258.2					Magdeswar Temple	11°04'35.55" N, 77°53'25.16" E																Scattered Banana, Coconut, Sugarcane Plantations.				

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Tows City/ Jetty/ Terminal	Position	Remarks	Other Details	
							E															s.					
85	258.3									Electric Line VC - 10m.	11°04' 37.70' 'N, 77°53' 23.65' 'E											Scattered Banana, Coconut, Sugarcane Plantations.					
86	258.6																			Kodumudi Gauge Station HFL- 34.76m	11°04'42.39" N, 77°53'19.33" E		Scattered Banana, Coconut, Sugarcane Plantations.				
87	267.5									High Tension Line VC - 10m.	11°09' 26.35' 'N, 77°52' 51.28' 'E											Scattered Banana, Coconut, Sugarcane Plantations.					
88	267.6																	Mariam mapadugai Check Dam	11°09'27.83"N, 77°52'49.66"E			Scattered Banana, Coconut, Sugarcane Plantations.			Boulder Strata, ferry service, a series of coconut trees at one bank		
89	277.8																	Passur Barrage	11°09'27.83"N, 77°52'49.66"E			Scattered Banana, Coconut, Sugarcane Plantations.					
90	284.3									High Tension Line VC - 20m.	11°15' 53.27' 'N, 77°48' 38.07' 'E											Scattered Banana, Coconut, Sugarcane Plantations.					
91	288.2									High Tension Line VC - 20m.	11°17' 37.33' 'N, 77°47' 23.99' 'E											Scattered Banana, Coconut, Sugarcane Plantations.					
92	288.3									High Tension Line VC - 20m.	11°17' 39.83' 'N, 77°47' 22.29' 'E											Scattered Banana, Coconut, Sugarcane Plantations.					
93	290.3							Kokkarayana pettai Bridge (V/C- 8m, H/C-20m)	11°18'37.83"N, 77°46'47.15"E													Scattered Banana, Coconut, Sugarcane Plantation			Very dense vegetation with large no. of coconut trees	Road Bridge@ 7.5+1.5x 2	

SI No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details	
																						s.					
94	293.3									High Tension Line VC - 20m.	11°19'55.11'N, 77°45'39.86'E											Scattered Banana, Coconut, Sugarcane Plantations.					
95	293.5																	Vendipalayam Barrage	11°19'59.97"N, 77°45'36.56"E			Scattered Banana, Coconut, Sugarcane Plantations.					
96	293.6									High Tension Line VC - 20m.	11°20'05.09'N, 77°45'32.22'E											Scattered Banana, Coconut, Sugarcane Plantations.					
97	295.4							Pallipalayam Rail Bridge (V/C- 9m, H/C-17m)	11°20'57.82"N, 77°45'16.05"E													Scattered Banana, Coconut, Sugarcane Plantations.			Bouldery Strata, Less Vegetation, Paper & Boards Factory nearby (0.5km away)		
98	297							Pallipalayam New Bridge under Construction (V/C- 9m, H/C-25m)	11°21'43.09"N, 77°44'46.21"E													Scattered Banana, Coconut, Sugarcane Plantations.			Water flowing in 300m river bed, bouldery strata, Temple at one end nearby (700m from bank)	Road Bridge@ 7.5+1.5x 2	
99	297							Pallipalayam Old Bridge (V/C- 8m, H/C-10m)	11°21'43.34"N, 77°44'45.58"E													Scattered Banana, Coconut, Sugarcane Plantations.					
100	297.5									High Tension Line VC - 20m.	11°21'53.44'N, 77°44'31.21'E												Scattered Banana, Coconut, Sugarcane Plantations.				
101	300.7									High Tension Line VC - 20m.	11°22'29.34'N, 77°43'26.68'E												Scattered Banana, Coconut, Sugarcane Plantations.				
102	301.1													Good	Dump yard found at WestBank	11°22'37.39"N 77°42'57.4							paddy, banana, coconut				

Sl No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Tows City/ Jetty/ Terminal	Position	Remarks	Other Details
												in the river old mechanical pump house sunk in the river as per local info	61"N, 77°41' 37.94 1"E									and Coconuts				
111	306.8													Good								Paddy, sugarcane, coconut plantation scattered here and there on both the banks				
112	307.5													Good								Paddy, Sugarcane and Coconuts				
113	308					sankeresh warar Temple	11°25' 57.20 6"N 77°40' 56.01" E	Bhavai kumarapalayam bridge 3&4 NH 47	11° 25'53.52 5"N, 77° 41'15.45 8"E 11° 25.52.63 23N, 77° 41'15.35 1"bridge 4					Good				Bhavai kumarapalayam bridge 2 ,Bhavai kumarapalayam bridge 23	11° 25'53.5 25"N, 77° 41'15.4 58"E bridge2 , 11° 25.52.6 323"N, 77° 41'15.3 51"			Paddy, sugarcane, coconut plantation scattered here and there on both the banks				
114	308.5							Bhavani kumarapalayam bridge2	11° 26'28.03 7"N, 77° 41'05.43 4"E					Good					Level Marking 161.0m	11° 26'28 .037" N, 77° 41'05 .434" E						
115	309.5							Bhavani Kumarapalayam Bride V/c= 8.288m, Ht=17.45m	11° 27'05.85 5"N,77° 41'31.41 "E	Ahead of the bridge and 29m ahead a electric cable passing vc=9m	11° 27'04. 618"N ,77° 41'30. 824"E			Good												
116	310.8													Good								Paddy, sugarcane, coconut plantation				

SI No	Chainage (Km)	Max WL (RAW)	Min WL (RAW)	Utility/Pipelines	Position	Historical and tourist places	Position	Bridges Name with VC & HC	Position	HT /Electric Line with VC	Position	Permanent Structure in Corridor of River	Position	Bank Condition	Critical Areas/ Not approachable	Position	Local Name of River	Dams	Position	HFL/ Gauge station details	Position	Types of Crops & Industry	Ferry/ Prominent Towns City/ Jetty/ Terminal	Position	Remarks	Other Details
117	314.1											Central water comission office urrachikottai	11°28' 47.64 41"N, 77°41' 58.25 7"E	Good								Paddy				
118	314.7							Lower Mettur Hydro Electric project pwoer house 4	11°29'04 .3914"N, 77°42'12 .3147"E	HT cable and electic line found v/c = 14m	11°28' 55.15' 'N, 77°42' 09.88 6"E		Good									Paddy, sugarcane, coconut plantation scattered here and there on both the banks				
119	315													Good				Uratchi kottai		11°29'0 2.79"N, 77° 42'14.7 2"E						

Annexure 1: Inventory of structures on Kaveri Kollidam River

Annexure 3: Soil Characteristics

Chainage (km)	Texture
0-16	SAND
16-50	SAND
50-100	SAND
100-200	SAND
200-309	SAND

Annexure 3: Soil Samples characteristics

Annexure 5: Source Data of Figure 26: Riverbed profile from the Estuary (CH-16) up to (CH-310)

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
16.766	2.64	3.14	2.65	7.50
16.840	2.49	2.99	2.67	7.52
16.915	2.28	2.78	2.69	7.54
16.989	2.25	2.75	2.70	7.56
17.063	2.16	2.56	2.72	7.58
17.138	2.09	2.59	2.74	7.60
17.241	2.00	2.40	2.76	7.62
17.302	1.82	2.12	2.78	7.64
17.368	1.71	2.21	2.79	7.65
17.458	1.68	2.18	2.82	7.68
17.512	1.65	2.05	2.83	7.69
17.652	1.52	2.02	2.86	7.73
17.755	1.48	1.78	2.89	7.75
17.862	1.53	1.83	2.91	7.78
17.950	1.62	1.92	2.93	7.80
18.047	1.72	2.12	2.96	7.83
18.147	1.79	2.29	2.98	7.85
18.227	1.82	2.42	3.00	7.88
18.329	1.96	2.46	3.02	7.90
18.431	2.05	2.75	3.05	7.93
18.536	2.13	2.93	3.07	7.95
18.642	2.21	2.91	3.10	7.98
18.745	2.31	3.01	3.12	8.01
18.852	2.39	3.09	3.15	8.04
18.949	2.45	3.25	3.17	8.06
19.048	2.57	3.37	3.20	8.09
19.121	2.65	3.55	3.21	8.10
19.207	2.73	3.63	3.24	8.13
19.278	2.82	3.52	3.25	8.14
19.355	2.91	3.91	3.27	8.16
19.447	3.02	4.02	3.29	8.19
19.546	3.08	4.18	3.32	8.21
19.646	3.17	4.27	3.34	8.24
19.745	3.25	4.25	3.36	8.26
19.844	3.32	4.22	3.39	8.29
19.944	3.43	4.33	3.41	8.32
20.043	3.51	4.51	3.44	8.34
20.143	3.58	4.68	3.46	8.37

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
20.241	3.71	4.91	3.48	8.39
20.337	3.72	4.72	3.51	8.42
20.433	3.75	4.75	3.53	8.44
20.529	3.74	4.74	3.55	8.47
20.624	3.71	4.61	3.57	8.49
20.720	3.71	4.51	3.60	8.52
20.816	3.72	4.52	3.62	8.54
20.884	3.71	4.51	3.64	8.56
20.976	3.79	4.59	3.66	8.58
21.068	3.75	4.45	3.68	8.60
21.160	3.71	4.51	3.70	8.63
21.252	3.72	4.52	3.73	8.65
21.343	3.76	4.46	3.75	8.67
21.435	3.75	4.65	3.77	8.70
21.527	3.80	4.60	3.79	8.72
21.586	3.76	4.66	3.81	8.74
21.658	3.69		3.82	8.76
21.745	3.60		3.84	8.78
21.832	3.54		3.86	8.80
21.920	3.48		3.89	8.82
22.007	3.39		3.91	8.85
22.094	3.32		3.93	8.87
22.182	3.21		3.95	8.89
22.269	3.17		3.97	8.91
22.357	3.10		3.99	8.94
22.444	3.01		4.01	8.96
22.531	2.95		4.03	8.98
22.601	2.88		4.05	9.00
22.617	2.80		4.05	9.00
22.662	2.99		4.06	9.01
22.719	2.94		4.08	9.03
22.754	2.87	3.17	4.09	9.04
22.778	2.84	3.04	4.09	9.04
22.805	2.85	3.15	4.10	9.05
22.832	2.84	3.14	4.10	9.06
22.882	2.84	3.04	4.12	9.07
22.936	2.82	3.02	4.13	9.08
23.013	2.80	3.10	4.15	9.10
23.082	2.78	2.98	4.16	9.12
23.163	2.79	2.99	4.18	9.14
23.246	2.79	3.09	4.20	9.16

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
23.311	2.75	2.95	4.22	9.18
23.431	2.71	2.91	4.25	9.21
23.531	2.74	3.04	4.27	9.24
23.627	2.75	2.95	4.29	9.26
23.736	2.73	3.03	4.32	9.29
23.836	2.72	2.92	4.34	9.31
23.986	2.68	2.98	4.38	9.35
24.084	2.69	2.99	4.40	9.38
24.183	2.68	2.98	4.43	9.40
24.282	2.64	2.84	4.45	9.43
24.401	2.65	2.85	4.48	9.46
24.501	2.63	2.93	4.50	9.49
24.596	2.62	2.92	4.53	9.51
24.693	2.90	3.20	4.55	9.53
24.789	3.15	3.35	4.57	9.56
24.880	3.16	3.36	4.59	9.58
24.960	3.16	3.36	4.61	9.60
25.036	3.17	3.37	4.63	9.62
25.136	3.12	3.32	4.66	9.65
25.236	3.10	3.30	4.68	9.67
25.336	3.06	3.26	4.70	9.70
25.446	3.08	3.28	4.73	9.73
25.553	3.04	3.24	4.76	9.76
25.657	3.12	3.32	4.78	9.78
25.757	3.22	3.52	4.81	9.81
25.850	3.30	3.80	4.83	9.83
25.943	3.41	4.01	4.85	9.86
26.032	3.49	4.19	4.87	9.88
26.126	3.56	4.26	4.89	9.90
26.235	3.68	4.38	4.92	9.93
26.338	3.74	4.44	4.94	9.96
26.440	3.74	4.44	4.97	9.98
26.564	3.86	4.46	5.00	10.02
26.681	3.94	4.44	5.03	10.05
26.821	4.05	4.55	5.06	10.08
26.931	4.10	4.60	5.09	10.11
27.031	4.23	4.73	5.11	10.14
27.129	4.35	4.95	5.13	10.16
27.209	4.35	4.95	5.15	10.18
27.324	4.42	5.12	5.18	10.21
27.416	4.50	5.20	5.20	10.23

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
27.514	4.81	5.71	5.23	10.26
27.613	4.90	5.80	5.25	10.28
27.723	5.05	6.05	5.28	10.31
27.816	5.09	6.29	5.30	10.34
27.895	5.12	6.42	5.32	10.36
27.992	5.18	6.48	5.34	10.38
28.099	5.20	6.70	5.37	10.41
28.206	5.27	6.77	5.39	10.44
28.309	5.31	6.81	5.42	10.46
28.428	5.36	7.16	5.45	10.49
28.541	5.40	7.10	5.47	10.52
28.643	5.44	7.24	5.50	10.55
28.745	5.46	7.36	5.52	10.58
28.821	5.53	7.33	5.54	10.59
28.912	5.57	7.27	5.56	10.62
28.967	5.60	7.40	5.57	10.63
29.082	5.66	7.56	5.60	10.66
29.205	5.71	7.61	5.63	10.69
29.283	5.74	7.74	5.65	10.71
29.361	5.79	7.79	5.67	10.73
29.459	5.82	7.62	5.69	10.76
29.569	5.87	7.57	5.72	10.79
29.672	5.90	7.60	5.74	10.81
29.741	5.96	7.56	5.76	10.83
29.823	6.01	7.61	5.78	10.85
29.921	6.05	7.55	5.80	10.88
30.007	6.10	7.60	5.82	10.90
30.157	5.97	7.47	5.86	10.94
30.244	5.79	7.39	5.88	10.96
30.350	5.63	7.13	5.91	10.99
30.450	5.45	7.05	5.93	11.01
30.545	5.30	7.00	5.95	11.04
30.617	5.14	6.84	5.97	11.06
30.690	4.96	6.66	5.99	11.07
30.811	4.82	6.62	6.02	11.11
30.902	4.85	6.55	6.04	11.13
30.967	4.87	6.67	6.05	11.15
31.035	4.89	6.59	6.07	11.16
31.131	4.99	5.99	6.09	11.19
31.223	5.01	5.51	6.12	11.21
31.304	5.03	5.23	6.13	11.23

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
31.386	5.05	5.35	6.15	11.25
31.482	5.05	5.35	6.18	11.28
31.577	5.07	5.27	6.20	11.30
31.716	5.09	5.29	6.25	11.34
31.862	5.11	5.31	6.29	11.38
32.001	5.13	5.33	6.34	11.41
32.104	5.13	5.33	6.37	11.44
32.178	5.15	5.35	6.40	11.46
32.289	5.17	5.37	6.43	11.48
32.429	5.19	5.39	6.48	11.52
32.531	5.21	5.41	6.51	11.55
32.631	5.23	5.43	6.54	11.57
32.743	5.25	5.45	6.58	11.60
32.842	5.27	5.47	6.61	11.63
32.938	5.29	5.49	6.64	11.65
33.044	5.31	5.51	6.68	11.68
33.153	5.33	5.53	6.71	11.71
33.262	5.35	5.55	6.75	11.73
33.357	5.37	5.57	6.78	11.76
33.468	5.39	5.59	6.81	11.79
33.581	5.41	5.61	6.85	11.82
33.679	5.41	5.61	6.88	11.84
33.780	5.43	5.63	6.91	11.87
33.882	5.43	5.63	6.95	11.89
33.977	5.49	5.69	6.98	11.92
34.088	5.51	5.71	7.01	11.95
34.187	5.53	5.73	7.05	11.97
34.292	5.55	5.75	7.08	12.00
34.395	5.69	5.89	7.11	12.03
34.485	5.81	6.11	7.14	12.05
34.576	6.00	6.20	7.17	12.07
34.714	6.15	6.35	7.22	12.11
34.834	6.04	6.24	7.26	12.14
34.934	5.98	6.18	7.29	12.16
35.039	5.84	6.04	7.32	12.19
35.089	5.73	6.03	7.34	12.20
35.119	6.08	6.38	7.35	12.21
35.180	6.84	7.34	7.37	12.23
35.223	7.98	8.98	7.38	12.24
35.270	8.00	9.20	7.40	12.25
35.324	7.56	8.56	7.42	12.26

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
35.392	7.02	8.02	7.44	12.28
35.458	6.59	7.09	7.46	12.30
35.536	6.23	6.53	7.48	12.32
35.617	5.99	6.29	7.51	12.34
35.624	6.02	6.32	7.51	12.34
35.693	6.09	6.39	7.54	12.36
35.760	6.15	6.35	7.56	12.38
35.841	6.17	6.37	7.58	12.40
35.971	6.11	6.41	7.63	12.43
36.068	6.16	6.46	7.66	12.45
36.164	6.14	6.34	7.69	12.48
36.261	6.15	6.35	7.72	12.50
36.358	6.16	6.46	7.75	12.53
36.491	6.18	6.38	7.79	12.56
36.589	6.17	6.37	7.83	12.59
36.688	6.17	6.37	7.86	12.61
36.788	6.22	6.52	7.89	12.64
36.811	6.26	6.56	7.90	12.65
36.910	6.32	6.52	7.93	12.67
37.009	6.34	6.54	7.96	12.70
37.111	6.39	6.69	8.00	12.72
37.186	6.42	6.72	8.02	12.74
37.267	6.46	6.66	8.05	12.76
37.329	6.51	6.81	8.07	12.78
37.389	6.54	6.74	8.09	12.79
37.475	6.59	6.89	8.11	12.82
37.562	6.62	6.92	8.14	12.84
37.649	6.66	6.96	8.17	12.86
37.723	6.70	7.00	8.19	12.88
37.815	6.76	7.06	8.22	12.90
37.906	6.78	7.08	8.25	12.93
37.997	6.81	7.11	8.28	12.95
38.095	6.86	7.16	8.32	12.98
38.194	6.91	7.21	8.35	13.00
38.293	6.94	7.24	8.38	13.03
38.393	6.97	7.27	8.41	13.05
38.490	7.10	7.50	8.44	13.08
38.583	7.16	7.56	8.47	13.10
38.691	7.22	7.62	8.51	13.13
38.795	7.25	7.65	8.54	13.15
38.894	7.34	7.74	8.57	13.18

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
38.993	7.39	7.89	8.61	13.21
39.102	7.44	7.94	8.64	13.23
39.217	7.41	7.81	8.68	13.26
39.316	7.38	7.78	8.71	13.29
39.416	7.35	7.75	8.74	13.31
39.516	7.31	7.61	8.78	13.34
39.631	7.30	7.60	8.81	13.37
39.730	7.31	7.71	8.85	13.39
39.825	7.29	7.69	8.88	13.42
39.920	7.24	7.64	8.91	13.44
40.015	7.16	7.56	8.94	13.47
40.110	7.10	7.50	8.97	13.49
40.204	7.05	7.35	9.00	13.52
40.299	7.09	7.39	9.03	13.54
40.390	7.08	7.38	9.06	13.56
40.488	7.12	7.42	9.09	13.59
40.556	7.08	7.38	9.11	13.61
40.654	7.07	7.37	9.15	13.63
40.742	7.21	7.51	9.17	13.65
40.801	7.38	7.68	9.19	13.67
40.830	7.41	7.71	9.20	13.68
40.870	7.46	7.76	9.22	13.69
40.965	7.52	7.92	9.25	13.71
41.064	7.57	7.97	9.28	13.74
41.163	7.64	8.04	9.31	13.76
41.262	7.70	8.10	9.34	13.79
41.361	7.76	8.06	9.38	13.81
41.460	7.81	8.11	9.41	13.84
41.559	7.87	8.17	9.44	13.86
41.658	7.93	8.33	9.47	13.89
41.757	7.99	8.39	9.50	13.92
41.857	8.08	8.48	9.54	13.94
41.956	8.11	8.51	9.57	13.97
42.055	8.17	8.67	9.60	13.99
42.153	8.21	8.61	9.63	14.02
42.252	8.29	8.79	9.66	14.04
42.351	8.34	8.74	9.70	14.07
42.450	8.40	8.80	9.73	14.09
42.549	8.45	8.85	9.76	14.12
42.648	8.52	8.92	9.79	14.14
42.836	8.58	8.98	9.85	14.19

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
42.935	8.67	9.07	9.89	14.22
43.035	8.77	9.27	9.92	14.24
43.134	8.84	9.24	9.95	14.27
43.232	8.91	9.31	9.98	14.29
43.341	8.99	9.29	10.02	14.32
43.441	9.05	9.25	10.05	14.35
43.635	9.13	9.43	10.11	14.40
43.733	9.20	9.50	10.15	14.42
43.827	9.26	9.56	10.18	14.45
43.927	9.34	9.64	10.21	14.47
44.026	9.41	9.71	10.24	14.50
44.126	9.48	9.78	10.27	14.52
44.226	9.54	9.84	10.31	14.55
44.326	9.63	9.93	10.34	14.57
44.426	9.70	10.00	10.37	14.60
44.525	9.77	10.07	10.40	14.63
44.625	9.85	10.15	10.43	14.65
44.725	9.92	10.22	10.47	14.68
44.802	10.00	10.30	10.49	14.70
44.889	10.06	10.36	10.52	14.72
44.988	10.15	10.45	10.55	14.74
45.088	10.20	10.50	10.58	14.77
45.188	10.29	10.59	10.62	14.80
45.286	10.31	10.61	10.65	14.82
45.382	10.32	10.62	10.68	14.85
45.478	10.31	10.71	10.71	14.87
45.574	10.34	10.74	10.74	14.90
45.670	10.32	10.72	10.77	14.92
45.766	10.32	10.72	10.80	14.94
45.862	10.34	10.74	10.84	14.97
45.958	10.31	10.81	10.87	14.99
46.054	10.28	10.78	10.90	15.02
46.150	10.24	10.74	10.93	15.04
46.245	10.22	10.72	10.96	15.07
46.341	10.25	10.65	10.99	15.09
46.439	10.21	10.61	11.02	15.12
46.536	10.21	10.51	11.05	15.14
46.636	10.22		11.09	15.17
46.736	10.18		11.12	15.19
46.836	10.04		11.15	15.22
46.936	10.08		11.18	15.24

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
47.036	10.02		11.22	15.27
47.136	10.00		11.25	15.30
47.236	9.82		11.28	15.32
47.336	9.81		11.31	15.35
47.436	9.87		11.35	15.37
47.539	9.74		11.38	15.40
47.638	9.80		11.41	15.42
47.737	9.71		11.44	15.45
47.837	9.70		11.48	15.48
47.936	9.64		11.51	15.50
48.035	9.52		11.54	15.53
48.134	9.51		11.57	15.55
48.233	9.56		11.61	15.58
48.338	9.50		11.64	15.60
48.440	9.48		11.67	15.63
48.542	9.47		11.71	15.66
48.644	9.41		11.74	15.68
48.733	9.40		11.77	15.71
48.811	9.32		11.79	15.73
48.884	9.23		11.82	15.74
48.941	9.39		11.84	15.76
49.003	9.31		11.86	15.78
49.062	9.28		11.87	15.79
49.121	9.21		11.89	15.81
49.179	9.19		11.91	15.82
49.263	9.26		11.94	15.84
49.369	9.33		11.97	15.87
49.455	9.41		12.00	15.89
49.532	9.48		12.03	15.91
49.612	9.54		12.05	15.93
49.694	9.63		12.08	15.95
49.800	9.70		12.11	15.98
49.902	9.79		12.15	16.01
49.967	9.85		12.17	16.02
50.039	9.92		12.19	16.04
50.112	10.02		12.22	16.06
50.181	10.07		12.24	16.08
50.254	10.15		12.26	16.10
50.327	10.21		12.29	16.12
50.402	10.29		12.31	16.13
50.484	10.37		12.34	16.16

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
50.568	10.41		12.36	16.18
50.656	10.51		12.39	16.20
50.743	10.59		12.42	16.22
50.814	10.66		12.44	16.24
50.898	10.74		12.47	16.26
51.006	10.84		12.51	16.29
51.316	10.88		12.61	16.37
51.421	10.96		12.64	16.40
51.536	11.04		12.68	16.43
51.665	11.11		12.72	16.46
51.784	11.18		12.76	16.49
51.905	11.23		12.80	16.52
51.996	11.33	11.63	12.83	16.54
52.091	11.40	11.70	12.86	16.57
52.205	11.48	11.78	12.89	16.60
52.287	11.59	11.89	12.92	16.62
52.385	11.71	12.21	12.95	16.64
52.501	11.81	12.31	12.99	16.67
52.607	11.92	12.42	13.03	16.70
52.675	12.04	12.54	13.05	16.72
52.747	12.14	12.64	13.07	16.74
52.848	12.25	12.75	13.10	16.76
52.948	12.35	12.85	13.14	16.79
53.067	12.47	12.97	13.17	16.82
53.185	12.58	13.08	13.21	16.85
53.314	12.65	13.15	13.25	16.88
53.409	12.80	13.30	13.29	16.91
53.519	12.91	13.41	13.32	16.93
53.609	13.01	13.51	13.35	16.96
53.721	13.13	13.63	13.39	16.99
53.828	13.24	13.74	13.42	17.01
53.897	13.35	13.85	13.44	17.03
53.978	13.48	13.98	13.47	17.05
54.060	13.57	14.07	13.50	17.07
54.156	13.68	14.18	13.53	17.10
54.233	13.80	14.30	13.55	17.12
54.349	13.90	14.40	13.59	17.15
54.461	14.02	14.52	13.63	17.18
54.551	14.15	14.65	13.66	17.20
54.651	14.24	14.74	13.69	17.23
54.755	14.35	14.85	13.72	17.25

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
54.831	14.44	14.94	13.75	17.27
54.956	14.57	15.07	13.79	17.30
55.075	14.68	15.18	13.83	17.33
55.206	14.80	15.30	13.87	17.37
55.319	14.90	15.40	13.91	17.40
55.428	15.01	15.51	13.94	17.42
55.599	15.11	15.61	14.00	17.47
55.691	15.23	15.53	14.03	17.49
55.791	15.32	15.62	14.06	17.52
55.891	15.45	15.75	14.09	17.54
55.991	15.56	15.86	14.12	17.57
56.101	15.64	15.94	14.16	17.60
56.208	15.78	16.08	14.19	17.62
56.308	15.89	16.19	14.23	17.65
56.408	16.02	16.32	14.26	17.68
56.508	16.11	16.41	14.29	17.70
56.608	16.22	16.52	14.32	17.73
56.708	16.33	16.63	14.36	17.75
56.807	16.44	16.74	14.39	17.78
56.907	16.56	16.86	14.42	17.80
57.006	16.58	16.88	14.45	17.83
57.103	16.59	16.89	14.48	17.85
57.201	16.69	16.99	14.52	17.88
57.298	16.68	16.98	14.55	17.90
57.395	16.86	17.16	14.58	17.93
57.492	16.84	17.14	14.61	17.95
57.590	16.98	17.28	14.64	17.98
57.687	16.90	17.20	14.67	18.00
57.784	17.05	17.35	14.71	18.03
57.882	17.13	17.43	14.74	18.05
57.979	17.16	17.66	14.77	18.08
58.015	17.19	17.49	14.78	18.09
58.107	17.28	17.58	14.81	18.11
58.207	17.31	17.61	14.84	18.14
58.307	17.30	17.60	14.87	18.16
58.407	17.42	17.92	14.91	18.19
58.506	17.48	17.98	14.94	18.21
58.606	17.52	18.02	14.97	18.24
58.706	17.55	18.05	15.00	18.27
58.806	17.58	18.08	15.04	18.29
58.906	17.63	18.13	15.07	18.32

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
59.006	17.62	18.12	15.10	18.34
59.106	17.60	18.20	15.13	18.37
59.206	17.61	18.21	15.17	18.39
59.326	17.52	18.22	15.21	18.43
59.425	16.31	16.91	15.24	18.45
59.520	16.19	16.89	15.27	18.48
59.617	16.07	16.87	15.30	18.50
59.617	16.08	16.88	16.26	18.50
59.715	16.11	16.91	16.30	18.54
59.813	16.18	16.98	16.34	18.59
59.910	16.29	17.09	16.38	18.63
60.007	16.29	17.09	16.42	18.68
60.125	16.28	17.08	16.47	18.73
60.254	16.19	16.99	16.53	18.79
60.363	16.26	17.06	16.58	18.84
60.463	16.29	17.09	16.62	18.89
60.562	16.31	17.11	16.66	18.93
60.661	16.30	17.10	16.70	18.98
60.760	16.26	17.06	16.75	19.02
60.860	16.24	17.04	16.79	19.07
60.982	16.34	17.14	16.84	19.12
61.080	16.33	17.13	16.88	19.17
61.168	16.39	17.19	16.92	19.21
61.248	16.43	17.13	16.95	19.24
61.327	16.44	17.14	16.99	19.28
61.406	16.38	17.08	17.02	19.32
61.492	16.31	16.91	17.06	19.36
61.578	16.26	16.86	17.09	19.39
61.663	16.18	16.78	17.13	19.43
61.753	16.01	16.51	17.17	19.47
61.847	15.94	16.44	17.21	19.52
61.941	16.86	17.46	17.25	19.56
62.033	16.81	17.31	17.29	19.60
62.118	15.80	16.20	17.33	19.64
62.201	15.96	16.26	17.36	19.68
62.284	16.02	16.32	17.40	19.72
62.367	16.09	16.39	17.43	19.75
62.441	16.18	16.48	17.46	19.79
62.492	16.26	16.56	17.48	19.81
62.539	16.59	16.89	17.50	19.83
62.633	16.68	16.98	17.54	19.88

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
62.733	16.73	17.03	17.59	19.92
62.833	16.89	17.19	17.63	19.97
62.933	16.99	17.29	17.67	20.01
63.033	17.06	17.36	17.72	20.06
63.109	17.09	17.39	17.75	20.09
63.209	17.16	17.46	17.79	20.14
63.308	17.28	17.58	17.83	20.18
63.408	17.39	17.69	17.88	20.23
63.508	17.43	17.73	17.92	20.28
63.607	17.39	17.69	17.96	20.32
63.708	17.46	17.76	18.00	20.37
63.779	17.40	17.70	18.03	20.40
63.857	17.46	17.76	18.07	20.43
63.931	17.49	17.69	18.10	20.47
64.030	17.42	17.62	18.14	20.51
64.129	17.47	17.67	18.18	20.56
64.229	17.52	17.72	18.23	20.60
64.329	17.59	17.79	18.27	20.65
64.439	17.64	17.84	18.32	20.70
64.541	17.71	17.91	18.36	20.75
64.641	17.75	17.95	18.40	20.79
64.740	17.83	18.03	18.44	20.84
64.840	17.89	18.09	18.49	20.88
64.940	17.95	18.15	18.53	20.93
65.039	18.03		18.57	20.97
65.139	18.07		18.61	21.02
65.239	18.13		18.66	21.06
65.338	18.19		18.70	21.11
65.438	18.28		18.74	21.16
65.536	18.31		18.78	21.20
65.622	18.37		18.82	21.24
65.722	18.41		18.86	21.29
65.822	18.49		18.91	21.33
65.921	18.56		18.95	21.38
66.003	18.69		18.98	21.41
66.072	18.82		19.01	21.44
66.132	18.99		19.04	21.47
66.232	19.20		19.08	21.52
66.331	19.34		19.12	21.56
66.431	19.39		19.17	21.61
66.530	19.50		19.21	21.65

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
66.630	19.68		19.25	21.70
66.729	19.72		19.29	21.74
66.829	19.79		19.34	21.79
66.883	19.86		19.36	21.81
66.976	19.84		19.40	21.86
67.073	19.99		19.44	21.90
67.169	20.46		19.48	21.95
67.266	20.82		19.52	21.99
67.363	21.24		19.56	22.03
67.463	21.20		19.61	22.08
67.563	21.16		19.65	22.13
67.662	21.14		19.69	22.17
67.762	21.10		19.73	22.22
67.862	21.09		19.78	22.26
67.940	21.16		19.81	22.30
68.040	21.14		19.85	22.34
68.139	21.08		19.89	22.39
68.239	21.04		19.94	22.43
68.339	20.13		19.98	22.48
68.439	20.17		20.02	22.52
68.538	20.19		20.06	22.57
68.638	20.28		20.11	22.62
68.738	20.32		20.15	22.66
68.837	20.42		20.19	22.71
68.937	20.38		20.23	22.75
69.037	20.49		20.28	22.80
69.137	20.56		20.32	22.84
69.236	20.66		20.36	22.89
69.263	20.69		20.37	22.90
69.360	20.98		20.42	22.94
69.431	21.19		20.45	22.98
69.503	21.46		20.48	23.01
69.551	21.59		20.50	23.03
69.613	21.61		20.52	23.06
69.690	21.73		20.56	23.10
69.768	21.94		20.59	23.13
69.854	22.18		20.63	23.17
69.939	22.08		20.66	23.21
70.025	22.29		20.70	23.25
70.115	22.34		20.74	23.29
70.221	22.99		20.78	23.34

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
70.285	23.55		20.81	23.37
70.338	23.34		20.83	23.39
70.394	23.16		20.86	23.42
70.460	23.08		20.88	23.45
70.544	23.00		20.92	23.49
70.637	22.99		20.96	23.53
70.747	22.79		21.01	23.58
70.838	22.72		21.05	23.62
70.943	22.61		21.09	23.67
71.045	22.51		21.13	23.71
71.171	22.42		21.19	23.77
71.303	22.30		21.24	23.83
71.405	22.04		21.29	23.88
71.508	21.86		21.33	23.92
71.641	21.62		21.39	23.99
71.765	21.46		21.44	24.04
71.883	21.22		21.49	24.10
71.940	21.13		21.52	24.12
72.037	20.93		21.56	24.17
72.134	20.84		21.60	24.21
72.232	20.68		21.64	24.26
72.322	20.51		21.68	24.30
72.421	20.34		21.72	24.34
72.519	20.22		21.76	24.39
72.625	20.11		21.81	24.43
72.708	19.26		21.84	24.47
72.756	18.98		21.86	24.49
72.843	19.24		21.90	24.53
72.932	19.85		21.94	24.57
73.021	20.32		21.98	24.62
73.109	20.84		22.01	24.66
73.198	21.39		22.05	24.70
73.282	22.72		22.09	24.73
73.425	22.85		22.15	24.80
73.528	22.74		22.19	24.85
73.625	22.71		22.23	24.89
73.722	22.62		22.28	24.93
73.819	22.59		22.32	24.98
73.907	22.52		22.36	25.02
73.965	21.43		22.38	25.05
73.993	21.38		22.39	25.06

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
74.093	21.29	21.49	22.43	25.10
74.193	21.29	21.49	22.48	25.15
74.293	21.41	21.61	22.52	25.20
74.393	21.52	21.72	22.56	25.24
74.502	21.62	21.82	22.61	25.29
74.625	21.57	21.77	22.66	25.35
74.748	21.53	21.73	22.71	25.40
74.866	21.84	22.04	22.76	25.46
74.964	21.74	21.94	22.81	25.50
75.061	21.73	21.93	22.85	25.55
75.162	21.80	22.10	22.89	25.59
75.235	21.94	22.14	22.92	25.63
75.335	22.05	22.25	22.96	25.67
75.434	22.16	22.36	23.01	25.72
75.506	22.25	22.45	23.04	25.75
75.606	22.37	22.57	23.08	25.79
75.705	22.48	22.68	23.12	25.84
75.805	22.62	22.82	23.17	25.89
75.905	22.69	22.89	23.21	25.93
76.005	22.81	23.01	23.25	25.98
76.105	22.91	23.11	23.29	26.02
76.205	23.05	23.25	23.34	26.07
76.305	23.12	23.32	23.38	26.11
76.405	23.32	23.52	23.42	26.16
76.483	23.52		23.45	26.19
76.506	23.00		23.46	26.21
76.524	23.11		23.47	26.21
76.542	22.89		23.48	26.22
76.626	22.81		23.52	26.26
76.725	22.71		23.56	26.30
76.823	22.70		23.60	26.35
76.902	22.68		23.63	26.39
77.004	22.71		23.68	26.43
77.082	22.00		23.71	26.47
77.173	21.23		23.75	26.51
77.273	21.13		23.79	26.55
77.370	21.05		23.83	26.60
77.469	20.94		23.88	26.64
77.569	20.86		23.92	26.69
77.668	20.75		23.96	26.74
77.768	20.65		24.00	26.78

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
77.867	20.61		24.04	26.83
77.967	20.52		24.09	26.87
78.066	21.00		24.13	26.92
78.118	21.64	21.74	24.15	26.94
78.180	21.85	21.95	24.18	26.97
78.253	22.03	22.13	24.21	27.00
78.352	22.26	22.36	24.25	27.05
78.450	22.43	22.53	24.29	27.09
78.549	22.67	22.77	24.34	27.14
78.648	22.88	22.98	24.38	27.18
78.746	23.08	23.18	24.42	27.23
78.845	23.30	23.40	24.46	27.27
78.944	23.49	23.59	24.50	27.32
79.042	23.72	23.82	24.55	27.36
79.141	23.90	24.00	24.59	27.41
79.240	24.13	24.23	24.63	27.45
79.313	24.50	24.60	24.66	27.49
79.373	24.99	25.09	24.69	27.51
79.457	24.87	24.97	24.72	27.55
79.511	24.82	24.92	24.75	27.58
79.599	25.02	25.52	24.78	27.62
79.689	24.80	25.20	24.82	27.66
79.777	24.54	25.04	24.86	27.70
79.868	24.56	25.06	24.90	27.74
79.966	24.59	24.99	24.94	27.78
80.064	24.63	25.03	24.98	27.83
80.162	24.68	25.08	25.02	27.87
80.260	24.74	25.14	25.07	27.92
80.358	24.72	25.02	25.11	27.96
80.456	24.70	25.00	25.15	28.01
80.533	24.68	24.98	25.18	28.04
80.632	24.71	24.91	25.22	28.09
80.730	24.73	24.93	25.27	28.13
80.829	24.78	24.98	25.31	28.18
80.928	24.82	25.02	25.35	28.22
81.026	24.86		25.39	28.27
81.117	25.03		25.43	28.31
81.193	25.35		25.46	28.34
81.291	25.39		25.51	28.39
81.389	25.41		25.55	28.43
81.487	25.52		25.59	28.48

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
81.585	25.59		25.63	28.52
81.683	25.68		25.67	28.57
81.781	25.76		25.71	28.61
81.901	25.84		25.77	28.67
82.004	25.89		25.81	28.71
82.099	25.94		25.85	28.76
82.184	25.89		25.89	28.80
82.283	25.60		25.93	28.84
82.364	25.41		25.96	28.88
82.413	25.50		25.98	28.90
82.479	25.46		26.01	28.93
82.550	25.41		26.04	28.96
82.628	25.39		26.08	29.00
82.713	25.36		26.11	29.04
82.810	25.38		26.15	29.08
82.941	25.32		26.21	29.14
83.057	25.22		26.26	29.19
83.153	25.21		26.30	29.24
83.248	25.19		26.34	29.28
83.344	25.17		26.38	29.32
83.440	25.13		26.42	29.37
83.536	25.09	25.29	26.46	29.41
83.631	25.06	25.26	26.50	29.46
83.727	25.08	25.28	26.55	29.50
83.835	25.09	25.29	26.59	29.55
83.929	25.11	25.41	26.63	29.59
84.026	25.26	25.46	26.67	29.64
84.124	25.63	25.93	26.71	29.68
84.222	26.17	26.47	26.76	29.73
84.320	25.99	26.39	26.80	29.77
84.419	25.54	25.94	26.84	29.82
84.507	25.98	26.38	26.88	29.86
84.599	26.03	26.33	26.92	29.90
84.698	26.09	26.39	26.96	29.94
84.778	26.17	26.47	26.99	29.98
84.877	26.19	26.49	27.04	30.02
84.975	26.09	26.39	27.08	30.07
85.074	26.07	26.37	27.12	30.11
85.172	26.08	26.48	27.16	30.16
85.271	26.14	26.54	27.20	30.20
85.370	26.18	26.58	27.25	30.25

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
85.468	26.00	26.40	27.29	30.29
85.568	25.80	26.10	27.33	30.34
85.668	25.68	25.98	27.37	30.38
85.768	25.62	25.92	27.42	30.43
85.837	25.43	25.73	27.45	30.46
85.937	25.31	25.61	27.49	30.51
86.036	25.10	25.40	27.53	30.55
86.136	25.19	25.49	27.57	30.60
86.236	26.00	26.50	27.62	30.64
86.336	26.32	26.82	27.66	30.69
86.436	26.94	27.44	27.70	30.74
86.536	27.24	27.64	27.74	30.78
86.635	27.56	27.96	27.79	30.83
86.735	28.03	28.43	27.83	30.87
86.835	28.99	29.39	27.87	30.92
86.945	29.68	30.18	27.92	30.97
87.051	30.72	31.22	27.96	31.02
87.151	31.02	31.52	28.01	31.06
87.244	30.72	31.12	28.05	31.10
87.337	30.25	30.65	28.09	31.15
87.430	29.59	29.99	28.13	31.19
87.523	29.01	29.41	28.16	31.23
87.616	28.61	29.01	28.20	31.27
87.709	28.16	28.56	28.24	31.32
87.799	27.84	28.14	28.28	31.36
87.845	27.80	28.10	28.30	31.38
87.916	27.84	28.24	28.33	31.41
88.010	27.92	28.12	28.37	31.45
88.110	27.99	28.19	28.42	31.50
88.210	28.03	28.23	28.46	31.54
88.310	28.02	28.22	28.50	31.59
88.410	28.11	28.31	28.54	31.64
88.510	28.13	28.33	28.59	31.68
88.610	28.28	28.48	28.63	31.73
88.710	28.15	28.35	28.67	31.77
88.810	28.19	28.39	28.71	31.82
88.928	28.20	28.40	28.76	31.87
89.047	28.31	28.51	28.82	31.93
89.146	28.28	28.48	28.86	31.97
89.242	28.30	28.50	28.90	32.02
89.319	29.13		28.93	32.05

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
89.401	30.01		28.97	32.09
89.492	29.44		29.00	32.13
89.589	29.00		29.05	32.17
89.688	28.81		29.09	32.22
89.788	28.71		29.13	32.26
89.887	28.62	28.82	29.17	32.31
89.987	28.51	28.71	29.22	32.36
90.086	28.43	28.63	29.26	32.40
90.159	28.41	28.61	29.29	32.43
90.257	28.32	28.62	29.33	32.48
90.356	28.38	28.68	29.37	32.52
90.454	28.39	28.59	29.42	32.57
90.553	28.46	28.66	29.46	32.61
90.651	28.52	28.82	29.50	32.66
90.750	28.44	28.74	29.54	32.70
90.848	28.40	28.50	29.58	32.75
90.947	28.36	28.56	29.63	32.79
91.043	28.36	28.56	29.67	32.84
91.135	28.40	28.60	29.71	32.88
91.226	28.86	29.16	29.74	32.92
91.267	28.99	29.29	29.76	32.94
91.360	30.28	30.68	29.80	32.98
91.453	31.26	31.66	29.84	33.02
91.546	31.80	32.10	29.88	33.07
91.644	31.12	31.52	29.92	33.11
91.744	30.65	30.95	29.97	33.16
91.844	29.56	29.86	30.01	33.20
91.943	29.00	29.40	30.05	33.25
92.032	29.00	29.30	30.09	33.29
92.113	28.99	29.29	30.12	33.33
92.191	29.76	30.06	30.16	33.36
92.269	29.86	30.26	30.19	33.40
92.351	29.90	30.30	30.22	33.43
92.430	29.00	29.50	30.26	33.47
92.519	28.74	29.24	30.30	33.51
92.619	28.72	29.22	30.34	33.56
92.719	28.86	29.36	30.38	33.60
92.818	28.92	29.42	30.42	33.65
92.918	29.98	30.58	30.47	33.69
93.018	29.97	30.57	30.51	33.74
93.050	29.89	30.49	30.52	33.75

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
93.062	29.82	30.42	30.53	33.76
93.159	30.06	30.66	30.57	33.80
93.259	30.18	30.68	30.61	33.85
93.359	30.76	31.26	30.65	33.89
93.459	30.99	31.49	30.70	33.94
93.558	31.00	31.40	30.74	33.98
93.658	31.15	31.55	30.78	34.03
93.758	31.29	31.69	30.83	34.08
93.858	31.84	32.14	30.87	34.12
93.958	31.89	32.19	30.91	34.17
94.057	31.96	32.16	30.95	34.21
94.149	31.86	32.06	30.99	34.25
94.285	31.71	31.91	31.05	34.32
94.305	31.62	31.92	31.06	34.33
94.397	31.49	31.79	31.10	34.37
94.489	31.26	31.46	31.14	34.41
94.581	30.88	31.08	31.18	34.45
94.669	30.23	30.43	31.21	34.49
94.764	30.07	30.27	31.25	34.53
94.853	30.22	30.42	31.29	34.58
94.945	30.26	30.56	31.33	34.62
95.039	30.27	30.57	31.37	34.66
95.118	30.30	30.60	31.41	34.70
95.190	30.33	30.53	31.44	34.73
95.288	30.35	30.55	31.48	34.77
95.385	30.37	30.67	31.52	34.82
95.483	30.46	30.76	31.56	34.86
95.580	30.42	30.62	31.60	34.91
95.678	30.45	30.75	31.64	34.95
95.775	30.48	30.78	31.69	35.00
95.873	30.50	30.80	31.73	35.04
95.970	30.51	30.81	31.77	35.08
96.054	30.55	30.85	31.80	35.12
96.153	30.58	30.88	31.85	35.17
96.252	30.60	30.90	31.89	35.21
96.351	30.68	30.98	31.93	35.26
96.450	30.65	30.95	31.97	35.30
96.549	30.68	30.98	32.02	35.35
96.649	30.72	31.02	32.06	35.39
96.748	30.73	31.03	32.10	35.44
96.847	30.75	31.05	32.14	35.48

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
96.946	30.80	31.10	32.19	35.53
97.045	30.81	31.11	32.23	35.58
97.144	30.83	31.13	32.27	35.62
97.243	30.89	31.19	32.31	35.67
97.346	30.88	31.18	32.36	35.71
97.426	30.91	31.21	32.39	35.75
97.488	30.94	31.14	32.42	35.78
97.567	30.96	31.16	32.45	35.81
97.598	31.09	31.39	32.46	35.83
97.621	31.38	31.68	32.47	35.84
97.654	31.46	31.76	32.49	35.85
97.711	31.48	31.78	32.51	35.88
97.809	31.59	31.79	32.55	35.92
97.907	31.58	31.88	32.60	35.97
98.005	31.59	31.79	32.64	36.01
98.103	31.68	31.98	32.68	36.06
98.200	31.82	32.12	32.72	36.10
98.298	31.84	32.04	32.76	36.15
98.396	31.99	32.29	32.80	36.19
98.494	32.09	32.39	32.85	36.24
98.592	32.16	32.46	32.89	36.28
98.695	32.18	32.48	32.93	36.33
98.794	32.35	32.65	32.97	36.37
98.892	32.56	32.86	33.02	36.42
98.990	32.64	32.94	33.06	36.46
99.087	32.54	32.84	33.10	36.51
99.187	32.48	32.78	33.14	36.55
99.287	32.42	32.72	33.18	36.60
99.387	32.41	32.71	33.23	36.64
99.486	32.40	32.70	33.27	36.69
99.614	32.36	32.66	33.32	36.75
99.731	34.41	34.51	33.37	36.80
99.827	34.56	34.76	33.41	36.84
99.927	34.59	34.79	33.46	36.89
100.027	34.84	35.04	33.50	36.94
100.127	34.99	35.19	33.55	36.99
100.234	34.99	35.19	33.60	37.04
100.345	35.00	35.20	33.66	37.10
100.442	35.02	35.22	33.71	37.15
100.538	35.06	35.26	33.76	37.20
100.635	35.10	35.20	33.80	37.25

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
100.730	35.98	36.08	33.85	37.29
100.838	35.95	36.05	33.91	37.35
100.933	35.36	35.56	33.95	37.40
101.028	35.46	35.66	34.00	37.45
101.128	35.84	36.04	34.05	37.50
101.228	35.94	36.14	34.10	37.55
101.332	35.52	35.72	34.15	37.60
101.432	35.22		34.20	37.65
101.532	35.28		34.25	37.70
101.628	35.22		34.30	37.75
101.720	35.29		34.35	37.80
101.811	35.19		34.39	37.85
101.902	35.33		34.44	37.89
101.995	35.16		34.48	37.94
102.086	35.39		34.53	37.99
102.178	35.64		34.58	38.03
102.269	35.48		34.62	38.08
102.361	35.29		34.67	38.13
102.452	35.36		34.71	38.17
102.544	35.42		34.76	38.22
102.636	35.31		34.80	38.27
102.729	35.36		34.85	38.31
102.768	35.42		34.87	38.33
102.864	35.41		34.92	38.38
102.961	35.49		34.97	38.43
103.057	35.52		35.02	38.48
103.154	35.51		35.06	38.53
103.250	35.56		35.11	38.58
103.347	35.59		35.16	38.63
103.420	35.52		35.20	38.67
103.520	35.64		35.25	38.72
103.623	35.62		35.30	38.77
103.698	35.61		35.34	38.81
103.780	35.69		35.38	38.85
103.863	35.61		35.42	38.89
103.935	35.68		35.45	38.93
104.020	35.69		35.50	38.97
104.073	35.46		35.52	39.00
104.115	35.40		35.54	39.02
104.160	35.46		35.57	39.04
104.208	35.35		35.59	39.07

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
104.268	35.64		35.62	39.10
104.319	35.49		35.65	39.12
104.373	35.40		35.67	39.15
104.423	35.48		35.70	39.18
104.486	36.41		35.73	39.21
104.504	37.08		35.74	39.22
104.551	37.01		35.76	39.24
104.614	36.69		35.79	39.28
104.714	36.85		35.84	39.33
104.814	36.59		35.89	39.38
104.914	36.62		35.94	39.43
105.014	36.61	36.91	35.99	39.48
105.113	36.38	36.68	36.04	39.53
105.212	36.18	36.48	36.09	39.58
105.299	36.55	36.75	36.14	39.62
105.333	36.08	36.38	36.15	39.64
105.367	36.00	36.30	36.17	39.66
105.404	35.62	36.12	36.19	39.68
105.442	35.20	35.70	36.21	39.70
105.480	35.26	35.76	36.23	39.72
105.541	35.21	35.71	36.26	39.75
105.602	35.26	35.76	36.29	39.78
105.677	35.24	35.94	36.33	39.82
105.770	35.25	36.05	36.37	39.86
105.863	35.29	36.09	36.42	39.91
105.971	35.35	35.85	36.47	39.97
106.060	35.40	35.70	36.52	40.01
106.144	35.41	35.71	36.56	40.06
106.231	35.46	35.76	36.60	40.10
106.323	35.48	35.78	36.65	40.15
106.415	35.41	35.71	36.69	40.19
106.421	35.40	35.60	36.70	40.20
106.482	35.46	35.66	36.73	40.23
106.565	35.54	35.74	36.77	40.27
106.644	35.51	35.71	36.81	40.31
106.721	35.54	35.74	36.85	40.35
106.797	35.38	35.58	36.89	40.39
106.889	35.59	35.79	36.93	40.44
106.982	35.18	35.38	36.98	40.48
107.074	35.68	35.88	37.02	40.53
107.166	35.98	36.18	37.07	40.58

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
107.259	36.21	36.41	37.12	40.62
107.351	36.23	36.43	37.16	40.67
107.467	36.43	36.63	37.22	40.73
107.591	36.62	36.82	37.28	40.79
107.693	36.71	36.91	37.33	40.85
107.792	36.88	37.08	37.38	40.90
107.907	36.88	37.08	37.44	40.95
108.001	37.00	37.30	37.49	41.00
108.101	36.91	37.21	37.54	41.05
108.195	36.89	37.09	37.58	41.10
108.283	36.94	37.14	37.63	41.15
108.371	37.11	37.31	37.67	41.19
108.501	37.06	37.26	37.74	41.26
108.601	37.09	37.29	37.79	41.31
108.701	37.12	37.32	37.84	41.36
108.801	37.19	37.39	37.89	41.41
108.901	37.15	37.35	37.94	41.46
108.998	38.00	38.20	37.99	41.51
109.091	39.00	39.20	38.03	41.56
109.186	39.71		38.08	41.61
109.285	39.64		38.13	41.66
109.381	39.41		38.18	41.71
109.475	39.03		38.22	41.75
109.569	38.82		38.27	41.80
109.663	38.51		38.32	41.85
109.757	38.13		38.37	41.90
109.850	37.91		38.41	41.95
109.932	37.86	38.06	38.45	41.99
109.983	37.92	38.12	38.48	42.01
110.007	37.90	38.10	38.49	42.03
110.037	37.81	38.11	38.51	42.04
110.137	37.76	37.96	38.56	42.09
110.255	37.64	37.84	38.61	42.15
110.362	37.58	37.78	38.67	42.21
110.458	37.55	37.75	38.72	42.26
110.549	37.60	37.90	38.76	42.30
110.646	37.59	37.89	38.81	42.35
110.745	37.58	37.88	38.86	42.40
110.844	37.52	37.82	38.91	42.45
110.922	37.55	37.85	38.95	42.49
111.002	37.54	37.84	38.99	42.53

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
111.101	37.54	37.84	39.04	42.58
111.198	37.42	37.72	39.09	42.63
111.293	37.34	37.64	39.13	42.68
111.371	38.59	38.79	39.17	42.72
111.429	38.82	39.02	39.20	42.75
111.482	38.97	39.17	39.23	42.78
111.522	39.00	39.20	39.25	42.80
111.604	38.82	39.02	39.29	42.84
111.692	38.68	38.88	39.33	42.88
111.781	38.46	38.66	39.38	42.93
111.869	38.29	38.49	39.42	42.98
111.942	38.14	38.34	39.46	43.01
112.036	38.16	38.46	39.50	43.06
112.128	38.28	38.48	39.55	43.11
112.220	38.39	38.69	39.60	43.15
112.295	38.55	38.85	39.63	43.19
112.391	38.59	38.89	39.68	43.24
112.487	38.64	38.84	39.73	43.29
112.584	38.62	38.82	39.78	43.34
112.671	38.61	38.81	39.82	43.38
112.770	38.72	38.92	39.87	43.43
112.869	38.74	38.94	39.92	43.49
112.963	38.79	38.99	39.97	43.53
113.063	38.78	38.98	40.02	43.58
113.162	38.82	39.02	40.07	43.63
113.262	38.95	39.15	40.12	43.69
113.361	39.01	39.21	40.17	43.74
113.453	39.07	39.37	40.21	43.78
113.551	39.28	39.48	40.26	43.83
113.640	39.39	39.69	40.31	43.88
113.730	39.69	39.99	40.35	43.92
113.822	39.85	40.15	40.40	43.97
113.914	39.84	40.04	40.44	44.02
113.995	39.86	40.06	40.48	44.06
114.094	39.89	40.09	40.53	44.11
114.194	39.98	40.28	40.58	44.16
114.290	39.99	40.19	40.63	44.21
114.381	40.02	40.22	40.68	44.26
114.455	39.98	40.18	40.71	44.29
114.544	39.89	40.09	40.76	44.34
114.633	39.88	40.08	40.80	44.38

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
114.716	40.00	40.20	40.84	44.43
114.770	41.25	41.45	40.87	44.45
114.839	41.29	41.49	40.91	44.49
114.937	41.42	41.62	40.96	44.54
115.035	41.49	41.69	41.00	44.59
115.090	41.56	41.76	41.03	44.62
115.187	41.69	41.89	41.08	44.67
115.287	41.74	41.94	41.13	44.72
115.386	41.08	41.28	41.18	44.77
115.484	40.71	40.91	41.23	44.82
115.568	40.42	40.62	41.28	44.87
115.667	40.28	40.48	41.33	44.93
115.765	40.29	40.49	41.39	44.99
115.864	40.38	40.68	41.45	45.05
115.962	40.46	40.76	41.50	45.10
116.060	40.66	40.96	41.56	45.16
116.156	40.70	40.90	41.61	45.22
116.253	40.76	40.96	41.67	45.28
116.347	40.89	40.99	41.72	45.33
116.461	40.90	41.00	41.79	45.40
116.575	41.16	41.26	41.86	45.47
116.672	41.32	41.52	41.91	45.53
116.772	41.32	41.52	41.97	45.59
116.872	41.31	41.51	42.03	45.65
116.972	41.39	41.59	42.08	45.71
117.072	41.58	41.78	42.14	45.77
117.172	41.52	41.72	42.20	45.83
117.272	41.59	41.79	42.26	45.89
117.372	41.62	41.82	42.31	45.95
117.472	41.74	41.94	42.37	46.01
117.591	41.98	42.18	42.44	46.08
117.712	42.21	42.41	42.51	46.15
117.813	42.23	42.43	42.57	46.21
117.896	42.33	42.53	42.62	46.26
117.979	42.38	42.58	42.66	46.31
118.062	42.35	42.55	42.71	46.36
118.161	42.26	42.46	42.77	46.42
118.261	42.22	42.42	42.83	46.48
118.361	42.29	42.49	42.88	46.54
118.457	42.56	42.76	42.94	46.60
118.552	42.69	42.89	42.99	46.65

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
118.648	42.88	43.08	43.05	46.71
118.743	43.16	43.46	43.10	46.77
118.845	43.16	43.46	43.16	46.83
118.915	43.19	43.49	43.20	46.87
119.014	43.21	43.51	43.26	46.93
119.114	43.29	43.59	43.32	46.99
119.214	43.30	43.60	43.37	47.05
119.311	43.30	43.50	43.43	47.11
119.394	43.22	43.42	43.48	47.16
119.477	43.11	43.31	43.52	47.21
119.560	43.20	43.40	43.57	47.26
119.658	43.28	43.48	43.63	47.31
119.758	43.38	43.68	43.69	47.37
119.852	43.46	43.76	43.74	47.43
119.942	43.52	43.72	43.79	47.48
120.046	43.55	43.75	43.85	47.55
120.137	43.59	43.79	43.90	47.60
120.226	43.70	43.90	43.95	47.65
120.310	43.73	43.93	44.00	47.70
120.393	43.77	43.97	44.05	47.75
120.476	43.79	44.09	44.10	47.80
120.562	43.88	44.18	44.15	47.85
120.653	43.98	44.18	44.20	47.91
120.752	44.01	44.21	44.26	47.97
120.842	44.19	44.39	44.31	48.02
120.936	44.29	44.59	44.36	48.08
121.035	44.49	44.79	44.42	48.14
121.134	44.42	44.72	44.48	48.20
121.232	44.48	44.78	44.53	48.26
121.330	44.50	44.80	44.59	48.31
121.428	44.53	44.83	44.65	48.37
121.528	44.59	44.99	44.70	48.43
121.620	44.54	45.04	44.76	48.49
121.720	44.60	45.10	44.81	48.55
121.820	44.70	45.20	44.87	48.61
121.920	44.79	45.19	44.93	48.67
122.019	44.82	45.02	44.99	48.73
122.113	44.77	44.97	45.04	48.78
122.219	44.77	44.97	45.10	48.85
122.277	44.78	44.98	45.13	48.88
122.366	44.90	45.10	45.19	48.93

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
122.458	45.09	45.29	45.24	48.99
122.560	45.19	45.39	45.30	49.05
122.657	45.29	45.49	45.35	49.11
122.756	45.38	45.58	45.41	49.17
122.860	45.56	45.76	45.47	49.23
122.948	45.56	45.76	45.52	49.28
123.046	45.59	45.79	45.58	49.34
123.144	45.62	45.82	45.63	49.40
123.237	45.77	45.97	45.69	49.45
123.348	45.85	46.05	45.75	49.52
123.457	45.85	46.05	45.81	49.59
123.556	45.85	46.05	45.87	49.64
123.701	45.89	46.09	45.95	49.73
123.841	45.80	46.00	46.03	49.81
123.971	45.88	46.08	46.11	49.89
124.086	46.02	46.22	46.17	49.96
124.159	46.00	46.20	46.22	50.00
124.220	45.99	46.19	46.25	50.04
124.283	46.02	46.32	46.29	50.08
124.368	46.07	46.37	46.34	50.13
124.454	46.16	46.36	46.39	50.18
124.541	46.24	46.54	46.44	50.23
124.628	46.29	46.59	46.49	50.29
124.715	46.33	46.63	46.54	50.34
124.783	46.45	46.85	46.57	50.38
124.871	46.62	47.12	46.63	50.43
124.955	46.61	47.11	46.67	50.48
125.039	46.69	46.99	46.72	50.53
125.123	46.72	47.02	46.77	50.58
125.213	46.75	47.15	46.82	50.64
125.308	46.72	47.12	46.88	50.69
125.403	46.80	47.10	46.93	50.75
125.499	46.99	47.29	46.99	50.81
125.594	47.20	47.50	47.04	50.86
125.719	47.29	47.69	47.11	50.94
125.811	47.42	47.82	47.17	50.99
125.914	47.55	47.95	47.23	51.05
126.025	47.46	47.86	47.29	51.12
126.126	47.40	47.80	47.35	51.18
126.229	47.32	47.62	47.41	51.24
126.329	47.23	47.53	47.46	51.30

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
126.429	47.14	47.44	47.52	51.36
126.528	47.10	47.40	47.58	51.42
126.607	47.08	47.38	47.62	51.47
126.701	47.09	47.39	47.68	51.52
126.800	47.03	47.33	47.73	51.58
126.899	47.04	47.34	47.79	51.64
126.986	47.12	47.42	47.84	51.70
127.070	47.26	47.56	47.89	51.75
127.154	47.29	47.59	47.94	51.80
127.238	47.30	47.60	47.99	51.85
127.322	47.28	47.58	48.03	51.90
127.402	47.29	47.49	48.08	51.94
127.498	47.30	47.50	48.14	52.00
127.595	47.48	47.68	48.19	52.06
127.681	47.52	47.72	48.24	52.11
127.758	47.70	48.00	48.29	52.16
127.852	47.71	48.01	48.34	52.21
127.947	47.69	47.89	48.39	52.27
128.041	47.62	47.82	48.45	52.33
128.135	47.59	47.79	48.50	52.38
128.202	47.64	47.84	48.54	52.42
128.292	47.70	47.90	48.59	52.48
128.385	47.80	48.00	48.65	52.53
128.484	49.24	49.54	48.70	52.59
128.584	49.00	49.30	48.76	52.65
128.684	48.50	48.80	48.82	52.71
128.784	48.00	48.50	48.88	52.77
128.884	47.96	48.46	48.93	52.83
128.984	47.90	48.40	48.99	52.89
129.084	47.89	48.39	49.05	52.95
129.184	47.93	48.43	49.11	53.01
129.282	47.78	48.28	49.16	53.07
129.379	47.71	48.21	49.22	53.13
129.476	47.62	48.22	49.27	53.18
129.573	47.53	48.33	49.33	53.24
129.670	47.44	48.24	49.38	53.30
129.767	47.27	48.17	49.44	53.36
129.864	48.26	49.26	49.50	53.42
129.959	48.38	49.18	49.55	53.47
130.052	48.49	49.29	49.60	53.53
130.144	48.56	49.26	49.66	53.58

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
130.237	48.66	49.36	49.71	53.64
130.330	48.71	49.41	49.76	53.69
130.437	48.78	49.48	49.83	53.76
130.531	48.84	49.54	49.88	53.81
130.625	48.92	49.62	49.93	53.87
130.720	49.03	49.73	49.99	53.93
130.815	49.10	49.60	50.04	53.98
130.914	49.08	49.38	50.10	54.04
131.014	49.09	49.39	50.16	54.10
131.114	49.07	49.37	50.21	54.16
131.214	49.06	49.36	50.27	54.22
131.313	49.03	49.33	50.33	54.28
131.413	49.19	49.49	50.39	54.34
131.503	49.38	49.68	50.44	54.40
131.593	49.55	49.85	50.49	54.45
131.672	49.86	50.06	50.54	54.50
131.738	49.81	50.01	50.57	54.54
131.804	49.91	50.11	50.61	54.58
131.870	49.93	50.13	50.65	54.61
131.936	49.94	50.14	50.69	54.65
132.002	49.98	50.18	50.73	54.69
132.068	49.99	50.19	50.76	54.73
132.134	50.10	50.30	50.80	54.77
132.201	50.12	50.42	50.84	54.81
132.267	50.19	50.49	50.88	54.85
132.352	50.26	50.46	50.93	54.90
132.451	50.39	50.59	50.98	54.96
132.550	50.44	50.64	51.04	55.02
132.649	50.49	50.69	51.10	55.08
132.747	50.54	50.84	51.15	55.14
132.835	50.50	50.80	51.20	55.19
132.907	50.42	50.72	51.25	55.23
132.981	50.40	50.70	51.29	55.28
133.053	50.35	50.65	51.33	55.32
133.125	50.39	50.79	51.37	55.37
133.190	50.52	50.92	51.41	55.40
133.251	50.59	50.99	51.44	55.44
133.313	50.68	51.18	51.48	55.48
133.375	51.16	51.66	51.51	55.51
133.453	51.29	51.79	51.56	55.56
133.538	52.00	52.50	51.61	55.61

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
133.623	52.53	53.03	51.66	55.66
133.714	53.00	53.50	51.71	55.72
133.814	52.62	53.12	51.77	55.78
133.914	52.49	52.99	51.82	55.84
134.014	50.89	51.49	51.88	55.90
134.114	50.22	50.92	51.94	55.96
134.213	49.38	50.08	52.00	56.02
134.313	49.28	50.08	52.05	56.08
134.409	49.39	50.19	52.11	56.13
134.502	49.00	49.80	52.16	56.19
134.595	49.75	50.55	52.22	56.24
134.688	50.62	51.42	52.27	56.30
134.781	51.16	51.96	52.32	56.36
134.873	51.15	51.95	52.38	56.41
134.996	51.26	52.06	52.45	56.48
135.092	51.18	51.88	52.50	56.54
135.187	51.39	52.09	52.56	56.60
135.282	51.23	51.93	52.61	56.65
135.377	51.20	51.90	52.67	56.71
135.473	51.97	52.47	52.72	56.77
135.569	52.52		52.78	56.83
135.665	53.64		52.83	56.88
135.761	53.69		52.89	56.94
135.857	54.00		52.94	57.00
135.913	53.81		52.97	57.03
136.011	53.68		53.03	57.09
136.110	53.41		53.09	57.15
136.208	53.28		53.14	57.21
136.307	53.00		53.20	57.27
136.405	52.51		53.26	57.33
136.503	52.21		53.31	57.38
136.602	52.00	52.20	53.37	57.44
136.693	51.96	52.16	53.42	57.50
136.773	52.03	52.23	53.47	57.55
136.850	52.46	52.66	53.51	57.59
136.946	52.80	53.00	53.57	57.65
137.020	53.16	53.36	53.61	57.69
137.075	53.29	53.49	53.64	57.73
137.154	53.81	54.01	53.69	57.77
137.260	54.38		53.75	57.84
137.331	54.90		53.79	57.88

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
137.398	55.27		53.83	57.92
137.459	55.62		53.86	57.96
137.511	55.41		53.89	57.99
137.561	55.00		53.92	58.02
137.635	54.71		53.96	58.06
137.708	54.21		54.01	58.10
137.774	54.00	54.50	54.04	58.14
137.831	53.90	54.40	54.08	58.18
137.893	53.72	54.12	54.11	58.22
138.000	53.80	54.20	54.17	58.28
138.088	53.99	54.39	54.22	58.33
138.154	55.10	55.40	54.26	58.37
138.210	55.80	56.10	54.29	58.41
138.279	55.03	55.23	54.33	58.45
138.378	54.23	54.43	54.39	58.51
138.476	54.29	54.59	54.45	58.56
138.573	54.36	54.66	54.50	58.62
138.666	54.39	54.69	54.56	58.68
138.757	54.40	54.80	54.61	58.73
138.849	54.44	54.84	54.66	58.79
138.943	54.49	54.89	54.72	58.84
139.039	54.54	54.84	54.77	58.90
139.134	54.60	54.90	54.83	58.96
139.231	54.70	54.90	54.88	59.02
139.329	54.76	54.96	54.94	59.07
139.426	54.82	55.02	54.99	59.13
139.524	54.83	55.13	55.05	59.19
139.624	54.88	55.18	55.11	59.25
139.723	54.90	55.30	55.16	59.31
139.815	54.94	55.34	55.22	59.36
139.900	54.98	55.38	55.27	59.42
140.004	54.95	55.35	55.33	59.48
140.102	54.91	55.51	55.38	59.54
140.213	54.92	57.42	55.45	59.60
140.300	54.99	57.49	55.50	59.65
140.359	60.01	63.01	61.57	64.50
140.428	60.00	63.00	61.57	64.50
140.467	59.94	62.94	61.57	64.50
140.556	59.81	62.51	61.57	64.50
140.636	59.52	62.22	61.57	64.50
140.732	59.60	62.20	61.57	64.50

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
140.808	59.88	62.38	61.57	64.50
140.908	60.16	62.66	61.57	64.50
141.008	60.89	63.19	61.57	64.50
141.108	60.12	62.12	61.57	64.50
141.213	58.56	60.56	61.57	64.50
141.333	57.92	58.92	61.57	64.50
141.433	57.90	58.90	61.57	64.50
141.538	58.00	58.20	61.57	64.50
141.647	58.06	58.36	61.57	64.50
141.755	58.12	58.42	61.57	64.50
141.834	58.64	58.94	61.57	64.50
141.912	58.99	59.29	61.57	64.50
141.980	58.99	59.29	61.57	64.50
142.043	58.96	59.26	61.57	64.50
142.101	59.00	59.30	61.57	64.50
142.199	59.10	59.30	61.57	64.50
142.288	59.26	59.46	61.57	64.50
142.356	59.10	59.30	61.57	64.50
142.402	59.05	59.25	61.57	64.50
142.436	59.06	59.36	61.57	64.50
142.479	59.07	59.37	61.57	64.50
142.512	59.10	59.40	61.57	64.50
142.559	59.12	59.42	61.57	64.50
142.620	59.14	59.34	61.57	64.50
142.665	59.18	59.38	61.57	64.50
142.746	59.26	59.46	61.57	64.50
142.803	59.32	59.52	61.57	64.50
142.864	59.38	59.58	61.57	64.50
142.915	59.41	59.61	61.57	64.50
143.026	59.51	59.71	61.57	64.50
143.144	59.57	59.77	61.57	64.50
143.261	59.65	59.85	61.57	64.50
143.381	59.70	59.90	61.57	64.50
143.491	59.76	59.96	61.57	64.50
143.597	59.88	60.08	61.57	64.50
143.697	59.89	60.09	61.57	64.50
143.797	59.95	60.15	61.57	64.50
143.875	60.06	60.26	61.57	64.50
143.974	60.07	60.27	61.57	64.50
144.079	60.14	60.34	61.57	64.50
144.178	60.20	60.40	61.57	64.50

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
144.204	60.29	60.49	61.57	64.50
144.296	60.77	61.07	61.57	64.50
144.393	60.84	61.14	61.57	64.50
144.467	60.97	61.27	61.57	64.50
144.515	60.68	60.98	61.57	64.50
144.559	60.12	60.42	61.57	64.50
144.580	59.60	59.90	61.57	64.50
144.601	59.60	59.90	61.57	64.50
144.621	59.53	59.83	61.57	64.50
144.674	59.70	60.00	61.57	64.50
144.744	59.75	60.05	61.57	64.50
144.843	59.73	60.13	61.57	64.50
144.943	59.66	60.06	61.57	64.50
145.042	59.62	60.02	61.57	64.50
145.142	59.49	59.99	61.57	64.50
145.251	59.52	60.02	61.57	64.50
145.343	59.55	60.05	61.57	64.50
145.432	59.63	60.13	61.57	64.51
145.507	59.69	60.19	61.57	64.51
145.580	59.77	60.27	61.57	64.51
145.652	59.90	60.40	61.57	64.51
145.750	59.92	60.52	61.57	64.51
145.848	59.87	60.47	61.57	64.51
145.948	59.92	60.52	61.57	64.51
146.046	59.99	60.59	61.57	64.51
146.142	59.99	60.49	61.57	64.54
146.229	60.21	60.61	61.57	64.57
146.283	60.48	60.88	61.57	64.59
146.345	60.49	60.89	61.57	64.61
146.445	60.68	61.08	61.57	64.65
146.516	60.94	61.34	61.57	64.67
146.616	61.06	61.46	61.57	64.71
146.716	61.19	61.69	61.61	64.75
146.816	61.27	61.77	61.65	64.78
146.916	61.30	61.80	61.68	64.82
147.002	61.23	61.73	61.71	64.85
147.102	61.88	62.48	61.75	64.89
147.198	62.31	62.91	61.78	64.92
147.295	62.20	62.70	61.82	64.96
147.401	62.00	62.50	61.86	64.99
147.498	61.73	62.23	61.89	65.03

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
147.599	61.37	61.77	61.93	65.06
147.686	61.33	61.63	61.96	65.10
147.806	61.39	61.59	62.00	65.14
147.895	61.40	61.70	62.03	65.17
147.997	61.51	61.81	62.07	65.21
148.092	61.52	61.82	62.10	65.24
148.185	61.55	61.85	62.14	65.28
148.279	61.74	62.04	62.17	65.31
148.374	61.86	62.16	62.21	65.34
148.473	61.88	62.18	62.24	65.38
148.573	61.84	62.24	62.28	65.42
148.675	61.86	62.26	62.31	65.45
148.785	62.66	63.16	62.35	65.49
148.894	62.32	62.82	62.39	65.53
148.994	62.18	62.58	62.43	65.57
149.094	62.08	62.48	62.47	65.60
149.201	61.99	62.39	62.50	65.64
149.312	61.60	61.90	62.54	65.68
149.422	61.36	61.66	62.58	65.72
149.519	61.48	61.88	62.62	65.76
149.623	61.65	62.05	62.66	65.79
149.716	61.70	62.20	62.69	65.83
149.810	62.00	62.50	62.72	65.86
149.908	62.19	62.69	62.76	65.90
150.007	62.66	62.96	62.79	65.93
150.105	63.00	63.30	62.83	65.97
150.204	63.18	63.48	62.87	66.00
150.302	63.28	63.58	62.90	66.04
150.401	63.05	63.25	62.94	66.07
150.497	62.03	62.23	62.97	66.11
150.562	62.07	62.37	62.99	66.13
150.632	62.07	62.37	63.02	66.16
150.710	62.04	62.44	63.05	66.18
150.799	62.13	62.53	63.08	66.22
150.894	61.17	61.57	63.11	66.25
150.990	61.20	61.70	63.15	66.29
151.087	62.44	62.94	63.18	66.32
151.180	62.58	62.98	63.22	66.35
151.275	62.50	62.80	63.25	66.39
151.370	62.54	62.84	63.29	66.42
151.447	62.46	62.76	63.31	66.45

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
151.537	62.40	62.70	63.35	66.48
151.637	62.31	62.71	63.38	66.52
151.736	62.85	63.25	63.42	66.55
151.829	63.06	63.36	63.45	66.59
151.926	63.00	63.30	63.49	66.62
152.026	62.50	62.90	63.52	66.66
152.125	62.55	63.05	63.56	66.69
152.225	62.70	63.10	63.59	66.73
152.320	62.72	63.12	63.63	66.76
152.412	62.77	63.07	63.66	66.80
152.505	62.83	63.13	63.69	66.83
152.589	62.86	63.26	63.72	66.86
152.658	62.78	63.18	63.75	66.89
152.746	62.70	63.00	63.78	66.92
152.846	62.70	63.00	63.82	66.95
152.946	62.80	63.20	63.85	66.99
153.040	63.02	63.52	63.89	67.02
153.126	63.09	63.59	63.92	67.05
153.224	63.37	63.87	63.95	67.09
153.321	63.59	64.09	63.99	67.12
153.419	63.57	64.17	64.02	67.17
153.516	63.85	64.45	64.06	67.22
153.594	64.10	64.70	64.09	67.26
153.684	64.19	64.79	64.12	67.31
153.775	64.20	64.60	64.15	67.35
153.866	64.18	64.58	64.18	67.40
153.957	64.19	64.59	64.22	67.44
154.048	64.29	64.69	64.25	67.49
154.115	64.48	64.88	64.27	67.52
154.171	64.36	64.66	64.29	67.55
154.227	63.92	64.22	64.31	67.58
154.297	63.72	64.02	64.34	67.61
154.431	63.61	63.91	64.39	67.68
154.531	63.60	64.00	64.42	67.73
154.645	63.65	64.05	64.47	67.79
154.750	63.84	64.24	64.50	67.84
154.848	64.02	64.52	64.54	67.89
154.947	64.19	64.59	64.57	67.94
155.040	64.07	64.37	64.61	67.98
155.138	64.05	64.35	64.64	68.03
155.235	64.09	64.39	64.68	68.08

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
155.334	64.18	64.58	64.71	68.13
155.432	64.20	64.50	64.75	68.18
155.530	64.25	64.45	64.78	68.23
155.607	64.38	64.58	64.81	68.27
155.684	64.45	64.65	64.84	68.31
155.761	64.86	65.16	64.87	68.34
155.837	65.11	65.41	64.89	68.38
155.914	65.29	65.59	64.92	68.42
155.981	65.41	65.81	64.95	68.45
156.055	65.89	66.29	64.97	68.49
156.129	65.98	66.38	65.00	68.53
156.226	63.24	63.64	66.50	69.46
156.325	62.83	63.23	66.55	69.51
156.424	62.00	62.40	66.60	69.55
156.523	62.45	62.85	66.65	69.60
156.623	62.96	63.46	66.69	69.64
156.743	62.84	63.44	66.75	69.70
156.860	62.02	62.72	66.81	69.75
156.944	61.80	62.50	66.85	69.79
157.049	62.03	62.73	66.90	69.84
157.152	62.23	62.93	66.95	69.88
157.251	62.44	63.04	67.00	69.93
157.345	62.65	63.25	67.05	69.97
157.437	62.82	63.42	67.09	70.01
157.554	63.08	63.58	67.15	70.07
157.666	63.30	63.80	67.20	70.12
157.764	63.30	63.80	67.25	70.16
157.903	63.54	64.04	67.32	70.22
158.026	63.72	64.22	67.38	70.28
158.147	63.94	64.44	67.44	70.34
158.266	64.15	64.65	67.50	70.39
158.365	64.39	64.89	67.55	70.44
158.461	64.58	65.08	67.59	70.48
158.543	64.79	65.29	67.63	70.52
158.653	64.97	65.47	67.69	70.57
158.760	65.22	65.62	67.74	70.62
158.815	65.43	65.83	67.77	70.64
158.897	65.65	66.05	67.81	70.68
159.009	65.74	66.14	67.86	70.73
159.118	65.74	66.14	67.92	70.78
159.211	66.08	66.48	67.96	70.82

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
159.338	66.29	66.69	68.02	70.88
159.429	66.84	67.24	68.07	70.92
159.515	66.72	67.12	68.11	70.96
159.581	66.90	67.30	68.14	70.99
159.705	67.14	67.54	68.20	71.05
159.807	67.31	67.71	68.25	71.09
159.895	67.57	67.97	68.30	71.13
159.909	67.79	68.19	68.30	71.14
159.938	67.80	68.20	68.32	71.15
159.961	67.75	68.15	68.33	71.16
160.065	67.80	68.20	68.38	71.21
160.205	67.70	68.10	68.45	71.27
160.270	67.65	68.15	68.48	71.30
160.392	67.80	68.30	68.54	71.36
160.528	67.45	67.95	68.61	71.42
160.654	67.56	68.06	68.67	71.48
160.814	67.56	68.06	68.74	71.55
160.872	67.55	67.95	68.77	71.58
160.983	67.92	68.32	68.83	71.63
161.112	68.29	68.59	68.89	71.69
161.176	68.66	68.86	68.92	71.72
161.212	69.40	69.60	68.94	71.73
161.319	69.45	69.55	68.99	71.78
161.409	69.55	69.75	69.04	71.82
161.508	69.75	70.05	69.08	71.87
161.508	69.75	70.05	69.08	71.87
161.561	68.85	69.15	69.11	71.89
161.603	68.85	69.25	69.13	71.91
161.701	68.85	69.25	69.18	71.96
161.799	68.85	69.25	69.23	72.00
161.896	68.66	69.06	69.27	72.05
161.992	68.90	69.30	69.32	72.09
162.089	68.90	69.30	69.37	72.13
162.198	68.91	69.31	69.42	72.18
162.307	68.80	69.10	69.48	72.23
162.360	68.85	69.15	69.50	72.26
162.405	68.45	68.65	69.52	72.28
162.499	68.55		69.57	72.32
162.593	68.78		69.62	72.36
162.687	69.00		69.66	72.41
162.782	69.25		69.71	72.45

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
162.876	69.25		69.75	72.49
162.970	69.30		69.80	72.54
163.065	69.45		69.85	72.58
163.158	69.45	69.65	69.89	72.62
163.251	69.45	69.65	69.94	72.66
163.345	69.30	69.50	69.98	72.71
163.390	69.27	69.57	70.01	72.73
163.442	69.50	69.80	70.03	72.75
163.542	69.45	69.75	70.08	72.80
163.641	69.40	69.80	70.13	72.84
163.732	69.46	69.86	70.17	72.88
163.835	69.50	69.70	70.22	72.93
163.936	69.25	69.45	70.27	72.98
164.032	69.35	69.65	70.32	73.02
164.087	69.50	69.80	70.35	73.05
164.129	69.30	69.60	70.37	73.06
164.229	69.30	69.50	70.42	73.11
164.284	69.36	69.56	70.44	73.14
164.328	69.25	69.45	70.46	73.16
164.428	69.25	69.45	70.51	73.20
164.470	69.36	69.66	70.53	73.22
164.528	69.30	69.60	70.56	73.25
164.628	69.30	69.60	70.61	73.29
164.682	69.31	69.61	70.64	73.32
164.726	69.25	69.65	70.66	73.34
164.821	69.30	69.70	70.71	73.38
164.869	69.40	69.80	70.73	73.40
164.914	69.45	69.85	70.75	73.42
165.013	69.25	69.65	70.80	73.47
165.074	69.41	69.81	70.83	73.50
165.120	69.75	70.15	70.85	73.52
165.204	71.00	71.40	70.89	73.55
165.303	71.50	71.90	70.94	73.60
165.346	72.00	72.40	70.96	73.62
165.390	72.20	72.60	70.98	73.64
165.450	72.50	72.90	71.01	73.67
165.493	73.25	73.65	71.03	73.69
165.537	73.00	73.40	71.06	73.71
165.634	72.69	73.09	71.10	73.75
165.732	72.50	72.90	71.15	73.80
165.790	72.94	73.34	71.18	73.82

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
165.830	72.50	72.90	71.20	73.84
165.927	72.25	72.65	71.25	73.88
166.025	72.45	72.85	71.29	73.93
166.123	72.25	72.65	71.34	73.97
166.159	72.45	72.85	71.36	73.99
166.184	72.00	72.20	71.37	74.00
166.238	71.95	72.15	71.40	74.03
166.272	71.88	72.18	71.42	74.04
166.303	71.85	72.05	71.43	74.06
166.378	72.00	72.20	71.47	74.09
166.418	72.20	72.40	71.49	74.11
166.449	72.04	72.34	71.50	74.12
166.476	72.10	72.40	71.52	74.14
166.486	72.21	72.51	71.52	74.14
166.494	72.00	72.40	71.52	74.14
166.514	71.89	72.29	71.53	74.15
166.530	71.25	71.65	71.54	74.16
166.616	71.55	71.95	71.58	74.20
166.657	71.45	71.85	71.60	74.22
166.723	71.55	71.95	71.64	74.25
166.796	71.36	71.76	71.67	74.28
166.849	71.56	71.96	71.70	74.31
166.887	71.52	71.92	71.72	74.32
166.927	69.36	69.66	71.74	74.34
166.971	69.30	69.60	71.76	74.36
167.072	69.30	69.60	71.81	74.41
167.107	69.30	69.50	71.82	74.42
167.187	69.30	69.50	71.86	74.46
167.215	69.30	69.50	71.88	74.47
167.227	69.36	69.56	71.88	74.48
167.240	71.00	71.10	71.89	74.48
167.275	72.45	72.55	71.91	74.50
167.341	72.45	72.55	71.94	74.53
167.407	72.50	72.70	71.97	74.56
167.490	72.60	72.80	72.01	74.60
167.590	72.65	72.85	72.06	74.64
167.690	72.70	73.00	72.11	74.69
167.742	72.75	73.05	72.13	74.71
167.816	72.80	73.10	72.17	74.75
167.913	72.85	73.25	72.22	74.79
167.940	72.86	73.26	72.23	74.80

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
167.973	73.33	73.73	72.25	74.82
168.009	73.50	73.90	72.27	74.83
168.107	73.25	73.65	72.31	74.88
168.197	73.55	73.95	72.36	74.92
168.295	73.45	73.85	72.41	74.96
168.393	73.00	73.40	72.45	75.01
168.491	73.25	73.65	72.50	75.05
168.535	73.51	73.91	72.52	75.07
168.587	73.50	73.90	72.55	75.10
168.682	73.45	73.85	72.59	75.14
168.776	73.25	73.65	72.64	75.18
168.868	73.45	73.85	72.69	75.23
168.956	73.50	73.90	72.73	75.27
169.041	73.25	73.65	72.77	75.31
169.096	73.45	73.75	72.80	75.33
169.156	73.25		72.83	75.36
169.285	73.26		72.89	75.42
169.431	73.25		72.96	75.48
169.537	73.16		73.01	75.53
169.588	73.25		73.04	75.55
169.615	73.45		73.05	75.57
169.676	74.00		73.08	75.59
169.768	74.10		73.13	75.64
169.874	74.25		73.18	75.68
169.960	74.36		73.22	75.72
170.023	74.25		73.25	75.75
170.086	74.50		73.28	75.78
170.148	74.26		73.31	75.81
170.211	74.26		73.34	75.84
170.274	74.80		73.37	75.87
170.370	74.85		73.42	75.91
170.426	75.80		73.45	75.94
170.465	74.82		73.47	75.95
170.511	74.80		73.49	75.98
170.596	74.85		73.53	76.01
170.681	74.90	75.00	73.57	76.05
170.768	74.83	74.93	73.62	76.09
170.869	74.25	74.35	73.67	76.14
170.969	74.10	74.20	73.71	76.18
171.069	74.25	74.35	73.76	76.23
171.118	73.91	74.01	73.79	76.25

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
171.168	73.75	73.85	73.81	76.28
171.268	74.25	74.35	73.86	76.32
171.367	73.25	73.35	73.91	76.37
171.467	73.50	73.60	73.96	76.41
171.513	73.97	74.07	73.98	76.43
171.564	73.50	73.60	74.01	76.46
171.661	73.45	73.55	74.05	76.50
171.758	73.25	73.35	74.45	76.55
171.854	73.25	73.35	74.50	76.62
171.935	73.96	74.06	74.54	76.68
172.041	74.00		74.59	76.76
172.145	74.25		74.64	76.83
172.249	74.20		74.70	76.91
172.347	75.50		74.74	76.98
172.445	76.00		74.79	77.05
172.510	76.43		74.83	77.10
172.625	76.40		74.88	77.18
172.712	76.25		74.93	77.25
172.800	76.40		74.97	77.31
172.893	76.41		75.02	77.38
172.990	76.25		75.07	77.45
173.089	76.50		75.12	77.52
173.188	76.55		75.17	77.59
173.236	76.30		75.19	77.63
173.313	76.45		75.23	77.68
173.364	76.33		75.25	77.72
173.412	76.50		75.28	77.76
173.510	76.25		75.33	77.83
173.609	76.33		75.38	77.90
173.707	76.40		75.42	77.97
173.806	76.24		75.47	78.04
173.905	76.36		75.52	78.12
174.016	76.49		75.58	78.20
174.030	76.11		75.59	78.21
174.095	75.50		75.62	78.25
174.195	75.82		75.67	78.33
174.295	74.00		75.72	78.40
174.399	73.50		75.77	78.48
174.495	73.25		75.82	78.55
174.595	73.50		75.87	78.62
174.650	73.77		75.90	78.66

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
174.693	73.24		75.92	78.69
174.790	73.50		75.97	78.76
174.887	73.94		76.01	78.83
174.992	74.00	74.20	76.07	78.91
175.092	74.00	74.20	76.12	78.98
175.185	74.09	74.39	76.16	79.05
175.284	74.00	74.30	76.21	79.12
175.383	74.20	74.50	76.26	79.19
175.429	74.20	74.70	76.29	79.23
175.482	74.50	75.00	76.31	79.27
175.581	74.50	74.90	76.36	79.34
175.680	74.25	74.55	76.41	79.41
175.753	75.31	75.61	76.45	79.46
175.848	75.25	75.55	76.50	79.53
175.944	75.26	75.56	76.54	79.60
175.997	75.24	75.54	76.57	79.64
176.041	75.00	75.30	76.59	79.67
176.141	75.10	75.40	76.64	79.75
176.241	75.00	75.30	76.69	79.82
176.283	75.09	75.39	76.71	79.85
176.340	75.00	75.30	76.74	79.89
176.440	75.12	75.42	76.79	79.97
176.539	75.00	75.30	76.84	80.04
176.647	75.11	75.41	76.89	80.12
176.737	75.00	75.30	76.94	80.18
176.835	75.12	75.42	76.99	80.25
176.934	74.90	75.20	77.04	80.33
177.043	75.11	75.31	77.09	80.41
177.132	75.50	75.70	77.14	80.47
177.247	75.80	76.10	77.19	80.55
177.347	75.90	76.10	77.24	80.63
177.447	76.00	76.20	77.29	80.70
177.547	77.50	77.70	77.34	80.77
177.614	78.41	78.61	77.38	80.82
177.681	78.20	78.40	77.41	80.87
177.735	78.00	78.20	77.44	80.91
177.788	77.80	78.00	77.47	80.95
177.842	77.45	77.65	77.49	80.99
177.912	77.20	77.40	77.53	81.04
177.952	77.30	77.60	77.55	81.07
178.000	77.25	77.55	77.57	81.10

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
178.061	77.40	77.70	77.60	81.15
178.139	77.45	77.75	77.64	81.21
178.187	77.40	77.70	77.66	81.24
178.248	77.63	77.93	77.70	81.28
178.307	78.00	78.30	77.72	81.33
178.358	78.33	78.53	77.75	81.36
178.420	78.25	78.55	77.78	81.41
178.509	78.50	78.80	77.83	81.47
178.564	78.20	78.50	77.85	81.52
178.642	78.50	78.80	77.89	81.57
178.700	78.25	78.55	77.92	81.61
178.802	78.12	78.42	77.97	81.69
178.885	78.23	78.53	78.01	81.75
178.967	78.14	78.44	78.05	81.81
179.049	78.50	78.80	78.10	81.87
179.132	78.50	78.80	78.14	81.93
179.214	78.50	78.80	78.18	81.99
179.297	78.60	78.90	78.22	82.05
179.379	78.70	79.00	78.26	82.11
179.462	78.80	79.10	78.30	82.17
179.551	78.90	79.20	78.35	82.24
179.629	78.81	79.11	78.39	82.29
179.731	78.40	78.60	78.44	82.37
179.837	78.60	78.80	78.49	82.44
179.937	78.30	78.50	78.54	82.52
180.036	78.60	78.80	78.59	82.59
180.136	78.50	78.70	78.64	82.66
180.236	78.60	78.80	78.69	82.73
180.336	78.30	78.50	78.74	82.81
180.436	78.40	78.60	78.79	82.88
180.536	78.60	78.90	78.84	82.95
180.572	78.90	79.20	78.86	82.98
180.680	78.80	79.10	78.91	83.06
180.769	78.82	79.12	78.96	83.12
180.869	78.78	79.08	79.01	83.20
180.969	78.75	79.05	79.06	83.27
181.069	78.65	78.95	79.11	83.34
181.169	78.80	79.10	79.16	83.42
181.269	78.80	79.10	79.21	83.49
181.368	78.80	79.10	79.26	83.56
181.468	78.75	78.95	79.31	83.63

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
181.568	78.80	79.00	79.36	83.71
181.614	78.82	79.02	79.38	83.74
181.668	78.20	78.40	79.41	83.78
181.768	78.10	78.30	79.46	83.85
181.868	78.50	78.70	79.51	83.93
181.904	78.90	79.10	79.52	83.95
182.019	79.84	80.04	79.58	84.04
182.103	79.50	79.70	79.62	84.10
182.203	79.60	79.80	79.67	84.17
182.302	79.80	80.00	79.72	84.24
182.402	79.80	80.00	79.77	84.32
182.513	79.82	80.12	79.83	84.40
182.590	79.50	79.80	79.87	84.45
182.679	79.82	80.22	79.91	84.52
182.768	79.82	80.22	79.96	84.58
182.857	79.60	80.10	80.00	84.65
182.931	79.81	80.31	80.04	84.70
183.037	79.60	80.10	80.09	84.78
183.137	79.50	80.00	80.14	84.85
183.237	79.40	79.90	80.19	84.92
183.337	79.30	80.00	80.24	85.00
183.393	79.78	80.58	80.27	85.04
183.437	79.50	80.30	80.29	85.07
183.537	79.40	80.20	80.34	85.14
183.637	79.60	80.50	80.39	85.22
183.737	79.80	80.70	80.44	85.29
183.837	79.60	80.50	80.49	85.36
183.884	79.79	80.79	80.51	85.40
183.937	80.00	80.90	80.54	85.43
184.037	80.10	81.00	80.59	85.51
184.137	79.50	80.40	80.64	85.58
184.237	79.50	80.40	80.69	85.65
184.284	79.99	80.89	80.71	85.69
184.337	80.10	80.90	80.74	85.73
184.437	80.20	81.00	80.79	85.80
184.521	80.10	80.90	80.83	85.86
184.621	80.00	80.60	80.88	85.93
184.677	79.95	80.55	80.91	85.97
184.720	80.00	80.60	80.93	86.01
184.818	80.10	80.70	80.98	86.08
184.916	80.20	80.80	81.03	86.15

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
185.014	80.30	80.90	81.08	86.22
185.057	79.89	80.39	81.10	86.25
185.109	80.30	80.70	81.13	86.29
185.204	80.70	81.10	81.17	86.36
185.298	81.00	81.40	81.22	86.43
185.393	81.50	81.90	81.27	86.50
185.487	82.65	83.05	81.31	86.57
185.589	82.60	83.10	81.37	86.64
185.589	82.60	83.10	81.86	86.64
185.689	82.50	83.00	81.92	86.70
185.789	82.60	83.10	81.98	86.76
185.831	82.62	83.12	82.01	86.79
185.899	82.60	83.10	82.05	86.83
186.008	82.70	83.20	82.11	86.90
186.115	82.60	83.10	82.18	86.96
186.168	82.64	83.14	82.21	86.99
186.213	82.50	83.00	82.23	87.02
186.313	82.60	83.10	82.29	87.08
186.399	82.59	83.09	82.34	87.13
186.504	82.60	83.10	82.41	87.20
186.585	82.57	82.97	82.46	87.25
186.671	82.70	83.10	82.51	87.30
186.760	82.60	82.90	82.56	87.35
186.802	82.49	82.69	82.58	87.38
186.858	82.00	82.20	82.62	87.41
186.958	81.90	82.00	82.68	87.47
187.058	81.80	81.90	82.74	87.54
187.164	81.93	82.03	82.80	87.60
187.271	83.20	83.30	82.86	87.67
187.321	84.24	84.34	82.89	87.70
187.360	83.50	83.70	82.92	87.72
187.467	82.90	83.10	82.98	87.79
187.499	82.53	82.73	83.00	87.80
187.557	82.60	82.90	83.03	87.84
187.656	82.50	82.80	83.09	87.90
187.756	82.30	82.60	83.15	87.96
187.855	82.40	82.70	83.21	88.02
187.940	82.59	82.89	83.26	88.07
188.018	82.20	82.60	83.31	88.12
188.052	82.00	82.50	83.33	88.14
188.091	82.50	83.00	83.35	88.17

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
188.191	82.60	83.10	83.41	88.23
188.341	82.30	82.80	83.50	88.32
188.441	82.50	83.00	83.56	88.38
188.541	82.40	82.70	83.62	88.44
188.590	82.53	82.73	83.65	88.47
188.640	82.50	82.70	83.68	88.50
188.738	82.30	82.50	83.73	88.56
188.837	82.40	82.70	83.79	88.62
188.935	82.40	82.80	83.85	88.68
189.002	82.30	82.70	83.89	88.72
189.092	82.60	83.10	83.95	88.78
189.137	82.58	83.08	83.97	88.80
189.190	82.40	82.90	84.00	88.84
189.289	82.60	83.10	84.06	88.90
189.388	82.70	83.20	84.12	88.96
189.486	82.50	83.00	84.18	89.02
189.585	82.60	83.10	84.24	89.08
189.684	82.00	82.50	84.30	89.14
189.732	82.40	82.80	84.33	89.17
189.784	83.00	83.40	84.36	89.20
189.881	83.71	84.11	84.41	89.26
190.185	83.60	84.00	84.59	89.44
190.284	84.00	84.40	84.65	89.50
190.327	84.39	84.79	84.68	89.53
190.382	84.40	84.80	84.71	89.56
190.480	84.30	84.70	84.77	89.62
190.579	83.20	83.60	84.83	89.68
190.624	84.37	84.77	84.86	89.71
190.677	84.50	84.90	84.89	89.74
190.775	84.30	84.70	84.95	89.80
190.873	84.60	85.00	85.00	89.86
191.010	84.60	85.00	85.09	89.95
191.129	84.20	84.60	85.16	90.02
191.230	84.83	85.23	85.22	90.08
191.328	84.30	84.70	85.27	90.14
191.427	84.20	84.60	85.33	90.20
191.527	84.40	84.80	85.39	90.26
191.634	84.60	85.00	85.46	90.33
191.734	84.90	85.30	85.52	90.39
191.834	84.70	85.10	85.58	90.45
191.933	84.60	85.00	85.63	90.51

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
192.033	84.30	84.70	85.69	90.57
192.132	84.10	84.50	85.75	90.63
192.180	84.78	85.18	85.78	90.66
192.232	84.90	85.30	85.81	90.69
192.332	84.50	84.90	85.87	90.75
192.431	84.60	85.00	85.93	90.81
192.531	84.70	85.10	85.99	90.87
192.641	84.50	84.90	86.05	90.94
192.752	84.30	84.70	86.12	91.01
192.851	84.90	85.30	86.18	91.07
192.951	84.90	85.30	86.24	91.13
193.050	85.00	85.40	86.30	91.19
193.149	85.60	86.00	86.36	91.25
193.253	85.90	86.30	86.42	91.31
193.348	85.40	85.80	86.48	91.37
193.447	85.60	86.00	86.53	91.43
193.546	85.90	86.30	86.59	91.49
193.650	85.40	85.80	86.65	91.56
193.768	85.10	85.50	86.72	91.63
193.867	85.60	86.00	86.78	91.69
193.965	85.30	85.80	86.84	91.75
194.064	85.40	85.90	86.90	91.81
194.162	85.70	86.20	86.96	91.87
194.217	85.87	86.47	86.99	91.90
194.261	86.00	86.60	87.02	91.93
194.361	86.30	86.90	87.08	91.99
194.461	86.20	86.80	87.14	92.05
194.561	86.90	87.40	87.20	92.11
194.611	87.81	88.21	87.23	92.14
194.660	87.00	87.40	87.26	92.17
194.759	87.20	87.60	87.31	92.23
194.858	87.60	88.10	87.37	92.29
194.957	87.40	87.90	87.43	92.35
195.002	87.66	88.16	87.46	92.38
195.050	87.30	87.80	87.50	92.41
195.143	87.20	87.70	87.56	92.47
195.202	87.57	88.07	87.60	92.50
195.232	87.40	87.90	87.62	92.52
195.330	87.60	88.10	87.69	92.58
195.428	87.30	87.70	87.75	92.64
195.478	87.56	87.96	87.79	92.67

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
195.526	87.90	88.30	87.82	92.70
195.624	87.50	87.90	87.89	92.76
195.723	87.80	88.20	87.96	92.82
195.773	88.21	88.61	87.99	92.85
195.822	88.20	88.60	88.02	92.88
195.921	88.45	88.85	88.09	92.94
195.965	88.21	88.71	88.12	92.97
196.021	88.20	88.70	88.16	93.00
196.121	88.30	88.80	88.23	93.06
196.167	88.20	88.70	88.26	93.09
196.221	88.90	89.40	88.30	93.12
196.293	88.56	89.06	88.34	93.17
196.393	89.00	89.50	88.41	93.23
196.492	89.10	89.60	88.48	93.29
196.552	89.05		88.52	93.33
196.592	89.00		88.55	93.35
196.691	89.50		88.62	93.41
196.790	88.90		88.68	93.47
196.889	88.80		88.75	93.53
196.983	89.05		88.82	93.59
197.088	89.50		88.89	93.65
197.187	89.40		88.96	93.71
197.286	89.20		89.02	93.77
197.386	89.00		89.09	93.84
197.430	89.05		89.12	93.86
197.485	89.00		89.16	93.90
197.584	89.10		89.23	93.96
197.683	89.10	89.30	89.29	94.02
197.782	89.20	89.40	89.36	94.08
197.837	89.05	89.25	89.40	94.11
197.881	90.10	90.30	89.43	94.14
197.981	90.50	90.70	89.50	94.20
198.094	90.60	90.80	89.58	94.27
198.194	90.50	90.70	89.64	94.33
198.294	90.80	91.00	89.71	94.39
198.341	90.96	91.16	89.74	94.42
198.393	91.00	91.20	89.78	94.45
198.492	91.10	91.30	89.85	94.51
198.592	90.50	90.70	89.92	94.57
198.691	90.90	91.10	89.98	94.63
198.744	91.00	91.20	90.02	94.66

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
198.797	92.07	92.37	90.06	94.70
198.870	92.00	92.30	90.11	94.74
198.965	91.50	91.80	90.17	94.80
199.038	91.60	91.90	90.22	94.84
199.107	91.80	92.10	90.27	94.88
199.156	90.41	90.71	90.30	94.91
199.205	90.30	90.60	90.33	94.94
199.302	90.20	90.50	90.40	95.00
199.399	90.30	90.60	90.47	95.06
199.496	90.40	90.70	90.53	95.12
199.548	90.37	90.57	90.57	95.15
199.589	90.20	90.40	90.60	95.18
199.672	90.30	90.50	90.65	95.23
199.755	90.40	90.60	90.71	95.28
199.798	90.62		90.74	95.31
199.848	91.40		90.77	95.34
199.891	91.75		90.80	95.36
199.947	90.56		90.84	95.40
200.047	90.80		90.91	95.46
200.147	91.10		90.98	95.52
200.233	91.50		91.04	95.57
200.333	92.10		91.11	95.63
200.387	92.40		91.14	95.67
200.433	92.30		91.17	95.69
200.532	92.40		91.24	95.75
200.630	92.50		91.31	95.81
200.729	92.40		91.38	95.87
200.828	92.70		91.44	95.93
200.927	92.30		91.51	95.99
200.962	92.30		91.54	96.02
200.988	92.10		91.55	96.03
201.047	92.50	92.70	91.59	96.07
201.080	92.10	92.30	91.62	96.09
201.136	92.40	92.60	91.65	96.12
201.236	92.50	92.70	91.72	96.18
201.336	92.30	92.50	91.79	96.24
201.435	92.50	92.70	91.86	96.30
201.535	92.80	93.00	91.93	96.37
201.586	92.77	92.97	91.96	96.40
201.635	92.50		92.00	96.43
201.735	92.60		92.06	96.49

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
201.833	92.30		92.13	96.55
201.933	92.40		92.20	96.61
202.033	92.80		92.27	96.67
202.133	92.50		92.34	96.73
202.184	92.72		92.37	96.76
202.233	91.90		92.40	96.79
202.333	91.80		92.47	96.85
202.433	92.50		92.54	96.91
202.533	92.80	93.20	92.61	96.97
202.639	92.80	93.30	92.68	97.04
202.738	92.40	92.90	92.75	97.10
202.793	92.81	93.31	92.79	97.13
202.837	93.00	93.50	92.82	97.16
202.935	93.50	94.00	92.88	97.22
203.033	93.60	94.10	92.95	97.28
203.131	93.40	93.90	93.02	97.34
203.229	93.45	94.05	93.08	97.40
203.320	93.80	94.40	93.15	97.45
203.417	93.80	94.40	93.21	97.51
203.460	93.73	94.33	93.24	97.54
203.504	93.50	94.10	93.27	97.57
203.584	93.50	94.10	93.33	97.62
203.677	93.10	93.70	93.39	97.67
203.768	93.50	94.10	93.45	97.73
203.870	93.80	94.40	93.52	97.79
203.985	93.20	93.80	93.60	97.86
204.043	94.03	94.63	93.64	97.90
204.081	93.80	94.50	93.67	97.92
204.088	93.56	94.26	93.67	97.92
204.121	93.50	94.20	93.69	97.94
204.218	93.40	94.10	93.76	98.00
204.316	93.80	94.50	93.83	98.06
204.413	93.50	94.20	93.89	98.12
204.510	93.40	94.10	93.96	98.18
204.608	93.20	94.00	94.03	98.24
204.662	93.17	93.97	94.06	98.27
204.741	93.10	93.90	94.12	98.32
204.841	93.20	94.10	94.19	98.38
204.941	93.60	94.50	94.26	98.44
205.040	93.40	94.30	94.32	98.50
205.140	93.20	94.10	94.39	98.56

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
205.240	93.00	94.00	94.46	98.63
205.340	93.50	94.50	94.53	98.69
205.439	93.50	94.50	94.60	98.75
205.490	93.01	94.01	94.63	98.78
205.538	93.00	93.90	94.66	98.81
205.637	92.50	93.40	94.73	98.87
205.745	92.50	93.40	94.80	98.93
205.863	93.20	94.00	94.89	99.01
205.963	93.50	94.20	94.95	99.07
206.062	93.30	94.00	95.02	99.13
206.161	93.50	94.10	95.09	99.19
206.261	93.00	93.60	95.16	99.25
206.360	93.80	94.40	95.22	99.31
206.459	93.50	94.00	95.29	99.37
206.559	93.40	93.80	95.36	99.43
206.655	93.40	93.80	95.43	99.49
206.771	93.20	93.60	95.51	99.56
206.847	93.49	93.89	95.56	99.61
206.890	93.50	93.90	95.59	99.63
206.986	93.40	93.80	95.65	99.69
207.082	93.80	94.10	95.72	99.75
207.178	93.80	94.10	95.78	99.81
207.274	94.10	94.40	95.85	99.87
207.370	93.50	93.80	95.92	99.92
207.457	94.23	94.53	95.97	99.98
207.504	94.20	94.50	96.01	100.01
207.601	94.40	94.70	96.07	100.07
207.698	94.50	94.80	96.14	100.12
207.750	94.55	94.85	96.17	100.16
207.794	94.72	95.02	96.20	100.18
207.875	94.80	95.10	96.26	100.23
207.955	95.08	95.38	96.31	100.28
208.036	95.25	95.55	96.37	100.33
208.116	95.60	95.90	96.42	100.38
208.196	95.61	95.91	96.48	100.43
208.276	95.90	96.20	96.53	100.48
208.355	95.96	96.26	96.59	100.53
208.434	96.14	96.44	96.64	100.57
208.513	96.50	96.80	96.70	100.62
208.592	96.49	96.79	96.75	100.67
208.671	96.40	96.70	96.80	100.72

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
208.750	96.84	97.14	96.86	100.77
208.869	97.02	97.42	96.94	100.84
209.000	97.50	97.90	97.03	100.92
209.099	97.37	97.77	97.10	100.98
209.197	97.40	97.80	97.16	101.04
209.320	97.73	98.13	97.25	101.11
209.444	97.90	98.30	97.33	101.19
209.488	98.26	98.66	97.36	101.22
209.527	98.50	98.90	97.39	101.24
209.586	98.60	99.00	97.43	101.28
209.682	98.40	98.80	97.50	101.33
209.781	98.20	98.50	97.56	101.40
210.000	98.60	98.90	97.71	101.53
210.087	98.30	98.60	97.77	101.58
210.196	98.40	98.70	97.85	101.65
210.244	98.29	98.49	97.88	101.68
210.296	98.50	98.70	97.91	101.71
210.395	98.40	98.60	97.98	101.77
210.496	98.40	98.60	98.05	101.83
210.622	98.60	98.80	98.14	101.91
210.722	98.40	98.70	98.21	101.97
210.819	98.80	99.10	98.27	102.03
210.865	98.98	99.28	98.30	102.06
210.915	99.00	99.30	98.34	102.09
211.013	99.10	99.40	98.40	102.15
211.109	98.90	99.20	98.47	102.21
211.174	98.30	98.70	98.51	102.24
211.240	98.70	99.10	98.56	102.28
211.297	98.94	99.34	98.60	102.32
211.398	98.70	99.10	98.67	102.38
211.477	98.80	99.20	98.72	102.43
211.477	98.60	99.00	98.72	102.43
211.526	98.40	98.80	98.76	102.46
211.611	98.60	99.00	98.81	102.51
211.672	98.60	99.00	98.86	102.55
211.717	98.70	99.10	98.89	102.58
211.741	98.20	98.60	98.90	102.59
211.762	98.72	99.12	98.92	102.60
211.783	98.80	99.10	98.93	102.62
211.791	98.60	98.90	98.94	102.62
211.802	98.70	99.00	98.94	102.63

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
211.819	98.79	99.09	98.96	102.64
211.847	98.20	98.50	98.97	102.66
211.879	98.60	98.90	99.00	102.67
211.946	98.60	98.90	99.04	102.72
211.964	98.72	99.12	99.05	102.73
211.983	98.80	99.20	99.07	102.74
212.000	98.50	98.90	99.08	102.75
212.034	98.60	99.00	99.10	102.77
212.064	99.10	99.50	99.12	102.79
212.138	99.20	99.70	99.17	102.83
212.339	99.50	100.00	99.31	102.96
212.413	98.80	99.30	99.36	103.00
212.475	98.60	99.10	99.40	103.04
212.507	99.40	99.90	99.43	103.06
212.546	99.02	99.52	99.45	103.08
212.584	99.10	99.60	99.48	103.10
212.724	99.50	100.00	99.57	103.19
212.822	99.20	99.70	99.64	103.25
212.900	99.10	99.60	99.69	103.30
213.000	99.00	99.60	99.76	103.36
213.020	99.02	99.62	99.78	103.37
213.045	99.20	99.80	99.79	103.39
213.144	99.20	99.80	99.86	103.45
213.242	99.40	100.00	99.93	103.51
213.347	99.10	99.70	100.00	103.57
213.347	99.10	99.70	101.20	105.00
213.444	98.60	99.20	101.25	105.06
213.524	98.80	99.40	101.29	105.10
213.626	98.60	99.20	101.35	105.16
213.672	99.00	99.60	101.37	105.19
213.701	99.50	100.00	101.38	105.20
213.771	99.40	99.90	101.42	105.24
213.834	99.30	99.80	101.45	105.28
213.903	99.60	100.10	101.49	105.32
213.954	99.80	100.30	101.52	105.35
214.000	99.50	100.00	101.54	105.37
214.069	99.50	100.00	101.58	105.41
214.131	99.30	99.80	101.61	105.45
214.185	99.40	99.90	101.64	105.48
214.202	99.37	99.87	101.65	105.49
214.222	98.94	99.34	101.66	105.50

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
214.257	99.80	100.20	101.67	105.52
214.352	99.00	99.40	101.72	105.57
214.448	99.20	99.60	101.77	105.63
214.543	99.50	99.90	101.82	105.68
214.639	99.50	99.90	101.87	105.74
214.698	100.29	100.69	101.90	105.77
214.742	100.20	100.60	101.93	105.80
214.842	100.30	100.80	101.98	105.85
214.942	100.50	101.00	102.03	105.91
215.041	100.30	100.80	102.08	105.97
215.141	100.40	100.90	102.14	106.02
215.239	100.30	100.80	102.19	106.08
215.290	100.30	100.80	102.21	106.11
215.335	100.10	100.60	102.24	106.13
215.431	100.20	100.80	102.29	106.19
215.527	100.50	101.10	102.34	106.24
215.623	100.60	101.30	102.39	106.30
215.737	100.40	101.20	102.45	106.36
215.791	100.27	101.17	102.47	106.39
215.834	100.20	101.10	102.50	106.42
215.932	100.40	101.40	102.55	106.48
216.030	100.20	101.20	102.60	106.53
216.128	100.20	101.20	102.65	106.59
216.226	100.30	101.30	102.70	106.64
216.323	100.40	101.40	102.75	106.70
216.378	100.30	101.30	102.78	106.73
216.417	100.40	101.40	102.80	106.75
216.495	100.50	101.50	102.84	106.80
216.582	100.80	101.80	102.89	106.85
216.654	101.00	102.00	102.92	106.89
216.728	101.20	102.20	102.96	106.93
216.804	102.00	103.00	103.00	106.97
216.861	102.30	103.20	103.03	107.01
216.902	102.40	103.20	103.05	107.03
216.920	102.60	103.40	103.06	107.04
216.945	100.16	100.96	103.08	107.05
216.992	100.20	101.00	103.10	107.08
217.092	101.40	102.20	103.15	107.14
217.192	101.20	102.00	103.21	107.19
217.291	101.30	102.10	103.26	107.25
217.390	101.20	102.00	103.31	107.31

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
217.436	101.17	101.87	103.33	107.33
217.484	101.50	102.20	103.36	107.36
217.579	102.10	102.70	103.41	107.42
217.678	102.00	102.60	103.46	107.47
217.689	101.60	102.20	103.46	107.48
217.744	101.14	101.74	103.49	107.51
217.780	101.50	102.20	103.51	107.53
217.875	101.80	102.50	103.56	107.58
217.909	101.97	102.77	103.58	107.60
217.973	101.80	102.60	103.61	107.64
218.072	101.50	102.30	103.66	107.70
218.171	101.60	102.40	103.72	107.75
218.215	101.97	102.87	103.74	107.78
218.266	101.20	102.10	103.77	107.81
218.361	101.30	102.20	103.82	107.86
218.469	101.40	102.30	103.87	107.92
218.586	101.50	102.40	103.93	107.99
218.684	101.20	102.10	103.98	108.05
218.727	101.93	102.93	104.01	108.07
218.782	101.60	102.60	104.03	108.10
218.880	101.30	102.30	104.09	108.16
218.979	101.40	102.40	104.14	108.21
219.077	101.84	102.84	104.19	108.27
219.163	101.84	102.84	104.23	108.32
219.204	101.20	102.20	104.25	108.34
219.302	101.30	102.30	104.31	108.40
219.401	101.40	102.40	104.36	108.46
219.499	101.23	102.23	104.41	108.51
219.598	101.50	102.50	104.46	108.57
219.648	101.73	102.73	104.49	108.60
219.698	101.60	102.50	104.51	108.63
219.798	101.50	102.40	104.56	108.68
219.897	101.80	102.70	104.62	108.74
219.997	101.60	102.40	104.67	108.80
220.097	101.40	102.20	104.72	108.85
220.144	102.92	103.72	104.75	108.88
220.199	102.40	103.10	104.77	108.91
220.298	102.60	103.30	104.83	108.97
220.398	102.30	103.00	104.88	109.02
220.498	102.50	103.00	104.93	109.08
220.597	102.90	103.40	104.98	109.14

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
220.649	102.95	103.45	105.01	109.17
220.695	102.10	102.50	105.03	109.19
220.813	102.80	103.20	105.09	109.26
220.944	102.60	103.00	105.16	109.34
221.063	102.80	103.20	105.22	109.40
221.163	102.30	102.70	105.28	109.46
221.222	102.96	103.36	105.31	109.49
221.263	103.10	103.50	105.33	109.52
221.362	103.50	103.90	105.38	109.57
221.461	103.60	104.00	105.43	109.63
221.561	103.40	103.80	105.48	109.69
221.658	103.70	104.10	105.53	109.74
221.757	103.50	103.90	105.59	109.80
221.805	104.55	104.95	105.61	109.83
221.857	104.50	104.90	105.64	109.86
221.957	104.60	105.00	105.69	109.91
222.057	104.20	104.60	105.74	109.97
222.157	104.30	104.70	105.80	110.03
222.257	104.80	105.20	105.85	110.09
222.347	104.50	104.90	105.89	110.14
222.465	104.30	104.70	105.96	110.20
222.585	104.80	105.30	106.02	110.27
222.701	104.50	105.00	106.08	110.34
222.801	104.30	104.80	106.13	110.40
222.900	104.50	105.00	106.18	110.45
223.000	104.00	104.50	106.23	110.51
223.027	104.49	104.99	106.25	110.53
223.068	104.48	104.98	106.27	110.55
223.100	104.70	105.20	106.29	110.57
223.200	104.50	105.00	106.34	110.62
223.300	104.60	105.10	106.39	110.68
223.399	104.90	105.40	106.44	110.74
223.454	105.13	105.63	106.47	110.77
223.499	105.20	105.70	106.50	110.79
223.612	105.30	105.80	106.55	110.86
223.712	105.40	105.90	106.61	110.92
223.811	105.80	106.30	106.66	110.97
223.911	105.20	105.60	106.71	111.03
224.011	105.60	106.00	106.76	111.09
224.111	106.30	106.70	106.81	111.14
224.211	106.20	106.60	106.87	111.20

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
224.311	106.20	106.60	106.92	111.26
224.411	106.00	106.40	106.97	111.32
224.511	106.80	107.20	107.02	111.37
224.611	106.20	106.60	107.08	111.43
224.711	107.80	108.20	107.13	111.49
224.811	107.20	107.60	107.18	111.54
224.911	107.50	107.90	107.23	111.60
224.958	107.20	107.60	107.26	111.63
225.008	107.50	107.90	107.28	111.66
225.106	107.20	107.60	107.33	111.71
225.203	107.60	108.00	107.38	111.77
225.295	107.80	108.30	107.43	111.82
225.401	107.60	108.10	107.49	111.88
225.504	107.10	107.60	107.54	111.94
225.600	107.40	108.00	107.59	111.99
225.697	107.60	108.20	107.64	112.05
225.794	107.50	108.20	107.69	112.10
225.891	107.60	108.30	107.74	112.16
225.988	107.50	108.30	107.79	112.22
226.085	108.00	108.80	107.84	112.27
226.182	108.20	109.00	107.89	112.33
226.279	108.30	109.10	107.95	112.38
226.318	108.01	108.81	107.97	112.40
226.384	108.20	109.00	108.00	112.44
226.483	108.01	108.81	108.05	112.50
226.583	108.30	109.10	108.10	112.55
226.682	108.01	108.91	108.16	112.61
226.782	108.01	108.91	108.21	112.67
226.881	108.40	109.30	108.26	112.72
226.981	108.60	109.60	108.31	112.78
227.080	108.01	109.01	108.36	112.84
227.180	108.20	109.20	108.42	112.90
227.274	108.01	109.01	108.46	112.95
227.373	108.01	109.01	108.52	113.01
227.473	108.20	109.20	108.57	113.06
227.572	108.01	109.01	108.62	113.12
227.671	108.01	109.11	108.67	113.18
227.771	108.40	109.50	108.72	113.23
227.856	108.01	109.11	108.77	113.28
227.955	108.20	109.30	108.82	113.34
228.054	108.01	109.11	108.87	113.39

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
228.152	108.01	109.11	108.92	113.45
228.281	108.30	109.50	108.99	113.52
228.409	108.01	109.21	109.06	113.60
228.509	108.20	109.40	109.11	113.65
228.608	108.01	109.21	109.16	113.71
228.752	108.01	109.21	109.24	113.79
228.880	108.40	109.60	109.30	113.87
228.979	108.01	109.21	109.35	113.92
229.015	108.15	109.35	109.37	113.94
229.047	108.14	109.34	109.39	113.96
229.062	108.15	109.35	109.40	113.97
229.076	108.10	109.30	109.40	113.98
229.193	108.30	109.50	109.47	114.04
229.312	108.20	109.40	109.53	114.11
229.411	107.50	109.00	109.58	114.17
229.510	107.80	109.30	109.63	114.23
229.558	107.15	108.65	109.66	114.25
229.610	107.50	108.70	109.68	114.28
229.709	107.60	108.80	109.73	114.34
229.803	107.30	108.50	109.78	114.39
229.919	107.80	108.80	109.84	114.46
230.028	108.00	109.00	109.90	114.52
230.127	108.20	109.20	109.95	114.58
230.226	108.30	109.20	110.00	114.63
230.332	108.30	109.10	110.06	114.69
230.451	109.10	109.80	110.12	114.76
230.556	109.20	109.80	110.18	114.82
230.616	109.02	109.52	110.21	114.86
230.635	108.98	109.48	110.22	114.87
230.649	109.20	109.60	110.22	114.88
230.678	109.30	109.70	110.24	114.89
230.704	109.50	109.80	110.25	114.91
230.754	110.20	110.50	110.28	114.94
230.780	110.20	110.40	110.29	114.95
230.839	110.50	110.70	110.32	114.98
230.851	110.25	110.45	110.33	114.99
230.864	110.30	110.50	110.34	115.00
230.884	110.20	110.40	110.35	115.01
230.905	110.30	110.50	110.36	115.02
230.925	110.50	110.70	110.37	115.03
230.945	110.60	110.80	110.38	115.04

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
230.965	110.40	110.70	110.39	115.06
230.986	110.30	110.60	110.40	115.07
231.006	110.40	110.70	110.41	115.08
231.035	110.49	110.79	110.43	115.10
231.081	110.20	110.50	110.45	115.12
231.195	110.30	110.60	110.51	115.19
231.298	110.40	110.70	110.56	115.25
231.401	110.50	110.80	110.62	115.30
231.452	110.49	110.79	110.64	115.33
231.540	110.20	110.50	110.69	115.38
231.633	110.30	110.70	110.74	115.44
231.732	110.10	110.50	110.79	115.49
231.832	109.40	109.80	110.84	115.55
231.884	109.12	109.52	110.87	115.58
231.932	109.40	109.80	110.89	115.61
232.026	109.20	109.60	110.94	115.66
232.118	109.30	109.70	110.99	115.71
232.210	109.10	109.50	111.04	115.77
232.303	109.20	109.60	111.09	115.82
232.354	109.12	109.52	111.11	115.85
232.388	110.10	110.90	111.13	115.87
232.402	111.07	111.97	111.14	115.88
232.421	111.12	112.62	111.15	115.89
232.487	110.90	112.10	111.18	115.92
232.581	110.60	111.90	111.23	115.98
232.632	110.10	111.30	111.26	116.01
232.691	109.50	110.70	111.29	116.04
232.724	109.12	110.32	111.31	116.06
232.764	109.10	110.30	111.33	116.08
232.857	109.20	110.40	111.38	116.14
232.968	109.30	110.50	111.43	116.20
233.066	110.00	111.20	111.49	116.26
233.104	109.11	110.31	111.50	116.28
233.139	109.10	110.30	111.52	116.30
233.156	110.30	111.50	111.53	116.31
233.240	110.90	112.10	111.58	116.35
233.301	111.89	113.09	111.61	116.39
233.347	111.77	112.87	111.63	116.42
233.371	110.60	111.70	111.64	116.43
233.428	109.40	110.20	111.67	116.46
233.467	109.50	110.30	111.69	116.48

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
233.513	109.20	109.90	111.72	116.51
233.551	109.15	109.85	111.74	116.53
233.578	109.80	110.50	111.75	116.55
233.600	109.60	110.20	111.76	116.56
233.693	109.90	110.50	111.81	116.61
233.823	110.20	110.70	111.88	116.69
233.921	110.50	111.00	111.93	116.74
233.974	110.98	111.48	111.96	116.77
234.020	110.60	111.10	111.98	116.80
234.120	110.90	111.40	112.03	116.86
234.218	111.00	111.50	112.09	116.91
234.336	110.50	111.00	112.15	116.98
234.444	110.60	111.10	112.20	117.04
234.541	111.30	111.80	112.25	117.10
234.584	111.17	111.57	112.28	117.12
234.650	111.20	111.60	112.31	117.16
234.746	111.30	111.70	112.36	117.21
234.842	111.20	111.60	112.41	117.27
234.938	111.20	111.60	112.46	117.32
235.034	111.00	111.40	112.51	117.38
235.074	111.01	111.41	112.53	117.40
235.119	111.40	111.80	112.56	117.43
235.201	111.30	111.70	112.60	117.47
235.315	111.60	112.00	112.66	117.54
235.425	112.10	112.50	112.72	117.60
235.461	112.20	112.60	112.73	117.62
235.480	112.12	112.52	112.74	117.63
235.508	112.12	112.52	112.76	117.65
235.536	112.30	112.70	112.77	117.67
235.608	112.00	112.40	112.81	117.71
235.652	112.40	112.80	112.83	117.73
235.696	112.00	112.40	112.86	117.76
235.741	112.10	112.50	112.88	117.78
235.847	112.14	112.54	112.94	117.84
235.944	112.20	112.60	112.99	117.90
236.009	112.10	112.50	113.02	117.93
236.052	112.20	112.60	113.04	117.96
236.093	112.40	112.80	113.06	117.98
236.142	112.00	112.40	113.09	118.01
236.194	112.40	112.80	113.12	118.04
236.247	112.30	112.70	113.14	118.07

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
236.299	112.50	112.90	113.17	118.10
236.352	112.60	113.00	113.20	118.13
236.393	112.47	112.87	113.22	118.15
236.435	112.50	112.90	113.24	118.18
236.534	112.30	112.70	113.29	118.23
236.589	112.33	112.83	113.32	118.27
236.631	112.60	113.10	113.34	118.29
236.723	112.90	113.40	113.39	118.34
236.814	113.00	113.50	113.44	118.39
236.859	113.27	113.77	113.46	118.42
236.899	113.40	113.90	113.48	118.44
236.981	113.80	114.30	113.53	118.49
237.054	113.10	113.60	113.57	118.53
237.093	112.82	113.32	113.59	118.55
237.139	112.70	113.20	113.61	118.58
237.238	112.60	113.10	113.66	118.64
237.296	112.87	113.27	113.69	118.67
237.338	112.60	113.00	113.71	118.69
237.437	112.50	112.90	113.77	118.75
237.537	112.30	112.70	113.82	118.81
237.636	112.70	113.10	113.87	118.86
237.736	112.56	112.96	113.92	118.92
237.787	112.84	113.24	113.95	118.95
237.830	112.94	113.34	113.97	118.97
237.919	113.20	113.60	114.02	119.03
238.006	113.14	113.54	114.06	119.07
238.096	113.23	113.63	114.11	119.13
238.185	113.40	113.80	114.16	119.18
238.275	113.43	113.83	114.20	119.23
238.364	113.53	113.93	114.25	119.28
238.494	113.60	114.00	114.32	119.35
238.601	113.73	114.13	114.37	119.41
238.716	113.83	114.23	114.43	119.48
238.811	113.83	114.23	114.48	119.53
238.901	114.12	114.62	114.53	119.59
239.022	114.40	114.90	114.59	119.65
239.132	114.40	114.90	114.65	119.72
239.272	114.32	114.82	114.72	119.80
239.388	114.42	114.92	114.78	119.86
239.449	114.60	115.10	114.81	119.90
239.549	114.62	115.12	114.87	119.96

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
239.650	114.72	115.22	114.92	120.01
239.750	114.26	114.76	114.97	120.07
239.850	114.91	115.41	115.02	120.13
240.000	115.01	115.51	115.10	120.21
240.090	115.50	116.10	115.15	120.26
240.141	115.60	116.20	115.18	120.29
240.244	115.60	116.20	115.23	120.35
240.369	115.60	116.20	115.29	120.42
240.509	115.70	116.30	115.37	120.50
240.648	115.70	116.30	115.44	120.58
240.748	115.80	116.40	115.49	120.64
240.834	116.00	116.60	115.54	120.69
240.885	116.20	116.80	115.56	120.72
240.990	116.20	116.80	115.62	120.78
241.095	116.20	116.80	115.67	120.84
241.240	116.20	116.80	115.75	120.92
241.347	116.40	117.10	115.80	120.98
241.446	116.49	117.19	115.86	121.04
241.495	116.50	117.20	115.88	121.07
241.604	116.50	117.20	115.94	121.13
241.708	116.50	117.20	115.99	121.19
241.852	116.69	117.39	116.07	121.27
242.000	114.30	115.00	116.15	121.35
242.116	114.90	115.60	116.21	121.42
242.229	114.90	115.60	116.26	121.49
242.354	114.90	115.60	116.33	121.56
242.485	113.52	114.22	116.40	121.63
242.605	114.50	115.20	116.46	121.70
242.717	115.60	116.40	116.52	121.76
242.761	115.90	116.70	116.54	121.79
242.861	116.66	117.46	116.59	121.85
242.961	116.40	117.00	116.65	121.90
243.015	116.20	116.70	116.67	121.93
243.061	116.30	116.80	116.70	121.96
243.158	116.40	116.90	116.75	122.02
243.257	116.61	117.11	116.80	122.07
243.314	116.26	116.76	116.83	122.10
243.354	116.45	116.95	116.85	122.13
243.453	117.00	117.50	116.90	122.18
243.553	117.25	117.85	116.96	122.24
243.653	117.10	117.70	117.01	122.30

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
243.704	117.10	117.80	117.03	122.33
243.753	117.25	117.95	117.06	122.36
243.849	117.36	118.06	117.11	122.41
243.943	117.10	117.80	117.16	122.46
244.038	117.10	117.70	117.21	122.52
244.086	116.90	117.50	117.23	122.55
244.118	116.50	117.10	117.25	122.56
244.217	116.80	117.40	117.30	122.62
244.316	116.70	117.40	117.35	122.68
244.367	117.09	117.79	117.38	122.71
244.415	117.10	117.80	117.40	122.73
244.514	117.20	118.00	117.46	122.79
244.612	117.40	118.20	117.51	122.85
244.712	117.10	117.90	117.56	122.90
244.810	117.03	117.83	117.61	122.96
244.851	117.10	117.90	117.63	122.98
244.904	117.10	117.80	117.66	123.01
244.995	117.20	117.80	117.71	123.06
245.086	117.10	117.70	117.75	123.12
245.177	117.09	117.69	117.80	123.17
245.210	117.20	117.80	117.82	123.19
245.270	117.10	117.70	117.85	123.22
245.370	117.20	117.80	117.90	123.28
245.470	117.15	117.75	117.95	123.34
245.580	117.23	117.83	118.01	123.40
245.627	117.40	118.10	118.04	123.42
245.680	117.25	117.85	118.06	123.45
245.778	117.60	118.20	118.12	123.51
245.876	117.90	118.50	118.17	123.57
245.974	118.20	118.70	118.22	123.62
246.025	118.53	119.03	118.24	123.65
246.072	118.20	118.70	118.27	123.68
246.178	118.30	118.80	118.32	123.74
246.278	118.60	119.10	118.38	123.80
246.342	118.40	118.90	118.41	123.83
246.442	118.20	118.70	118.46	123.89
246.486	118.60	119.10	118.48	123.92
246.533	118.70	119.20	118.51	123.94
246.566	118.60	119.10	118.53	123.96
246.665	118.40	118.90	118.58	124.02
246.740	118.80	119.30	118.62	124.06

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
246.787	118.90	119.40	118.64	124.09
246.835	119.00	119.50	118.67	124.11
246.882	119.10	119.70	118.69	124.14
246.982	119.22	119.82	118.74	124.20
247.040	119.20	119.80	118.77	124.23
247.139	119.10	119.70	118.83	124.29
247.238	119.23	119.83	118.88	124.34
247.321	119.30	120.00	118.92	124.39
247.410	119.22	119.92	118.97	124.44
247.457	119.20	119.90	118.99	124.47
247.500	119.50	120.20	119.01	124.49
247.568	119.60	120.30	119.05	124.53
247.635	120.50	121.20	119.08	124.57
247.703	120.54	121.24	119.12	124.61
247.722	120.10	120.80	119.13	124.62
247.755	120.50	121.20	119.15	124.64
247.849	120.30	121.00	119.20	124.69
247.944	120.54	121.24	119.25	124.75
248.039	120.10	120.80	119.29	124.80
248.090	119.80	120.60	119.32	124.83
248.135	119.60	120.40	119.34	124.86
248.224	119.30	120.10	119.39	124.91
248.321	118.98	119.78	119.44	124.96
248.374	119.20	120.00	119.47	124.99
248.418	119.30	120.10	119.49	125.02
248.509	119.50	120.20	119.54	125.07
248.608	119.90	120.60	119.59	125.13
248.708	120.50	121.10	119.64	125.18
248.749	120.30	120.90	119.67	125.21
248.802	120.40	121.00	119.69	125.24
248.913	120.10	120.70	119.75	125.30
249.010	120.40	120.90	119.80	125.36
249.108	120.50	121.00	119.85	125.41
249.159	120.30	120.80	119.88	125.44
249.208	120.50	121.00	119.90	125.47
249.308	120.30	120.80	119.96	125.53
249.433	120.40	120.90	120.02	125.60
249.477	120.41	120.91	120.04	125.62
249.548	120.50	121.00	120.08	125.66
249.612	120.50	121.00	120.12	125.70
249.755	120.30	120.90	120.19	125.78

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
249.859	120.40	121.00	120.24	125.84
249.962	120.50	121.10	120.30	125.90
250.007	120.41	121.01	120.32	125.92
250.055	120.10	120.70	120.35	125.95
250.150	120.30	120.90	120.40	126.01
250.245	120.30	120.90	120.45	126.06
250.343	120.40	121.00	120.50	126.12
250.400	120.22	120.82	120.53	126.15
250.443	120.30	120.80	120.55	126.17
250.540	120.50	121.00	120.60	126.23
250.639	120.40	120.90	120.65	126.29
250.736	120.30	120.80	120.70	126.34
250.865	120.50	121.00	120.77	126.41
250.962	120.30	120.80	120.82	126.47
251.011	120.37	120.87	120.85	126.50
251.061	120.20	120.80	120.87	126.53
251.160	120.30	120.90	120.92	126.58
251.259	120.30	120.90	120.97	126.64
251.359	120.40	121.10	121.03	126.70
251.458	120.10	120.90	121.08	126.75
251.557	119.80	120.60	121.13	126.81
251.614	119.93	120.63	121.16	126.84
251.642	119.60	120.30	121.17	126.86
251.742	120.10	120.80	121.23	126.92
251.841	120.50	121.20	121.28	126.97
251.941	120.50	121.20	121.33	127.03
251.993	120.13	120.83	121.36	127.06
252.041	120.30	121.00	121.38	127.09
252.140	120.60	121.40	121.43	127.14
252.239	120.40	121.20	121.49	127.20
252.338	120.70	121.50	121.54	127.26
252.383	120.80	121.60	121.56	127.28
252.396	120.40	121.20	121.57	127.29
252.496	120.50	121.30	121.62	127.35
252.596	120.30	121.10	121.67	127.40
252.696	120.40	121.10	121.72	127.46
252.736	120.39	121.09	121.74	127.48
252.780	120.50	121.10	121.77	127.51
252.880	120.60	121.20	121.82	127.56
252.932	120.65	121.25	121.85	127.59
252.979	120.10	120.70	121.87	127.62

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
253.040	120.50	121.10	121.90	127.66
253.102	120.30	120.90	121.94	127.69
253.202	120.40	121.00	121.99	127.75
253.252	120.65	121.25	122.01	127.78
253.302	120.90	121.50	122.04	127.81
253.345	120.60	121.30	122.04	127.83
253.423	121.10	121.80	122.09	127.87
253.476	121.42	122.22	122.12	127.90
253.519	122.30	123.10	122.15	127.93
253.541	122.43	123.23	122.16	127.94
253.593	122.50	123.30	122.19	127.97
253.645	122.30	123.00	122.22	128.00
253.738	122.50	123.20	122.28	128.05
253.828	122.60	123.30	122.33	128.11
253.879	122.63	123.33	122.36	128.13
253.916	122.45	123.15	122.39	128.16
254.016	122.30	123.00	122.45	128.21
254.105	122.30	123.00	122.50	128.26
254.205	122.40	123.10	122.56	128.32
254.305	122.30	123.00	122.62	128.38
254.343	122.35	123.05	122.64	128.40
254.387	122.40	123.10	122.67	128.42
254.479	122.30	123.00	122.72	128.48
254.571	122.90	123.60	122.78	128.53
254.666	123.20	123.90	122.84	128.58
254.720	123.85	124.55	122.87	128.61
254.766	123.60	124.30	122.90	128.64
254.868	123.50	124.20	122.96	128.70
254.968	123.40	124.10	123.02	128.76
255.067	123.80	124.50	123.08	128.81
255.165	123.40	124.10	123.14	128.87
255.194	123.59	124.29	123.15	128.88
255.264	123.60	124.20	123.20	128.92
255.363	123.50	124.10	123.26	128.98
255.462	123.60	124.30	123.32	129.04
255.560	123.80	124.50	123.37	129.09
255.647	123.67	124.17	123.43	129.14
255.659	123.40	124.00	123.43	129.15
255.761	123.50	124.20	123.50	129.21
255.860	123.40	124.10	123.55	129.26
255.959	123.60	124.40	123.61	129.32

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
256.037	123.80	124.60	123.66	129.36
256.091	123.63	124.43	123.69	129.40
256.137	123.40	124.30	123.72	129.42
256.236	123.60	124.60	123.78	129.48
256.336	123.40	124.40	123.84	129.53
256.428	123.10	124.10	123.90	129.59
256.511	123.40	124.50	123.95	129.63
256.566	123.00	124.20	123.98	129.67
256.582	123.20	124.40	123.99	129.68
256.604	123.40	124.50	124.00	129.69
256.671	123.60	124.60	124.04	129.73
256.677	123.63	124.53	124.05	129.73
256.747	123.50	124.40	124.09	129.77
256.834	123.60	124.50	124.14	129.82
256.938	123.40	124.30	124.20	129.88
257.035	123.70	124.60	124.26	129.93
257.125	123.70	124.60	124.32	129.98
257.218	123.80	124.70	124.37	130.04
257.262	123.84	124.64	124.40	130.06
257.319	123.70	124.50	124.43	130.10
257.396	123.60	124.40	124.48	130.14
257.500	123.40	124.20	124.54	130.20
257.604	123.80	124.60	124.60	130.26
257.709	123.50	124.30	124.67	130.32
257.773	123.79	124.59	124.70	130.35
257.809	123.60	124.40	124.73	130.37
257.909	123.50	124.30	124.79	130.43
258.005	123.70	124.50	124.84	130.49
258.105	123.60	124.40	124.90	130.54
258.162	123.66	124.56	124.94	130.58
258.205	123.60	124.50	124.96	130.60
258.304	123.50	124.40	125.02	130.66
258.398	123.40	124.30	125.08	130.71
258.476	123.60	124.50	125.13	130.75
258.574	123.70	124.60	125.19	130.81
258.673	123.50	124.40	125.25	130.87
258.691	123.65	124.55	125.26	130.88
258.773	123.40	124.40	125.31	130.92
258.872	123.50	124.40	125.37	130.98
258.972	123.20	124.10	125.43	131.04
259.023	123.30	124.10	125.46	131.07

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
259.046	124.38	125.18	125.47	131.08
259.122	124.50	125.30	125.52	131.12
259.222	126.20	127.00	125.58	131.18
259.322	127.60	128.40	125.64	131.24
259.422	128.00	128.80	125.70	131.29
259.476	128.95	129.75	125.73	131.32
259.520	127.20	127.90	125.76	131.35
259.599	126.90	127.60	125.80	131.39
259.698	126.10	126.80	125.86	131.45
259.797	126.00	126.60	125.92	131.51
259.896	125.60	126.20	125.98	131.56
259.996	125.00	125.50	126.04	131.62
260.010	124.12	124.62	126.05	131.63
260.096	124.10	124.60	126.10	131.68
260.196	124.30	124.80	126.16	131.74
260.291	124.60	125.10	126.22	131.79
260.387	124.50	125.00	126.28	131.84
260.433	124.14	124.64	126.30	131.87
260.486	125.20	125.70	126.34	131.90
260.585	125.40	125.90	126.40	131.96
260.684	125.90	126.40	126.46	132.01
260.778	126.00	126.80	126.51	132.07
260.878	126.20	127.00	126.57	132.12
260.943	126.40	127.30	126.61	132.16
260.977	126.30	127.30	126.63	132.18
261.077	126.50	127.70	126.69	132.24
261.177	126.40	127.60	126.75	132.29
261.276	126.10	127.40	126.81	132.35
261.375	126.20	127.50	126.87	132.41
261.446	126.13	127.63	126.91	132.45
261.473	126.20	127.60	126.93	132.46
261.581	126.30	127.70	126.99	132.52
261.680	126.80	128.10	127.05	132.58
261.803	126.50	127.70	127.13	132.65
261.902	126.90	128.10	127.19	132.71
262.001	127.00	128.10	127.25	132.76
262.089	127.20	128.40	127.30	132.81
262.143	127.09	128.29	127.33	132.84
262.190	126.90	128.10	127.36	132.87
262.263	126.80	128.00	127.40	132.91
262.358	126.30	127.50	127.46	132.97

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
262.414	126.40	127.60	127.50	133.00
262.489	126.30	127.50	127.54	133.04
262.531	126.50	127.70	127.57	133.07
262.605	127.00	128.20	127.61	133.11
262.625	127.60	128.80	127.62	133.12
262.635	127.01	128.31	127.63	133.13
262.646	127.50	128.90	127.63	133.13
262.651	127.60	129.00	127.64	133.13
262.655	127.40	128.90	127.64	133.14
262.666	128.50	130.00	127.65	133.14
262.674	128.41	129.91	127.65	133.15
262.686	128.06	129.46	127.66	133.15
262.695	129.52	130.72	127.66	133.16
262.711	128.87	130.27	127.67	133.17
262.756	128.50	129.80	127.70	133.19
262.854	128.30	129.60	127.76	133.25
262.931	128.50	129.80	127.81	133.29
263.024	128.90	130.20	127.86	133.35
263.076	128.97	130.27	127.89	133.38
263.120	128.70	129.90	127.92	133.40
263.220	128.30	129.50	127.98	133.46
263.320	128.60	129.80	128.04	133.52
263.420	128.70	129.90	128.10	133.57
263.469	128.98	130.18	128.13	133.60
263.519	128.70	130.00	128.16	133.63
263.624	128.60	130.00	128.22	133.69
263.722	127.90	129.30	128.28	133.74
263.821	128.50	129.90	128.34	133.80
263.920	128.60	130.10	128.40	133.86
263.970	128.99	130.49	128.43	133.89
264.018	128.50	129.90	128.46	133.91
264.109	128.60	130.00	128.51	133.97
264.206	128.40	129.80	128.57	134.02
264.303	128.90	130.20	128.63	134.08
264.357	129.05	130.35	128.66	134.11
264.402	129.10	130.40	128.69	134.13
264.502	129.20	130.50	128.75	134.19
264.601	129.40	130.70	128.81	134.25
264.701	129.10	130.40	128.87	134.30
264.753	129.05	130.25	128.90	134.33
264.829	128.90	130.10	128.95	134.38

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
264.929	128.60	129.80	129.01	134.43
265.029	128.90	130.10	129.07	134.49
265.088	128.98	129.98	129.10	134.52
265.129	127.90	128.90	129.13	134.55
265.222	126.50	127.50	129.18	134.60
265.334	126.20	127.20	129.25	134.66
265.441	126.00	127.00	129.31	134.72
265.491	125.99	126.89	129.34	134.75
265.594	126.10	127.00	129.41	134.81
265.710	126.20	127.10	129.48	134.88
265.809	126.40	127.30	129.54	134.93
265.908	126.30	127.20	129.60	134.99
265.937	126.33	127.13	129.61	135.01
266.006	127.50	128.30	129.65	135.05
266.106	127.90	128.70	129.71	135.10
266.206	128.60	129.40	129.77	135.16
266.306	129.70	130.50	129.83	135.22
266.368	130.92	131.72	129.87	135.25
266.403	130.45	131.25	129.89	135.27
266.526	130.40	131.20	129.97	135.34
266.625	130.20	131.00	130.03	135.40
266.754	130.60	131.40	130.10	135.47
266.878	130.10	130.90	130.18	135.54
266.930	130.06	130.76	130.21	135.57
266.978	130.50	131.20	130.24	135.60
267.078	129.20	129.90	130.30	135.66
267.178	129.80	130.50	130.36	135.71
267.278	129.70	130.40	130.42	135.77
267.376	129.60	130.30	130.48	135.83
267.400	129.80	130.50	130.49	135.84
267.478	129.60	130.30	130.54	135.89
267.570	129.80	130.50	130.59	135.94
267.662	130.10	130.80	130.65	135.99
267.716	130.79	131.59	130.68	136.47
267.760	130.40	131.20	130.70	137.50
267.860	130.80	131.60	130.73	137.51
267.959	130.40	131.20	130.77	137.52
268.014	130.59	131.39	130.79	137.53
268.059	130.20	131.00	130.81	137.53
268.172	129.80	130.60	130.85	137.54
268.272	129.60	130.40	130.88	137.55

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
268.372	129.30	130.10	130.92	137.56
268.471	128.00	128.80	130.95	137.57
268.516	128.76	129.36	130.97	137.58
268.568	128.90	129.50	130.99	137.58
268.684	128.60	129.20	131.03	137.59
268.789	129.00	129.60	131.07	137.60
268.888	129.50	130.10	131.10	137.61
268.988	129.40	130.00	131.14	137.62
269.088	129.80	130.40	131.17	137.63
269.146	129.76	130.36	131.19	137.64
269.187	129.60	130.30	131.21	137.64
269.287	129.70	130.40	131.24	137.65
269.382	129.50	130.20	131.28	137.66
269.471	130.50	131.20	131.31	137.67
269.518	130.79	131.39	131.33	137.68
269.571	130.90	131.60	131.35	137.68
269.671	130.80	131.60	131.38	137.69
269.746	131.40	132.20	131.41	137.70
269.797	131.17	131.97	131.43	137.70
269.846	130.50	131.30	131.44	137.71
269.945	130.90	131.70	131.48	137.72
270.009	129.40	130.20	131.50	137.72
270.109	128.00	128.80	131.54	137.73
270.180	128.40	129.20	131.56	137.74
270.209	128.09	128.89	131.57	137.74
270.262	128.50	129.30	131.59	137.75
270.358	128.90	129.70	131.63	137.76
270.455	129.60	130.40	131.66	137.77
270.492	130.71	131.51	131.68	137.77
270.542	131.50	132.30	131.69	137.78
270.642	132.20	133.00	131.73	137.79
270.742	133.60	134.40	131.77	137.80
270.840	134.00	134.80	131.80	137.81
270.883	134.27	135.07	131.82	137.81
270.937	134.10	134.90	131.84	137.82
271.034	134.20	135.00	131.87	137.83
271.129	134.60	135.40	131.90	137.84
271.225	134.00	134.80	131.94	137.85
271.235	134.21	135.01	131.94	137.85
271.321	133.50	134.30	131.97	137.86
271.417	132.40	133.20	132.01	137.87

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
271.523	132.10	132.90	132.04	137.88
271.622	130.00	130.80	132.08	137.89
271.663	130.74	131.54	132.10	137.89
271.722	130.20	131.00	132.12	137.90
271.825	130.50	131.30	132.15	137.91
271.924	130.60	131.40	132.19	137.92
272.024	130.60	131.40	132.22	137.93
272.124	130.20	131.00	132.26	137.94
272.175	130.77	131.67	132.28	137.94
272.216	130.80	131.70	132.29	137.95
272.308	130.40	131.30	132.33	137.95
272.404	130.50	131.40	132.36	137.96
272.500	130.70	131.60	132.39	137.97
272.596	130.90	131.80	132.43	137.98
272.691	131.00	131.90	132.46	137.99
272.802	131.20	132.10	132.50	138.00
272.900	131.40	132.30	132.54	138.01
272.935	131.37	132.37	132.55	138.02
273.045	131.40	132.30	132.59	138.03
273.135	132.00	132.90	132.62	138.04
273.225	131.60	132.40	132.65	138.05
273.316	131.40	132.20	132.69	138.06
273.406	131.60	132.40	132.72	138.06
273.492	131.70	132.50	132.75	138.07
273.538	131.69	132.49	132.77	138.08
273.584	131.20	132.00	132.78	138.08
273.678	131.50	132.30	132.82	138.09
273.772	131.60	132.40	132.85	138.10
273.866	131.80	132.60	132.88	138.11
273.959	131.60	132.40	132.92	138.12
274.053	131.20	132.00	132.95	138.13
274.122	131.59	132.39	132.98	138.14
274.166	131.40	132.20	132.99	138.14
274.264	131.20	132.00	133.03	138.15
274.362	131.50	132.30	133.06	138.16
274.460	131.50	132.30	133.10	138.17
274.558	131.60	132.40	133.13	138.18
274.656	131.80	132.60	133.17	138.19
274.730	131.61	132.51	133.19	138.20
274.776	131.70	132.60	133.21	138.20
274.876	131.60	132.50	133.24	138.21

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
274.976	131.50	132.40	133.28	138.22
275.076	131.90	132.80	133.32	138.23
275.126	132.04	133.04	133.33	138.24
275.176	132.50	133.50	133.35	138.24
275.298	132.40	133.40	133.40	138.25
275.398	132.60	133.60	133.43	138.26
275.498	132.70	133.70	133.47	138.27
275.597	132.20	133.20	133.50	138.28
275.655	132.05	133.05	133.52	138.29
275.712	132.10	133.50	133.54	138.30
275.812	132.20	133.50	133.58	138.31
275.865	132.25	133.75	133.60	138.31
275.909	132.00	133.60	133.61	138.31
276.004	131.50	133.10	133.65	138.32
276.098	131.60	133.20	133.68	138.33
276.192	131.40	133.00	133.72	138.34
276.233	131.77	133.37	133.73	138.35
276.282	131.80	133.10	133.75	138.35
276.404	131.60	132.90	133.79	138.36
276.517	131.90	133.20	133.83	138.38
276.572	132.03	133.33	133.85	138.38
276.616	132.40	133.60	133.87	138.39
276.716	132.50	133.70	133.90	138.40
276.816	132.60	133.80	133.94	138.41
276.932	132.80	134.00	133.98	138.42
276.991	133.77	134.97	134.00	138.42
277.032	133.45	134.45	134.02	138.43
277.131	133.56	134.56	134.05	138.44
277.231	133.80	134.80	134.09	138.45
277.338	133.90	134.90	134.13	138.46
277.389	133.67	134.67	134.14	138.46
277.438	133.70	134.60	134.16	138.47
277.527	133.80	134.70	134.19	138.48
277.627	133.50	134.40	134.23	138.49
277.724	133.60	134.50	134.26	138.50
277.824	133.90	134.80	134.30	138.51
277.824	133.90	134.80	134.50	139.25
277.880	133.52	134.42	134.52	139.28
277.905	133.50	134.30	134.53	139.30
277.994	133.60	134.40	134.57	139.35
278.093	133.80	134.60	134.61	139.41

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
278.193	133.90	134.70	134.65	139.47
278.293	134.00	134.80	134.69	139.53
278.335	134.19	134.99	134.71	139.56
278.384	133.50	134.50	134.73	139.59
278.484	133.60	134.60	134.77	139.65
278.584	133.40	134.40	134.81	139.71
278.684	133.60	134.60	134.85	139.77
278.736	133.75	134.75	134.87	139.80
278.785	133.20	134.20	134.89	139.83
278.884	133.50	134.50	134.93	139.89
278.984	133.60	134.60	134.97	139.95
279.084	133.40	134.40	135.01	140.01
279.182	133.20	134.20	135.05	140.07
279.233	133.75	134.75	135.07	140.10
279.286	133.50	134.50	135.09	140.13
279.385	133.40	134.40	135.13	140.19
279.483	133.70	134.80	135.17	140.25
279.564	133.60	134.70	135.20	140.30
279.619	133.83	134.73	135.22	140.33
279.664	133.90	134.80	135.24	140.36
279.720	133.94	134.84	135.27	140.39
279.758	133.25	134.05	135.28	140.42
279.839	133.54	134.34	135.31	140.46
279.933	134.50	135.30	135.35	140.52
280.027	135.00	135.70	135.39	140.58
280.085	135.82	136.52	135.41	140.61
280.136	135.80	136.50	135.43	140.64
280.235	135.60	136.30	135.47	140.70
280.334	135.40	136.10	135.51	140.76
280.433	135.20	135.90	135.55	140.82
280.470	135.82	136.52	135.57	140.84
280.558	135.60	136.30	135.60	140.90
280.656	135.20	135.90	135.64	140.96
280.754	134.90	135.60	135.68	141.02
280.869	134.70	135.40	135.73	141.09
280.925	134.70	135.50	135.75	141.12
280.976	135.00	135.80	135.77	141.15
281.049	135.60	136.40	135.80	141.19
281.147	135.80	136.60	135.84	141.25
281.195	136.10	136.90	135.86	141.28
281.245	136.20	137.00	135.88	141.31

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
281.343	136.40	137.20	135.92	141.37
281.441	133.30	134.10	135.96	141.43
281.498	136.08	136.88	135.98	141.46
281.537	136.50	137.30	136.00	141.49
281.635	136.20	137.00	136.04	141.55
281.732	136.10	136.90	136.08	141.61
281.770	136.08	136.98	136.09	141.63
281.819	135.90	136.80	136.11	141.66
281.919	135.50	136.40	136.15	141.72
282.018	135.60	136.50	136.19	141.78
282.079	135.65	136.55	136.22	141.81
282.118	135.20	136.20	136.23	141.84
282.218	134.80	135.80	136.27	141.90
282.318	134.50	135.50	136.31	141.96
282.373	134.62	135.62	136.34	141.99
282.417	135.50	136.50	136.35	142.02
282.520	135.40	136.40	136.40	142.08
282.617	134.60	135.60	136.43	142.14
282.678	134.58	135.48	136.46	142.18
282.716	134.80	135.70	136.47	142.20
282.815	134.90	135.80	136.51	142.26
282.915	135.00	135.90	136.55	142.32
283.015	135.50	136.40	136.60	142.38
283.067	135.93	136.83	136.62	142.41
283.115	135.80	136.70	136.64	142.44
283.214	135.70	136.60	136.68	142.50
283.274	135.63	136.43	136.70	142.54
283.314	135.70	136.40	136.72	142.56
283.414	135.60	136.30	136.76	142.62
283.514	135.60	136.30	136.80	142.68
283.614	135.40	136.10	136.84	142.74
283.648	135.23	135.93	136.85	142.76
283.671	135.19	135.99	136.86	142.77
283.714	135.20	136.10	136.88	142.80
283.812	135.10	136.00	136.92	142.86
283.910	135.40	136.30	136.96	142.92
284.009	135.20	136.10	137.00	142.98
284.066	135.18	136.08	137.02	143.01
284.111	135.40	136.40	137.04	143.04
284.211	135.60	136.70	137.08	143.10
284.311	135.40	136.60	137.12	143.16

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
284.427	135.10	136.30	137.16	143.23
284.481	135.09	136.29	137.19	143.26
284.526	135.40	136.60	137.20	143.29
284.626	135.60	136.80	137.25	143.35
284.726	135.80	137.00	137.29	143.41
284.826	135.70	136.90	137.33	143.47
284.926	136.00	137.20	137.37	143.53
284.976	136.39	137.59	137.39	143.56
285.030	136.20	137.40	137.41	143.59
285.130	136.40	137.60	137.45	143.65
285.229	136.80	138.00	137.49	143.71
285.328	136.70	137.90	137.53	143.77
285.382	136.37	137.47	137.55	143.81
285.428	136.40	137.50	137.57	143.83
285.528	136.60	137.70	137.61	143.89
285.628	136.50	137.60	137.65	143.95
285.728	136.20	137.30	137.69	144.01
285.828	136.30	137.40	137.73	144.07
285.893	136.40	137.50	137.76	144.11
285.908	136.36	137.46	137.76	144.12
285.927	140.52	141.72	137.77	144.13
285.946	136.40	137.40	137.78	144.15
285.982	136.20	137.10	137.79	144.17
286.055	136.50	137.40	137.82	144.21
286.146	136.50	137.30	137.86	144.27
286.243	136.20	137.00	137.90	144.32
286.287	136.88	137.68	137.92	144.35
286.343	136.80	137.60	137.94	144.39
286.436	136.70	137.50	137.98	144.44
286.489	136.88	137.68	138.00	144.47
286.536	136.50	137.40	138.02	144.50
286.644	136.40	137.30	138.06	144.57
286.744	136.40	137.40	138.10	144.63
286.820	136.81	137.91	138.13	144.67
286.866	136.50	137.50	138.15	144.70
286.966	136.40	137.40	138.19	144.76
287.066	136.40	137.40	138.23	144.82
287.121	138.88	139.88	138.25	144.85
287.161	137.50	138.40	138.27	144.88
287.261	137.90	138.80	138.31	144.94
287.355	138.00	138.80	138.35	145.00

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
287.384	138.78	139.58	138.36	145.01
287.449	137.00	137.80	138.38	145.05
287.551	137.80	138.60	138.43	145.11
287.677	137.60	138.40	138.48	145.19
287.801	137.40	138.20	138.53	145.26
287.902	136.80	137.60	138.57	145.32
287.936	136.06	136.86	138.58	145.35
288.012	136.00	136.90	138.61	145.39
288.093	136.20	137.10	138.64	145.44
288.193	136.20	137.10	138.68	145.50
288.292	136.40	137.30	138.72	145.56
288.391	136.20	137.10	138.76	145.62
288.450	136.00	136.90	138.79	145.66
288.497	136.10	137.00	138.81	145.68
288.597	136.10	137.00	138.85	145.74
288.697	136.20	137.10	138.89	145.80
288.759	136.00	136.90	138.91	145.84
288.797	137.10	137.90	138.93	145.86
288.886	137.80	138.60	138.96	145.92
288.974	138.50	139.30	139.00	145.97
289.022	139.01	139.81	139.02	146.00
289.022	139.01	139.81	143.00	148.25
289.066	139.40	140.30	143.00	148.25
289.157	139.60	140.50	143.01	148.26
289.269	140.20	141.10	143.02	148.27
289.364	140.30	141.30	143.03	148.28
289.502	140.60	141.60	143.05	148.30
289.683	141.20	142.30	143.07	148.32
289.781	141.90	143.10	143.08	148.33
289.874	142.50	143.70	143.09	148.34
289.916	142.88	144.08	143.09	148.34
289.976	143.50	144.70	143.10	148.35
290.077	143.20	144.40	143.11	148.36
290.210	143.60	144.80	143.12	148.37
290.246	143.32	144.62	143.12	148.37
290.283	143.20	144.50	143.13	148.38
290.383	143.10	144.40	143.14	148.39
290.500	142.80	144.10	143.15	148.40
290.605	142.60	143.90	143.16	148.41
290.711	142.70	144.00	143.17	148.42
290.759	142.73	144.03	143.17	148.42

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
290.815	142.60	143.80	143.18	148.43
290.918	142.40	143.60	143.19	148.44
291.007	142.30	143.50	143.20	148.45
291.112	142.50	143.70	143.21	148.46
291.227	142.30	143.50	143.22	148.47
291.270	142.51	143.71	143.22	148.47
291.328	142.50	143.70	143.23	148.48
291.427	142.60	143.80	143.24	148.49
291.484	142.51	143.71	143.25	148.50
291.507	142.50	143.60	143.25	148.50
291.607	142.30	143.30	143.26	148.51
291.661	141.90	142.90	143.26	148.51
291.732	141.46	142.46	143.27	148.52
291.757	141.60	142.60	143.27	148.52
291.811	141.50	142.50	143.28	148.53
291.908	142.00	143.00	143.29	148.54
291.977	142.30	143.30	143.30	148.55
292.027	142.61	143.51	143.30	148.55
292.070	142.30	143.20	143.30	148.55
292.162	142.40	143.30	143.31	148.56
292.245	142.50	143.40	143.32	148.57
292.298	142.61	143.51	143.33	148.58
292.337	142.30	143.10	143.33	148.58
292.423	142.60	143.40	143.34	148.59
292.511	142.80	143.60	143.35	148.60
292.557	142.90	143.70	143.35	148.60
292.599	142.20	143.00	143.36	148.61
292.691	141.90	142.70	143.37	148.62
292.764	141.50	142.30	143.37	148.62
292.846	141.70	142.50	143.38	148.63
292.905	141.81	142.61	143.39	148.64
292.928	141.90	142.70	143.39	148.64
292.949	147.59	148.59	143.39	148.64
292.974	142.50	143.20	143.40	148.65
293.042	143.20	143.90	143.40	148.65
293.135	144.10	144.80	143.41	148.66
293.243	144.60	145.30	143.42	148.67
293.327	144.80	145.50	143.43	148.68
293.383	144.91	145.61	143.44	148.69
293.416	142.60	143.40	143.44	148.69
293.510	142.50	143.30	143.45	148.70

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
293.588	142.10	142.90	143.46	148.71
293.677	141.80	142.60	143.47	148.72
293.749	141.60	142.40	143.47	148.72
293.798	141.59	142.39	143.48	148.73
293.848	141.60	142.50	143.48	148.73
293.895	141.50	142.40	143.49	148.74
294.000	142.00	143.00	143.50	148.75
294.046	142.91	143.91	143.50	148.75
294.049	142.50	143.60	143.50	148.75
294.113	142.30	143.40	143.51	148.76
294.220	141.90	143.00	143.52	148.77
294.274	141.50	142.60	143.53	148.78
294.362	141.30	142.40	143.53	148.78
294.411	141.18	142.28	143.54	148.79
294.464	141.00	142.10	143.54	148.79
294.585	141.20	142.30	143.56	148.81
294.729	141.30	142.40	143.57	149.15
294.843	141.20	142.30	143.58	149.43
294.872	141.09	142.19	143.59	149.50
294.923	142.20	143.20	143.59	149.62
295.051	142.90	143.90	143.60	149.92
295.142	142.60	143.60	143.61	150.14
295.228	143.50	144.50	143.81	150.35
295.289	144.60	145.60	143.95	150.50
295.349	146.72	147.72	144.09	150.64
295.416	146.50	147.50	144.25	150.80
295.537	146.20	147.20	144.53	151.09
295.634	146.80	147.80	144.76	151.32
295.691	146.52	147.52	144.89	151.46
295.732	146.00	147.00	144.98	151.56
295.830	145.90	146.90	145.21	151.79
295.884	145.39	146.39	145.34	151.92
295.930	145.40	146.40	145.44	152.03
296.029	146.20	147.20	145.67	152.27
296.148	147.00	148.00	145.95	152.56
296.248	147.60	148.60	146.18	152.80
296.320	147.20	148.20	146.35	152.97
296.417	148.00	149.00	146.58	153.20
296.478	148.77	149.77	146.72	153.35
296.538	148.20	149.20	146.86	153.49
296.634	147.50	148.50	147.08	153.72

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
296.738	145.20	146.20	147.32	153.97
296.797	146.51	147.51	147.46	154.12
296.856	147.00	148.20	147.60	154.26
296.956	147.20	148.50	147.83	154.50
297.085	147.50	148.90	148.13	154.81
297.200	147.90	149.40	148.40	155.08
297.307	148.50	150.10	148.65	155.34
297.415	149.60	151.30	148.90	155.60
297.520	149.50	151.30	149.14	155.85
297.630	150.60	152.50	149.40	156.11
297.713	150.90	153.10	149.59	156.31
297.813	151.60	154.20	149.82	156.55
297.866	152.60	155.50	149.95	156.68
297.922	152.70	155.70	150.08	156.82
297.965	153.00	155.90	150.18	156.92
298.065	153.20	156.00	150.41	157.16
298.165	153.90	156.40	150.64	157.40
298.261	153.40	155.90	150.87	157.63
298.361	154.20	156.60	151.10	157.87
298.461	154.30	156.60	151.33	158.11
298.561	154.10	156.20	151.56	158.35
298.619	154.50	156.50	151.70	158.49
298.654	154.90	156.90	151.78	158.57
298.744	154.80	156.80	151.99	158.79
298.844	155.20	157.20	152.22	159.03
298.898	155.79	157.79	152.35	159.16
298.945	155.20	157.50	152.46	159.27
299.058	155.30	157.70	152.72	159.54
299.156	155.40	157.90	152.95	159.78
299.279	155.20	158.00	153.23	160.07
299.342	155.43	158.43	153.38	160.22
299.392	155.20	158.20	153.50	160.34
299.503	154.30	157.30	153.75	160.61
299.597	154.50	157.50	153.97	160.84
299.711	154.36	157.36	154.24	161.11
299.818	154.60	157.60	154.49	161.37
299.876	154.59	157.59	154.62	161.50
299.943	154.90	157.80	154.78	161.67
300.038	155.30	157.80	155.00	161.89
300.143	156.30	158.50	155.24	162.15
300.222	157.30	159.40	155.43	162.34

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
300.313	157.80	159.70	155.64	162.55
300.417	159.00	160.50	155.88	162.80
300.469	160.21	161.21	156.00	162.93
300.469	160.21	161.21	157.50	164.00
300.514	159.80	160.80	157.51	164.03
300.625	158.30	159.30	157.53	164.10
300.708	158.40	159.40	157.55	164.16
300.800	157.50	158.50	157.57	164.22
300.858	157.34	158.34	157.58	164.25
300.885	157.20	158.20	157.58	164.27
301.000	157.10	158.10	157.61	164.35
301.061	157.30	158.30	157.62	164.39
301.104	157.32	158.32	157.63	164.41
301.147	156.20	157.20	157.64	164.44
301.217	156.40	157.40	157.65	164.49
301.332	155.80	156.80	157.67	164.56
301.443	155.20	156.20	157.70	164.64
301.527	154.00	155.00	157.71	164.69
301.616	154.90	155.90	157.73	164.75
301.736	154.90	155.90	157.76	164.83
301.858	154.60	155.60	157.78	164.91
301.885	153.80	154.80	157.79	164.92
302.018	153.09	154.09	157.81	165.01
302.144	154.20	155.20	157.84	165.02
302.286	155.60	156.60	157.87	165.02
302.417	157.00	158.00	157.89	165.03
302.548	158.50	159.50	157.92	165.04
302.603	160.62	161.62	157.93	165.04
302.646	159.50	160.50	157.94	165.04
302.741	158.20	159.20	157.96	165.05
302.842	157.93	158.93	157.98	165.05
302.925	157.30	158.30	157.99	165.06
303.019	157.90	158.90	158.01	165.06
303.123	158.50	159.50	158.03	165.07
303.180	158.70	159.70	158.05	165.07
303.226	157.20	158.20	158.06	165.07
303.333	156.40	157.40	158.08	165.08
303.406	155.90	156.90	158.09	165.08
303.514	154.50	155.50	158.11	165.08
303.615	153.40	154.40	158.13	165.09
303.709	153.20	154.20	158.15	165.09

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
303.803	152.20	153.20	158.17	165.10
303.899	151.30	152.30	158.19	165.10
303.933	151.07	152.07	158.20	165.11
303.995	152.30	153.30	158.21	165.11
304.084	152.80	153.80	158.23	165.11
304.174	152.60	153.60	158.25	165.12
304.263	153.40	154.40	158.26	165.12
304.353	153.90	154.90	158.28	165.13
304.442	154.00	155.00	158.30	165.13
304.531	154.60	155.60	158.32	165.14
304.627	154.80	155.80	158.34	165.14
304.723	155.00	156.00	158.36	165.15
304.816	155.60	156.60	158.38	165.15
304.855	155.95	156.95	158.38	165.15
304.888	155.46	156.46	158.39	165.15
304.970	156.20	157.20	158.41	165.16
305.055	156.10	157.10	158.42	165.16
305.144	156.40	157.40	158.44	165.17
305.242	156.30	157.30	158.46	165.17
305.340	156.00	157.00	158.48	165.18
305.424	155.90	156.90	158.50	165.18
305.524	155.50	156.50	158.52	165.19
305.624	155.20	156.20	158.54	165.19
305.724	156.20	157.20	158.56	165.20
305.761	156.08	157.08	158.57	165.20
305.820	156.20	157.20	158.58	165.20
305.920	156.30	157.30	158.60	165.21
306.019	156.40	157.40	158.62	165.21
306.119	156.30	157.30	158.64	165.22
306.225	157.00	158.00	158.66	165.22
306.254	157.09	158.29	158.67	165.22
306.325	158.20	159.50	158.68	165.23
306.425	158.80	160.20	158.70	165.23
306.525	159.20	160.70	158.72	165.24
306.568	159.18	160.68	158.73	165.24
306.624	159.10	160.60	158.74	165.24
306.723	158.80	160.30	158.76	165.25
306.826	158.40	159.90	158.78	165.25
306.926	158.60	160.10	158.80	165.26
307.029	158.10	159.60	158.82	165.26
307.126	158.50	160.00	158.84	165.27

Chainage (km)	River Bed Level w.r.t MSL (m)	Observed Water Level (m) w.r.t. MSL	Adopted C.D. (m) w.r.t. M.S.L.	H.F.L. (m) w.r.t. M.S.L.
307.156	158.68	160.18	158.85	165.27
307.219	157.20	158.60	158.86	165.27
307.261	156.88	158.38	158.87	165.27
307.319	156.40	157.90	158.88	165.28
307.425	157.20	158.70	158.90	165.28
307.525	156.80	158.30	158.92	165.29
307.624	156.30	157.80	158.94	165.29
307.649	157.04	158.54	158.95	165.29
307.730	157.20	158.70	158.96	165.30
307.829	157.90	159.40	158.98	165.30
307.921	157.33	158.83	159.00	165.31
307.928	158.20	159.70	159.00	165.31
308.028	158.60	160.10	159.02	165.31
308.130	158.40	159.90	159.04	165.32
308.230	158.60	160.10	159.06	165.32
308.330	159.10	160.60	159.08	165.33
308.358	159.52	161.02	159.09	165.33
308.425	159.20	160.70	159.10	165.33
308.524	159.10	160.60	159.12	165.34
308.624	159.00	160.50	159.14	165.34
308.724	158.40	159.90	159.16	165.35
308.817	158.60	160.10	159.18	165.35
308.851	158.49	159.99	159.19	165.35
308.901	158.00	159.60	159.20	165.35
309.000	157.40	159.10	159.22	165.36
309.000	157.40	159.10	159.22	165.36
309.064	157.20	159.00	159.23	165.36
309.148	156.80	158.70	159.25	165.37
309.236	156.70	158.70	159.27	165.37
309.299	156.24	158.24	159.28	165.37
309.347	157.20	159.20	159.29	165.38
309.404	158.60	160.60	159.30	165.38
309.448	158.00	160.00	159.31	165.38
309.477	164.69	166.69	159.31	165.38
309.506	158.40	160.40	159.32	165.38
309.532	158.20	160.20	159.33	165.39
309.609	158.35	160.35	159.34	165.39
309.686	158.29	160.29	159.36	165.39
309.762	158.27	160.27	159.37	165.40
309.839	158.30	160.30	159.39	165.40

Annexure 5: Source data of Figure 26: Riverbed profile from the Estuary (CH-16) up to (CH-310)