



INUNDATED AREA MAPS OF THE GAL OYA BASIN

FLOOD IN FEBRUARY 2011



HYDROLOGY AND DISASTER MANAGEMENT DIVISION
IRRIGATION DEPARTMENT
SRI LANKA

MARCH 2021

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Contribution to the Publication	
Guidance:	
Late Eng.(Mrs) R.M.M.R. Alawathugoda	Former Director of Irrigation (Hydrology)
Eng.S.P.C. Sugeeshwara	Director of Irrigation (Hydrology & Disaster Management)
Supervised & Scrutinized by:	
Eng. K.P.U.K. Tilakaratna	Chief Engineer (Hydrology & Disaster Management)
Eng. J.D. Amarasekara	Former Chief Engineer (Hydrology)
Inundated Area Surveyed by:	
Amarasiri Ketipearachchi	Hydrological Data Superintendent
W.H.J. Abeywickrama	Senior Hydrological Assistant
G.A.S.A. Jayamal	Hydrological Assistant
K.K.C.U. Dilshan	Hydrological Assistant (Trainee)
Compiled by:	
Amarasiri Ketipearachchi	Hydrological Data Superintendent
Multiple Supports by:	
All Engineers & the staff of the Hydrology Division	
Remarks:	
The inundated areas were marked according to the field observations taken with the Global Positioning System (GPS) instruments after the flood event (in August 2019).	

Inundation Maps of Gal Oya Flood in February 2011

1. Introduction

Gal Oya is a medium size river, bears the Number 44, in the River Basin Atlas of Sri Lanka. It rises in Madolsima hills at an elevation of 5000 ft. above mean sea level and flows in an easterly direction to the Bay of Bengal in a length of 70 miles. It is situated in between the Mundeni Aru and Maduru Oya to the north, and Kumbukkan Oya and Heda Oya to the south. The catchment area of the river is 1813 square kilometers, which is situated entirely in the Dry Zone of the country. The average annual rainfall of the catchment is around 1594 milimeters and the average discharge to the sea has been estimated as 86.20 MCM per annum (Ref. of Annual Rainfall and Surface Runoff (1974)). The river discharges into the sea at Oluvil. And Gal Oya crosses the Siyambalanduwa - Ampara Road near Ampara. There are three main tributaries called Hamannawe Oya, Pammedilla Oya, and Dahamala Oya. The Senanayake Samudraya which is the largest Irrigation Reservoir is constructed at the confluence of Pansal Oya, Sellakka Oya and Gal Oya at Inginiyagala.

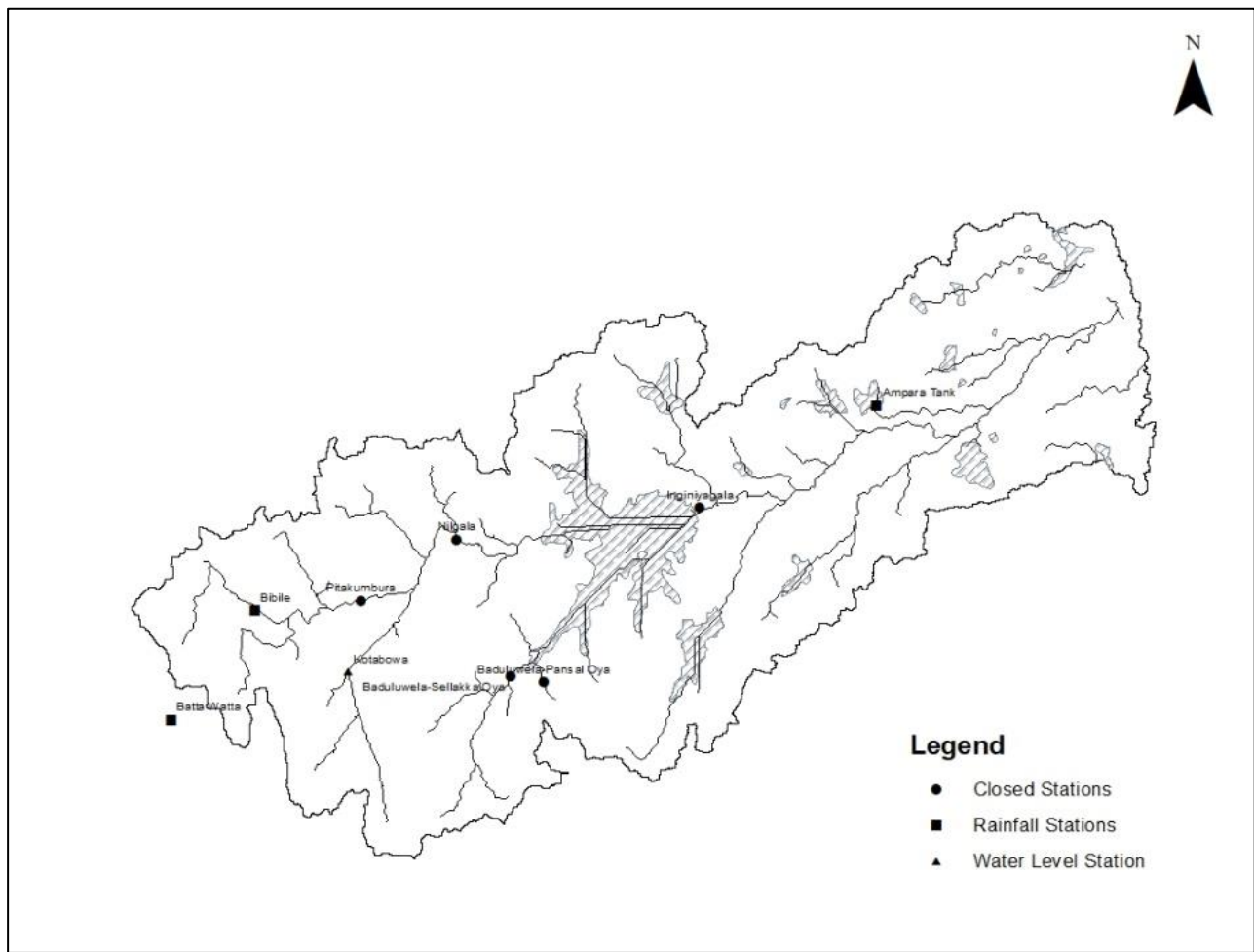


Figure I. The Gal Oya Basin with the Locations of Hydro-Meteorological Station

2. Hydrometric Stations in Gal Oya basin.

River gauging history of the Gal Oya goes back to October 1937 when Inginiyagala Hydrometric station was established. However the station had been closed from November 1949 with the start of the construction work of Senanayaka Samudraya. Two Gauging Stations at Pansal Oya and Sellaka Oya at Baduluwela and Nilgala Gauging Station at Gal Oya are functioned only for a short period, from February 1983 to March 1984.

Pitakumbura River Gauging station has also been functioned only for 1984/85 water year. There are three rainfall stations in the catchment at Bibile, Ampara Tank and Battawatta maintained by the Irrigation Department and other organizations. Kotabowa hydrometric station was established in January 2015. The station collects water level twice a day. Four Water Level Stations have been installed in Gal Oya basin as Gal Oya (LB 01), Gal Oya (LB 02), Gal Oya(RB 01), and Senanayake Samudraya under HMIS done by DSWRP. In addition 3 rainfall stations have also been eastablished under HMIS, in Bibile. Now there are facilities to collect rainfalls and water levels automatically and transmit to the Hydrology Division with automated communication facilities through satellite (or GPRS). The Ceylon Electricity Board is maintaining a Power Plant in Senanayake Samudraya and they also collect Daily Rainfall data.

Layout of these stations is shown in Figure 1. The recorded highest flood levels at Kotabowa hydrometric stations is given in Table 1.

Table 1. Recorded highest flood levels at Kotabowa hydrometric Stations.

Station Name	Location/Station Type	Period of records available	Highest W.L recorded (m)	Date of Highest Flood
Kotabowa	(257148, 210374)	January 2015 – to date	5.80	20/11/2019

Gal Oya basin is not flooding frequently due to the high capacity of Senanayake Samudraya Reservoir. However, there are instances that downstream low line areas are undergone with floods in the past history.

3. The Flood in February 2011

3.1 Extreme Rainfalls Caused Flooding

Table 2. Extreme Daily Rainfalls caused floods in February 2011

Station	Date																Total	
	25/01/2011	26/01/2011	27/01/2011	28/01/2011	29/01/2011	30/01/2011	31/01/2011	1/2/2011	2/2/2011	3/2/2011	4/2/2011	5/2/2011	6/2/2011	7/2/2011	8/2/2011	9/2/2011		10/2/2011
Ampara	69	17	30	37	28	4	0	217	104	33	52	10	30	11	24	0	0	665
Battawatta	16	63	26	54	47	20	19	193	168	48	37	80	64	54	15	6	9	919
Bibile	27	59	32	40	74	27	23	178	88	24	19	19	55	44	5	7	6	725

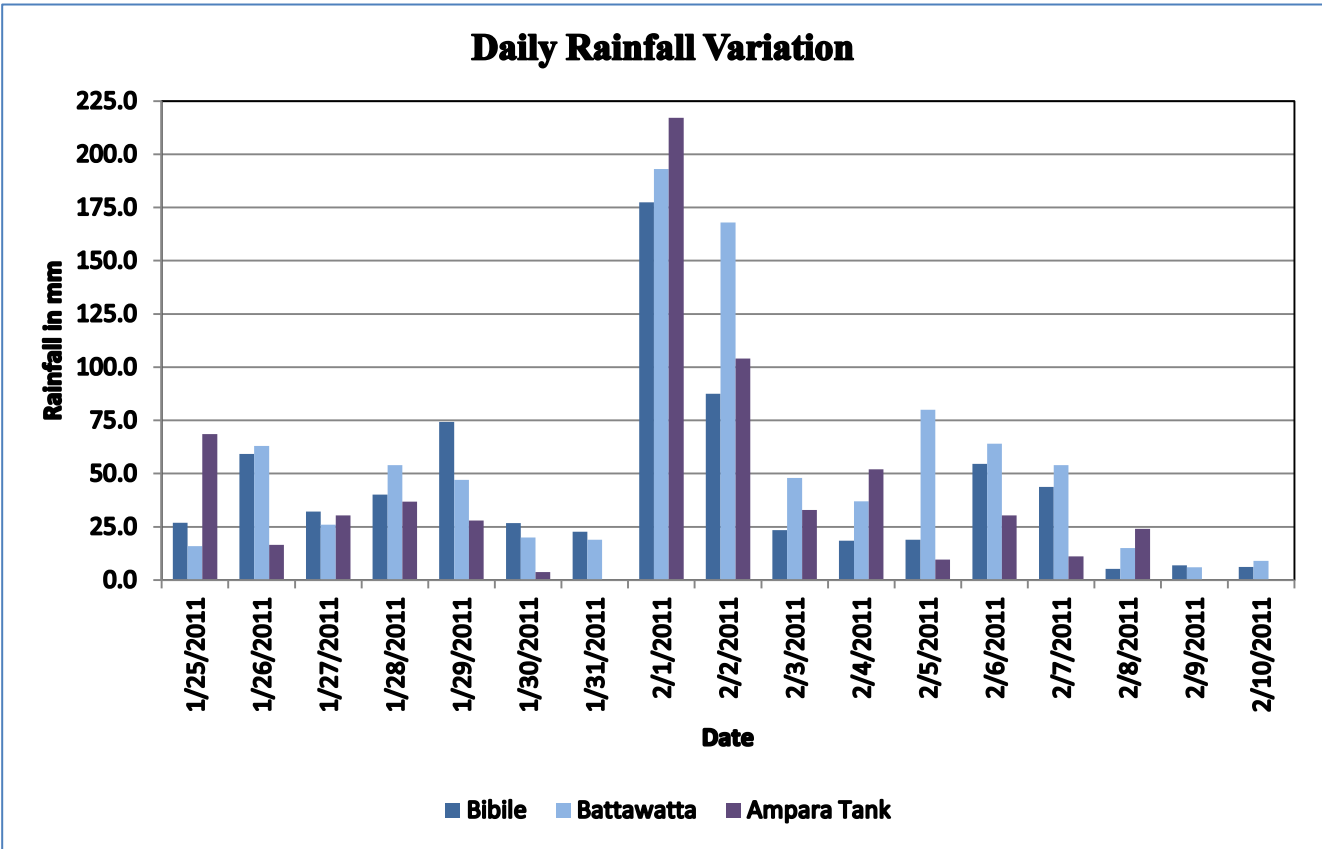


Figure 2. Extreme Daily Rainfalls caused floods in February 2011

Extreme rainfalls that caused floods in February 2011 are presented in Table 3 and figure 1. Some of these Rainfall stations are maintained by the Hydrology Division (HD) of Irrigation Department while some others are maintained by other organizations. In these stations there are daily records only.

As per above details, the catchment has recorded extremely high rainfalls on 1st and 2nd February and moderate rainfalls on 3rd and 4th February. After these days there was no any significant rainfall in Bibile and Ampara Tank, but Battawatta rainfall station recorded a significant rainfall. The station in Ampara Tank recoded the highest Daily rainfall of 217.0mm, however the highest total for entire event has been recorded in Battawatta rainfall station.

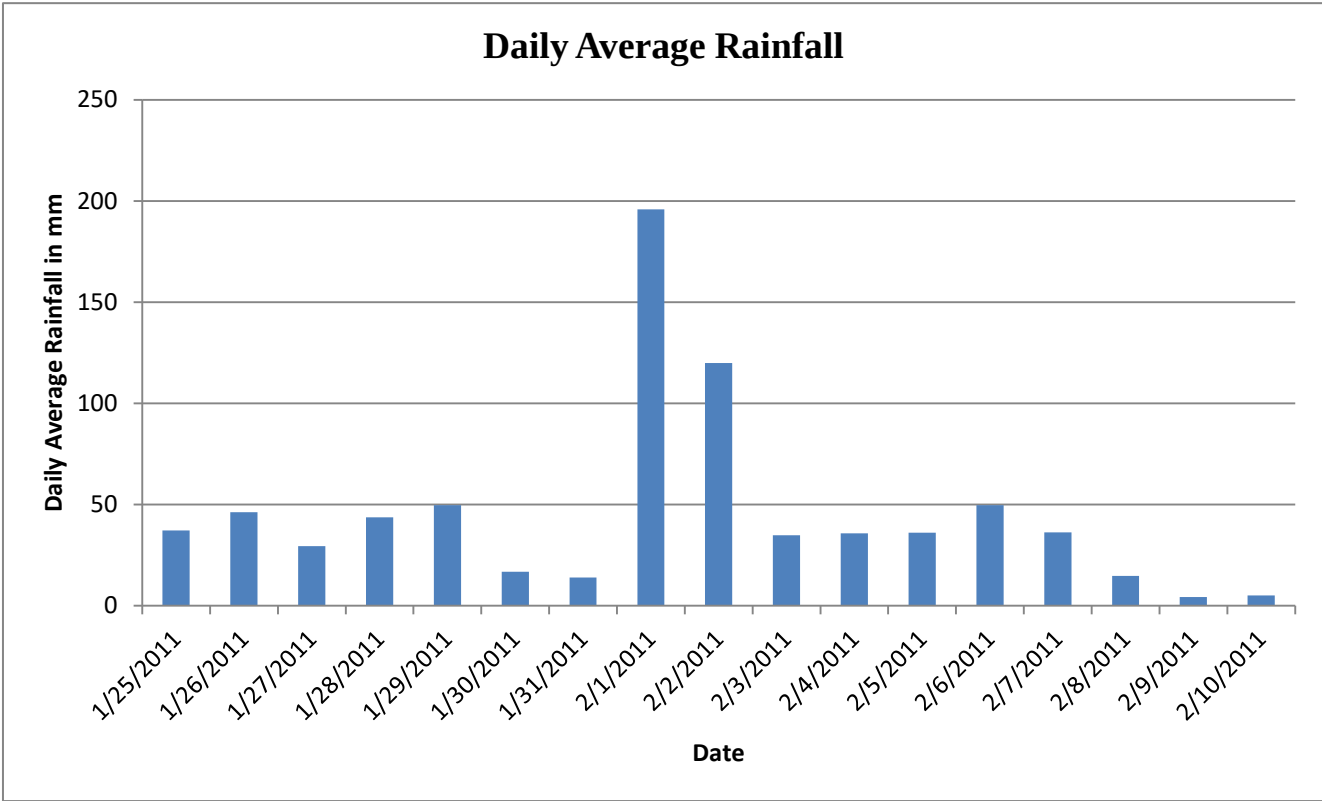


Figure 3. Average Daily Rainfall for the entire basin at the flood event of February 2011

This average daily rainfall chart confirm that highest rainfall recoded in 1st of February and then gradually decreased.

4. Areas Inundated and Damages Experienced

Flood in 2011 was the largest recorded flood in the Gal Oya basin in the recent history. The total flood plain was inundated including residential areas. Agricultural losses were most critical among the flood

damages. No deaths were reported due to drowning or collapse of buildings.

4.1 Divisional Secretary Areas Affected

Low line areas of Addalachchenai, Damana, Akkaraipattu, Ampara, and Eragama Divisional Secretary divisions were mainly affected by the flood. Some areas of Nintlavur, Samanthurai and Madulla DS divisions were too affected.

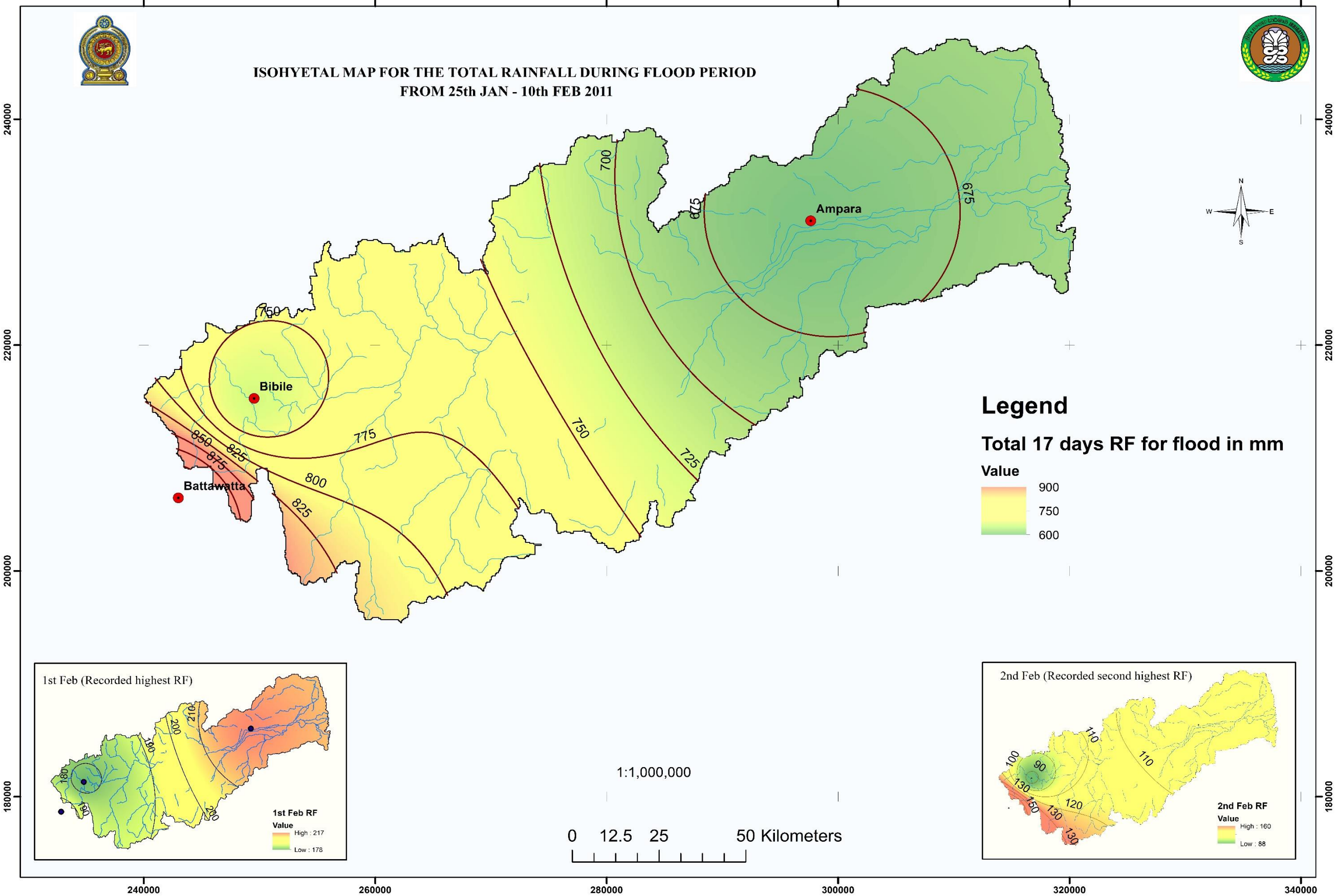
5. Flood Mapping

Flood inundation survey was carried out by a group of Hydrological Assistants attached to Hydrology Division. Boundaries of the inundated areas were observed with GPS (Global Positioning System) instruments based on the flood marks and the information provided by the residents of the area. GPS coordinates taken along the boundary of inundated area were overlaid with and digitized maps of 1:50000 using the ArcGIS software to develop the flood maps. These maps are provided in hard and soft copies at different scales, in order to facilitate various parties carrying out flood relief activities and rescue operations. Accuracy of these maps may not be sufficient for more precise works but can be used as an initial guide for such activities. The residents in the flood prone areas can use these maps to have some idea whether their houses and properties are in danger in future cases of flooding and take necessary precautions for securing themselves. However it should be mentioned that the behavior of one flood may differ from another due to spatial distribution of rainfalls and also with the other climatic factors and catchment characteristics.

Eng. S.P.C.Sugeeshawara

Director of Irrigation (Hydrology and Disaster Management)

SPATIAL AND TEMPORAL VARIATION OF RAINFALL OVER FLOOD PERIOD

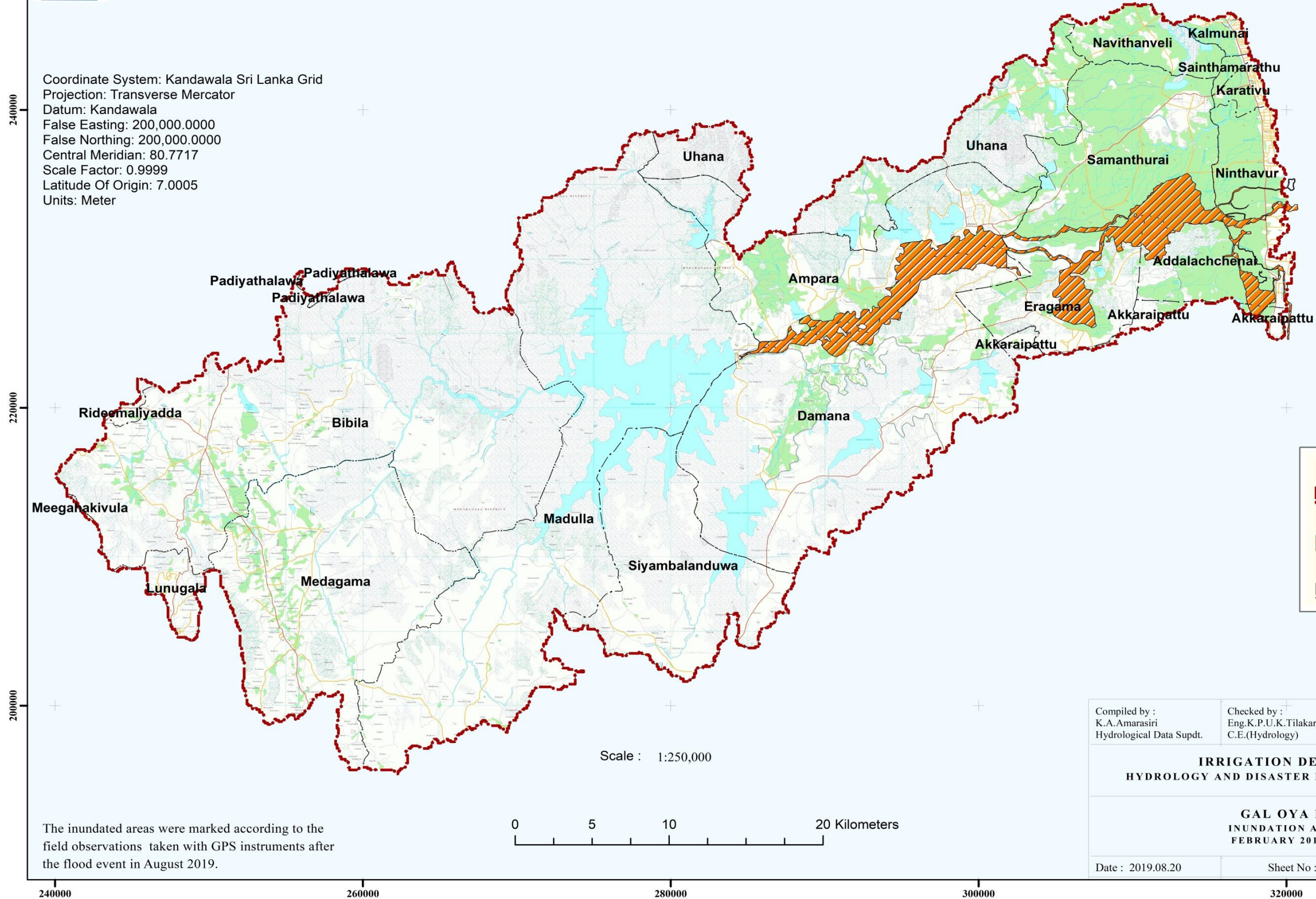
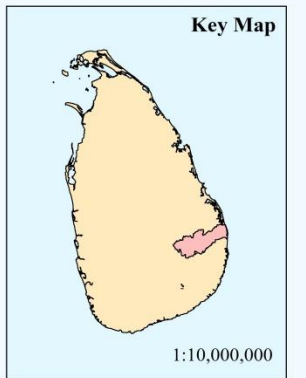


INUNDATION AREA MAP - GAL OYA BASIN IN FEBRUARY 2011 FLOOD

ID FLOOD MAP



Coordinate System: Kandawala Sri Lanka Grid
Projection: Transverse Mercator
Datum: Kandawala
False Easting: 200,000.0000
False Northing: 200,000.0000
Central Meridian: 80.7717
Scale Factor: 0.9999
Latitude Of Origin: 7.0005
Units: Meter



LEGEND

- Gal Oya Basin
- Inundated Area
- DSD Boundaries

Compiled by : K.A.Amarasiri Hydrological Data Supdt.	Checked by : Eng.K.P.U.K.Tilakaratne C.E.(Hydrology)	Approved by : Eng. R.M.M.R.Alawathugoda D.I.(Hydrology)
IRRIGATION DEPARTMENT HYDROLOGY AND DISASTER MANAGEMENT DIVISION		
GAL OYA BASIN INUNDATION AREA MAP FEBRUARY 2011 FLOOD		
Date : 2019.08.20	Sheet No :	Map no : IDFM/RB/44/2011

The inundated areas were marked according to the field observations taken with GPS instruments after the flood event in August 2019.

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Table 01**INUNDATED AREAS IN GAL OYA BASIN - MAY 2017**

District	DS Division	Area Sq.Km.	Inundated area Sq.Km.	Percentage %
Ampara	Ninthavur	36.30	1.76	4.85
Ampara	Ampara	139.27	16.63	11.94
Ampara	Madulla	722.52	0.28	0.04
Ampara	Damana	444.14	15.60	3.51
Ampara	Eragama	66.65	12.38	18.58
Ampara	Addalachchenai	56.96	9.44	16.57
Ampara	Akkaraipattu	60.41	0.81	1.35
Ampara	Samanthurai	123.01	18.64	15.16
Total		1649.26	75.55	4.58

INUNDATION AREA MAP - NINTHAUR DS DIVISION IN FEBRUARY 2011 FLOOD

ID FLOOD MAP

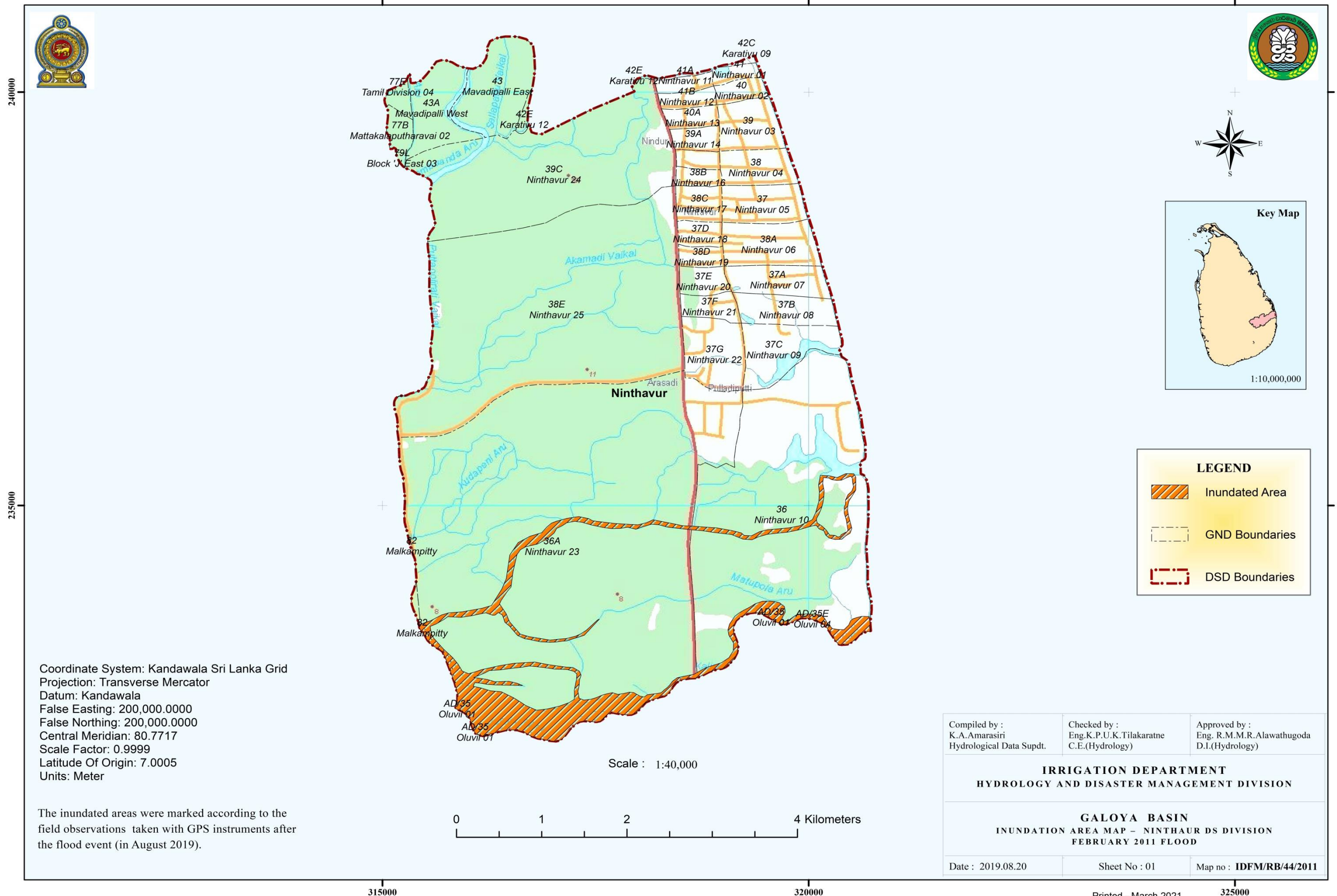


Table 02

Inundated Areas in Ninthaur Divisional Secretariat Division in February 2011 flood						
Eastern Province						
Ampara District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
AMPARA	NINTHAVUR	36A	Ninthavur 23	13.09	0.00000133	1.016E-05
AMPARA	NINTHAVUR	36	Ninthavur 10	5.87	0.00000046	7.900E-06

INUNDATION AREA MAP - SAMANTHURAI DS DIVISION IN FEBRUARY 2011 FLOOD

ID FLOOD MAP

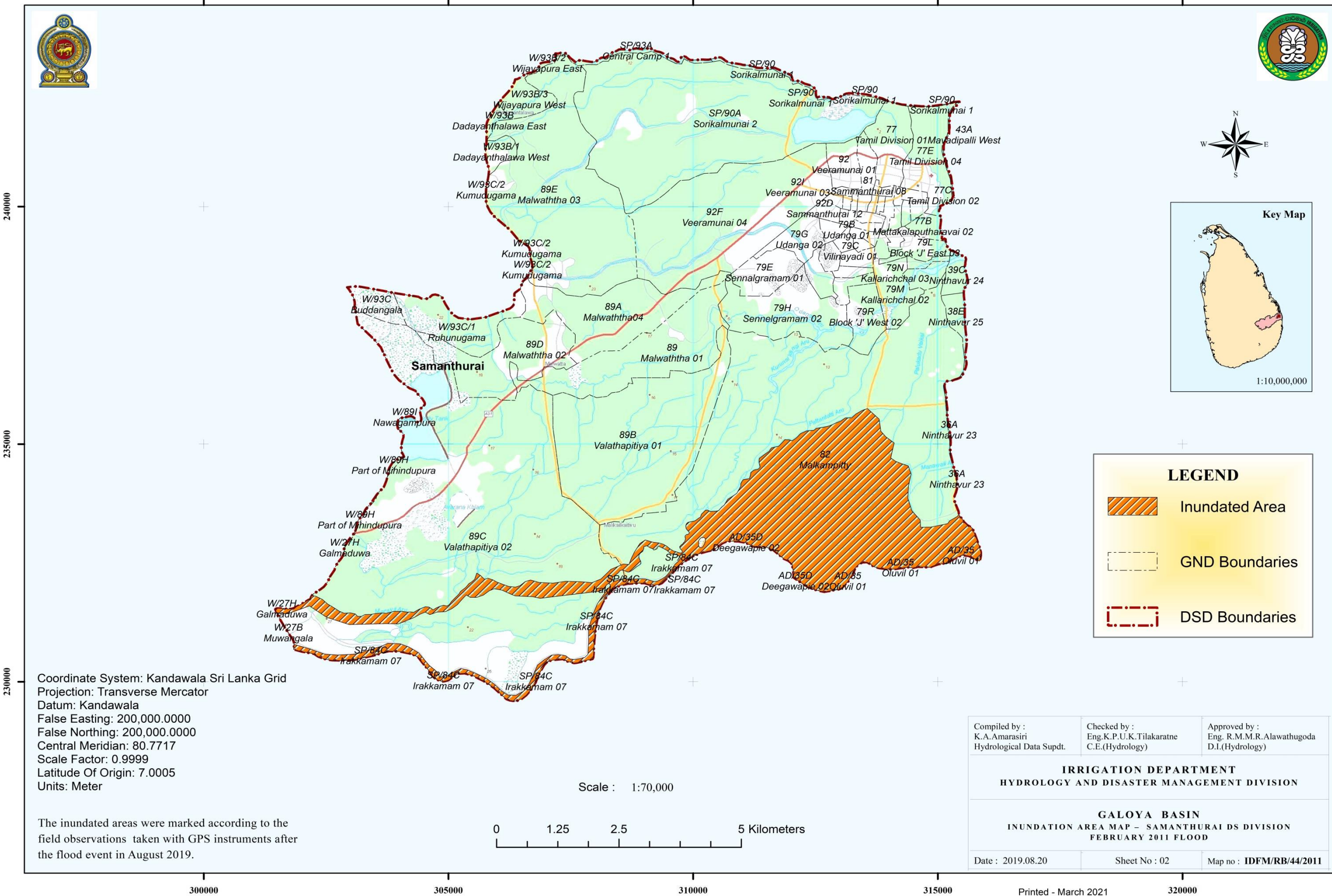


Table 03

Inundated Areas in Samanthurai Divisional Secretariat Division in February 2011 flood						
Eastern Province						
Ampara District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
AMPARA	SAMANTHURAI	89C	Valathapitiya 02	29.12	2.36E-06	0.0000081
AMPARA	SAMANTHURAI	82	Malkampitty	27.84	1.20E-05	0.0000429

INUNDATION AREA MAP - AMPARA DS DIVISION IN FEBRUARY 2011 FLOOD

ID FLOOD MAP

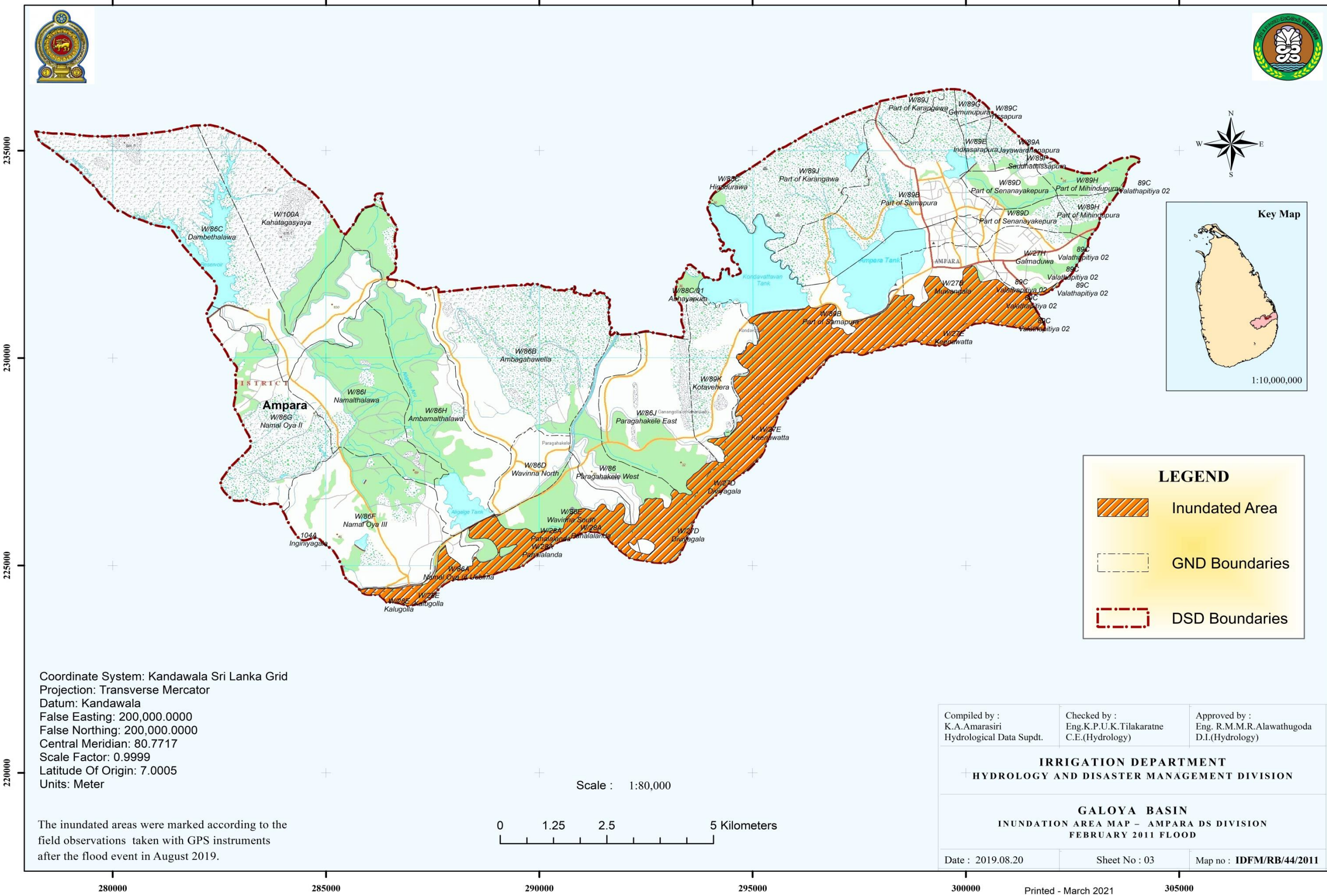


Table 04

Inundated Areas in Ampara Divisional Secretariat Division in February 2011 flood						
Eastern Province						
Ampara District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
AMPARA	AMPARA	W/86A	Namal Oya (i) Usbima	1.50	0.0000010	0.0000675
AMPARA	AMPARA	W/86E	Wavinna South	5.35	0.0000027	0.0000495
AMPARA	AMPARA	W/86F	Namal Oya III	8.78	0.0000001	0.0000010
AMPARA	AMPARA	W/86D	Wavinna North	2.28	0.0000000	0.0000000
AMPARA	AMPARA	W/86J	Paragahakele East	6.76	0.0000003	0.0000046
AMPARA	AMPARA	W/86	Paragahakele West	5.78	0.0000021	0.0000371
AMPARA	AMPARA	W/89K	Kotavehera	4.12	0.0000001	0.0000031
AMPARA	AMPARA	W/86H	Ambamalthalawa	11.31	0.0000000	0.0000000
AMPARA	AMPARA	W/89B	Part of Samapura	14.24	0.0000068	0.0000475

INUNDATION AREA MAP - MADULLA DS DIVISION IN FEBRUARY 2011 FLOOD

ID FLOOD MAP

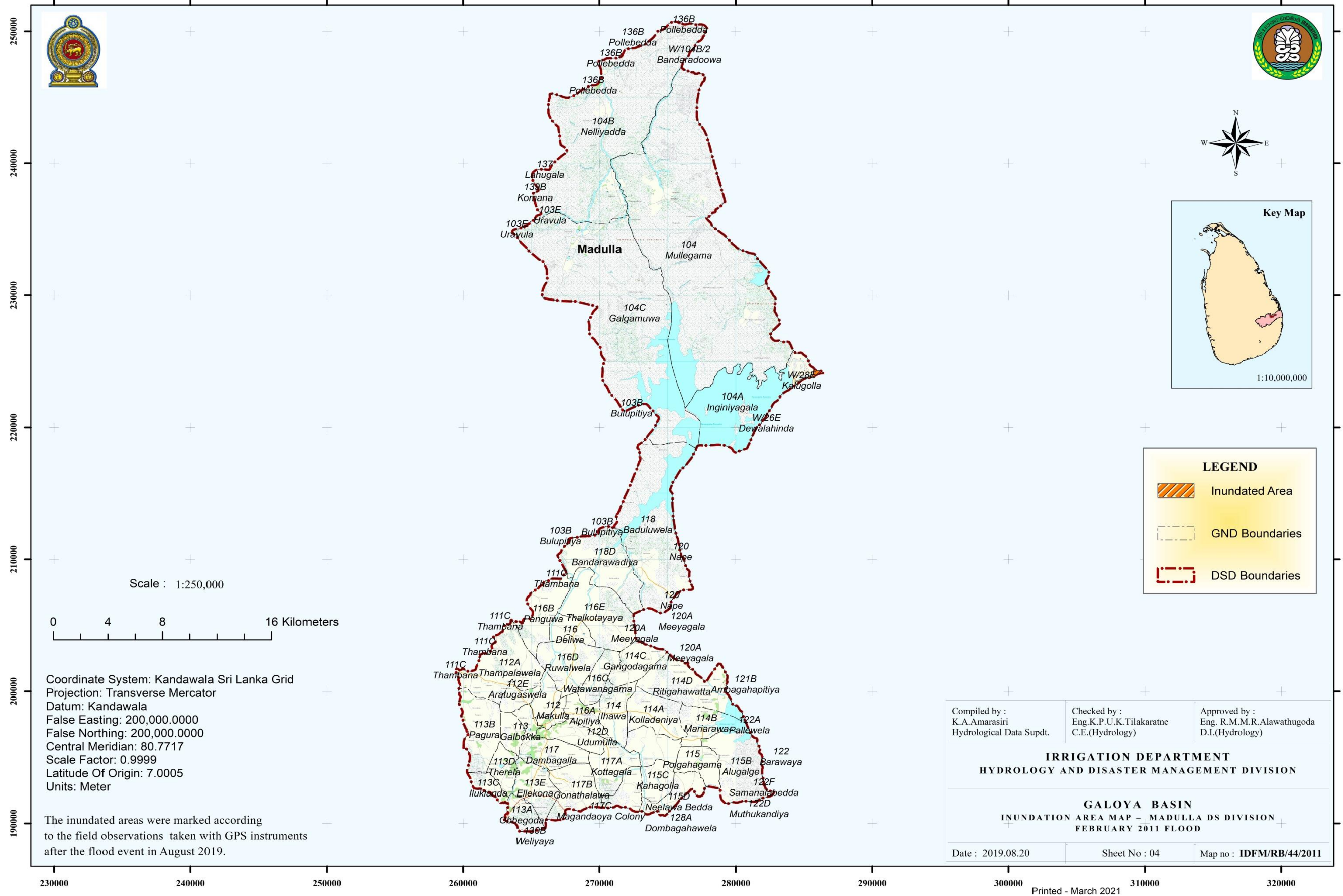


Table 05

Inundated Areas in Madulla Divisional Secretariat Division in February 2011 flood						
Uva Province						
Monaragala District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
MONERAGALA	MADULLA	104A	Inginiyagala	33.43	2.78455E-07	0.0000008

ID FLOOD MAP

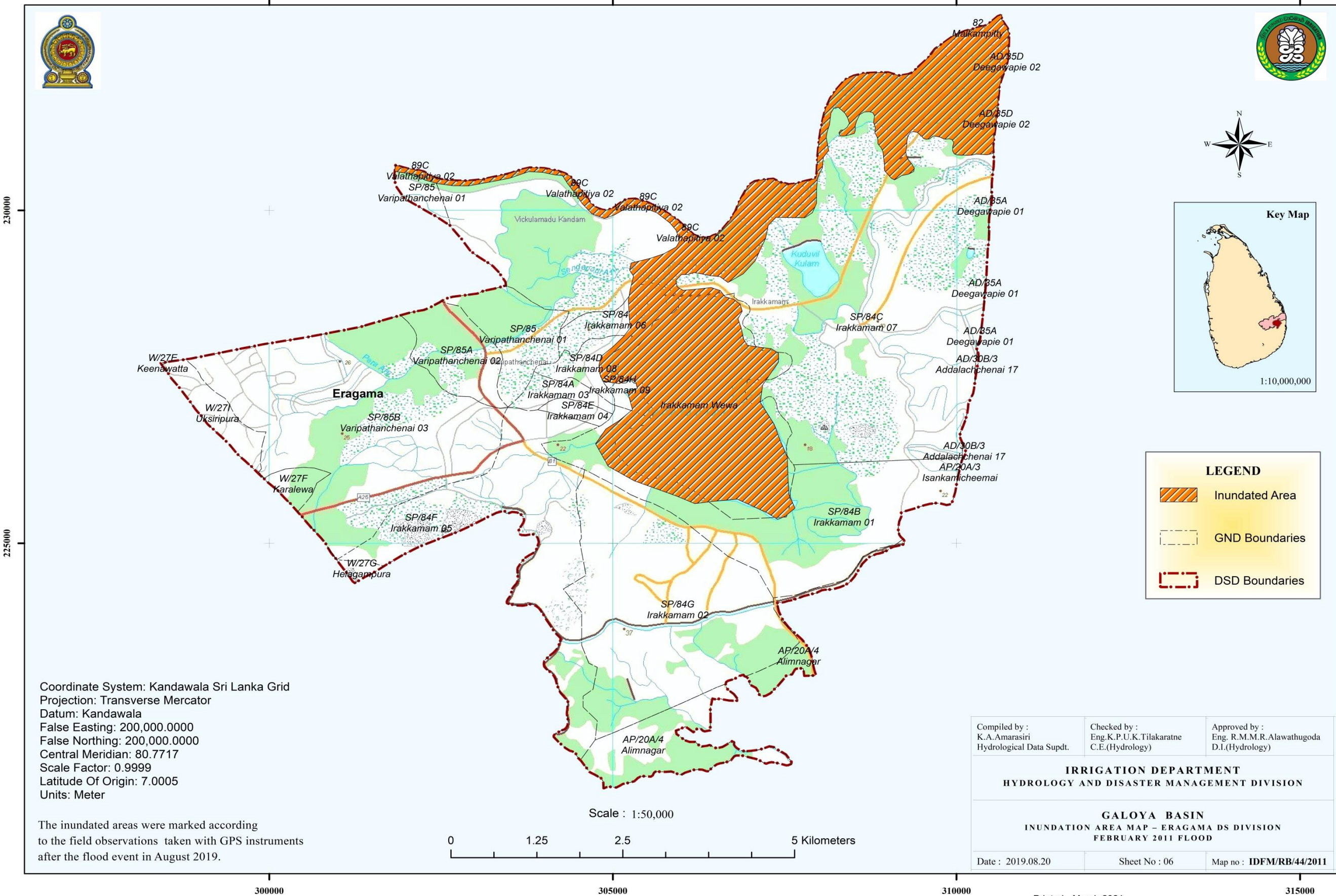


Table 06

Inundated Areas in Damana Divisional Secretariat Division in February 2011 flood						
Eastern Province						
Ampara District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
AMPARA	DAMANA	W/28E	Kalugolla	4.58	7.45E-07	0.0000163
AMPARA	DAMANA	W/28	Padagoda	2.81	7.11E-07	0.0000253
AMPARA	DAMANA	W/28A	Pahalalanda	6.57	4.14E-06	0.0000630
AMPARA	DAMANA	W/27D	Diviyagala	8.49	1.91E-06	0.0000225
AMPARA	DAMANA	W/27B	Muwangala	4.97	3.04E-06	0.0000612
AMPARA	DAMANA	W/27H	Galmaduwa	2.84	5.16E-08	0.0000018
AMPARA	DAMANA	W/27E	Keenawatta	17.61	8.37E-06	0.0000475

INUNDATION AREA MAP - ERAGAMA DS DIVISION IN FEBRUARY 2011 FLOOD

ID FLOOD MAP



Coordinate System: Kandawala Sri Lanka Grid
Projection: Transverse Mercator
Datum: Kandawala
False Easting: 200,000.0000
False Northing: 200,000.0000
Central Meridian: 80.7717
Scale Factor: 0.9999
Latitude Of Origin: 7.0005
Units: Meter

The inundated areas were marked according to the field observations taken with GPS instruments after the flood event in August 2019.

Scale : 1:50,000

0 1.25 2.5 5 Kilometers

Compiled by : K.A.Amarasiri Hydrological Data Supdt.	Checked by : Eng.K.P.U.K.Tilakaratne C.E.(Hydrology)	Approved by : Eng. R.M.M.R.Alawathugoda D.I.(Hydrology)
IRRIGATION DEPARTMENT HYDROLOGY AND DISASTER MANAGEMENT DIVISION		
GALOYA BASIN INUNDATION AREA MAP - ERAGAMA DS DIVISION FEBRUARY 2011 FLOOD		
Date : 2019.08.20	Sheet No : 06	Map no : IDFM/RB/44/2011

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Table 07

Inundated Areas in Eragama Divisional Secretariat Division in February 2011 flood						
Eastern Province						
Ampara District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
AMPARA	ERAGAMA	SP/84B	Irakkamam 01	5.74	4.94E-07	0.0000086
AMPARA	ERAGAMA	SP/84H	Irakkamam 09	0.05	3.62E-08	0.0000776
AMPARA	ERAGAMA	SP/84D	Irakkamam 08	0.54	4.59E-08	0.0000085
AMPARA	ERAGAMA		Irakkamam Wewa	5.97	5.48E-06	0.0000918
AMPARA	ERAGAMA	SP/84	Irakkamam 06	1.18	6.37E-07	0.0000541
AMPARA	ERAGAMA	SP/85	Varipathanchenai 01	2.83	1.61E-07	0.0000057
AMPARA	ERAGAMA	SP/84C	Irakkamam 07	24.92	5.71E-06	0.0000229

INUNDATION AREA MAP - ADDALACHCHANAI DS DIVISION IN FEBRUARY 2011 FLOOD

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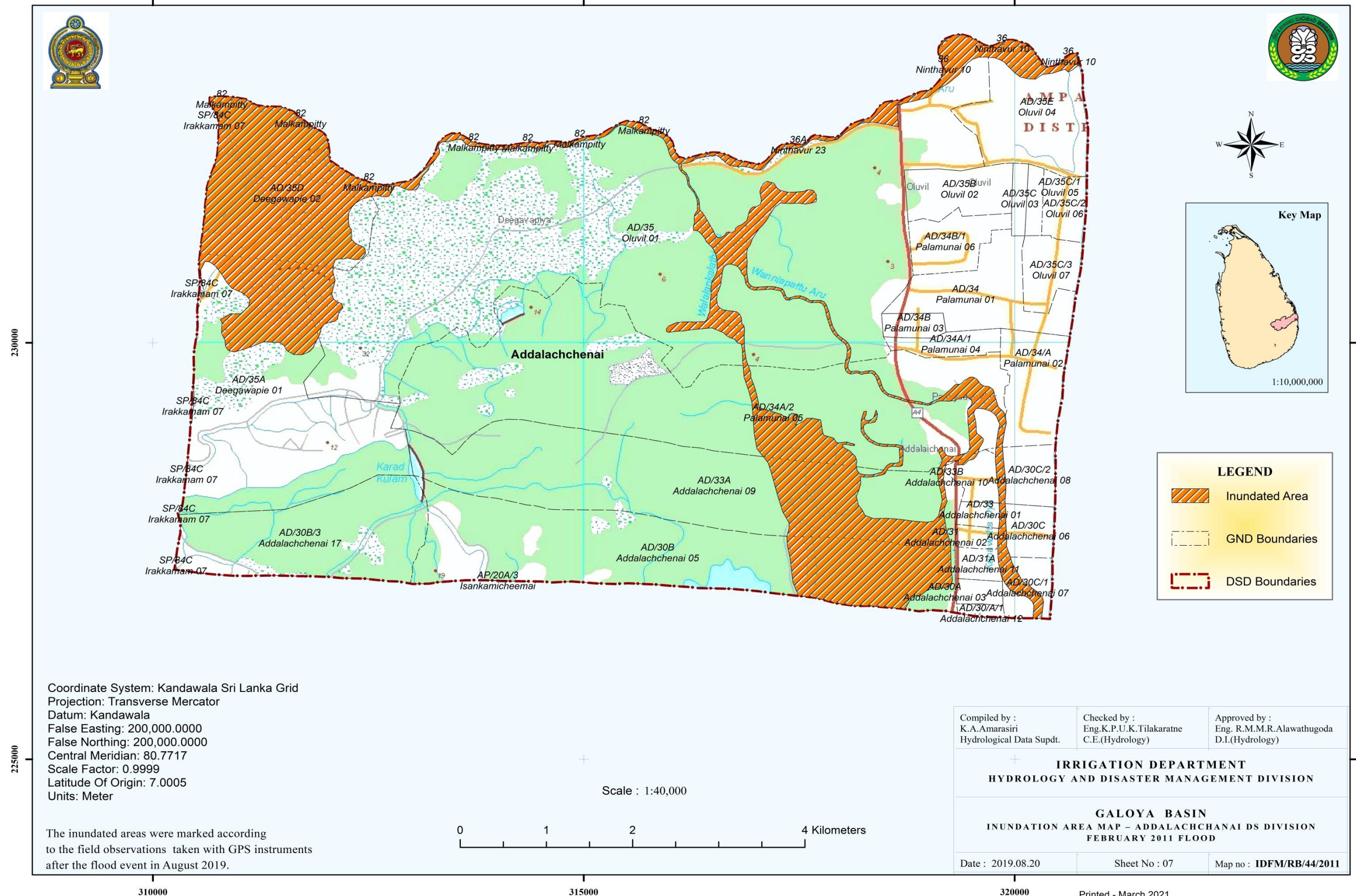


Table 08

Inundated Areas in Addalachchanai Divisional Secretariat Division in February 2011 flood						
Eastern Province						
Ampara District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
AMPARA	ADDALACHCHENAI	AD/30B/2	Addalachchenai 16	0.25	0.00000002	0.0000081
AMPARA	ADDALACHCHENAI	AD/30B/1	Addalachchenai 15	0.20	0.00000001	0.0000065
AMPARA	ADDALACHCHENAI	AD/30C/1	Addalachchenai 07	0.65	0.00000018	0.0000280
AMPARA	ADDALACHCHENAI	AD/31A	Addalachchenai 11	0.21	0.00000001	0.0000057
AMPARA	ADDALACHCHENAI	AD/31	Addalachchenai 02	0.14	0.00000001	0.0000071
AMPARA	ADDALACHCHENAI	AD/30C	Addalachchenai 06	0.39	0.00000004	0.0000100
AMPARA	ADDALACHCHENAI	AD/33	Addalachchenai 01	0.14	0.00000001	0.0000040
AMPARA	ADDALACHCHENAI	AD/30B	Addalachchenai 05	9.12	0.00000186	0.0000204
AMPARA	ADDALACHCHENAI	AD/33B	Addalachchenai 10	0.30	0.00000004	0.0000136
AMPARA	ADDALACHCHENAI	AD/30C/2	Addalachchenai 08	0.48	0.00000003	0.0000073
AMPARA	ADDALACHCHENAI	AD/33A	Addalachchenai 09	5.58	0.00000120	0.0000215
AMPARA	ADDALACHCHENAI	AD/34/A	Palamunai 02	0.97	0.00000001	0.0000015
AMPARA	ADDALACHCHENAI	AD/34A/2	Palamunai 05	8.81	0.00000090	0.0000102
AMPARA	ADDALACHCHENAI	AD/35A	Deegawapie 01	5.26	0.00000101	0.0000192
AMPARA	ADDALACHCHENAI	AD/35D	Deegawapie 02	3.03	0.00000284	0.0000939
AMPARA	ADDALACHCHENAI	AD/35E	Oluvil 04	1.72	0.00000022	0.0000127
AMPARA	ADDALACHCHENAI	AD/35	Oluvil 01	16.95	0.00000157	0.0000093

INUNDATION AREA MAP - AKKARAIPATTU DS DIVISION IN FEBRUARY 2011 FLOOD

ID FLOOD MAP

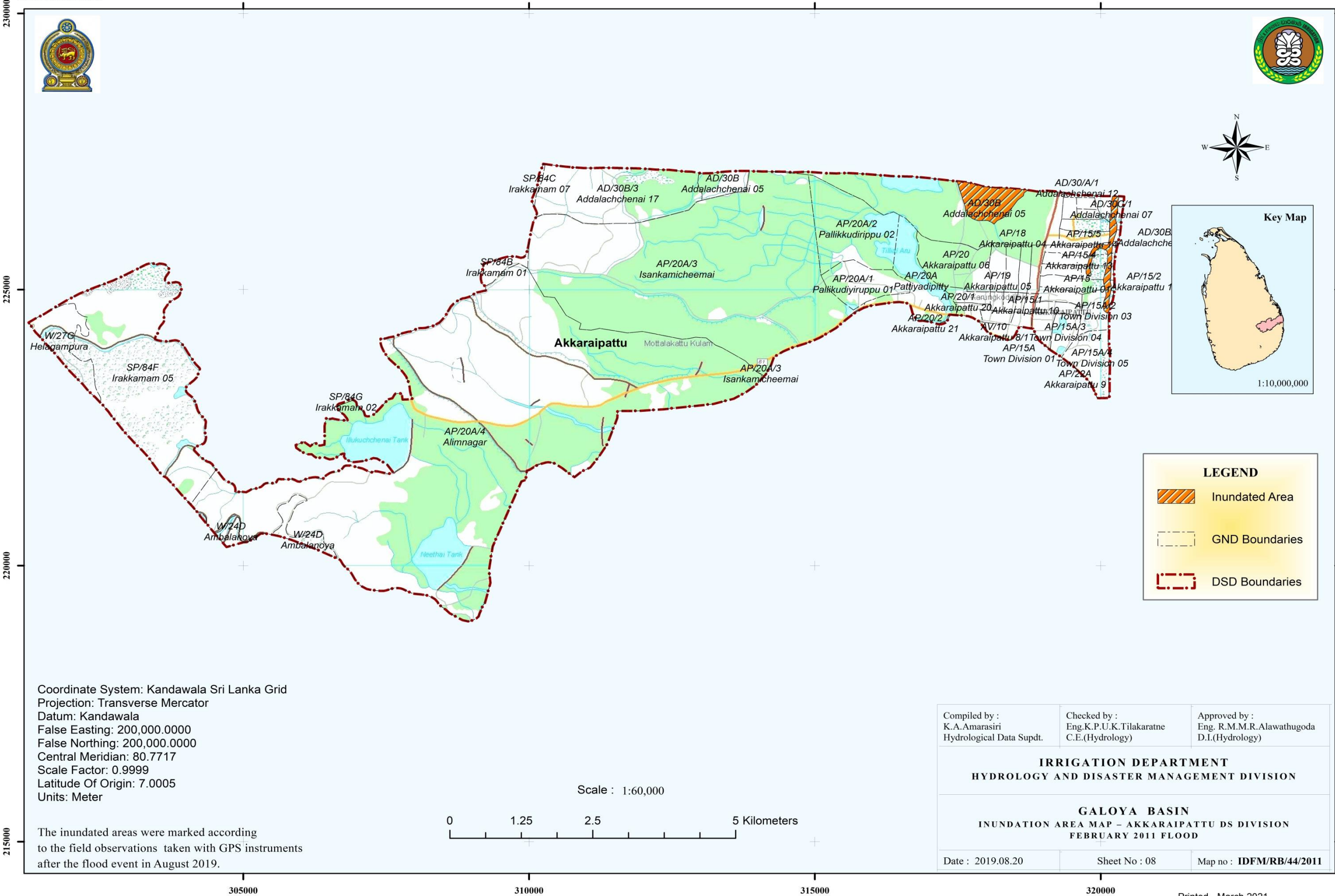


Table 09

Inundated Areas in Akkaraipattu Divisional Secretariat Division in February 2011 flood						
Eastern Province						
Ampara District						
District	DS Division	GN Division NO	GN Division Name	GND Area Sq.Km.	Inundated Area Sq.Km.	Percentage %
AMPARA	AKKARAIPATTU	AP/15A/2	Town Division 03	0.37	3.44E-08	0.0000094
AMPARA	AKKARAIPATTU	AP/15	Akkaraipattu 01	0.30	2.14E-08	0.0000072
AMPARA	AKKARAIPATTU	AP/15/2	Akkaraipattu 11	0.14	4.06E-08	0.0000286
AMPARA	AKKARAIPATTU	AP/15/4	Akkaraipattu 13	0.24	2.59E-08	0.0000107
AMPARA	AKKARAIPATTU	AP/15/5	Akkaraipattu 14	0.22	4.34E-08	0.0000194