Real Time Flood Forecasting and Spatial Decision Support System (RTFF & SDSS) for Chennai Basin and Real Time Data Acquisition System (RTDAS)

by

**Revenue Administration and Disaster Management Department,
Water Resources Department,
Tamil Nadu Urban Infrastructure Financial Services Limited &
The International Bank for Reconstruction and Development**

TNUIFSL
TAMIL NADU URBAN INFRASTRUCTURE FINANCIAL SERVICES LTD

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Consultant	Supervisory Consultant	RTDAS Supplier

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1 Real Time Flood Forecasting and Spatial Decision Support System (RTFF & SDSS) of Chennai Basin (CRTFF)

The Government of Tamil Nadu sanctioned the project "Real Time Flood Forecasting and Spatial Decision Support System for Chennai Basin" in 2018. The project is partly funded by World Bank. The World Bank funding is managed by Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFSL) on behalf of (i) Commissionerate for Revenue Administration (CRA), (ii) Greater Chennai Corporation (GCC) and (iii) Commissionerate of Municipal Administration (CMA).

The Joint Venture of M/s. SECON Private Limited, Bangalore and JBA, UK are the Consultants for the Planning, Setting-up and Commissioning of the Real Time Flood Forecasting and Spatial Decision Support System Project. The Indian Institute of Technology, Madras is the Technical Supervisory Consultants for the project.

2 Real Time Data Acquisition System (RTDAS) of Field Equipments and Control Rooms

The RTDAS of Field Equipments and Control Rooms is implemented by the Superintending Engineer, Ground Water Circle, WRD, Chennai. The project was awarded to M/s. SS Tech Salem Commercials Pvt Ltd – Azista Industries, Ahmedabad JV. The key components of the project are given below.

2.1 Field Equipments

The Real Time Data Acquisition System consists of the following field equipments, which collects the rainfall, weather and water level data and telemetrically transfer the same to the Control Room at Chennai.

1) Network of Automatic Rain Gauges (ARG) and Soil Moisture Sensor (78 Nos.) - to collect rainfall data and Soil Moisture Content

2) Network of Automatic Weather Stations (AWS) (14 Nos.) - to measure weather parameters like Rainfall, Air temperature, Relative Humidity, Wind Speed, Wind Direction, Sun irradiance, Evaporation and Soil Moisture content.

3) Network of Automatic Water Level Recorders (AWLR) (160 Nos. in 145 locations) - to measure the water level in the lakes, tanks and rivers

2.2 Control Rooms

The role of the Control Room is to receive the data sent by the field equipments, process the data with Hydrological Modelling and issue Flood Alerts over a Web-DSS. The following Control Rooms are now established under the project.

(a) Integrated Flood Management Centre (IFMC) at State Emergency Operation Centre (SEOC), Chennai

(b) Nearline Disaster Recovery Centre (NDRC) at Adyar Section office, St Thomas Mount, WRD

(c) Flood Monitoring Centre (FMC) at Tiruvallur.

(d) Flood Monitoring Centre (FMC) at Kancheepuram.

(e) Flood Monitoring Centre (FMC) at Chengalpattu.

(f) Flood Monitoring Centre (FMC) at Ranipet.

(g) Feed to the Integrated Command Control Centre (ICCC), Greater Chennai Corporation (GCC), Chennai.

3   CRTFF - RTDAS Functioning

1) The Field equipments like ARG, AWS and AWLR are installed in the sites.

2) The data like rainfall, weather parameters, water level in rivers/ tanks are measured by the sensors and stored in the Data Loggers. The data is also uploaded telemetrically through the modem to the TNSDC Cloud.

3) The data received in the Cloud is stored in a RDBMS like PostgreSQL.

4) The data is fed into the Hydrologic and Hydraulic model in IFMC for scenario analysis.

5) The output of the Hydrologic and Hydraulic model is input into the Spatial Decision Support System (SDSS) for generation of decision support information.

4   Utility of the Project

The CRTFF System is expected to be able to predict the Street Level flooding in Chennai (CMA) area, the level of water in the Reservoirs and the flow of water in the 3 Rivers Adyar, Cooum and Kosasthalayar, based on rainfall predictions of ECMWF and NCEP-GFS, and actual rainfall recorded through RTDAS. This prediction will help better preparedness before disasters. The CRTFF Hydro model will also help quantify the impact of mitigation measures, which are planned by various stakeholders.

List of Field Equipments installed under this Project

Automatic Rain Gauges (ARG)

Sl. No.	Station ID	Table 1: Automatic Rain Gauges Site	Latitude	Longitude	District
1	ARG0001	Ramco Industrial Warehouse, Winterpet	13.0768	79.6528	Ranipet
2	ARG0002	Government Higher Secondary School, Mittanamalli	13.15668	80.07043	Tiruvallur
3	ARG0003	Banavaram Reserve Forest	13.0158	79.4923	Ranipet
4	ARG0004	Primary Health Centre, Beerakuppam	13.1729	79.5023	Tiruvallur
5	ARG0005	Boomi Bricks, Pothur	13.1678	79.9575	Tiruvallur
6	ARG0006	College of Food and Dairy Technology, Koduvallli	13.2098	80.103	Tiruvallur
7	ARG0007	Panchayat Union Middle School, Sennenkarani, Uthukottai	13.29871	79.97206	Tiruvallur
8	ARG0008	Government Higher Secondary School, Koodalur	13.0962	79.5095	Ranipet
9	ARG0009	Primary Health Centre, Karadikuppam	13.0002	79.4344	Ranipet
10	ARG0010	Government Higher Secondary School, Kanagammachatram	13.2056	79.7544	Tiruvallur
11	ARG0011	Government Higher Secondary School, Puchireddypalli	13.227	79.5326	Tiruvallur
12	ARG0012	Government Higher Secondary School, Valarpuram	13.1684	79.6747	Ranipet
13	ARG0013	Dr. Ambedkar Government Law College, Pattaraiperumbudur	13.1586	79.7984	Tiruvallur
14	ARG0014	Primary Health Centre, Budur	13.2338	80.2073	Tiruvallur
15	ARG0015	WRD Government Guest House, Minnal	13.079	79.5543	Ranipet
16	ARG0016	National Disaster Relief Force, Arakkonam	13.0489	79.753	Ranipet
17	ARG0017	Nemili Taluk office	12.9753	79.6143	Ranipet
18	ARG0018	WRD Section Office, Panapakkam	12.9258	79.5667	Ranipet
19	ARG0019	Primary Health Centre, Melkalathur	13.0427	79.5717	Ranipet
20	ARG0020	R.K. Pet Taluk office	13.1525	79.4317	Tiruvallur
21	ARG0021	Panchayat Union Middle School, Thaniyur	13.0299	79.4013	Ranipet
22	ARG0022	Vidya Peetam Senior Secondary School, Sholinghur	13.082	79.443	Ranipet
23	ARG0023	Suncity Apartments, Pudumavilangai Village Panchayat	13.0809	79.8559	Tiruvallur
24	ARG0024	WRD Section Office, Thakkolam	13.0192	79.6773	Ranipet
25	ARG0025	Sevalaya's Trust	13.169	80.0263	Tiruvallur
26	ARG0026	WRD,Section office, Thamaraipakkam Anicut	13.2293	80.0259	Tiruvallur
27	ARG0027	Thirutani Taluk Office	13.1875	79.62	Tiruvallur
28	ARG0028	Block Development Office, Thiruvalangadu	13.1319	79.7808	Tiruvallur
29	ARG0029	Tiruvallur District Collectorate office	13.142	79.8951	Tiruvallur
30	ARG0030	TNEB Sub Station, Poonimangadu	13.2558	79.6374	Tiruvallur

Sl. No.	Station ID	Table 1: Automatic Rain Gauges Site	Latitude	Longitude	District
31	ARG0031	TNEB Sub-Station, Athipattu	13.2522	80.3066	Tiruvallur
32	ARG0032	TNEB Sub-Station, Podhaturpet	13.296	79.4797	Tiruvallur
33	ARG0033	WRD Section office, Vallur Anicut	13.2626	80.2545	Tiruvallur
34	ARG0034	Government Higher Secondary School, Athimanjeripet	13.2430	79.4381	Tiruvallur
35	ARG0035	Veltech University, Avadi	13.178	80.0973	Tiruvallur
36	ARG0036	Walajah Road junction, Southern Railway	12.9705	79.3609	Ranipet
37	ARG0037	Arignar Anna Government Arts and Science College, Walajahpet	12.9225	79.3778	Ranipet
38	ARG0038	WRD Section office, Ponnai Anicut	13.0898	79.2719	Vellore
39	ARG0039	Siddharth Industries, Uthukottai	13.2937	79.8622	Tiruvallur
40	ARG0040	Taluk office, Avadi	13.1234	80.0758	Tiruvallur
41	ARG0041	Taluk office, Ayanavaram	13.0883	80.2318	Chennai
42	ARG0042	Catter Pillar India Pvt Ltd, Melnallathur	13.0893	79.902	Tiruvallur
43	ARG0043	Toprun Automotive India Pvt Ltd., Tiruvallur	12.9806	79.8522	Tiruvallur
44	ARG0044	Kodungaiyur Sewage Treatment Plant	13.1456	80.2624	Chennai
45	ARG0045	Taluk office, Maduravoyal	13.0777	80.1733	Chennai
46	ARG0046	Primary Health Centre, Parandur	12.9339	79.7402	Kancheepuram
47	ARG0047	University College of Engineering, Kancheepuram	12.8732	79.7057	Kancheepuram
48	ARG0048	Sindhi College, Numbal	13.0604	80.1303	Tiruvallur
49	ARG0049	Kancheepuram District Collector Office	12.8244	79.6965	Kancheepuram
50	ARG0050	Tex BioSciences Pvt Ltd., Tiruvallur	13.0187	79.895	Kancheepuram
51	ARG0051	Maharishi International Residential School, Sunguvarchathiram	12.9224	79.8672	Kancheepuram
52	ARG0052	Government High School, MGR Nagar	13.0331	80.2027	Chennai
53	ARG0053	Sub Registrar Office, Guduvanchery	12.841	80.0614	Chengalpattu
54	ARG0054	Hyundai Motors, Irungattukottai	12.9999	80.0001	Kancheepuram
55	ARG0055	Indian Institute of Technology Madras, Guindy	12.991	80.2362	Chennai
56	ARG0056	JK Tyre & Industries Ltd, Sriperumbudhur	12.94	79.9997	Kancheepuram
57	ARG0057	Primary Health Centre, Papparambakkam	13.0561	79.9587	Tiruvallur
58	ARG0058	Sri Sai Ram Engineering College, West Tambaram	12.9606	80.0574	Chengalpattu
59	ARG0059	Saveetha Institute of Medical And Technical Sciences - Engineering, Thandalam	13.0295	80.0123	Kancheepuram
60	ARG0060	Government Higher Secondary School, Meyyur	13.2376	79.9451	Tiruvallur
61	ARG0061	SRM Institute of Science and Technology, Kattankulathur	12.8243	80.0454	Chengalpattu
62	ARG0062	Sri Venkateswara College of Technology Sriperumbudhur	12.9088	79.9374	Kancheepuram

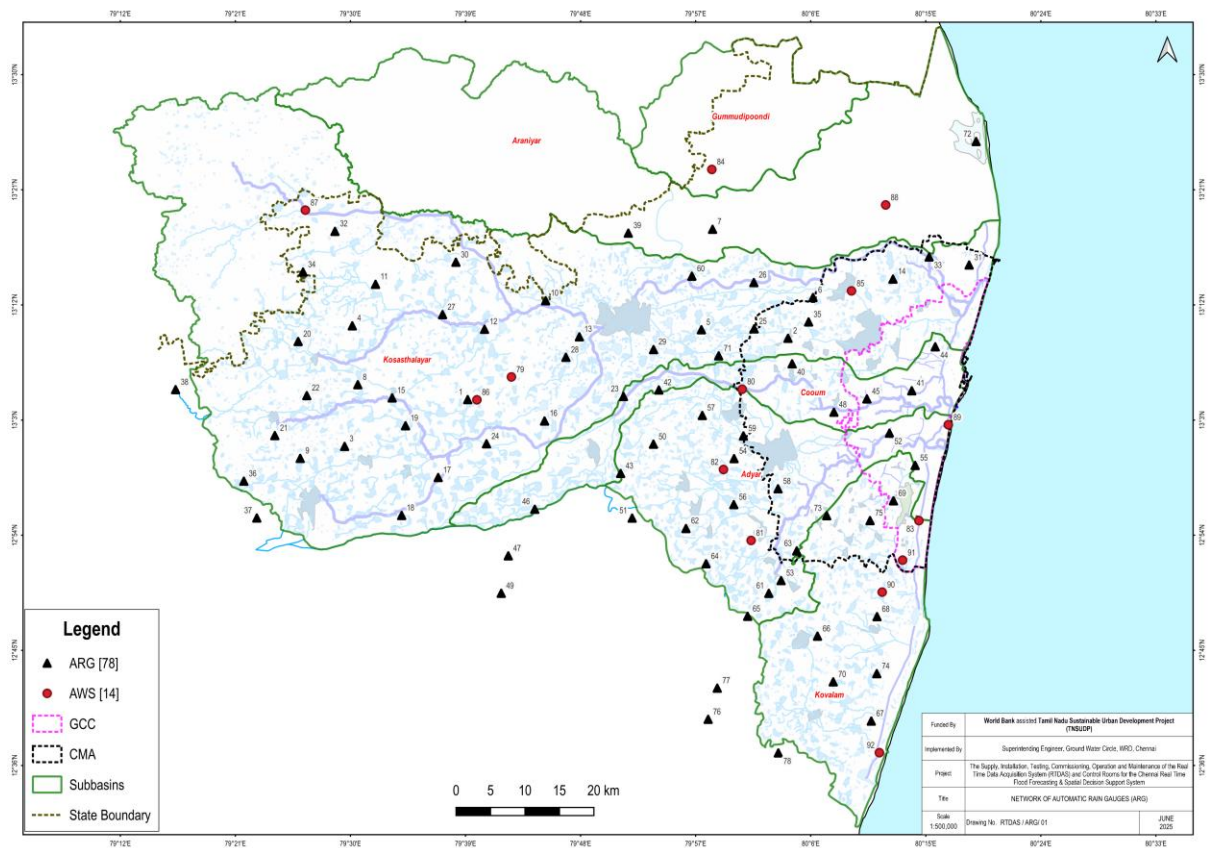| Sl. No.	Station ID	Table 1: Automatic Rain Gauges Site	Latitude	Longitude	District
63	ARG0063	B.S. Abdur Rahman Crescent College of Engineering, Vandalur	12.8796	80.0818	Chengalpattu
64	ARG0064	Government Industrial Training Institute College, SIPCOT, Oragadam	12.8629	79.9636	Kancheepuram
65	ARG0065	State Institute of Rural Development & Panchayat Raj, Maraimalai Nagar	12.7944	80.0178	Chengalpattu
66	ARG0066	Primary Health Centre, Melkalavai-Othivakkam	12.7685	80.1089	Chengalpattu
67	ARG0067	Aarupadai Veedu Institute of Technology, Paiyanur	12.6579	80.179	Chengalpattu
68	ARG0068	Indian Institute of Technology "Discovery" Campus, Thaiyur	12.794	80.1865	Chengalpattu
69	ARG0069	Jerusalem Engineering College, Pallikaranai	12.9449	80.2079	Chennai
70	ARG0070	Government Higher Secondary School, Sembakkam	12.709	80.1294	Chengalpattu
71	ARG0071	Government Polytechnic College, Sevvapet	13.13378764	79.98000505	Tiruvallur
72	ARG0072	Jagathambal Subramaniam Government Higher Secondary School, Pulicat	13.4131	80.3157	Tiruvallur
73	ARG0073	Tambaram Railway Station, Southern Railway	12.9255	80.1209	Chengalpattu
74	ARG0074	Taluk office, Thiruporur	12.7197	80.1862	Chengalpattu
75	ARG0075	Tamil Nadu Bio-Diversity Board, Medavakkam	12.9191	80.1774	Chengalpattu
76	ARG0076	Chengalpattu District Collector Office	12.6602	79.9663	Chengalpattu
77	ARG0077	Lower Palar Basin Subdivision Office, Water Resources Department, Chengalpattu	12.7008	79.9782	Chengalpattu
78	ARG0078	Government Girls Higher Secondary School, Tirukazhukundram	12.6164	80.0578	Chengalpattu

Figure 1 Location of Automatic Rain Gauges under the CRTFF Project

Automatic Weather Stations (AWS)

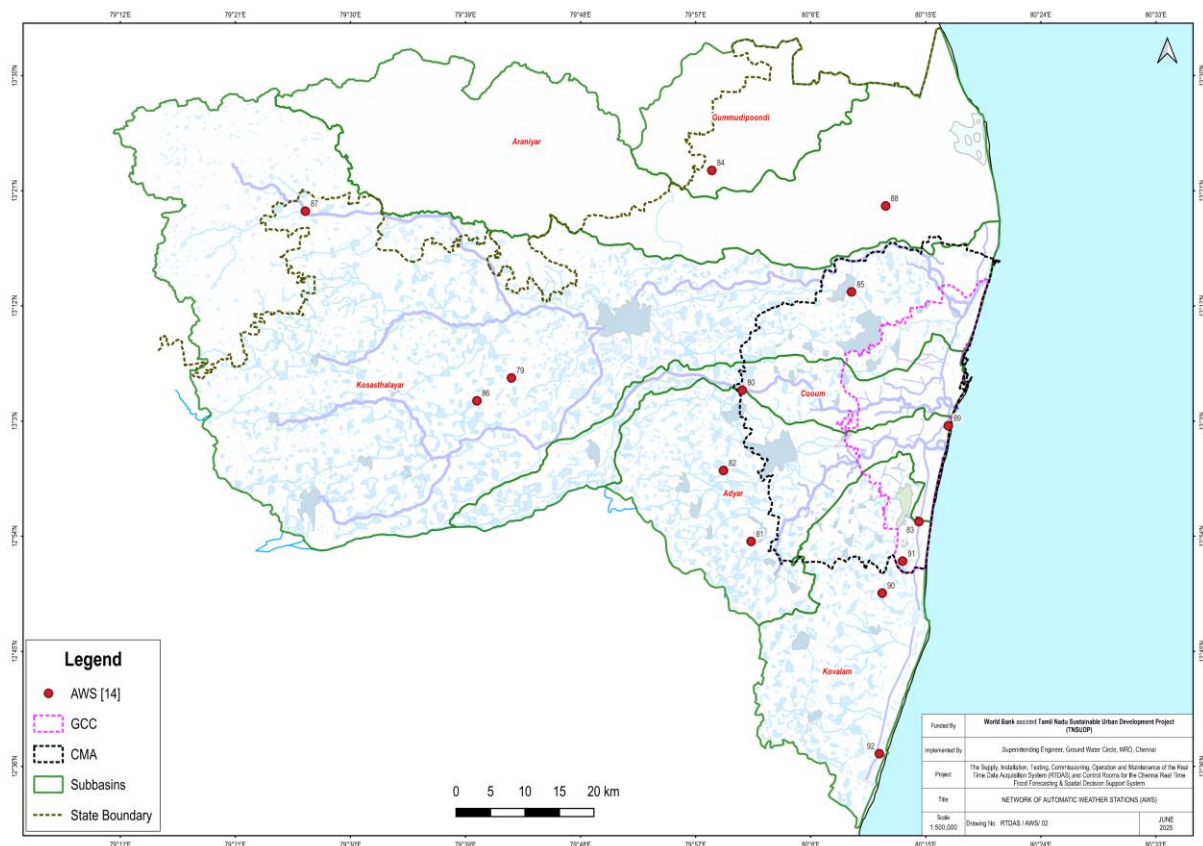| Sl. No.	Station ID	Table 2: Automatic Weather Stations Site	Latitude	Longitude	District
79	AWS0001	Jaya Agricultural College, Vyasapuram	13.1061	79.7098	Tiruvallur
80	AWS0002	Korattur Anicut, Puduchatram	13.090092	80.0107	Tiruvallur
81	AWS0003	International Institute of Biotechnology And Toxicology, Padappai	12.893046	80.022329	Kancheepuram
82	AWS0004	P.B. College of Engineering, Kancheepuram	12.9855	79.9863	Kancheepuram
83	AWS0005	KCG College of Technology, Karapakkam	12.918863	80.241138	Chennai
84	AWS0006	WRD Section office, Thervoy-Kandigai Lake	13.376454	79.971087	Tiruvallur
85	AWS0007	WRD Section office, Cholavaram Lake	13.218202	80.153213	Tiruvallur
86	AWS0008	PWD Inspection Bungalow, Arakkonam	13.0763	79.6648	Ranipet
87	AWS0009	Taluk office, Pallipattu	13.3234	79.441097	Tiruvallur
88	AWS0010	Dr. MGR Fisheries College and Research Institute, Ponneri	13.3302	80.1978	Tiruvallur
89	AWS0011	Queen Mary's College, Mylapore	13.0438	80.2794	Chennai
90	AWS0012	Chennai Dr Ambedkar Govt Law College, Pudupakkam	12.8257	80.1932	Chengalpattu
91	AWS0013	Jeppiaar Engineering College, Rajiv Gandhi Salai	12.867363	80.219819	Chennai
92	AWS0014	PWD Inspection Bungalow, Mamallapuram	12.6165	80.1896	Chengalpattu

Figure 2 Location of Automatic Weather Stations under the CRTFF Project

Automatic Water Level Recorders (AWLR) - Radar Type

Sl. No.	Station ID	Table 3: Automatic Water Level Recorders - Radar Site	Latitude	Longitude	District
93	AWLR0001	Korattur Anicut	13.0903	80.0108	Tiruvallur
94	AWLR0002	Thervoy-Kandigai Lake	13.3809	79.9819	Tiruvallur
95	AWLR0003	Cholavaram Lake	13.221696	80.154608	Tiruvallur
96	AWLR0004	Poondi Lake	13.209828	79.872644	Tiruvallur
97	AWLR0005	Redhills Lake	13.186175	80.188574	Tiruvallur
98	AWLR0006	Chembarambakkam Lake	13.015034	80.078593	Kancheepuram
99	AWLR0007	Kandaleru Poondi –Thervoy Kandigai canal regulator	13.342545	79.92016	Tiruvallur
100	AWLR0008	Araniyar Anicut	13.32589	79.902986	Tiruvallur
101	AWLR0009	Feeder canal Regulator	13.138455	79.969364	Tiruvallur
102	AWLR0010	Kandaleru Poondi –Thervoy Kandigai canal regulator (Second location)	13.342682	79.920342	Tiruvallur
103	AWLR0011	Poochikal Regulator D/s bridge	13.220044	80.090655	Tiruvallur
104	AWLR0012	Araniyar Anicut (Second location)	13.325073	79.903995	Tiruvallur
105	AWLR0013	Tamaraipakkam Upper Supply Channel D/s bridge	13.222852	80.030589	Tiruvallur
106	AWLR0014	Feeder canal Regulator (Second location)	13.13865	79.969344	Tiruvallur
107	AWLR0015	Arungulam check dam	13.230644	79.691024	Tiruvallur
108	AWLR0016	Ennore Creek Bridge	13.227878	80.319664	Chennai
109	AWLR0017	Kaveripakkam Tank	12.93926	79.4531	Ranipet
110	AWLR0018	Kesavaram Anicut across Cooum River	13.021168	79.762132	Ranipet
111	AWLR0019	Illupur check dam	13.190108	79.719274	Tiruvallur
112	AWLR0020	Pattaraiperambudur check dam	13.154758	79.812003	Tiruvallur
113	AWLR0021	Uriyur bridge across Kosasthalayar River (Second location)	13.045322	79.774622	Ranipet
114	AWLR0022	Kondangi Tank	12.7528	80.0921	Chengalpattu
115	AWLR0023	Vichoor brodge (SH 56/104 Bridge)	13.216532	80.272362	Tiruvallur
116	AWLR0024	Sorakayapet check dam	13.3196	79.4805	Tiruvallur
117	AWLR0025	Tamaraipakkam Anicut	13.231083	80.025283	Tiruvallur
118	AWLR0026	Vallur Anicut	13.26261	80.254027	Tiruvallur
119	AWLR0027	Korattur Tank	13.132771	80.190216	Chennai
120	AWLR0028	Madhavaram Retteri Tank	13.13126	80.212637	Chennai
121	AWLR0029	T.V.K. Link Road bridge, Captain Cotton Canal	13.127517	80.265986	Chennai
122	AWLR0030	Kodungaiyur dumpyard road bridge, Kodungaiyur Canal	13.130493	80.267256	Chennai

Sl. No.	Station ID	Table 3: Automatic Water Level Recorders - Radar Site	Latitude	Longitude	District
123	AWLR0031	Erukkancherry High Road bridge, Otteri Nullah	13.105178	80.270971	Chennai
124	AWLR0032	Aminjikarai bridge	13.0806	80.2178	Chennai
125	AWLR0033	Mahendravadi Tank	13.0007	79.5278	Ranipet
126	AWLR0034	Napier Bridge	13.068763	80.284646	Chennai
127	AWLR0035	Nelson Manickam road bridge across Arumbakkam drain	13.067034	80.227791	Chennai
128	AWLR0036	Putlur check dam	13.108907	79.937074	Tiruvallur
129	AWLR0037	Ambathur Tank	13.104485	80.14962	Chennai
130	AWLR0038	Katrambakkam Weir, Chowdrikal Channel	12.971974	79.993132	Kancheepuram
131	AWLR0039	Orathur madavu near Adanur Tank	12.862228	80.017397	Kancheepuram
132	AWLR0040	Mudichur Bridge, Outer Ring Road	12.921803	80.076788	Kancheepuram
133	AWLR0041	Nandhambakkam check dam	13.017076	80.181992	Chennai
134	AWLR0042	Saidapet Bridge	13.017353	80.224927	Chennai
135	AWLR0043	Thiru Vi ka Bridge	13.013339	80.259078	Chennai
136	AWLR0044	Thiruneermalai Bridge	12.965615	80.110205	Chengalpattu
137	AWLR0045	Dr. Kalaignar Karunanidhi Salai Bridge, South Buckingham Canal	12.899407	80.238081	Chennai
138	AWLR0046	ECR Road Bridge, Muttukadu	12.804276	80.242444	Chengalpattu
139	AWLR0047	Buckingham Canal Bridge, ECR Mamallapuram	12.6222	80.1866	Chengalpattu
140	AWLR0048	Mohammad Sathak College of Arts and Science, Campus Compound wall	12.900191	80.223243	Chennai
141	AWLR0049	OMR road bridge, Okkium Madavu	12.923559	80.230752	Chennai
142	AWLR0050	Velachery - Tambaram main road bridge across Veerangal Odai	12.96418	80.216008	Chennai
143	AWLR0051	Keelkatalai Tank	12.949725	80.179909	Chengalpattu
144	AWLR0052	Narayanapuram Tank	12.948442	80.201668	Chennai
145	AWLR0053	Velachery tank	12.987032	80.218064	Chennai
146	AWLR0054	Thakkolam Check Dam	13.028857	79.729531	Ranipet
147	AWLR0055	Koilpathakai Tank	13.152903	80.098379	Tiruvallur
148	AWLR0056	Redhills lake downstream right guide wall	13.186532	80.188619	Tiruvallur
149	AWLR0057	Anna Nagar 3rd avenue road bridge across Otteri Nullah	13.094023	80.218241	Chennai
150	AWLR0058	Ayanambakkam Tank	13.068737	80.131076	Tiruvallur
151	AWLR0059	Ayyapakkam Tank	13.106182	80.127985	Tiruvallur
152	AWLR0060	Poondi lake downstream right guide wall	13.210184	79.872975	Tiruvallur

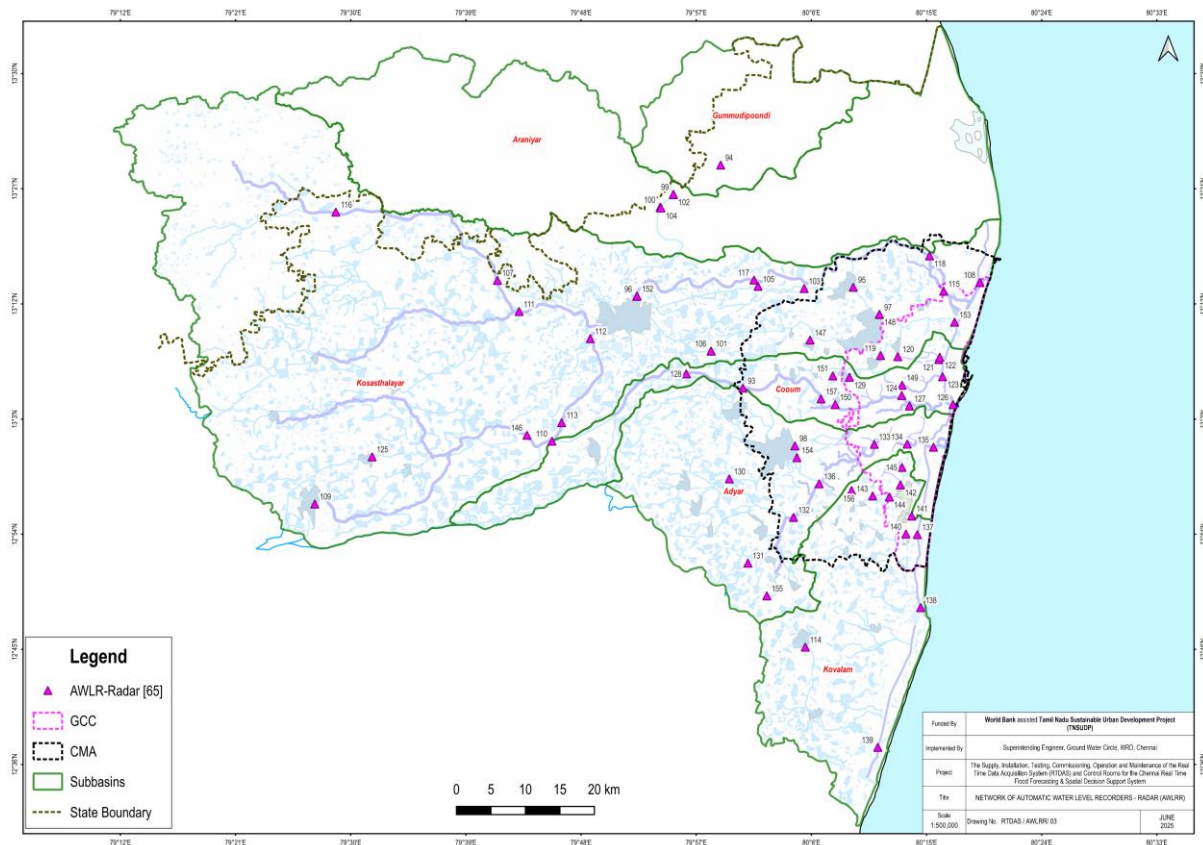| Sl. No.	Station ID	Table 3: Automatic Water Level Recorders - Radar Site	Latitude	Longitude	District
153	AWLR0061	Burma Nagar Main Road bridge across Redhills Surplus Channel	13.176279	80.286623	Chennai
154	AWLR0062	Chembarambakkam lake downstream right guide wall	12.999639	80.081173	Chengalpattu
155	AWLR0063	Potheri Tank	12.819648	80.042012	Chengalpattu
156	AWLR0064	Pallavaram tank	12.956622	80.152419	Chengalpattu
157	AWLR0065	Paruthipattu Anicut	13.076234	80.112556	Tiruvallur

Figure 3 Location of Automatic Water Level Recorder – Radar installed in the Project

Automatic Water Level Recorders (AWLR) - Shaft Encoder Type

Sl. No.	Station ID	Table 4: Automatic Water Level Recorders – Shaft Encoder	Latitude	Longitude	District
158	AWRS0001	Ayyaneri Tank	13.1299	79.4568	Tiruvallur
159	AWRS0002	Vandalur Tank	12.8929	80.079	Chengalpattu
160	AWRS0003	Keelveethi Tank	12.9884	79.5775	Ranipet
161	AWRS0004	Kodakkal Tank	13.059986	79.403562	Ranipet
162	AWRS0005	Mudichur Tank	12.883	80.0565	Chengalpattu
163	AWRS0006	Minnal periya eri tank	13.0828	79.5563	Ranipet
164	AWRS0007	Cooum Big Tank	13.0176	79.8218	Tiruvallur
165	AWRS0008	Adanur Tank	12.8708	80.0453	Kancheepuram
166	AWRS0009	Guduvanchery Tank	12.848595	80.057485	Chengalpattu
167	AWRS0010	Gunduperumbedu Tank	12.9104	79.9706	Kancheepuram
168	AWRS0011	Manimangalam Tank	12.899563	80.040942	Kancheepuram
169	AWRS0012	Nandhivaram Tank	12.83932	80.074397	Chengalpattu
170	AWRS0013	Nemam Tank	13.055667	80.00821	Tiruvallur
171	AWRS0014	Pillaipakkam Tank	12.9318	79.9548	Kancheepuram
172	AWRS0015	Porur tank	13.0359	80.1521	Tiruvallur
173	AWRS0016	Sriperumbudur Tank	12.96716	79.941518	Kancheepuram
174	AWRS0017	Agaramthen Tank	12.879	80.1478	Chengalpattu
175	AWRS0018	Kattur tank	12.7318	80.1362	Chengalpattu
176	AWRS0019	Vengaivasal Tank	12.9084	80.1672	Chengalpattu
177	AWRS0020	Manamathy Tank	12.6621	80.1108	Chengalpattu
178	AWRS0021	Kayarambedu Tank	12.80422	80.0655	Chengalpattu
179	AWRS0022	Parandur Big Tank	12.9422	79.736	Kancheepuram
180	AWRS0023	Vellarai Tank	12.925	79.9872	Kancheepuram
181	AWRS0024	Navalur Tank	12.9407	79.9789	Kancheepuram
182	AWRS0025	Thaiyur Tank	12.7763	80.1905	Chengalpattu
183	AWRS0026	Periyakalakattur Big Tank	13.072765	79.757511	Tiruvallur
184	AWRS0027	periyakalakattur Chitheri	13.0611	79.7615	Tiruvallur
185	AWRS0028	Krishnasamudram Tank	13.21594	79.535193	Tiruvallur
186	AWRS0029	Manavur Hissa Tank	13.09054	79.841688	Tiruvallur
187	AWRS0030	Mudhur Hissa Tank	13.147747	79.686001	Ranipet

Sl. No.	Station ID	Table 4: Automatic Water Level Recorders – Shaft Encoder	Latitude	Longitude	District
188	AWRS0031	Nagavedu Tank	13.054636	79.621883	Ranipet
189	AWRS0032	Pakkam Tank	13.134886	80.022292	Tiruvallur
190	AWRS0033	Pallipattu Tank	13.3455	79.4447	Tiruvallur
191	AWRS0034	Panderavedu Tank	13.2847	79.5106	Tiruvallur
192	AWRS0035	Pandur Tank	13.149861	79.846803	Tiruvallur
193	AWRS0036	Thandurai Tank	13.1174	80.0566	Tiruvallur
194	AWRS0037	Perumuchi Banal Eri	13.0505	79.6659	Ranipet
195	AWRS0038	Podaturpet Tank	13.270838	79.476983	Tiruvallur
196	AWRS0039	Polur Big Tank	13.1142	79.6283	Ranipet
197	AWRS0040	Ponpadi Tank	13.232513	79.596967	Tiruvallur
198	AWRS0041	Pullarambakkam Tank	13.166128	79.898433	Tiruvallur
199	AWRS0042	Ramapuram Big Tank	13.1746	79.7016	Tiruvallur
200	AWRS0043	Palavedu tank	13.1493	80.044	Tiruvallur
201	AWRS0044	Siruvalayam Tank	12.95631	79.532549	Ranipet
202	AWRS0045	Mittanamalli tank	13.1633	80.0726	Tiruvallur
203	AWRS0046	Vadathur Kasam And Tank	13.184618	79.990698	Tiruvallur
204	AWRS0047	Veliagaram Cheruvu	13.322219	79.406539	Tiruvallur
205	AWRS0048	Vellur Hissa Tank	13.1561	79.6773	Ranipet
206	AWRS0049	Aranvoyal Peria Eri	13.104881	79.94803	Tiruvallur
207	AWRS0050	Edayarpakkam Tank	12.9823	79.7881	Kancheepuram
208	AWRS0051	Paruthipattu (Avadi) Tank	13.1049	80.1077	Tiruvallur
209	AWRS0052	Satharai Tank	13.052027	79.853672	Tiruvallur
210	AWRS0053	Thiruninravur Tank	13.112035	80.023891	Tiruvallur
211	AWRS0054	Thirumalpur Tank	12.936767	79.677553	Ranipet
212	AWRS0055	Valathur Tank	12.963157	79.748559	Kancheepuram
213	AWRS0056	Vayalanallur Tank	13.096659	80.069606	Tiruvallur
214	AWRS0057	Veliyur Tank	12.922447	79.692404	Kancheepuram
215	AWRS0058	Venkathur Tank	13.103445	79.9257	Tiruvallur
216	AWRS0059	Amarambedu Tank	12.964823	80.01202	Kancheepuram
217	AWRS0060	Gudapakkam Tank	13.080082	80.000402	Tiruvallur
218	AWRS0061	Kavanoor Tank	12.832695	80.02742	Kancheepuram

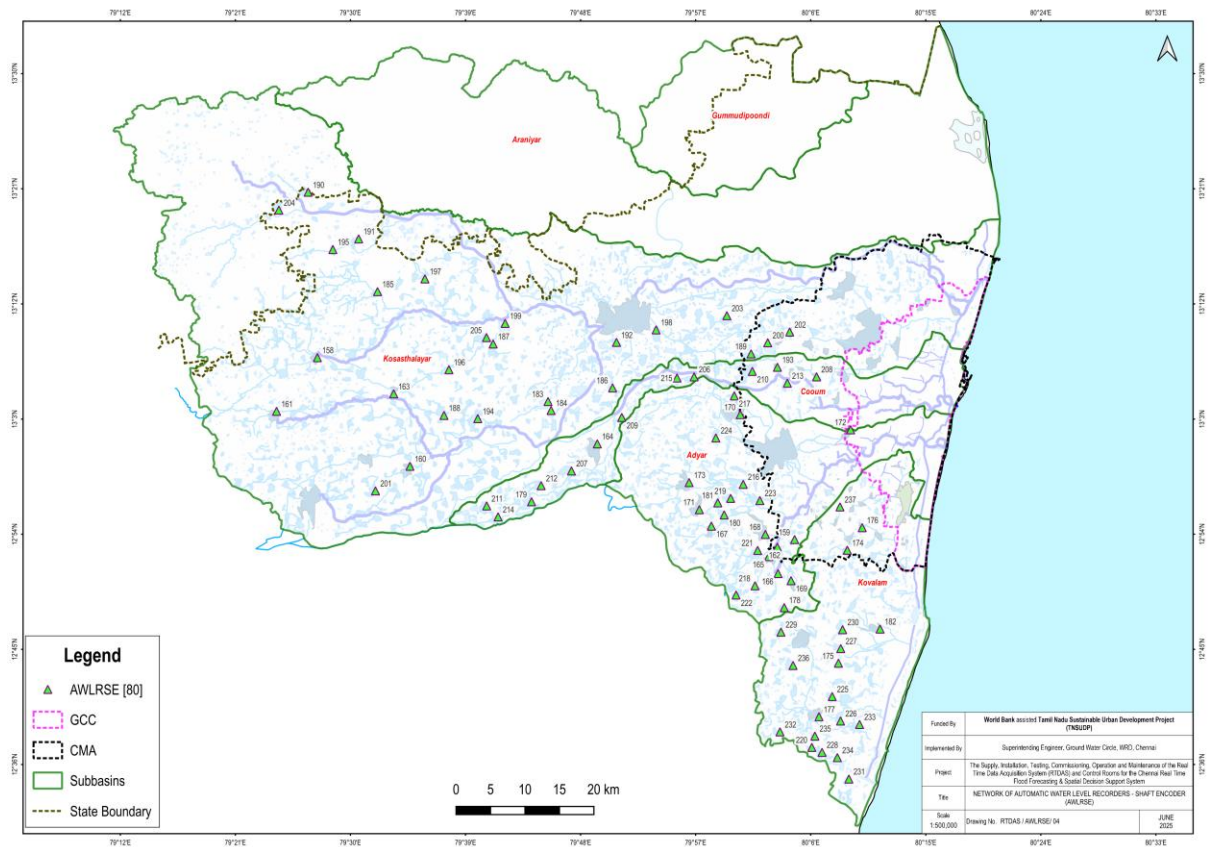| Sl. No.	Station ID	Table 4: Automatic Water Level Recorders – Shaft Encoder	Latitude	Longitude	District
219	AWRS0062	Kolathur Tank	12.946624	79.995654	Kancheepuram
220	AWRS0063	Echur Tank	12.6221	80.1015	Chengalpattu
221	AWRS0064	Padappai Tank	12.878776	80.030905	Kancheepuram
222	AWRS0065	Siruvanjur Katteri	12.820677	80.002755	Kancheepuram
223	AWRS0066	Somangalam Big Tank	12.943694	80.033756	Kancheepuram
224	AWRS0067	Valarpuram Tank	13.025284	79.976369	Kancheepuram
225	AWRS0068	Acharavakkam Eri	12.688402	80.128053	Chengalpattu
226	AWRS0069	Amur Eri	12.65643	80.138947	Chengalpattu
227	AWRS0070	Vembaedu Tank	12.7508	80.1392	Chengalpattu
228	AWRS0071	Karanai Eri (Kunnapattu)	12.6156	80.1148	Chengalpattu
229	AWRS0072	Karumbur Tank	12.77235	80.061247	Chengalpattu
230	AWRS0073	Kayar Peria Eri	12.775435	80.141607	Chengalpattu
231	AWRS0074	Manamai Big Tank	12.580853	80.149815	Chengalpattu
232	AWRS0075	Oragadam Eri	12.642319	80.059948	Chengalpattu
233	AWRS0076	Paiyanoor Tank	12.652022	80.163749	Chengalpattu
234	AWRS0077	Nallan pillai petral Tank	12.6088	80.1348	Chengalpattu
235	AWRS0078	Arunkundram Tank	12.6368	80.1055	Chengalpattu
236	AWRS0079	Sirukundram Eri	12.728832	80.07704	Chengalpattu
237	AWRS0080	Chitlapakkam Tank	12.935438	80.138186	Chengalpattu

Figure 4 Location of Automatic Water Level Recorder – Shaft Encoder installed in the Project