

BRIEF NOTE:

INTRODUCTION:

Hyderabad is one of the fast growing cities in India. The city's boundaries are expanding with the merger of adjacent habitations. The water supply demand to cater the requirements of the population for domestic purpose, industrial, commercial, IT and other floating population requirements are exponentially growing, resulting urgent need for planning for the drinking water security of Hyderabad city.

Hyderabad Metropolitan Water Supply and Sewerage Board has taken up major projects for improvement of water supply and sanitation project for the twin cities Hyderabad and Secunderabad including surrounding Municipalities and upcoming satellite townships. The Hyderabad Metropolitan Area extends over 1536 Sqkm and comprises three districts of Hyderabad, Rangareddy and Medak. The HMWS&SB, providing water supply that caters to drinking water needs of about 130.87 lakhs persons including those living in about 800 slums. HMWS&SB after taking over the entire water supply in GHMC area caters to an area of 688 Sq.Km with present withdrawals of 410 MGD from all the sources covering core city and 12 municipal circles and villages upto ORR limits, wherein, under the 29 O&M divisions, there are about 10 Lakh connections.

Accordingly, it is decided to create / establish two independent raw water storage reservoirs having capacity to the tune of 15 TMC nearer to the city with the arrangements to fill them from the nearest projects of I&CAD department on Krishna and Godavari river waters to ensure reliable supplies to Hyderabad city.

Therefore, it is proposed to create two reservoirs, one with a capacity of 10 TMC in the hillock portions at Malkapur Village, Choutuppal Mandal, Nalgonda District and the other with a capacity of 5.04 TMC at Keshavapuram, Keesara Mandal, Ranga Reddy District. In the present report, project conceptual planning, structural design, drawings and cost estimation of Keshavapuram Reservoir are given.

SCOPE:

- (i) Intake at Kondapochama reservoir for diversion of about 10 TMC of monsoon water within a period of 90 days.
- (ii) Pipeline of 3.6 m dia. and 34 km length connecting Kondapochama sagar reservoir to proposed Keshavapuram reservoir.
- (iii) 5.04 TMC Reservoir having a maximum height of about 48 m mostly as a earthen dam(about 14.41 km length) except for one block (about 300 m length) of concrete gravity dam for housing Inlet and outlet arrangement for supplying water to reservoir and supplying water to WTP
- (iv) A water treatment plant (WTP) near Bommarasipet reservoir having initial capacity of 750 MLD.

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- (v) Clear Water Reservoir of 40 ML capacity with pumping station.
 - (vi) Pumping main of 3 m dia. for transfer of water from WTP at Keshavapuram connecting to Ring Main.
 - (vii) Master Balancing Reservoir (MBR) at Ghanpur having a capacity of 80ML.

KESHAVAPURAM 5.04 TMC PROJECT:

In order to ensure more secured and reliable water supply to Hyderabad City, the present project is proposed to construct raw water storage reservoir proximity to the city under Godavari as source such that uninterrupted supplies can be ensured by linking it to existing water supply system.

Keeping in view the existing geological and topographical features, the techno-economic considerations, availability of materials, an earthen dam has been envisaged. The details about the site selection and other aspects, which were taken into consideration while finalizing the reservoir site location and its proposed layout are described in the subsequent Paras.

Major Components:

The project comprises of the following major components:

- (i) Laying of main pipe line from KondaPochamma sagar (Pamulaparthi Reservoir to Keshavapuram Reservoir having a total length of 34 kilometers).
- (ii) Construction of Keshavapuram Reservoir by constructing Earthen and Concrete block with intake.
- (iii) Laying of Pipeline from intake to WTP.
- (iv) Construction of 750 MLD Water Treatment Plant.
- (v) Construction of Clear Water Sump and Pumping Station near WTP.
- (vi) Laying of pipe line from WTP to Ghanpur Master Balancing Reservoir.
- (vii) Supplying water to Hyderabad city with existing water distribution system from Ghanpur Mass Balancing Reservoir.

1. FORMATION OF EARTHERN BUND:

- Generally Earthen dam is provide when one type of suitable material is readily available nearby, a homogeneous selection is generally preferred.
- A zoned earthen dam is preferred where different types of soils are available from borrow areas. It also facilitates the use of excavated material from different structures.

- The zoned earthen dam is generally composed of an impervious core and filter in the down stream of core. When the casing material is relatively impervious material, horizontal filters at different elevations on upstream are provided to reduce pore pressure during sudden draw down conditions. Which also avoids excessive flatterring of upstream slopes from consideration of stability analysis and economy, the same has been provided in Keshavapuram Reservoir.

2. INLET MAINS

Pipeline of 3600 mm dia MS Mains inlets are proposed for transportation of raw water from Kondapochamma Sagar Reservoir to Keshavapuram 5.04 TMC reservoir through gravity.

3. 750 MLD WATER TREATMENT PLANT

The water treatment plant is designed to produce 750 MLD of treated water at Bommarasipeta. The main units of the plant are diffused aeration system proposed within the raw water reservoir, stilling chamber, flash mixing, flocculators, clarifiers, filters and backwashing unit, chemical houses for alum, chlorination buildings, sludge control buildings, sludge sump, and laboratory.

4. 40 ML CLEAR WATER RESERVOIR

A 40 ML clear water reservoir is proposed near the WTP at Bommarasipeta for pumping the treated water to 80 ML MBR at Ghanpur/Connect Ring Main.

5. PUMP HOUSE:

A Pump house is proposed for pumping of treated water to 80 ML MBR at Ghanpur/Connect Ring Main.

6. PUMPING MAIN:

A Pumping main of 3000 mm diameter MS pipeline is proposed to carry treated water from WTP to 80 ML MBR at Ghanpur/Connect Ring Main.

7. 80 ML CAPACITY MBR AT GHANPUR

An 80 ML capacity RCC Master Balancing Reservoir is proposed at Ghanpur for storage of clear water reservoir and connecting with existing water distribution network.

Keshavapuram Tank Capacity Calculations					
Lowest bed level 545 m					
Contour Elevation in m	Area in Ha	Height in m	Volume In Ha-m	Capacity in TMC	Cumulative Capacity in TMC
545.00	0.29	1.00	0.28	0.00	0.00
546.00	3.58	1.00	1.63	0.00	0.00
547.00	7.86	1.00	5.58	0.00	0.00
548.00	13.47	1.00	10.54	0.00	0.01
549.00	21.25	1.00	17.21	0.01	0.01
550.00	29.58	1.00	25.30	0.01	0.02
551.00	38.34	1.00	33.86	0.01	0.03
552.00	50.53	1.00	44.29	0.02	0.05
553.00	65.39	1.00	57.80	0.02	0.07
554.00	81.84	1.00	73.46	0.03	0.09
555.00	99.56	1.00	90.56	0.03	0.13
556.00	118.72	1.00	109.00	0.04	0.16
557.00	137.66	1.00	128.07	0.04	0.21
558.00	157.06	1.00	147.25	0.05	0.26
559.00	177.97	1.00	167.41	0.06	0.32
560.00	198.92	1.00	188.35	0.07	0.39
561.00	218.71	1.00	208.74	0.07	0.46
562.00	238.03	1.00	228.30	0.08	0.54
563.00	255.94	1.00	246.93	0.09	0.62
564.00	273.17	1.00	264.51	0.09	0.72
565.00	288.50	1.00	280.80	0.10	0.82
566.00	302.69	1.00	295.56	0.10	0.92
567.00	314.14	1.00	308.40	0.11	1.03
568.00	323.54	1.00	318.83	0.11	1.14
569.00	331.75	1.00	327.64	0.11	1.25
570.00	339.36	1.00	335.55	0.12	1.37
571.00	346.07	1.00	342.71	0.12	1.49
572.00	352.10	1.00	349.08	0.12	1.61
573.00	358.60	1.00	355.34	0.12	1.74
574.00	365.22	1.00	361.90	0.13	1.86
575.00	371.62	1.00	368.41	0.13	1.99
576.00	377.90	1.00	374.76	0.13	2.12
577.00	384.16	1.00	381.03	0.13	2.26
578.00	392.76	1.00	388.45	0.14	2.39
579.00	399.07	1.00	395.91	0.14	2.53
580.00	405.63	1.00	402.35	0.14	2.67
581.00	412.52	1.00	409.07	0.14	2.82
582.00	421.33	1.00	416.92	0.15	2.96

583.00	427.22	1.00	424.27	0.15	3.11
584.00	432.68	1.00	429.95	0.15	3.26
585.00	438.00	1.00	435.34	0.15	3.41
586.00	443.01	1.00	440.50	0.15	3.57
587.00	452.21	1.00	447.60	0.16	3.72
588.00	459.42	1.00	455.81	0.16	3.88
589.00	465.77	1.00	462.60	0.16	4.05
590.00	471.59	1.00	468.68	0.16	4.21
591.00	476.18	1.00	473.89	0.17	4.38
592.00	480.36	1.00	478.27	0.17	4.54
593.00	484.65	1.00	482.50	0.17	4.71
594.00	488.74	1.00	486.69	0.17	4.88
595.00	492.67	1.00	490.70	0.17	5.05
596.00	496.34	1.00	494.51	0.17	5.23
597.00	499.21	1.00	497.78	0.17	5.40
598.00	502.14	1.00	500.67	0.18	5.58
599.00	505.73	1.00	503.93	0.18	5.75
600.00	509.06	1.00	507.39	0.18	5.93
601.00	511.85	1.00	510.45	0.18	6.11
602.00	514.32	1.00	513.08	0.18	6.29
603.00	516.40	1.00	515.36	0.18	6.47
604.00	518.33	1.00	517.37	0.18	6.65
605.00	520.46	1.00	519.39	0.18	6.83
606.00	522.31	1.00	521.38	0.18	7.01
607.00	524.33	1.00	523.32	0.18	7.20
608.00	526.02	1.00	525.17	0.18	7.38
609.00	527.96	1.00	526.99	0.18	7.57
610.00	529.61	1.00	528.79	0.19	7.75

Project Geology

The proposed Keshavapuram raw water collection reservoir site forms part of the Survey of India toposheet no.E44M10.This site is approximately 35 Km from Hyderabad, near village Keshavapuram of taluka Shamirpet of Rangareddy district, Telangana.

The proposed site for collection of raw water reservoir is granitic area; hard massive rock is present as seen in exposed condition; however, the same rock is available below the soil cover also.

The site is a large depression slopping towards the centre; It is surrounded by denudation hills at higher topographic level, forming part of the boundary of the reservoir. The site appears free from negative anomalies viz, shear zone, faults and fault zone etc.

JUSTIFICATION FOR LOCATING THE PROJECT IN FOREST AREA:

Reservoir Site Selection

The topographical location of the reservoir site is so selected such that, it is in the gorge portion near the hillock area and having adequate storage capacity.

Experts of Hyderabad Metropolitan Water Supply & Sewerage Board, Govt. of Telangana and WAPCOS visited the proposed reservoir site at Keshavapuram. After geological reconnaissance and detailed appraisal of the geological features of the project area, the proposed site has been found to be geologically safe and suitable for construction of the proposed water storage reservoir. Based on toposheet identification and satellite imageries, some tentative sites around Hyderabad city were visited. Selected areas were traversed and physiographical and other relevant features noted for further examination.

All the alternatives have been examined and selected the present location with respect to the above criteria to have sufficient storage of water wherein forest land of 409.53 Ha as per notification(387.13Ha horizontal area as per DGPS) for reservoir have been involved in this project as detailed below.

I)

<u>S. No.</u>	<u>Division</u>	<u>Block</u>	<u>Compartment No.</u>	<u>Component Description</u>	<u>Area in Ha</u>
1.	Medchal	Keshavapuram-RF	242 & 243	Earthen Bund area	198.00
				Submergence area.	211.53
				Total:	409.53 Ha

- 409.53 Ha as per notification(387.13Ha horizontal area as per DGPS)

II)

<u>S. No.</u>	<u>Component Description</u>	<u>Forest land area in Ha</u>	<u>Non forest land area in Ha</u>
1	Earthen Bund area	198.00	114.30
2	Submergence area.	211.53	146.84
Total:		409.53 Ha	261.14 Ha

- 409.53 Ha as per notification(387.13Ha horizontal area as per DGPS)

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