International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

The Design of Water Supply System for Tasgaon

Jadhav Ankita[1#], Gadekar Aniket[1#], Thite Aditya[1#], Gaikwad Dnyaneshwar[1#], Prof Ashwini Waghule[2]

U.G. Students, Department of Civil Engineering, D Y Patil School of Engineering and Technology, Lohegaon, Pune, Maharashtra, India1#

Assistant Professor, Department of Civil Engineering, D Y Patil School of Engineering and Technology, Lohegaon, Pune, Maharashtra, India2

Submitted: 20-03-2022 Revised: 27-03-2022 Accepted: 30-03-2022

ABSTRACT
This paper demonstrates the design of rural water distribution system for area located in the rural region. For this study, water supply distribution network is designed for population estimated for future 30 years. Water GEMS is hydraulic modelling software which is used for analysis and design of water distribution network. The study presents hydraulic analysis of Tasgaon Village & comprise of a cost-optimised system so as to make it economical for villagers and other stakeholders to bear the expenses of implementation. Google Earth used for ensuring layout of water distribution network and Satellite image of study area shown effectiveness for selection of alternate alignment of road.The design follows various guidelines laid by Indians standard CPHEEO(Central Public Health And Environmental Engineering Organisation) Manual and Jal Jeevan Mission for maintaining the quality of the process.

KEYWORDS: Rural region, Distribution Network, Water Gems, JJM(Jal Jeevan Mission), CPHEEO Manual.

I. INTRODUCTION

India being in tropical region has sample amount of water available for various human needs but most of the water resources are seasonal. The amount of water varies in them as per the seasonal changes and use. Various storage facilities allowed us to use them and alter as per our demand.

Water from various ground water and surface water sources is received by the water supply system, where it gets purified, disinfected, chlorinated. This treated water is sent to elevated reservoirs or tanks, from which the water enters the water distribution networks. Water distribution networks serves the purpose of supplying water for drinking, washing, sanitation, irrigation, fire-fighting etc. The objective of the distribution system is to make accessible the water to every house, industrial plants and public places. Every point has to be supplied with optimum quantity of water with the desired pressure. Therefore the water has to be taken to the roads and streets in the city and finally to the individual houses. This activity of taking the water from the treatment plant to the individual homes is done through a well-planned distribution system.

A water distribution network is an essential hydraulic infrastructure which is a part of the water supply system composed of a different set of pipes, hydraulic devices and storage reservoirs. Water distribution network connects consumers to sources of water using hydraulic components. A distribution network may have different configurations depending upon the layout of the existing area. Generally, water distribution network have a branched and looped type of configuration of pipelines. The primary variable is flow in the network. The constraints are that demands are to be met and pressures at selected junctions in the network are to be within specified limits. The decision variables thus consists of design parameters i.e. pipe diameters, reservoir capacity, and elevation.

WaterGEMS are software that performs extended period simulation of hydraulic and water quality behaviour within pressurized pipe networks. Water GEMS tracks the flow of water in each pipe, the pressure at each junction, the height of water in each tank, and the concentration of water throughout the network during a simulation period. Water GEMS is optimization software that can be used to simulate or design new or partially existing gravity fed water distribution systems. The software finds the lowest allowable diameter for each pipe segment that will allow the system to

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

function, or more specifically, to meet the minimum pressure requirements at all junctions. Since pipe diameters are linked to the capital cost of the network.

II. STUDY AREA

Tasgaon is a village in Hatkangale Taluka, in Kolhapur District. It belongs to paschim region. It belongs to Pune Division. It is located 19 km towards East from District head quarters Kolhapur. 361 km from State capital Mumbai towards west.Tasgaonpincode is 416122 & postal head office is kolhapur Town. shown in Figure .

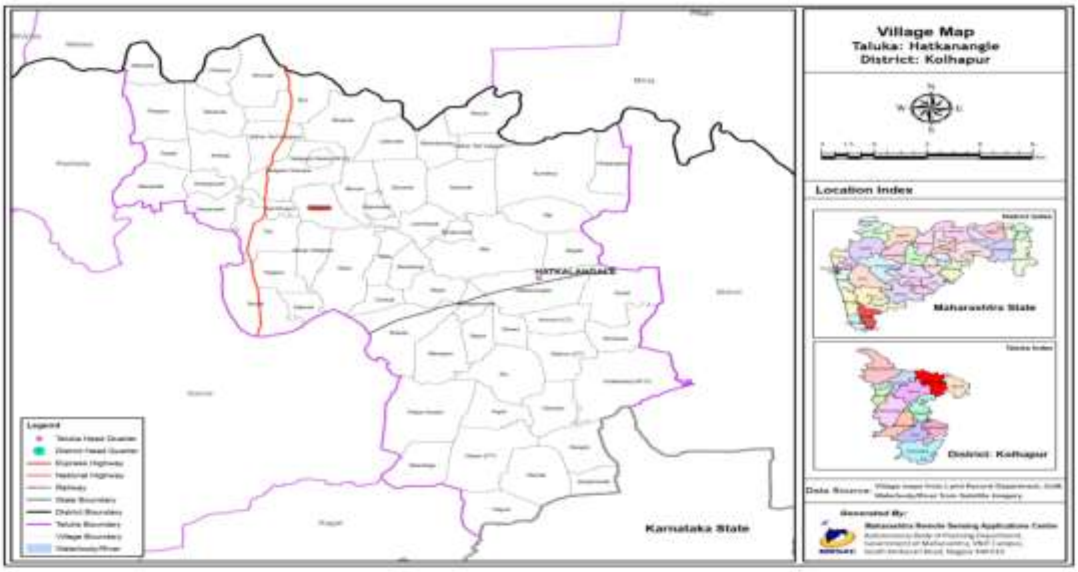


Figure : Index map of Tasgaon Village.

At present Tasgaon is getting water supply the well situated at the village. A tap water supply scheme was started in the year 2007 under SWAJALDHARA scheme for the village Tasgaon. The following appendices were included in the scheme. Tasgaon is a small village in Hatkanangle District Kolhapur and in State of Maharashtra India. Village has population of 2105 as per census data of 2011, in which male population is 1132 and female population is 973. Total geographical area of Tasgaon village is 841 Hectares. Population density of Tasgaon is 3 persons per Hectares. Total number of house hold in village is 443. As per the Census Data 2011 there are 860 Females per 1000 males out of 2105 total population of village. There are 766 girls per 1000 boys under 6 years of age in the village. Out of total population total 1548 people in Tasgaon Village are literate, among them 886 are male and 662 are female in the village. Total literacy rate of Tasgaon is 80.79%, for male literacy is 86.44% and for female literacy rate is 74.3%.

III. METHODOLOGY:

The design population will have to be estimated by considering all the factors governing the future growth and development of the project area in the industrial, commercial, educational, social, and administrative spheres. Special factors causing sudden immigration or influx of population are also being considered. A study of these factors would help in selecting the most suitable method of deriving the actual trend of the population growth in the particular area. The different methods for the projection of population are Demographic Method, Arithmetic Increase Method, Incremental Increase method, Geometrical Increase Method, Graphical Method. Out of these five methods, we used the Arithmetic increase method, incremental increase method, and Geometric Increase Method for projection of population and take the mean value of population for the next 30 years.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

POPULATION FORCASTING:

YEAR	POPULATION	INCREASE IN DECADE	INCREMENTAL INCREASE IN DECADE	RATE OF GROWTH PER DECADE
1971	1139			
1981	1335	196		0.1721
1991	1699	364	168	0.2727
2001	1889	190	-174	0.1118
2011	2105	216	26	0.1143
TOTAL	8167	966	20	
AVERAGE :-	1633	242	7	0.1565

OUTCOME OF POPULATION FORCAST				
YEAR	ARITHMETICAL METHOD	INCREMENTAL INCREASE METHOD	GEOMETRIC PROGRESSION METHOD	AVERAGE OF A.I., I.I., G.I (2, 3, 4)
1	2	3	4	5
2023	2421	2446	2601	2490
2038	2784	2845	3235	2955
2053	3147	3260	4023	3477

DEMAND CALCULATION:

Design Parameters	Present stage	Intermediate Stage	Ultimate Stage
	2023	2038	2053
Population	2490	2955	3477
Rate of water supply LPCD	55	55	55
Daily net demand in MLD	0.14	0.16	0.19
Total Net demand in MLD	0.16	0.18	0.21
Total Gross demand in MLD (15 % Losses)	0.19	0.22	0.25

CAPACITY CALCULATION FOR ESR:

S. No.	Particulars	Design Stage	
1	Daily Demand of Intermediate Stage (2038)	0.22	ML
2	Assuming 12 hour Capacity of E.S.R (as per Norms)	108226	Lits
3	**Say**	109000	Lits
4		109.00	Cum
5	Depth of water	4.50	M

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

6	Area in Sqm	24.22	Sqm
7	Dia. as per calculations	5.60	M
8	Capacity Proposed	109000	Lits
9	Existing Capacity	60000	Lits
10	Required Capacity Of ESR	49000	Lits

RECAPULATION SHEET:

Sr. No	Sub-Estimate	Amount Rs.
1	RAW WATER RISING MAIN (HDPE) 8 kg/cm2 DIA 125 MM L-2250 M)	2286248.00
2	RAW WATER PUMPING MACHINARY (5 HP 1 W + 1S, , 43.0 M HEAD)	180806.00
3	WATER TREATMENT PLANT CAP- 0.50 MLD	3386250.00
7	PURE WATER RISING MAIN (P.V.C 6 Kg/cm 110 mm, LENGTH-100 M)	314451.00
6	PURE WATER PUMPING MACHINERY AT WTP (3 HP 1 W + 1S, 22.0 M HEAD)	175855.00
9	RCC ESR OF CAPACITY 49000 LL AT WTP	1224872.00
11	DISTRIBUTION SYSTEM : 63mm-10457m, 75mm-386m, 90mm-295mm, 110mm-163m, 125mm-76m, 140mm-85m	9975887.00
17	MISELINIOUS WORK	915389.00
18	TRIAL AND RUN FOR 1 YEAR	402889.00
	Total cost	18862647.00
	Add 12% GST	2263517.64
	Add 4% Supervision & Contingencies Charges	754505.88
	Total Gross Cost	21880670.52
	Say	21880671.00

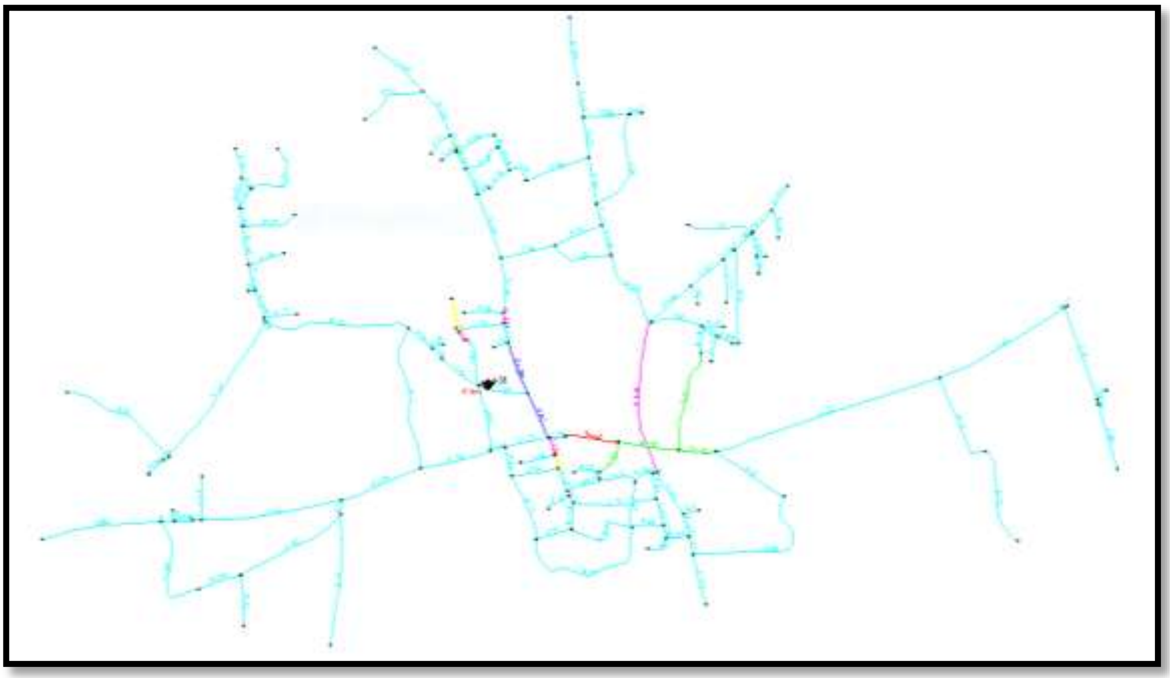
The rates used for estimating the system has been takenfrom the District Schedule Rated (DSR – 2021-22) created by Maharashtra Jeevan Pradhikaran (MJP**)**. The total cost of water distribution system includes all the factors including lead rates, standard testing procedures, royalty charges etc.

IV. RESULT &DISCUSSION:

In the city pipes are laid of various materials such as R.C.C., C.I. and HDPE. for thedistribution system. Primarily, reservoir was a focal point from where the pipes and nodes will be drawn through Water GEMS software. Elevation and flow direction were automatically taken from the input parameters by the software. While digitizing the pipe line and the nodes care were taken elevation was considered from the previous

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

level was considered. Then the network is designed as



Schematic Diagram of Real Network Showing All Pipes

SR. NO	Diameter	Length	Colour
1	57	10457	Sky Blue
2	67.8	386	Parrot
3	81.4	295	Pink
4	98.2	163	Blue
5	113	76	Yellow
6	126.6	85	Orange

The complete network is designed and finally the network is computed. After computation of network the next step is to validate the results and if there are errors in network then those errors are adjusted and further the network is validate. Finally the results for pipe network are obtained as follows,

Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Head loss Gradient (m/km)
P1	11	57	HDPE	140	-0.0039	0	0
P2	16	57	HDPE	140	0.0054	0	0
P3	16	57	HDPE	140	0.0056	0	0
P4	25	57	HDPE	140	-0.0086	0	0
P5	26	57	HDPE	140	0.0091	0	0.0029

P6	28	57	HDPE	140	-0.0098	0	0
P7	31	57	HDPE	140	0.0108	0	0
P8	37	57	HDPE	140	0.1304	0.05	0.0835
P9	37	57	HDPE	140	0.1359	0.05	0.0895
P10	39	57	HDPE	140	0.0139	0.01	0
P11	42	57	HDPE	140	-0.0147	0.01	0.0018
P12	43	57	HDPE	140	-0.015	0.01	0.0017
P13	41	57	HDPE	140	-0.0143	0.01	0.0018
P14	41	57	HDPE	140	0.1249	0.05	0.0775
P15	43	57	HDPE	140	0.1717	0.07	0.1377
P16	45	57	HDPE	140	0.0159	0.01	0.0016
P17	55	57	HDPE	140	0.0192	0.01	0.002
P18	57	57	HDPE	140	0.02	0.01	0.0026
P19	61	57	HDPE	140	0.0215	0.01	0.003
P20	65	57	HDPE	140	-0.0226	0.01	0.0035
P21	67	57	HDPE	140	0.0236	0.01	0.0033
P22	67	57	HDPE	140	0.0236	0.01	0.0033
P23	72	57	HDPE	140	-0.0254	0.01	0.0041
P24	72	57	HDPE	140	-0.0253	0.01	0.0041
P25	77	57	HDPE	140	0.0272	0.01	0.0048
P26	92	57	HDPE	140	-0.0609	0.02	0.0202
P27	72	126.6	HDPE	140	7.851	0.62	3.3643
P28	92	57	HDPE	140	0.0323	0.01	0.0065
P29	97	57	HDPE	140	0.034	0.01	0.0069
P30	104	57	HDPE	140	0.0363	0.01	0.0075
P31	92	57	HDPE	140	-0.0321	0.01	0.0065
P32	113	57	HDPE	140	-0.0395	0.02	0.0092
P33	109	57	HDPE	140	-0.0384	0.02	0.0089
P34	150	57	HDPE	140	0.1589	0.06	0.1199
P35	143	57	HDPE	140	0.05	0.02	0.0141
P36	151	57	HDPE	140	-0.0531	0.02	0.0157
P37	144	57	HDPE	140	-0.0507	0.02	0.0144
P38	148	57	HDPE	140	0.4879	0.19	0.9558
P39	155	57	HDPE	140	0.0552	0.02	0.0166
P40	258	57	HDPE	140	0.0907	0.04	0.0426
P41	201	57	HDPE	140	0.0706	0.03	0.0266
P42	219	57	HDPE	140	0.0767	0.03	0.031
P43	246	57	HDPE	140	1.06	0.42	4.022
P44	30	57	HDPE	140	-0.0106	0	0
P45	10	57	HDPE	140	0.0037	0	0
P46	219	57	HDPE	140	-0.077	0.03	0.0312

P47	124	57	HDPE	140	0.0436	0.02	0.0108
P48	108	57	HDPE	140	-0.0377	0.01	0.0083
P49	491	57	HDPE	140	-0.1722	0.07	0.1389
P50	76	113	HDPE	140	6.5259	0.65	4.1549
P51	241	57	HDPE	140	0.8893	0.35	2.9053
P52	22	57	HDPE	140	0.3518	0.14	0.5245
P53	90	57	HDPE	140	0.1499	0.06	0.108
P54	72	57	HDPE	140	0.0252	0.01	0.0031
P55	85	57	HDPE	140	0.1291	0.05	0.0812
P56	68	57	HDPE	140	0.024	0.01	0.0043
P57	86	57	HDPE	140	0.2632	0.1	0.3044
P58	36	57	HDPE	140	0.0126	0	0.0021
P59	35	57	HDPE	140	0.0969	0.04	0.0478
P60	121	57	HDPE	140	0.0423	0.02	0.0105
P61	97	57	HDPE	140	0.034	0.01	0.0069
P62	7	57	HDPE	140	0.086	0.03	0.0455
P63	52	57	HDPE	140	0.0674	0.03	0.0243
P64	69	57	HDPE	140	-0.1112	0.04	0.0622
P65	19	57	HDPE	140	0.0067	0	0
P66	40	57	HDPE	140	-0.1629	0.06	0.125
P67	38	57	HDPE	140	-0.0336	0.01	0.0078
P68	35	57	HDPE	140	0.042	0.02	0.0107
P69	27	57	HDPE	140	0.0095	0	0
P70	31	57	HDPE	140	0.0573	0.02	0.0191
P71	27	57	HDPE	140	0.0093	0	0
P72	18	57	HDPE	140	-0.0064	0	0
P73	39	57	HDPE	140	-0.0375	0.01	0.0096
P74	58	57	HDPE	140	0.5081	0.2	1.0304
P75	28	57	HDPE	140	0.2891	0.11	0.3623
P76	65	57	HDPE	140	0.3901	0.15	0.6313
P77	73	57	HDPE	140	0.1985	0.08	0.1806
P78	343	57	HDPE	140	0.2968	0.12	0.3804
P79	154	57	HDPE	140	0.0542	0.02	0.0164
P80	15	57	HDPE	140	0.0054	0	0
P81	43	57	HDPE	140	0.0154	0.01	0
P82	0	57	HDPE	140	0.0001	0	0
P83	20	57	HDPE	140	0.007	0	0
P84	189	57	HDPE	140	-0.3419	0.13	0.4946
P85	23	57	HDPE	140	-0.5575	0.22	1.2228
P86	198	57	HDPE	140	-0.0694	0.03	0.0258
P87	261	57	HDPE	140	-0.2589	0.1	0.2956

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

P88	47	57	HDPE	140	0.0164	0.01	0.0016
P89	52	57	HDPE	140	0.0938	0.04	0.0457
P90	39	57	HDPE	140	0.1876	0.07	0.1626
P91	42	57	HDPE	140	0.1591	0.06	0.1195
P92	20	57	HDPE	140	0.1863	0.07	0.1607
P93	43	57	HDPE	140	0.015	0.01	0.0017
P94	151	57	HDPE	140	-0.0528	0.02	0.0158
P95	73	57	HDPE	140	-0.1955	0.08	0.176
P96	64	57	HDPE	140	0.1352	0.05	0.0879
P97	94	57	HDPE	140	0.033	0.01	0.0071
P98	221	57	HDPE	140	0.6282	0.25	1.5264
P99	47	57	HDPE	140	0.0493	0.02	0.0142
P100	21	57	HDPE	140	0.2321	0.09	0.2412
P101	46	57	HDPE	140	0.1581	0.06	0.1183
P102	5	57	HDPE	140	-0.1731	0.07	0.1454
P103	36	57	HDPE	140	-0.2417	0.09	0.2603
P104	104	57	HDPE	140	-0.0364	0.01	0.0079
P105	29	57	HDPE	140	0.2467	0.1	0.2697
P106	79	57	HDPE	140	0.0276	0.01	0.0047
P107	17	67.8	HDPE	140	-1.1192	0.31	1.9073
P108	6	57	HDPE	140	0.4523	0.18	0.8308
P109	82	57	HDPE	140	-0.1808	0.07	0.1518
P110	23	57	HDPE	140	-0.2472	0.1	0.269
P111	28	57	HDPE	140	0.1849	0.07	0.1586
P112	31	67.8	HDPE	140	-1.1865	0.33	2.1279
P113	84	67.8	HDPE	140	-1.2438	0.34	2.3228
P114	104	57	HDPE	140	-0.7916	0.31	2.3416
P115	83	57	HDPE	140	-1.0389	0.41	3.8748
P116	44	57	HDPE	140	-0.3802	0.15	0.6037
P117	60	57	HDPE	140	0.2804	0.11	0.3424
P118	3	57	HDPE	140	-0.4099	0.16	0.7088
P119	30	57	HDPE	140	-0.4411	0.17	0.7915
P120	45	57	HDPE	140	0.3961	0.16	0.6491
P121	40	57	HDPE	140	0.3584	0.14	0.5399
P122	495	57	HDPE	140	1.0912	0.43	4.2437
P123	197	81.4	HDPE	140	-1.3256	0.25	1.0728
P124	41	57	HDPE	140	0.3339	0.13	0.473
P125	77	57	HDPE	140	0.2041	0.08	0.1903
P126	35	57	HDPE	140	0.1465	0.06	0.1033
P127	115	98.2	HDPE	140	3.6107	0.48	2.7512
P128	48	98.2	HDPE	140	3.0249	0.4	1.9812

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

P129	134	67.8	HDPE	140	-1.1019	0.31	1.8557
P130	7	57	HDPE	140	0.4195	0.16	0.723
P131	23	57	HDPE	140	-0.3626	0.14	0.55
P132	49	57	HDPE	140	-0.2644	0.1	0.3077
P133	229	57	HDPE	140	-0.4091	0.16	0.6895
P134	45	57	HDPE	140	-0.0157	0.01	0.0017
P135	45	57	HDPE	140	-0.0788	0.03	0.0331
P136	68	57	HDPE	140	-0.4418	0.17	0.7952
P137	84	57	HDPE	140	-0.5167	0.2	1.0628
P138	73	81.4	HDPE	140	-2.5239	0.48	3.535
P139	120	67.8	HDPE	140	-1.1909	0.33	2.1428
P140	25	81.4	HDPE	140	-2.3882	0.46	3.1918
P141	14	57	HDPE	140	0.452	0.18	0.828
P142	49	57	HDPE	140	0.0171	0.01	0.0015
P143	3	126.6	HDPE	140	3.6757	0.29	0.8343
P144	4	126.6	HDPE	140	4.368	0.35	1.1285
P145	4	126.6	HDPE	140	8.0365	0.64	3.5178
P146	2	126.6	HDPE	140	3.673	0.29	0.7969

Optimal Layout of Network with Pipe Section Data for HDPE Pipe

After finalizing, all the pipes and the nodes, inputs such as demand and the pipe material will be provided to thesoftware. Software takes into consideration of the elevation, contour, demand, pipe material and other parameters. A simulation was carried out by the software's, were it decides the diameter of the pipe and flow direction and flow quantity along with the drawing profile and the results of junctions are as follows,

Label	Elevation (m)	Demand (ML/day)	Hydraulic Grade (m)	Pressure (m H2O)
J1	614.75	0.0014	625.65	10.9
J2	614.74	0.0024	625.65	10.9
J3	613.8	0.0009	625.38	11.6
J4	613.91	0.0044	625.25	11.3
J5	606.99	0.0003	623.96	16.9
J6	607.2	0.0029	623.96	16.7
J7	615.8	0.0023	625.24	9.4
J8	615.02	0.0005	625.24	10.2
J9	610.7	0.0109	625.01	14.3
J10	608.88	0.0022	626.58	17.7
J11	609.24	0.0005	626.58	17.3
J12	603.14	0.0028	623.92	20.7
J13	603.8	0.0047	623.92	20.1
J14	609.43	0.0007	626.15	16.7

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

J15	608.48	0.0042	626.15	17.6
J16	617.23	0.0042	625.58	8.3
J17	616.68	0.0008	625.58	8.9
J18	605.78	0.0008	625.43	19.6
J19	606.95	0.0019	625.43	18.4
J20	614.33	0.0055	625.31	11
J21	614.02	0.0009	625.31	11.3
J22	617.88	0.0053	625.6	7.7
J23	616.98	0.0025	625.59	8.6
J24	617.42	0.0031	625.58	8.1
J25	617.03	0.0031	625.58	8.5
J26	613.51	0.0029	625.38	11.8
J27	613.1	0.0012	625.38	12.3
J28	605.61	0.0013	625.42	19.8
J29	607.17	0.0045	625.42	18.2
J30	614.55	0.0013	626	11.4
J31	615.4	0.0043	626	10.6
J32	610.6	0.0009	625.01	14.4
J33	610.6	0.0003	625.01	14.4
J34	607	0.0012	623.92	16.9
J35	607.2	0.0151	623.92	16.7
J36	613.48	0.0059	625.38	11.9
J37	612.95	0.006	625.37	12.4
J38	615.78	0.0035	625.65	9.8
J39	606.11	0.0039	625.47	19.3
J40	608.07	0.0037	625.47	17.4
J41	616.94	0.0041	625.24	8.3
J42	616.8	0.0014	625.24	8.4
J43	607.77	0.0032	623.99	16.2
J44	607.69	0.0017	623.99	16.3
J45	608.39	0.0006	626.58	18.1
J46	609.77	0.0058	626.58	16.8
J47	613.98	0.0032	626.01	12
J48	613.61	0.0017	626.01	12.4
J49	615.98	0.0023	625.24	9.2
J50	615.6	0.0008	625.24	9.6
J51	606.41	0.0049	623.94	17.5
J52	606.69	0.0019	623.94	17.2
J53	608.08	0.002	626.05	17.9
J54	607.2	0.005	626.05	18.8

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 3 Mar 2022, pp: 1135-1147 www.ijaem.net ISSN: 2395-5252

J55	610.8	0.0105	625.02	14.2
J56	610.7	0.002	625.02	14.3
J57	615.24	0.0048	625.26	10
J58	614.29	0.002	625.26	10.9
J59	608.97	0.0039	625.46	16.5
J60	607.99	0.0059	625.47	17.4
J61	606.48	0.0043	625.46	18.9
J62	609.18	0.0006	625.46	16.2
J63	609.15	0.0022	626.08	16.9
J64	607.8	0.0036	626.08	18.2
J65	613.2	0.0022	626.01	12.8
J66	614.28	0.0042	626.01	11.7
J67	611.44	0.0103	625.06	13.6
J68	611	0.0023	625.06	14
J69	610.7	0.004	625.01	14.3
J70	616.81	0.0038	625.59	8.8
J71	617.78	0.0035	625.58	7.8
J72	611.37	0.0049	626.58	15.2
J73	610.14	0.017	626.34	16.2
J74	604.92	0.0055	623.92	19
J75	606.37	0.0028	623.92	17.5
J76	616.24	0.0039	625.64	9.4
J77	618.28	0.0076	625.58	7.3
J78	607.16	0.0078	625.72	18.5
J79	609.33	0.0029	625.72	16.4
J80	611.43	0.018	625.27	13.8
J81	611.3	0.0029	625.27	13.9
J82	615.76	0.0048	626	10.2
J83	615.54	0.0182	623.03	7.5
J84	615.22	0.0031	623.03	7.8
J85	610.54	0.0028	625.05	14.5
J86	611	0.0095	625.05	14
J87	603.43	0.0034	625.41	21.9
J88	606.38	0.0091	625.41	19
J89	615.06	0.0033	625.24	10.2
J90	616.1	0.0048	625.24	9.1
J91	604.27	0.0033	623.92	19.6
J92	602.04	0.0037	623.92	21.8
J93	615.17	0.0067	625.71	10.5
J94	615.23	0.0115	625.64	10.4

J95	611.54	0.0215	625.4	13.8
J96	613.78	0.0011	625.38	11.6
J97	616	0.0263	623.51	7.5
J98	615.54	0.0091	623.49	7.9
J99	617.69	0.0125	625.59	7.9
J100	606.66	0.0121	626.58	19.9
J101	615.44	0.0061	625.25	9.8
J102	615.01	0.0046	623.49	8.5
J103	613.53	0.0144	625.77	12.2
J104	612.91	0.0073	625.77	12.8
J105	615.9	0.0117	623.17	7.3
J106	615.8	0.0053	623.03	7.2
J107	614.73	0.0048	625.37	10.6
J108	605.04	0.0084	625.73	20.6
J109	609.99	0.0022	625.72	15.7
J110	617.04	0.0124	625.57	8.5
J111	617.33	0.0178	625.56	8.2
J112	605.28	0.0051	625.48	20.2
J113	612.5	0.0029	625.47	12.9
J114	611.5	0.0125	625.15	13.6
J115	610.02	0.00161	625.15	15.1
J116	606.98	0.0074	625.43	18.4
J117	609.01	0.0166	625.42	16.4
J118	612.5	0.0119	625.69	13.2
J119	606.49	0.0148	624.7	18.2
J120	612.8	0.0088	626.02	13.2
J121	617.26	0.0013	625.58	8.3
J122	610.38	0.0046	625.05	14.6
J123	610.94	0.0117	625.18	14.2
J124	610.48	0.0077	625.43	14.9
J125	607.82	0.0154	624	16.1
J126	607.11	0.006	623.92	16.8
J127	602.05	0.0014	623.92	21.8
J128	611.28	0.0047	625.27	14
J129	615.13	0.0149	622.96	7.8
J130	615.77	0.0006	623.03	7.2
J131	616.79	0.0014	625.24	8.4
J132	616.79	0.0024	625.57	8.8
J133	606.09	0.0031	625.41	19.3
J134	610.01	0.0067	625	15

J135	615.58	0.0005	623.17	7.6
J136	613.48	0.0133	626	12.5
J137	614.24	0.0138	625.58	11.3
J138	616.1	0.0237	625.61	9.5
J139	611.01	0.0012	626.6	15.6
J140	611.02	0.0055	626.6	15.5

Optimal Layout of Network with Junction Data for HDPE Pipe

V. SUMMARY & CONCLUSION

An effective Water distribution system ensures the supply of pure water at consumer's households which will promote the socio-economic development at prior levels and help people to better themselves in living aspects. In this project WaterGEMS software is used for obtaining optimal design of water supply network of a part of Tasgaon Village. The software also gives different alternative optimal design solution considering pipe diameters and pipe material. The WaterGEMS software provide required standard and economical environment for design, analysis and troubleshooting of new and existing supply network withaccuracy and minimum time duration. The software is also used for solving problems in expansion of existing water supply network.

REFERENCE

[1]. Roy Pankaj Kumar, Konar Ankita and Paul Somnath (2014), "Development and Hydraulic Analysis of aProposed Drinking Water Distribution Network Using Water GEMS and GIS", pp.371-379.

[2]. MJP - "Basics of water supply system - Training Module for Local Water and Sanitation Management" – CEPT University, 2012

[3]. McKenzie RD (1999) SANFLOW user guide. South Africa Water Research Commission, WRC Report TT 109/99

[4]. McKenzie RD (2001) PRESMAC user guide. South Africa Water Research Commission, WRC Report TT 152/01

[5]. Lambert A (1997) Pressure management/leakage relationships: theory, concepts, and practical applications. In: Proceedings of minimizing leakage in water supply/distribution systems, IQPC Seminar, London, April 1997

[6]. Lambert AO, Brown TG, Takizawa M, Weimer D (1999) A review of performance indicators for real losses from water supply systems. AQUA 48(6):227–237