GAURIYAPUR ESTIMATES

6459 15/09/2010

COMPUTER DESIGN FOR ECONOMIC SIZE OF PUMPING MAIN (Taking Water Hammer Pressure into consideration)

Scheme Gauriyapur W/S Scheme, Kannauj

Line # 1 From : TW1 to OHT

1) Water requirem		Discharge		Pumping Hour(X)	Design Period
Stage	Year	lpm	Mld(Ql)		(n)
Initial	2012	500	0.13110	4.37	
Middle	2027	500	0.18510	6.17	15 Yrs
Ultim	2042	500	0.25950	8.65	30 Yrs

2) Pumping Main	CI/DI	50	
Length (meters	AC	0	50.00 M
3) Static head on	Hs	5.00	
	Hd	40.00	45 M
5) Combined eff. of pump set			60.00 %
6) Cost of pumping unit		Rs.	16000 /KW
7) Interest rate		(i)	10.00 %
8) Life of elec.motors & PumpSets			15 yr.
9) Energy charges		(Ec) Rs.	3.5 /KWH Unit

PIPE DATA — Excavation Rate : Rs 70.00 /cub.m

DIA.	CI/DI Pipe					AC Pipe			
				Rates per Rm			Rates per Rm		Excavation
MM	Type	Class NWC W/kPa		Supply	Lay&Jntg	Class NWC W/kPa	Supply	Lay&Jntg	Rates/Rm
100	CI	B	100.0 160.0	931.70	18.33	75.0	0.00	0.00	53.90
125	CI	A	100.0 125.0	1052.00	17.06	75.0	0.00	0.00	57.09
150	CI	A	100.0 125.0	1269.00	21.81	75.0	0.00	0.00	60.38
80	DI	K-9	140.0 350.0	660.00	18.38	75.0	0.00	0.00	51.41
100	DI	K-9	140.0 350.0	968.00	13.09	75.0	0.00	0.00	53.90
125	DI	K-9	140.0 350.0	804.50	17.06	75.0	0.00	0.00	57.09
150	DI	K-9	140.0 350.0	941.00	21.81	75.0	0.00	0.00	60.38

CALCULATIONS :

		1st 15 years	2nd 15 years
1) Average Discharge	(Qa)	0.1581 mld	0.2178 m/d
2) Average hours of pumping for Avg Discharge	(Xa)	5.2700 hrs	7.2600 hrs
3) KW reqd at 61% combined eff.of pumping set	(KW)	0.1342 * H1	0.1542 * H2
4) Ave annual energy charges in Rs.	(Cr)	6738.85 * KW1	9280.75 * KW2
5) Capitalised Energy Charges	(Cc)	7.606 * Cr1	7.606 * Cr2
6) Present worth of sum required after		15Yrs for pump	0.239 * Cost of Pump
		15Yrs for energy	0.239 * Cc2

Data for Water Hammer Calculation

k =	2.07E+08 Kg/sqm.
E(CI)=	7.50E+09 Kg/sqm.
E(DI) =	1.70E+10 Kg/sqm.
E(AC) =	3.00E+09 Kg/sqm.
g =	9.81 m/sec/sec

$$H_{max} = \frac{1425}{\sqrt{1 + \frac{K\,d}{E\,C_1}}} * \frac{V_s}{g}$$

TABLE 1 - VELOCITY AND HEADLOSSES (in Meters) FOR DIFFERENT PIPE SIZES

Pipe Size	Velocity in M/sec (Vs)		Friction Losses for 50m CI/DI pipe including 10% other losses in meters		Friction Losses for 0m AC pipe including 10% other losses in meters		CI/DI Pipe			AC Pipe		Ratio Max.Head including Hmax to Internal Design Pressure	
							Wall Thickness (Ct)	Max Water hammer prs'r in meters (Hmax)	Max Head Loss + Hd + D/S Losses + Hmax	Wall Thickness (Ct)	Max Water hammer prs'r in meters (Hmax)	Max Head Loss + Hd + D/S Losses + Hmax	
in mm (d)	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage							CI/DI / AC
100	1.062	1.062	1.196	1.196	0.000	0.000	0.0050	134.900	176.096	0.0000	0.000	0.000	1.10 / 0.0
125	0.679	0.679	0.404	0.404	0.000	0.000	0.0067	83.512	123.916	0.0000	0.000	0.000	0.66 / 0.0
150	0.472	0.472	0.166	0.166	0.000	0.000	0.0092	56.915	97.081	0.0000	0.000	0.000	0.78 / 0.0
80	1.659	1.659	1.903	1.903	0.000	0.000	0.0056	222.948	264.851	0.0000	0.000	0.000	0.74 / 0.0
100	1.062	1.062	0.542	0.842	0.000	0.000	0.0060	140.596	181.238	0.0000	0.000	0.000	0.50 / 0.0
125	0.679	0.679	0.217	0.217	0.000	0.000	0.0063	88.570	128.787	0.0000	0.000	0.000	0.35 / 0.0
150	0.472	0.472	0.089	0.089	0.000	0.000	0.0065	60.553	100.642	0.0000	0.000	0.000	0.28 / 0.0

TABLE 2 - KILOWATTS & COST OF PUMP SETS REQUIRED FOR DIFFERENT PIPE SIZES AND PIPE COST (Rs in Thousands)

Sl. No.	Pipe Size in mm	1st stage flow 0.1851 Mld: Hd Total head (meter)	Kw reqd + 0.00% standby	Pump Cost@Rs 16000 per kw	2nd stage flow 0.2505 Mld: H2 Total head (meter)	Kw reqd+ 0.00% standby	Pump Cost@Rs 16000 per kw	Class of Pipes: CI/DI	AC	Cost of pipe line (Supply + 10% for Spls. + excavation + laying and jointing): CI/DI 50.00m	AC 0.00m	Total 50.00m
1.	100	46.196	6.198	99.168	46.196	6.198	99.168	B	–	54.855	0.000	54.855
2.	125	45.404	6.092	97.472	45.404	6.092	97.472	A	–	61.568	0.000	61.568
3.	150	45.166	6.060	96.960	45.166	6.060	96.960	A	–	73.904	0.000	73.904
4.	80	46.903	6.293	100.688	46.903	6.293	100.688	K-9	–	36.089	0.000	36.089
5.	100	45.842	6.124	97.984	45.842	6.124	97.984	K-9	–	40.090	0.000	40.090
6.	125	45.217	6.066	97.056	45.217	6.066	97.056	K-9	–	47.955	0.000	47.955
7.	150	45.069	6.049	96.784	45.069	6.049	96.784	K-9	–	55.804	0.000	55.804

TABLE 3 - COMPARATIVE STATEMENT OF OVERALL COST OF PUMPING MAIN FOR DIFFERENT PIPE SIZES (Rs.in Thousands)

Sl. No.	PIPE SIZE in (mm)	1st stage flow 0.1851 Mld: Cost of pump sets	Annual Energy Charges (Cr1)	Capitalised Energy Charges (Cc1)	Capitalised Total Cost	2nd stage flow 0.2505 Mld: Cost of pump sets	Annual Energy Charges (Cr2)	Capitalised Energy Charges (Cc2)	Capitalised Total Cost		Grand Total of Capitalised cost for 30 yrs
1.	100	99.17	41.75	317.59	471.62	99.17	57.52	437.52	128.27		599.88
2.	125	97.47	41.84	312.14	471.18	97.47	56.53	430.00	126.97		597.24
3.	150	96.96	40.82	310.50	461.37	96.96	56.24	427.76	125.41		606.78
4.	80	100.69	42.39	322.45	459.22	100.69	58.40	444.21	130.23		589.45
5.	100	97.98	41.25	313.78	451.86	97.98	56.83	432.26	126.73	<<<	578.58 >>>
6.	125	97.06	40.87	310.85	455.86	97.06	56.30	428.24	125.55		581.41
7.	150	96.78	40.75	309.96	462.63	96.78	56.14	427.03	125.19		587.82

CONCLUSION

Most Economical size of Rising Main is..

<< 100mm >>

DI-K-9

Water Hammer device not reqd.

Reference: Manual on Water Supply and Treatment, Ministry of Urban Development, New Delhi

(3)

Gauriyapur water supply scheme Block-Jalalabad, District- Kannauj

JAL JEEVAN MISSION (2020-2021)

FROM - J (Comprehensive)

Sl. No.	Description of work	Amount (in Lacs)	%	Total Amount (Rs.in Lacs	Funding by U.P Govt.	Funding by India Govt.
1	Cost of work	34.85		34.85		
2	Contingencies	34.85	2%	0.70		
	Sub total			**35.54**		
3	Deduct For Departmental Efficiency	35.54	5%	1.78		
	Total			**33.76**	**16.88**	**16.88**
4	Departmental Centage	33.76	12.50%	4.22	4.22	
	Grand Total			**37.99**	**21.10**	**16.88**

Checked

(Arvind Kumar)
Computer

Prepared

(D.S.Gupta)
Assistant Engineer

CONTRUCTION DIVISION , U.P. JAL NIGAM, KANNAUJ.

Approved

(Sunil Kumar)
Executive Engineer
CONTRUCTION DIVISION , U.P. JAL NIGAM, KANNAUJ

OFFICE OF THE EXECUTIVE ENGINEER C.D.U.P.J.N. KANNAUJ

Details for Retrofitting

S.No.	District	Name Of PWS	Name Of Block	No of		Habitations		Household details			Cost Detail (Rs in Lakhs)			Tubewells Proposed		Power Source	DS Proposed
				GP	Villages	Total	Covered	Total	Existing FHTC	Proposed FHTC	Work	Centage	Total	New	Rebore	(Electric/ Solar)	Km
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Kannauj	Gauriyapur	Jalalabad	1	1	1	1	239	11	228	33.77	4.22	37.99	-	-	-	1.60

A.E.

E.E.

Gauriyapur water supply scheme Block-Jalalabad, District- Kannauj

Abstract of cost for schemes (Retrofitting) District Kannauj

Rs in Lakh

Sl.No	Name of scheme	No. of				Works proposed			Cost of work				Taxes		G Total (13+14+15)
		Village	Habitations	Households	Existing FHTC	Distribution system (Meter)	FHTC (Nos)	Misc.	Distribution system	FHTC	Misc	Total (10+11+12)	Labour cess@ 1%	G.S.T. @12%	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Gauriyapur water supply scheme Block- Jalalabad	1	1	239	11	1602.00	228	-	16.30	8.07	6.46	30.84	0.31	3.70	34.85

Assistant Engineer

	Bitumen Road	8.00	M^2	1603.75	12830.00
11	Provision of inter connection & jointing in following pipe lines including their supply of specials & all materials, labour & T&P etc.				
	A-63 mm dia to 90 mm dia	4	Nos.	2200.00	8800.00
	B-90/110 mm dia to 110/140/160 mm dia	3	Nos.	4100.00	12300.00
	C-110 mm dia to 140 mm dia	2	Nos.	4100.00	8200.00
				Total- A	**1629845.68**
12	Provision for ferruled house connection (FHTC) with 15mm dia GI (medium) pipe including supply of all material, labour, T & P etc. complete as per direction of engineer in charge.	228.00	Nos.	3541.37	807432.36
				Total-B	**807432.36**
13	Provision of chlorine dozer installtaion with their proper setup of liquied chlorine tank & supply of all material, labour, T & P etc. complete as per direction of engineer in charge.	1	Job	L.S.	25000.00
14	Provision of cleaning work of OHT (100 KL) with their vertical pipes & supply of all material, labour, T & P etc. complete as per direction of engineer in charge.	100.00	KL	145.00	14500.00
15	Internal seepage resisting treatment and repairing of ventiltor ladder , mess , railing of balcony and staircase of OHT with supply of all material, labour, T&P etc. complete as per direction of engineer in charge.	1.00	Job	42000.00	42000.00
16	Provision of various repairing & finising work are given below and completion of work in Direction of engineer in charge.				
	A-Construction & repairing of Ist class masonry brick work in (1:6) cement : local sand.	87.00	cum	5808.00	505296.00
	B- RCC repairng work in (1:15:3)	1.15	cum	9910.27	11396.81
	C-Repairing & plaster works in (1:6) Cement : local sand .	125.00	sqm	222.55	27818.75
	D-White washing by putty after old Paint scratching & painting work completed by three coat of apex ultima	165.00	sqm	123.34	20351.10
				Total-C	**646362.66**
	Total				**3083640.70**
	G.Total				

Assistant Engineer

RETROFITTING OF GAURIYAPUR WATER SUPPLY SCHEME
ESTIMATE OF DISTRIBUTION SYSTEM & OTHER WORKS

Sl. No.	Description	Qty.	Unit	Rate	Amount
1	3	4	5	6	7
1	Supply of following sizes of pipe including rail way freight and cartage up to store including all taxes etc. complete.				
	HDPE Pipes (PE-100,PN-6)				
	63 mm dia OD	1103.00	Per M	60.63	66874.89
	90 mm dia OD	285.00	Per M	123.00	35055.00
	110 mm dia OD	118.00	Per M	182.33	21514.94
	140 mm dia OD	96.00	Per M	301.51	28944.96
	Sub Total	**1602.00**			**152389.79**
2	Supply of specials for above HDPE pipes	5% of above HDPE item No. 1			7619.49
3	Carting,laying and jointing of the following sizes of pipe into the trenches including cost of all jointing material, labour,T & P and testing etc,complete.				
	HDPE Pipes (PE-100,PN-6)				
	63 mm dia OD	1103.00	Per M	23.57	25997.71
	90 mm dia OD	285.00	Per M	32.06	9137.10
	110 mm dia OD	118.00	Per M	39.58	4670.44
	140 mm dia OD	96.00	Per M	44.10	4233.60
4	Excavation for pipeline work in ordinary soil (loan clay and sand) with lift upto 1.5 m and lead upto 50 m including filling back the excavated earth into the trenches with watering ramming and disposal of surplus. Earth within 50 m are as per direction of Engineer incharge.	1188.68	Per M^3	269.53	320386.00
5	Supply of following fittings including F.O.R. destination and taxes and insurance etc. complete . Sluice valves class I as per IS 1538 (1969) with working pressure10kg/cm^2				
	50 mm dia	3	Each	3000.00	9000.00
	80 mm dia	0	Each	6536.00	0.00
	100 mm dia	2	Each	10680.00	21360.00
	125 mm dia	1	Each	14400.00	14400.00
	C.I. Single Ball Type Air Valve 25 mm	1	Each	3000.00	3000.00
	Fire Hydrant (sluice Valve type) as per I.S.369/1995	1	Each	11520.00	11520.00
	Scour Valve, 80 mm	1	Each	6000.00	6000.00
6	Carting of following fitting with specials to the site of work, lowering them into trenches, fixing in position and jointing them with pipe lines and testing etc. complete (including supply of jointing material) Wheel Valve working pressure 10 Kg/cm 2				
	50 mm dia	3	Each	846.11	2538.33
	80 mm dia	0	Each	846.11	0.00
	100 mm dia	2	Each	1077.97	2155.94
	125 mm dia	1	Each	1172.39	1172.39
	C.I. Single Ball Type Air Valve 25 mm	1	Each	779.38	779.38
	Fire Hydrant (sluice Valve type) as per I.S.369/1995	1	Each	618.78	618.78
	Scour Valve, 80 mm	1	Each	978.73	978.73
7	Provision for repairing of lekages in pre existing following sizes of PVC pipe line including all materials, labour T&P etc. complete.				
	63 mm dia OD	8.00	No	993.82	7950.56
	75 mm dia OD	0.00	No	1215.81	0.00
	90 mm dia OD	2.00	No	1430.80	2861.60
	110 mm dia OD	4.00	No	1772.51	7090.04
	140 mm dia OD	2.00	No	2224.96	4449.92
8	Supply of all types of materials and construct following Chambers as per types design with supply of all labour, T&P etc. complete.				
	Sluice Valve Chamber (Surface box type)	4	Each	3500.00	14000.00
	Sluice Valve Chamber (Masonay Type)	3	Each	22000.00	66000.00
	Fire Hydrant Chamber	1	Each	14000.00	14000.00
	Air valve Chamber	1	Each	5900.00	5900.00
9	Dismantling of roads for laying of distribution lines including shorting out a stacking and disposal of unserviceable materials up to a distance of 50 m form centre of trenches and disposal of unserviceable materials (trenches of roads surface will not be measured towards excavation in trenches)				
	B.O.E. Road.	8.00	M^2	99.00	792.00
	Interlocking Road	15.00	M^2	178.53	2677.95
	C.C Road	345.00	M^2	401.45	138500.25
	Bitumen Road	8.00	M^2	320.00	2560.00
10	Reinstatement of roads for laying of distribution lines including shorting out a stacking and disposal of unserviceable materials up to a distance of 50 m form centre of trenches and disposal of unserviceable materials (trenches of roads surface will not be measured towards excavation in trenches)				
	B.O.E. Road.	8.00	M^2	344.96	2759.68
	Interlocking Road	15.00	M^2	841.40	12621.00
	C.C Road	345.00	M^2	2051.00	707595.00

खण्ड कार्यालय
अधिशासी अभियंता
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क:- 01 / / दिनांक:- 22.12.22

Testing & Commissioning certificate

प्रमाणित किया जाता है कि मैसर्स अनिल कुमार शर्मा जनपद इटावा द्वारा विकास खण्ड जलालाबाद की गौरियापुर ग्रामीण पेयजल योजना के समस्त कार्यो को पूर्ण कर लिया गया है तथा परीक्षण करते हुए पूर्णतः संचालित कर दिया गया है।

जूनियर इंजीनियर

सहायक अभियन्ता

खण्ड कार्यालय
अधिशासी अभियंता
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पत्रांक:- 01 / / दिनांक:- 22.12.22

Trial & Run Certificate

प्रमाणित किया जाता है कि मैसर्स अनिल कुमार शर्मा जनपद इटावा द्वारा विकास खण्ड जलालाबाद की गौरियापुर ग्रामीण पेयजल योजना के समस्त कार्यो को पूर्ण कर लिया गया है एवं योजना के Trial & Run का कार्य दिनॉक 18.09.2022 से दिनॉक 22.12.2022 तक पूर्ण कर लिया गया है।

जूनियर इंजीनियर

सहायक अभियन्ता

HYDRAULIC DESIGN

DATE:14-09-10 (GAURIY/3famuk)

GAURIYAPURG.O.V W/S Scheme
Distt. Kannauj
DISTRIBUTION SYSTEM

1.NETWORK DESIGN

LINE NO (1)	LENGTH IN M (2)	Sec.Populn for Pvt.Com (3)	PUB.SP (4)	Eq.Cumm. Popln. (5)	DIA MM (6)	HMC (7)	FLOW KL/Hr (8)	VEL. M/Sec (9)	EQ.DIA (C=100) (10)	H L/ 1000 (11)	HEAD LOSS (12)	U/S NODE (13)	DOWN STREAM H.LEV (14)	DOWN STREAM R.LEV (15)	DOWN STREAM HEAD (16)	DOWN STREAM NODE (17)
													110.000	100.000	10.000	1PH
1	50.	0.	0.	3115.	132PV	145.	31.34	0.636	152.0	3.12	0.155	1	109.844	100.180	9.664	2MH
2	300.	215.	0.	108.	59PV	145.	1.08	0.110	68.0	0.31	0.095	2	109.752	99.910	9.842	3RN
3	110.	80.	0.	2860.	104PV	145.	28.78	0.941	119.8	8.50	0.935	2	108.969	99.070	9.839	4
4	185.	135.	0.	1949.	104PV	145.	19.61	0.641	119.8	4.18	0.775	4	108.137	98.930	9.207	5
5	146.	105.	0.	1714.	104PV	145.	17.25	0.564	119.8	3.29	0.480	5	107.656	98.710	8.946	6
6	218.	155.	0.	171.	59PV	145.	1.72	0.175	68.0	0.73	0.160	6	107.497	98.730	8.767	7
7	385.	275.	0.	666.	71PV	145.	6.70	0.470	81.8	3.67	1.410	4	107.497	98.730	8.767	7
8	162.	115.	0.	58.	59PV	145.	0.58	0.059	68.0	0.10	0.015	5	108.121	99.125	8.996	8RN
9	82.	60.	0.	916.	71PV	145.	9.22	0.647	81.8	6.62	0.545	6	107.113	99.010	8.103	9
10	52.	35.	0.	518.	59PV	145.	5.22	0.530	68.0	5.69	0.295	9	106.817	98.960	7.857	10MH
11	112.	80.	0.	295.	59PV	145.	2.97	0.301	68.0	2.00	0.225	10	106.593	98.260	8.333	11
12	135.	95.	0.	113.	59PV	145.	1.14	0.116	68.0	0.34	0.045	12	106.593	98.260	8.333	11
13	124.	90.	0.	577.	59PV	145.	5.80	0.589	68.0	6.92	0.860	7	106.639	98.965	7.674	12
14	86.	60.	0.	290.	59PV	145.	2.92	0.297	68.0	1.94	0.165	11	106.426	97.930	8.496	13
15	238.	170.	0.	11.	59PV	145.	0.11	0.011	68.0	0.00	0.000	14	106.426	97.930	8.496	13
16	81.	60.	0.	341.	59PV	145.	3.43	0.349	68.0	2.62	0.210	12	106.427	99.110	7.317	14
17	300.	215.	0.	108.	59PV	145.	1.08	0.110	68.0	0.31	0.095	14	106.334	99.270	7.064	15RN
18	248.	180.	0.	377.	59PV	145.	3.80	0.386	68.0	3.16	0.785	6	106.872	99.025	7.847	16MH
19	108.	75.	0.	313.	59PV	145.	3.15	0.320	68.0	2.23	0.240	9	106.872	99.025	7.847	16MH
20	88.	65.	0.	176.	59PV	145.	1.77	0.180	68.0	0.77	0.070	16	106.805	98.290	8.515	17
21	20.	15.	0.	159.	59PV	145.	1.60	0.162	68.0	0.63	0.015	10	106.805	98.290	8.515	17
22	89.	65.	0.	321.	59PV	145.	3.23	0.329	68.0	2.35	0.210	16	106.663	98.510	8.153	18
23	85.	60.	0.	45.	59PV	145.	0.46	0.046	68.0	0.06	0.005	18	106.658	98.450	8.208	19
24	91.	65.	0.	262.	59PV	145.	2.64	0.268	68.0	1.61	0.145	17	106.658	98.450	8.208	19
25	144.	105.	0.	161.	59PV	145.	1.62	0.165	68.0	0.65	0.095	18	106.569	98.600	7.969	20MH
26	78.	55.	0.	218.	59PV	145.	2.19	0.222	68.0	1.14	0.090	19	106.569	98.600	7.969	20MH
27	146.	105.	0.	246.	59PV	145.	2.48	0.252	68.0	1.43	0.210	20	106.360	98.105	8.255	21
28	228.	165.	0.	104.	59PV	145.	1.04	0.106	68.0	0.29	0.065	13	106.360	98.105	8.255	21
29	300.	215.	0.	108.	59PV	145.	1.08	0.110	68.0	0.31	0.095	21	106.267	98.600	7.667	22RN

** Continuity and Connectivity may be checked thoroughly at the time of Scheme preparation and execution to ensure correctness.

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** Continuity and Connectivity may be checked thoroughly at the time of Scheme preparation and execution to ensure correctness.

2.CONCLUSIONS :

INPUT HEAD AT NODE 1 = 10.00M Fixed
NODE NO OF MIN TER HEAD = 15
MINIMUM TERMINAL HEAD = 7.064 M
MAXIMUM ERROR IN FLOW =0.00046 Kl/hr
MAX. DIFFERENCE IN RL-S = 2.250 M
TOTAL FLOW LENGTH = 4391. M
Eq.DesignPopulation @ 80.50 lpcd = 3115.
SL NO. OF FARTHEST NODE = 22
MINIMUM TRAVERSE LENGTH BETWEEN FEEDING NODE & FARTHEST NODE = 1260. M
AV HYD GRAD BET FEEDING NODE & FARTHEST NODE THRU MIN TRAVERSE= 2.96/1000
RATIO OF AVERAGE TO MAX.DEMAND DURING DESIGN PERIOD= 0.90 (Calc.)

NOTE :
E - Existing pipe line, EH- Economical Head, FH- Fixed Head
MH = NODE OF LOWEST TERMINAL HEAD AMONGST THE NEIGHBOURING NODES
MN = NOD E OF LOWEST HYDRAULIC LEVEL AMONGST THE NEIGHBOURING NODES
DIRECTION OF FLOW IN LINE (COL 2) IS FROM U/S NODE (COL 1) TO D/S NODE (COL 17)
HEAD & LEVELS ARE IN METERS
I.D. of PVC Pipes have been assumed as given in Bill of Quantities, below
In case of more than one existing pipes along a line, Equivalent Dia. is taken

3.DESIGN PARAMETERS & CONSTRAINTS GIVEN

DESIGN PERIOD OF PROJECT .. = 30.YEARS
TERMINAL HEAD AT FEEDING NODE NO. 1= 10.00 M
MIN.TERMINAL HEAD TO BE MAINTAINED = 7.00 M
MIN.DIA OF PIPE TO BE PROVIDED .. = 5.90 CM
Popln, S/RATE, P/FACTOR for Priv.Com= 3115. 80.50 LPCD, 3.00
Popln, S/RATE, P/FACTOR for Pub.S.P.= 0. 80.50 LPCD, 3.00
Popln, S/RATE FOR NODAL POPLN. .. = 0. 80.50 LPCD

4.AIR-VALVES & SCOUR-VALVES

POSITION OF SCOUR-VALVES ADJACENT TO FOLLOWING NODES MAY BE CONSIDERED
13

5.BILL OF QUANTITIES & COST ESTIMATE

PIPE			EXCAVATION			SUPPLY		LAYING		SPECIALS
CO/ ID(cm)	TYPE	LENGTH	VOLUME	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT
6.30/ 5.90	PVC	3433.	2395.83	51.00	122187.11	25.20	86511.60	3.95	13560.35	0.05 X SUPPLY COST	4325.58
7.50/ 7.10	PVC	467.	335.61	51.00	17115.87	35.70	16671.90	5.35	2498.45	0.05 X SUPPLY COST	833.60
11.00/10.40	PVC	441.	342.75	51.00	17480.37	72.45	31950.45	7.23	3188.43	0.05 X SUPPLY COST	1597.52
14.00/13.20	PVC	50.	41.43	51.00	2112.99	114.45	5722.50	7.90	395.00	0.05 X SUPPLY COST	286.13
TOTAL =		4391.	3115.61		158896.33		140856.45		19642.23		7042.82

GRAND TOTAL (ROUNDED TO WHOLE RUPEE) : 326438.

** Continuity and Connectivity may be checked thoroughly at the time of Scheme preparation and execution to ensure correctness.

6459 15/09/2010

COMPUTER DESIGN FOR ECONOMIC SIZE OF PUMPING MAIN (Taking Water Hammer Pressure into consideration)

Scheme Gauriyapur W/S Scheme, Kannauj

Line # 1 From : TW1 to OHT

1) Water requirem

Stage	Year	Discharge lpm	Discharge Mld(Qi)	Pumping Hour(X)	Design Period
Initial	2012	500	0.13110	4.37	(n)
Middle	2027	500	0.18510	6.17	15 Yrs
Ultim.	2042	500	0.25050	8.35	30 Yrs

2) Pumping Main	CI/DI	50	
Length (meters	AC	0	50.00 M
3) Static head on	Hs	5.00	
	Hd	40.00	45 M
5) Combined eff. of pump set			60.00 %
6) Cost of pumping unit		Rs.	16000 /KW
7) Interest rate		(r)	10.00 %
8) Life of elec.motors & PumpSets			15 yr.
9) Energy charges		(Ec) Rs.	3.5 /KWH Unit

PIPE DATA — Excavation Rate : Rs 70.00 /cub m

DIA MM	CI/DI Pipe Type	Class HWC W/mPr	Rates per Rm Supply	Rates per Rm Lay&Jntg	AC Pipe Class HWC W/mPr	Rates per Rm Supply	Rates per Rm Lay&Jntg	Excavation Rates/Rm
100	CI	B 100.0 160.0	931.70	18.33	75.0	0.00	0.00	53.90
125	CI	A 100.0 125.0	1052.00	17.06	75.0	0.00	0.00	57.09
150	CI	A 100.0 125.0	1269.00	21.81	75.0	0.00	0.00	60.38
80	DI	K-9 140.0 350.0	600.00	18.38	75.0	0.00	0.00	51.41
100	DI	K-9 140.0 350.0	968.00	13.09	75.0	9.00	0.00	53.90
125	DI	K-9 140.0 350.0	804.50	17.06	75.0	0.00	0.00	57.09
150	DI	K-9 140.0 350.0	941.00	21.81	75.0	0.00	0.00	60.38

CALCULATIONS :

		1st 15 years	2nd 15 years
1) Average Discharge	(Qa)	0.1581 mld	0.2178 m/d
2) Average hours of pumping for Avg Discharge	(Xa)	5.2700 hrs	7.2600 hrs
3) KW reqd.at 61% combined eff.of pumping set	(KW)	0.1342 * H1	0.1342 * H2
4) Ave annual energy charges in Rs.	(Cr)	6736.85 * KW1	9280.75 * KW2
5) Capitalised Energy Charges	(Cc)	7.606 * Cr1	7.606 * Cr2
6) Present worth of sum required after		15Yrs for pump	0.239 * Cost of Pump
		15Yrs for energy	0.239 * Cc2

Data for Water Hammer Calculation

k =	2.07E+08 Kg/sqm.
E(CI)=	7.50E+09 Kg/sqm.
E(DI) =	1.70E+10 Kg/sqm.
E(AC) =	3.00E+09 Kg/sqm.
g =	9.81 m/sec/sec

$$H_{max} = \frac{1425}{\sqrt{1 + \frac{K\,d}{E\,C_t}}} * \frac{V_s}{g}$$

TABLE 1 - VELOCITY AND HEADLOSSES (in Meters) FOR DIFFERENT PIPE SIZES

Pipe Size in mm (d)	Velocity in M/sec (Vs) 1st stage	Velocity in M/sec (Vs) 2nd stage	Friction Losses for 50m CI/DI pipe including 10% other losses in meters 1st stage	Friction Losses for 0m AC pipe including 10% other losses in meters 1st stage	Friction Losses for 0m AC pipe including 10% other losses in meters 2nd stage	CI/DI Pipe Wall Thickness (Ct)	CI/DI Pipe Max Water hammer prs'r in meters (Hmax)	CI/DI Pipe Max Head Loss + Hd + D/S Losses + Hmax	AC Pipe Wall Thickness (Ct)	AC Pipe Max Water hammer prs'r in meters (Hmax)	AC Pipe Max Head Loss + Hd + D/S Losses + Hmax	Ratio Max Head including Hmax to Internal Design Pressure CI/DI	Ratio Max Head including Hmax to Internal Design Pressure AC
100	1.062	1.062	1.196	1.196	0.000	0.0050	134.900	176.096	0.0000	0.000	0.000	1.10	0.0
125	0.679	0.679	0.404	0.404	0.000	0.0067	83.512	123.916	0.0000	0.000	0.000	0.66	0.0
150	0.472	0.472	0.166	0.166	0.000	0.0092	56.915	97.081	0.0000	0.000	0.000	0.78	0.0
80	1.659	1.659	1.903	1.903	0.000	0.0058	222.948	264.851	0.0000	0.000	0.000	0.74	0.0
100	1.062	1.062	0.842	0.842	0.000	0.0090	140.596	181.238	0.0000	0.000	0.000	0.50	0.0
125	0.679	0.679	0.217	0.217	0.000	0.0063	88.570	128.787	0.0000	0.000	0.000	0.35	0.0
150	0.472	0.472	0.089	0.089	0.000	0.0085	60.553	100.642	0.0000	0.000	0.000	0.28	0.0

TABLE 2 - KILOWATTS & COST OF PUMP SETS REQUIRED FOR DIFFERENT PIPE SIZES AND PIPE COST (Rs.in Thousands)

Sl. No	Pipe Size in mm	1st stage flow 0.1851 Mld H1 Total head (meter)	1st stage flow 0.1851 Mld Kw reqd + 0.00% standby	1st stage flow 0.1851 Mld Pump Cost@Rs 16000 per kw	2nd stage flow 0.2505 Mld H2 Total head (meter)	2nd stage flow 0.2505 Mld Kw reqd+ 0.00% standby	2nd stage flow 0.2505 Mld Pump Cost@Rs 16000 per kw	Class of Pipes CI/DI	Class of Pipes AC	Cost of pipe line (Supply + 10% for Spls. + excavation + laying and jointing) CI/DI 50.00m	Cost of pipe line (Supply + 10% for Spls. + excavation + laying and jointing) AC 0.00m	Cost of pipe line (Supply + 10% for Spls. + excavation + laying and jointing) Total 50.00m
1.	100	46.196	6.198	99.168	46.196	6.198	99.168	B	–	54.855	0.000	54.855
2.	125	45.404	6.092	97.472	45.404	6.092	97.472	A	–	61.568	0.000	61.568
3.	150	45.166	6.060	96.960	45.166	6.060	96.960	A	–	73.904	0.000	73.904
4.	80	46.903	6.293	100.688	46.903	6.293	100.688	K-9	–	36.089	0.000	36.089
5.	100	45.842	6.124	97.984	45.842	6.124	97.984	K-9	–	40.090	0.000	40.090
6.	125	45.217	6.066	97.056	45.217	6.066	97.056	K-9	–	47.955	0.000	47.955
7.	150	45.069	6.049	96.784	45.069	6.049	96.784	K-9	–	55.804	0.000	55.804

TABLE 3 - COMPARATIVE STATEMENT OF OVERALL COST OF PUMPING MAIN FOR DIFFERENT PIPE SIZES (Rs.in Thousands)

Sl. No.	PIPE SIZE in (mm)	1st stage flow 0.1851 Mld Cost of pump sets	1st stage flow 0.1851 Mld Annual Energy Charges (Cr1)	1st stage flow 0.1851 Mld Capitalised Energy Charges (Cc1)	1st stage flow 0.1851 Mld Capitalised Total Cost	2nd stage flow 0.2505 Mld Cost of pump sets	2nd stage flow 0.2505 Mld Annual Energy Charges (Cr2)	2nd stage flow 0.2505 Mld Capitalised Energy Charges (Cc2)	2nd stage flow 0.2505 Mld Capitalised Total Cost	Grand Total of Capitalised cost for 30 yrs
1.	100	99.17	41.75	317.59	471.62	99.17	57.52	437.52	128.27	599.88
2.	125	97.47	41.04	312.14	471.18	97.47	56.53	430.00	126.07	597.24
3.	150	96.96	40.82	310.50	461.37	96.96	56.24	427.76	125.41	606.78
4.	80	100.69	42.39	322.45	459.22	100.69	58.40	444.21	130.23	589.45
5.	100	97.98	41.25	313.78	451.86	97.98	56.83	432.26	126.73	578.58
6.	125	97.06	40.87	310.85	455.86	97.06	56.30	428.24	125.55	581.41
7.	150	96.78	40.75	309.96	462.63	96.78	56.14	427.03	125.19	587.82

CONCLUSION

Most Economical size of Rising Main is..

<< 100mm >>

DI-K-9

Water Hammer device not reqd.

Reference: Manual on Water Supply and Treatment, Ministry of Urban Development, New Delhi

Jai Mata Di

M/s. Anil Kumar Sharma
A Class Contractor U.P. Jal Nigam
Water Supply Works, Reservoirs
Mechanical Civil Construction work and general
Order Suppliers

GSTIN : 09ALLPK7505J1ZQ
PAN No. : ALLPK7505J
Vill. & Post- Dadora
(Etawah)
PIN No. 206126
Mob. : 9412429805
9761056147
7906216353

Date 4.2.22

Ref. No. 01

HYDRO TEST REPORT

District-Kannauj

Block- Jalalabad

Name of Scheme- Gauriyapur W/S Scheme

S.No.	Materials of Pipe	Dia of Pipe	Location	Length	Applied Test presure on pipe (kg./cm2)	Time in Hrs.		
						1	2	3
1	HDPE	110 mm	रहमिदा से कब्रिस्तान	304 mtr	7	2	3	6
2	HDPE	63 mm	मिट्टी कलेक्टर से सुकीरा तक	728 mtr	8	2	2	6
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Remark Hydro Testing of Laid Pipe Line is Successfully

A/Sharma
Contractor

J.E.

A.E.

खण्ड कार्यालय
अधिशासी अभियंता
उ0प्र0 जल निगम (ग्रामीण),
ग्वाल मैदान, कन्नौज (209725)

E-Mail ID
ee_cd_kannauj@yahoo.com
eecdupjnkannauj@gmail.com

Inventory handover list

1	Name of Scheme	**Gauriyapur W/S Scheme**
3	Detail of works	1- OHT 2- Pump House 3- Boundary wall 4- Laying of pipe line (6.80 Km), etc work.
4	Tube well	01 Nos
8	Sluice valve	07 Nos

जूनियर इंजीनियर

सहायक अभियन्ता

OFFICE OF THE EXECUTIVE ENGINEER
CONSTRUCTION .DIVISION., KANNAUJ
U.P. JAL NIGAM
DISTRICT LABORATORY KANNAUJ

ANALYSIS REPORT OF WATER

Report No.	
Location	गौरिमापुर
Panchayat	गौरिमापुर
Village	गौरिमापुर
Habitation	
Block	छलेसर बाद
Tehsil	क-नौज
District	क-नौज

Name & Designation of sample Collector	अंकित पोरवाल
Date of Obtaining Sample	
Date of Analysis	22/12/2022
Received Form	21/12/2022
Source of Sampling	PWS
Code No.	

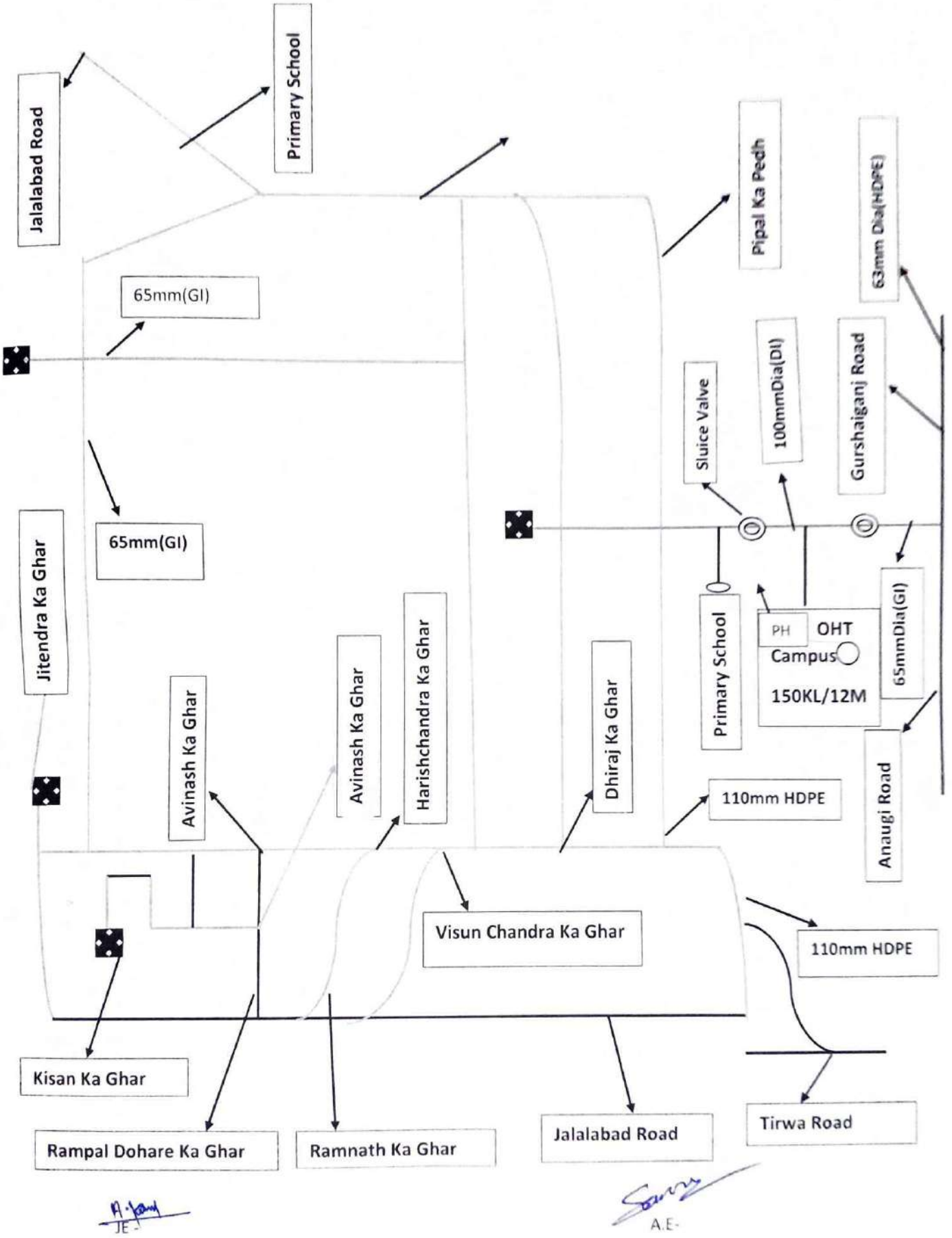
S.No.	Name of Analysis	Unit	Test Result	INDIAN STANDARD	
				Acceptable	Cause of Rejection
1	2	3	4	5	6
(A)	PHYSICAL				
1	pH Value		7.38	7.0 to 8.5	<6.50 or > 8.5
2	Taste		objectinable	Unobjectionable	Objectionable
3	Odour		odourless	Unobjectionable	Objectionable
4	Colour (Unit on Patinum -Cobalt Scale)			5	25
5	Turbidity	N.T.U.	1.01	2-5	>5
(B)	CHEMICAL				
1	Total Dissolved Solids	mg./l.	479	500	2000
2	Chlorides (as Cl)	mg./l.	46	200	1000
3	Fluorides (as Fl)	mg./l.	0.37	1.0	1.5
4	Sulphates (as So_4)	mg./l.	-	200	400
5	Iron (as Fe)	mg./l.	-	0.1	1.0
6	Nitrate (as No_3)	mg./l.	-	45	>45
7	Residual Chlorine	mg./l.	-	0.2	-
8	Conductivity at (R.T.)	Micrombos	-	100	-
9	Total Hardness (as $Caco_3$)	mg./l.	214	200	600
10	Alkalinity (as Caco3)	mg./l.	236	200	600
11	Aresenic (as As)	mg./l.	-	0.01	0.05
12	Residual Free Chlorine	mg./l.	0.3	0.2	1
(C)	BECTROLOGICAL				
1	E.Coli Count in 100 ml. of Sample			0	10
2	Vial Test (Test Kit)		(-)	(-)	(+)

REMARKS water is potable

Analysed by	Cheked by	Counter Signed
Chemist	Junior Engineer	Assistant Engineer

Copy to
(I) Superintending Engineer, Con. Circle, U.P. Jal Nigam, Etawah.
(II) Executive Engineer, Con.Div., U.P. Jal Nigam, Kannauj

As Built Drawing Of Gauriyapur WSS
Block Jalalabad Dist. Kannauj



JE -

A.E-

कार्यालय
अधिशासी अभियंता निर्माण खण्ड,
उ0प्र0 जल निगम (ग्रामीण),
गंगल मैदान, कन्नौज (209725)

E-Mail ID:

पत्रांक:- 626 / M-2 /12 दिनांक- 19/4/22

सेवा मे,

ग्राम प्रधान/सचिव,
ग्राम पंचायत गौरियापुर
विकास खण्ड-जलालाबाद
जनपद-कन्नौज।

विषयः-गौरियापुर ग्रामीण पेयजल योजना (ट्रीटेकिटिंग) को हस्तगत करने के सम्बन्ध मे।

महोदय,

उपरोक्त विषयक गौरियापुर ग्रामीण पेयजल योजना (ट्रीटेकिटिंग) के अन्तर्गत पेयजल गृह संयोजन एवं तत्सम्बन्धी कार्य पूर्ण कर योजना द्वारा जलापूर्ति सुचारु रुप से चालू कर दी गई है। इस योजना के अन्तर्गत कराये गये कार्यों को हस्तान्तरण प्रपत्र पर त्रिपर्ण मे योजना हस्तगत हेतु प्रेषित है। अतः योजना को हस्तगत कर दो प्रतियां इस कार्यालय को वापस भेजने का कष्ट करे।

संलग्नक-उपरोक्तानुसार।
(त्रिपर्ण मे)

भवदीय,

(एस0बी0 आनन्द)
अधिशासी अभियन्ता

पृ0सं0 626 / M-2 /12 दिनांक

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।
1-जिला पंचायत राज अधिकारी, कन्नौज।
2-खण्ड विकास अधिकारी, जलालाबाद।
3-श्री राकेश कुमार सहायक अभियन्ता।
4-सम्बन्धित जूनियर इंजीनियर।
5-संलग्नक को अभिलेख हेतु।

Received
19.4.22

अधिशासी अभियन्ता

उ0प्र0 जल निगम, कन्नौज

पेयजल लाग बुक रजिस्टर

1- पेयजल योजना का नाम- ..गौरिमापुर पेयजल योजना.....

2- विकास खण्ड का नाम- .....कन्नौज.....

3- ग्राम पंचायत का नाम- .....गौरिमापुर.....

4- ग्राम प्रधान का नाम-श्रीमती सपना.....

5- ग्राम पंचायत सचिव का नाम- ..कु०...प्रियंका सिंह.....

6-नलकूप आपरेटर का नाम- .....आशीष कुमार.....

पेयजल लाग बुक रजिस्टर

पाइप पेयजल योजना का नाम गौरियापुर

ग्राम पंचायत का नाम गौरियापुर

क्र०सं०	दिनांक	पेयजल वितरण का समय						कुल घन्टा	पम्प आपरेटर के हस्ताक्षर	प्रधान के हस्ताक्षर	अन्य विवरण
		सुबह (कब से कब तक)		दोपहर (कब से कब तक)		सायं (कब से कब तक)					
1	2	3	4	5	6	7	8	9	10	11	12
1	18.9.22	7:00	8:10			5:00	6:30	2:40 घण्टे	आशीष कुमार		
2	19.9.22	7:00	8:30			5:00	6:30	3:00 घण्टे	आशीष कुमार		
3	20.9.22	7:00	9:00			5:00	7:00	4:00 घण्टे	आशीष कुमार		
4	21.9.22	7:00	9:00			5:00	7:00	4:00 घण्टे	आशीष कुमार		
5	22.9.22	7:00	9:00			5:00	6:20	3:20 घण्टे	आशीष कुमार		
6	23.9.22	7:10	9:20			5:00	6:30	3:40 घण्टे	आशीष कुमार		
7	24.9.22	7:00	9:00			5:00	6:50	3:50 घण्टे	आशीष कुमार		
8	25.9.22	7:20	9:10			5:00	6:10	3:00 घण्टे	आशीष कुमार		
9	26.9.22	7:00	9:00			5:00	6:00	3:00 घण्टे	आशीष कुमार		
10	27.9.22	6:50	9:00			5:00	6:25	3:35 घण्टे	आशीष कुमार		
11	28.9.22	6:55	8:55			5:00	6:30	3:30 घण्टे	आशीष कुमार		

नोट:-

सपना

प्रधान
ग्राम पंचायत - गौरियापुर
वि०ख० जलालाबाद (कन्नौज)

ग्राम पंचायत अधिकारी
ग्राम पंचायत गौरियापुर
वि० ख० जलालाबाद जनप० कन्नौज

पेयजल लाग बुक रजिस्टर

पाइप पेयजल योजना का नाम गौरिआपुर

ग्राम पंचायत का नाम गौरिआपुर

क्र०सं०	दिनांक	पेयजल वितरण का समय						कुल घन्टा	पम्प आपरेटर के हस्ताक्षर	प्रधान के हस्ताक्षर	अन्य विवरण
		सुबह (कब से कब तक)		दोपहर (कब से कब तक)		सायं (कब से कब तक)					
1	2	3	4	5	6	7	8	9	10	11	12
89	15.12.22	7:00	9:00			5:00	6:30	3:30	आशीष कुमार		
90	16.12.22	6:50	8:50			5:10	6:40	3:30	आशीष कुमार		
91	17.12.22	6:40	8:50			5:00	6:50	4:00	आशीष कुमार		
92	18.12.22	7:00	9:00			5:10	6:50	3:40	आशीष कुमार		
93	19.12.22	6:50	9:00			5:00	7:00	4:10	आशीष कुमार	अपना	
94	20.12.22	7:00	9:10			5:05	6:55	4:00	आशीष कुमार	प्रधान ग्राम पंचायत - गौरिआपुर जि० ख० जलालाबाद (कन्नौज)	
95	21.12.22	7:20	9:00			5:00	7:00	3:40	आशीष कुमार		
96	22.12.22	7:00	8:50			5:10	6:50	3:30	आशीष कुमार		
97	23.12.22	7:10	9:00			5:00	7:00	3:50	आशीष कुमार		

नोटः-

ग्राम पंचायत अधिकारी
ग्राम पंचायत गौरिआपुर
जि० ख० जलालाबाद जनप० कन्नौज