

**PROJECT - A AFFORDABLE GROUP HOUSING COLONY ON LAND MEASURING 5.7875 ACRES  
(LICENSE NO. 43 OF 2021) IN THE REVENUE ESTATE OF VILLAGE ULLAWAS, SECTOR 62, DIST.**

**Design Calculation**

A) Requirement of Water :-							
	No. of Apartments	800					
	Population @ 5 Persons Per Apartment	800	x	5.00	=	4000	Person
		Total Population			=	4000	Person
	Daily Requirement @ 172.50 (150 + 15% uncounted W/S) Lit. / Head / day	4000	x	172.50	=	690000	Lit.
				Say (A)		690.00	KL
i	Community building With Crèche						
	Population @ 1.4 Sqm. Per Person for 190.678x2	381.35	/	1.4		272.39	Person
	Daily requirement @ 45 lpcd	272.39	x	45		12257.68	Lit.
	Total Water Requirement					12530.07	Lit.
				Say		<b>12.53</b>	KL
ii	Commercial	Sqm					
	Population @ 3 Sqm. Per Person for Stilt Floor	2013.6 17	/	3.00	=	671	Person
	Population @ 6 Sqm. Per Person for Upper Floor	2453.7 25	/	6.00	=	409	Person
	20% Staff / Shopkeepers @ 45 lpcd	178	x	45.00	=	8010	Lit.
	80% Visitors @ 15 lpcd	864	x	15.00	=	12960	Lit.
	Total Water Requirement				=	22.050	Lit.
				Say		<b>23.50</b>	KL
iii	Maintenance Staff (Such as Gardener, ESS Staff, Security Guards etc.)				=	200	Person
	Water Requirement 45 Lit. / day	200	x	45	=	9000	Lit.
				Say		<b>9.00</b>	KL
iv	Filter Back Wash L.S.					15.00	KL
				Say		<b>15</b>	KL
v	Floating Population 10% of Population	4000	x	10%	=	400	Person
	Daily requirement @ 15 lpcd	400	x	15.00	=	5993	Lit.
	Total Water Requirement				=	5993	Lit.
				Say		<b>6.00</b>	KL
	Total Commercial Water Requirement Per Day (i+ii+iii+iv)				=	66.03	KL
	<b>Total Commercial Daily Water Requirement</b>			<b>Say (B)</b>		<b>66</b>	<b>KL</b>

<b>B)</b>	<b>Horticulture &amp; Road Side Plantation</b>						
i	Area under Green Area (Sqm.)	3195					
	Water Requirement 6.18 Litre/Sqm./day	3195	x	6.18	=	19745	Lit.
		Total			=	19745	Lit.
					Say	20.00	KL
ii	Area under road & paved Area (Acre)	2.66					
	Water Requirement 5 KL/Acre/day	2.66	x	5.00	=	13	KL
					Say	13.00	KL
	<b>Total Treated Water Requirement (i + ii)</b>				=	33.00	KL
					<b>Say (C)</b>	<b>33</b>	<b>KL</b>
The demand of Horticulture & Road work will meet from recirculated water after treatment at S.T.P.							
<b>C)</b>	Total Water demand (A+B)					756	KL
					<b>Say</b>	<b>756.00</b>	<b>KL</b>
	<b>Domestic Water demand</b>						
	65% of (A) + 35% of (B=i+ii+iii+v) + 100% of (B=iv)					481	KL
					Say	481	KL
	<b>Flushing Water demand</b>						
	35% of (A) + 65% of (B=i+ii+iii+v)					275	KL
					Say	275	KL
<b>D)</b>	<b>Sewage Treatment Plant Capacity</b>						
	Average Sewerage Contribution Considering 75% of AV domestic water demand & 75% of AV flushing demand				=	567	KL
					<b>Say</b>	<b>570</b>	<b>KL</b>
<b>E)</b>	<b>Tube wells :-</b>						
	Assuming working hours of Tube Well					16	Hours
	Assuming discharge / hour of each Tube Well					27.00	KL/Hour
	Total domestic water demand					481	KL
	No. of Tube wells required = 481 / 16 x 27					1.11	Nos.
	Add 10% Stand by					0.11	Nos.
					Total	1.23	Nos.
					Say	<b>2</b>	Nos.
<b>It is proposed to provide 2 nos. Tube wells. (1 Working + 1 Standby). Moreover, the water demand for horticulture purposes is to meet from recirculated water after treatment at STP and ultimate water supply is to be provided by HUDA.</b>							

<b>F)</b>	<b>Pumping Machinery for Tube wells :-</b>						
	Gross working head				45	M.	
	Average fall in spring level				5.00	M.	
	Depression head				5.00	M.	
	Friction loss in main + Positive Head				10.00	M.	
					Total	65.00	M.
					Say	70	M.
	BHP = $(27000 \times 70 \times 1) / (60 \times 60 \times 75 \times 0.60)$					11.67	HP
				Say	<b>12.0</b>	HP	
<b>G)</b>	<b>Under Ground Tank :-</b>						
	Daily Water Requirement				481	KL	
	Taking 16 hours storage = $481 \times 16 / 24$				320.91	KL	
					Say	<b>320</b>	KL
	Fire Tank provided as per NBC Norms				200	KL	
	<b>It is proposed to provide an UGT of capacity 500 KL. Having 150 KL for treated water, 150 KL for Raw water and 200 KL for Fire</b>						
<b>H)</b>	<b>Boosting Machinery :-</b>						
	Daily Water Requirement				300	KL	
	Assuming working hours				8	Hours	
	By providing one set of pumping at 8 Hrs of pumping.				1	Nos.	
	The pumping capacity = $300 / 8$				37.5	KL/Hr	
	However, it is proposed to provide				630	LPM	
	<b>Gross Working Head :-</b>						
	i) Suction lift				6.0	M.	
	ii) Delivery head				5.0	M.	
	iii) Friction loss in main & Specials + Positive head				8.0	M.	
	iv) Clear head (OHT height)				81.9	M.	
	v) Add 10% for wear / tear				8.2	M.	
					Total	109.1	M.
					Say	110	M.
	HP = $(630 \times 110 \times 100) / (60 \times 110 \times 70)$					25.66	HP
					Say	<b>26</b>	HP
<b>It is proposed to provide 2 Nos. of motors of 26 HP. (1 W + 1 S) sets of 630 LPM discharge at 110 Head for domestic supply</b>							

<b>I)</b>	<b>Under Ground Flushing Water Tanks (From STP)</b>								
	Average Water demand					756	KL		
	Flushing Water demand					275	KL		
	Horticulture Water demand					33	KL		
					Total	308	KL		
	Assuming working hours					8	Hours		
	By providing one set of pumping at 8 Hrs of pumping.					1	Nos.		
	The pumping capacity = 308/ 8					38.5	KL/Hr		
	However, it is proposed to provide					641	LPM		
	<b>Gross Working Head :-</b>								
	i) Suction lift					6.0	M.		
	ii) Delivery head					5.0	M.		
	iii) Friction loss in main & Specials + Positive head					8.0	M.		
	iv) Clear head (OHT height)					81.9	M.		
	v) Add 10% for wear / tear					8.2	M.		
					Total	109	M.		
					Say	110	M.		
	HP = $(590 \times 75 \times 100) / (60 \times 75 \times 70)$					22.4	HP		
					Say	23	HP		
	<b>It is proposed to provide 2 Nos. of motors of 23 HP. (1 W + 1 S) sets of 641 LPM discharge at 110 Head for flushing supply</b>								
	<b>J)</b>	<b>Capacity of Generator Set</b>							
		(i) Booster Machinery (For Domestic Water)	2	No	26	HP	52	HP	
		(ii) Tube Well	2	No No	12	HP	24	HP	
(iii) Booster Machinery (For Flushing Water)		2	No	23	HP	46	HP		
(iv) Lighting						8	HP		
					Total	130	HP		
					Total KVA =	$130 \times 0.746 \times 1.5 =$	145	KVA	
					Say	<b>145.0</b>	<b>KVA</b>		
<b>Hence, 145 KVA capacity D.G. Set to be added to provide Standby supply</b>									

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**FINAL ABSTRACT OF COST**

<b>SI No</b>		<b>DESCRIPTION</b>		<b>AMOUNT (In Lacs.)</b>
1	Sub Work No.I	Water Supply Scheme	Rs.	149.57
2	Sub Work No.II	Sewerage Scheme	Rs.	180.00
3	Sub Work No.III	Storm Water Drainage.	Rs.	55.00
4	Sub Work No.IV	Road	Rs.	108.33
5	Sub Work No.V	Street Lighting.	Rs.	17.76
6	Sub Work No.VI	Horticulture.	Rs.	16.20
7	Sub Work No.VII	Maintenance Charges for 10 Years including Resurfacing of Roads after Ist 5 year & IInd 5 years of mtc	Rs.	174.27
		<b>TOTAL COST</b>	<b>Rs.</b>	<b>701.12</b>
		<b>Cost / Gross Area (In lacs. / Acre)</b>	<b>Rs.</b>	<b>121.30</b>
				<b>Lacs.</b>

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<b>Sub Work No.I</b>		<b>WATER SUPPLY ABSTRACT OF COST</b>		
<b>SI No</b>		<b>DESCRIPTION</b>		<b>AMOUNT (In Lacs.)</b>
1	Sub Head No. I	Head Works	Rs.	50.81
2	Sub Head No. II	Pumping Machinery	Rs.	26.50
3	Sub Head No. III	Rising Mains	Rs.	2.82
4	Sub Head No. IV	Distribution System	Rs.	17.33
		<b>TOTAL</b>	<b>Rs.</b>	<b>97.46</b>
		<b>Add 3% contingencies &amp; P E charges</b>	<b>Rs.</b>	<b>2.92</b>
		<b>TOTAL</b>	<b>Rs.</b>	<b>100.38</b>
		<b>Add 49% Departmental, price escalation, unforeseen &amp; adm charges</b>	<b>Rs.</b>	<b>49.19</b>
		<b>TOTAL COST</b>	<b>Rs.</b>	<b>149.57</b>
				<b>Lacs.</b>



SYNERGY SHINE INFRA 62 GGN  
 RISING MAIN (FROM BOREWLL TO  
 UGT)

S. No.	Node		80 mm dia.
	From	To	
1	B 1	B2	75
2	B 2	B3	4
3	B 2	B4	4
4	B 4	B5	4
5	B 4	B6	6
6	B 6	B7	4
	B4	B5	4
TOTAL LENGTH			101



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<b>Sub Work No. I</b>		<b>Water Supply</b>	
<b>Sub Head No. II</b>		<b>Pumping Machinery</b>	
<b>Sl No</b>	<b>DESCRIPTION</b>		<b>AMOUNT (In Lacs.)</b>
1	Providing and installing electricity driven Submersible pumping set capable of delivery about 27 KL / Hr. of water against a total Head of 70 M complete with motor and other accessories, 2 No @ 2,00,000/-	Rs.	4.00
2	Providing and installing electricity driven boosting pumping set capable of delivery about 450 LPM of water against a total Head of 70 M complete with motor and other accessories, 2 No @ 3,00,000/-	Rs.	6.00
3	Provision for diesel engine genset each for standby arrangements for T.W. of booster pump complete with gear head arrangement. - 1 No. 145 KVA	Rs.	11.50
4	Providing for chlorination plant complete. 1 No @ 50,000/-	Rs.	0.50
5	Provision for making foundations and erection of Pumping machinery.	Rs.	1.00
6	Provision for pipes, valves and specials inside boosting chamber - 1 Set (L.S.)	Rs.	1.50
7	Provision for electric services connection including electric fitting for tube wells & boosting chamber etc. 1 set (L.S.)	Rs.	1.00
8	Provision for carriage of material and unforeseen item. L.S.	Rs.	1.00
	<b>TOTAL</b>	<b>Rs.</b>	<b>26.50</b>
			<b>Lacs.</b>

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Sub Work No. I					Water Supply	
Sub Head No. III					Rising Mains from HUDA	
Sl No	DESCRIPTION	Qty		Rate		AMOUNT (In Lacs.)
1	Providing, laying, jointing & testing 80 mm dia. D.I pipe lines including cost of excavation complete in all respects.	95	@	1050	Rs.	1.00
2	Providing and fixing 80 mm dia. sluice valves including cost of surface boxes and masonry chambers etc., complete in all respects.	0	@	10000	Rs.	0.20
3	Providing and Fixing indicating plates for sluice valves, air valves and fire hydrants.	2	@	1000	Rs.	0.02
4	Provision for carriage of material and other unforeseen item. L.S.				Rs.	0.50
5	Provision for making connection with HUDA main (L.S.) 1 job				Rs.	0.50
6	Provision for cutting road, making good the same L.S.				Rs.	0.60
	<b>TOTAL</b>				<b>Rs.</b>	<b>2.82</b>
	<b>SAY</b>				<b>Rs.</b>	<b>2.82</b>
						<b>Lacs.</b>

Material statement of HUDA Rising Mains				
Sl No	Name of Line	Length of 80 mm dia. Pipe	Rate	AMOUNT (In Lacs.)
1	M1 to M2	5		5
2	M2 to M3	90		90
	<b>TOTAL</b>			<b>95</b>







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Sub Work No. IV		Roads Work		
	Width of Road	Length of Road (in Mtrs.)	Metalled Width (Mtrs.)	Area in Sqm.
	<b>A</b>	<b>B</b>	<b>C</b>	<b>B x C</b>
	6.0 M Wide	788	5.8	4570
				4570
			Add 10% curves	457.0
			Total Area	5027.4
			<b>Say</b>	<b>5050</b>
				<b>Sqm.</b>
	Total Length	788		
	Add 10% curves	78.8		
	Total Length	866.8		
	<b>Say</b>	<b>870</b>		
		<b>Mts.</b>		









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Sub Work No. VII				MTC. Charges and Resurfacing of Roads		
Sl No	DESCRIPTION	Qty		Rate		AMOUNT (In Lacs.)
1	Provision for maintenance charges for water supply, sewerage, storm water, drainage, roads, street light, Hort., etc. complete including operation & establishment charges as per HUDA norms for 10 years completion.					
	Area = 5.78 Acre	5.780	@	750000	Rs.	43.35
2	Provision for resurfacing of roads after first five years of maintenance one layer of 100mm thick WBM compacted to 75 mm thick with 25mm thick premix carpet with seal coat. (Sqm)	5200	@	600	Rs.	31.20
3	Provision for resurfacing of roads after 10 years of Mtc. i.e. 25mm thick premix carpet with seal coat with mechanical paver. (Sqm)	5200	@	750	Rs.	39.00
<b>TOTAL</b>					<b>Rs.</b>	<b>113.55</b>
<b>Add 3% contingencies &amp; P E charges</b>					<b>Rs.</b>	<b>3.41</b>
<b>TOTAL</b>					<b>Rs.</b>	<b>116.96</b>
<b>Add 49% Departmental, price escalation, unforeseen &amp; adm charges</b>					<b>Rs.</b>	<b>57.31</b>
<b>TOTAL</b>					<b>Rs.</b>	<b>174.27</b>
						<b>Lacs.</b>