PROPOSED RESIDENTIAL PLOTTED COLONY (13.35625 ACRE) UNDER DEEN DAYAL JAN AWAS YOJNA IN SECTOR - 29 AT VILLAGE- JAUNDHI, DISTT.- JHAJJAR (HARYANA)

PROJECT REPORT

DEVELOPED BY:-

M/S VIJAYLAXMI INFRABUILD PVT. LTD.

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BRIEF DESCRIPTION OF PROJECT

A) PROJECT-

Affordable Residential Plotted Colony under Deen Dayal Jan Awas Yojna(DDJAY) on land ad-measuring 13.35625 acres is located at sector 29,village Jhaundhi,Tehsil and District, Jhajjar.Village Jhaundhi of Haryana state situated on near Delhi-Rohtak road at a distance of 70 kms from Delhi.Jhajjar is a small town in the state of Haryana is known for its developing economy and industrial growth.The nearest airport is Indira Gandhi International Airport ,New Delhi which is 54 km away from Jhajjar.Today it counts amongst the fast developing regions of Haryana with focus on public welfare.In order to relieve the growing pressure of population in National capital region of Delhi ,it has been decided by Haryana Govt to establish various residential ,industrial and infrastructure sectors in village Jhaundhi,Distt Jhajjar.

B) LIST OF APPROVALS-

S.NO	LIST OF APPROVALS	DATE
1.	License No. 30 of 2020	19.10.2020
2.	Approval Layout Plan from DTCP -7516	20.08.2020
3.	Approval Layout Cum Demarcation Plan	10.03.2021
4.	Zoning Plan	12.07.2021
5.	Rera Registration No.	
6.	Electrical Scheme from UHBVN Ltd.	

C) AREAS-

AREA OF PROJECT

The total land of the project measuring 13.35625 Acres will be utilised in the following manner:

Sr.No	Land Area Under Usage	Area of Land in (Sq.m.)	Area of Land in (Acres)	Remarks
1	Plotted Area	26555.567	6.562	
2	Const. of apartment			N/A
3	Roads Area	9652.402	2.38555	
4	Pavement Area	4881.860	1.207	
5	Park & Playground Area	4229.351	1.044	
6	Green Belt Area	651.550	0.161	
7	Vehicle Parking			N/A
8	Commercial Area	1339.566	0.331	
9	Electric Substation & other Services	221.720	0.055	
10	Club House			N/A
11	STP Area	450.000	0.1112	
12	Community Area	5868.700	1.450	
13	UGT Area	200.158	0.0495	
14	Any other UD Area			N/A
	Total Area	**54050.874**	**13.35625**	

SUMMARY OF PLOTS

S.No.	Type	Area in Sq.m.	No.of Plots	Total Area in Sq.m.
	Type-A			
1		136.38	**12**	**1636.57**
	Type-B			
2		126.61	26	3291.97
3		128.36	1	128.36
			27	**3420.33**
	Type-C			
4		110.04	116	12764.64
5		110.54	3	331.63
6		109.78	3	329.33
7		102.65	2	205.30
			124	**13630.90**
	Type-D			
8		103.24	2	206.48
9		102.80	22	2261.58
			24	**2468.07**
	Type-E			
10		121.27	**9**	**1091.43**
	Type-F			
11		108.08	24	2593.80
12		92.90	1	92.90
13		105.44	1	105.44
			26	**2792.13**
	Type-G			
14		126.22	3	378.666
15		126.39	9	1137.4695
			12	**1516.14**
	TOTAL PLOT AREA OF(TYPE-A to TYPE-G)		**234**	**26555.567**

SUMMARY OF COST ON INFRASTRUCTURE

S.NO.	ITEM DESCRIPTION	COST (LAKH)
1	Internal roads and pavements	217.00
2	Water supply system	209.00
3	Storm water drainage	120.00
4	Electricity supply system	196.00
5	Sewage treatment & Garbage disposal	231.00
6	Street lighting	42.0
7	Fire Fighting	--
8	Play grounds and parks	39.00
9	Club House/ Community Centre	Plot to be handed over to Govt.
10	Shopping Area	--
11	Boundary wall	279.00
12	Hard Landscape	6.00
13	Play Equipment	19.00
14	Security System	5.00
15	DWC	45.00
16	Others (Gate,Guard Room, Meter room HT panel Room civil work, Signages etc)	19.00
	Grand Total	**1427.00 Lakh**

BRIEF REPORT ON ELECTRICAL INSTALLATIONS, SANITARY ENGINEERING AT PROPOSED DEEN DAYAN JAN AWAS YOJNA AT JHAJJAR

GENERAL

1.1 The project consists of developing a housing township with plots, commercial, community services for Deen Dayal Jan Awas Yojna at Jhajjar.

1.2. The Township will consist of plots of the following types:

S. No.	Description	No. of Plots
A	PLOT TYPE-A	12
B	PLOT TYPE-B	27
C	PLOT TYPE-C	124
D	PLOT TYPE-D	24
E	PLOT TYPE-E	9
F	PLOT TYPE-F	26
G	PLOT TYPE-G	12
H	COMMUNITY AREA	1
I	COMMERCIAL AREA	1

1.0 GENERAL

Electricity – Most Important Utility in any development. Nothing works without it. Be it the lighting, Lifts, Air- Conditioning, kitchen or any equipment.

Design Requirements -

i) Sufficient lighting in service areas etc.

ii) Attractive Landscape and Street Lighting.

iii) Power supply to various consumers and services.

Design Philosophy - Power distribution system to be designed keeping in view the Following:

i) Continuity and reliability of power supply.

ii) Flexibility of operation.

iii) Concentration/ distribution of loads.

iv) Safety of personnel and equipment.

v) Investment and operational costs.

vi) Compliance with various statutory provisions such as Indian Electricity Act and Rules, National Electrical Code and the relevant B.I.S. Specifications and State Electricity Authority' norms.

vii) Easy future extensions/ modifications.

viii) Ease of maintenance.

ix) Maximum interchangeability of equipment resulting in minimum inventories and spare parts.

x) Minimum fire risk.

xi) Simplicity of operation.

2.0 ENERGY CONSERVATION

To economize on the use of energy, following main systems are proposed to be adopted:

i) Adequate design to limit the losses in the distribution system.

ii) Use of energy efficient devices like light sources such as true-lite fluorescent lamps and LED lamps.

iv) Use of capacitors at load centers to improve voltage and power factor to reduce distributional losses and also to avoid penalty by state electricity authority.

v) All high efficiency motors will be used.

3.0 ILLUMINATION SYSTEM

The provision of sufficient lighting will be done on the roads. The luminaries will be selected keeping in mind Aesthetics, location requirement, and ease of maintenance and energy conservation.

S. No.	Description of Space	Type of Lighting	Illumination (Lux Level)
i)	Internal roads 9 Mtrs.	9Mtrs. High poles with LED lamp Fixtures	15-20
ii)	External roads 12Mtrs.	9Mtrs. High poles with LED lamp Fixtures	15-20
iii)	Internal Parks/ Gardens	Post tops, LED Bollards & LED up lighters etc. as per landscape lighting.	6 – 8 & glare free beautification

Solar power based street lighting shall also be provided for minimum illumination to avoid darkness & to feel people easy on the roads

4.0 PROVISION OF SOCKET OUTLETS

Shall be made as per space requirements. All 16 amp. Sockets shall be 6pin 6/16 amp. Type. All sockets shall be modular shuttered type. Sockets are proposed to be provided in the utility room like sub-stations, pump room/ park rooms etc.

5.0 PROVISION IN INDIVIDUAL PLOTS

All plots will be provided with three phase power supply. The installation of the HT equipment's, HT cabling work, distribution transformers, Feeder pillars etc. shall be provided by the developer. The electrical connection will be given by the state electricity board on the request of the plot owner subsequently.

6.0 TOTAL ELECTRICAL LOAD

Total electrical load on the basis of Haryana norms works out to be as under:

ELECTRICAL LOAD CALCULATION FOR AFFORDABLE RESIDENTIAL PLOTTED COLONY AT JHAJJAR

AS PER CLASS 'C' CITY

S. No.	DESCRIPTION	No. of Plots	Area Per Plot (in sq.mtr.)	Area per Plot (Sq.Ft.)	Area in marla per Plot	Load Per Plot (KW)	Connected Load (KW)	Demand factor	Demand Load (KW)
				ESS-1					
1	TYPE - A (C-001 TO C-012)	12	136.38	1467.45	5.39	6.00	72.00	0.4	28.80
2	TYPE - D (C-164 & C-176)	2	103.24	1110.86	4.08	6.00	12.00	0.4	4.80
3	TYPE - D (C-165 TO C-175)	11	102.80	1106.13	4.06	6.00	66.00	0.4	26.40
4	TYPE - D (C-177 TO C-187)	11	102.80	1106.13	4.06	6.00	66.00	0.4	26.40
5	TYPE - E (C-188 TO C-196)	9	121.27	1304.87	4.79	6.00	54.00	0.4	21.60
6	TYPE - F (C-197 TO C-200)	4	108.08	1162.94	4.27	6.00	24.00	0.4	9.60
7	TYPE - F (C-203 TO C-222)	20	108.08	1162.94	4.27	6.00	120.00	0.4	48.00
8	TYPE - F (C-201)	1	92.90	999.60	3.67	5.51	5.51	0.4	2.20
9	TYPE - F (C-202)	1	105.44	1134.53	4.17	6.00	6.00	0.4	2.40
10	TYPE - G (C-223,C-230 & C-231)	3	126.22	1358.13	4.99	6.00	18.00	0.4	7.20
11	TYPE - G (C-224 TO C-229)	6	126.39	1359.96	5.00	6.00	36.00	0.4	14.40
12	TYPE - G (C-232 TO C-234)	3	126.39	1359.96	5.00	6.00	18.00	0.4	7.20
13	COMMUNITY AREA (15kW / ACRES)	1.45 Acre	5868.70				21.75	0.5	10.88
	Total	**83.00**					**519.26**		**209.88**
	TRANSFORMER SELECTION								
	Taking Loading @ 0.8 & PF @ 0.9, Transformer Capacity works out to be								**291.50**
	TRANSFORMER SELECTED						**1 Nos. x 315 kVA**		

S. No.	DESCRIPTION	No. Of Plots	Area Per Plot (in sq.mtr.)	Area per Plot (Sq.Ft.)	Area in marla per Plot	Load Per Plot (KW)	Connected Load (KW)	Demand factor	Demand Load (KW)
			ESS-2						
1	TYPE - B (C-12A TO C-038)	26	126.61	1362.32	5.00	6.00	156.00	0.4	62.40
2	TYPE - B (C-039)	1	128.36	1381.15	5.07	6.00	6.00	0.4	2.40
3	TYPE - C (C-040 TO C-059)	20	110.04	1184.03	4.35	6.00	120.00	0.4	48.00
4	TYPE - C (C-062 TO C-068)	7	110.04	1184.03	4.35	6.00	42.00	0.4	16.80
5	TYPE - C (C-070 TO C-132)	63	110.04	1184.03	4.35	6.00	378.00	0.4	151.20
6	TYPE - C (C-137 TO C-162)	26	110.04	1184.03	4.35	6.00	156.00	0.4	62.40
7	TYPE - C (C-60,C-61&C-69)	3	110.54	1189.41	4.37	6.00	18.00	0.4	7.20
8	TYPE - C(C-133 TO C-135)	3	109.78	1181.23	4.34	6.00	18.00	0.4	7.20
9	TYPE - C (C-136 & C-163)	2	102.65	1104.51	4.06	6.00	12.00	0.4	4.80
10	EXTERNAL LIGHTING						10.00	1	10.00
11	STP						15.00	0.6	9.00
12	UGT						20.00	0.6	12.00
	Total	**151.00**					**951.00**		**393.40**
	TRANSFORMER SELECTION								
	Taking Loading @ 0.8 & PF @ 0.9, Transformer Capacity works out to be								**546.39**
	TRANSFORMER SELECTED			**1 Nos. x 400 kVA+1 Nos. x 200 kVA**					
			ESS-3						

S. No.	DESCRIPTION	Area (in sq.mtr.)	FAR Area (in sq.mtr.)			Connected Load (KW)	TOTAL Connected LOAD (KW)	Demand factor	Demand Load (KW)
1	COMMERCIAL (16kW/100 Sqmtr.)	1340.6	2346.05			16.00	375.37	0.6	225.22
	TRANSFORMER SELECTION								
	Taking Loading @ 0.8 & PF @ 0.9, Transformer Capacity works out to be								**312.81**
	TRANSFORMER SELECTED							**1 x 315 kVA**	

The electrical supply will be made available at 11 KV from the electricity board. To transform this supply to the useable voltage, step-down system 11KV/ 0.433KV shall be installed at receiving substation along with 11KV breakers with required protections & earthing equipment etc. for which space has been provided.

7.0 SELECTION OF EQUIPMENT

1. H.T. Equipments

Receiving Sub Station:-

11KV Single breaker with extendable bus bars for future provision to be coupled alter on.

11KV/ 0.433KV Sub-Station with ON LOAD Tap changer etc.

All the required protections & metering shall be considered for all the breakers.

2. Distribution transformers

Outdoor type oil filled transformer of 11KV/.433 KV with On Load Tap Changer. Transformer shall be provided with on circuit taps in the range of + 5% to -15% @ 1.25% steps will be on the H.T. winding in specified range of variation.

The transformers will be provided with all the necessary protection and neutral grounding etc.

3. L.T.PANEL AND POWER DISTRIBUTION

The L.T. Panel will have air circuit breakers for controlling the feeders of more than 630 Amp. Rating whereas feeders of 630 Amp. And below will have MCCB.s to control them. Feeder pillars will be set up to distribute the power to the Plots etc.

4. Cables

All cables proposed to be used shall be of aluminum conductor, XLPE Insulated armored type. All wires shall be PVC insulated FRLS with multi-stranded copper conductors. All cables & wires shall be new & ISI marked only as per up to date amended IS codes.

8.0 EARTHING SYSTEMS

Earthing system including earthing strips/ cables and earth pits will be provided.

Main earth electrode will be suitable to achieve a maximum resistance to earth of 1 Ohm.

Proper Grounding will be provided for

a) HT Metering, HT panels.
b) Transformers body & neutral earthing
c) DG's body & neutral earthing.
d) LT panels body earthing
e) Feeder pillars & Meter boards.
f) All apparatus and metal pieces
g) Steel Structures

9.0 TELEPHONE SYSTEM, CABLE TV AND INTERNET NET WORK

A network of underground PVC pipes will be provided with access manholes etc. for providing the telephone, cable TV and internet network. These will be used by the service providers to lay their cables.

LIST OF APPLICABLE INDIAN STANDARDS FOR ELECTRIFICATION WORK

S. No.	STANDARDS	TITLE
(1)	IS: 732 - 1989	Code of practice for electrical wiring installations.
(2)	IS: 4648 - 1968	Guide for electrical layout in residential buildings.
(3)	IS: 8061 - 1976	Code of practice for design, installation and Maintenance of service lines up to and including 650V
(4)	IS: 8884 - 1978	Code of practice for installation of electric bells And call system.
(5)	IS: 5578 - 1985	Guide for marking of insulated conductor.
(6)	IS: 11353- 1985	Guide for uniform system of marking and Identification of conductors and apparatus Terminals .
(7)	IS: 5728 - 1970	Guide for short-circuit calculations.
(8)	IS: 7752(Part-1)-1975	Guide for improvement of power factor in Consumer installation: Low and medium supply voltages.
(9)	IS: 3646(Part-1)-1966	Code of practice for interior illumination: Principles for good lighting and aspects of design .
(10)	IS: 3646(Part-2)-1966	Code of practice for interior illumination: Schedule Of illumination and glare index.
(11)	IS: 2672 - 1966	Code of practice for library lighting.
(12)	IS: 10118(Part-1)-1982	Code of practice for selection, installation and Maintenance of switchgear and control gear : General.
(13)	IS: 10118(Part-2)-1982	Code of practice for selection, installation and Maintenance of switchgear and control gear .
(14)	IS: 10118(Part-3)-1982	Code of practice for selection, installation and Maintenance of switchgear and control gear: Installation.
(15)	IS: 10118(Part-4)-1982	Code of practice for selection, installation and Maintenance of switchgear and control gear: Maintenance.

(16)	IS: 2309 - 1989	Code of practice for the protection and allied Structures against lightning.
(17)	IS: 3043 - 1987	Code of practice for earthing.
(18)	IS: 5216(Part-1)-1982	Guide for safety procedures and practices in Electrical work: General.
(19)	IS: 4237 – 1983	General requirements for switchgear and control Gear for voltages not exceeding 1000 V AC or 1200 V DC .
(20)	IS: 6875(Part-1)-1973	Control switches (switching devices for control And auxiliary circuits including contractor relays) for voltages up to and including 1000 V AC and 1200 DC : General requirements and tests.
(21)	IS: 4064(Part-1)-1978	Air break switches, air break dis-connectors, air-Break switch disconnectors and fuse-combination units for voltages not exceeding 1000 V AC or 1200 DC: General requirements.
(22)	IS: 8828 - 1978	Miniature air break circuit breakers for voltages Not exceeding 1000 volt.
(23)	IS: 13032 - 1991	Miniature circuit breaker boards for voltages up to And including 1000 volts AC .
(24)	IS: 12640 - 1988	Residua current operated circuit breakers.
(25)	IS: 2959 – 1985	Contactors for voltages not exceeding 1000 V AC Or 1200 V DC .
(26)	IS: 8623(Part-1)-1977	Factory built assemblies of switchgear and control Gear for voltages up to and including 1000 V AC and 1200 V DC: General requirements.
(27)	IS: 8623(Part-2)-1980	Factory assemblies of switchgear and control Gear for voltages up to and including 1000 V AC and 1200 V DC : Particular requirements for bus bar trunking system (bus ways).
(28)	IS: 694 – 1990	PVC Insulated cables for working voltages up to And including 1100 V.
(29)	IS: 1554(Part-1)-1988	PVC insulated (heavy duty) electric cables: For Working voltages up to and including 1100 V.

(30)	IS: 3961 (Part-5)-1968	Recommended current ratings for cables: PVC Insulated light duty cables .
(31)	IS: 9537(Part-1)-1980	Conduits for electrical installations: General Requirements.
(32)	IS: 9537(Part-2)-1981	Conduits for electrical installations Rigid steel Conduits.
(33)	IS: 3480 - 1966	Flexible steel conduits for electrical wiring.
(34)	IS: 2667 - 1988	Fittings for rigid steel conduits for electrical wiring.
(35)	IS: 3837 - 1976	Accessories for rigid steel conduits for electrical Wiring.
(36)	IS: 5133(Part-1)-1969	Boxes for enclosure of electrical accessories : Steel and cast iron boxes.
(37)	IS: 371 - 1979	Ceiling roses.
(38)	IS: 3854 - 1988	Switches for domestic and similar purposes.
(39)	IS: 4615 - 1968	Switch socket outlets (non-interlocking type).
(40)	IS: 4160 - 1967	Interlocking switch socket outlet.
(41)	IS: 1293 - 1988	Plugs and socket outlets of rated voltage up to and Including 250 volts and rated current up to and Including 16 amperes .

1. INTRODUCTION

1.1 Water supply and wastewater disposal constitute a very important part of the services in a building. Maintenance of hygiene and cleanliness are indispensable to the wellbeing of the occupants as a whole.

1.2 It is proposed to design the services, storage capacities and piping network of the township in totality.

1.3 It is proposed to locate all the pumps and equipment's in the underground pump room which shall accommodate all major pumps and equipment's and electrical panels etc.

1.4 This report intends to highlight the details of the following proposed services, which are to be provided from the point view of Sanitary Engineering, Fire Fighting and other allied services.

- Water Supply System
- Wastewater Disposal System
- Sewerage and drainage system including disposal
- Sewage Treatment Plant and Recycling of Waste Water
- Rain Water Harvesting

2. WATER SUPPLY SYSTEM

2.1 Total Water Requirement

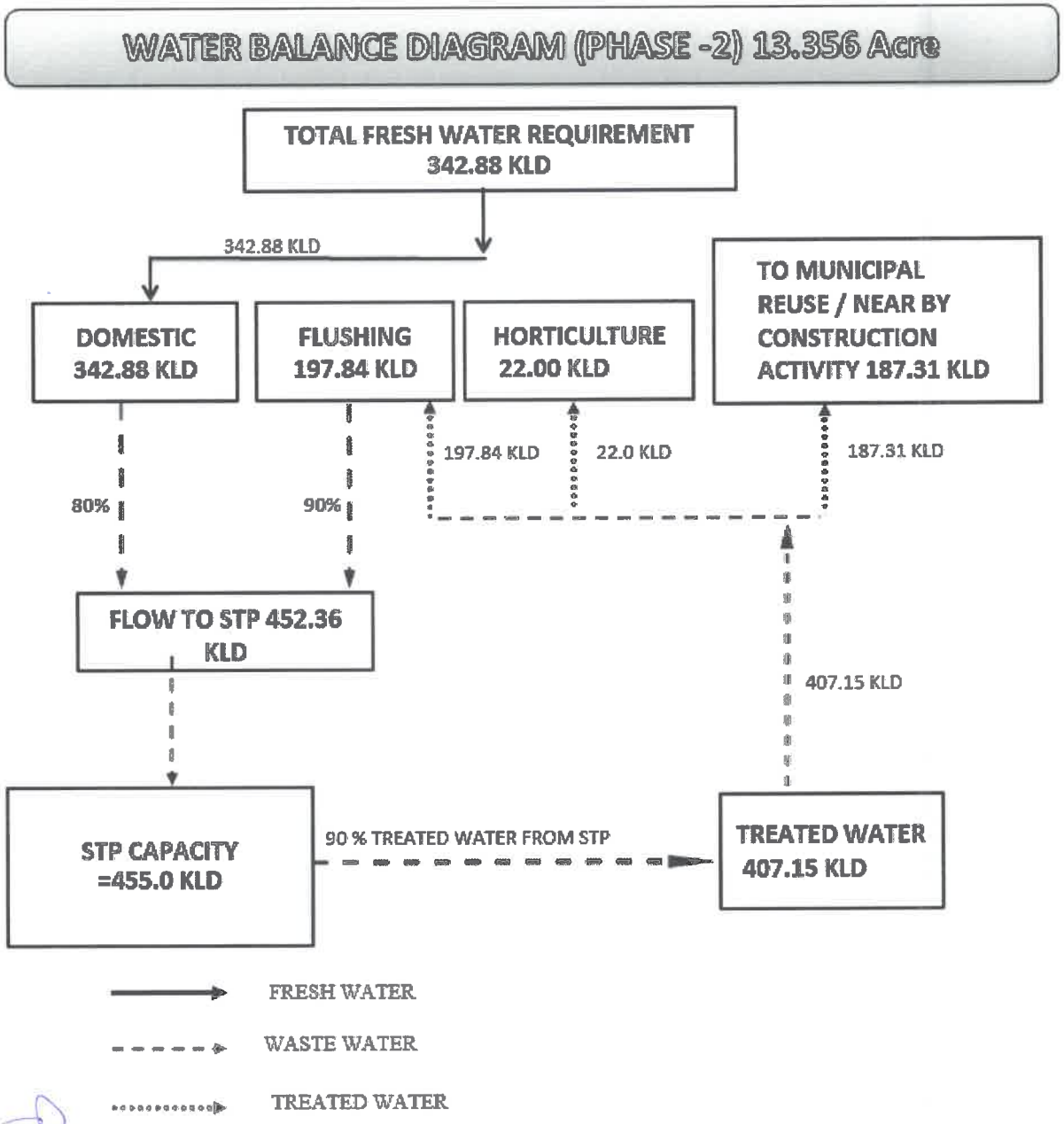
The total water requirement is proposed to be catered by an underground water tank. The water requirement as per I.S. specifications and Govt. manuals shall be as below:

WATER REQUIREMENT FOR PLOTED COLONY UNDER (DDJAY)- 13.35625 Acre

S. No.	Description	No OF Flat / Plots	Area (Sqm)	Occupancy	Total Occupancy	Water Requirement per capita per day (LPCD)	Total Requirement (LPD)	Total Domestic Water Requirement (LPD)	Total Flushing Water Requirement (LPD)
1	TYPE - A	12	-	13.5	162	155.25	25151	16348	8803
2	TYPE - B	27	-	13.5	365	155.25	56589	36783	19806
3	TYPE - C	124	-	13.5	1674	155.25	25889	168928	90961
4	TYPE - D	24	-	13.5	324	155.25	50301	32696	17605
5	TYPE - E	9	-	13.5	122	155.25	18863	12261	6602
6	TYPE - F	26	-	13.5	351	155.25	54493	35420	19072
7	TYPE - G	12	-	13.5	162	155.25	25151	16348	8803
8	Commercial Building	-	1340	3 sqm/person	447				
8.1	Comm. Staff	-		10% of population	45	45	2010	704	1307
8.2	Visitors	-		90% of population	402	15	6030	2111	3920
9	Community Building	-	5868	10sqm/person	587	45	26406	9242	17164
10	Staff (20 nos. @ 45 LPCD)				25	45	1125	394	731
11	Backwash Filter	L.S					10000	10000	
12	Flouting Population @ 10 % of total population				315	15.00	4725	1654	3071
	Total	**234**					**540731**	**342886**	**197845**

WATER REQUIREMENT FOR PLOTED COLONY UNDER (DDJAY)- 13.35625 Acre

S. No.	Description	No OF Flat / Plots	Area (Sqm)	Occupancy	Total Occupancy	Water Requirement per capita per day (LPCD)	Total Requirement (LPD)	Total Domestic Water Requirement (LPD)	Total Flushing Water Requirement (LPD)
	Capacity of Sewage Treatment :								
13	80% of Total domestic water required & 90 % of total flushing water required		=				452369		
			=				452369	LPD	
	Capacity of STP		=				**455**	**KLD**	
	Treated Effluent available after sewage treatment @ 90% of waste water					=	**410**	**KLD**	
	STP Water required for irrigation								
15	Horticulture	-	4230	-	-	5	21150	LPD	
A.	**UNDER GROUND WATER TANKS (13.356 acre)**		**Capacity**						
1	Raw Water Tank		**175**	**KLD**					
2	Treated Water Tank		**175**	**KLD**					
3	Flushing & Irrigation Water Tank (in STP)		**220**	**KLD**					


WATER BALANCE DIAGRAM (PHASE -2) 13.356 Acre
TOTAL FRESH WATER REQUIREMENT 342.88 KLD
342.88 KLD
DOMESTIC 342.88 KLD
FLUSHING 197.84 KLD
HORTICULTURE 22.00 KLD
TO MUNICIPAL REUSE / NEAR BY CONSTRUCTION ACTIVITY 187.31 KLD
197.84 KLD
22.0 KLD
187.31 KLD
80%
90%
FLOW TO STP 452.36 KLD
407.15 KLD
STP CAPACITY =455.0 KLD
90 % TREATED WATER FROM STP
TREATED WATER 407.15 KLD
FRESH WATER
WASTE WATER
TREATED WATER

2.2 Source of Water

2.2.1 Since municipal water supply may not be expected to fulfill the entire requirement, it is proposed to meet the total water requirement for the campus by other source/external supply such as water tankers etc.

2.2.2 However, it is also proposed to design a sewage treatment plant in such a way that effluent can be recycled for flushing & horticulture.

2.3 Storage

2.3.1 Considering minimum requirement of storage Full day requirement in the underground tanks (excluding for horticulture purpose), the capacity in underground tanks shall be as follows:

Under Ground Tanks		
	Total Water Requirement	
(a)	Raw Water Tank- (Compartment No-1)	**175 KLD**
(b)	Treated Water Tank- (Compartment No-2)	**175 KLD**

2.4 Quality of Water Supply

Since, the water will be required for different purposes i.e. for drinking, cooking, in the toilets etc., it has to be of a required standard quality. The exact treatment of water will be suggested after getting the municipal and bore well water tested for portability.

However, as a standard, the water shall be passed through a multi grade filter disinfection (U.V.) and chlorinated prior to the supply to the plots.

It is also advisable to maintain a strict monitoring system on the quality of the water during the operation of the system.

2.5 Water Supply System

2.5.1 The water from the potable water supply line will be brought into compartment No. 1, which will serve exclusively as a raw water tank of capacity 115 cum. The water from this tank shall be taken for treatment through filtration disinfection (U.V.) and chlorination units and then stored in Treated water tank compartment No. 2 of capacity 115 cum.

2.5.2 Water from the compartment No. 2 termed as domestic water tank will be pumped through a hydro-pneumatic system with ring main system to overhead domestic water tank for plots and the Water shall be supplied to the toilets, pantries and other fixtures from overhead water tank by gravity.

2.5.3 An underground ring main shall be provided along the roads which will be connected directly to the garden hydrant pumps from the flushing water tank at STP. Garden hydrants will be provided on the ring main.

The flushing water tank in STP area will be replenished by the recycled water supply from the STP. Water from here will be pumped through a hydro-pneumatic system to the flushing overhead tanks in the similar way as the domestic water.

3. MATERIALS FOR WATER SUPPLY

3.1 All the external pipes to be used for water supply shall be C.I / Ductile Iron for 100mm dia. and above and galvanized steel tubes confirming to I.S.1239 medium class of superior quality for below 80 mm dia. pipes. Fittings shall be malleable iron/brass as applicable.

3.2 Valves on branches, main line and pumps shall have Brass ball valve / CI butterfly valve of good approved quality, as per requirement.

4. SEWERAGE SYSTEM

4.1 One Sewerage manhole will be constructed in each plot which will be further connected to the external manholes. The external sewerage system shall be running along the roads. The main sewer line will carry the whole sewage by gravity up to the STP.

4.2 Design Parameters

The following parameters shall be considered for design of sewerage system:

(i)	Flow of sewage	=	0.8 of water supply)
(ii)	Peak Flow	=	3 x average flow
(iii)	Min. velocity of flow in pipes flowing half full	=	0.75 m/sec
(iv)	Max Velocity of flow	=	2.0 m/sec.
(v)	Min. depth for sewers	=	0.9m
(vi)	Infiltration Factor (For surface run off, subsoil water conditions etc.)	=	Add 8.33% of average discharge

(vii) Formula for calculation for design of sewer lines shall be by Manning's formula:

$$V = \frac{1}{n} S^{1/2} R^{2/3}$$

Where,

V = Velocity in m/sec.
R = Hydraulic radius in m
S = Slope or hydraulic gradient in m/m
n = Manning's co-efficient

(viii) Manning's co-efficient **n = 0.015**

4.3 Appurtenances & Materials' Specifications

4.3.1 Pipes

(a) **R.C.C. Pipes Class NP3 (For Storm Water)**

Minimum 400mm dia NP3 pipe will be used for external services

For road crossings 200mm NP3 pipe will be used as per IS: 458.

All road crossing pipes will be in cased around by cement concrete of 1:3:6 and other pipe will be in cased up to Haunches.

All R.C.C. pipes shall be laid as per IS: 873 - 1985 and as per "Manual on Sewerage and Sewage Treatment" by Ministry of Urban Development, New Delhi.

4.3.2 Manholes

(a) The manholes shall be constructed of brick masonry as per standard specifications of National Building Code.

(b) Minimum Depths of Manhole - 0.9m- 1.67m Depth for 0.91m dia
1.68m – 2.29 m dia Depth for 1.22m dia
2.30m and above. For 1.52m dia

(c) **Spacing**

(i) Manholes shall be provided at all junctions, change of directions, and change in diameters, as per connection requirement from every house/unit.

(ii) A distance of 30 meters on the main trunk sewer lines, depending on dia of pipe and local conditions.

(d) **Manhole Covers**

(i) Medium/heavy duty for manholes.

5.0 Sewage Treatment Plant (455 KLD)

It is proposed to treat the domestic sewage water in a scientific manner through a properly planned sewage/effluent treatment plant. The objective is to stabilize the decomposable organic matters present in sewage so as to get an effluent and sludge having characteristics which are within safe limits, and which can be recycled and re-utilized for various purposes to help in maintaining the ecology of nature and save energy resources. The treatment process for sewage/effluent and the location of the final waste water disposal shall be based on the following considerations:

- Use of Treated Sewage.
- Aesthetics of the area and nearby inhabitation.
- Wind direction
- Availability of suitable land.
- Initial Cost of the system
- Recurring Cost of the system.

5.1 Salient Features of STP

(A) Characteristics of Influent

• B.O.D (5 days at 20°C) (mg/lit)	--	250 -300
• Suspended solids (mg/lit)	--	400 – 600
• PH	--	6.5 – 8.5

(B) Characteristic of Effluent (after treatment)

- B.O.D (5 days 20°C) (mg/lit) less than 10mg/lit.
- Suspended solids mg/lit less than 30mg/lit.

The technology suggested to be used for Sewage treatment will be as follows:

5.2 PROCESS DESCRIPTION: FAB Process with Ultra filtration plant

Sewage generated from the building will reach the last manhole of trunk sewer line from where it shall be passed through a bar screen of suitable size before entering the equalization cum collection tank. There shall be suitable arrangement for cleaning and lifting the coarse material from the platform near the screen chamber.

From equalization tank the sewage shall be lifted through submersible automatic control pumps into adjoining FAB aeration tank. The equalization tank shall also have provision of the aeration system to keep the sewage in the homogeneous condition.

In the FAB aeration tank of required capacity wastewater will be mixed with microorganisms in presence of dissolved oxygen. Microorganisms will assimilate organic impurities. The FAB aeration tank will be supplied through two positive displacement (roots type) air blowers (1 working + 1 standby) located outside the tank. Submerged air diffusers will provide mixing and oxygen for the needs of microorganisms. The blowers will be sized to maintain dissolved oxygen level in the aeration tank of approximately 2 mg/lit.

From the FAB aeration tank mixed liquor will flow by gravity into adjoining Plate Settler of required capacity. The solids will settle in the plate settler tank. A sludge return pump will be provided for pumping the settled sludge from the plate settler tank back to the aeration tank. Plate settler tank will also be provided with skimmer system to pump floating scum back to the aeration tank to keep the plate settler surface clean.

An overflow weir with scum baffle will be provided in plate settler to take treated wastewater out of the plate settler.

From the plate settler, treated wastewater will flow by gravity into adjoining clarified water tank. From this tank the water will be lifted with a submersible pump and passed through a pressure sand filter and an activated carbon filter and stored in the treated water tank. Water from this tank will be lifted with suitable pumps for further use for flushing and horticulture purpose. In case of extra effluent the arrangement shall be made to dispose of into municipal sewer.

Excess sludge from the plate settler tank will be taken periodically into sludge holding tank. In this tank sludge will be aerated for self-stabilization. Air will be shut off periodically and superannuate water will be transferred to the aeration tank creating stabilized sludge. This stabilized sludge shall be dried in filter presses and used as manure and extra will be carted away.

6. RAIN WATER DISPOSAL

6.1 Drainage system shall be designed on the parameters setup by the metrology department and various statutory codes. Surface drainage consisting of surface drains and underground storm water disposal pipes will be provided so that there is no accumulation of rain water. In addition to this Rain Water Harvesting and Ground Water Recharge structures will also be provided to make optimal use of the rain water so collected.

6.3 Design/Technical Parameters

6.3.1

Min. velocity of flow in pipes	=	0.6 m/sec or as per site
Max Velocity of flow	=	2.0 m/sec.
Min. Free board		

a. For drains up to 300 mm width = 75 mm
b. For drains up to 900 mm width = 150 mm

6.3.2 The run off for designing of drainage = 1 Cusec. /acre

6.3.3 The design of drains is based on Manning's formula, for flow due to gravity

$$V = \frac{1}{n} R^{2/3} S^{1/2}$$

Where V = Velocity in m/sec.
R = Hydraulic mean radius in m
S = Hydraulic gradient in m/meter
n = Manning's co-efficient

6.3.4 **Manning's Co-efficient**

(a) For R.C.C. pipes **n = 0.015**
(b) For brick masonry channel with neat coat of cement plaster **n = 0.013**

7. RAIN WATER HARVESTING

The main emphasis given in the planning of the storm water drainage system is on recharging the underground aquifer of the area while having the safe disposal of storm water without flooding the campus. A network of storm water disposal drains will be planned which will finally dispose off into a percolation well for direct injection of collected storm water into the ground water. Bar screens and silt traps have been incorporated before the percolation wells to remove the silt, heavier particles and other objectionable material which can cause the choking of the percolation well. The over flow of these rain water harvesting pits will be interconnected and then finally connected to the trunk storm water pipe line.

WHY DO WE REQUIRE RAIN WATER HARVESTING AND GROUND WATER RECHARGE

- To meet ever increasing demand for water in urban areas.
- To reduce the runoff that is choking the storm drains.
- To avoid the flooding of roads.
- To augment the ground water storage and control decline of water levels.
- To improve the quality of ground water.

THE ADVANTAGES OF RAIN WATER HARVESTING AND GROUND WATER RECHARGE

This is an ideal solution of water problem where there is inadequate ground water supply or surface resources are either lacking or insignificant.

- To utilize the rainfall runoff, which is going to sewer or storm drains.
- Rainwater is pure, free from organic matter and soft in nature.
- It will help in reducing the flood hazard.
- To improve the quality of existing ground water through dilution.
- Rainwater may be harnessed at place of need and may be utilized at time of need.

The structures required for harvesting the rainwater are simple, economical and eco-friendly.

The drainage system shall be led to various percolation wells catering to different parts of the catchments area. Silt traps will be provided at inlet to each percolation well. The overflow from percolation wells will either be inter connected or will be pumped to the existing storm water disposal line.

IMPORTANT INDIAN STANDARDS PLUMBING & SANITARY WORK

	TITLE
IS 651-1965	Specification for salt Glazed stoneware pipes and fittings (First revision).
IS 782-1978	Specification for caulking lead.
IS 1172-1971	Code of basic requirements for water supply, drainage and sanitation (revised).
IS 1239-1968 (Part-I)	Specifications for mild steel tube, tubular and other steel pipe fittings.
IS 1239-1968 (Part-II)	Specifications for mild steel tube, tubular and other steel pipe fittings.
IS 1537-1976	Specification for vertically cast iron pressure pipes for water, gas and sewage.
IS 1536-1976	Specification for centrifugally Cast (Spun) Iron pressure pipes for water, gas and sewage.
IS 1538 (Part 1 to 23)	Specification for Cast Iron fittings for pressure pipes for water, gas and sewage.
IS 1626-1960	AC building pipes, gutters and fittings (Spigot and socket type).
IS 1726-1960	Code for cast iron manhole frame and cover.
IS 1729-1979	Specification for Sand cast iron Spigot and Ventilating pipes, fittings and accessories.
IS 1742-1960	Code of practice for building drainage.
IS 2064-1962	Code of practice for selection, installation and maintenance of sanitary appliances.
IS 2065-1963	Code of practice for water supply to buildings.
IS 3114-1965	Code of practice for laying of C.I. Pipes.
IS 3589-1981	Specification for electrically welded steel pipes for water, gas and sewage.
IS 3989-1970	Centrifugally cast spun iron and socket soil and ventilating

pipe, fittings and accessories.

IS 4111-1967	Code of practice for Ancillary structure in sewerage system.
IS 4127-1967	Code of Practice for laying glazed stone ware pipe.
IS 4515	Specification for unplasticized PVC pipe fittings.
IS 4985-1981	Specification for unplasticized PVC pipes for portable water supplies.
IS 1703-1984	Ball Valves
IS 2548-1970	Toilet Seat Cover
IS 4736-1986	Galvanizing G.I. Pipes
IS 780-1984	Cast iron sluice valves
IS 778-1984	Full way valves
IS 2692-1978	Brass ferrule
IS 458-1971	R.C.C. pipes

National building code for water supply, drainage and sanitation Part IX Plumbing services section 1 & 2.

The installation shall also be in conformity with the bye-laws and requirements of the local authority are so far as these become applicable to the installation. Where-ever this specification calls for a higher standard of materials and/or workmanship then those required by any of the above regulations and standards, hen this specification shall take precedence over the said regulations and standards. Wherever drawings and specifications require something that may violate the regulations, the regulation shall government.