

LC-3804

**SERVICE ESTIMATE, DESIGN REPORT AND
CALCULATION OF
INTERNAL DEVELOPMENT WORKS**

FOR

**REVISED LAYOUT OF "AFFORDABLE PLOTTED COLONY (UNDER DEEN DAYAL
JAN AWAS YOJNA - 2016)" FOR LAND AREA MEASURING 12.41875 ACRES
(LICENSE NO. 23 OF 2019 DATED 20.02.2019) IN REVENUE ESTATE OF SECTOR
- 35, SOHNA, DISTT. – GURUGRAM BELONGING TO LION INFRADEVELOPERS
LLP, VALLABHAM BUILDCON PVT. LTD. AND VIBHOR HOME DEVELOPERS PVT.
LTD. IN COLLABORATION WITH M/S LION INFRADEVELOPERS LLP.**

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1023, JMD MEGAPOLIS, SECTOR 48, GURUGRAM-122001
MEP CONSULTANT: PRIFACTOR ENGINEERS,
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SERVICE ESTIMATE, DESIGN REPORT AND CALCULATIONS OF INTERNAL DEVELOPMENT WORKS FOR PROPOSED "AFFORDABLE PLOTTED COLONY (UNDER DEEN DAYAL JAN AWAS YOJNA - 2016) LAND AREA MEASURING 12.41875 ACRES (LICENSE NO. 23 OF 2019 DATED 20.02.2019) IN SECTOR 35, SOHNA, DISTT. GURUGRAM BELONGING TO LION INFRADEVELOPERS LLP, VALLABHAM BUILDCON PVT.LTD. AND VIBHOR HOME DEVELOPERS PVT. LTD. IN COLLABORATION WITH M/S LION INFRADEVELOPERS LLP

Sohna town of Haryana State situated on NH 248-a road at a distance of 54 Km from Delhi. Being in the national capital region, the town has developing tendency and potential. Further, it has also started sharing the growing residential, commercial and Industrial load of Delhi. In order to review the growing pressure of population in National Capital of Delhi, it has been decided by the Haryana Government to develop various infrastructure facilities in Sohna, Distt. - Gurugram Urban Complex. This report is for a part of service estimate for proposed "Affordable Plotted Colony" (under Deen Dayal Jan Awas Yojna - 2016) measuring 12.41875 acres (License No. 23 of 2019 dated 20.02.2019) in Sector 35, Sohna Distt. Gurugram being belonging to Lion Infradevelopers LLP, Vallabham Buildcon Pvt. Ltd. and Vibhor Home Developers Pvt. Ltd. in collaboration with M/s Lion Infradevelopers LLP has been prepared with the following provisions which are as under: -

1. WATER SUPPLY

The source of water supply in this area is by HSVP Mains. It has been proposed to construct underground tanks of capacity as per attached details (Annexure-I: Water requirement chart and water storage capacity) and to location for domestic purpose and for fire protection. The underground tanks will be fed from the HSVP based supply, which will feed O.H. tanks on the roof of the Building and has been designed as per the Hazen Williams formula. Presently there is proposed HSVP W/S in this area. However the provision of tube well have been taken due to non availability of water but after getting the approval from the competent authority through tube wells /tankers / any other approved source till HSVP W/S will made available. The proposed tube wells shall be 510mm bore drilled with reverse rotary rig and installed with 100mm i/d housing pipe and 80mm i/d slotted tube as strainer, hence the provision of Two Nos Tube Wells have been taken in this estimate.

DESIGN

The scheme has been designed for population of ³⁹⁶²~~4160~~ persons considering @ ⁵~~5~~ ^{13.5}~~13.5~~ persons/~~apartment~~ ^{plots} for Affordable Plotted Colony and other provision etc. The combined quantum of water supply (domestic + flushing) per head / day has been taken as 135 Liters per head per day as per design calculation and in relevance to the national building codes of 2016.

PUMPING EQUIPMENTS

It has been proposed to install pumping set as described with standby of equal capacity. The provision for standby generating set has also been provided in case of any time electricity failure. Generator will be provided separately or added to the capacity of main generator.

2. SEWERAGE

The scheme is designed for sewer connecting to the STP and bypass connection to HSVP sewer scheme. The sewer lines have designed for three times average D.W.F. in relation to water supply demand. It has assumed that about 80% of the domestic and flushing water supply shall find its way into the proposed sewer. Sewer lines shall be running by gravity and discharge to STP proposed. Treated water will be used for Irrigation & Flushing purpose (through recycling) under the pipeline system. ~~R.C.C Np2 class pipes~~ ^{S.W. pipes} have been used for the sewage system.

3. STORM WATER DRAINAGE

It has been proposed to lay RCC NP3 and NP2 pipes with required number of manholes for disposal of storm water, which will be connected to the HSVP drain. The intensity of rain fall has been taken as 25mm per hour. A minimum size of ~~250mm~~ ^{450mm/480mm/500mm} i/d R.C.C. Np3 pipes for storm water drain will be provided and designed as per manning's formula. Necessary provision of rainwater harvesting arrangement has also been taken in this estimate.

4. ROADS

Road Parking and Pavement have been provided to above areas and estimates prepared as revised specifications adopted by HSVP.

5. STREET LIGHTING AND ELECTRIFICATION

Provision for external lighting and electrification of proposed area has been made.

6. HORTICULTURE

Estimate and details of plantation, landscaping, signage etc. have been included.

7. FIRE FIGHTING

Provision of Fire Fighting system has been made.

8. Provision for **Electric Panel or ESS** provision has also been made in this estimate

9. SPECIFICATIONS

The work will be carried out in accordance with the standard specifications of PH as laid down by the Haryana Government / HSVP.

10. RATES

The estimate has been used the present market rates

11. COST

The Total cost of scheme including cost of all services works out to Rs. ~~1034.37~~ ^{1084.10} Lacs (Rupees Ten Crores Thirty Four Lacs and Thirty Seven Thousand Only) including 3% contingencies and 49% departmental charges + Price escalation and cost per acre comes out to Rs. ~~83.29~~ ^{87.30} Lacs.

FOR LION INFRADEVELOPERS LLP

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Fire water will be replenished from the domestic and raw water tanks.

III.

Garden Irrigation Requirement (For Total Area)	25.00 =15.67 KLD
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IV. Total Water Requirement for UGT

Raw Water Tanks	= 2 x 100 KLD
Domestic Water Tanks	= 2 x 75 KLD 2x100 KLD
Flushing Water Tanks	= 1 x 125 KLD 1x100 KLD

V. Tube Well

Tube Well	For UGT
a) Yield	= 15 K.L. / Hr.
b) Working Hour per day	= 16 Hr. / per day
c) Total water demand	= 484.6 ³⁴⁰ M3 / day
d) Number of tube well required (water Demand / Discharge / Hr. working Per day)	= 2.01 ^{1.42} Nos
Say	= 2 Nos

(Water to the proposed development is to be supplied by HSVP. However, consider 2.00 Nos TW's to install for proposed requirement of water for augmentation / standby purposes and provision has also been taken in the estimates due to non-availability of water but after getting the approval from the competent authority.

I. Pumping Machinery for Tube wells

a) Gross Working Head	= 80 Mtr
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b) Average fall in S.L	= 2 Mtr
c) Depression Head	= 6 Mtr
d) Friction loss in main	= 10 mtr
Total	= 98 Mtr
e) Discharge	= 15000 LPH (Or 4.17 LPS Say 4.50 LPS)
f) Horse Power	= 9.80 HP
HP = $(4.50 \times 98) / (75 \times 0.60)$	Say = 10.00 H.P.

It is proposed to provide ⁰¹ ~~2~~ No pumping set of 4.50 LPS discharge at 98 Mtr head (2W)

II. Boosting Machinery for domestic water for UGT

Total Water Requirement	= ³³⁸ 314.7 KLD
Pumping per hour @ 8 hr. pumping / day	= ³³⁸ 314.7 / 8 KL / hr.
	= ^{42.25} 39.33 KL / hr.
	= ^{704.16} 655.25 lpm = ^{11.74} 10.93 lps
	Say 2 No. 6.00 lps each
Gross working head	For UGT
Suction lift	= 5.00 mts.
Frictional loss in mains & Specials	= 10.00 mts.
Clear Head required	= 30.00 mts.
Total	= 45.00 mts
Say	= 45.00 mts
Pump HP	= $(6.00 \times 45) / (75 \times 0.60)$
	= 6.00 H.P.
Say	= 6.00 H.P.

It is proposed to provide 3 No of pumping set of 6.00 lps discharge at 45 mts Head each (2W + 1S) for UGT.

III. Boosting Machinery for flushing water at STP

Total Water Requirement	¹⁶⁷ = 169.9 KLD
Pumping per hour @ 8 hr. pumping / day	¹⁶⁷ = 169.9 / 8 KL / hr.
	^{20.88} = 21.23 KL / hr.
	^{5.80} = 5.9 lps
	Say 2 No. 6.00 lps each
Gross working head	
Suction lift	= 5.00 mts.
Frictional loss in mains & Specials	= 10.00 mts.
Clear Head required	= 30.00 mts.
Total	= 45.00 mts
Say	= 45.00 mts
Pump HP	= $(6.00 \times 45) / (75 \times 0.60)$
	= 6.00 H.P.
Say	= 6.00 H.P.

It is proposed to provide 2 Nos of pumping set of 6.00 lps discharge at 45 mts Head each (1W + 1S).

IV. Boosting Machinery for Irrigation water

Total Water Requirement	^{25.00} = 15.00 KLD
Pumping per hour @ 5 hr. pumping / day	^{25/5} = 15/2 KL / hr.
	^{5.00} = 7.50 KL / hr.
	^{83.33} ¹³⁸ = 125.00 lpm = 2.08 lps
	^{2.00} Say = 2.20 lps each
Gross working head	
Suction lift	= 5.00 mts.
Frictional loss in mains & Specials	= 3.00 mts.
Clear Head required	= 15.00 mts.
Total	= 21.00 mts
Say	= 21.00 mts
Pump HP	^{2.00} = (2.20 x 21) / (75 x 0.60)
	^{0.93} = 1.03 H.P.
Say	^{2.00} = 1.05 H.P.

It is proposed to provide 2 No. of pumping set of 2.2 lps discharge at 21 mts Head each (1W+1S).

FLOW TO SEWAGE TREATMENT PLANT

Total Water Requirement = ^{50.5} ~~314.7~~ KLD for domestic & ~~169.9~~ KLD for flushing

- I. ~~85% of total Domestic Water Demand = 85% of 314.7 KLD = 267.495 KLD~~
- II. ~~100% of total Flushing Water Demand = 100% of 169.9 KLD = 169.90 KLD~~

Total = ~~437.395~~ KLD

Say ~~440~~ KLD

Proposed STP Capacity = ~~440~~ KLD Or 0.44 MLD

^{Take up 80% of STP = 404 KLD}

^{Add 5% marginal factor = 20 KLD}

^{424 KLD}

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^{Proposed = 440 KLD}
STP

FINAL ABSTRACT OF COST

SR. NO.	SUB WORK	DESCRIPTION	Amount (Rs. in Lacs)
1.	SUB WORK NO. I	WATER SUPPLY SCHEME	165.51
2.	SUB WORK NO. II	SEWERAGE SCHEME	148.97
3.	SUB WORK NO. III	STORM WATER DRAINAGE	99.86
4.	SUB WORK NO. IV	ROADS & FOOT PATHS	240.24
5.	SUB WORK NO. V	STREET LIGHTING	47.64
6.	SUB WORK NO. VI	HORTICULTURE (PLANTATION & ROAD SIDE TREES)	7.16
7.	SUB WORK NO. VII	MTC CHARGES INCL RESURFACING OF ROADS AFTER 1st 5 YEARS AND 2nd YEAR OF MTC AS/HUDA	324.99
		TOTAL	1034.37
TOTAL : (Rupees Ten Crores Thirty Four Lacs and Thirty Seven Thousand Only)/--			

Cost Per Acre = Rs. ~~1034.37~~ Lacs / 12.41875 = ~~83.29~~ Lacs Per Acre.

FOR LION INFRADEVELOPERS LLP

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Executive Engineer
HSVP Division No. VI
Gurugram

Checked subject to comments
in forwarding letter No. 45/82
Dt. 12.03.2021 and notes
attached with the estimate

Superintending Engineer,
HSVP Circle-II, GurugramDirector Town & Country
Planning Haryana
ChandigarhSuperintending Engineer (HQ)
for Chief Engineer 1 HSVP
Panchkula

SUB WORK No. 1
(Abstract of Cost)

WATER SUPPLY SCHEME

SR. NO.	SUB WORK	DESCRIPTION	AMOUNT (Rs. In Lacs)
1	Sub Head No. 01	Head Works	41.12
2	Sub Head No. 02	Plumbing Machinery	11.00
3	Sub Head No. 03	Water Supply Distribution (Domestic, Flushing & Rising Main pipe)	52.61
4	Sub Head No. 04	Irrigation	3.12
		TOTAL	107.85
		Add 3% contingencies & PH Charges	3.2355
		TOTAL	111.08
		Add 49% Departmental charges + Price escalation	54.43
		G. TOTAL	165.51
		Say in Lacs	165.51

54.13

15.25

55.17

2.73

127.98

3.82

131.16

64.24

195.34

(C.O. to Final Abstract of Cost)

Say Rs. 195.35 Lacs

Sub Work No. 1
Sub Head No. 01

Water Supply
Head Works

Sr. No.	Description	Amount in Rs.
1	Construction of U.G. Tanks including pipes, valve & Specials. 350 KLD @ Rs. 3000/- per KLD	10,50,000/-
	500 4500	
2	Provision of Construction of Boosting Station 1 Nos @ Rs. 200000/- each	2,00,000/-
	3,00,000/-	
3	Boring and installing tube well with reverse rotary rig complete with pipe and strainer to a depth of about 120 Mtr complete in all respect . 1 Nos @ Rs. 1000000/- each	10,00,000/-
4	Provision of Construction of Tube well Chambers of Size 1.50m x 1.50m complete in all respect. 1 Nos @ Rs. 100000/- each. (Housing T.W)	1,00,000/-
5	Provision for Carriage of material & other unforeseen items L.S	50,000/-
6	Provision of rising main for tube well upto UGT L.S to by pass arrangement 100mm dia 170m @Rs.1250/-	2,12,000/-
7	Provision for footpath, lawn, hedges at T.W boundary wall, boosting station (L.S)	5,00,000/-
8	Provision for staff office for maintenance Staff (L.S)	10,00,000/-
	Total	41,12,000/-
	Say in Lacs	41.12 Lacs

(C.O. to Abstract of cost of Sub Work No. I)

54.13

Sub Work No. 1

Sub Head No. 02

Water Supply
Pumping
Machinery

Sr. No.	Description	Amount in Rs.
1	Providing and installing transfer pumping set of following capacities for domestic water Supply with specials.	4,50,000/-
	6.00 lps at 45 mts head 3 No. (2W+1SB) - @ Rs. 150,000/- each Set (6 00HP)	1,50,000/-
2	Providing and installing pumping set of following capacities for Flushing water supply.	3,00,000/-
	6.00 lps at 45 mts head - 2 No. (1W + 1SB) @ Rs 1,00,000/- 1 Set (6 HP each)	1,00,000/-
3	Providing and installing Submersible pump for tube wells with specials.	
	Complete in all respects ① 125000/-	125000/-
	4.50 lps at 98 mts head - 2 No. (2W) @ Rs 2,00,000/- 1 Set (10 HP each)	2,00,000/-
4	Provision for making foundations & erection of pumping machinery.	1,50,000/-
5	Provision for pipes, valves & specials inside boosting chamber.	1,00,000/-
6	Provision for electric services connection including electric fittings for boosting chambers and pump chamber etc.	2,50,000/-
7	Provision for carriage of materials and other unforeseen items L.S.	1,50,000/-
	Total	11,00,000/-
	Say in Lacs	11.00 Lacs

(C.O. to Abstract of cost of Sub Work No. 1)

⑧ Prov. & installation of pumping set for irrigation.

22PS at 21.7 m head, 2 HP

2 Nos (1W + 1S) @ Rs 50,000/-

1,00,000/-

1525000/-

Say Rs 15.25 Lakh.

Sub-Work No. 1

Water Supply

Sub Head No. 03

Water Supply Distribution & Rising Main Pipe

Sr. No.	Description	Amount in Rs.
1	Providing, laying, jointing & testing pipe lines including cost of excavation etc complete in all respects.	
i)	80mm dia D.I. Pipe 767 Mtr @ Rs. 1750/- per Mtr	13,42,250/-
ii)	100mm i/d D.I. Pipes - 787 Mtr @ Rs. 2250/- per Mtr	17,70,750/-
iii)	150mm i/d D.I. Pipes 520 Mtr @ Rs. 2750/- per Mtr	14,30,000/-
2	Providing and fixing sluice valve including cost of surface box and masonry chamber etc. complete in all respect.	
a)	80mm i/d 18 No. @ Rs. 7500/- each	1,35,000/-
b)	100mm i/d 9 No. @ Rs. 10000/- each	90,000/-
c)	150mm i/d 1 No. @ Rs. 15000/- each	15,000/-
3	Providing and fixing indicating plates for sluice valve 28 No @ Rs. 1000/-	28,000/-
4	Provision for carriage of materials and other unforeseen items.	1,00,000/-
5	Provision for making connection with HUDA Pipe on master road	2,00,000/-
6	Provision for cutting the road and making good the same.	1,50,000/-
	Total	52,61,000/-
	Say in Lacs	52.61 Lac

(C.O. to Abstract of cost of Sub Work No. I)

⑦ Prov. & fixing of fire hydrants
with accessories

555000/-

37 Nos @ Rs 15000/-

⑧ D.G. Pump 2850 LPM, 45 m
Head, 48 HP, 60 KVA

9,00,000/-

5517000/-

Say Rs 55.17 Lakh.

Sub-Work No. 1
Sub Head No. 04

Water Supply
Irrigation

Sr. No.	Description	Amount in Rs.
1	Providing. Laying, jointing and testing UPVC Pipe lines suitable for 6 kg pressure including cost of fittings, valves, connection etc. complete in all respect. <i>300/-</i>	<i>60,000/-</i>
a)	25mm dia - 200 M @ Rs. 500/- Per Mtr.	1,00,000/-
2	Providing and fixing 25mm dia irrigation hydrant valve complete in all respect. 25 Nos @ Rs. 3500/- each.	87,500/-
3	Provision for carriage of materials and other unforeseen items L.S.	1,00,000/-
4	Provision for indicating plate with safety box etc. complete in all respect. 25 Nos @ Rs. 1000/- each.	25,000/-
		<i>272500/-</i>
	Total	3,12,500/-
	Say in Lacs	3.12 lac <i>2.73</i> <i>2 lakhs</i>

(C/O To Abstract of Cost for Sub work No.1)

Sub-Work No. II

SEWERAGE SCHEME

Sr. No.	Description	Amount in Rs.
1	Sewer Pipes - Providing and laying non pressure NP2 class (medium duty) R.C.C. pipes conforming to IS 458 with collars jointed with stiff mixture cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) including testing of joints etc. complete. (all round and upto haunching shall be paid separately)	
	a) 200 mm Diameter i/d 1700 M @ Rs. 1400/- per Mtr	2380000.00/-
	b) 250 mm Diameter i/d 163 M @ Rs. 2000/- per Mtr	3260000.00/-
	c) 300 mm Diameter i/d 10 M @ Rs. 2600/- per Mtr	260000.00/-
2	Provision of lighting and watching etc (L.S)	1,00,000/-
③	Provision for carriage of material & underpin etc.	2,00,000/-
④	Provision for construction of Sewerage Treatment Plant (STP) including the cost of tertiary treatment level with recycling storage tank and machinery with all arrangement etc. complete in all respect 4.4 MLD or (0.44 MLD) Capacity	68,75,000.00/-
⑤	Provision for make up connection with existing/ proposed sewer line.	1,00,000/-
	Total	9707000.00/-
	Add 3% contingency & P.H. Services	291210/-
	Total	9998210/-
	Add 49% Department charges + Price Escalation	4899122.9/-
	G. Total	14897332.9/-
	Say in Lacs	148.97 Lacs

150.90

(C/O to Final Abstract of Cost)

Sub-Work No. III

STORM WATER DRAINAGE SCHEME

Sr. No.	Description	Amount in Rs.
1	Storm Water Pipes - Providing and laying non pressure NP2 class (medium duty) R.C.C. pipes conforming to IS 458 with collars jointed with stiff mixture cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) including testing of joints etc. complete. (all round and upto haunching shall be paid separately)	
	a) 150 mm Diameter i/d = 150 M @ Rs. 650/- per Mtr	97,500.00/-
	b) 200 mm Diameter i/d = 1500 M @ Rs. 850/- per Mtr	12,75,000.00/-
	c) 250 mm Diameter i/d = 298 M @ Rs. 1020/- per Mtr	3,03,960.00/-
	d) 300 mm Diameter i/d = 424 M @ Rs. 1250/- per Mtr	5,30,000.00/-
	e) 450 mm Diameter i/d = 286 M @ Rs. 1850/- per Mtr	5,29,100.00/-
	f) 600 mm Diameter i/d = 189 M @ Rs. 3500/- per Mtr	6,61,500.00/-
2	Provision for Rain Water Harvesting arrangement including the cost of screening chamber and pit with all type of pipes and other material etc. complete in all respect as per standard drawing and bore upto requirement of site etc. 9 Nos RWH @ Rs. 1,50,000/- each.	13,50,000.00/-
3	Provision for road gully & pipe with connection 300mm dia (L.S)	3,00,000.00/-
4	Provision for lighting and watching (L.S)	80,000.00/-
5	Provision for timbering and shoring (L.S)	80,000.00/-
6	Provision for cartage of material and other unforeseen item	1,00,000.00/-
7	Provision for making connection with HSVP storm water drain (L.S)	1,00,000.00/-
8	Provision for temporary disposal arrangement	10,00,000.00/-
9	Provision for cutting of road and making road to its original condition	1,00,000.00/-
	Total	65,07,060.00/-
	Add 3% contingency & P.H. Services	1,95,211.80/-
	Total	67,02,271.80/-
	Add 49% Department charges + Price Escalation, unforeseen, addendum	32,84,113.18/-
	G. Total	99,86,384.98/-
	Say in Lacs	99.86 Lacs

(C/O to Final Abstract of Cost)

117.77

180500/-
757900/-
850500/-

7673400
230202
7903602
3872765
11776367

Sub Work No. IV

ROAD AND FOOTPATH

S. No.	Description	Unit	Qty.	Rate (In Rs.)	Amount (In Rs.)
1	Provision for leveling & earth filling as per site conditions	Per Acre	12.4187	150000	18,62,805.00
2	i) Providing and laying 100 mm thick PCC under pavement, cement concrete of specified grade 1:4:8 and 150 mm thick RMC grade M-40 ii) Providing and laying Bituminous road (200mm GSB, 250mm WMM, 50mm BM, 25mm MSS DBM , 25mm BC)	Sqm	8787	1200	1,05,44,400.00
3	Provision for kerbs and channels of C.C. 1:2:4	Meter	1440.93	600	8,64,558.00
4	Provision for arrangement of guide map and indicating board etc.	LS			2,00,000.00
5	Provision for Traffic light control	LS			1,00,000.00
6	Provision for footpath with 100mm thick PCC under pavement cement concrete of specified grade 1:4:8 and 150mm thick RMC Grade M-40 or Bituminous road with 250 mm GSB, 300mm WMM, 50mm thick DBM & 40mm thick BC etc as per requirement of site for surface car parking & approach to Tower / Block etc.	Sqm	2161.39	600	12,96,834.00
7	Provision for carriage of material & other unforeseen	LS			2,00,000.00
8	Provision for pavement in common commercial area i.e. 50% of the area 1952.47 946.98 i.e. 1952.47/2 = 976.235 946.98 Sqm	Sqm	976 947	600	5,85,600.00 5,68,200.00
	1893.96 1893.96/2 Sub Total			15654797	1,56,54,197.00
	Add 3% contingencies & PH services			469644	4,69,625.91
	Sub Total			16124441	1,61,23,822.91
	Add 49% Departmental Charges + Price Escalation			7900976	79,00,673.23
	Total			24025417/-	2,40,24,496.14
	Say Rs. in Lacs			240.26 Lacs	240.24

(C.O. to Final Abstract of cost)

Sub Work No. V

STREET LIGHTING

S. No.	Description	Unit	Qty.	Rate (In Rs.)	Amount (In Rs.)
1	Provision for Street Lighting at surrounding area as per standard specifications of HVPN etc. complete with CFL	Acre	12.4187	250000	31,04,675.00
	Add 3% contingencies & PH services				93,140.25
	Total				31,97,815.25
	Add 49% Departmental Charges + Price Escalation and unforeseen, addendum				15,66,929.47
	Total				47,64,744.72
	Say Rs. in Lacs				47.64

(C.O. to Final Abstract of cost)

47.65

Sub Work No. VI

HORTICULTURE

S. No.	Description	Unit	Qty.	Rate (In Rs.)	Amount (In Rs.)
1	Development of Lawn Areas				
a	Trenching of ordinary soil upto depth of 60cm i/c removal & stacking of serviceable material & disposing by spreading and levelling with in a lead of 50M and making up the trench area for proper levels by filling with earth or earth mixed with manure before and after flooding trench with water i/c cost of imported earth and manure with all fitting and valve etc. complete				
b	Rough dressing of turfed area				
c	Grassing with "Cynadon dactylon" i/c watering and maintenance of lawns for 30 days till the grass forms a thick lawn, free from weeds and fit for moving in row 7.5cm part in either direction				
d	Organized green 3830.63 Sqm or 0.94 acres (As per detail given in green park area calculation)	Acre	0.9466	150000	1,41,990.00
2	Providing and planting trees along boundary @12m interval (Length appx. x 1440M) = $1440/12 = 120$, $120 \times 2 = 240$ Say No. of trees = 250 NOS Cost details : Excavation = Rs. 60 Manure = Rs. 90 Tree Plant + Tree guarded = Rs. 1150 Total Rs. = Rs. 1300				
		Each	250	1300	3,25,000.00
	Total				4,66,990.00
	Add 3% contingencies & PH services				14,009.70
	Total				4,80,999.70
	Add 49% Departmental Charges + Price Escalation, unforeseen, addendum				2,35,689.85
	Total				7,16,689.55
	Say Rs. in Lacs				7.16

(C.O. to Final Abstract of cost)

7.17

Sub Work No. VII

Mtc. of services and Resurfacing of Roads

S. No.	Description	Unit	Qty.	Rate (In Rs.)	Amount (In Rs.)
1	Mtc of water supply, sewer, storm water drain, roads, street light, hort, etc. for period of 10 years including operation charges full establishment etc. complete in all respects @ Rs. 7.5 lacs per acre	Acre	12.4187	7,50,000.00	93,14,025.00
2	Provision for resurfacing of roads after 5 years of 1st phase with provision of 50mm thick BM including leveling coarse and 25mm BC as per crust design whichever is safer	Sqm	8787	600	52,72,200.00
3	2nd phase after next five years of 1st phase (50mm DBM & 25mm BC or as per crust design whichever is safer	Sqm	8787	750	65,90,250.00
	Sub Total				2,11,76,475.00
	Add 3% contingencies & PH services				6,35,294.25
	Sub Total				2,18,11,769.25
	Add 49% Departmental Charges + Price Escalation and unforeseen, addendum				1,06,87,766.93
	Total				3,24,99,536.18
	Say Rs. in Lacs				324.99

(C.O. to Final Abstract of cost)

325.00 Lakh

SUMMARY OF DESIGN REQUIREMENT

Sr. No.	Description	Qty	Unit
1	Total Population	3962 4160	Persons
2	Total Water Requirement (Domestic)	338 314.7	KLD
3	Total Water Requirement (Flushing)	167 154.23	KLD
4	Total Water Requirement (Horticulture)	25.0 15.67	KLD
5	U. G. Tank (Domestic)	2	No.
6	U. G. Tank (Raw)	2	No.
7	No. of Domestic WS pumps UGT	2+1	Set
8	No. Flushing pumps	1+1	No.
9	No. of submersible pumps	2	No.
10	STP (440 KLD)	1	No.

Material Summary : Water Supply (Domestic & Flushing) and Rising Main

Sr. No.	Pipe Size (in mm)	Qty (in Mtr)		
		Water Supply (Domestic)	Water Supply (Flushing)	Rising Main
1	20		1200	
2	25	1200		
3	50		423	
4	65	423	43	
5	80	43	680	
6	100	680		
7	150			520

Grand Total

	Domestic	Flushing	Total
80mm	466	1146	= 1612 Mtr
100 mm	680	—	= 680 Mtr
1.50mm	520	—	= 520 Mtr

Material Summary (Water Supply : Domestic)

S. No.	Node		Pipe Size / Length		
	From	To	65 mm	80 mm	100 mm
1	1	2	115	115	
2	3	4		43	
3	4	5		—	115
4	4	6		—	101
5	7	8		—	115
6	9	10	157	157	
7	11	12	33	33	
8	13	14		—	20
9	15	16		—	174
10	17	18		—	155
11	19	20	30	30	
12	21	22	88	88	
Total Quantity			423	43 466	680

Branch Pipe for Domestic (25mm) = 1200 Mtr

80mm = 466 Mtr

100mm = 680 Mtr

Material Summary (Water Supply : Flushing)

S. No.	Node		Pipe Size / Length		
	From	To	50 mm	65 mm	80 mm
1	1	2	115		115
2	3	4		43	43
3	4	5			115
4	4	6			101
5	7	8			115
6	9	10	157		157
7	11	12	33		33
8	13	14			20
9	15	16			174
10	17	18			155
11	19	20	30		30
12	21	22	88		88
Total Quantity			423	43	680

Branch Pipe for Flushing (20mm) = 1200 Mtr

1146 Mtr

Rising Main

S. No.	Name of Line		Size	Length (in Mtr)	
	From	To	mm	100	150
1	TW	UGT	150		170
2	Government Line	UGT	150		350
Total				0	520

MATERIAL STATEMENT OF SEWERAGE SCHEME

Node no (Sewer)	Length in mtr.	Design
		Pipe size (R.C.C NP2 PIPE)
		<i>Sw Pipes</i>
1	0	200
1-2	97	200
3	0	200
3-2	24	200
2-8	84	200
7	0	200
7-8	101	200
9	0	200
9-8	60	200
8-6	88	250
4	0	200
4-5	78	200
5-6	38	200
6-12	24	250
16	0	200
16-17	58	200
15	0	200
15-17	29	200
17-14	62	200
13	0	200
13-14	129	200
14-11	53	200
10	0	200
10-11	103	200
11-12	51	250
12-STP	10	300
	<i>1089 Mtr</i>	

200 mm i/d Pipe Length	= 916 Mtr + 784 = 1700 Mtr
250 mm i/d Pipe Length	= 163 Mtr
300 mm i/d Pipe Length	= 10 Mtr

MATERIAL STATEMENT OF STORM WATER DRAINAGE SCHEME

Node no (Storm Water)	Length in mtr.	Design
		Pipe size (R.C.C. NP2)
1-2	88	250-400
3-2	16	250-400
2-4	84	300-400
5-5A	31	300-400
6-5A	21	300-400
5A-4	43	300-400
4-7	82	450
8-7	29	250-400
7-9	89	450
10-12	130	300-400
11-12	93	250-400
12-09	74	450
09-13	41	450
14-13	115	300-400
13-16	21	600
15-16	36	250-400
16-18	40	600
17-18	36	250-400
18-19	128	600

7797

~~250 mm i/d Pipe Length~~
 300 mm i/d Pipe Length
 450 mm i/d Pipe Length
 600 mm i/d Pipe Length

~~= 298 Mtr~~
~~= 424 Mtr~~ 722 mtr.
 = 286 Mtr
 = 189 Mtr

Material statement of Road work

SR. NO.	ROAD NO.	ROAD WIDTH	LENGTH	WIDTH	AREA	
1	1	9	82.377	6	494.262	Sqm.
2	2	9	94.94	6	569.64	Sqm.
3	3	9	174.122	6	1044.732	Sqm.
4	4	9	34.233	6	205.398	Sqm.
5	5	9	154.934	6	929.604	Sqm.
6	6	9	114.968	6	689.808	Sqm.
7	7	9	148.968	6	893.808	Sqm.
8	8	9	86.696	6	520.176	Sqm.
9	9	9	61.736	6	370.416	Sqm.
10	10	9	33.944	6	203.664	Sqm.
11	11	9	86.699	6	520.194	Sqm.
12	12	9	120.7	6	724.2	Sqm.
13	13	12	44	6	264	Sqm.
14	14	24	67	2x7	938	Sqm.
G. TOTAL					8367.902	Sqm.
Add 5% extra for curves					418.3951	Sqm.
Total					8786.2971	Sqm.
				say	8787	Sqm.

1 Kerbs and channels

(i)	9 mtr. wide road	(1 x 1194.317)	1194.317 mtr
(ii)	12 mtr. wide road	(1 x 44)	44 mtr
(iii)	24 mtr. wide road	(2 x 67)	134 mtr
Total			1372.317 mtr
Add 5% extra for curves			68.62 mtr
G. TOTAL			1440.93 mtr

2 Footpath

(i)	9M & 12M wide road	1238.317 x 1.5	1857.4755 mtr
(ii)	24 mtr. wide road	67 x 2 x 1.5	201 mtr
Total			2058.4755 mtr
Add 5% extra for curves			102.923775 mtr
G. TOTAL			2161.399275 mtr



RAINWATER HARVESTING AND REUSE POTENTIAL							
RAINWATER HARVESTING CALCULATION							
S.NO.	DESCRIPTION	AREA (SQ. MTR.)	RUNOFF COEFFICIENT	AVERAGE ANNUAL RAINFALL (MM)	TOTAL VOLUME AVAILABLE FROM RAINFALL (CUM/YEAR)	DESIGN HOURLY INTENSITY OF RAINFALL (MM/HR.)	RAINWATER HARVESTING POTENTIAL (CUM/HR.)
1	ROOF TOP WATER	28704	0.85	389	9498.30	25.0	610.71
2	PAVED SURFACES, ROADS AND OTHER BUILT UP AREAS	10746	0.6	389	2510.06	25.0	161.39
3	LAWNS, GARDEN AND OTHER GREEN SPACES	2343	0.35	389	319.24	25.0	20.53
	TOTAL	41793			12327.60		792.63
DETENTION TIME PLANNED (MIN)					20.00		
TOTAL VOLUME OF HARVESTING PIT REQUIRED (CUM)					264.21		
SURFACE AREA REQUIRED (CONSIDERING WATER DEPTH OF 3 MTR.) IN SQ. MTR.					88.07		
NO. OF PIT PLANNED					9.00		
SURFACE AREA FOR EACH PIT					9.79		
DIAMETER OF CIRCULAR CONVENTIONAL PIT					3.53		
MODULAR HARVESTING PIT				LENGTH (M)	2.55		
				WIDTH (M)	3.83		



WATER REQUIREMENT CHART																				
Sr. No.	DESCRIPTION	AREA/REMARK	OCCUPANCY				WATER REQUIREMENT						WATER REQUIREMENT				FLOW TO SEWER			GROSS FLOW TO SEWER
			RE-CYCLED		FRESH WATER		RE-CYCLED	FRESH WATER		RE-CYCLED	FRESH WATER		DOMESTIC	FRESH WATER		DOMESTIC	FRESH WATER			
			TREATED	LPD	DOMESTIC	HOT		DRINKING	TREATED		LPD	DOMESTIC		HOT	DRINKING		TREATED	LPD	DOMESTIC	
1	APARTMENTS	SQ. MTR.	NO.	45	70	15	5	187200	251200	62400	20800	187200	247520	45800	10400	491920	LPD			
2	MAINTENANCE STAFF	ASSUMED	10	20	20	0	5	200	200	0	50	200	170	0	25	395				
3	FILTRATION BACKWASH							9370	14570	3120	1043	9370	14570	3120	1043	28103				
4	EXTERNAL IRRIGATION - 4000 SQ. MTR. APPROX. (DEMAND TO BE VERIFIED FROM THE LANDSCAPE CONSULTANT)							15667												
TOTAL				212437	305970	65520	21893	196770	262260	49920	11468	520418								
TOTAL (CONSIDERING REDUCTION IN DEMAND @ 20% BY USING LOW FLOW FIXTURES)				169949	244776	52416	17514	157416	209808	39936	9174	442355								
TOTAL RECYCLED TREATED WATER DEMAND			169.9	KLD	UNDERGROUND STORAGE CAPACITY										SOURCE SIZING					
TOTAL FRESH WATER DEMAND			314.7	KLD	RAW WATER TANK (60% OF 1 DAY REQ.)										MUNICIPAL CONNECTION					
FLOW TO SEWER/SEWAGE TREATMENT PLANT			442.4	KLD	TREATED FRESH WATER TANK (40% OF 1 DAY REQ.)										BOREWELL FLOW RATE REQ.					
					189										169.01					
					126										39.34					
					KL										MM DIAMETER					
															CUM/H.R.					



DOMESTIC WATER TREATMENT STATION			
GROSS DOMESTIC WATER REQUIREMENT		315	KLD
Sr. No.	Description	Value	Unit
A	Filter Feed Pump		
1	Capacity Calculation		
1.1	Operational Hours	14	Hrs.
1.2	Flow Rate	22.5	m3/hr
		374.7	Lit./min.
		6.2	Lit./sec.
1.3	Safety Factor @ 10%	0.6	Lit./sec.
1.4	Calculated Flow Rate	6.9	Lit./sec.
1.5	Selected Flow Rate (1W+1S)	7.0	Lit./sec.
2	Head Loss Calculation		
2.1	Length of Horizontal Pipes	10.0	mtr.
2.2	Static Head	1.5	mtr.
2.3	Total Length of pipes	11.5	mtr.
2.4	Residual head required	15	mtr.
2.5	Discharge through pipe	0.0070	cum/sec
2.6	Diameter of pipe	77.1	mm
2.7	No. of Bends and fittings in pipe	5	No.
2.8	Coefficient of roughness	1.0	
2.9	Resistance Coefficient of valves and fitting	6.0	
2.10	Gravitational acceleration	9.8	m/sec^2
2.11	Velocity of flow	1.5	m/sec
2.12	Major Head Loss (Modified Hazen williams)	0.3	mtr.
2.13	Minor Head Loss	0.7	mtr.
2.14	Total Head Loss	1.0	mtr.
2.15	Head of Pump Required	17.5	mtr.
2.16	Adding 10% Safety Factor	1.8	mtr.
2.17	Head of Pump	19.3	mtr.
2.18	Head of Pump Selected	25.0	mtr.
B	Domestic Water Transfer Pump		
1	Capacity Calculation		
1.1	Operational Hours	6	Hrs.
1.2	Flow Rate	52.5	m3/hr
		874.2	Lit./min.
		14.6	Lit./sec.
1.3	Safety Factor @ 10%	1.5	Lit./sec.
1.4	Calculated Flow Rate	16.0	Lit./sec.
1.5	Selected Flow Rate (2W+1S)	8.0	Lit./sec.
2	Head Loss Calculation		
2.1	Length of Horizontal Pipes	1000.0	mtr.
2.2	Static Head	25.0	mtr.
2.3	Total Length of pipes	1025.0	mtr.
2.4	Residual head required	10	mtr.
2.5	Discharge through pipe	0.0080	cum/sec
2.6	Diameter of pipe	82.4	mm
2.7	No. of Bends and fittings in pipe	15	No.
2.8	Coefficient of roughness	1.0	
2.9	Resistance Coefficient of valves and fitting	6.0	
2.10	Gravitational acceleration	9.8	m/sec^2
2.11	Velocity of flow	1.5	m/sec
2.12	Major Head Loss (Modified Hazen williams)	27.0	mtr.
2.13	Minor Head Loss	0.7	mtr.
2.14	Total Head Loss	27.7	mtr.
2.15	Head of Pump Required	62.7	mtr.
2.16	Adding 10% Safety Factor	6.3	mtr.
2.17	Head of Pump	69.0	mtr.
2.18	Head of Pump Selected	70.0	mtr.
E	Multigrade Filter		
1.1	Flow of Filtration system	25.2	m3/hr
1.2	Total no. of filters	2	No.
1.3	Design flow of each filter	12.6	m3/hr.
1.4	Filtration Rate	14	m3/m2/hr.
1.5	Therefore surface area required	0.90	m2



DOMESTIC WATER TREATMENT STATION			
GROSS DOMESTIC WATER REQUIREMENT		315	KLD
Sr. No.	Description	Value	Unit
1.6	Diameter of filter	1070	mm
1.7	Diameter of filter selected	1000	mm
F	Activated Carbon Filter		
1.1	Flow of Filtration system	25.2	m3/hr
1.2	Total no. of filters	2	No.
1.3	Design flow of each filter	12.6	m3/hr.
1.4	Filtration Rate	14	m3/m2/hr.
1.5	Therefore surface area required	0.90	m2
1.6	Diameter of filter	1070	mm
1.7	Diameter of filter selected	1000	mm



MANNING'S CALCULATION - SEWER																
Node no	Length in mtr.	Peak Discharge(LPS)				Mannings constant	Design				Fall in metre	Level at start		Level at end		
		Self(LPM)	Self	Infiltration @ 10%	Add.		Total	Slope 1 in	Pipe size	Velocity in m/s		Discharge in lps(full flow)	Discharge in lps(half flow)	G.L.	I.L.	G.L.
1	0	11.3	0.19	0.02	0.00	0.21	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
1-2	97	135.6	2.26	0.23	0.21	2.69	0.01	150	150	0.91	16.17	8.09	0.65	0.90	0.00	1.55
3	0	5.65	0.09	0.01	0.00	0.10	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
3-2	24	5.65	0.09	0.01	0.10	0.21	0.01	150	150	0.91	16.17	8.09	0.16	0.90	0.00	1.06
2-8	84	50.85	0.85	0.08	2.90	3.83	0.01	150	150	0.91	16.17	8.09	0.56	0.90	0.00	2.11
7	0	11.3	0.19	0.02	0.00	0.21	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
7-8	101	79.1	1.32	0.13	0.21	1.66	0.01	150	150	0.91	16.17	8.09	0.67	0.90	0.00	1.57
9	0	11.3	0.19	0.02	0.00	0.21	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
9-8	60	79.1	1.32	0.13	0.21	1.66	0.01	150	150	0.91	16.17	8.09	0.40	0.90	0.00	1.30
8-6	88	107.35	1.79	0.18	7.15	9.12	0.01	225	250	1.05	51.56	25.78	0.39	2.11	0.00	2.50
4	0	22.6	0.38	0.04	0.00	0.41	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
4-5	78	113	1.88	0.19	0.41	2.49	0.01	150	150	0.91	16.17	8.09	0.52	0.90	0.00	1.42
5-6	38	28.25	0.47	0.05	2.49	3.00	0.01	150	150	0.91	16.17	8.09	0.25	1.42	0.00	1.67
6-12	24	28.25	0.47	0.05	12.12	12.64	0.01	225	250	1.05	51.56	25.78	0.11	2.50	0.00	2.60
16	0	5.65	0.09	0.01	0.00	0.10	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
16-17	58	45.2	0.75	0.08	0.10	0.93	0.01	150	150	0.91	16.17	8.09	0.39	0.90	0.00	1.29
15	0	11.3	0.19	0.02	0.00	0.21	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
15-17	29	33.9	0.57	0.06	0.21	0.83	0.01	150	150	0.91	16.17	8.09	0.19	0.90	0.00	1.09
17-14	62	62.15	1.04	0.10	1.76	2.90	0.01	150	150	0.91	16.17	8.09	0.41	1.29	0.00	1.70
13	0	22.6	0.38	0.04	0.00	0.41	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
13-14	129	158.2	2.64	0.26	0.41	3.31	0.01	150	150	0.91	16.17	8.09	0.86	0.90	0.00	1.76
14-11	53	33.9	0.57	0.06	6.22	6.84	0.01	150	150	0.91	16.17	8.09	0.35	1.76	0.00	2.11
10	0	11.3	0.19	0.02	0.00	0.21	0.01	150	150	0.91	16.17	8.09	0.00	0.90	0.00	0.90
10-11	103	73.45	1.22	0.12	0.21	1.55	0.01	150	150	0.91	16.17	8.09	0.69	0.90	0.00	1.59
11-12	51	28.25	0.47	0.05	8.39	8.91	0.01	225	250	1.05	51.56	25.78	0.23	2.11	0.00	2.34
12-STP	10	0	0.00	0.00	21.03	21.03	0.01	275	300	1.07	75.83	37.92	0.04	2.60	0.00	2.64



MANNING'S CALCULATION - STORM WATER PIPES													
Node no	Length in mtr.	Area (sq.mtr.)	Catchment Area (Hectare)		Discharge in LPS	Manning's constant	Design		Fall in metre	Level at start		Level at end	
			Self	Add.			Slope 1 in	Pipe size		G.L.	I.L.	G.L.	I.L.
1-2	88	4115	0.41	0.00	51.44	0.01	225	250	0.39	0.00	-0.80	0.00	-1.19
3-2	16	650	0.07	0.00	8.13	0.01	225	250	0.07	0.00	-0.80	0.00	-0.87
2-4	84	1924	0.19	0.24	53.83	0.01	250	300	0.34	0.00	-1.19	0.00	-1.53
5-5A	31	1546	0.15	0.00	19.33	0.01	250	300	0.12	0.00	-0.80	0.00	-0.92
6-5A	21	723	0.07	0.00	9.04	0.01	250	300	0.08	0.00	-0.80	0.00	-0.88
5A-4	43	797	0.08	0.23	38.33	0.01	250	300	0.17	0.00	-0.92	0.00	-1.10
4-7	82	3022	0.30	0.44	93.07	0.01	400	450	0.21	0.00	-1.53	0.00	-1.73
8-7	29	773	0.08	0.00	9.66	0.01	225	250	0.13	0.00	-0.80	0.00	-0.93
7-9	89	2379	0.24	0.52	95.24	0.01	400	450	0.22	0.00	-1.73	0.00	-1.95
10-12	130	4895	0.49	0.00	61.19	0.01	275	300	0.47	0.00	-0.80	0.00	-1.27
11-12	93	2987	0.30	0.00	37.34	0.01	225	250	0.41	0.00	-0.80	0.00	-1.21
12-09	74	1892	0.19	0.59	97.70	0.01	400	450	0.19	0.00	-1.27	0.00	-1.46
09-13	41	935	0.09	1.08	146.99	0.01	400	450	0.10	0.00	-1.95	0.00	-2.06
14-13	115	4665	0.47	0.00	58.31	0.01	275	300	0.42	0.00	-0.80	0.00	-1.22
13-16	21	684	0.07	1.55	202.19	0.01	500	600	0.04	0.00	-2.06	0.00	-2.10
15-16	36	838	0.08	0.00	10.48	0.01	225	250	0.16	0.00	-0.80	0.00	-0.96
16-18	40	1045	0.10	1.70	1.81	0.01	500	600	0.08	0.00	-2.10	0.00	-2.18
17-18	36	1553	0.16	0.00	19.41	0.01	225	250	0.16	0.00	-0.80	0.00	-0.96
18-19	128	2188	0.22	1.96	272.49	0.01	500	600	0.26	0.00	-2.18	0.00	-2.44