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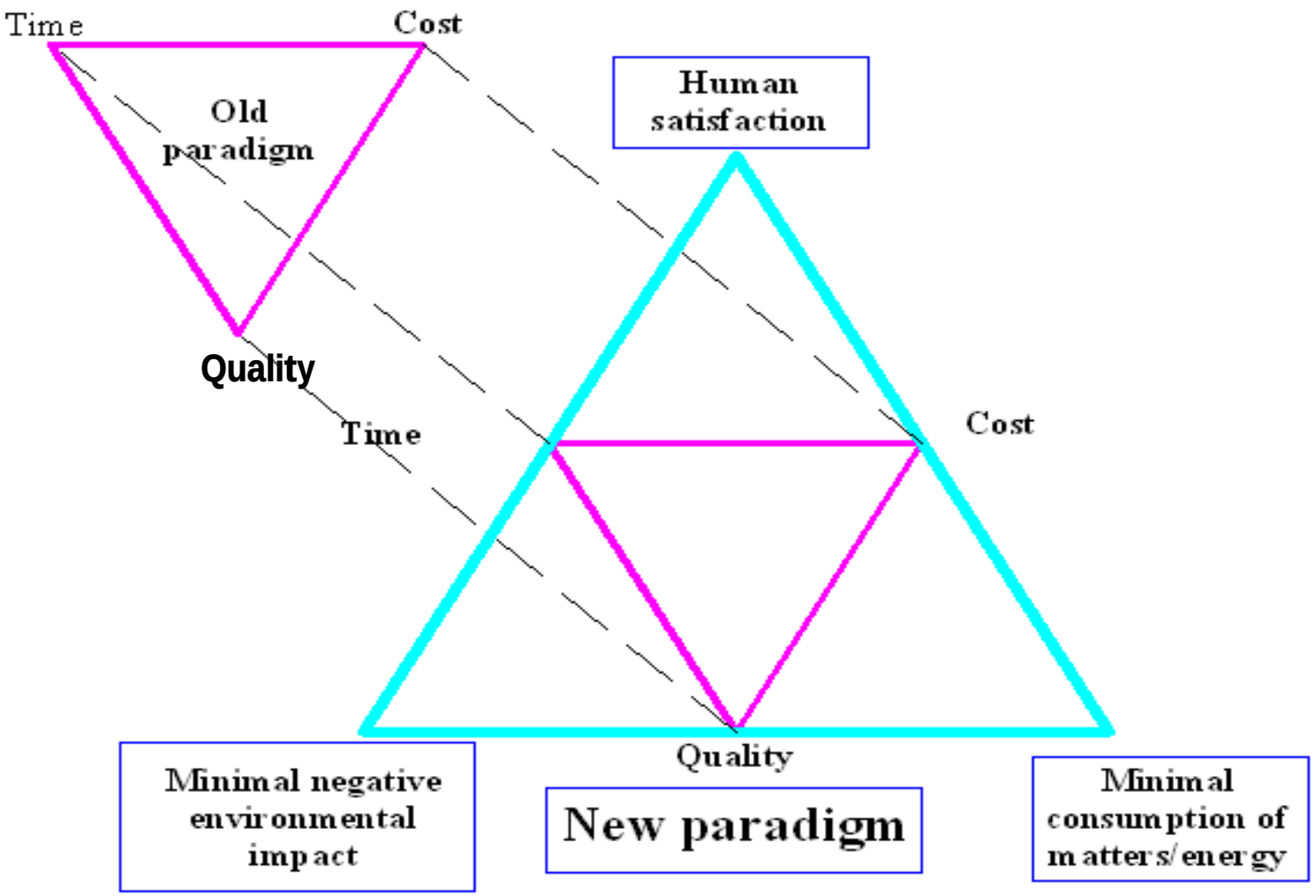
Green Building

- A green building is an environmentally sustainable building, designed, constructed and operated to minimize the total environmental impacts.

Sustainability Calls for New Paradigm



Main Features of Green Building

- Increasing efficiency with buildings use resources —
  - *Energy*
  - *Water*
  - *Materials*
- Reducing impacts on human health and environment

Benefits of the Green Building

- Reduce operating costs.,
- Improved public and occupant health ,
- Reduced environmental impacts
- Deliver superior customer service

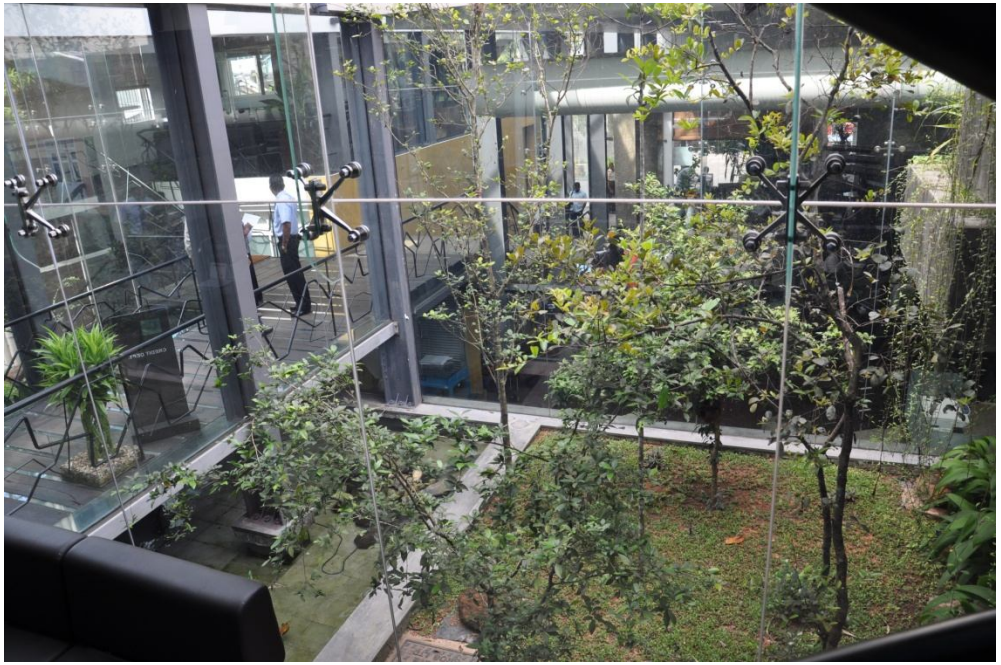
LEED™ Green Building Site

to be in harmony with the environment and for the health and well-being of employees.

Green Building


HNB Nittambuwa
"HARITHA KADELLA"
the first 'Green' Customer Centre in
Sri Lanka
was declared open
on2nd June 2011
by
Mr. Rajendra Theagarajah
Managing Director / Chief Executive Officer
Hatton National Bank PLC


HNB
Islamic Banking
Offers you
Mudarabah



Benefits of the Project

- **Tangible Benefits**
- Over 30% reductions in energy consumption.
- Over 50% reductions in water consumption.
- Business Growth
- **Intangible Benefits**
- Green image for the building and institution
- Health and safety of the building occupants
- Enhanced occupant comfort
- Higher productivity of occupants
- Best operating practice
- Incorporate latest techniques / technologies

Green Credit Achieved for the Building	**Achieved**	**Denied**
1.0 Management - 4 Total Points Available	3	1
2.0 Sustainable Site - 25 Total Points Available	25	0
3.0 Water Efficiency – 14 Total Points Available	**10**	**4**
4.0 Energy & Atmosphere – 22 Total Points Available	21	1
5.0 Material & Resources – 14 Total Points Available	4	10
6.0 Indoor Environmental Quality – 13 Total Points Available	13	0
7.0 Innovation & Design Process – 4 Total Points Available	3	1
8.0 Social & Cultural Awareness - 4 Total Points Available	2	2
Total	**81**	**19**

Water Management in Green Building

- Reduction in Water Usage
- Rain Water Harvesting
- Storm Water Management
- Water Efficient Landscaping
- Water Efficient Air Conditioning
- Innovative Water Transmission

REDUCTION IN WATER USAGE

Conventional Building - Water Consumption

BASELINE Building (without Using water saving Fixtures)	**Fixture Tupe**			**FTE**			**Customer**			**Total (Litrers/Day)**
	Type	**Average use of a Baseline Building**	**Sex**	**No of people**	**No of Usage per Day**	**Consumption (Litrers/day)**	**No of people**	**Usage per Day**	**Consumption (Litrers/day)**	
	Water Closet (lpf)	6	Male	18	3	324	2	1	12	336
			Female	2	4	48	2	1	12	60
	Wash Basin-6 lpm (assume 30 seconds)	3	Male	18	3	162	7	1	21	183
			Female	2	4	24	2	1	6	30
	Lunch room Sink-6lpm (assume 30 sec)	3	both	20	2	120	6	2	36	156
										765

Reduction in Water Usage

Use Water efficient Green certified fitting

Type of fittings	Base line	Used low water consumption fittings	% of water savings
Water closet	6 lpf	3.5 lpf	42 %
Hand wash (basin tap	6 lpm	1.5 lpm	75%
Kitchen sink	6 lpm	1.5 lpm	75%

Reduction in Water Usage
Green Building - Water Consumption

	Fixture Tupe			FTE			Customer			Total (Litrers/ Day)
	Type	Average use of a Green Building (Litrers/Person	Sex	No of people	No of Usage per Day	Consumption (Litrers/ day)	No of people	Usage per Day	Consumption (Litrers/ day)	
GREEN Building (with Using water saving Fixtures)	Water Closet (lpf)	3.5	Male	18	3	189	2	1	7	196
			Female	2	4	28	2	1	7	35
	Wash Basin-6 lpm (assume 30 seconds)	0.75	Male	18	3	40.5	7	1	5.25	46
			Female	2	4	6	2	1	1.5	8
	Lunch room Sink-6lpm (assume 30 sec)	0.75	both	20	2	30	6	2	9	39
										323

$$\text{Saving} = \frac{(765 - 323)}{765} \times 100 = 57.8\%$$

Rain Water Harvesting

Catchment area 95 Sqm

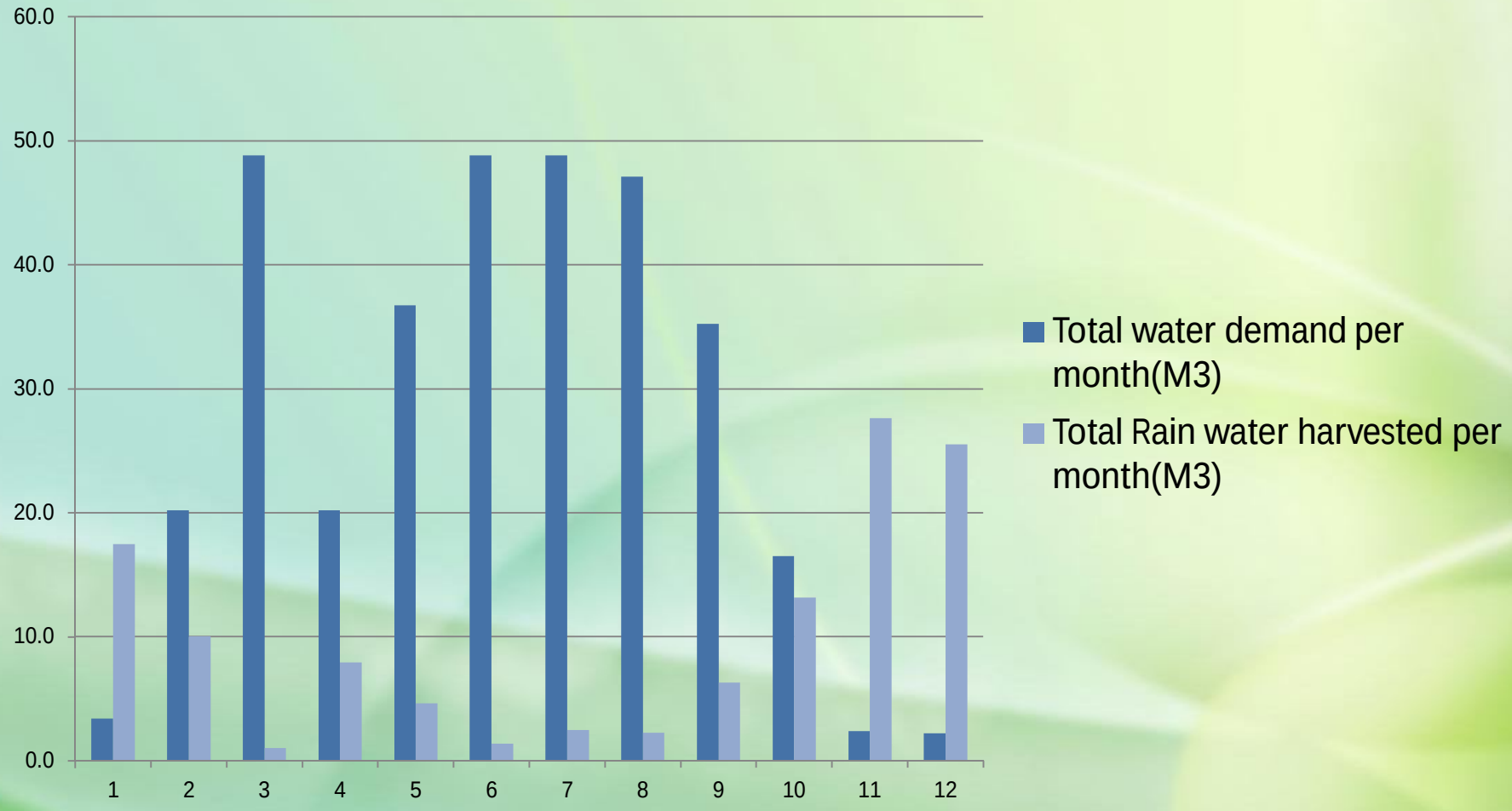
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
Floor Area (M^2)	95	95	95	95	95	95	95	95	95	95	95	95	
Rainfall-Monthly(mm)	245.4	141.2	14.5	111.4	64.9	19.8	35	31.8	88.7	184.6	387.9	358	
Rain Water Efficiency rate	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	
Total Rain water harvested per month(M^3)	**17.48**	**10.06**	**1.03**	**7.94**	**4.62**	**1.41**	**2.49**	**2.27**	**6.32**	**13.15**	**27.64**	**25.51**	**119.93**

Water Demand for Landscaping

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Rainy Days	11	8	2	8	5	2	2	3	6	12	17	18	
water demand rate(Not including the rainy days)	0.1	0.5	0.95	0.5	0.8	0.95	0.95	0.95	0.8	0.5	0.1	0.1	
No. of Days(Water is used per month)	1.9	11	26.6	11	20	26.6	26.6	25.65	19.2	9	1.3	1.2	
Total water demand per day(Litres)	1800	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	1836	
Total water demand per month(Litres)	3420	20196	48837.6	20196	36720	48837.6	48837.6	47093.4	35251.2	16524	2386.8	2203.2	
Total water demand per month(M^3)	3.4	20.2	48.8	20.2	36.7	48.8	48.8	47.1	35.3	16.5	2.4	2.2	330.5

Rainfall-Monthly (mm)	water demand rate(Not including the rainy days)
<50	95%
50 - 100	80%
100-200	50%
>200	10%

Rain Water Harvesting System Vs Demand



Rain Water Management – Rooftop

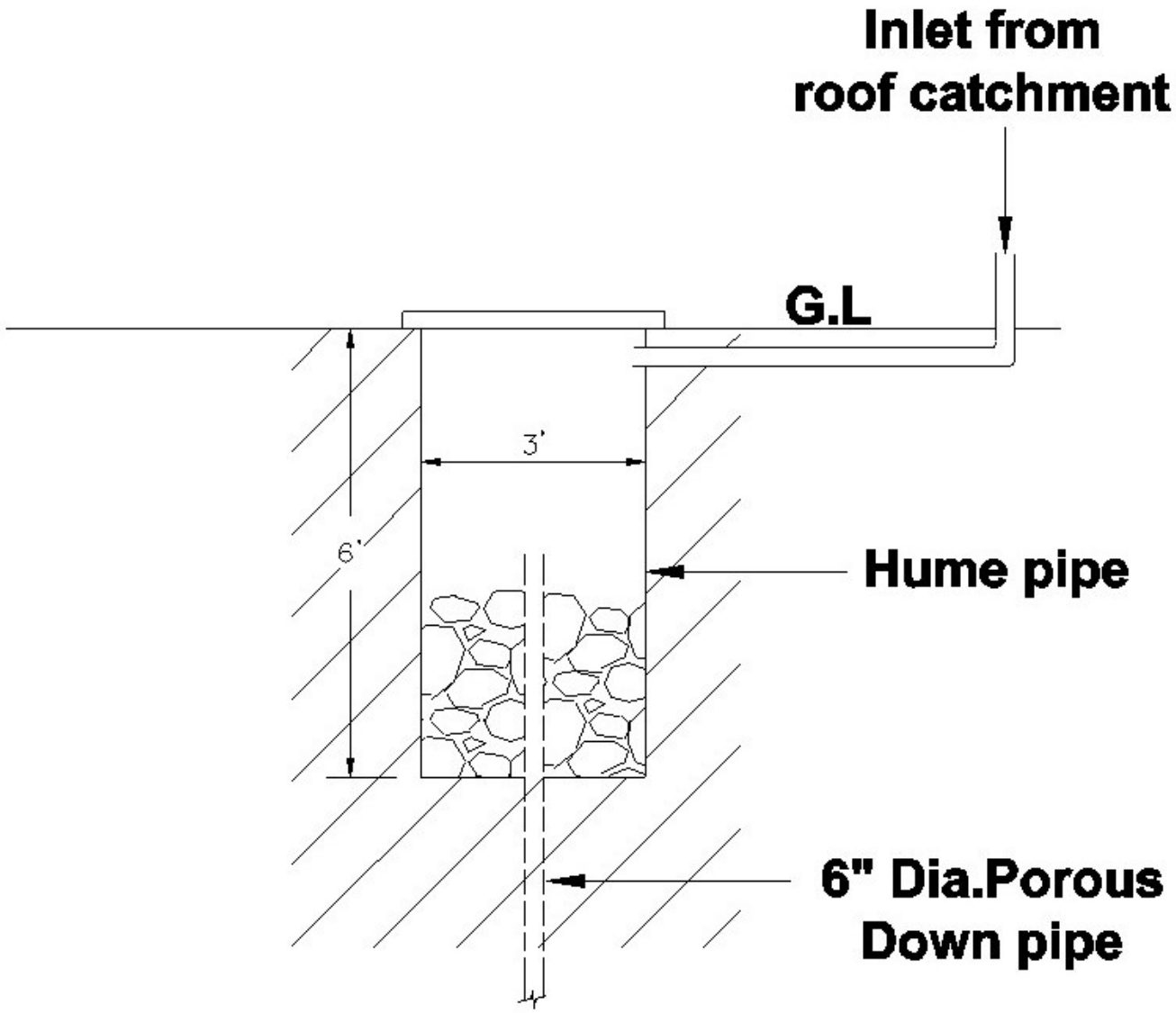
RAIN WATER RUN OFF CALCULATIONS

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Floor Area (M^2)	162	162	162	162	162	162	162	162	162	162	162	162	
Rainfall-Monthly(mm)	245.4	141.2	14.5	111.4	64.9	19.8	35	31.8	88.7	184.6	387.9	358	
Rain Water Run-off Co-Efficiency Rate	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Total Rain water Run-off per month(M^3)	**31.80**	**18.30**	**1.88**	**14.44**	**8.41**	**2.57**	**4.54**	**4.12**	**11.50**	**23.92**	**50.27**	**46.40**	218.14

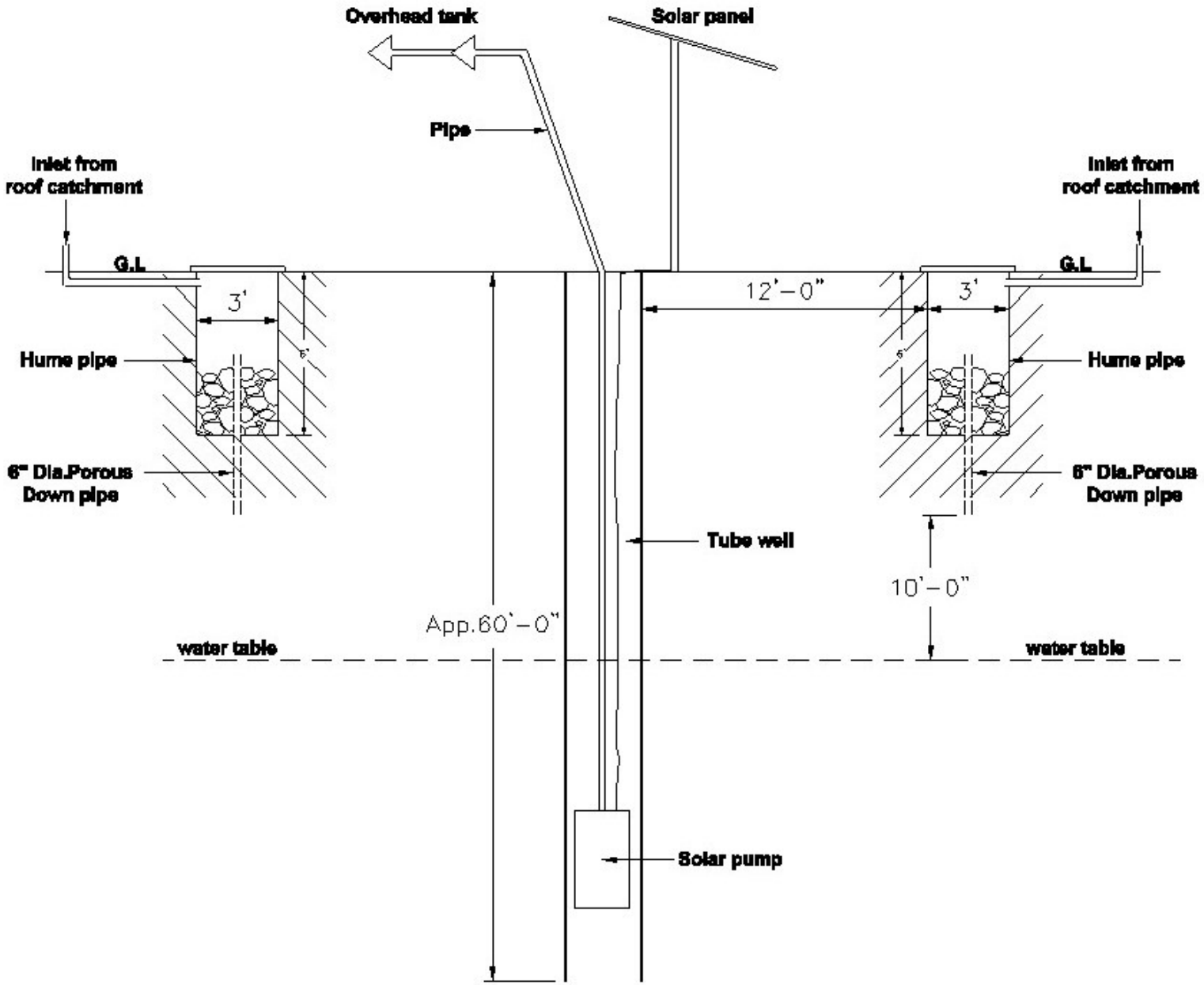
Rain Water Management – Ground Level

PERVIOUS PAVING

	Jan.	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Floor Area (M^2)	225	225	225	225	225	225	225	225	225	225	225	225	
Rainfall-Monthly(mm)	245.4	141.2	14.5	111.4	64.9	19.8	35	31.8	88.7	184.6	387.9	358	
Rain Water Run-off Co-Efficiency Rate	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
Total Rain water Run-off per month(M^3)	**13.80**	**7.94**	**0.82**	**6.27**	**3.65**	**1.11**	**1.97**	**1.79**	**4.99**	**10.38**	**21.82**	**20.14**	94.68

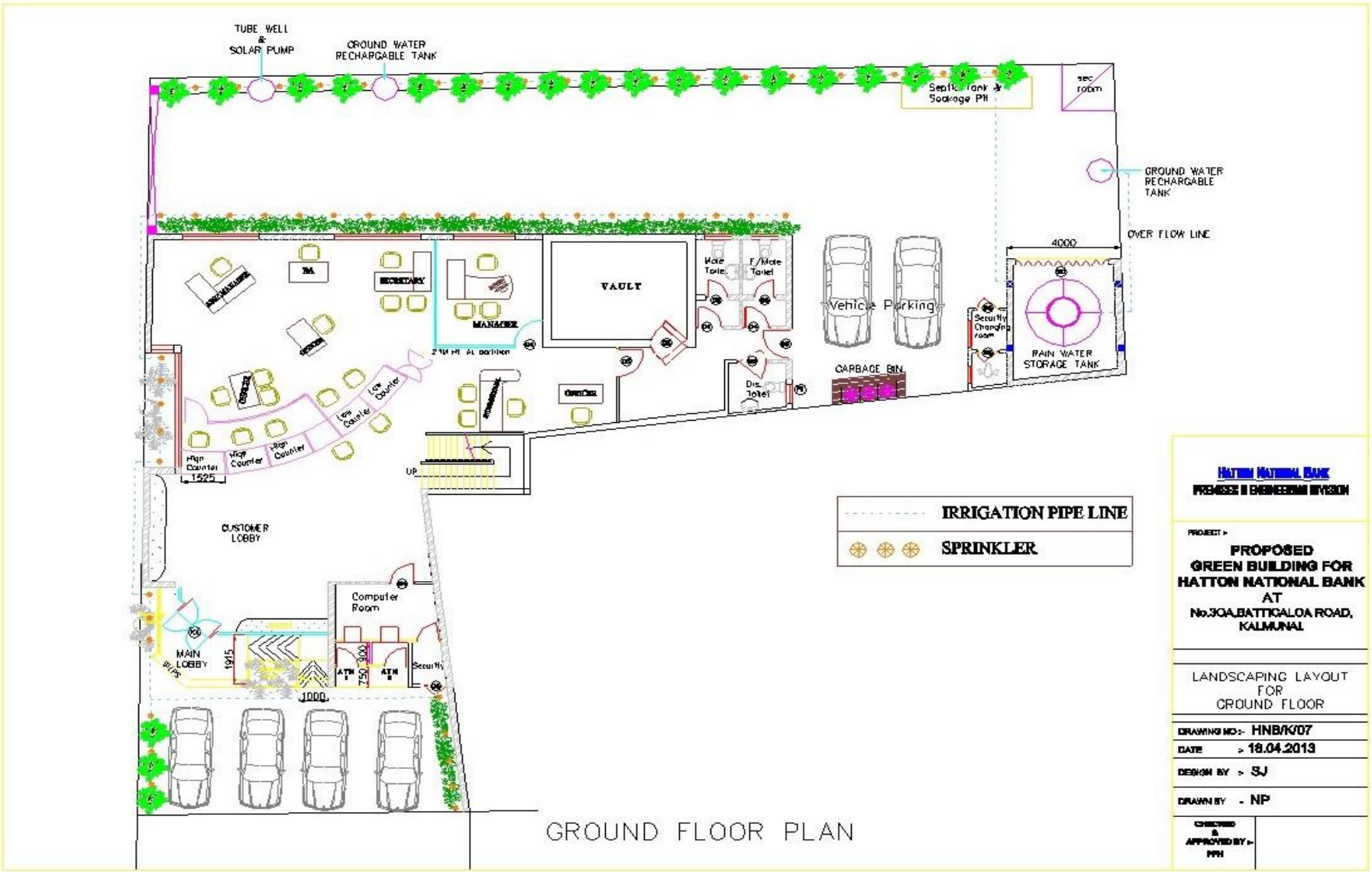


GROUND WATER RECHARGE SYSTEM
AT HNB C/C KALMUNAI


Overhead tank
Solar panel
Pipe
Inlet from roof catchment
Inlet from roof catchment
G.L
G.L
3'
12'–0"
3'
Hume pipe
Hume pipe
6" Dia.Porous Down pipe
6" Dia.Porous Down pipe
Tube well
10'–0"
App.60'–0"
water table
water table
Solar pump

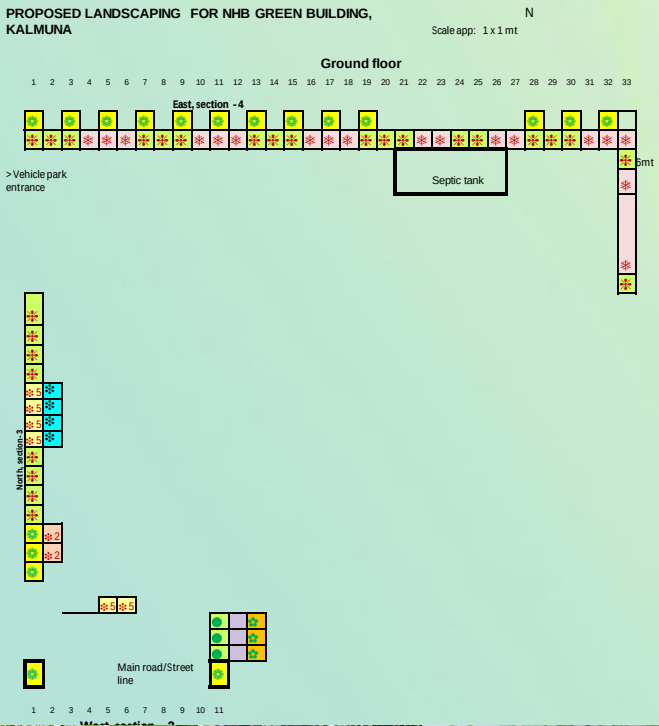
Ancient Ground Water Recharge Tank
400 m away from the premises

Water Efficient Landscaping



GROUND FLOOR PLAN

Native Plants



Plant legend		
Symbol	Qty	Name
	63	*Golden glow*
	80	*Ixora*
	20	*Shady trees*
5	17	*Christina*
	16	*Tall shrub*
2	20	*American raseena*
	20	*Wall stick creepers*
	10	*Flowering creepers hanging downwards in pots as directed. Rangoon creeper, Butter cub, ect*
	2	*Tree guard for avenue plantings*
		Shady trees
	2	*Cassia Fistula*
	5	*Kaya*
	5	*Pihimbia*
	2	*Bengemina*
	4	*Tabubea rosea*
	1	*Olinda*
	1	*Aththemata*
		Bakmee
		Sansooria
		Tall shrub
1	2	*Arricanut palm*
2	2	*Candia palm*
		Bengemina
	10	*Walehala/suitable shrubs*
3	2	*Strip bicolor*

Water Efficient Landscaping

Water Demand for Landscaping

Water demand for seedlings	Water demand @ seedlings/day/lits	No of SLL	Total water demand per day	
Shrubs	2	306	612	
Trees	20	30	600	
Potted plants	2	210	420	
Seedlings for vacancy planting	3	68	204	
Total		614	1836	

Watering required period	1st 2 weeks	2nd 2 weeks	After one month/Dry season	Monsoon season
Daily twice full demand	*			
Daily twice 50% demand		*		
Daily once			*	
Once in 3 days when required				*

Water Requirement for Plants

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Water Efficiency in Air – Conditioning System

Inverter type Air conditioners use, water consumption is zero.

All condensed water diverted to irrigate landscape

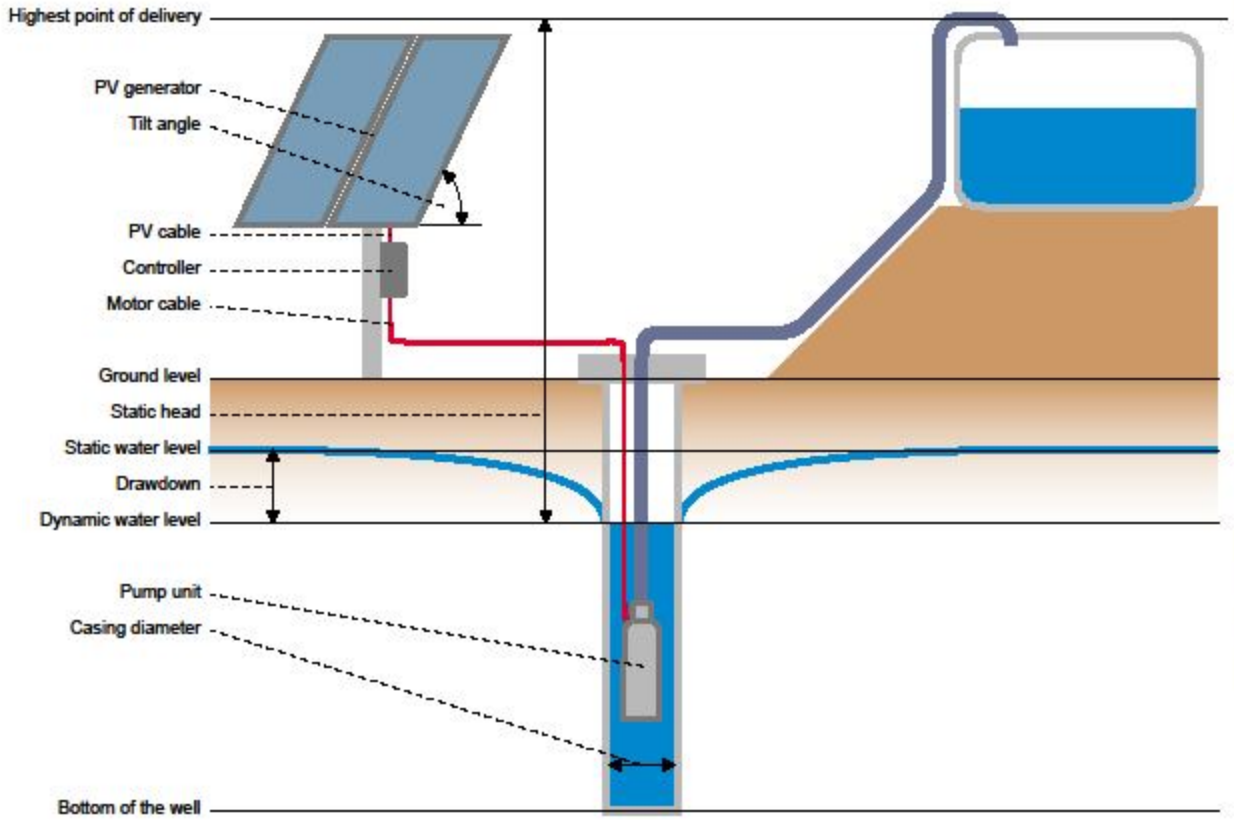
Innovative Water Transmission

•Solar powered water pump installed for water transmission.

Sun. Water. Life.

LORENTZ

Solar pump layout sketch



Total Dynamic Head (TDH): Static head plus friction losses.

Static head: Vertical height from the dynamic water level to the highest point of delivery.

Friction losses: Pressure losses in the pipeline as height of a water column with the equivalent pressure. Proportional to the length, diameter, surface of the pipe and the square of the flow rate.

Pump unit: Pump end and motor.

Motor cable length: Cable length from the pump unit to the controller.

PV cable length: Cable length from the controller to the PV generator

Pipe length: Complete pipe length from the pump unit to the point of delivery

Tilt angle: Angle between the PV generator pane and the horizontal pane.

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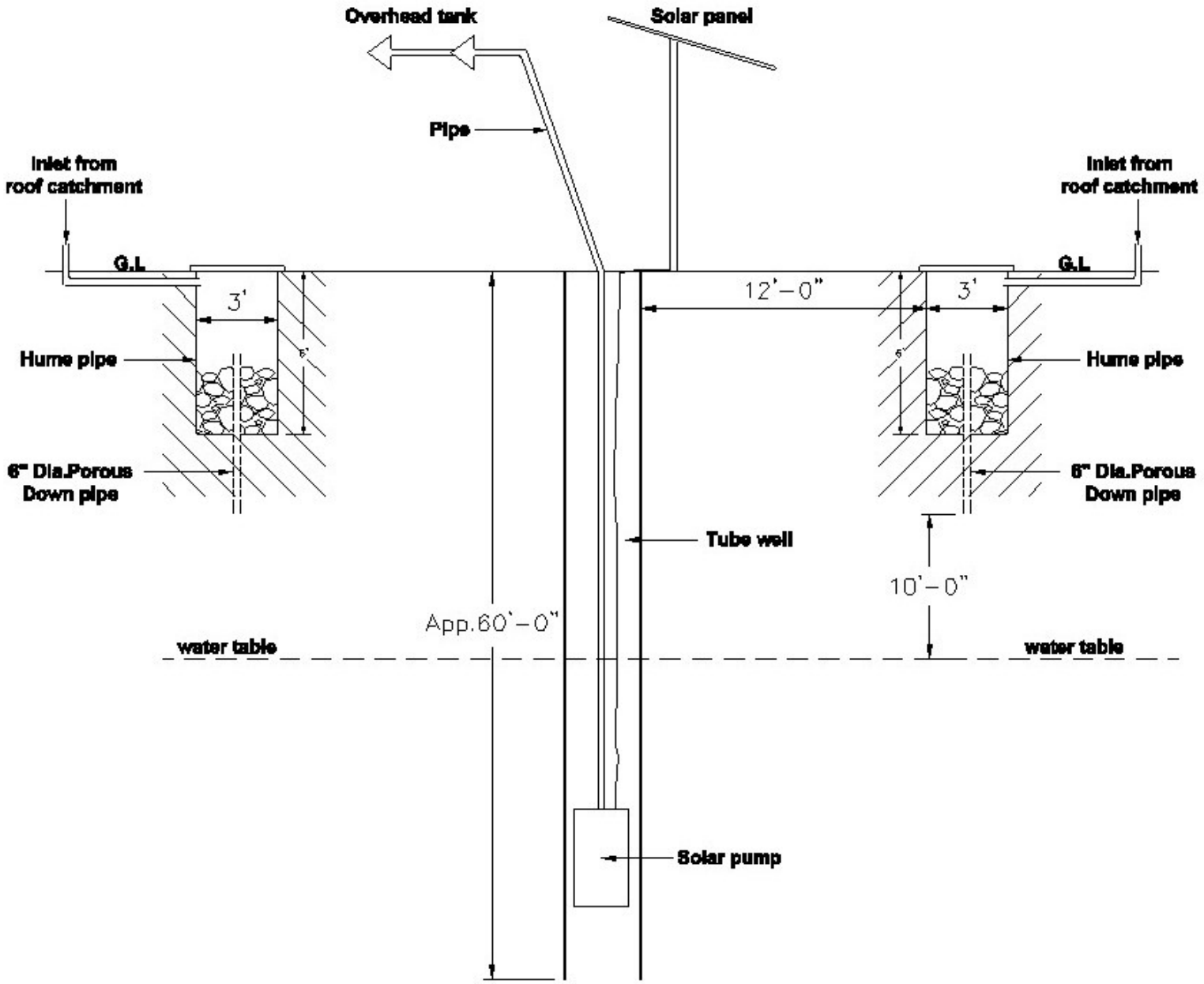
Ground Water Recharging System



Thank You...