DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
Nagar Pipaliya Village

Rajkot District

PREPARED BY

NAME	BRANCH NAME	ENROLLMENT NO
Jaydeep Devani	Civil Engineering	180893106010
Jayraj Pansuriya	Civil Engineering	180893106041
Dinesh Baraiya	Electrical Engineering	180893109003

Shree Labhubhai Trivedi Institute
Of Engineering and Technology
Rajkot

Assi. Prof. Mehul M Chavda
Civil Engineering Department

YEAR:2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda,Ahmedabad– 382424 Gujarat

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Chandkheda, Ahmedabad– 382424 Gujarat

CERTIFICATE

This is to certify that the following students of Degree / Diploma Engineering successfully submitted.

Detail Project Report For,

VILLAGE :NAGAR PIPALIYA

DISTRICT: RAJKOT

Under

VishwakarmaYojana: Phase-VIII

In partial fulfillment of the project offered by

GUJARATTECHNOLOGICALUNIVERSITY,CHANDKHEDA

During the academic year 2020-21.

This project work has been carried out by them under our super vision and guidance.

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
Jaydeep Devani	Civil Engineering	180893106010
Jayraj Pansuriya	Civil Engineering	180893106041
Dinesh Baraiya	Electrical Engineering	180893109003

Date of Report Submission:	
Principal Name and Signature:	**Prof. Dr. B.M. Ramani**
VY-Nodal Officer Name and Signature:	**Assi. Prof. Mehul M Chavda**
Internal(Evaluator) Guide Name and Signature:	**Assi. Prof. Mehul M Chavda**
College Name:	**Shri Labhubhai Trivedi Institute of Engineering & Technology, Rajkot**
College Stamp:	

ABSTRACT

For the development of the rural area of State considering social development, infrastructure development and socio-cultural development, Government of Gujarat started a rural development program "Vishwakarma Yojana" and it is allotted to the Gujarat Technological University in which team of Nodal officers and Students from civil and electrical engineering branch of diploma engineering and degree engineering colleges are designed the basic infrastructure and urban facilities to the allotted village which will help to minimize many current issues like urbanization, etc. Vishwakarma Yojana is one of the approaches to reduce urban city Pressure and lower the migration rate by developing village with a 'rural soul' but with all urban amenities that a city may have. The developmental work in villages that could undertake as per the need of the village in particular includes Physical, Social and Renewable infrastructure Facilities.

The main vision of the project given basic facilities like Bank, Post Office, Health Care, Local Transportation, Education, Electricity, Water Problem Solution, etc with today techniques.

The allocated village is Nagar Pipaliya near Rajkot. Nagar Pipaliya is a Village in Lodhika Taluka in Rajkot District of Gujarat State, India. Nagar Pipaliya Local Language is Gujarati. Nagar Pipaliya Village total population is 2721 and number of houses are 571. It is located 28 KM towards west from District headquarters Rajkot. 14 KM from Lodhika. 281 KM from State capital Gandhinagar.

As per our actual visit of village, we found the current scenario of village. All the major facilities are available in village like Gram Panchayat building, Banks, PHC, School, etc. Cotton, Magfali and Chana is the major crops grown in village. There is underground drainage system in main localities. Village is lacking for the not proper solid waste management, road network, local transportation, bus stand. In addition, should focus on maintenance of existing facility.

After analyzing all the data, we found that village needs some new facilities and some facilities need maintenance. We suggest six designs for our village, a Public Toilet Block, Post Office, Gram Panchayat, Community Hall cum Library, Skill Development Centre and Animal Shelter to fulfil the requirement of existing population and also we design Automatic Switch for Water Pump, Photovoltaic Water Pumping System Design and Public Solar water Purifier and Cooler in Electric design purpose. In addition, village needs initiative for the approach to various Govt. schemes by local bodies.

After providing the facilities suggested by us, we will try to approach towards smart village concept. With the help of this Yojana and Village governance, we will try to make the village digital by providing E-facilities. In addition, it is important to maintain the existing facilities rather than new development. We always are looking in future forgetting the past that will keep us as it is in development point of view.

We can only approach to digital facilities and sustainable technology for our village. Because we cannot directly approach to latest technologies, we have to consider its future scope also. Now a day's awareness is more required rather than technology. As our village is heritage site and surrounded by other religious temples we can develop it as tourism clustered.

Key Words: Rural development, Ideal Village Surveys, Techno-Economic Survey of Village, Smart village survey, Gap analysis, SAGY survey, Design Provision.

ACKNOWLEDGEMENT

We are highly indented to **Gujarat Technological University**, Ahmedabad for providing us such opportunity to work under Vishwakarma Yojana to get real work experience and applying our technical knowledge in the development of Villages.

We wish to express our deep sense of gratitude to **Prof.(Dr.) NavinSheth**, **Hon'ble Vice Chancellor, Gujarat Technological University-Ahmedabad**, for his encouragement and giving us the wonderful project.

We also express our gratitude to **Dr. K.N.Kher**, **Registrar, Gujarat Technological University-Ahmedabad** for giving us complete support.

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We express our sincere thanks to **DDO, TDO, Sarpanch, Talatiand staff members of Ahmadabad** District for providing us with requisite data whenever we approached them. Especially our thanks are to all villagers and stake holders for their support during Survey.

We are also thankful to our **Prof.(Dr.) Bharat Ramani Principal**, faculties of our colleges for their encouragement and support to complete this project work.

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We are also thankful to all the experts who provided us their valuable guidance during the work. We express our sincere thanks to, **Dr. Jayesh Deshkar, Hon'ble Director of Vishwakarma Yojana project and Principal, V.V.P Engineering College and Core Committee member of Vishwakarma Yojana projectProf(Dr.)Jigar Sevalia**,Professor, SCET, Surat, **Prof.K.L.Timani,** Associate Professor,VGEC, **Prof.Rena Shukla**,Associate Professor, LD Engineering College, **Prof.Y.B.Bhavsar,**Associate Professor,VGEC,**Prof.Jagruti Shah**, Assistant Professor, BVM Engineering Collegefor providing us technical knowledge of this project work.

We are also thankful to **Ms. Darshana Chauhan, Vishwakarmrma Yojana**, for all support during our work. We therefore, take this opportunity for this Project work expressing our deep gratitude and sincere thanks for her cooperation to produce this project work in the present form.

Above all we would like to thank our Parents, family members and Friends for their encouragement and support rendered in completion of the present this work.

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abraviation

SHORT NAME / SYMBOL	FULL NAME
VY	Vishwakarma Yojana
TDO	Taluka Development Officer
DDO	District Development Officer
NH	National Highway
SH	State Highway
MDR	Major District Road
ODR	Ordinary District Road
VR	Village Road
AR	Approach Road
PCC	Plain Cement Concrete
RCC	Reinforced Cement Concrete
BM	Brick Masonry
UDPFI	Urban Development Plans Formulation And Implementation
PHC	Public Health Center
SWOT	Strength Weakness Opportunity
CBP	Common Biogas Plant
Cum	Cubic Meter
SqM	Square Meter
NGO	Non-governmental Organization
PHC	Public Health Centre
CHC	Community health centre
APMC	Agricultural produce market committee
U/G	Underground sump
SC	Schedule caste
ST	Schedule Tribe
PMGSY	Pradhan Mantri Gram Sadak Yojana
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
IAY	Indira Awash Yojana
PMAGY	Pradhan Mantri Adarsh Gram Yojana
NRHM	National Rural Health Mission
SSA	Sarva Siksha Abhiyan
BPL	Below Poverty Line

Chapter 1: Ideal Village Visit from Pardi Village

1.1 Background & Study Area Location:

Pardi is a Village in Lodhika Taluka in Rajkot District of Gujarat State, India. It is located 11 KM towards South from District headquarters Rajkot. 19 KM from Lodhika. 260 KM from State capital Gandhinagar. Pardi Pin code is 360024 and postal head office is Veraval (Shapar). Veraval (4 KM), Dholara (5 KM), Pal (6 KM), Vavdi (6 KM), Vavdi (6 KM) are the nearby Villages to Pardi. Pardi is surrounded by Lodhika Taluka towards west, KotdaSangani Taluka towards South, Gondal Taluka towards South, Paddhari Taluka towards North. Rajkot, Kalavad, Wankaner, Thangadh are the nearby Cities to Pardi.

The total geographical area of village is 760.77 hectares. Pardi Local Language is Gujarati. Pardi Village Total population is 7818 and number of houses are 1713. Female Population is 45.8%. Pardi village has

higher literacy rate compared to Gujarat. In 2011, literacy rate of Pardi village was 79.36 % compared to 78.03 % of Gujarat. In Pardi Male literacy stands at 87.73 % while female literacy rate was 69.42 %.

The infrastructure consists of pure drinking water, underground drainage system and tar roads. Whereas the lanes are stone laid. The smallest and remotest by lanes are well provided with proper street lights.

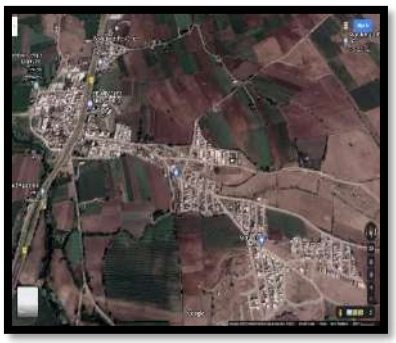


Fig. 1.1 Map of Pardi village (from Google Map)

❖ Study Area Location:

Pardi is situated in Rajkot, Gujarat, India; its geographical coordinates are 22° 18' 0" North, 70° 89' 0" East. Elevation of 196 meters above Sea level

- ➢ Dharmaj village land information:
- Total Population: 7818 as per 2011 Census
- Total Area of village: 760.77 Hector.
- Total Forest Area: 0.01 Hector.
- Total Agricultural Land Area: 504.22 Hector.
- Total Residential Area: 46.67 Hector.
- Total other Area: 255.95 Hector
- Main crops: Cotton, Magfali, & Bajra.
- ➢ Pardi is located in Lodhika taluka of Rajkot district of Gujarat. It is 11 km away from Rajkot district.
- ➢ Mr. Rajbha Jadeja who was the Sarpanch of Pardi is the key person for making the Pardi as model village.

1.2 Concept: Ideal Village:

1.2.1 Objectives:

- **Basic physical infrastructure:** Water supply, Transport, Sewerage & Solid management should be the priority focus and be provided.
- **Basic Social infrastructure:** Health & Education facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Promote integrated **development** of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.
- Reduce **migration from rural to urban areas** due to lack of basic service and sufficient economic activities in rural areas.
- **Roads:** Internal roads within village settlement, efficient mass transportation system to improve connectivity between urban and rural areas, public transportation facilities that need to be developed like bus stops, transport depot etc.
- **Magnification of sanitation facilities that need improvement:** Sewerage and drainage line for household connection, door to door solid waste connection & dumping facilities.
- **Electricity:** Electricity connections like street lighting that is energy efficient & eco-friendly refurbishing of village lakes, water tanks and wells, construction of rain water harvesting structure for sustainable Development.

1.2.2 Example/live case studies of ideal village of India/Gujarat:

1.2.2.1 Juvvalapalem of West Godavari District in Andhra Pradesh:

Juvvalapalem, a small village in West Godavari District of Andhra Pradesh having population of 3700, situated near coast of Bay of Bengal Over decades, the villagers health has been highly affected due to lack of drinking water facility, poor hygiene due to open defecation and lack of waste disposal system. The initiatives taken by the selected representatives of Panchayat has not only begged Juvvalapalem ―Nirmal Gram Puraskar‖ but has turned a healthy place to stay. Initially the Panchayat faced lot of resistance and non-co-operation from different corners of society, but gradually they convinced the masses through sanitary awareness campaigns, and over here children played major role.

The villagers were asked to take oath to keep village free from open defecation and also formed human chain to show the unity amongst village to fight against open defecation system. Along with achieving 100% sanitation target the village noticed various other changes like rate of communicable and water borne diseases reduced, in order to improve children‘s health eggs were distributed periodically in mid-day meals in schools. A unique waste disposable system was developed, wherein every day from household through medium of cycle rickshaw or bullock cart waste used to be collected and was taken to a common place. Over there it was further classified into recyclable and bio degradable and was properly dispose to safeguard the public health.

The villagers are also provided with mineral water of International standards at a highly subsidized cost i.e. 12 paisa per liter to the public and free to schools and hospitals, in addition to well-maintained protected water supply system.

1.2.2.2 KavatehPiran village of Sangali District in Maharashtra:

KavathePiran, a southern Gram Panchayat of the block Miraj in Sangli district in Maharashtra located about 13 kms from the district headquarters has a unique feature of having elected the Gram Panchayat body unopposed since its formation and is led by the Hind Kesari Shri Maroti Mane (recipient of the Dhyan Chand Award conferred by the Government of India). Besides, this all the women members in the Gram Panchayat body are elected unopposed.
The Gram Panchayat has bagged several awards at its possession including the State level award of Rs. 25 lakhs given by the State Government, under the Saint Gadge Baba Village Sanitation Campaign (SGBVSC).

A decade ago, the Panchayat was characterized by its notorious & criminal activities; in factKav the Piran is a story of turning of criminal land into a peaceful land. A simple question raised in Gram Sabha of 2001 by woman to the then young and energetic Sarpanch Bhimrao Mane changed the whole scenario in the village. She simply asked **"If the leader of the village and his associates are addicted to innumerable bad habits, what is the future ahead for the generation to the come?"** – The question led to silence in Gram Sabha, but the silence broke and next2 years gave answer to her question and witnessed a change. The modern Walmiki Bhimrao Mane was in action and nothing could come in way of the development of KavthePiran. Initially the Gram Panchayat faced problems in convincing people for constructing toilets. So the Gram Panchayat adopted policy of mandatory construction of toilet sand its use. It also announced that a person found for lavatory in open defecation would be charged Rs. 100/- and the reporter will be rewarded with Rs. 20/- per case.

A fake appeal was also made in the Panchayat that families constructing and using a toilet would be given a grant of Rs.7000/- per household. After construction many villagers turned to Panchayat to claim the amount. A special Gram Sabha was then called to resolve the issue of giving grant. Mr. Bhimrao Mane counseled the villagers and explained them that many of us have luxurious facilitates at our place but we don't opt for toilets, it is shameful for us to see our females go in open defecation. The appeal made impact and community members got convinced that they owe a toilet for their females, and almost all of them rejected the grant and returned home with a smile for doing something for their families and also getting the Nirmal Gram Puraskar for the joint efforts made by entire community.

1.2.3 The Idea of a model/ Smart village:

- The smart village is a model in which, energy access acts as a catalyst for a range of development outcomes. If managed correctly, technology leapfrogging could lead to rapid improvements in healthcare, nutrition, education, and economic security.
- The social, economic and scientific developments in these communities helped in the growth of such villages and also have become the building block of civilizations.
- However, even after the collapse of such progressed civilizations, villages continued to exist and flourish through rich heritage and traditional practices.
- It was the dream of Mahatma Gandhi to make the Indian villages smarter and ideal/model by improving them in all aspects like physical, economic and social etc.

1.2.4 Ancient History Civil / Electrical concept about Indian Village / Foreign Countries Perspective and its new Development

An intervention under one of these areas could have an effect across other areas as well. For example, technology could be used to improve the quality and delivery of other services such as health and education, which in turn contributes to sustainable development. Similarly, the use of renewable energy, apart from meeting energy needs, also contributes towards environmental sustainability.

Village tree plantation drives could encourage community participation, benefit the environment, prevent soil erosion and benefit agriculture, conserve water, and finally contribute to the aesthetics of the village. A number of these initiatives have already been taken in different parts of the country, but most of them have been attempted in isolation.

1.2.5 Resources:

- Drinking Water
- Drainage Network
- Irrigation Facilities
- Health Facilities
- Education Facilities
- Public Garden /Park/Playground
- GYM& International/National Bank

1.3 Detail study (Socio economic, physical, demographic and infrastructure details) of Ideal village / Smart Village with photograph:

1.3.1 Physical & Demographical Growth:

The village is home to about 7.8 thousand people, among them 4235 are male and 3583 are female. In Pardi village, most of the villagers are from Schedule Caste (SC). Schedule Caste (SC) constitutes 43.13 % while Schedule Tribe (ST) were 0.17 % of total population in Pardi village.Child (aged under 6 years) population of Pardi village is 1167, among them 625 are boys and 542 are girls. There are 1713 households in the village and an average 5 persons live in every family.

Particulars	Total	Male	Female
Total No. of Houses	**1,713**	-	-
Population	**7,818**	4,235	3,583
Child (0-6)	**1,167**	625	542
Schedule Caste	**3,372**	1,824	1,548
Schedule Tribe	**13**	6	7
Literacy	**79.36 %**	87.73 %	69.42 %
Total Workers	**3,270**	2,738	532
Main Worker	**3,152**	-	-
Marginal Worker	**118**	67	51

Table No. 1.1: Physical & Demographical Detail in Pardi Village

1.3.2 Economic profile:

In Pardi village out of total population, 3270 were engaged in work activities. 96.39 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 3.61 % were involved in Marginal activity providing livelihood for less than 6 months. Of 3270 workers engaged in Main Work, 200 were cultivators (owner or co-owner) while 359 were Agricultural laborers.

Total working population of Pardi is 3270 which are either main or marginal workers. Total workers in the village are 3270 out of which 2738 are male and 532 are female. Total main workers are 3152 out of which female main workers are 2671 and male main workers are 481. Total marginal workers of village are 118.

1.3.3 Social Scenario:

Sex Ratio of Pardi Village -Census 2011

	Total	Male	Female
Total Workers	**3270**	2738	532
Main Workers	**3152**	2671	481
Main Workers Cultivators	**200**	172	28
Agriculture Labourer	**359**	312	47
Household Industries	**12**	10	2
Other Workers	**2581**	2177	404
Marginal Workers	**118**	67	51
Non Working Persons	**4548**	1497	3051

As per the Census Data 2011 there are 846 Females per 1000 males out of 7818 total population of village. There are 867 girls per 1000 boys under 6 years of age in the village.

Literacy of Pardi Village

Out of total population total 5278 people in Pardi Village are literate, among them 3167 are male and 2111 are female in the village. Total literacy rate of Pardi is 79.36%, for male literacy is 87.73% and for female literacy rate 69.42%

1.3.4 Infrastructures facilities:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				

	• Tap Water (Treated/ Untreated) • RO Water • Well (Covered/ Uncovered) • Hand pumps • Tube well/ Borehole • River/ Canal/ Spring/ Lake/ Pond	• Treated Tap water • Well • Hand pumps • Tube well	Yes		
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	60000 lit		
	Underground Sump	Capacity:	125000 lit		
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes	Yes		
D.	**Type of Drainage**				
	Closed/ Open	Closed	Yes		

Fig. No. 1.3: Water Storage and Distribution facilities in Pardi Village

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	R.C.C. Bituminous	Yes		
	Main road	Bituminous	Yes		
	Internal streets	Paver Block	Yes		
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH Rajkot Gondal 0 Km.	Yes		

F.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.		Yes		4 No.
	Solid & liquid waste Disposal system available			Yes	
	Any facility for Waste collection from road	Door to Door	Yes		

G.	Housing Condition:				
	Kutchha/Pucca	Pucca 80% Kutchha 20%			

H.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes	PHC 3 No.			
	Private Clinic/Private Hospital/ Nursing Home	Private Clinic Private Hospital			

Table No. 1.3: Infrastructures facilities in Pardi Village

1.3.4 Social Infrastructure Facilities:

A.	Socio- Culture Facilities				
	Community Hall	Samajvadi	Yes		
	Public Garden	Panchavati Park	Yes		
	Birth & Death Registration Office	at Gram Panchayat	Yes		

Table No. 1.5: Social Infrastructure Facilities in Pardi Village

1.3.5 Education Facilities:

A.	Education Facilities:				
	Aaganwadi/ Play group	2 No.	Yes		
	Primary School	2 No.	Yes		
	Secondary school		Yes		

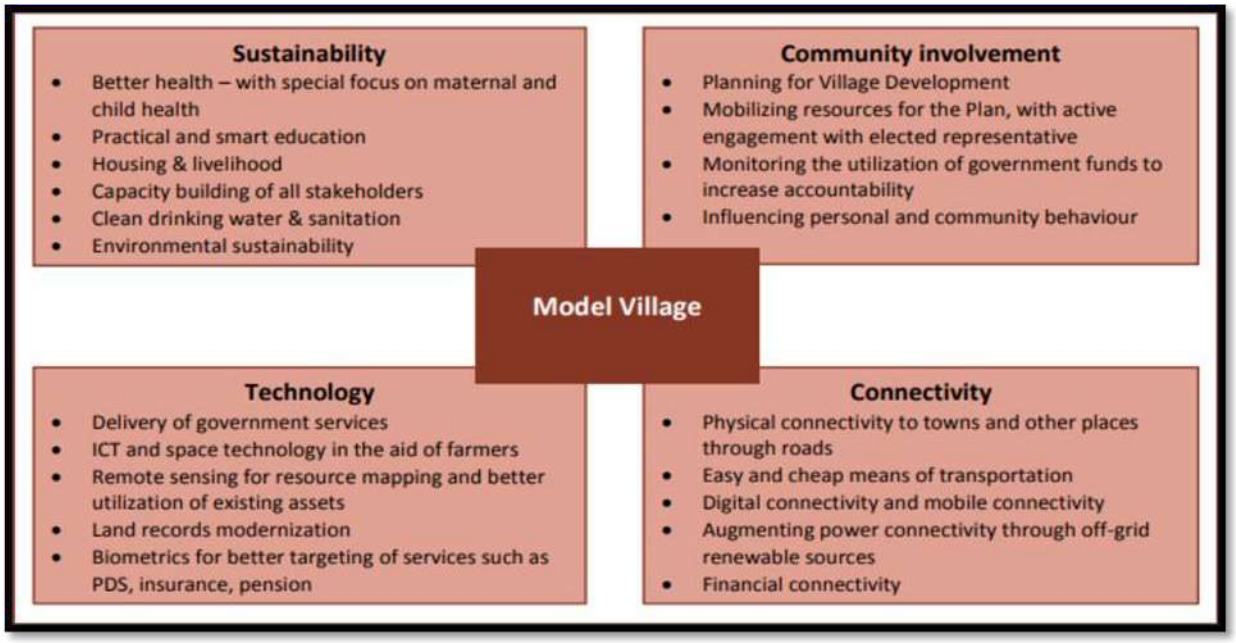
Table No. 1.4: Education Facilities in Pardi Village

1.3.7 Other Facilities:

A.	Other Facilities				
	Post-office		Yes		
	General Market		Yes		
	Shops (Public Distribution System)		Yes		
	Panchayat Building		Yes		
	Pharmacy/Medical Shop		Yes		

	Bank & ATM Facility		Yes		
	Agriculture Co-operative Society		Yes		
	Milk Co-operative Soc.		Yes		
	Small Scale Industries		Yes		
	Internet Cafes/ Common Service Center/Wi Fi		Yes		

1.3.8 Key Elements of Ideal Village:



1.3.9 Resources:

- Drinking Water
- Drainage Network
- Irrigation Facilities
- Health Facilities
- Education Facilities
- Public Garden /Park/Playground
- GYM
- Bank
- Oil Petrol Pump
- 24/7 electricity and water supply
- E-Panchayat (self-developed and designed)

1.4 SWOT analysis of ideal village:

Village strength	• Better natural resources base • Basic Infrastructure • Availability of enough agricultural lands • Good educational status of the villagers • Strong will power of the villagers for village development

	• Connected with NH
Weakness	• Few water sources are drying • Poor health facilities • Poor livelihoods opportunities and low technical knowledge • Communication gap between government and villager • Great deficit in fodder and fuel
Opportunities	• Use of modern techniques in agriculture, new cropping patterned scope of irrigation in agriculture. • Soil improvement by different institutions such as GBPIHED Kosi and VPKAS Almora. • Development of wastelands, abandon lands and other village lands. • Grow as Industrial Area
Threads	• Crop damage by wild animals • Low rainfall and dry season for crops • Demolition of Agricultural land

1.5 Future prospects of Development of the Ideal Village/ Smart Village:

In the future, due to the development of Rajkot city the development of the Pardi village will increase and the area of the city become spreads so that the ideal village will include in the city area and it will make a portion of the Rajkot city.

It is very important to understand those problems which have been retarding the growth of the state and the measures to eliminate such problems. At the same time, they must also be able to discover the prospects of the development of the economy with the available resource base of the state. Taking into consideration of all these issues, an attempt has been made through this paper to point out the main problems of the rural development of rurban leading to industrialization and agricultural, to suggest appropriate measures to overcome these problems and to throw light on the future prospects of pace development of its economy.

For future prospect, the village Pardi can use more advanced technologies for agricultural prospect and for other requirements also. For planning them village as green villages. More Increasing Renewable Energy in villages. Provide More Smart System with their own soul of village facilities like religion social physical and sustainable facilities.

1.6 Benefits of the visits of Ideal Village/ Smart village:

- Provided Proper response from the gram Panchayat and did the very healthy convection about the Ideal village feature.
- Can able to know different types of the facilities infrastructure likes Physical social; social cultural sustainable and repair and maintain ace related and also know about the basic facilities about the village which have to provide for every poor villages.
- With solid and liquid waste management system with proper treatment method provide proper solution such as recycle of recycling processes of waste management.
- More renewable energy source and providing village own sustainable infrastructure.

1.7 Case Study of any other state Ideal Village / any other from outside Gujarat:

1. Mala Gram Panchayat of Thrissur District in Kerala:

Mala Gram Panchayat is situated 40 kms away from the District Head Quarters. The village is equally represented by Hindu, Christian and Muslim community, having its main source of livelihood as agriculture.

Since past 15 years Panchayat is working towards attaining ―Open defecation free status. The efforts have started way back in 1990‘s by Kerala Water Authority for construction of two pit latrines, also as part of decentralized planning with the introduction of the Panchayati Raj System between (1996 to 2003).

In the future, due to the development of Rajkot city the development of the Pardi village will increase and the area of the city become spreads so that the ideal village will include in the city area and it will make a portion of the Rajkot city.

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On the launch of TSC programme in the district in 2003, people from various walks of life came together including ward level representatives formed Health Promotion Team (HPT) to motivate people for construction of sanitary latrines.

In order to sensitize general public about the necessity of sanitation, health and hygiene sound amplifier mounded vehicles were used to spread the message. Through medium of traditional folk media called as **“Kalajatha”** a form of street play were also performed to create awareness amongst general public on sanitation issue.

Also since launch of the program participation of community based organizations such as SHG‘s, area based development societies and community development societies were ensured. Attractive dustbins are kept on roadsides for collection of garbage. At school level unique program, which targeted the adolescent girls, were under taken.

To ensure the smooth functioning of the project, a committee at Panchayat level was formed and which monitored the progress at regular interval. Targets were also assigned to block level officers and District level officers for monitoring the construction activities. Besides the individual toilets, 15 schools and 27 Aanganwadi were provided with sanitation facilities. Three sanitary complexes were constructed under TSC. The authorities of Mala Grama strongly believes that change which they have come across is not overnight, it has come a long way after efforts of committed individuals and in order to sustain hygiene behavior change, they formed SHG and school health clubs.

Chapter 2: Literature Review

2.1 Introduction: Urban & Rural village concept

2.1.1 Urban:

The term 'urban' is related to town or cities. Unlike in rural areas here majority of the employed inhabitants are engaged in non-agricultural activities and it is endowed with large nucleated settlements and industries. Urban areas may be defined by national governments based on their own criteria for example size, population density, occupation of people and type of local government.

The multidimensional character of urban areas posed hindrance in giving a precise definition for them. The census of India until 1951 defined an urban settlement based on municipalities and the population of area. The 1961 census adopted a strict definition which is modified in 1971 census to treat all places satisfying the following conditions as towns:-

- All municipal corporations, municipal boards, cantonments and notified areas.
- All localities though not in themselves local bodies but forming part of a city or town agglomeration.
- Other places satisfying all three following conditions. Population exceeds 5,000
- At least 75 per cent of the male working population engages in non-agricultural pursuits
- The density of population exceeds 400 persons per square km.

In 1981 census some minor changes were incorporated whereby livestock, forestry, fishing, hunting, plantations, orchard etc. were treated as agricultural activity and places having distinct urban characteristics and physical amenities like industrial area, special project area, large housing colonies, places of tourist interest, railway colonies, etc could be regarded as towns at the discretion of the Director of Census operations in consultation with the concerned state governments.

All towns and urban agglomerations, so identified, are grouped into following six classes according to population size:

- Class I: Population of 100,000 and above
- Class II: Population of 50,000 to 99,999
- Class III: Population of 20,000 to 49,999
- Class IV: Population of 10,000 to 19,999
- Class V: Population of 5,000 to 9,999
- Class VI: Population less than 5,000

2.1.2 Rural:

Rural areas are also known as the 'countryside' or a 'village' in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing, cottage industries, pottery etc.

The quest to discover the real rural India still continues in great earnest. Almost every economic agency today has a definition of rural India. Here are a few definitions:

According to the Planning Commission, a town with a maximum population of 15,000 is considered rural in nature. In these areas the panchayat makes all the decisions. There are five persons in the panchayat. The National Sample Survey Organization (NSSO) defines 'rural' as follows:

- An area with a population density of up to 400 per square kilometer,
- Villages with clear surveyed boundaries but no municipal board,
- A minimum of 75% of male working population involved in agriculture and allied activities.

RBI defines rural areas as those areas with a population of less than 49,000 (tier -3 to tier-6 cities). It is generally said that the rural areas house up to 70% of India 's population. Rural India contributes a large chunk to India 's GDP by way of agriculture, self-employment, services, construction etc. As per a strict measure used by the National Sample Survey in its 63rd round, called monthly per capita expenditure, rural expenditure accounts for 55% of total national monthly expenditure. The rural population currently accounts for one-third of the total Indian FMCG sales.

2.2 Importance of the Rural Development

Rural development is necessary not only for an over-whelming majority of the population living in villages but the development of rural activities is essential to accelerate the pace of overall economic development of the country. Rural development has assumed greater importance in India today than in the earlier period in the process of the development of the country.

It is a strategy package seeking to achieve enhanced rural production and productivity, greater socio-economic equity, and aspiration, balance in social and economic development. The primary task is to mitigate the hunger of about 70 percent of the rural population, providing adequate and nutritious food. Then follow an adequate provision ofclothing and footwear, a clean house in a clean environment, medical care, recreational facility, education, transport and communication.

The need of the hour is that rural development should aim at:

- Removal of unemployment;
- Reduction in under-employment;
- Improve the standard of living;
- Adequate income for nutritious food;
- Sufficient clothes;
- Availability of soft drinking water;
- Hygienic living conditions;
- Satisfactory educational facilities for learning;
- Suitable medical facilities for treatment;
- Proper house to live in;
- Appropriate socio-cultural activities to enrich oneself;
- Adequate all-weather roads for better communication.

2.3 Ancient Villages / Different Definition of: Rural area / Villages:

We define the term 'rural' as a region located on the outskirts. It refers to a small settlement, which is outside the boundaries of a city, commercial or industrial area. It may include, countryside areas, villages or hamlets, where there are natural vegetation and open spaces. There is a low density of population in such area. The primary source of income of the residents is agriculture and animal husbandry. Cottage Industries also form a chief source of income here.

In India, a town whose population is below 15000 is considered as rural, as per the planning commission. Gram Panchayat is responsible for looking after such areas. Further, there is no municipal board, in the villages and maximum percentage of the male population are engaged in agriculture and related activities.

2.3.1 India:

The census of India considers those areas as rural where the population is below 5000 and the density of population less than 400 per square Kilometer. It further provides that in such areas at least 75% of the males of the working population are engaged in agricultural pursuits.

2.3.2 United Kingdom:

In Britain, "rural" is defined by the government Department for Environment, Food and Rural Affairs (DEFRA), using population data from the latest census (A periodic count of the population), such as the United Kingdom Census 2001. These definitions have various grades, but the upper point is any local government area with less than 26% of its population living in a market town ("market town" being defined as any settlement which has permission to hold a street market).

2.4 Scenario: Rural / Urban Village ofIndia Population Growth:

For the first time since Independence, the absolute increase in population is more in urban areas that in rural areas in census 2011.

	2001	2011	Difference
India	102.9	121.0	18.1
Rural	74.3	83.3	9.0
Urban	28.6	37.7	9.1

Table No. 2.1: Population (in crore)

- Rural – Urban distribution: 68.84% & 31.16%
- Level of urbanization increased from 27.81% in 2001 Census to 31.16% in 2011 Census
- The proportion of rural population declined from 72.19% to 68.84%

	1991-2001	2001-2011	Difference
EAG	25.0	20.9	-4.1
Rural	23.5	18.7	-4.8
Urban	31.6	29.9	-1.7
Non EAG	18.9	15.0	-3.9
Rural	13.2	5.7	-7.5
Urban	31.5	32.7	+1.2

Table No. 2.2: Growth Rate of Population (in %)

The slowing down of the overall growth rate of population is due to the sharp decline in the growth rate in rural areas, while the growth rate in urban areas remains almost the same.

Though the growth rate of population in rural areas of EAG States is nearly 3 times that in rural areas in non EAG States, it is for the first time that significant fall of growth rate is seen in the rural areas of EAG States

2.5 Scenario: Rural / Urban Village of Gujarat as per Census 2011 {Population Growth}:

2.5.1 Gujarat Total Population 2011:

As per details from Census 2011, Gujarat has population of 6.04 Crores, an increase from figure of 5.07 Crore in 2001 census. Total population of Gujarat as per 2011 census is 60,439,692 of which male and female are 31,491,260 and 28,948,432 respectively. In 2001, total population was 50,671,017 in which males were 26,385,577 while females were 24,285,440. The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent. The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the figure was 4.93 percent. Recently as per Gujarat census data, 83.92% houses are owned while 13.54% were rented. In all, 65.95% couples in Gujarat lived in single family.

Description	2011	2001
Approximate Population	6.04 Crores	5.07 Crores
Actual Population	60,439,692	50,671,017
Male	31,491,260	26,385,577
Female	28,948,432	24,285,440
Population Growth	19.28%	22.48%
Percentage of total Population	4.99%	4.93%
Sex Ratio	919	920
Child Sex Ratio	890	883

Table No. 2.3: Total Population Gujarat as per census 2001 & 2011

2.5.2 Gujarat Urban Population 2011:

Out of total population of Gujarat, 42.60% people live in urban regions. The total figure of population living in urban areas is 25,745,083 of which 13,692,101 are males and while remaining 12,052,982 are females. The urban population in the last 10 years has increased by 42.60 percent.

Sex Ratio in urban regions of Gujarat was 880 females per 1000 males. For child (06) sex ratio the figure for urban region stood at 852 girls per 1000 boys. Total children (0-6 age) living in urban areas of Gujarat were 2,952,359. Of total population in urban region, 11.47 % were children.

Average Literacy rate in Gujarat for Urban regions was 86.31 percent in which males were 90.98% literate while female literacy stood at 70.26%. Total literates in urban region of Gujarat were 19,672,516.

2.5.3 Gujarat Rural Population 2011:

Of the total population of Gujarat state, around 57.40 percent live in the villages of rural areas. In actual numbers, males and females were 17,799,159 and 16,895,450 respectively. Total population of rural areas of Gujarat state was 34,694,609. The population growth rate recorded for this decade (2001-2011) was 57.40%.

In rural regions of Gujarat state, female sex ratio per 1000 males was 949 while same for the child (0-6 age) was 914 girls per 1000 boys. In Gujarat, 4,824,903 children (0-6) live in rural areas. Child population forms 13.91 percent of total rural population.

In rural areas of Gujarat, literacy rate for males and female stood at 81.61 % and 57.78 %. Average literacy rate in Gujarat for rural areas was 71.71 percent. Total literates in rural areas were 21,420,842.

Description	Rural	Urban
Population (%)	57.40 %	42.60 %
Total Population	34,694,609	25,745,083
Male Population	17,799,159	13,692,101
Female Population	16,895,450	12,052,982
Population Growth	9.31 %	36.00 %
Sex Ratio	949	880
Child Sex Ratio (0-6)	914	852
Child Population (0-6)	4,824,903	2,952,359
Child Percentage (0-6)	13.91 %	11.47 %
Literates	21,420,842	19,672,516
Average Literacy	71.71 %	86.31 %
Male Literacy	81.61 %	90.98 %
Female Literacy	57.78 %	70.26 %

Table No. 2.4: Total Population Urban & Rural Areas Gujarat as per census 2011

2.6 Rural Development Issues-Concerns and Measures:

2.6.1 People related:

- Traditional way of thinking.
- Poor understanding.
- Low level of education to understand developmental efforts and new technology.
- Deprived psychology and scientific orientation.
- Lack of confidence.
- Poor awareness.
- Low level of education.
- Existence of unfelt needs &Personal ego.

2.6.2 Agricultural related problems:

- Lack of expected awareness, knowledge, skill and attitude.
- Unavailability of inputs.
- Poor marketing facility.
- Insufficient extension staff and services.
- Multidimensional tasks to extension personnel.
- Small size of land holding.
- Division of land.
- Unwillingness to work and stay in rural areas.

2.6.3 Infrastructure related problems:

- Poor infrastructure facilities like water, electricity, transport, educational institutions, Communication, health, storage facility etc.

2.6.4 Economic problems:

- Unfavorable economic condition to adopt high cost technology.
- High cost of inputs.
- Underprivileged rural industries.

2.6.5 Social and Cultural problems:

- Cultural norms and traditions.
- Conflict within and between groups, castes, religions, regions, languages.

2.6.6 Leadership related problems:

- Leadership among the hands of inactive and incompetent people.
- Mollified interest of leaders.
- Biased political.

2.6.7 Administrative problems:

- Earlier, majority of the programmers were planning based on top to bottom approach and were target oriented.
- Political interference.
- Lack of motivation and interest.
- Unwillingness to work in rural area.
- Improper utilization of budget.

2.7 Various Measures for Rural development:

2.7.1 Rural Development Programmes:

Sr. No.	Name of the Programme	Started by	Year
Pre independence			
1	Sriniketan Project	Shri Rabindra Nath Tagore	1914
2	Marthandam Project	Dr. Spencer Hatch	1921
3	Gurgaon Experiment	F. L. Brayne	1928
4	SarvodayProgramme	Shri Vinoba Bhave	1948-49
Post early independence(1947-53)			
1	Firka Development	Madras Government	1948
2	Etawah Pilot Project	Albert Mayor	1948
3	Nilokheri Experiment	S.K.Dey	1948
4	Community Development Programme (CDP)	Government of India	1952
5	National Extension Service (NES)	Government of India	1953

Table No. 2.5: Rural Development Efforts / Programmes before Independence

2.7.2 Rural Development Efforts / Programmes after Independence:

No	Year	Name of the Programme after independence	
1	1948	GMFC	Grow More Food Campaign
2	1950	JMPC	Japanese Method of Paddy Cultivation
3	1952	CDP	Community Development Programme
4	1953	NES	National Extension Service
5	1961	IADP	Intensive Agriculture District Programme
6	1963	ANP	Applied Nutrition Programme
7	1964-65	IAAP	Integrated Agricultural Area Programme
8	1964	ICDP	Integrated Cattle Development Programme
9	1965	NDP	National Demonstration Project
10	1966	ODP	Oilseed Development Programme
11	1966-67	HYVP	High Yielding Varieties Programme

12	1966	FTEP	Farmers Training and Education Programme
13	1966	FTC	Farmers Training Centre
14	1966	MCP	Multiple Crop Programme
15	1970	DPAP	Draught Prone Area Programme
16	1970	DFAP	Dry Farming Area Programme
17	1971	ICDP	Integrated Cotton Development Programme
18	1971	WVDP	Whole Village Development Programme
19	1971	SFDA	Small Farmers Development Agency
20	1971	MFAL	Marginal Farmers and Agricultural Labour Agency
21	1971-72	TADP	Tribal Area Development Programme
22	1973	HADP	Hill Area Development Programme
23	1974	T&V	Training and Visit System
24	1974	KVK	KrushiVigyan Kendra
25	1974	TDB	Tribal Development Block
26	1975	CADP	Command Area Development Programme
27	1976	IRDP	Intergraded Rural Development Programme
28	1976	ORP	Operational Research Project
29	1976	SF	Social Forestry
30	1977	DDP	Desert Development Programme
31	1978	LLP	Lab-to-Land Programme
32	1978	NARP	National Agricultural Research Project
33	1979	TRYSEM	Training of Rural Youth for Self-Employment
34	1980	NREP	National Rural Employment Programme
35	1980	DRDA	District Rural Development Agency
36	1980-81	TUP	Tribal Upliftment Project
37	1981	RLEGP	Rural Landless Employment Guarantee Programme
38	1982	DWCRA	Development of Women and Children in Rural Areas
39	1984-85	NAEP	National Agricultural Extension Project
40	1986-87	NWDP	National Watershed Development Project
41	1989	JRY	Jawahar Rojgar Yojana
42	1990-91	NWDPRA	National Water Development Project for Rain fed Areas

43	1998	NATP	National Agricultural Technology Project
44	1998	ATMA	Agricultural Technology Management Agency
45	2005	NAIP	National Agricultural Innovation Project

Table No. 2.6: Rural Development Efforts / Programmes after Independence

2.8 Various infrastructure & guidelines/Norms for Villages for the provisions of different infrastructure facilities

❖ According to UDPFI norms:

Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Education		
Aganwadi	Each Village	1
Primary School	Each Village	1
Secondary School	Per 7,500 Population	2
Higher Secondary School	Per 15,000 Population	1
College	Per 125,000 Population	1
Tech. Training Institute	Per 100,000 Population	1
Agriculture Research Centre	Per 100,000 Population	1
Medical Facility		
Gov./Panchayat Dispensary or Sub PHC or Health Centre	Each Village	1
PHC & CHC	Per 20,000 Population	1
Child Welfare and Maternity Home	Per 10,000 Population	1
Hospital	Per 100,000 Population	1
Transportation		
Pucca Village Approach Road	Each Village	
Bus/Auto Stand Provision	All Villages connected by PT (ST Bus or Auto)	1
Drinking Water		
Over Head Tank	1/3 of Total Demand	1.6 lac cap
U/G Sump	2/3 of Total Demand	3.2 lac cap
Public Latrines	Each Village	60
Cremation Ground	Per 20,000 Population	1

Post Office	Per 10,000 Population	1
Gram Panchayat Building	Each individual/group Panchayat	1
APMC	Per 100,000 Population	1

Table No. 2.7: Guidelines/Norms for Villages for the provisions of different infrastructurefacilities

2.9 Ancient / Existing Electrical concept study as a Literature Review for village development

To assure this familiarity a review of the relevant literature is done. A Survey of related studies was undertaken by the researcher to get an insight into the work that has already been in the field of this investigation in the context of related industry. An attempt is made in this chapter to review the existing literature on the subject of research. The available literature related to the present research work studied by the researcher is divided into the following subcategories: -

- Prior studies on power sector
- Power sector scenario in India
- Recent issues & challenges of Indian power sector
- Overview of Indian power sector performance
- Power sector reforms in Gujarat.
- The concept of performance & its measurement
- Approaches of performance measurement
- KPI approach of performance measurement
- KPIs for a power distribution utility
- The Concept of Customer satisfaction
- Summary and research gaps

2.10 Other projects / Schemes of Gujrat/ Indian Government :

1. Pradhan Mantri Adarsh Gram Sadak Yojana (PMAGSY):

- It focuses on integrated development of 100 villages with a 50 per cent population of SCs.

2. Bharat Nirman Yojana:

- It was launched in 2005 for building infrastructure and basic amenities in rural areas. It comprises of six components rural housing, irrigation, drinking water, rural roads, electrification and rural telephony.

3. Indira Awas Yojana:

- It is one of the six components of Bharat Nirman Yojana. It was introduced in 1985-86. It aims to help built or upgrade the households of people living under BPL.

4. Jawaharlal Nehru National Urban Renewal Mission (JNNURM):

Chapter: 3. Smart (Cities / Village) Concept Idea and its Visit (Civil & Electrical Concept)

3.1 Introduction: Concepts, Definitions and Practices

The concept of a smart city itself is still emerging, and the work of defining and conceptualizing it is in progress. The concept is used all over the world with different nomenclatures, context and meanings. A range of conceptual variants generated by replacing the word smart with adjectives such as digital or intelligent are readily used and reused. Some are recognizing the use of smart city as an urban labeling phenomenon. One way to conceptualize a smart city is as an icon of a sustainable and livable city.

By exploring an extensive array of literature from various fields such as e-government, information science, urban studies, and public administration, we identify and discuss challenges, success factors, and impacts of government-driven initiatives to that make a city smart.

Working Definitions of a Smart City:
A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens.

City that monitors and integrates conditions of all of its critical infrastructures, including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, power, even major buildings, can better optimize its resources, plan its preventive maintenance activities, and monitor security aspects while maximizing services to its citizens.

“The use of Smart Computing technologies to make the critical infrastructure components and services of a city which include city administration, education, healthcare, public safety, real estate, transportation, and utilities more intelligent, interconnected, and efficient”

The forward-looking development approach to a smart city considers issues, such as, awareness, flexibility, transformability, synergy, individuality, self-decisiveness, and strategic behavior.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

Various Smart Cities Bench Marks, Standards and Performance Measurement Indicators are shown in below tables respectively.

Sr no.	Parameters	Benchmarks
1	**Transport**	• Maximum travel time of 30 minutes in small &medium size cities and 45 minutes in metropolitan areas. • Continuous unobstructed footpath for 2 m wide on either side of all streets with Row 12 m more. • Dedicated and physically segregated bicycle tracks with width of 2 m or more, one in each direction, should be provided on all streets with carriageway larger than 10 m. • High quality and high frequency mass transport within 800m (10-15-minute walking distance) of all residences in areas over 175persons / ha of

		built area.
2	**Spatial planning**	• 175 persons per Ha along transit corridors.95% of residences should have daily needs retail, parks, primary schools and recreational areas accessible within 400m walking distance. • 95% residences should have access to employment and public and institutional transport or bicycle or walk. At least 20% of all residential units to be occupied by economically weaker sections in each Transit Oriented Development Zone 800m from Transit Stations. • At least 30% residential and 30 commercial/institutional in every TOD Zone with in 800 m of Transit Stations.
3	**Water supply**	• 24 x 7 supply of water. • 100% household with direct water supply connections. • 135 liters of per capita supply of water. • 100% metering of water connections. • 100% efficiency in collection of water.
4	**Sewerage & sanitation**	• 100% households should have access to toilets. • 100% schools should have separate toilets for girls. • 100% households should be connected to the waste water network. • 100% efficiency in the collection and treatment of waste water. • 100% efficiency in the collection of sewerage network.
5	**Solid management**	• 100% households are covered by daily door step collection system. • 100% collection of municipal solid waste. • 100% segregation of waste at source, i.e. biodegradable and non-degradable waste. • 100% recycling of solid waste.
6	**Strom water**	• 100% coverage of road network with storm water drainage network. • Aggregate number of incidents of water logging reported in a Year = 0. • 100 % rainwater harvesting.
7	**Health care facilities**	• Availability of telemedicine facilities to100% residents. • 30 minutes emergency response time. • 1 dispensary for every 15,000 residents. • Nursing home, child, welfare and maternity, center - 25 to 30 beds per lakh population. • Intermediate Hospital (Category B) - 80 beds per lakh population. • Intermediate Hospital (Category A) – 200beds per lakh population. • Multi-Specialty Hospital - 200 beds per lakh population. • Specialty Hospital - 200 beds per lakh population. • General Hospital - 500 beds per lakh population. • 10020 Family Welfare Centre for every50, 000 residents.
8	**Telephone connection**	• 100% households have a telephone connection including mobile.
9	**Wi-Fi connection**	• 100% households have a telephone connection including mobile.
10	**Electricity**	• 100% households have electricity connection 24 x 7 supply of electricity. • 100% metering of electricity supply. • 100% recovery of cost. • Tariff slabs that work towards minimizing waste.

Table No. 3.1: Smart Cities Benchmark

Fig. 3.1 Smart Rural Villages factors

Smart Cities Standards

- Smart City management and assessment
- SSC services
- Information and Communication Technology (ICT)
- Buildings and physical infrastructures

Smart Cities Performance Measurement Indicators

- Supports the transition to low-carbon, resource-efficient cities
- Helps cities respond to the needs of their citizens
- Offers tools to foster the efficient use of municipal budgets
- Enables stakeholders to learn from each other
- Creates trust in smart city solutions
- Provides a framework for monitoring long-term outcomes

3.3 Technological Options

Smart city has no longer wave in the future. Now they are continuously growing as the internet of growing expand and impact municipal grown around the globe.
They are key technologies that make smart cite up to the mark they are as follow:

3.3.1 Smart Energy:

Both residential and commercial in the smart cities are more efficient using and the energy used is basically analyzed and data should be collected and therefore building get monitor their energy usage and report this data to utilities and reduce the cost Smart grid solution play important role in making smart cities from prepaid application to advanced metering there are several factor that is to enhance.

3.3.2 Smart Transportation:

It's considered smart parking, smart traffic light and smart multi transportation by making parking smarter, people spend less time looking for parking spots and circling city blocks and convent life. Traffic lights are particular based on the bus schedules so that less traffic and more freely during rush hours.

3.3.3 Smart Infrastructure:

The city has good infrastructure may move forward with other technologies and make meaningful changes in future city plan.

3.3.4 Smart Mobility:

It indicates both data and technology which travel across the technology needs more interoperable and perform to great expectations regardless of who made it or when it was made.

3.4 Road Map and Safe Guards

A smart city road map consists of four/three (the first is a preliminary check) major components:

- **To describe exactly what is the community:** maybe that definition can condition what you are doing in the subsequent steps; it relates to geography, links between cities and flows of people between them; that in some Countries the definition of City/community that is stated does not correspond effectively happens in the real life.
- **Study Community:** Before deciding to build a smart city, first we need to know that. This can be done by determining the benefits of such an initiative. Study the community to know the citizens, the business's needs – know the citizens and the community's unique attributes, such as the age of the citizens, their education, hobbies, and attractions of the city.
- **People, Processes, and Technology (PPT)** are the three principles of the success of a smart city initiative. Cities must study their citizens; know the processes, business drivers, create policies, and objectives to meet the citizens' needs.

3.5 Issues & Challenges

1. Retrofitting existing legacy city: Infrastructure to make it smart, there are a number of issues to consider when reviewing a smart city concept. The most important is to determine the existing cities weak areas that need utmost consideration, e.g. 100-per-cent distribution of water supply and sanitation. The integration of formerly isolated legacy systems to achieve citywide efficiencies can be a significant challenge.

2. Financings of smart cities: The High-Power Expert Committee on Investment Estimates in Urban Infrastructure has assessed a per-capita investment cost of Rs 43,386 for a 20year period. Using an average figure of 1 million people in each of the 100 smart cities, the total estimate of investment requirements for the smart city comes to Rs 7 lakh crore over 20 years. This translates into an annual requirement of Rs 35,000 crore. One needs to see how these projects will be financed as the majority of project need would move through complete private investment or through PPPs (public-private partnership).

3. Availability of city development plan: Most of our cities don't have a city development plan, which is the key to smart city planning and encapsulates, and encapsulates all a city needs to improve and provide better opportunities to its citizens. Unfortunately, 70-80 % of Indian cities don't have.

4. Financial sustainability of ULBS: Most ULBS are not financially self-sustainable and tariff levels fixed by the ULBs for providing services often do not mirror the cost of supplying the same. Even if additional investments are recovered in a phased manner, inadequate cost recovery will lead to continued financial losses.

5. Technical constraints of ULBS: Most ULBS have limited technical capacity to ensure timely and cost-effective implementation and subsequent operations and maintenance owing to limited recruitment over a number of years along with inability of the ULBs to attract best of talent at market competitive compensation rates.

6.Three-tier governance: Successful implementation of smart city solutions needs effective horizontal and vertical coordination between various institutions providing various municipal amenities as well as effective coordination between local government, state government, central government, agencies on various issues related to financing and sharing of best practices and service delivery processes.

7. Providing clearances in a timely manner: For timely completion of the project, all clearances should use online processes and be cleared in a time-bound manner. A regulatory body should be set up for all utility services so that a level playing field is made available to the private sector and tariffs are set in a manner that balances financial sustainability with quality

8. Dealing with a multivendor environment: Another major challenge in the smart city space is that software infrastructure in cities contains components supplied by different vendors. Hence, the ability to handle complex combinations of smart city solutions developed by multiple technology vendors becomes very significant.

9. Capacity building program: Building capacity for 100 smart cities is not an easy task and most ambitious projects are delayed owing to lack of quality machinery and manpower, both at the center and state levels. In terms of funds, only around 5 per cent of the central allocation may be allocated for capacity building programs that focus on training, contextual research, knowledge exchange and a rich database. Investments in capacity building programs have a multiplier effect as they help in time-bound completion of projects and in designing programs, developing faculty, building databases as well as designing tool kits and decision support systems. As all these have a lag time, capacity building needs to be strengthened right at the starting.

10. Reliability of utility services: For any smart city in the world, the focus is on reliability of utility services, whether it is water, telephone, electricity, broadband services. Smart cities should have to provide electricity 24 Hours.

3.6 Smart Infrastructure - Intelligent Traffic Management

3.6.1 Introduction

In today's times, traffic management has become one of the core concerns for an urban city. The constant increase in the number of vehicles has led to the recurring problem of traffic management. An increase in the infrastructure growth is a possible solution but turns out to be costly in terms of both time and effort. Countries all over the world are looking forward to developing efficient traffic management systems by making use of ICT technologies. The recent advancements in Wireless Sensor Networks(WSN) and low-cost low power consuming sensors have strengthened the regime towards creating an intelligent traffic

management system. Governments are trying to capitalize the power of present-day computing, networking and communication technologies for building systems that are able to improve the efficiency of current roads and traffic conditions. The advent of the Internet of Things and high availability of Cloud resources are helping us create mechanisms that can automate the transportation systems and enhance utilization of existing infrastructures.

The tiny sensors which we have today have their applicability across various fields such as health, surveillance, home automation and industrial practices. A network of such sensors is able to map an entire city and collect minutest of the details with minimum time and cost overhead. With IPv6 becoming more and more popular it becomes easy to allocate a sensor node with an IP address for its tracking and localization purposes. Traffic systems can make use of such sensor nodes for gathering real-time information regarding traffic conditions like traffic flow, traffic congestion, etc. These sensors are also capable of vehicle classification, speed calculation and vehicle count. The data being collected from these sensor nodes is diverse in nature and humongous in size. We are fortunate to live in times where we have efficient data analytics through machine learning algorithms for extracting information or say knowledge from these huge chunks of data. Machine learning algorithms are capable of making predictions regarding the levels of traffic congestion in a particular area of a city. They can very well depict patterns with respect to traffic flow and suggest measures that authorities can take to curb traffic-related problems. A traffic management system can only be successful when all of its actors work and communicate in sync with another. Talking about our work, we present an Intelligent Traffic Management System that caters to all traffic related issues of a smart city. Our model suggests an optimum route which it takes into consideration parameters like, travel time, travel cost (fuel consumption) and travel distance. Our system in use of machine learning algorithms predicts levels of traffic congestion at various time intervals. It also comes up with the concept of a green corridor catering to emergency vehicles.

3.6.2 Algorithm

The working of our Intelligent Traffic Management System could be explained through the illustration of the algorithm that forms the core for it. The algorithm depicts the workflow of the system by representing the relationship between various actors and the information that they share in form of parameters among themselves.

Step 1: Start
Step 2: Traffic Management Controller Initialization Block
Step 3: Traffic Monitoring Unit
Step 4: ORS
Step 5: On Road Sensors collect information from every road and intersection
Step 6: Vehicle Nodes transmit their location information
Step 7: All information is sent to the respective Gateways. The entire city is divided into areas and each are having a gateway assigned to it.
Step 8: Gateways transmits all the information to respective TMU and TMC.
Step 9: Data is stored and processed at the Cloud end. KNN based anomaly detection algorithm is used for categorizing incidents as an accident or not. Features such as traffic density, moving traffic velocity, vehicle presence, average waiting time and levels of precipitation are taken into consideration. Levels of precipitation have been divided into three categories: 0 -10 cm; 10 - 20cm and above 20cm.
Step 10: Random Forest algorithm is used for traffic estimation and predicts traffic congestion levels across various time intervals.
Step 11: End user enters Source and Destination.

Step 12: Optimum Route is computed considering factors like, average waiting time, total travel time, travel distance, moving traffic velocity, number of intersections and intended fuel consumption. A vector space model is constructed based on all of these parameters for all routes leading to the desired destination. A route whose vector lies in the region of optimization is considered as optimum route.
Step 13: Results are communicated to the specific Vehicle Node
Step 14: End

3.6.3 Proposed Work

In this section, we discuss our proposed Intelligent Traffic Management System and all the various actors that constitute it. We present a layered architecture that depicts the functionalities of our traffic management system and showcases all the different entities which it comprises. The core of our proposed system is based upon presenting an optimum route followed by traffic estimation.

3.6.3.1 Design Objectives

In this subsection, we elucidate some of the prominent objectives which we intend to achieve through our proposed work. These objectives can also be considered as driving forces for designing our proposed intelligent traffic management system.
• **Traffic Monitoring:** It can be considered as one of the key components of a smart city. Traffic monitoring allows the local authorities to monitor the flow of traffic pertaining to a particular area, route or street. It helps in keeping track of the inflow of traffic from other neighbouring cities during specific days or a particular time of the year. Historical data of traffic monitoring can be very useful in smart city planning and city infrastructure development.
• **Pollution Avoidance:** Rising pollution levels pose a threat to the environment as along with having adverse impacts on human health and wellbeing. The extent of air and noise pollution are directly proportionally to the intensity of traffic congestion in a city. Long-standing queues of vehicles result in the exorbitant emission of pollutants resulting in an increase in temperatures, a decrease in rainfall, respiratory problems, etc.
• **Route Optimization:** In recent times, it has been observed that the shortest route doesn't seem to work well in terms of total travel time, fuel consumption and average waiting time. In such scenarios, an optimum route is the best option for travel as it considers factors such as traffic congestion, distance travelled, total travel time and fuel consumption. An optimum route comprises of a trade-off between all these parameters and sits well for a traveller in context to its time and money being spent on travel.
• **Green Corridor:** It's been a couple of years since the concept of a green corridor has seen the light of the day. It is a corridor which in reality is a route from a source to the destination comprising of various traffic signals all of which having a green signal. The green corridor is used to cater to the emergency vehicles by allowing them to reach their desired destination without any waiting time and at maximum speed.
• **Accident Detection:** The overcrowded streets of present-day roads have given rise to the number of accidents. Accident detection is a crucial part of a traffic management system as it not only informs the medical services to attend to the accident hit personnel's but also has an impact on the traffic flow and congestion levels of a particular region.
• **Jamming:** Prevention of traffic jams and reduction in average waiting time are the two most important functionalities of an efficient traffic management system.
• **Vehicle Tracking:** It helps the local administration in keeping track of vehicles in terms of the areas they are traveling, time of travel, speed, places visited and vehicle type. All of these

parameters prove to be fruitful when it comes to maintaining a state of law and order in the city.

3.6.3.2 Layered Architecture

In this subsection we would be discussing the layered architecture of our proposed intelligent traffic management system. We would also be talking about the various actors along with their functionalities that constitute the system. Following is the diagram that depicts the layered architecture for our proposed system.

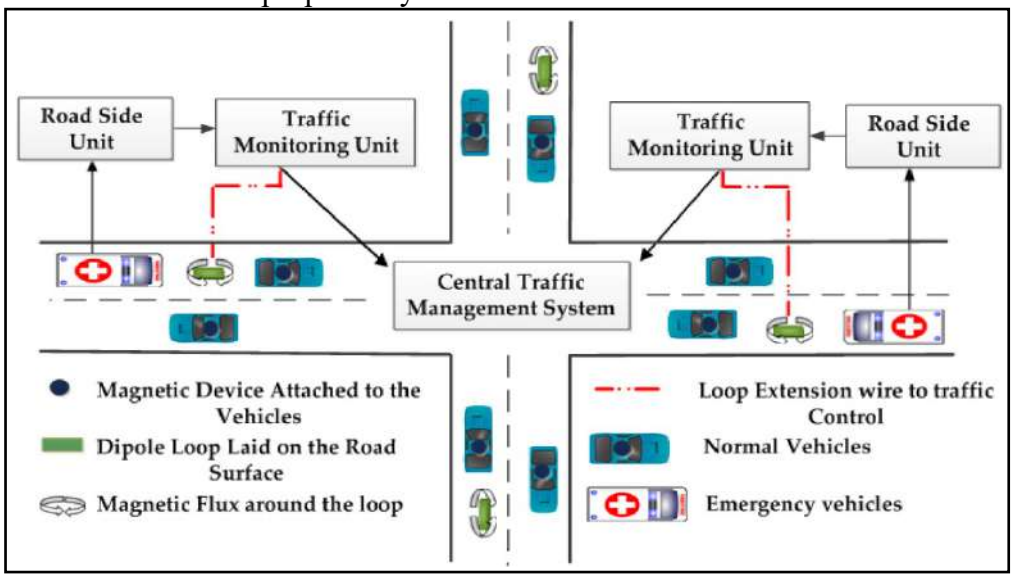

Fig No. 3.2 Intelligent Traffic Management System Architecture

•**Traffic Management Controller (TMC):** The purpose of the controller is to manage and govern the entire system. It is the controller which orchestrates the functionalities of other application modules and entities within the system. The controller resides at the Cloud end and has detailed information regarding every vehicle, traffic signal, gateway, On Road Sensors and Traffic Management Unit. All of this information is stored and processed by the controller in order to generate optimized routes between the specified source and destination. The controller establishes a one to one connection with the middleware and circulates all of its orders through it. It is the controller which generates prediction data concerning with levels of traffic congestion at varying time intervals. The TMC is the one which uses a hop counter-based flooding algorithm for broadcasting notifications regarding an accident, change of routes, road developmental activities and adverse climatic impact. The occurrence of an emergency vehicle and creating a green corridor for it is all done through the traffic management controller.

•**Gateways:** All the information that has been sensed and collected by the on-road sensors are transmitted to the gateways. Gateways act as a common point of contact wherein diverse kinds of information coming from heterogeneous types of sensors gets collected. The gateways use greedy based data collection algorithm for collecting data from various data sources. It is the gateway which is responsible for the global addressing of Vehicle Nodes (V) by making use of IPv4 addresses. Each gateway is allotted a coverage area, wherein each on-road sensor and vehicle node has been given an IP address thus facilitating efficient identification of objects within that area. Every gateway is allocated more than one area so as to enhance the granularity of vehicle identification. The gateway also keeps track of its neighbouring gateways along with the total number of vehicle nodes traveling in its area. Finally, the gateway transmits all forms of unstructured information to its subsequent traffic management controller.

• **Traffic Monitoring Unit(TMU):** It acts as an intermediary node between On Road Sensors and Gateways. The purpose of adding a TMU is to enhance the response time of the system as communicating directly with the TMC could lead to increased latency cost.TMU provides a communication link between TMC and the rest of the system and also offers local processing and storage capabilities in order to boost the efficiency of the system. Any information coming from an on-road sensor or vehicle node is addressed by the TMU which then subsequently informs the Controller and other devices on the network. All the instruction given by the Controller are communicated through the TMU to the respective vehicle nodes and local authorities. The traffic monitoring unit can also be considered as a Fog computing element as it resides at the edge of the network making its access both easy and efficient. It is the TMU which at regular intervals updates the traffic management controller about information regarding every entity involved in the system.

•**On Road Sensors(ORS):** Sensors are the eyes and ears of the system as they detect the occurrence of events, surrounding conditions and transmit the collected information. The work of the on-road sensors is to monitor and perceive events or phenomena that take place on road. Every ORS can be categorized on the basis of three parameters namely, sensor type, methodology, and sensing parameters. Sen- sor type defines which type of sensor it is i.e. whether it is a homogeneous or a heterogeneous sensor or it is a single dimensional or a multidimensional sensor. Methodology talks about the ways in which a sensor gathers information. It can be either active or passive in nature. Sensing parameters are the number of parameters which a sensor can sense. A sensor might just sense one parameter like body temperature or many parameters like in the case of an ECG. Each sensor node is provided an IP address which helps in its unique identification. Every sensor node communicates all of its sensor data to its subsequent gateway. Entities starting with the letter “S” represent the On Road Sensors in the physical topology. In case of our work, we have used inductive loop sensor technology. The following are the functionalities that an On-Road Sensor provides.

- Vehicle Count
- Vehicle Presence
- Vehicle Speed
- Vehicle Classification
- Low Bandwidth Consumption

•**Vehicle Node:** It is the vehicle for whom an entire transportation system is constructed in order to provide an effortless and convenient traveling experience. It can also be seen as a moving sensory node which continues to receive and transmit information while traveling. Each vehicle node is provided an IP address which helps in its unique identification. Every sensor node communicates all of its sensor data to its subsequent gateway. Entities starting with the letter “V” represent the Vehicle Node in the physical topology. Every transportation vehicle has an LED display installed that informs the pilot about the most optimum route and the constantly changing levels of traffic. All messages or notifications such as accident alert or prevention of entry in a particular area from the TMC can be seen on the LED display.

3.7 Cyber Security

•**Network Security:** Protect your networks against external and internal attack. Manage the network primer. Filter out unauthorized access and malicious contents. Monitor and test security control.

•**Malware Protection:** Produce relevant policy and establish anti-malware defences that are applicable and relevant to all business areas. Scan for malware across the Organ.

- **Monitoring:** Establish a monitoring strategy and produce supporting policies. Continuously monitor all ICT system and networks. Analyze logs for unusual activity that could indicate an attack.
- **Incident Management:** Establish an incident response and disaster recover capability. Produce and test incident management plans. Provide specialist training to the incident management team. Report criminal incidents to law enforcement.
- **User Education and Awareness:** Produce user policies covering acceptable and secure use of the organization's systems. Establish a staff training programmed. Maintain user awareness of the cyber risks.
- **Home and Mobile Working:** Develop a mobile working policy and train staff to adhere to it. Apply the secure baseline to all devices. Protect data both in transit and at rest.
- **Secure Configuration:** Apply security patches and ensure that the secure configuration of all ICT systems is maintained. Create a system inventory & define a base line build for all ICT devices.
- **Removable Media Controls:** Produce a policy to control all access to removable media. Limit media types and use. Scan all media for malware before imported on the corporate system.
- **Managing User Privileges:** Establish account management processes and limit the number of privileged accounts. Limit user privileges and monitor user activity. Control access to activity and audit logs.
- **Information Risk Management Regime:** Establish and effective governance structure and determine your risk appetite. Maintain boards engagement with cyber risk. Produce supporting information risk management policies.

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

3.8.1 Retrofitting

Retrofitting is one of the strategic components which when will be introduce planning in an existing built-up area, will help us to achieve several objectives for smart city like making the existing area more efficient and livable along with others. In this method, generally an area more than 500 acres will be identified by the city in consultation with citizens. After identification and observation of the current situation of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. The whole process of retrofitting must be completed in a shorter time frame, as it will lead to help and assistance in other part of city or another city of similar condition. SMART-RETROFITS are projects to mitigate major issues affecting urban resilience; are catalytic in nature, effective, requires policy initiatives & some investments for pre-take-off. Now days, one of the most commonly method used for the retrofitting for any buildings is Green retrofitting.

3.8.2 Redevelopment

Redevelopment causes the tremendous development in infrastructure by using the mixed land use patterns and also increasing the density at the same time. When the area is more than 50 acres, then for the sake of concerns of citizens redevelopment is adopted. For example, By implementing high ground coverage, mixed land use is done by preparing new layout for the area. Vacant land represents both a significant problem and an attractive opportunity for

many central cities. Vacant land and abandoned structures impose both economic and social costs on cities and the neighborhoods or districts in which they are located. On the economic side, such properties lower neighboring property values and tax revenues even as they create pressure to raise taxes to maintain service levels. Addressing the issue of vacant and abandoned land and structures, state governments play an important role as well. In many cases, the ability to overcome the problems associated with vacant properties and convert them to productive use requires legislative powers that are found only at the state level. Even when demand for new or restored land uses is sufficient for redevelopment to occur, the path to success is troubled by the displacement of previous residents and the elimination of their neighborhoods. Displacement can occur directly through property clearance and conversion to new uses, or indirectly through gentrification when land prices and rents are bid-up to a level unaffordable to the neighborhood's long-term residents. The redevelopment process can create winners and losers, with the losers too often racial and ethnic minorities and the economically disadvantaged. Physical and economic redevelopment are virtual imperatives for cities, but paths to redevelopment that minimize displacement and offset its negative consequences are unsure. Redevelopment has created new, vibrant central city areas. Historic buildings have been restored to physical and economic vitality. At the same time, affordable housing has filtered upward in price and economic class. Historic buildings have been lost. Residences and neighborhoods have been destroyed. People have been displaced. Two examples of the redevelopment model are the SaifeeBurhani Upliftment Project in Mumbai (also called the Bhendi Bazaar Project) and the redevelopment of East Kidwai Nagar in New Delhi being undertaken by the National Building Construction Corporation.

For Bhubaneswar we can recollect the redevelopment proposal as:

- Redevelopment Plans underway to promote compact, higher density, mixed-use living in the urban core of the city.
- Redevelopment of Master Canteen Chowk as Bhubaneswar ‘s new Town Centre and Multi-modal Hub.

3.8.3 Green Field Development

Greenfield development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population. from a legal perspective, the challenges in obtaining timely, effective, and affordable approvals for Greenfield residential development. In particular, we focus on the constraints on Greenfield developments (not all green fields are equal); the need to integrate land use planning with the provision of infrastructure; and the opportunities provided by the Special Housing Area legislation. Greenfield areas are seen as the low hanging fruit in terms of providing land for urban expansion, however the reality is quite different. There will be no perfect sites where the conversion of land for urban use will have no effects; all areas will be constrained, and the conversion of any area will need to occur in the context of compromises having been made. One of the most important issues with Greenfield developments is to ensure that the development area can be appropriately served with infrastructure. New areas (Greenfield) will be developed around cities in order to accommodate the expanding population in urban areas. Application of Smart Solutions will enable cities to use technology, information and data to improve infrastructure and services that includes physical as well as social infrastructure. One well known example is the GIFT City in Gujarat. For Bhubaneswar, the constituent proposal comprise of :

- Identification and Preparation of Town Planning Schemes as an urban growth strategy through effective management of land resources.

- Master planning of mixed-use integrated townships in Jagasara and Shyamapur.

Unlike retrofitting and redevelopment, Greenfield developments could be located either within the limits of the ULB or within the limits of the local Urban Development Authority (UDA). Some of the important determining factors about Greenfield development are:

- Areas of land that have never been used for construction, areas of natural, often grassed, land.
- Nothing to demolish, and no existing issues
- Cheaper to develop
- Demand for rural/suburban housing
- Easier to comply with environmental standards
- Profitable for local farmers to sell their land on, and they have a right to do so.

3.8.4 District Heating

District energy, both heating and cooling, tie together the energy generating sources in a city with buildings and facilities having a need of heating and/or cooling. Instead of each building having its own heating or cooling system, the energy is delivered to several buildings in a larger area from a central plant.

District Heating is the most widespread of the two types of district energy; heating and cooling. To transport heat efficiently, the district heating distribution infrastructure comprises a network of insulated pipes, delivering heat in the form of hot water, from the generation site to the end user.

Networks can measure from a few hundred meters to covering entire large cities. End users range from residential buildings to offices and industrial facilities.

3.9 Strategic Options for Fast Development

- **Global outlook and political will**

Smart city leaders, like their counterparts in private industry, must benchmark their cities against the very best – particularly in the application of digital technologies to city operations and urban services delivery.

- **Smart standards**

Smart cities must establish radical new standards to ensure the effective use of technology for delivering services and managing complex civic problems. For example, in physical infrastructure management, a city could set standards for all new city assets (lights, parking meters, snow plows, and buildings) that they be equipped with sensors to monitor performance and signal when maintenance is required. Similarly, a city may choose to establish open data standards for various urban departments to enable an innovation economy focused on urban service apps, ensuring that entrepreneurs have access to data on public transportation, energy use, traffic, crime, and so on, from which to create valuable data-driven apps for citizen use.

- **Smart regulations**

City authorities must also use their political will to mandate – via regulation – the use of smart technology while safeguarding citizen security and privacy. Some regulatory actions may be fairly straightforward: where the technology is available and economical, cities or states may mandate that utilities and consumers install smart meters

However, cities will also need to build a more complex regulatory framework to address complex liability, security and privacy issues. For example, when a service provider monitors a smart home using video and sensor technology, how much of that data can it sell and monetize? Cities must also examine the unexpected connections between traditional regulation and its effect on technology

- **Public private partnerships**

Cities will have to rely on public-private partnerships (PPPs) to build and operate both physical and digital infrastructure – especially given increasingly tight municipal, state, and federal budgets and huge global infrastructure requirements.models are already being leveraged to build digital infrastructure and to ensure that ubiquitous broadband and wi-fi connectivity is available across city landscapes. Effective PPPs will take advantage of the private sector's risk-taking capacity and access to funding, while ensuring that the economics of the deal still serve the public good.

- **Local innovation**

The final pillar supporting smart city success is the encouragement of a local innovation economy. In a technology-intensive future, jobs and GDP growth will be dependent on the steady incubation of new, innovative companies that scale and go global. Cities can encourage local innovation by investing in technology education, establishing start-up incubators in partnership with the private sector, and by helping startups access financing. Cities can also encourage partnerships between educational institutions and start-ups, which might entail, for instance, getting a university to provide a physical space or mentorship for a promising new firm. Cities should encourage startups that focus on solving urban challenges (traffic, crime, energy conservation) using leveraging technology – through tax incentives and other support mechanisms.

3.10 India's Urban Water and Sanitation Challenges and Role of IndigenousTechnologies

3.10.1 Urban Water challenges

Climate change is predicted to cause significant in precipitation and temperature patterns, affecting the availability of water.Population growth and urbanization are enforcing rapid changes leading to a dramatic increase in high-quality water consumption. Frequently, this demand for water cannot be satisfied by the locally available water resources, while the discharge of insufficiently treated wastewater increases costs for downstream users and has detrimental effects on the aquatic systems.

Sanitation Challenges

- More than 40% of the world's population lacks improved sanitation facilities, and India's urban sanitation coverage rate is only 50%.
- Consequences of poor sanitation are devastating on human health and the environment. Many urban areas provide access to toilets, yet often upkeep is lacking, septage is not well managed, and sewerage is discharged untreated.
- It must also ramp up the waste treatment facilities so that water bodies are not polluted by effluent discharge.
- One of the major challenges for the government is to elevate India to the international levels of urban sanitation that is found in developed counties.
- Health Risks Along the Entire Sanitation Chain.

3.10.2 Role of Indigenous Technologies

The BARC is playing a pivotal role in the development of these technologies. Some of these Technologies are as follows:

Environment friendly Plasma technologies:

Solid waste dumping sites or landfill sites need more amount of land which is not available in Urban areas. Incineration of solid waste pollutes the environment if the incinerators are not Designed or operated properly. Thermal Plasma Technology is ideally suited for waste treatment. By plasma technology Hazardous & toxic compounds are broken down to elemental constituents At high temperatures; Inorganic materials are converted to Vitrified Mass; and Organic materials Are Pyrolysis or Gasified, converted to flue gases (H2 & CO)& Lower hydrocarbon gases when Operated at low temperature (500 – 600OC). Disposal of carcass is also being thought of using Plasma pyrolysis.

Unique Multi Stage Biological Treatment Solution:

Multi Stage Biological Treatment Solution (MSBT) can be implemented on existing STP which Are not able to process Sewage to optimum efficiency. MSBT can be implemented as a modular or container on the banks of rivers on Drains/Nalas which discharge waste water to the river. It can also be implanted in small urban societies and housing complex for better water Management. Benefits of MSBT are: No Surplus of Organic Sludge, No Odour problem, drastic Reduction of Electrical Power usage which minimizes operating costs, no need for return sludge Pumping (minimizing electromechanical component which ultimately reduces operating cost).

3.11 Initiatives in village development by local self-government

- Local self-government in India refers to governmental jurisdictions below the level of the state.
- India is a federal republic with three spheres of government: central (union), state and local. The 73rd and 74th constitutional amendments give recognition and protection to local governments and in addition each state has its own local government legislation.
- The modern system is based imparts on traditional Panchayat governance, in part on the vision of mahatma Gandhi and in part by the work of various committees to harmonize the highly centralized in Indian governmental administration with a degree of local autonomy. The result was intended to create greater participation in local government by people and more effective implementation of rural development programs.
- Although, as of 2015, implementation in all of India is not complete the intension is for there to be a gram Panchayat for each village or group of villages, Taluka level and district Panchayat at the district level.

3.12 Smart Initiatives by District Municipal Corporation

- Stabilization pond system for waste water treatment
- Duckweed based waste water treatment with pisciculture
- Root zone treatment system
- Anaerobic Decentralized Waste Water Treatment System
- Aerobic DEWATS
- Study Technological Options at Household Level Management like

- Kitchen Garden with Piped Root Zone System, Kitchen Garden without Piped Root
- Zone System and Leach Pit
- Pile Method, NADEP Method, Bangalore Method, Indor Method and Coimbatore Method
- Vermi composting
- Windrow Composting
- Thermophilic Composting
- MARC Method
- Biogas Technology
- Toilet Linked Biogas Plant

3.13 Any Projects contributed working by Government / NGO / Other Digital Country concept

M-Office BMC (Bhubaneswar Municipal Corporation)

This application is only for the BMC authorities to resolve citizen issues. Corporation officials will be intimated about the complaints registered through MCMP application via another application called BMC M-Office. Once a citizen registers a complaint, the officials get intimated through Office in real time. This will help the Action taking authority (ATA) of Bhubaneswar Municipal Corporation to take action on the registered complaint by the citizen. The BMC Officials can also view the status of any pending complaint.

3.14 How to implement other Countries smart villages projects inIndian village context (Regarding Environment, Employment)

3.14.1 Case study discussions on BARC indigenous water technologies already being used and dissemination of the technologies in Indian market:

- Bhabha Atomic Research Centre (BARC) has developed several water purification devices and desalination techniques, as a part of its research and development efforts towards the betterment of society.
- These technologies or products are backed by robust design concepts and pilot plant studies, which can cover the needs of households, communities, industries and metropolis.
- A novel idea of coating polysulfide on a porous candle resulted in the development of a "Point of Use" water purifier.
- Unlike other devices available in the market which only deactivates the microorganisms, this device physically eliminates them. This device does not require any electricity or any addition of chemicals.
- Removal of suspended particulates, colour and door are additional benefits available in these units. A typical unit provides nearly sufficient water per day at 3 meters pressure head and can withstand up to 40 psig pressure (2.76 bar). These water purifiers of low capacity and zero operating cost are meant to satisfy the domestic need for safe water.

Devices based on ultra-filtration membrane can physically remove bacteria, suspended solids and high molecular weight organics without the use of electricity, at tap water pressure,

mainly by sieving (size-exclusion) mechanism. The useful life of this membrane device depends on configuration of the membrane. Some of the salient features are:

- Very effective as it removes bacteria to the extent of > 99.99% (4 log scale).
- Removes complete turbidity and produces crystal clear water.
- Works in a dead end device so not a single drop of water is wasted.
- Does not need electricity or addition of any chemical.
- Provision to remove organic or collaring material if they are present in feed.
- Highly strong (both chemically and mechanically) membranes giving high life(3-5 years).
- Almost maintenance free except occasional cleaning of suspended solids which deposits on membrane surface and this does not take more than 3-4 minutes time.

3.14.2 Logical framework and linkage of Smart City Development Vision-Goals-Activities:

The goals constitute the long-term vision for the project. State the long-term social and/or economic (impact) benefits to which the project will contribute, and describe why the project is important for the beneficiaries and for the society. A management / systematic tool for designing, planning, implementing and monitoring and evaluating a project (or programme).

- A tool for systematic thinking for relating inputs to the implementation of activities, activities to the production of outputs, outputs to the achievement of a defined purpose, and purpose to a high-level goal or impact.
- A tool for identifying and assessing risks by listing critical assumptions inherent in project design and implementation.

3.14.3 Lake Redevelopment Projects:

Introduction:

Lake is a very general term used for any standing water, generally large enough in area and depth, but irrespective of its hydrology, ecology and other characteristics.
These water bodies are used primarily for drinking water supplies, irrigation and recreation. Marginal aquatic vegetation is to be promoted because it checks erosion and helps improve water quality.

Function of lake:

- Power generation is generally a collateral use.
- Ground water recharge.
- Storage of water.
- Most riverine lakes play a very important role in flood mitigation and ground water recharge.

Lake restoration method:

- Restoration of lake for improvement in water quality requires therefore interventions that address both the factors responsible for an increase in nutrient load and the accumulated nutrients.
- The various lake restoration method can be considered under two broad categories: 1. Preventive or indirect methods & 2. Ameliorative or Direct methods.

3.15 Electrical concept (Design Ideal and Prototype model)

Renewable energy Options through solar rooftop PV and solar Micro-grid

The village receives abundant solar energy throughout the year which ranges from 4.4 to 6.5 kWh/m2/day. Figure shows the solar energy and wind speed variation across the months. The region experience lower wind speed throughout the year which may support low speed turbines for mechanical and electrical energy generation. However, decentralized solar PV and solar water heaters can be installed in barren areas or rooftop.

Solar water heater is a viable option in the village since many households are dependent on traditional cook stove for water heating and fuel wood availability is a limiting factor.

	Specifications	Weight
Collector area	2 m^2 (2 kW)	50 kg
Storage Tank	100 lt./day	120-140 kg
Installation area	4.5 – 5 m^2	
Total cost (INR)	18,000 – 25,000	

Fig. No. 3.3: Techno-economic details of the rooftop solar water heater

Multi Stage Biological Treatment Solution (MSBT) can be implemented on existing STP which Are not able to process Sewage to optimum efficiency. MSBT can be implemented as a modular or container on the banks of rivers on Drains/Nalas which discharge waste water to the river. It can also be implanted in small urban societies and housing complex for better water Management. Benefits of MSBT are: No Surplus of Organic Sludge, No Odour problem, drastic Reduction of Electrical Power usage which minimizes operating costs, no need for return sludge Pumping (minimizing electromechanical component which ultimately reduces operating cost).

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Chapter4. About Nagar Pipaliya Village

4.1 Introduction

4.1.1 Introduction About Nagar Pipaliya Village details

Nagar Pipaliya is a Village in Lodhika Taluka in Rajkot District of Gujarat State, India. It is located 28 KM towards west from District headquarter Rajkot. 14 KM from Lodhika. 281 KM from State capital Gandhinagar.Nagar Pipaliya Pin code is 360021 and postal head office is Rajkot MetodaGidc.Sagaliya Nana (3 KM), Nanavada (3 KM), DomdaBhayuna (4 KM), Intala Nana (4 KM), Hidad (5 KM) are the nearby Villages to Nagar Pipaliya. Nagar Pipaliya is surrounded by Paddhari Taluka towards North, Kalavad Taluka towards west, Rajkot Taluka towards East, Dhrol Taluka towards North.Kalavad, Rajkot, Jamnagar, Wankaner are the nearby Cities to Nagar Pipaliya.The Nagar Pipaliya village has population of 2721 of which 1362 are males while 1359 are females as per Population Census 2011.Nagar Pipaliya Local Language is Gujarati.

In Nagar Pipaliya village population of children with age 0-6 is 283 which makes up 10.40 % of total population of village. Average Sex Ratio of Nagar Pipaliya village is 998 which is higher than Gujarat state average of 919. Child Sex Ratio for the Nagar Pipaliya as per census is 791, lower than Gujarat average of 890.

Nagar Pipaliya village has lower literacy rate compared to Gujarat. In 2011, literacy rate of Nagar Pipaliya village was 73.83 % compared to 78.03 % of Gujarat. In Nagar Pipaliya Male literacy stands at 84.05 % while female literacy rate was 63.86 %.

As per constitution of India and PanchyatiRaaj Act, Nagar Pipaliya village is administrated by Sarpanch (Head of Village) who is elected representative of village.KamleshbhaiSakariya is current Sarpanch of the village Nagar Pipaliya.

4.1.2 Justification/ need of the study

- In present India, population is growing very fast so need of development like education facilities, employments, increasing living standards are providing only in cities or in urban area. Hence, people of village must have to migrate to the cities due to lack of all amenities. This cause population density in cities are increase, so we have to think about to provide the all-infrastructural facilities required in Rural area.
- In current scenario, the ratio of migration in rural area to urban area is increase and it is necessary to provide all primary requirements to rural area so they have benefits/satisfy of all needs because more than 70% of population in India is lives in villages.
- Hence need of village development is necessary to do stop migration and give better life in villages it is the main aim of VY project.
- Therefore, the main thing is to study primary and secondary survey, determine gap analysis of village, and then go to detail survey report on it.

4.1.3 Study Area

Study area includes Gujarat and its districts. We have taken study of Rajkot district and in that Nagar Pipaliya village. The Vishwakarma Yojana is aimed to Rurban development of the village. For that purpose, study area is decided for taking detail information of the village.

The study area includes education, social life, basic needs of the person, economic growth of village, transport facilities etc. explained below;

- **Education:**
  - Aanganwadi
  - Primary School
  - Secondary School
  - Higher Secondary School
  - College
- **Medical Facility:**
  - Govt./Panchayat Dispensary or Sub PHC or Health Centre
  - PHG & CHC
  - Child Welfare and Maternity
  - Hospital
- **Transportation:**
  - Pucca Village Approach Road
  - Bus/Auto Stand Provision
- **Drinking Water:**
  - Water Facilities
  - Overhead Tank
- **Public Latrines**
- **Cremation Ground**
- **APMC (Agricultural Produce Market Committee)**

4.1.4 Objectives of the study

The main objective of the study undertaken is to utilize the results to provide true feedback of the present state of implementation of all development schemes in the rural areas. The observation made during the study are to inputs to help in bringing about changes in the formulation or reformulation.

- To assess problems, constrains in the effective implementation.
- To know the basic requirement of village.
- To provide the basic facilities in rural areas like Education, Health, irrigation, electric power etc.
- To suggest strategies and policies that would enable Government of India to increase the pace of rural development.
- To assess the adequacy of these schemes in solving and providing solution to problems of rural development.
- To provide the impact of these various Programmes.
- To gauge the general opinion of the people towards these schemes and programs of the government.

4.1.5 Scope of the Study

In Nagar Pipaliya by taking detail of village scope of study In VY project, the mains cope is in two fields are as under.

4.1.5.1 Scope for Civil engineering:

- Planning and Designing.
- Techno-Economic Survey.
- Preparation of map for Village.

- Redesigning and Reimagination.
- Repair and maintenance of structure.
- Infrastructure planning & development.
- Quantity, estimation and surveying, Rurbanization.

4.1.5.2 Scope of Electrical Engineering:

- Design, develop and provide more efficient and sustainable electricity in rural area.
- Providing better connection of electricity in rural areas Telecommunication.

4.1.5.3 Scope for Villagers by VY Project:

- Utilizing each resources maximum.
- Developing and Using Sustainable and Economical Planning and Designing.
- Earn money for villagers by receiving Tax and giving facilities.

4.1.6 Methodology Frame Work for development of our village

- Ideal village survey at Pardi village nearRajkot.
- Datacollection.
- Gap analysis for facilities available as per ideal village norms&requirement.
- Techno-economic survey of Pardi village nearAnand.
- SWOT analysis of Pardi village nearAnand.
- Techno-economic survey of allotted village Nagar nearPipaliya.
- Meeting with Villagers, Sarpanch, Talati, TDO & DDO.
- Consulting with all related to village and analyse problem faced by Nagar Pipaliyavillage
- Gap analysis of Nagar Pipaliyavillage.
- SWOT analysis of Nagar Pipaliyavillage.
- Finding best, economical & sustainable solution for problems as per UDPFIGuidelines.
- Best Proposal and Design for solvingproblem.
- Detail progress report and detail design done in final project
-

4.1.7 Available Methodology for development of related to Civil/Electrical

- Make special efforts to increase production of pulses and vegetable oil seeds.
- Implement agricultural land ceiling, distribute surplus land and complete compilation of land records by removing all administrative and legal obstacles.
- Increase irrigation potential, develop and disseminate technologies and inputs for dry land agriculture.
- Supply drinking water to all problem villages.
- Strengthen and expand coverage of integrated rural development and national rural employment programmes.
- Allot house sites to rural families who are without them and expand programmes for construction assistance to them.
- Rehabilitate Bonded labor.

- Pursue vigorously programmes of afforestation, social, farm forestry, the development of bio-gas, and other alternative energy sources.

4.2 Nagar Pipaliya Study Area Profile

4.2.1 Study Area Location with brief History land use details

Nagar Pipaliya Village, with population of 2721 is Lodhika sub district's the 5th most populous village, located in Lodhika sub district of Rajkot district in thestate Gujarat in India. Total geographical area of Nagar Pipaliya village is 23 km2 and it is the 4th biggest village by area in the sub district. Population density of the village is 117 persons per km2. Nearest town of the village is Kalavad and distance from Nagar Pipaliya village to Kalavad is 29 km. The village has its own post office and the pin code of Nagar Pipaliya village is 360021. The village comes under Nagar Pipaliya panchayat. Lodhika is the sub district head quarter and the distance from the village is 22 km. District head quarter of the village is Rajkot which is 32 km away.

1. Country	2. India
State	Gujarat
District	Rajkot
Sub District	Lodhika
Area	23.22 km^2
Panchayat	Nagar Pipaliya
Sub District HQ	Lodhika (22
District HQ	Rajkot (32 km)
Nearest town	Kalavad (29
Pincode	360021
Latitude	22.2655202
Longitude	70.5547536
Language	Gujarati

Table No. 4.1: Study area location of Nagar Pipaliya

1. Area of Village (Approx.) (In Hector)	2321.38 Hector
2. Forest Area (In hect.)	0.39 Hector
3. Agricultural Land Area (In hect.)	1780 Hector
4. Residential Area (In hect.)	75 Hector
5. Other Area (In hect.)	60 Hector

Table No. 4.2: Land use details of Nagar Pipaliya

4.2.2 Base Location map, Land Map, Gram Tal Map

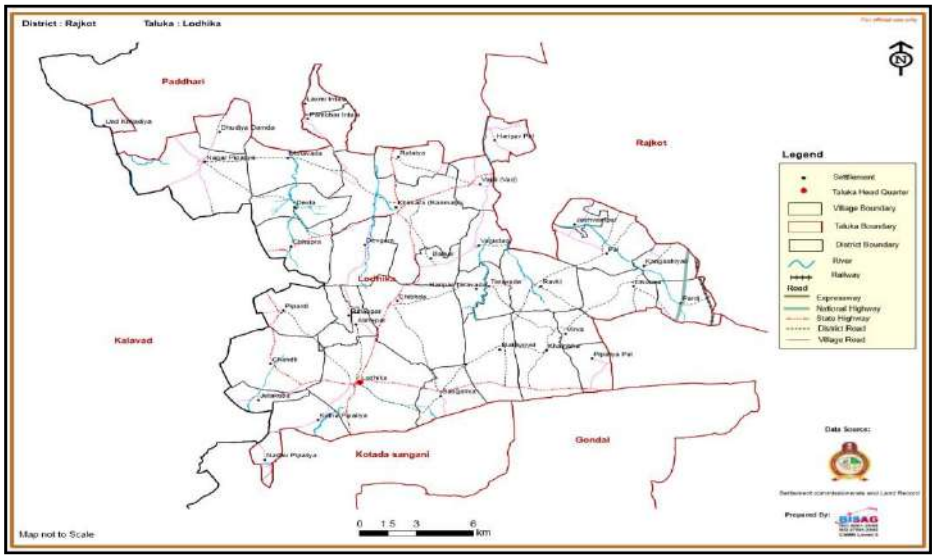


Fig. No. 4.3: Location Map of Nagar Pipaliya Village in Lodhika taluka

4.2.3 Physical & Demographical Growth

Sr. No.	Census	Population	Male	Female	Total house holds
i.	2001	2280	1160	1120	556
ii.	2011	2721	1362	1356	571

Table No. 4.3: Detail Population of Nagar Pipaliya are listed above As per Census 2001 & 2011

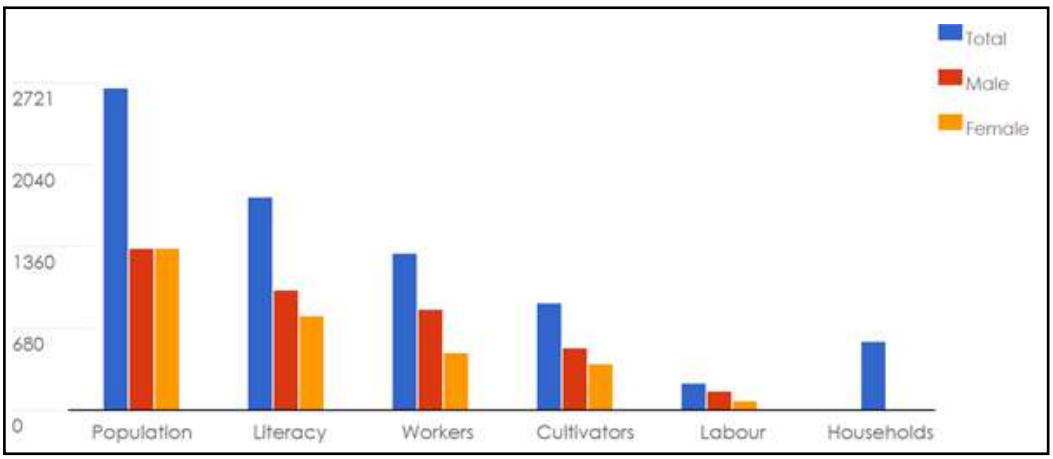


Fig. No. 4.5: Population Chart of Nagar Pipaliya Village

4.2.4 Economic generation profile / Banks

People living in Nagar Pipaliya depend on multiple skills, total workers are 1323 out of which men are 843 and women are 480. Total 892 Cultivators are depended on agriculture farming out of 517 are cultivated by men and 375 are women. 217 people works in agricultural land as a labour in Nagar Pipaliya, men are 148 and 69 are women.

- **Name of three Major Occupation Groups in Village**

- Agriculture
- Labour Work in Metoda Industries
- Dairy

➢ **Major Crops Grown in The Village**

- Cottan
- Magfali
- Chana

4.2.5 Actual Problem faced by Villagers and smart solution

Problems:

- Roads are not properly designed and surfaced.
- Public toilet block requires.
- Problems of solid waste management and collection of solid waste system.
- New panchayat building requires.
- Post office building require.
- Village has no CCTV system and it shouldn't have renewable energy.
- Problems of basic facility like public garden, public library, community hall etc.
- Bus stand in close condition and less facilities in public transportion.
- School building needs maintence.
- Awareness about covid 19.

Solution:

- Proper economic and efficient design of roads.
- We are given the smart solution and design of public toilet, solid waste management etc.
- Solid waste management is done by door to door collection dustbin at some specific interval.
- Design of smart gram panchayat.
- Design of post office building.
- Electrical point of view we will give design of Solar Renewable Energy device and CCTV system etc.
- We will design Eco public buildings and parks.
- Design of new smart bus stand.

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

Particulars	Total	Male	Female
Total No. of Houses	571	-	-
Population	2,721	1,362	1,359
Child (0-6)	283	158	125
Schedule Caste	159	76	83
Schedule Tribe	100	55	45
Literacy	73.83 %	84.05 %	63.86 %

Particulars	Total	Male	Female
Total Workers	1,323	843	480
Main Worker	1,275	-	-
Marginal Worker	48	32	16

Table No. 4.4: Social Scenario of Nagar Pipaliya Village

The intangible heritage that the tribal population possesses including the traditional knowledge system contains many positive and productive elements that are really invaluable for the entire humanity.

Despite its significant role to integrate the society and enhance the sense of ownership to the concerned people and culture, intangible heritage faces serious threats for its existence.
In many parts of India fast pace of modernization has been taking toll on it.
The danger also comes from the rapid process of globalization, homogenization, and pervading influence of western culture.

Festival:

Navratri, Uttarayan, Rathyatra, Ganpati Mohotsav, Diwali etc.

Cuisine:

The Gujarati thali has garnered much fame not only outside the Gujarati diaspora but also beyond the national boundary. The platter usually consists of rotli or chapatti that is homemade bread; rice; a shaak/sabzi, that is a sweet or spicy dish prepared out of varied combinations of vegetables and spices; and either dal (lentils) or kadhi, a thick gravy made of chickpea flour, yogurt and vegetable fritters known as pakoras. A farsaan (snacks item) such as pathra, dhokla and samosa among others; a dish made of whole beans or pulses; a sweet dish or mishthaan such as jalebi and mohanthal also find place in the platter.

4.2.7 Migration Reasons / Trends

Various factors are responsible for the rural-urban migration in India

- Poor returns from the subsistence agriculture and agricultural distress owing to monsoon failure, untimely rains, flash floods etc. make lose the trust of farmer in farming and force him to migrate to cities for better employment.
- The construction, manufacturing and other urban services boom especially since the globalization looks better for him compared to the low rural wages and returns. The penetration of education in villages turns the educated youth to look for better life avenues in urban areas and metros.
- Lack of growth in non-farming employment opportunities in rural areas due to low purchasing power there and the absence of such a consumption culture like in cities both urges people to move to cities for starting new businesses.
- The social restrictions in employment like the caste system also make people resort to migrate to cities where they can work freely under the urban anonymity.
- The depletion of hitherto village common properties like ponds, forests, grazing lands etc for which the marginalized communities and the tribal's depended for their livelihood, made them to look into cities for their survival.

4.3. Data Collection Nagar Pipaliya Village

4.3.1 Describe Methods for data collection

We are collecting data of firstly in ideal village survey at Pardi near Rajkot and then allotted Nagar Pipaliya village near Lodhika, dist. Rajkot we also survey at smart village Khokhdadad near Rajkot by following methods…

- Door-to-Door information collected from villagers of Pardi, Khokhdadad and Nagar Pipaliya.
- Collection of Information from Talati Mantri, Sarpanch, Gram Sevak and School Principal.
- Techno-economic survey of ideal village Pardi and reference it done.
- Techno-economic survey of smart village Khokhdadad and reference it done.
- Techno- Economic survey of allotted village Nagar Pipaliya.
- Gap analysis and SWOT analysis as per collected data of all villages.
- From internet and Census 2001 & 2011 records.
- From self-exploration of village by doing survey.

4.3.2 Primary details of survey details

Nagar Pipaliya is a village located in Lodhika Taluka of Rajkot district. Village is located 32 Km away from Rajkot. Total area of village is 2321.8 hectares. Total population of village is 2721 among them 1362 are male and 1356 are female as per census 2011. Total households in Nagar Pipaliya village are 571 as per census. Main occupation of the Nagar Pipaliya village peoples is Farming.Population density of the village is 117 persons per km2.

4.3.3 Average size of the House - Geo-Tagging of House

Nagar Pipaliya is a large village located in Lodhika Taluka of Rajkot district, Gujarat with total 571 families residing. The Nagar Pipaliya village has population of 2721 of which 1362 are males while 1356 are females as per Population Census 2011.

There are about 571 houses.Most of the houses in the Nagar Pipaliya village is residential house and some of the are Puchha house 90% pucca &10% Kutchha house.

4.3.4 No of Human being in One House

In village generally each family consist average 4 to 5 member. There are about 283 children in village.

4.3.5 Material available locally in the village and MaterialOut Sourced by the villagers

The village has no specific material. All the martial which is required which has been Transported to village from the nearest town like Rajkot. For the house, they used mainly bricks, sands and wood. As brick manufacturing is available in village bricks are economical for them.

There is no milk chilling centre and milk production association, which is not in working. All other commodities needed for villagers are imported from nearby cities Rajkot.

4.3.6 Geographical Detail

Sr. No.	Description	Information/Detail

1	Area of Village (Approx.) (In Hector) Coordinates for Location:	2321.38 Hector
2	Forest Area (In Hect.)	0.39 Hector
3	Agricultural Land Area (In hect.)	1780 Hector
4	Residential Area (In hect.)	75 Hector
5	Other Area (In hect.)	60 Hector
6	Distance to the nearest railway station with distance	28 kms in Rajkot Bhaktinagar Junction.
7	Nearest Town with Distance:	Rajkot – 32 kms
6	Distance to the nearest bus station	Gardi Bus stop 8.6 Km
7	Whether village is connected to all roads for the any facility or town or village?	Kalawad Main Road. Devala Sub Road.

Table No. 4.5: Geographical Detail

4.3.7 Demographical Detail - Cast Wise Population Details / Which ID proof using by villagers

Particulars	Total	Male	Female
Total No. of Houses	571	-	-
Population	2,721	1,362	1,359
Child (0-6)	283	158	125
Schedule Caste	159	76	83
Schedule Tribe	100	55	45
Literacy	73.83 %	84.05 %	63.86 %

Table No. 4.6:Demographical Detail – Cast Wise Population Detail

Normally all villagers are using Aadhar Card issued by Government of India and also use Election commission ID card and Ration Card.

4.3.8 Occupational Detail - Occupation wise Details / Majority business

People living in Nagar Pipaliya depend on multiple skills, total workers are 1323 out of which men are 843 and women are 480. Total 892 Cultivators are depended on agriculture farming out of 517 are cultivated by men and 375 are women. 217 people works in agricultural land as a labour in Nagar Pipaliya, men are 148 and 69 are women.

- **Name of three Major Occupation Groups in Village**
  - Agriculture 60 %
  - Labor Work in Metoda Industries and Agricultural labour35 %
  - Dairy 5 %

4.3.9 Agricultural Details / Organic Farming / Fishery

Agricultural area of Nagar Pipaliya village is 1780 Hector. 60 % workers of village are

attached with agricultural activities. In recent time farmers of village are getting vision on organic farming and its techniques.

- **Major Crops Grown in The Village**
  - Cottan
  - Magfali
  - Chana

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

Nagar Pipaliya village does not have any big Manufacturing Hub but some small-scale industries like manufacturing of tools used in agriculture are produced in welding shops of village.

4.3.11 Tourism development available in the village for attracting the tourist

- In Nagar Piplaiya village there are some religion places.
- One temple is famous in village, it is Ramapir temple.

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking Water / Water Management Facilities

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
•	**Main Source of Drinking water**			
1	**PIPED WATER** Piped into Dwelling Piped To Yard/Plot Public Tap/Stand pipe Tube Well Or Bore Well	Piped into Dwelling Piped To Yard/Plot Tube Well or Bore Well	Yes	-
2	**DUG WELL** Protected Well UnProtected Well	Protected Well	Yes	-
3	**WATER FROM SPRING** Protected Spring Unprotected Spring Rainwater Tanker Truck	Rainwater Tanker Truck	Yes	-
4	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/ CANAL)** Irrigation Channel Bottled Water Hand Pump	Irrigation channel Hand pump	-	Irrigation channel and Hand pump not working
5	Other(Specify) **Lake/ Pond**	Pond/ lake	-	Yes
•	**Water tank Facility**			

	Overhead Tank	1 Nos – 100,000 lit	Yes	–
	Underground Tank	2 Nos – 50,000 lit	Yes	–

Table No. 4.7: Details Main sources of water in Nagar Pipaliya Village





Fig. No. 4.6: Main sources of water in Nagar Pipaliya Village

4.4.2 Drainage Network / Sanitation Facilities

4.4.2.1 Drainage Network:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Drainage Facility**			
	Available (Yes/ No)	Yes	Yes	-
2	**Type of Drainage**			
	Closed/Open	Closed	Yes	-
	If open than Pucca / Kutchha			-
	Whether drain water is discharged directly into	Road	-	Yes

Table No. 4.8: Details Drainage Facility in Nagar Pipaliya Village

4.4.2.2 Sanitation Facilities & Waste Management Facilities:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Sanitation Facility**			
	Public Latrine Blocks (Y/N)	No	-	-
	Community Toilet (with bath/without bath) facility	No	-	-

	Solid and Liquid Waste disposal system Available	Yes	-	Yes
	Any facility for waste collection from Road	No	-	-

Table No. 4.9: Details Sanitation Facilities in Nagar Pipaliya Village

4.4.3 Transportation & Road Network

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Road Network (All weather road/ Kutchha(Gravel)/Black Topped Pucca/WBM**			
	Village approach road	Bitumen	-	Yes
	Main road	RCC/Bitumen	-	Yes
	Internal streets	RCC/WBM	-	Yes
	(NH/SH/MDR/ODR) Distance in kms: 8.3 kms	Rajkot-Kalawad Road	Yes	-
2	**Transport Facility**			
	Railway Station (Y/N) (If No than Nearest Railway Station: Bhaktinagar–28 Kms)	No	-	Yes
	Bus station (If No than Nearest Bus Station Kms)	Yes Close condition	-	Yes
	Local Transportation	Auto, Chhakda, Privet Vehicle & Jeeps	-	Yes

Table No. 4.10: Details Road Network and Transportation facility in Nagar Pipaliya Village

Fig. No. 4.9: Road Network, Bus Station and Public Transportation Stand in Nagar Pipaliya Village

4.4.4 Housing condition

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Housing condition**			
	Kutchha/Pucca	90 % Kutchha 10 % Pucca	Yes	-

Table No. 4.11: Details Housing Condition in Nagar Pipaliya Village

4.4.5 Social Infrastructure Facilities, Health, Education, Community Hall, Library

4.4.5.1 HealthFacilities:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Health Facilities**			
	ICDS (Aanganwadi) Sub-Centre PHC BLOCKPHC CHC/RH District/ Govt. Hospital Govt. Dispensary Private Clinic Private Hospital/ Nursing Home AYUSH Health Facility sonography /ultrasound facility	3 No. ICDS (Aanganwadi) PHC PrivateClinic	Yes (50%-50%)	-
• If any of the above Facility is not available in village than approx. distance from Village: • Other facility Rajkot-32 kms and Lodhika - 22 kms.				

Table No. 4.12: Details Health facilities in Nagar Pipaliya Village

4.4.5.2 Education Facilities:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Education Facilities**			
	Aanganwadi/ Play group	3	Yes	2 closed
	Primary School	2	Yes	-
	Secondary school	1	Yes	-
	Higher sec. School	-	Yes	-
	ITI college/vocational training centre	No	-	-
	Art, Commerce& Science /Polytechnic/	No	-	-
• If any of the above facilities is not available in the village than approx. distance from village: B. H. GardiVidhyapith 4 kms.				

Table No. 4.13: Details Education facilities in Nagar Pipaliya Village

4.4.5.3 Community Hall:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Community Hall	Gram samajvadi	-	Yes
• Require to Community Hall invillage.				
• Generally use Patel Samaj for functions.				

Table No. 4.14: Details Community Hall in Nagar Pipaliya Village

4.4.5.4 Public Library:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Public Library	Yes	Yes	-

Table No. 4.15: Details Public Library in Nagar Pipaliya Village

4.4.6 Existing Condition of Public Buildings & Maintenance of existing Public Infrastructures

Sr. No.	Descriptions	Information/ Detail	Remarks
1	Panchayat Building	Very bad condition	Demolition required
2	Primary School building	Need maintenance	Cleaning
3	Secondary school building	Development of play ground	Cleaning
4	PHC	Newly constructed	-
5	Agriculture Co-operative Soc.	Good condition	-
6	Milk Co-operative Soc.	Good condition	-
7	Post Office	New building required	Currently on rent
8	Village Pond	Development required	Cleaning

Table No. 4. 16 Existing Condition of Public Buildings & Maintenance of existing Public Infrastructures

Fig No. 4.13: Existing Condition of Panchayat Building

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Technology Mobile/ WIFI / Internet Usage Details. In %	Yes	Yes	Only Used Mobile 60 % - used

Table No. 4.17: Details Technology Mobile/ WIFI / Internet Usage Details in Nagar Pipaliya Village

4.4.8 Sports Activity as Gram Panchayat

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Sports Activity as Gram Panchayat	Yes	-	Yes
• Require to Sport ground inschool.				

Table No. 4.18: Details Sports Activity as Gram Panchayat in Nagar Pipaliya Village

4.4.9 Socio-Cultural Facilities, Public Garden /Park/Playground /Pond/ Other Recreation Facilities

4.4.9.1 public garden/ park/ playground

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Public Garden	No	-	-
• Temples of village are used for social gathering and quality time spent.				

Table No. 4.19: Details Public Garden in Nagar Pipaliya Village

4.4.9.2 village pond/ lake

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Village Pond Location: End of village Condition: Not good	Yes	Yes	-
• Villagepondisoutsideofthevillagebutneedtobepropersoundingareacover&cleaned properly.				

Table No. 4.20: Details Village Pond in Nagar Pipaliya Village

4.4.9.3 Other Recreation Facilities:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Recreation Center	No	-	-
2	Cinema/ Video Hall	No	-	-
3	Assembly Polling Station	Yes	Yes	-
4	Birth & Death Registration Office	Yes	Yes	-
• Assembly Polling station available in government school & aanganwadi. • Birth & death registration office available in panchayat building.				

Table No. 4.21: Details other recreation facilities in Nagar Pipaliya Village

4.4.10 Other Facilities(e.g like foot path development-Smart toilets-Coin operated entry, self-cleansing, waterless, public building)

4.4.11 Any other details

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Post-office	Yes	-	Yes
2	Telecommunication Network/ STD booth	Yes	-	-
3	General Market	Yes	Yes	-
4	Shops (Public Distribution System)	Yes	Yes	-
5	Panchayat Building	Yes	-	Yes
6	Pharmacy/Medical Shop	No	-	-
7	Bank & ATM Facility	Yes	Yes	-
8	Agriculture Co-operative Society	Yes	Yes	-
9	Milk Co-operative Soc.	Yes	Yes	-
10	Small Scale Industries	Yes	Yes	-

11	Internet Cafes/ Common Service Center/Wi Fi	No	-	-
12	Youth Club	Yes	-	-
13	Mahila Mandal	Yes	-	-
15	Other Facility	Yes	-	-

Table No. 4.22: Other Details

4.5 Electrical Concept

4.5.1 Renewable energy source planning particularly for villages

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Adoption of Non-Conventional Energy Sources/Renewable Energy Sources	No	-	-

Table No. 4.23: Details of Renewable energy source in Nagar Pipaliya Village

4.5.2 Irrigation Facilities

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Irrigation Facility**			
	Main Source of Irrigation (Tank/Pond/Stream/River/ Canal/ Well/ Tube well/ Other)	Tank, Pond, Well, Tube well	Yes	-

Table No. 4.24: Details Irrigation Facilities in Nagar Pipaliya Village

4.5.3 Electricity Facilities with Area

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	**Electricity Distribution**			
	Govt./ Private (Y/N)	Govt.	-	Yes
	Power supply for domestic use	24 Hrs.	-	Yes
	Power supply for agricultural use	8 Hrs.	-	Yes
	Power supply for commercial use	24 Hrs.	-	Yes
	Road/street lights	No	-	-
	Electrification inGovernment Buildings/ Schools/Hospitals	24 Hrs.	-	-
	Renewable energy source (Y/N)	No	-	-
	LED Facilities	No	-	-

Table No. 4.25: Details Electricity Distribution in Nagar Pipaliya Village

Fig. No. 4.16: Electricity in Nagar Pipaliya Village

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 BachatMandali

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	BachatMandali	No	-	-

Table No. 4.26: Details of BachatMandali in Nagar Pipaliya Village

4.6.2 DudhMandali

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	DudhMandali	Yes	Yes	-

Table No. 4.27: Details of DudhMandali in Nagar Pipaliya Village

4.6.3 Mahila forum

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Mahila forum	No	-	-

Table No. 4.28: Details of Mahila forum in Nagar Pipaliya Village

4.6.4 Plantation for the Air Pollution

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Plantation for the Air Pollution	Yes	-	Yes

Table No. 4.29: Details of Plantation for the Air Pollution in Nagar Pipaliya Village

4.6.5 Rain Water Harvesting - Waste Water Recycling

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Rain Water Harvesting	Yes	-	80% houses of the village

Table No. 4.30: Details of Rain Water Harvesting in Nagar Pipaliya Village

Fig. No. 4.18: Rain Water Harvesting in Nagar Pipaliya Village

4.6.6 Agricultural Development

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Agricultural Development	Yes	-	Yes

Table No. 4.31: Details of Agricultural Development in Nagar Pipaliya Village

4.6.7 Any Other

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate
1	Adoption of Non-Conventional Energy Sources/Renewable Energy Sources	No	-	-

Table No. 4.32: Details of Renewable energy source in Nagar Pipaliya Village

Chapter 5. Technical Options with Case Studies

5.1 Sustainable Sanitation

5.1.1 Introduction

A Guide to Selecting a Sustainable Water, Sanitation, Health & Hygiene Project Systems

A safe and reliable drinking water and access to adequate sanitation is not available to nearly one billion people. Bringing safe and reliable drinking water to the developing world has been a challenge to Governmental Organizations, with the result that an estimated fifty percent of all water projects built by these organizations have failed within five years of being built.

This high level of failures can be attributed to many factors, including:

- Selection of inappropriate technologies
- The Myth: "Just built it and it will work forever."
- Poor water point siting
- Lack of on-going operations and maintenance training
- Lack of spare parts
- Poor or changing water quality
- Vandalism, theft, or conflict
- Lack of finance for operations and maintenance
- Ineffective community water committees
- Weak follow-up and project supervision by project sponsors
- No long-term project monitoring and evaluation

Planning for Sustainability

With over one billion people without safe drinking water and over two billion without adequate sanitation facilities, the challenge of providing everyone with safe drinking water and proper sanitation is daunting.

This simple analysis demonstrates the importance of doing each project right and ensuring that they continue to provide the services intended for the design life of the facility is obvious and the importance of efficiently and effectively working together to build projects that are sustainable.

The following steps are designed to help achieve sustainable projects:

1. Identifying potential alliances in the host country to support the leadership and assist in monitoring and evaluating successful operation of the installed system
2. Ensuring community ownership and to demonstrate self-sufficiency in operation
3. Focusing on needs, the current state of the community, the desired future (such as access to clean water year-round and reduction in water-borne diseases) and an assessment of technical, socio/cultural and financial risks affecting the likely long-term viability of the project,
4. Involving women in the initial design of the system and in ensuring that the system is maintained and associated hygiene and behavioral changes take place.,
5. Choosing appropriate technologies are installed and operational support is available, and
6. Focusing on the overall community goals of a healthy and economically stable future

The three part approach that the PEP Pilot is testing includes:

1. Formation of a Country Regional Team or Water, Sanitation, Health & Hygiene Committee that provides the in country priorities and overall guidance of a phased program;
2. Develop a Program Planning and Performance Team that assists the Regional Team and village leaders in completing a needs assessment and conduct an Alternative Analysis of the best technical and operational solution
3. Use of the Technical Guidelines and in-country support system to achieve the Sustainable System that meets the jointly defined village needs for WASH.

This PEP Pilot is seeking to support a program that will over time provide WASH services for 100 percent coverage of all of the villages in each country/RI District. This approach helps create a shared support system designed to enable a health and hygiene program and an operator/water and sanitation committee training program for the project service area that will be sustained.

5.1.2 What is Sustainable Sanitation all about?

The main objective of a sustainable sanitation system is to protect and promote human health by providing a clean environment which breaks the cycle of disease. **A sustainable sanitation system must be economically viable, socially acceptable, technically and institutionally appropriate and be capable of being managed to provide protection to the environment and natural resources.**

Ecological sanitation, as defined by Tilley in the WS&SCC/Eawag Compendium of Sanitation Systems and Technologies, **"applies to waste treatment technologies when they not only limit the spread of disease, but protect the environment and return nutrients to the soil in a beneficial way."**
Many ecological technologies require human waste to be treated on site, as opposed to the centralized water transporting systems that have been installed over the last century or so in large cities across the globe.

5.1.3 Site Considerations of Sustainable Sanitation

The focus of this document is on sustainable sanitation technologies that can be used while being maintained, that do not require relocation when filled to capacity, and do not depend on unsustainable water supplies.

Selection of the most appropriate sustainable sanitation treatment for a region or country is dependent upon:

1. Government policies which may/may not consider sustainable technologies
2. Cultural aspects, open defecation and any restrictions of working and/or eating foods fertilized with human urine and treated feces
3. Climate
4. Geography and terrain
5. Soil porosity
6. Water availability
7. Depth to ground water , local flooding
8. Location of facility
9. Agricultural activity

5.1.4 Project Planning

Introduction

Sustainable project planning uses a 4-step analytical system to assist choosing the most suitable sanitation technology, given the project location and aforementioned factors:

Step 1. Classify the site using the descriptions below. Classification will help match the most suitable technology with the environment and demography of the target area.

Step 2. Engage with the community. Work to understand how the community under consideration lives. Get answers to questions such as:

- What governmental agency, if any, regulates sanitation in the area?
- Is there a sanitation policy in place with an established program?
- What existing water and sanitation practices are in place?
- Is the community generally healthy?
- What hygiene practices are generally used following urination and defecation?
- What can you learn from local infant and child mortality, disease rates and causes?
- Is information about sanitary related disease and mortality available?
- Is open defecation commonly practiced in the area?
- Has a Community Led Total Sanitation (CLTS) or similar sanitation awareness program been introduced in the community? If so, how is it progressing? Read about CLTS from sites designated later in the Guide.
- Talk to central and regional government agencies about the CLTS program and ascertain how and who implements it.
- How can Rotary help improve sanitation conditions in the community?

This step may involve dealing with centuries-old habits, like defecating and urinating in fields, around villages and streams in which people swim and which are used as a water supply. These may be normal living habits of the people in the community you want to help.

Step 3. Understand how local cultural and environmental issues affect the best selection of a sustainable technology. This step should always be with the community as partners so that they will be more likely to accept and adopt new programs. Get answers to questions like:

- What and where are the local drinking water sources?
- How deep is the local water table?
- What is the seasonal variability of local and regional water sources?
- Is there sufficient water available for sanitation all year?
- What are other geological factors, soil types, topography, etc.?
- Are there local food and water taboos, myths, preconceptions of agriculture?

This step will help understand it the local population has preconceptions about how their food is grown and if they would resist the idea of eating food fertilized by human waste. It will also identify resistance to adoption of technologies which would allow urine to be separated for use as a crop fertilizer, and the use of dehydrated feces or compost as a soil enhancement. Note: Studies have found this is technically not a problem, but some people have preconceived ideas that it is.

Step 4. Use the above information to compile a list of suitable technologies and select the most appropriate. Don't forget to have a look at the Ecological table of Pros and Cons of the Technologies near the end of this Guideline, as it gives a quick guide to differences between them

Step 1. Classify the Site to Assist with Technology Selection

The first step entails classifying the site into types defined by size, population, and organization.

1. **Household**

A household is defined as allotments having an area from ¼ to 1 hectare (Ha) in area, predominantly used for housing only, and from which no income is derived. Household demographics can extend from infants to elderly. Population numbers and age information determines the size of fecal vaults and latrine pits. Fecal matter accumulates on average at about 50 liters (L) per person per year but could increase to 80L with dry cleansing materials. Each household would own and be responsible for the management of the installed unit, which should involve the owner in providing on-site construction and the purchase of some or all components.

Most suitable technologies: Arborloo, UDDT, Fossa Alterna, Twin Pits for Pour Flush, Composting Toilet

2. **Neighborhood**

A neighborhood is defined as adjacent allotments with communal facilities/institutions and include densely populated slum settlements which will most likely necessitate the installation of a multi-pan/cubicle facility due to existing cramped occupational conditions. Such installation will be affected by the site's area and services, availability of water, how and who will be responsible for the charges required to cover ongoing maintenance and cleaning costs.

Most suitable technologies: Septic Tank, UDDT's, Anaerobic Digester, Biogas Digester, Twin Pits for Pour Flush

3. **Peri Urban**

Comprised of larger, outer allotments (1Ha and greater) of an urbanized area which may be attached or separate but close to the main town. Selected Technologies where flooding does not occur and where the ground water is maintained at a depth of at least 2 meters below the bottom of the facility can be considered. Education and monitoring of the toilet use together with the collection, storage, dilution and application of urine to plants and ultimately adding any treated feces to the soil will need to be undertaken and regularly monitored for most likely at least one year.

Most suitable technologies: Septic Tank, UDDT, Biogas Digester, Twin Pits for Pour Flush, Composting Toilet, Fossa Alterna, Arborloo.

4. **School**

These are usually one-off projects, consisting of a building or compound used for educating children above preschool age. They are most suitable for Rotary Clubs to provide using local labor and materials wherever possible.

Although some higher ratios for school toilets have been used the WHO requirements are most adequate. Female urinals may be substituted for some pans. A high instance of girls staying at home during menstruating occurs because of the lack of privacy in school toilets and this requires urgent addressing at most schools. Consider upgrading some toilets if this is found to be occurring.

A health and hygiene regime is the cheapest and easiest first stage of introducing sanitation into a school and the community that has no sanitation facilities and which practices open defecation.

While the training of students in the correct use and cleaning of school toilets will contribute tremendously in their use and ongoing maintenance this could be extended both at school and in the home. It would be beneficial to have teachers meet with leaders and influential women of the community and for them to introduce a training program on toilet use and etiquette along with instructional flyers. Teachers can also provide training at school for parents in after school parent classes. A student Toilet committee should also be involved with teachers in toilet planning and training children in the correct use of toilets. Toilets should be provided to the following minimum requirements:

1. The World Health Organization (WHO) ratio of 1:50 children,
2. Preferably provide two female pans for each male pan/urinal
3. Minimum internal cubicle dimensions of 90cm (36 inches) width by 150cm (60 inches) in length fitted with a privacy door having a 150mm (6-inch) open space to and bottom to assist with air circulation. In hot climates provide openings in the upper walls to reduce internal temperatures. Dry sanitation toilets (e.g., UDDT) should be installed where water cannot be guaranteed all year round. Latrine pit or VIP latrines must not be installed.
4. Female Toilets must be fitted with a wash basin and small bench to facilitate full privacy for girls during menstruation.
5. A concrete or other hard surface floor should be provided to assist with maintenance cleaning.
6. Urinals can be substituted in boy/male toilets on a ratio of about 5 urinals for each required sit/squat pan cubicle.
7. Provide hand washing basins/troughs at the ratio of one to each three toilets with soap (sand and/or ashes are equally alternative if soap is unavailable) and water, including hand drying, together with training and management of the toilets prior to handover.
8. The formation of a student toilet committee is strongly supported in the planning, design and construction of school toilets as well as providing training to other students in the school.
9. Consider providing (the Sustainable Sanitation Alliance has reported successful use of) unisex cubicles for children up to 9 years of age.
10. Facilities must include provisions for anal or dry cleaning.

Most Suitable technologies: Septic Tank with Leach Field or Constructed Wetland , UDDT's, Biogas Digester, Twin Pits for Pour Flush, Composting Toilets, Fossa Alterna, Arborloo.

5. Community Facilities/Institutions

These facilities comprise public toilets and toilets in community centers, halls and the like. The number of fixtures for females and males may be subject to local regulation, but provision on the ratio of two female to one male toilet is desirable due to the difference in time of body functions and clothing. Urinals/cubicles for both males and females should be the same as for schools, unless directed by local regulation. Cubicles for disabled people, where provided, should be rectangular in plan with a minimum circulation space of 1.6m (63") by 2.0m (79") for use by either gender. Toilet facilities in halls and the like may require accessibility from within the building and be subject to regulation by governing authorities.

Most Suitable Technologies: Septic Tank with Leach Field or Constructed Wetland , UDDT's, Biogas Digester, Twin Pits for Pour Flush, Composting Toilets, Fossa Alterna, Arborloo.

Step 2. Implementing Sanitation Education

Without community buy-in starting with the planning stage, the project may be destined to failure. The following education systems are tried and tested methods for engaging the community in a sanitation project.

Community Led Total Sanitation (CLTS). CLTS is a highly successful sanitation education system used in over 50 countries, but it requires accredited and trained facilitators to engage with the target population. Such education programs are the first stage of moving from an open defecation to a defecation free area. WaterAid also has a program with defined steps which must be followed in the process. Investigate and ascertain answers to the following questions:

1. Should a CLTS program (Community) and/or a SLTS (School) be undertaken?
2. Are there CLTS Trainers available and if so how are they contacted?
3. Can a Rotarian be trained to be a CLTS specialist?
4. Are there alternative ways of engaging the local population?

How we introduce toilets into the community may well dictate either a favorable or non-favorable response from the community we are targeting. Various tools should be considered including using school toilets to make parents aware of why they should consider a home toilet along with offering favorable purchase terms particularly those in rural areas who live below the poverty line.

Step 3. Identify On-Site Cultural and Environmental Parameters

- **Determine Cultural Practices**

Open Defecation. The practice of openly defecating and discharging urine anywhere in the open is widely practiced in many developing countries of the African, Indian and Asian continents, particularly in rural and semi-rural areas. While some communal toilets are provided in slum areas, they are generally short of the numbers required to serve the population and are inconveniently located by both position and distance. The same open practices occur in the rural rice fields, on tracks, roads and the like. It is a practice that is millennia old, and many do not understand that this, together with the non-washing of hands, is the cause of the high rate of illnesses and death from diarrhea (5,000 children per day under 5 years of age) and cholera. Ask the following questions to gain an understanding of what is happening in the Community/school:

- What are the existing sanitation practices?
- Is open defecation practiced anywhere in the community? Is defecation practiced in a defined location?
- Are there any toilets in the area?
- Are there any toilets in the community that people have access to? Are there any community toilets in the area?
- Are there any toilets at the school?
- Are there any illnesses or diseases caused through the lack of sanitation facilities? Have there been any child deaths from diarrhea?

Managing Urine and Feces. Some ecological sanitation technologies require urine and feces to be collected separately and stored for use as a fertilizer and/or soil amendment. Working with feces may be foreign to some community cultures and as a result unless detailed education and management training on these issues are provided, both the toilet and the potential benefit of fertilization and soil amendment will fail. Urine can be used as a fertilizer almost immediately while feces require a longer period in a warm dark chamber to kill off pathogens. Cultural opposition may, however, continue to ferment. See also notes on UDDT's and Composting Toilets. Ascertain answers to:

- Has the local community used urine and feces as fertilizer of locally grown crops?
- Apart from rice are other vegetables and fruit grown in the area?

- **Determine Climatic Conditions**

Arid Dry Areas. In areas where water is scarce, dry toilets are more suited, and lower (deeper) water tables allow the construction of deeper latrines. However, the greater the depth the harder it is to remove any feces because it becomes compacted under its own weight and difficult to empty. As a result, once pits are filled, new pits need to be built and the latrine structure moved. There are instances where this has reached a crisis point with some schools, community facilities and household sites having insufficient land for further pits.

Urine diversion dehydration toilets (UDDT) are most suitable for arid areas, particularly where urine can be diverted for plant fertilization and feces can be used as a soil amendment. Feces require storage in a dark chamber built at ground level for not less than 6 to 12 months so that pathogens are killed before the material can be handled safely.

Sub-tropical/tropical Areas. These areas are more suited to pour flush (or wet) toilet systems because of the availability of water. However some areas which are subjected to very wet seasons can still be devoid of water towards the end of the dry season thereby making the Pour Flush toilet redundant and unusable. It is imperative that rain water and/or ground water availability be investigated early, and its effect taken into account in reaching a decision of which technology to implement. Like arid areas, the desire to separate wastes for plant fertilization and soil improvement needs to be considered in deciding whether to adopt pour flush or dry toilets.

Temperature. Warm to hot temperatures speed up feces enhancement, killing pathogens in 6 to 8 months (whereas in colder climates below 25o Celsius, composting doesn't work as well as biogas reactors). Placing UDDTs and composting units under houses where space is available enhances the composting process, as does painting the access panels black. The local effects of temperature should be understood before deciding which technology to install. More ventilation is required in the toilet surround in hot climates.

Rainfall. Rainfall increases flows in streams and rivers and causes lake levels to rise. Streams and lakes reach their maximum areas and depths during the wet season. More water is available for percolation into the ground in the wet season, which causes the ground water table to rise. Surface water and ground water levels drop during the dry season. Keeping adequate depth between the bottom of the toilet pit and the ground water table is important, as is keeping the toilet out of the reach of flood waters. Obtaining rainfall and water level information is imperative before making any decision on the suitability of sanitation technology. Determine the following:

- Does the area have a reliable year-round water supply?
- What is the source of the water supply?
- What systems (rainwater harvesting, water well, spring water) are used to maintain the water supply?

- Is water required to flush toilet pans and perform anal cleansing?

- **Determine Water Table Effect**

Water Table. Surface waters percolate underground to the water table, where it slowly travels over long distances, taking with it any polluting human wastes (such as nitrates) and chemicals (such as arsenic and pesticides). Streams and lakes reach their maximum areas and depths during the wet season, thereby providing higher water tables beneath them. As surface water levels drop, so does, too, the underlying water table. At least 2 meters of soil (more is better) must be maintained above the highest water table level to the base of any technology which allows urine and feces to leach into the surrounding soil such as the Latrines, Arborloo and the Fossa Alterna.
Most Suitable Technologies: Biogas Reactors, Composting Toilets and UDDTs because they can be sealed from high and variable water tables.

- **Determine Water Access**

Water Distance. No ecological sanitation technology which allows waste to seep into adjacent soils should be placed within 30 meters of any water source - including streams, lakes and water wells.
Quality. Water quality can vary in streams and lakes between wet and dry seasons depending upon the amount of human activities and what is deposited. At the end of the wet season when water tables are high and where flooding occurs, discharge from Arborloos, Fossa Alternas, pour flush and septic tanks increase the chance of pollution of surface water supplies and underlying ground water sources if incorrectly located.
Flooding Depth. The depth and duration of flooding must be established to assist in determining the most suitable technology to install in these areas. Flood levels may vary over the area under consideration due to varying topographies, terrain and vegetation covers. Flooding of dry and wet VIP latrines, fossa alternas and other pit-type latrine toilets allows urine and feces to escape increasing the e coli count and pathogens of a water source, which can lead to the spread of diarrhea and cholera. Toilet pans must be installed above the locally accepted flood level to prevent flood waters accessing fecal chambers and allowing the waste to mix with flood waters. Urine however will not increase e-coli if discharged to water sources. Determine answers to the following:

- The areas covered by flood waters?
- What is the maximum depth of the flood waters at end of wet and dry seasons for the areas under consideration?

Most Suitable Technologies for areas subject to flooding are Biogas Reactors, Composting Toilets and UDDTs because they can be sealed from flood waters.
Flooding Frequency and Duration. Flooding quite often occurs on an annual basis in the river deltas of the developing countries of Bangladesh, Cambodia, Vietnam, India and Nigeria and this affects settlement patterns, including the location and type of sanitation technology. Frequent flooding of an area must be given consideration during the planning of a sanitation system, as regular flooding will render some ecological sanitation units useless for considerable time until after the flood has abated. Latrines and other toilets with in-ground unsealed pits located below the flood waters allow the feces to disperse thereby polluting water and making the surrounding area dangerous to humans. Flood levels need to be determined so that the squat pan is set higher to avoid flows into the feces storage vaults which must have sealed access panels.

- **Determine Soil Types**

Rock. Ecological sanitation technologies, such as UDDTs that do not rely on ground pits or in- ground pipes, can be built in rock or on rocky surfaces. Latrines installed in rock are capable of polluting adjacent water supplies as wastes may percolate into rock fissures and spread to nearby water sources.
Compacted Clays. These materials have an advantage where the water table is very low as they allow very deep latrine pits to be excavated. While depth prolongs the usefulness of the latrine, it increases the costs and difficulties to remove wastes, since its density increases due to compaction. The extra depth also necessitates the use of mechanical vacuum pumps, which are both expensive and rare in developing countries.
Friable Loams and Sand. These materials, while favoring excavation, allow waste from latrines and pour flush pits to more easily absorb into the surrounding soil and to disperse over a larger area. In many river delta areas they also assist in carrying waste further, which can lead to increased pollution of streams. Sand is generally carried by faster flowing waters, so care needs to be taken in deciding on the most suitable sanitation technology to use in river deltas. Septic tank irrigation systems (leach fields) should be kept well clear of these situations.

- **Using Bio-solids for Agricultural**

Trees and food crops. Individual trees (for example, mangoes) and food crops can benefit from the regular application of urine (diluted about 5:1) collected from UDDTs and other similar urine
separating sanitation technologies. Because of its high nitrogen content, urine can be used by local farmers to improve their crops, and at the same time provide a small increase in household income. When stored, the container should be capped to prevent contamination by air, which can bring on early deterioration of the urine. Feces covered with ashes, sand or soil to absorb any moisture can be worked, after which it can be used as a soil conditioner or, if properly composted, can be used as a fertilizer in the same manner as urine with both materials attracting payment from farmers.
UDDTs at schools quite often use ashes or soil supplied by students.
Animal Husbandry. Concentrated products rich in organic material, which can include animal manure and biodegradable organic waste, can be combined with human waste in Biogas Digesters, thereby increasing the output-from animal sources.

Step 4. Select the Most Appropriate Sanitation Technology And Practice

Once the critical information collected in steps 1, 2, and 3, above, has been compiled, selection of the most appropriate ecological sanitation technology can be undertaken. In the following sections, each technology will be discussed. At the end of this guideline, thabele titled, “Ecological Sanitation Technologies Pros and Cons” provides a list of the various technologies discussed herein, and compares them using the critical siting factors discussed in the first three steps. Once armed with this information, the reader is encouraged to discuss the pros and cons of several alternatives with leaders in the community so that early buy-in of the program is encouraged.

5.1.5 Ecological Sanitation Technologies

Introduction

Over the years, ecological sanitation technologies have evolved from the simple pit latrine to more sophisticated systems that can withstand the ravages of flooding, limit pollution to the surrounding ground and water supplies, and provide safe and reliable fertilizers and soil amendments. In the following sections the various technologies that Wasrag feels can be used in appropriate settings are discussed.

Composting Toilets

Composting toilets comprise storage/composting vaults which can be constructed above or below ground level to convert excreta and organics into compost—a safe, inoffensive product that can be used as a soil conditioner. Cultural and societal aspects, however, will require consideration, and some technical education will also be required. Composting vaults require moisture control to prevent anaerobic conditions from occurring, and careful balancing of carbon and nitrogen ratios in the waste is necessary for optimal results. Some societies find eating vegetables fertilized by human waste to be objectionable and intolerable and this and other cultural aspects need to be evaluated before any human waste composting installation is undertaken.

In general, toilet compost is hygienically harmless if thermophilic (heat-loving bacteria) composting occurs at temperatures of 55°C (about 130°F) for at least two weeks or at 60°C (140 °F) for one week. However, the World Health Organization recommends composting at 55°C to 60°C for one month with a further maturation period of two to four months in order to ensure satisfactory pathogen reduction.
The optimal process of human waste composting entails regulating the supply of oxygen and moisture (45 to 70% moisture), adjusting the Carbon/Nitrogen ratio (to 25:1) by adding different organic material such as wood chips and/or vegetable scraps, controlling the internal temperature (to 40 to 500C) and regularly working, or turning the compost material at least one to two times per year.

However, thermophilic temperatures are not always achieved in most composting toilets. While considerable pathogen reduction can be achieved in a composting toilet, complete pathogen destruction cannot be guaranteed. Hygienic measures for handling of compost must be applied by all people who are exposed to it.

Hygienic safety can be improved by secondary co-composting with organic solid waste, and by including other treatment methods such as long-term storage, acidification to raise the pH, exposure to ultraviolet (UV) light.

Composted material from toilets should only be applied to ornamental plants, fruit-growing bushes and trees. It should not be applied directly to food crops such as leafy vegetables and root plants, but it can be used safely as a soil conditioner.

Systems that collect urine in a vault produce larger volumes of leachate. This leachate has to be handled carefully in order to avoid spreading pathogens. The handling, discharge and treatment of excess leachate have to be considered in the planning phase of a composting toilet. Liquid need to discharge to a tank or absorption pit or, alternatively be evaporated though a glass panel or black painted doors concentrating the sun rays onto a flat panel.

A chamber volume of 300 liters (80 gallons) per person per year (which equates to 1.5m3 (53 cubic feet) per year for a family of five) helps maintain the compost pile temperature between the required 40 and 50o C. A leachate collection system and a ventilation unit that provides oxygen and allows gases to escape are also required. In some designs, a second chamber is provided, allowing one chamber to rest (after filling) while the second chamber is filling. A better alternative is to install suitably sized interchangeable plastic 9 bins to allow for increased storage and degradation time.

Storage vaults may be located under the house, but they must be sealed to reduce water access when installed in flood-prone areas.

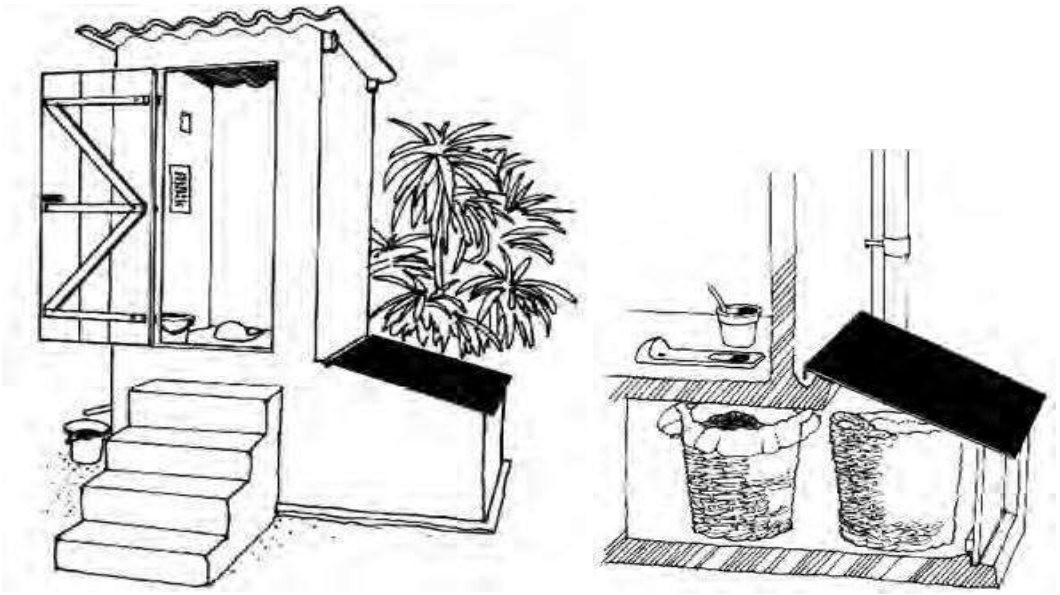


Fig No. 5.2 Eco Toilet with Solar heated processing
Chamber and Moveable Basket Feces Containers

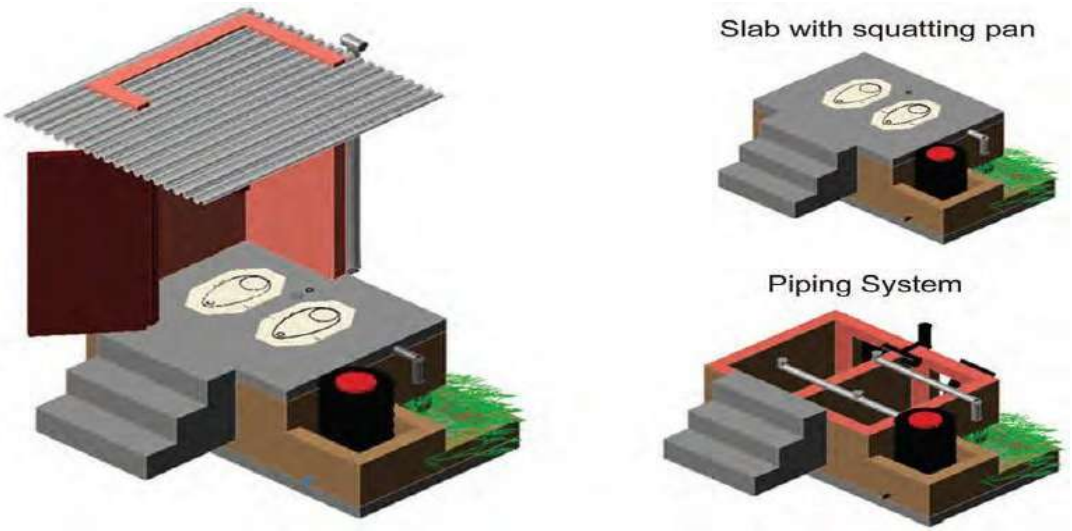


Fig. No. 5.3 Composting Toilets - Single above with transportable bins and double chamber below where a full chamber is composting while the second chamber is filling with use.

Due to their compactness and operation composting toilets are especially suited to warmer climates and areas where land and water are limited. They can be used indoors to ensure that low temperatures do not impede the composting process. In colder areas solar panels help

elevate the temperature. Anal cleansing water should not added to the composting chamber as anaerobic conditions could occur along with foul smells and reduced collection capacity.

Urine Diversion Dehydration Toilets

Urine Diversion Dehydration Toilets (UDDT) are ideally suited to flood-prone areas provided its working platform is placed above flood level and the doors to the dehydration vaults are sealed when flooding occur. Also known as Ecosan Toilets, they operate without water, which allows the urine to be collected separately from the feces. Urine and dry feces can then be applied to as a crop fertilizer and soil enhancer. Urine empties into a separate plastic container beneath the floor. Feces, which are deposited through the large apertures of the pans in the photo below into a closed chamber or plastic bin with lid or even locally available palm leaf baskets. Each deposit is covered with a small amount of ashes, straw/dry grass or earth, which absorbs the moisture, reduces smells and assists in the dehydration process.

The UDDT is not immediately obvious in its function, which to some degree is its disadvantage, making demonstration and education of use and maintenance an ongoing necessity before and during its early use. UDDTs are becoming more accepted due to their suitability of use in flood prone lands and their ability to return both urine and dehydrated feces to the soil. Due to their more permanent life capability, the above ground enclosed structure tends to be constructed of more durable materials, such as brick and/or corrugated metal, which increases their cost. They are extensively used in school toilets both in the two-vault-s and single-chamber version. These larger units need to have 40- to 60-litre (10 to 16 gallon) plastic drums which can be transported to a secondary secured area for storage while dehydration takes place.

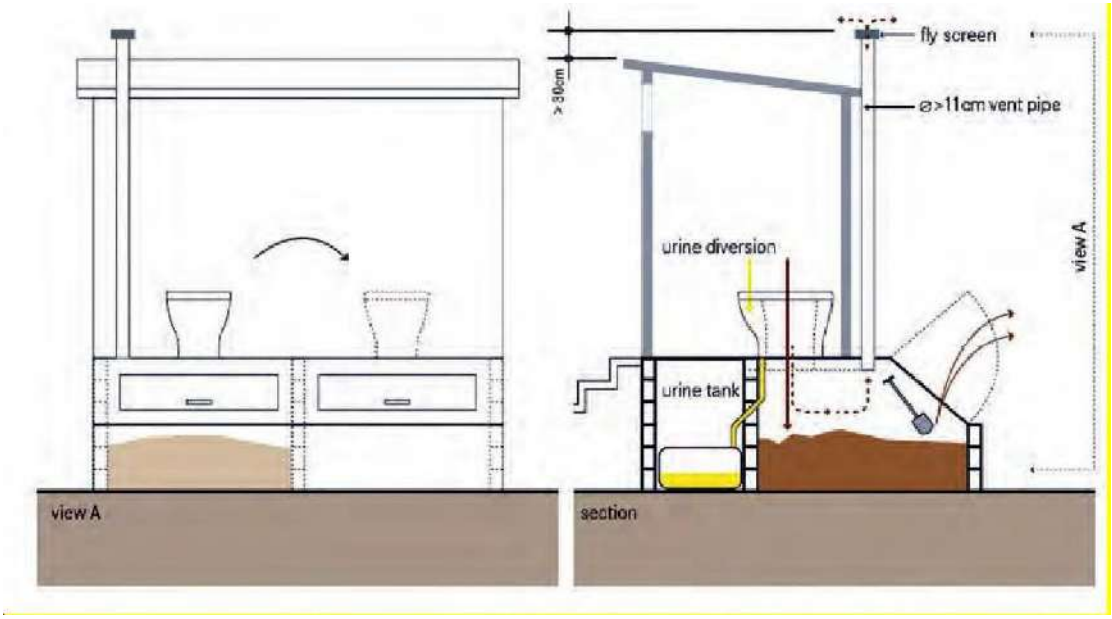


Fig No. 5.7: Double Chamber UDDT with Solar Access Doors to Feces Chamber

A single chamber unit for households is usually about 150 to 200cm long, 90cm wide and 80 to 90cm high (about 60-80"X35"X35") . Any second chamber is constructed to identical dimensions beside the first chamber. Chamber wall construction is usually of brick or concrete block although bamboo, timber or light steel frame can be substituted as an alternative with a timber floor and either an EcoSan squat pan (shown above) or a drop through pedestal pan. These units are generally fitted with a 40L (10 gal.) or larger plastic or

rattan basket containers, which must be closed over after filling for storage and dehydration. It is desirable to keep the moisture content of the feces to around 25% while maintaining temperatures up around 50oC (125 °F) or more to create a dry environment for pathogen destruction, which can be further aided by adding ashes, dry sand or straw etc. Maintaining temperatures of 43oC or more for one month will see most pathogens killed off, although 6 months is usually adopted as the minimum retention time in the warmer climates. In cooler climates, dehydration can be assisted by fitting the chamber with black painted sloping access doors. The system is most suitable for dry and/or hot climates such as Southeast Asia, India and Africa.

The brick and /or concrete walls of the vault should be constructed on a 75mm to 100mm (3 - 4") thick reinforced concrete slab at ground level to provide an impervious chamber. An access hatch is provided either to the rear or side wall to allow the feces to be worked every few weeks (see diagram and note above). The hatch must be fitted with a sealable door where the toilet is constructed in a flood prone area to avoid the dehydrating material becoming wet again. Painting the access door black helps maintain higher chamber temperatures which assist dehydration.

Costs of single locally constructed UDDTs are slightly more than a pit latrine. Facilities using removable containers require a separate secure drying area to be established to facilitate secondary treatment of the material prior to final placement in the soil. See reference 1.0 on page 19 for single chamber wood fabricated chamber

Provision of both female and male urinals particularly in schools facilitates the operation of the UDDT and has been found to assist in the maintenance of cleaner facilities. Having school children provide ashes from home (cooking) fires ensures an ongoing supply for covering deposited feces.

Amila 3 Biofilter Toilet System

The Amila 3 Biofilter toilet system was designed to provide a low-cost household solution to overcome soil pollution restrictions after the Sri Lankan tsunami. It uses 44-gallon petrol drums as a septic tank with settled liquid drained off the top into the base of a second drum filled with sand from which the secondary effluent rises to safely discharge through slotted pipes (leach lines) into surrounding soil. Walls of both tanks can be constructed from locally available materials such as mortared brickwork, concrete or metal. The Biofilter material can be sand or graded stone, which reduces the oxygen demand of organic materials passing to the drainage field by emitting a cleaner effluent to the soil. The system is seen as being sustainable provided both tanks are cleaned and maintained on a reasonably regular basis.

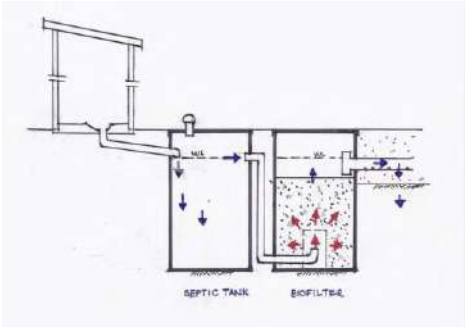


Fig. No. 5.10 Amila 3 BioFilter Toilet

Its advantages lie in its simplicity, low construction costs and ability to be built from locally obtainable materials and by local inhabitants. Its main disadvantage is that the shallow field absorption lines must be kept clear of water sources and sandy soils to avoid pollution. These lines are 75mm to 100mm (3 to 4 inches) diameter slotted plastic or ceramic pipe covered with geotextile fabric and one-size rock to prevent clogging of the slots; the pipes are laid on 15cm of one-size rock in 40cm wide by 50cm deep trenches. Depending upon the soils, two

to three rows of 20-metre- long pipe set about 5 meters apart should work for 10 to 15 years. At the end of this period a new leach field should be constructed perpendicular to existing field and the old field retired.

Anaerobic Bio-digester Reactor

An Anaerobic Biogas Reactor produces digested slurry that can be used as a soil additive and a biogas which can be used for cooking, heating and powering small plants to produce electricity.

Biogas contains a mixture of methane, carbon dioxide and other minor gases. Biogas digesters can be used by a single household, a neighborhood city area, and school toilets. The reactor comprises a large cylindrical chamber which aids the anaerobic breakdown of blackwater, sludge and other biodegradable wastes, including animal wastes, food wastes and certain plants. The tanks can be built above or below ground and can have prefabricated components (such as a roof) or on-site construction using local labor and bricks or concrete. Some research is being undertaken using plastic tanks and heavy HDP polyethylene sheets for the gas chamber dome roof, which can be fixed or floating. At the household level, reactors with a volume of about 1,000L (about 260 gallons) can be built from plastic containers or bricks at or below ground level. Size increases to about 100,000L (about 26,000 gallons) for institutional or public toilet applications.

The input material of human, animal (pig and cow manure) and organic waste is retained for a minimum of 15 to 25 days depending whether the reactor is located in a hot or temperate climate. During the fermentation process, gas is generated which exerts a pressure, displacing the slurry upwards into an expansion chamber. When the gas is removed, the slurry flows back down into the expansion chamber. The generated pressure is then used to transport the biogas through pipes. These units are similar to a septic tank in the waste it produces but with the addition of the beneficial biogas.

The majority of biogas reactors are directly connected to private or public toilets with an additional entry point for organic materials. Although odorless and rich in organics and nutrients the slurry will need further (thermophilic) treatment to complete pathogen destruction.

Advantages:

- Generates a usable energy source;
- Low capital and operating costs as no electrical energy is required;
- Underground construction minimizes land requirement and long life span.

Disadvantages:

- Requires expert design and skilled construction personnel;
- Depending on size, digested sludge requires regular removal and effluent still requires treatment.

The reactor comprises a large cylindrical chamber which aids the anaerobic breakdown of blackwater, sludge and other biodegradable wastes, including animal wastes, food wastes and certain plants. The tanks can be built above or below ground and can have prefabricated components (such as a roof) or on-site construction using local labor and bricks or concrete.

Fig No. 5.11: Biogas Digester under construction.

A Bio center is constructed over the digester with public toilets on the ground floor and a kitchen, office and meeting room on the first floor. Power and cooking fuel is derived directly from the gases generated from the urine and feces derived from use of the public toilets and stored in the dome.

Anaerobic Baffled Reactor

This technology is suitable for installation in tightly packed residential areas, like slums. The reactor is an enlarged septic tank fitted with a series of baffles through and under which wastewater is forced to flow before discharging to either a perforated pipe leach field (see Urine Application) or a small-bore pipe which can discharge to a sewer. The increased contact time with the active sludge in the reactor improves overall treatment. This technology can be applied to large households with high water usage for showers, washing clothes and toilet flushing, or in small neighborhoods as well as at small community levels. It should not be used in ground with high water tables nor should it be used where immediate treatment is required because it takes several months to commence operation. It is more suited to warmer climates. The sludge requires annual removal or further treatment, such as connecting it to a biogas reactor which in turn produces gas for cooking lighting and heating. It has a long service life but needs to be installed by specialist personnel and maintained by trained personnel.

Fossa Alterna

Fossa Alterna is an alternating waterless, dry double-pit ventilated sanitation technology. It is designed to make compost which can be used as a soil amendment. The pits are partially lined and are no more than 1.5 meters (5 feet) deep. They require a constant input of soil, ashes and/or straw, which is required for degradation and a dry material.

They initially are more expensive to build than a VIP latrine as two pits are required about one meter (40 inches) in diameter over which a cover has to be constructed. They can be used again repeatedly. One pit is used at a time. When full (which is dependent upon the number of users—12 to 18 months), the superstructure, which should be of light weight construction, is moved over the second hole and the first is temporarily sealed. During this time, the full pit goes through a degradation process and is transformed into a dry mixture similar to compost that can be easily removed after about 12 months. As with similar technologies, soil, ash and

leaves must be added to the pit after each defecation and urination. This addition makes the material more friable and the ashes add to an increase in ph which assists in the breakdown of pathogens.

The system can operate successfully with or without urine, but water must not be added as this leads to vectors and pathogens. Water also fills the pore space and deprives the aerobic bacteria of oxygen, which is required for degradation.

Fig. No. 5.14: Fossa Alterna toilets

The main disadvantage of the fossa alterna system is that it cannot be installed in areas containing rock or hard clays or where the water table is high, or where flooding occurs. It requires correct use of the compost material and a constant supply of soil, ash and leaves. Because it is shallow and the waste is of a lighter humic nature, the pit is easier to clean out compared to fecal sludge from pit latrines. Fossa alterna systems are relatively cheap to construct and can be easily built on site using local labor and materials where available.

Arborloo

An Arborloo toilet is a single shallow temporary VIP latrine that has a maximum depth of about 1.5 meters (5 feet) over which a toilet consisting of a ring beam, slab and structure is placed. When the latrine is filled to within about 40 centimeters (16 inches) below the ground surface, it is then finally covered with soil and a (fruit) tree is planted. Soil, ashes and leaves thrown over each urination and defecation provides a rich material that will compost over a period of time. Nitrates from decomposing feces provide rich soils for trees. The ring slab and toilet structure are transferred to a second pit clear of the first when it is full. The operation is endless provided there is sufficient land available. A large crop of trees can result over a period of years. The system is not suitable for areas subject to flooding or where there is a high water table and sandy soils as ground water contamination can occur. Provided the owner is capable, the technology will costvery little to build and install because unskilled local labor and inexpensive materials can be used for construction.

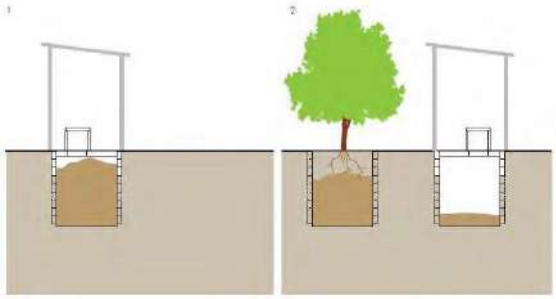


Fig. No. 5.15: Feces are deposited in the pit of an arborloo until it is near full.

Twin Pits for Pour Flush

A pour flush toilet is similar to a normal flushing toilet except that the 1 to 3 liters of water is poured into the cistern by hand instead of having the water delivered from a cistern after pressing a button. The toilet bowl is shallower and fitted with a water seal at the neck which prevents any odors or flies from coming back up the discharge pipe into the toilet chamber. Toilet paper should not be flushed down the bowl as the water may not have sufficient force to move the paper over the neck.

A pour flush toilet can discharge directly into a single pit either under or adjacent to the toilet structure. It can alternatively discharge into twin pits which then allow both black and grey water to be collected and allowed to slowly infiltrate into the surrounding soil. Over time the solids are sufficiently dewatered to the extent they can be removed by shovel. The structure can be either moved around or left in the same place relative to the pits. Only one pit is allowed to be used at a time while the other is slowly allowing liquid waste to drain off through slots built into the walls (generally of brick construction) leaving safe inoffensive soil-like material. While similar to the fossa Alterna, the twin pits do not require the addition of soil and organic material because they contain water.

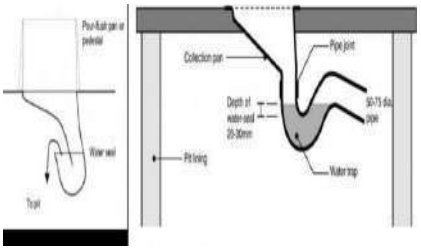


Fig. No.5.16: Twins Pits For Pour Flush

Pits are usually about one meter in diameter, are placed about one meter clear of each other and must be located at least 30 meters (100 feet) clear of, and downhill of, any water source to reduce ground water pollution. At least one year should be allowed for retention prior to the pit being excavated. Some conditions may require a retention time of an additional year.

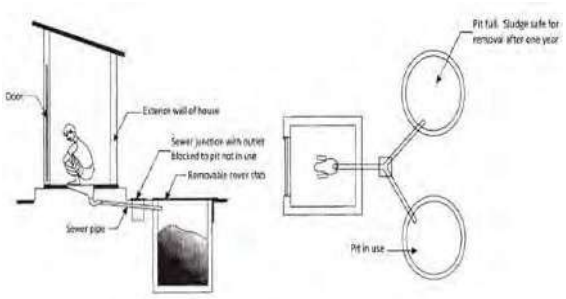


Fig. No.5.17: Twins Pits Toilets

The system is suitable in areas where there is insufficient room to continuously move pit latrines but unsuitable for areas with high ground water table and unreliable water supply or areas where frequent flooding may occur and in sandy type soils close to water resources. It must be carefully sighted to reduce pollution of soils which should be very absorbent; they should not be placed in tightly packed clays or rocky soils.

Decentralized Wastewater Treatment Systems

A Decentralized Wastewater Treatment (DEWAT) system is a proprietary technical approach to providing a solution to physical and biological wastewater treatment. It comprises a separation settling tank, an anaerobic baffled reactor, an anaerobic filter, and a planted gravel filter. It uses local materials in its construction. The system is suitable for hospitals and agricultural industries. It provides communities with an environmental sanitation solution with other benefits, such as biogas generation if installed to supply gas for cooking, lighting and heating.

The selection of this technology is similar to the anaerobic reactor and would need professional engineering/sanitary engineering, community and government input because of its size.

Septic Tanks, Leach fields and Wetlands

This facility is a water tight chamber now made of concrete, fiberglass or various kinds of plastic for the initial treatment of both black and grey water. Solid waste settles to the bottom while the liquid stays on the top and a moderate anaerobic process reduce solids and organics. The tank is of two chamber layout with the first main chamber occupying two thirds of the

total length in which most of the solids settle. A baffle between the two chambers allows the effluent to access the second chamber but its location is such as to prevent scum and solids from escaping with the effluent. Sizes vary according to household numbers and amount of waste.

The rate of accumulation is generally faster than the rate of decomposition which results in having the settled waste removed by mechanical vacuum vehicle every 3-5 years. The effluent escapes via a T shaped outlet pipe to a four line leach field or a horizontal Subsurface Flow Constructed Wetlands.

Septic Tanks are most suitable for single households but require a minimum area of around one hectare of land if using leach fields as there is a need to relocate the leach field after about 15 years but less if using transpiration beds or wetlands. Leach fields comprise slotted plastic pipes laid in trenches up to about one meter in depth depending upon the soils and filled with clean crushed rock size, with heavier soils requiring much larger field than sands and the like. They must not be placed close to water sources of any kind or in close proximity to the sea.

In smaller tracts of land, a Horizontal Subsurface Flow Constructed may be a better solution. This treatment can be used in single households, neighborhoods and cities including public toilets but is dependent upon availability of adequate land. Unlike the leach field it has the ability to dramatically reduce the biological oxygen demand (BOD), suspended solids and pathogens of the effluent. It can be constructed with local labor but it requires expert design and construction supervision. Current plants include duckweed, phragmites australis (water reed), and a new plant, vetiver.

5.2 Home Automation using IoT / Any other methodology

5.2.1 IOT home automation: getting started

Home automation has three major parts:

- Hardware
- Software/apps
- Communication protocols

Each of these parts is equally important in building a truly smart home experience for your customers. Having the right hardware enables the ability to develop your iot prototype iteratively and respond to technology pivots with ease.

A protocol selected with the right testing and careful consideration helps you avoid performance bottlenecks that otherwise would restrict the technology and device integration capabilities with sensors and iot gateways.

Another important consideration is the firmware that resides in your hardware managing your data, managing data transfer, firmware ota updates, and performing other critical operations to make things talk.

5.2.2 Applications of Home Automation

Rebuilding consumer expectations, home automation has been projected to target wide array applications for the new digital consumer. Some of the areas where consumers can expect to see home automation led IOT-enabled connectivity are:

- Lighting control
- Hvac

- Lawn/gardening management
- Smart home appliances
- Improved home safety and security
- Home air quality and water quality monitoring
- Natural language-based voice assistants
- Better infotainment delivery
- Ai-driven digital experiences
- Smart switches
- Smart locks
- Smart energy meters

The list is still not exhaustive and will evolve over the time to accommodate new iot use cases. Now that you are familiar with home automation applications, let's have a detailed look at what components are involved in building a typical home automation prototype.

5.2.3 Home automation components

We have talked about them before, but let's clearly separate our components that will finally help you build a realistic model of what major components are involved in building a smart home. The major components can be broken into:

- IOT sensors
- IOT gateways
- IOT protocols
- IOT firmware
- IOT cloud and databases
- IOT middleware (if required)

IOT sensors involved in home automation are in thousands, and there are hundreds of home automation gateways as well. Most of the firmware is either written in c, python, node.js, or any other programming language. The biggest players in iot cloud can be divided into a platform-as-a-service (paas) and infrastructure-as-a-service (iaas).

- **Major IOT Paas Providers**

- Aws iot
- Azure iot
- Thingworx
- Ubidots
- Thingspeak
- Carriots
- Konekt
- Tempoiq
- Xively
- Ibmbluemix
-

- **Characteristics of IOT Platforms**

Again, these platforms are extremely divided over the iot application and security-related features that they provide. A few of these platforms are open source.

Let's have a look at what you should expect from a typical iot platform:

- Device security and authentication
- Message brokers and message queuing

- Device administration
- Support towards protocols like coap, mqtt, and http
- Data collection, visualization, and simple analysis capabilities
- Integrability with other web services
- Horizontal and vertical scalability
- Websocketapis for real-time for real-time information flow

Apart from what we mentioned above, more and more platform builders are open sourcing their libraries to developers. Take for example the dallas temperature library for ds18b20 for arduino was quickly ported because of open source development to a new version that helped developers to integrate ds18b20 with linkit one . Understanding these things become crucial as iot tends to evolve continuously and having an equally responsive platform makes it business safe to proceed.

Let's now deeply evaluate each of these components, starting with iot sensors.

5.2.4 Home automation sensors

There are probably thousands of such sensors out there that can be a part of this list, but since this is an introduction towards smart home technology, we will keep it brief. We will break down iot sensors for home automation by their sensing capabilities:

- Temperature sensors
- Lux sensors
- Water level sensors
- Air composition sensors
- Video cameras for surveillance
- Voice/sound sensors
- Pressure sensors
- Humidity sensors
- Accelerometers
- Infrared sensors
- Vibrations sensors
- Ultrasonic sensors

Depending upon what you need, you may use one or many of these to build a truly smart home iot product. Let's have a look at some of the most commonly used home automation sensors.

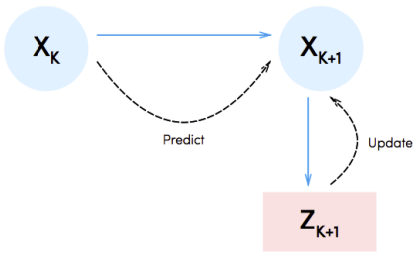
- **Temperature sensors**

The market is full of them, but the famous temperature sensors are dht11/22, ds18b20, lm35, and msp430 series from ti. The msp430 series is more accurate than the rest, but at the same time, it is one of the most expensive for prototyping or initial product testing purposes. Msp430 tops all temperature sensors, as the precision and battery consumption is minimal with them.

The dht11 has a very restricted temperature range and suffers from accuracy issues. Dht22, on the other hand, is a little bit more accurate but still, doesn't make it as the preference.

The ds18b20, on the other hand, is more accurate, as opposed to digital temperature sensors like the dht22 and 11. Dallas temperature sensors are analog and can be extremely accurate down to 0.5 degrees.

Take note that often, the temperatures that you directly sense from these sensors may not be very accurate, and you would occasionally see 1000 f or greater values no matter what you are doing.



There's an entire logic that goes around building temperature sensors that we will address in another blog post.

- **Lux sensors**

Lux sensors measure the luminosity and can be used to trigger various functions range from cross-validating movements to turn the lights on if it becomes too dark. Some of the most popular light sensors are tsl2591 and bh1750. Recent tests to include tsl2591 and bh1750 into low-powered iot devices have found them to be working fairly well for most use cases. To get a good idea of whether these two sensors would meet your needs, we would suggest illuminance tests followed by normalizations of the data to observe deviations under various situations.

- **Water level sensors**

While building your prototype, you may consider a solid state etape liquid level sensor or, like others, just use an hc-sr04 ultrasonic sensor to measure the water level. On the other hand, in other cases where those two don't suffice, one has to utilize something that can deliver a much higher performance. Float level sensors and other ics like lm1830 offer a more precise measurement capability to iot developers although, they are substantially much more expensive than others.

- **Air composition sensors**

There are a couple of specific sensors that are used by developers to measure specific components in the air:

- Co monitoring by mics-5525
- Mq-8 to measure hydrogen gas levels
- Mics-2714 to measure nitrogen oxide
- Mq135 to sense hazardous gas levels (nh3, nox, alcohol, benzene, smoke, co2)

Most of these are sensors have a heating time, which also means that they require a certain time before they actually start delivering accurate values.

These sensors mainly rely on their surface to detect gas components. When they initially start sensing, there's always something that's there on their surface, some sort of deposition that requires some heating to go away. Hence, after the surface gets heated enough, true values start to show up.

- **Video cameras for surveillance and analytics**

A range of webcams and cameras specific to hardware development kits are usually used in such scenarios. Hardware with usb ports offer to integrate camera modules to build functionality.

But utilizing usb ports is not very efficient, especially in the case of real-time video transfer or any kind of video processing.

Take the raspberry pi for example. It comes with a camera module (pi cam) that connects using a flex connector directly to the board without using the usb port. This makes the pi cam extremely efficient.

- **Sound detection**

Sound detection plays a vital role in everything from monitoring babies to automatically turning lights on and off to automatically detecting your dog's sound at the door and opening it up for your pet.

Some commonly used sensors for sound detection include the sen-12462 and easyvr shield for rapid prototyping.

These sensors aren't as good as industrial-grade sensors like those from 3dsignals , which can detect even ultra-low levels of noise and fine tune between various noise levels to build even machine break-up patterns.

- **Humidity sensors**

These sensors bring the capability of sensing humidity/rh levels in the air to smart homes. The accuracy and sensing precision depends a lot on multiple factors, including the overall sensor design and placement.

But certain sensors like the dht22 and 11, built for rapid prototyping, will always perform poorly when compared to high-quality sensors like hih6100 and dig rh.
While building a product to sense humidity levels, ensure that there's no localized layer of humidity that is obscuring the actual results. Also, keep in mind that in certain small spaces, the humidity might be too high at one end as compared to the others.

When you look at free and open spaces where the air components can move much freely, the distribution around the sensor can be expected to be uniform and, subsequently, will require fewer corrective actions for the right calibration.

- **Home automation protocols**

One of the most important parts of building a home automation product is to think about protocols protocols that your device will use to communicate to gateways, servers, and sensors. A few years ago, the only way to do so was by either using bluetooth, wi-fi, or gsm. But due to added expenses on cellular sim cards and low performance of wi-fi, most such solutions didn't work.

Bluetooth survived and later evolved as bluetooth smart or bluetooth low energy. This helped bring a lot of connectivity in the "mobile server powered economy." Essentially, your phone would act as a middleware to fetch data from ble-powered sensors and send it over to the internet.
When looking at the major home automation protocols, the following top the list:

- Bluetooth low energy or bluetooth smart: wireless protocol with mesh capabilities, security, data encryption algorithms, and much more. Ideal for iot-based products for smart homes.
- Zigbee: low cost, mesh networked, and low power radio frequency-based protocol for iot. Different zigbee versions don't talk to each other.
- X10: a legacy protocol that utilizes powerline wiring for signaling and control.
- Insteon: communicates with devices both wirelessly and with wires.

- Z-wave: specializes in home automation with an emphasis on security.
- Wi-fi: needs no explanation.
- Upb: uses existing power lines installed in a home. Reduces costs.
- Thread: a royalty-free protocol for smart home automation, uses a 6lowpan.
- Ant: an ultra low-power protocol helping developers build low-powered sensors with a mesh distribution capabilities.
- 6lowpan

- **Home automation: which protocol is the best?**

While there are some protocols that clearly offer much more, it is always important to start from your smart home development needs and then move towards narrowing down the solutions.

The commonly preferred protocols are bluetooth low energy, z-wave, zigbee, and thread. The protocol selection can now be narrowed down by the following factors:

- Ability to perform identity verification
- Quality of sensor networks
- Data transfer rate
- Security level
- Network topology required
- Density of objects around
- Effective distance to be covered

5.2.5 Home Automation Architecture

This architecture supports the following considerations for home automation solutions:

- End to end security mechanisms involving multilevel authentication
- End to end data encryption, including the link layer
- Flexible and configurable access and authorization control
- Powerful cloud infrastructure
- Network agnostic with built-in feedback loops
- Configurable cloud-based rules engine
- Api endpoints
- Data scalability
- Nosql databases

- **Home Automation Gateways**

For developing a home automation product, often a standalone product sending data to a server is not enough. Due to battery and protocol limitations, the data from a sensor or sensors present in a home has been routed through an iot gateway.

To select the perfect gateway for your iot home automation, consider some of these factors:

- Communication protocols supported
- Real-time capabilities
- Mqtt, coap, and https support
- Security and configuration
- Modularity

When it comes to building iot gateways, modularity and hybrid iot protocol support top the list when a product is in the early stages of market introduction.

To incorporate a gateway in your home automation stack, you can consider the following options:

- Either create a gateway from the ground up using existing hardware stacks for prototyping (using raspberry pi, intel edison, etc). Then, when a poc is validated, you can create your own custom hardware.
- Or, you can use existing gateway modules like ingincsble gateway . These gateways are extremely easy to customize and connect with your cloud services and devices. However, they may or may not offer the same level of support that you need to build certain features.

For example, a gateway with a bad networking queue may result in traffic congestion, or it may not support the required protocols that you wish to use.

\Further, pivoting with these gateways to some other technology stack may become very difficult. It should be emphasized that they are extremely good for robust prototyping needs.

- **Home automation programming languages**

The following programming languages dominate the home automation space: python, embedded c, c, shell, go, and javascript (node.js). This has mainly happened due to the sheer optimization of the languages for similar use cases.

- **Home automation frameworks**

If you think you can build everything for home automation (protocols, hardware, software, etc.) On your own, that is a bit unrealistic. Everyone, from high-growth startups to billion-dollar consumer-focused enterprises, is now using the help of home automation frameworks to build connected products to delight consumers.

There are more than 15 different smart home frameworks available for iot developers to use and build their next generation of connected home products. Some of these frameworks are open source and some are closed-source. Let’s have a look at some of them in the sections that follow.

- **Open source iot platforms and frameworks**

Looking forward to doing a quick and dirty prototype? There’s no need to write down everything from scratch. Thanks to a bunch of awesome contributions, we have open source platforms that can get your home automation products up and running in no time.
Our favorites are:

- Home assistant
- Calaos
- Domoticz
- Openhab: supports raspberry pi, written in java and has design tools to build your own mobile apps by tweaking ui.
- Openmotics[asked their developer, waiting for them to respond(dev confirmed)]
- Linuxmce
- Pidome
- Misterhouse
- Smarthomatic

Let’s take a look at the major home automation iot platforms.

- **Home assistant**

Supports raspberry pi, uses python, and the os is hassbian. It has simplified automation rules that developers can use to build their home automation product, saving them thousands of lines of code.

How home assistant works:

- Home control: responsible for collecting information and storing devices.
- Home automation triggers commands based on user configurations.
- Smart home triggers based on past user behavior.

As developers, it is very important for us to understand the architecture of home assistant for us to build high-performing products on top of it.
Let's have a look at the architecture that makes control and information flow possible.
Home control consists of five components:

- Components
- State machine
- Event bus
- Service registry
- Timer

- **The core architecture of home assistant**:

All of these components working together create a seamless asynchronous system for smart home iot. In the earlier version of home assistant core, the core often had to stop while looking for new device information.

But with the new versions of home assistant, a backward compatible api, and an async core have been introduced, making things a lot faster for iot applications.

The best part about home assistant's core architecture is how carefully it has been designed and developed to support iot at home.

- **Open hab**

Openhab is a home automation and iot gateway framework for smart homes. Similar to home assistant, openhab works nicely with raspberry pi and comes with their own design tools to create a ui for your home automation product.
An understanding architecture of openhab:

- Modularity: it is realized with the bundle concept
- Runtime dynamics: so that software components can be managed at runtime
- Service orientation: there are services for various components to speak with each other and exchange information

Further relying on the ogsi framework, it leverages the following layers stacked together:

- Modular layer: manages dependencies between bundles
- Life cycle layer: controls the life cycle of the bundles
- Service layers: defines a dynamic model of communication between various modules
- Actual services: this is the application layer, using all other layers
- Security layer: optional, leverages java 2 security architecture and manages permissions from different modules

Fig. No. 28: Home Automation Bundles

Openhab features:

- Plugin framework
- Rules engine
- Logging mechanism
- Ui abstraction: a tree structure for ui widgets, item ui providers, and dynamic ui configuration
- Ui implementations are available for the web, android, and ios
- Designer tools availability

Openhab has been primarily only been observed as a project for the hobbyist programmer, and even many parts of openhab.org convey the same. But we have observed a different effort in recent times from openhab in building the developer economy for building iot smart homes.

According to the repository, openhab cloud architecture will look something like this

Impressive enough that some open platform out there is thinking about system services, cron jobs, logging, etc.

Further, let's look at the frameworks and technologies that openhab will support: node.js, express.js, nginx, mongodb, redis, socket.io.

Unlike home assistant's vast integrability, openhab is currently limited to:

- Amazon alexa
- Aws ec2 [aws multi-az isn't compatible for multiple time zone availability]
- awsiot with openhab
- Mqtt support

Openhab is extremely powerful, but at the same time very limited in terms of integration. The team behind openhab is extremely promising and have already conveyed their plans to open up openhab to other integration capabilities very shortly.

- **Calaos**

Calaos was developed initially by a company that closed back in 2013, but home automation since then has grown, and it is being maintained and upgraded by developers. While now being open source, it facilitates premade source code to:

- Create sweet home environments
- Control music
- Automation rules that focus on time, mood, or ambiance
- Easy configuration

Calaos supports the following hardware:

- Premoboard
- Cubieboard
- Raspberry pi
- Intel-based machines

Their lack of support towards developing private iot applications restricts their usage by developers to build high-quality solutions for consumers.

- **Domoticz**

Domoticz allows you to monitor and configure your devices and sensors with the simplest possible design. Impressive enough that the entire project is extremely lightweight, it further is backed by high integrability with third parties and features like auto-learning switches.

This platform has been designed to work with operating systems like linux and windows.
Protocol capabilities of domoticz include: z-wave, bluetooth, apple homekit, x10, and mqtt

Hardware integration capabilities of domoticz:

- Rfxcom transceiver
- Esp2866 wi-fi module
- P1 smart meter
- Youless meter
- Pulse counters
- 1-wire
- Philips hue
- Essent e thermostat

Domiticz can be used to create any sort of services that you can think of, ranging from a smart weather device to a telegram bot.

- **Domoticz architecture**

Currently, very few people know about the architecture of domoticz, making it extremely difficult to build applications on it without taking unnecessary risks in building the product itself.

For example, the entire design of general architecture feels a little weird when you look at the concept of a sensor to control to an actuator. It seems to be missing.

Building advanced applications with domoticz can be done using c++, lula, php, shell, etc.

- **Blockchain in iot**

Consumers, especially those who grew up in the digital era, understand the importance of privacy. With the evolution of iot, security has taken center stage for realistic deployment scenarios.

Deployment of blockchain into home networks can easily be done with a $35 raspberry pi. A blockchain secured layer between devices and gateways can be implemented without a massive revamp of the existing code base.

Simply put, blockchain is a technology that would be an implementation that most users won’t even know about, but it will play a huge role in the future to reassure them with revolutionary and new business models like dynamic renting for airbnb.

So far, interoperability issues and broken protocols seemed to have hampered the growth of iot-based smart homes.

Chapter 6. Swatchh Bharat Abhiyan (Clean India)

6.1 Swatchhta needed in Nagar Pipaliya village

"A clean India would be the best tribute India could pay to Mahatma Gandhi on his 150 birth anniversary in 2019," said Shri Narendra Modi as he launched the Swachh Bharat Mission at Rajpath in New Delhi. On 2nd October 2014, Swachh Bharat Mission was launched throughout length and breadth of the country as a national movement. The campaign aims to achieve the vision of a 'Clean India' by 2nd October 2019.

The Swachh Bharat Abhiyan is the most significant cleanliness campaign by the Government of India. Shri Narendra Modi led a cleanliness pledge at India Gate, which about thirty lakh government employees across the country joined. He also flagged off a walkathon at Rajpath and surprised people by joining in not just for a token few steps, but marching with the participants for a long way.

In sense of cleanliness the Nagar Pipaliya village require sounder strategic plan for making village swatchh. At present there is no plan or strategy for waste management. Due to this reasons the present outlook of Nagar Pipaliya village is not very good according to swatchhta, on the roads of Nagar Pipaliya village you can see the scattered waste, this scattered waste invite mosquitoes, fly and many other small insect and due to this disease like malaria and dengue spread it.So in Nagar Pipaliya village there is an need to implement daily cleanliness program and which includes cleaning of road, collecting of waste from every house, disposal of waste regularly, cutting of unnecessary grass.

We observe during Survey and visit of the village that the cleanliness needed as list given below

1. Pond Cleaning
2. Street Road Cleaning
3. Cleaning Around Drain Strainers
4. Cleaning of Overhead and Under Ground Water Reservoir.
5. Unnecessary Grass on Primary And Secondary School.
6. Gram Panchayat Gate Cleaning

Fig. No. 6.1: Existing Condition of Nagar Pipaliya village related to sawachta

6.2 Guidelines - Implementation in Nagar Pipaliya village with Photograph

1. Interact with villagers and explain the importance of cleanliness in the life.
2. Provide dustbins in village at important junction.

Fig. No. 6.2: Dustbins at important junction

6. Providing the facility of common toilet in village

Fig. No. 6.7: Public Toilets

7. Make swatchta related rules in gram panchayat of village.

6.3 Activities Done by Students for allocated village with Photograph

We Identify what are the major sources of waste, e.g., Cow dung/pee, general dust from vehicle movement, kitchen waste, household waste, packaging waste (polythene, plastic etc.). Then we evaluate which one of these are the biggest concerns. I would assume
(i) Cow-dung waste
(ii) Packaging waste

Chapter 7. Village condition due to Covid-19

7.1 Taken steps in Nagar Pipaliya village related to Covid-19

The Gujrat government had shut the primary schools earlier this month, the secondary classes were left open in view of the exams. The Chief Minister also declared that all cinema halls will remain shut in Gujrat till 31st March. Schools and colleges where exams are not being held will also remain closed. Gujrat government has also made disinfecting all public places, including government, private offices and shopping malls compulsory. Furthermore, vacant flats owned by Gujrat Urban Shelter Improvement Board will be used for quarantine, says CM Vijay Rupani.

- To regulate the inflow of visitors, village entry points were sealed. Volunteers mapped the village main road and byroads. To enter panchayat area, people had to take permission from the ward member or mukhiya.
- Field team members shifted their priorities from their normal work to making efforts to spread awareness and education on taking precautions against the spread of COVID-19.
- They shared verified informational videos and explained preventative measures like proper hand-washing to the members of the village communities. An awareness session on COVID-19 was provided to villagers and students using tablets on topics such as covering your mouth, staying at home, how to seek treatment, and proper handwashing techniques. Posters regarding precautions that need to be taken were pasted.
- In many places, cloth masks were made and distributed as well. The masks were distributed to essential service locations like gas stations and banks, and to electrical workers and police.
- Students created some hand-made artwork promoting safety and awareness for their communities.
- Vulnerable people should be considered moving with relatives in rural areas and spend their time in voluntary isolation, such as a small hut. They should receive food supplies via a neighbor or relative, but without direct contact.
- Does anyone at home have fever? Do you have visitors from outside the village? Asks door to door.
- Helping manage the return of migrant workers from cities.
- Preparing isolation facilities, arranging food, coordinating with the medical staff, ensuring social distancing and looking for symptomatic patients overnight.
- WhatsApp group comprising the police, gram sevak, health workers, and other important functionaries to circulate state and Central government announcements, and pleas to adhere to social distancing and lockdown norms.
- The Asha (Accredited Social and Health Activist) worker door-to-door surveys, spreading awareness about prevention, reporting symptomatic cases and maintaining a record of the roughly 2500 residents in her village.
- Health volunteers made door-to-door visits to educate people about the use of masks, hygiene and social distancing norms. To ensure social distancing at shops, wells, hand pumps, PDS shops, etc, volunteers marked circles for people to stan in.
- Lists were prepared and single women, persons with disabilities, widows, the landless and elderly citizens were given priority.
- Guidelines given:

- Travel should be reduced to a minimum.
- Avoid large gatherings and crowds as much as possible.
- Keep at least 1-2 meters of distance from a person with respiratory symptoms. Do not stay in the same room with this person.
- Use a mask if travelling by bus, train or plane. If masks are not available or affordable, cover your nose and mouth with a cloth or similar.

Fig. No. 7.1 Social Distancing

7.2 Activities Done by Students for Nagar Pipaliya village

In Nagar Pipaliya awareness about Covid-19 is at good level. Villagers know how to protect themselves from thisdisaster.

We arrange meeting with sarpanch KmaleshbhaiSakariya and talatimantrikalpeshbhaiGohel, also with the representative of the village to give information about Covid-19.In this meeting we discussed about

- Formation of Covid 19.
- Spared of Covid 19.
- Flow medium of Covid 19.
- Precaution to prevent Covid 19.
- Importance of mask and sanitizer.
- Importance of avoid social gathering.
- Government rules and regulation on about lockdown.
- 14 days Isolation importance.
- How to improve Immunity.

We also visit some shop and temples to give them importance of avoid social gathering. Proper way to use of mask and sanitizer. How to Improve the Immunity. Show them poster of awareness about Covid 19 and explained it.

7.3 Any other steps taken by the students / villagers

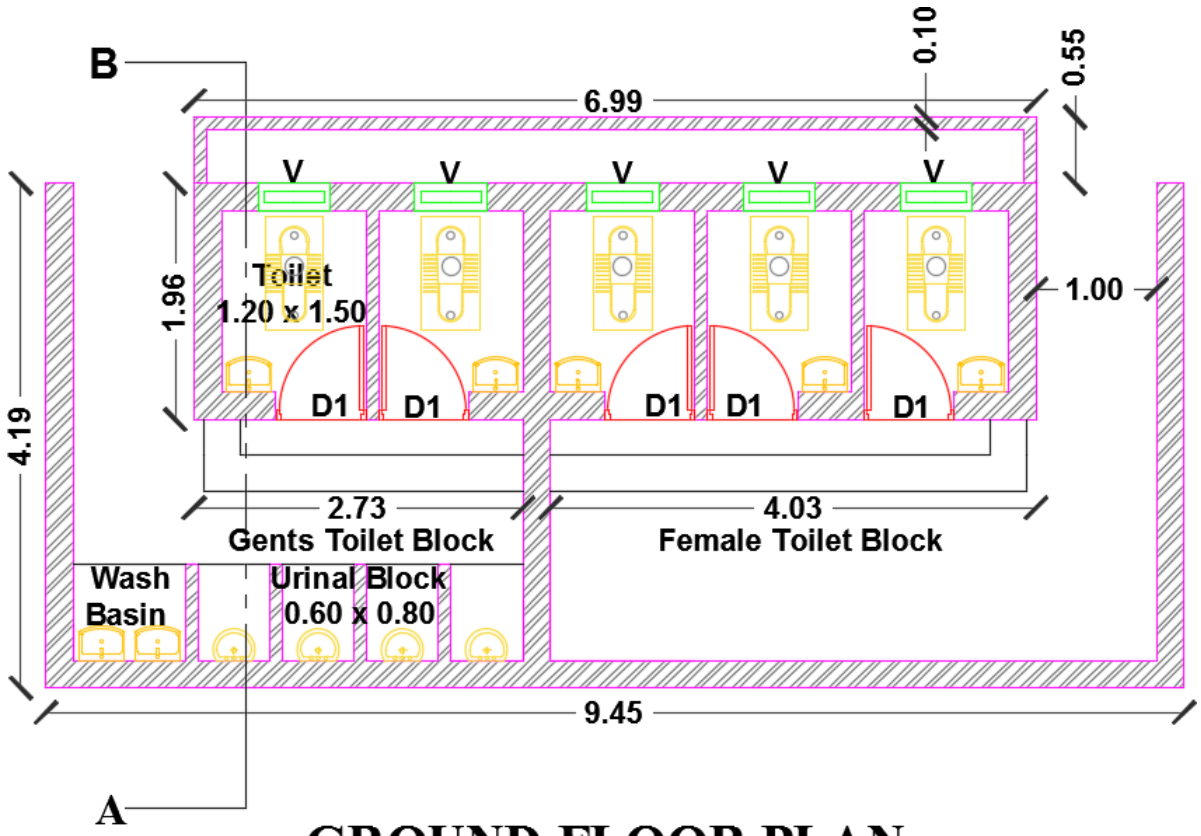
Our village also uses manpower for clean roads and households road side area. Major space is clean in our village and good cc roads. We are also talk with villagers for clean village and use dustbin. We click goods photographs of village. We are also discussing with Sarpanch and Talati about cleanliness.

Chapter 8. Sustainable Design Planning Proposal (Prototype Design)- Part- I

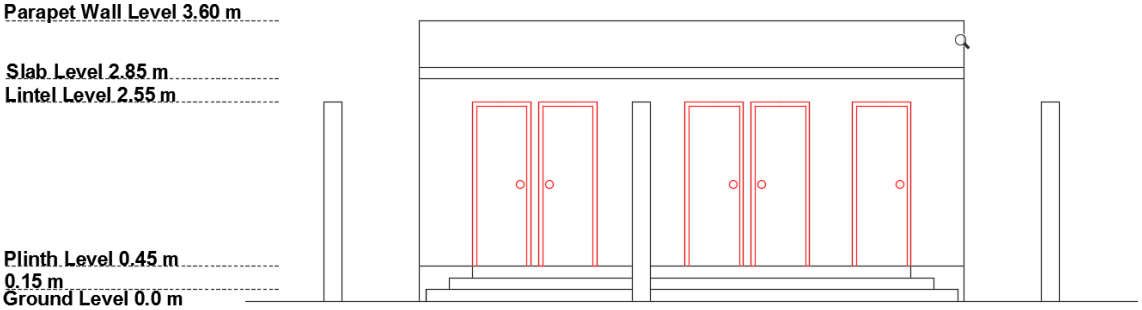
8.1 Design Proposals

8.1.1 Sustainable Design-

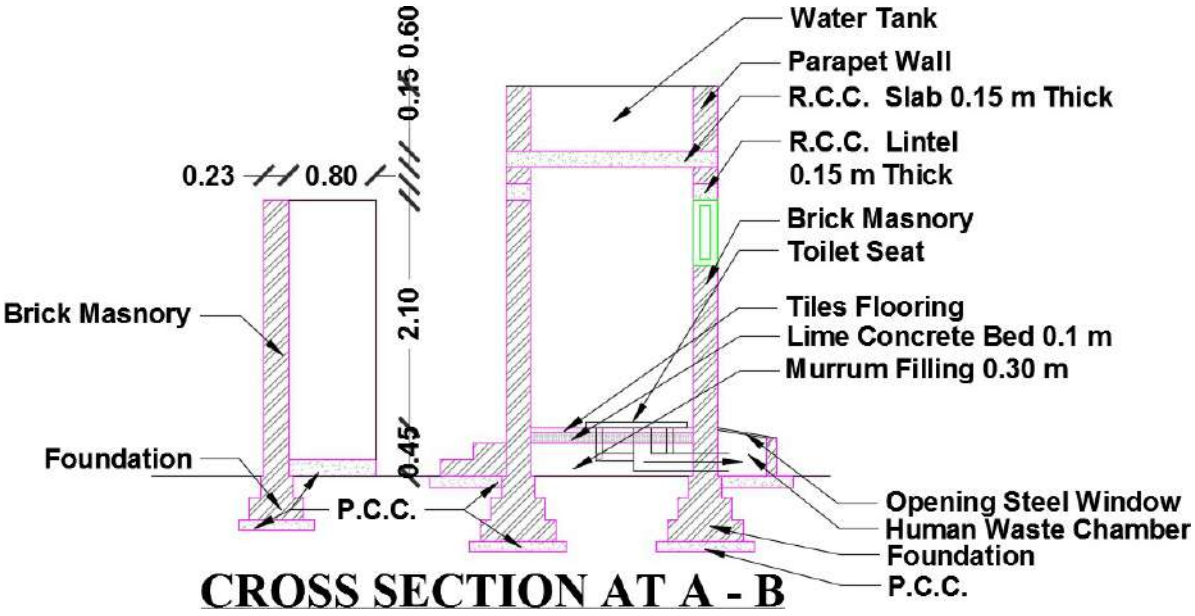
Public Toilet Block



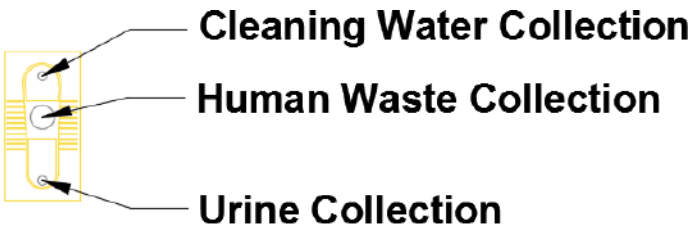
GROUND FLOOR PLAN



FRONT ELEVATION



CROSS SECTION AT A - B



Urine Diversion Dehydration Toilet

Quantity Sheet of Public Toilet Block							
Sr. No.	Item Description	No.	Length M	Breath M	Height M	Quantity	
1	Earthwork In Excavation For Foundation and P.C.C.						
	Brick Wall -1	1	18.71	0.90	0.70	11.787	Cu. M.
	Brick Wall -2	1	19.49	0.70	0.50	6.820	Cu. M.
	Chamber P.C.C.	1	7.29	0.60	0.10	0.437	Cu. M.
	Entry Stair	1	7.06	0.75	0.10	0.530	Cu. M.
				Total Quantity		19.574	Cu. M.
2	Plain Cement Concrete (P. C. C.)						
	Brick Wall -1	1	18.71	0.90	0.10	1.684	Cu. M.
	Brick Wall -2	1	19.49	0.70	0.10	1.364	Cu. M.
	Chamber Bed	1	7.29	0.60	0.10	0.437	Cu. M.

	Entry Stair	1	7.06	0.75	0.10	0.530	Cu. M.
	Urinal Block	4	0.60	0.80	0.10	0.192	Cu. M.
				Total Quantity		4.207	Cu. M.
3	Brick Masonry Below Ground Level In Cement Mortar 1:6						
	Brick Wall -1 Step 1	1	17.47	0.70	0.20	2.446	Cu. M.
	Brick Wall -1 Step 2	1	17.67	0.50	0.20	1.767	Cu. M.
	Brick Wall -1 Step 3	1	17.87	0.30	0.20	1.072	Cu. M.
				Total Quantity		5.285	Cu. M.
	Brick Wall -2 Step 1	1	18.99	0.50	0.20	1.899	Cu. M.
	Brick Wall -2 Step 2	1	19.19	0.30	0.20	1.151	Cu. M.
				Total Quantity		3.050	Cu. M.
				Net Quantity		8.335	Cu. M.
4	Brick Masonry Above Ground Level In Cement Mortar 1:6						
	Brick Wall -1	1	17.94	0.23	3.30	13.616	Cu. M.
	Brick Wall -2 Boundary Wall	1	19.26	0.23	2.55	11.293	Cu. M.
	Brick Wall -3 Chamber Wall	1	7.89	0.10	0.35	0.276	Cu. M.
	Brick Wall -4 Urinal Block Wall	4	0.80	0.10	2.40	0.768	Cu. M.
				Total Quantity		25.954	Cu. M.
	Deduction						
	Ventilation	5	0.60	0.23	0.60	0.414	Cu. M.
	Door	5	0.75	0.23	2.10	1.811	Cu. M.
				Total Quantity		2.225	Cu. M.
				Net Quantity		23.728	Cu. M.
5	R.C.C. Work In Slab, Chajja And Lintel 1:2:4						
	Slab	1	6.99	1.96	0.15	2.055	Cu. M.
	Lintel	1	6.99	0.23	0.15	0.241	Cu. M.
				Total Quantity		2.296	Cu. M.
6	Smooth Plaster Inside The Rooms And Ceilings In C:M 1:3 12 Mm Thickness						
	Toilet	10	1.50		2.40	36.000	Sq. M.
		10		1.20	2.40	28.800	Sq. M.
		5	1.50	1.20		9.000	Sq. M.
				Total Quantity		73.800	Sq. M.
	Deduction						
	Door	2.50	0.75		2.10	3.938	Sq. M.
				Net Quantity		69.863	Sq. M.
7	Outer Plaster In C:M 1:3 25 Mm Thickness						
	Toilet	2	6.99		3.15	44.037	Sq. M.

		2	1.96		3.60	14.112	Sq. M.
	Boundary Wall	2	9.45		2.55	48.195	Sq. M.
		4	4.19		2.55	42.738	Sq. M.
		2	2.00		2.55	10.200	Sq. M.
	Urinal Block	8	0.80		2.55	16.320	Sq. M.
				Total Quantity		175.602	Sq. M.
	Deduction						
	Door	2.5	0.75		2.10	3.938	Sq. M.
				Net Quantity		171.665	Sq. M.
8	Earth Filling						
	Toilet	5	1.20	1.50	0.45	4.050	Cu. M.
				Total Quantity		4.050	Cu. M.
9	Brick Bat Lime Concrete(B.B.L.C.)						
	Toilet	5	1.20	1.50	0.10	0.900	Cu. M.
				Total Quantity		0.900	Cu. M.
10	Tiles Flooring						
	Toilet Floor	5	1.20	1.50		9.000	Sq. M.
	Wall Tiles	10	1.20		2.10	25.200	Sq. M.
		10		1.50	2.10	31.500	Sq. M.
				Total Quantity		65.700	Sq. M.
	Deduction						
	Door	5	0.75		2.10	7.875	Sq. M.
	Ventilation	5	0.60		0.60	1.800	Sq. M.
				Total Quantity		9.675	Sq. M.
				Net Quantity		56.025	Sq. M.
11	Marble Sills For Stair, Door, Window And Ventilation						
	Stair	1	7.36	0.30		2.208	Sq. M.
		1	6.00	0.30		1.800	Sq. M.
	Door	5	5.70	0.23		6.555	Sq. M.
	Ventilation	5	2.40	0.23		2.760	Sq. M.
				Total Quantity		13.323	Sq. M.
12	Wood Work For Doors						
	Door	5	0.75		2.10	7.875	Sq. M.
				Total Quantity		7.875	Sq. M.

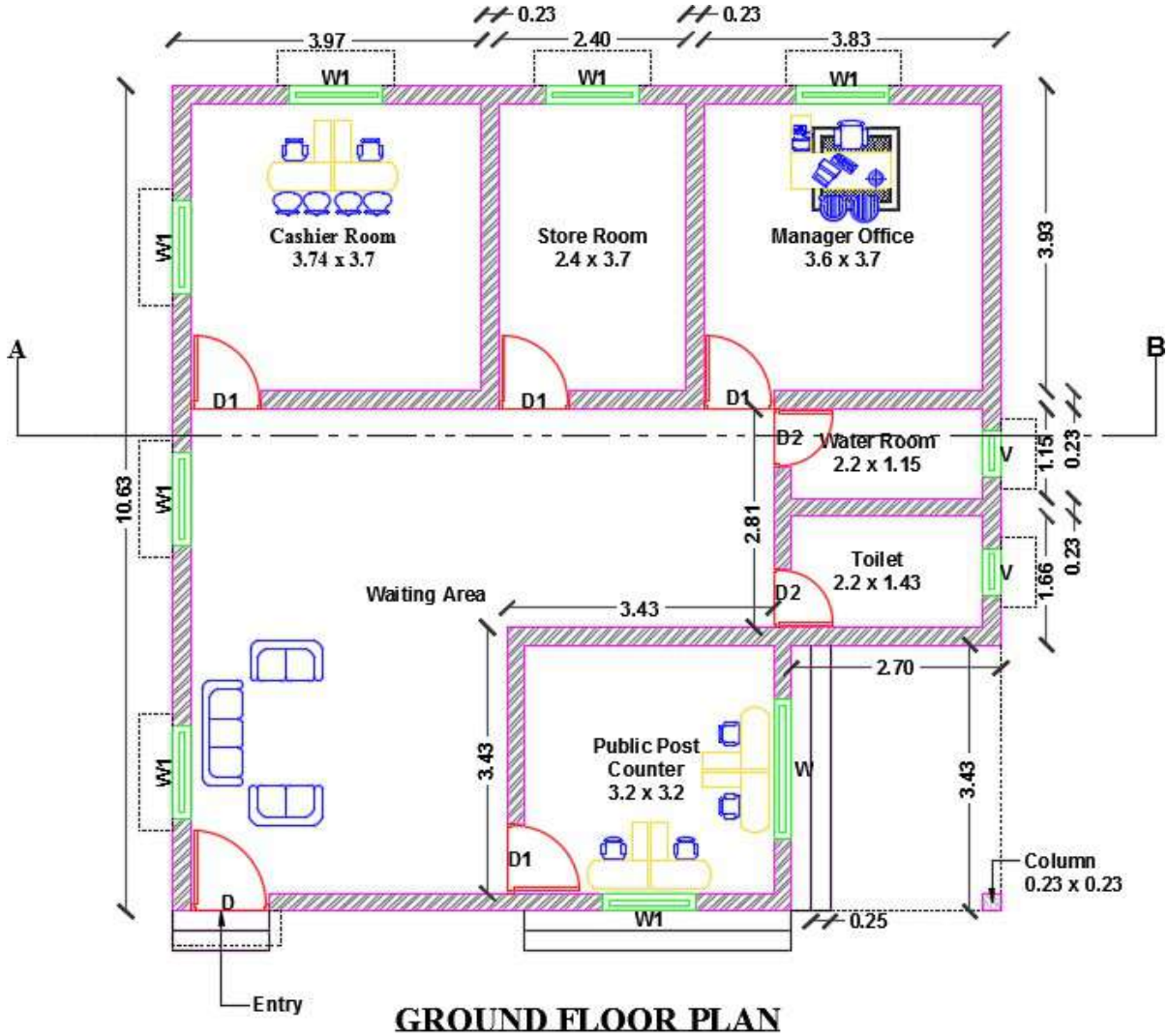
13	Aluminum Section Work For Window And Ventilation						
	Ventilation	5	0.60		0.60	1.800	Sq. M.
				Total Quantity		1.800	Sq. M.

Abstract sheet for Public Toilet Block					
Sr. No.	Item Description	Unit	Rate	Quantity	Amount in Rs
1	Excavation for foundation up to 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff up to 50 Meter lead.(B) Dense or Hard soil	Cu.M.	₹ 95	19.574	₹ 1,860
2	Providing and laying Plain cement concrete work 1:3:6 (1- Cement : 3- Coarse sand : 6- graded stone aggregates 30 mm nominal size) and curing complete	Cu.M.	₹ 3,000	4.207	₹ 12,621
3	Providing and laying cement concrete work 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete including approximate cost of formwork and reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up to floor two level.	Cu.M.	₹ 8,800	2.296	₹ 20,205
4	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. in foundation and plinth in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(C) Fly Ash Bricks	Cu.M.	₹ 3,200	8.335	₹ 26,672
5	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq. Cm. Super Structure in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(C) Fly Ash Bricks	Cu.M.	₹ 3,500	23.728	₹ 83,048
6	Providing 12mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering up to floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand)	Sq.M.	₹ 150	69.863	₹ 10,479
7	Applying two coats of Birla (white cement based) or Asian (acrylic lapy- putty) or equivalent & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.	Sq.M.	₹ 55	69.863	₹ 3,842
8	Providing 20 mm thick double coat mala cement plaster on interior brick / concrete work for plastering comprising of base coat of 12 mm thick cement plaster in cement mortar	Sq.M.	₹ 200	171.665	₹ 34,333

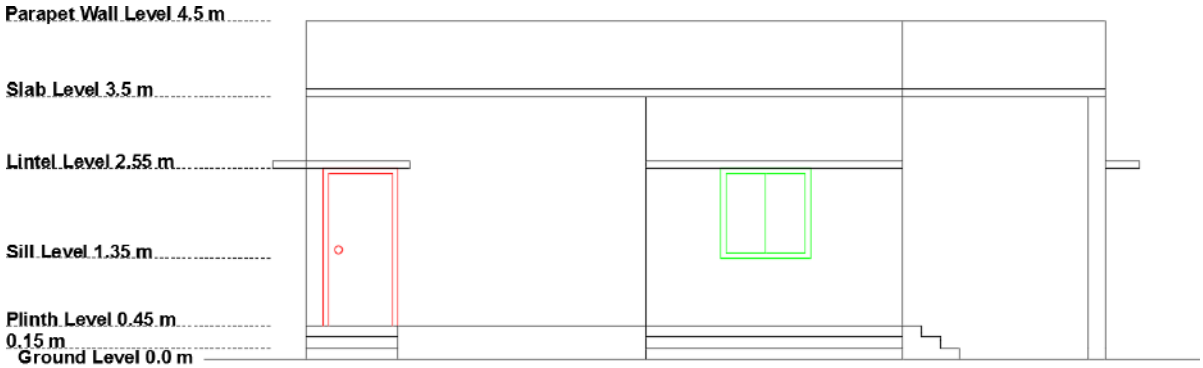
	(1 Cement : 3 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trowel including scaffolding curing etc. complete.				
9	Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials.etc complete	Sq.M.	₹ 80	171.665	₹ 13,733
10	Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. complete.	Cu.M.	₹ 287	4.050	₹ 1,162
11	P & L 24" x 24" vitrified 8 mm thick tile flooring over 30 mm (average) base of cement mortar 1:6 (1 cement: 6 coarse sand) on new surface and jointed with colour cement slurry including finished with flush pointing & cleaning the surface etc. complete for antiskid	Sq.M.	₹ 1,019	56.025	₹ 57,089
12	P & L 10 mm thick Marble Sill over 10 mm (average) base of cement mortar 1:2 (1 cement: 2 coarse sand) on Door Bottom, Window and Ventilation Side and jointed with Chemical including finished with flush pointing & cleaning the surface etc.	Sq.M.	₹ 800	13.323	₹ 10,658
13	Providing and fixing 35 mm thick shutters for Doors including anodised aluminium butt hinges with necessary screws. (A) Indian Teak Wood	Sq.M.	₹ 5,000	7.875	₹ 39,375
14	Providing and fixing standard extruded of aluminium section of size 63.50 x 38.10 x 1.95 mm(of Jindal Section no:4605,@ Wt 1.094Kg / R mt with colour anodized aluminium frame with 5 mm thick transparent bronze colour tinted float glass as details etc complete for Fix window.	Sq.M.	₹ 2,000	1.800	₹ 3,600
				Total	₹ 3,18,679
				add 2.5 % for Electrical wiring material and Plug fitting	₹ 7,967
				add 2.5 % for Water Supply and sanitation material and fitting	₹ 7,967
				add 5 % Contingencies	₹ 15,934
				Grand Total	₹ 3,50,547
				Say	₹ 3,51,000

8.1.2 Physical design (Civil)-

Post Office



GROUND FLOOR PLAN



FRONT ELEVATION

Quantity Sheet Of Post Office							
Sr. No.	Item Description	No.	Length M	Breath M	Height M	Quantity	
1	Earthwork In Excavation For Foundation And P.C.C.						
	Brick Wall Foundation	1	63.72	0.90	0.90	51.613	Cu. M.
	Entry Stair 1	1	8.84	0.65	0.10	0.575	Cu. M.
				Total Quantity		52.188	Cu. M.
2	Plain Cement Concrete (P. C. C.)						
	Brick Wall Foundation	1	63.72	0.90	0.10	5.735	Cu. M.
	Entry Stair 1	1	8.84	0.65	0.10	0.575	Cu. M.
				Total Quantity		6.309	Cu. M.
3	R.C.C. Work Above Plinth Level Up To First Floor Level C:S:A 1:2:4						
	R.C.C. Lintel And Sill						
	D	1	1.30	0.23	0.15	0.045	Cu. M.
	D1	4	1.20	0.23	0.15	0.166	Cu. M.
	D2	2	1.05	0.23	0.15	0.072	Cu. M.
	W	1	2.10	0.23	0.15	0.072	Cu. M.
	W1	7	1.50	0.23	0.15	0.362	Cu. M.
	V	2	0.90	0.23	0.15	0.062	Cu. M.
				Total Quantity		0.780	Cu. M.
	R.C.C. Chajja	1	2.10	0.45	0.10	0.095	Cu. M.
		7	1.50	0.45	0.10	0.473	Cu. M.
		2	0.90	0.45	0.10	0.081	Cu. M.
				Total Quantity		0.648	Cu. M.
	R.C.C. Slab	1	10.66	7.20	0.15	11.513	Cu. M.
		1	7.96	3.43	0.15	4.095	Cu. M.
				Total Quantity		15.608	Cu. M.
				Grand Total Quantity		17.036	Cu. M.
4	Brick Masonry Below Ground Level In Cement Mortar 1:6						
	BRICK WALL						
	Step 1	1	65.52	0.60	0.20	7.862	Cu. M.
	Step 2	1	66.12	0.50	0.20	6.612	Cu. M.
	Step 3	1	66.72	0.40	0.20	5.338	Cu. M.
	Step 4	1	67.32	0.30	0.20	4.039	Cu. M.
				Total Quantity		23.851	Cu. M.
5	Brick Masonry Above Ground Level In Cement Mortar 1:6						
	Brick Wall	1	67.74	0.23	3.05	47.520	Cu. M.
	Entry Stair	1	8.09	0.60	0.15	0.728	Cu. M.

		1	8.09	0.30	0.15	0.364	Cu. M.
	Parapet Wall	1	41.68	0.23	0.90	8.628	Cu. M.
					Total Quantity	57.240	Cu. M.
	Deduction						
	For Door, Window And Ventilation						
	D	1	1.00	0.23	2.10	0.483	Cu. M.
	D1	4	0.90	0.23	2.10	1.739	Cu. M.
	D2	2	0.75	0.23	2.10	0.725	Cu. M.
	W	1	1.80	0.23	1.20	0.497	Cu. M.
	W1	7	1.20	0.23	1.20	2.318	Cu. M.
	V	2	0.60	0.23	0.60	0.166	Cu. M.
	R.C.C. Lintel And Sill						
	D	1	1.30	0.23	0.15	0.045	Cu. M.
	D1	4	1.20	0.23	0.15	0.166	Cu. M.
	D2	2	1.05	0.23	0.15	0.072	Cu. M.
	W	1	2.10	0.23	0.15	0.072	Cu. M.
	W1	7	1.50	0.23	0.15	0.362	Cu. M.
	V	2	0.90	0.23	0.15	0.062	Cu. M.
					Total Quantity	6.707	Cu. M.
					Net Quantity	50.533	Cu. M.
6	Smooth Plaster Inside The Rooms And Ceilings In C:M 1:3 12 mm Thickness						
	Cashier Room	2	3.74		3.05	22.814	Sp. M.
		2		3.70	3.05	22.570	Sp. M.
	Store Room	2	2.40		3.05	14.640	Sp. M.
		2		3.70	3.05	22.570	Sp. M.
	Manager Office	2	3.60		3.05	21.960	Sp. M.
		2		3.70	3.05	22.570	Sp. M.
	WATER Room	2	2.20		3.05	13.420	Sp. M.
		2		1.15	3.05	7.015	Sp. M.
	Toilet	2	2.20		3.05	13.420	Sp. M.
		2		1.43	3.05	8.723	Sp. M.
	Public Post Counter	2	3.20		3.05	19.520	Sp. M.
		2		3.20	3.05	19.520	Sp. M.
	Waiting Area	2	7.50		3.05	45.750	Sp. M.
		2		2.81	3.05	17.141	Sp. M.
		2	3.43		3.05	20.923	Sp. M.
					Total Quantity	292.556	Sp. M.
	Ground Floor Ceiling						
	Cashier Room	1	3.74	3.70		13.838	Sp. M.
	Store Room	1	2.40	3.70		8.880	Sp. M.
	Manager Office	1	3.60	3.70		13.320	Sp. M.
	WATER Room	1	2.20	3.70		8.140	Sp. M.

	Toilet	1	2.20	1.15		2.530	Sp. M.
	Public Post Counter	1	3.20	1.43		4.576	Sp. M.
	Waiting Area	1	7.50	2.81		21.075	Sp. M.
		1	3.43	4.07		13.960	Sp. M.
				Total Quantity		86.319	Sp. M.
	Deduction						
	D	1	1.00		2.10	2.100	Sp. M.
	D1	8	0.90		2.10	15.120	Sp. M.
	D2	4	0.75		2.10	6.300	Sp. M.
	W	0.5	1.80		1.20	1.080	Sp. M.
	W1	3.5	1.20		1.20	5.040	Sp. M.
				Total Quantity		29.640	Sp. M.
				Net Quantity		349.235	Sp. M.
7	Outer Plaster In C:M 1:3 20 mm Thickness						
	Brick Wall-1						
	Horizontal Wall	1	21.32		4.50	95.940	Sp. M.
	Vertical Wall	1		21.26	4.50	95.670	Sp. M.
				Total Quantity		191.610	Sp. M.
	Deduction						
	D	1	1.00		2.10	2.100	Sp. M.
	W	0.5	1.80		1.20	1.080	Sp. M.
	W1	3.5	1.20		1.20	5.040	Sp. M.
				Total Quantity		7.140	Sp. M.
				Net Quantity		184.470	Sp. M.
8	Earth Filling						
	Cashier Room	1	3.74	3.70	0.30	4.151	Cu. M.
	Store Room	1	2.40	3.70	0.30	2.664	Cu. M.
	Manager Office	1	3.60	3.70	0.30	3.996	Cu. M.
	Water Room	1	2.20	3.70	0.30	2.442	Cu. M.
	Toilet	1	2.20	1.15	0.30	0.759	Cu. M.
	Public Post Counter	1	3.20	1.43	0.30	1.373	Cu. M.
	Waiting Area	1	7.50	2.81	0.30	6.323	Cu. M.
		1	3.43	4.07	0.30	4.188	Cu. M.
				Total Quantity		25.896	Cu. M.
9	Brick Bat Lime Concrete(B.B.L.C.)						
	Cashier Room	1	3.74	3.70	0.10	1.384	Cu. M.
	Store Room	1	2.40	3.70	0.10	0.888	Cu. M.
	Manager Office	1	3.60	3.70	0.10	1.332	Cu. M.
	Water Room	1	2.20	3.70	0.10	0.814	Cu. M.

	Toilet	1	2.20	1.15	0.10	0.253	Cu. M.
	Public Post Counter	1	3.20	1.43	0.10	0.458	Cu. M.
	Waiting Area	1	7.50	2.81	0.10	2.108	Cu. M.
		1	3.43	4.07	0.10	1.396	Cu. M.
				Total Quantity		8.632	Cu. M.
10	Tiles Flooring						
	Toilet	1	2.20	1.15		2.530	Sp. M.
		2	2.20		2.10	9.240	Sp. M.
		2		1.15	2.10	4.830	Sp. M.
	Deduction V	1	0.60		0.60	0.360	Sp. M.
				Total Quantity		16.240	Sp. M.
	Cashier Room	1	3.74	3.70	13.84	13.838	Sp. M.
	Store Room	1	2.40	3.70	8.88	8.880	Sp. M.
	Manager Office	1	3.60	3.70	13.32	13.320	Sp. M.
	WATER Room	1	2.20	3.70	8.14	8.140	Sp. M.
	Public Post Counter	1	3.20	1.43	4.58	4.576	Sp. M.
	Waiting Area	1	7.50	2.81	21.08	21.075	Sp. M.
		1	3.43	4.07	13.96	13.960	Sp. M.
				Total Quantity		100.029	Sq. M.
11	Marble Sills For Stair, Door, Window and Ventilation						
	Entry Stair	2	8.84	0.23		4.066	Sq. M.
	Door, Window, Ventilation						
	D	1	1.00	0.23		0.230	Sp. M.
	D1	4	0.90	0.23		0.828	Sp. M.
	D2	2	0.75	0.23		0.345	Sp. M.
	W	2	1.80	0.23		0.828	Sp. M.
		2		0.23	1.20	0.552	Sp. M.
	W1	14	1.20	0.23		3.864	Sp. M.
		14		0.23	1.20	3.864	Sp. M.
	V	4	0.60	0.23		0.552	Sp. M.
		4		0.23	0.60	0.552	Sp. M.
				Total Quantity		11.615	Sp. M.
				Grand Total Quantity		11.615	Sq. M.
12	Wood Work For Doors						
	D	1	1.00		2.10	2.100	Sp. M.
	D1	4	0.90		2.10	7.560	Sp. M.
	D2	2	0.75		2.10	3.150	Sp. M.
				Total Quantity		12.810	Sp. M.

13	Aluminium Section Work For Window And Ventilation						
	W	1	1.50		1.20	1.800	Sp. M.
	W1	7	1.20		1.20	10.080	Sp. M.
	V	2	0.60		0.60	0.720	Sp. M.
				Total Quantity		12.600	Sq. M.
14	R.C.C. Column						
	C1	1	0.30	0.30	3.50	0.315	Cu. M.
	Footing	1	0.60	0.60	0.60	0.216	Cu. M.
				Total Quantity		0.531	Cu. M.
15	Fibber Weather Shed						
		1	2.70	3.43		9.261	Sq. M.
				Total Quantity		9.261	Sq. M.

Abstract sheet for Post Office					
Sr. No.	Item Description	Unit	Rate	Quantity	Amount in Rs
1	Excavation for foundation	Cu.M.	₹ 95	52.188	₹ 4,958
2	Providing and laying Plain cement concrete work 1:3:6	Cu.M.	₹ 3,000	6.309	₹ 18,927
3	Providing and laying cement concrete work 1:2:4 (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up to floor two level.	Cu.M.	₹ 8,800	17.567	₹ 1,54,590
4	Brick work in foundation and plinth	Cu.M.	₹ 3,200	23.851	₹ 76,323
5	Brick work in Super Structure	Cu.M.	₹ 3,500	50.533	₹ 1,76,866
6	Providing 12mm thick cement plaster in single coat for interior plastering Cement mortar 1:3 (1-cement:3-sand)	Sq.M.	₹ 150	349.235	₹ 52,385
7	Applying two coats of Birla (white cement based) or Asian (acrylic lapy- putty) or equivalent	Sq.M.	₹ 55	349.235	₹ 19,208
8	Providing 20 mm thick double coat mala cement plaster in cement mortar (1 Cement : 3 coarse sand)	Sq.M.	₹ 200	184.470	₹ 36,894
9	Finishing wall with weather proof exterior emulsion paint on wall surface	Sq.M.	₹ 80	184.470	₹ 14,758
10	Filling in foundation and plinth with murrum	Cu.M.	₹ 287	25.896	₹ 7,432
11	Providing and laying Brick bat cement concrete work 1:3:6 and curing complete	Cu.M.	₹ 2,000	8.632	₹ 17,264
12	P & L 24" x 24" vitrified 8 mm thick tile flooring	Sq.M.	₹ 1,019	100.029	₹ 1,01,930
13	P & L 10 mm thick Marble Sill	Sq.M.	₹ 800	11.615	₹ 9,292
14	Providing and fixing of wooden Doors	Sq.M.	₹ 5,000	12.810	₹ 64,050
15	Providing and fixing aluminium section of size complete for Fix window.	Sq.M.	₹ 2,000	12.600	₹ 25,200
16	Providing and Fixing 6 mm thick Lexan Polycarbonate multi wall roofing sheet fixed	Sq.M.	₹ 1,685	9.261	₹ 15,605

	with hilti screw and rubber silicon sealer and aluminium strip of size 50 x 3 mm etc complete as directed by Engineer in charge.				
				Total	₹ 7,95,680
				add 2.5 % for Electrical wiring material and Plug fitting	₹ 19,892
				add 2.5 % for Water Supply and sanitation material and fitting	₹ 19,892
				add 5 % Contingencies	₹ 39,784
				Grand Total	₹ 8,75,248
				Say	₹ 9,20,000

8.1.3 Social design (Civil) –

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Quantity Sheet Of Gram Panchayat							
Sr. No	Item Description	No	Length M	Breath M	Height M	Quantity	
1	Earthwork In Excavation For Foundation And P.C.C.						
	Brick Wall Foundation	1	60.63	0.90	0.90	49.110	Cu. M.
	Entry Stair 1	1	3.00	0.75	0.10	0.225	Cu. M.
				Total Quantity		49.335	Cu. M.
2	Plain Cement Concrete (P. C. C.)						
	Brick Wall Foundation	1	60.63	0.90	0.10	5.457	Cu. M.
	Entry Stair 1	1	3.00	0.75	0.10	0.225	Cu. M.
				Total Quantity		5.682	Cu. M.
3	R.C.C. Work Above Plinth Level Up To First Floor Level C:S:A 1:2:4						
	R.C.C. Lintel And Sill						
	MD	1	1.80	0.23	0.15	0.062	Cu. M.
	D1	2	1.20	0.23	0.15	0.083	Cu. M.
	D2	2	1.05	0.23	0.15	0.072	Cu. M.
	W1	8	2.10	0.53	0.15	1.336	Cu. M.
	W2	2	1.80	0.53	0.15	0.286	Cu. M.
	V	2	0.90	0.23	0.15	0.062	Cu. M.
	Gap 1	2	1.17	0.23	0.15	0.081	Cu. M.
	Gap2	2	1.00	0.23	0.15	0.069	Cu. M.
				Total Quantity		2.051	Cu. M.
	R.C.C. Slab	1	8.00	11.00	0.15	13.200	Cu. M.
				Total Quantity		15.251	Cu. M.
4	Brick Masonry Below Ground Level In Cement Mortar 1:6						
	BRICK WALL						
	Step 1	1	62.73	0.60	0.20	7.528	Cu. M.

	Step 2	1	63.43	0.50	0.20	6.343	Cu. M.
	Step 3	1	64.13	0.40	0.20	5.130	Cu. M.
	Step 4	1	64.83	0.30	0.20	3.890	Cu. M.
					Total Quantity	22.891	Cu. M.
5	Brick Masonry Above Ground Level In Cement Mortar 1:6						
	Brick Wall	1	65.32	0.23	3.00	45.071	Cu. M.
	Entry Stair	1	2.70	0.60	0.15	0.243	Cu. M.
		1	2.10	0.30	0.15	0.095	Cu. M.
	Parapet Wall	1	37.08	0.23	0.90	7.676	Cu. M.
					Total Quantity	53.084	Cu. M.
	Deduction						
	For Door, Window And Ventilation						
	MD	1	1.50	0.23	2.10	0.725	Cu. M.
	D1	2	0.90	0.23	2.10	0.869	Cu. M.
	D2	2	0.75	0.23	2.10	0.725	Cu. M.
	W1	8	1.50	0.23	1.20	3.312	Cu. M.
	W2	2	1.20	0.23	1.20	0.662	Cu. M.
	V	2	0.60	0.23	0.60	0.166	Cu. M.
	Open Gape 1 Store	2	1.17	0.23	2.10	1.130	Cu. M.
	Open Gape 2 Office	2	1.00	0.23	2.10	0.966	Cu. M.
	R.C.C. Lintel And Sill						
	MD	1	1.80	0.23	0.15	0.062	Cu. M.
	D1	2	1.20	0.23	0.15	0.083	Cu. M.
	D2	2	1.05	0.23	0.15	0.072	Cu. M.
	W1	8	2.10	0.23	0.15	0.580	Cu. M.
	W2	2	1.80	0.23	0.15	0.124	Cu. M.
	V	2	0.90	0.23	0.15	0.062	Cu. M.
	Gap 1	2	1.47	0.23	0.15	0.101	Cu. M.
	Gap2	2	1.30	0.23	0.15	0.090	Cu. M.
					Total Quantity	9.639	Cu. M.
					Net Quantity	43.445	Cu. M.
6	Smooth Plaster Inside The Rooms And Ceilings In C:M 1:3 12 mm Thickness						
	Toilet	4	1.66		3.00	19.920	Sp. M.
		4		1.54	3.00	18.480	Sp. M.
	Store Room	4	1.77		3.00	21.240	Sp. M.
		4		1.54	3.00	18.480	Sp. M.
	Sarpanch / Talati Officer Office	4	3.65		3.00	43.800	Sp. M.
		4		6.00	3.00	72.000	Sp. M.
	Waiting Are	2	7.53		3.00	45.180	Sp. M.
		2		2.54	3.00	15.240	Sp. M.

				Total Quantity		254.340	Sp. M.
	Ground Floor Ceiling						
	Toilet	2	1.66	1.54		5.113	Sp. M.
	Store Room	2	1.77	1.54		5.452	Sp. M.
	Sarpanch / Talati Officer Office	2	3.65	6.00		43.800	Sp. M.
	Waiting Are	1	7.53	2.54		19.126	Sp. M.
				Total Quantity		73.491	Sp. M.
	Deduction						
	MD	1	1.50		2.10	3.150	Sp. M.
	D1	4	0.90		2.10	7.560	Sp. M.
	D2	4	0.75		2.10	6.300	Sp. M.
	W1	4	1.50		1.20	7.200	Sp. M.
	W2	2	1.20		1.20	2.880	Sp. M.
	Gap 1	4	1.17		2.10	9.828	Sp. M.
	Gap2	4	1.00		2.10	8.400	Sp. M.
				Total Quantity		45.318	Sp. M.
				Net Quantity		282.513	Sp. M.
7	Outer Plaster In C:M 1:3 20 mm Thickness						
	Brick Wall-1						
	Horizontal Wall	1	16.00		4.50	72.000	Sp. M.
	Vertical Wall	1		22.00	4.50	99.000	Sp. M.
				Total Quantity		171.000	Sp. M.
	Deduction						
	MD	1	1.50		2.10	3.150	Sp. M.
	W1	4	1.50		1.20	7.200	Sp. M.
				Total Quantity		10.350	Sp. M.
				Net Quantity		160.650	Sp. M.
8	Earth Filling						
	Toilet	2	1.66	1.54	0.30	1.534	Cu. M.
	Store Room	2	1.77	1.54	0.30	1.635	Cu. M.
	Office	2	3.65	6.00	0.30	13.140	Cu. M.
	Waiting Are	1	7.53	2.54	0.30	5.738	Cu. M.
				Total Quantity		16.309	Cu. M.
9	Brick Bat Lime Concrete(B.B.L.C.)						
	Toilet	2	1.66	1.54	0.10	0.511	Cu. M.
	Store Room	2	1.77	1.54	0.10	0.545	Cu. M.
	Office	2	3.65	6.00	0.10	4.380	Cu. M.

	Waiting Are	1	7.53	2.54	0.10	1.913	Cu. M.
				Total Quantity		7.349	Cu. M.
10	Tiles Flooring						
	Toilet	2	1.66	1.54		2.556	Sp. M.
		4	1.66		2.10	13.944	Sp. M.
		4		1.54	2.10	12.936	Sp. M.
	Deduction V	2	0.60		0.60	0.720	Sp. M.
				Total Quantity		26.160	Sp. M.
	Store Room	2	1.77	1.54		2.726	Sp. M.
	Office	2	3.65	6.00		21.900	Sp. M.
	Waiting Are	1	7.53	2.54		19.126	Sp. M.
				Total Quantity		72.468	Sq. M.
11	Marble Sills For Stair, Door, Window And Ventilation						
	Entry Stair	1	3.00	0.30		0.900	Cu. M.
		1	2.10	0.30		0.630	Cu. M.
				Total Quantity		1.530	Sq. M.
	Door, Window, Ventilation						
	MD	1	1.50	0.23		0.345	Sp. M.
	D1	2	0.90	0.23		0.414	Sp. M.
	D2	2	0.75	0.23		0.345	Sp. M.
	W1	16	1.50	0.23		5.520	Sp. M.
		16		0.23	1.20	4.416	Sp. M.
	W2	4	1.20	0.23		1.104	Sp. M.
		4		0.23	1.20	1.104	Sp. M.
	V	4	0.60	0.23		0.552	Sp. M.
		4		0.23	0.60	0.552	Sp. M.
				Total Quantity		14.352	Sp. M.
				Grand Total Quantity		15.882	Sq. M.
12	Wood Work For Doors						
	Md	1	1.50		2.10	3.150	Sp. M.
	D1	2	0.90		2.10	3.780	Sp. M.
	D2	2	0.75		2.10	3.150	Sp. M.
				Total Quantity		10.080	Sp. M.
13	Aluminium Section Work For Window And Ventilation						
	W1	8	1.50		1.20	14.400	Sp. M.
	W2	2	1.20		1.20	2.880	Sp. M.
	V	2	0.60		0.60	0.720	Sp. M.

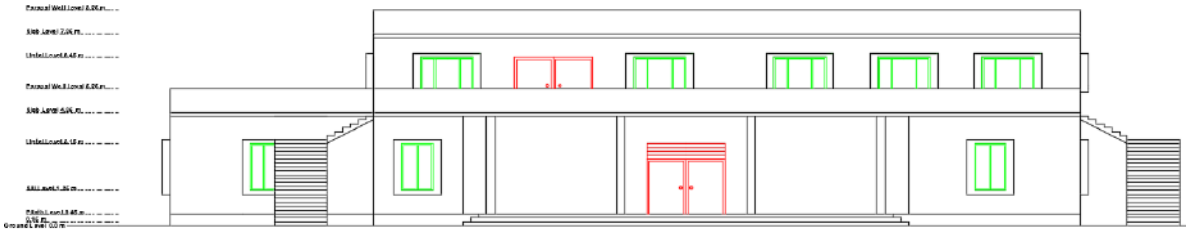
	Total Quantity	18.000	Sq. M.

Abstract sheet for Gram Panchayat					
Sr. No.	Item Description	Unit	Rate	Quantity	Amount in Rs
1	Excavation for foundation	Cu.M.	₹ 95	49.335	₹ 4,687
2	Providing and laying Plain cement concrete work 1:3:6	Cu.M.	₹ 3,000	5.682	₹ 17,046
3	Providing and laying cement concrete work 1:2:4 (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up to floor two level.	Cu.M.	₹ 8,800	15.251	₹ 1,34,209
4	Brick work in foundation and plinth	Cu.M.	₹ 3,200	22.891	₹ 73,251
5	Brick work in Super Structure	Cu.M.	₹ 3,500	43.445	₹ 1,52,058
6	Providing 12mm thick cement plaster in single coat for interior plastering Cement mortar 1:3 (1-cement:3-sand)	Sq.M.	₹ 150	282.513	₹ 42,377
7	Applying two coats of Birla (white cement based) or Asian (acrylic lapy- putty) or equivalent	Sq.M.	₹ 55	282.513	₹ 15,538
8	Providing 20 mm thick double coat mala cement plaster in cement mortar (1 Cement : 3 coarse sand)	Sq.M.	₹ 200	160.650	₹ 32,130
9	Finishing wall with weather proof exterior emulsion paint on wall surface	Sq.M.	₹ 80	160.650	₹ 12,852
10	Filling in foundation and plinth with murrum	Cu.M.	₹ 287	16.309	₹ 4,681
11	Providing and laying Brick bat cement concrete work 1:3:6 and curing complete	Cu.M.	₹ 2,000	7.349	₹ 14,698
12	P & L 24" x 24" vitrified 8 mm thick tile flooring	Sq.M.	₹ 1,019	72.468	₹ 73,845
13	P & L 10 mm thick Marble Sill	Sq.M.	₹ 800	15.882	₹ 12,706
14	Providing and fixing of wooden Doors	Sq.M.	₹ 5,000	10.080	₹ 50,400
15	Providing and fixing aluminium section of size complete for Fix window.	Sq.M.	₹ 2,000	18.000	₹ 36,000
				Total	₹ 6,76,477
				add 2.5 % for Electrical wiring material and Plug fitting	₹ 16,912
				add 2.5 % for Water Supply and sanitation material and fitting	₹ 16,912
				add 5 % Contingencies	₹ 33,824
				Grand Total	₹ 7,44,124
				Say	₹ 7,50,000

8.1.4 Socio-Cultural design (Civil)

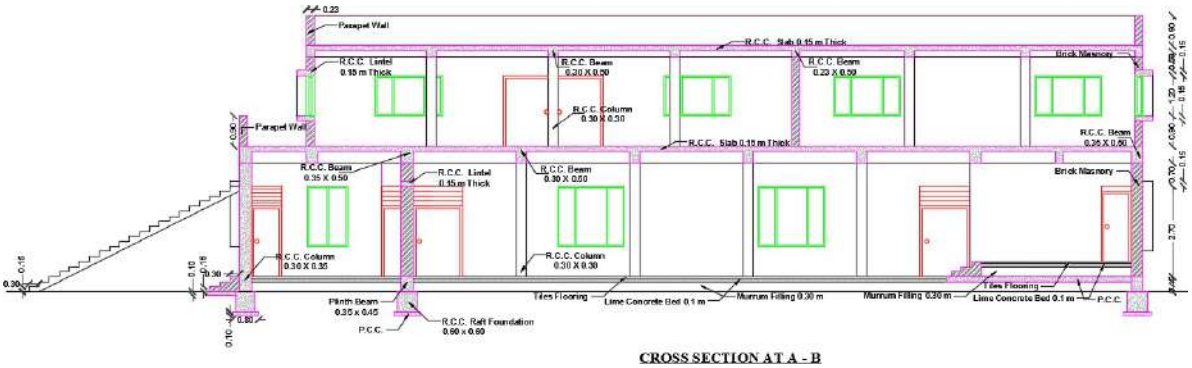
Community Hall cum Librar

GROUND FLOOR PLAN



FRONT ELEVATION

FIRST FLOOR PLAN



CROSS SECTION AT A - B

Quantity Sheet of Community Hall cum Library Hall							
Sr. No.	Item Description	No.	Length M	Breath M	Height M	Quantity	
1	Earthwork in Excavation for Foundation and P.C.C.						
	Column Foundation	72	0.80	0.80	0.70	32.256	Cu. M.
	Entry Stair	1	17.75	0.90	0.10	1.598	Cu. M.
				Total Quantity		33.854	Cu. M.
2	Plain Cement Concrete (P. C. C.)						
	Column Foundation	72	0.80	0.80	0.10	4.608	Cu. M.
	Entry Stair	1	17.75	0.90	0.10	1.598	Cu. M.
	Stage Stair	1	9.40	0.90	0.10	0.846	Cu. M.
	Plinth Beam	1	596.03	0.50	0.10	29.802	Cu. M.
				Total Quantity		36.853	Cu. M.
3	R.C.C. Work up to Plinth Level C:S:A 1:2:4						
	Raft Footing For Column Foundation	72	0.60	0.60	0.60	15.552	Cu. M.
	Plinth Beam	1	596.03	0.35	0.45	93.875	Cu. M.
				Total Quantity		109.427	Cu. M.
4	R.C.C. Work above Plinth Level up to First Floor Level C:S:A 1:2:4						
	R.C.C. Column At Ground Floor						
	C1	20	0.35	0.35	3.40	8.330	Cu. M.
	C2	25	0.30	0.35	3.40	8.925	Cu. M.
	C3	12	0.30	0.30	3.40	3.672	Cu. M.
	C4	10	0.23	0.35	3.40	2.737	Cu. M.
	C5	10	0.23	0.23	3.40	1.799	Cu. M.
				Total Quantity		25.463	Cu. M.
	R.C.C. Lintel And Sill						
	M.D.	1	3.30	0.35	0.15	0.173	Cu. M.
	D1	9	1.80	0.35	0.15	0.851	Cu. M.
	D2	2	1.20	0.35	0.15	0.126	Cu. M.
	D3	4	1.20	0.23	0.15	0.166	Cu. M.
	D4	2	1.20	0.35	0.15	0.126	Cu. M.
	D5	4	1.05	0.23	0.15	0.145	Cu. M.
	W1	34	2.60	0.65	0.15	8.619	Cu. M.
	W2	4	1.80	0.65	0.15	0.702	Cu. M.
	W3	2	1.80	0.23	0.15	0.124	Cu. M.
	V	1	10.00	0.35	0.15	0.525	Cu. M.
				Total Quantity		11.556	Cu. M.
	R.C.C. Beam At Ground Floor						
	B1	1	296.68	0.35	0.35	36.343	Cu. M.

	B2	1	215.59	0.30	0.35	22.637	Cu. M.
	B3	1	81.56	0.23	0.35	6.566	Cu. M.
				Total Quantity		65.546	Cu. M.
	R.C.C. Slab	1	27.18	27.00	0.15	110.079	Cu. M.
		1	7.83	25.00	0.15	29.363	Cu. M.
				Total Quantity		139.442	Cu. M.
				Net Quantity		242.006	Cu. M.
5	Brick Masonry below Plinth Level in Cement Mortar 1:6						
	Entry Stair	1	17.15	0.9	0.15	2.315	Cu. M.
		1	16.55	0.6	0.15	1.490	Cu. M.
		1	15.95	0.3	0.15	0.718	Cu. M.
				Total Quantity		4.523	Cu. M.
6	Brick Masonry above Ground Level in Cement Mortar 1:6						
	Brick Wall-1 (0.35 Wall)	1	206.38	0.35	3.40	245.592	Cu. M.
	Brick Wall -2 (0.23 Wall)	1	44.27	0.23	3.40	34.619	Cu. M.
	Brick Wall -3 (Stage Wall)	1	14.65	0.23	0.45	1.516	Cu. M.
	Stage Entry Stair	1	8.60	0.30	0.15	0.387	Cu. M.
		1	9.20	0.60	0.15	0.828	Cu. M.
		1	9.80	0.90	0.15	1.323	Cu. M.
				Total Quantity		284.266	Cu. M.
	Deduction						
	For Door, Window And Ventilation						
	M.D.	1	3.00	0.35	2.70	2.835	Cu. M.
	D1	9	1.50	0.35	2.70	12.758	Cu. M.
	D2	2	0.90	0.35	2.70	1.701	Cu. M.
	D3	4	0.90	0.23	2.70	2.236	Cu. M.
	D4	2	0.90	0.35	2.25	1.418	Cu. M.
	D5	4	0.75	0.35	2.70	2.835	Cu. M.
	W1	17	2.00	0.35	1.80	21.420	Cu. M.
	W2	2	1.20	0.35	1.80	1.512	Cu. M.
	W3	1	1.20	0.23	1.80	0.497	Cu. M.
	V	10	0.60	0.35	0.60	1.260	Cu. M.
	R.C.C. Column At Ground Floor						
	C1	20	0.35	0.35	3.40	8.330	Cu. M.
	C2	25	0.30	0.35	3.40	8.925	Cu. M.
	C3	12	0.30	0.30	3.40	3.672	Cu. M.
	C4	10	0.23	0.35	3.40	2.737	Cu. M.
	C5	10	0.23	0.23	3.40	1.799	Cu. M.
	R.C.C. Lintel And Sill						
	M.D.	1	3.30	0.35	0.15	0.173	Cu. M.

	D1	9	1.80	0.35	0.15	0.851	Cu. M.
	D2	2	1.20	0.35	0.15	0.126	Cu. M.
	D3	4	1.20	0.23	0.15	0.166	Cu. M.
	D4	2	1.20	0.35	0.15	0.126	Cu. M.
	D5	4	1.05	0.23	0.15	0.145	Cu. M.
	W1	34	2.60	0.35	0.15	4.641	Cu. M.
	W2	4	1.80	0.35	0.15	0.378	Cu. M.
	W3	2	1.80	0.23	0.15	0.124	Cu. M.
	V	1	10.00	0.35	0.15	0.525	Cu. M.
				Total Quantity		81.187	Cu. M.
				Net Quantity		203.078	Cu. M.
7	R.C.C. above Ground Floor Slab 1:2:4						
	R.C.C. Column At First Floor						
	C6	33	0.30	0.30	2.65	7.871	Cu. M.
	R.C.C. Lintel And Sill						
	M.D.	2	3.30	0.23	0.15	0.228	Cu. M.
	D6	5	1.80	0.23	0.15	0.311	Cu. M.
	W4	38	2.60	0.63	0.15	9.337	Cu. M.
				Total Quantity		9.875	Cu. M.
	R.C.C. Beam At Ground Floor						
	B4	1	154.47	0.23	0.20	7.106	Cu. M.
	B5	1	297.47	0.30	0.20	17.848	Cu. M.
				Total Quantity		24.954	Cu. M.
	R.C.C. Slab	1	27.18	25.00	0.15	101.925	Cu. M.
				Net Quantity		144.624	Cu. M.
8	Brick Masonry above Ground Floor Slab in Cement Mortar 1:6						
	Brick Wall-4 (0.23 Wall)	1	154.81	0.23	2.65	94.357	Cu. M.
	Brick Wall -5 (Parapet Wall Above G.F. Slab)	1	67.37	0.23	0.90	13.946	Cu. M.
	Brick Wall -6 (Parapet Wall Above F.F. Slab)	1	51.72	0.23	0.90	10.706	Cu. M.
				Total Quantity		119.008	Cu. M.
	Deduction						
	For Door, Window And Ventilation						
	M.D.	2	3.00	0.23	2.10	2.898	Cu. M.
	D6	5	1.50	0.23	2.10	3.623	Cu. M.
	W4	19	2.00	0.23	1.20	10.488	Cu. M.
	R.C.C. Lintel And Sill						
	M.D.	2	3.30	0.23	0.15	0.228	Cu. M.
	D6	5	1.80	0.23	0.15	0.311	Cu. M.

	W4	38	2.60	0.23	0.15	3.409	Cu. M.
				Total Quantity		20.955	Cu. M.
				Net Quantity		98.053	Cu. M.
9	Smooth Plaster Inside the Rooms and Ceilings in C:M 1:3 12 mm Thickness						
	Ground Floor Walls						
	Kitchen	2	7.46		3.75	55.950	Sp. M.
		2		4.48	3.75	33.600	Sp. M.
	Dining Hall	2	7.48		3.75	56.100	Sp. M.
		2		19.48	3.75	146.100	Sp. M.
	Toilet	4	1.04		3.75	15.600	Sp. M.
		4		2.04	3.75	30.600	Sp. M.
	Changing Room	4	1.04		3.75	15.600	Sp. M.
		4		2.21	3.75	33.150	Sp. M.
	Dressing Room	4	2.71		3.75	40.650	Sp. M.
		4		4.48	3.75	67.200	Sp. M.
	Performing Stage	2	14.65		3.75	109.875	Sp. M.
		2		4.43	3.75	33.225	Sp. M.
	Hall	2	14.65		3.75	109.875	Sp. M.
		2		17	3.75	127.500	Sp. M.
	Admin Office	2	2.65		3.75	19.875	Sp. M.
		2		3.65	3.75	27.375	Sp. M.
	Men’s Toilet	2	2.6		3.75	19.500	Sp. M.
		2		3.66	3.75	27.450	Sp. M.
	Ladies Toilet	2	2.6		3.75	19.500	Sp. M.
		2		3.66	3.75	27.450	Sp. M.
	Water Room	2	2.6		3.75	19.500	Sp. M.
		2		2.77	3.75	20.775	Sp. M.
	Equipment Room	2	2.71		3.75	20.325	Sp. M.
		2		4.48	3.75	33.600	Sp. M.
	Walkway And Open Area	1	112.43		3.75	421.613	Sp. M.
				Total Quantity		1498.388	Sp. M.
	Ground Floor Ceiling						
	Kitchen	1	7.46	4.48		33.421	Sp. M.
	Dining Hall	1	7.48	19.48		145.710	Sp. M.
	Toilet	2	1.04	2.04		4.243	Sp. M.
	Changing Room	2	1.04	2.21		4.597	Sp. M.
	Dressing Room	2	2.71	4.48		24.282	Sp. M.
	Performing Stage	1	14.65	4.43		64.900	Sp. M.
	Hall	1	14.65	17		249.050	Sp. M.
	Admin Office	1	2.65	3.65		9.673	Sp. M.
	Men’s Toilet	1	2.6	3.66		9.516	Sp. M.
	Ladies Toilet	1	2.6	3.66		9.516	Sp. M.
	Water Room	1	2.6	2.77		7.202	Sp. M.

	Equipment Room	1	2.71	4.48		12.141	Sp. M.
	Walkway And Open Area	1	23.6	5.13		121.068	Sp. M.
		1	7.15	5.88		42.042	Sp. M.
		1	3.98	17		67.660	Sp. M.
		1	4.33	11.12		48.150	Sp. M.
				Total Quantity		853.169	Sp. M.
	Ground Floor Column						
	C1	8	0.35		3.75	10.500	Sp. M.
	C2	4	0.3		3.75	4.500	Sp. M.
		4		0.35	3.75	5.250	Sp. M.
	C3	52	0.3		3.75	58.500	Sp. M.
				Total Quantity		78.750	Sp. M.
	First Floor Walls						
	Library Hall	2	13.36		2.85	76.152	Sp. M.
		2		10.04	2.85	57.228	Sp. M.
	Computer Lab	2	13.13		2.85	74.841	Sp. M.
		2		12.16	2.85	69.312	Sp. M.
	Reading Room	2	13.13		2.85	74.841	Sp. M.
		2		12.16	2.85	69.312	Sp. M.
	Reception Area	2	13.36		2.85	76.152	Sp. M.
		2		14.27	2.85	81.339	Sp. M.
	Open Area For Reading	2	7.6		0.9	13.680	Sp. M.
		1		24.54	0.9	22.086	Sp. M.
				Total Quantity		614.943	Sp. M.
	Parapet Wall At First Floor	2	26.72		0.9	48.096	Sp. M.
		2		24.54	0.9	44.172	Sp. M.
				Total Quantity		92.268	Sp. M.
	Parapet Wall At Ground Floor	1	26.95		0.9	24.255	Sp. M.
	First Floor Ceiling						
	Library Hall	1	13.36	10.04		134.134	Sp. M.
	Computer Lab	1	13.13	12.16		159.661	Sp. M.
	Reading Room	1	13.36	12.16		162.458	Sp. M.
	Reception Area	1	13.13	14.27		187.365	Sp. M.
				Total Quantity		643.618	Sp. M.
	Ground Floor Column						
	C6	66	0.30		2.85	56.430	Sp. M.
		66		0.30	2.85	56.430	Sp. M.
				Total Quantity		112.860	Sp. M.
				Grand Total Quantity		3918.251	Sp. M.
	Deduction						
	Ground Floor						
	M.D.	2	3.00		2.70	16.200	Sp. M.

	D1	18	1.50		2.70	72.900	Sp. M.
	D2	4	0.90		2.70	9.720	Sp. M.
	D3	8	0.90		2.70	19.440	Sp. M.
	D4	4	0.90		2.25	8.100	Sp. M.
	D5	8	0.75		2.70	16.200	Sp. M.
	W1	11.5	2.00		1.80	41.400	Sp. M.
	W2	1	1.20		1.80	2.160	Sp. M.
	W3	1	1.20		1.80	2.160	Sp. M.
	First Floor						
	M.D.	2	3.00		2.10	12.600	Sp. M.
	D6	10	1.50		2.10	31.500	Sp. M.
	W4	9.5	2.00		1.20	22.800	Sp. M.
				Total Quantity		255.180	Sp. M.
				Net Quantity		3663.071	Sp. M.
10	Outer Plaster in C:M 1:3 20 mm Thickness						
	Ground Floor						
	Horizontal Wall	1	52.86		4.35	229.941	Sp. M.
	Vertical Wall	1		54	4.35	234.900	Sp. M.
	First Floor						
	Horizontal Wall	2	27.18		3	163.080	Sp. M.
	Vertical Wall	2		25	3	150.000	Sp. M.
	Parapet Wall						
		2	7.83		0.9	14.094	Sp. M.
		3	27.18		0.9	73.386	Sp. M.
		3		25	0.9	67.500	Sp. M.
				Total Quantity		932.901	Sp. M.
	Deduction						
	Ground Floor						
	W1	6.5	2.00		1.80	23.400	Sp. M.
	W2	1	1.20		1.80	2.160	Sp. M.
	First Floor						
	M.D.	2	3.00		2.10	12.600	Sp. M.
	W4	9.5	2.00		1.20	22.800	Sp. M.
				Total Quantity		60.960	Sp. M.
				Net Quantity		871.941	Sp. M.
11	Earth Filling						
	Plinth Beam (Assume Whole Plinth Raft)	1	35	25	0.45	393.750	Cu. M.
		1	35	2	0.45	31.500	Cu. M.
	Plinth Beam (Actual)	1	596.03	0.35	0.45	93.875	Cu. M.

				Net Quantity		331.375	Cu. M.
12	Brick Bat Lime Concrete(B.B.L.C.)						
	Kitchen	1	7.46	4.48	0.1	3.342	Cu. M.
	Dining Hall	1	7.48	19.48	0.1	14.571	Cu. M.
	Toilet	2	1.04	2.04	0.1	0.424	Cu. M.
	Changing Room	2	1.04	2.21	0.1	0.460	Cu. M.
	Dressing Room	2	2.71	4.48	0.1	2.428	Cu. M.
	Performing Stage	1	14.65	4.43	0.1	6.490	Cu. M.
	Hall	1	14.65	17	0.1	24.905	Cu. M.
	Admin Office	1	2.65	3.65	0.1	0.967	Cu. M.
	Men's Toilet	1	2.6	3.66	0.1	0.952	Cu. M.
	Ladies Toilet	1	2.6	3.66	0.1	0.952	Cu. M.
	Water Room	1	2.6	2.77	0.1	0.720	Cu. M.
	Equipment Room	1	2.71	4.48	0.1	1.214	Cu. M.
	Walkway And Open Area	1	23.6	5.13	0.1	12.107	Cu. M.
		1	7.15	5.88	0.1	4.204	Cu. M.
		1	3.98	17	0.1	6.766	Cu. M.
		1	4.33	11.12	0.1	4.815	Cu. M.
				Total Quantity		85.317	Cu. M.
13	Tiles Flooring						
	Ground Floor						
	Kitchen	1	7.46	4.48		33.421	Sp. M.
	Dining Hall	1	7.48	19.48		145.710	Sp. M.
	Toilet	2	1.04	2.04		4.243	Sp. M.
	Changing Room	2	1.04	2.21		4.597	Sp. M.
	Dressing Room	2	2.71	4.48		24.282	Sp. M.
	Performing Stage	1	14.65	4.43		64.900	Sp. M.
	Hall	1	14.65	17		249.050	Sp. M.
	Admin Office	1	2.65	3.65		9.673	Sp. M.
	Men's Toilet	1	2.6	3.66		9.516	Sp. M.
	Ladies Toilet	1	2.6	3.66		9.516	Sp. M.
	Water Room	1	2.6	2.77		7.202	Sp. M.
	Equipment Room	1	2.71	4.48		12.141	Sp. M.
	Walkway And Open Area	1	23.6	5.13		121.068	Sp. M.
		1	7.15	5.88		42.042	Sp. M.
		1	3.98	17		67.660	Sp. M.
		1	4.33	11.12		48.150	Sp. M.
				Total Quantity		853.169	Sp. M.
	First Floor						
	Library Hall	1	13.36	10.04		134.134	Sp. M.
	Computer Lab	1	13.13	12.16		159.661	Sp. M.
	Reading Room	1	13.36	12.16		162.458	Sp. M.

	Reception Area	1	13.13	14.27		187.365	Sp. M.
	Open Area For Reading	1	7.60	24.54		186.504	Sp. M.
	Walkway And Open Area	1	27.18	1.77		48.109	Sp. M.
				Total Quantity		878.231	Sp. M.
				Grand Total Quantity		1731.400	Sp. M.
14	Marble Sills for Stair, Door, Window and Ventilation						
	Stair						
	Main Entry	1	17.75	0.3		5.325	Sq. M.
		1	17.15	0.3		5.145	Sq. M.
		1	16.55	0.3		4.965	Sq. M.
	Stage Entry	1	10.4	0.3		3.120	Sq. M.
		1	9.8	0.3		2.940	Sq. M.
		1	9.2	0.3		2.760	Sq. M.
	Ground To First Floor Stair	50	2	0.3		30.000	Sq. M.
		2	2	2		8.000	Sq. M.
				Total Quantity		62.255	Sq. M.
	Door, Window, Ventilation						
	M.D.	1	3.00	0.35		1.050	Sq. M.
	M.D.	2	3.00	0.23		1.380	Sq. M.
	D1	9	1.50	0.35		4.725	Sq. M.
	D2	2	0.90	0.35		0.630	Sq. M.
	D3	4	0.90	0.23		0.828	Sq. M.
	D4	2	0.90	0.35		0.630	Sq. M.
	D5	4	0.75	0.35		1.050	Sq. M.
	D6	5	1.50	0.23		1.725	Sq. M.
	W1	34	2.00	0.35		23.800	Sq. M.
		34		0.35	1.80	21.420	Sq. M.
	W2	4	1.20	0.35		1.680	Sq. M.
		4		0.35	1.80	2.520	Sq. M.
	W3	2	1.20	0.23		0.552	Sq. M.
		2		0.23	1.80	0.828	Sq. M.
	W4	38	2.00	0.23		17.480	Sq. M.
		38		0.23	1.20	10.488	Sq. M.
	V	40	0.60	0.35		8.400	Sq. M.
				Total Quantity		99.186	Sq. M.
				Grand Total Quantity		161.441	Sq. M.
15	Wood Work for Doors						
	M.D.	1	3.00		2.70	8.100	Sq. M.
	M.D.	2	3.00		2.10	12.600	Sq. M.

	D1	9	1.50		2.70	36.450	Sq. M.
	D2	2	0.90		2.70	4.860	Sq. M.
	D3	4	0.90		2.70	9.720	Sq. M.
	D4	2	0.90		2.25	4.050	Sq. M.
	D5	4	0.75		2.70	8.100	Sq. M.
	D6	5	1.50		2.10	15.750	Sq. M.
				Total Quantity		99.630	Sq. M.
16	Aluminium Section Work for Window and Ventilation						
	W1	17	2.00		1.80	61.200	Sq. M.
	W2	2	1.20		1.80	4.320	Sq. M.
	W3	1	1.20		1.80	2.160	Sq. M.
	W4	19	2.00		1.20	45.600	Sq. M.
	V	10	0.60		0.60	3.600	Sq. M.
				Total Quantity		116.880	Sq. M.
17	R.C.C. Work for Stair						
	Riser And Trade	50	2.00	0.30	0.15	4.500	Cu. M.
	Rest	2	2.00	2.00	0.15	1.200	Cu. M.
	Waist Slab	2	8.72	2.00	0.13	4.534	Cu. M.
				Total Quantity		10.234	Cu. M.

Abstract sheet for Community Hall cum Library					
Sr. No.	Item Description	Unit	Rate	Quantity	Amount in Rs
1	Excavation for foundation	Cu.M.	₹ 95	33.854	₹ 3,216
2	Providing and laying Plain cement concrete work 1:3:6	Cu.M.	₹ 3,000	36.853	₹ 1,10,559
3	Providing and laying cement concrete work 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete Including Approximate cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete	Cu.M.	₹ 8,000	109.427	₹ 8,75,416
4	Providing and laying cement concrete work 1:2:4 (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up to floor two level.	Cu.M.	₹ 8,800	393.864	₹ 34,66,003
5	Brick work in foundation and plinth	Cu.M.	₹ 3,200	4.523	₹ 14,474
6	Brick work in Super Structure	Cu.M.	₹ 3,500	301.131	₹ 10,53,959
7	Providing 12mm thick cement plaster in single coat for interior plastering Cement mortar 1:3 (1-cement:3-sand)	Sq.M.	₹ 150	3663.071	₹ 5,49,461
8	Applying two coats of Birla (white cement based) or Asian (acrylic lapy- putty) or equivalent	Sq.M.	₹ 55	3663.071	₹ 2,01,469

9	Providing 20 mm thick double coat mala cement plaster in cement mortar (1 Cement : 3 coarse sand)	Sq.M.	₹ 200	871.941	₹ 1,74,388
10	Finishing wall with weather proof exterior emulsion paint on wall surface	Sq.M.	₹ 80	871.941	₹ 69,755
11	Filling in foundation and plinth with murrum	Cu.M.	₹ 287	331.375	₹ 95,105
12	Providing and laying Brick bat cement concrete work 1:3:6 (1- Cement : 3- Coarse sand : 6- graded stone aggregates 30 mm nominal size) and curing complete	Cu.M.	₹ 2,000	85.317	₹ 1,70,634
13	P & L 24" x 24" vitrified 8 mm thick tile flooring	Sq.M.	₹ 1,019	1731.400	₹ 17,64,297
14	P & L 10 mm thick Marble Sill	Sq.M.	₹ 800	161.441	₹ 1,29,153
15	Providing and fixing of wooden Doors	Sq.M.	₹ 5,000	99.630	₹ 4,98,150
16	Providing and fixing aluminium section of size complete for Fix window.	Sq.M.	₹ 2,000	116.880	₹ 2,33,760
				Total	₹ 94,09,797
				add 2.5 % for Electrical wiring material and Plug fitting	₹ 2,35,245
				add 2.5 % for Water Supply and sanitation material and fitting	₹ 2,35,245
				add 5 % Contingencies	₹ 4,70,490
				Grand Total	₹1,03,50,777
				Say	₹1,03,51,000

8.1.5 Smart Village Design (Civil)

Skill Development Centre

Add in last page

Quantity Sheet Of Skill Development Centre							
Sr. No.	Item Description	No.	Length M	Breath M	Height M	Quantity	
1	Earthwork In Excavation For Foundation And P.C.C.						
	Brick Wall Foundation	1	95.10	0.90	0.90	77.031	Cu. M.
	Entry Stair 1	1	20.20	1.87	0.10	3.777	Cu. M.
				Total Quantity		80.808	Cu. M.
2	Plain Cement Concrete (P. C. C.)						
	Brick Wall Foundation	1	95.10	0.90	0.10	8.559	Cu. M.
	Entry Stair 1	1	20.20	1.87	0.10	3.777	Cu. M.
				Total Quantity		12.336	Cu. M.
3	R.C.C. Work Above Plinth Level Up To First Floor Level C:S:A 1:2:4						
	R.C.C. Lintel And Sill						
	D	4	1.80	0.23	0.15	0.248	Cu. M.

	D1	6	1.30	0.23	0.15	0.269	Cu. M.
	W	28	2.10	0.53	0.15	4.675	Cu. M.
				Total Quantity		5.192	Cu. M.
	R.C.C. Slab	1	18.39	6.23	0.15	17.185	Cu. M.
		2	7.43	7.59	0.15	8.459	Cu. M.
				Total Quantity		25.645	Cu. M.
				Grand Total Quantity		30.837	Cu. M.
4	Brick Masonry Below Ground Level In Cement Mortar 1:6						
	BRICK WALL						
	Step 1	1	96.00	0.60	0.20	11.520	Cu. M.
	Step 2	1	96.30	0.50	0.20	9.630	Cu. M.
	Step 3	1	96.60	0.40	0.20	7.728	Cu. M.
	Step 4	1	96.90	0.30	0.20	5.814	Cu. M.
				Total Quantity		34.692	Cu. M.
5	Brick Masonry Above Ground Level In Cement Mortar 1:6						
	Brick Wall	1	97.11	0.23	3.35	74.823	Cu. M.
	Entry Stair	2	7.59	1.20	0.15	2.732	Cu. M.
		1	5.93	0.97	0.15	0.863	Cu. M.
		2	7.59	1.45	0.15	3.302	Cu. M.
		1	5.93	1.22	0.15	1.085	Cu. M.
		2	7.59	1.70	0.15	3.871	Cu. M.
		1	5.93	1.47	0.15	1.308	Cu. M.
	Parapet Wall	1	68.72	0.23	0.90	14.225	Cu. M.
				Total Quantity		102.209	Cu. M.
	Deduction						
	For Door, Window And Ventilation						
	D	4	1.50	0.23	2.10	2.898	Cu. M.
	D1	6	1.00	0.23	2.10	2.898	Cu. M.
	W	14	1.50	0.23	1.50	7.245	Cu. M.
	R.C.C. Lintel And Sill						
	D	4	1.80	0.23	0.15	0.248	Cu. M.
	D1	6	1.30	0.23	0.15	0.269	Cu. M.
	W	28	2.10	0.53	0.15	4.675	Cu. M.
				Total Quantity		18.233	Cu. M.
				Net Quantity		83.976	Cu. M.
6	Smooth Plaster Inside The Rooms And Ceilings In C:M 1:3 12 mm Thickness						
	Workshop Classes	4	8.85		3.35	118.590	Sp. M.
		4		4.85	3.35	64.990	Sp. M.

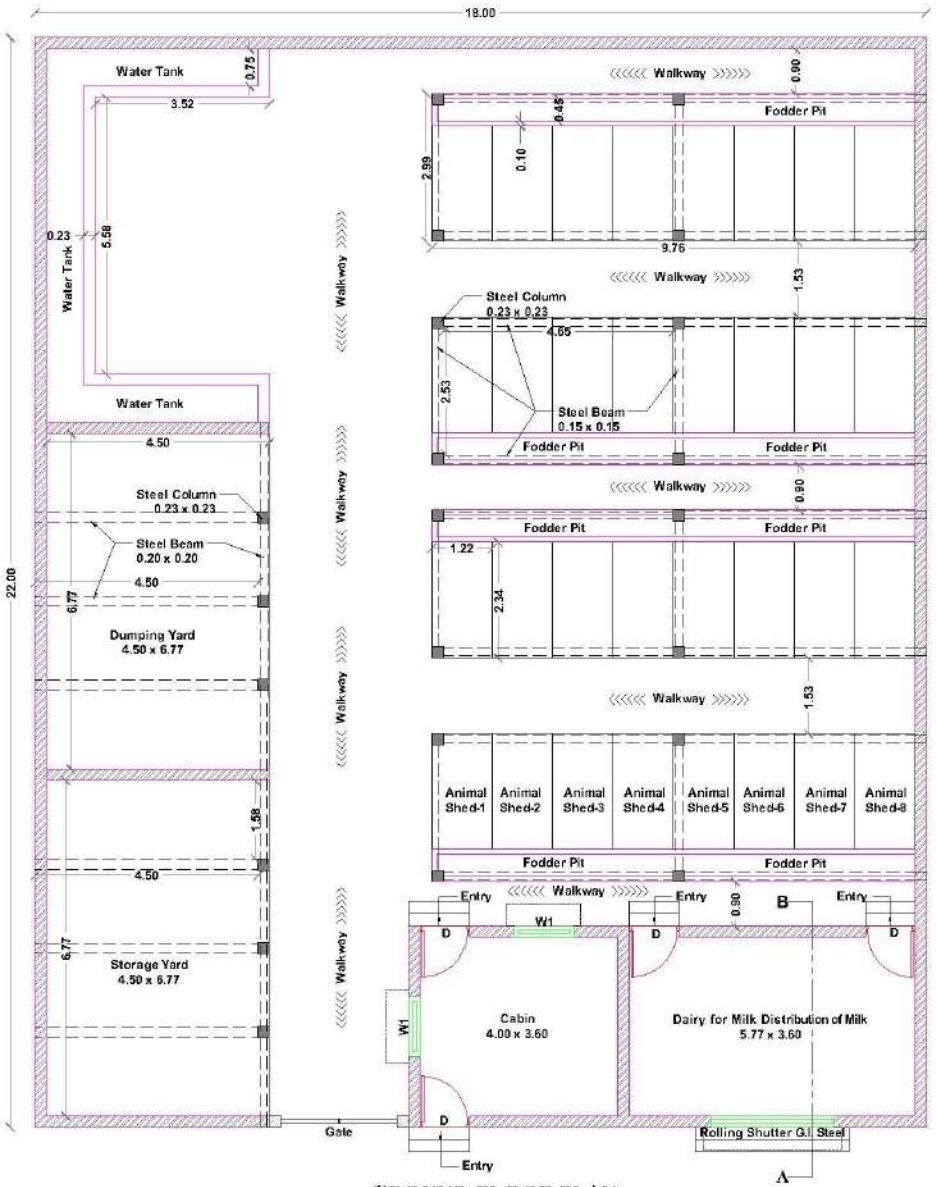
	Computer Lab	4	6.00		3.35	80.400	Sp. M.
		4		4.80	3.35	64.320	Sp. M.
	Admin Office/ Library	4	6.00		3.35	80.400	Sp. M.
		4		3.30	3.35	44.220	Sp. M.
				Total Quantity		452.920	Sp. M.
	Ground Floor Ceiling						
	Workshop Classes	2	8.85	4.85		85.845	Sp. M.
	Computer Lab	2	6.00	4.80		57.600	Sp. M.
	Admin Office/ Library	2	6.00	3.30		39.600	Sp. M.
	Walkway	2	7.59	1.20		18.216	Sp. M.
		1	5.93	0.97		5.752	Sp. M.
				Total Quantity		207.013	Sp. M.
	Deduction						
	D	4	1.50		2.10	12.600	Sp. M.
	D1	6	1.00		2.10	12.600	Sp. M.
	W	7	1.50		1.50	15.750	Sp. M.
				Total Quantity		40.950	Sp. M.
				Net Quantity		618.983	Sp. M.
7	Outer Plaster In C:M 1:3 20 mm Thickness						
	Brick Wall-1						
	Horizontal Wall	1	30.85		4.95	152.708	Sp. M.
	Vertical Wall	1		27.74	4.95	137.313	Sp. M.
	Brick Wall-2						
	Horizontal Wall	1	5.93		4.50	26.685	Sp. M.
	Vertical Wall	1		17.12	4.50	77.040	Sp. M.
				Total Quantity		393.746	Sp. M.
	Deduction						
	D	4	1.50		2.10	12.600	Sp. M.
	D1	6	1.00		2.10	12.600	Sp. M.
	W	7	1.50		1.50	15.750	Sp. M.
				Total Quantity		40.950	Sp. M.
				Net Quantity		352.796	Sp. M.
8	Earth Filling						
	Workshop Classes	2	8.85	4.85	0.30	25.754	Cu. M.
	Computer Lab	2	6.00	4.80	0.30	17.280	Cu. M.
	Admin Office/ Library	2	6.00	3.30	0.30	11.880	Cu. M.
				Total Quantity		54.914	Cu. M.
9	Brick Bat Lime Concrete(B.B.L.C.)						
	Workshop Classes	2	8.85	4.85	0.10	8.585	Cu. M.

	Computer Lab	2	6.00	4.80	0.10	5.760	Cu. M.
	Admin Office/ Library	2	6.00	3.30	0.10	3.960	Cu. M.
				Total Quantity		18.305	Cu. M.
10	Tiles Flooring						
	Workshop Classes	2	8.85	4.85		85.845	Sp. M.
	Computer Lab	2	6.00	4.80		57.600	Sp. M.
	Admin Office/ Library	2	6.00	3.30		39.600	Sp. M.
				Total Quantity		183.045	Sq. M.
11	Marble Sills For Stair, Door, Window And Ventilation						
	Walkway	2	7.59	1.20		18.216	Sp. M.
		1	5.93	0.97		5.752	Sp. M.
	Entry Stair	2	7.59	0.25		3.795	Cu. M.
		1	5.93	0.25		1.483	Cu. M.
				Total Quantity		29.246	Sq. M.
	Door, Window, Ventilation						
	D	4	1.50	0.23		1.380	Sp. M.
	D1	6	1.00	0.23		1.380	Sp. M.
	W	28	1.50	0.23		9.660	Sp. M.
		28		0.23	1.50	9.660	Sp. M.
				Total Quantity		38.906	Sp. M.
				Grand Total Quantity		68.151	Sq. M.
12	Wood Work For Doors						
	D	4	1.50		2.10	12.600	Sp. M.
	D1	6	1.00		2.10	12.600	Sp. M.
				Total Quantity		25.200	Sp. M.
13	Aluminium Section Work For Window And Ventilation						
	W	14	1.50		1.50	31.500	Sp. M.
				Total Quantity		31.500	Sq. M.

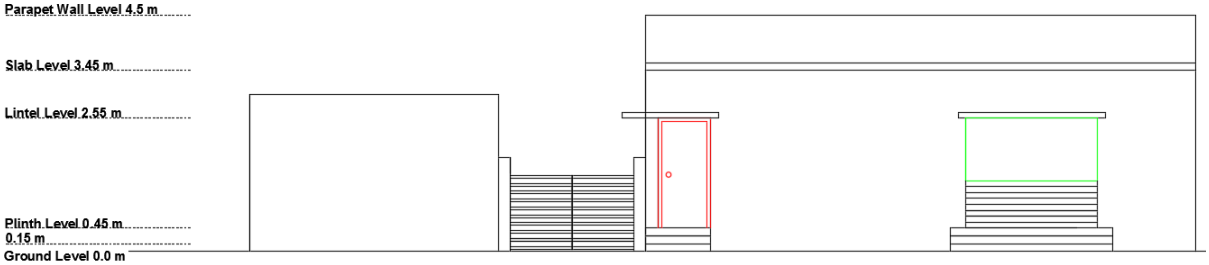
Abstract sheet for Skill Development Centre					
Sr. No.	Item Description	Unit	Rate	Quantity	Amount in Rs
1	Excavation for foundation	Cu.M.	₹ 95	80.808	₹ 7,677
2	Providing and laying Plain cement concrete work 1:3:6	Cu.M.	₹ 3,000	12.336	₹ 37,008
3	Providing and laying cement concrete work 1:2:4 (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up to floor two level.	Cu.M.	₹ 8,800	30.837	₹ 2,71,366
4	Brick work in foundation and plinth	Cu.M.	₹ 3,200	34.692	₹ 1,11,014
5	Brick work in Super Structure	Cu.M.	₹ 3,500	83.976	₹ 2,93,916
6	Providing 12mm thick cement plaster in single coat for interior plastering Cement mortar 1:3 (1-cement:3-sand)	Sq.M.	₹ 150	618.983	₹ 92,847
7	Applying two coats of Birla (white cement based) or Asian (acrylic lapy- putty) or equivalent	Sq.M.	₹ 55	618.983	₹ 34,044
8	Providing 20 mm thick double coat mala cement plaster in cement mortar (1 Cement : 3 coarse sand)	Sq.M.	₹ 200	352.796	₹ 70,559
9	Finishing wall with weather proof exterior emulsion paint on wall surface	Sq.M.	₹ 80	352.796	₹ 28,224
10	Filling in foundation and plinth with murrum	Cu.M.	₹ 287	54.914	₹ 15,760
11	Providing and laying Brick bat cement concrete work 1:3:6 and curing complete	Cu.M.	₹ 2,000	18.305	₹ 36,610
12	P & L 24" x 24" vitrified 8 mm thick tile flooring	Sq.M.	₹ 1,019	183.045	₹ 1,86,523
13	P & L 10 mm thick Marble Sill	Sq.M.	₹ 800	68.151	₹ 54,521
14	Providing and fixing of wooden Doors	Sq.M.	₹ 5,000	25.200	₹ 1,26,000
15	Providing and fixing aluminium section of size complete for Fix window.	Sq.M.	₹ 2,000	31.500	₹ 63,000
				Total	₹ 14,29,069
				add 2.5 % for Electrical wiring material and Plug fitting	₹ 35,727
				add 2.5 % for Water Supply and sanitation material and fitting	₹ 35,727
				add 5 % Contingencies	₹ 71,453
				Grand Total	₹ 15,71,976
				Say	₹ 15,72,000

8.1.6 Heritage Village Design (Civil)

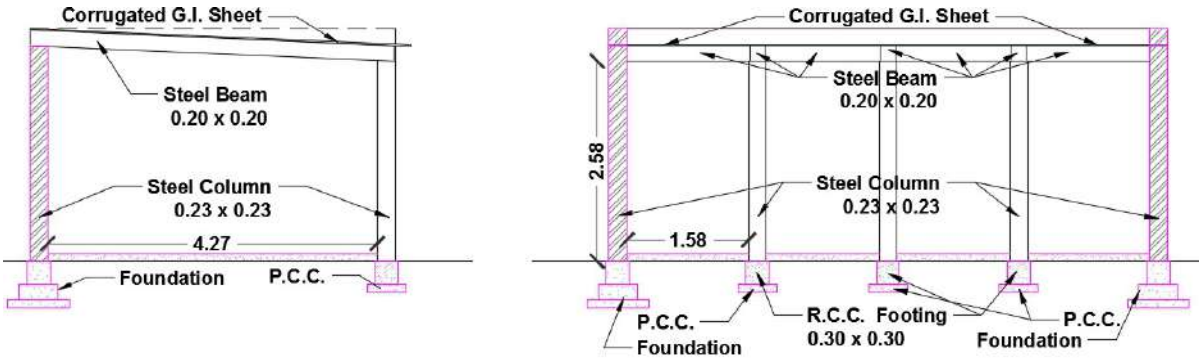
Animal Shelter



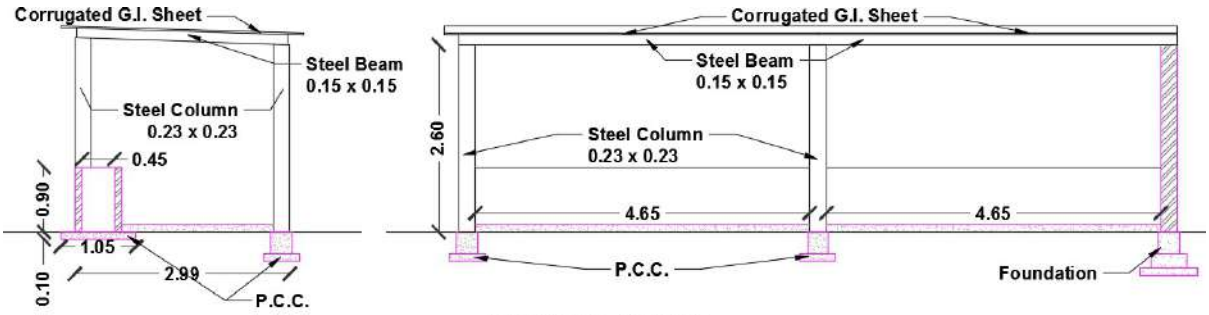
GROUND FLOOR PLAN



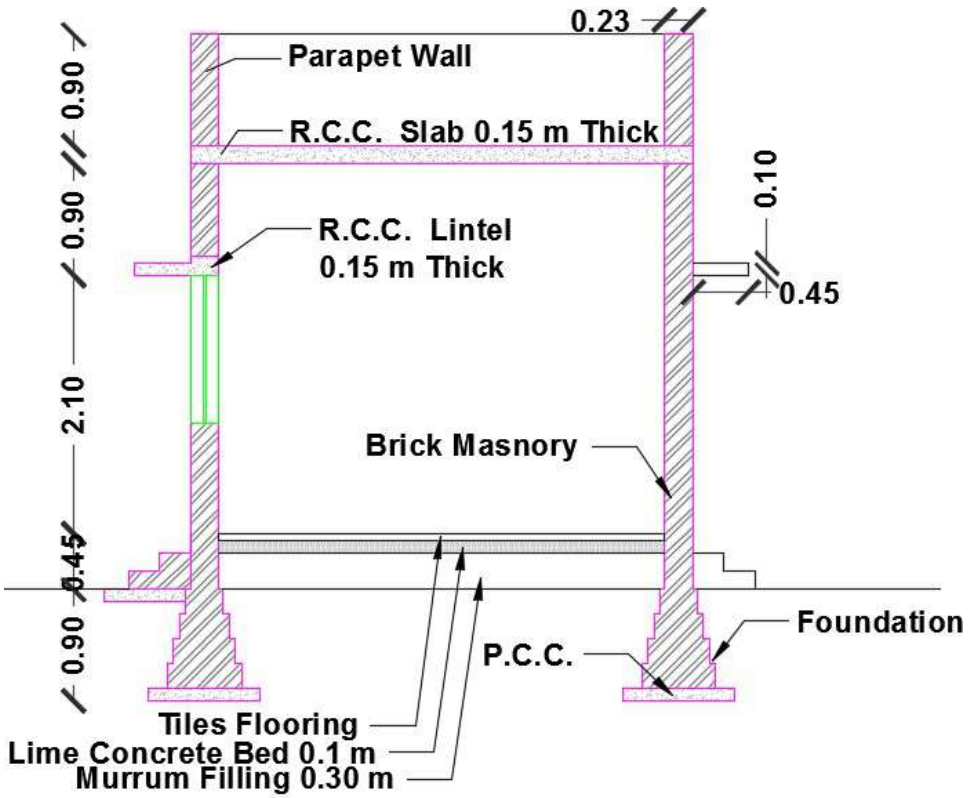
FRONT ELEVATION



DUMPING YARD SHED



ANIMAL SHED



CROSS SECTION AT A - B

Quantity Sheet Of Animal Shelter							
Sr. No.	Item Description	No.	Length	Breath	Height	Quantity	
			M	M	M		
1	Earthwork In Excavation For Foundation And P.C.C.						
	Brick Wall-1 (Boundary Wall)	1	70.82	0.80	0.60	33.994	Cu. M.
	Brick Wall-2 (Cabin And Shop)	1	31.47	0.90	0.90	25.491	Cu. M.
	Column Foundation	24	0.50	0.50	0.40	2.400	Cu. M.
	Water Tank	1	15.00	1.05	0.10	1.575	Cu. M.
	Fodder Pit	4	9.83	1.05	0.10	4.129	Cu. M.
	Entry Stair 1	2	1.30	0.67	0.10	0.174	Cu. M.
	Entry Stair 2	2	1.53	0.67	0.10	0.205	Cu. M.
				Total Quantity		67.967	Cu. M.
2	Plain Cement Concrete (P. C. C.)						
	Brick Wall-1 (Boundary Wall)	1	70.82	0.80	0.10	5.666	Cu. M.
	Brick Wall-2 (Cabin And Shop)	1	31.47	0.90	0.10	2.832	Cu. M.
	Column Foundation	24	0.50	0.50	0.10	0.600	Cu. M.
	Water Tank	1	15.00	1.05	0.10	1.575	Cu. M.
	Fodder Pit	4	9.83	1.05	0.10	4.129	Cu. M.
	Entry Stair 1	2	1.30	0.67	0.10	0.174	Cu. M.
	Entry Stair 2	2	1.53	0.67	0.10	0.205	Cu. M.
	Storage And Dumping Yard	2	4.50	6.77	0.10	6.093	Cu. M.
	Animal Shed	4	2.34	9.77	0.10	9.145	Cu. M.
				Total Quantity		30.418	Cu. M.
3	R.C.C. Work Up To Plinth Level C:S:A 1:2:4						
	Raft Footing For Steel Column Foundation	22	0.30	0.30	0.30	0.594	Cu. M.
	R.C.C. Beam Step 1	1	70.97	0.50	0.20	7.097	Cu. M.
	R.C.C. Beam Step 2	1	71.07	0.30	0.30	6.396	Cu. M.
				Total Quantity		14.087	Cu. M.
4	R.C.C. Work Above Plinth Level Up To First Floor Level C:S:A 1:2:4						
	R.C.C. Column At Ground Floor						
	C1	2	0.23	0.23	1.80	0.190	Cu. M.
	R.C.C. Lintel And Sill						
	D	4	1.30	0.23	0.15	0.179	Cu. M.
	W	1	2.80	0.23	0.15	0.097	Cu. M.
	W1	2	1.50	0.23	0.15	0.104	Cu. M.
				Total Quantity		0.380	Cu. M.
	R.C.C. Chajja						
	D	2	1.23	0.45	0.10	0.111	Cu. M.
	D	2	1.00	0.45	0.10	0.090	Cu. M.

	W	1	2.80	0.45	0.10	0.126	Cu. M.
	W1	1	81.56	0.23	0.10	1.876	Cu. M.
				Total Quantity		2.203	Cu. M.
	R.C.C. Slab	1	10.46	4.06	0.15	6.370	Cu. M.
				Grand Total Quantity		9.143	Cu. M.
5	Brick Masonry Below Ground Level In Cement Mortar 1:6						
	BRICK WALL-2						
	Step 1	1	31.65	0.60	0.20	3.798	Cu. M.
	Step 2	1	31.70	0.50	0.20	3.170	Cu. M.
	Step 3	1	31.75	0.40	0.20	2.540	Cu. M.
	Step 4	1	31.80	0.30	0.20	1.908	Cu. M.
				Total Quantity		11.416	Cu. M.
6	Brick Masonry Above Ground Level In Cement Mortar 1:6						
	Brick Wall-1	1	70.99	0.23	3.00	48.983	Cu. M.
	Brick Wall -2	1	31.72	0.23	3.45	25.170	Cu. M.
	Brick Wall -3 (Water Tank Wall)	1	14.60	0.23	0.90	3.022	Cu. M.
	Brick Wall -4 (Fodder Pit Wall)	1	20.11	0.10	0.90	1.810	Cu. M.
	Entry Stair	4	4.46	0.60	0.15	1.606	Cu. M.
		4	4.46	0.30	0.15	0.803	Cu. M.
	Shop Stair	1	3.10	0.60	0.15	0.279	Cu. M.
		1	3.10	0.30	0.15	0.140	Cu. M.
	Parapet Wall	1	28.01	0.23	0.90	5.797	Cu. M.
				Total Quantity		87.609	Cu. M.
	Deduction						
	For Door, Window And Ventilation						
	D	4	1.00	0.23	2.10	1.932	Cu. M.
	W	1	2.50	0.23	1.20	0.690	Cu. M.
	W1	2	1.20	0.23	1.20	0.662	Cu. M.
	R.C.C. Lintel And Sill						
	D	4	1.30	0.23	0.15	0.179	Cu. M.
	W	1	2.80	0.23	0.15	0.097	Cu. M.
	W1	2	1.50	0.23	0.15	0.104	Cu. M.
				Total Quantity		3.664	Cu. M.
				Net Quantity		83.945	Cu. M.
7	Smooth Plaster Inside The Rooms And Ceilings In C:M 1:3 12 mm Thickness						
	Cabin	2	4.00		3.00	24.000	Sp. M.
		2		3.60	3.00	21.600	Sp. M.

	Dairy	2	5.77		3.00	34.620	Sp. M.
		2		3.60	3.00	21.600	Sp. M.
				Total Quantity		101.820	Sp. M.
	Ground Floor Ceiling						
	Cabin	1	4.00	3.60		14.400	Sp. M.
	Dairy	1	5.77	3.60		20.772	Sp. M.
				Total Quantity		35.172	Sp. M.
	Deduction						
	D	4	1.00		2.10	8.400	Sp. M.
	W	0.5	2.50		1.20	1.500	Sp. M.
	W1	1	1.20		1.20	1.440	Sp. M.
				Total Quantity		11.340	Sp. M.
				Net Quantity		125.652	Sp. M.
8	Outer Plaster In C:M 1:3 20 mm Thickness						
	Brick Wall-1						
	Horizontal Wall	1	62.77		3.00	188.310	Sp. M.
	Vertical Wall	1		79.21	3.00	237.630	Sp. M.
	Brick Wall-2						
	Horizontal Wall	1	20.69		4.50	93.105	Sp. M.
	Vertical Wall	1		8.92	4.50	40.140	Sp. M.
	Brick Wall-3						
	Horizontal Wall	1	14.08		0.90	12.672	Sp. M.
	Vertical Wall	1		15.08	0.90	13.572	Sp. M.
	Brick Wall -4						
	Horizontal Wall	4	39.04		0.90	140.544	Sp. M.
	Vertical Wall	4		1.45	0.90	5.220	Sp. M.
				Total Quantity		731.193	Sp. M.
	Deduction						
	D	4	1.00		2.10	8.400	Sp. M.
	W	0.5	2.50		1.20	1.500	Sp. M.
	W1	1	1.20		1.20	1.440	Sp. M.
				Total Quantity		11.340	Sp. M.
				Net Quantity		719.853	Sp. M.
9	Earth Filling						
	Cabin	1	4.00	3.60	0.30	4.320	Cu. M.
	Dairy	1	5.77	3.60	0.30	6.232	Cu. M.
				Total Quantity		10.552	Cu. M.
10	Brick Bat Lime Concrete(B.B.L.C.)						
	Cabin	1	4.00	3.60	0.10	1.440	Cu. M.
	Dairy	1	5.77	3.60	0.10	2.077	Cu. M.

				Total Quantity		3.517	Cu. M.
11	Tiles Flooring						
	Cabin	1	4.00	3.60	0.00	14.400	Sq. M.
	Dairy	1	5.77	3.60	0.00	20.772	Sq. M.
				Total Quantity		35.172	Sq. M.
12	Marble Sills For Stair, Door, Window And Ventilation						
	Stair						
	Entry Stair 1	4	1.23	0.30		1.476	Sq. M.
	Entry Stair 2	4	1.00	0.30		1.200	Sq. M.
	Window Stair	2	3.10	0.30		1.860	Sq. M.
				Total Quantity		4.536	Sq. M.
	Door, Window, Ventilation						
	D	4	1.00	0.23		0.920	Sp. M.
	W	2	2.50	0.23		1.150	Sp. M.
		2		0.23	1.20	0.552	
	W1	4	1.20	0.23		1.104	Sp. M.
		4		0.23	1.20	1.104	
				Total Quantity		4.830	Sp. M.
				Grand Total Quantity		9.366	Sq. M.
13	Wood Work For Doors						
	D	4	1.00		2.10	8.400	Sp. M.
				Total Quantity		8.400	Sp. M.
14	Aluminium Section Work For Window And Ventilation						
	W	1	2.50		1.20	3.000	Sp. M.
	W1	2	1.20		1.20	2.880	Sp. M.
				Total Quantity		5.880	Sq. M.
15	Steel Section						
	Column						
	C1	22	0.23	0.23	2.60	3.026	Cu. M.
	Beam					0.738	
	B1	6	4.73	0.20	0.20	1.135	Cu. M.
						0.496	
	B2	8	10.00	0.15	0.15	1.800	Cu. M.
						1.000	
	B3	8	3.00	0.15	0.15	0.540	Cu. M.
						0.300	
				Total Quantity		2.534	Cu. M.
	Density of Steel 8050 Kg/Cu. M.					8050	Kg

				Total Quantity		20398.7	Kg
16	Corrugated G.I. Sheet						
	Animal Shed	4	10.19	3.40		138.584	Sq. M.
	Storage Yard	1	4.93	7.23		35.644	Sq. M.
	Dumping Yard	1	4.93	7.23		35.644	Sq. M.
				Total Quantity		209.872	Sq. M.

Abstract sheet for Animal Shelter					
Sr. No.	Item Description	Unit	Rate	Quantity	Amount in Rs
1	Excavation for foundation	Cu.M.	₹ 95	67.967	₹ 6,457
2	Providing and laying Plain cement concrete work 1:3:6	Cu.M.	₹ 3,000	30.418	₹ 91,254
3	Providing and laying cement concrete work 1:2:4 (A) Foundations, footings, Base or columns and Mass concrete	Cu.M.	₹ 8,000	14.087	₹ 1,12,696
4	Providing and laying cement concrete work 1:2:4 (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up to floor two level.	Cu.M.	₹ 8,800	9.143	₹ 80,458
5	Brick work in foundation and plinth	Cu.M.	₹ 3,200	11.146	₹ 35,667
6	Brick work in Super Structure	Cu.M.	₹ 3,500	83.945	₹ 2,93,808
7	Providing 12mm thick cement plaster in single coat for interior plastering Cement mortar 1:3 (1-cement:3-sand)	Sq.M.	₹ 150	125.652	₹ 18,848
8	Applying two coats of Birla (white cement based) or Asian (acrylic lapy- putty) or equivalent	Sq.M.	₹ 55	125.625	₹ 6,909
9	Providing 20 mm thick double coat mala cement plaster in cement mortar (1 Cement : 3 coarse sand)	Sq.M.	₹ 200	719.853	₹ 1,43,971
10	Finishing wall with weather proof exterior emulsion paint on wall surface	Sq.M.	₹ 80	719.853	₹ 57,588
11	Filling in foundation and plinth with murrum	Cu.M.	₹ 287	10.552	₹ 3,028
12	Providing and laying Brick bat cement concrete work 1:3:6 and curing complete	Cu.M.	₹ 2,000	3.517	₹ 7,034
13	P & L 24" x 24" vitrified 8 mm thick tile flooring	Sq.M.	₹ 1,019	35.172	₹ 35,840
14	P & L 10 mm thick Marble Sill	Sq.M.	₹ 800	9.366	₹ 7,493
15	Providing and fixing of wooden Doors	Sq.M.	₹ 5,000	8.400	₹ 42,000
16	Providing and fixing aluminium section of size complete for Fix window.	Sq.M.	₹ 2,000	5.880	₹ 11,760
17	Steel Section Fe- 453 used for Column and Beam with Fitting	Kg	₹ 50	20398.7	₹ 10,19,935
18	Providing corrugated G.I. sheet of class-3 roofing fixed with galvanised iron J or L Hooks, Bolts and nuts 8mm diameter with bitumen and G.I. limpet washer or G.I. limpet washer. Filled with white lead complete excluding the cost of purlins, Rafters and Trusses.(1) 0.80 mm thick sheet.	Sq.M.	₹ 762	209.872	₹ 1,59,922

Total	₹ 21,34,669
add 2.5 % for Electrical wiring material and Plug fitting	₹ 53,367
add 2.5 % for Water Supply and sanitation material and fitting	₹ 53,367
add 5 % Contingencies	₹ 1,06,733
Grand Total	₹ 23,48,136
Say	₹ 23,50,000

8.1.7 Electrical Design 1

Automatic switch for water pump

Electricity and water are the most valuable properties for any country. In our country, the want of electricity and water are the burning question. Load shedding has become a very common problem in our daily life. Water also plays a vital role in our life. To perform any sort of family task water is must. Nowadays most probably every house, office, industry and etc. use water pump for needed water. But switching on and off the water pump is a boring task. And most of the times we forget to start water pump in appropriate time or even we start may forget to switch off the water pump, for that reason there is a huge wastage of water as well as the electricity. To solve these sorts of problem we've made an automatic switch for water pump. This will start the water pump when the water level fall a certain predetermine level and will automatically shut off the pump when the water rise in the over flow level

Objectives:

1. To save Electricity as well as Electric bill.
2. Appropriate running of water pump.
3. To eliminate the concern about water pump switch on and off.
4. To ensure the availability of water in water tank.

Why make automatic pump control?

It will make you more comfortable Because it enables open – close water pump automatically. When full of water, was ordered off the water. But When levels gradually reduced to the required, then turned on fully the water. So, we do not have to worry about overflow and water out anymore.We have 2 circuits. First, using a transistor version. Second, using the famous 555 timers.

Using transistors version

The working principle

As Figure shows automatic on-off switch for water pump circuit diagram.
In begin states when without water on a bucket. Both transistor Q1 and Q2 will not works. Because the base of both transistors not triggered from the common point. Which still connect positive voltage through R1.

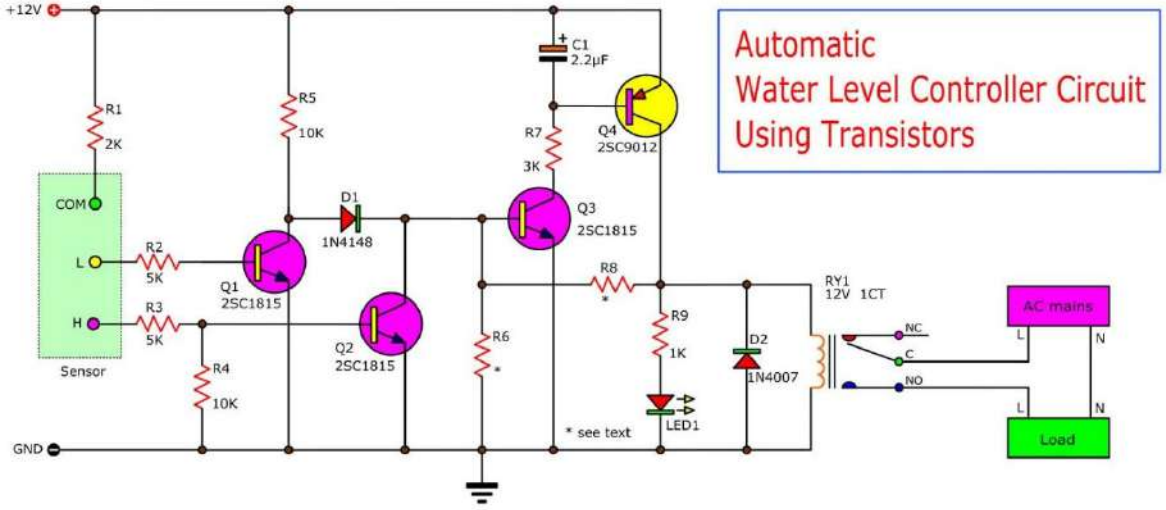


Fig. No. 8.1: Simple automatic water level controller circuit

And this result to both transistors no conduction. So current through R5 and D1 to trigger base of Q3, cause Q3 conducts current to cause the transistor Q4 also works. When Q4 conducts current, LED1 will get a forward biased. So it glows. And relay-RY1 will pull in to contact continuously a water pump with the AC-line 220 volts. Until water to low level (L). So it work as conductor of electricity to base of Q1. To get bias and conduct current at collector. So there is voltage like ground. But Q3 and Q4 exist voltage at collector. So there are voltage same the positive supply. The current will flows through D1 to trigger base of transistor-Q3. So begin cycle working new again.

How makes it

Because this project is small and uses less equipment so easy to build you can assemble them on universal PCB. You need to put all parts in the correct position, and matches terminal according to Figure.

Fig. No.8.2 Components Layout

The external wires should larger size In particular 220 volts to load power should withstand a minimum of 600 watts.

The external 12V power supply adapter can be used from anywhere but must be able to supply up to 300mA.
In real deployment must bring them to mount in the box neatly and securely. Because the circuit is the voltage AC 220 volts in the PCB which will be harm easily.
Put it in a box must be steel or plastic. But must be durable.

Testing

Remember, in the testing circuit, do not connect input and output to AC220V to this project, because maybe the danger while testing them.

Just connected DC 12 volts as a power supply to positive or +12V point and negative to 0V point. If not constitute any part of an error, the result follows.
Firstly, when applying a 12V power supply into the circuit. The LED1 will glow and the relay will work. Then when we connect the “H” and “COM” point together.
Next, the LED1 will go out and the relay will stop working take “H” point out of “COM” point so cause LED1 will glow and relay pull in again.
Secondly, the short “L” and “COM” terminal, LED1 will glow and relay still working.

- Then short “H” to “COM” another one point.
- Now all three terminals are connected to each end.
- As a result, the relay stops working and LED1 goes off.

When removing the terminal “H” out now relay will not function and LED1 will notglow.When removable terminal “L” out of the terminal “COM” now relay with LED1 light up.

The Parts list

- Q1-Q3: 2SC1815 or 2SC1740—NPN transistors or similar
- Q4: CS9012—PNP transistor or similar
- D1,D2: 1N4148—200V 0.15A Diodes
- LED1: As you like
- 0.25W resistor
- R1: 2K
- R2, R3: 5K
- R4, R5, R8: 10K
- R6: 1.5K
- R7: 3K
- R9: 1K
- C1: 2.2uF 25V—Electrolytic
- RY1: 12V-1C 3A current relay
- Wires, PCB, and others.

Application

Take three lines to connected to “L” “H” and “COM” terminal will be a general copper wire and cut them as the level you need but do not short-circuit. We may install it in the pond or water tank.
Note: Do not use a point detector in oil or hazardous chemicals. Because it may be a spark of the wire may cause the explosion.

Automatic Pump controller using 555 timer

This is an Automatic water pump controller circuit diagram using an NE555 timer.
In the countryside, water is very important. The most to use the groundwater to dig as a pond, and for the convenience.
They often use the pump automatically. But waste a lot of electricity.

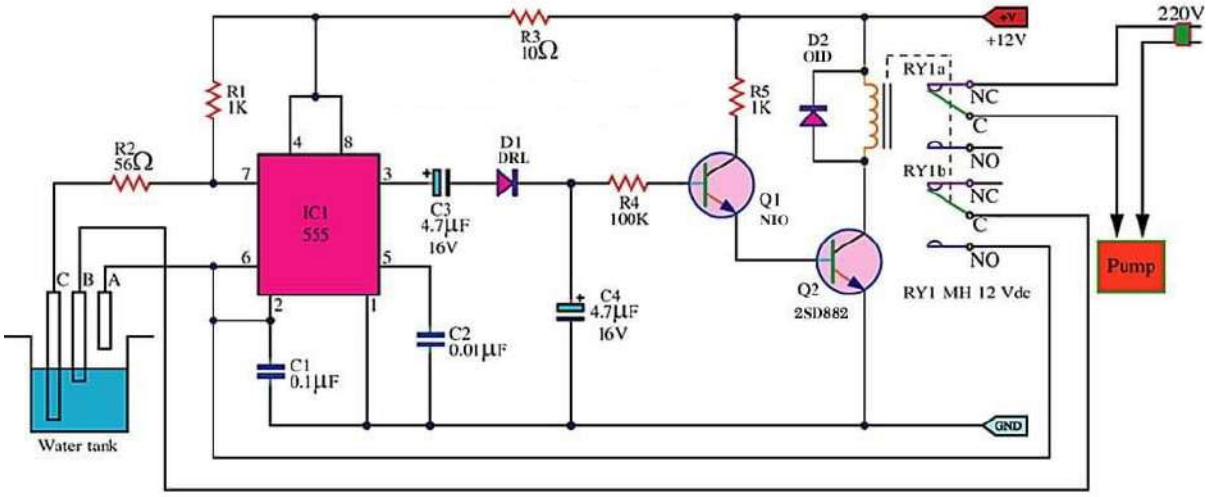


Fig. No. 8.3: Automatic water pump controller circuit diagram

Automatic water pump controller circuit diagram

Some homes have a large water tank on high, then Pumping up the put on hold. When you want to use, just to turn on the tap at the bottom. It does not require all-time electricity and also high water pressure.

Water tank system. Convenient and savings, but …

But I have to control the water level in the tank is fixed, is water must not out or overflow, which is a waste of time look at the pump. I have the ideal to create this automatic water pump controller project.

Main ideas

When the water a full tank. This circuit controls the pump stopped working. Then we use the water out. The pump will start running again. This manner is ever automatically

Roughly description

The IC1 No. 555 works in the astablemultivibrators. For signal generators to activate the transistor, which is used to drive relays – off the pump.

Assuming flood level to the test point C. (Will has flooded all the time.) But the water level has not reached the test point B. These parts to be IC1, Q1, Q2 (2SD882) and RY1 will not work. So the contacts of RY1a and RY1b be connected to the terminal NC, the 220 volt AC electricity can be supplied to the pump. The waters pump start to pump water into the tank.

Circuit parts

- Q1: BC547, 45V 100mA NPN Transistor
- Q2: 2SD882, 30V 3A NPN Transistor
- D1: 1N4148,75V 150mA Diodes
- D1-D5: 1N4007, Diode
- RY1: Relay 2 contracts 12V
- 0.25W 5% Resistor
- R1, R5: 1K
- R2: 56 ohms
- R3: 10 ohms

- R4: 100K
- Capacitors
- C1: 0.1uF 63V Polyester
- C2: 0.01uF 63V Polyester
- C3,C4: 4.7uF 25V Electrolytic

Until the water level increases to the sensor point A, As a result, the sensor point A is connected to the test point C. The IC1 works and pulse signal generator.

Then through diodes, D1 and C4 both to be the DC voltage to the bias current to Q1, After the Q1 and Q2 (2SD882) conducts current.
As a result, current flows through the coil of RY1. So the two sets of the contacts (RY1) move on the poles NO, the pump will stop working.
The contacts of the RY1b sets will connect both test point A – B together. Although the water level drops below the test point A, the pump still does not work.

Until water levels drop below the detector B. Water pumps, therefore, started again. Which will circle as continue?

8.1.8 Electrical Design 2

Photovoltaic Water Pumping System Design

Introduction

Solar energy such as photovoltaic is the most important energy of the non-conventional energy sources which is capable to satisfy the energy needs of the isolated rural areas. This source of energy is kind a free. The water from the source is kept and pumped then it is stored in the tanks until its next use by dwellers. These water tanks can be bought directly from the market.
Photovoltaic pumping system is a standard system. Here the whole system is equipped with pump and an electric motor. This motor will be providing electrical energy by photovoltaic panels installed on the site. The main function of pump is to make water available to the reach of the dwellers.so pump water from the basement is accessible to users. There are mainly two types of photovoltaic water pumping systems are being used: the photovoltaic water pumping with

1.) Batteries 2.) without batteries.

Photovoltaic System

To draw the water surface there are two types of pumps can be used Pumps
1.) volumetric pumps and 2.) centrifugal pumps.

According to the physical location of the pump, there are two other characteristics at the pumps in relation to the pumped water: the suction system and stuffer one. They discharge pumps are submerged in water. Their motor is immersed in water with the pump and the discharge pipe placed after the pump can lift water to tons of meters to the storage tank depending to the engine's power. Afterward, the system is connected to a distribution network that delivers water to dwellers.

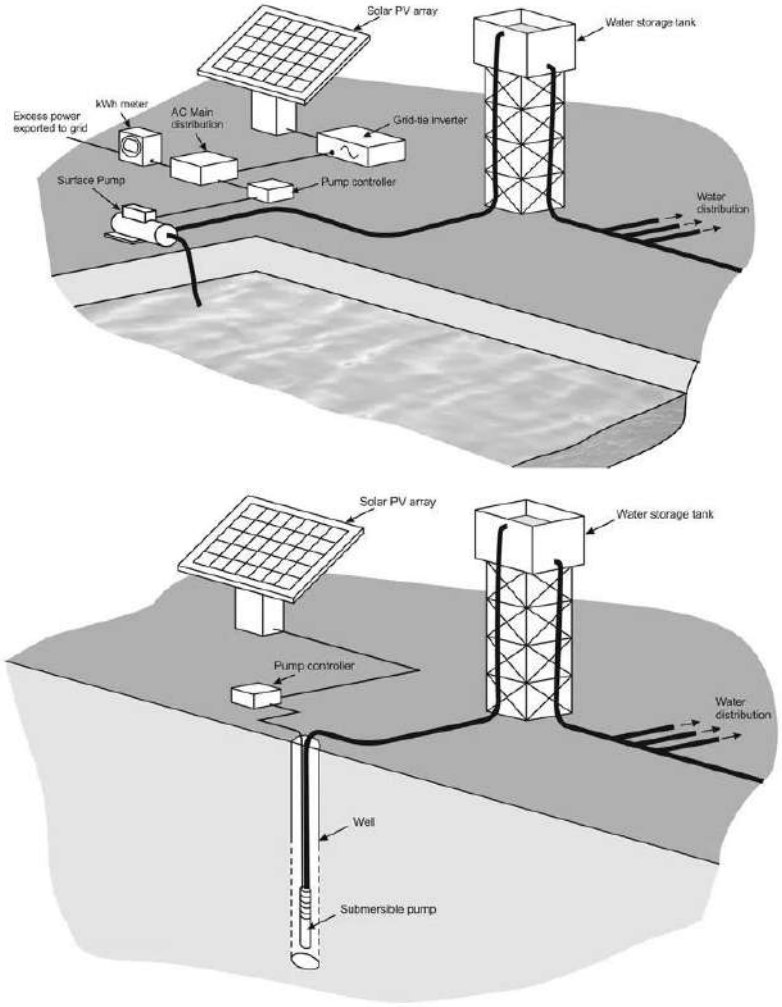


Fig. No. 8.4: Photovoltaic water pumping with a tank to store water

Solar photovoltaic panels are placed for converting solar energy into electrical energy so that we can generate the necessary energy to the motor of the pump, Panels will generate a direct current (DC), and therefore DC/AC converter to will be used to convert this direct current produced by the solar panels into alternative current (AC),so that AC motor can use this AC Power we generated.

On the other side, if we have the DC motor, Than we do not need this DC to AC conversion. The amount of energy will be generated can be used directly, also we can store that energy as well. If we want to use, In the case of an application for water pumping, it is more interesting to use the energy to raise the water in a castle that serves as hydraulic energy storage.

When pump is live on photovoltaic due to under sizing or over sizing there are chances that Pump get damaged or loosen the support, to prevent a dysfunction of the pump, the PV generator, an inverter is used to ensure the proper operation of the PV/pump system.

Solar Radiation at Gujarat

Solar energy can be used effectively if we have regulatory data and we can quantify that availabe solar energy to design a photovoltaic water pumping system.Therefore, it is very important to know the solar radiation of the locality. Solar radiation (kWh/m2) is the energy from the sun that reaches the earth.The earth receives a nearly constant of solar radiation at

its outer atmosphere. The intensity of solar radiation varies along with the whether and geographic location as well.

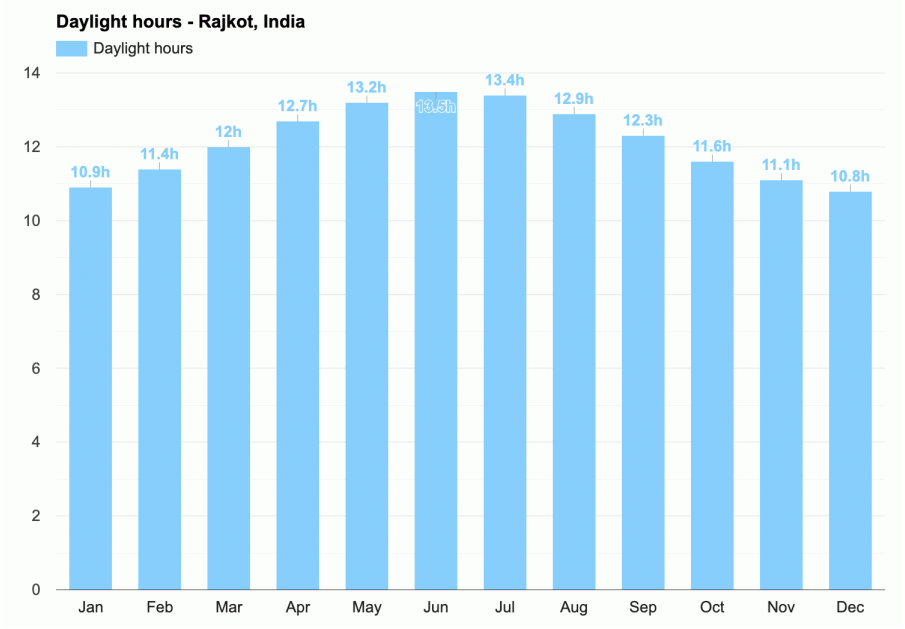


Fig. No. 8. 5: Monthly average radiation of sunlight per month at Rajkot, Gujarat.
The most productive hours of sunlight are from 9:00 a.m. to 5:00 p.m

Sizing a Photovoltaic Water Pumping System

We need to have an assumption of desired amount for the use and in that case Sizing is really important. Photovoltaic water pump sizing is the determination of the power of the solar generator that will provide the desired amount of water.

The photovoltaic water pump sizing consists of:

a) Assessment of daily water needs of the population to know the rate flow required;
b) calculation of hydropower helpful;
c) determining of the available solar energy;
d) determining of the inclination of the photovoltaic generator which can be placed;
e) determination of the month sizing (the month in which the ratio between solar radiation and hydropower is minimum);
f) sizing of the PV generator (determination of the required electrical energy);

Determination of Hydropower Helpful

The average daily load i.e. hydropower helpful (kWh/day) required is expressed by:

$EH=g*\rho a*Qa*TH\eta P*3600 = CH*Qa*TH\eta P$ E1

Where,

- g is acceleration of gravity (9.81 m.s-2);
- ρa is water density (1000 kg/m3);
- Qa is daily water needs (m3/day);
- TH is the total head (m);
- ηP is pump system efficiency

The tank capacity is determined by the daily water needs and the autonomy of the system.

Taking an example of daily the water needs: (50 liters/day/person), the water needs rises to 25 m3/day. With photovoltaic panels which have 3.5 A, we will have 3 modules in parallel.

The average daily load i.e. hydropower helpful (kWh/day) required is given by this expression :

EH=g*ρa*Qa*THηP*3 600 = CH*Qa*THηP

With g= 9.81 m.s-2

ρa= 1000 kg/m3

Qa= 25 m3/day

TH = 52 m

ηP= 50 %

It provides: EH=7085 Wh

The available solar energy:

- Daily average radiation of sunlight varies from 5.7 to 5.8 kWh/m2/day.
- To make sure to do a good sizing, we choose the minimum value of average radiance: 5.7 kWh/m2/day.
- The inclination to the horizontal plane of the photovoltaic panels is: β=15°N.
- The sizing month is: December, 4.7 hours/day.

Sizing of the PV generator

Assuming a 25% loss due to the temperature and dust, the required electrical energy is given by this expression:

WPV = EHRadiance*(1−loss)

WPV=1260 Wc

The operating point of photovoltaic field is set around 120 volts due to the characteristics of the inverter. The photovoltaic field will be composed of 10 multiple modules in series. Generator power is 1260 Wc.

Prediction of requirement

Suppose we have to run 2HP motor for irrigation. For that the energy required is:
2HP=1.5 Kw.
:. 1.5Kw = 1500 watt, Power = volt*current, V=240 v. So,
Current (I) =1500/240 = 6.25 A.

Requirement for rechargeable batteries of 120V:
Power = volt*current

1500 = N*volt*current
1500=N*240*6.25 (N=number of require batteries)
1500=N*240*6.25, N=2, (2 batteries are required)

Requirement for solar panels:
1 solar panel of 72 cells generates 200watts
Required power is 1500 watts.
: .1500/200=7.5
Nearly 8 solar panels are required

Cost Calculation of Solar based irrigation system

Components	Unit cost	Quantity	Total cost
Solar panel (72 cells)	24,000	8	192,000
Water pumps	15,000	1	15,000
Battery (120 V)	20,000	2	40,000
Converter circuit	1000	1	1000
Overall cost			2,48,000

Table No. 8.1: Cost Calculation of Solar based irrigation system

8.1.9 Electrical Design 3

Public Solar Water Purifier and Cooler System

Introduction

A Solar Water Purifier and Cooler consists of PV modules, batteries, a charge controller, inverter AC appliance are used, DC Submersible Pump and Water Purifier and Cooler. A battery is required to provide reliable electricity services to a single water purifier and cooler without shortage or loss of peak load at any time of the year. As a result, the battery usually designed to give two third days of self-sufficiency if there is a possibility of inadequate solar radiation. Most common PV modules have output range of between 10Wp to 300Wp. It is possible to use a single PV module if the demand of electricity is low or an array of modules for high electricity demand.

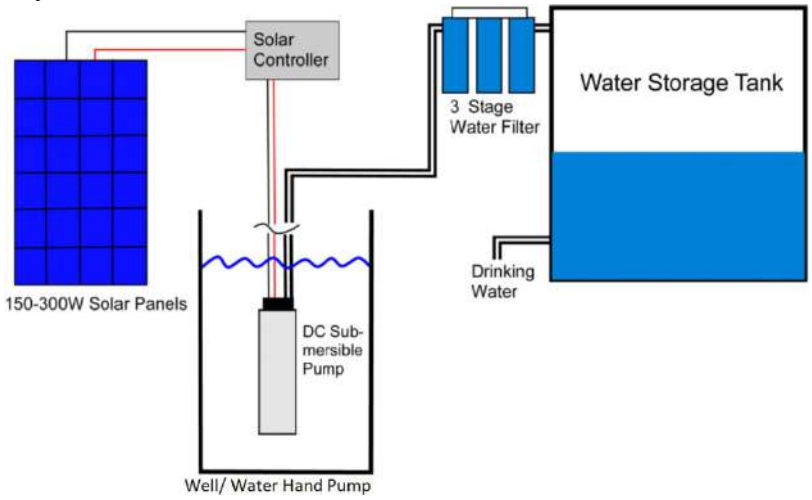


Fig. No.8.6 PV Solar Water Purifier and Cooler System block diagram

1 Solar PV Module

There are two classes of PV cells that are used in the present commercial PV modules. These are crystalline silicon (first generation) and thin film (second generation). The crystalline PV cells produce electricity via crystalline silicon semiconductor material derived from highly refined poly silicon feed stock. On the other hand thin film cells produce electricity via extremely thin layers of semi-conductor materials which are made up of amorphous silicon (a-Si), copper indium diselenide (CIS), copper indium gallium diselenide (CIGS), or cadmium telluride (CdTe).

2 Batteries

Batteries offer the best balance of capacity per dollar and it is the most common type of battery that used in standalone power systems. More than 97% of the batteries can be recycled. As an electrochemical device, batteries are sensitive to climate, charge or discharge history, temperature and age.

3 Charge controllers

Charge controller is one of the important parts of solar home systems that controls the energy inflow and out flow into and from the battery bank. It prevents overcharging and deep discharging so that the life of the battery becomes longer. A typical charge controller has an efficiency of 85% for solar home system.

4 Inverters (converters)

An inverter is used to convert DC electric power to AC. There are three kinds of DC to AC converters. These are square wave, modified sin wave and pure sin wave. From these three inverters the square wave type is the simplest and least expensive but has a poor quality. The modified 33 sine wave inverter type is suitable for many load types and it also has low cost. The pure sine wave inverters produce high quality signals and are used mainly for sensitive devices like medical equipment.

5 DC Submersible Pump

Used for carry out the water from well or Public hand pump pit to water purifier. generally, 12V 2HPDC Submersible Water Pump are used in well. It can change on the requirement of water.

6 Water Purifier and Cooler

Used for purifier the water from well or Hand Pump, remove all the impurities and organic matter from the water. Generally, 250 lit storage tank and 50 L/Hr cooling and purifying capacity Water Purifier and Cooler required in public use.

Fig. No. 8.7 Solar Water purifier and cooler

Chapter 9. Proposing designs for Future Development of the Village for the PART-II Design

After completion of visit & data collection, the project carried out in the current semester by the group members, which includes the design of sustainable facilities for Nagar Pipaliya village.

Through our study we will try to make a master development plan of the village. Our master development plan might be including provisions of all the facilities suggest by us, then we focus on the improvement in the existing facilities. Our aim is to work according To new upcoming T.P. scheme in Nagar Pipaliya village.
Then in part-I designed:

According to UDPFI norms, lacking in Basic amenities & Smart Amenities can be suggested as;(Part-I)
Basic Amenities:Public Toilet Blocks, Post Office, Gram Panchayat & Animal Shelter.
Smart Amenities: Community Hall cum Library & Skill Development Centre.

Future scope would be study over other different urban amenities that would be sustainable in rural areas of Rajkot.

The village still lacks in maintenance of the building and various structures. Taking this into consideration the estimation of its rehabilitation with other necessary amenities will be designed in the next semester. As major facilities are already available in village, few facilities are required which we suggest. Once this all basic facilities is available in Nagar Pipaliya Village, then we should focus on making the village smarter by adopting various technology. In new designs proposed by as, we should focus on regular maintenance of these facilities. Because due to lack of maintenance peoples will avoid to use and hence it become obsolete. For maintenance purpose we should provide a maintenance plan which is economical and effective. It can be done by villagers them self. In this way with coordination between various Government agencies, we can develop Nagar Pipaliya village in better way as other smart or model villages.

This all amenities may stop migration from the village towards the urban area.

By performing this project we are able to reduce the pressure on the urban area. As well as this amenities are very much helpful for overall development of the village.

According to UDPFI norms, lacking in Basic amenities, Smart Amenitiescan be suggested as; (Part-II)
Basic Amenities: Bus Stand, Flexible Pavement Road, Solid Waste Management, Public Garden, General Market for Agriculture Product and Cold Storage
Smart Amenities: Cyber cafe,

Chapter 10. Conclusion of the Entire Village Activities of the Project

What is basic need of village and what is amenities and prior requirement to make any village as an ideal village?

We have surveyed of an ideal village at Pardi near Rajkot, have to determine that what is basic need & facilities to have in a village and how to providing this facilities as economical and sustainably for superior purposes in our Nagar Pipaliya village.

We can also determine that what is the process needs to be done such all this work and what is role of villagers, Sarpanch, Local authorities, Talati, TDO, DDO for development of village and also basic and main thing is supporting to all will make sustaining design and facilities for village develops as an ideal village.

We discussed with the village authorities and village dwellers after that we filled the different type of survey and analysis form. In the Techno-Economic Survey conclude about Introduction of village, Geographical details, Demo-graphical details, Occupational detail and different types of Infrastructure facilities.

By providing required amenities to village, development of village can be possible. So ultimately
migration to the city from village will be reduced and livelihood of villagers will increase. So healthy and prosperous life can be possible for the villagers. Ultimate growth of village and peopleare base step for the development of country. India is developing country and GDP is highlydepended on farming. As the development of village would be possible, farming techniques will increase and percentage of GDP will increase.

In this Project We suggested some basic Requirements of The Jashapar Village. We talked to Villagers, what they need to fulfil their basic requirements/to make their work easy. For example,there is No Primary Health Centre in the village and the nearest clinic is in Kalawad village.

By providing required amenities to village, development of village can be possible. So ultimately migration to the city from village will be reduced and livelihood of villagers will increase. So healthy and prosperous life can be possible for the villagers. Ultimate growth of village and people is base step for the development of country. India is developing country and GDP is highly depended on farming. As the development of village would be possible, farming techniques will increase, and percentage of GDP will increase.

Smart Village Survey concludes about % Value of Education: % Health and % Cleanliness of village and we find about which smart facilities can be subjected as per requirement of village dweller and village authorities.

According to UDPFI norms, lacking in Basic amenities & Smart Amenities can be suggested as;

Chapter 11. References refereed for this project

Our references consist of both physical and online references. As for physical we had visited the village interacting with people there and collecting the data.

- UDPFI Guidelines, Ministry of Housing and Urban Affairs || A-|| B- 2014
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- Dr. N. Kumara Swamy & A. Kameshwara Rao,Building planning and Drawing‖ by Charotar Publication.

Some of the online references are mentioned below

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- http://giftgujarat.in
- http://swatchbharaturban.in - swatch bharat website
- http://pradhanmantriyojna.co.in
- http://censusindia.gov.in - Census department website
- http://vy.gtu.ac.in - vishwakarma literatures
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Chapter 12. Annexure attachment

12.1 Survey form of Ideal Village Scanned copy attachment in the report for Part-I

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach toward- Rurbanisation for Village Development

Name of Village:	Paradi
Name of Taluka:	Lodhika
Name of District:	Rajkot
Name of Institute:	SLTTET
Nodal Officer Name & Contact Detail:	Mehul M Chavda 9427665085
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch : Rajbha Jadeja
Date of Survey:	6-9-2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	6894	3580	3314	1696
ii)	2011	7818	4235	3583	1773

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	760.77 hector 22.7834° N 70.7994° E
	Forest Area (In hect.)	
	Agricultural Land Area (In hect.)	201.6 hector
	Residential Area (In hect.)	45.7 hector.
	Other Area (In hect.)	523.47 hector
	Water bodies	
	Nearest Town with Distance:	Rajkot (22Km)

Gujarat Technological University, Ahmedabad, Gujarat

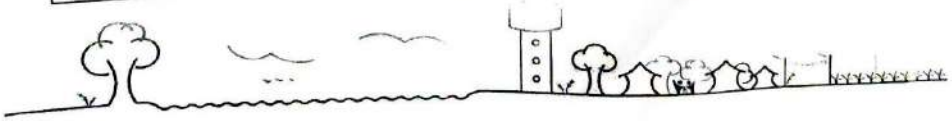
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

3. Occupational Details:

Name of Three Major Occupation groups in Village	1. Agriculture 2. labour work 3. Job work

4. Physical Infrastructure Facilities:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated) • RO Water • Well (Covered/ Uncovered) • Hand pumps • Tube well/ Borehole • River/ Canal/ Spring/ Lake/ Pond	YES YES YES YES	YES YES YES		DOOR TO DOOR Pipeline
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	60,000 Lit.		
	Underground Sump	Capacity:	1,25,000 Lit		
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	YES	YES		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	YES closed			
	If Open than Pucca / Kutchcha	Pucca			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants				
Suggestions if any:					



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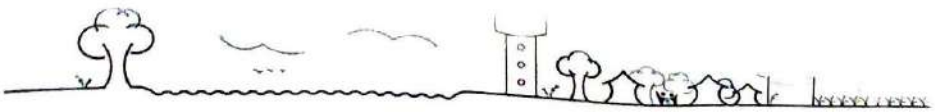
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	YES	YES		R.C.C.
	Main road	YES	YES		Bituminous
	Internal streets	YES	YES		Bituminous.
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH Rajkot - Gondal			Paver block C.C. road
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Kothariya 7.8KM	YES		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NH : Rajkot - Gondal	YES		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto Jeep chhakda	YES		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	more mun 6 hrs.	YES		Jyotigram Yojna
	Power supply for Domestic Use	24 hrs	YES		
	Power supply for Agricultural Use	8 hrs			
	Power supply for Commercial Use	24 hrs	YES		
	Road/ Street Lights	"	YES		

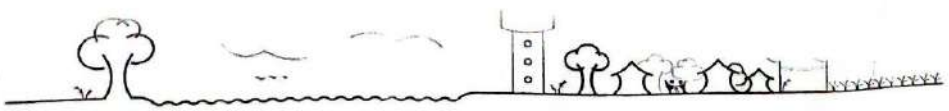


	Electrification in Government Buildings/ Schools/ Hospitals		YES		
	Renewable Energy Source Facilities (Y/ N)		YES		
	LED Facilities		YES		
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.		YES		4
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)				
	Solid & liquid waste Disposal system available	YES			
	Any facility for Waste collection from road	YES			
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	- well - Tube well	YES		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Kutchh - 20 % Pucca - 80 %			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	PHC : 3NO.			
	Private Clinic/Private Hospital/ Nursing Home		YES		3NO
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Education Facilities:**				
	Aaganwadi/ Play group		YES		2NO
	Primary School		YES		2NO
	Secondary school		YES		
	Higher sec. School				
	ITI college/ vocational Training Center				
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities				
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:		YES		



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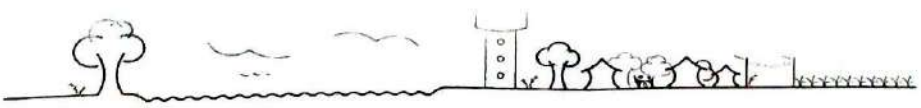
	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location : Condition:				
	Public Garden Location: Condition:	Panchvati Park	YES		
	Village Pond Location: Condition:				
	Recreation Center Location: Condition:				
	Cinema/ Video Hall Location: Condition:				
	Assembly Polling Station Location: Condition:				
	Birth & Death Registration Office Location: Condition:	Gram Panchayat	YES		
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office		YES		
	Telecommunication Network/ STD booth		YES		



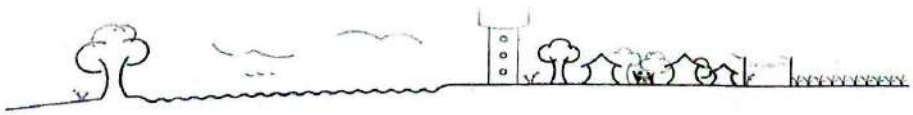
	General Market		YES		
	Shops (Public Distribution System)		YES		
	Panchayat Building		YES		
	Pharmacy/Medical Shop		YES		
	Bank & ATM Facility		YES		
	Agriculture Co-operative Society		YES		
	Milk Co-operative Soc.		YES		
	Small Scale Industries		YES		
	Internet Cafes/ Common Service Center/Wi Fi		YES		
	Other Facility				
Suggestions if any:					

6. **Sustainable /Green Infrastructure Facilities:**

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources				
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System				
Q.	Any Other				

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	Hard copy available.



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Vishwakarma Yojana: Phase VI
Techno Economic Survey

Recent Projects going on for Development of Village	R.C.C., Paver block, Drainage
Any NGO working for village development	

8. Additional Information/ Requirement:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)		
2.	Additional Information/ Requirement		

9. Smart Village Proposal Design

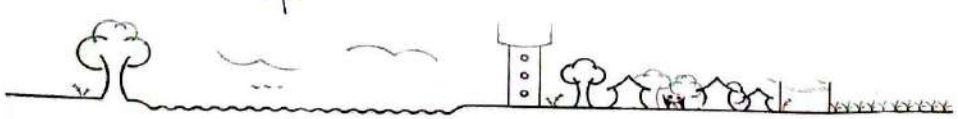
Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section:
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

સરપંચ
પારડી ગ્રામ પંચાયત

Nodal officer.



12.2 Survey form of Smart Village Scanned copy attachment in the report for Part-I

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	Rajkot
Name of Taluka:	Rajkot
Name of Village:	Khambhadadad
Name of Institute:	SLTIET - Rajkot
Nodal Officer Name & Contact Detail:	Mehul M. Chavadel 94276 65085
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch : Raghubhai Vastubhai Borat
Date of Survey:	29-10-2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	1897	978	920	258
2.	2011	2050	1070	980	398

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1178 Hector Lattitude : 22.785885
2.	Forest Area (In hect.)	204 hector
3.	Agricultural Land Area (In hect.)	862 hector
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	15 hector
6.	Distance to the nearest railway station (in kilometers):	Rajkot Junction - 18KM

7.	Name of Nearest Town with Distance:	Rajkot - 13KM
8.	Distance to the nearest bus station (in kilometers):	Khokhudadad
9.	Whether village is connected to all road for the any facility or town or City?	Rajkot- Kotmariya road.

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Agriculture
	2.	Buisness
	3.	...work

Major crops grown in the village:	1.	Mugfuli
	2.	cottun
	3.	wheat

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	YES	YES		Door to door pipeline
2.	**DUG WELL** Protected Well Un Protected Well	YES			
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring Rainwater Tanker Truck Cart With Small Tank	YES			
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump Other(Specify)**Lake/ Pond**	YES			

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Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	1,25,000 lit		
	Underground Sump	Capacity:	1,00,000 lit		
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	Under ground drainage	YES		100%.
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Bituminous road	YES		
	Main road	R.C.C.			
	Internal streets	R.C.C.	YES		
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH NH	YES		0.2KM 4.6KM
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Bhakkinagar Rajkot Junct	YES		3.1KM 6.0KM)
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)		YES		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto Jeep Chhakda	YES		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	More than 6 hrs	YES		Jyotigram yojna

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	Power supply for Domestic Use	24 hrs	yes		
	Power supply for Agricultural Use	8 hrs	yes		
	Power supply for Commercial Use	24 hrs	yes		
	Road/ Street Lights		yes		
	Electrification in Government Buildings/ Schools/ Hospitals		yes		
	Renewable Energy Source Facilities (Y/ N)		yes		
	LED Facilities		yes		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	yes	yes		5 urinal blocks
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	yes			
	Solid & liquid waste Disposal system available	Door to door	yes		Disposal to the pit
	Any facility for Waste collection from road				
Suggestions if any:	Suggestion) shed for disposal				
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	- Khokhudadi river - well - Tube well	yes		
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Kutchha 10% Pucca - 90%			

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi) Sub-Centre PHC BLOCK PHC CHC/RH District/ Govt. Hospital Govt. Dispensary Private Clinic Private Hospital/ Nursing Home AYUSH Health Facility sonography /ultrasound facility	ICDS - 1NO. PHC - 1NO private clinic -3	YES		
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	YES	YES		
	Primary School	YES	YES		
	Secondary school	YES	YES		
	Higher sec. School				
	ITI college/ vocational Training Center				
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities				
	If any of the above Facility is not available in village than approx. distance from village: ..13....kms.				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)			YES	
	Public Library (With daily newspaper supply: Y/N)				
	Public Garden				
	Village Pond				
	Recreation Center				
	Cinema/ Video Hall				
	Assembly Polling Station				
	Birth & Death Registration			YES	

If any of the above Facility is not available in village than approx. distance from village: .11.....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Good		YES	
	Telecommunication Network/ STD booth				
	General Market			YES	
	Shops (Public Distribution System)			YES	
	Panchayat Building	Good		YES	
	Pharmacy/Medical Shop			YES	
	Bank & ATM Facility			YES	
	Agriculture Co-operative Society			YES	
	Milk Co-operative Soc.	Good		YES	
	Small Scale Industries			YES	
	Internet Cafes/ Common Service Center/Wi Fi				
	Youth Club				
	Mahila Mandal			YES	

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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Agricultural society - Milk cooperative society			
	Other Facility				

Suggestions if any: Bus stand needs to maintenance and repairing

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Suraksha Yojana	3		YES	
	4. Kishori Shakti Yojana			YES	
	5. Balika Samriddhi Yojana			YES	
	6. Mid-day Meal Programme				
	7. Intergrated Child Development Scheme (ICDS)			YES	
	8. Mahila Mandal Protsahan Yojana (MMPY)				
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana			YES	
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)			YES	
	18. Jawahar Rozgar Yojana (JRY)			YES	
	19. Indira Awas Yaojna (IAY)			YES	
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources		YES		
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System		YES		30%
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	illage Base Map Available: Hard Copy/Soft Copy		YES		
2.	Recent Projects going on for Development of Village	Road Drainage			
3.	Any NGO working for village development				
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)				

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	- Bus stand - Gram panchayat	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?		

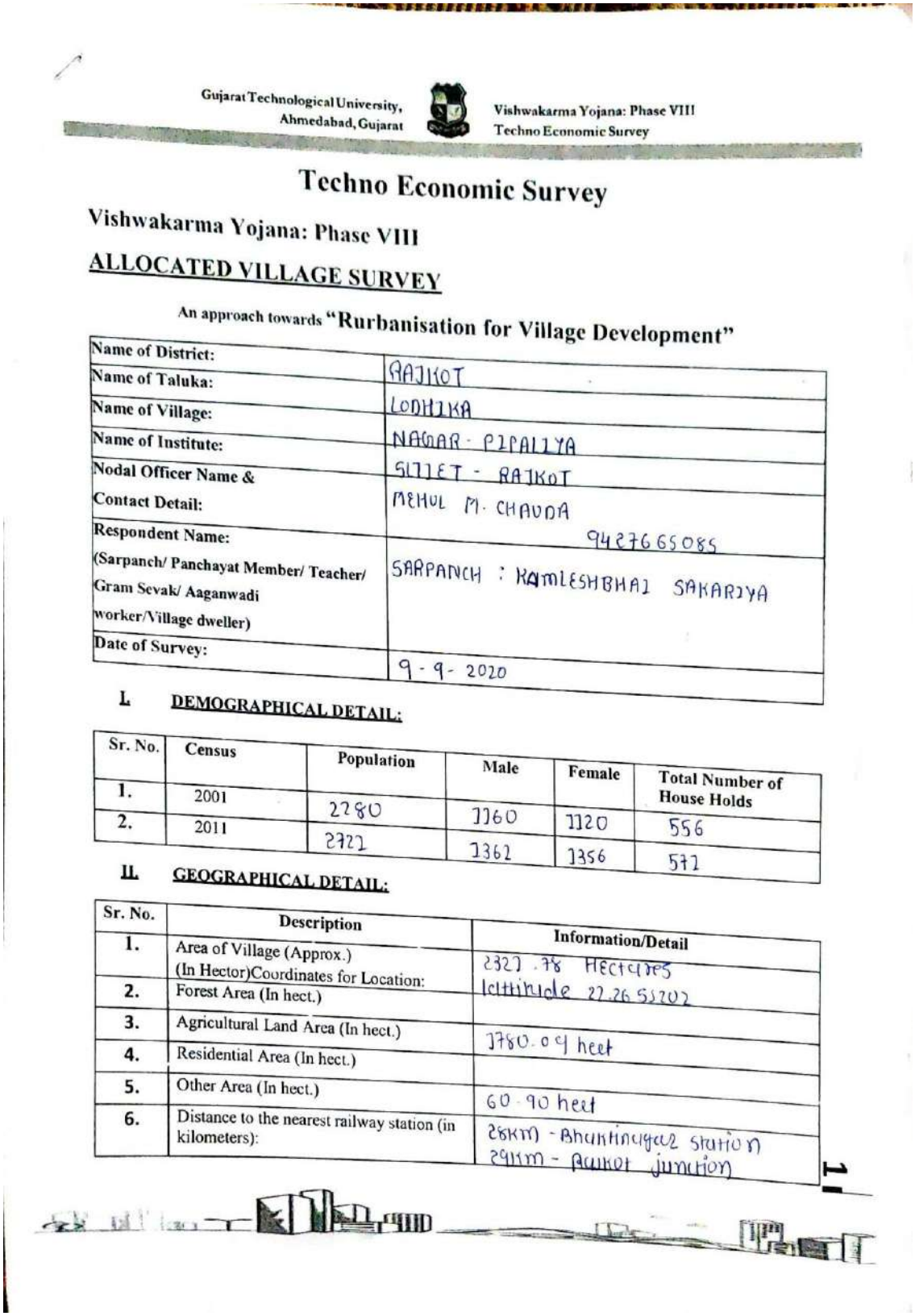
Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

તલાટી-કમ-મંત્રી,
ખોખડદડ ગ્રામ પંચાયત
26/10/2018

Model officer

12.3 Survey form of Allocated Village Scanned copy attachment in the report for Part-I



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Vishwakarma Yojana: Phase VIII
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Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	RAJKOT
Name of Taluka:	LODHIKA
Name of Village:	NAGAR - PIPALIYA
Name of Institute:	SLTJET - RAJKOT
Nodal Officer Name & Contact Detail:	MEHUL M. CHAUDA 9427665085
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	SARPANCH : KAMLESHBHAI SAKARIYA
Date of Survey:	9-9-2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	2780	1360	1120	556
2.	2011	2722	1362	1356	572

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	2327.78 Hectares latitude 22.26.55202
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	1780.09 heet
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	60.90 heet
6.	Distance to the nearest railway station (in kilometers):	26KM - Bhaktinagar station 29KM - Rajkot junction

7.	Name of Nearest Town with Distance:	28 Km - Rajkot
8.	Distance to the nearest bus station (in kilometers):	Gondal bus stop - 8.6 KM)
9.	Whether village is connected to all road for the any facility or town or City?	Kalavad Main road Devalia - Sub road.

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Agriculture 2. Labour works (200 persons) 3. Dairy

Major crops grown in the village:	1. Cotton 2. Bajrd 3. Mugfali, chana

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	YES Every Second day	YES		DOOR TO door Pipeline
2.	**DUG WELL** Protected Well Un Protected Well	YES			GOV. - 6NO.
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring	YES	YES		Chekdam)
	Rainwater Tanker Truck Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump	YES	YES		- Khodiyar dam) - Narmada water line - Pond - 1NO.

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Techno Economic Survey

	Other(Specify)Lake/ Pond				

Suggestions if any:

B.	Water Tank Facility				
	Overhead Tank	Capacity:	1,00,000 Lit	yes	
	Underground Sump	Capacity:	1,00,000 Lit	yes	

Suggestions if any: one each underground sump available but need to maintaince

C.	The Type of Drainage Facility				
	A. UNDERGROUND DRAINAGE 1	yes			90% house is connected. Remain in new constructions.

Suggestions if any:

D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	yes		yes	Bituminous Pavement Need repairing
	Main road	yes		yes	Bituminous Pavement Need repairing
	Internal streets	yes		yes	50% RCC, 35% Black 35% Kutchha
	Nearest NH/SH/MDR/ODR Dist. in kms.	8.3 KM	yes		Bituminous Pavement Rajkot-Kalavad-Road

Suggestions if any:

E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Bhakhinagar St. 28KM.	yes		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	BH. Gondal Bus Stop 8KM. - village bus.		yes	- In close condition
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto - Jeep Chhakda		yes	

Suggestions if any:

F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	More than 6 hrs.		yes	Jyotigram yojna connected with 4 village.

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Techno Economic Survey

	Power supply for Domestic Use	24 hrs.	YES		
	Power supply for Agricultural Use	8 hrs.		YES	
	Power supply for Commercial Use	24 hrs.	YES		
	Road/ Street Lights			YES	
	Electrification in Government Buildings/ Schools/ Hospitals	YES	YES		
	Renewable Energy Source Facilities (Y/ N)	NO			
	LED Facilities	YES		YES	

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO			
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	NO			
	Solid & liquid waste Disposal system available	NO			
	Any facility for Waste collection from road	NO			

Suggestions if any: solid waste collected at near primary school.

H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	- Pond - Stream - well - Tube well	YES		

Suggestions if any: Maintenance in canal required.

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	90% Pucca 10% Kutchha			

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	ICDS - 2NO.	YES		one close
	Sub-Centre				
	PHC	PHC - 1NO.	YES		
	BLOCK PHC				
	CHC/RH				
	District/ Govt. Hospital				
	Govt. Dispensary				
	Private Clinic	Private clinic	YES		
	Private Hospital/ Nursing Home				
	AYUSH Health Facility				
	sonography /ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: .28....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	2NO.	YES		
	Primary School	2NO.	YES		
	Secondary school	1NO.	YES		
	Higher sec. School				
	ITI college/ vocational Training Center				
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities				

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If any of the above Facility is not available in village than approx. distance from village: ...4....kms.

Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)				NO
	Public Library (With daily newspaper supply: Y/N)				NO
	Public Garden				NO
	Village Pond	POOR		YES	
	Recreation Center				NO
	Cinema/ Video Hall				NO
	Assembly Polling Station				NO
	Birth & Death Registration Office		Gram Panchayat	YES	

If any of the above Facility is not available in village than approx. distance from village: .28....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	POOR		YES	
	Telecommunication Network/ STD booth				NO
	General Market				
	Shops (Public Distribution System)			YES	
	Panchayat Building	POOR		YES	
	Pharmacy/Medical Shop			YES	
	Bank & ATM Facility	Good		YES	
	Agriculture Cc-operative Society	Good		YES	
	Milk Co-operative Soc.	Good		YES	
	Small Scale Industries				
	Internet Cafes/ Common Service Center/Wi Fi				
	Youth Club				
	Mahila Mandal			YES	

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Agriculture and milk co operative		Yes	
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Surksha Yojana				
	4. Kishori Shakti Yojana			Yes	
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme				
	7. Intergrated Child Development Scheme (ICDS)			Yes	
	8. Mahila Mandal Protsahan Yojana (MMPY)				
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana			Yes	
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)			Yes	
	18. Jawahar Rozgar Yojana (JRY)			Yes	
	19. Indira Awas Yaojna (IAY)				
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	NO			
2.	Bio-Gas Plant	YES		YES	25-1.
	Solar Street Lights Rain Water Harvesting System	YES		YES	80-1.
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	illage Base Map Available: Hard Copy/Soft Copy	NO			
2.	Recent Projects going on for Development of Village	Yes			Internal steel paver block
3.	Any NGO working for village development	NO			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	NO			

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VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrast ucture facilities, School Building Health Center Panchayat Building Public Toilets & any other	YES	Panchayat building, primary school, secondary school, Bus stand, water tank
2.	Additional Information/ Requirement	NO	
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	NO	

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Industrial development	

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

તલાટી-કમ-મંત્રી,
નગરપીપળીયા ગ્રામ પંચાયત

સરપચ,
નગરપીપળીયા ગ્રામ પંચાયત

Nodal Officer

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12.4 Gap Analysis of the Allocated Village

VILLAGE GAP ANALYSIS					
Village Facilities	**Planning Commission/UDPFI Norms**	Village Name	Nagar Pipaliya, Rajkot.		
		Population: 2721			
		Existing	Required as per Norms	Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 Population	2	1	-	+1
Primary School	Each Per 2500 population	2	1	-	+1
Secondary School	Per 7,500 population	1	1	-	0
Higher Secondary School	Per 15,000 Population	0	0	-	0
College	Per 125,000 Population	0	0	-	0
Tech. Training Institute	Per 100000 Population	0	0	-	0
Agriculture Research Centre	Per 100000 Population	0	0	-	0
Skill Development Center	Per 100000 Population	0	0	-	0
Health Facility					
Govt. / Panchayat Dispensary or Sub PHC or Health Centre	Each Village	1	1	-	0
Primary Health & Child Health Center	Per 20,000 population	0	0	-	0
Child Welfare and Maternity Home	Per 10,000 population	0	0	-	0
Multi specialty Hospital	Per 100000 Population	0	0	-	0
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	10	-	-10
Physical Infrastructure Facilities					
Transportation		Inadequate			
Pucca Village Approach Road	Each village	Inadequate			
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	Inadequate	No pick up stand available (connected by ST bus, auto)		
Drinking Water (Mini. 70 LPCD)		Adequate			
Over Head Tank	1/3 of Total Demand	50000 lit.			
U/G Sump	2 /3 of Total Demand	100000 lit.			

Drainage Network – Open		Inadequate			
Drainage Network - Cover		adequate	100% covered		
Waste Management System		Inadequate			
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	0	-	0
Community hall and Public Library	Per 15000 Population	0	0	-	0
Cremation Ground	Per 20,000 population	0	0	-	0
Post Office	Per 10,000 population	1	0	-	+1
Gram Panchayat Building	Each individual/group Panchayat	1	1	-	0
APMC	Per 100000 Population	0	0	-	0
Fire Station	Per 100000 Population	0	0	-	0
Public Garden	Per village	0	1	-	-1
Police post	Per 40,000Population	0	0	-	0
Shopping Mall Shops are available					
Electrical design					
Electricity Network		Inadequate	Electricity available		
Any Smart Village Facility					
Technology					
		ESR Cap	100000 Lit.		
		Sump Cap	50000 Lit.		
		Lat	0		

12.5 Summary Details of All the Villages Designs in Table form as Part-I and Part-II

Sr. no.	Village Name	Discipline	Phase - I	Phase – II
1	**Nagar pipaliya**	**Civil**	Public toilet block	Solid Waste Management
			Post office	Bus stand
			Panchayat building	Flexible Pavement road

			Community hall + library	Public Garden
			Skill development center	Cyber cafe
			Animal center	General Market
		Electrical	Automatic on-off switch for water tank	CCTV camera
			Photovolic water pump	Solar cleaning system
			Solar water purifier	Street light
2	**Movaiya**	**Civil**	Public garden	Bio gas plant
			Community hall	General market
			Public library	Anganwadi
			Bus stand	Post office
			Panchayat building	Godowan for agriculture product
			Public toilet	Atm
				Police station
		Electrical	House wiring	Solar library
			Street lighting	Commercial wiring
			Solar roof top	Solar street light
3	**Jaliya**	**Civil**	Chanakya Library	Soil testing laboratory
			Panchayat building	Garden
			Pay and use	Recreational center
			General market	Biogas plant
			Bus stand	Aganwadi
			Community hall	Solid waste collection
		Electrical	Solar street light	Smart garden
			Solar roof top	Solar laboratory

			Solar cleaning system	Irrigation by solar
4	**Isra**	**Civil**	Biogas plant	Community hall
			Garden	Solid waste collection
			Public toilet	Library
			Post office	Internal road
			Water harvesting	Recreational center
			Waste water treatment plant	Police station
		Electrical	Solar panel fitting	Small hydropower generation
			Solar street light	Temperature control fan
			Solar cleaning system	Water level indicates
5	**Meta khambliya**	**Civil**	Public library	Godown
			Community hall	Rain water harvesting
			Garden	Bank
			Water tank	Play ground
			Solid waste collection	Biogas plant
			Public toilet	Chabutro
6	**Visaman**	**Civil**	Compos pit	Biogas plant
			Public garden	PHC
			Solid waste management	Rain water harvesting
			Chabutro	Public library
			Shopping mall	ATM
			Community hall	Road
		Electrical	Pizo electrical generation	Solar street light

			Smart energy meter	Central control unit for irrigation water pump construction
			Solar tree	Electrical wiringand cost estimate of post office
7	**Khorana**	**Civil**	Public Toilet	ATM
			Bus Stand	Post office
			Community Hall	STP
			PHC Centre	Bank
			Public Garden	Rain water harvesting
			Public Library	Hall paver block
		Electrical	Solar roof top	Solar panel
			Street light	Power generator by river water
			Solar pump	Wind farm
8	**Derdi kumbhaji**	**Civil**	PHC	Rain water harsvesting
			Public library	Cyber café
			Community hall	Sill development center
			Public garden	Gym
			Police station	Soli testing laboratory
			Bachatmandali	Agriculture store
		Electrical	Solar street light installation design	CCTV
			Solar pump system	Solar roof installation design
			Pizo-electrical speed braker power generation design	Purification water plant

12.7 Summary of Good Photographs in Table Format (village visits, Ideal, Smart Village or any other)

Allocated Village : Nagar Pipaliya Village Lodhika, Rajkot.

IdealVillage : Pardi Village Lodhika, Rajkot.


ગ્રામ પંચાયત કચેરી


શ્રી સ્વામિ વિવેકાનંદ પ્રા. શાળા


બંદ ઘર


લાઇફ લાઇન
હોસ્પીટલ

Smart Village : Khokhadadad Village , Rajkot.

12.8 Village Interaction with sarpanch Report with the photograph

A report on
Interactive Presentation (Vishwakarma Yojana: Phase: VIII)
at
Nagar Pipaliya Village, Rajkot District.

As per the circular GTU guideline, GTU informed all the teams of Vishwakarma Yojana to present their work in village for the effective implementation of Vishwakarma Yojana. Under this guideline Students team of Nagar Pipaliya village presented the village development plan of village at Nagar Pipaliya Panchayat office on 6th September, 2020. Sarpanch, Talati, All the Panchayat members and Village dwellers remained present to know how the development of Nagar Pipaliya village is possible and to give their feedback.

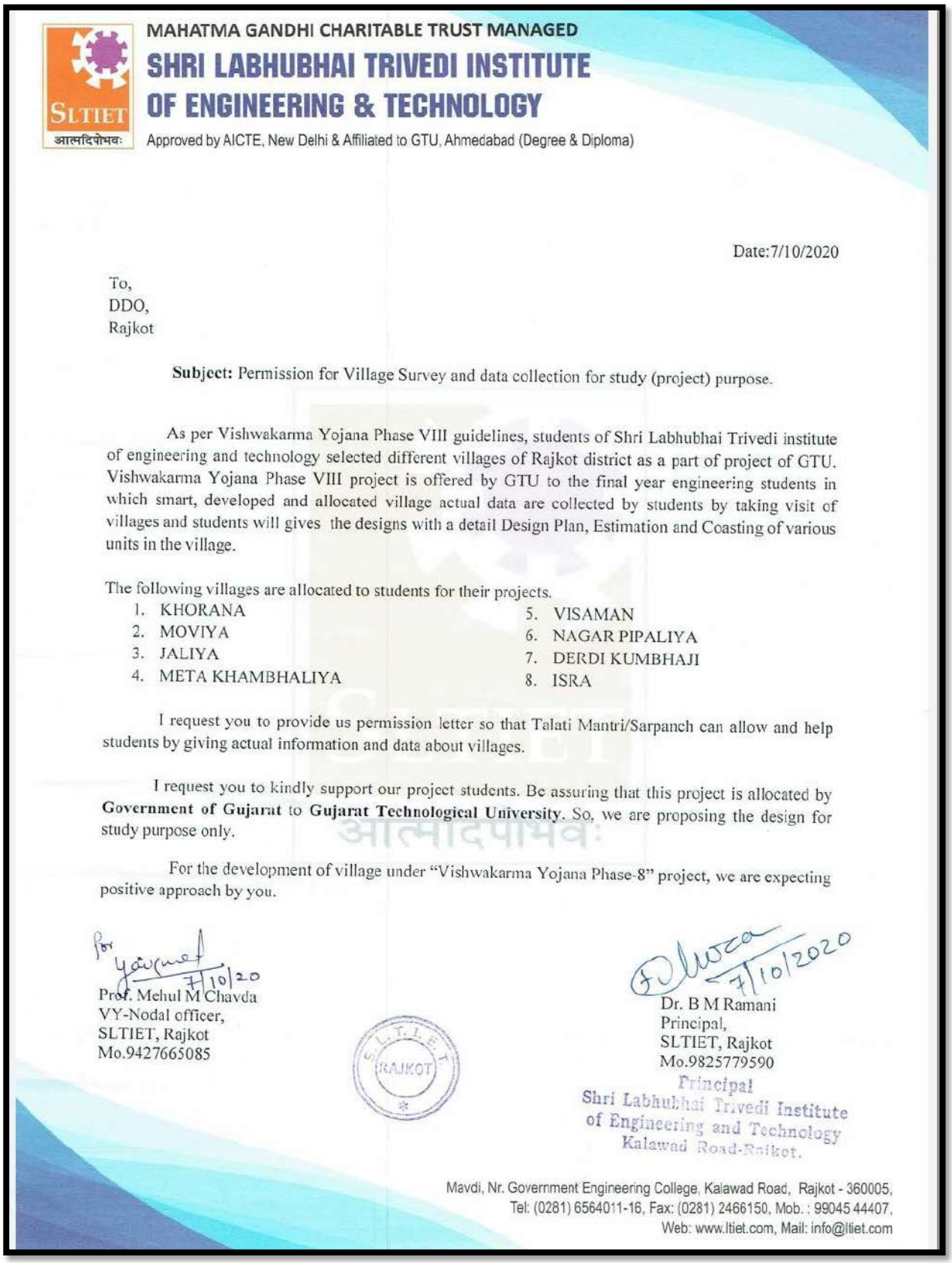
We presented our work under VY. We explained core theme of VY, various benefits of village development and issues prevailing in villages. We explained various designs under Physical infrastructure, Social infrastructure and Socio-Cultural facilities such as Internal Street Road, Solid waste management, Community toilet, Bus stand & Community Hall.

Nagar Pipaliya village dwellers shared various problems faced by them while designing such a facilities, we gave various approaches and also presented management techniques of such facilities with proposed design.

The presentation was very much interactive and helpful to understand various amenities to be designed at village level for the overall development of the Nagar Pipaliya village as Rurban town (Rural Soul + Urban Amenities).

Our team of VY thanked all the members of the village for their support during this work period and made them understand that the implementation of such facilities can build a better village and hence lead to build a strong nation.

12.9Sarpanch Letter giving information about the village development



MAHATMA GANDHI CHARITABLE TRUST MANAGED

SHRI LABHUBHAI TRIVEDI INSTITUTE OF ENGINEERING & TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to GTU, Ahmedabad (Degree & Diploma)

Date:7/10/2020

To,
DDO,
Rajkot

Subject: Permission for Village Survey and data collection for study (project) purpose.

As per Vishwakarma Yojana Phase VIII guidelines, students of Shri Labhubhai Trivedi institute of engineering and technology selected different villages of Rajkot district as a part of project of GTU. Vishwakarma Yojana Phase VIII project is offered by GTU to the final year engineering students in which smart, developed and allocated village actual data are collected by students by taking visit of villages and students will gives the designs with a detail Design Plan, Estimation and Coasting of various units in the village.

The following villages are allocated to students for their projects.

1. KHORANA
2. MOVIYA
3. JALIYA
4. META KHAMBHALIYA
5. VISAMAN
6. NAGAR PIPALIYA
7. DERDI KUMBHAJI
8. ISRA

I request you to provide us permission letter so that Talati Mantri/Sarpanch can allow and help students by giving actual information and data about villages.

I request you to kindly support our project students. Be assuring that this project is allocated by **Government of Gujarat** to **Gujarat Technological University**. So, we are proposing the design for study purpose only.

For the development of village under "Vishwakarma Yojana Phase-8" project, we are expecting positive approach by you.

7/10/20
Prof. Mehul M Chavda
VY-Nodal officer,
SLTIET, Rajkot
Mo.9427665085

S.L.T.I.E.T. RAJKOT

7/10/2020
Dr. B M Ramani
Principal,
SLTIET, Rajkot
Mo.9825779590

Principal
Shri Labhubhai Trivedi Institute of Engineering and Technology
Kalawad Road-Rajkot.

Mavdi, Nr. Government Engineering College, Kalawad Road, Rajkot - 360005,
Tel: (0281) 6564011-16, Fax: (0281) 2466150, Mob. : 99045 44407,
Web: www.ltiet.com, Mail: info@ltiet.com

12.10 Comprehensive report preparation as per format

Vishwakarma Yojana is provides special scheme for development of village by GTU and Government of Gujarat in which students work together and collect data and information regards village development with the help of gram Panchayat and stake holders. Village have some basic facilities likes drinking water, drainage system, pucca road, and other facilities like primary school, primary health center, community hall, library, public latrine block, are sufficient so that village can develop. So, we will give proposal regarding sustainable energy sources and solution related to infrastructure problems. Efforts have been made in this project work to identify and plan some of the below facilities for sustainable development of village and to meet need of future population. Vishwakarma Yojana is one of the initiatives towards Rurbanisation that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU.

It is one of the strategies to reduce urban city pressure and lower the migration rate by developing village with a “rural soul” but with all urban amenities that a city may have. In this project the students meet the relevant citizens of village and survey the existing facilities. Then design of the sustainable infrastructure which is to be modified is carried out for the village. This includes implementation of engineering skills to prepare detailed project reports for village as a part of the final year project work. By this project certain experiences recreates a real work and need of application of an individual technical knowledge on any existing problems. Based on survey we tried to give design of basic facilities to fulfill their needs. By providing these basic facilities to village for reduce urban city pressure and decrease migration rate, which is ultimate aim of Vishwakarma Yojana.

After annalise whole village we seen many lake awareness of villagers needful facilities, some cleanly and smartness of village we decide to provide some facilities like Public Library, Community Hall, Garden, Water Tank, Solid Waste Collection, Public Toilets, Godown, Rain Water Harvesting, Bank, Play Ground, Biogas Plant, Chabutaro etc. all of this facility we create a design and estimate with sarpanch and nodal officer permissiom

Chapter-13 Sustainable Design Planning Proposal

13.1 Design Proposals

- Vishwakarma Yojana Phase-VII Part – II we have given total nine design according to the village need and useful for the villagers.in which 6 civil and 3 electrical.
- The design proposals are: -
    - Bus In the Stand
    - Solid Waste Management
    - Flexible Pavement Road
    - Public Garden
    - Cyber Cafe
    - General Market
    - Solar Cleaning System
    - Sreet Light
    - CCTV Camera

- The primary goal of **solid waste management** is reducing and eliminating adverse impacts of **waste** materials on human health and the environment to support economic development and superior quality of life

- A **bus stand** is usually employed to allow a **bus** to lay over at a **bus terminus**, without giving the appearance of being in service, or blocking the stop from use by other **buses** that are in service. **Bus stands** also allow short-term parking for driver changes or driver breaks.

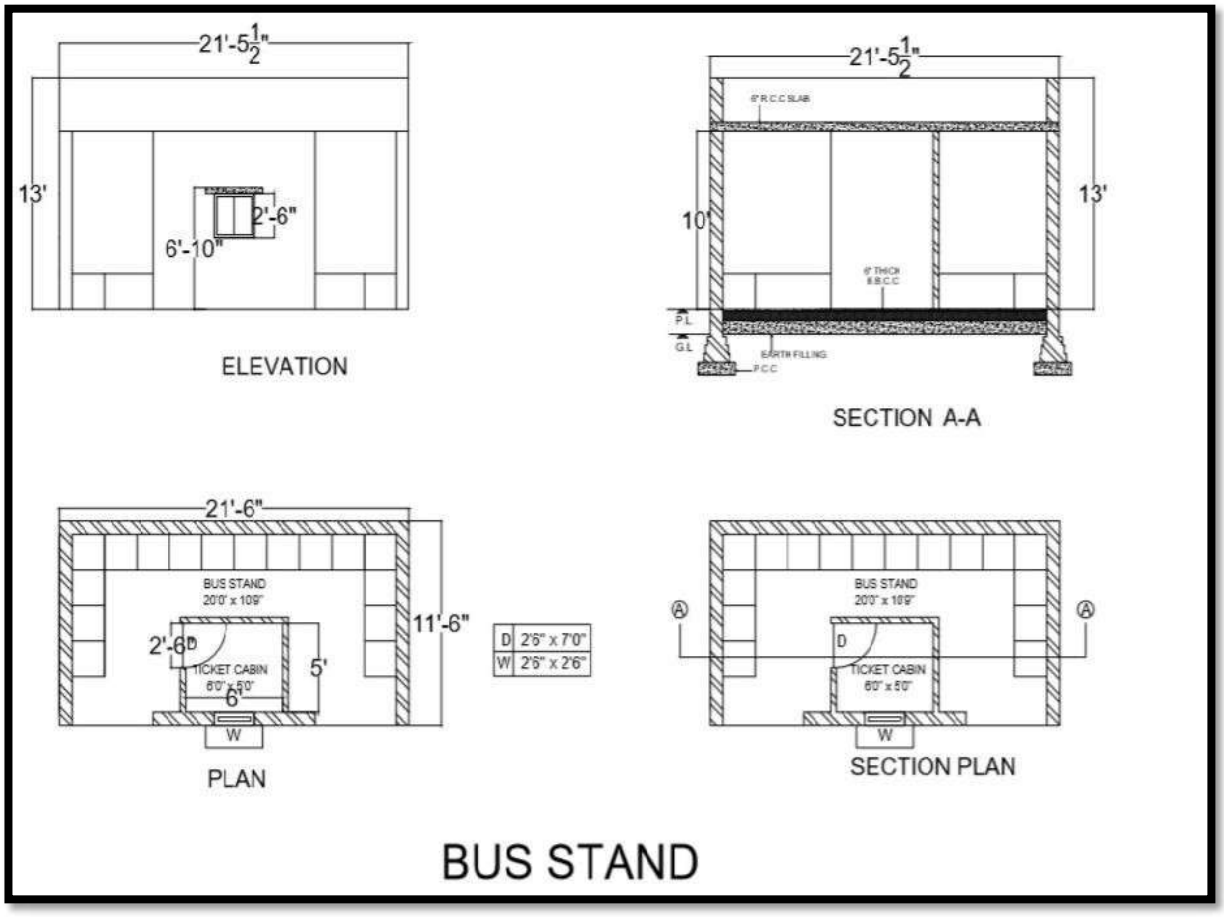
- Flexible pavements are preferred over rigid concrete roads because of their certain advantages, such as they can be strengthened and improved in stages with the growth of traffic.

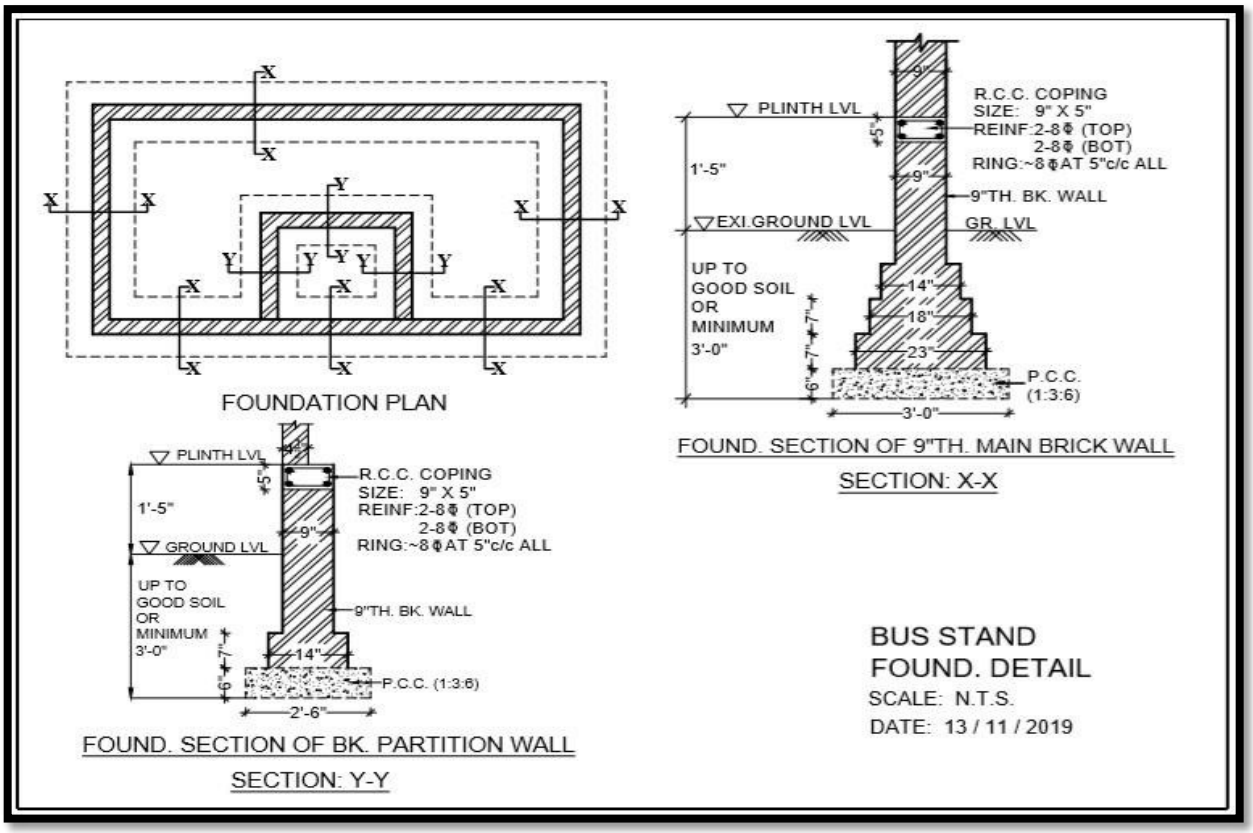
- They’re a place where people can spend time and socialize in a relaxing natural environment. This is especially good in areas where most people live in apartments or in homes that don’t have much (or any) land around them.

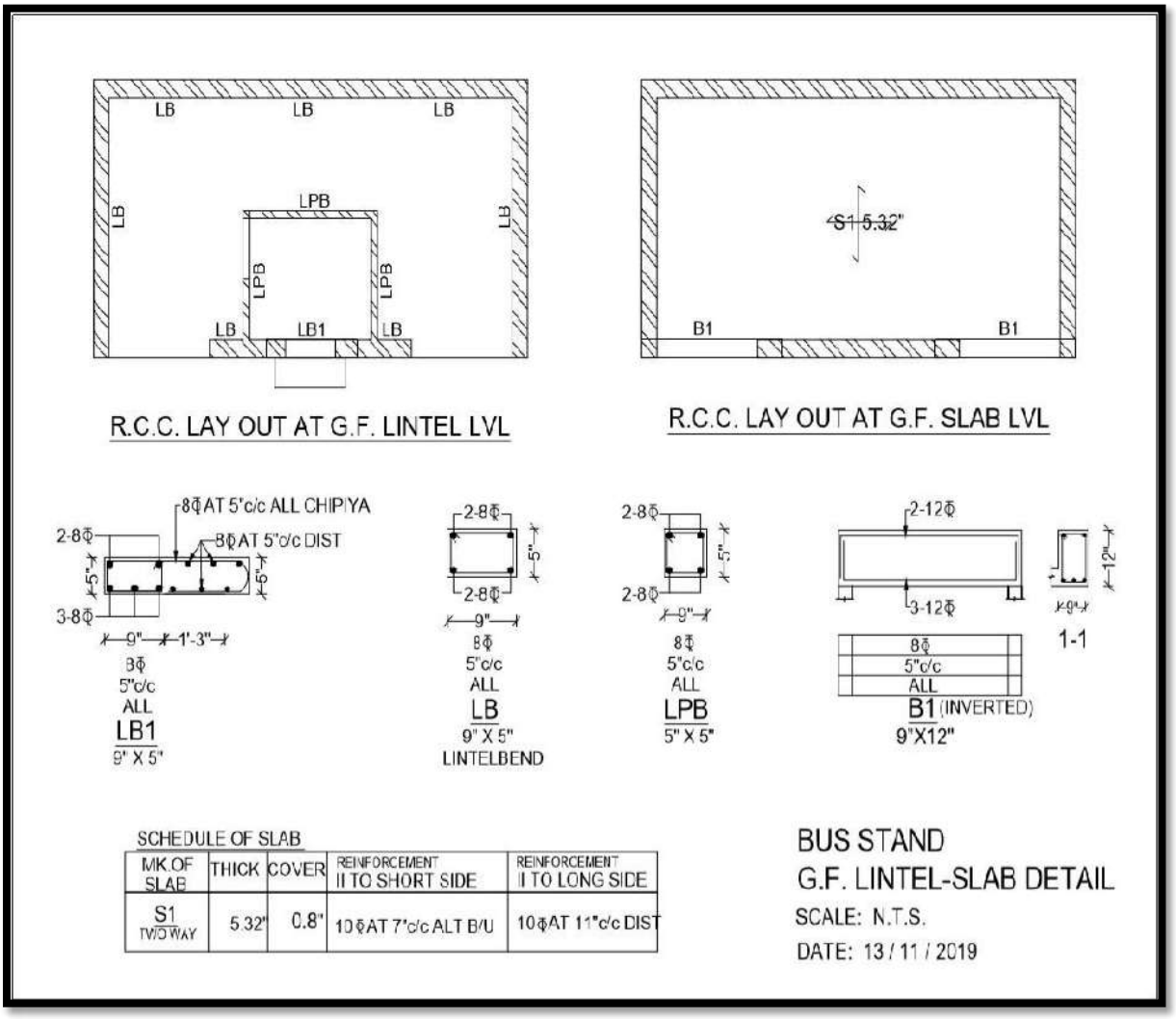
- If you play the game at an Internet cafe, you will enjoy the game at its full optimization without the burdensome **cost** of buying a special gaming PC. The Internet speed at gaming cafes is also much faster than the average home Internet speed, which reduces lag and timeouts from interrupted Internet connections.

- The general store served as a meeting place for members of the community, of which the storekeeper was an important member not only because he supplied material goods but because he was also the source of news and gossip.

- **13.1.1 DESIGN OF BUS STAND**







- **QUANTITY SHEET OF BUS STAND**

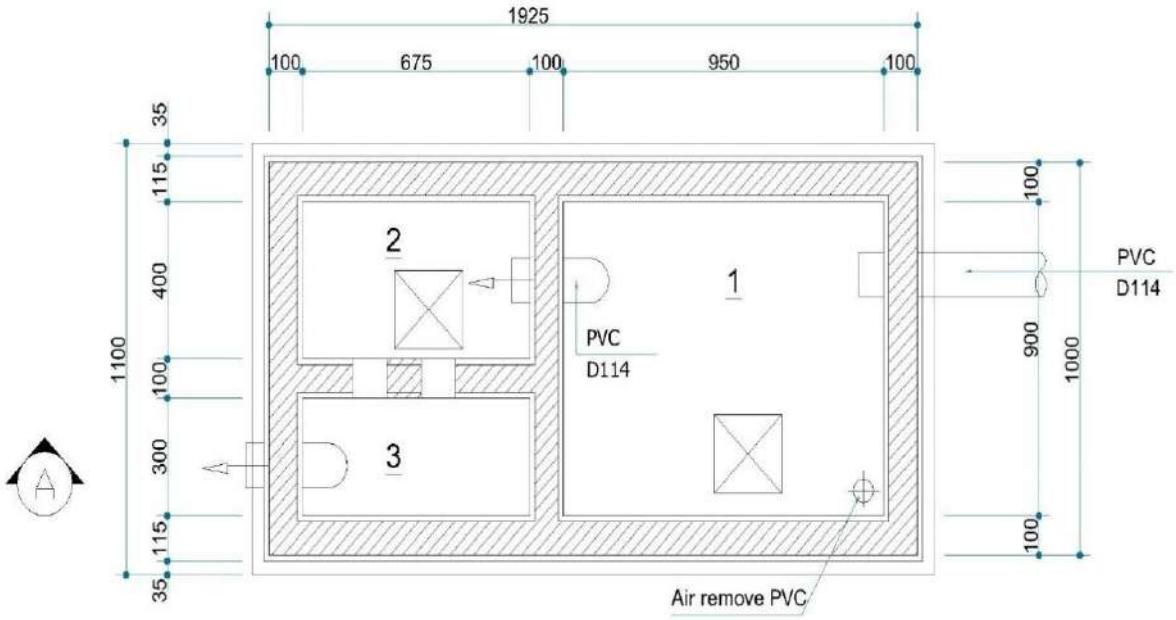
Sr No	Description of items	No	Length (inches)	Breadth (inches)	Height (inches)	Quantity (inches)	Total Quantity
	CL=(20+0.45+0.45)*2 +(10+0.45+0.45)*2		63'6"				
1	Earthwork in Foundation	1	762"	36"	36"	987552"	16.18m^3
2	P.C.C in Foundation	1	762"	36"	6"	164592"	2.69m^3
3	Brickwork upto plinth						

	Step-1	1	762”	23”	7”	122682”	2.01 m^3
	Step-2	1	762”	18”	7”	96012”	1.58 m3
	Step-3	1	762”	14”	7”	74676”	1.23 m3
	Step-4	1	762”	9”	21”	144018”	2.36 m3
							Total = 7.18 m^3
4	Brickwork in Superstructure						
	For outer wall=516’	1	516”	9”	120”	557280”	9.14 m^3
	For front wall=10’	1	120”	9”	120”	129600”	2.13 m^3
	Ticketcabin wall=200”	1	200”	4”	120”	96000”	1.58 m^3
	Parapet wall	1	762”	4”	36”	109728”	1.80 m^3
							Total = 14.65 m^3
5	R.C.C for slab,lintel,chajja						
	Slab	1	258”	138”	6”	213624”	3.50 m^3
	Coping below plinth	1	762”	9”	5”	34290”	0.56 m^3
	Lintel						
	D1	1	42”	4”	6”	1008”	0.02 m^3
	W	1	42”	9”	6”	2268”	0.04 m^3
							Total = 4.12m^3
6	Plaster						
	Internal wall 1	2	129”	-	120”	30960”	19.97 m^2
	Internal wall 2	1	240”	-	120”	28800”	18.59m^2
	Cabin side wall	2	24”	-	120”	5760”	3.72 m^2
	Cabin internal wall 1	2	60”	-	120”	14400”	9.30 m^2
	Cabin internal wall 2	2	72”	-	120”	17280”	11.15 m^2
	Cabin outer wall 1	2	64”	-	120”	15360”	9.91 m^2
	Cabin outer wall 2	1	80”	-	120”	9600”	6.20 m^2
	External wall 1	1	138”	-	162”	22356”	14.43 m^2
	External wall 2	2	258”	-	162”	83592”	53.94 m^2
	Outer cabin wall	1	120”	-	162”	19440”	12.55 m^2

							Total = 159.76 **m^2**
	Deduction						
	For plaster						
	D	1	30”	-	84”	2520”	1.66 m^2
	V	1	-	30”	30”	900”	0.59 m^2
							Total = 2.25 **m^2**
							Total = 159.76-2.25 = 157.51 m^2
7	Flooring	1	240”	129”	-	30960”	19.98 m^2
8	Paint	AS per plastering	AS per plastering	AS per plastering	AS per plasterin g		157.51 m^2
9	Sitting blocks	16	24”	24”		9216”	5.95m^2
10	Steel calculation						
	For 10 mmØ @ 180 mm c/c spacing						
	L = 3.50+2*9*0.01-2*0.02 =3.64						
	Span = 6.55-2*0.02 = 6.51 m						
	No of bar = 6.51/0.18+1 = 37 No						
	Extra length of bent up bars length = 0.45*x =0.135-2*0.02-0.010 =0.085 m						
	L = 3.64 + 0.45x = 3.64 +0.45*0.085 = 3.678 m	37	144”	@	0.617 kg/m		84 kg
	For 10 mmØ @ 280 mm c/c spacing						
	Bars at bottom: Hook length = 9d						

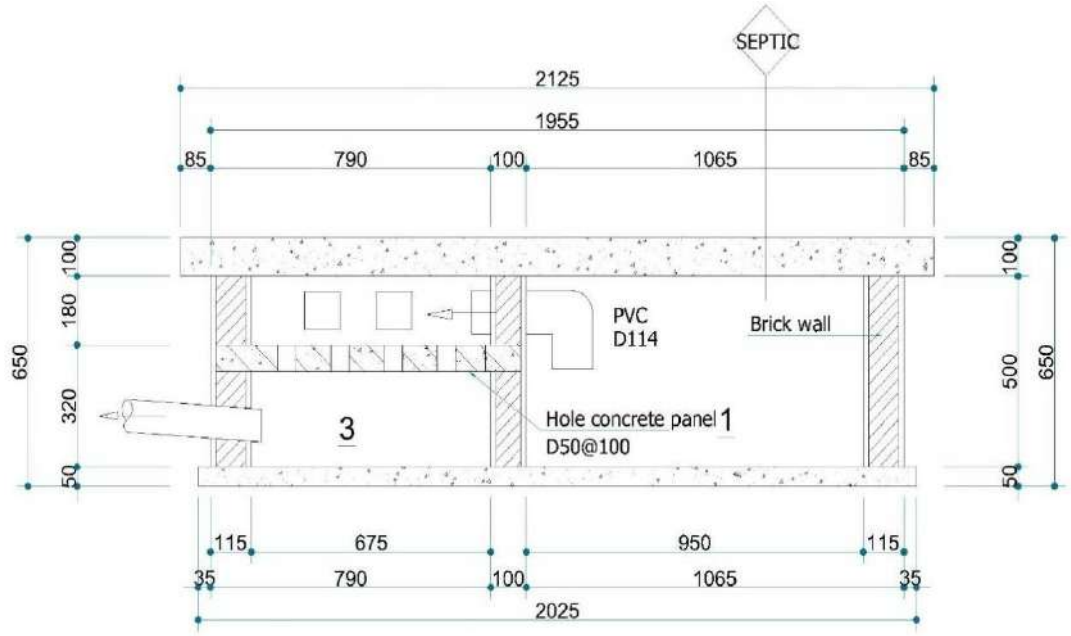
	L= 6.55+2*0.09-2*0.02 =6.69 m Width of slab= 3.50-2*0.02 =3.46 So,No of bars =3.46/0.28+1 =14 nos Bars at top: Width of slab at one end for bent up at top =0.23+0.45-0.085-0.02 =0.575 m So,No of bar at one end = (0.575/0.28)+1 = 4 nos So,No of bar at both end = 2*4 = 8 nos Total no of bars = 8 + 14 = 22	22	263”	@	0.617 kg/m		90.85 kg

- **13.1.2 S0LID WASTE MANAGEMENT**



SEPTIC TANK

SCALE: 1/70



SECTION AA

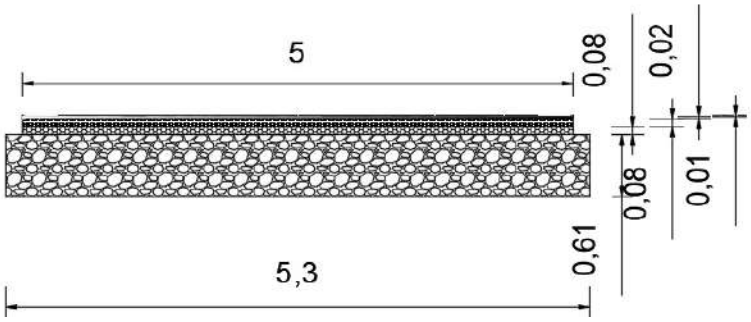
SCALE 1/70

Measurement sheet for Solid waste Disposal Septic Tank

Item No.	Item Description	No	Length (feet)	Breadth (feet)	Heigth (feet)	Quantity (cu feet)
1	Earthwork in Excavation					
	Long wall = 63.15	2	63.15	3.28	1.64	679.393
	Short wall 1 = 36.08	2	36.08	3.28	1.64	388.163
	Short wall 2 = 22.14	1	22.14	3.28	1.64	119.095
						1186.65
2	p.c.c(1:4:8) in foundetion					
	Longt wall = 63.15	2	63.15	2.78	0.5	175.557
	Short wall 1 = 36.08	2	36.08	2.78	0.5	100.302
	Short wall 2 = 22.14	1	22.14	2.78	0.5	30.7746
						306.634
3	Bricks mesonary for foundation and plinth					
	Longt wall = 63.15					
	First step	3	22.14	4	0.75	199.26
	Second step	3	22.14	3	0.75	149.445
	Third step	3	31.16	2	0.75	140.22
	Short wall 1 = 36.08					
	First step	2	32.08	4	0.75	192.48
	Second step	2	33.08	3	0.75	148.86
	Third step	2	34.08	2	0.75	102.24
	Short wall 2 = 22.14					
	First step	2	18	4	0.75	108
	Second step	2	19	3	0.75	85.5
	Third step	2	20	2	0.75	60
						1186.01
4	Bricks mesonary of Superstructure					
	H=10					
	Longt wall = 63.15	3	63.15	0.75	10	1420.88
	Short wall 1 = 36.08	2	36.08	0.75	10	541.2
	Short wall 2 = 22.14	2	22.14	0.75	10	332.1
						2294.18
5	R.c.c work for slab and lintal					
	R.c.c work for slab	1	47	30	5	7050
	R.c.c work for lintal	10	7	1.5	3.5	367.5
						7417.5
					Total	12391.0

13.1.3 FLEXIBLE PAVEMENT ROAD

ALL DIMENSION IN METER
ROAD LENGTH=250M
ROAD WIDTH=5.3
SECOND COAT PLINTH 12MM GRIT
FIRST COAT PLINTH 20 MM GRIT
80MM TOP COAT 40MM BALLAST
80MM INTER COAT 50MM BALLAST
150MM SOLING COAT OF BOULDERS



No	Description	No	Length	Breath	Height	Qty.
1	150mm soling coat of boulder for lower level	1	250	5.3	0.15	198.75 cub.m
2	80mm Interco at 50 mm ballast	1	250	5	0.12	150
3	80 mm top coat 40mm ballast	1	250	5	0.12	150
4	first coat painting 20mm grit	1	250	5	0.0135	16.87
5	Second coat painting 12mm grit	1	250	5	0.0075	9.37
6	Bitumen coat before painting of bitumen	1	250	5	2.2	2750
7	Bitumen coat for second layer of bitumen	1	250	5	1.2	1500
8N	Labour work 250*5*5=6250					

No.	Item Description	Qty.	Rate	Per	Amount (Rs)
1	150mm soling coat of boulder for lower level	198.75	800	cu.m	1,59,000/-
2	80mm Interco at 50 mm ballast	150	600	cu.m	90,000/-
3	80 mm top coat 40mm ballast	150	400	cu.m	60,000/-
4	first coat painting 20mm grit	16.87	220	cu.m	3,711.4/-
5	second coat painting 12mm grit	9.37	200	cu.m	1,874/-
6	Bitumen coat before painting and second layer of Bitumen	4250	750	cu.m	31,87,500/-
	Total Amount			Rs. 35,02,085.4/-	
	10% contractor charges			Rs. 3,50,208.54/-	
	5 % extra charges like painters, mixer, transport & labour charges			Rs. 1,75,104.27/-	
	Grand Total			Rs. 40,27.398.21/-	

13.1.4 PUBLIC GARDEN

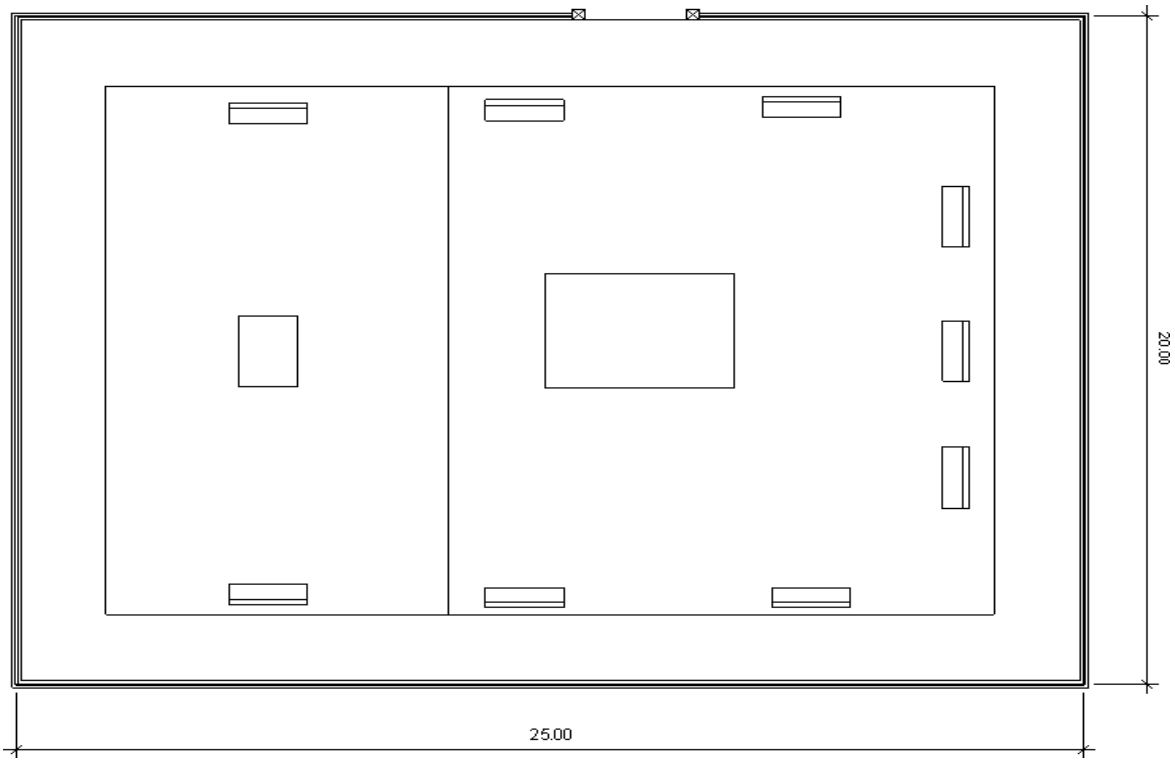


fig no plan of garden

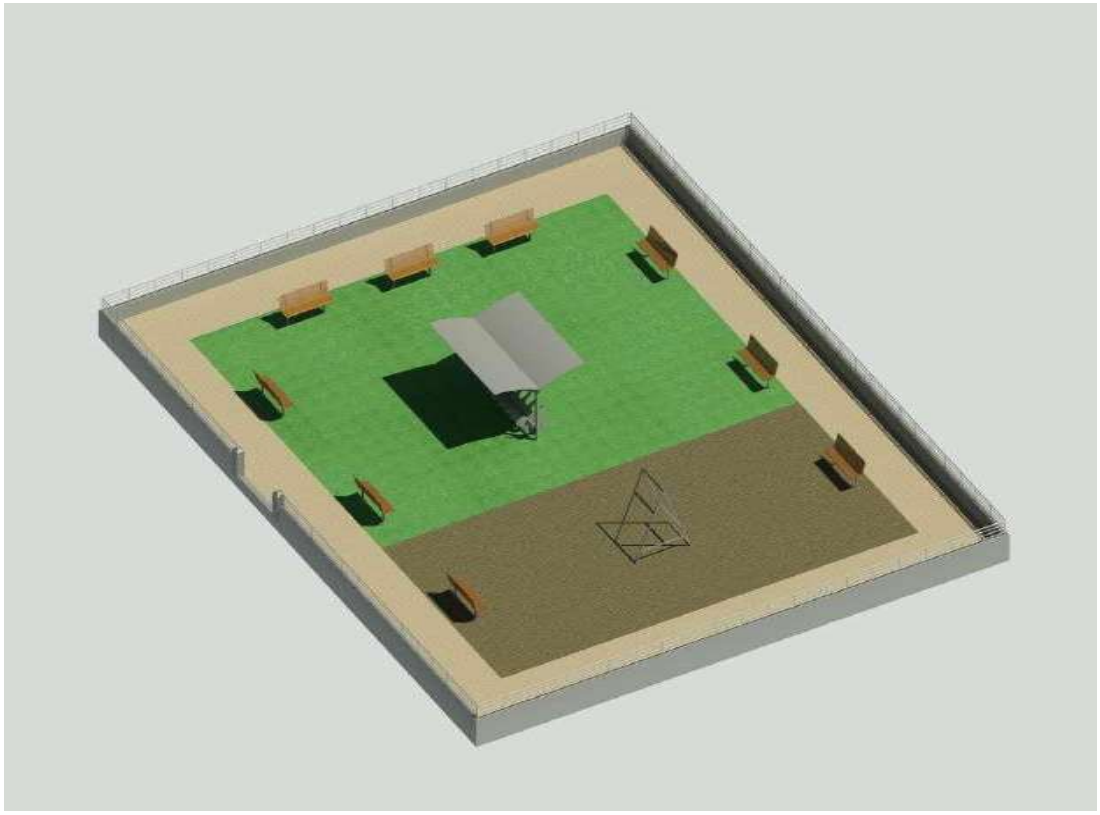
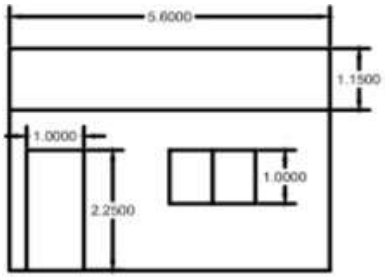


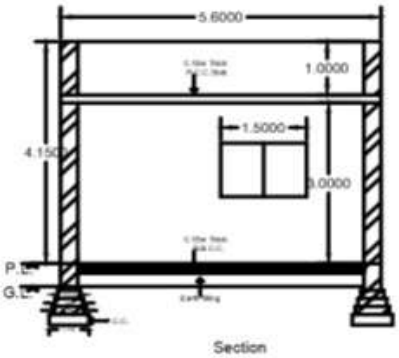
fig no 3D plan of garden

Item Description	Total Quantity	Rate	Amount
Provide Sit Clearance	500 m2	8	4000
Complete Wall const.	493.7 m2	150	74055
Walking Area	164m2	500	82000
Sand pit in Garden	10.86m2	0	0
paver block	164m2	78	12792
flling mooram for grass			
in garden	50.4m2	500	25200
Rcc benches	6no.	1300	7800
Gate	1no.	1200	1200
garden plants	25nos.	500	12500
		total=	2,51,047
	10% contractors	profit	25100
Excavation	20.2X25.2	45.5	44,946
	849.04		
		Grand Total=	2,83,682Rs.

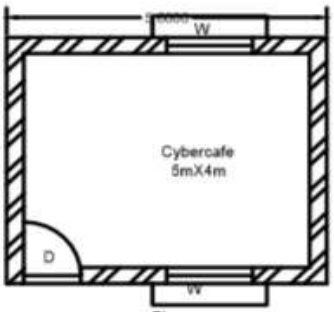
13.1.5 CYBER CAFE



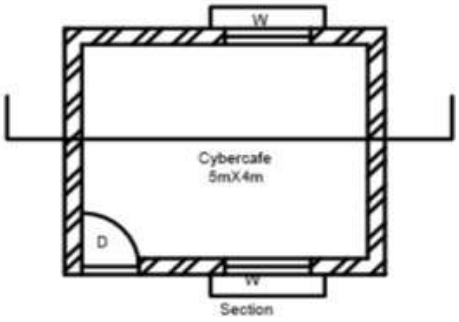
Elevation



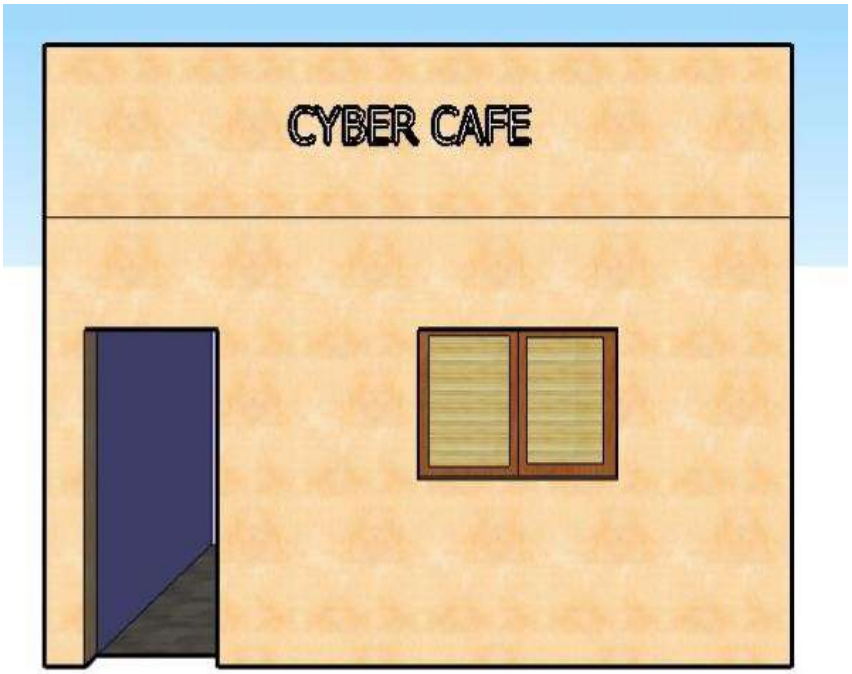
Section

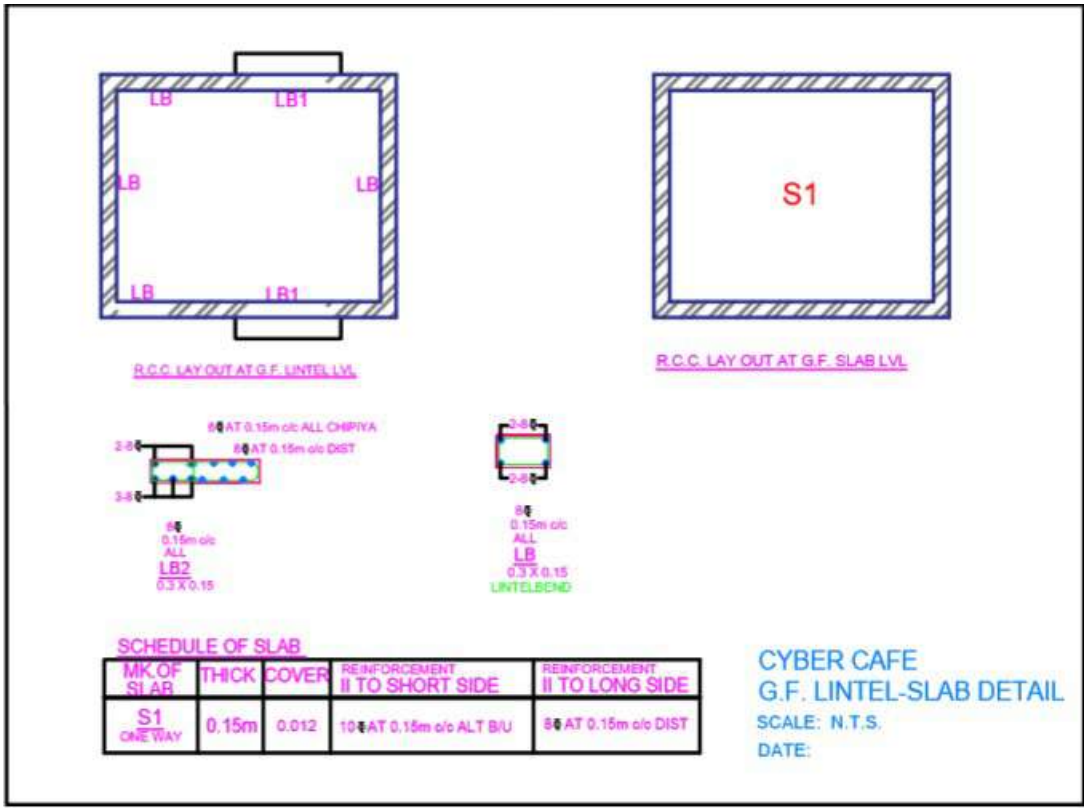


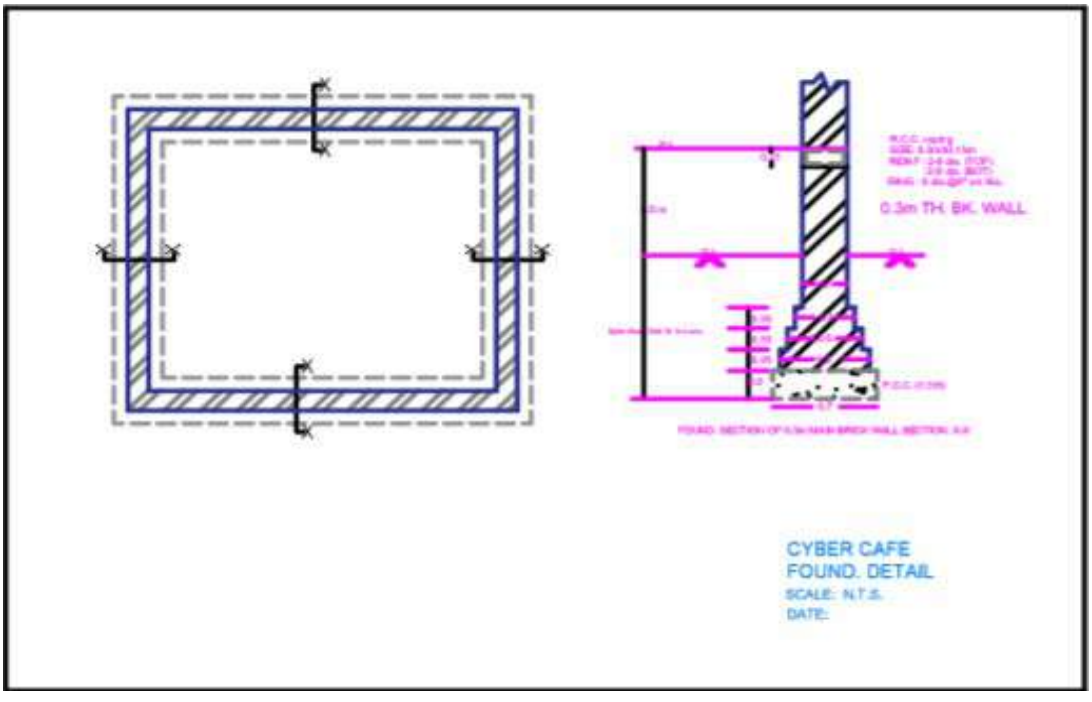
Plan



Section



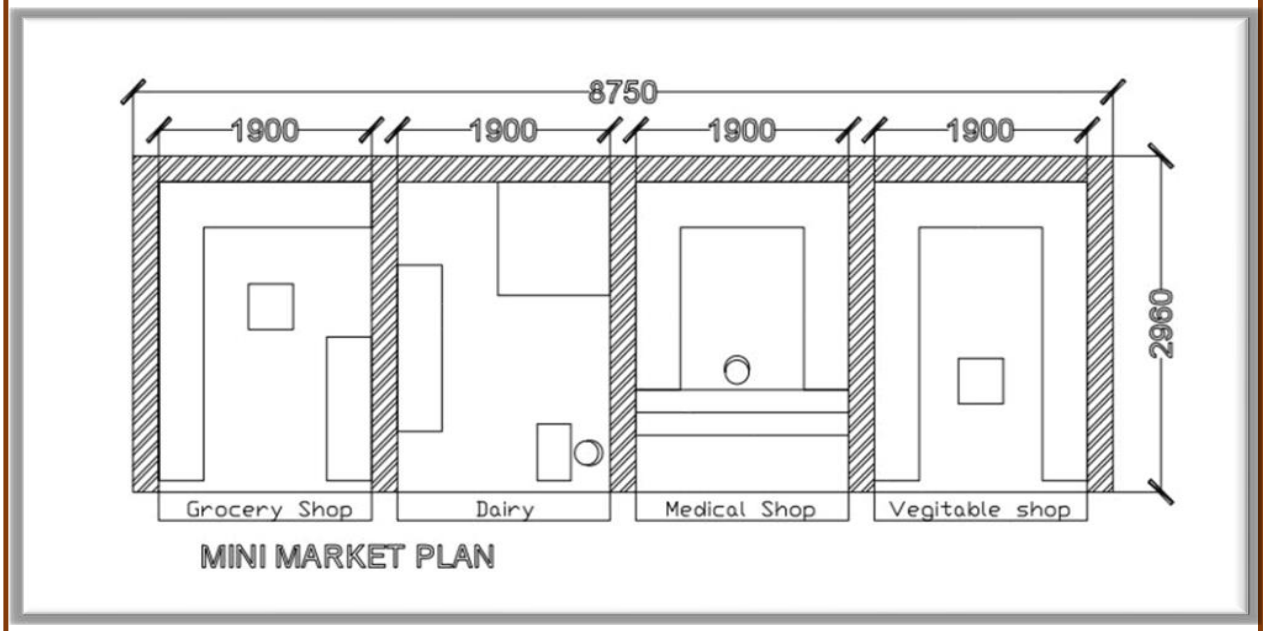

LB
LB1
LB
LB
LB
LB1
R.C.C. LAY OUT AT G.F. LINTEL LVL
S1
R.C.C. LAY OUT AT G.F. SLAB LVL
8Φ AT 0.15m c/c ALL CHIPIYA
8Φ AT 0.15m c/c DIST
2-8Φ
3-8Φ
8Φ
0.15m c/c
ALL
LB2
0.3 X 0.15
2-8Φ
2-8Φ
8Φ
0.15m c/c
ALL
LB
0.3 X 0.15
LINTELBEND
SCHEDULE OF SLAB
MK.OF SLAB
THICK
COVER
REINFORCEMENT II TO SHORT SIDE
REINFORCEMENT II TO LONG SIDE
S1
ONE WAY
0.15m
0.012
10Φ AT 0.15m c/c ALT B/U
8Φ AT 0.15m c/c DIST
CYBER CAFE
G.F. LINTEL-SLAB DETAIL
SCALE: N.T.S.
DATE:


0.3m TH. BK. WALL
CYBER CAFE
FOUND. DETAIL
SCALE: N.T.S.
DATE:

Sr No	Description of items	No	Length (meter)	Breadth (meter)	Height (meter)	Total Quantity
	CL=(5.3)*2 +(4.3)*2		19.2			
1	Earthwork in Foundation	1	19.2	0.7	1.15	15.456m^3
2	P.C.C in Foundation	1	19.2	0.7	0.2	2.698m^3
3	Brickwork upto plinth					
	Step-1	1	19.2	0.6	0.15	1.728 m^3
	Step-2	1	19.2	0.5	0.15	1.44 m^3
	Step-3	1	19.2	0.4	0.15	1.152 m^3
	Step-4	1	19.2	0.3	0.5	2.88 m^3
						Total=7.2 m^3
4	Brickwork in Superstructure					
	For outer wall	1	19.2	0.3	3	17.28 m^3
	Parapet wall	1	19.2	0.3	1	5.76 m^3
	Deduction					
	Door	1	1	0.3	2.25	-0.675 m^3
	Window	2	1.5	0.3	1	-0.9 m^3
					Total=27.465 m^3	
5	R.C.C for slab,lintel					
	Slab	1	5.6	4.6	0.15	3.864 m^3
	Lintel	2	2.0	0.15	0.4	0.24
				Total= 4.2 m^3		
6	Plaster					
	Internal wall 1	2	5	-	3	30 m^2
	Internal wall 2	2	4	-	3	24 m^2
	external wall 1	2	5.6	-	4.15	46.48 m^2
	external wall 2	2	4.6	-	4.15	38.18 m^2
	Deduction					
	Door	2	1	-	2.25	-4.6 m^2
	Window	4	1.5	-	1	-6.0 m^2
				Total= 128.14 m^3		
7	Flooring	1	5	4	-	20 m^2
8	Paint	AS per plastering	AS per plastering	AS per plastering	AS per plastering	128.14 m^3

Sr. no.	Particular items	Quantity	Rate (Rs.)	Per	Amount (Rs.)
1.	Excavation for foundation	15.456	85	Cu.m	1314
2.	P.C.C work in foundation	2.688	3200	Cu.m	8602
3.	Brickwork in foundation up to plinth	7.2	3200	Cu.m	23040
4.	Brickwork for super structure	27.465	3500	Cu.m	96127
5.	R.C.C work	4.2	8800	Cu.m	36960
6.	Plaster	128.14	150	Sq. m	19221
7.	Flooring	20	500	Sq. m	10000
8.	Paint	128.14	120	Sq. m	15377
Total = 210641 Rs.					

13.1.6 GENERAL MARKET



MINI MARKET PLAN

MINI MARKET ELEVATION

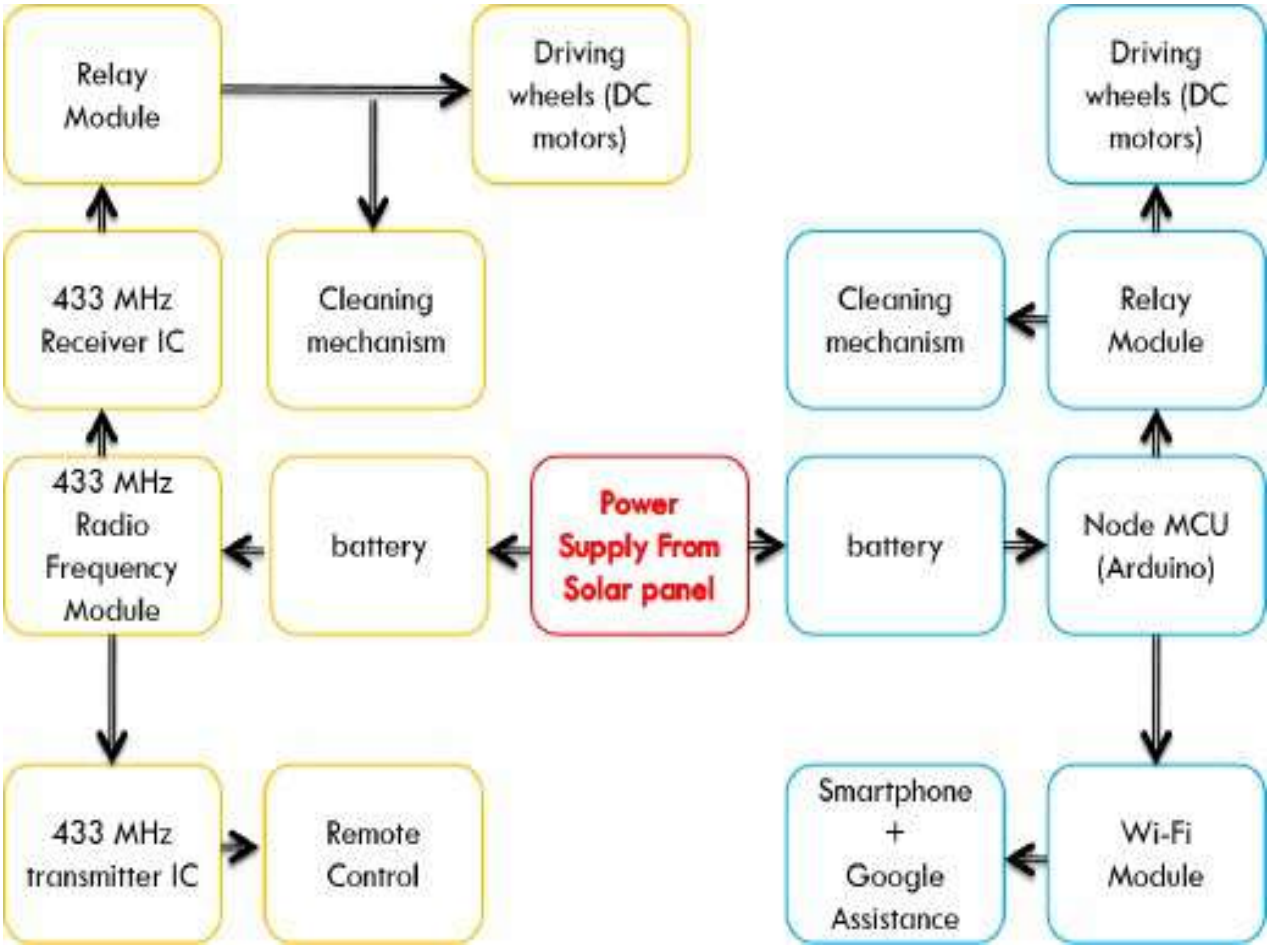
No.	Description	Nos.	L (m)	B (m)	H (m)	Onty. (m^3)
1.	**Excavation for foundation in ordinary soil:**					
	L=21.25 m	1	21.25	0.90	1.2	22.95
2.	**p.c.c. in Foundation:**					
	L=21.25 m	1	21.25	0.90	0.3	5.7375
3.	**Brick masonry in Foundation:**					
	Step 1:					
	L=21.7 m	1	21.7	0.60	0.2	2.604
	Step 2:					
	L=21.85 m	1	21.85	0.5	0.2	2.185
	Step 3:					
	L=22 m	1	22	0.4	0.2	1.76
	Step 4:					
	L=22.25 m	1	22.25	0.23	0.9	4.607
						Total=11.155 m^3
4.	**Brick masonry above P.L. to slab level:**					
	L=22.25 m	1	22.25	0.23	3.0	15.36

5.	**Smooth plstering inside room and ceiling:**					
	Plaster for walls:					
	Shop 1:	1	1.9	-	3	5.7
		2	2.7	-	3	16.2
	Shop 2:	1	1.9	-	3	5.7
		1	2.7	-	3	8.1
	Shop 3	1	1.9	-	3	5.7
		1	2.7	-	3	8.1
	Shop 4:	1	1.9	-	3	5.7
		1	2.7	-	3	8.1
	Ceiling plaster:					
	Shop 1:	1	1.9	2.7	-	5.13
	Shop 2:	1	1.9	2.7	-	5.13
	Shop 3:	1	1.9	2.7	-	5.13
	Shop 4:	1	1.9	2.7	-	5.13
						Total:83.82 m^3

Item No.	Particulars of item	Onty.	Per	Rate	Amount Rs.
1.	**Excavation in Foundation**	22.25	M^3	86	1973
2.	**p.c.c. in Foundation**	5.738	M^3	3022	17340
3.	**Brick masonry in Foundation**	11.155	M^3	3162	35272
4.	**Brick masonry in super structure**	15.36	M^3	3530	54220

5.	**Plastering**	83.82	M^3	132	11064 Total Rs.:1,19.850 Rs. + 3% contingencies (3595 Rs) + 2% work charged establish (2397Rs.) **Net Amount:1,25,842 Rs.**

13.1.7 SOLAR CLEANING SYSTEM

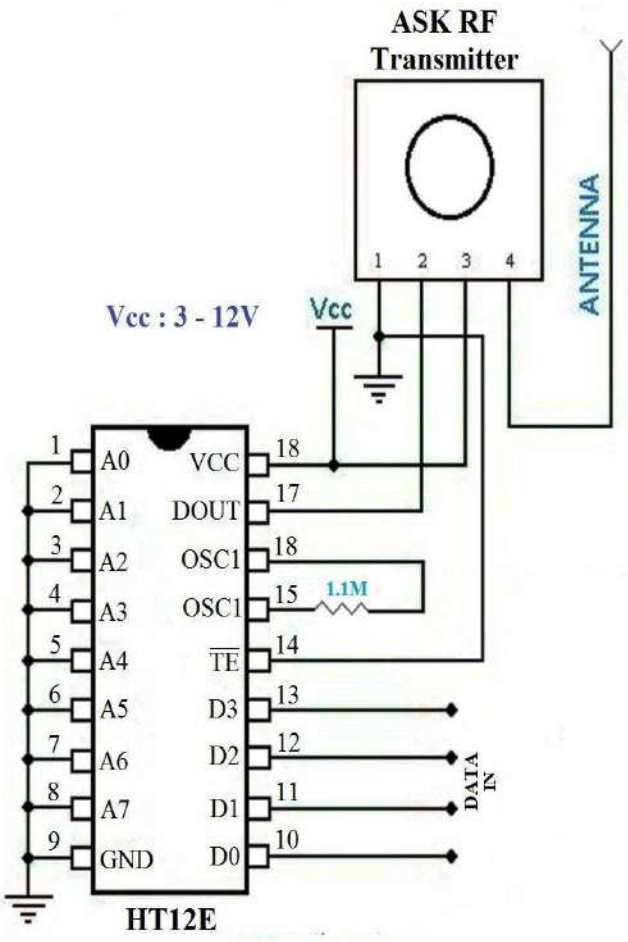


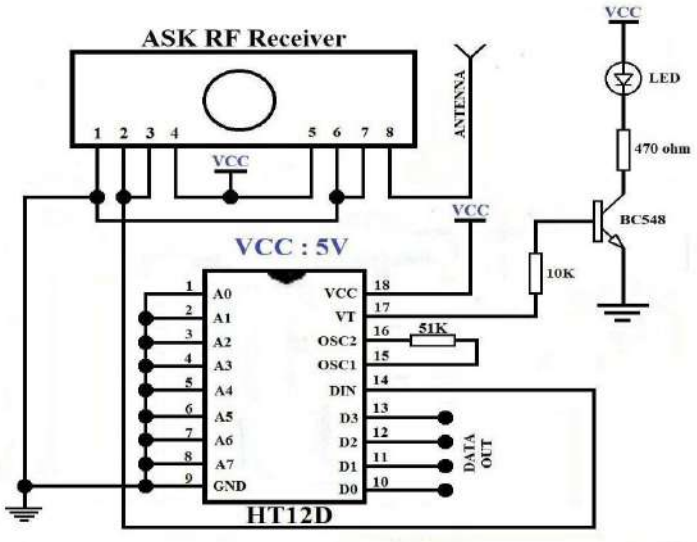
- So here we use the 433 Mhzics which is basically a 2 ic set. One is transmitter and other is receiver. And with that we have used HT12E/HT12D ics which is basically a encoder decoder ic respectively.along with that I have used the relay module to connect 4 load to the circuit and So we have a receiver module and in other hand we have transmitter module.

- So first I connect the decoder ic with transmitter to make the transmitter module which is know as remote control. It transmit the radio frequency signal to the receiver module

- Then I have connected the encoder ic with receiver ic and make a receiver module which receive the signal given from the transmitter module

- In receiver module there is a relay module which have 4 load to connect, we can connect 4 loads to the receiver module and make them wirelessly remote controlled by a transmitter module.So now I can make a robot and a cleaning mechanism which is controlled by this cirvuit wirelessly





CIRCUIT DAIGRAM OF SOLAR CLEANING SYSTEM

Component	No. Of comp.	Cost
12v Geared DC motor	6×200	1200
Plastic Pipe	7 feet	150
Wires		100
433Mhz Reciever And Transmitter		200
IC – Nodemcu- wifi module		350
HT12E-HT12D(Encoder-decoder)		150
Relay module		500
Variable resistor		30
Cleaning brush		360
Sweeper		120
Wheels	6×10	60
Battery(12V,6A)		1500
Total Cost		**4800**

13.1.8 STREET LIGHT

The solar street light does not need to set up the transmission line or route the cable, and no any special management and control are required. It can be installed in the entire public place such as the square, the parking lot, the campus, the street or the highway etc.
We are going to design a Solar Street Light Installation for The main Street of our Allocated Village

Components required for a single Solar Street Light Pole:
(1) Solar cell
(2) LED lamp
(3) Light pole
(4) Control box (charger, controller, battery)

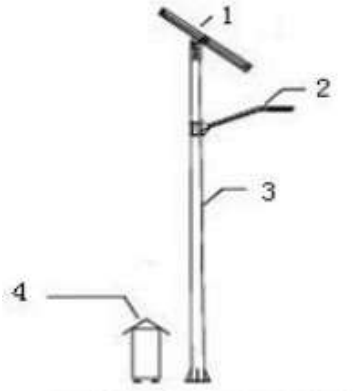


FIG NO 8.7 STEET LIGHT

As we seen above our basic components required are Solar Cell, LED Lamp, Light Pole and Control Box (It consists of Charger, Controller, and Battery). Now these components are available in Different Ratings as per our requirement. And hence cost of that component also varies with the change in rating

Rating & costing of street light:

Type	LED Rating (Watt)	Battery Size (AH)	Controller Size (A)	Pole Height (m)
1	**10**	**30-40**	**5**	**7**
2	**20**	**45-60**	**10**	**7**
Cost(Rs)	**3000-5000**	**4000-7000**	**1000-2000**	**10000-3000**

Parameters	Cost in INR
LED Light	**5000**
Battery	**5000**
Charge Controller	1000
Pole	10000
Wire	1500
Installation Cost	3000
Total cost	**24500**

13.1.9 CCTV camera

We should have **surveillance cameras** in public places because they ensure public safety. ... Through **surveillance cameras**, the police can both prevent crimes from happening and can quickly solve criminal cases with material evidence. In addition, **surveillance cameras** protect against property theft, and vandalism.

CCTV uses components that are directly connected to generate, transmit, display, and store video data. A CCTV system can be as simple as a camera purchased from a retail electronics store connected to a video monitor. However, larger systems operated by professional security personnel are comprised of a number of components falling into several basic categories:

- Cameras;
- Lenses;
- Housings and mounts;
- Monitors;
- Switchers and multiplexers; and
- Video recorders.

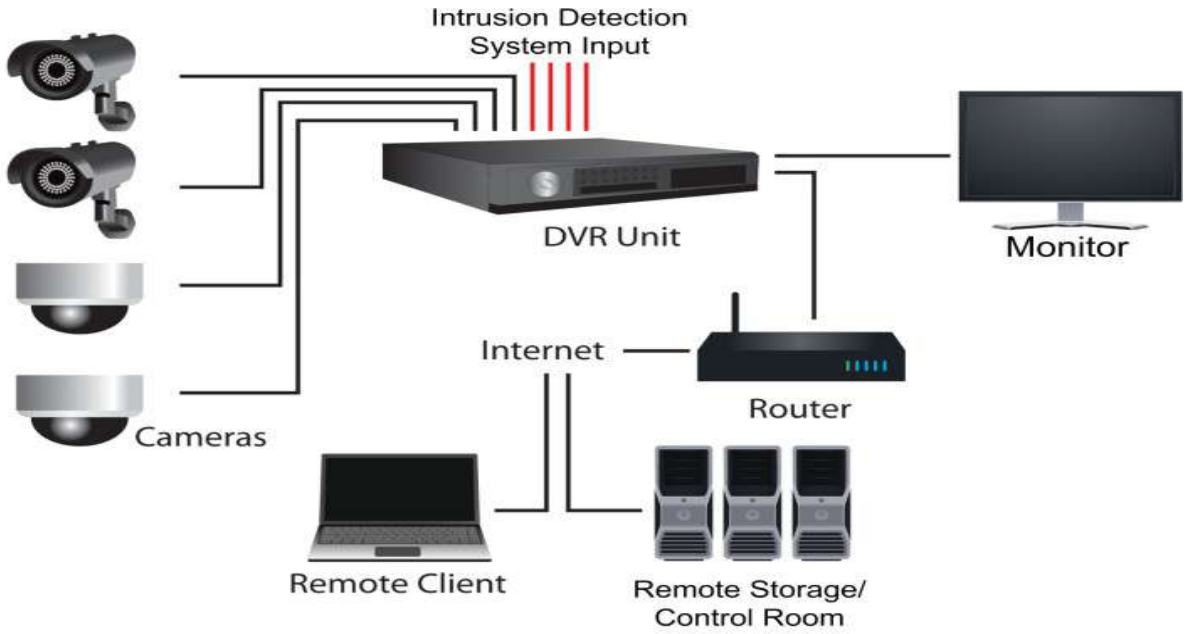


FIG NO 13.9 CCTV CAMERA

Type of camera	Minimum price	Pole price	Router price
CP plus	650	200	150
HKvision	850	200	200

Parameters	Cost are INR
Camera	850
Wire	200
Pole	500
Router	300
Installation cost	100
Total cost	**1950/-**

Chapter 14 Technical option with case studies

14.1 civil engineer

14.1.1 Advanced Earthquake Resistant

Earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to **reduce the earthquake-generated forces acting upon it.**

These range from appropriately sizing the structure to be strong and ductile enough to survive the shaking with an acceptable damage. The conventional approach to earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to reduce the earthquake-generated forces acting upon it.

Among the most important advanced techniques of earthquake resistant design and construction are:

1.Base Isolation

2.Energy dissipation devices

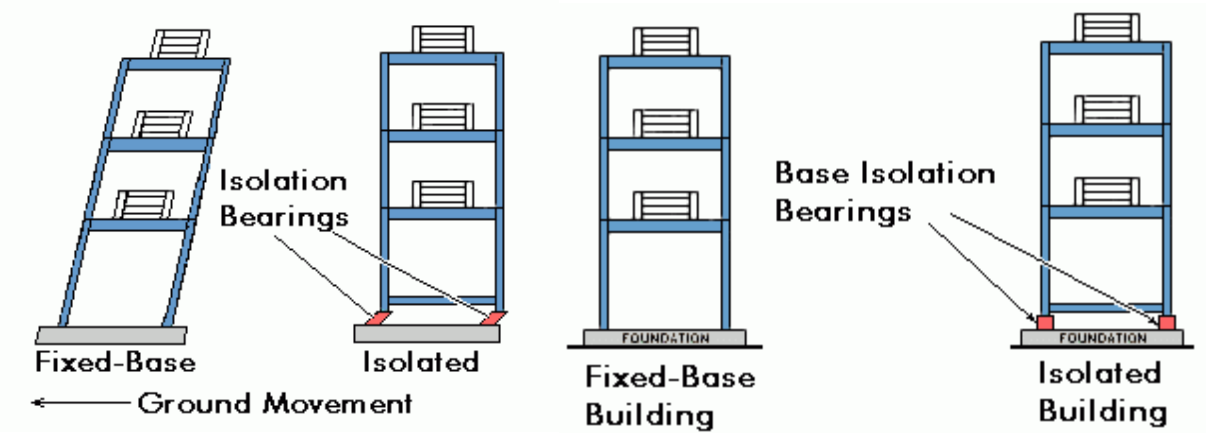


Fig no 14.1 earth quake

GUIDELINES FOR EARTHQUAKE RESISTANT CONSTRUCTION

In addition to the main earthquake design code 1893 the BIS(Bureau of Indian Standards)has published other relevant earthquake design codes for earthquake resistant construction Masonry structures (IS-13828 1993) • Horizontal bands should be provided at plinth ,lintel and roof levels as per code • Providing vertical reinforcement at important locations such as corners, internal and external wall junctions as per code. • Grade of mortar should be as per codes specified for different earthquake zones. • Irregular shapes should be avoided both in plan and vertical configuration. • Quality assurance and proper workmanship must be ensured at all cost without any compromise. In RCC framed structures (IS-13920) • In RCC framed structures the spacing of lateral ties should be kept closer as per the code • The hook in the ties should be at 135 degree instead of 90 degree for better anchorage. • The arrangement of lateral ties in the columns should be as per code and must be continued through the joint as well.

14.1.2 Seismic retrofitting of building

1. Introduction to Seismic Retrofitting Techniques:

- Earthquake creates great devastation in terms of life, money and failures of structures.
- Upgrading of certain building systems (existing structures) to make them more resistant to seismic activity (earthquake resistance) is really of more importance.
- Structures can be (a) Earthquake damaged, (b) Earthquake vulnerable
- Retrofitting proves to be a better economic consideration and immediate shelter to problems rather than replacement of building.

1.1 Seismic Retrofitting of Concrete Structures:

Definition: It is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. The retrofit techniques are also applicable for other natural hazards such as tropical cyclones, tornadoes, and severe winds from thunderstorms.

1.2 Need for Seismic Retrofitting:

- To ensure the safety and security of a building, employees, structure functionality, machinery and inventory
- Essential to reduce hazard and losses from non-structural elements.
- predominantly concerned with structural improvement to reduce seismic hazard.

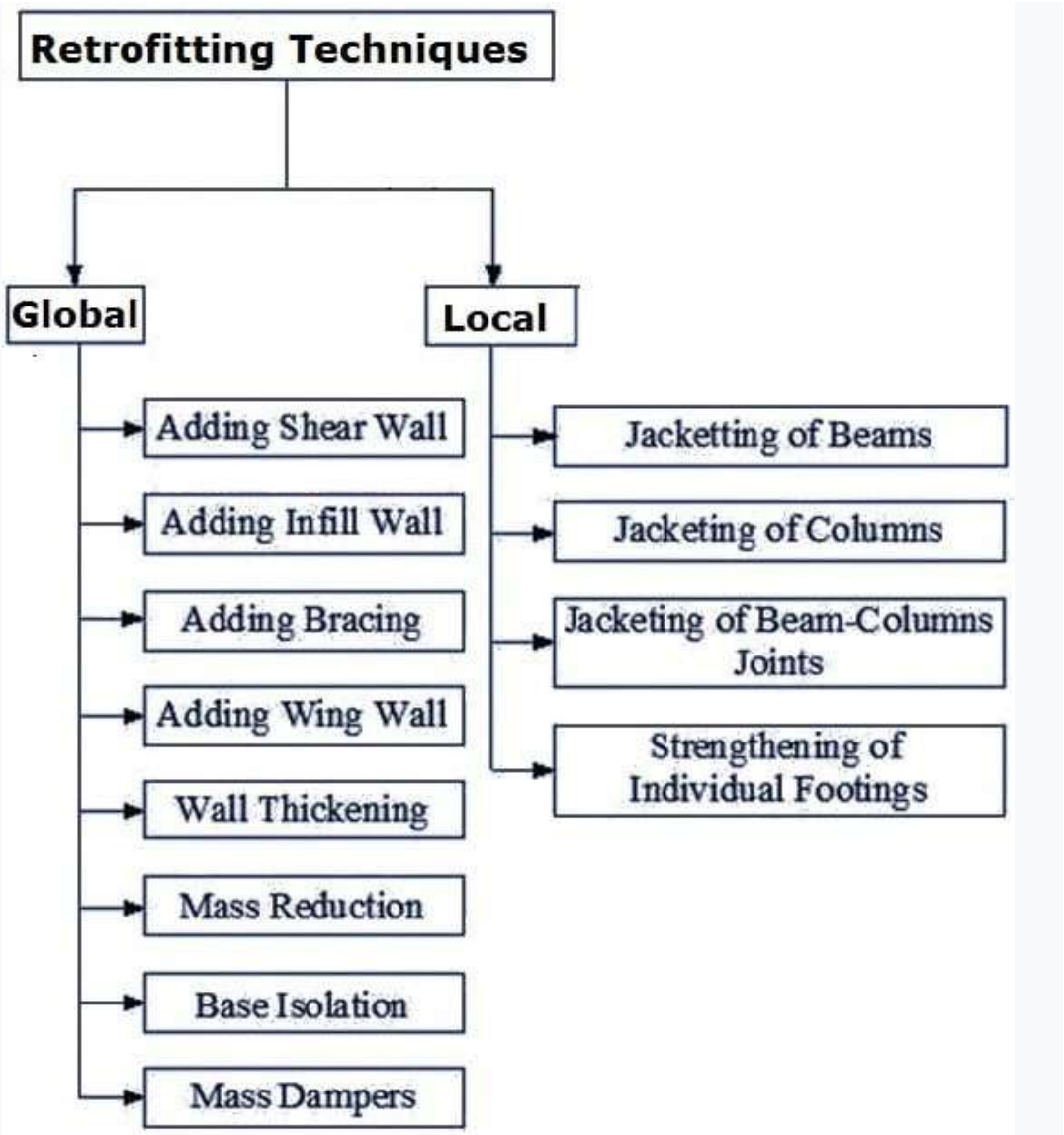
1.2 Problems faced by Structural Engineers are:

Lack of standards for retrofitting methods – Effectiveness of each methods varies a lot depending upon parameters like type of structures, material condition, amount of damage etc.,

1.4 Basic Concept of Retrofitting:

- Upgradation of lateral strength of the structure
- Increase in the ductility of the structure
- Increase in strength and ductility

2.Classification of Retrofitting Techniques:



14.1.3 ADVANCED CONSTRUCTION TECHNIQUES – NECESSITY

1. The building construction activity, especially the residential and commercial complex is highly labour intensive with very little mechanization. Approximately 35% of the total construction cost is spent on labour.
2. The labourers have their limitations and may fail to meet the time limits. The quality of workmanship, too, differs from person to person. Hence, quality standards cannot be maintained. Wastage of material is considerably high as it is handled and utilized manually.
3. The objective of the construction organizations should be 'speed and economy'. This cannot be achieved with labour oriented advanced construction techniques.
4. Only studying and adopting modern industrial techniques and equipment is the solution. By this, one can save material, reduce labour expenses, and increase the speed of work, leading to the economy in construction.
5. Though the scope of the subject is vast, in this chapter we shall discuss only the advanced techniques to be used in advanced construction techniques activities.

EQUIPMENT USED FOR SMALL AND MEDIUM CONSTRUCTION WORK

The equipment with proven utility in building construction may be as listed below

- Chain and pulley block.
- Grouting pumps.
- Sprayers for painting work.
- Tile cutters.
- Portable hand drilling machines.
- Horizontal trolleys, wheelbarrows.
- Pumps.
- Vibrators for compaction of concrete, surface vibrators.
- Auto ramming concrete block machine.
- Sand washing machine.
- Vertical lifts, hoists, winches.
- M.S. tubular scaffolding, and formwork.
- Concrete mixers.
- Cranes.
- Earth excavators.
- Earthmovers.

14.1.4 engineering aspects of soil mechanics – environmental impact assessment

The Need for an Environmental Impact Assessment

An Environmental Impact Assessment is a formal method of judging the impact that any new developmental project would have on the environment and its constituents. This can include changes that the project would create in the physical aspects of existing geography, chemical

changes to the atmosphere including air and water, biological changes that affect plant, animal and human life, cultural impact of a project on the society in the area, and other socio-economic effects that the project can have.

Such an assessment allows problems to be foreseen, so that the design and planning of the projects is modified to reduce any negative effects. It is now fashionable to build **green buildings** which have a positive effect on the environment.

Objectives of Environmental Impact Assessment

The objective of an EIA is to predict the environmental impact project would have on all aspects of the environment. Once this is done, a study has to be made to see if the impacts can be reduced in any way. The project has then to be modified to suit the local environment and all predictions and likely options presented to decision makers for final decisions.

You can gain a better understanding of EIA by understanding how any typical **project** can affect the environment of a particular area. Take for example the building of a new road in a city.

14.1.5 water supply-sewage system-waste water-sustainable development technique

Water supply system

A **water supply network** or **water supply system** is a **system** of engineered hydrologic and hydraulic components that provide **water supply**. ... **Water** purification facilities. Treated **water** is transferred using **water** pipes (usually underground). **Water** storage facilities such as reservoirs, **water** tanks, or **water** towers.

Water was an important factor in the location of the earliest settled communities, and the evolution of public water supply systems is tied directly to the growth of cities. In the development of water resources beyond their natural condition in rivers, lakes, and springs, the digging of shallow wells was probably the earliest innovation.

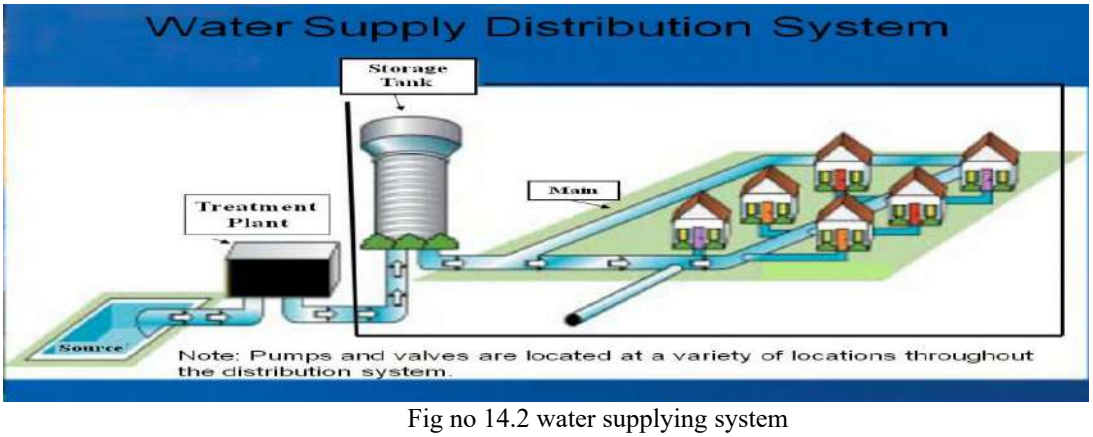
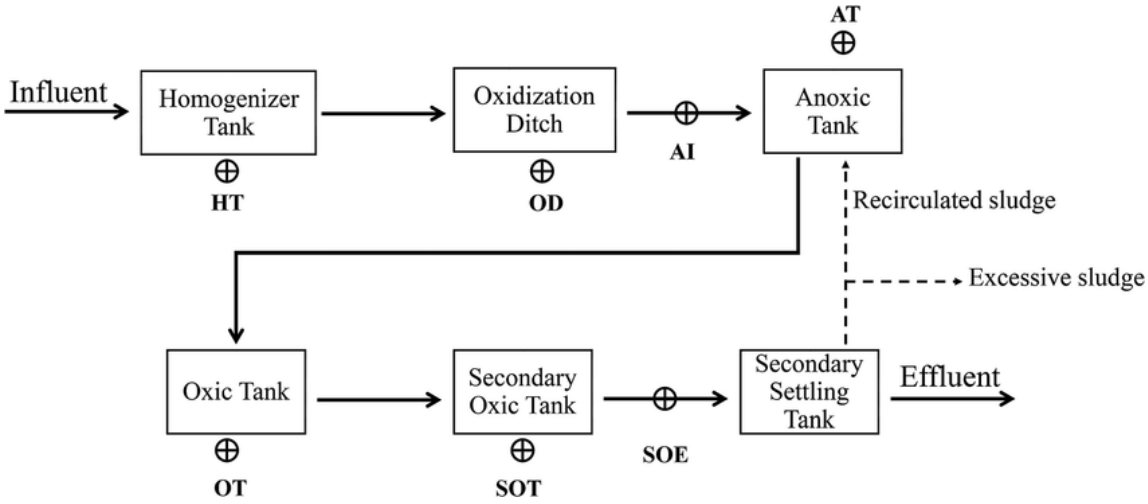


Fig no 14.2 water supplying system

Sewage system

A **sewerage system**, or **wastewater** collection **system**, is a network of pipes, pumping stations, and appurtenances that convey **sewage** from its points of origin to a point of **treatment** and **disposal**.



Waste water system

We consider wastewater treatment as a water use because it is so interconnected with the other uses of water. Much of the water used by homes, industries, and businesses must be treated before it is released back to the environment.
If the term "wastewater treatment" is confusing to you, you might think of it as "sewage treatment." Nature has an amazing ability to cope with small amounts of water wastes and pollution, but it would be overwhelmed if we didn't treat the billions of gallons of wastewater and sewage produced every day before releasing it back to the environment. Treatment plants reduce pollutants in wastewater to a level nature can handle.

14.2 electrical engineering

14.2.1Design of Power Electronics converter

As the technology for the power semiconductor devices and integrated circuit develops, the potential for applications of power electronics become wider. There are already many power semiconductor devices that are commercially available, however, the development in this direction is continuing.

The power semiconductor devices or power electronic converter fall generally into six categories:-

⇒ Diode Rectifier (Uncontrolled Rectifier)
⇒ DC to AC Converter (Inverter)
⇒ DC to DC Converter (DC Chopper)
⇒ AC to DC Converter (Controlled Rectifier)
⇒ AC to AC Converter (AC voltage regulator)
⇒ Static Switches

The design of power electronics converter circuits requires design the power and control circuits. The voltage and current harmonics that are generated by the power converters can be reduced or minimized with a proper choice of the control strategy.

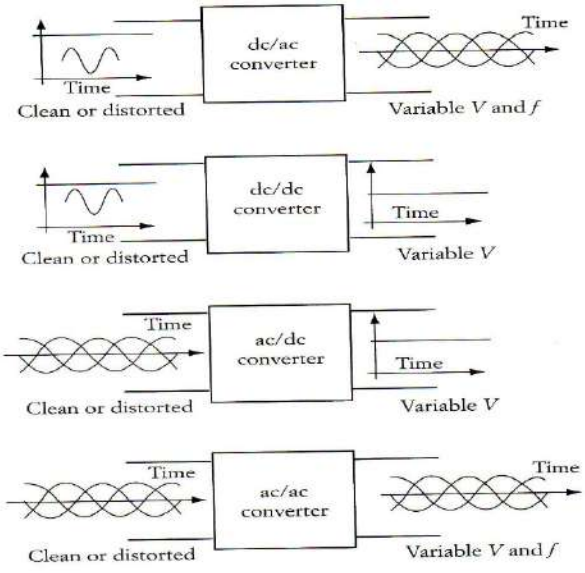
⇒ **Diode Rectifiers:** A diode rectifier circuit converts AC voltage into a fixed DC voltage. The input voltage to rectifier could be either single phase or three phases.

⇒ **DC to AC Converter:** DC to AC converter circuit can convert DC voltage into an AC voltage. The AC output voltage can be controlled by varying the firing angle of the thyristors. The AC output voltage could be a single phase or three phases.

⇒ **DC to DC Converter:** These converters can converter a fixed DC input voltage into variable DC voltage or vice versa. The DC output voltage is controlled by varying of duty cycle.

⇒ **AC to DC Converter:** An AC to DC converter circuit can convert AC voltage into a DC voltage. The DC output voltage can be controlled by varying the firing angle of the thyristors. The AC input voltage could be a single phase or three phases.

⇒ **AC to AC Converter:** This converter can convert from a fixed ac input voltage into variable AC output voltage. The output voltage is controlled by varying firing angle of TRIAC. These type converters are known as AC voltage regulator.



(Fig – 103 Block diagram type of converter)

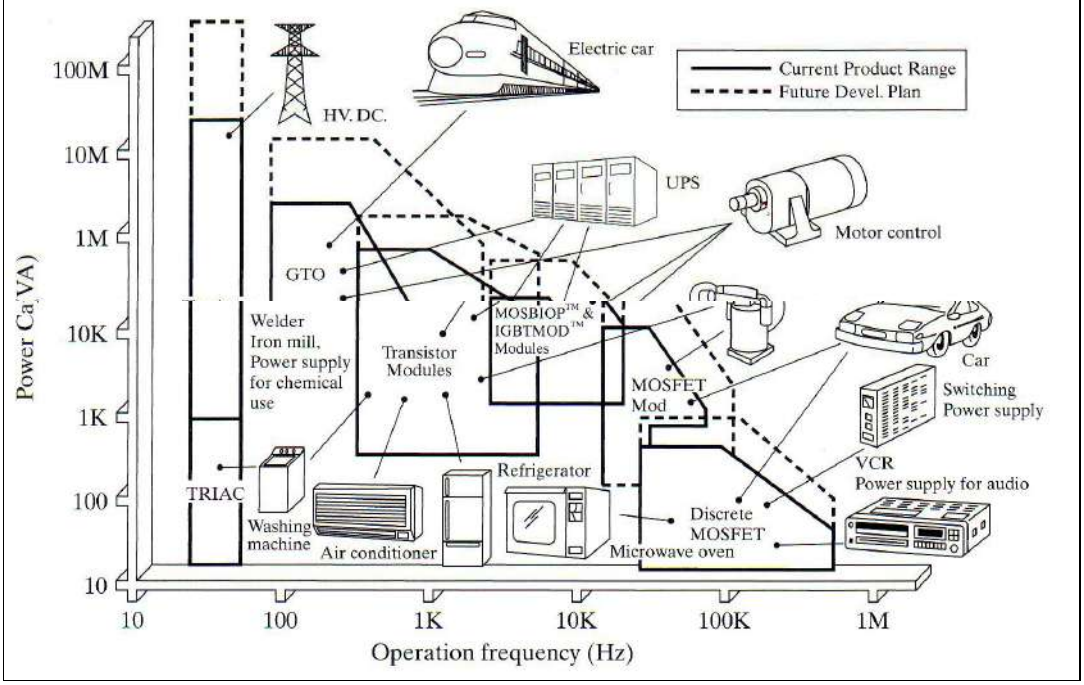
⇒ **Static Switches:** The power devices can be operated as static switches or contactors, the supply to these switches could be either AC or DC and the switches are called as AC static switches or DC static switches.

➢ **Power Electronics Application:**

Power Electronics defined as the application of solid-state (devices) electronics for the control and conversion of electric power. Power electronics have already found an important place in modern technology and are now used in a great variety of high- power product, including heat controls, light controls, electric motor control, power supplies, vehicle propulsion system and high voltage direct current (HVDC) systems.

Protects a motor from drawing too much current and "burning out" from overheating. The overload relay is the motor overload protection used in soft starters. It limits the time the overload current is drawn and protects the motor from overheating. Soft Starters place a device called a reduced voltage starter, or soft starter, between the motor and the incoming utility line to regulate the amount of current fed to the motor. Soft Starters enable the AC induction motor to speed up in smaller, resulting in less current drawn than with a traditional motor starter.

(Fig – 104 Power Electronics Application)



14.2.1 Electronic Soft Starter for 1/3 Phase Induction Motor for Agriculture

A Soft Starter is a device that starts motors with reduced power supplied at start-up. Reducing the power reduces potentially damaging electrical and mechanical shocks on the system.
Soft Starters are a combination of a controller and overload protection.

CONTROLLERS - Turns electric current to the motor on and off. A contactor is a controller that is controlled by an electromagnet.

OVERLOAD PROTECTION - Protects a motor from drawing too much current and "burning out" from overheating. The overload relay is the motor overload protection used in soft starters. It limits the time the overload current is drawn and protects the motor from overheating. Soft Starters place a device called a reduced voltage starter, or soft starter, between the motor and the incoming utility line to regulate the amount of current fed to the motor. Soft Starters enable the AC induction motor to speed up in smaller, resulting in less current drawn than with a traditional motor starter. Due to decreased voltage, torque is also reduced resulting in a soft, or easy start. Soft Starters are used on all types of AC and DC motors. They are most commonly used with the AC squirrel cage induction motor because of its simplicity, ruggedness and reliability.

Why Soft Starters are needed?

1. To avoid overloading the power distribution system.
2. To avoid unnecessary wear and tear on equipment by reducing starting torque.

Types of Soft Starters:

1. Primary Resistor
2. Auto Transformer
3. Part Winding
4. Wye Delta
5. Solid State

1) Primary Resistor:

Developed in the early 1900's, this simple unit is one of the first soft starters placed into operation. That there is a resistor for each of the three phases of current. Resistors resist the flow of current. When the motor is started, the resistors resist the current flow resulting in a voltage drop. Approximately 70% of the line voltage is sent to the motor terminals at startup. A timer closes a set of contacts after the motor has accelerated to a pre-determined point. This removes the resistors from the circuit and lets full power through to the motor. Primary resistors starters are known for their smooth starts. They offer two-point acceleration, or one step of resistance. For extra-smooth starting, add additional stages of resistors and contactors.

2) Auto Transformer:

Auto transformer starting is one of the most effective methods of soft starting. It is preferred over primary resistor starting when the starting current is drawn from the line must be held to a minimum, yet the maximum starting torque per line amp is required. Instead of using resistors, this starter uses taps on transformer windings to control the power input to the motor. Taps are usually set up to provide 80%, 65% and 50% of the line voltage, respectively.

These taps provide built-in flexibility. Activating any one of three taps on the windings allows different amounts of current to the motor. In Fig. 6, the motor is receiving voltage through the second of the three taps. This type of starter can supply more current to the motor than other soft starters, while keeping voltage low. The transformer steps up the current making it greater than the line current input during startup.

3) Part Winding:

The part winding method requires dividing the motor windings into two, or more, separate sets. These identical winding sets are intended for parallel operation. At startup, power is applied to only one set of windings. As the motor comes up to speed, power is applied to the other winding set for normal running. When windings are energized in this manner, they produce reduced starting current and reduced starting torque. Most dual voltage (230V/460V) motors are compatible with the part winding starter at 230 volts.

4) Wye Delta:

Wye Delta starting requires the motor have connection points to each of the three coil windings. These are specially wound with six leads for Delta and Wye connections. Illustrates the winding configurations as they are connected at startup. It is called the Wye Configuration because it is shaped like the letter "Y". This connection results in line voltage applied to an electrically larger winding, reducing the line current. It provides 33% of the normal starting torque and 58% of the normal starting voltage.

After a pre-determined time, the starter electrically switches the windings over to a Delta Configuration. This configuration resembles the Greek letter "delta". The windings are connected in their normal run configuration with every winding receiving full voltage. An important consideration with this starter is at the transition point, where the starter switches from Wye to Delta, the motor MUST disconnect and reconnect. This type of Wye Delta starter is known as Open Transition and can have a momentary hitch in operation, allowing a momentary current inrush. Closed Transition is another type of Wye Delta starter. It uses an extra contactor and set of resistors to keep the motor on-line during the transition. It eliminates the inrush concern and the cost is slightly higher than the open transition version.

5) Solid State:

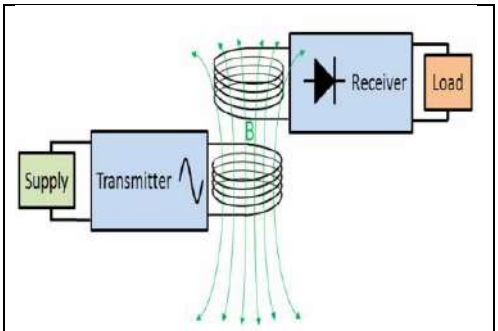
The newest soft start method is the solid-state type. It replaces mechanical components with electrical components. The key is the Silicon Control Rectifier or SCR. During motor acceleration, this device controls motor voltage, current and torque. How the solid-state soft

starter controls the current draw and the starting torque. The SCR has the ability to rapidly switch heavy currents. This allows the soft starter to provide smooth steeples acceleration - the smoothest of any of the soft start methods.

14.2.2 Advanced Wireless Power Transfer System

One of the major problems in power system is the losses occurring during the transmission of electrical power. The loss of percentage during the transmission is approximated as 26%. The main cause for power loss during transmission is the resistance of wires used in the grid. According to WRI (world resource institute), the electricity grid of India has the highest percentage (27-40%) of power transmission losses in the world. For this reason, Telsa has proposed methods of electricity transmission using an electromagnetic induction method.

The Serbian scientist "Nikola Telsa" was the first one to research and propose the concept of wireless power transfer in the year 1899, since then many scientists have been working to make his vision a reality. In the same year he has continued research on wireless power transmission in Colorado Springs and writes, the inferiority of the induction method would come into view immense as compared with the distributed charge of ground and air method. In the year 1961, William C. Brown publishes an article exploring possibilities of microwave power transmission. In the year 2009, Sony shows a wireless electrodynamics induction powered TV set.



(Fig – Wireless Power Transfer)

Wireless power can be defined as the transmission of electrical energy from a power source to an electrical load without connecting wires. It is reliable, efficient, fast, low maintenance cost, and it can be used for short range or long range. The basic working principle of wireless power transfer is, two objects having similar resonant frequency and in magnetic resonance at powerfully coupled rule tends to exchange the energy, while dissipating relatively little energy to the extraneous off-resonant objects.


(Fig-14.7Voltage Regulator)

Moreover, this method can be involved in a variety of applications, like to charge mobile phones, laptops wirelessly. And also this kind of charging gives a far lower risk of electrical shock as it would be galvanic ally isolated. This is an emerging technology, and further, the distance of power transfer can be improved as the study across the world is still going on.

Hardware Requirements of Wireless Power Transfer

The hardware requirements of wireless power transfer include HF-Transformer, HF-diodes, rectifier, basic Transistors, two air filled inductor coils, Voltage regulator and BLDC fan.

HF-Transformer:

High frequency (HF) transformers transfer electric power and physical size are reliant on the power to be transformed as well as the operating frequency. The emf equation of universal transformer indicates that at a higher frequency, the core flux density will be lower for a given voltage. This implies that a core can have a smaller cross-sectional area.

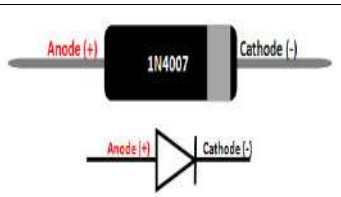
Voltage regulator:

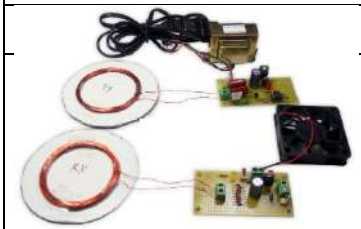
A voltage regulator is an electrical regulator, designed to maintain a constant level voltage automatically. There are three terminal positive voltage regulators are available in many packages and also with several o/p voltages, making them useful in a wide range of applications. Output current up to 1A and o/p voltages is 12. Thermal overload and short circuit protection. Output transistor safe operating area protection.

Coil:

An electromagnetic coil is formed when a conductor is wound around a core. Primarily used to transfer energy from one electrical circuit to another by magnetic coupling. Common types of electrical coils are Tesla, barker, choke, Maxwell coil, etc.

(Fig-14.9 Coil)





(Fig-14.8 Wireless Power Transfer Project)

1N4007 Diode:

This diode is used as full wave bridge rectifier circuit in this project. Maximum reverse bias voltage capacity of 50V and max forward current capacity of 1Amp.

Project Working:

The main concept of this project is to design a device for the concept of wireless power transfer to eliminate the use conventional copper cables and also current carrying wires. This project is built upon a circuit which converts AC 230V 50Hz to AC 12V, High frequency (HF). The output is fed to a tuned coil shaping as main of an air core transformer. The minor coil develops a voltage of HF 12volt.

Thus the power can be done by the primary to the secondary that is divided with 3cm distance. So the transfer could be seen as the primary transmits and the secondary receives the power to run a load. In addition, this method can be used in several applications, like to charge gadgets like mobile phone, laptop battery, iPod, propeller clock wirelessly. And also this type of charging offers a far lower risk of electrical shock as it would be galvanic ally isolated. This is an emerging technology, and in future, the distance of power transfer can be improved as the study across the world is still going on.

Wireless Power Transfer Advantages:

1. Simple design
2. Lower frequency operation
3. Low cost
4. Practical for short distance

Wireless Power Transfer Disadvantages:

1. High power loss
2. Non-directionality
3. Inefficient for longer distances

Wireless Power Transfer Applications:

1. Consumer electronics
2. Transport
3. Heating and ventilation
4. Industrial engineering
5. Model engineering

Cost Estimation:

Component	No. Of Comp	Cost
HF-Transformer(6KVA)	1	35
HF-Diodes(50V,1A)	10	20
Rectifier	1	480
Basic Transistors	10	650
Air Filled Inductor Coil	15m	5000
Voltage Regulator(12V,1A)	5	260
BLDC Fan	1	89
Other Miscellaneous Charge	-	500
Total Cost		**7034**

(Table- Advanced Wireless Power Transfer System)

14.2.3Industrial Temperature Controller

We can literally say that a Temperature Control System is a device or set of devices that manage, command, direct or regulate the behavior of other devices or systems in order to influence the degree of hotness or coldness of a body or an environment. A Temperature Control System is a more like a programmable thermostat that can keep the environment (home or office) at a desired temperature regardless of fluctuating exterior weather conditions. The advantage of having a temperature control system over a common thermostat is that it saves energy and money by automatically maintaining different temperatures at different times of the day and night. It is usually a feedback system having a control loop, including sensors, control algorithms and actuators/effectors, and is arranged in such a fashion as to try to regulate a variable at a set point or reference value. An example of this may increase the fuel supply to a furnace when a measured temperature drops.

IN THE INDUSTRIES: Many Industries (especially Manufacturing and Pharmaceutical Industries) have growing concerns for the need to store certain production materials within a specific temperature range. Some of these materials could be highly inflammable or explosive at certain extreme temperatures. This necessitates the need for a Temperature Control system.

BASIC COMPONENTS OF A TEMPERATURE CONTROL SYSTEM:

⇒ **Power Supply Unit**: This Unit provides the Temperature Control System with the Electrical Energy that drives it. In this case, the Power Supply Unit consists of a Step- down transformer which works based on the principle of induction. The transformer steps down the voltage received from the power outlet from the national rating of 230V to 15V, which is all the voltage needed to drive the system. This voltage is further rectified (using a bridge rectifier) and filtered (using a power capacitor) to give a perfect and undistorted voltage to the system. Of this 15V input voltage, about 5V drives the microcontroller. The rest are needed to drive the other units of the circuit.

⇒ **Sensor Unit**: This Module consists of devices (thermometers in traditional systems) that detect the current temperature status. These devices sense the current room/surface temperature, and provide its result to be used as input in the Control unit and in the Display Unit.

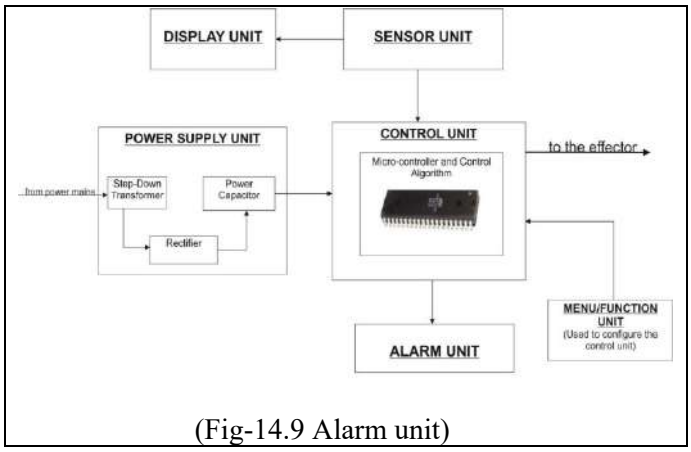
⇒ **LCD/Display Unit**: This displays the current temperature status of the environment as received from the Sensor Unit. In this case it consists of a 7-bit graphic large-digit display device that reveals the results/reading of the temperature sensor to the external user.

⇒ **Control Unit:** The Control unit houses the Controller and related devices (thermostats in automatic systems) that process information to produce effects/action by the system. In this

case, this unit houses the microcontroller (and control program/algorithm) that stores the set-point temperature. The control program receives temperature status from the sensor unit and ensures that it doesn't compromise the set-point by initiating the appropriate sequence of action.

⇒ **Menu/Function Unit:** This unit consists of input buttons that are used to give commands to the control program and also to program the set-point for the system. In this case, a variable resistor which changes the set-point temperature when its resistance is varied.

⇒ **Alarm Unit:** This unit consists of an alarm system that alerts the inhabitants of the environment of a temperature breach. This is an optional component of Temperature Control Systems. It comes mostly with those systems that are built to specifications (custom systems). Most commercial Temperature Control Systems prefer to maintain a silent profile in the environment where they function.



(Fig-14.9 Alarm unit)

There are three types of Controller / Control Algorithms for use in the construction and design of most Temperature Control Systems:

⇒ **On/Off Control:**

An on/off controller is the simplest form of temperature control device. The output from the device is either on or off, with no middle state. An on-off controller will switch the output only when the temperature crosses the set-point. For heating control, the output is on when the temperature is below the set-point and off above the set-point. Since the temperature crosses the set-point to change the output state, the process temperature will be cycling continually, going from below the set- point to above, and back below. In cases where this cycling occurs rapidly, and to prevent damage to contactors and valves, and on-off differential, or "hysteresis" is added to the controller operations. This differential requires that the temperature exceed the set-point by a certain amount before the output will turn off or on again. On-off differential prevents the output from "chattering" or making fast, continual switches if the cycling above and below the set-point occurs very rapidly. On-off control is usually used where a precise control is not necessary such as in systems which cannot handle having the energy turned on and off frequently, where the mass of the system is so great that temperatures change extremely slowly, or for a temperature alarm. One special type of on-off control used for alarm is a limit controller. This controller uses a latching relay, which can be manually reset, and is used to shut down a process when a certain temperature is reached.

⇒ **Proportional Control:**

Proportional controls are designed to eliminate the cycling associated with the on/off control. A proportional controller decreases the average power supplied to the effector as the temperature approaches the set-point. This has the effect of slowing down the heater/cooler so that it will not overshoot the set-point, but will approach the set-point and maintain a stable temperature. This proportioning action can be accomplished by turning the effectors on/off for short time intervals. This "time proportioning" varies the ratio of "on" to "off" time to control the temperature. The proportioning action occurs within a "proportional band" around the set-point temperature. Outside this band, the controller functions as an on-off unit, with the output either fully on

(below the band) or fully off (above the band). However, within the band, the output is turned on and off in the ratio of the measurement difference from the set-point. At the set-point (the midpoint of the proportional band), the output on: off ratio is 1:1; that is, the on-time and the off-time are equal. If the temperature is further from the set-point, the on-and-off times vary in proportion to the temperature difference. However, if the temperature is below the set-point, the output will be on longer; if the temperature is too high, the output will be off longer.

⇒ **PID Control (proportional–integral–derivative controller):**

The third controller type provides proportional with integral and derivative control, or PID. This controller combines proportional control with two additional adjustments, which helps the unit to automatically compensate for changes in the system. These adjustments, integral and derivative, are expressed in time-based units; they are also referred to by their reciprocals, RESET and RATE, respectively. The proportional, integral and derivative terms must be individually adjusted or "tuned" to a particular system using trial and error. It provides the most accurate and stable control of the three controller types, and is best used in systems which have a relatively small mass, those which react quickly to changes in the energy added to the process. It is recommended in systems where the load changes often and the controller is expected to compensate automatically due to frequent changes in the set-point, the amount of energy available, or the mass to be controlled. Some other controllers exist which are designed to automatically tune themselves. These are known as auto-tune controllers.

14.2.5 Accident Alerts in Modern Traffic Signal Control System -Camera Surveillance System

Vehicle Accident Detection, Prevention and Tracking System:

The presented paper is based on IOT. This framework is utilized to detect the location of the vehicle and prevent the vehicle from an accident by the use of an alarm. The person needs to introduce the application in their cell phone and register by giving the immediate contact numbers to which the alarm message would be sent. For e.g., if the driver feels sluggish while driving and the vehicle is going to be smashed, the alarm buzzes, which makes the driver mindful of his status. This application uses GPS for locating the position of the vehicle. Through this it is additionally conceivable to compute the distance traveled by the vehicle in 'X' seconds by means of its coordinates. To begin sending location to the server, the user has to first login to the application on his phone via the credentials used during the registration.

➢ **Process Flow:-**

⇒ **IoT Device:**

The device comprises of different sensors which are Ultra sonic sensor, Accelerometer, Temperature sensor, GSM module and GPS module. All these sensors and modules are combined and connected to each other through Arduino board, which is the Microcontroller.

⇒ **Accident Detection:**

The main advantage of this system is that along with the detection of an accident it is also capable of preventing it. The Ultra sonic sensors situated at all the 4 sides of the vehicle will prevent the car from being too close from any object. If in case car meets an accident or small-scale collision, the device will detect the accident.

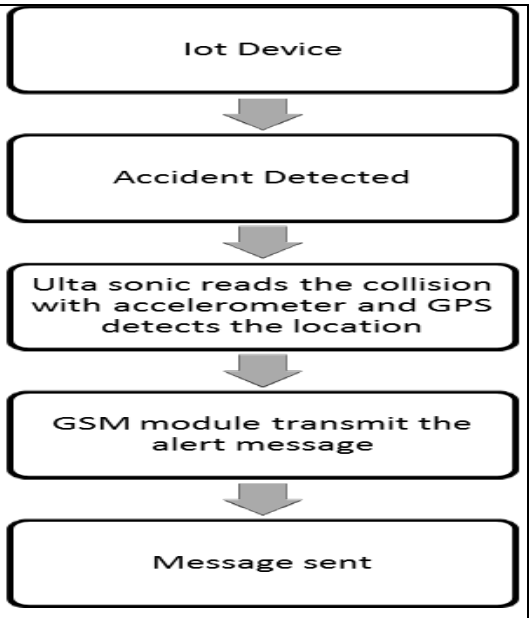
⇒ **Ultra-Sonic:**

Ultra-sonic will compute the distance between your vehicle and the surroundings. If any object or vehicle draws close to the set limit, it will buzz an alarm which will only turn off if you maintain the specified distance.

⇒ **Accelerometer:**
Accelerometer will trace the X, Y and Z coordinates of the vehicle. These coordinates will help in detecting whether the vehicle is left, right or top tilted. This will also help in detecting the amount of damage during the accident.

⇒ **GPS Module:**
GPS module will trace the location of the vehicle after every 30 seconds by satellite so that if vehicle is fully damaged and all the sensors including the car is destroyed, at least the recent location is tracked.

⇒ **GSM Module:**
GSM module is used to send a message with the current location. When the accident is detected, it will send an alert message to respective people, nearby police station and hospital.



(Fig-14.10 Process flow of Vehicle Accident Detection, Prevention and Tracking System)

⇒ **Message Sent:**
All the data from the sensors, the message sent and the location are stored in Cloud storage. The alert message will be sent to the people whose mobile numbers would be listed during the time of registration.

Chapter 15.

Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society.

(For Allocated village development, villagers happiness, comfortable and for enhancement of the village) (With the Smart village development Concept As Per Your Idea And Village Visit, modern technology with innovation).

with doing small changes, Period, Amount Expenditure and Benefit Immediately b) Within 1 year c) Long term (3-5 years) along with cost estimation.

If possible, List the sources of the funding available with the Village gram panchayat

Chapter 8 & 13 designs Impact on Society

In Civil

Public Garden: - Community gardens can mitigate some of the problems that plague urban areas. They can be a beneficial addition to many communities by increasing the availability of nutritious foods, strengthening community ties, reducing environmental hazards, reducing food miles and creating a more sustainable system.

Solid waste management: - Solid waste management is a term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage or trash. As long as people have been living in settlements and residential areas, garbage or solid waste has been an issue. Waste management is all about how solid waste can be changed and used as a valuable resource.

Solid waste management should be embraced by each and every household, including the business owners across the world. The industrialization has brought a lot of good things and bad things as well. One of the adverse effects of industrialization is the creation of solid waste.

Bus stand: - In local cities, it is important to improve bus service level in order to keep the number of passengers and to maintain bus routes since there is no other public transportation system operated except bus. Our research focuses on the punctuality, which is one of the most important factors to determine the level of bus service. Improvement of the punctuality of bus service does not provide benefits only to bus users but also to bus operators. For example, improving of the bus service level will increases number of passengers and, in the meantime, decreases the expense to bus operator because of reducing the bus waiting time at terminals. Our survey was conducted in Nagaoka city, Niigata to study the behavior of passengers coming to bus stops and to analyze the operation costs of bus operator. In addition, we estimate the benefits on both bus passengers and bus operator when the punctuality of bus service has been improved.

Flexible pavement road: It provides the possibility of low-cost type construction. The construction process consists of a series of simple steps and can be easily constructed. It has a wider resistance to temperature fluctuations. Repair works can be carried out easily in case of flexible pavement.

Flexible Pavements are those which on the whole have low or negligible flexural strength and are rather flexible in their structural action under the loads. Means, Flexible pavements are designed to pass the load immediately from the point where it occurs. Thus, if the lower layer of the pavement or soil subgrade gets deformed or undulated due to permanent deformation, the flexible pavement layers and also the pavement surface may get undulated to a somewhat similar.

Cyber cafe: - The Internet is dramatically changing the way people live, work, communicate, recreate and participate in public life all over the world. But the growth and the penetration of the Internet is far from being distributed equally around the globe. Whereas in developed countries the Internet today reaches substantial proportions of the population, e.g. in Germany (56.2%) or in the United States (68.8%), the situation is different in developing countries. In India for example, only 2.9 percent of households had Internet access in early 2005.

Geanral market: Before looking at the markets themselves it is first necessary to define what is meant by retailing. The purpose of retail shops or markets for any commodity is to provide an environment for looking at and buying merchandise that is displayed for sale. With a conventional shop, including a large-scale supermarket, there is usually a sales area where goods are displayed, a shop front used for advertising the goods and a service area where goods can be received, re-packed and stored. With a market stall these functions occur at one place.

A retail market, like any other type of market, is a location at which there is a public gathering of buyers and sellers at a known time. All retail markets involve a large number of transactions of relatively small quantities of goods on a face-to-face basis between a seller and buyer. An essential feature of a market is the opportunity it can provide to immediately and easily compare prices between different sellers of the same product.

Solar cleaning system : - Most **solar panel** systems use a glass coating to protect **solar cells**. Dust and dirt settle on the protective glass **panels**; as the material accumulates, it gradually decreases the amount of sunlight the **solar cells** receive. Keeping the glass **panel** faces **clean** maximizes the system's ability to generate electricity.

Street light: - Street lighting provides a number of important benefits. It can be used to promote security in urban areas and to increase the quality of life by artificially extending the hours in which it is light so that activity can take place. Street lighting also improves safety for drivers, riders, and pedestrian

CCTV Camera: Cameras keep you and your personal property safe. The police can identify criminals recorded with cameras. Through surveillance cameras, the police can both prevent crimes from happening and can quickly solve criminal cases with material evidence.

With doing small changes, Period, Amount Expenditure and Benefit –

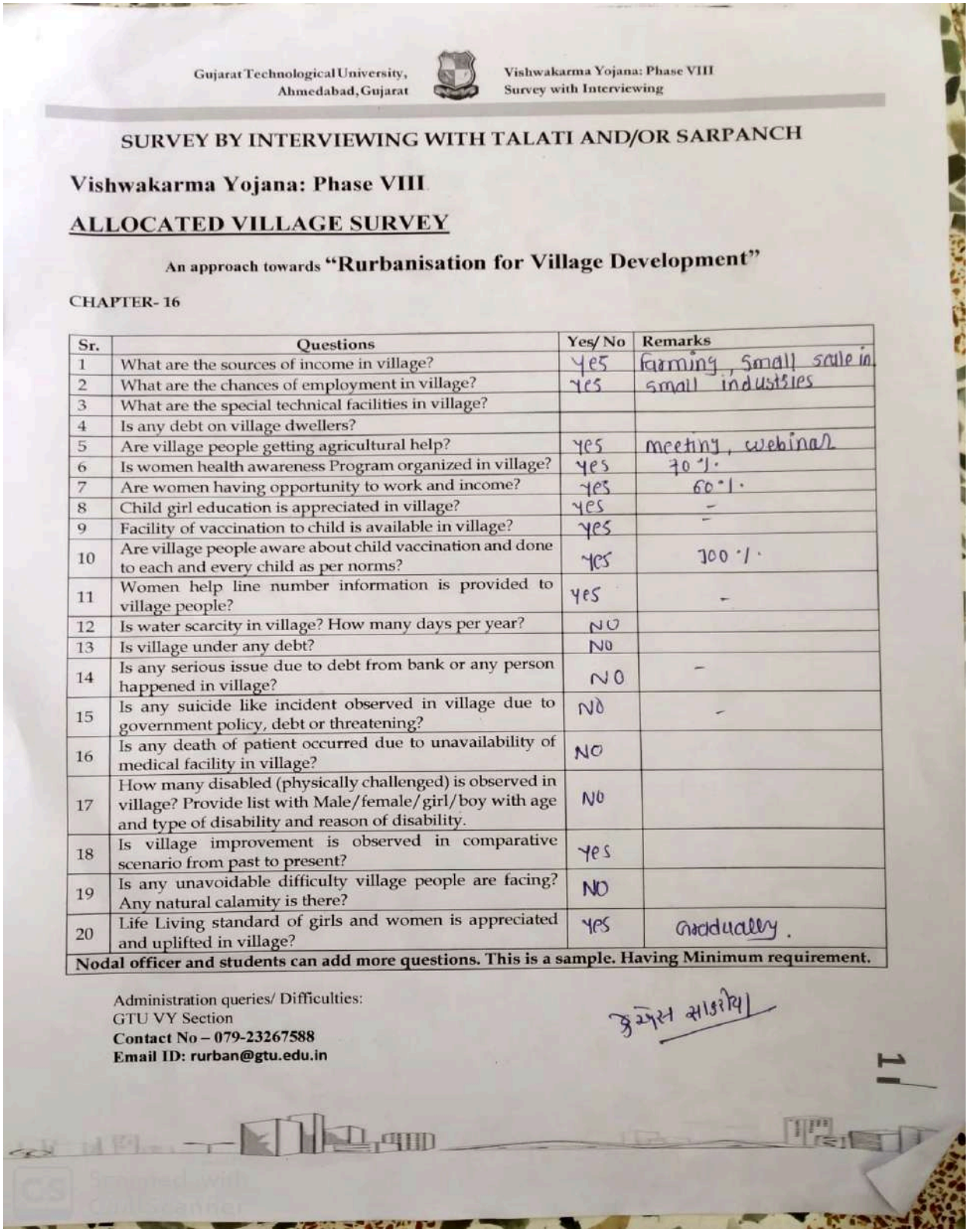
a) Immediately b) Within 1 year c) Long term (3-5 years) along with cost estimation.

Sr.	Design name	Period	Amount	Benefits
			CIVIL	
1	Public Garden	Within 1 Yr.	2,56,815	⇒ Provide refreshment to the village peoples. ⇒ Children use playground to improve their physical fitness

2	Solid waste managemnet	Long term	8,32,191	⇒ We can keep village neat and clean. ⇒ Reduce illegal activities and solve local problems
3	Bus stand	Long term	3,13,708	⇒ Use for villagers transportation and many other functions.
4	Flexible pavement road	Within 1 Yr.	3,14,580	⇒ Very useful for all vehicle . ⇒ Learn about modern new technology.
5	Gram panchayat	Long term	7,94,880	⇒ We can store all data in this building ⇒ People all worl do easly if building ⇒ Affordable and effective treatment
6	General market	Within 1 Yr.	4,88,483	⇒ It will provide finance to farmers and students ⇒ Save time for all people ⇒ Provide good material and food
7	Public toilet block	Immediate	49,500	⇒ We can reduce the deases. ⇒ Good manner for villager.
8	Post office	Within 1 Yr.	8,23,000	⇒ All problem solve with this place
9	Cyber café	Within 1 Yr.	4,67,400	⇒ Villagers can use high speed internet ⇒ Net banking and other online activity ⇒ For Online examination and studies.
10	Skill Development Centre	Long term	6,27,900	⇒ The emphasis is to skill the youths in such a way so that they get employment and also improve entrepreneurship. ⇒ Provides training, support and guidance to farmers ⇒ To provide skills to women so that they become self-dependent ⇒ To aware villagers regarding new development schemes for their betterment
11	Animal shelter	Long term	5,61,340	⇒ Farmers can keep their animal ⇒ Provide good milk for all the people
12	Community hall	Immediate	2,82,791	⇒ Also get part of equipment and related hardware ⇒ We can arrange all the programe their.
ELECTRICAL				
1	Solar cleaning system	Immediate	34,000	⇒ One time Investment reduces the operating cost. ⇒ No Energy Charges, as it will use renewable Energy Source.
2	Street light	Immediate	61,000	⇒ Safety for all villages ⇒ No more cost ⇒ Without electricity
3	Automatic switch for water pump	Within 1 Yr.	51,600	⇒ Manual work are not requirement. ⇒ This energy generated can be used in multiple ways.
4	CCTV installation	Immediate	28,300	⇒ Improve safety. ⇒ Reduce crime rate ⇒ Maintain law & order
5	Photovoltaic water pump	Immediate	2,48,000	⇒ We can provide water rapidly in village ⇒ It will reduce the energy Charges as it uses Renewable Source of Energy
6	Solar water purifier and cooler system	Immediate	4,20,000	⇒ It will be usefull for all the people and increase the solar life.

(Table-65 Design and their expenditure, benefits and period)

Chapter: 16
Survey By Interviewing With Talati And/Or Sarpanch



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	farming, small scale in.
2	What are the chances of employment in village?	Yes	small industries
3	What are the special technical facilities in village?		
4	Is any debt on village dwellers?		
5	Are village people getting agricultural help?	Yes	meeting, webinar
6	Is women health awareness Program organized in village?	Yes	70 %
7	Are women having opportunity to work and income?	Yes	60 %
8	Child girl education is appreciated in village?	Yes	-
9	Facility of vaccination to child is available in village?	Yes	
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	100 %
11	Women help line number information is provided to village people?	Yes	-
12	Is water scarcity in village? How many days per year?	NO	
13	Is village under any debt?	No	
14	Is any serious issue due to debt from bank or any person happened in village?	NO	-
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	NO	-
16	Is any death of patient occurred due to unavailability of medical facility in village?	NO	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	NO	
18	Is village improvement is observed in comparative scenario from past to present?	Yes	
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	NO	
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	Gradually.

Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.

Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

કુ ચૂસ્ત સાક્ષરો

11

Chapter: 17

Irrigation / agriculture activities and agro industry, alternate technics and solution

Agriculture activities and Agro Industry in India

For such a predominantly agricultural country as India, resources of cultivable soil and water are of crucial importance. Although India does possess extensive areas of fertile alluvial soils, especially on the Indo-Gangetic Plain, and other substantial areas of relatively productive soils, such as the black *(regur)* soils of the Deccan lava plateau, the red-to-yellow lateritic soils that predominate over most of the remainder of the country are low in fertility. Overall, the per capita availability of cultivable area is low, and less than half of the cultivable land is of high quality. Moreover, many areas have lost much of their fertility because of erosion, alkalinisation (caused by excessive irrigation without proper drainage), the subsurface formation of impenetrable hardpans, and protracted cultivation without restoring depleted plant nutrients.

Although the average farm size is only about 5 acres (2 hectares) and is declining, that figure masks the markedly skewed distribution of landholdings. More than half of all farms are less than 3 acres (1.2 hectares) in size, while much of the remainder is controlled by a small number of relatively affluent peasants and landlords. Most cultivators own farms that provide little more than a bare subsistence for their families; given fluctuations in the agricultural market and the fickle nature of the annual monsoon, the farm failure rate often has been quite high, particularly among smallholders. Further, nearly one-third of all agricultural households own no land at all and, along with many submarginal landowners, must work for the larger landholders or must supplement their earnings from some subsidiary occupation, often the one traditionally associated with their caste.

The demand for chemical fertilizers also has been steadily increasing, although since the late 1960s the introduction of new, high-yielding hybrid varieties of seeds (HYVs), mainly for wheat and secondarily for rice, has brought about the most dramatic increases in production, especially in Punjab (where their adoption is virtually universal), Haryana, western Uttar Pradesh, and Gujarat. So great has been the success of the so-called Green Revolution that India was able to build up buffer stocks of grain sufficient for the country to weather several years of disastrously bad monsoons with virtually no imports or starvation and even to become, in some years, a modest net food exporter. During the same period, the production of coarse grains and pulses, which were less in demand than rice and wheat, either did not increase significantly or decreased. Hence, the total per capita grain production has been notably less than that suggested by many protagonists of the Green Revolution, and the threat of major food scarcity has not been eliminated.

CROPS

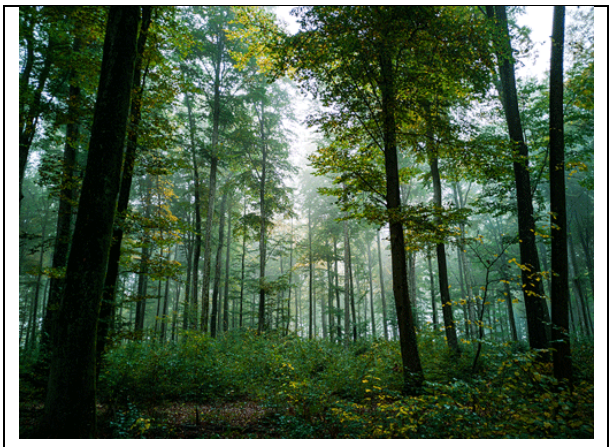
Population growth has, over the centuries, resulted in a continuous diminution of forest land. Most of India's formerly forested area has been converted to agricultural use (though some of that land is no longer productive), and other large areas have been effectively turned into wasteland from either overgrazing or overexploitation for timber and firewood. The problem of obtaining sufficient firewood, mainly for cooking, is particularly acute. In many areas forests have ceased to exist, and the only trees of consequence are found in protected village.

(Fig-17.1 Crops)

Most Indian farms grow little besides food crops, especially cereal grains, and these account for more than three-fifths of the area under cultivation. Foremost among the grains, in terms of both area sown and total yield, is rice, the crop of choice in almost all areas with more than 40 inches (1,000 mm) of average annual precipitation, as well as in some irrigated areas. Wheat ranks second in both area sown and total yield and, because of the use of HYVs, leads all grains in yield per acre. Wheat is grown mainly on the fertile soils of northern and northwestern India in areas with 15 to 40 inches (380 to 1,000 mm) of average annual precipitation, often with supplementary irrigation. Unlike rice, which is mainly grown during the *kharif* (summer) season, wheat is primarily a *rabi* (cool-season) crop. Other important cereals, in descending order of sown acreage, are sorghum (called jowar in India), pearl millet (*bajra*), corn (maize), and finger millet (*ragi*). All these typically are grown on relatively infertile soils unsuitable for rice or wheat, while corn cultivation is also favoured in hilly and mountainous regions. After cereals, pulses are the most important category of food crop. These ubiquitous leguminous crops—of which the chickpea (gram) is the most important—are the main source of protein for most Indians, for whom the consumption of animal products is an expensive luxury or is proscribed on religious grounds.

Forestry

Commercial forestry is not highly developed in India. Nevertheless, the annual cutting of hardwoods is among the highest of any country in the world. Species that are sources of timber, pulp, plywood, veneers, and matchwood include teak, deodar, *Sal*, sissoo, and chir pine. Virtually any woody vegetation is used for firewood, much of it illegally gathered, and substantial amounts go into making charcoal. Minor forest products include bamboo, cane, gum, resins, dyes, tanning agents, lac, and medicinal plants.



(Fig-17.2**Forestry)**

The principal areas for commercial forestry, in order of importance, are the Western Ghats, the western Himalayas, and the hill regions of central India. In an effort to counteract forest depletion, the central and state governments have vigorously supported small-scale afforestation projects; these have met with mixed success, both economically and ecologically.

Population growth has, over the centuries, resulted in a continuous diminution of forest land. Most of India's formerly forested area has been converted to agricultural use (though some of that land is no longer productive), and other large areas have been effectively turned into wasteland from either overgrazing or overexploitation for timber and firewood. The problem of obtaining sufficient firewood, mainly for cooking, is particularly acute. In many areas forests have ceased to exist, and the only trees of consequence are found in protected village groves, often planted with mangoes or other fruit trees, where people and animals can seek shade from the fierce summer sun. In some areas, especially the northeast, bamboo thickets provide an important substitute for wood for structural

purposes. Official figures on the amount of forested land (roughly one-fifth of India's total area) are virtually meaningless, as much of the area officially classified as forest contains little but scrub. Among the ecological consequences of deforestation in India are the reduced groundwater retentiveness, a concomitant rapid runoff of monsoon rains, a higher incidence of flooding, accelerated erosion and siltation, and an exacerbated problem of water scarcity.

Alternative Farming Techniques and Solution

Organic Farming

The principles of organic farming is the maintenance of soil fertility by bio-intensive nutrient management, recycling of agricultural wastes, vermicomposting, avoidance or reduction of external inputs, use of natural forms of pest management and weed control (Goldsmith and Hildeyard 1996; Hansen et al. 2006). The organic movement began in the 1930s and 1940s as a reaction to the growing reliance of agriculture on synthetic fertilizers. Organic farming is a form of agriculture which excludes the use of synthetic fertilizers and pesticides; plant growth regulators, livestock feed additives, and genetically modified organisms. Organic agriculture can be considered a subset of sustainable agriculture, the difference being that organic implies certification in accordance with legal standards. Sir Albert Howard was widely considered to be the father of modern organic farming worked as an agricultural adviser in Pusa, Bengal from 1905 to 1924. He documented traditional Indian farming practices and came to regard them as superior to conventional agriculture, Rudolf Steiner a German philosopher made influential strides in the earliest organic theory with his biodynamic agriculture. More work was done by Rodale in the United States, Lady Eve Balfour in the United Kingdom and many others across the world-such as Masanobu Fukuoka, Aldo Leopold, William Albrecht, Louis Bromfield, Edward Faulkner, Ehrenfried Pfeiffer, Alan Chadwick, Wes Jackson, and Garth Youngberg. One of the earliest recorded examples of research on organic farming is the comparison of organic and conventional farming systems at Hughley, Suffolk, England initiated by Eve Balfour. But the practice of organic farming is as old as the early history of agriculture-if we track back some 12,000 years and beyond into prehistory. Organic agriculture is distinct from conventional agriculture through alternative agricultural practices, in their view and values. Organic agricultural methods are standard, internationally regulated and legally enforced International Federation of Organic Agriculture Movements (IFOAM) an international umbrella organization for organic organizations established in 1972. This is known as certification. Certification of organic food products is advantageous for both producers as well as consumers. Farmers fallowing certification are rewarded with eliminating the risk of exposure to toxic agrochemicals, premium prices and better market access. Several countries have already adopted community certification of organic food. Organic agriculture world over involves certain basic steps as like:

(Fig-17.3 Organic Farming)

⇒ Green manuring
⇒ Bio fertilizers
⇒ Crop rotation
⇒ Cover cropping
⇒ Soil Health Management

Green Manuring

A green manure is a type of cover crop grown primarily to add nutrients and organic matter to the soil for soil improvement and soil protection. Typically a green manure crop is grown for a specific period, plowed and incorporated into the soil.

⇒ Leguminous green manures contain nitrogen-fixing symbiotic bacteria in root nodules that fix atmospheric nitrogen in a form that plants can use.

⇒ Green manures increase the percentage of organic matter (biomass) in the soil, thereby improving water retention, aeration, and other soil characteristics.

⇒ The root systems of some varieties of green manure grow deep in the soil and bring up nutrient resources unavailable to shallower-rooted crops.

⇒ Common cover crop functions of weed suppression and prevention of soil erosion and compaction are often also taken into account when selecting and using green manures.

⇒ Some green manure crops, when allowed to flower, provide forage for pollinating insects.

The green manure crops could contribute 30–60 kg nitrogen per hectare annually to the subsequent crop and is an inexpensive source of organic fertilizer to build up or maintain soil fertility (Amanullah 2008). For instance, the rice yield could be significantly improved by incorporating green manure and stem nodulating green manure has the capacity to fix approximately 150–220 kg N ha1 in 50–60 days. Green manuring alone (without fertilizer nitrogen) manifested an yield increase of toria by 122% equivalent to solitary application of 60 kg N ha1 and the residual effect of green manuring on the following sunflower crop resulted in an additional yield of 317 kg ha1 (Bahi and Pasricha 2001). Organic agriculture is no longer a phenomenon of developed countries. It is now commercially practiced in 120 countries, representing 31 million ha of certified croplands and pastures (0.7% of global agricultural lands and an average of 4% in the European Union), 62 million ha of certified wild lands (for organic collection of bamboo shoots, wild berries, mushrooms and nuts) and a market of US$40 billion in 2006 (2% of food retail in developed countries). Although difficult to quantify, non-certified organic systems e.g. indigenous models that follow organic principles by intent or by default) of several million small farmers may represent at least an equivalent share in subsistence agriculture of developing countries (FAO 2007).

Bio fertilizers

Bio fertilizers are the substance which contains symbiotic nutrients fixating living microbes which are capable of colonizing in rhizosphere and enhances plant growth by increasing the availability of primary nutrients or by synthesizing growth promoting. The plant inoculation with Azospirillum promoted the uptake of KC, NO 3 and H2PO 4, releases various metabolites such as auxines, cytokines, riboflavin and vitamins leading to higher growth in various legume and non-leguminous plant (Saubidet et al. 2000; Matriu and Dakora 2004). Azospirillum and Pseudomonas fluorescens colonize plant roots and exert beneficial effects on plant growth and development (Bashan et al. 2004; Choong et al. 2005). Rhizobium, Azospirillum and phosphobacteria encourage plant growth by producing growth regulators, facilitating nutrient uptake, accelerating mineralization, reducing plant stress, stimulating nodulation and promoting nitrogen fixation.

(Fig-17.4 Bio fertilizers)

Crop Rotation

Crop rotations serve to provide new above-and below-ground habitats as each new crop has a distinct chemical and biological make-up, introducing new vegetation types to the landscape eventually increases crop residues to the soil ecosystem. Different crop residues promote or inhibit different soil organisms which may have inhibitory or growth promoting effects to subsequent crops. By interrupting the continuous presence of a crop host, crop rotation serves to break the build-up in the cycles of weeds and insects and diseases, thus eliminating the need for pesticide application. Fallow periods i.e. ground left uncultivated for an extended period of time, allow a limited amount of secondary succession to advance and hence the recovery of the diversity of both terrestrial and below-ground species are possible.

Natural Farming

Do-Nothing Farming also known as Natural Farming (NF) is an alternative farming method to chemical or traditional farming. Natural framing is used to emphasize the importance of "spatially" and "temporarily" overlapping the growing crops, plants and animals so that we can utilize their synergistic effects. Natural Farming with indigenous microorganisms is a distinctive approach to organic farming practiced successfully in more than 30 countries, in home gardens and on a commercial scale. Natural Farming is unique in that it is not meant to be commercialized but rather practiced by individual farmers with cheap, easily available ingredients and microbes or mycorrhizae indigenous to each locale or farm. These microorganisms are:

⇒ cultured in a simple wooden box of rice
⇒ mixed with brown sugar and stored in a crock
⇒ Further propagated on rice bran or wheat mill run mixed with soil and cultured again.
⇒ The resultant product is then mixed with compost, added to potting soil or spread on beds before planting, the process takes 3–4 weeks.

There are also procedures for water soluble calcium made from eggshells, water-soluble calcium phosphate made from animal bones and vinegar, fish amino acid made from fish waste, lactic acid bacteria, seed soak solution and insect attractants made from rice wine. There are half dozen more inputs that can be made simply and easily at home which are used according to the nutritive and growth cycle of the plants. Many of these inputs are made from waste residues and materials (Prell 2010).

Eco-Farming

Eco-farming or site-appropriate agriculture involves treating both regions used for agriculture and individual farms as ecological systems. "Site" restricted to natural conditions like soil, climate and temperature. The demand for stability and sustainability stems from the obligation of each generation to pass on to future generations an environment that remains capable of guaranteeing the fundamentals of human existence. Consideration must also be given to economic development i.e. price– cost ratios, incomes, farm-specific conditions i.e. access to factors of production and the internal forces influencing a farm's operations like self-sufficiency, risk minimization and preservation of soil fertility. Countries must develop forms of agriculture that permit a high degree of self-sufficiency and decentralization at national and regional levels. The essential characteristics of these Eco farming systems are:

⇒ maximal but sustainable use of local resources
⇒ minimal use of purchased inputs, only as complementary to local resources
⇒ emphasis on subsistence cropping, combined with complementary production for the market
⇒ ensuring the basic biological functions of soil-water-nutrients-humus

⇒ maintaining a diversity of plant and animal species as a basis for ecological balance and economic stability, with primary emphasis on local species, varieties and races
⇒ conserving life support systems and ecosystem services
⇒ Creating an attractive overall land cape which gives satisfaction to the local people.

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Chapter: 18

Social Activities – Any Activates Planned By Students

E.g. Teaching Learning activities, awareness camp, business idea for SELF HELP GROUP OR ANY OTHER

Tree plantation:

We do tree plantation in village as a social activity. We plant tree in front of panchayat buildings plane area, and also in school of nagar pipaliya village. Due to covid-19 we not together many people, plantation done by our team of 3 people. We also request principal of school to do plantation I school as well as in village after pandemic is over and they give us good response for that suggestion. We also request serpanch and talati to do tree plantation and take care of trees until they grew up and they also give very good response to our suggestion.

Awareness for Covid-19 and importance of mask, sanitizer and social distancing:

We all are very well know about current scenario so instead of gathering people we decide to spread awareness about covid-19 and importance of mask, sanitizer and social distancing through social media and through WhatsApp. We type a message in which we write how covid-19 spread, how we can break chain of spread of covid-19, how can we protect our self from covid-19, how we can improve our immune system and how proper use of mask and sanitizer are used for protection.

We also send some photos and videos regarding how wear mask properly and some home remedies for improve immune system. We also suggest some medicine which are use full for normal fewer and cold. We also suggest some medicine for those who are home quarantine because of covid-19 or who are infected. We suggest some medicine like zinc, vitamin B-12, iron-manganese, vitamin-C and paracetamol.

We will try our best to do some small activity with following all precaution from covid-19, so we will try to spread awareness in social media other than that we hadn’t do any activity in village due to covid-19.

We also suggest some medicine which are use full for normal fewer and cold. We also suggest some medicine for those who are home quarantine because of covid-19 or who are infected. , how can we protect our self from covid-19, how we can improve our immune system and how proper use of mask and sanitizer are used for protection.

Chapter: 19

NAGAR PIPALIYA VILLAGE SAGY Questionnaire Survey form with the Sarpanch Signature

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Nagar Pipaliya Gram Panchayat: Nagar pipaliya Ward No. 7

Block: Rajkot District: Rajkot

State: Gujrat L S Constituency: Rajkot

1. Family Identity and Size

Name of Head of Household	Maheshbhai vithalbhai sakaniya							Male/ Female	M
SECC Survey ID:	-	Family Size	3	Over 18	2	6 to 18	1	Under 6	-

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]		Life Insurance	1. All Adults 2. Some Adults 3. None ✓	AABY	1. Yes 2. No ✓	Kisan Credit Card	Yes / No ✓
Poverty Status Year[2]:	1. BPL 2. ✓APL	Health Insurance	1. All Adults 2. Some Adults 3. None ✓	RSBY	1. Yes ✓ 2. No	MGNREGS Job Card Number	
PDS (If NFSA is not implemented)		Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? Yes / No	
PDS (If NFSA is implemented)		Annapurna	Antyodaya	Priority	Other		

2. Adults (above 18 years)

Name	Age	Sex M/F / O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension[5]
Maheshbhai V. sakaniya	41	M	N	Married	5	Y	Y	
Manishaben M. sakaniya	39	F	N	"	8	Y	Y	

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
Ravi M. sakaniya	14	M	N	-	1	Y	9	Y

4. Children below 6 years

Name	Age	Sex M/F/ O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)

[3] Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4

[4] Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	Soap ✓	Other	Soap	Other	
Before Eating	Soap ✓	Other	Soap	Other	

6. Use of Mosquito Net
Children: Yes / No Adults: Yes / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / ~~No~~	Yes / No	Yes / No ✓
Children	Yes / No	Yes / No	Yes / No ✓

8. Consumption of Tobacco

	Smoking	Chewing
Adults	No	No
Children	No	No

9. House & Homestead Data

Own House: Yes / No	No. of Rooms: 4
Type: Kutcha / Semi Pucca / Pucca	
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System	Door Step / Common Point / No Collection System
Homestead Land: Yes / No	Kitchen Garden : Yes / No Yes
Compost Pit: Individual/ Group/ None	Biogas Plant: Individual/ Group/ None

10. Source of Water (Distance from source in KMs)

Source of Water		Distance
Piped Water at Home	Yes / No	0.03 km
Community Water Tap	Yes / No	
Hand Pump (Public / Private)	Yes / No	
Open Well(Public / Private)	Yes / No	
Other (mention):		

11. Source of Lighting and Power

Electricity Connection to Household: Yes / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: LPG
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other:
If cooking in Chullah: Normal/ Smokeless

12. Landholding (Acres)

1. Total	-	2. Cultivable Area	-
3. Irrigated Area	-	4. Uncultivable Area	-

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	✓
Sharecropping /Farming Leased Land	
Animal Husbandry	✓
Pisciculture	
Fishing	
Skilled Wage Worker	✓
Unskilled Wage Worker	
Salaried Employment in Government	
Salaried Employment - Private Sector	
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

14. Migration Status
Does any member of the household migrate for Work: Yes / ~~No~~. If Yes Entire Year / Seasonal
Does anyone below 18 years migrate for work: Y/N

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes/No
Do you use Chemical Insecticides	Yes/No
Do you use Chemical Weedicide	Yes/No
Do you have Soil Health Card	Yes/No
Irrigation: None/ Canal/ Tank/ Borewell/Other	
Drip or Sprinkler Irrigation: Drip /Sprinkler / None	

16. Agricultural Produce in a normal year (Top 3)

Name	Unit	Quantity

17. Livestock Numbers

Cows: 1	Bullocks:	Calves: -
Female Buffalo: 1	Male Buffalo: -	Buffalo Calves: -
Goats/ Sheep: -	Poultry/ Ducks: -	Pigs: -
Any other: Type		No.
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 9 ltr.		

18. What games do Children Play
CRICKET, CYCLING, KABBADI

19. Do children play musical instrument (mention)
No

Schedule Filled By:
Principal Respondent: કે. પ્રેમ. વાઘેલા
Date of Survey:

+

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	NO	-
m	Common Service Centre	NO	-
n	Veterinary Care Centre	NO	-

ii. Road Connectivity

a. Habitations connected by All-weather Roads *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations where not available: All

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

b.Hand Pump Coverage in Habitations: Nil *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

b. Coverage under Open Drains: Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

c. Coverage under Doorstep Waste Collection: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: Some.

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: None

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: Some

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): Nil

b.Mini Stadium : No Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 2

c. Schools (Number)

Primary Private: 0 Primary Govt.: 1

Middle Private: 0 Middle Govt.: 0

Secondary Private: 0 Secondary Govt.: 0

Higher Secondary Private: 0 Higher Secondary Govt: 0

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

I. Basic Information

a. Village: Nagar pipaliya

b. Ward Number: 7

c. Gram Panchayat: Nagar pipaliya

d. Block: Rajkot

e. District: Rajkot

f. State: Gujrat

g. Lok Sabha Constituency: Rajkot

h. Number of Habitations / Hamlets in the Gram Panchayat: _____

i. Names of Habitations / Hamlets: —

Demographic Information

Number of Households 520 Total Population 3408 Male 1880 Female 1518

SC HHs 642 ST HHs _____ OBC HHs 220 Other HHs 900

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	yes	village
b.	Nearest Middle School	NO	-
c.	Nearest Secondary School	NO	
d.	Kisan Seva Kendra	yes	"
e.	Milk Cooperative /Collection Centre	yes	"
g.	Health Sub Centre	NO	
h.	Bank	yes	village
i.	ATM	yes	village
j.	Bus Stop	yes	"
k.	Railway Station	No	—

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	9
b)	Number of Households receiving pension (old age, widow, disability)	20
c)	Number of eligible Households who are not receiving pension	40
d)	Number of Households eligible for Ration Card	480
e)	Number of eligible HHs having ration cards	510
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	0
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	0
h)	Number of active Job Card holders under MGNREGA	10
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	0
k)	Number of BPL families	240
l)	Number of landless households	-
m)	Number of IAY beneficiaries	0
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	12
p)	Number of Households headed by single women	9
q)	Number of Households headed by physically handicapped persons	4
r)	Total number of Persons with Disability in the village	20
s)	Number of SHGs	10
t)	Number of active SHGs	0
u)	Number of SHG Federations	0
v)	Number of Youth Clubs	2
w)	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent'

Pansuriya Jayraj M. Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	10-2-2021 Date of Survey

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

4

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered _____ Not Covered _____	Nagar Pipaliya	
b.	Hand Pump Coverage in Villages:	Covered _____ Not Covered _____		Nagar Pipaliya
c.	Coverage under Covered Drains:	Covered _____ Not Covered _____	–	Nagar Pipaliya
d.	Coverage under Open Drains:	Covered _____ Not Covered _____	Nagar Pipaliya	–
e.	Villages with Household Electricity Connection (Numbers)	Connected _____ Not Connected _____	Nagar Pipaliya	–

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	3860.00	d.	Pasture / Grazing Land	0	g.	Check Dam	9
b.	Irrigated Land	2820.41	e.	Forests/ Plantations	0.	h.	Wells/Bore Wells	6
c.	Un-irrigated Land	1080.96	f.	Other Common Land	280.04	i	Tanks /Ponds	1

[1] Mention the number of Villages Covered and Not Covered

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	Yes	Village
p	Nearest Agro Service Centre	Yes	Village
p	MSP based Government Procurement Centre	N	-
q	Milk Cooperative /Collection Centre	Yes	Village
r	Veterinary Care Centre	NO	NO.
s	Ayurveda Centre	NO	-
t	E – Seva Kendra	NO	-
u	Bus Stop	Yes	Village
v	Railway Station	NO	-
w	Library	NO	-
x	Common Service Centre	NO	-

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 0 Public 0 Private 0

b. Mini Stadium : NO Yes(Y) /No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres 0

Names of such villages: _____

c. Schools (Number)

Primary Private: 0 Primary Govt.: 1

Middle Private: 0 Middle Govt.: 0

Secondary Private: 0 Secondary Govt.: 0

Higher Secondary Private: 0 Higher Secondary Govt: 0

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)	-	-	-	-	Government	Yes	-
b.	Kerosene	-	-	-	-	Government	Yes	-
c.	Other (mention)	-	-	-		-	-	-

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	3460.80	d.	Pasture / Grazing Land	0	g.	Check Dam	9
b.	Irrigated Land	3204.06	e.	Forests/ Plnatations	0	h.	Wells/Bore Wells	6
c.	Un-irrigated Land	280.84	f.	Other Common Land	320.41	I	Tanks /Ponds	1

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	09
2	Number of active Job Card holders who have completed 100 days of work	40
3	Number of shops selling alcohol	0
4	Number of BPL families	380
5	Number of landless households	200
6	Number of IAY beneficiaries	0
7	Number of FRA beneficiaries	0
8	Number of common sanitation complexes	20
9	Number of SHGs	0
10	Number of active SHGs	0
11	Existence of SHG Federation in the Village (Yes / No)	0
12	Number of Youth Clubs	4
13	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent'

Pansuriya Jayraj M. (signature)	Maheshbhai U. Sakariya (signature)	[illegible]	10-2-2021
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

3

Chapter: 20

TDO-DDO-Collector email sending Soft copy attachment in the report

Gmail

Jayraj Pansuriya <pansuriyajayraj222@gmail.com>

DEVELOPMENT SCENARIO OF NAGAR PIPALIYA, TAL. LODHIKA & DIST. RAJKOT.

1 message

Jayraj Pansuriya <pansuriyajayraj222@gmail.com> Fri, Jun 11, 2021 at 5:26 PM
To: ddo-raj@gujarat.gov.in

Respected sir/madam

We are students of Shri Labhubhai Trivedi Institute of Engineering and Technology, District Rajkot affiliated to gujarat technological university-GTU. Gtu has been assigned to vishwakarma yojana phase- VIII in which students survey the various villages and design various amenities to deliver it to them making them ideal for living a better life as per requirement and village problem statements.

We attach a report of Nagar PIpaliya, Ta:- Lodhika, Dit:- Rajkot. We attach a village development report for Phase-1 and Phase-2.
We add the estimate, costing and drawings of designs. As a part of vishwakarma yojana guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Nagar Pipaliya village profile of issues for development and our design work for them that is below.

Sr.	Design name	Period	Amount
	CIVIL		
1	Public Garden	Within 1 Yr.	2,56,815
2	Solid waste management	Long term	8,32,191
3	Bus stand	Long term	3,13,708
4	Flexible pavement road	Within 1 Yr.	3,14,580
5	Gram panchayat	Long term	7,94,880
6	General market	Within 1 Yr.	4,88,483
7	Public toilet block	Immediate	49,500
8	Post office	Within 1 Yr.	8,23,000
9	Cyber café	Within 1 Yr.	4,67,400
10	Skill Development Centre	Long term	6,27,900
11	Animal shelter	Long term	5,61,340
12	Community hall	Immediate	2,82,791
	ELECTRICAL		
1	Solar cleaning system	Immediate	34,000
2	Street light	Immediate	61,000
3	Automatic switch for water pump	Within 1 Yr.	51,600
4	CCTV installation	Immediate	28,300
5	Photovoltaic water pump	Immediate	2,48,000
6	Solar water purifier and cooler system	Immediate	4,20,000

GTU-VY-PHASE-VIII-PART-I-PARDI_compressed.pdf
9167K

Chapter21. Comprehensive report for entire village

We study some case study for ideal village and smart village development, identify new techniques and learn about sustainable development techniques. Smart Villages access to sustainable energy services acts as a catalyst for development - enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost incomes, and enhanced security, gender equality and democratic engagement. It can be help to develop the other village as increase basic amenities and after that smart amenities on any country with the help Smart (Ideal) Village visit and solid and liquid waste water management system Survey and Analysis. And it's also help to increase GDP Of state And Also increase country image in front of world as Good infrastructure; Good Economic Profile and Good Employment Solution; Good (Ideal Example) Smart Example of New infrastructure with Uses Of renewable energy Solution Country.

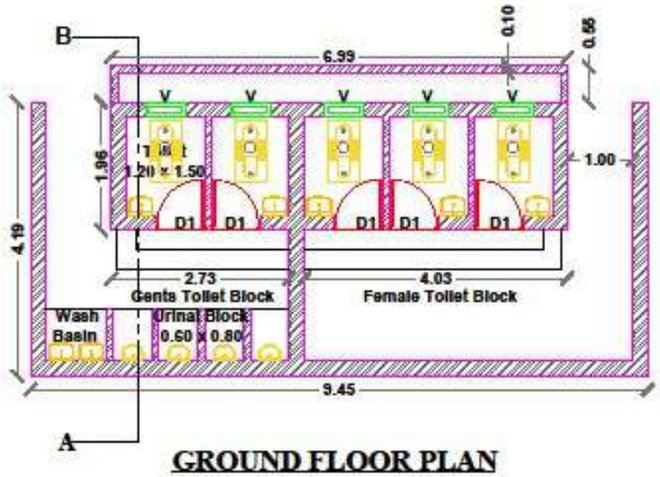
We visit ideal village and smart village for study and know the existing situation of village. We see all facilities in village and see their condition. Major facilities are in good and workable condition. Over all village condition is good. We interact with both village serpanch and talatikam mantri. We discuss village condition with them and ask for necessary data for our survey. Also they say about dome facilities May not in workable condition in their respective village. They also say about some of its facilities may require maintenance.

After visiting ideal village and smart village we visit our allocated village Naga pipaliya. We visit village interact with sarpanch and talatikam mantri and a few of villagers. We see all the existing facilities of village take some good photograph of them we seem some lack of facilities in village and talk about that with serpanch. Sarpench told us about their condition. Majority of facilities are need some maintenance and some of them are in very good condition. Likewise, panchayat building is newly constructed. High school and primary school are at good condition. Water storage facilities need some maintenance.

After study the village and facilities at village we do gap analysis and then we identify some facilities that are not at village. We short list 6 design that are most important and we gave their plane elevation and section. We also give 3 electrical design. We also give another 6 electric designs in pahse-2 and also give 3 new designs in electrical. We try to give design as per norms. We make sure that, which design we gave is maintain time by time and for that we give some method, recommended and new material introduce to serpanch and talalti.

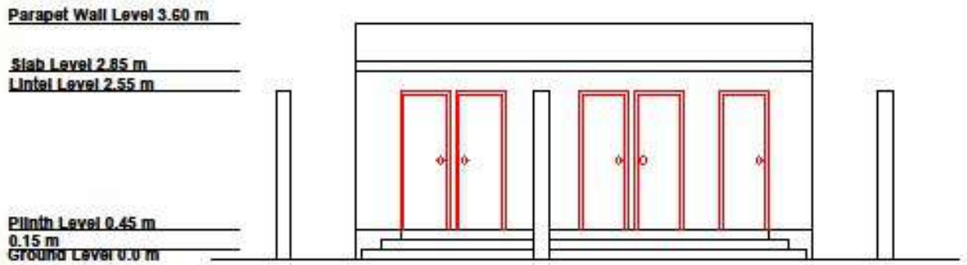
We study and identify problems related with electrical and try to solve them with knowledge and new technique. Over village have 24/7 electricity so no major problem is faced. We gave sustainable or can say one time investment for electrical designs.

We try our best to full fill our project moto which is "Developing village with a 'rural soul' but with all urban amenities that a city may have" and we also learn new thing and we seeing forward to develop our village under Vishwakarma Yojana.

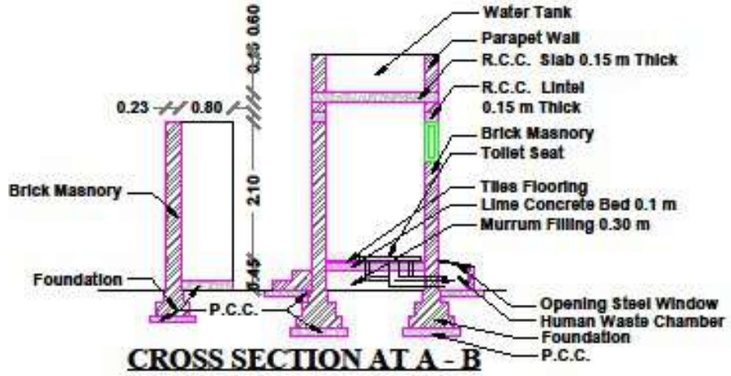


GROUND FLOOR PLAN

Urine Diversion
Dehydration Toilet



FRONT ELEVATION



CROSS SECTION AT A - B

PROPOSED PUBLIC TOILET BLOCK PLANS

TITLE:
PROPOSED PUBLIC TOILET BLOCK PLANS FOR STUDY PURPOSE AT VILLAGE : NAGAR PIPALIYA, TALUKA : LODHIKA, DISTRICT: RAJKOT FOR VISHVAKARMA YOJANA PHASE~8

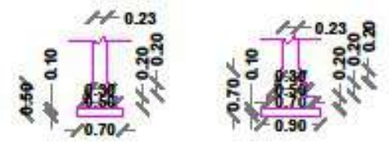
N

Schedule of Opening

Sr. No.	Iteam	No. of Iteam	Size
1	D1	5	0.75 X 2.10
2	V	5	0.60 X 0.60

Area Table

Sr. No.	Iteam	Size
1	Toilet block	1.20 x 1.50
2	Urinal block	0.60 x 0.80



All Dimension are in Meter.

VISHVAKARMA YOJNA PHASE -8

VILLAGE : NAGAR PIPALIYA

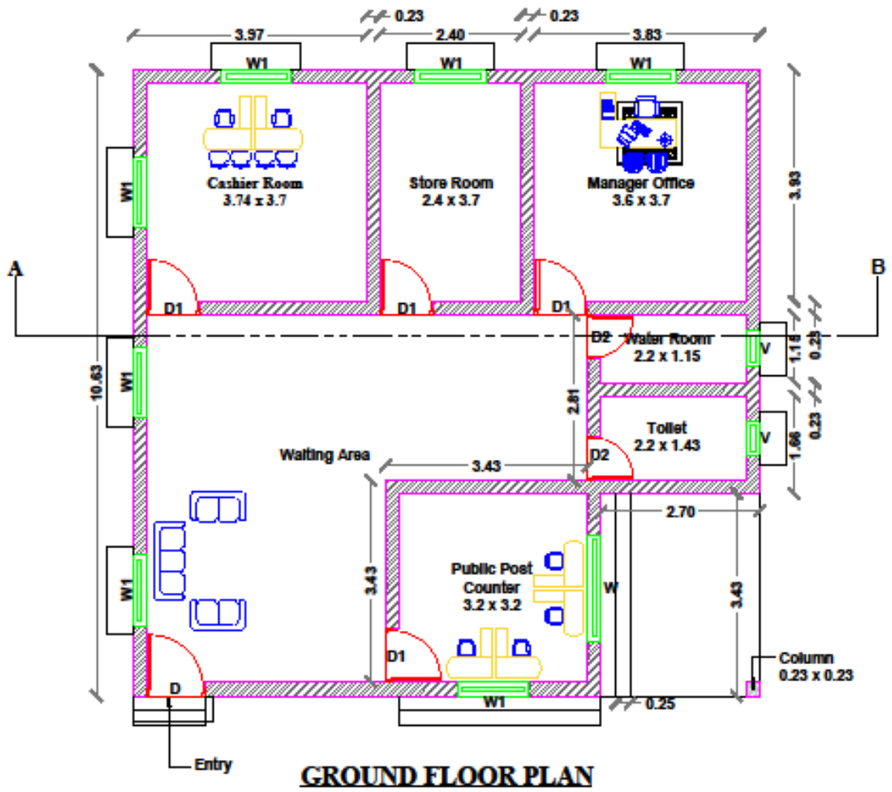
TALUKA : LODHIKA, RAJKOT

TITLE : PUBLIC TOILET BLOCK LAYOUT

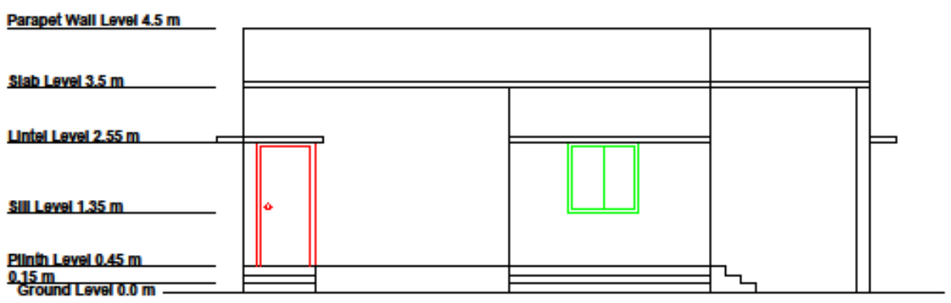
SCALE : 1 : 100

DRAWN: JAYDEEP DEVANI
JAYRAJ PANSURIYA
DINESH BARAIYA

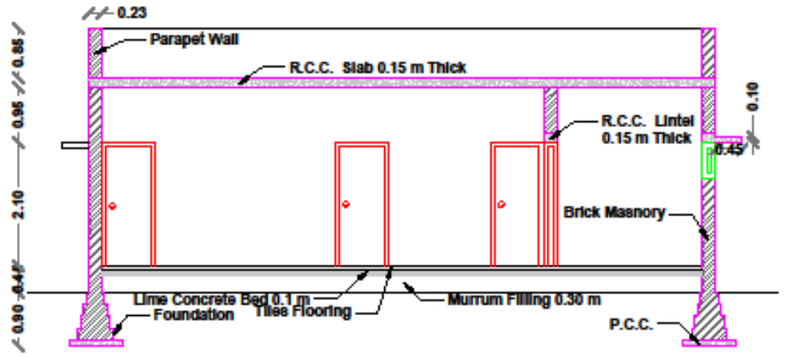
DRAWING NO. 1



GROUND FLOOR PLAN



FRONT ELEVATION



CROSS SECTION AT A - B

PROPOSED POST OFFICE PLANS

TITLE:
PROPOSED POST OFFICE PLANS FOR STUDY PURPOSE
AT VILLAGE : NAGAR PIPALIYA,
TALUKA : LODHIKA,
DISTRICT: RAJKOT
FOR VISHVAKARMA YOJANA PHASE~8

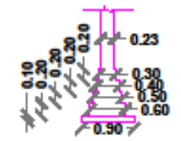
N

Schedule of Opening

Sr. No.	Iteam	No. of Iteam	Size
1	D	1	1.00 X 2.10
2	D1	4	0.90 X 2.10
3	D2	2	0.75 X 2.10
4	W	1	1.50 X 1.20
5	W1	7	1.20 X 1.20
6	V	2	0.60 X 0.60

Area Table

Sr. No.	Iteam	Size
1	Cashier Room	3.74 X 3.70
2	Store Room	2.40 X 3.70
3	Manager Office	3.60 X 3.70
4	Water Room	2.20 X 1.15
5	Toilet	2.20 X 1.43
6	Public Post Counter	3.20 X 3.20



All Dimension are in Meter.

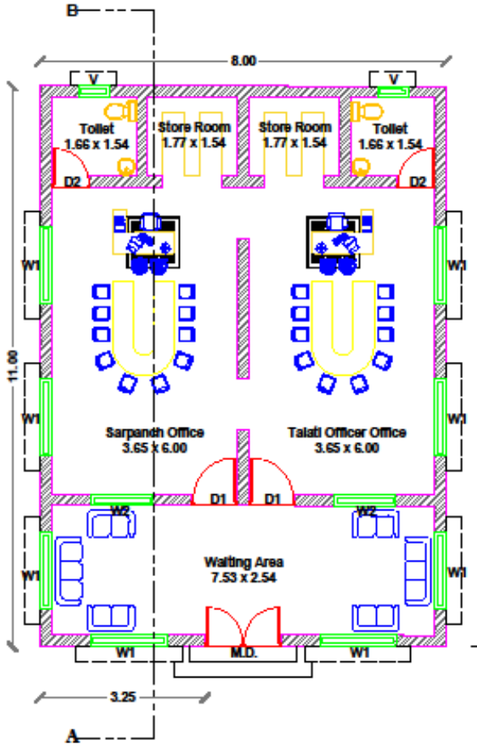
VISHVAKARMA YOJNA PHASE -8
VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT

TITLE : LAYOUT OF POST OFFICE

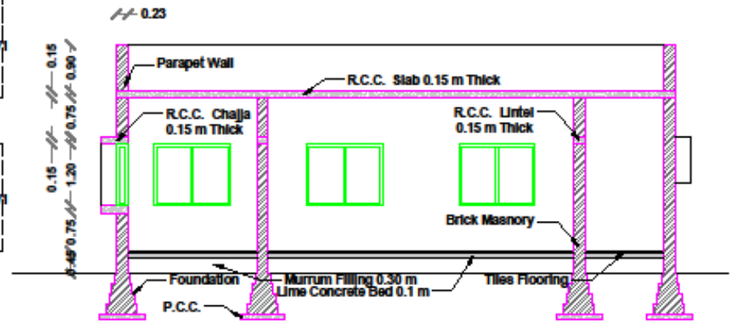
SCALE : 1 : 100

DRAWN: JAYDEEP DEVANI
JAYRAJ PANSURIYA
DINESH BARAIYA

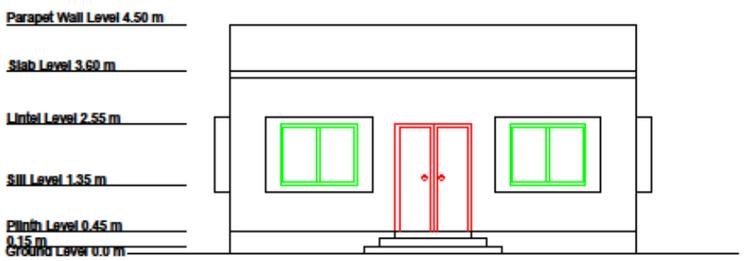
DRAWING NO. 2



GROUND FLOOR PLAN



CROSS SECTION AT A - B



FRONT ELEVATION

PROPOSED GRAM PANCHAYAT BUILDING PLANS

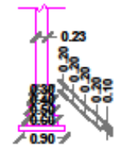
TITLE:
PROPOSED GRAM PANCHAYAT BUILDING PLANS FOR STUDY PURPOSE
AT VILLAGE : NAGAR PIPALIYA,
TALUKA : LODHIKA,
DISTRICT: RAJKOT
FOR VISHVAKARMA YOJANA PHASE~8

Schedule of Openings

Sr. No.	Itsam	No. of Itsam	Size
1	M.D.	1	1.50 X 2.10
2	D1	2	0.90 X 2.10
3	D2	2	0.75 X 2.10
4	W1	8	1.50 X 1.20
5	W2	2	1.20 X 1.20
6	V	2	0.60 X 0.60

Area Table

Sr. No.	Itsam	Size
1	Toilet 2no.	1.66 x 1.54
2	Store Room 2 No.	1.77 x 1.54
3	Sarpanch and Talati Mantry Office 2 No.	3.65 X 6
4	Waiting Area	7.53 X 2.54



All Dimension are in Meter.

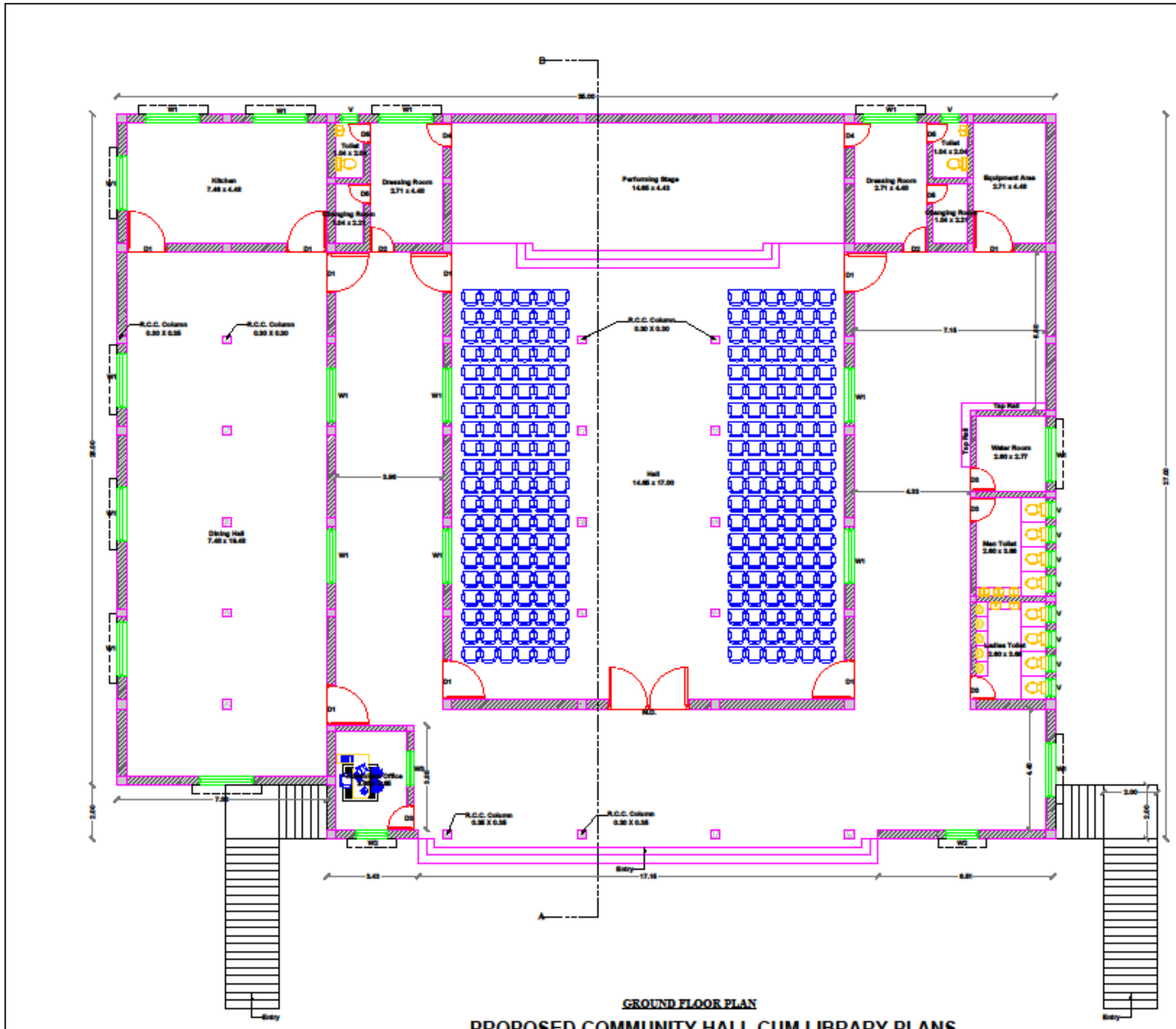
VISHVAKARMA YOJNA PHASE -8

VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT

TITLE : LAYOUT OF GRAM PANCHAYAT

SCALE : 1 : 100	DRAWN: JAYDEEP DEVANI JAYRAJ PANSURIYA DINESH BARAIYA

DRAWING NO. 3



GROUND FLOOR PLAN

PROPOSED COMMUNITY HALL CUM LIBRARY PLANS

TITLE:
PROPOSED COMMUNITY HALL CUM LIBRARY PLANS FOR STUDY PURPOSE
AT VILLAGE : NAGAR PIPALIYA,
TALUKA : LODHIKA,
DISTRICT: RAJKOT
FOR VISHVAKARMA YOJANA PHASE-8

Schedule of Opening

Sr. No.	Name	No. of Room	Size
1	M.D.	1	3.00 X 2.70
2	M.D.	2	3.00 X 2.10
3	D1	8	1.80 X 2.70
4	D2	2	0.90 X 2.70
5	D3	4	0.90 X 2.70
6	D4	2	0.90 X 2.10
7	D5	4	0.76 X 2.70
8	D6	6	1.80 X 2.10
9	W1	17	2.00 X 1.80
10	W2	2	1.20 X 1.80
11	W3	1	1.20 X 1.80
12	W4	18	2.00 X 1.30
13	V	10	0.60 X 0.60

Area Table

Sr. No.	Name	Size
1	Kitchen	7.48X 4.48
2	Dining Hall	7.48 X 19.48
3	Toilet 2 No.	1.04 X 2.04
4	Changing Room 2 No.	1.04 X 2.71
5	Dressing Room 2 No.	2.71 X 4.48
6	Performing Stage	14.66 X 4.43
7	Hall	14.66 X 17.00
8	Admin Office	2.66 X 3.66
9	Mens Toilet	2.60 X 3.66
10	Ladies Toilet	2.60 X 3.66
11	Water Room	2.60 X 2.77
12	Equipment room	2.71 X 4.48
13	Library Hall	13.36 X 13.04
14	Computer Lab	13.13 X 13.16
15	Reading Room	13.36 X 13.16
16	Reception Area	13.13 X 14.27
17	Open Area for Reading	7.80 X 34.84

All Dimension are in Meter.

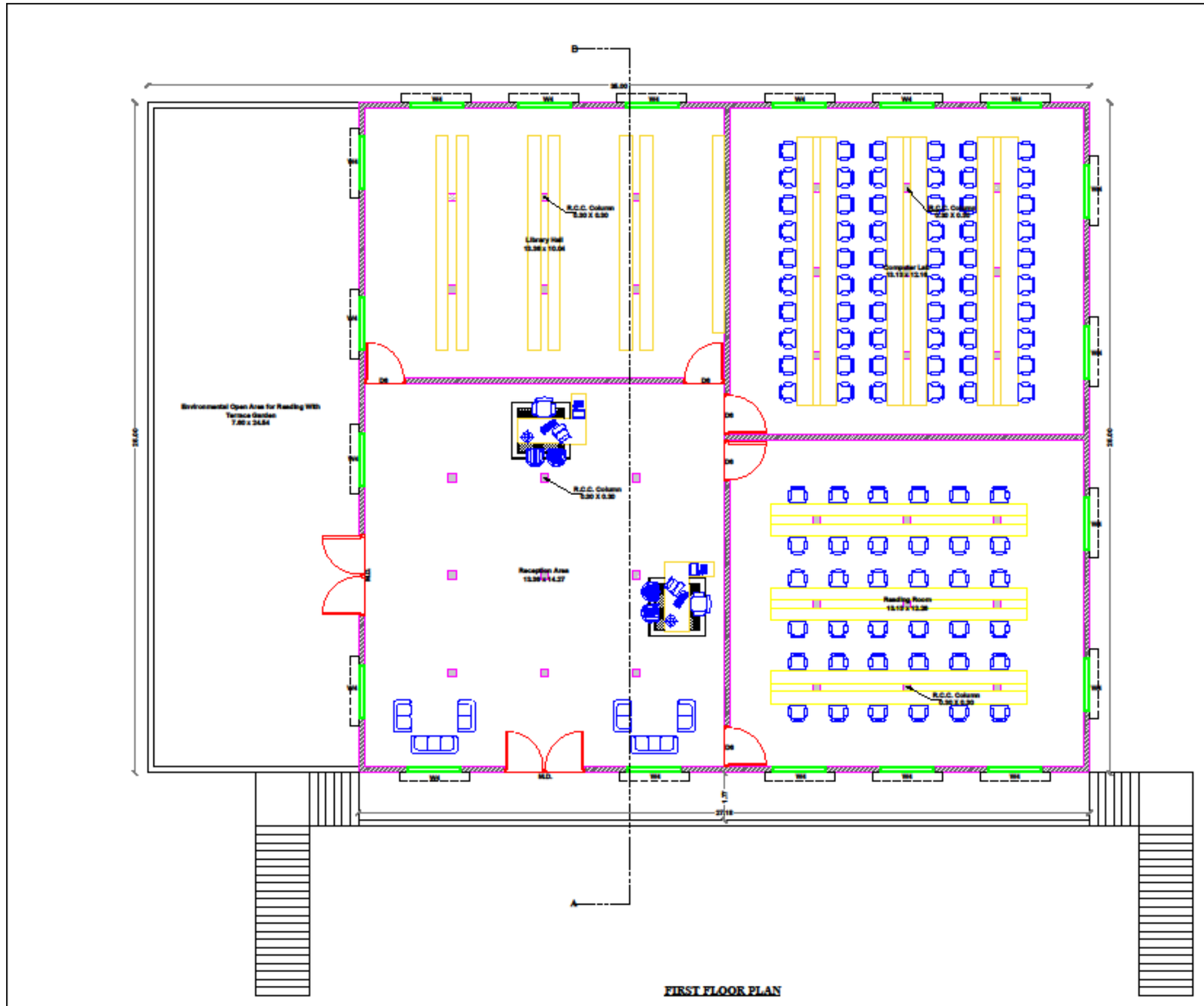
VISHVAKARMA YOJNA PHASE -8
VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT

TITLE : Layout of Comm. Hall & Library

SCALE : 1 : 100

DRAWN: JAYDEEP DEVANI
JAYRAJ PANSURIYA
DINESH BARAIYA

DRAWING NO. 4



FIRST FLOOR PLAN

PROPOSED COMMUNITY HALL CUM LIBRARY PLANS

TITLE:
PROPOSED COMMUNITY HALL CUM LIBRARY PLANS FOR STUDY PURPOSE AT VILLAGE : NAGAR PIPALIYA, TALUKA : LODHIKA, DISTRICT: RAJKOT FOR VISHVAKARMA YOJANA PHASE-8

Schedule of Opening

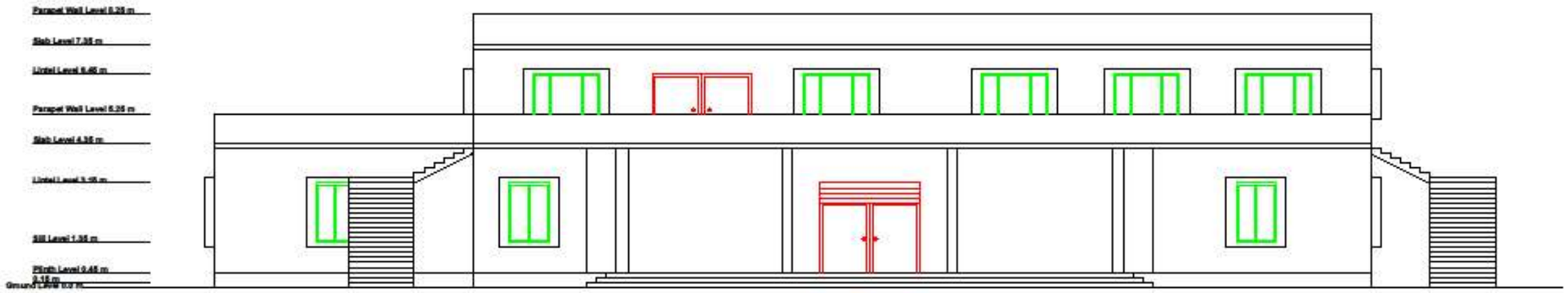
Sr. No.	Name	No. of Nam	Size
1	M.D.	1	3.00 X 2.70
2	M.D.	2	3.00 X 3.10
3	D1	9	1.50 X 2.70
4	D2	3	0.90 X 2.70
5	D3	4	0.90 X 2.70
6	D4	2	0.90 X 3.28
7	D5	4	0.75 X 2.70
8	D6	5	1.50 X 2.10
9	W1	17	3.00 X 1.50
10	W2	3	1.20 X 1.50
11	W3	1	1.20 X 1.50
12	W4	19	3.00 X 1.20
13	V	10	0.60 X 0.60

Area Table

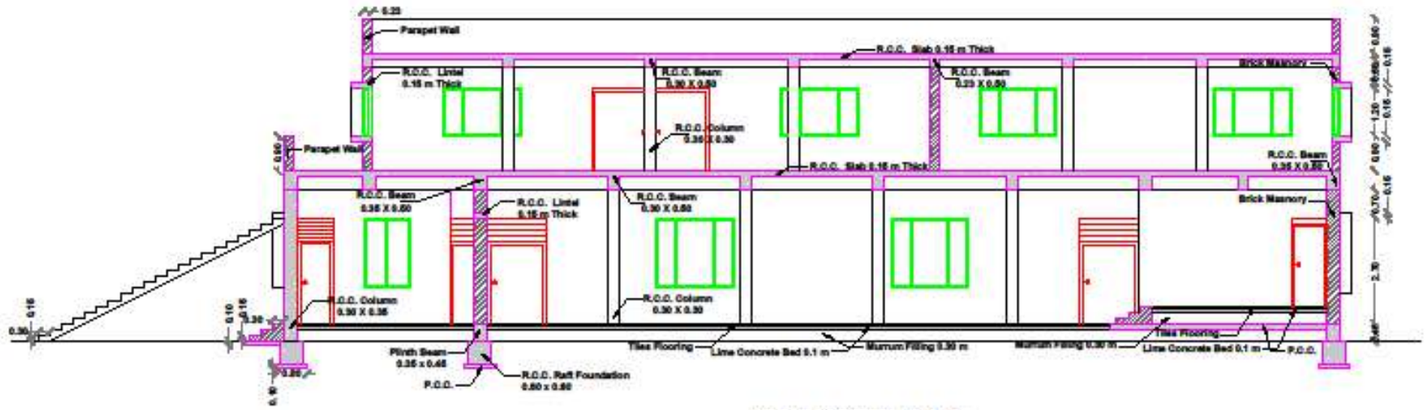
Sr. No.	Name	Size
1	Kitchen	7.48X 4.48
2	Dining Hall	7.48 X 19.48
3	Toilet 2 No.	1.64 X 2.54
4	Changing Room 2 No.	1.64 X 2.25
5	Dressing Room 2 No.	2.71 X 4.48
6	Performing Stage	14.66 X 4.48
7	Hall	14.66 X 17.20
8	Admin Office	3.66 X 3.66
9	Mens Toilet	3.66 X 3.66
10	Ladies Toilet	3.66 X 3.66
11	Water Room	3.66 X 2.77
12	Equipment room	2.71 X 4.48
13	Library Hall	13.38 X 10.04
14	Computer Lab	13.13 X 12.16
15	Reading Room	13.38 X 13.16
16	Reception Area	13.13 X 14.27
17	Open Area for Reading	7.80 X 24.84

All Dimension are in Meter.

VISHVAKARMA YOJNA PHASE -8
VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT
TITLE : Layout of Comm. Hall & Library
SCALE : 1 : 100
DRAWN: JAYDEEP DEVANI, JAYRAJ PANSURIYA, DINESH BARAIYA
DRAWING NO. 4



FRONT ELEVATION



CROSS SECTION AT A - B

PROPOSED COMMUNITY HALL CUM LIBRARY PLANS

TITLE:
PROPOSED COMMUNITY HALL CUM LIBRARY PLANS FOR STUDY PURPOSE
AT VILLAGE : NAGAR PIPALIYA,
TALUKA : LODHIKA,
DISTRICT: RAJKOT
FOR VISHVAKARMA YOJANA PHASE-8

Schedule of Opening

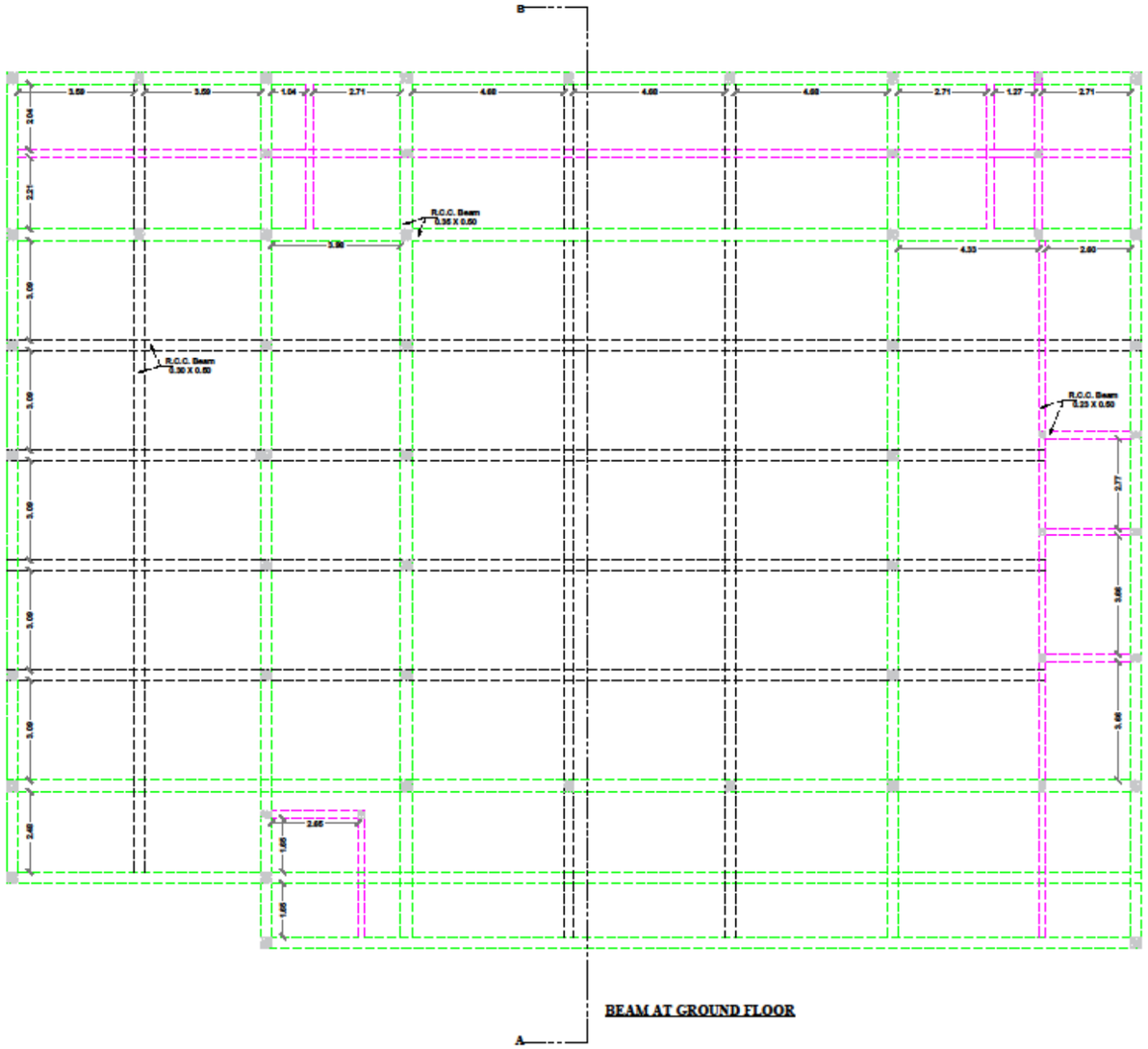
Sr. No.	Ileam	No. of Ileam	Size
1	M.D.	1	3.00 X 3.70
2	M.D.	2	3.00 X 3.10
3	D1	8	1.80 X 2.70
4	D2	3	0.90 X 2.70
5	D3	4	0.90 X 2.70
6	D4	3	0.90 X 2.25
7	D5	4	0.75 X 2.70
8	D6	5	1.80 X 2.10
9	W1	17	2.00 X 1.00
10	W2	2	1.20 X 1.00
11	W3	1	1.30 X 1.00
12	W4	19	2.00 X 1.20
13	V	10	0.60 X 0.60

Area Table

Sr. No.	Ileam	Size
1	Kitchen	7.460 X 4.40
2	Dining Hall	7.46 X 15.46
3	Toilet 2 No.	1.04 X 2.04
4	Changing Room 2 No.	1.04 X 2.21
5	Dressing Room 2 No.	2.71 X 4.40
6	Performing Stage	14.66 X 4.40
7	Hall	14.66 X 17.20
8	Admin Office	2.66 X 3.66
9	Mens Toilet	2.60 X 3.66
10	Ladies Toilet	2.60 X 3.66
11	Water Room	2.60 X 2.77
12	Equipment room	2.71 X 4.40
13	Library Hall	13.36 X 10.04
14	Computer Lab	13.13 X 12.16
15	Reading Room	13.36 X 12.16
16	Reception Area	13.13 X 14.27
17	Open Area for Reading	7.60 X 24.64

All Dimension are in Meter.

VISHVAKARMA YOJNA PHASE -8
VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT
TITLE : Layout of Comm. Hall & Library
SCALE : 1 : 100
DRAWN: JAYDEEP DEVANI
JAYRAJ PANSURIYA
DINESH BARAIYA
DRAWING NO. 4



BEAM AT GROUND FLOOR

PROPOSED COMMUNITY HALL CUM LIBRARY PLANS

TITLE:
PROPOSED COMMUNITY HALL CUM LIBRARY PLANS FOR STUDY PURPOSE AT VILLAGE : NAGAR PIPALIYA, TALUKA : LODHIKA, DISTRICT: RAJKOT FOR VISHVAKARMA YOJANA PHASE--8

N

Schedule of Opening

Sr. No.	Item	No. of Item	Size
1	M.D.	1	3.00 X 2.70
2	M.D.	2	3.00 X 2.10
3	D1	8	1.50 X 2.70
4	D2	2	0.90 X 2.70
5	D3	4	0.90 X 2.70
6	D4	2	0.90 X 2.25
7	D5	4	0.75 X 2.70
8	D6	6	1.50 X 2.10
9	W1	17	3.00 X 1.80
10	W2	2	1.20 X 1.80
11	W3	1	1.20 X 1.80
12	W4	19	3.00 X 1.20
13	V	10	0.60 X 0.60

Area Table

Sr. No.	Item	Size
1	Kitchen	7.46X 4.40
2	Dining Hall	7.46 X 18.48
3	Toilet 2 No.	1.04 X 2.04
4	Changing Room 3 No.	1.04 X 2.21
5	Dressing Room 3 No.	3.71 X 4.40
6	Performing Stage	14.66 X 4.40
7	Hall	14.66 X 17.60
8	Admin Office	2.65 X 3.65
9	Mens Toilet	2.60 X 3.06
10	Ladies Toilet	2.60 X 3.06
11	Water Room	2.90 X 2.77
12	Equipment room	3.71 X 4.40
13	Library Hall	13.36 X 10.04
14	Computer Lab	13.13 X 12.16
15	Reading Room	13.36 X 12.16
16	Reception Area	13.13 X 14.27
17	Open Area for Reading	7.60 X 24.54

All Dimension are in Meter.

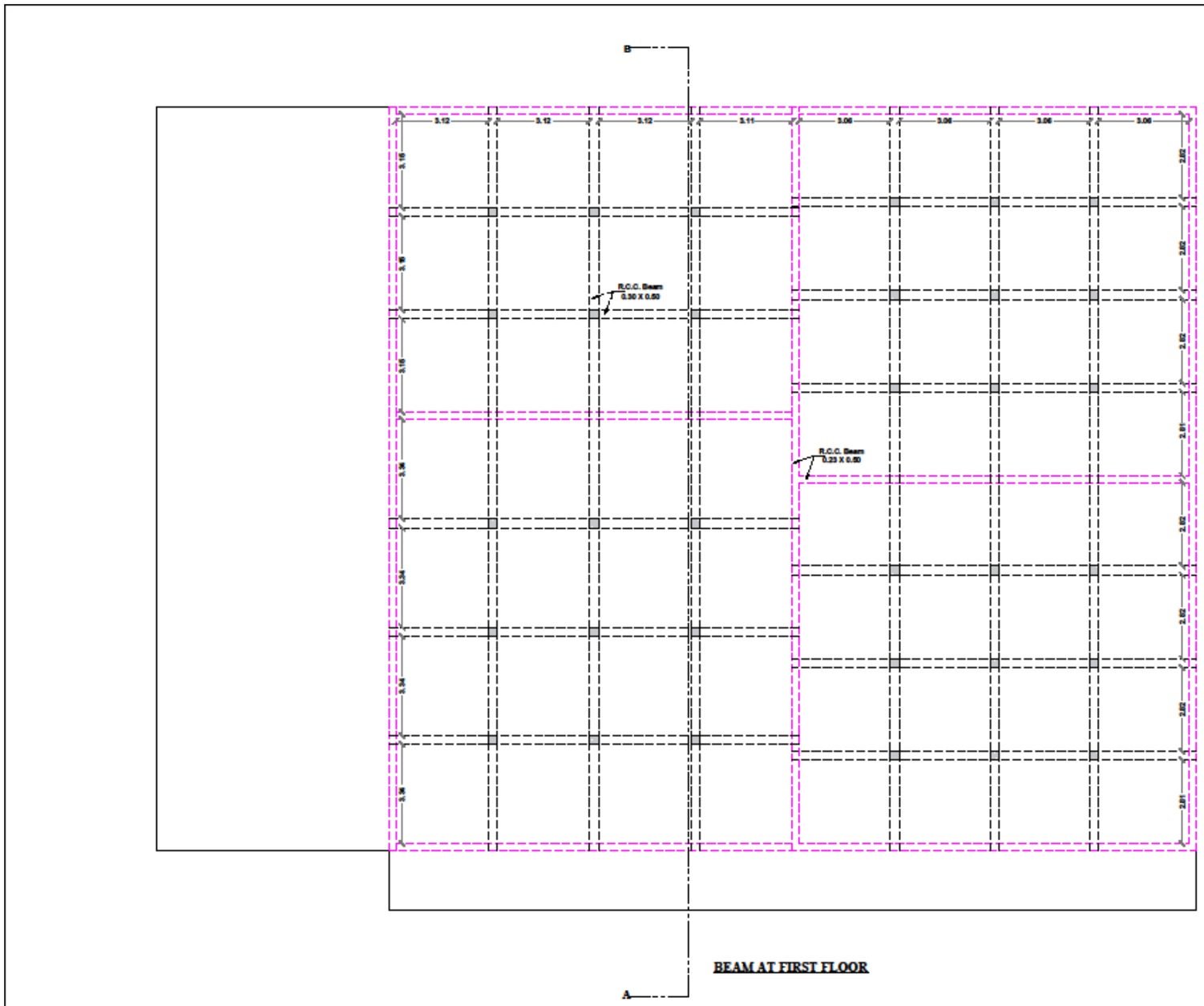
VISHVAKARMA YOJNA PHASE -8
VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT

TITLE : Layout of Comm. Hall & Library

SCALE : 1 : 100

DRAWN: JAYDEEP DEVANI
JAYRAJ PANSURIYA
DINESH BARAIYA

DRAWING NO. 4



BEAM AT FIRST FLOOR

PROPOSED COMMUNITY HALL CUM LIBRARY PLANS

TITLE:
PROPOSED COMMUNITY HALL CUM LIBRARY PLANS FOR STUDY PURPOSE AT VILLAGE : NAGAR PIPALIYA, TALUKA : LODHIKA, DISTRICT: RAJKOT FOR VISHVAKARMA YOJANA PHASE–8

N

Schedule of Opening

Sr. No.	Item	No. of Item	Size
1	M.D.	1	3.00 X 2.70
2	M.D.	2	3.00 X 2.10
3	D1	9	1.50 X 2.70
4	D2	2	0.90 X 2.70
5	D3	4	0.90 X 2.70
6	D4	2	0.90 X 2.25
7	D5	4	0.75 X 2.70
8	D6	6	1.50 X 2.10
9	W1	17	2.00 X 1.80
10	W2	2	1.20 X 1.80
11	W3	1	1.20 X 1.80
12	W4	19	2.00 X 1.20
13	V	10	0.60 X 0.60

Area Table

Sr. No.	Item	Size
1	Kitchen	7.46X 4.46
2	Dining Hall	7.46 X 16.46
3	Toilet 2 No.	1.04 X 2.04
4	Changing Room 2 No.	1.04 X 2.21
5	Dressing Room 2 No.	2.71 X 4.46
6	Performing Stage	14.66 X 4.43
7	Hall	14.66 X 17.00
8	Admin Office	2.66 X 3.66
9	Mens Toilet	2.60 X 3.66
10	Ladies Toilet	2.60 X 3.66
11	Water Room	2.60 X 2.77
12	Equipment room	2.71 X 4.46
13	Library Hall	13.36 X 10.04
14	Computer Lab	13.13 X 12.16
15	Reading Room	13.36 X 12.16
16	Reception Area	13.13 X 14.27
17	Open Area for Reading	7.60 X 24.54

All Dimension are in Meter.

VISHVAKARMA YOJNA PHASE -8

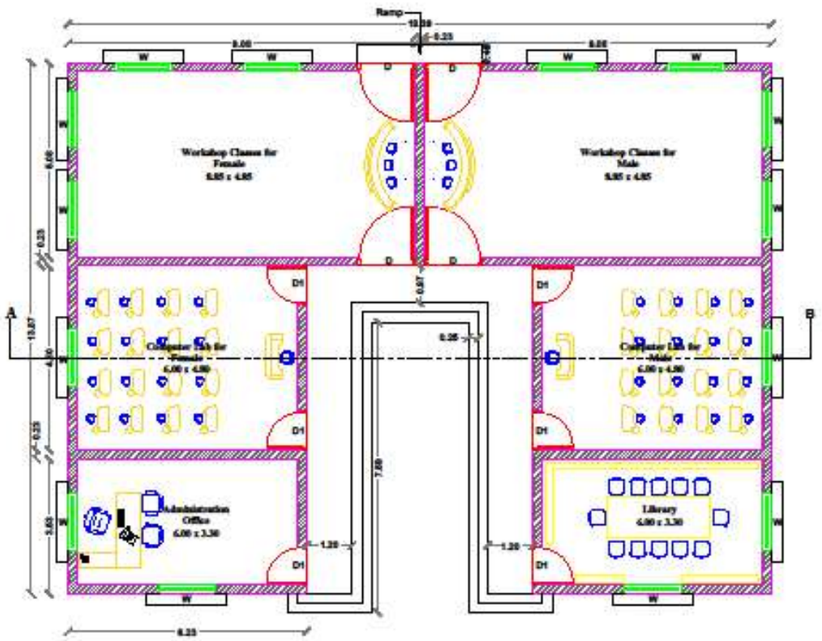
VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT

TITLE : Layout of Comm. Hall & Library

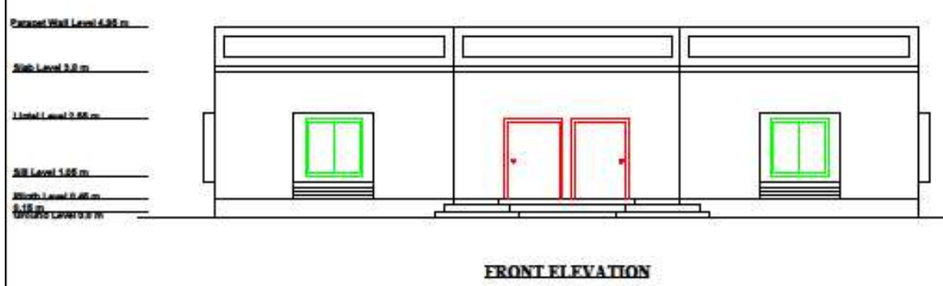
SCALE : 1 : 100

DRAWN: JAYDEEP DEVANI
JAYRAJ PANSURIYA
DINESH BARAIYA

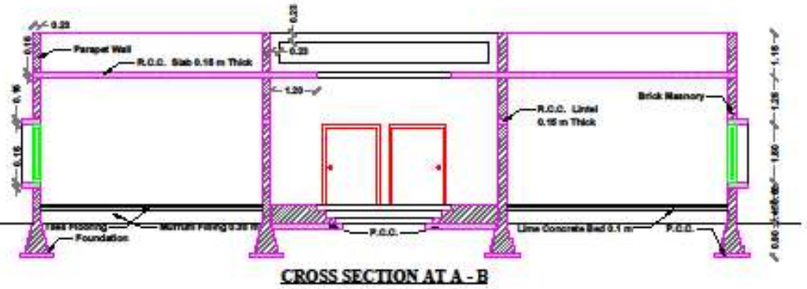
DRAWING NO. 4



GROUND FLOOR PLAN



FRONT ELEVATION



CROSS SECTION AT A - B

TITLE:
PROPOSED SKILL DEVELOPMENT CENTRE PLANS FOR STUDY PURPOSE AT VILLAGE : NAGAR PIPALIYA, TALUKA : LODHIKA, DISTRICT: RAJKOT FOR VISHVAKARMA YOJANA PHASE-8

Schedule of Opening

Sr. No.	Item	No. of Item	Size
1	D	4	1.00 X 2.10
2	D1	6	1.00 X 2.10
3	W	14	1.00 X 1.50

Area Table

Sr. No.	Item	Size
1	Men and Female Workshop-class 2 No.	6.85 x 4.85
2	Men and Female Computer Lab 2 No.	6.00 x 4.80
3	Administer Office	6.00 x 3.30
4	Libary	6.00 x 3.30

All Dimension are in Meter.

VISHVAKARMA YOJNA PHASE -8
VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT

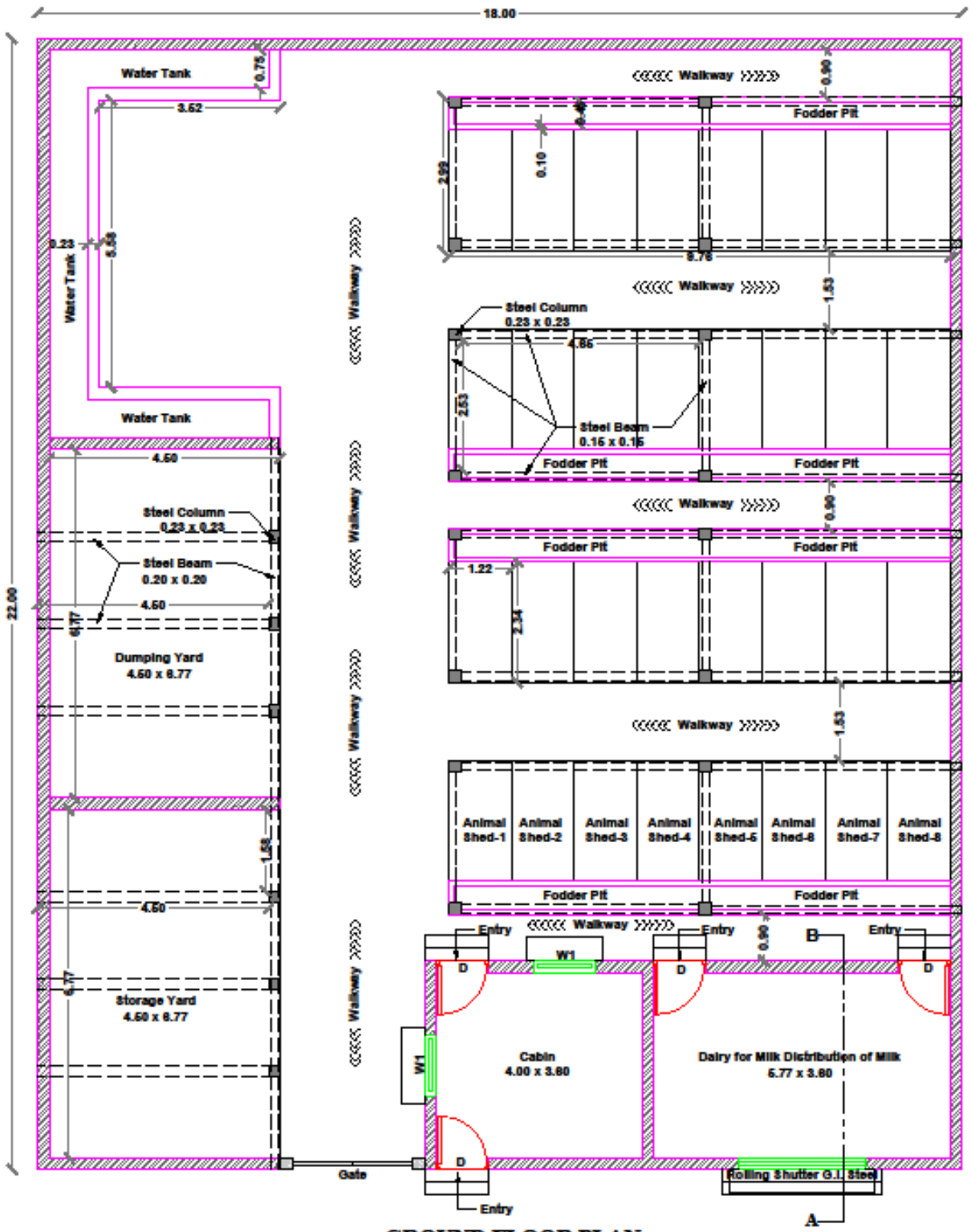
TITLE : Layout of Skill Development Cen.

SCALE : 1 : 100

JAYDEEP DEVANI
DRAWN: JAYRAJ PANSURIYA
DINESH BARAIYA

DRAWING NO. 5

PROPOSED SKILL DEVELOPMENT CENTRE PLANS



GROUND FLOOR PLAN

PROPOSED ANIMAL SHELTER PLANS

TITLE:
PROPOSED GRAM PANCHAYAT BUILDING PLANS FOR STUDY PURPOSE
AT VILLAGE : NAGAR PIPALIYA,
TALUKA : LODHIKA,
DISTRICT: RAJKOT
FOR VISHVAKARMA YOJANA PHASE~8

N

Schedule of Openings

Sr. No.	Iteam	No. of Iteam	Size
1	M.D.	1	1.50 X 2.10
2	D1	2	0.90 X 2.10
3	D2	2	0.75 X 2.10
4	W1	8	1.50 X 1.20
5	W2	2	1.20 X 1.20
6	V	2	0.60 X 0.60

Area Table

Sr. No.	Iteam	Size
1	Toilet 2no.	1.88 x 1.64
2	Store Room 2 No.	1.77 x 1.64
3	Sarpanch and Talati Mantry Office 2 No.	3.85 X 6
4	Waiting Area	7.53 X 2.64

All Dimension are In Meter.

VISHVAKARMA YOJNA PHASE -8

VILLAGE : NAGAR PIPALIYA
TALUKA : LODHIKA, RAJKOT

TITLE : LAYOUT OF GRAM PANCHAYAT

SCALE : 1 : 100

DRAWN: JAYDEEP DEVANI
JAYRAJ PANSURIYA
DINESH BARAIYA

DRAWING NO. 6