DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII

AN APPROACH TOWARDS RURBANISATION

Village: Ranol
District: Banas kantha

PREPARED BY

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NODAL OFFICERS NAME:

Dr. Ghanshyam Savaliya (Civil)
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Government Engineering College,
Palanpur

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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CERTIFICATE

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

Detail Project Report for,

VILLAGE: RANOL

DISTRICT: BANAS KANTHA

Under

Vishwakarma Yojana: Phase-VIII

in partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

during the academic year 2020-21.

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

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Date of Report Submission:	14th May 2021
Principal Name and Signature:	Dr. K. B. Judal
VY-Nodal Officer Name and Signature:	Dr. Ghanshyam Savaliya (Civil)
Internal (Evaluator) Guide Name and Signature:	Prof. H. N. Chaudhry (Electrical)
College Name:	Government Engineering College, Palanpur
College Stamp:	

ABSTRACT

The government of Gujarat has launched Vishwakarma yojana (scheme) for development of villages by identifying the requirements of villages. Under this scheme, the villages are surveyed and this project was identified and selected for implementation. Rurbanization is to bring peace of mind to the villagers by providing them the basic amenities required and still keeping the village soul intact. It is about finding out what the basic facilities are present and what can be provided to betterment of the village. The present resources are made to such a use that it gives its cent percentage usability with sustainability.

According to Census 2011 information the location code or village code of Ranol village is 507727. Ranol village is located in Dantiwada Tehsil of Banas Kantha district in Gujarat, India. It is situated 10km away from sub-district headquarter Dantiwada and 30km away from district headquarter Palanpur. The total geographical area of village is 520.15 hectares. Ranol has a total population of 1,343 peoples. There are about 248 houses in Ranol village.

The main aspects for development of this village are sewage, public toilets, community hall, etc. Some of the physical infrastructure like dairy, panchayat building, primary school, and well exist in the village and are properly maintained and utilized. More over Water tank is present but in bad condition. On the basis of survey data, we have observed that there are some physical infrastructures like water tank, dairy, primary school, etc. but among them some are not in usable condition which creates problems for villagers. Construction of roads are in better condition and usable. More such problems are identified and are to be designed and renovated in the project phases.

In part 1 on the basis of survey data, which we have collected from Ranol village and interaction with villagers, Sarpanch and Talati. we have finalized some designs for the further development of the village as, Community Hall, Pharmacy Store, ATM, Village entrance gate, Supermarket and Cybercafe. By introducing above mentioned amenities all the facilities can be made available to villagers which may reduce the migration. This will sustain the culture of cooperative living. Socioeconomic development will occur giving a sense of livelihood to the dwellers yet maintaining the essence of a village. And in part 2 we have decided some designs for future scope of the village development as, Rain water harvesting, Bank, Public garden, Solid waste management, Skill development center and Solar street lights and dustbins.

Key words: Development, Environment, Infrastructure, Rural Development, Village, Socioeconomical development

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.

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

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An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer, **Dr.Ghanshyam Savaliya and Prof. H. N. Chaudhry from college** for their invaluable guidance, constant inspiration and active involvement in our project work.

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We are also thankful to **Ms. Darshana Chauhan, Vishwakarma 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.

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
VY	Vishwakarma yojna
PHC	Primary health center
CHC	Community health center
RCC	Reinforced concrete structure
WBM	Water bound macadam
BM	Brick masonry
D	Door
V	Ventilator
W	Window
WC	Water closet
O	Opening
URDPFI	Urban and regional development plans formulation and implementation guidelines
GDP	Gross domestic product
SAGY	Sansad Adarsh gram yojana
GHG	Greenhouse gas
NH	National highway
SH	State highway
ODR	Other district roads
MDR	Major district roads
SBA	Swachh Bharat Abhiyan
SC	Schedule cast
ST	Schedule tribe
NGO	Non-governmental organization
SWOT	Strength, Weakness, Opportunity, Threats

Chapter 1. Ideal village visit from District of Gujarat State

1.1 Background & Study Area Location

As a part of Vishwakarma Yojana Project, we visited LAXMIPURA village in BANSKANTHA District & tried to observe the various parameters like important elements in village development like various infrastructure, economic and social growth & activities related to population, financial background, environmental sustainability, electricity, water supply, drainage network, waste management, educational facilities, mandals, trust, society etc.

We also met Sarpanch Ashok Chelabhai Patel gram panchayat of Laxmipura village and villagers. In Laxmipura village, the various infrastructures are there like primary School, Sewage system, Bank, PHC, Hospital, dudha mandali, anganvadi, hospital, Animal Hospital, Community hall, Temple, Playground, library, public toilet, public bathroom, RO plant for public use, overhead tank, sump, market, ATM, private clinic etc. are available in the village. RCC and Bitumen roads are there and 24 hour electricity available in village.

Laxmipura is a Locality in Palanpur City in Gujarat State, India. Akesan, Gathaman, Jagana, Lalawada, Sadarpur are the nearby Localities to Laxmipura. Laxmipura is a village located in Banas kantha district of Gujarat.

The Laxmipura Census Town has population of 7461 in which 1884 are males while 1746 are females as per report released by Census India 2011.

Table 1.1 Ideal Village: Laxmipura Overview

Laxmipura - Village Overview	
Gram Panchayat:	Laxmipura
Block / Tehsil:	Palanpur
District:	Banas Kantha
State:	Gujarat
Pin code:	385001
Population:	7,461
Households:	1,596
Assembly Constituency:	Palanpur
Parliament Constituency:	Palanpur

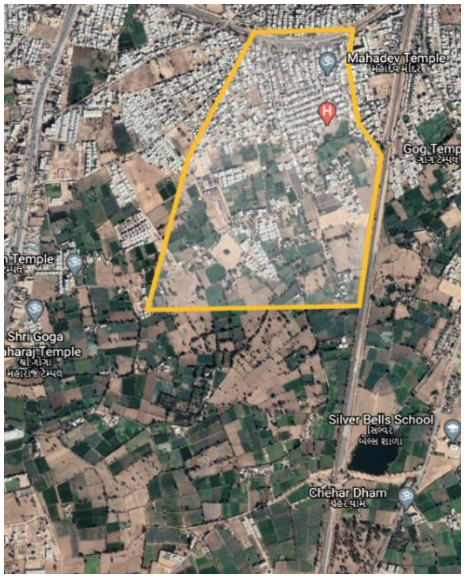


Figure 1.1 Satellite map of Laxmipura

Table 1.2 Population of Laxmipura Village as per senses 2011

Total Population	Male Population	Female Population
7461	3852	3609

1.2 Concept: Ideal Village, Normal Village

1.2.1 Objectives

- Prevent distress migration from rural to urban areas, which is a common phenomenon in India's villages due to lack of opportunities and facilities that guarantee a suitable standard of living.
- Basic Physical Infrastructure – Water Supply, Transport, Sewerage and Solid Waste Management should be the priority focus and be provided.
- Basic Social Infrastructure – Health and Education facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such village.
- Internal roads with in village settlement, Efficient Mass Transportation systems to improve connectivity between urban and rural areas, Public transportation facilities than need to be developed like bus stops, transport depot etc.
- Identification of sanitation facilities that need improvement – sewerage and drainage line for household connection, door to door solid waste collection & dumping facilities.
- Electricity connections like street lighting that is energy efficient and ecofriendly.
- Refurbishing of village lakes, water tanks and wells, construction of rain water harvesting structures for sustainable Development.
- Repair & maintenance of Existing Public Buildings like Gram Panchayat, Public Library, School Buildings, Health Center, Public Toilet Block & Other.

1.2.2 Live Case studies of ideal village of India/Gujarat

Mawlynnong - Asia's cleanest village

Mawlynnong, located in Meghalaya, is called "God's own Garden" and has enough reasons for that. It was awarded the title "cleanest village in Asia" by *Discover India* in 2003. Cleanliness must be its most important aspect, but it has achieved so much more than that. From a full hundred percent literacy rate to a highly progressive scenario for women, it has struck all the correct chords.

Located 90 kms from Shillong, the village offers a sky walk for you to take in the beauty as you explore it. According to visitors, you cannot find a single cigarette butt/plastic bag lying around there.

Punsari

Located in Gujarat's Sabarkantha district, Punsari village has emerged as a model village with modern urban amenities such as 24X7 power supply, WiFi connectivity, CCTV cameras to ensure security, and pucca roads connecting the village with other villages and towns. Other important features of the village include: A reverse osmosis plant which supplies 20 litres of water to each household at Rs 4, Use of solar power for agricultural purposes, Accidental

Insurance cover to one member of every household, Air-conditioned primary schools with no dropouts, Bus facility for all households, Focus on behavioral change through campaigns and awareness drives. For this purpose, 120 loudspeakers have been installed in different parts of the village. Punsari was awarded with the Best Gram Panchayat Award from the Center and the State in 2011.

Hiware Bazar – The village of 60 millionaires

This is a village located in the rain shadow region of the Sahyadri mountain range in Maharashtra's Ahmednagar district. Till the 1980s, farming in the village was largely rainfed, and farmers were forced to migrate seasonally to surrounding areas for work. From the 1990s onwards, things began to change. The village Panchayat adopted a holistic focus on a variety of activities, with community groups responsible for various aspects of the village economy and social development. Women thrift groups, Milk Dairy Society and Youth Clubs are examples of such community-based organizations. The village Panchayat also focused on family planning and reforestation, for which awareness programs and drives have frequently been organized in the village. The village Gram Sabha also launched a watershed development programme, and an annual water audit is being conducted in the village since 2004 for more efficient and equitable management of water resources. It has also contributed to greater agricultural productivity. Today, the village is considered a model for community-led, multi-sectoral growth of rural parts of the country.

Dharnai- First fully Solar-powered village

Dharnai is a small village with 2400 people. Located near Bodh Gaya in Bihar's Jehanabad district, it didn't have access to electricity. But a few years ago, the villagers took things in their own hands and changed their fate forever. With the help of Greenpeace, the village installed a solar-powered micro-grid, which provides 24×7 electricity to more than 450 households and 50 commercial establishments. The entire project cost them 3 crores, making Dharnai India's first first fully solar powered village.

Ankapur- Telangana

Ankapur is located in the Nizamabad district in the state of Telangana. Ankapoor has been globally recognized as a "Model Agricultural Village" for its achievements in introducing modern technologies in agriculture while ensuring the participation of all sections of the village community, particularly women. Organizations like the Indian Council for Agricultural Research (ICAR), International Rice Research Institute (IRRI), Manila and International Crops Research Institute for the Semi-arid Tropics (ICRISAT) have formally commended the developments in agriculture in the village.

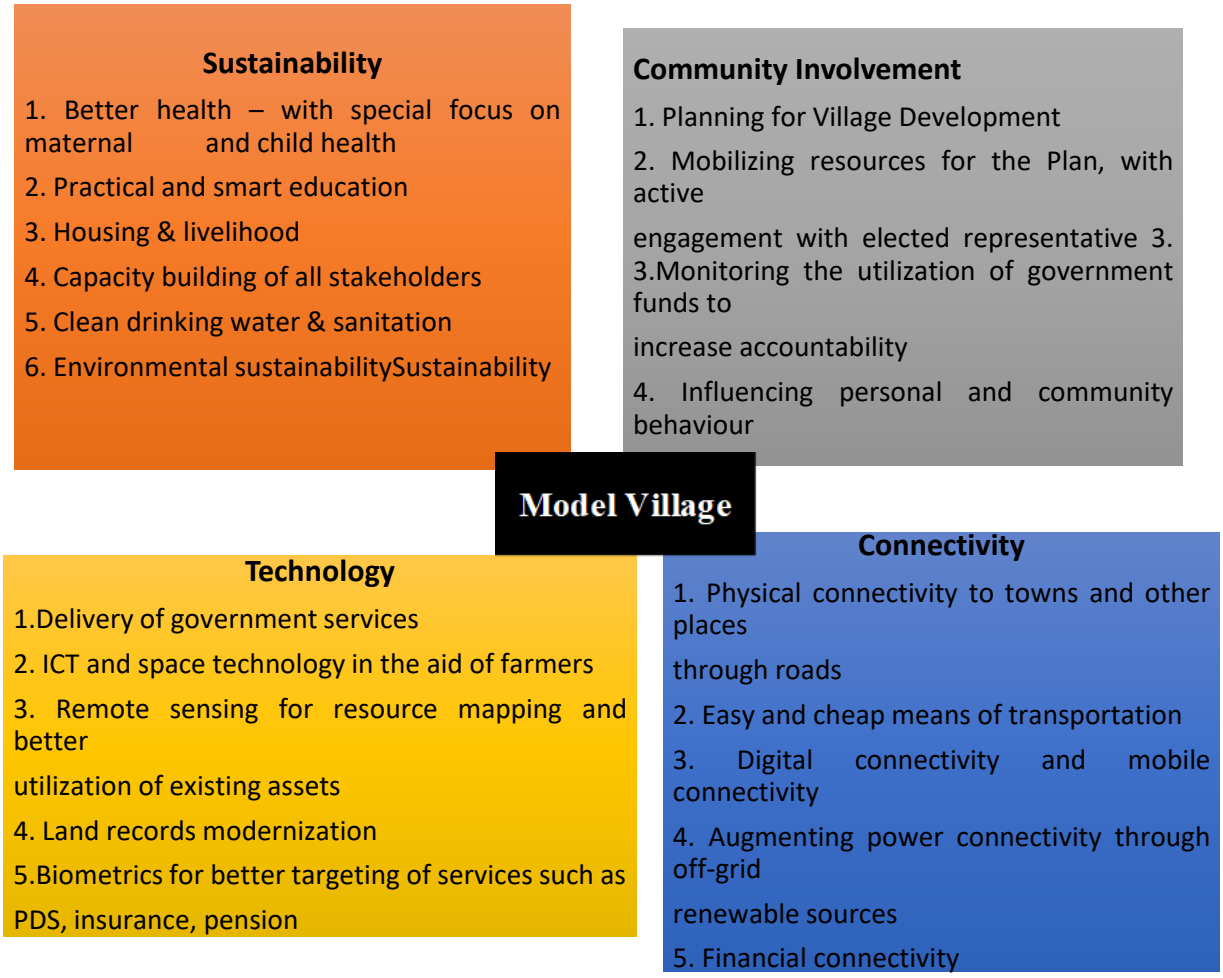
Some of the important features of the agricultural model of the Ankapoor include: Peasant Association of the village coordinates various agricultural interventions, The decision making process is inclusive and based on consensus-building. Women have a dominant role in the utilization and supervision of labour, Focus on new sources of income, such as commercial cultivation of seeds, scientific crop rotation techniques, Village market yards facilitate the sale of agriculture produce with minimal wastage. Since agriculture accounts for almost the entire economic output from many villages in India, participatory agriculture, with equal focus on irrigation, watershed management and technology-led cultivation should be the way forward.

Kumbalangi village, Kerala – a model for eco-tourism

Kumbalangi is essentially a fishing hamlet which has been developed as a unique rural tourist destination in Kerala's Ernakulam district. The Kumbalangi Integrated Tourism Village Project was launched in 2004, with a focus on ecotourism, while offering tourists a glimpse of the rich and rustic life of the Indian countryside. The important attractions in Kumbalangi include organic farm produce used to prepare meals for tourists, toddy tapping and crab farming. To keep the village clean and serve its energy needs, households are also provided subsidies for setting up mini biogas plants in their households.

The Kumbalangi approach could be adopted by other coastal villages to boost tourism and provide livelihood to local communities

1.2.3 The Idea of a model/Smart Village



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

In the past, villages were a usual form of community for societies that practice subsistence agriculture, and also for some non-agricultural societies. In many cultures, towns and cities were few, with only a small proportion of the population living in them. The Industrial Revolution attracted people in larger numbers to work in mills and factories; the concentration of people caused many villages to grow into towns and cities. This also enabled specialization of labor and crafts, and development of many trades. The trend of urbanization continues, though not always in connection with industrialization.

"The Soul of India lives in its Villages", declared M.K. Gandhi at the begging of 29th century. According to the 2011 census of India, 68.84% of Indians (around 833.1 million people) live in 640,867 different villages. The size of these villages varies considerably. 236,004 Indian villages have a population of fewer than 500, while 3,976 villages have a population of 10,000+. Most of the villages have their own temple, mosque, or church, depending on the local religious following. India offers astounding variety in virtually every aspect of social life. Diversities of ethnic, linguistic, regional, economic, religious, class, and caste groups crosscut Indian society, which is also permeated with immense urban-rural differences and gender distinctions.

1.3 Detail study

Objectives of Ideal village

- A Laxmipura village has the following important objectives:
- Prevent distress migration from rural to urban areas, which is a common phenomenon in India's villages due to lack of opportunities and facilities that guarantee a suitable standard of living.
- Basic Physical Infrastructure – Water Supply, Transport, Sewerage and Solid Waste Management should be the priority focus and be provided.
- Basic Social Infrastructure – Health and Education facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such village.
- Internal roads with in village settlement, Efficient Mass Transportation systems to improve connectivity between urban and rural areas, Public transportation facilities that need to be developed like bus stops, transport depot etc.
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- Refurbishing of village lakes, water tanks and wells, construction of rain water harvesting structures for sustainable Development.
- Repair & maintenance of Existing Public Buildings like Gram Panchayat, Public Library, School Buildings, Health Center, Public Toilet Block & Other.

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. Village tree plantation drives could encourage a 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.

Resources available in Laxmipura village

There are sufficient facilities which required for a better life are available like library, bank, ATM, Hospitals, Milk Co-operative society, Anganvadi, PHC center, Animal Hospital, Transportation Facilities, market, Religion infrastructure, RO drinking water, Overhead and underground water tank, public toilet and bath facilities, daily tiffin service, etc. available in village.

Physical and demographical growth

Laxmipura is a Census village in district of Banskantha, Gujarat. The Laxmipura Census Town has population 7461 in which 3852 are males while 3609 are females as per report released by Census India 2011.

Economic profile

Economic background of Laxmipura village is strong because here maximum people involved with agricultural activities and other have a job and own business.

Social scenario /profile

Patel, brahman, kumbhar, suthar cast people are live in this village.

Social infrastructure facility

Public health center, Privet clinic and hospitals, Anganwadi, primary school, secondary and higher secondary school, Community Hall, Public library, Well defined village planning, Religious place, Overhead and underground water tank, RO Drinking Water Plant, Market shops, Play Ground, Road connectivity etc.

Other facilities

Telecommunication network, General Market, Panchayat building, Banks & ATM, Milk co-operative society, Solar street light & LED street lig

Figure 1.6 Entry Gate of Laxmipura

Figure 1.5 Over head tank

Figure 1.4 PHC center

Figure 1.3 Drinking water tap

Figure 1.2 Milk Dairy

Figure 1.7 Gramin Bank

Figure 1.12 Primary School

Figure 1.11 Library

Figure 1.10 Market

Figure 1.15 Community hall

Figure 1.9 Animal Hospital

Figure 1.8 Public Bath rooms

Figure 1.14 Panchayat Office

Figure 1.13 ATM

1.4 SWOT analysis of Ideal village / Smart Village

SWOT analysis (or SWOT matrix) is a strategic planning technique used to help a person or organization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. This technique, which operates by 'peeling back layers of the company' is designed for use in the preliminary stages of decision-making processes and can be used as a tool for evaluation of the strategic position of organizations of many kinds (for-profit enterprises, local and national governments, NGOs, etc.). It is intended to specify the objectives of the business venture or project and identify the internal and external factors that are favorable and unfavorable to achieving those objectives. Users of a SWOT analysis often ask and answer questions to generate meaningful information for each category to make the tool useful and identify their competitive advantage. SWOT has been described as the tried-and-true tool of strategic analysis, but has also been criticized for its limitations

S- Strengths:

High growth rate, Employment, Door to door Collection of waste, Strong infrastructure, Educational facilities availability up to Higher secondary level.

W- Weakness:

Less sustainable ecofriendly environment in terms of capacity to green development in future.

O- Opportunities:

Involvement of government-initiated health program, WIFI spots development, Developed green Infrastructures Tech., Solar Panels, Waste Recycle Development of special agricultural programs to various new techniques, Sustainable ecofriendly structure, Rain water harvesting, Energy efficient buildings

T- Threats:

Very less sustainability to environment in future

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

- Development of physical as well as social.
- Improved network of physical infrastructure facilities such as well-built irrigation, rail links, power and telecommunications, information technology, food storage, cold chains, market-growth cand centers, processing of produce and social infrastructure support, viz., health and education, water and sanitation, and veterinary service and co- operatives are essential for the development of the economy, especially in the era of liberalization, privatization and globalization.
- Development of industry in village related to agriculture.
- Development cottage industry and allied sectors.
- Setting up parks in rural areas with special emphasis on cleaning.

- Vermiculture composting.
- Provision of electricity through solar photo-voltaic.
- Hundred present brick pavement of village streets with mechanized prefabricated bricks, with due attention to disposal of storm water.
- Integrated water supply and sewerage disposal system.

1.6 Benefits of the visits of Ideal village / Smart Village

- Example for set up a village development project.
- To get insight into the socio-economic and cultural realities of rural life.
- Can able to know different types of the facilities infrastructure likes Physical social; social cultural sustainable and repair and maintenance related and also know about the basic facilities about the village which have to provide for every poor villages.
- Got information related various amenities from gram panchayat

1.7 Electrical aspects required in Ideal village / Smart Village

Smart villages will be connected to towns and cities through information and communication technologies (ICT) enabled by access to energy. Such technologies will enhance education and health services by providing links to the world's knowledge base and opportunities for distance learning, as well as supporting initiatives in m-health (mobile health, also known as telemedicine). Connectivity will also open up participation in governance processes at local, regional and national levels.

Education

Smart villages aim to increase the time available for students to study and will address prevalent factors that negatively affect the ability of students to acquire the knowledge and skills necessary to achieve economic goals and improve labour productivity. These include eliminating the need to spend time collecting traditional biomass, reducing respiratory illness caused by indoor air pollution, and ensuring that lighting is both safe and of sufficient quality.

ICT-equipped schools will provide a good level of access to the internet and consequently the world's knowledge base, ending the information isolation experienced by many rural communities. New opportunities will be generated for distance and adaptive learning, reducing the need to move to towns or cities to achieve higher levels of education. In addition, ICT and internet access also have a "pull factor", providing incentives for school attendance and for attracting and retaining good teachers.

Health

ICT-enabled m-health initiatives will enable mobile health diagnostic solutions, requiring relatively low levels of local medical skill and providing access to specialist health-care services based in urban communities where necessary. Epidemiological data will be gathered, providing the opportunity for more effective interventions and early warning capability in case of outbreaks of contagious diseases

Quality of life

Through the provision of modern energy, smart villages will have a transformative impact on villagers by alleviating the drudgery of repetitive tasks that is pervasive in many lives in rural communities. This will save time and effort, and villagers will be able to enjoy entertainment

through radio, television and the internet. Public lighting at night will mean that people, particularly women, can enjoy social interaction without fear of danger.

Smart Weather and Irrigation

Accurate weather information can be of great use to the people of the village. As we know, the majority of population in villages engages in agriculture for their living. The use of environmental sensors to predict weather forecasts can help the farmers to a large extent. Many farming activities like sowing, irrigation and harvesting depend on the weather. Smart irrigation systems can make use of sensors in the fields and remote satellite data to ensure the optimal use of available water resources.

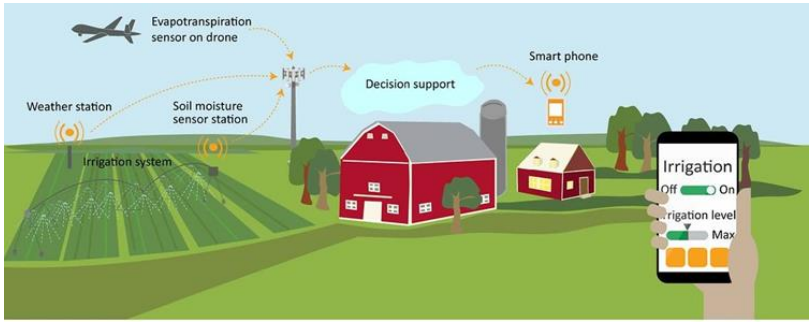


Figure 1.16 Smart Weather Irrigation

Table 1.3 Electrification technology options for smart village

Technology	Generation capacity (kW)	Energy sources	Services available
Pico-power systems	0.001–0.01	Solar PV	Lighting, radio communication reception, two-way mobile communication
Stand-alone home systems	0.01–1	Solar PV	Same as above plus additional lighting and communication, television, fans, limited motive and heat power
Micro/minigrids	1–1,000	Hydro, wind, solar PV, biomass, diesel, hybrid combinations	Same as above plus enhanced motive and heat power, and ability to power community-based services
Regional grid connection	1,000–1,000,000	Fossil fuel, hydro, wind, solar PV, biomass, geothermal	Assuming high quality of connection, same as above up to a full range of electric power appliances, commercial and industrial applications

Chapter 2. Literature Review

2.1 Introduction: Urban & Rural village concept

Urban:

A settlement where the population is very high and has the feature of a built environment is known as Urban. City, towns, conurbations are examples of urban and this term is can't be extended to villages and hamlets. It includes Non-agricultural work, i.e., trade, commerce or provision of service.

Urbanization also includes having more advanced technology and science, where hospitals have more advanced machineries and people have smart-phones, tablets, etc. It also has a higher employment rate compared to rural area. An urban area is the region surrounding a city. Most people of urban areas have non-agricultural jobs. Urban areas are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways. "Urban area" can refer to town's cities, and suburbs.

Rural:

Rural area is defined as the area in which 75% or more male population is engaged with agricultural Activity. According to the planning commission a town with a max. population of 15,000 is considered rural in nature. In these areas the panchayat makes all the decisions. In rural areas, agriculture is the chief source of livelihood along with fishing, cottage industry, pottery, etc. It has a very low population density.

2.2 Importance of the Rural development

- Rural development is important not only for the majority of the population residing in a rural area but the growth of rural activities is necessary to stimulate the speed of overall economic expansion of the nation.
- Rural development is pretended to be noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy trying to obtain improved rural creation and productivity, higher socio-economic equality, and ambition, stability in social and economic development.
- The primitive task is to decrease the famine roughly about 70 percent of the rural population, implement sufficient and healthy food. Later, serve fair equipment of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

- A rural area is an area or a land that has lower residential density or other buildings, and with lower population density generally with lower or backwardness in facilities, low literacy rate in comparison to city or any other urban area as per conventional Indian context rural area has following characteristics and problems.
- An urban area is the region surrounding a city. Most inhabitants of urban areas have non-agricultural jobs. The population density is quite high. Urban areas are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways. “Urban area" can refer to towns, cities, and suburbs. An urban area includes the city itself, as well as the surrounding areas. Many urban areas are called metropolitan areas, when two or more metropolitan areas grow until they combine, the result may be known as a megalopolis.

- Lower literacy, educational achievements and vocational education
- Lower standard of living, Lower aspirations and less amenities and services
- 75% or more male population is engaged with agricultural activity.
- Migration for search of job and better facilities.
- Less health infrastructure leading to higher death rate.
- Lower income groups.

Village:

A Village is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand. It is generally larger than a "hamlet" but smaller than a "town".

Village has following characteristics

- Village can have population between 500 to 10000 inhabitants.
- The villagers managed their own affairs through the traditional institution of Panchayat. The central government had neither the inclination nor the means for interfering with the self-government of villages.
- Village has the atmosphere of simplicity, calmness and peace prevailing therein. There is no noise and little sophistication.
- Generally, the women in villages are not much educated and their social status is lower than that of their counterparts in the towns. Factors like prevalence of child marriage, joint family system, traditional ideals, old values and lack of education among females are responsible for the low status of women.

2.4 Scenario: Rural / Urban village of India population Growth

India:

- According to the census reports of Indian Census 2011, is given bellow.
- Urban and Rural Population of India:
- According to the provisional data released by Census India, these are some of trends of Urban and Rural Population of India.
- Rural Population in India: 68.84%
- Urban Population in India :31.16%
- Level of urbanization increased from 27.81% in 2001 Census to 31.16% in 2011 Census

2.5 Scenario: Rural / Urban village of Gujarat as per Census 2011 and latest

Gujarat Rural Population 2011:

Out 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%.

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 %

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.

2.6 Rural Development Issues - Concerns - Measures

Crime free / Dispute free

Poverty is largely a rural problem. More than 75 percent of the world's poor live in rural areas and a majority of the poor will continue to live in rural areas well into the 21st century. Although internationally comparable statistics on rural poverty are limited, it is clear that in virtually all developing countries, the rural poor outnumber the urban poor, often by a factor of two or more.

- There for to make crime free rural areas it should be developed.
- There are some of issues and concerns are shown below

- Water problem
- Sewage system

- Lower education
- Poor Health services
- Migration to urban areas
- Lower living standards
- No transportation facility
- Less awareness
- Less income opportunity

Resources
Following are the resources concerned with rural development.

- Covered drainage
- Primary school
- Batter roads (pakka roads)
- Proper solution for villager's issue.

Literacy
Due to poverty more than 75% peoples live in rural regions which directly affects to literacy rate of India, corruption is other factor due to which people from rural area migrates to urban region and doesn't get their benefits, which result in more % of illiteracy.

Literacy and poverty bring down the, development of the rural areas as people, can't easily accept the new technology and thus many schemes by government doesn't seems to worked out in many aspects.

Health / hygiene
In rural areas due to less use of public toilets and poor mentality there are more chances of spreading disease's and if village has lower population than they suffer due to non- ability of PHC center.

Woman Empowerment
In villages now in 21st century peoples are believing to educate girl child even in village areas, which must. They are supported by different sectors too. Gram panchayat also provides financial support to them. At present in every town in Anand district Sarpanch of the villages are Woman candidates. Hence it's been good sight point for woman Empowerment.

Any other
The financial, manpower and, managerial resources devoted to the implementation of rural development programmers are completely insufficient.

Better implementation, of rural growth programmers can be ensured only, if those accountable for actual implementation are, paid reasonably well, appropriately trained, and adequately motivated. But this has not been done as yet.

2.7 Various infrastructure guidelines with the Norms for Villages for the provisions of different infrastructure facilities

Infrastructure is the basic requirement of economic development of rural village area.

Types of infrastructure facilities:
Physical infrastructure facilities
Social infrastructure facilities
Socio-Cultural infrastructure facilities
Sustainable infrastructure facilities

Physical infrastructure facilities:

The Physical infrastructure consists of a broad array of system and facilities required for economic development at a higher community level.

It includes various facilities as follows:
Water and Sanitation Infrastructure - E.g.: Water Supply Systems, Sewage treatment systems
Telecommunication Infrastructure – E.g.: postal and telecommunication services
Transportation Infrastructure - E.g.: Roads, Bridges, Airports, Ports, Waterways
Energy Infrastructure – E.g.: Dams, power plants, power distribution and transmission facilities, pipelines

Social infrastructure facilities:

Social Infrastructure is a subset of the infrastructure sector and typically includes assets that accommodate social services. As set out below, examples of Social Infrastructure Assets include schools, universities, hospitals, prisons and community housing etc.

It includes; Medical facilities, Education facilities, State or Council and defense force housing, Civic and Utilities, Transport

Socio-Cultural infrastructure facilities:

These infrastructures are Social and cultural facilities mixed together to give a holistic approach to looking at both the non-material cultural constructs – such as faith, value systems – and the social structures – such as political organizations, civil organizations, educational systems etc – and how the two interact.

It includes; Religion buildings: Mandir, Masjid, Church etc., Auditorium, Garden, Library, Playgrounds, Community halls

Sustainable infrastructure facilities:
Sustainable infrastructure is dynamic conceptual infrastructure which allows environment and infrastructure facility to survive with consideration of natural resources and its limitations, renewability in relation with present and future aspects.

It includes; Rain water harvesting and ground water recharge, Biogas plant, Recycling of waste like in composting, Green roofs, Photovoltaic panel and Solar Street lights

Provision and norms for infrastructure facilities are,
URDPFI - URBAN AND REGIONAL DEVELOPMENT PLANS FORMULATION AND IMPLEMENTATION (URDPFI) GUIDELINES from Town and Country Planning department
GDCR: General Development Control Regulations

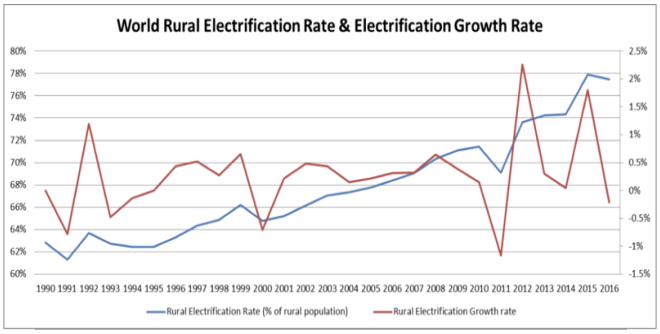
Table 2.1 Infrastructure Guidelines

Infrastructure facilities	Population
Community room	One for 5,000 population
Community hall and library	One for 15,000 population
Recreational club	One for one lakh population
. Music, dance and drama center	One for one lakh population
Meditation and spiritual center	One for one lakh population
Socio-cultural center	One for 10 lakhs population

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

Rural electrification with the use of renewable energies or hybrid systems improves individual quality of life, facilitates community services such as health and education (consumption use) and enables business entities to carry out professional activities (productive use) for rural populations. All of these benefits are possible without creating unintended negative consequences for local ecosystems and the global climate.

Energy is: "…the golden thread that connects economic growth, social equity and an environment that allows the world to thrive." (UN, 2012) as eloquently described by UN Secretary General, Ban-Ki-moon. Rural electrification is thus key for the socio-economic.



Rural electrification is the process of bringing electrical power to rural and remote areas. Rural communities are suffering from colossal market failures as the national grids fall short of their demand for electricity.

Electrification typically begins in cities and towns and gradually extends to rural areas, however, this process often runs into obstacles in developing nations. Expanding the national grid is expensive and countries consistently lack the capital to grow their current infrastructure. Additionally, amortizing capital costs to reduce the unit cost of each hook-up is harder to do in lightly populated areas (yielding higher per capita share of the expense).

If countries are able to overcome these obstacles and reach nationwide electrification, rural communities will be able to reap considerable amounts of economic and social development.

This graph shows the world rural electrification rate along with the electrification growth rate from 1990-2016 and synthesizes data from the World Bank

Social and economic benefits

Education :- Students who were previously forced to study when the sun was shining are now able to study by the light of LEDs early in the morning or late into the night.

Productivity and efficiency :- Businesses will be able to keep their doors open for longer and generate additional revenues. Farmers will have access to streamlined modern techniques such as irrigation, crop processing, and food preservation

Healthcare improvements :- The availability of electricity can drastically increase the quality of healthcare provided. Improved lighting increases the time patients can come and get treatment. Refrigerators can be used to conserve incredibly valuable vaccines and blood. Sterilization measures will be improved and the implementation of high tech machines such as x-rays or ultrasound scanners can provide doctors and nurses the tools they need to perform

Reduce isolation and marginalization through telephone lines and Television
Improve safety with the implementation of street lighting, lit road signs.
Reduce expenses on expensive fossil fuel lamps.

Due to villages geographical location and relatively low aggregate demand, expanding the nationwide grid to rural areas is expensive and challenging. Renewable energy based mini grids are less dependent on larger-scale infrastructure and can be implemented faster and cheaper.

The following technologies are used extensively :- Photovoltaics, Wind mechanical water pumps, Small wind electric, Diesel solar hybrid power systems: especially for telecommunications, Bioenergy development of non-urban regions in developing and emerging countries.

2.9 Other Projects / Schemes of Gujarat / Indian Government

The aim of the scheme is to integrated development of the selected villages so that they have all required physical and social infrastructure for an all round socio-economic development. Another objective of the plan is elimination of disparity between SCs and other communities in terms of common socio-economic indicators such as literacy rate, completion rate of elementary education, infant mortality rate/maternal mortality rate and ownership of productive assets.

In the past "government as provider" approach, the priorities were to secure budget allocations and develop projects. The Housing Policy and the NCU statement implicitly give higher priority to two other requirements: first, the reform of policies and regulations that now inhibit development initiatives by the people; and second, more efficient resource management and the building of institutional capacity.

Resource Management and Institutional Development. As discussed in Section 5, India's urban institutions do not have the capacity to provide adequate services at present, let alone address the requirements of accelerated urban growth in the future. Proposals relate to three types of institutions.

Pradhan Mantri Adarsh Gram Yojana (PMAGY) :
The aim of the scheme is to integrated development of the selected villages so that they have all required physical and social infrastructure for an all round socio-economic development. Another objective of the plan is elimination of disparity between SCs and other communities in terms of common socio-economic indicators such as literacy rate, completion rate of elementary education, infant mortality rate/maternal mortality rate and ownership of productive assets.

Sarva Shiksha Abhiyan:

- Focus on elementary education of satisfactory quality with emphasis on education for life.
- Bridge all gender and social category gaps at primary stage by 2007 and at elementary education level by 2010.

Sansad Adarsh Gram Yojana:
- Creating models of local development which can be replicated in other villages.
- The development of model villages, called Adarsh Grams, through the implementation of existing schemes, and certain new initiatives to be designed for the local context, which may vary from village to village.

Pradhan Mantri Jan-Dhan Yojana:
- Pradhan Mantri Jan-DhanYojana (P.M.J.D.Y), Prime Minister's People Money Scheme is India's National Mission for Financial Inclusion to ensure access to financial services, namely Banking Savings & Deposit Accounts, Remittance, Credit, Insurance, Pension in an affordable manner.

Following are schemes invented for development of Rural areas

National Rural Livelihood Mission: It is mean to eradicate poverty by 2014-15.

National Food Security Scheme: On the pattern of MNREGS, the central government is trying hard to bring a bill in the monsoon session (2013) to provide guarantee for food to the poor people, although it has already issued an ordinance in this regard

Other Project Schemes
- Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS)
- Atal Pension Yojana
- Pradhan Mantri Suraksha Bima Yojana

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.

Indira Awas Yojana:

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

Jawaharlal Nehru National Urban Renewal Mission (JNNURM):

It was launched on 3rd December, 2005. The main objective of this scheme was fast track development of cities across the country. It was focused especially on developing efficient urban infrastructure service delivery mechanism, community participation and accountability of urban local bodies and other agencies towards citizen.

Rajiv Awas Yojana (RAY):

This program was announced in June 2009 with an objective to make the country slum-free.

National Rural Health Mission:

It was launched to make basic health care facilities accessible to the rural people.

Although governance has been defined variously by different people depending upon the context and perspective, there is agreement over the broad elements ofgovernance namely, • the process whereby elements in society wield power and authority, and influence and enact policies and decisions concerning public life, and economic and social development, • the capacity of governments to manage resources efficiently and to formulate, implement, and enforce sound policies and regulations

Following are projects by govt. for development.

Pradhan-Mantri Awas Yojna

Pradhan MantriGraminAwaasYojana (PMGAY), previously Indira AwaasYojana (IAY), is a social welfare flagship programme, created by the Indian Government, to provide housing for the rural poor in India. A similar scheme for urban poor was launched in 2015 as Housing for All by 2022. Indira AwaasYojana was launched by Rajiv Gandhi, the then Prime Minister of India, as one of the major flagship programs of the Ministry of Rural Development to construct houses for BPL population in the villages. Under the scheme, financial assistance worth ₹70,000 (US$1,100) in plain areas and ₹75,000 (US$1,200) in difficult areas (high land area) is provided for construction of houses. The houses are allotted in the name of the woman or jointly between husband and wife. The construction of the houses is the sole responsibility of the beneficiary and poverty.

Engagement of contractors is strictly prohibited. Sanitary latrine and smokeless challah are required to be constructed along with each IAY house for which additional financial assistance is provided from "Total Sanitation Campaign" and "Rajiv Gandhi Grameen Vidyut Karan Yojana" respectively. This scheme, operating since 1985, provides subsidies and cash-assistance to people in villages to construct their houses, themselves.

Atal Pension Yojana

This scheme is related to Social Sector Scheme pertaining to Pension Sector.

In Atal Pension Yojana, for every contribution made to the pension fund, The Central Government would also co-contribute 50% of the total contribution or ₹1,000(US$16) per annum, whichever is lower, to each eligible subscriber account, for a period of 5 years. The minimum age of joining APY is 18 years and maximum age is 40 years. The age of exit and start of pension would be 60 years. Therefore, minimum period of contribution by the subscriber under APY would be 20 years or more.

Digital India Program

Digital India is a campaign launched by the Government of India to ensure that Government services are made available to citizens electronically by improved online infrastructure and by increasing Internet connectivity or by making the country digitally empowered in the field of technology.

Pradhanmantri ujjwala yojana

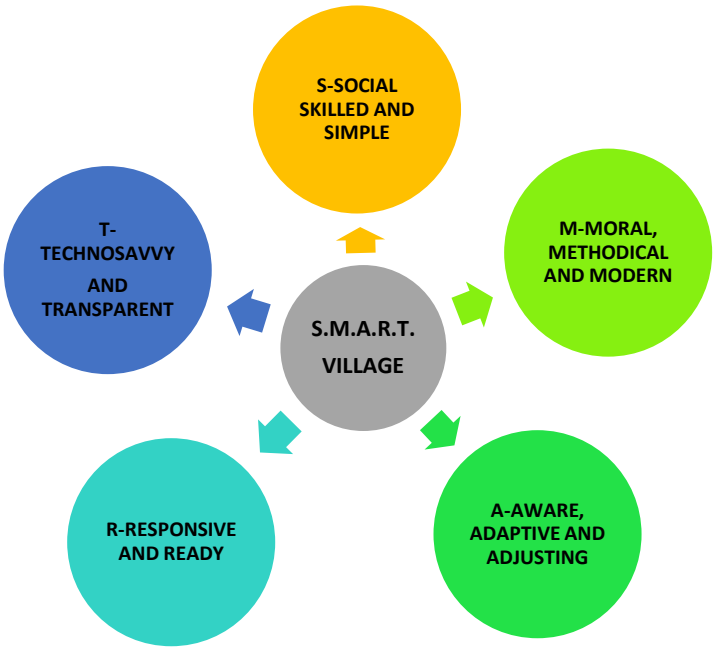
Launched to provide free LPG connections to women from below poverty line families.

Antyodaya Anna Yojana

Under the scheme 1 crore of the poorest among the (Below Poverty Line)BPL families covered under the targeted public distribution system are identified. Issue of Ration Cards Following the recognition of Antyodaya families, unique quota cards to be recognized an "Antyodaya Ration Card" must be given to the Antyodaya families by the chosen power.

Chapter 3. Smart (Cities / Village) Concept Idea and its Visit

Smart village is an "Ideal Village with Technology". Ideal village deals with the proper availability of service to people to their means regardless of achieving their means while in smart village conceptualization it is needed to properly define role of technology for sustainable development for various achievement of goals for village development.



Village Figure above shows various aspects in terms of S.M.A.R.T. village should follow in its planning and delivering of service.

3.1 Introduction: Concepts, Definitions and Practices

Jagana village is located in Palanpur Tehsil of Banas Kantha district in Gujarat, India. It is situated 4km away from Palanpur, which is both district & sub-district headquarter of Jagana village. As per 2009 stats, Jagana village is also a gram panchayat.

The total geographical area of village is 2020.71 hectares. Jagana has a total population of 7,461 peoples. There are about 1,596 houses in Jagana village. As per 2019 stats, Jagana villages comes under Vadgam assembly & Patan parliamentary constituency. Palanpur is nearest town to Jagana which is approximately 4km away.

Table 3.1Overview of Jagana (smart village)

Jagana - Village Overview	
Gram Panchayat:	Jagana
Block / Tehsil:	Palanpur
District:	Banas Kantha
State:	Gujarat
Pincode:	385001
Area:	2020.71 hectares
Population:	7,461
Household:	1,596
Assembly Constituency:	Vadgam
Parliament Constituency:	Patan
Nearest Town:	Palanpur (4 km)

Population of Jagana

Table 3.2 Population of Jagana

Total Population	Male Population	Female Population
7461	3852	3609

Connectivity of Jagana

Table 3.3 Connectivity of Jagana

Type	Status
Public Bus Service	Available within village
Private Bus Service	Available with 5-10 km distance
Railway station	Available within 5-10 km distance

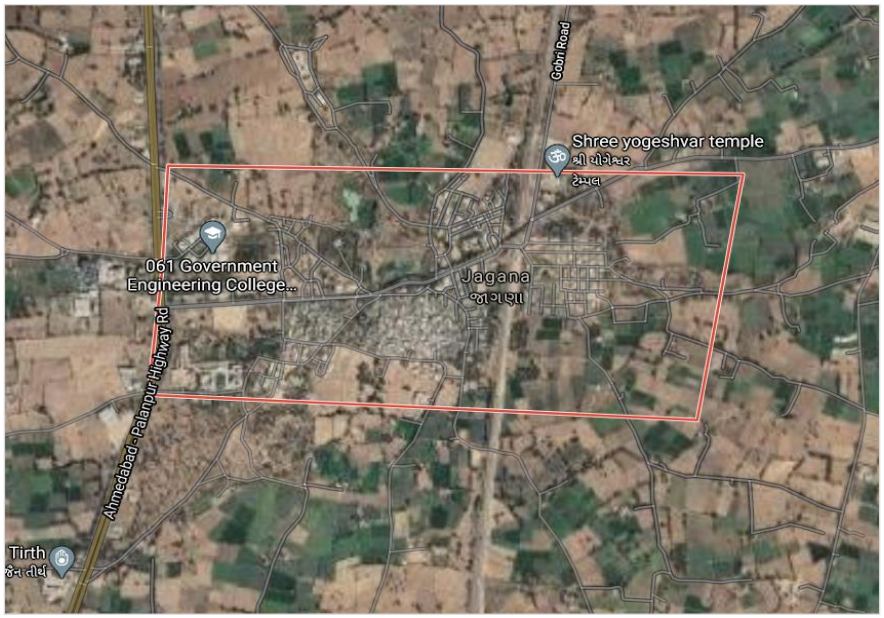


Figure 3.1 Satellite map of Jagana

Figure 3.2 Meeting with Talati

Figure 3.3 Panchayat

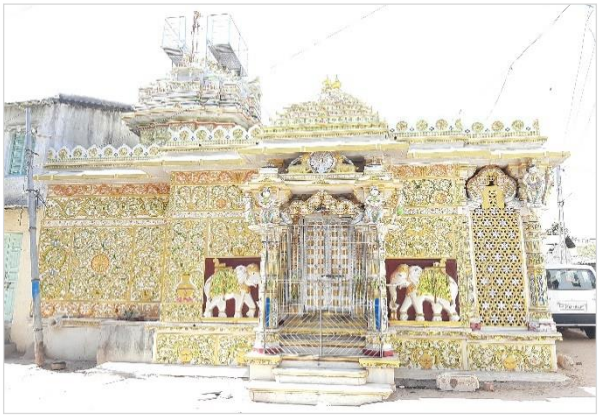


Figure 3.10 Temple

Figure 3.11 Bank

Figure 3.9 Milk Co- operative Society

Figure 3.8 Public Garden

Figure 3.7 Higher Secondary school

Figure 3.6 School play Ground

Figure 3.5 Temple

Figure 3.4 Helipad & Play Ground

Smart Village Concept

A 'smart city' is an urban region that is advanced in terms of overall infrastructure, sustainable real estate, communications and market viability. It is a city where information technology is the principal infrastructure and the basis for providing essential services to residents. People migrate to cities primarily for employment.

Making a city "smart" is evolving as a strategy to ease the problems generated by the urban population growth and speedy urbanization. Yet little hypothetical research has sparingly discussed the phenomenon. To close the gap in the literature about smart cities and in response to the increasing use of the concept, this paper proposes an agenda to understand the concept of smart cities. Based on the exploration of a wide and extensive array of literature from various disciplinary areas we identify eight critical factors of smart city initiatives: management and organization, technology, governance, policy context, people and communities, economy, built infrastructure, and natural environment.

- The infrastructure elements in a Smart City would include:
- Adequate Sustainable Water Supply
- Electricity Supply with Renewable sources
- Sanitation, Including Solid Waste Management
- Efficient Urban Mobility and Public Transport
- Affordable Housing, Especially for The Poor
- Sustainable Environment
- Safety and Security
- Strategic planning
- Mobility
- Wi fi
- E – government
- E – transportation
- Technological resiliency
- Cyber defense
- Renewable energy

Definition:

The concept which is done for development of village by National, state and Rural Government. A city well performing in a forward looking way in economy, people governance, mobility, environment, and living, builds on the smart combination of endowment and activities of self-decisive, independent and aware citizens.

Practices

In order to develop a smart village, all the above criteria need to be met and a sustainable environment needs to be created which is supportive of the initiatives required in order to make the efforts to develop a smart village successful.

Education:

This is one of the most important aspects of developing a village. A community can only thrive when people have access to education which helps empower them with the knowledge required to create better lives for the people around them. Therefore, this is probably one of the most important criteria when it comes to developing a smart village.

Healthcare:
A unified healthcare system needs to be developed which guarantees access to healthcare for every citizen. A community cannot thrive if the people can't even access basic healthcare.

Access to Drinking Water and Sanitation:
Clean drinking water is something that is a basic requirement for survival along with proper sanitation to ensure that people live healthy and fulfilling lives.

Nutrition:
A unified program needs to be developed where every single individual in the community has access to a nutritious diet. Regarding this, a proper plan needs to be developed that would ensure that no one goes without food.

Connectivity and Security:
Connectivity and Security are two of the most fundamental requirements. Proper policing and maintenance of law and order are paramount for the safety and security of a community. Connectivity is another aspect which needs to be looked into, irrespective of whether we are talking about the roads, transport or digital and mobile connectivity.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

The USDOT identifies twelve vision element that comprise a smart city.

- Urban automation
- Connected vehicles
- Intelligent, sensor-based infrastructure
- Urban analytics
- User-focused mobility services and choices
- Urban delivery and logistics
- Strategic business models and partnering opportunities
- Smart grid, roadway electrification and electric vehicals
- Connected, involved citizens
- Architecture and standards
- Low cost, efficient, secure and resilient information and communication technology (ICT)
- Smart land use

Goal

- Improve people's quality of life
- Improve health
- Increase economic growth
- Provide employment
- Sustainable environment
- Use of renewable energy.
- Smart City would be the one which plans judiciously to meet its aspirations and challenges in a sustainable manner while fostering principles of good governance. These are achieved in a Smart City by utilizing the enhanced power of technology.

Smart Cities Performance Measurement Indicators

- These included indicators on economics, education, energy, environment, health, governance, transport, shelter and safety. Other indicators related to particulate matter pollution, renewable energy consumption, the unemployment rate, the ratio of police personnel to population, and the infant mortality rate.
- The indicators are listed under the following heads:
- Economy
- Education
- Environment
- Energy
- Finance
- Fire and Emergency Responses
- Governance
- Health
- safety

3.3 Technological Options

- Intelligent Traffic Management System
- Metering and monitoring of various parameters of all resources for energy waste water, drainage etc.
- Outreach medical and educational facility
- Green building technologies
- Self-sustained renewable resource management technologies
  Smart city into required developed/ used some structure/ technology based on given below indicator:

3.4 Road Map and Safe Guards

To become a digital city, governments will need an appropriate set of solutions that will help them advance to the next stage of ICT maturity. The more a city takes advantage of the potential offered by ICT in terms of the provision of digital services and an integrated urban network, the higher its level of ICT maturity. In many ways, this is easier for newer cities in emerging markets, which are just now investing in urban infrastructure.

For example, Lusail City in Qatar, Masdar City in the UAE, and Songdo in South Korea are all making digital technology, networks, and apps a central part of how they operate and interact with citizens. By contrast, existing — or brownfield — metropolitan areas face clear challenges in moving up the ICT maturity ladder, as they need to modernize their existing infrastructure with embedded sensors and control systems and retrofit old buildings — a complicated and expensive process.

Indeed, in some cases it is impossible as the buildings cannot accommodate new technologies. However, becoming a digital city is not so stark a choice that urban authorities either achieve this revolution or fail. Rather, even taking small steps, particularly for established cities, toward becoming more digitized and offering enhanced digital services provides a variety of benefits. In some cases, established cities can use the disruptive power of digitization to leapfrog some of the obstacles.

A smart city roadmap consists of major components:

1. 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.

2. 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.

3. Develop a Smart City Policy:
Develop a policy to drive the initiatives, where roles, responsibilities, objective, and goals, can be defined. Create plans and strategies on how the goals will be achieved.

4. **Engage the Citizens:**
This can be done by engaging the citizens through the use of government initiatives, open data, sport events, etc.

3.5 Issues & Challenges

Funding: One of the biggest challenge is having a streamlined funding for the development of smart cities. It was decided that each Smart City will receive 500 Crore over the period of 5 years by Central Government. But this amount won't be sufficient. To match the contribution of central government there should be some contribution from the state government too in order to create sustainable funding to take the smart cities from pilot phase to execution and then completion. There are many private firms that are providing funding but it requires to be in proper process.

Technology: There are certain technologies that are a part of the project and it is expensive to use them. Because of the advancement, some technologies are borrowed from other countries which makes it more expensive. This hinders the success of smart city project. Another challenge is in the discovery of technology and the need for a medium that can bring technology

users and creators together to adopt faster platforms.

Problem of regulation and governance: Owing to a large set of investors, the list of stakeholders in the project is growing. In case of any legal issues, there is a strong need of separate legal framework in the stages of smart city mission. When the project is big there is a need of effective communication between central government, state and local governments. Apart from this, there is also a need of statutory bodies to provide quick approvals so that no resources and time goes waste.

3.6 Smart Infrastructure - Intelligent Traffic Management

Smart Cities Bench Marks

- There are no specified benchmarks or codes or standard for Smart Village.
- Good services to satisfy needs of its people to a very good extent within approachable area like educational and health facility.
- No pollution at all like heat wave, water pollution, noise pollution etc.
- Provision of maximum e-Governance to each and every person equally.
- A complete set of sustainable environment friendly approach for infrastructure and technology
- Affordable houses, transport, healthcare etc. for all
- Safety for all categories of citizen.

Transport

- Maximum travel time of 30 minutes in small & medium size cities and 45 minutes in metropolitan area.
- Continuous unobstructed footpath for 2 m wide on either side of all street 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 carriage way larger than 10 m
- High quality and high frequency mass transport within 800 m (10-15-minute walking distance) of all residences in areas over 175persons / ha of built area

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 within 800m of Transit Stations

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 related Charges

Sewerage & sanitation

- 100% households should have access to toilets Sanitation
- 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

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. bio- degradable and non-degradable waste 100% recycling of solid waste

Storm storage

- 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

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

Telephone

- 100% households have a telephone connection Connections including mobile
- Wi-Fi connectivity
- 100% households have a telephone connection including mobile

Health care

- Availability of telemedicine facilities to 100% Facilities 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) - 200 beds per lakh population
- Multi-Specialty Hospital - 200 beds per lakh population
- Specialty Hospital - 200 beds per lakh population

Smart data Center

It is undeniable that Smart Cities will contribute to a heavy squeeze on the supply of data center and cloud resources, particularly as Smart Cities grow in number and complexity. As a result, those involved in building and developing Smart Cities must consider data first, and then ensure that their investments in infrastructure put scalability, flexibility, security and future-proofing at the top of the list of their priorities. Stringent service level agreements, 24/7/365 support and real-time reporting are also fundamental to help users access the data in their systems and provide the services promised.

Smart Data Center Facilities Solution provides a modern foundation for distributed cloud applications for individuals and corporations.

Easily scale up or scale out to meet the growing demand for cloud computing, virtualization, and other advanced technologies. Incorporate intelligent plug-and-play micro modules that address the requirements of branch and headquarters data centers Be based on digital, intelligent network technologies. Uses green energy technology to reduce Power Usage Effectiveness (PUE), and slashes operating costs with proactive Operations and Management (O&M) techniques.

In a world where infrastructure is truly smart, sensing technologies are embedded in infrastructure and the equipment it interacts with. These sensors are connected to a communication backbone which allows real-time data acquisition and analysis.
The information gathered is analyzed, interpreted and delivered as reliable, robust and meaningful information to infrastructure providers, who can then make better-informed decisions about the structural health and maintenance of their assets.

Funding of smart cities Development
According to past data The Rs 1 lakh crore that will be granted for the ambitious five-year Smart Cities plan by the Center, state governments and municipal bodies of the 100 selected cities, will account for merely a fifth of the money needed for the mission. As per Central government estimates, a whopping Rs 4 lakh crore of funds will be infused chiefly through private investments and loans from multilateral institutions among other sources.

3.7 Cyber Security

The last 30 to 40 years have fostered an era of rapid automation and ingenuity to create technology that makes our lives easier and operations simpler. Today, technology is interwoven into our everyday lives with interconnected smart devices that respond to seemingly everything around us. These advances, which are frequently used by consumers and commercial enterprises, are now being leveraged within our nation’s critical infrastructure, creating new concerns about the network integrity and vulnerability of the nation’s mission critical operations.

The introduction of automation to our nation’s critical infrastructure for electricity, transportation and security drives the need for a stronger, more robust means of cybersecurity. Our cities are becoming increasingly smarter due to the implementation of autonomous monitoring and control technologies. However, hese technologies, when not connected to secure networks, are extremely susceptible to cyber threats - many of which have.

The increased complexity of city’s systems, interdependencies, globally connected social, economic and political sub systems has increased the vulnerability of a city‟s security. The cyber threats get magnified as infinite supply of data becomes more integral to a wide array of operations. Smart Cities have smart (intelligent) physical, social, institutional and economic infrastructure while ensuring centrality of citizens in a sustainable environment. It is expected that such a Smart City will generate options for all residents to pursue their livelihoods and interests meaningfully and with joy.Smart surveillance technology or analytics to manage the crowd, traffic, cyber security, data privacy, building code to manage natural/man-made disasters etc. are factors that would make a city safe and secured for a citizen to live in.

We examine two important and entangled challenges:
Security
Privacy

City infrastructures and services are changing with new interconnected systems for monitoring, control and automation. These may include water and sanitation to emergency responders and disaster recovery.

These benefits must be considered against the potential harm that may come from this massively interconnected world. Technical, administrative and financial factors must be weighted with the legal, political and social environment of the city.

Cyber security in the context of Smart Cities is a hot topic. The objective of Smart Cities is to optimize the city in a dynamic way to offer a better quality of life to the citizens through the application of information and communication technology (ICT). The range of areas where cities can become smarter is extensive: it is an evolution of "Connected Cities" with the prevalence of data exchange at a larger scale.

The benefits of Information and Computing Technologies (ICT) in a Smart City and of the Internet of Things are tremendous. Smart energy meters, security devices, smart appliances for health and domestic life: these and more offer unprecedented conveniences and improved quality of life. City infrastructures and services are changing with new interconnected systems for monitoring, control and automation. These may include water and sanitation to emergency responders and disaster recovery.

Methodology
Several paradigms and categorical structures may be applied in analyzing the benefits and detriments of this data environment. An applicable paradigm used for this analysis is that of IBM that the Smart City, its components and its citizens are instrumented, interconnected, intelligent.

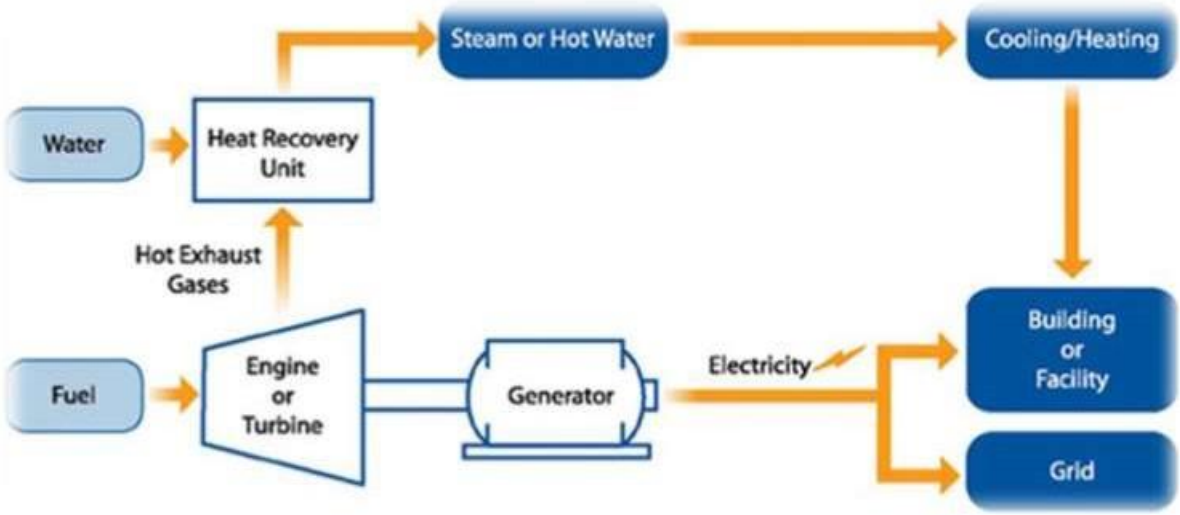
3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

District Cooling
District cooling is the cooling equivalent of district heating. Working on broadly similar principles to district heating, district cooling delivers chilled water to buildings like offices and factories needing cooling. In winter, the source for the cooling can often be sea water, so it is a cheaper resource than using electricity to run compressors for cooling. Alternatively, District Cooling can be provided by a Heat Sharing Network which enables each building on the circuit to use a heat pump to reject heat to an ambient ground temperature circuit.

District cooling is the distribution of cooling energy from a centralized plant to several buildings in a district. Centralizing the comfort cooling infrastructure offset the need for mechanical rooms in each building within the district. The result is up to 40% improvement in efficiency and up to 20% life cycle cost saving.

District Heating
District heating is a system for distributing heat generated in a centralized location for residential and commercial heating requirements such as space heating and water heating. The heat is often obtained from a cogeneration plant burning fossil fuels but increasingly also biomass, although heat-only boiler stations, geothermal heating, heat pumps and central solar

heating are also used, as well as nuclear power. District heating plants can provide higher efficiencies and better pollution control than localized boilers. According to some research, district heating with combined heat and power is the cheapest method of cutting carbon emissions, and has one of the lowest carbon footprints of all fossil plants.



District heating plants can provide higher efficiencies and better pollution control than localized boilers. According to some research, district heating with combined heat and power (CHPDH) is the cheapest method of cutting carbon emissions, and has one of the lowest carbon footprints of all fossil generation plants.

Green Building

According to world green building council A 'green' building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life.

There are a number of features which can make a building 'green'. These include:

- Efficient use of energy, water and other resources
- Use of renewable energy, such as solar energy
- Pollution and waste reduction measures, and the enabling of re-use and recycling
- Good indoor environmental air quality
- Use of materials that are non-toxic, ethical and sustainable
- Consideration of the environment in design, construction and operation
- Consideration of the quality of life of occupants in design, construction and operation
- A design that enables adaptation to a changing environment

  Any building can be a green building, whether it's a home, an office, a school, a hospital, a community center, or any other type of structure, provided it includes features listed above.

3.9 Strategic Options for Fast Development

Available Option for Developing Fast Smart villages

- There are 6 key features on which smart city works
- Smart energy
- Smart transportation

- Smart data
- Smart infrastructure
- Smart mobility
- Smart lot services

Each of these technologies work together to make a smart city even smarter. As the world's population grows, and more people move into urban areas, the need for smarter cities will increase to make the best use of available resources

3.10 India's Urban Water and Sanitation Challenges and Role of Indigenous Technologies

Urban Water and Sanitation Challenges

Swachh Bharat Abhiyaan was launched by Hon'ble Prime Minister of India on 2nd October 2015, which caught attention of everybody not only in India, but also in the world. The government has taken various steps to create awareness among the masses for keeping the area surrounding them neat and clean. Government is also paying special attention for cleaning of rivers, railway stations, tourist destinations and other public places.

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 Pyrolyzed 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.

Role of Indigenous Technologies

Some of these Role of Indigenous technologies are as follows:

Indigenous water purification technologies: These technologies can improve the: drinking water quality of smaller villages as well as larger cities. It uses the Pressure Driven Membrane Processes. These are suitable for all capacity units e.g. they are adaptable from household level unit or community level unit to large scale unit. Water purification technologies make use of the nuclear energy and solar energy also.

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 Pyrolyzed 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 is not able to process Sewage to optimum efficiency. MSBT can be implemented as a modular or container onthe 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 Oder 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).

Role of environmental isotope techniques in the water resources development and management: There are two type of isotopes, stable isotopes and radioactive isotopes. Isotope techniques are used to find out the type of contamination in surface water and ground water, the sources and origin of contamination, pollutant dispersion in surface water bodies, to assess the ground water salinity, to assess the changes due to long-term exploitation of groundwater, for hydro-chemical investigation and to carry out geochemical evolution of groundwater.

3.11 Initiatives in village development by local self-government

The institutions of Local Government have flourished in India since time immemorial. The Panchayats or Village Governments, as they were called, were ancient institutions and were themselves small republics. They exercised power in various spheres such as industrial, commercial, administrative, and social including civic education and religious functions. The development of Urban Local Self-Government, as compared to that of Rural Local Self Government, has been very slow after independence. The first two Plans did not carry much for the improvement of Urban Local Bodies. It was only at the end of the Second Plan that the planners focused their attention on the Urban Local Bodies. In the Third Plan, it was suggested strengthening the Municipal Administration by the way of better Personnel and Finances and by enlarging their jurisdiction and functions. It was also suggested to cover all the Towns and Cities having a population of over one lakh under the scheme of planning in an organic way. Election to Municipalities- The superintendence, direction, and control of the preparation of the electoral rolls for, and the conduct of, all elections to the Panchayats and Municipalities shall be vested in the State Election Commission. Audit and Accounts- The maintenance of the Accounts of the Municipalities and other audit shall be done in accordance with the provisions of the State law. The State Legislatures will be free to make appropriate provisions in this regard, depending upon the local needs and institutional framework available for this purpose. Committee for District Planning- There shall be constituted in every State at the District level a District Planning Committee to consolidate the plans prepared by the Panchayats and the Municipalities in the District and to prepare a Draft Development Plan for the District.

3.12 Smart Initiatives by District Municipal Corporation

Talking about the smart city initiative by Vadodara district the goal of the initiative is " Smart utilization of Vadodara city's potential for enhancing quality of life for the citizens of providing equal access to best quality physical infrastructure , social infrastructure and mobility through leveraging state of the art and technology : thus making Vadodara a futuristic Global city with focus on enhancing economy , protecting the ecology and preserving the identity and culture of the city".

The initiatives taken by Vadodara Municipal Corporation are:

- Solar roof Panels
- Green Vadodara campaign

- Integrated command and control center.
- Installation of CCTV Cameras
- Installation of smart toilets
- Installation of public wi-fi
- Parking encroachment drive

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

Digital India Initiative: The initiative comprises of several projects which will focus on better governance, knowledge and universal phone connectivity across the country.

- Digi Locker
- MyGov.in
- eSig Framework
- Swachh Bharat Mission mobile app
- National Scholarship Portal
- hospital
- Digitize India Platform
- Bharat Net
- Wi-fi Hotspots
- Next Generation Network
- Electronics Development Fund
- Centre of Excellence on Internet of Things (IoT)

3.14 How to implement other Countries smart villages projects in Indian village context

Smart Environment

Smart villages can be stewards of the environment aided by technologies to monitor key environmental indicators such as forest health, water quality, soil conditions and changes to the landscape. They can also reduce pressure on deforestation using efficient cook stoves to decrease the need for traditional biomass energy sources such as charcoal and wood a key driver of unsustainable forest use. Smart villages can host community-run recycling facilities ranging from those equipped to recycle wastewater and organic waste from agro -processing, to next-generation facilities for the recycling of e-waste, including energy-storage and generation technologies such as batteries and solar panels. Depending on geographical endowments, some smart villages will be able to operate as regional ecotourism hubs, an activity that can improve the welfare and connectivity of rural and urban communities. The aforementioned Villages have all emerged as Smart Villages but only in a particular domain. It's not holistic in nature. However, the pressing need of hour is to have a Smart Village with all sorts of comprehensiveness in it.

Smart cities revolution to boost employment in India

Government of India's 'smart cities mission', a flagship initiative, is aimed at developing 100 sustainable and citizen friendly cities across the country. Each of these smart cities will be a key driver of economic growth boosting the GDP of the country and creating multiple new-age employment opportunities. With increased urbanization, urban areas are expected to house 40 per cent of India's population and contribute to over 75 per cent of India's GDP by 2030. This

calls for large scale infrastructural development which is not just physical and institutional but also social and economic infrastructure. Only then would these cities will attract investments leading to continuous growth and development. A key way of developing smart cities is by enabling using smart evolved technology for local area development in the cities. Such development will generate employment for a large segment of local population. Application of smart solutions will enable cities to use technology, information and data to improve their services. Integration of technology is a major challenge and implementation of technology across smart cities needs a lot of hand holding at the moment. To understand the dynamics of smart cities and to create a strong eco-system it is important that the workforce has advanced skill sets. Smart cities have emerged as a potential job creator in the past few months. Many new-age profiles are likely to witness potential growth especially in the areas of ICT (Information Communication Technology), Data Management & Analytics and e-Governance. As there is a large pool of data being used in the building and management of smart cities, data monitoring and surveillance will become a crucial aspect. Whether the data is used for intelligence gathering, prevention of crime, public health, investigation or surveys; surveillance will hold a lot of importance for citizens. It is important for us to understand that the existing workforce and the new workforce entering the labor market need to align their skill sets basis the requirements of smart cities. Each and every sector and job roles will need enhancement of knowledge, specialized skills training and continuous upskilling. People with varied skill sets will be needed to manage and monitor data across smart cities. Data Skills, Communication skills, Business Intelligence and Analytics, Visualization, Data Modelling, Numerical skills, Quantitative Analysis, Product Development are few key skills that will be required for continuous surveillance at smart cities.

3.15 Electrical concept

Smart Villages, when technology arrives at a village to stay

Towns and villages are no strangers to the digital revolution that is taking place in the world, or at least they should not be because their survival depends on it. Innovative solutions, from Big Data to the Internet of Things (IoT), have reached rural areas to help develop and improve their social, economic and environmental conditions.

FACTORS IN RURAL TRANSFORMATION

Technological changes

In addition to access to the internet and new technologies, which we will discuss later, here we will mention the use of precision farming techniques, which improve crop yields and the use of water and soil. Applied biotechnology also contributes to the production of new, more effective and nutritious crops, pest control and ecosystem recovery using bioremediation techniques.

Environmental changes

Climate change is having a palpable effect in many rural areas, affecting crops and biodiversity, with the loss of species and ecosystems. Sustainable resource management and environmental protection are needed, a task that falls to the rural population itself.

Demographic changes
The increase in the cost of living in large cities and the new possibilities for teleworking are, on the one hand, slowing the abandonment of rural areas and, on the other, returning young people from the cities to the villages, where they can work or set up businesses with a better quality of life.

Economic changes
Global consumer trends show an unstoppable growth in organic agriculture and sustainable products, whose sales are growing at five times the rate of unsustainable products, according to the Center for Sustainable Business at the Stern School of Business (New York University). This provides greater added value for production in rural areas.

Political changes
The development of rural communities also depends on the impetus of local, national and supranational governments to provide infrastructure and support for new businesses with tax exemptions and funding.

RURAL INNOVATION: TECHNOLOGIES FOR A SMART VILLAGE
The new technologies are coming together to help the development of rural communities:

IoT: the Internet of Things is linked to the concept of smart cities, but is also applicable in rural areas. For example, using sensors that allow crops to be more competitive or applied to education and health in isolated areas.

Artificial intelligence: the adoption of artificial intelligence systems is directly applicable to improving crops and environmental management, as well as in optimising health services and infrastructure use.

Big Data: the huge amount of data generated today (Big Data), allows changes in climate to be analyzed accurately along with water consumption, livestock movements, the growth of pastures and forests, and other essential information.
Drones: thanks to the use of drones, hectares of land can be monitored automatically thereby collecting data on temperature, crop status, animal movements or controlling the spread of pests, thus improving the use of pesticides.

Blockchain: according to the United Nations Food and Agriculture Organization (FAO), blockchain technology can be used to increase efficiency, transparency and traceability in agricultural supply chains and make them more productive and sustainable.

Nanomaterials: the use of smart materials has the potential to enhance sensors, apply fertilizers, pesticides and protective layers that improve food safety, eliminate waste and even mitigate the effects of climate change on plants.

Robots: from autonomous tractors that do not need a driver to robots capable of picking delicate fruits one by one without damaging them, the introduction of robots in rural areas is driving a revolution in efficiency and sustainability.

Chapter 4. About Ranol Village

4.1 Introduction

4.1.1 Introduction Allocated village: Ranol

- According to Census 2011 information the location code or village code of Ranol village is 507727.
- Ranol village is located in Dantiwada Tehsil of Banas Kantha district in Gujarat, India. It is situated 10km away from sub-district headquarter Dantiwada and 30km away from district headquarter Palanpur.
- The total geographical area of village is 520.15 hectares.
- As per 2011 counting Ranol has a total population of 1,343 peoples. There are about 248 houses in Ranol village. But in current situation population is more than 5000.
- As per 2019 stats, Ranol villages comes under Dhanera assembly & Banas kantha parliamentary constituency. Palanpur is nearest town to Ranol which is approximately 30km away.

4.1.2 Justification/ need of the study

As a future civil engineer to serve the civilization it is required that the true depth of development requirement should be understood. As our great leader Gandhiji said that "The India Lives In Its Villages ". Almost 69% population of our India lives in villages even if just 1% of village population migrates to any city area, it greatly affects the livelihood of whole Nation: let it be overcrowding in city area, pollution , GDP growth decrement , increase in prices of goods for day to day use. Migration occurs mainly due to job opportunities and better facilities like hospitals, educational facilities etc provided in urban area.

To increase liveliness of village by providing good sanitation facilities, good infrastructure, basic requirements like pucca houses or awash, water supply etc. are required considering the environmental and need of people.

4.1.3 Study Area

Education:

- Anganvadi
- Primary school
- Secondary and higher secondary school required

Medical facilities:

- Gov. hospital
- other medical facilities are not available

Transportation facilities:

- Private vehicles
- Auto rickshaw
- Pacca road
- Need to maintenance of road

Drinking water facilities

- Overhead water tank

- Protected well
- Irrigation canal
- Hand pump

Others:

- Gram panchayat
- Pond
- Need bus stand

4.1.4 Objectives of the study

"Creation of infrastructure connectivity, civic and social infrastructure along with provision of alternative Economy generation is the key pillars that the concept things on."

- To create sanitation for all Basic physical infrastructure– Water Supply, Transport, Sewerage and solid Waste Management should be the priority focus and be provided.
- Reduce migration from rural to urban areas due to lack of basic service sand sufficient economic activities in rural areas.
- Improve connectivity between urban and rural areas, Public transportation facilities that need to be developed like bus stops, transport depo etc.
- Electricity connections like street lighting that is energy efficient and eco-friendly.
- To create better lifestyle for village without changing its core soul
- Economy generation is the key pillars that the concept hinges on which should be introduced to village.

4.1.5 Scope of the Study

- To ensure integrated development of village, people and environment by creating sustainable designs for all to optimum extent as possible.
- The study will focus the development trend, intensity of growth of the village, and find out the problems related to the physical development of the area and infrastructure services of the village.
- Project proposal and sustainability aspect not consider in micro level; it is only guide way. The study focused to only following Village: Ranol

4.1.6 Methodology Frame Work for development of your village

Project roadmap: Method for development of village
Part-I (Odd Semester) Includes:

- Literature Review
- Visit of Ideal Village of Respective District
- Data Collection- Techno economic survey
- Data Presentation
- Sustainable Design Planning Proposals (Rain water harvesting, Biogas plant, waste to energy
- models, eco sanitation, Renewable Energy sources Application & Other)
- Repair & Maintenance of Existing Infrastructure
- Facilities Suggestions and Recommendation

Part-II (Even Semester) Includes:

- Gap Analysis (Guidelines, Regulation and Literature will be given for comparison)
- Design Proposals for Over all development of Village includes
  Physical Infrastructure Facilities
  Social Infrastructure Facilities
  Socio Cultural Infrastructures Facilities
- Recommendation & Suggestions For Village Development
- Conclusion

4.1.7 Available Methodology for development of our village

1. Define the problem
2. Do background Research
3. Specify requirements
4. Brainstorm, evaluate, and choose solution
5. Develop and prototype solution
6. Test solution
7. Solution meets requirement
8. Communicate results
9. Based on results and data, design changes,
10. prototype, test again, and review new data

4.2 Ranol village Study Area Profile

4.2.1 Study Area Location

Table 4.1 Ranol Overview

Gram Panchayat	Ranol
Block/Tehsil:	Dantiwada
District	Banas kantha
State	Gujarart
Pincode	385001
Area	520.15 hectare
Population	1,343
Household	248
Assembly constituency	Dhanera
Parliament Constituency	Banas kantha
Nearest Town	Palanpur (30km)

4.2.2 Base Location map, Land Map, Gram Tal Map

Figure 4.1 satellite map of Ranol

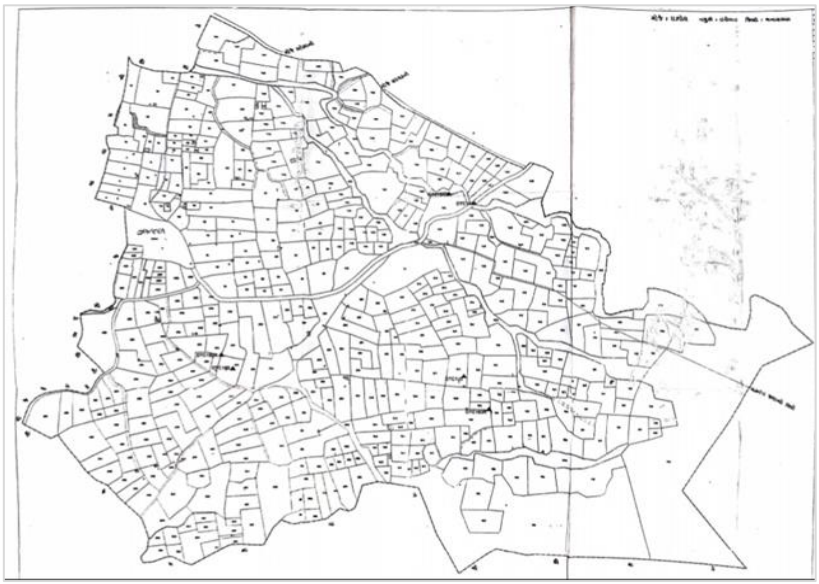


Figure 4.2 Ranol base map

4.2.3 Physical & Demographical Growth

- Ranol village is situated in Tehsil Dantiwada, District Banas Kantha and in State of GUJARAT India.
- Village has population of 1343 as per census data of 2011, in which male population is 706 and female population is 637.
- Total geographical area of Ranol village is 520.15 Hectares. Population density of Ranol is 3 persons per Hectares. Total number of house hold in village is 248.

Census Data of Ranol village -Census 2011

Table 4.2 census Data of Ranol

Population	Area (Ha)	Density (P/Ha)	Sex Ratio	Literacy
1343	520.15	3	902	82.89%

Demographics Population of Ranol village

Table 4.3 Demographic Population

Total Population	Male Population	Female Population
1343	706	637

Sex Ratio of Ranol Village -Census 2011
As per the Census Data 2011 there are 902 Females per 1000 males out of 1343 total population of village. There are 754 girls per 1000 boys under 6 years of age in the village.

Literacy of Ranol Village
Out of total poplation total 930 people in Ranol Village are literate, among them 535 are male and 395 are female in the village. Total literacy rate of Ranol is 82.89%, for male literacy is 92.24% and for female literacy rate is 72.88%.
Total literacy rate: 82.89 %
Male literacy rate: 92.24 %
Female literacy rate: 72.88 %

4.2.4 Economic generation profile

The major sources of income are:

- Farming
- Animal Husbandry
- As Shopkeepers
- As workers in mills and factories.
- Banks: There are no banks currently present in Ranol village. Banks can be found in a nearby sub headquarter.
- Sub headquarter Dantiwada.
- Income: The average income of the village dwellers is about ₹6000 to ₹ 25000 per month. Post Office: There is no any Post Office in Ranol village.

4.2.5 Actual Problem faced by Villagers and smart solution

There is lack of some facilities which will give the better life to villagers.

- There is a waterlogging problem during rainy season,
- There is no community hall available in the village,
- There is no bank existing in the village,
- There is no ATM in the village
- Lack of library and play ground
- Maintenance of Community hall
- Maintenance of Roads

Smart Solution

There are required some basic facilities in village,

- Bank
- ATM
- Health center
- Solar street lights
- Library
- Solid waste management

- Liquid waste management
- Water drainage
- Rain water harvesting

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

Gujarat social scenario

Culture:

The Gujarati's are known for their diverse cultural heritage and rich traditions. It is a vibrant mix of Hinduism, Islam, Jainism and Buddhism and also a blend of different cultures of the Gujarat's like arts, beliefs, customs, traditions, institutions, inventions, language, technology and values. The culture of the people does not stop with one particular generation but instead the elders of the community see to that the future generations also practice it which automatically leads to the wisdom and appreciation of cultural traditions and lifestyles. They also as a part of their culture join hands to greet the guests and the elders. The lifestyle of the people of Gujarat is very balanced because of the fact that they have a perfect system of learning, religious practices and excellent forms of artistic expressions. The culture of the Gujarati's does not only prevails in Gujarat but it has been widespread to different parts of the world and now recognized as an international culture. There is not much of culture shock seen in the people of Gujarat and so it makes people bold and courageous with lot of energy to face different challenges raised by the global scenario.

Customs and traditions:

Though modern and sophisticated houses have come in Gujarat, still there are places which have their traditional homes and wooden houses. Most of these traditionally built houses have beautiful and intricately designed interiors but as a customary practice each house has a special "Chabutara" built for bird feeding. Pachchikam jewelry is one of the traditional jewelry of the people of Gujarat where instead of gold, the metal used in making of this ornament is silver. The Gujarati women as a part of their tradition carry a bunch of keys on their waist and the ring holder is usually made of silver. Some other jewelry which is worn by the ladies as part of their customs includes Mangal sutra, earrings, necklace, rings and bangles. The Gujarati have lot of belief in various gods and goddesses. Cow is considered as mother God or "Gau-Mata" and the Gujarati's have lot of faith in them. Some of the ceremonies which are must to be celebrated by the people of Gujarat are birth, thread ceremony, marriage and death. In all these ceremonies the rituals and poojas are performed by the Brahmans. As a part of the Gujarati's custom and tradition they celebrate festivals like Navratri and Diwali.

Cuisine:

Mostly Gujarati food is vegetarian because the state is dominated by Jains and the Vaishnavas. Most of their staple food includes wheat and millet varieties like jowar and bajri. No meal of Gujarati will miss roti along with a variety of vegetable curries and dishes. The food is generally served on a metal tray which is called as thali and 4-5 small bowls placed on it These thali mainly consists of roti, dal or kadhi, sabzi also known as shaak and rice. The Gujarati's are noted for their sweet tongue and every meal will be accompanied by a sweet dish. Sugar is also sometimes alternated by jaggery. Some of the other common food which is a must for the Gujarati's in their thali are dal, steamed vegetables, homemade pickles, buttermilk and salad. Vaghaar is Gujarat food a blend of spices, which is purified in hot oil and then added to the dal. Gujaratis generally use lot of salt, sugar, tomato and lemon in their cuisine. Desserts, which were in the ancient times offered only on festivityor some special occasions, have now found their way in the daily meals. Ghee is a must in the food of Gujarati's. Srikhand is a rich dessert

made with curds and spiced with saffron, cardamom, nuts, and fruit. The Guajarati's evening snack include bhakri-shak or khichdi kadhi.

Occupation:
The major occupation of the people of Gujarat is agriculture for at least one-half of the total land area is cultivable. Other area of economy and job sector includes dairy farming, primarily concerned with milk production. There are lot of industries which are involved in the production of fertilizers and petrochemicals.

4.2.7 Migration Reasons / Trends

Migrations are caused by variant factors including social and economic facilities like,

1. Marriage
2. Employment
3. Urban facilities
4. Education

Migration trends in India:
India's in-migration is growing at 4.5 per cent annually.
Pune and Surat are the cities most affected by in-migration in Asia.
Andhra Pradesh and Karnataka account for a third of interstate migrants, while those from northern states account for another 20 per cent.

Census 2011 data on migration:

- It showed that over 45.58 crore Indians were found to be "migrants" for various reasons.
- The socio-economic development of the southern states is considerably higher and has attracted more people.
- While marriage remains the primary reason for women to migrate, the Census data shows that Indian women are also migrating for work and education. The number of Indian women who are economic migrants has grown by 129 per cent.

Economic Survey of India 2017:

- It estimates that the magnitude of inter-state migration in India was close to 9 million annually between 2011 and 2016.
- Uttar Pradesh and Bihar are the biggest source states, followed closely by Madhya Pradesh, Punjab, and Rajasthan.
- The major destination states are Maharashtra, UP, Tamil Nadu, Gujarat, Andhra Pradesh and Kerala.

4.3. Data Collection of Ranol Village

4.3.1 Describe Methods for data collection

The main methods for data collecting were:

- Individual interviews.
- Focus groups.
- Observations –field trips.
- Research by open data achieve of government

- Questionnaires Survey

4.3.2 Primary details

- According to Census 2011 information the location code or village code of Ranol village is 507727.
- Ranol village is located in Dantiwada Tehsil of Banas Kantha district in Gujarat, India. It is situated 10km away from sub-district headquarter Dantiwada and 30km away from district headquarter Palanpur and 155km from state capital Gandhinagar.
- The total geographical area of village is 520.15 hectares.
- As per 2011 counting Ranol has a total population of 1,343 peoples. There are about 248 houses in Ranol village. But in currunt situation population is more than 5000.
- As per 2019 stats, Ranol villages comes under Dhanera assembly & Banaskantha parliamentary constituency. Palanpur is nearest town to Ranol which is approximately 30km away.

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

In Ranol: Average size of the house in the village is 5x10 m.

Geo-Tagging: The process of tagging infrastructure with geographical information like Latitude, Longitude, Distance, place name, etc. It is connected to GPS which are monitored through computer internet networks. It can be used to locate important places like labs, dispensaries, milk center, etc. Geo Tagging is not implemented in Ranol village.

4.3.4 No of Human being in One House

- The average human being in village Is around 4,5 humans in a particular house.

-

Table 4.4 human being in Ranol

Description	Total	Male	Female
House holds	248	-	-
Population	1343	706	637
0-6 Age group population	221	126	95
Literates	930	535	395
Illiterate	413	171	242

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

Table 4.5 locally available material in Ranol

No.	Material
1	Concrete
2	Brick
3	House made with animal mud and clay
4	Sand and some gasket available

Table 4.6 construction material in Ranol

Materials available in village	Material exposed in village
Cement	Material exposed in village
Clay	Material exposed in village
Animal mud	Material exposed in village

Out Sourced Material
Labour work
Labour work in farm
Labour work doing in various small industry

Costing

Table 4.7 Costing at Ranol

Sr. no	Type of costing	Material	Per	price
1	Construction materials cost	Cement Sand Aggregate	Bag Metric tone Metric tone	300 550 700
2	Labour cost	Mason Unskilled	Day Day	750 400

4.3.6 Geographical Detail

Table 4.8 Geographical Details

Village area	
Forest area	10 hectors
Agricultural land area	10 hectors
Residential area	3 hectors
Other area	2 hectors

4.3.7 Demographical Detail

Table 4.9 Demographical Detail of Ranol Village

Cast	Population
SC	150
ST	90
OBC	1000
Other	103

4.3.8 Occupational Detail - Occupation wise Details
The major occupation in village is,
Agriculture work
Animal husbandry
Employers
workers

4.3.9 Agricultural Details

Table 4.10 Agriculture Details

Total land used in agriculture	10 hectors
Total people included in agriculture work	703
Total organic land in village	10 hectors
Main crop farming	Wheat Mustard Pearl millet

4.3.10 Physical Infrastructure Facilities

- There are not very big industries located near the village.
- But the highway side small garage and ware houses are available.

4.3.11 Tourism development available in the village for attracting the tourist

- There is no tourism cluster in village. But have a mahadev temple at hill**.**

4.4 Infrastructure Details

- Water tank
- Gram panchayat
- Religious place
- Primary School
- Anganwadi
- Community hall
- Milk co-operative society etc.

4.4.1 Drinking Water / Water Management Facilities

Overhead water Tank

Drinking faculties available in this village like Tap water. It is sufficient as per village demand but in monsoon season the quality of drinking water is not good because of solid particles as the due to rainfall hindrance of solid particles in water comes under. The consideration in the media of main source is overhead tanks. Overhead water tank condition average. Tank is filled by underground sump. Source of water is tube well.

Figure 4.3 overhead tank

The capacity of overhead tank is 50,000 litter and sump capacity are 1,00,000 litter.
In this village 248 houses are available personal tap.

4.4.2 Drainage Network / Sanitation Facilities

Drainage Network

- Underground drainage is available but pipes are chock up so required new drainage network.

Sanitation Facilities

- Ranol village have only one public toilet is available and its condition is good.
- And also houses have private toilet by government schem and personal sanitation tank.
- In this village 248 houses have sanitation facilities

4.4.3 Transportation & Road Network

Road network

- Ranol village have bitumen and cc roads in village.
- Roads are narrow at some points and create difficulties some times. Required roads in village where roads are not available.
- Ranol village connected with bitumen's roads with other near by villages.
- There is bus stand for government bus service.

Transportation

- In village bus service is available.
- And other transportation is jeep and private vehicles are available.
- National highway 27 is 20km far from the Ranol village.

Figure 4.4 Roads

4.4.4 Housing condition

In this village 65 % of houses are proper (pacca) and 35 % houses are not proper (kacha).

Figure 4.5 Housing condition

4.4.5 Social Infrastructure Facilities

Health facility does not available in village but have a private clinic near by another village.

Community Hall

There is a one community hall available in village. The community hall is in average condition

Public Library

Village don't have library.

Figure 4.6 Community Hall

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

Public Buildings such as primary school, gram panchayat, overhead water tank etc. are required to be maintenance.

4.4.7 Technology

Educated villagers are using Mobile with Internet connectivity.

Gram panchayat have a Wi-Fi connection and government works are done online in gram panchayat.

4.4.8 Sports Activity at Gram Panchayat

There is no any public garden in village and children use school ground as a playground.

Figure 4.7 School Play ground

4.4.9 Socio-Cultural Facilities

- There is no public garden and park.
- Playground is available in school for children. The pond is available in village. The pond is little bit dirty**.**
- There are temples in village.

Figure 4.8 lack at Ranol

4.4.10 Other Facilities

There is one public toilet which is located near gram panchayat.

Figure 4.9 Public toilet

4.4.11 Any other detail

In village there are electricity available for full time and solar system is available on the milk co-operative society's building. There are street bulbs provided for street light.

4.5 Electrical Concept

4.5.1 Renewable energy source planning particularly for villages

India is endowed with abundant natural and renewable resources of energy viz., sun, wind and biomass. The country has been able to achieve significant capacity addition of 1,367 MW through wind farms. India now ranks fifth in the world after Germany, United States, Spain and Denmark inthe generation of wind energy. Available renewable resources need to be exploited by giving a commercial orientation, wherever possible. It may be necessary to continue with subsidies in the case of socially oriented programmers to meet the energy requirements of rural areas, particularly remote villages, which may be difficult to service through the conventional power grids in the near future. Apart from these resources, the country has significant potential for ocean thermal, sea wave power and tidal power.

Village Name: Ranol

If bio gas is used in Ranol village, their advantages given below:

- Provides a non-polluting and renewable source of energy.
- Efficient way of energy conversion (saves fuel wood).
- Produces enriched organic manure, which can supplement or even replace chemical fertilizers.
- Provides a source for decentralized power generation

Renewable energy plays an important role in reducing greenhouse gas emissions. When renewable energy sources are used, the demand for fossil fuels is reduced. Unlike fossil fuels, non-biomass renewable sources of energy (hydropower, geothermal, wind, and solar) do not directly emit greenhouse gases. Solar energy is commonly used on public parking meters, street lights and the roof of buildings. Wind power has expanded quickly, its share of worldwide electricity usage at the end of 2014 was 3.1%. Most of California's fossil fuel infrastructures are sited in or near low-income communities, and have traditionally suffered the most from California's fossil fuel energy system. These communities are historically left out during the decision-making process, and often end up with dirty power plants and other dirty energy projects that poison the air and harm the area. These toxicants are major contributors to health problems in the communities. As renewable energy becomes more common, fossil fuel infrastructures are replaced by renewables, providing better social equity to these communities. Overall, and in the long run, sustainable development in the field of energy is also deemed to contribute to economic sustainability and national security of communities, thus being increasingly encouraged through investment policies.

4.5.2 Irrigation Facilities

There are any public irrigation facilities but people have their own tube well or irrigation facilities like sprinkle and drop irrigation.

Figure 4.10 sprinkle irrigation

4.5.3 Electricity Facilities with Area

Ranol have 24 hours house hold electricity facilities and have street bulbs on electric pole. Milk co-operative society have an own solar plant.

4.6 Existing Institution

4.6.1 Bachat Mandali

In village there is record that kept by organization which have target of economy in mind this organizations are bachat mandli.

4.6.2 Dudh Mandali

In village the Dhudh mandali or Milk Co-Operative Society is available.

The milk co-operative society has a very important economical role in village. Majorly people of village are financial depend upon Agriculture work and milk production.

Figure 4.11 Dudh mandali

4.6.3 Mahila forum

In village a team for woman health and support is generated by village woman's which is named as mahila forum

4.6.4 Plantation for the Air Pollution

There are maximus area is using as a agriculture purpose so there are greenery in village so that there are not much air pollution.

4.6.5 Rain Water Harvesting - Waste Water Recycling

There are no any facilities of rain water harvesting.

4.6.6 Agricultural Development

Peoples have own tube well and sprinkle and drop irrigation facilities but village required to provide some more irrigation facilities to other irrigation facilities.

4.6.7 Any Other

There are no any other kind of institutions existing in the Ranol village apart from panchayat building, dharmshala, dairy, primary school, public library, government grocery shop, temples, agricultural cooperative office building, Anganwadi, etc.

Chapter 5. Technical Options with Case Studies

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying:

Green Roof

Globalization and rapid urbanization sprawl have become a salient feature of the Indian metro cities. It has changed the cities drastically for the good over the past few decades and has marked their presence on the globe. Indian cities are slowly striding towards a broad-based infrastructural development, which is unfavorably affecting the ecological balance of these cities. As the green spaces are being replaced by impervious spaces rapidly, there's a dire need to look for a viable option to lessen the adverse effects of the construction and rapid urbanization.

The fast lifestyle of urban cities has fortified the situation of greenhouse gases in the environment, these gases not only increase the surface temperature of the land but it is also creating a path for an unlivable environment in coming time. Cities that were relatively cool in the past have started to grapple with buildings that weren't built for heat. Hot temperatures get even hotter as pavement and roofs of the buildings soak up and release radiation from the sun. Green roofs can be an excellent method to get better temperature control and tackle-down the scorching heat.

What is a green roof?

Green roofs or living roofs are roofs that are covered entirely or partially with vegetation growing over a waterproof membrane. It can also include supplementary layers such as a root barrier and drainage and irrigation systems. A roof with plants growing in containers or a bucket is not a green roof. There are two types of green roofs: extensive (soil layer of six inches or less) and intensive (soil layer of more than six inches).

Although Green roofs are not a popular phenomenon in India but it is widely considered as an excellent approach towards saving the environment. Green roofs work as a natural coolant and have many hydrological benefits. There are various techniques and systems such as Hydroponics, Aeroponics and container gardening etc to install green roofs in residential and commercial buildings.

Benefits of green roofs:

Installing green roofs in residential and commercial buildings will help in reducing the negative impact of development providing numerous environmental, economic, and social benefits.

Green roof systems hold on to 60%-100% of the storm-water they receive which prevents the surface of the roof from getting deteriorated. Similarly, green roofs have a longer life-span than regular roofs. They protect the surface from ultraviolet radiation and extreme flux in the temperature that causes roof membranes to depreciate and results in leakage during the rainy season. The vegetation of the plants maintains the coolness of the roof during the summer and it allows the building to retain the heat during the winter, as the plants act as an insulation layer and they shade the roof from the extreme weather conditions.

Things to consider before installing:

Calculating the bearable weight:

The most important step before considering the installation of green roofs is calculating the bearable weight for the roof surface. Taking due diligence of the strength is important; the common depth for the soil layer of a green roof without any special structural design is four to six inches. As the soil layer depth increases it exerts more pressure on the roofs. Roofs should be strong enough to sustain that pressure and there should be no shuddering or wobble. If the roof structure is in doubt, consult trusted structural experts to suggest options for reinforcement. Special consideration for extra bracing may be necessary for seismic zones depending on the height of the roof.

Choosing an ideal location and roof surface:

Choosing an ideal location for a green roof is an important aspect before proceeding with the installations. Green roofs are easier to install and maintain on a flat roof surface. They can be installed on low-sloping roofs surfaces without the need for stabilization. Surfaces with a steep slope require an additional reinforcing system such as a tray planting or terracing system to hold soil in place.

How to install a green roof:

Green roofs can be installed using a series of planting trays or by creating an edged rooftop landscape area or there is another method to install green roofs is to purchase vegetated mats. These mats come with succulents or other plants and are grown on the ground in the same manner that some nurseries grow sod.

Here are a few steps to install the layers on a flat surface using a protective, multi-layered waterproof barrier between the soil and the roof surface:

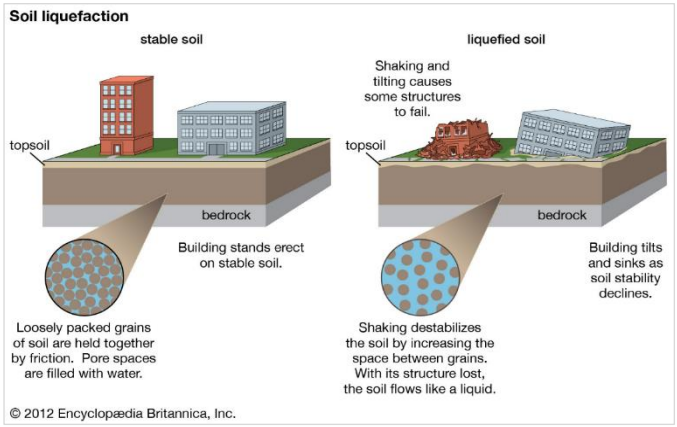
- Install a waterproof membrane it can be a monolithic membrane (rubber or plastic).
- Place a sheet of plastic on the waterproof membrane (this will serve as a root barrier).
- Place one more thin insulation layer on top of the first two layers.
- Set a drainage mat with capillary spaces on top of the insulation.

- Add soil.
- Set plants in place.

Mesh gutter guards can be installed with wood or other edgings that will permit drainage to hold soil in place. Devising and organizing supports is advised so they don't penetrate the waterproof membrane surface to prevent leaks.

Although green roof is a fairly new concept in India but a pro-active adoption of the concept is visible across the country. This has resulted in a progressive increase in the number of green roofs across urban cities. Eco-conscious and organic-friendly urbanites are conceding the importance of sustainable living as it is the need of the hour to sustain in the changing ecological conditions. As more people are moving and migrating around the urban areas, green roofs are looked upon as a sustainable way to produce and efficiently supply locally-grown fresh crops and vegetables to cities. Roofs can be used as a viable option for urban agriculture on the account of decreasing agricultural land, especially in Indian cities. It can play a significant role in urban environmental management and enhance the continuously deteriorating quality of air while offering organic, fertilizer-free produce.

5.1.2 Soil Liquefaction



Soil liquefaction, also called earthquake liquefaction, ground failure or loss of strength that causes otherwise solid soil to behave temporarily as a viscous liquid. The phenomenon occurs in water-saturated unconsolidated soils affected by seismic S waves (secondary waves), which cause ground vibrations during earthquakes. Although earthquake shock is the best known cause of liquefaction, certain construction practices, including blasting and soil compaction and vibrio flotation (which uses a vibrating probe to change the grain structure of the surrounding soil), produce this phenomenon intentionally. Poorly drained fine-grained soils such as sandy, silty, and gravelly soils are the most susceptible to liquefaction.

Granular soils are made up of a mix of soil and pore spaces. When earthquake shock occurs in waterlogged soils, the water-filled pore spaces collapse, which decreases the overall volume of the soil. This process increases the water pressure between individual soil grains, and the grains can then move freely in the watery matrix. This substantially lowers the soil's resistance to shear stress and causes the mass of soil to take on the characteristics of a liquid. In its liquefied state, soil deforms easily, and heavy objects such as structures can be damaged from the sudden loss of support from below.

Building constructed on loose soil pitch and tilt easily when liquefaction occurs, since the soil no longer supports the structures' foundations. In contrast, structures anchored to bedrock or stiff soils in earthquake-prone areas suffer less damage, because less vibration is transmitted through the foundation to the structure above. In addition, buildings anchored to bedrock have a reduced risk of pitching and tilting.

liquefaction may also contribute to sand blows, which are also known as sand boils or sand volcanoes. Sand blows often accompany the liquefaction of sandy or silty soil. With the collapse of the soil's granular structure, the density of the soil increases. This increased pressure squeezes the water out of the pore spaces between the soil grains and expels wet sand from the ground. Sand blows have been observed in the aftermath of several earthquakes, including the New Madrid earthquakes of 1811–12, the Tangshan earthquake of 1976, the San Francisco–Oakland earthquake of 1989, and the Christchurch earthquakes of 2010–11.

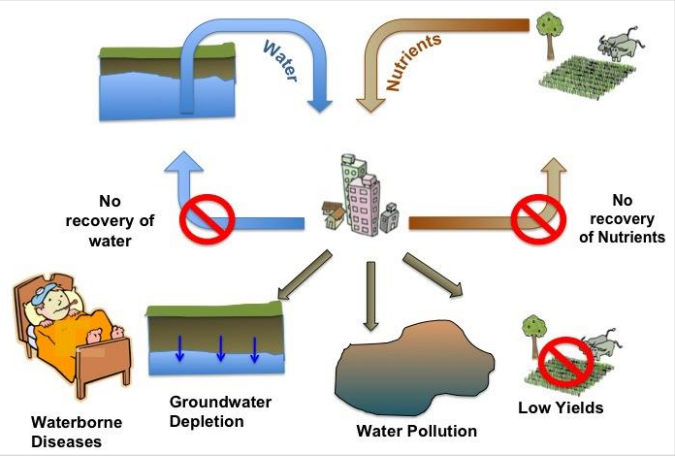
In addition, liquefaction may also cause landslides. For example, during the Alaska earthquake of 1964, the liquefaction of a sandy layer of soft clay beneath Turnagain Heights, a suburb of Anchorage, caused a landslide in the mass of ground above that destroyed approximately 75 homes and disrupted utilities.

5.1.3 Sustainable Sanitation

Sustainable sanitation is an approach that considers sanitation holistically. It recognises that human excreta and wastewater are not waste product, but a valuable resource.

- (Sustainable Sanitation and Water Management (SSWM))

Sustainable Sanitation is not a technology, but an approach having certain principles. The first principle of Sustainable Sanitation is to recognize that excreta and wastewater are not wastes, but resources that are valuable and can be reused and recycled. The main objective of sanitation is to provide a healthy and clean environment and breaking the cycle of disease. Now-a-days sustainable sanitation is identified as a key-driver for economic development and sustainable development in general. Recently this has become more and more popular around the globe and had led the UN General Assembly to declare the year 2008 as the "International Year of Sanitation (IYS)".



In the last few centuries, the basic concept of collecting domestic liquid waste from sewer systems, treating the wastewater in centralized treatment plants and discharging the effluent to surface water bodies has become the accepted, conventional approach to sanitation. These conventional sewer systems have improved with time in those countries that can afford to install and operate them properly. In countries like India where there is insufficient access to adequate sanitation it becomes a problem. Despite the vastness and the large population, India is working hard and is successful in providing water and sanitation facilities to its people around the country.

Under the Indian Constitution sanitation and water supply are the State's responsibility and according to the 73rd and 74th Constitutional Amendments, the State gives the responsibility and powers to Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs).

Through the State's Public Health Engineering Departments or Panchayati Raj Engineering Departments or Rural Development Engineering Departments the States generally design, operate, plan and execute the water supply schemes. However, the Center has through the Five Year Plans guided the investment and improved the financial instruments for implementation of infrastructure in the States. There have been many efforts made by the Government of India to focus on sanitation. Awards like Nirmal Gram Puruskar were created to make the sanitation drive more vigorous by the local self-governments.

Sanitation is an essential component in a person's life. In India, there are different legislations and schemes that are involved with sustainable sanitation. The Strategic Plan 2011-2022 of Department of Drinking Water and Sanitation- Rural Drinking Water's "Ensuring Drinking Water Security in Rural India" ensures that every rural person has enough safe water for drinking, cooking, and for other domestic needs, as well as livestock throughout the year including times of natural calamities. It states that, waste water treatment and recycling should be an integral part of every water supply plan or project. Management of liquid and solid waste should be promoted together with recycling and reuse of grey water for agriculture and groundwater recharge and pollution control. The Total Sanitation Campaign Guidelines, 2011 is another scheme involved with sustainable sanitation. It aims to improve the general quality of life in rural areas and by 2017 it aims to make toilets accessible to all and popularize sanitation in rural areas. Another aim is by promoting sustainable sanitation facilities through awareness creation and health education by motivating communities and Panchayati Raj Institution. It also aims to encourage cost effective and appropriate technologies for ecologically safe and sustainable sanitation and along with developing environmental sanitation systems by focusing on solid and liquid waste management.

Another scheme by the Government of India is the Nirmal Bharat Abhigyan, 2012. The Nirmal Gram Puraskar (NGP) was launched by the Government of India to give a fillip to the Total Sanitation Campaign and which sought to recognise the achievements and efforts made in ensuring full sanitation coverage. The award became immensely popular and thereby significantly adding to the achievements made for increasing the sanitation drive in the rural areas of the country. Encouraged by the success of the award, Total sanitation Campaign was renamed as Nirmal Bharat Abhigyan which aims to accelerate the sanitation coverage in rural areas to cover the rural community through different approaches. The Swachh Bharat Mission (Gramin) Guidelines also deals with sustainable sanitation. Its objectives are similar to that of Nirmal Bharat Abhigyan. Millions of people in India need to be provided with sustainable sanitation facilities in the years to come and millions of toilets and related sanitation systems are needed to be built to make sustainable sanitation successful.

5.1.4 Transport Infrastructure / system

Transport infrastructure consists of the fixed installations necessary for transport and includes roads, railways, airways, waterways, and terminals.

Transport is vital to the well-functioning of economic activities and a key to ensuring social well-being and cohesion of populations. Transport ensures everyday mobility of people and is crucial to the production and distribution of goods. Adequate infrastructure is a fundamental

precondition for transport systems. In their endeavor to facilitate transport, however, decision-makers in governments and international organizations face difficult challenges. These include the existence of physical barriers or hindrances, such as insufficient or inadequate transport infrastructures, bottlenecks and missing links, as well as lack of funds to remove them. Solving these problems is not an easy task. It requires action on the part of the governments concerned, actions that are coordinated with other governments at international level.

5.1.5 Vertical Farming

In vertical farming, crops are grown indoors, under artificial conditions of light and temperature.

Crops are grown indoors, under artificial conditions of light and temperature. It aims at higher productivity in smaller spaces. It uses soil-less methods such as hydroponics, aquaponics and aeroponics. Vertical farming uses significantly less water and pesticides than traditional agricultural methods. Being indoors, the crops aren't subject to seasons and hence give high productivity year-round. Lettuces, tomatoes and green crops can be produced through this practice.

Japan has been one of the early pioneers in vertical farming. It holds the largest share in the global vertical farming market. In Japan, vertical farming is born out of necessity where traditional farming is losing its face due to ageing population and rural migration.
Now, countries like Denmark and USA are also taking up vertical farming.

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

Mechanism:

In the case of Reinforced concrete structure, the ingress of moisture or air may lead to corrosion of steel, cracking and spalling of the concrete cover thereby reducing durability of the concrete structure. Repair has been suggested as the protective solution for damaged structure due to corrosion. Corrosion of reinforcing steel is a significant economic and safety problem, preventing many buildings from attaining their design life. It is now a must look into field as corrosion of reinforcing steel is seen almost in every 10 out of 100 constructions within a life of 10 years. Nowadays the increase content of pollutants in the city atmosphere has very much affected the lifespan of RCC structures. The increased content of pollutants includes a very high rates of Sulphates and Chlorides which when these mixes with rain water and falls over these structures and damages the visible parts.

Prevention:

Corrosion of steel in reinforced concrete structures can be divided into four different categories, based on how they provide protection: 1) Alternative reinforcement and slab design method includes materials that electrically isolate the steel from the concrete and create a barrier for chloride ions, materials that protect steel galvanic-ally, and materials that have significantly higher corrosion thresholds than conventional reinforcing steel. Concrete slabs have been designed without any internal reinforcement. 2) Barrier methods protect reinforced concrete from corrosion damage by preventing water, oxygen, and chloride ions from reaching the reinforcement and initiating corrosion. 3) Electrochemical methods use current and an external anode to protect the reinforcement, even when the chloride ion concentration is above the corrosion threshold. 4) Corrosion inhibitors offer protection by raising the threshold chloride concentration level, by reducing the permeability of the concrete, or by doing both.

5.1.7 Sewage treatment plant

Sewage is water that is discharged after residences, institutions, hospitals, industrial and commercial use.

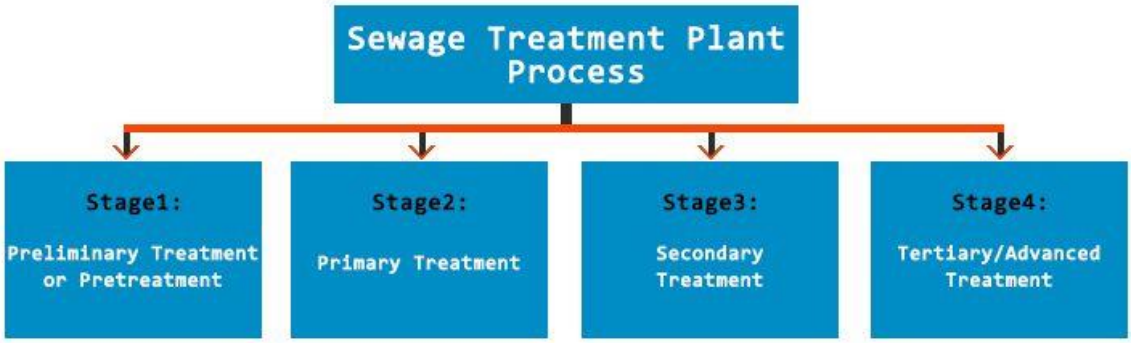
Sewage treatment refers to the process of removing contaminants, micro-organisms and other types of pollutants from wastewater influent. The main objective of sewage treatment is to produce an effluent (treated waste water) and a solid waste/sludge suitable for discharge into the natural environment.

For what purpose Sewage treatment is required?

Treatment of sewage or wastewater protects public health and prevents pollution, disease as well as hazards from sewage contaminants. Hence, sewage treatment is required.

What is sewage treatment plants and how they work?

It is one type of wastewater treatment methods which is designed to hold polluted water in specially designed compartments. This plant goes through series of stages that involves extracting waste from the waste water influent.



Sewage Treatment Process:

1. Preliminary Treatment: This is the first stage of sewage treatment plant process and its main objective is the removal of coarse solids and other large materials often found in raw wastewater. Preliminary treatment operations typically include large filtering screens, grit removal and, in some cases, breaking of large objects. Excess grit cause severe pump blockages thereby affecting a range of subsequent treatment pumps. Flow measurement devices, often standing-wave flumes, are always included at the preliminary treatment stage.

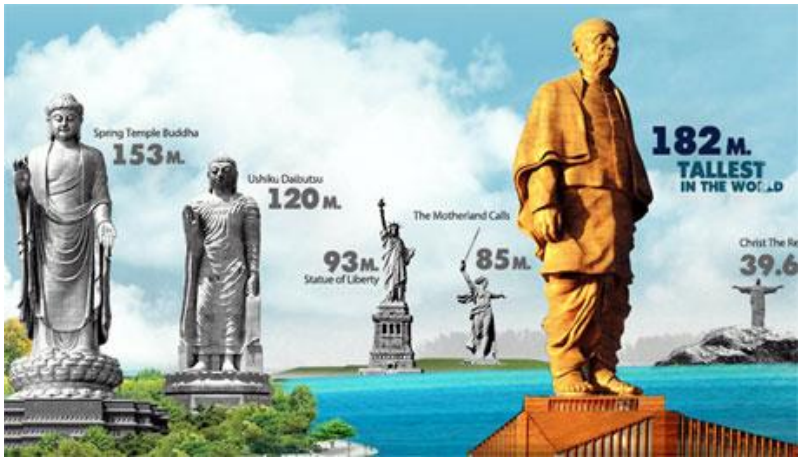
2. Primary Treatment: The main purpose of this treatment is to reduce any heavy solids (organic & inorganic) that settle to the bottom by sedimentation while oil, grease & lighter solids float to the surface by skimming. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to the next stage i.e. secondary treatment. Primary treatment removes about 60% of suspended solids from wastewater.

3. Secondary Treatment: The prime objective is the further treatment of the effluent from primary treatment to remove dissolved and suspended biological matter. The biological solids removed during secondary sedimentation, called secondary or biological sludge, are normally combined with primary sludge for sludge processing. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment. Secondary treatment removes more than 90% of suspended solids.

4. Tertiary/Advanced Treatment: Tertiary treatment generally follows secondary treatment and aids the removal of those wastewater constituents which cannot be removed in secondary treatment. Treated wastewater is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior its discharge into the receiving environment (sea, river, lake, wet lands, ground, etc.)

5.1.8 Case Study: Statue of Unity

The Tallest statue of the world:



The 'Statue of Unity' (SOU) is dedicated to the Iron Man of India, Sardar Vallabhbhai Patel. Sardar Patel is widely considered to be the architect of modern India. The SoU will stand tall as an inspiration to future generations, a reminder of Sardar Patel's sterling contribution. At 182 meters from the road entry and 208.5 meters from the river entry, the Soul will be the tallest statue in the world; taller than the 153 m tall Spring Temple Buddha in China and almost twice as tall as the world-famous Statue of Liberty in New York. For a sense of its height, the statue is 100 times larger than a man of average height of about 5 to 5 and a half feet!

Features of Sardar Patel statue

- An exhibition center at its base showcasing the life and achievements of Sardar Patel
- A 320 m long designer bridge connecting Sadhu Hill to the mainland
- A memorial and visitors' center
- 4-lane approach road
- An administrative complex, 3-star hotel and conference center
- A 40-m suspended fabric roof structure for the visitors' center

Engineering challenges

Wind, Earthquakes: Natural factors like wind and earthquakes posed stiff challenges. Situated right in the middle of the river Narmada, the statue is exposed to the tunnel effect of winds blowing down the river. Studies of wind patterns over the years revealed wind speeds of 39 m per second (roughly translated into 130 km/hr.) could buffet the statue in a worst-case scenario. The statue has been engineered to withstand wind speeds of up to 50 m per second (almost 180 km/hr.). The challenge is not only of the wind blowing against the statue but the succession effect it creates at the back of the statue that had to considered in the structural design.

Walking pose of sardar

The Sardar's legs are clad in a dhoti, his feet in chappals and in a walking pose that means that the statue is most slender at the base. The walking pose also opened up a gap of 6.4 meters between the two feet which then had to be tested to withstand wind velocity.

The Face

Another challenge came in the form of the look of the statue. Since Patel's face was an important aspect, special care was taken in casting the facial features that had to be as close as possible to the Sardar's face. The statue is also supposed to appear as if it is walking on water, towards the Sardar Sarovar dam, with its left leg slightly forward. The actual features of the Sardar were decided through a participative exercise involving thousands of people. A mock-up was created and exhibited for people to see and comment on it.

Moment of Men and Material

The statue is located amidst remote, mountainous terrain, which posed enormous difficulties in delivery of materials. A temporary Bailey's bridge connected the hill to the mainland. The statue base also stands above the highest flood level recorded over a 100-year period of the nearby Narmada dam. A detailed hydrological study was conducted by a specialist consultant to ascertain the river level and flow during various conditions. Altogether, the statue is divided into five zones. Up to its shin is the first zone, comprising three levels, including an exhibit floor, mezzanine and roof. It will contain a Memorial Garden and a large museum. Zone 2 extends up to the statue's thighs at 149 meters, while Zone 3 goes up to the viewing gallery at 153 meters. Zone 4 and Zone 5 would be out of reach of visitors, with Zone 4 comprising the maintenance area and Zone 5 the head and shoulders.

METHODOLOGY

Structure Design:

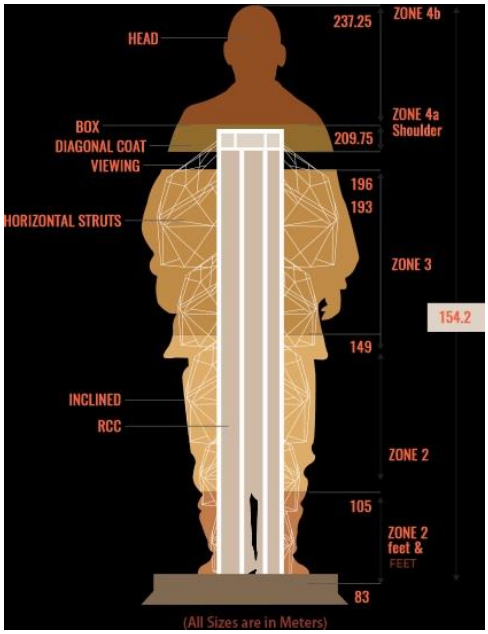
Part of the statue enclosed inside the 8mm bronze cladding is a two-layered structure. The innermost layer has two 127-metre-high towers made of reinforced cement concrete. These towers rise up to the chest area. The steel frame between the towers and the cladding forms the second layer. There were multiple engineering challenges too. One, unlike the Statue of Liberty and Christ the Redeemer, the Statue of Unity does not have a wider base.

A wider base is required to make a structure stable. As Patel wore a dhoti, the statue is thicker towards the top and thinner at the bottom. This challenge was overcome by keeping the slenderness ratio between the width of the statue and its height to 16:19 — significantly higher than the 8:14 ratio rule that is followed in the construction of high-rise structures. Two, the base of the statue, below the dhoti-clad legs, is about 25 metres high, equivalent to an eight-storey building. This part of the structure houses two massive lifts, which can carry over 25 people to a 135-metre-high gallery in just above half a minute. Fitting these vibration-causing machines inside the statue's two vertical cores, the first of its three layers, was a challenge for the engineers. Three, engineers had to factor in the speed of wind, and the possibility of earthquakes and flood. Being built on an island in the middle of Narmada, the statue will have to face the tunnel effect of winds blowing down the river. The walking pose of the statue opened up a gap of 6.4 metres between the two feet. To deal with these issues, the cladding used in the statue has overlapping panels, which allow it to move vertically and horizontally, to resist earthquake and wind forces. Two 250- tonne mass dampers, which are installed in structures to reduce the amplitude of vibrations, have been used. As a result, the statue is capable of withstanding wind blowing at almost 220 km per hour and surviving earthquakes measuring up to 6.5 on the Richter scale. Four, the statue's location amidst remote, mountainous terrain made transportation of equipment and material difficult. To make the movement to the island easier, the engineers banked on the fact that the island remains accessible from one side of the river via land for at least eight months post monsoon as water in the channel recedes. A rock bridge was built over shallow water and a temporary Bailey bridge was constructed for the monsoon, when there is more water in the river. Over 210,000 cubic metres of cement concrete, 18,500 tonnes of reinforced steel, 6,500 tonnes of structural steel, 1,700 tonnes of bronze, and around 1,850 tonnes of bronze cladding, made up of some 565 macro and 6,000 micro panels, were used to build the statue. Most of this material was moved using the two bridges.

CONSTRUCTION

A Consortium comprising Turner Construction, Michael Graves and Associates and the Meinhardt Group supervised the project. It took 56 months to complete – 15 months for planning, 40 months for construction and two months for handing over by the consortium. The total cost of the project was estimated to be about 20.63 billion (US$290 million) by the government. The tender bids for the first phase were invited in October 2013 and were closed in November 2013. Narendra Modi, then serving as Chief Minister of Gujarat, laid the statue's foundation stone on 31 October 2013, the 138th anniversary of Patel's birth.

Indian infrastructure company Larsen & Toubro won the contract on 27 October 2014 for its lowest bid of 29.89 billion (US$420 million) for the design, construction and maintenance. They commenced the construction on 31 October 2014. In the first phase of the project, 13.47 billion were for the main statue, 2.35 billion for the exhibition hall and convention centre, 830 million for the bridge connecting the memorial to the mainland and 6.57 billion for the maintenance of the structure for 15 years after its completion. The Sadhu



Bet hillock was flattened from 70 to 55 metres to lay the foundation. L&T employed over 3000 workers and 250 engineers in the statue's construction. The core of the statue utilised 210,000 cubic metres (7,400,000 cu ft) of cement concrete, 6500 tonnes of structural steel, and 18500 tonnes of reinforced steel. The outer façade is made up of 1700 tonnes of bronze plates and 1850 tonnes of bronze cladding which in turn comprise 565 macro and 6000 micro panels. The

bronze panels were cast in Jiangxi Tongqing Metal Handicrafts Co. Ltd (the TQ Art foundry) in China as suitable facilities were unavailable in India. The bronze panels were transported over sea and then by road to the workshop near the construction site where they were assembled. Local tribals belonging to the Tadvi tribe opposed land acquisition for the development of tourism infrastructure around the statue. They have been offered cash and land compensation, and have been provided jobs. People of Kevadia, Kothi, Waghodia, Limbdi, Navagam, and Gora villages opposed the construction of the statue and demanded the restitution of the land rights over 375 hectares (927 acres) of land acquired earlier for the dam as well as the formation of new Garudeshwar subdistrict. They also opposed the formation of Kevadia Area Development Authority (KADA) and the construction of Garudeshwar weir-cumcauseway project. The government of Gujarat accepted their demands. Construction of the monument was completed in mid-October 2018; and the inaugural ceremony was held on 31 October 2018, presided over by Prime Minister Narendra Modi. The statue has been described as a tribute to Indian engineering skills.

Environmental clearance:

In the Constitution of India, it is clearly stated that it is the duty of the state to ‘protect and improve the environment and to safeguard the forests and wildlife of the country’. It imposes a duty on every citizen ‘to protect and improve the Natural environment including forests, lakes, rivers, and wildlife’. Reference to the environment has also been made in the Directive Principles of State Policy as well as the Fundamental Rights. The Department of Environment was established in India in 1980 to ensure a healthy environment for the country. This later became the Ministry of Environment and Forests in 1985.

The constitutional provisions are backed by a number of laws — Acts, Rules, and Notifications. The Environment Protection Act, 1986 came into force soon after the Bhopal Gas Tragedy and is considered an umbrella legislation as it fills many gaps in the existing laws. Thereafter a large number of laws came into existence as the problems began arising, for example, Handling and Management of Hazardous Waste Rules in 1989. The Environment (Protection) Act, 1986

authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds. 1986 - The Environment (Protection) Rules lay down procedures for setting standards of emission or discharge of environmental pollutants. The environmental Protection Act, 1986 is an 'Umbrella' Act enacted by the national parliament. This Act empowers the Government to take all necessary measures to protect control and abate environmental pollution. The Act identifies the MoEF, Government of India as the apex nodal agency to deal with environmental problems of nation so that an integrated and holistic policy can be implemented with regard to the environment. The scope of this Act is very broad covering water, Air, Land and human beings and other living creatures. The main functions of MoEF are:
Coordination of the activities of various central and state authorities established under the previous Acts;

- Laying down emission/ effluent standard for various industrial activities;
- Powers to get information about the industrial process and to inspect the plant, premises, records and other necessary materials including seizure of the documents;
- Giving direction for closure, prohibition or regulation of industrial processes as necessary

Environmental Impact Assessment Notification 2006:
The Environmental Impact Assessment has been used as a management tool to minimize adverse impacts of the developmental projects on the environment and to achieve sustainable development through timely, adequate, corrective and protective mitigation measures. The Ministry of Environment and Forests (MoEF) has used Environmental Impact Assessment Notification 2006 as a major tool to regulate rapid industrial development of the country for minimizing the adverse impact on environment and reversing the trends which may lead to climate change in long run. Environmental Ministry has said that they are looking into the issue. In a couple of days, ministry will decide whether to send an inquiry team to Gujarat or issue a notice to the State Government. A 10 member delegation headed by Shri Ganpatsinh Vasava, Minister of Gujarat Forest & Environment will meet Governor SC Jamir and Chief Minister Naveen Patnaik and seek their support for the project.

Results and Discussions:
Funding: The statue was built by Public Private Partnership model, with most of the money raised by the Government of Gujarat. The Gujarat state government had allotted 6 billion (US$83 million) for the project in the budget from 2012 to 2015. In the 2014–15 Union Budget, 2 billion (US$28 million) were allocated for the construction of the statue. Funds were also contributed by Public Sector Undertakings under Corporate Social Responsibility scheme.

Tourism:
Over 128,000 tourists visited it in 11 days since it was opened to the public on 1 November 2018. Buses take tourists from the parking lot to the statue, as the area around the statue is a "no private vehicle" zone. Elevators run from 3 to 5 pm to take tourists with tickets up to the observation deck at the top. The statue remains closed every Monday for maintenance.

Future Plans
As of November 2018, construction was still in progress around the statue for various aspects of the project. As per the government, there are plans to introduce alternate means of transport to improve accessibility to the memorial, including a boat service. An amphibian bus from

Kevadiya is also planned as is a jetty service from the site of the Sardar Sarovar dam and a ropeway.

conclusion
The project requires environmental clearance from the competent authority. As has been done in recent cases of Adani in SEZ Kutch, the work should be immediately stopped and recommenced after getting environmental clearance. State government has no right to violate the EIA Notification. Statue of Unity is truly an engineering marvel. It is a tribute to Indian engineering skills. Our skilled labors, architects and engineers have received immense appreciation for constructing this intricately designed enormous piece of art. We are proud to have the tallest statue of the world in our country.

Statue of Unity is a symbol of unity and strength. It reflects the true personality of Sardar Patel who was strong and robust. The initiative taken by PM Modi has been supported and appreciated by people in power as well as the general public. PM Modi sees this statue as an inspiration for the people of our country.

5.2 Concept (Electrical)

5.2.1 Programmable Load Shedding

The demand for electrical energy is increasing. Today over 21% of the total electrical energy generated in Nigeria is lost in transmission (4-6%) and distribution (15-18%). The electrical power deficit is currently about 18% in the country. Clearly, reduction in distribution losses can reduce this deficit by significantly. Its possibility to bring down the distribution losses to a 6-8 % level in India with the help of newer technological option (including information technology) in the electrical power distribution sector which will enable better monitoring and control. The project “Electricity and load shedding monitoring” are designed such that distribution point or grids monitored and load shedding from one central location.

Load shedding in electrical supply networks is a controlled process in which the utility company drops off part of the load in order to balance the demand and the generated capacity. This is often done whenever there is excess load on the system. In standby generators, it involves disconnecting or shedding some circuits to prevent an overload condition. The main aim of this work is to build a microcontroller-based device for on or off a power supply whenever there is excess load on the system. Most common problems that we face is monitoring feeders, substation, Distribution Transformers and Distribution points from one central location. In this project we will be making a prototype to monitor a distribution point from a central location and if any problem occurs information will be sent to the central unit. Moreover, theft is also quite common at the distribution points as it is not possible for someone to monitor them24 hours. When load shedding occurs in an area the complete power to the concerned area is cut off, these include street lights, traffic signals and important utilities like hospitals, police

stations & fire brigade even their power is turned OFF. In this project, this device can cut off the power to specific area by just sending an SMS to the concerned Distribution Point there by retaining power for the basic utilities.

Aim of the project

The main aim of this work is to build a microcontroller-based device the on/off a power supply whenever there is excess load on the system.

Purpose of the project

This project is required for load shedding time management which is used when the electricity demand exceeds the supply and there comes a need for manually switching ON/OFF the electrical devices in time. However, the purpose of the system is to eliminates the manual operation by automatically switching the load
ON/OFF.

Significance of the project

1. Prevents overloading and damage of the power generators
2. Prevents instability and system collapse of the electrical generation and distribution systems
3. Ensures that consumers or parts of the network have power as opposed to a total blackout.
4. The planned schedules ensure that available capacity is shared fairly and each consumer gets power at one time or another.
5. It serves as a warning to the utility hence forcing them to increase capacity, and efficiency so as to meet the demand.

Disadvantages of load shedding

I. One another major problem in our society created by load shedding is safety. Even though this point looks farfetched it is a dangerous problem. People in our society not only work at day but have night shifts as well. These people face serious threat from attackers at night specially walking down dark narrow lanes with no light. They can be easy prey to any thieves or robbers.

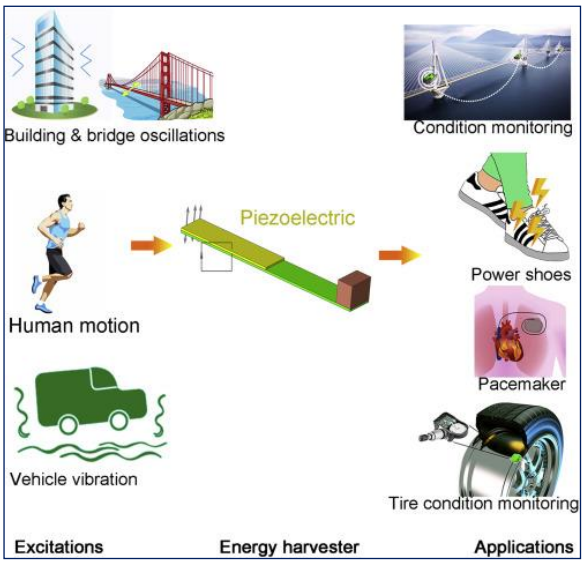
ii. The other disadvantage is that the students are going to have a hard time studying without light. Our country's future looks dark if the students who are to lead the country in future are deprived of the basic infrastructure which helps them move forward. Load shedding not only stops them from reading and writing but blocks the path to them getting knowledge through internet, television etc. iii. Other disadvantages can be people and hospitals having problems with their day-to-day activities. Offices not being able to run properly, people not being able to do their work on time. These are only branches of a huge problem our country faces. The root problem could lead to financial breakdown and an economic disbalance in the country with all the importing of electricity and everything. 1. The utilities may not increase the output 2. Restoring the load may cause more instabilities

5.2.2 Management through Energy Harvesting Concept:

<u>What is energy harvesting?</u>

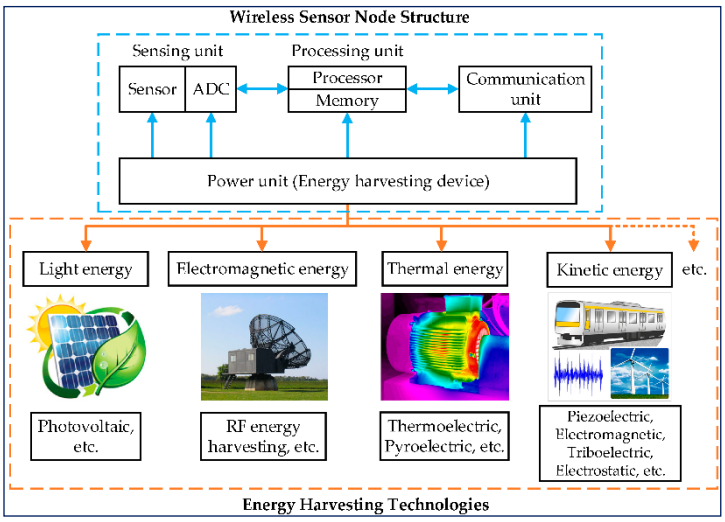
Energy harvesting is commonly defined as the conversion of ambient energy into Electrical energy This definition is too narrow. We define energy harvesting as “the Collection and storage of ambient energy for on-demand, off-grid use”.

The first definition considers only the transducer technology for energy conversion, and Assumes that the energy must be converted to electricity. Our definition takes abrader, application centric view, where the transducer is one component of complete system that provides power for those niche applications where other sources of energy are unavailable or unsuitable.



Ambient Energy

Energy is all around us, in many different forms – thermal, chemical, electrical, Mechanical and more. To make use of energy harvesting one or more of these energy Fields must be present in the environment of interest, and there must be a suitable Transducer to convert the energy.



Off-grid energy

Energy harvesting is used where another supply of energy is not available. Harvesters Cost money, so it only makes sense to use them when it is too expensive or physically Impossible to use other energy sources such as grid electricity or batteries.

On-demand energy

An energy harvester has to supply power when it is needed, not simply when it is Available, and some form of energy storage is generally required to match the demand With the supply.

<u>Balancing the energy supply and energy demand</u>

How much energy is available?

There are in principle many different energies fields available from which to harvest Energy:

- Radiation (light, solar, cosmic rays, electromagnetic radiation)
- Thermal
- Mechanical (potential, kinetic, elastic, fluid)
- Gravitational
- Chemical (battery, fuel cell, fossil fuels, phase change)
- Nuclear

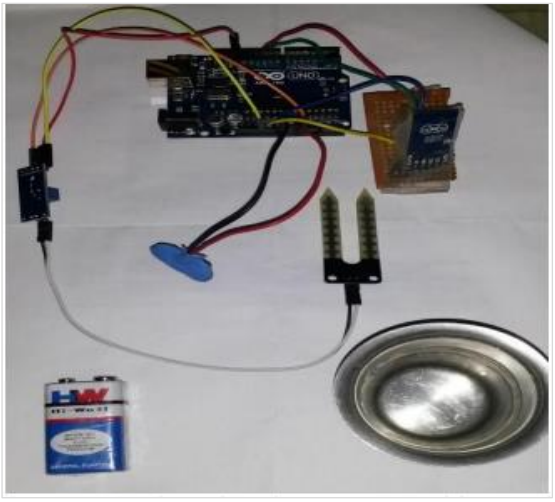
- Magnetic (Magnetisation, currents etc)
- Electric

In practice, many have no value for energy harvesting. Sound, cosmic radiation, Atmospheric pressure variation and nuclear background radiation are universally Present, but have almost no associated energy. Whether the other energy fields are Usable depends entirely on the location of the harvester, and the list of useful energy Types usually comes down to only one or two that are suitable for a given application in A given location.
Outdoors above ground, sunlight is a good source of energy with high energy density, And good predictability. Wind can be suitable for large enough applications that are High up enough to provide clear airpaths. Suitable temperature differences and Vibrations are hard to find.
Indoors, artificial lighting can provide enough power for low power applications, such as Calculators, but most other fields are not present or do not provide enough energy.
For vehicles and for industrial applications, machine vibrations and thermal gradients Are often practical, since there are high temperatures and strong vibrations at known Frequencies.
Human motion can be usefully harvested. Commercial products include the wind up Radios, torches and phone chargers produced by Free play and others, and bicycle Powered computing in India

How much energy is needed?
Different kinds of devices have very different energy requirements. A pacemaker Requires only around five Joules of energy to operate for a day, whereas a desktop Computer requires around 5 Mega joules – a million times more.
Some devices operate continuously, and the average power requirement is the same As the instantaneous power requirement. Other devices only need to operate Intermittently – something that is on for 1 second, and then off for 9 seconds has a 'duty cycle' of 10%, and the average power requirement is thus only 10% of the Maximum power requirement.
Whether or not a particular application can make use of energy harvesting depends on Understanding its energy usage profile, and matching it with the energy available from Harvesting. The table below gives figures for the energy and power requirements of a Range of common devices.

Energy harvesting is useful when:
- There is a match between the available energy and the energy needed
- Energy harvesting provides a benefit that is not achievable using batteries or grid Electricity

5.2.3 Moisture Monitoring System
Soil moisture sensors measure the volumetric water content in soil. [1] Since the direct gravimetric measurement of free soil moisture requires removing, drying, and weighting of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing in hydrology and agriculture. Portable probe instruments can be used by farmers or gardeners.



Measuring soil moisture is important for agricultural applications to help farmers manage their irrigation systems more efficiently. Knowing the exact soil moisture conditions on their fields, not only are farmers able to generally use less water to grow a crop, they are also able to increase yields and the quality of the crop by improved management of soil moisture during critical plant growth stages. Soil moisture sensors are used in numerous research applications, e.g. in agricultural science and horticulture including irrigation planning, climate research, or environmental science including solute transport studies and as auxiliary sensors for soil respiration measurements.

The proposed hardware of this system includes 8-bit AVR, Blue tooth module, and soil moisture sensors. The system is low cost & low power consuming so that anybody can afford it. The data monitored is collected at the server. The system should be designed in such a way that even illiterate villagers can operate it. During irrigation period, they have to monitor their distant pump house throughout the night as the electricity supply is not consistent. The system can be installed at the pump house located remotely from the village; it is interfaced with the pump starter & sensors are plugged at different location in the field for data acquisition. Using this system, they can switch on their pump from their home whenever they want. The soil moisture sensor used is capacitive type. The sensor gives analog output of zero volt when there is 100% moisture and 5V for 0% moisture.

The Arduino Micro is a microcontroller board based on the ATmega32U4 (datasheet), developed in conjunction with Ad fruit. It has 20 digital input/output pins (of which 7 can be used as PWM outputs and 12 as analog inputs), a 16 MHz crystal oscillator, a micro-USB connection, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a micro-USB cable to get started. It has a form factor that enables it to be easily placed on a breadboard.

Automatic irrigation system uses an 8051-series microcontroller which is programmed to receive the input signal of varying moisture condition of the soil through the sensing arrangement. This is achieved by using an op-amp as comparator which acts as interface between the sensing arrangement and the microcontroller. Once the controller receives this signal, it generates an output that drives a relay for operating the water pump. An LCD display is also interfaced to the microcontroller to display status of the soil and water pump. The sensing arrangement is made by using two stiff metallic rods inserted into the field at a distance. Connections from the metallic rods are interfaced to the control unit. The concept in future can be enhanced by integrating GSM technology, such that whenever the water pump switches

ON/OFF, an SMS is delivered to the concerned person regarding the status of the pump. We can also control the pump through SMS.

This Soil Moisture Sensor based agriculture monitoring system serves as a reliable and efficient system for monitoring agricultural parameters. The corrective action can be taken. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. It is cheaper in cost and consumes less power.

5.2.4 Home Automation using IoT

A home automation system makes the operations of various home appliances more convenient and saves energy. With the energy-saving concept, home automation or building automation makes life very simple nowadays. It involves automatic controlling of all electrical or electronic devices in homes or even remotely through wireless communication. Centralized control of lighting equipment, air conditioning and heating, audio/video systems, security systems, kitchen appliances and all other equipment used in home systems is possible with this system.

This system is mainly implemented by sensors, controlling devices and actuators as shown in the figure. The sensors detect light, motion, temperature and other sensing elements, and then send that data to the main controlling devices. These sensors can be thermocouples or thermistors, photodetectors, level sensors, pressure sensors, current transformers, IR sensors, etc., which need additional signal conditioning equipment to communicate with the main controller.

Controllers may be personal computers/laptops, touchpads, smartphones, etc., attached to the controlling devices like programmable logic controllers that receive the information from the sensors, and based on the program, control the actuators. This program can be modified based on load operations. The programmable controller allows connecting various sensors and actuators through various input and output modules whether they are analog or digital.

Actuators are the final controlling devices like limit switches, relays, motors, and other controlling mechanisms which finally control the home equipment. Communication plays an important role in this home automation system for remote access to these operations. This smart home system also provides continuous monitoring through video surveillance with cameras, scheduling, and energy-saving operations. This is the best solution even for the elderly and disabled persons to operate the equipment.

Types of Home Automation Systems

Implementation of home automation depends on the type of controls like wired or wireless. There are mainly three types of home automation systems:

1. Power line Based Home Automation
2. Wired or BUS Cable Home Automation
3. Wireless Home Automation

1. Power Line Home Automation System

This automation is inexpensive and doesn't require additional cables to transfer the information, but uses existing power lines to transfer the data. However, this system involves a large complexity and necessitates additional converter circuits and devices.

2. Wired Home Automation System

In this type of automation, all the home equipment is connected to the main controller (programmable logic controller) through a communication cable. The equipment is attached with actuators to communicate with the main controller. The entire operations are centralized by the computer that continuously communicates with the main controller.

3. Wireless Home Automation

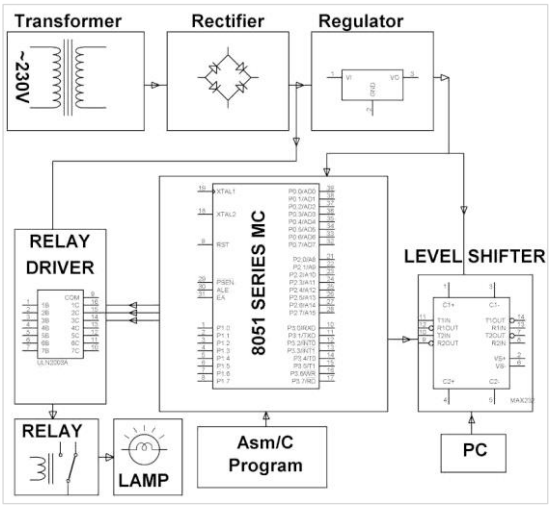
This is the expansion and advancement of wired automation which uses wireless technologies like IR, Zigbee, Wi-Fi, GSM, Bluetooth, etc., for achieving remote operation. As an example, the GSM based home automation provides the controlling of home equipment by an SMS to the GSM modem. As a practical example, the following home automation system project, in which loads are controlled by a touch panel, is very informative.

Touch Screen Based Home Automation System

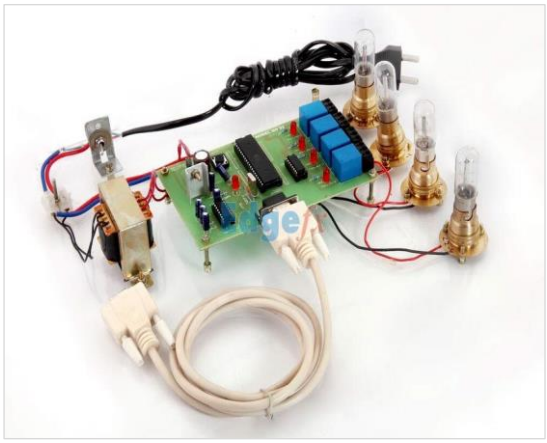
This touch-screen based home automation explains how the automation can be implemented to our homes at lower costs. In this system, a microcontroller is attached to the light loads to control them. At the controlling side, a touch screen allows any user to send the command signals to operate the loads. These signals are transferred to the microcontroller, and according to the program written, it sends the command signals to the encoder circuit. An encoder converts this data into binary format, and then transfers that to an RF transmitter; from there the data is transmitted to the receiver section.

Touch Screen Based Home Automation System- Transmitter, at the receiver side, the RF receiver receives the information sent by the transmitter section, and then decodes and transfers that to the microcontroller. Therefore, the microcontroller sends the command signals to an optoisolator, which triggers the TRAICs. All the light loads are controlled by the TRIACs; as switches, these are enabled only after triggering their gates.

5.2.5 PC Based Electrical Load Control



The aim of this project is to control the electrical appliances through a personal computer (PC). For example, theatre lighting can be centrally controlled form the PC for better stage management. The aim of this project is to control the electrical appliances through a personal computer (PC). For example, theatre lighting can be centrally controlled form the PC for better stage management. Presently, they are manually managed which makes it difficult to coordinate the lighting with the respective scene. With this system, one can control the electrical appliances ON/OFF by just being seated at one place using a PC.



This system is integrated with the electrical loads and also connected to the PC where centralized control takes place. It uses an RS-232 protocol from the microcontroller to communicate with the PC. To turn on/off the appliances, we use Hyper Terminal on PC.

Once the connection is established with the PC, then the system starts working. The microcontroller used in this project belongs to 8051 family. This project can be further enhanced by implementing a GUI based control panel on the PC with appropriate embedded software. The intensity control can also be incorporated using power electronics devices. Note: The project works only on operating systems having hyper terminal (E.g., Windows XP). The computer must have a RS232 serial port.

Electrical appliances can be controlled through a PC interfaced to a microcontroller. This interface is done through a level shifter IC. The loads are then controlled through the relays duly interfaced to the relay driver which in turn is connected to the microcontroller.

Chapter 6. Swatchh Bharat Abhiyan (Clean India)

Introduction:

Swachh Bharat Abhiyan is a Clean India drive and Mission launched as a national campaign by the Indian Government aimed at maintaining cleanliness of streets, roads and infrastructure of the country. Indian Prime Minister, Narendra Modi has officially launched this mission on 2nd of October (the birth anniversary of the Mahatma Gandhi) in 2014 at Rajghat, New Delhi. While launching the event Prime Minister himself had cleaned the road. It is the biggest cleanliness drive ever in India where approximately 3 million government employees including students from schools and colleges took part in the cleanliness activities.

Table 6.1 Overview of Swachh Bharat Abhiyan

PM Modi launches Swachh Barat Abhiyan	
Slogan	One step towards cleanliness
Country	India
Prime Minister	Narendra Modi
Launched	Raj Ghat: 2 October 2014; 6 years ago,
Status	Phase 1 Ended, Phase 2 Launched
Website	Swachhbharat.mygov.in

On the day of launch of the event PM himself has nominated the name of nine people to participate in the cleanliness drive in their own areas. Schools and colleges have participated in the event by organizing many cleanliness activities according to their own themes. Students of India participated in this event. PM had also requested to all those nine nominees to call another nine people separately to participate in this cleanliness drive as well as continue the chain of calling nine people by each and every participated candidate of the mission until the message reach to the every Indian in every corner of the country to make it a national mission.

Aim of the Mission:

This mission aimed to join each and every Indian people from all walks of life by making the structure of branching of a tree. Swachh Bharat mission aimed to construct individual sanitary latrines for household purposes for the people living under poverty line, converting dry latrines

into low-cost sanitary latrines, provide facility of hand pumping, safe and secure bathing, set up sanitary marts, construct drains, disposal of solid and liquid wastes, enhance health and education awareness, provide household and environmental sanitation facilities and many more.

Earlier many awareness programs (such as Total Sanitation Campaign, Nirmal Bharat Abhiyan, etc) about the environmental sanitation and personal cleanliness were launched by the Indian government however could not be so effective to make India a clean India. The main objectives of Swachh Bharat Abhiyan are removing the trend of open defecation, changing insanitary toilets into pour flush toilets, removal of manual scavenging, proper disposal of solid and liquid wastes, bring behavioral changes among people, enhance awareness about sanitation, facilitating the participation of private sectors towards cleanliness facilities. First nine nominated people by the PM of this abhiyan are Salman Khan, Anil Ambani, Kamal Hassan, comedian Kapil Sharma, Priyanka Chopra, Baba Ramdev, Sachin Tendulkar, Shashi Tharoor and team of Taarak Mehta Ka Ooltah Chashmah (a most famous TV series).

Conclusion:
Other programs like Swachh Bharat Run, Swachh Bharat apps, Real-time monitoring system, Swachh Bharat short film, Swachh Bharat Nepal – Swasth Bharat Nepal Abhiyan and so many has been initiated an implemented to actively support the purpose of the mission.

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

In village there are some locations where garbage dumped at road sides. Nearby area of bus stop of Ranol village is required cleaning. So, there required a dustbin near some social locations and required a dump yard outside the village where land is useless.

Figure 6.2 Unclean Roads of Ranol

Figure 6.1 unclean bus stop of Ranol

6.2 Guidelines - Implementation in allocated village with Photograph

According to Talati, Sarpansh and villagers, people are cleaning their nearby area regularly and collect that waste and dispose it to out of the village and burn it. No daily basis waste collection is there in the Ranol village.

Figure 6.3 market

Figure 6.4 Milk dairy

6.3 Activities Done by Students for allocated village with Photograph

Firstly, we took a permission from village Talati and Sarpanch for interaction with people about Swachhta awareness and then we have done an interaction with villagers and aware them about the swachhta in our life and show them importance of keeping the village and infrastructure clean and safe. Aware about the diseases spread from garbage and how the plastic harm the environment.

Figure 6.5 public interaction for present the importance of swachhta in our life

Chapter 7. Village condition due to Covid-19

With respect to COVID 19 pandemic, Ministry of Panchayati Raj, Government of India in close collaboration with State Governments has taken various initiatives. Close consultation and guidance of the State as well as District authorities is being maintained to ensure that lock down conditions are not violated and norms of social distancing are scrupulously followed to contain the spread of the disease. India has overtaken Brazil and become the second-worst affected country in the world by the coronavirus pandemic, with more than 4 million cases. COVID-19 had mostly remained in India's cities, but the disease is now spreading to rural India – an area with over 850 million people and far worse healthcare. The reason for this shift appears to be migrant workers who have been returning to their villages since lockdown was eased at the end of June. The medical response to stop the spread and treat those infected has been inadequate, according to media reports. With one trained doctor for every 1,497 people, against the World Health Organization recommended one per 1,000, and public health expenditure for 2018 at just 1.3% of GDP, India faces an uphill struggle in dealing with the pandemic. While two-thirds of India's population lives in rural areas, there are almost four times as many health workers per person in cities. Most rural communities rely on untrained health workers. Over two-thirds of these rural health providers have no formal medical training, but remain the only option of medical support for most of the rural population

7.1 Taken steps in allocated village related to existing situation with photograph

There are no any case of COVID-19 in village, but there are some villagers have siemstance of corona so sarpanch suggest them for home quarantine. And here organized ayurvadik ukala camp for villagers and distributes masks, soaps to villagers and suggest to follow the guidelines of corona. Also donate food kit to poor families of village.

Figure 7.3 sanitizing during COVID-19

Figure 7.2 Health check-up

Figure 7.4 donating soaps

Figure 7.1 Donating Food

7.2 Activities Done by Students for allocated village with Photograph

We have taken a permission from Talati and Sarpanch for doing one awareness regarding covid 19 in Ranol village and then we did awareness camp regarding covid 19. In that awareness camp we distributed masks to the villagers for the protection against covid 19 and aware them about covid 19 situation in India and take precautionary measures like wear a mask perfectly, wash hands regularly, maintain social distancing in public place and avoid crowdy area & firstly make yourself home quarantined if you fill any COVID-19 symptom in your body.


Figure 7.5 mask donation & interaction

7.3 Any other steps taken by the students / villagers

During interaction with the Talati, he told us that quarantine place and home quarantine facility were implemented during the lockdown. In the COVID-19 situation fogging and sanitization, health check program did by villagers.

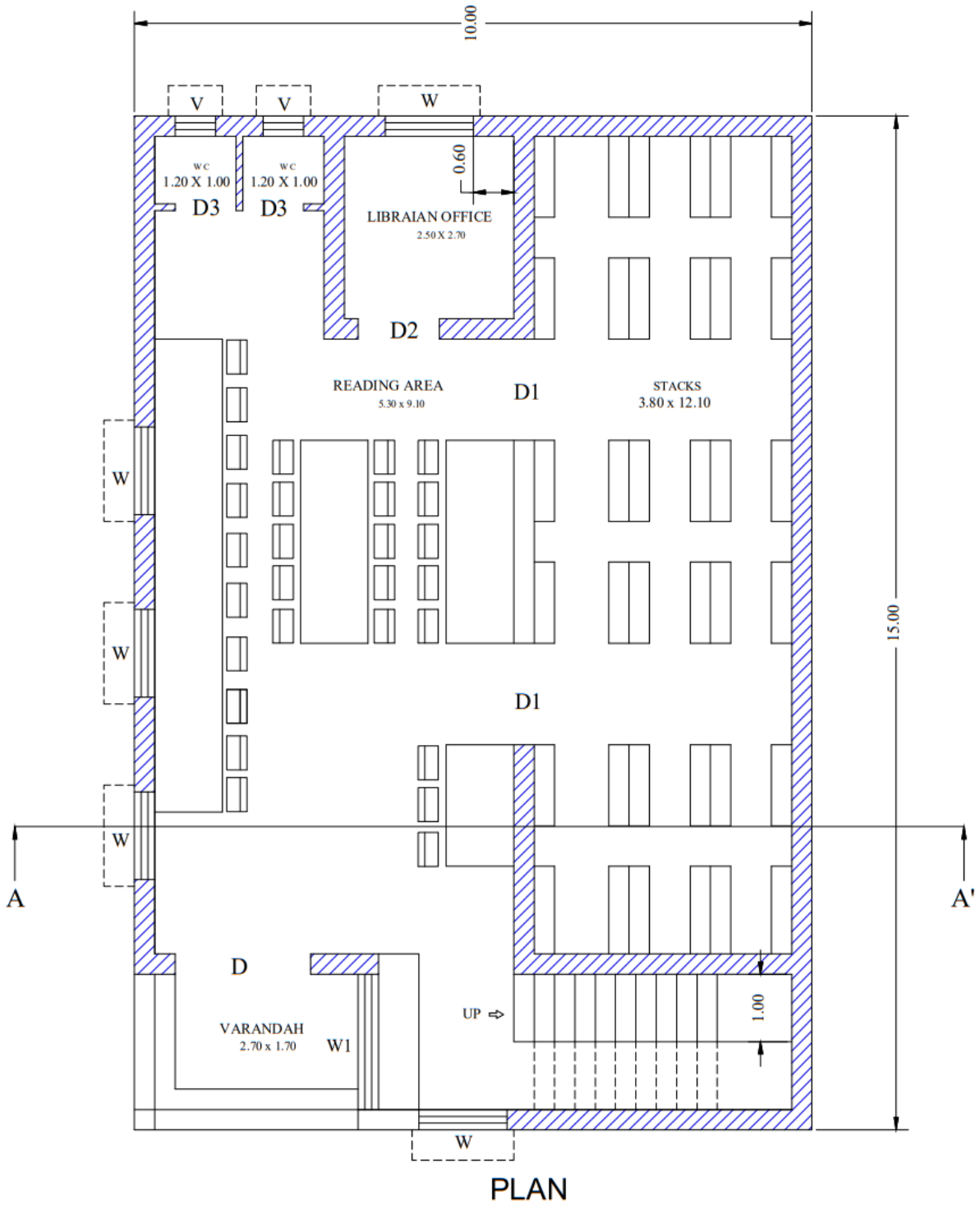
Figure 7.7 sanitizing

Figure 7.6 health checkup

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

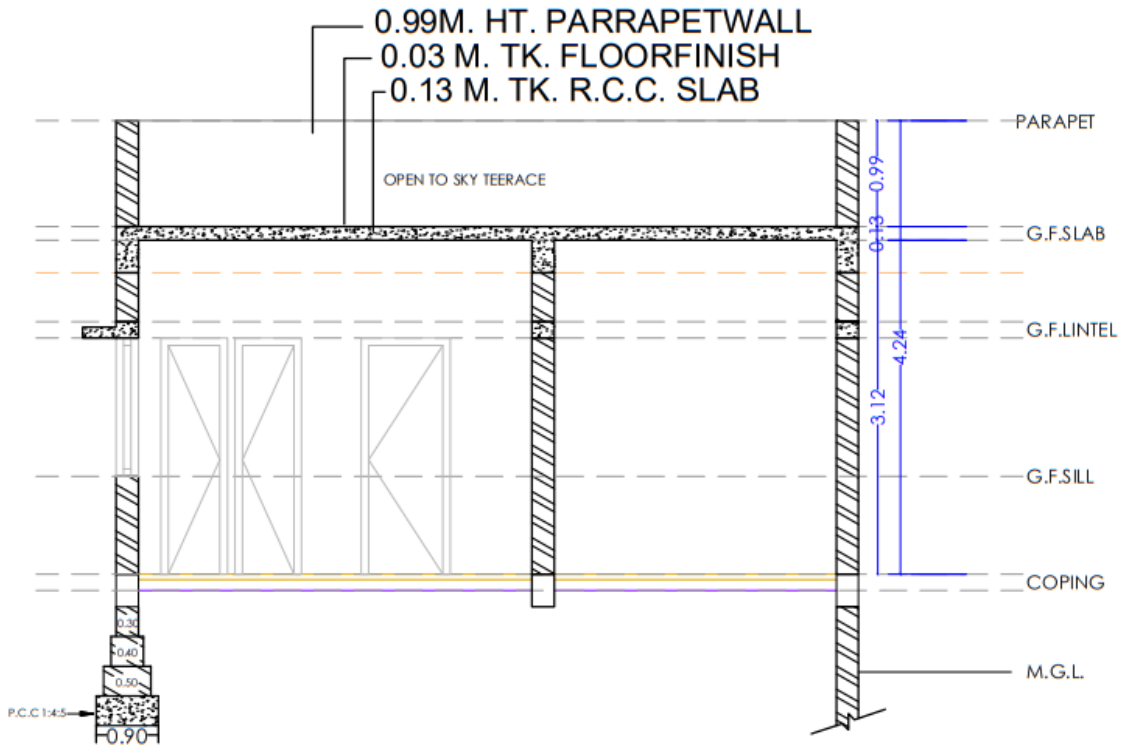
8.1 Design Proposals

8.1.1 Sustainable Design (Civil): Library

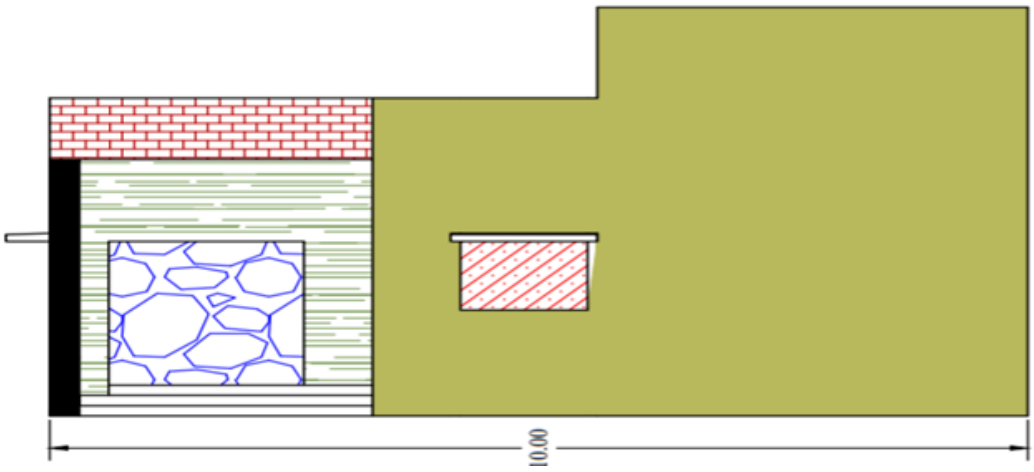


PLAN

LIBRARY



SECTION: A-A'



ELEVATION

Table 8.1 Door and Window Schedule for designs

DOOR & WINDOW SCHEDULE		
SR. NO.	DESCRIPTION	DIMENSION (M)
1	DOOR -D	2.00 × 2.10
2	DOOR -D1	1.50 × 2.10
3	DOOR – D2	1.20 × 2.10
4	DOOR – D3	0.90 × 2.10
5	WINDOW – W	1.30 × 1.20
6	WINDOW – W1	2.00 × 1.20
7	VENTILATION - V	0.60 × 0.60

Quantity sheet of library

C.l.= ((0.3/2)+2.4+(0.3/2) + 2((0.3/2)+2.5+(0.3/2)) + ((0.3/2)+3.8+(0.3/2)+
((0.3/2)+6.1+(0.3/2)+((0.3/2)+3+(0.3/2)+3((0.3/2)+12.1+(0.3/2)+2((0.3/2)+2+(0.3/2)+((
0.3/2)+1+(0.3/2)+((0.3/2)+2.7+(0.3/2)
= (9.7+5.6+4.1+6.4+3.3+33.2+4.6+1.2+3)
= 75.1 m

Table 8.2 Quantity Sheet for Library

no.	Description	No.	L	W	H	Qty.	Total Qty.
1	Excavation for foundation upto 1.5 in ordinary soil						
	L : 75.1-8(0.90/2)						
	L : 71.5 m	1	71.5	0.9	1.1	70.79	m^3
2	PCC (1:4:8) for foundation						
	L : 75.1-8(0.90/2)						
	L : 71.5 m	1	71.5	0.9	0.2	12.87	m^3
3	Brick masonary cm(1:6) for foundation						
	1st footing						
	L : 75.1-8(0.5/2)						
	L : 73.1 m	1	73.1	0.5	0.3	10.97	
	2nd footing						
	L : 75.1-8(0.40/2)						
	L : 73.5 m	1	73.5	0.5	0.3	11.03	
	Up to G.L.						

	L : 75.1-8(0.3/2)	1	73.9	0.3	0.3	6.65	
	L : 73.9 m					28.65	A
	G.L. to P.L.						
	L : 75.1-8(0.3/2)						
	L : 73.9 m	1	73.9	0.3	0.55	12.19	B
	Brick Masonary for step						
	1st step	1	5	0.6	0.15	0.45	
	2nd step	1	4.7	0.3	0.15	0.21	
						0.66	C
						A+B+C	41.5
4	Brick masonary in cm(1:6) for super structure above plinth	1	73.9	0.3	3.05	67.62	A
	L : 75.1-8(0.3/2)						
	L : 73.9 m						
	H: 0.70 + 1.40 + 0.15 + 0.80						
	H: 3.05 m						
	Parapet wall	1	50	0.3	0.7	10.5	B
	C/L = (10x2)+(15x2)=50m						
	Stair cabin	1	1.6	0.3	2.7	7.78	C
	C\L= (2.8x2)+(12x2)=9.6 m						
	Deduction for door & Window						
	Door:						
	D	1	2	0.3	2.1	1.26	
	D1	2	1.5	0.3	2.1	1.89	
	D2	1	1.2	0.3	2.1	0.76	
	D3	2	0.9	0.1	2.1	0.38	
	Window W	5	1.3	0.3	1.2	2.34	
	Window W1	1	2	0.3	1.2	0.72	
	Ventilator V	2	0.6	0.3	0.6	0.22	
						7.57	D
	Deduction for lintel						

	on D	1	2.3	0.3	0.1	0.07	
	D1	2	1.8	0.3	0.1	0.11	
	D2	1	1.5	0.3	0.1	0.05	
	D3	2	1.2	0.3	0.1	0.07	
	W	5	1.6	0.3	0.1	0.24	
	W1	1	2.3	0.3	0.1	0.07	
	V	2	0.2	0.3	0.1	0.05	
						0.66	E
	Total Qty.						
	A+B+C-D-E						
	67.62+10.5+7.57-0.66+7.78					77.67	m^3
5	Controlled Cement concrete						
	(1:2:4) for RCC work						
	1.slab having >10 to 13 cm						
	thickness on.						
	Reading room,book room &	1	15	10	0.1	15	m^3
	passage						
	2. lintel as per qty i-4 RCC lintel					0.66	m^3
6	Controlled cement conrete						
	for RCC chajja.						
	On W	5	1.3	0.6	0.1	0.39	
	W1	1	2	0.6	0.1	0.12	
	V	2	0.6	0.6	0.1	0.07	
						0.58	m^3
7	Reinforcement for RCC work.						
	A. For RCC slab assuming						
	0.8% steel as per 0.8×7850×15						
						942	A
	B. For RCC chajja assuming						
	1.5% steel as per i-6						
	1×7850×0.58					45.53	B
	C. For RCC lintel assuming						
	1.5% steel qty as per i-5 (2)						
	1.5/100×7850×0.66					77.72	C

						1065.25	kg
8	Filling for Foundation						
	upto 1.5 m depth in Ordinary						
	soil (As per i-1)					70.79	
	Deduction for Pcc						
	(As per i-2)					12.87	
	Deduction for brick masonary						
	in cm for foundation					28.65	
						29.27	
9	Filling for Foundation in						
	plinth with muram or selected						
	soil.						
	H=0.60-0.05						
	0.55						
	Stocks	1	12.1	3.8	0.55	25.29	
	Reading room	1	9.1	5.3	0.55	26.53	
	Library office	1	2.7	2.5	0.55	3.71	
	Wc	2	1.2	1	0.55	1.32	
	Stair place	1	6.1	2	0.55	6.71	
	Varndah	1	2.7	1.7	0.55	2.53	
	Passage	1	2.5	1.4	0.55	1.93	
						68.02	m^3
10	Vitrifiled tiles for Flooring						
	Stocks	1	12.1	3.8		45.98	
	Reading area	1	9.1	5.3		48.23	
	Library office	1	2.7	2.5		6.75	
	Stair place	1	6.1	2		12.2	
	Varandah	1	2.7	1.7		4.59	
	passage	1	2.5	1.4		3.5	
						121.25	m^3
11	Vitrifiled tiles for Scating						

	Stack	1	29.4		0.1	2.94	
	2 (12.10+2.80-2(1.5)+4(0.10)						
	29.4 m						
	Reading room	1	18.3		0.1	1.83	
	2(9.10+5.30)+4(0.20)-2(1.5)-2.5-1.2-2(2)						
	12.60 m						
	Library office	1	9.4		0.1	0.94	
	2(2.3+2.4)-1+2(0.30)						
	9 m						
	Stair place	1	14.5		0.1	1.45	
	2(6.1+2)-2+0.6-0.3						
	14.5 m						
	Varandah	1	3.2		0.1	0.32	
	2.7+1.7+0.20-2+0.60						
	3.2 m						
	passage	1	3.5		0.1	0.35	
	7.7+1.5+1.5+0.10-2(1)					7.83	m2
	8.8 m						
12	Kota stone for Entrance step.	2	2	0.3		1.2	m2
13	White glaced tiles for flooring						
	toilet	2	1.2	1		2.4	
	D3	2	0.9	0.1		0.18	
						2.58	m2
14	White glaced tiles for dectu.						
	Toilet						
	L=2(1.2+1)-2(.90)	2	2.6		2.1	10.92	m2
	2.6 m						
15	10 mm thick ceiling plate.						
	Stocks	1	12.8	3.8		45.98	
	Reading area	1	9.1	5.3		48.23	
	Library office	1	2.7	2.5		6.75	
	Stair place	1	6.1	2		12.2	
	Varandah	1	2.7	1.7		4.59	
	passage	1	2.5	1.4		3.5	

	W.C.	2	1.2	1		2.4	
						123.65	m2

Abstract Sheet of Library

Table 8.3 Abstract Sheet for Library

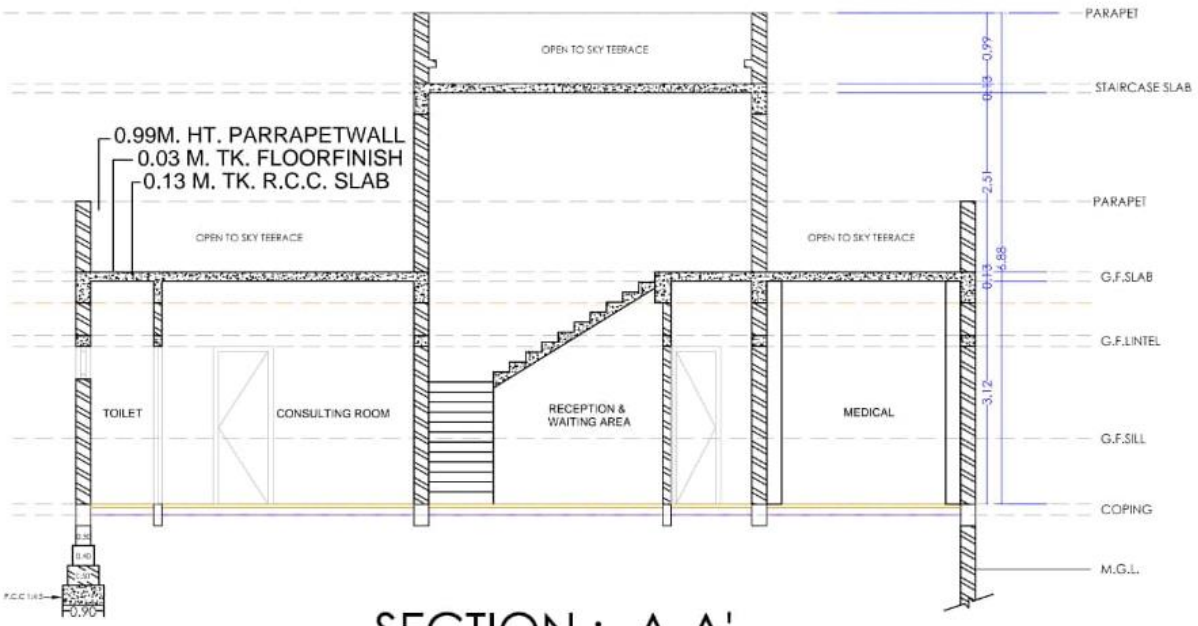
Item	Description	Qty.	Rate	Per	Amount	
					Rs	Ps
1	excavation for foundation up to 1.5 m depth including sorting out & stacking of useful material & disposing of the excavated stuff up to 50m lead (A) loose or soft soil	70.79	90	m^3	6371	10
2	Providing & laying cement conc. 1:4:8 & caring etc complete excluding. Cost of for m work in (A) foundation & plinth.	12.87	2500	m^3	32175	0
3	Brick work using common burnt clan building bricks having crushing strength 35 kg/sq.m in foundation & plinth in cm 1:6	41.5	2650	m^3	109975	0
4	Brick work using common burnt clay building bricks having crushing strength of 35 kg/sq.m in super structure above plinth lev. Up to floor 2 lev. In an 1:6.	77.67	2650	m^3	205825	O
5	Providing & laying controlled cement conc. 1:1.5:3 & curing etc. Complete including cost of form work out ex-cladding cost reinf. For reinforced conc. Work (1) Slab coping dpc etc having more than 10 cm to 13 cm thickness. (2) Lintel	 15 0.66	 5600 6672	 m^3 m^3	 8400 4403	 0 52
6	Providing & laying controlled cement concrete 1:15:3 for reinforced concrete chajja not exceeding 10 cm thickness up to any floor including finishing the exposed surfaces with an 1:3 to give a smooth & even surface centring & formwork & curing etc. complete excluding cost of reinforcement.	0.58	5986	m^3	33471	88
7	Providing reinforcement for RCC work including bending, binding & placing in position complete up to floor two level	1065.05	57	m^3	60707	85
8	Filling available excavated earth in trenches, plinth sides of foundation etc in	29.27	54	m^3	1580	58

	layers not exceeding 20 cm in depth consolidating each deposited layer by ramming & watering etc. complete					
9	Filling foundation & plinth with marram or selected soil in layer not exceeding 20 cm in depth consolidating each deposited layer by ramming & watering etc. complete.	68.02	332	m^3	22582	64
10	Providing & laying 60x45 cm vitrified tiles of 8mm thick in flooring over 20mm avg. base of cm 1:6 jointed with pigment to match the shade of tiles including finishing flush pointing & cleaning the surface complete for anti skid / matte finished	121.25	1320	m^3	160050	
11	Providing & laying vitrified tiles of 8mm thick in skirting, rises of step& dedo on 10 mm thick cm 1:3 jointed with pigment to match the shade of the including finishing with flush pointing & deeming the surface . complete	7.83	815	m^2	6381	45
12	Providing & laying white glazed tiles 6mm thick flooring treads of step & landing on a bed of 12 mm thickness of an 1:3 finished with pointing in white cement slurry.	2.58	705	m^2	1818	90
13	Providing & laying while glazed tiles 6mm thick skirting riser of steps & dado on 10 mm thickness of cm 1:3 finished with pointing in white cement slurry.	10.92	728	m^2	7949	76
14	Providing 10 mm thick cement plaster in single coat on brick /conc. Wall for interior up to floor two level finished even & smooth in cm 1:4	123.65	150	m^2	18552	
				Total amount	**755844**	**68**
				Contingence's charge (5%)	37792	23
					11337	67
				Work charge establishment charge (1.5%) **Grand Total Amount**	**804974**	**58**

8.1.2 Physical design (civil): Health Center

PLAN

HEALTH CENTRE



SECTION :- A-A'

ELEVATION

Quantity sheet of Health center

C.L.

= 4(10’1”+9”+9”+16’3”) + 2(9”+9”+9”+16’3”+16’3”+9’9’’) + (9”+9’9”) + (9”+16’3”)
= 4(27’10”) + 2(44’6”) + (11’4”) + (88’+1’) + (10’6”) + (17’)
= (111’4”) + (88’+1’) + (10’6”+17”)
= 227’11”

Table 8.4 Quantity sheet of Health center

No	DISCRIPTION	NO	L	B	H	Q
1	Excavation in foundation Net C.	1	215’9”	3’	56”	3559.375 ft^3
2	P.C.C in foundation or B.B.C.C	1	215’9”	3’	1’	627.25 ft^3
3	Brick work up to plinth 1st step: 2nd step: 3rd step up to plinth	 1 1 1	 219’9” 227’9” 224’9”	 2’ 1” 9”	 9” 9’ 3’	 329.625 ft^2 167.81 505.08
	STEP:					
	1st step	1	5’	11”	7”	2.68
	2nd step	1	5’	11”	7”	2.68
	3rd step	1	5’	11”	7”	2.68
	TOTAL		1011.15 ft^3			
4	Brick work on super structure	1	224’9”	9”	10’6”0	1769.90 ft^3
	TOTAL		1769.90 ft^3			

	Deduction For door & window					
	DOOR D_1	1	5’	9”	7’	31.5 ft^3
	D_2	1	3’6”	9”	7’	18.37 ft^3
	D_3	2	3’6”	9”	7’	36.74 ft^3
	WINDOW W_1	3	4’5”	9”	4’	69.61 ft^3
	W_2	2	2’6”	9”	2’6”	9.37 ft^3
	W_3	2	2’9”	9”	2’6”	10.31 ft^3
	(Deduction For total above door & window)					
	D_1	1	5’3”	9”	5.88”	1.92
	D_2	1	3’9”	9”	5.88”	1.37
	W_1	3	4’6”	9”	5.88”	5.14
	W_2	2	2’9”	9”	5.88”	2.02
	W_3	2	3’	9”	5.88”	2.20
						-151.81 ft^3
	Deduction For shutter	1	7’	9”	7’	-36.75
	Net quality	1769.90 – 188.56	=1581.134			
5	RRC work in slab, chajja & lintel	1	45’3”	18’7”	5.8”	411.96 ft^3
	RCC chajja					
	W_1	3	4’10”	1’11”	3.48”	2.96 ft^3
	RCC lintel from item NO:4	-	-	-	-	12.65 ft^3
	TOTAL RCC work					427.57 ft^3
6	2 cm trick marble flooring					
	Consulting Room	1	16’3”	16’1”		163.8
	General room	1	16’3”	16’3”		264.06
	Reception & Weighting area medical	1	28’8”	16’3”		465.88
	Varandha	1	28’8”	9’9”		279.53
	TOTAL FLOORING		1173.27 FT^2			
7	D.P.C (2.5 cm thick plinth level)	1	224’9”	9”		168.56 ft^2
8	Earth filling					
	for consulting room	1	16’3”	10’1”	5’6”	901.16
	General room	1	16’3”	16’3”	5’6”	1452.34
	For reception & Weighting room	1	19’8”	9’9”	3’6”	1391.05
	TOTAL EARTH FILLING					6596.03 ft^3
9	Inside Plaster					
	Consulting room	2	16’3”		10’6”	170.625
		2	10’1”		10’6”	105.87
	Celling	1	16’3”	10’1”		163.84
	General room	2	16’3”		10’6”	170.625
		2	16’3”		10’6”	170.625
	Celling	1	16’3”			264.60

	Reception &	2	29'8"	-	10'6"	304.12
	waiting area	2	16'3"	-	10'6"	170.625
	Celling	1	29'8"	16'3"	-	482.14
	Medical	2	14'8"	-	10'6"	154.03
		2	9'9"	-	10'6"	102.37
	Celling	1	14'8"	9'9"		143.03
	Varandha	1	9'9"		10'6"	102.37
		1	14'3"		10'6"	149.625
	Celling	1	9'9"	9'9"		138.93
						=2792.88
	Deduction in plaster					
	D_1	1/2	5'	-	7'	17.5
	D_2	2/2	3'6"		7'	24.5
	D_3	4/2	3'6"		7'	49
	W_1	3/2	4'5"		4'	16.52
						-117.92 ft^2
	Total Internal Plaster					2675.366 ft^2
10	Outside plaster					
		1	27'	-	13'6"	364.5
		1	32'6"		13'6"	438.75
		1	48'1"		13'6"	649.08
		1	14'8"		13'6"	198.045
	Chajja Face					
	W_1	3	4'5"		2'	26.52
	Deduction					
	W_1	3/2	4'5"		4'	-26.52
	Total outside plaster					1650.37
11	Vitryfiled tiles for scurting					
	Consulting room	1	52'8"		4"	17.53
	General room	2	32'6"		4"	21.43
	Medical	1	48'10"		4"	16.11
	Varandha	1	24'		4"	7.92
	Deduction in scurting					
	D_1	2	5'		4"	-3.3
	D_2	2	3'6"		4"	-2.31
	D_3	4	3'6"		4"	-4.62
	Total Scurting					82.08 ft^2
12	Form work for slab					
	Consulting room	1	16'3"	10'1"		163.84
	General room	1	16'3"	16'3"		264.06
	Reception & waiting area	1	29'8"	16'3"		482.19

	Medical	1	14’8”	9’9”		143.03
	Varandha	1	9’9”	19’3”		138.92
	Total					192 ft^2

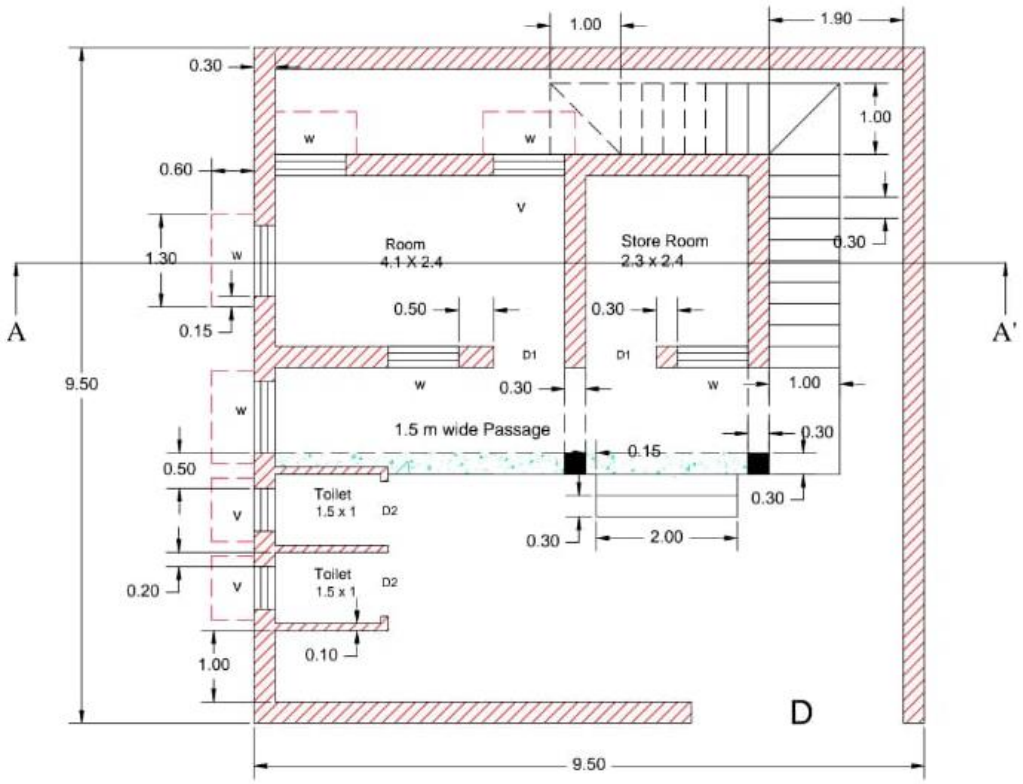
Abstract Sheet of Health Center

Table 8.5 Abstract Sheet of Health Center

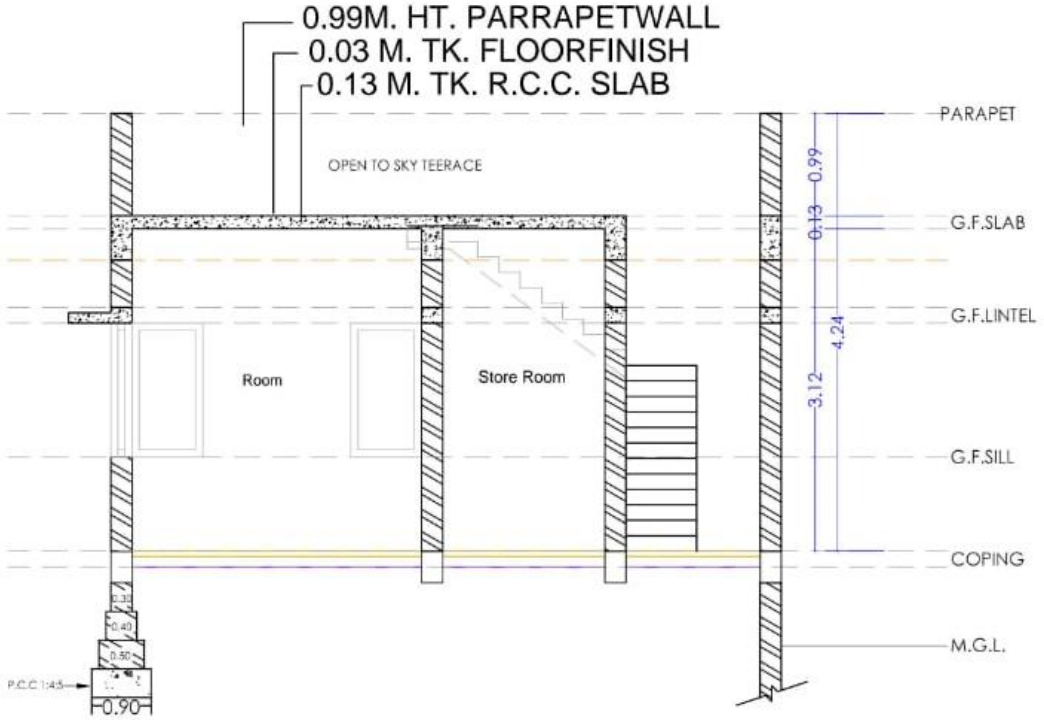
Item	Description	Qty	Rate	Per	Amount	
					Rs	Ps
1	excavation for foundation up to 1.5 m depth including sorting out & stacking of useful material & disposing of the excavated stuff up to 50m lead (A) loose or soft soil	100.79	90	m^3	9071	10
2	Providing & laying cement conc. 1:4:8 & caring etc complete excluding. Cost of for m work in (A) foundation & plinth.	17.76	2500	m^3	44400	0
3	Brick work using common burnt clan building bricks having crushing strength 35 kg/sq.m in foundation & plinth in cm 1:6	28.63	2650	m^3	75869	50
4	Brick work using common burnt clay building bricks having crushing strength of 35 kg/sq.m in super structure above plinth lev. Up to floor 2 lev. In an 1:6.	44.77	2650	m^3	118640	50
5	Providing & laying controlled cement conc. 1:1.5:3 & curing etc. Complete including cost of form work out ex-cluding cost reinf. For reinforced conc. Work (1) Slab coping dpc etc having > 10 cm to 13 cm thickness. (2) Lintel & chajja	 4.77 12.107	 5600 5986	 m^3 m^3	 26712 72472	 0 50
6	Earth filling.	186.77	332	m^3	62007	64

7	Providing & laying 60x45 cm vitrified tiles of 8mm thick in flooring over 20mm avg. base of cm 1:6 jointed with pigment to match the shade of tiles including finishing flush pointing & cleaning the surface complete for anti skid / matte finished	17.84	1315	m^3	23459	60
8	Providing & laying vitrified tiles of 8mm thick in skirting, rises of step& dedo on 10 mm thick cm 1:3 jointed with pigment to match the shade of the including finishing with flush pointing & deeming the surface . complete	7.72	815	m^2	6291	80
9	Providing 15mm thick cement plaster in single coat on brick /conc. Wall in cm 1:3. a) For interior plaster b) For outer plaster	 248.55 153.32	 105 142	 m^2 m^2	 26097 21771	 75 44
				Total amount	486789	483
			Contingence's charge (5%)		24339	69
			Work charge establishment charge (1.5%)		7301	90
			Grand Total Amount		518435	42

8.1.3 Social design (Civil): Anganwadi



PLAN
ANGANVADI



SECTION: A-A'

ELEVATION

Quantity Sheet of Anganwadi

C.l.

= 2((0.30/2)+1+0.1+1+0.1+1+0.1+1.5+0.30+2.4+0.30+1+(0.30/2) + 2((0.30/2)+2.4+(0.30/2)) + 5 ((0.30/2)+4.1+0.3+2.3+(0.30/2)) + 2((0.30/2)+1.70+(0.30/2)) + 2(0.7+(0.30/2)) + (1.2 + (0.30/2))

= (18.2+5.4+35+4.4+1.7+1.35)

= 66.05 m

Table 8.6 Quantity Sheet of Anganwadi

No.	Description	No.	L	W	H	Qty.	Total qty.	
1	Excavation for foundation upto 1.5 in ordanary soil							
	L : 66.05 - 12(0.70/2)							
	L : 60.65 m	1	60.65	0.7	1.1	60.04 m3		
2	Pcc (1:4:8) for foundation							
	L : 66.05 - 12(0.9/2)							
	L : 60.65 m	1	60.65	0.9	0.2	10.92	m3	
3	Brick masonary cm(1:6) for foundation							

	1st footing							
	L: 66.05 - 12(0.5/2)							
	L: 63.05 m	1	63.05	0.5	0.3	9.46		
	2nd footing							
	L: 66.05 - 12(0.40/2)							
	L: 63.65 m	1	63.65	0.4	0.3	7.64		
	Up to g.l.							
	L: 66.05 - 12(0.3/2)	1	64.25	0.3	0.3	5.78		
	L: 64.25 m					22.88	A	
	G.l. To p.l.							
	L: 66.05 - 12(0.3/2)							
	L: 64.25 m	1	64.25	0.3	0.55	10.6	B	
	Brick masonary for step							
	1st step	1	2	0.4	0.15	0.27		
	2nd step	1	2	0.6	0.15	0.18		
	3rd step	1	2	0.3	0.15	0.09		
						0.54	C	
						A+B+C	34.02	m3
4	Brick masonary in cm(1:6) for super structure above plinth	1	64.25	0.3	3.05	58.79	A	
	L: 66.05 - 12(0.3/2)							
	L: 64.25 m							
	H: 0.70 + 1.40 + 0.15 + 0.80							
	H: 3.05 m							
	Parapet wall	1	22.4	0.3	0.7	4.7	B	
	C/l = 2(7)+2(4.2)=22.4							
	Compound wall	1	29.4	0.3	1	8.82	C	
	C\l=2(9.2)+9.2+1.8=29.4							
	Deduction for door & window							
	Door:							
	D	1	3	0.3	1	0.9		
	D1	2	1	0.3	2.1	1.26		
	D2	2	0.9	0.1	2.1	0.38		
	Window w	6	1	0.3	1.2	2.16		
	Ventilator v	2	0.6	0.3	0.6	0.22		
						4.92	D	
	Deduction for lintel							
	On d1	2	1.3	0.3	0.1	0.08		
	D2	2	1.2	0.3	0.1	0.04		
	W	6	1.3	0.3	0.1	0.23		
	V	2	0.9	0.1	0.1	0.02		
						0.37	E	

	Total qty.							
	A+b+c-d-e							
	58.79+4.7+8.82-4.92-0.37					67.02	m3	
5	Controlled cement concrete							
	(1:2:4) for rcc work							
	1.slab having >10 to 13 cm							
	Thickness on.							
	Room, store room &	1	7.3	4.5	0.1	11.9	A	
	Passage							
	L=0.30+4.1+0.3+2.3+0.3							
	7.3							
	B=0.30+2.4+0.3+1.5							
	4.5							
	On toilet	1	2.2	1.9	0.1	0.42	B	
	B=0.30+1.5+0.10					12.32	m3	
	1.90 m							
	L=1+0.10+1+0.10							
	2.20 m							
	2. Lintel as per qty i-4 rcc lintel					0.37	m3	
6	Controlled cement conrete							
	For rcc chajja.							
	On	4	2.16	0.6	0.1	0.52		
	W	2	0.22	0.6	0.1	0.036	m3	
						0.556		
7	Reinforcement for rcc work.							
	A. For rcc slab assuming							
	0.8% steel as per 0.8×7850							
	×2.32/100					773.07	A	
	B. For rcc chajja assuming							
	1.5% steel as per i-6							
	1×7850×0.55/100					43.18	B	
	C. For rcc lintel assuming							
	1.5% steel qty as per i-5 (2)							
	1.5×7850×0.37/100					43.57	C	
						859.82	kg	
8	Filling for foundation							
	Upto 1.5 m depth in ordinary							
	Deduction for pcc							
	(As per i-2)					10.92		
	Deduction for brick masonary							
	In cm for foundation					22.88		

						26.24		
9	Filling for foundation in							
	Plinth with muram or selected							
	Soil.							
	H=0.60-0.05							
	0.55							
	Room	1	4.1	2.4	0.55	5.41		
	Store room	1	2.3	2.4	0.55	3.04		
	Passage	1	7.7	1.5	0.55	6.35		
						14.8	m3	
10	Vitrified tiles for flooring							
	Room	1	4.1	2.4		9.84		
	Store room	1	2.3	2.4		5.52		
	Passage	1	7.7	1.5		11.55		
						26.91	m3	
11	Vitrifiled tiles for scating							
	Room	1	12.6		0.1	1.26		
	2(4.1+2.4) -1+2(0.30)							
	12.60 m							
	Store room	1	9		0.1	0.9		
	2(2.3+2.4)-1+2(0.30)							
	9 m							
	Passage	1	8.8		0.1	0.88		
	7.7+1.5+1.5+0.10-2(1)					3.04	m2	
	8.8 m							
12	Kota stone for entrance step.	2	2	0.3		1.2	m2	
13	White glaced tiles for flooring							
	Toilet	2	1.5	1		3	3	
	D2	2	0.9	0.1		0.18	0.18	
							3.18	m2
14	White glaced tiles for dectu.							
	Toilet							
	L=2(1.5+1)-2(.90)	2	3.2			2.1	13.44	m2
	3.2 m							
15	10 mm thick ceiling plate.							
	Room	1	4.1	2.4		9.84		
	Store room	1	2.3	2.4		5.52		
	Passage	1	7.7	1.5		11.55		
	Toilet	2	1.5	1		3		
						29.91	m2	

Abstract Sheet of Anganwadi

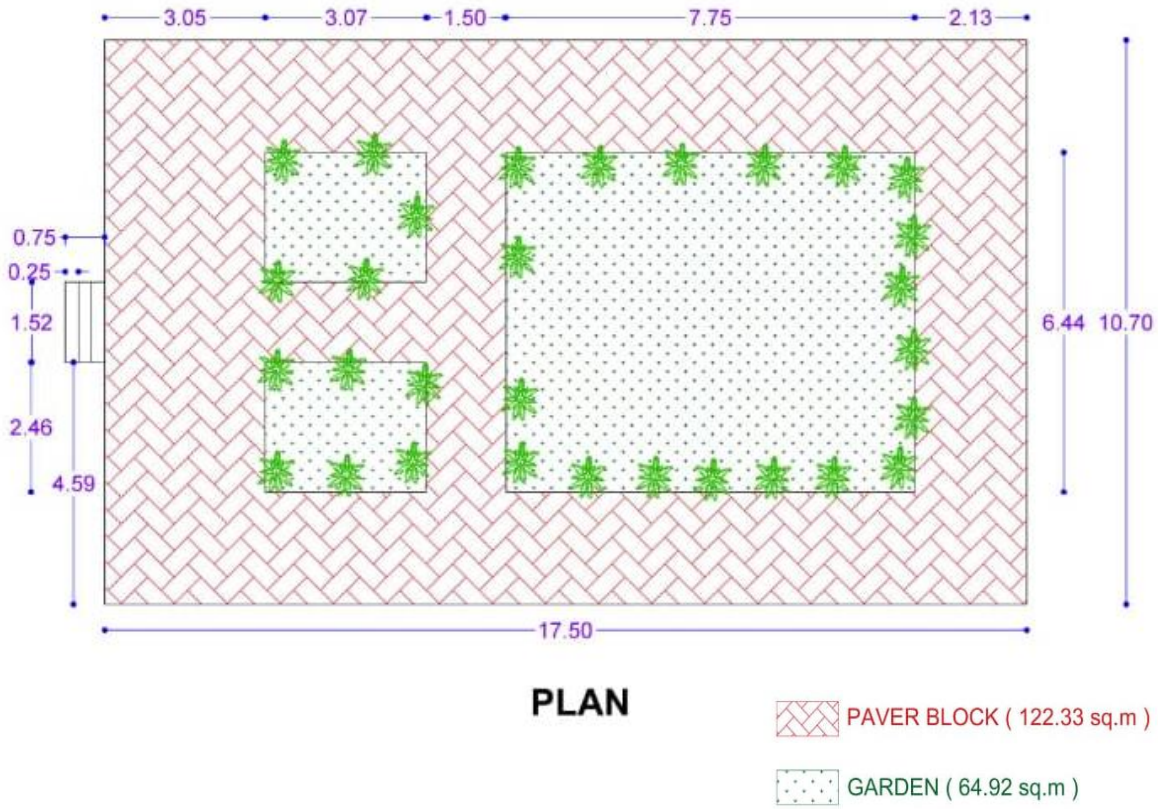
Table 8.7 Abstract sheet of Anganwadi

Item	Description	Qty	Rate	Per	Amount	
					Rs	Ps
1	excavation for foundation up to 1.5 m depth including sorting out & stacking of useful material & disposing of the excavated stuff up to 50m lead (A) loose or soft soil	60.04	90	m^3	5403	60
2	Providing & laying cement conc. 1:4:8 & caring etc complete excluding. Cost of for m work in (A) foundation & plinth.	10.92	2500	m^3	27300	0
3	Brick work using common burnt clan building bricks having crushing strength 35 kg/sq.m in foundation & plinth in cm 1:6	34.02	2650	m^3	90153	0
4	Brick work using common burnt clay building bricks having crushing strength of 35 kg/sq.m in super structure above plinth lev. Up to floor 2 lev. In an 1:6.	67.02	2650	m^3	177603	50
5	Providing & laying controlled cement conc. 1:1.5:3 & curing etc. Complete including cost of form work out ex-cladding cost reinf. For reinforced conc. Work (1) Slab coping dpc etc having more than 10 cm to 13 cm thickness. (2) Lintel	12.32 0.37	5600 6672	m^3 m^3	68992 2468	0 64
6	Providing & laying controlled cement concrete 1:15:3 for reinforced concrete chajja not exceeding 10 cm thickness up to any floor including finishing the exposed surfaces with an 1:3 to give a smooth & even surface centring & formwork & curing etc. complete excluding cost of reinforcement.	0.55	5986	m^3	3292	30

7	Providing reinforcement for RCC work including bending, binding & placing in position complete up to floor two level	859.82	57	m^3	49009	74
8	Filling available excavated earth in trenches, plinth sides of foundation etc in layers not exceeding 20 cm in depth consolidating each deposited layer by ramming & watering etc. complete	26.24	54	m^3	1416	96
9	Filling foundation & plinth with marram or selected soil in layer not exceeding 20 cm in depth consolidating each deposited layer by ramming & watering etc. complete.	14.8	332	m^3	4913	60
10	Providing & laying 60x45 cm vitrified tiles of 8mm thick in flooring over 20mm avg. base of cm 1:6 jointed with pigment to match the shade of tiles including finishing flush pointing & cleaning the surface complete for anti skid / matte finished	26.91	1320	m^3	35521	20
11	Providing & laying vitrified tiles of 8mm thick in skirting, rises of step& dedo on 10 mm thick cm 1:3 jointed with pigment to match the shade of the including finishing with flush pointing & deeming the surface . complete	3.04	815	m^2	2477	60
12	Providing & laying machine cut polished kota stone slab flooring over 20mm avg. thickness base of cement mortar 1:6 jointed with grey cement slurry including rubbing & polishing complete (A) 25 mm thick	18.62	766	m^2	14262	92
13	Providing & laying machine cut polished kota stone of 25 mm thick in skirting, risers of steps & dedo 10 mm thick an 1:3 jointed with pigment to match the shade of tiles including finishing with flush pointing & cleaning the surface complete	1.2	860	m^2	1032	0

14	Providing & laying white glazed tiles 6mm thick flooring treads of step & landing on a bed of 12 mm thickness of an 1:3 finished with pointing in white cement slurry.	3.18	705	m^2	2241	90
15	Providing & laying while glazed tiles 6mm thick skirting riser of steps & dado on 10 mm thickness of cm 1:3 finished with pointing in white cement slurry.	3.2	728	m^2	2329	60
16	Providing 10 mm thick cement plaster in single coat on brick /conc. Wall for interior up to floor two level finished even & smooth in cm 1:4	29.91	150	m^2	4486	50
				Total amount	432905	06
			Contingence's charge (5%)		21645	25
			Work charge establishment charge (1.5%)		6493	57
			Grand Total Amount		461043	88

8.1.4 Socio-Cultural design (Civil): Public Garden



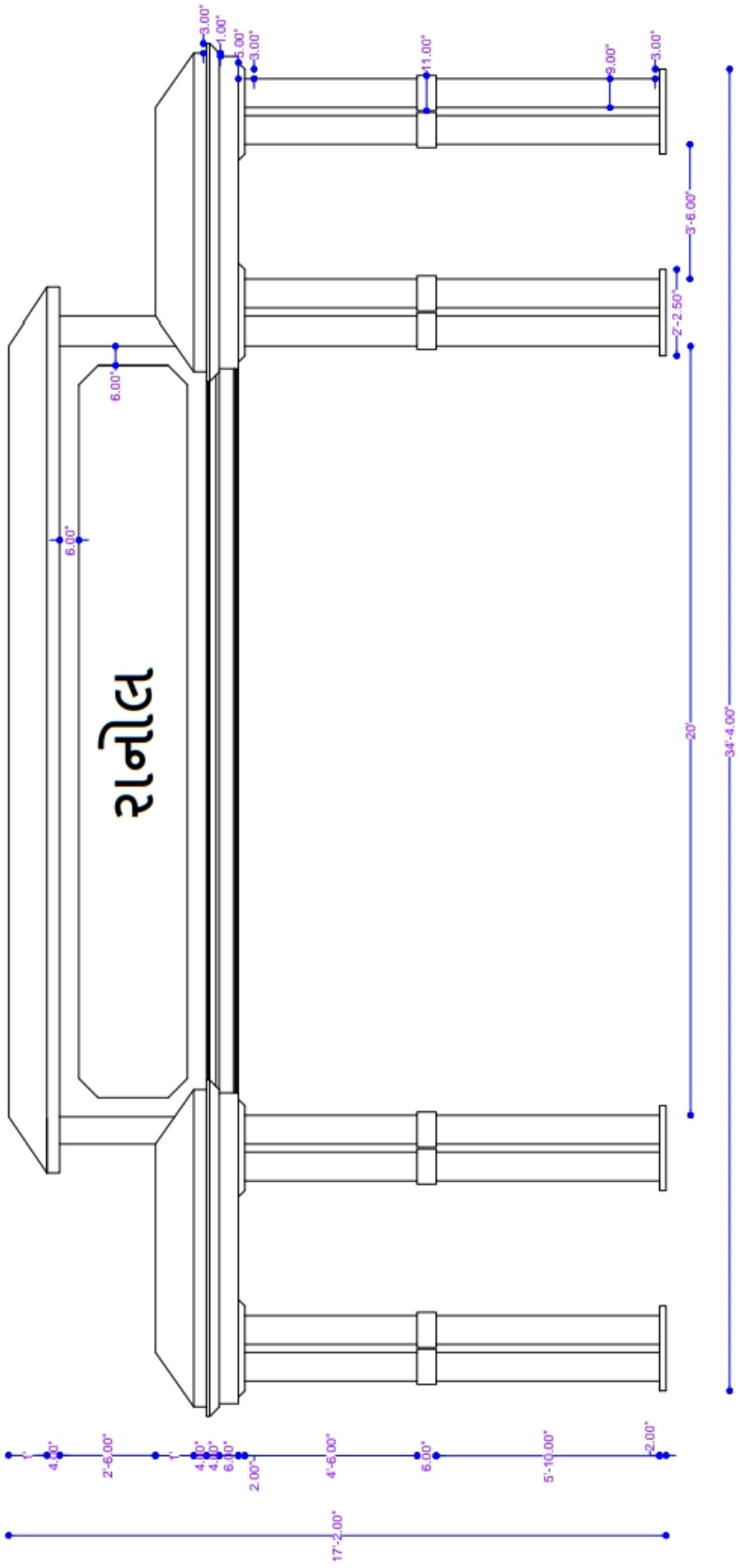
Estimate of Public Garden

Table 8.8 Public Garden

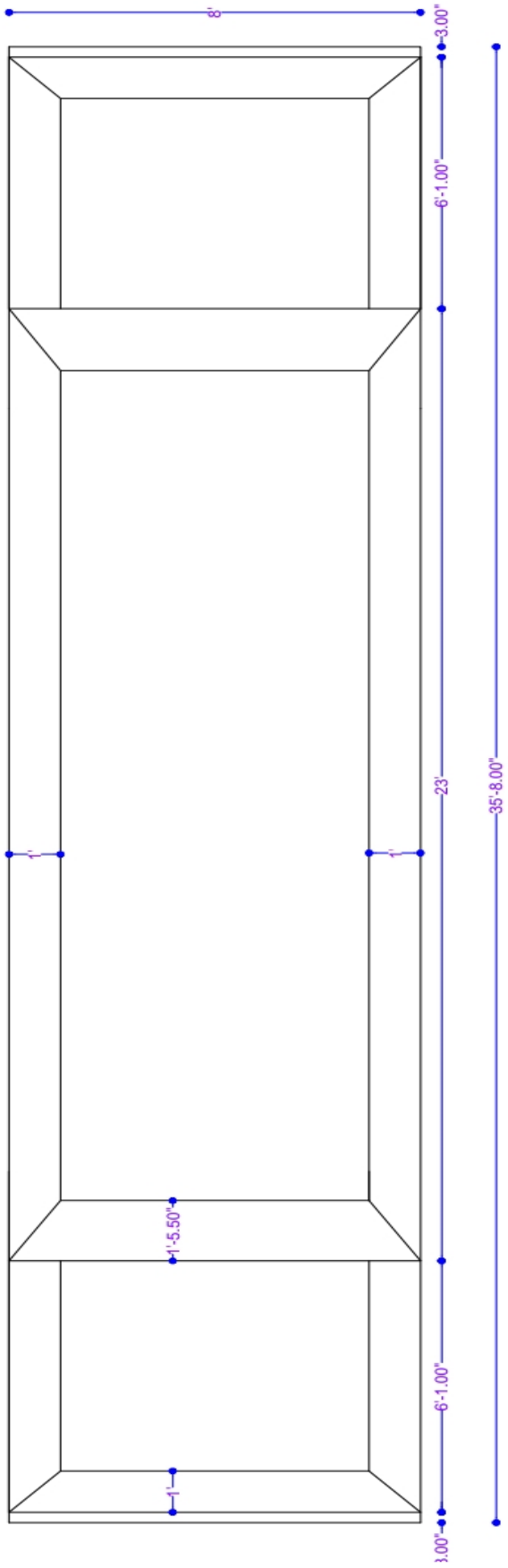
DESCRIPTION OF ITEMS	QTY .OR NO	RATE	PER	COST
Boundary Wall(brick Masonary)	42 m3 L=56.4 B=0.30 h=2.5 (above g.I. =1.6 m)	250	m3	10,500/-
Main door	1	6,000	piece	6,000/-
Bench	12	2,000	piece	24,000/-

Lawn	60m2 3side border =(17.5+17.5+(10.7- 1.68))×1 centre portion =8×2	160	m3	9,600/-
Paver block	127m2 without lawn portion= 187.05-60 =127	750	m2	92,250/-
Other including labour cost				60,000/-
Total				2,02,350/-

8.1.5 Smart Village Design (Civil): Entry Gate



ELEVATION



PLAN

Quantity Sheet of Entry Gate

Table 8.9 Quantity sheet of Entry gate

No.	Description	No.	Length	Breadth	Depth	Quantity	
1	Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil (04B001A) P-49						
		1	10.90	2.43	2.00	52.97	
				Total Qty...		52.97	Cmt.
2	Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- Graded brick bat aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) (5007-5.3.2) P-52						
		1	10.90	2.43	0.23	6.09	
	R.C.C Footing	1					
	1. trapezoidal footing						
	volume of cubic portion	2	3.05	0.23	0.50	0.70	
	trapezoidal section	2	1.00	1.00	9.60	19.20	
	Column R.C.C	2	1.00	1.00	1.15	2.30	
	Slab lvl of ele. 15'						
	Slab lvl of ele. 15'	1	10.48	0.15	0.50	0.79	
	Slab lvl of ele. 15'	2	1.00	1.00	1.56	3.12	
	Slab lvl of ele. 15'	1	1.00	1.00	1.00	5.75	
				Total Qty...		37.95	Cmt.
3	Providing and laying controlled cement concrete M.250 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (B) Walls, from top of foundation level upto floor two level (upto 10 ton) (05025B-5.8.3) P-58						
	bottom	1	3.05	2.13	0.20	1.30	
	Top	1	2.15	1.23	0.20	0.53	
	Sides	2	3.05	0.20	1.52	1.85	
		2	2.13	0.20	1.52	1.30	
				Total Qty...		4.98	Cmt.

4	Filling available excavated earth in treanches, Plinth sides of foundation etc. in layers not exceeding 20 cm. in depth consolidating each deosited layer by rumming and watering. (4006-4.12) P-46						
		2	3.05	0.30	1.52	2.78	
		2	2.13	0.30	1.52	1.94	
				Total Qty...		4.72	Cmt.
5	Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) (17002A-17.60) P-153						
	Sides	1	3.05	-	1.52	4.64	
	Sides	1	5.50	-	1.52	8.36	
	Top & Bottom	2	3.05	-	2.13	12.99	
				Total Qty...		25.99	Smt.
6	Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level (upto 10 ton) (05014C-5.4.11) P-55						
	Item No : 3	4.98					
		4.98	Cmt x	150	Kg/Cmt.	746.65	Kg.

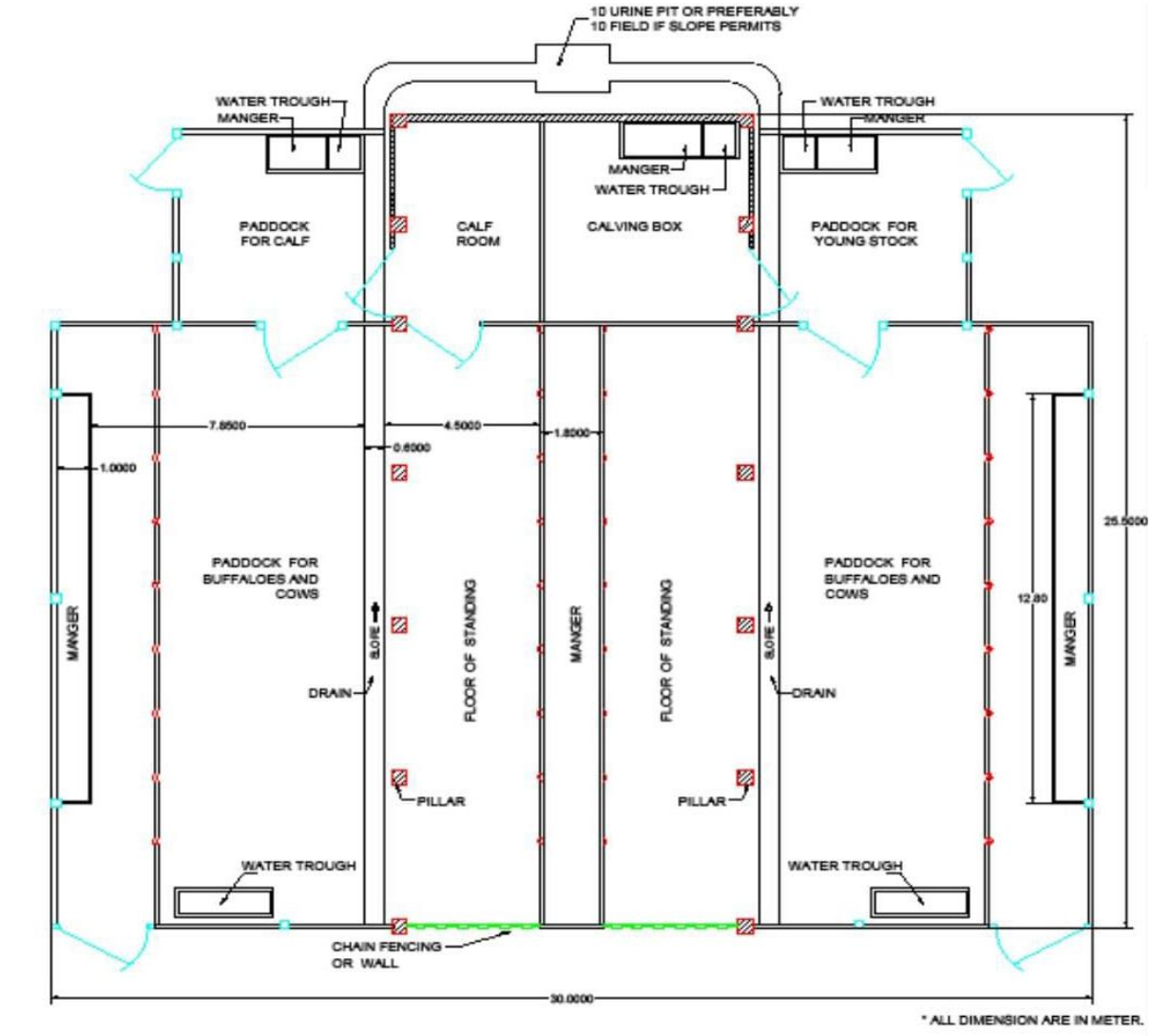
Abstract Sheet of Entry Gate

Table 8.10 Abstract sheet of Entry gate

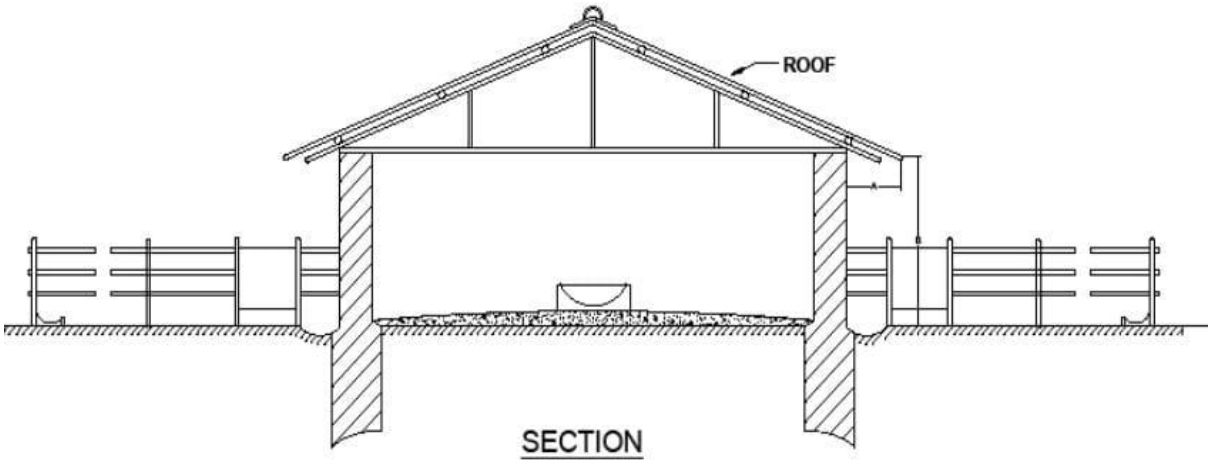
No	Quantity	Item No-1	Rate in Rs.	Per	Amount in Rs.
1	52.97	Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil (04B001A) P-49	119.00	Cmt.	6303.91
2	37.95	Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- Graded brick bat aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) (5007-5.3.2) P-52	2160.00	Cmt.	81970.94
3	4.98	Providing and laying controlled cement concrete M.250 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (B) Walls, from top of foundation level upto floor two level (upto 10 ton) (05025B-5.8.3) P-58	4013.00	Cmt.	19975.27

4	4.72	Filling available excavated earth in treanches, Plinth sides of foundation etc. in layers not exceeding 20 cm. in depth consolidating each deosited layer by rumming and watering. (4006-4.12) P-46	76.47	Cmt.	361.26
5	25.99	Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) (17002A-17.60) P-153	110.00	Smt.	2858.79
6	746.65	Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level (upto 10 ton) (05014C-5.4.11) P-55	45.00	Kg	33599.07
Total Rs.					145069.23

8.1.6 Heritage Village Design (Civil): Animal Husbandry



PLAN



Estimate of Animal Husbandry

Table 8.11 Estimate of Animal Husbandry

DESCRIPTION OF ITEMS	QTY. OR NO	RATE	PER	COST
Boundary Wall (Three Side Brick Masonry)	40.5m3 L=81 m B= 0.3 H=l.6 (above g.I. 0.9m)	250	m3	10,125/-
Square Pillar	14 L=2 H=3.5	1250	PIECE	17,500/-
Steel Roof	420m2 L =25.5×2+l 5×2 B=4.5	300	m2	1,26,000/
P.C.C. Flooring	900m2 L=2.5 B=30	100	m2	90,000/-
Main Door	1	6000	PIECE	6,000/-
Other Charges Including Laboure Work				75,000/-
Total Cost				3,24,625/-

8.1.7 Electrical Design 1: Solar System for Panchayat House

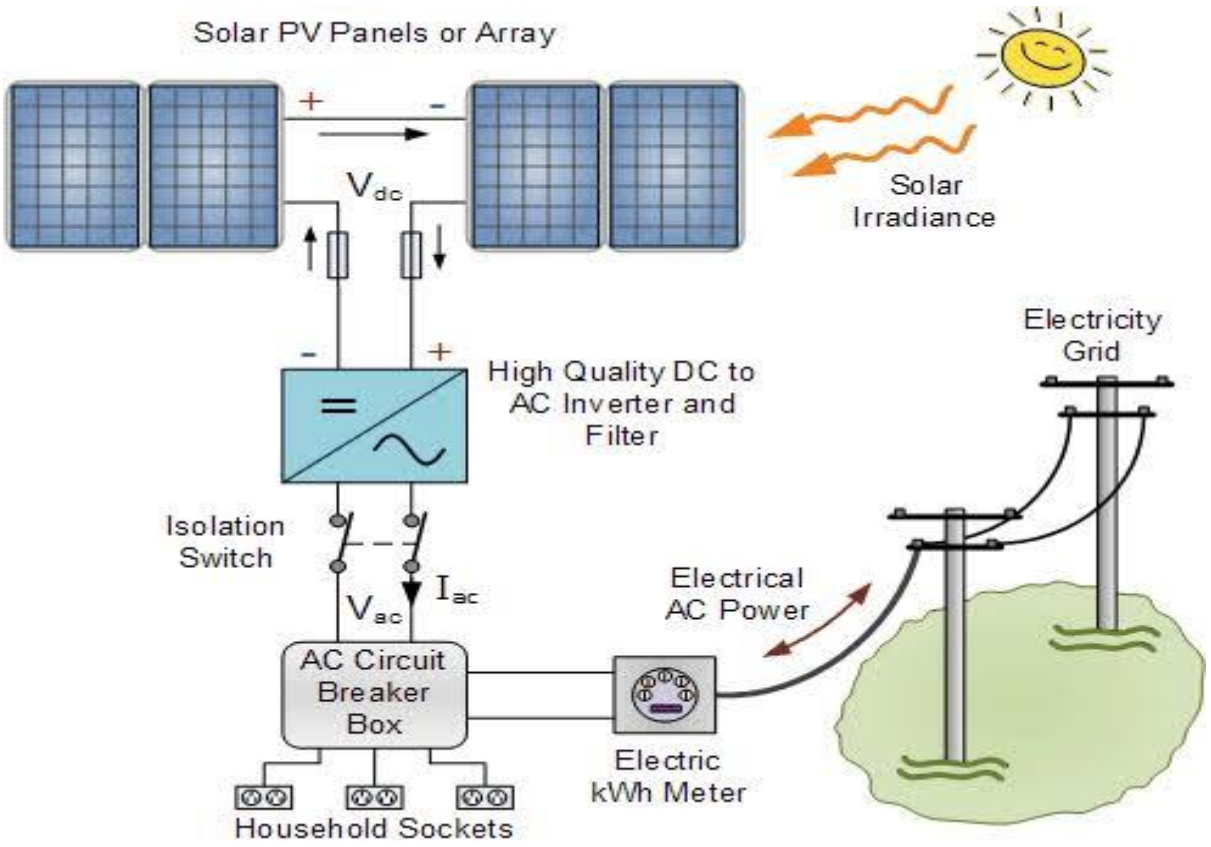
Total power required in pungwe it house throughout the year why is estimated about 1600 kilowatt per hour or 1600 unit

The when you need solar panel is produced average about 1.5 you need in a day by taking yearly average.

power requirement of Panchayat house is 1600 unit per year
show power generated by 1-unit solar panel is

$= 4.5 \times 365$
$= 1642.5$

So, when you need panel is more than enough or sufficient for Panchayat house.
For one unit rooftop solar system total initial cost of installation is about 45000 to 85000 rupees for on grid system without using batteries.
The simple connection diagram for on grid system



Total initial cost of the electricity bill for one year is around 9000 to 10,000. By installing the solar system, it is nearly about zero, this system works efficiently throughout the 20 years. Nearby the cost of electrical charges are increasing so the effective efficiency of the solar system is also increasing by year. Advantage of using on grid system the unused power of the solar system is given to the greed system which give another income. By using this installation for 20 years electricity bill Of the Panchayat house nearly zero and also gives another income from unused power. Estimate depends on the weather condition and lightning.

Table 8.12 Estimation of installing solar system of panchayat house

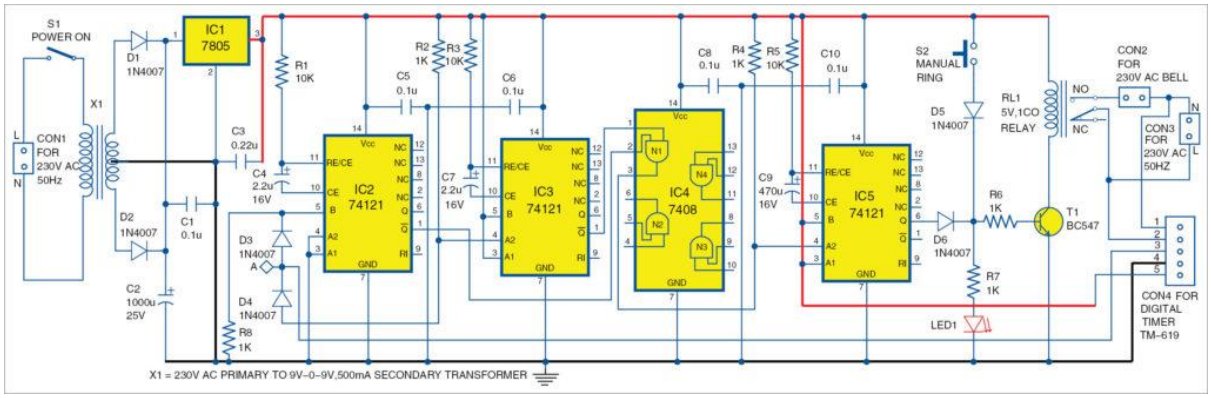
Equipment	Prices (Rs.)
Mono park solar panel 1 kw	30,000 to 36,000
Baifacial Solar Panel 1 kw	30,000 to 40,000
Solar inverter 1 kw	10,000
Panel stand	4,000
Solar DC wire, 6 sq mm, 15 meter	2,500
2 panel MC4 connector pairs, 2 wire in, 1 wire out	500
Transportation, installation & Service	24,000
Total	71,000 to 81,000

Importance for providing these Design

Every government works is done by the panchayat house like born-death certificate, light bill payment, online form filling for schemes of government, Village data, farm related work and much more dependent on electricity supply, But when electricity is not available then these solar system is useful. Also saves the electricity and reduce the burden of electricity bills of panchayat house and also use remain electricity power for sell and then its generate the income of Panchayat.

8.1.8 Electrical Design 2: Programmable Automatic Bell System

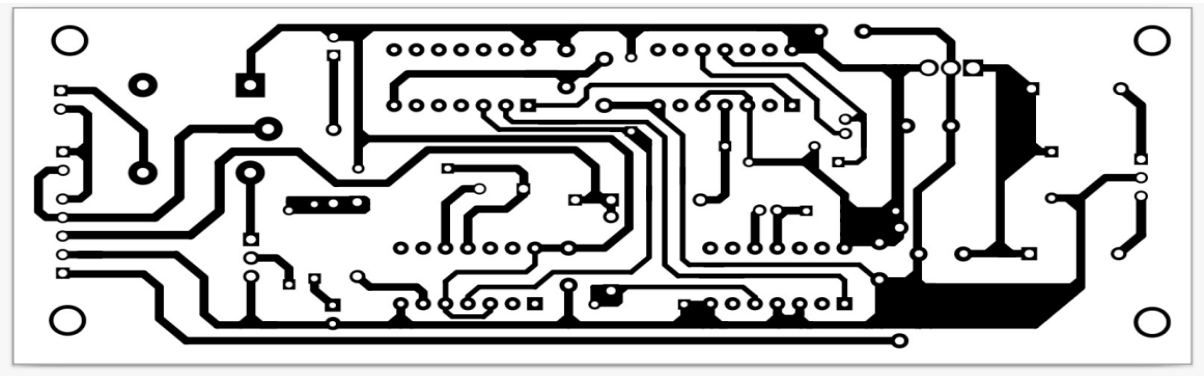
Circuit diagram of the programmable automatic bell system is shown in Fig. It Is built around a step-down transformer (X1), 5V voltage regulator IC 7805 (IC1), three 74121 monostable ICs (IC2, IC3 and IC5), quad AND gate IC 7408 (IC4), six 1N4007 diodes (D1 through D6), 230V AC bell, digital timer programmable time switch (TM-619) and a few other components.

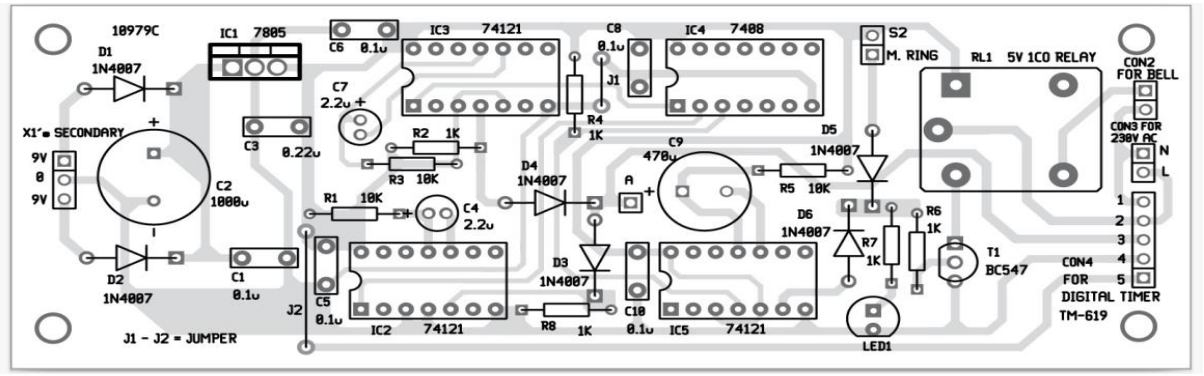


The working of the circuit can be understood easily by referring to the truth table of IC 74121. Truth table is given in the datasheet

Construction and testing

An actual-size PCB layout of the programmable automatic bell system is shown in Fig. and its components layout in Fig.





After mounting components on the PCB, first check Q output of IC2 using an oscilloscope; when a positive trigger is given to pin 5 (input B), the pulse width at pin 1 should be 1.5 milliseconds. Similarly, check pulse output pin 1 (Q) of IC3 by giving a negative trigger to pin 4 (A2 input) of IC3.

The output of IC5 drives the base of npn transistor T1 (BC 547) through diode D6 and resistor R6. In order to test the bell manually, a push-to-on switch (S2) is provided. It is connected to the base of the transistor through diode D5. When you press S2, transistor T1 conducts to drive relay RL1 and the bell rings continuously as long as S2 is pressed.

In normal condition, transistor T1 gets the pulse from pin 6 of IC5. As it has pulse width of 3.2 seconds, the bell rings only for 3.2 seconds.

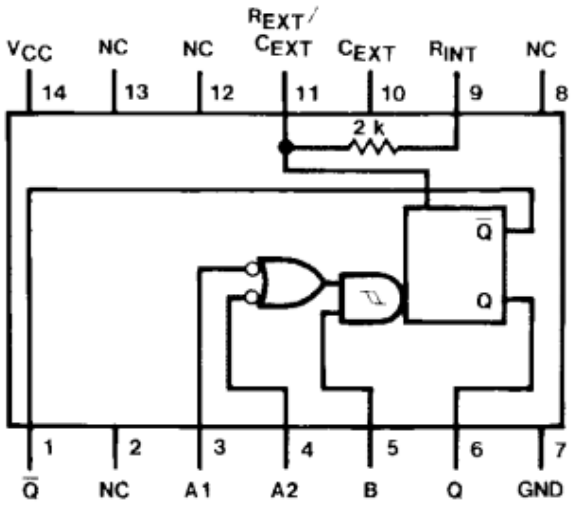
After assembling the circuit on the PCB, connect 230V AC to CON1. Also connect the digital timer and 230V AC bell externally to the PCB using external wires. Connect switches S1 and S2, and LED1, on the front panel of the cabinet. Note that the PCB shows only the secondary winding of X1 (9V-0-9V). Affix the switch S1 on the cabinet at a suitable location and connect to primary winding of X1 using external wires.

Fig. 1 shows how to use inputs of IC2 and IC3 for the required modes of operation, that is, falling-edge-triggered or rising-edge-triggered monostable multivibrator. Here, we use input A2 for falling-edge trigger of IC3, and input B for rising-edge trigger of IC2.

When we use input B for rising-edge trigger, A1, A2 or both these inputs of IC2 should be low, that is, connected to ground. Here, for convenience, both A1 and A2 are connected to ground. Similarly, for use of A2 as falling-edge trigger of IC3, pins A1 and B of IC3 should be high, that is, connected to 5V. Here IC2 is used as rising-edge-triggered, one-shot monostable multivibrator, whose time period is determined by the combination of resistor R1 and capacitor C4 as follows:
t= 0.69RC.

Here, value of R1 is taken as 10-kilo-ohm and C4 as 2.2µF for a pulse width of 1.5 milliseconds. Similarly, IC3 is used as a falling-edge-triggered one-shot monostable multivibrator, whose time period is determined by the combination of resistor R3 and capacitor C7. Here again, resistor and capacitor values are chosen for pulse duration of 1.5 milliseconds. Q output of IC2 and IC3 are connected to input pins 2 and 1 of IC4, respectively. In normal condition, when there is no trigger to IC2 and IC3, Q outputs at pin 1 of both IC2 and IC3 are high. Therefore, output pin 3 of IC4 (AND gate N1) is high, which is connected to trigger input A2 of IC5. Here IC5 is used as a falling-edge-triggered one-shot monostable multivibrator for pulse width of 3.2 seconds by choosing the values of resistor R5 and capacitor C9 as 10-kilo-ohm and 470µF, respectively. These values are selected depending on the time duration for which the bell should ring. You can use a potentiometer in place of the fixed-value R5 to vary the time duration as per the time slot of each class.

Normally, when Q output of IC2 and IC3 are high, N1 gate output of IC4 is also high. In this situation, Q output (pin 6) of IC5 is low. As transistor T1 is non-conducting, relay RL1 does not energise and the bell connected across CON2 remains off. The bell rings when Q output of IC5 goes high for predetermined time duration of 3.2 seconds. LED1 glows during this time duration.



Inputs			Outputs	
A1	A2	B	Q	$\overline{Q}$
L	X	H	L	H
X	L	H	L	H
X	X	L	L	H
H	H	X	L	H
H	↓	H	⎍	⎎
↓	H	H	⎍	⎎
↓	↓	H	⎍	⎎
L	X	↑	⎍	⎎
X	L	↑	⎍	⎎

H = HIGH Logic Level
L = LOW Logic Level
X = Can Be Either LOW or HIGH
⎍ = A Positive Pulse
⎎ = A Negative Pulse
↑ = Positive Going Transition
↓ = Negative Going Transition

Total market price without installation
2500 ~ 5000 Rs

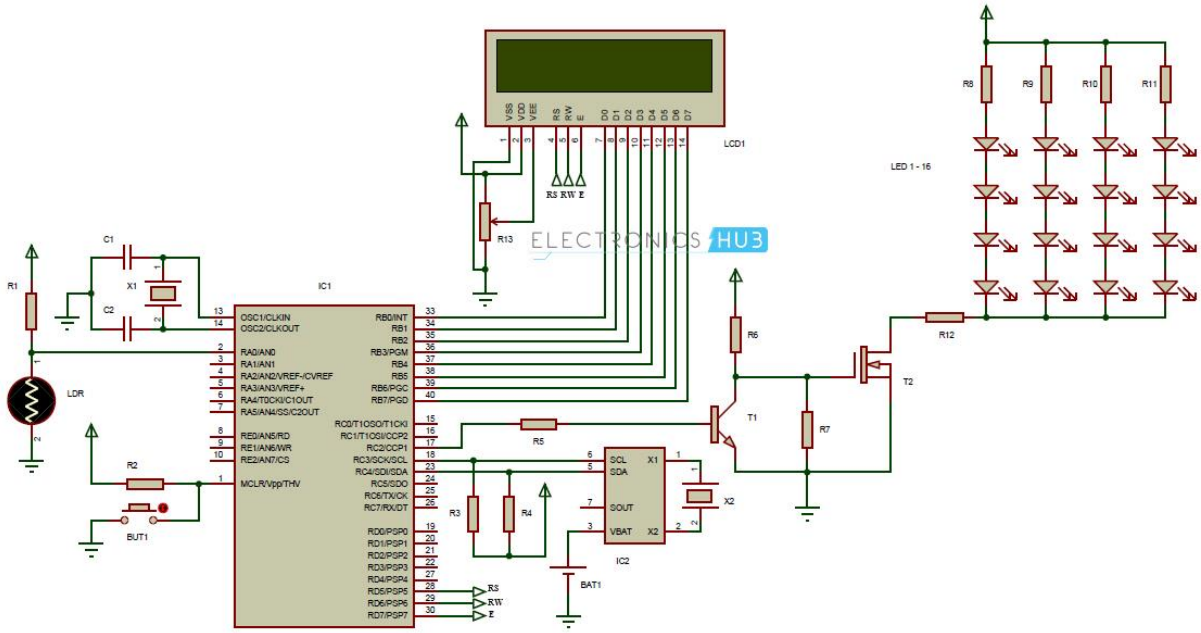
Use of Programmable Automatic bell system

All schools and colleges follow a timetable for their classes, providing different time slots for different subjects. In order to follow the planned timetable, a person is assigned the job of turning on and off an electric bell manually at certain time intervals. Here we describe an automatic bell system that eliminates the need for human intervention. It is designed using simple digital electronics and is easy to construct. For clock and digital timer programming, a programmable time switch (Frontier TM-619) is used.

8.1.9 Electrical Design 3: Auto Intensity control of street light using a PIC Microcontroller

Auto Intensity Control of Street Light using a PIC Microcontroller

We are willing to apply this system in our village Ranol. Street lights are controlled manually in olden days. These days automation of street lights has emerged. But one can observe that there is no need of high intensity in peak hours, when there is no traffic and even in early mornings. By reducing the intensity in these times, energy can be saved to some extent.



Components

- IC1 PIC 16F877A
- IC2 DS 1307
- LCD1 16X2 Alphanumeric LCD display
- R1, R2 10 KΩ
- R3, R4 1 KΩ
- R5 10 KΩ
- R6 1 KΩ
- R7 10 KΩ
- R8, R9, R10 and R11 330 Ω
- R12 10 KΩ
- R13 10 KΩ POT

Component Description

PIC16F877A

The microcontroller used in the circuit is a PIC16F877A. It is an 8 – bit microcontroller that reads the voltage across LDR and also checks the time in Real Time Clock IC. Based on the readings, the LEDs are switched on or off.

DS1307

It is a Real Time Clock IC. The communication between microcontroller and DS1307 is via I2C protocol. It provides clock and calendar with details like seconds, minutes, hours, day,

date, month and year. Time can be set in either 12-hour mode or 24-hour mode and there is an indication of AM/PM.

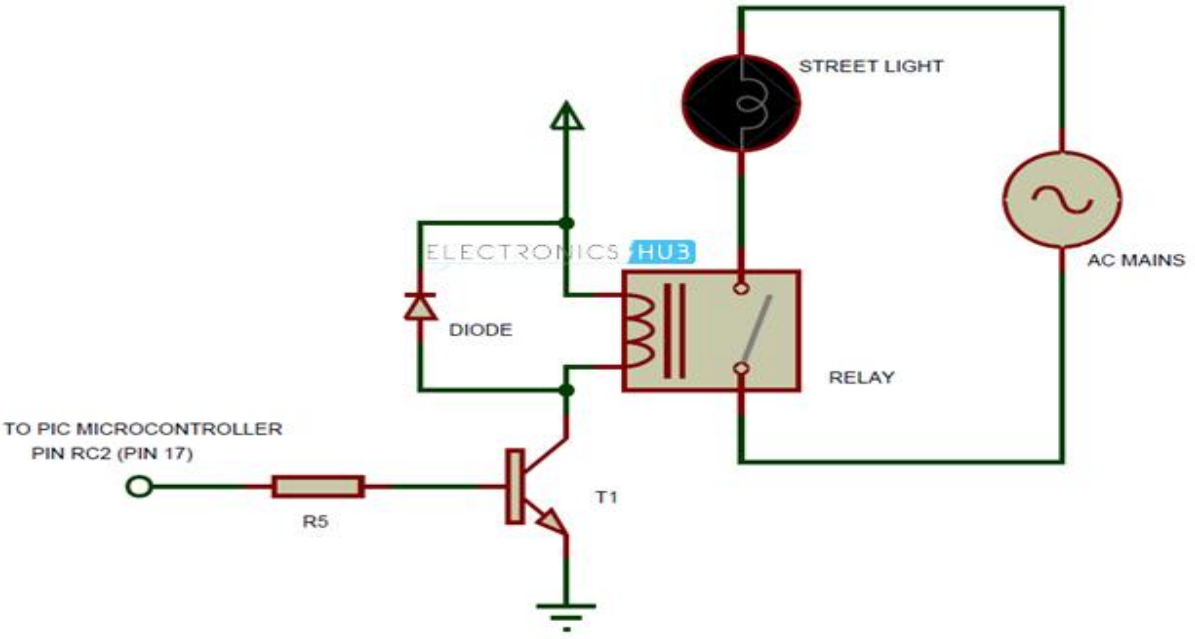
Working

We use both LDR and RTC in the circuit for the following reason: if only LDR is used, then there is no chance of saving any energy as the street lights will glow as soon as the intensity of light on LDR decreases and when the intensity increases, the street lights are turned off.
If only RTC is used, the street lights are turned on and off at preset time irrespective of the outside lighting conditions. When the device is turned on, RTC starts with the preset time in the code.

The microcontroller waits for the signal from LDR and when the intensity of light on LDR decreases, the output of the microcontroller is activated and the street lights start to glow. This event occurs only when the current time is in the range of preset time only after 5PM.
The lights continue to glow at full intensity up to 3 AM. When the time reaches 3 AM, the intensity of the street light gradually decreases and will turn off either at 6 AM or when the light on LDR in increasing, whichever is first.
Hence, the auto intensity control of street lights is achieved with the above circuit which has an LDR, an RTC, a PIC microcontroller and an LED array.

Alternative Circuit

The circuits shown above uses array of LEDs as street light in order to save power. But the same circuit can also be used to fire a normal HID street lamp. The circuit for auto intensity control of HID street light is as follows



The above circuit shows only the interface to the street light and the rest of the circuit is same. It consists of a relay, a high intensity discharge street light that is connected to the mains supply and a diode.
The relay contact is made only when the intensity of light on the LDR is low and the street light glows.

Auto Intensity Control of Street Lights Circuit Advantages

- Power wastage can be reduced.
- Using LED array reduces the cost.
- Using of RTC and LDR produces accurate results.

Table 8.13 Estimate of Auto intensity control of street light

Product	Quantity	Price in Rs
PIC 16F877A	1	127
DS 1307	1	46
16X2 Alphanumeric LCD display	1	119
10 KΩ Resistance	5	2*5=10
1 KΩ Resistance	3	1.5*3=4.5
330 Ω Resistance	4	1*4=4
10 KΩ POT	1	90
Total	16	400.5

Above are individual price

And this are market price

Project Kit (Rs.) 3599
Readymade (Rs.) 4299
(Total)DIY (Rs.) 5999

Use of Auto Intensity control of street light Circuit

circuit that automatically controls the intensity of street lights which is designed using microcontroller and LEDs. It is very useful to save the power.
Street lights are controlled manually in olden days. These days automation of street lights has emerged. But one can observe that there is no need of high intensity in peak hours i.e. when there is no traffic and even in early mornings. By reducing the intensity in these times, energy can be saved to some extent.

8.2 Reason for Students Recommending this Design

- Design to be proposed should be convenient enough, cost effective and valuable to the residents of the villagers. The design proposed is designed according to the use, value, costing recommended by the villagers.
- The cost of the design is the most important part which needs to be taken care of Costing should be value for money. Design should be designed according to number of people visiting, number of people going to use it, number of people wants the building or not.
- Our allocated village Ranol has most of the amenities and facilities needs by the resident and villagers for daily needs. Some amenities like public garden, public toilet, Primary school, RO plant and some requirements which are some amenities which can be beneficial to them in the long run and might also connect them to the fast-running world. Some of this might be not needed but might be as an entertainment and which can be used in the future.

8.3 About designs Suggestions / Benefit of the villagers

- For Reducing the migration of villagers to city area we provide some basic facilities to villagers then not required for them to live outside the villages.
- For providing better livelihood and facilities. We find out some lack of facilities in Ranol villages and design some amenities for villages. By providing these facilities to villagers they didn't required to live in cities, they got the facilities in the villages.
- Library, roads, underground drainage, primary health center, garden, animal husbandry, solar system, agricultural facilities, super market etc. help to villagers.

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

In part-I, after completion of survey and gap analysis, we propose some design for future development of village. In part 1, we are providing 9 designs in which 6 design related to civil and 3 designs related to electric. As the guidelines from GTU Vishwakarma project, we also required to prepare some more designs for develop the village and provide some new technology to villagers. So, we are again giving the more attention on survey of developed villages of our country and then decide to design more infrastructure and provide some new technology for villagers. Following are some points which we taken for selection of new designs.

- Renewable energy sources can be used for the purpose of energy conservation in every structure.
- Reduce load on conventional energy sources.
- Internal road quality can be improved to provide better transportation facilities by using waste material as filling material which is produced within the village.
- Use the rain water for increasing the ground water level.
- There are some facilities available but the care of machinery is not taken effectively.
- For increasing the mental health of villagers there are required to provide some recreational activities for living stressful.
- Agriculture and Animal husbandry is the main occupation of the villagers, so the effective irrigation system is very useful for saving the water.
- People required some automatic techniques for irrigation and some agriculture activity for decreasing their work load in farm etc.

Figure 9.1 Designs proposal for part II & their benefits

No.	Design	Benefits
1	Pump House	It's useful for operating the water supply in village
2	Bio-gas plant	For production of cooking gas and organic fertilizer in village, increase the income of village
3	Pick-up stand	Provide clean and comfortable sitting arrangement
4	Paver block	Increase the village's aesthetic view and centralized area for fairs and other occasions in village
5	Rain water Harvesting	Save the water and increase the ground water level, so increase irrigation facilities
6	Panchvati	A place to stay in group or visitors and villagers in summer and monsoon season
7	Smart Bin	These bin segregate the dry and wet waste
8	Automated Irrigation System	Farmer are relax about to irrigation because this system automatic start irrigation on provided scheduled
9	Motor protecting against Single Phasing and Overheating	Protect the motor in agriculture and centralized system in village

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

We have learned that the villages are backbone of the country and are lacking from basic amenities which are required to fulfill the basic needs of people to increase the living standard. villages are part of country which are directly and indirectly affects the development of the country. If villages are smart and with sufficient development and facilities than the people will not migrate from villages to the city. So the congestions and urban pressure can be eliminated and overall balanced growth of country becomes possible. At that time the economic consideration and feasibility of those infrastructure facilities should be considered. Providing facilities are not the only solution of migration but proper harmony and environment of growth and development should be there. The living standard of people should be increased. The purpose of this project is to reduce migration of people from rural to urban area due to lack of facilities and opportunities and reduce urban pressure by balancing both urban and rural area.

By the visit of ideal village (Laxmipura) and smart village (Jagana) we knew that village can be the better than the city or town. In cities of towns there are so many problems of pollution and congestion, but in villages Due to natural environment and technical and digital advancement villages can be better than cities or towns. After various surveys and visits of our allocated village Ranol. we have knew about existing conditions of rural areas also amenities and basic needs required in village for its economic and overall growth.

The major part of people is connected with agricultural activities. We also found some difficulties which village and its people are facing due to lack of infra-structure and development. That people of village are very good in nature and egger for the development. This project is proved as very knowledge gaining and interesting for us. After doing this project we have understood that the development of villages is equally important as urban area for country ‘s overall growth.

The village needs some infrastructural facilities to make village a better place we have tried our best by applying our technical knowledge in this project by proposing designs for some basic amenities which required. By this project we have learned so many things and it was the great experience of village culture and environment. We are proposing a design base on our survey, knowledge and Gap analysis to village for its development.

Chapter 11. References refereed for this project

- www.vyojana.gtu.ac.in
- www.onefivenine.com
- www.censusgujarat.gov.in
- www.census2011.com
- GTU guidelines and briefings
- URDPFI norms
- www.censusindia.gov.in
- www.researchgate.net
- www.villageinfo.in
- www.villagemaps.in
- https://sarkariyojana.com/gujarat/

Chapter 12. Annexure attachment

12.1 Survey form of Ideal Village

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Laxmipura
Name of Taluka:	Palanpur
Name of District:	Banas kantha
Name of Institute:	Government Engineering College, PALANPUR
Nodal Officer Name & Contact Detail:	DD. G.M. Savaliya.
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Patel Ashokkumar Shelabhai
Date of Survey:	14 October, 2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	5345	2709	2536	578

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	3.5 Hec
	Forest Area (In hect.)	0
	Agricultural Land Area (In hect.)	
	Residential Area (In hect.)	3.2 Hec
	Other Area (In hect.)	0
	Water bodies	
	Nearest Town with Distance:	Palanpur (0 km)

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Agriculture 2. Business 3. employ

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	yes	✓		
	• RO Water	yes	✓		
	• Well (Covered/ Uncovered)	-			
	• Hand pumps	-			
	• Tube well/ Borehole	yes	✓		
	• River/ Canal/ Spring/ Lake/ Pond	no			
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	1,00,000L		
	Underground Sump	Capacity:	10,00,000L		
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	yes			
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	open			
	If Open than Pucca / Kutchcha	Pucca			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	yes			
Suggestions if any:					

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E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Yes	✓		In good condition
	Main road	Yes			
	Internal streets	Yes			RCC streets
	Nearest NH/SH/MDR/ODR Dist. in kms.	Yes	✓		NH → 4km SH → 3km
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes			9km
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes			1.8 km
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto Private vehicle			
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Gov. come Private.			more than 6 hrs. (almost 24 hrs)
	Power supply for Domestic Use	Yes			
	Power supply for Agricultural Use	Yes			
	Power supply for Commercial Use	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.	4 Nos.	✓		
	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)	Yes 3+ private	.		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	✓			In good Condition

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

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K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	Yes - 3 Yes - 1 Yes - 1			Also available Ayurved Hospital
	Private Clinic/Private Hospital/ Nursing Home	Yes - 2			
	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			3 available
	Primary School	Yes			3 available
	Secondary school	Yes			2 available
	Higher sec. School	Yes			2 available
	ITI college/ vocational Training Center	-			In 10 km
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	-			In 5 km.
	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:	Best	near Temple	Yes	

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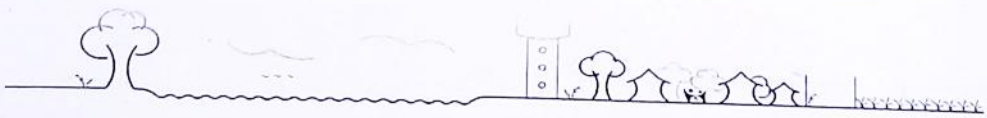
	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Yes Yes Gp Panchayat good			
	Public Garden Location: Condition:	Yes ~~Gp~~ milk dairy good			
	Village Pond Location: Condition:	-			
	Recreation Center Location: Condition:	-			
	Cinema/ Video Hall Location: Condition:	-			
	Assembly Polling Station Location: Condition:	Yes In school good			
	Birth & Death Registration Office Location: Condition:	Yes Panchayat good			

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	No			Post-box available
	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	wi-fi in Library and Panchayat			
	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	Yes, Solar plate available Per Person.			
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	Solar Street Lights available.			Private Rain water recharge tank available
Q.	Any Other				

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	Yes

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Recent Projects going on for Development of Village	
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)	Not required.	
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
લક્ષ્મીપુરા ગ્રામ પંચાયત
તા. પાલનપુર

12.2 Survey form of Smart Village

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	Banaskantha
Name of Taluka:	Palanpur
Name of Village:	Jagana
Name of Institute:	Government Engineering College, Palanpur
Nodal Officer Name & Contact Detail:	Dr. G.M. Saraliya
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch :- Bharatbhai P. Chaudhary
Date of Survey:	09 October, 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	7461	3852	3609	1596

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	2020.68 hec
2.	Forest Area (In hect.)	–
3.	Agricultural Land Area (In hect.)	1711.31 hec
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	6 km from palanpur

7.	Name of Nearest Town with Distance:	palanpur - 4km
8.	Distance to the nearest bus station (in kilometers):	Palanpur - 5 km
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Agriculture
	2.	Animal Husbandary
	3.	Employes

Major crops grown in the village:	1.	wheat
	2.	mustard
	3.	pearl millet (Bajari)

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	Yes	✓		
	Tube Well Or Bore Well	Yes	✓		4 Nos.
2.	DUG WELL				
	Protected Well	-			
	Un Protected Well	-			
3.	WATER FROM SPRING				
	Protected Spring				
	Unprotected Spring				
	Rainwater				
	Tanker Truck				
	Cart With Small Tank				
4.	SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/				
	Irrigation Channel	-			
	Bottled Water	-			
	Hand Pump	-			
	Other(Specify)Lake/ Pond	Yes			

21

Suggestions if any: Tank is empty.

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

Suggestions if any: There are three overhead tank and two underground sump.

C.	The Type of Drainage Facility				
	A UNDERGROUND DRAINAGE	Yes			
	1				
	2				
	B OPEN WITH OUTLET				
	C OPEN WITHOUT OUTLET				

Suggestions if any:

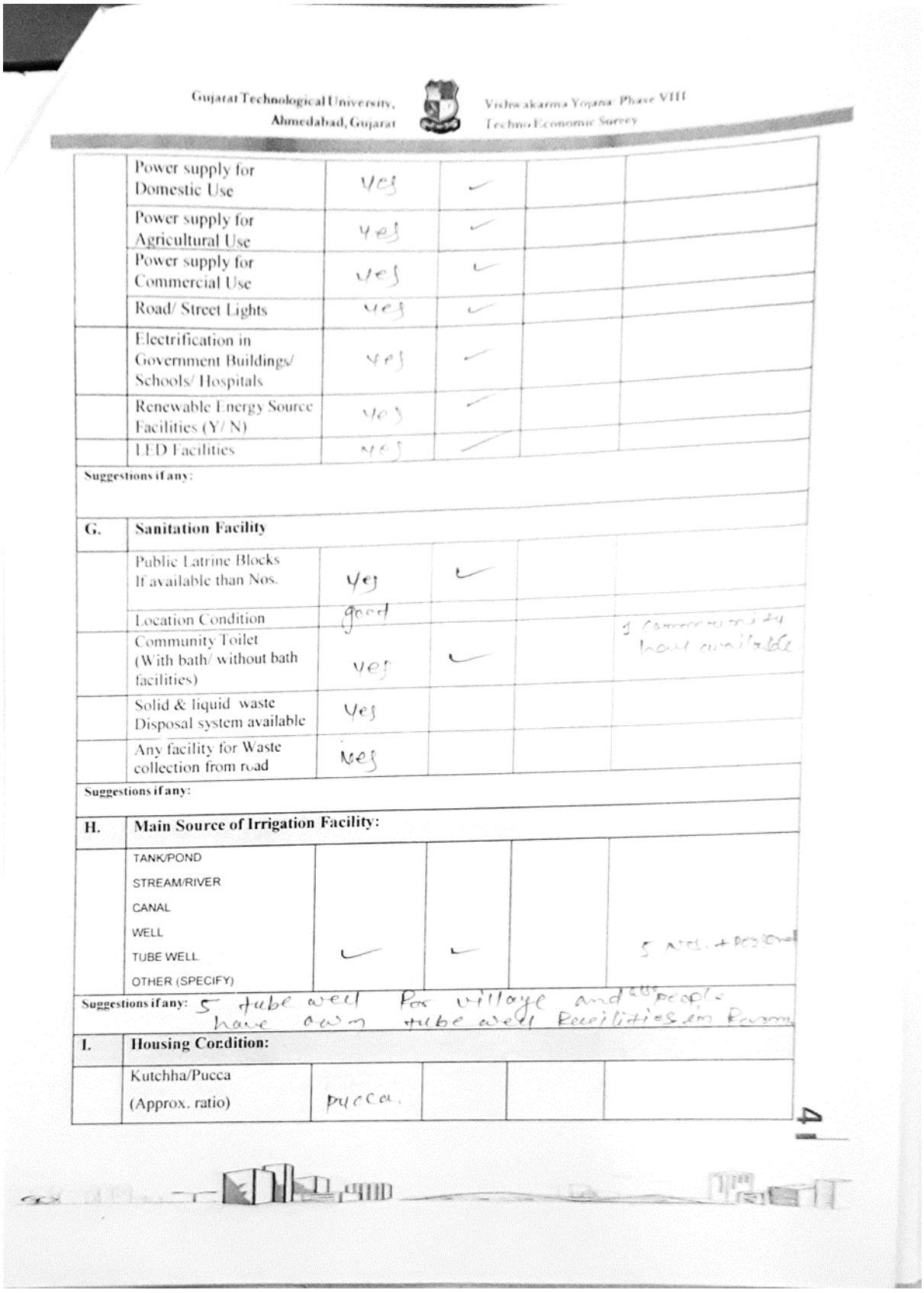
D.	Road Network : All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Yes	✓		
	Main road	Yes	✓		
	Internal streets	Yes	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	Yes	✓		SH-21 (1km away) NH-27 (7km away)

Suggestions if any: Bituminous and CC roads available.

E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes	✓		At Dilan Rly (5 km away)
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	✓		

Suggestions if any:

F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes			more than 6 hours.



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	Power supply for Domestic Use	Yes	✓		
	Power supply for Agricultural Use	Yes	✓		
	Power supply for Commercial Use	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	✓		
	Location Condition	good			
	Community Toilet (With bath/ without bath facilities)	Yes	✓		1 community toilet have available
	Solid & liquid waste Disposal system available	Yes			
	Any facility for Waste collection from road	Yes			

Suggestions if any:

H.	Main Source of Irrigation Facility:				
	TANK/POND				
	STREAM/RIVER				
	CANAL				
	WELL				
	TUBE WELL	✓	✓		5 Nos. + Personal
	OTHER (SPECIFY)				

Suggestions if any: 5 tube well For village and 400 people have own tube well Facilities in Room

I.	Housing Condition:				
	Kutchha/Pucca (Approx. ratio)	Pucca.			

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	yes	✓		
	Sub-Centre	yes	✓		
	PHC	yes	✓		
	BLOCK PHC				
	CHC/RH				
	District/ Govt. Hospital	yes	✓		
	Govt. Dispensary				
	Private Clinic	yes	✓		
	Private Hospital/ Nursing Home				
	AYUSH Health Facility	yes	✓		
	sonography /ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: 5 ....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	yes	✓		
	Primary School	yes	✓		
	Secondary school	yes	✓		
	Higher sec. School	yes	✓		
	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: 5 ....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)	Yes			
	Public Garden	Yes			
	Village Pond	Yes			
	Recreation Center	No			
	Cinema/ Video Hall	No			
	Assembly Polling Station	Yes			
	Birth & Death Registration	Yes			

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

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Yes			
	Telecommunication Network/ STD booth	No			
	General Market	Yes			
	Shops (Public Distribution System)	Yes			
	Panchayat Building	Yes			
	Pharmacy/Medical Shop	Yes			
	Bank & ATM Facility	Yes			
	Agriculture Co-operative Society	No			available nr. Palanpur
	Milk Co-operative Soc.	Yes			
	Small Scale Industries	Yes			
	Internet Cafes/ Common Service Center/Wi Fi	Yes			
	Youth Club	Yes			2 groups
	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	Yes Yes 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 Suraksha Yojana 4. Kishori Shakti Yojana 5. Balika Samriddhi Yojana 6. Mid-day Meal Programme 7. Intergrated Child Development Scheme (ICDS) 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 14. Minimum Needs Programme (MNP) 15. National Rural Employment Programme 16. Employee Guarantee Scheme (EGS) 17. Prime Minister Rojgar Yojana (PMRY) 18. Jawahar Rozgar Yojana (JRY) 19. Indira Awas Yojna (IAY) 20. Samagra Awas Yojana (SAY) 21. Sanjay Gandhi Niradhar Yojana (SGNY) 22. Jawahar Gram Samridhi Yojana (JGSY) 23. Other (SPECIFY)				

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Yes	✓		
2.	Recent Projects going on for Development of Village				
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)	No			

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	All Infrastructure in good condition, so not required any Repairing or maintance.	
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 ?		

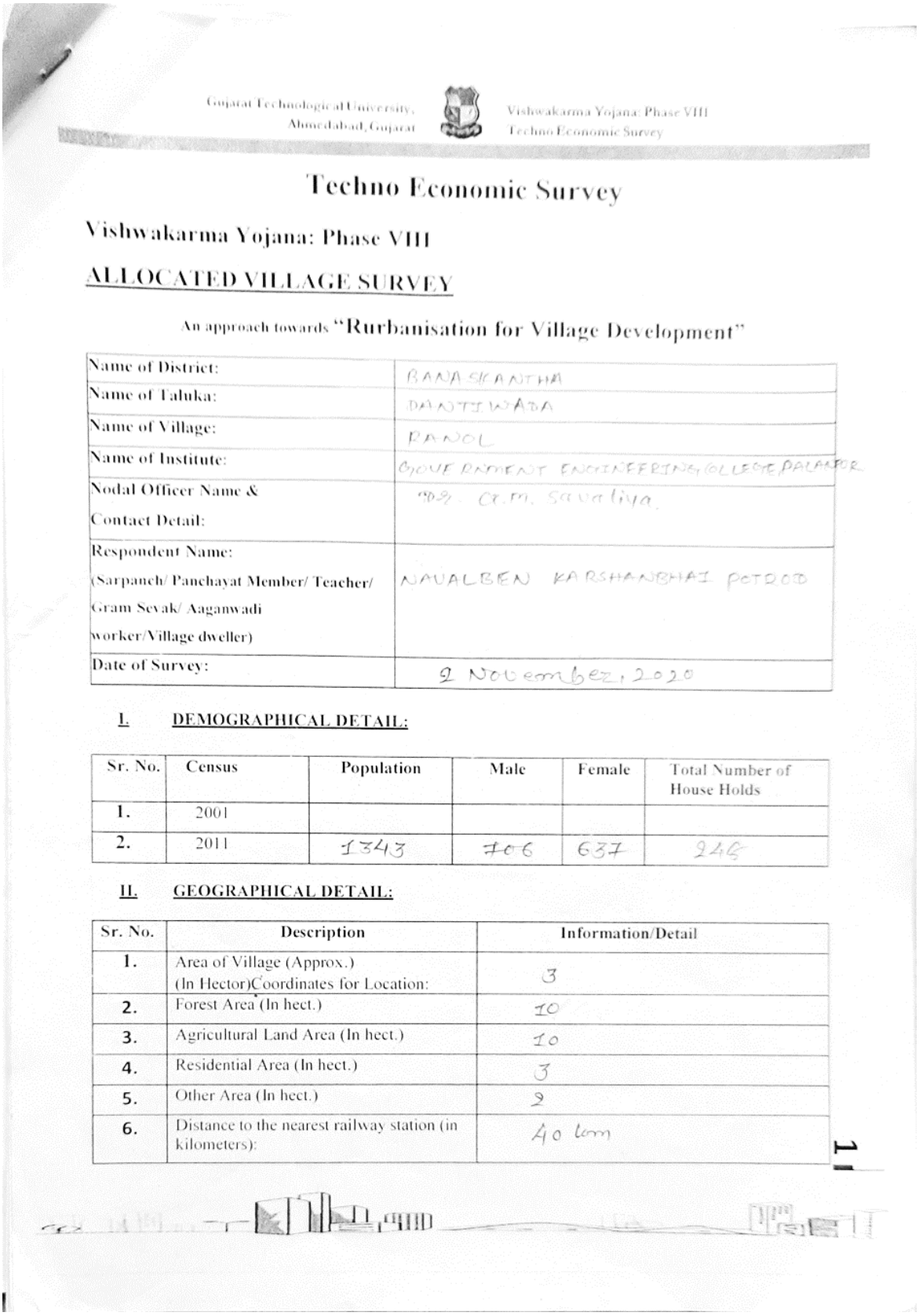
Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

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

સરપંચ
વનાણા ગ્રામ પંચાયત
તા. પાલનપુર જી. બ.

9

12.3 Survey form of Allocated Village



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	BANASKANTHA
Name of Taluka:	DANTIWADA
Name of Village:	RANOL
Name of Institute:	GOVERNMENT ENGINEERING COLLEGE, PALANPUR
Nodal Officer Name & Contact Detail:	Dr. C. M. Savaliya
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	NAVALBEN KARSHANBHAI PATOD
Date of Survey:	2 November, 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	1343	706	637	246

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	3
2.	Forest Area (In hect.)	10
3.	Agricultural Land Area (In hect.)	10
4.	Residential Area (In hect.)	3
5.	Other Area (In hect.)	2
6.	Distance to the nearest railway station (in kilometers):	40 km

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7.	Name of Nearest Town with Distance:	PALANPUR (24 km.)
8.	Distance to the nearest bus station (in kilometers):	BUS STATION : (24 km.) BUS DEP : (25 km)
9.	Whether village is connected to all road for the any facility or town or City?	YES

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Animal Husbandary 2. Agriculture 3. carpenter

Major crops grown in the village:	1. Wheat 2. mustard 3. pearl millet (Bajari)

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	yes		✓	
	Tube Well Or Bore Well	yes		✓	
2.	**DUG WELL**				
	Protected Well				
	Un Protected Well	NO			
3.	**WATER FROM SPRING**				
	Protected Spring				
	Unprotected Spring				
	Rainwater				
	Tanker Truck				
	Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**			✓	
	Irrigation Channel	yes			
	Bottled Water	NO			
	Hand Pump	NO			

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	Other(Specify)Lake/ Pond	yes		✓	
Suggestions if any: Lake are available but [illegible] situation.					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity 50,000			
	Underground Sump	Capacity 1,00,000			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	yes			Required new drainage system
Suggestions if any: Required new drainage system because old drainage pipes are blocked.					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Available	✓		
	Main road	Available	✓		
	Internal streets	Available		✓	maintenance required
	Nearest NH/SH/MDR/ODR Dist. in kms.	Available (20 km)			
Suggestions if any: maintenance Required					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO 40km away		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Bus stop available (0.5 km away)			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto private vehicle		✓	
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	YES (more than 6 hrs)			

3

	Power supply for Domestic Use	Yes			
	Power supply for Agricultural Use	Yes			
	Power supply for Commercial Use	Yes			
	Road/ Street Lights	Yes		✓	Bulb Available
	Electrification in Government Buildings/ Schools/ Hospitals	Yes		✓	Required maintance and more Electrification
	Renewable Energy Source Facilities (Y/ N)	No			
	LED Facilities	No			

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes			2 Nos. Available
	Location Condition	good			Panchayat
	Community Toilet (With bath/ without bath facilities)				
	Solid & liquid waste Disposal system available	Yes			Solid waste disposal Required
	Any facility for Waste collection from road	No		✓	Required

Suggestions if any: separate

H.	**Main Source of Irrigation Facility:**				
	TANK/POND				
	STREAM/RIVER				
	CANAL				
	WELL				
	TUBE WELL				
	OTHER (SPECIFY)				

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Yes	✓		Kuchha houses need maintance

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Vishwakarma Yojana: Phase VIII Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	yes	✓		/
	Sub-Centre	–			
	PHC	–			
	BLOCK PHC	–			
	CHC/RH	–			
	District/ Govt. Hospital	NO			[illegible]
	Govt. Dispensary	NO			
	Private Clinic	NO			
	Private Hospital/	NO			
	Nursing Home	NO			
	AYUSH Health Facility	yes			
	sonography /ultrasound facility	NO			
	If any of the above Facility is not available in village than approx. distance from village: .40...kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	yes			available
	Primary School	yes			
	Secondary school	NO			
	Higher sec. School	NO			
	ITI college/ vocational Training Center	NO			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO			

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

Suggestions if any:

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

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

Suggestions if any:

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

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries			✓	✓ ✓ ✓ ✓
	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 Suraksha Yojana 4. Kishori Shakti Yojana 5. Balika Samriddhi Yojana 6. Mid-day Meal Programme 7. Intergrated Child Development Scheme (ICDS) 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 14. Minimum Needs Programme (MNP) 15. National Rural Employment Programme 16. Employee Guarantee Scheme (EGS) 17. Prime Minister Rojgar Yojana (PMRY) 18. Jawahar Rozgar Yojana (JRY) 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)				

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES.

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Not available		✓	
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	Not available			Required
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Yes			
2.	Recent Projects going on for Development of Village				
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 Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	NIL	All Required maintenance
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

NKP
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તા.દાંતીવાડા, જી.બનાસકાંઠા.

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12.4 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis

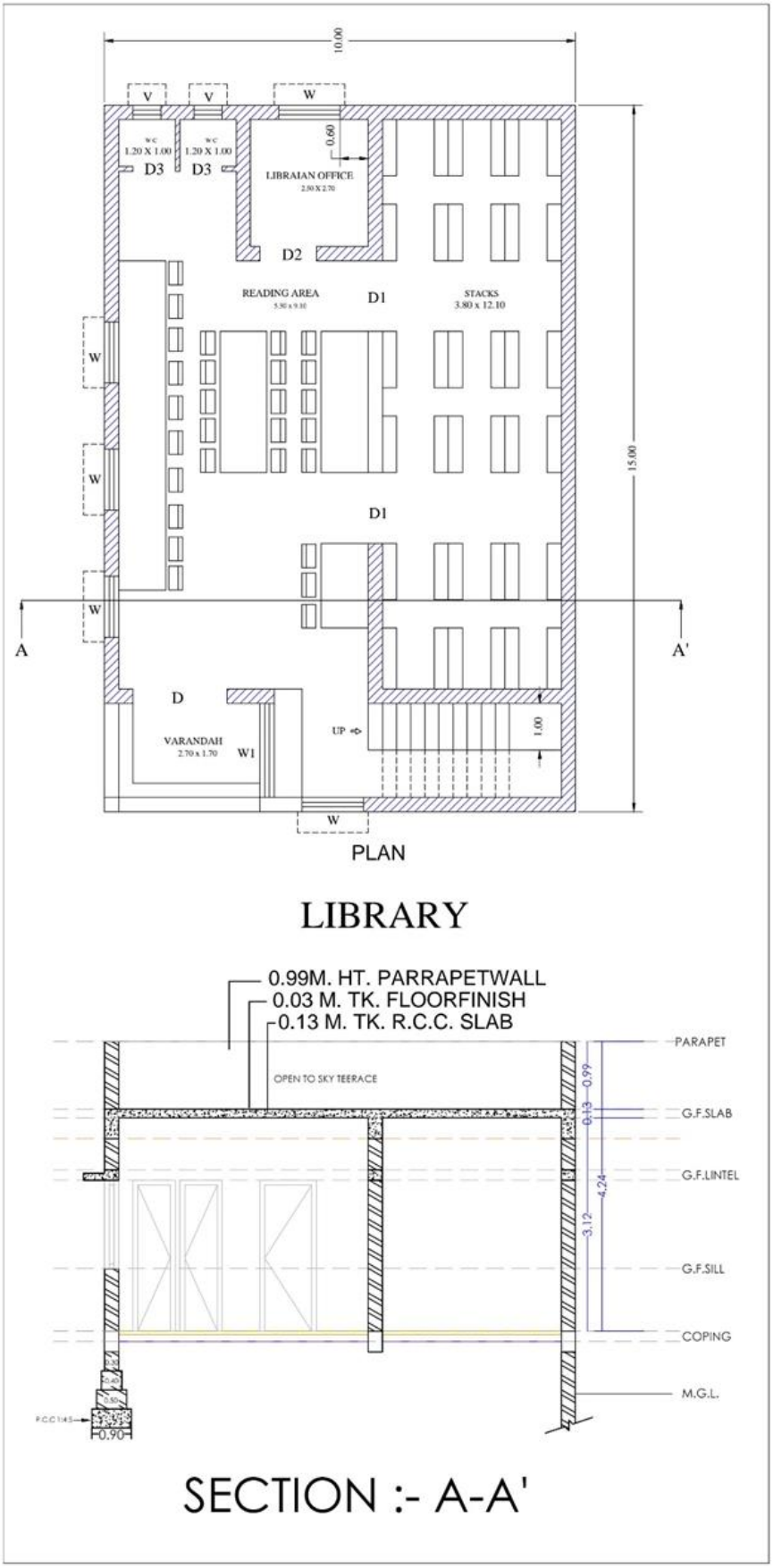
Village Name: Ranol

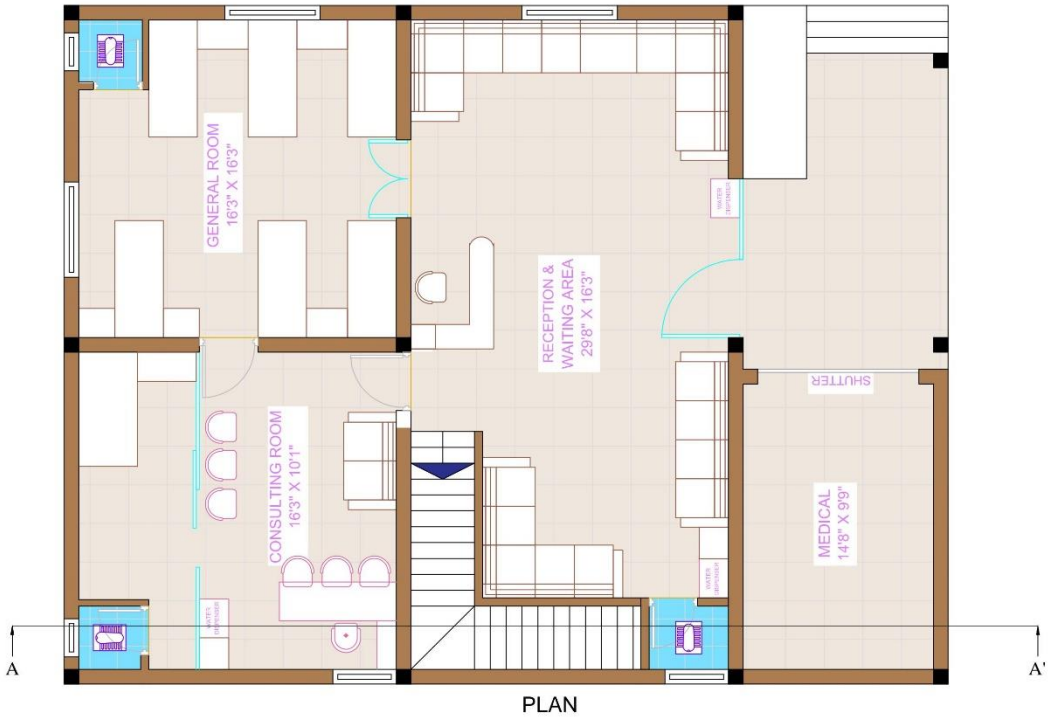
Village Facilities	Planning Commission/UDPFI Norms	Population: Existing	Required as per Norms	Smart Vilage / Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	1			
Primary School	Each Per 2500 population	1			
Secondary School	Per 7.500 population	0	NO		YES
Higher Secondary School	Per 15.000 Population	0	NO		
College	Per 125.000 Population	0	NO		
Tech. Training Institute	Per 100000 Population	0	NO		
Agriculture Research Centre	Per 100000 Population	0	NO		
Skill Development Center	Per 100000 Population	0	NO		
Health Facility					
Govt Panchyat Dispensary or Sub PHC or Health Centre	Each Village	NO	YES		YES
Primary Health & Child Health Center	Per 20.000 population	NO	NO		
Child Welfare and Maternity Home	Per 10.000 population	NO	NO		
Multispeciality Hospital	Per 100000 Population	NO	NO		
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	NO	NO		
Physical Infrastructure Facilities					
Transportation		Adequate / Inadequate			
Pucca Village Approach Road	Each village	Inadequate	Yes		
Bus Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	Adequate	NO		
Drinking Water (Minimum 70 lpcd)		Adequate / Inadequate			
Over Head Tank	1/3 of Total Demand	Adequate	NO		
U/G Sump	2/3 of Total Demand	Adequate	NO		
Drainage Network - Open		Adequate / Inadequate			
Drainage Network - Cover		Inadequate	YES		YES
Waste Management System		Adequate / Inadequate			
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	YES			
community hall and Public Library	Per 15000 Population	NO			
Cremation Ground	Per 20.000 population	YES			
Post Office	Per 10.000 population	NO			
Gram Panchayat Building	Each individual/group panchayat	Yes			
APMC	Per 100000 Population	NO			
Fire Station	Per 100000 Population	NO			
Public Garden	Per village	NO	YES		
Police post	Per 40.000Population				
Shopping Mall					
Electrical Design					
Electricity Network		Adequate / Inadequate	Yes		
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

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

Village	Part-1		Part-2	
	No.	**Civil**	**No.**	**Civil**
Ranol	1	Library	1	Pump House
	2	Health center	2	Bio-gas plant
	3	Anganwadi	3	Pick-up stand
	4	Public Garden	4	Paver block
	5	Entry Gate	5	Rain water Harvesting
	6	Animal Husbandry	6	Panchvati
		Electrical		**Electrical**
	7	Solar System for Panchayat House	7	Smart Bin
	8	Programmable Automatic Bell System	8	Automated Irrigation System
	9	Auto Intensity control of street light using a PIC Microcontroller	9	Motor protecting against Single Phasing and Overheating

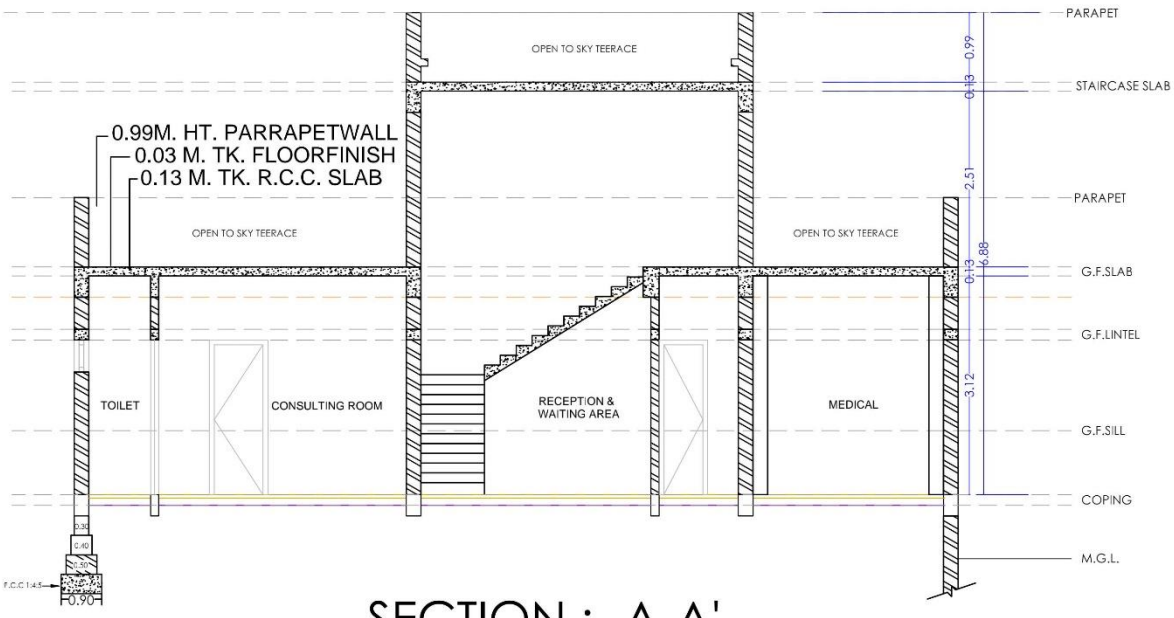
12.6 Drawings



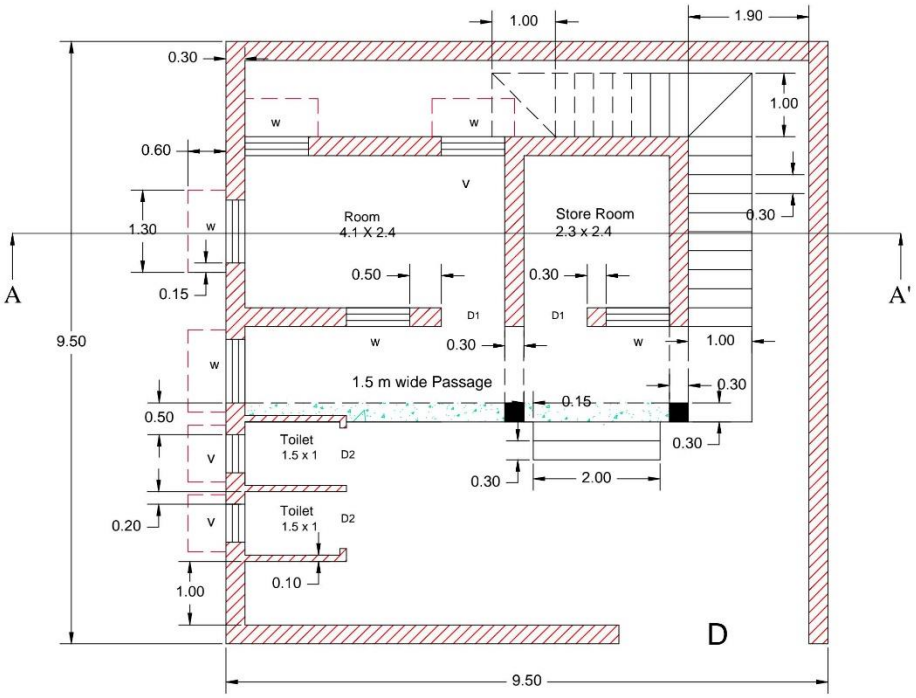


PLAN

HEALTH CENTRE

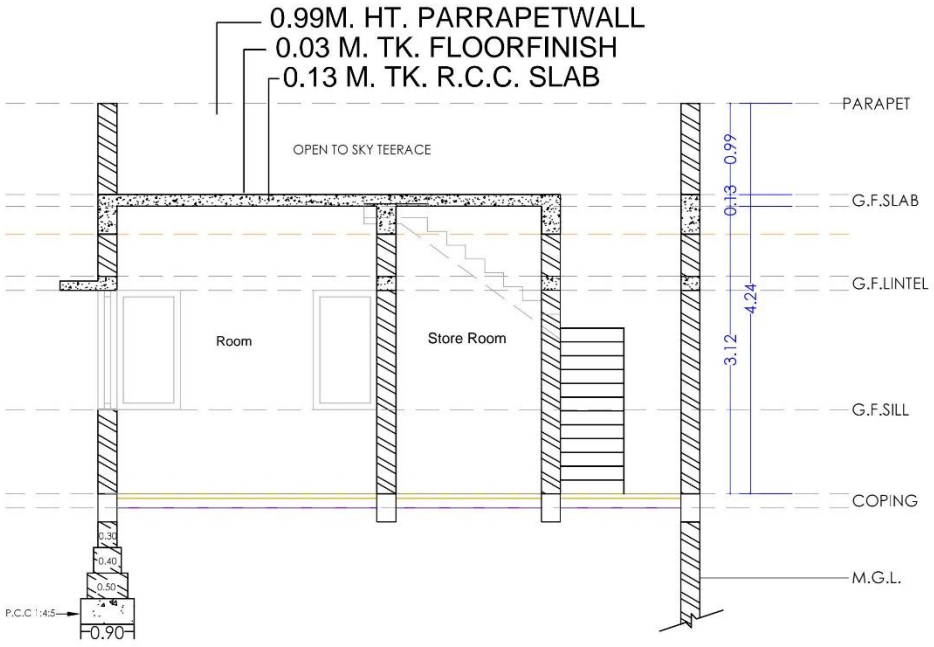


SECTION :- A-A'

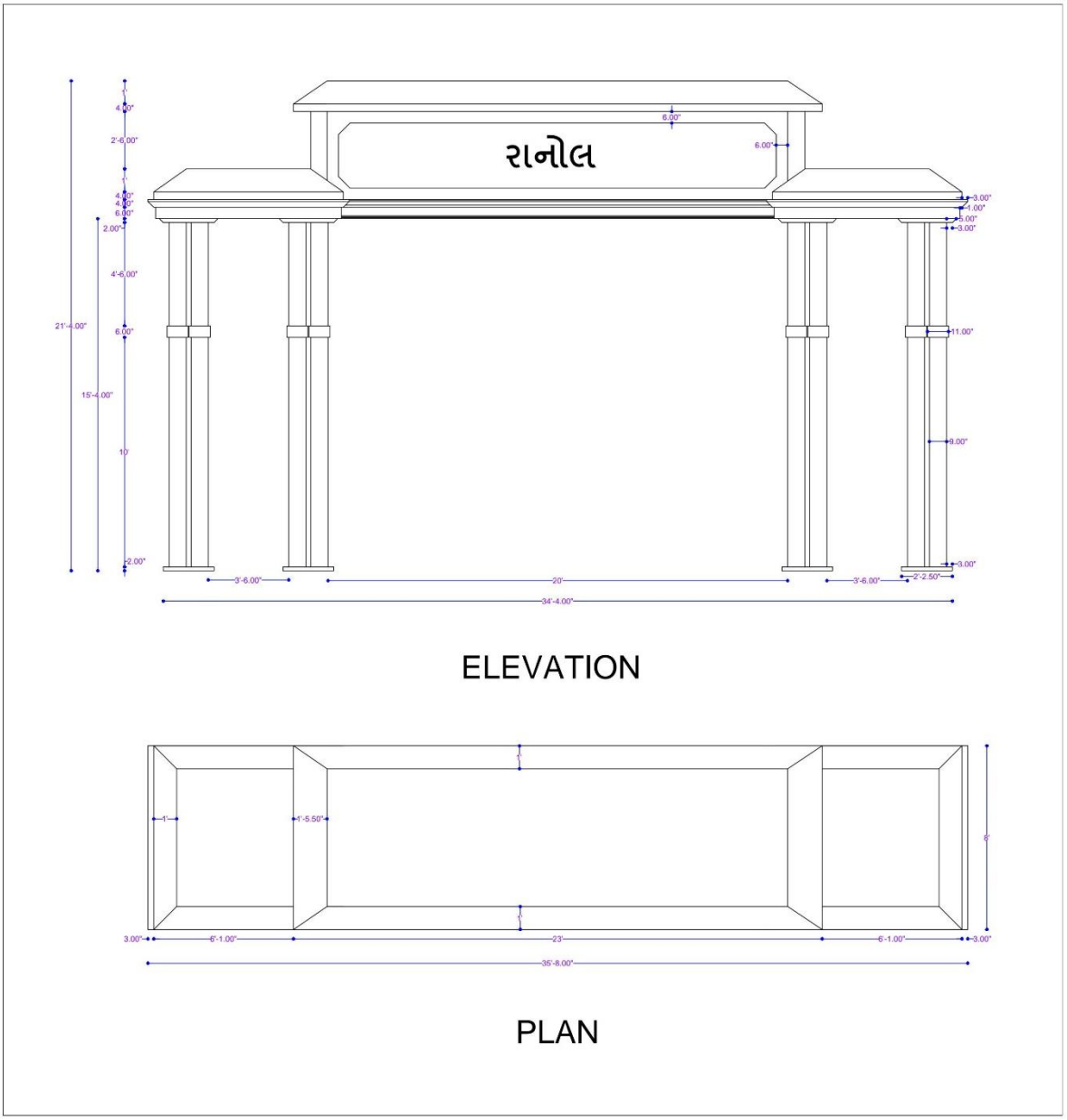


PLAN

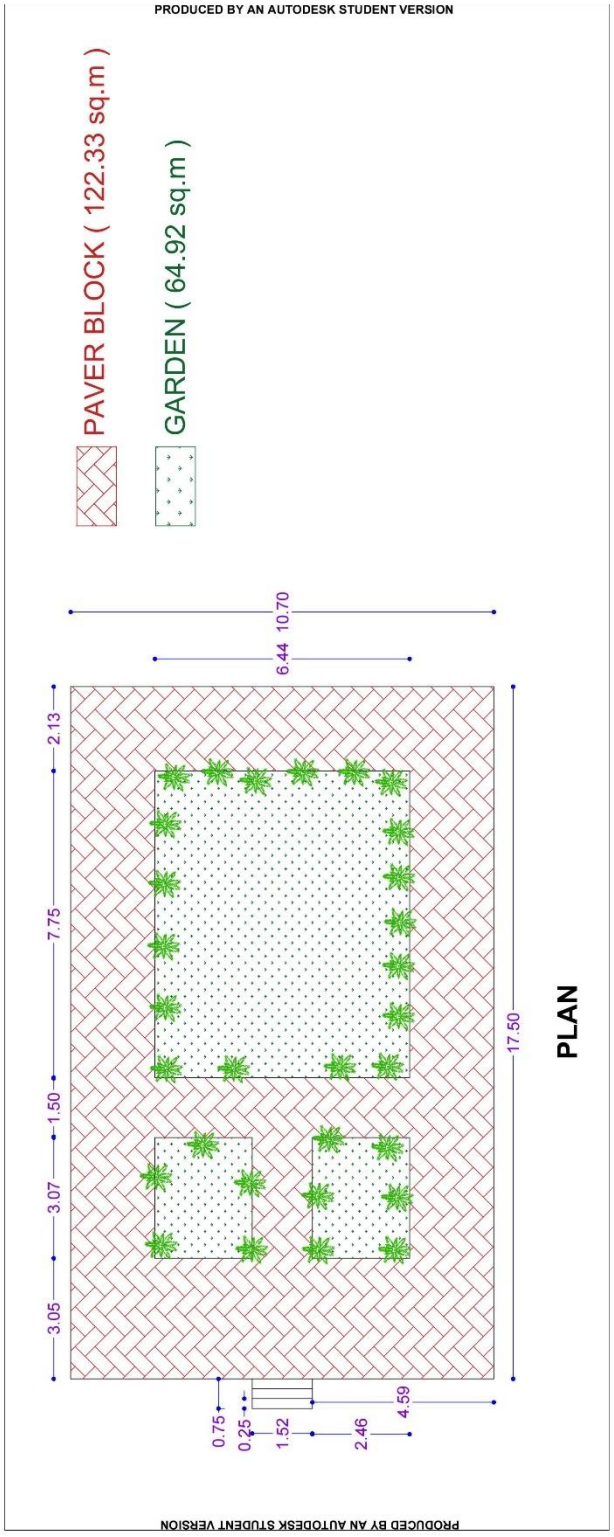
ANGANVADI



SECTION :- A-A'



Entry Gate



Public Garden

12.7 Summary of Good Photographs in Table Format

Allocated village (RANOL) survey

Ideal Village Survey

Smart Village Survey

12.8 Village interaction with sarpanch Report with photograph

Ranol Village:

Figure 12.1 interaction with Sarpanch of Ranol village

Ideal Village: Laxmipura

Figure 12.2 interaction with sarpanch of laxmipura village (Ideal village)

Smart Village: Jagana

Figure 12.3 interaction with Talati of Jagana village (smart village)

12.9 sarpanch letter giving information about the village development

Application for Approval

પ્રતિ,
સરપંચ મહોદયા,
ગામ: રાનોલ,
તાલુકો-દાંતીવાડા, બ.કા.

વિષય – વિશ્વકર્મા યોજના અંતર્ગત ગામની મુલાકાત તેમજ ગામજનો સાથે ચર્ચા- વિચારણા કરવા બાબત.

માનનીય મહોદયા,

સવિનય ઉપરોક્ત વિષય પ્રત્યે આપશ્રીને જણાવવાનું કે અમે નીચે દર્શાવેલ વિધ્યાર્થીઓ વિશ્વકર્મા યોજના અંતર્ગત સરકારી ઈજનેરી કોલેજ પાલનપુર સિવિલ વિભાગ અંતર્ગત પ્રોજેક્ટ કાર્ય કરી રહેલ હોઇ ગામ તથા ગામજનો ની મુલાકાત અનિવાર્ય છે.

વધુમાં, આ યોજના અંતર્ગત સ્વચ્છ ભારત અભિયાન તથા covid-19 જાગૃતિ કાર્યક્રમ કરવાનો થાય છે.

આથી, સદર બાબતે મંજૂરી આપી યોગ્ય કરવા આપશ્રી ને નમ્ર વિનંતી છે.

આભાર સહ

No.	Student's Name	Enrollment No.
1	Prajapati Nileshkumar Ramchandrabhai	170610106048
2	Patel Arth Chandreshbhai	180613106009
3	Prajapati Hardik Dolatbhai	170610109039

રાણોલ ગ્રામ પંચાયત * તા.દાંતીવાડા, જી.બ.કાં. *

VKP
સરપંચ
રાણોલ ગ્રામ પંચાયત
તા.દાંતીવાડા, જી.બનાસકાંઠા.
તા1-07/12/2020

Application for Approval of Design

To,
Sarpanch,
Village: Ranol,
Tehsil: Dantiwada, B.K.

Subject: Approval of Proposed Design for your village.

Respected Mam,

We have provided nine designs for your village as a part of our Vishwakarma yojana Phase- VIII. These designs will be helpful for growth of your village towards the path of smart village. Please Approve the designs, if you find helpful for the village growth.

Design proposal as off part: I

1. Library
2. Health Center
3. Anganwadi
4. Public Garden
5. Entry Gate
6. Animal Husbandry
7. Solar System for panchayat House
8. Programmable automatic bell system
9. Auto intensity control of street light using a PIC programmer

Yours faithfully

Prajapati Nilesh R. (170610106048)
Patel Arth C. (180613106009)
Prajapati Hardik D. (170610109039)

NKP
સરપંચ
રાણોલ ગ્રામ પંચાયત
તા.દાંતીવાડા, જી.બનાસકાંઠા.

12.10 Comprehensive Report for Part-I

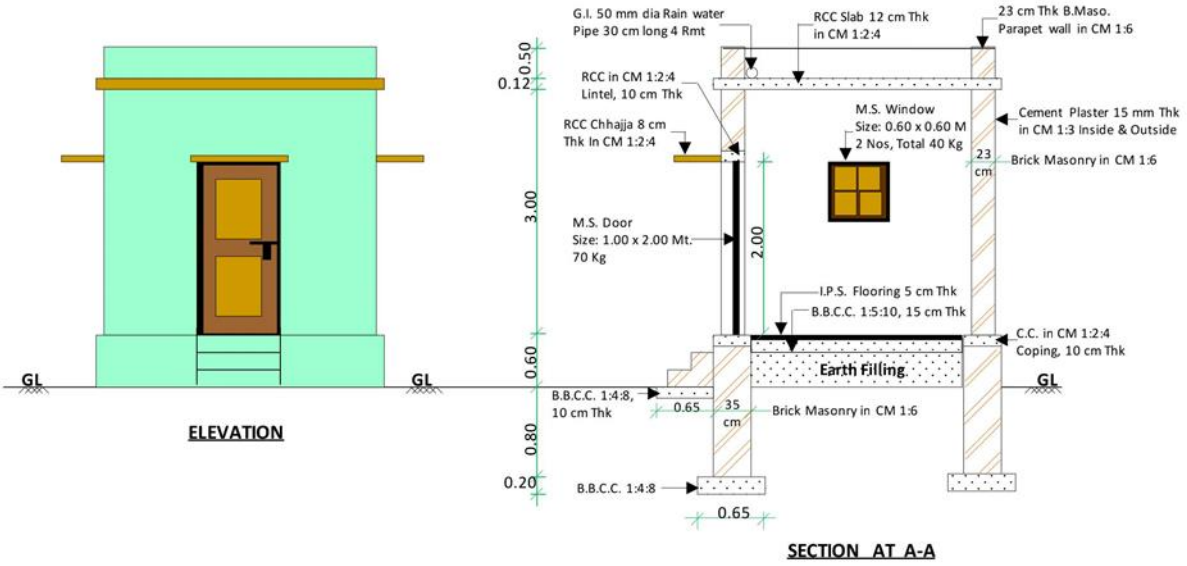
Table 12.1 Comprehensive Report

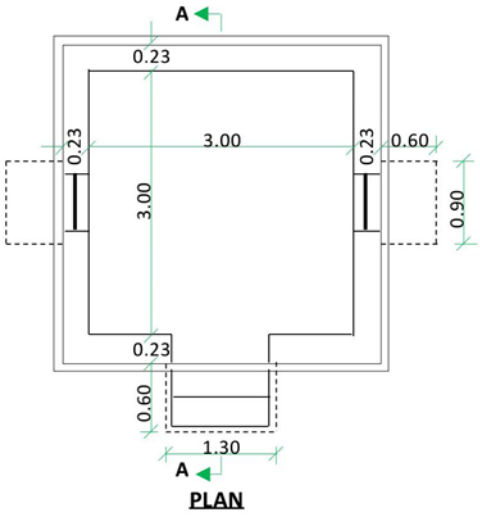
No.	Description	Work
1	Ideal Village: Laxmipura, Tehsil: Palanpur, District: B.K.	-Village survey (for find Available Facilities & lake of Facilities) -Techno economic survey
2	Smart Village: Jagana, Tehsil: Palanpur, District: B.K.	-Smart village survey (for find available Facilities and Lake of Facilities -Technoeconomic survey of village
3	Allocated village: Ranol Tehsil: Dantiwada District: B.K.	-village visit (Approval for public interaction) -interaction with sarpanch and talati for official information -Public interaction for getting the information about what they actually need in village -Techno economic survey -detailed survey -find the available facilities and lake of facilities
4	Allocated village's detailed survey for design of facilities	-got the information about lake of facilities and select some facilities and technologies to develop in the village, select some structure for maintenance
5	Design Proposals: Civil	1. Library 2. Health center 3. Anganwadi 4. Public Garden 5. Entry Gate 6. Animal Husbandry
6	Design Proposals: Electrical	1. Solar System for Panchayat House 2. Programmable Automatic Bell System 3. Auto Intensity control of street light using a PIC Microcontroller
7	Literature revie and case studies	-we done all literature revie and case studies which are provided by the GTU -got the many information related to village development and its useful for selecting our designs
8	COVID-19 Awareness	-In Ranol get the information about the covid-19 situation in village -Public interaction for awareness of COVID-19
9	Swachh bharat Abhiyan Awareness	-awareness about swachh bharat abhiyan -find the locations where need a swachhta in village

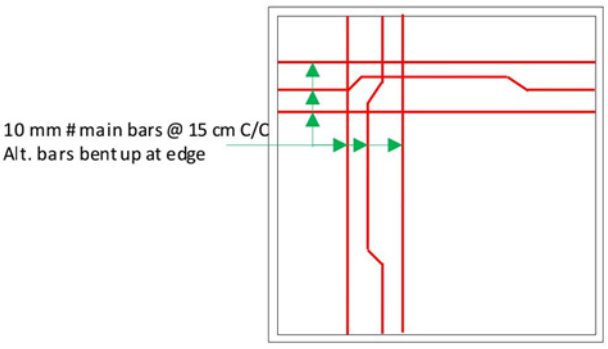
Chapter 13. From the Chapter- 9 future designs of the aspects

13.1 Design Proposals

13.1.1 Civil Design 1: Pump house







Quantity Sheet of Pump House

Table 13.1 Quantity sheet of Pump House

No.	Item description	NO.	L	B	H	Qty	Total
1	Excavation for foundation upto 1.5M. depth including sorting out and staking of useful material and diposing of excavated stuff up to 50.M lead.						
	For foundation L.W.	2.00	3.88	0.65	1.00	5.04	
	S.W.	2.00	2.58	0.65	1.00	3.35	
	Four steps	1.00	0.55	1.20	0.10	0.07	
					Total	8.46	8.50com
2	Providing & laying cement concrete 1:4:8 and curing complete exctuding cost of somework .in(a) foundation and plinth etc. complete						
	For foundation L.W.	2.00	3.88	0.65	0.20	1.01	
	S.W.	2.00	2.58	0.65	0.20	0.67	
		1.00	0.55	1.20	0.10	0.07	
					Total	1.75	1.80cum
3	Providing & laying brick day building concrete 1:5:10 and curing complete excluding cost of someworks .in(a) foundation and plinth.						
	In plinth for L.P.S. floring	1.00	2.88	2.88	0.15	1.24	1.25com
4	Brick work using coninon burnt day building having crushing strength not less then 35 kgs/sq .ml in foundation plinth in cement morter 1:6 etc. complete						
	For L.W.	2.00	3.58	0.35	1.30	3.26	
	S.W.	2.00	2.58	0.35	1.30	2.35	
	For step first	1.00	0.60	1.00	0.20	0.12	
	Step second	1.00	.30	1.00	0.20	0.06	
					total	5.79	5.80cum
5	Filling in plinth with earth under floor including watering , ramming , consolding & dressing etc						
	For L.W	2.00	2.88	2.88	0.45	3.73	3.80cum
6	Brick work using common burnt clay building having crushinkg strength not less man 35kg/sqm in foundation plinth in cement morter 1:6 etc. complete						
	For L.W.	2	3.46	0.23	3	4.77	
	S.W.	2	3	0.23	3	4.14	
	For parapet wall	1	3.45	0.23	0.50	0.40	
	S.W.	1	3	0.23	0.50	0.35	
					Total	9.66	
	Deduction						
	Door	1	1	0.23	2	4.46	
	Window lintel over Door	2	0.60	0.23	0.60	0.17	

	Lintel over window	1	1.30	0.23	0.10	0.03	
						-0.70	
					Total	6.96	9.0 cum
7	Providing and fixing iron door & window and cupboard etc.						
	Door	1	70			70.00	
	Window	2	20			40.00	
					Total	110	110kg
8	Providing & Laying cement C.C work 1:2:4						
		2	3.58	0.35	0.10	0.25	
		2	2.88	0.35	0.10	0.20	
					Total	0.45	0.50cum
9	Providing &laying Cement concrete work 1:2:4						
	For R.C.C lintel	1	1.30	0.23	0.100	0.03	
		2	0.90	0.23	0.100	0.04	
					Total	0.07	0.08cum
	For R.C.C. Chajja	1	1.30	0.60	0.080	0.06	
		1	0.90	0.23	0.100	0.04	
					Total	0.10	0.10cum
	For R.C.C. slab	1	3.66	3.66	0.120	1.61	1.62cum
10	Supplying,cutting , bending , and placing in position steel as per plan & design & as per ISS 2502 including cost of steel &binding wire for reservoir						
	For R.C.C work	1	0.20			0.20	0.20MT
11	Providing & Laying cement concrete flooring 1:2:4						
	50 mm in side P.H work	1	2.88	2.88		8.29	8.30sgm
12	Providing 15 mm Cement plaster in single coat on fair side brick concrete wall						
	Bellow plinth	4	3.58	0.60		8.59	
	Step side	2	0.30	0.20		0.12	
	Step side	2	0.60	0.20		0.24	
	Inside room	4	3	3		36.00	
	Out side room	4	3.46	3		41.52	
	Parapet outer	4	3.46	0.50		6.92	
	Parapet inside	4	3	0.50		6	
	Parapet top	4	3.23	0.23		2.97	
					Total	102.36	
	Deduction						
	Door	1	1	2		2	

	Window	2	0.60	0.60		0.72	
					Total	-2.72	
					Net tl	99.64	99.70sqm
13	Providing & Fixing G.I Rain water spout of 50 mm dia. 30 mm Long etc. complete.						
		4				4	4Rmt
14	Providing & supplying ISI mark G.I pipes with Coupling of following class & Dia. Incl. all taxs						
	80 mm dia G.I pipe (H/D)	1	19			20.00	20.00Rmt

Abstract Sheet of Pump House

Table 13.2 Abstract Sheet of Pump House

Qty	Detail	Per	Rate	Add 1% cess	Total	Amount
8.5	Item No.1 Excavation for foundation up to 1,50 M depth incluiding sotng aut and staking of useld matetat & diposing of excavated utuft up to 50 M. Lead a) Loone or solt soil. RSBSOR: 15-16, Pa.44, .04001A)	Cum	67.23	0.67	67.9	577.15
1.8	item No 2 Prov. & liying coment concite 1:4:8 (1 coment 4 sand. 8 hand brokon stone agrm) & ouring complete ewl cost of form work in foundation & plinth etc compl (a) Foundation & plinth, (R&B-SOR: 15-16, Pg.53, .5008)	Cum	1892	18.92	1910.92	3439.656
1.25	Item No.a Providing & Litying brick bat C.C. 1:5:10 (1 cement 5 coarse sand 10 brick bats) & curing complete axc cost of formwors in (a) Foundation & plinth (a) Foundation & plinth. (RSB-SOR: 15-16, Pa 53. R5009)	Cum	1673.76	16.74	1690.5	2112.125
5.8	Item No.4 Brick wark uning comon bumt day bulding having erushing strength not less than 5 kolsgm in foundation & plinth in cement morter 1,0 (1 cement 6 sand) etc complete. conventional	Cum	2878.68	28.79	2907.47	16863.326

	2878.68 (RSBSOR: 1510, Pg.78, It.06002B)					
3.8	Item No.5 Filling in pinth with sand under flodrs ind watering. ramming, cosoli & dressing etc comp. RSB-SOR: 15-16, Pg 47. It 4007)	cum	416.18	4.16	420.34	1597.292
9	Item No.6 Brick work using comon bumt clay building having crushing strength not inns than 35 kg/sqm in foundation & plinth in cement morter t6 (1cement :6 sand) etc. complete. With extra brick work in Super Structure Conventional R&B-SOR 2015-16, Pg 78 & G0, ILO600Z8 & 060OBB.	Cum	3039.64	30.4	3070.04	27630.36
110	Item No.7 Providing and fiaing iron door & window and cupboard etc incl using Ihe frames of Channels, angles and lats and M.S, sheets as pre design incl. Rovating, Welding & fixing in concrete block incl. iron foxture and fasting with one cont of primer etc, complete (R&8-SOR 2015-16, Pg 121, H11001A)	kg	59.726	0.6	60.326	6635.86
0.5	Item No.8 Providing and Laying oement concrete work 124 (1 cement: 2 sand : 4 graded stone agrgate) and curing complete including the cost of forwork but excluding the cost of renforcement for Copping etc. complete. (R&B-SOR: 2015-16. Pg 54, IL05011D)	Cum	3359.54	33.6	3393.14	1696.57
0.08	Itam No.D Pruviding & Laying comont concrete work 12:4 (1 cement 2 sand 4 graded stone aggrogaten) & curing complete including the cont of formwork but excluding the cost of reintorcement for Coping etc complete.	Cum	6058.8	60.59	6119.39	489.5512
0.1	A) Lintel IRKB-SOR: 15-16, Pg.81, t5030) Cum					
1.62	B) For R.C.C. Chhaja RSB-SOR 15-16, Pa54, It 5012)	Cum	5129.52	51.3	5180.82	8392.9284

1.62	C) For R.C.C. Flat Slab RSBSOR: 15-16, Po. 59, I05026C)	cum	4744.08	47.44	4791.52	7762.2624
0.2	itom No.10 Supplying cutting, bendin, binding and placing in poution steel as per plan & design & as per 18S 2502 including cost of steel & binding wire for teservoins atructures only inc lift up to 6 m height or depth below G.L for all diameters Do-Thermo mechunically troated (TMT)bars Fe-415 grade for all diamoters. GWSSB-SOR 2020-21, Sec.C. Pg.45, IL9) 0.2)	MT	6398	0	63398	12679.6
8.3	Itom No.11 Providing and Laying cement concrote tloorinng 1:2:4 (1 cument 2 corse sand: 4 Graded stone aggregate 20 mm nominal sizo) laid in one layer finiehed with floating coat of neat cement 50 mm in side P.H work. (R&B-SOR: 2015-16. Pg.140, It.14015B)	sqm	209.1	20.9	230	1909
99.7	Item No.12 Providing 15 mm thick Cement plaster in single cont on fair fide brick concrate wall for interior plastering up to floor two level and finished even and smooth in cement mortar 1:3 (1 coment : 3 sand) including White or Color wash of approved quility with three coat (R&B-SOR 2015-16, Pr 152 & 155, It.17002A & 18001)	sqm	118.07	1.18	119.25	11889.225
4	Item No.13 Providing & Fixing G.I. Rain water spout of 50 mm dia 30 cm long eto complete (R&B-SOR: 2015-16. Po. 189. IL.23039)	Rmt	119.07	1.19	120.26	481.04
20	Item No.14 Providing & uupplying ISI mark G.L pipes with Couplings of toll d & dia Incl all toxes 8 insurance tvansportation freight charges, octroi, Inspoction, conveyance to alore or wte of work incl. jointing them along with specials as tues, bends, reducers and jointing	Rmt	645	0	645	12900

	matorialn & jointa incd Lubour for hıydrants inca Tghting. ntriting turricating & other safely provisons 80 mm dia. GI. (Heavy duty) Pipe (GWSSB-SOR 2020-21 Sec-A&B P-11 & 30. 11-0.1.C-8					
					Total	109025.94
				Add contingency charges		5451.3
					Total	14477.24
				Add W.C. Estt charges 2%		2289.54
					total	116766.78
					Say RS.	116800
					4 Nos.	467200

13.1.2 Civil Design 2: Bio-gas Plant

- This was based on technical, economic and social considerations. The size to use depends on the availability of bio-degradable materials and amount of gas required in this quantity of cow dung and the use of the gas.
- To design for the volume of plant, knowledge of gas required per day, number of cattle available, number of family members (requirement of gas for cooking and lighting), purpose and hydraulic retention time were the factors of interest. Construction time and labour resources required to build a biogas plant vary depending on several factors.
- The most important consideration is the availability of people interested in carrying out this kind of work. A biogas digester which is the apparatus used to control anaerobic decomposition was proposed to be constructed of brick masonry. This is a sealed tank or pit that holds the organic materials, and some means to collect the gas that is produced. Many different shapes and styles of biogas plants have been experimented with horizontal, vertical, cylindrical, cubic, and dome shaped.
- This project adapted the dome shape biogas plant. The bottom line is that the construction showed be simple with low demand of materials, cheap labour and low in cost and easy to build. The foundation is constructed using tae plain concrete slab sides.
- The slurry mix tank is also provided using masonry construction. its size is decided such that it can hold charging material for at least one day. It is fitted with a pipe which leads into the digester. The outlet chamber is constructed having an outlet pipe leading the digested slurry from the digester into the chamber where it is removed and utilized as manure. The gas is lead out from the dome to a pipe network for consumption.

Design & Dimensions Calculations:
The number of cows per household as found on average = 7.
The amount of dung per cow = 10 kg.
Given the fact that the cows move far from home to graze.
However, with zero grazing practice a dairy cow produce above 55 kg. Of dung per day.
The amount of dung to be used for the design therefore = 100 kg. Per day.

Gas Requirement Per Day:

Size of household = 6 persons on average.

Cooking: Quantity of gas required for coking per person = 0.227 m3.
Therefore, required gas per day per household = 0.227 x 6 = 1.35 m3 of gas.

Lighting:
Quantity of gas required for lighting per 100 candle lamps (i.e., say 60 watts electric bulb) = 0.125 m3 per bhp-hour.
Assuming 3 lamps are required per household for 3 hours per day,
Required gas per day per household
= 0.125 x 3 x 3
=1.13 m3 of gas.

Total Volume of Gas Required:

Old average of Gas required for cooking lighting
=1.35 m3 +1.13m3
=2.45 m3 of gas.
Take 2.5m3 of gas for design.
Basing on the amount of gas required per day1 kg. Of fresh dung produces 0.05m3 of biogas, this implies for 2.5m3
= 2.5 / 0.05
= 50 kg. of dung per day.
Number of cows = 50 / 5 = 5 cows.
This is adequate compared to house 10.

Plant Capacity:

For the purpose of this project, the fixed dome type biogas plant was preferred. The digester volume is given by the formula:

$V = v \times T$ (1)

Where V = digester volume
v = volume of the fluid in the digester
T = hydraulic retention time.

But also,

V = m /……(2)

Where m = mass of dry input and
= density of dry material in the fluid.

Density of dry dung in the fluid is given by = 50 kg. /m3
Using equation (2),
Volume of daily slurry charge, V = mass / density 1kg of fresh cow dung
= 0.18kg of dry wet dung contains about 82 % water.
Volume of fluid, V = 9 / 50
= 0.18m3/day.
Let hydraulic retention time be 30 days.
From equation (1), volume, V = 0.18 x 30

= 5.4 m3 (3)
Actual digester volume = 1.1 V
Actual volume of digester therefore =1.1 x 5.4
=5.94 m3
Using United Nations data for fixed dome type biogas plant, the gas production rate in tropical climate range from 0.4 to 0.5 m3/day per 1 m3 of digester volume, taking an average of 0.45 m3,
2.5 m3 gas required per day= 2.5 / 0.45 will need 5.6 m3 of digester volume .
So, 6 m3 is adequate.

Digester Dimension: Height:
Diameter ratio = 0.9 (U.N. 1984). H / D ratio = 0.9 D. (4)
But,
$V = 0.785\ D2\ H$

6 = 0.785 x 0.9 D3

Dimension:

D = 2.04m and H = 1.84m

Plant Capacity(m3)	Daily Fresh Dung (kg)	Fresh Slurry	No. of Cows	No. of People	Cost (Rs.)
1	25	50	2-3	3-4	117180
2	50	100	4-4	6-8	140616
3	75	150	6-9	9-12	175770
4	100	200	8-12	12-16	210924
5	150	300	12-18	18-24	253108

Cost of owning and running a biogas plant per day on average is us$ 0.25, with a life of 20 to 30 years. The initial cost may be well above the average income of the majority of the rural population.

There is need for government intervention inform of biogas loans, plastic digesters and also training of biogas technicians for construction and maintenance.

Benefits of Bio-gas:

1) Cheap and reliable source of domestic energy.
2) Reduce foreign currency expenditures on electric appliances.
3) Methane being a green gas, its domestic use for cooking and lighting will greatly reduce its release to the atmosphere.
4) Sicknesses due to the use of firewood and charcoal will be history.
5) May encourage cattle keeping which economically will provide milk, meat and also be used for ploughing.

Conclusion:

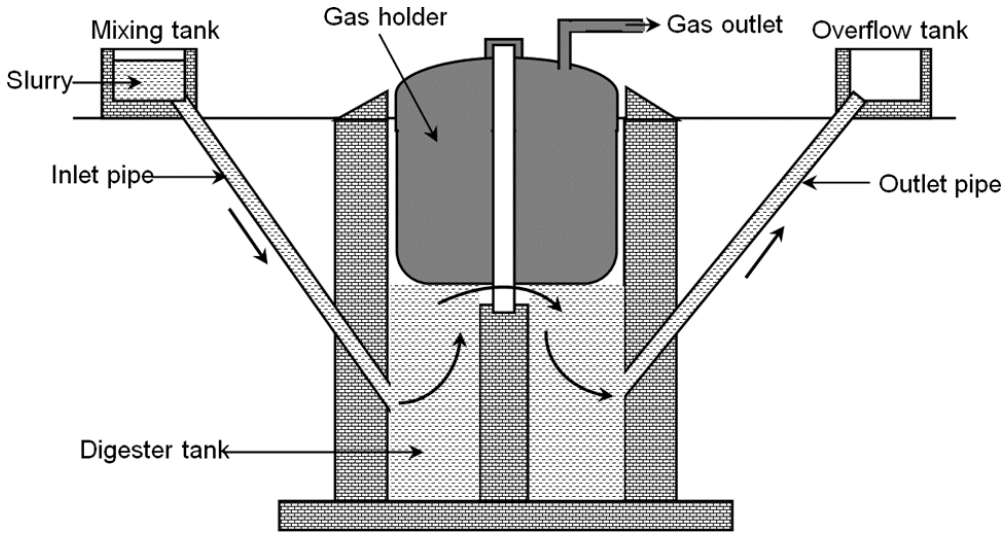
Basing on the finding of this project work, the following conclusions and recommendations have been reached:

1) The fixed dome type biogas plant was chose because of low cost and cheap technology.
2) The size of the plant digester volume was determined to be 6m3.
3) The major economic activity of the rural population in this area is cattle keeping and subsistence farming which provides disposal system for the by-products of the biogas plants in form of fertilizers.
4) The situation on the ground warrants the implementation of a biogas energy initiative as the major domestic energy for cooking and lighting.

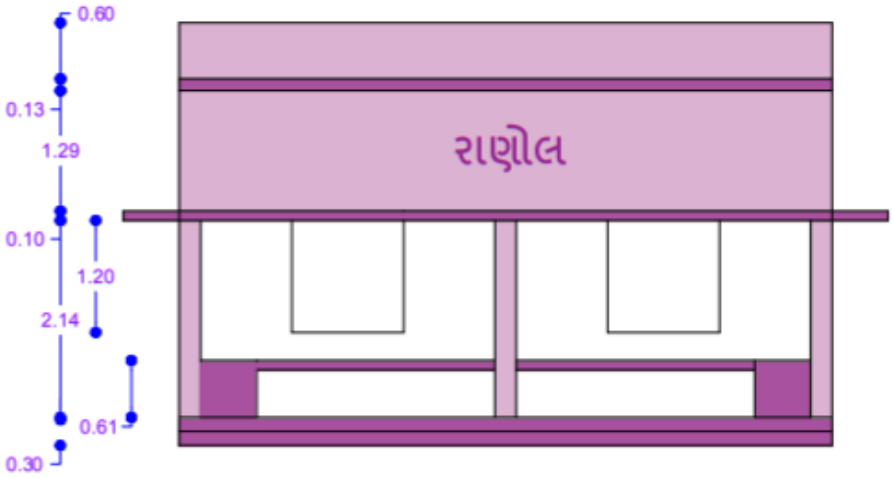
Recommends:

1) Biogas being cheap, reliable and easy to construct can be sustainable, and such is a necessary technology which needs exploration to benefit the rural population.

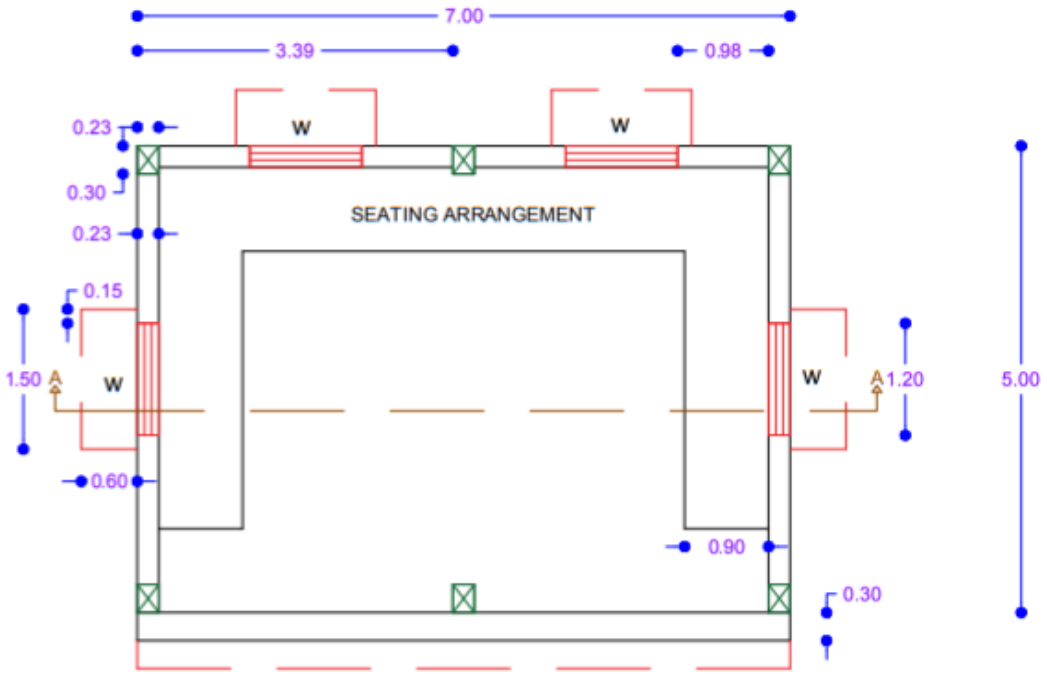
2) 2There is need to sensitive people about the use of biogas as a cheap, reliable source of energy.
3) Government should come in to promote the use of biogas through financing of the construction at a
4) community level or initiate the creation of biogas loans. This can be a good supplement to the ongoing rural electrification programmed.
5) Need for training technicians in biogas technology as it is a new thing.



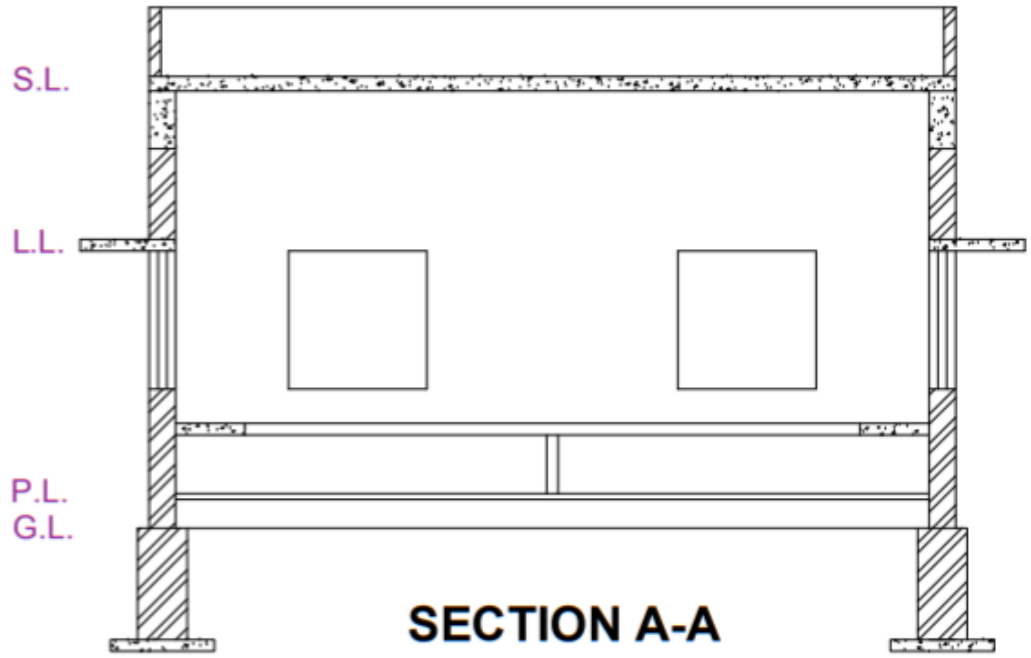
13.1.3 Civil Design 3: Pick up stand



ELEVATION



PLAN



Quantity Sheet of Pick-up stand

Table 13.3 Quantity Sheet of Pick-up stand

No.	Unit	L	W	Depth	Qty	Per
1	Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil					
	2	7.00	1.00	1.07	14.98	
	2	5	1	1.07	10.70	cmt
				Total	25.68	cmt
2	Providing and laying cement concrete 1:5:10 (1- Cement : 5- Coarse sand : 10- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) sor p.no.10					
	2	5.78	0.90	0.15	1.56	cmt
	2	4.45	0.90	0.15	1.29	cmt
	1	6.56	3.25	0.10	2.34	cmt
	2	3.10	0.40	0.10	0.25	cmt
				Total	5.70	cmt
3	Brick work using common burnt clay building brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth in cement mortar 1:5 (1 Cement : 5 fine sand)up to plinth(B) Conventional(S.O.R. P.No. 37, It No:1.6.12)					
	2	4.48	0.40	0.25	1.57	cmt
	2	4.26	0.45	0.25	0.95	cmt

	2	4.13	0.45	0.43	1.24	cmt
	2	6.08	0.70	0.25	2.13	cmt
	2	6.33	0.45	0.25	1.42	cmt
				Total	9.25	cmt
deduction detail column quantity & beam quantity						
	6	0.90	0.90	0.10	0.46	cmt
	1	6	0.43	0.40	1.03	cmt
	6	0.23	0.30	0.50	0.21	cmt
				Total	1.73	cmt
				Net total	7.53	cmt
4	Brick work using common burnt clay building brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth in cement mortar 1:5 (1 Cement: 5 fine sand)(B) Conventional for super structure (S.O.R. P.No. 37, It No:1.6.12)					
	2	8	0.35	0.45	2.21	cmt
	2	3.3	0.35	0.45	1.04	cmt
	1	7	0.22	3.43	5.28	cmt
	2	7	0.35	0.30	0.74	cmt
	1	7	0.22	0.73	1.12	cmt
	1	7	0.35	0.30	0.74	cmt
				Total	15.76	cmt
	deduction for door& column,beam window&lintel					
	5	0.23	0.23	3.45	0.91	cmt
	4	1.20	1.20	0.23	1.32	cmt
	2	0.30	0.23	3.56	0.49	cmt
				Total	2.73	cmt
				Net Total	13.03	cmt
5	Providing and Laying ordinary cement concrete 1:1.5:3 (1- Cement 1.5- coarse sand : 3- graded stone aggregates 20 mm nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in BEAM having more than 0.05 sq.mt and upto 0.08 sq.mt as per r.a					
	3	3.56	0.30	0.23	0.74	cmt
		1	6.40	0.30	0.44	cmt
				Total	1.18	cmt
6	Providing and Laying ordinary cement concrete 1:1.5:3 (1- Cement 1.5- coarse sand : 3- graded stone aggregates 20 mm nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in column having more than 0.08 sq.mt and upto 0.18 sq.mt as per r.a					
	6	0.90	0.90	0.10	0.49	cmt
	6	0.43	0.40	1.00	1.03	cmt
	6	0.23	0.30	3.87	1.60	cmt
				Total	3.12	cmt
7	Providing and Laying ordinary cement concrete 1:1.5:3 (1- Cement 1.5- coarse sand : 3- graded stone aggregates 20 mm nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in (ii) Slabs having more than 8 cm and upto 10 cm.as per r.a					
	1	7	4	0.11	3.08	cmt

8	Providing H.Y.S.D.bar rein forcement for R.C.C. work including bending binding and placing in position complete up to floor two level. (S.O.R. P.No. 12, It No:.5.4.11)					
	1	760			760	Kg

Abstract Sheet of Pick-up stand

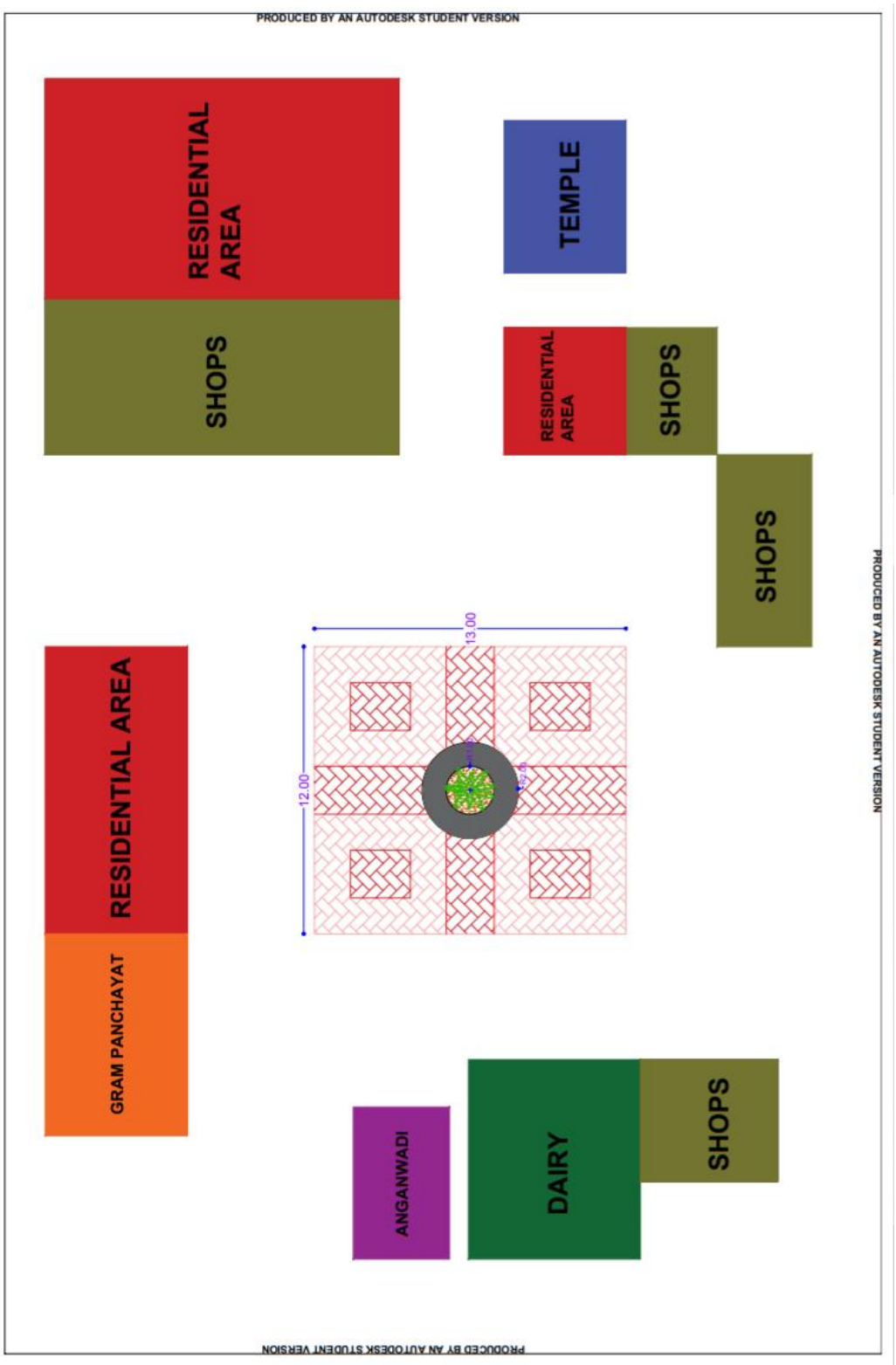
Table 13.4 Abstract sheet of pick-up stand

No.	Qty.	Discription	Rate	Per	Amount
1	25.68	Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil	118.67	Cmt	3047.45
2	5.70	Providing and laying cement concrete 1:5:10 (1- Cement : 5- Coarse sand : 10- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) sor p.no.10	2029.82	Cmt	11563.80
3	7.53	Brick work using common burnt clay building brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth in cement mortar 1:5 (1 Cement : 5 fine sand)up to plinth(B) Conventional(S.O.R. P.No. 37, It No:1.6.12)	2907.20	Cmt	21878.31
4	13.03	Brick work using common burnt clay building brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth in cement mortar 1:5 (1 Cement : 5 fine sand)(B) Conventional for super structure (S.O.R. P.No. cmt37, It No:1.6.12)	3068.16	cmt	39978.27
5	1.18	Providing and Laying ordinary cement concrete 1:1.5:3 (1- Cement 1.5- coarse sand : 3- graded stone aggregates 20 mm nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in BEAM having more than 0.05 sq.mt and upto 0.08 sq.mt as per r.a	6956.00	Cmt	8197.79
6	3.12	Providing and Laying ordinary cement concrete 1:1.5:3 (1- Cement 1.5- coarse sand : 3- graded stone aggregates 20 mm	6429.00	Cmt	20059.64

		nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in column having more than 0.08 sq.mt and upto 0.18 sq.mt as per r.a			
7	145.29	Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) sor.p.no.115 item no.17.60 sr.no.5	108.05	Smt	15698.97
8	1.60	Providing and Laying ordinary cement concrete 1:1.5:3 (1- Cement 1.5- coarse sand : 3- graded stone aggregates 20 mm nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in column having more than 0.08 sq.mt and upto 0.18 sq.mt as per r.a also & coping ,wether shad&lintel etc.	5210.00	Cmt	8361.42
9	3.08	Providing and Laying ordinary cement concrete 1:1.5:3 (1- Cement 1.5- coarse sand : 3- graded stone aggregates 20 mm nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in (ii) Slabs having more than 8 cm and upto 10 cm.as per r.a	5733.00	Cmt	17657.64
10	25.80	Providing and laying polished kota stone slab 25mm thick in risers of steps,skirting Dedo and pillars laid on 10mm thick cement mortar 1:3 (1-Cement : 3 coarse sand) and jointed with gray cement slury mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. (upto 10 ton)	677.05	smt	1747033
11	760.00	Providing H.Y.S.D.bar rein forcement for R.C.C. work including bending binding and placing in position complete up to floor two level. (S.O.R. P.No. 12, It No:.5.4.11)	41.14	Kg	31266.40
12	16.35	Earthwork for embankment including breaking clods, dressing with all lead and lift (excluding watering and consolidation)(B) From Borrow area within	156.88	Cmt	2564.60

		0.5 Km.lead (upto 10 ton)(SOR P. 170 It. 26.16.0.0)			
13	5.74	Half brick masonry in common burnt clay building brick having crushing strenght not less than 35 kg/sq. cm. in cement mortar 1:4 (1 cement : 4 coarse sand) in foundation and plinth(B) Conventional(S.O.R. Page No: 28 Item No:8.6.30	442.20	Smt	2539.11
14	1.00	Providing and fixing number plate of marble stone of required size set in C. M. 1 : 4 including finishing and engraving letters etc. comp. (S.O.R. P.No. 105, It No:87.00)	305.57	no	305.57
			Total		200589.30
			Add 2% cantigencies for labour fecilities		0.00
			Total		200589.30
			Say No.		200500.00

13.1.4 Civil Design 4: Paver Block



Quantity sheet of Paver Block

Table 13.5 quantity sheet of Paver block

Sr	Description	No		L		B		H		Q	Unit
1	Earth work										
		1	x	12.00	x	13.00	x	0.30	=	46.80	Cmt
2	Providing and fixing pre cast rubber dye inter locking concrete block 60 mm...etc. comp.										
		1	x	12.00	x	13.00			=	156.00	Smt.
3	Providing and fixing concrete kerb.....etc										
		1	x	12.00	x	0.15	x	0.20	=	0.36	Cmt

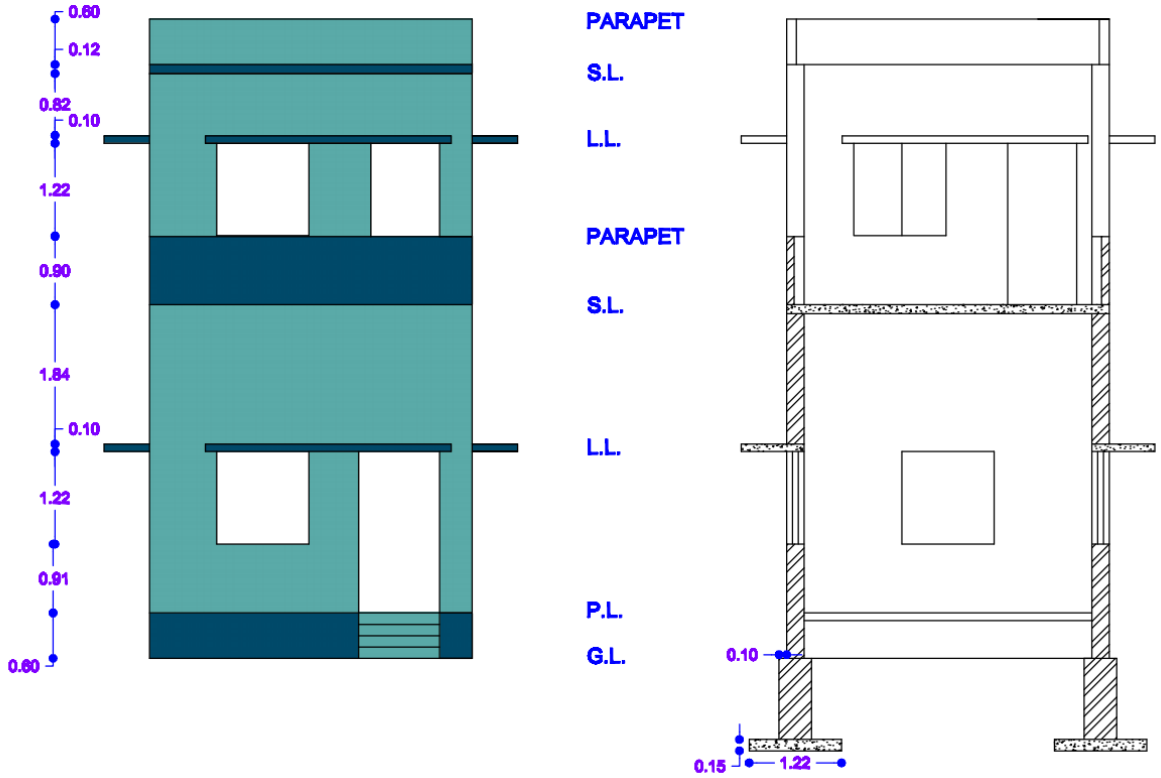
Abstract Sheet of Paver Block

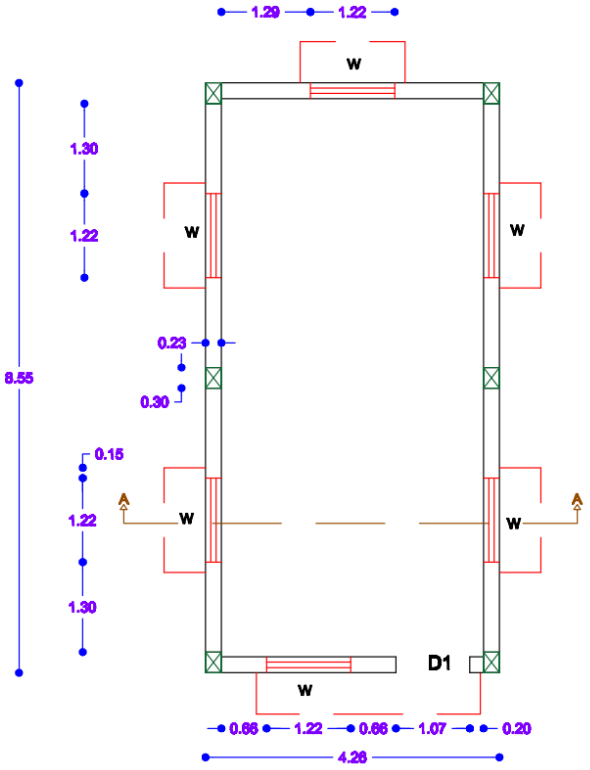
Table 13.6 Abstract sheet of Paver block

Sr	Description of Item	Qty.	Unit	S.O.R.	1% Ses	Rate	Amount
1	Earthwork in cutting including preparing the slope and camber and stacking or utilising the cutting stuff in bank as directed upto 200 Meters from the end of cutting with all lead and lift.(i) Hard murrum. (S.O.R. P. - 204 I. No. 26.16.A)	34.24	Cmt	156.00	1.56	157.56	5394.85
2	Providing and fixing pre cast rubber dye inter locking concrete block 60 mm thick with grade of concrete M200 pnumatic compressed by mechanically pressed and as per approved desigh including 75 mm sand layer for levelling and filling the jont with sand in proper line and level etc completed (Sr No-142 It No-50,)	156.00	smt	667.00	6.67	673.67	105092.52

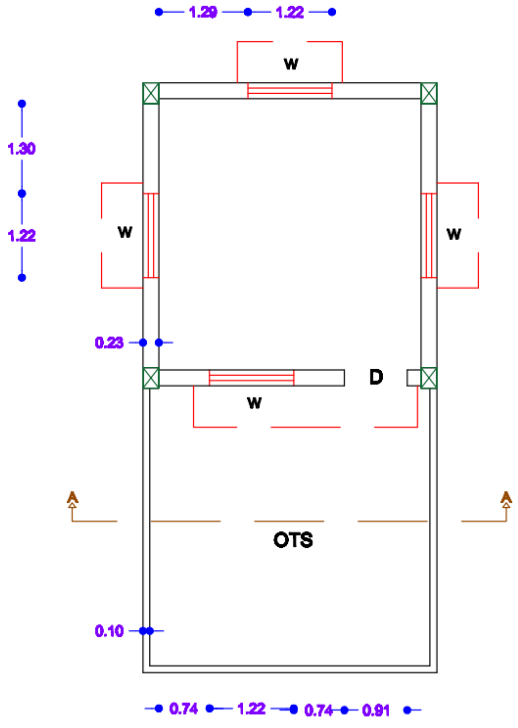
3	Providing and laying c.c.1:2:4 (1-cement: 2-course sand : 4-Aggregates 20mm nominal size) and curing complete excluding cost of formwork in (A) foundation and plinth (S.R.O. P-53 I.No. 5.3.13)	0.36	rmt	3166.00	31.66	3197.66	1151.16
4	Providing & number plate of marble stone of required size set in C.M. 1:4 including finishing and engeaving letters etc. complete (S.R.O. P-219 I.No. 132.26087)	1.00	no.	265.00	2.65	267.65	267.65
	Total Amounts in Rs.						111906.18
					Conti Charges, 2 %		0.00
							111906
	Say Rs.						220000

13.1.5 Civil Design 6: Panchvati





GROUND FLOOR



FIRST FLOOR

Quantity Sheet of Panchvati

Table 13.7Quatity sheet of Panchvati

Sr. No.	Item Description	No.	Length	Breadth	Depth	Quantity	
1	Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil (04B001A) P-49						
	Wall	2	8.55	0.90	0.90	13.85	
		3	3.80	0.90	0.90	9.23	
	Footing	6	1.22	1.22	1.22	10.90	
				Total Qty...		33.98	Cm.
					Say	33.98	Cmt.
2	Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- Graded brick bat aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) (5007-5.3.2) P-52						
	Wall	2	8.55	0.90	0.15	2.31	
		3	3.80	0.90	0.15	1.54	
	Footing	6	1.22	1.22	0.15	1.34	
	Flooring	1	3.80	8.09	0.15	4.61	
				Total Qty...		9.80	Cmt.
					Say	9.80	Cmt.
3	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 1:5. (1- Cement : 5 -fine sand)(A) Modular (upto 10 ton) (06001A-6.12) P-78						
	Up to plinth level						
	Wall	2	8.55	0.90	0.30	4.62	
		2	8.40	0.60	0.30	3.02	
		2	8.25	0.45	0.30	2.23	
		2	8.10	0.35	0.60	3.40	
	Wall	2	3.80	0.90	0.30	2.05	
		2	3.65	0.60	0.30	1.31	
		2	3.50	0.45	0.30	0.95	
		2	3.35	0.35	0.60	1.41	
				Total Qty...		18.99	Cmt.
					Say	18.99	Cmt.
4	Filling available excavated earth in treanches, Plinth sides of foundation etc. in layers not exceeding 20 cm. in depth consolidating each deosited layer by rumming and watering. (4006-4.12) P-46						
	Total Exacavation					23.09	
	Deduction					18.03	
	Flooring	1	3.80	8.09	0.90	27.67	
				Total Qty...		32.73	Cmt.

					Say	32.73	Cmt.
5	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 1:5. (1- Cement : 5 -fine sand)(A) Modular (upto 10 ton) (06001A-6.12) P-79						
	Superstructure						
	Wall	2	8.09	0.23	3.05	11.35	
	Wall	2	3.80	0.23	3.05	5.33	
	Wall	2	3.05	0.23	3.05	4.28	
		2	3.80	0.23	3.05	5.33	
		2	4.81	0.23	0.30	0.66	
		1	2.89	0.23	0.30	0.20	
				Total Qty...		27.16	Cmt.
	Deduction						
	M. Door	1	1.07	0.23	2.13	0.52	
	Door	1	0.91	0.23	2.13	0.45	
	Window	10	1.22	0.23	1.22	3.42	
				Total Qty...		4.39	Cmt.
				Total Qty...		22.76	Cmt.
					Say	22.76	Cmt.
6	Providing and laying cement concrete 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) (05010A-5.3.13) P-53						
	Coping	2	8.09	0.23	0.10	0.37	
		2	3.80	0.23	0.10	0.17	
				Total Qty...		0.55	Cmt.
					Say	0.55	Cmt.
7	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 excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete (upto 10 ton) (05011A-5.4.1) P-53						
	Footing	6	1.22	1.22	0.91	8.13	
				Total Qty...		8.13	Cmt.
					Say	8.13	Cmt.
8	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 excluding cost of formwork and reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconis , Lintels, Beams, Girders and Cantilever upto floor two level. (upto 10 ton) (05011B-5.4.1) P-53						
	Beam	5	3.80	0.23	0.30	1.31	
		4	3.05	0.23	0.30	0.84	
		2	4.81	0.23	0.30	0.66	
	Lintel	4	3.80	0.23	0.10	0.35	
		4	3.05	0.23	0.10	0.28	

		2	4.81	0.23	0.10	0.22	
	Cantilever	9	1.52	0.45	0.10	0.62	
		1	3.35	0.45	0.10	0.15	
		1	1.60	0.45	0.10	0.07	
				Total Qty...		4.51	Cmt.
					Say	4.51	Cmt.
9	Providing and laying cement concrete work 1:2:4 (1- Cement : 2- Coarse sand : 4-graded stone aggregates 20 mmnominal size) and curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (D) Columns, Pillars posts and struts upto floor two level. (upto 10 ton) (05011D-5.4.1) P-54						
	Column @ GF	6	0.23	0.30	3.95	1.64	
	FF	4	0.23	0.30	3.05	0.84	
				Total Qty...		2.48	Cmt.
					Say	2.48	Cmt.
10	Providing and laying ordinary cement concrete 1:2:4 (1- Cement 2- coarse sand : 4-graded stone aggregates 20 mm nominal size) exposed work with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in (i) Slabs upto 8cm thickness (05028A) P-60						
	Slab @ GF	1	4.26	8.55	0.12	4.37	
	FF	1	4.26	3.51	0.12	1.79	
				Total Qty...		6.17	Cmt.
					Say	6.17	Cmt.
11	Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level (upto 10 ton) (05014C-5.4.11) P-55						
	Item No. 5	0.55					
	Item No. 6	8.13					
	Item No. 7	4.51					
	Item No. 8	2.48					
	Item No. 9	6.17					
		21.82	Cmt x	150	Kg/Cmt.	3273.32	Kg.
					Say	3273.32	Kg.
12	Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) (17002A-17.60) P-						
	Interior Plaster						
	Wall	2	3.80	-	3.05	23.18	
		2	8.09	-	3.05	49.35	
		2	3.05	-	3.05	18.61	
		2	3.80	-	3.05	23.18	
		1	3.80	-	8.09	30.74	
		1	3.80	-	3.05	11.59	

				Total Qty...		156.65	Smt.
	Deduction						
	M. Door	1	1.07	-	2.13	2.28	
	Door	1	0.91	-	2.13	1.94	
	Window	10	1.22	-	1.22	14.88	
				Total Qty...		19.10	Smt.
				Total Qty...		137.54	Smt.
					Say	137.54	Smt.
13	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 (1 Cement : 4 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trovel including scaffolding curing etc. complete. (17017) P-155						
	Exterior Plaster						
	Wall	2	8.55	-	3.65	62.42	
		2	4.26	-	3.65	31.10	
		2	4.26	-	3.05	25.99	
		2	3.51	-	0.30	2.11	
		4	4.81	-	0.30	5.77	
		2	2.89	-	0.30	1.73	
				Total Qty...		129.11	Smt.
	Deduction						
	M. Door	1	1.07	-	2.13	2.28	
	Door	1	0.91	-	2.13	1.94	
	Window	10	1.22	-	1.22	14.88	
				Total Qty...		19.10	Smt.
				Total Qty...		110.01	Smt.
					Say	110.01	Smt.

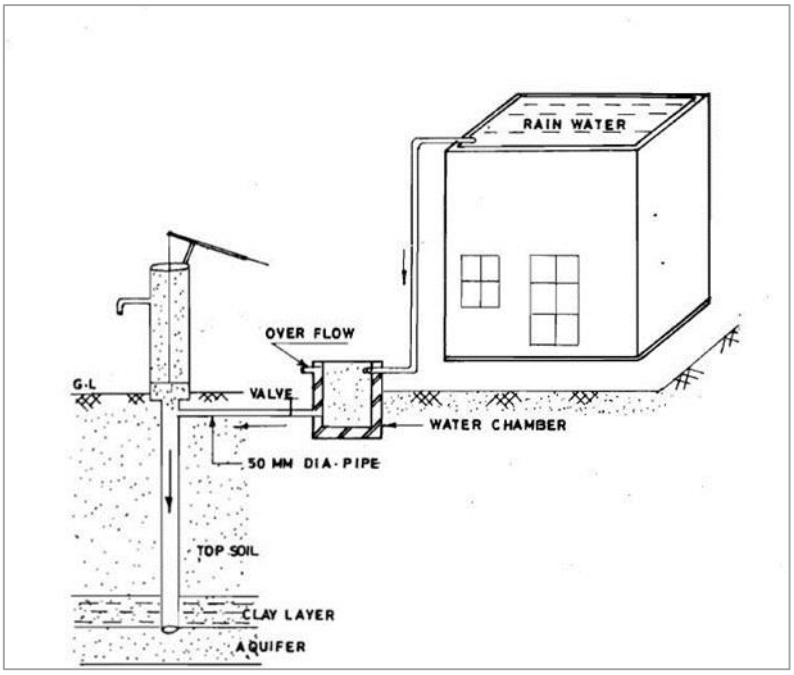
Abstract Sheet of Panchvati

Table 13.8 Abstract sheet of Panchvati

NO.	Qty.	Rate	Per	Amount
1	Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil (04B001A) P-49			
	33.98	119.00		4043.63
2	Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- Graded brick bat aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) (5007-5.3.2) P-52			
	9.80	2160.00		21164.46
3	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 1:5. (1- Cement : 5 -fine sand)(A) Modular (upto 10 ton) (06001A-6.12) P-78			
	18.99	3176.00		60307.48
4	Filling available excavated earth in treanches, Plinth sides of foundation etc. in layers not exceeding 20 cm. in depth consolidating each deosited layer by rumming and watering. (4006-4.12) P-46			
	32.73	76.47		72292.39
5	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 1:5. (1- Cement : 5 -fine sand)(A) Modular (upto 10 ton) (06001A-6.12) P-79			
	22.76	3176.00		72292.39
6	Providing and laying cement concrete 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth (upto 10 ton) (05010A-5.3.13) P-53			
	0.55	3166.00		1731.61
7	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 excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete (upto 10 ton) (05011A-5.4.1) P-53			
	8.13	3305.00		26858.62
8	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 excluding cost of formwork and reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconis , Lintels, Beams, Girders and Cantilever upto floor two level. (upto 10 ton) (05011B-5.4.1) P-53			
	4.81	3360.00		15141.47
9	Providing and laying cement concrete work 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mmnominal size) and curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (D) Columns, Pillars posts and struts upto floor two level. (upto 10 ton) (05011D-5.4.1) P-54			
	2.48	3360.00		8323.06

10	Providing and laying ordinary cement concrete 1:2:4 (1- Cement 2- coarse sand : 4-graded stone aggregates 20 mm nominal size) exposed work with curing etc. complete including the cost of formwork but excluding the cost of reinforsement for R.C.C work in (i) Slabs upto 8cm thickness (05028A) P-60			
	6.17	6120.00		37730.24
11	Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level (upto 10 ton) (05014C-5.4.11) P-55			
	3273.32	45.00		147299.62
12	Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) (17002A-17.60) P-153			
	137.54	110.00		15129.91
13	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 (1 Cement : 4 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trovel including scaffolding curing etc. complete. (17017) P-155			
	110.01	170.00		18701.63
14	Providing and fixing 35 mm thick shutters for Doors, windows and clear story windows including anodised alluminium butt hinges with necessary screws.(A) Indian Teak Wood (1) Fully Panelled (upto 10 ton) (10004A-10.12) P-102			
	Total Rs…			559676.91
	Say Rs.			559677.00

13.1.6 Civil Design 5: Rain Water Harvesting



Need for Rainwater Harvesting

- Water is one of the most essential requirements for existence of living beings. Surface water and ground water are two major sources of water. Due to over population and higher usage levels of water in urban areas, water supply agencies are unable to cope up demand from surface sources like dams, reservoirs, rivers etc.
- This has led to digging of individual tube wells by house owners. Even water supply agencies have resorted to ground water sources by digging tube-wells in order augment the water supply.
- Replenishment of ground water is drastically reduced due to paving of open areas. Indiscriminate exploitation of ground water results in lowering of water table rendering many bore-wells dry. To overcome this situation bore wells are drilled to greater depths.

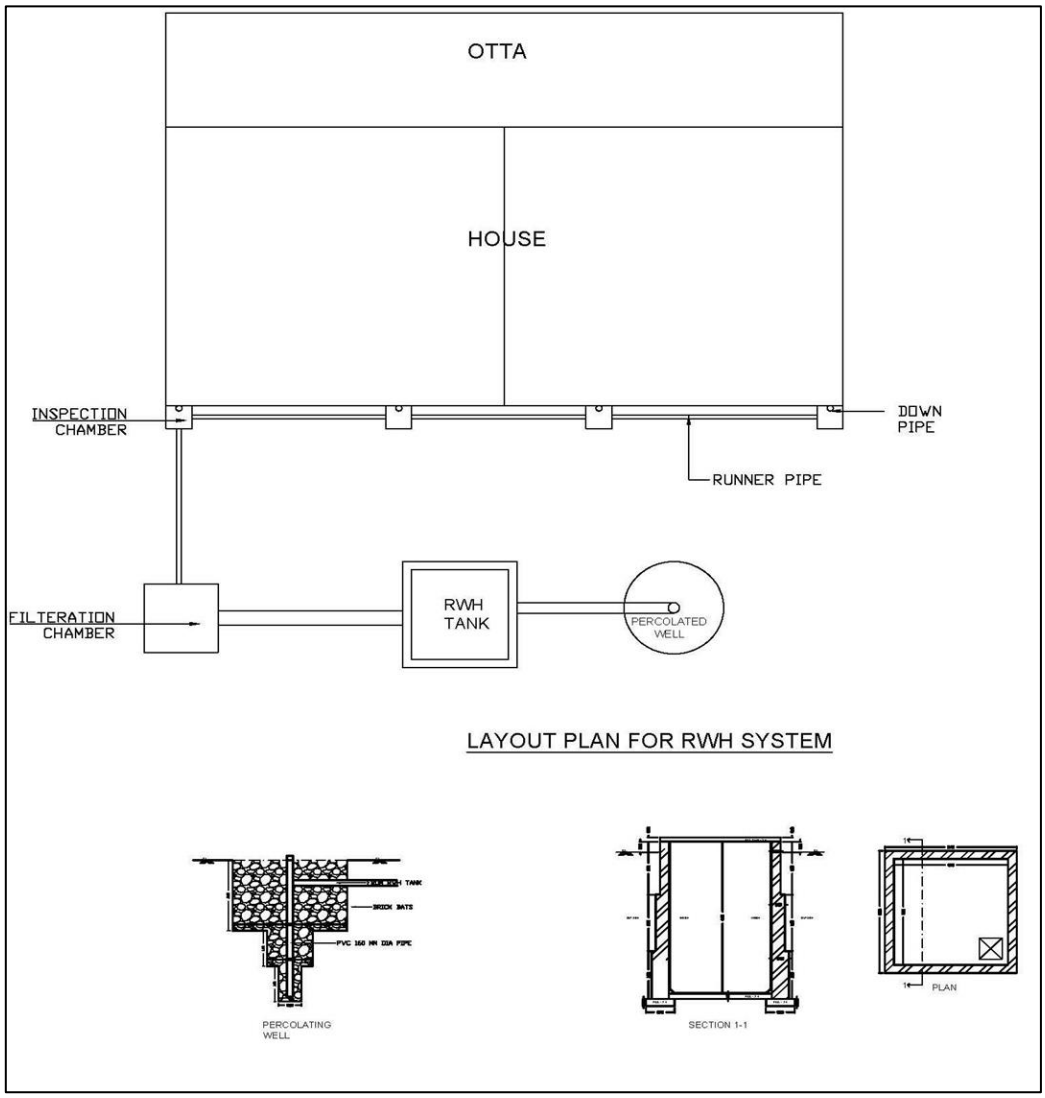
Methods of Harvesting Rain Water:

There are three methods of harvesting rain water as given below:
(a) Storing rain water for direct use.
(b) Recharging ground water aquifers, from roof top run off.
(c) Recharging ground water aquifers with runoff from ground area

Methodology:

- Recharging ground water aquifers, from roof top run off method is most economical design when compared to other methods where the roofs of building are flat. This method is so simple to execute on the field. At Siddhartha region the following are the structures whose roofs are flat.
- The main objective of our design is to connect the collected water to the nearby bore line to improve ground aquifer. There are a total of 4 bore holes out of which we are connecting to 3 of them.

- The other is not in working condition. the designing of pipe line from the building to the bore holes depends upon the catchment area and the discharge of runoff water from the roof tops based on this discharge the diameter of the pipe line and the depth of the filter near the bore holes are designed to improve the ground water aquifer in bore hole regions there by the ground water level near the bore will improve gradually by this methodology.



Roof Top Rainwater Harvesting:

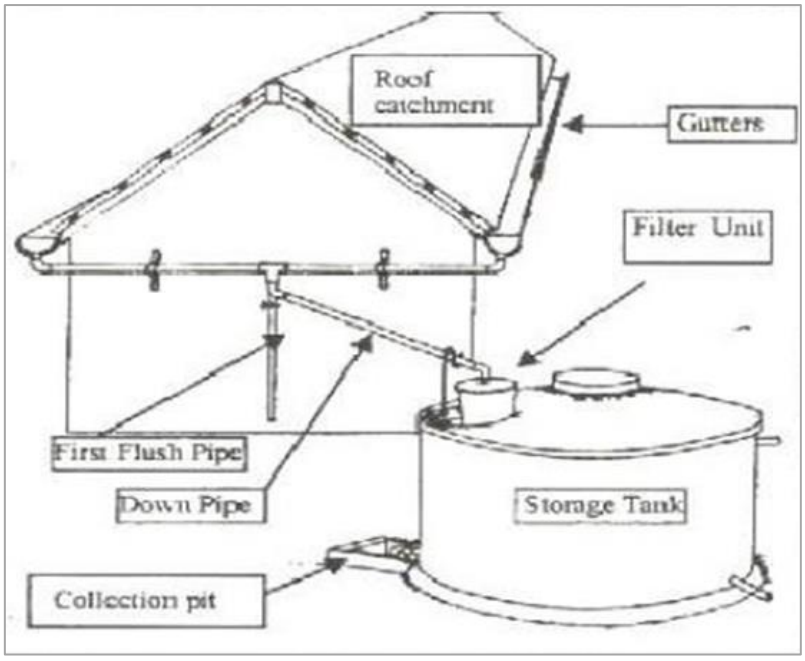
The concept of rainwater harvesting involves 'tapping the rainwater where it falls'. A major portion of rainwater that falls on the earth's surface runs off into streams and rivers and finally into the sea. An average of 8-12 percent of the total rainfall recharge only is considered to recharge the aquifers. The technique of rainwater harvesting involves collecting the rain from localized catchment surfaces such as roofs, plain /sloping surfaces etc., either for direct use or to augment the ground water resources depending on local conditions.

Components of Roof Top Rainwater Harvesting System

In a typical domestic roof top rainwater harvesting system, rainwater from the roof is collected in a storage vessel or tank for use during periods of scarcity. Such systems are usually designed to support the drinking and cooking needs of the family and comprise a roof, a storage tank

and guttering to transport the water from the roof to the storage tank. In addition, a first flush system to divert the dirty water, which contains debris, collected on the roof during non-rainy periods and a filter unit to remove debris and contaminants before water enters the storage tank are also provided. Therefore, a typical Roof top Rainwater Harvesting System comprises following components:

- Roof catchment
- Drain pipes
- Gutters
- Down pipe
- First flush pipe.
- Filter unit
- Storage tank.
- Collection sump.
- Pump



Typical Rainwater Harvesting System

Quantity Sheet of Rain water Harvesting

Table 13.9 Quantity sheet of Rain water Harvesting

No.	Description of item	No.	No.	L	W	Depth	Qut.	Total qty.
1	Excavation for foundation in Dense or Hard soil up to 1.5m depth including sorting out, stacking of useful materials and disposing of the excavated stuff up to any lead.							
	Tank	1		5.9	5.9	4.35	151.42	
	Deductions	-1		2.70	2.70	0.20	-1.46	
							0.00	

						Total	149.97	
							Cmt	149.97
2	Providing and laying cement concrete 1 : 2 : 4 (1 Cement : 2 course sand : 4 graded stone aggregate 20 mm nominal size) and curing complete excluding cost of formwork in Foundation & Plinth							
	Below foundation wall	4		3.45	3.45	0.20	9.52	
	Floor	1		3.00	3.00	0.15	1.35	
							0.00	
							0.00	
						Total	10.87	
							Cmt	10.87
3	Brick work using common burnt clay building brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth in cement mortar 1:6 (1 Cement : 6 fine sand)Brick Masonry Up to Plinth (B) Conventional							
		4		3.45	0.45	1.35	8.38	
		4		3.35	0.35	1.60	7.50	
		4		3.23	0.23	1.50	4.46	
							0.00	
						Total	20.34	
							Cmt	20.34
4	Providing 15mm thick cement plaster in single coat on rough or fair side of single or half brick wall / RCC Surface for interior plastering including finishing with a floating coat of neat cement slurry in cement mortar 1:3(1 cement :3 sand) watering, curing etc. complete. For all floors							
	Inside							
	walls	4		3.00		4.30	51.60	
	Base	1		3.00	3.00		9.00	
	Out side						0.00	
		4		3.90		1.35	21.06	
		4		3.70		1.60	23.68	
		4		3.46		1.62	22.42	

Abstract sheet of Rain water Harvesting

Table 13.10 Abstract sheet of Rain water harvesting

no.	Description of Item	Qty.	Unit	R & B SOR (In Rs.)	Estimated Amount (In Rs.)
1	Excavation for foundation in Dense or Hard soil up to 1.5m depth including sorting out, stacking of useful materials and disposing of the excavated stuff up to any lead.	149.97	Cmt	86.72	13005.40

2	Providing and laying cement concrete 1 : 2 : 4 (1 Cement : 2 course sand : 4 graded stone aggregate 20 mm nominal size) and curing complete excluding cost of formwork in Foundation & Plinth	10.87	Cmt	3,197.26	34754.22
3	Brick work using common burnt clay building brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth in cement mortar 1:6 (1 Cement : 6 fine sand)Brick Masonry Up to Plinth (B) Conventional	20.34	Cmt	2,954.25	60089.45
4	Providing 15mm thick cement plaster in single coat on rough or fair side of single or half brick wall / RCC Surface for interior plastering including finishing with a floating coat of neat cement slurry in cement mortar 1:3(1 cement :3 sand) watering, curing etc. complete. For all floors	142.61	Smt	150.12	21408.61
5	Providing cement vata (10 cm x 10 cm size) quarter round in cement mortar 1:1 including neat cement finishing, watering etc. Completed.	29.20	Rmt	18.59	542.83
6	Providing I.S.I. T.M.T Bars Fe.500 steel reinforcement (ISI mark) Confirmed to IS-1786 for R.C.C.work including Cutting, bending, binding and placing in position etc. complete. For all floors	115.79	Kgs	45.48	5266.13
7	Providing & Laying ordinary cement Concrete 1:1.5:3 (1 Cement :1.5 Coarse sand:3 graded stone aggregates) and finishing smooth with curing etc. complete including smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforce-ment for reinforced concrete work in RCC slabs having thickness more than 10 cm and upto 13cm thickness. R.A.	1.39	Cmt	5590.08	7770.21
8	C.I. Man hole cover Size 0.6x0.6 m	1.00	No.	500.00	500.00
9	Providing & fixing Hand pump.	1.00	No.	600.00	600.00
10	Providing & fixing to wall ceiling and floor UPVC/SWR soil waste pipe 75mm dia. Of ISI 13592/92.Rate inclusive of all fitting like single or double 'Y' with	19.00	Rmt	249.47	4739.93
11	Valve of 75mm dia. P.V.C.pipe	5.00	No.	250.00	1250.00

12	Providing & fixing to wall ceiling and floor UPVC/SWR soil waste pipe 110mm dia. Of ISI 13592/92.Rate inclusive of all fitting like single or double 'Y' with	40.00	Rmt	429.25	17170.00
13	Providing & fixing to wall ceiling and floor UPVC/SWR soil waste pipe 160mm dia. Of ISI 13592/92.Rate inclusive of all fitting like single or double 'Y' with door,reducer,coupler single T with door bend,pipe clip on wodden patti etc. complete and making good the wall,ceilling and floor.	7.00	Rmt	600.00	4200.00
14	Construction of brick masonary chamber of size 455mm * 610mm internal dimentions and depth upto 650mm for ground inspection chamber with brick having crushing strength not less than 35Kg/sqcm. in cement mortar 1:5 40mm thick C.I cover with frame (light duty) comp.	4.00	No.	2,768.33	11073.32
15	Filtration Chamber of size 0.6x0.75 mx .45m	1.00	No.	4000.00	4000.00
16	Underground percolation well to recharge water as per approved drawing	1.00	No.	14000.00	14000.00
				Total Amount in Rs.	200370.09
				Say Rs	200370.00

13.1.7 Electrical Design 1: Smart bin

OBJECTIVES

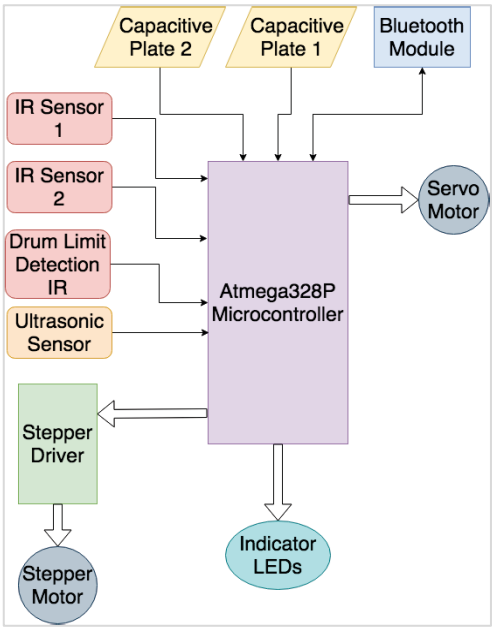
Smart bin segregates the waste into 3 types: dry, wet and plastic.

- **Sanitation**
  Automation of the door ensures that the user will not have to touch the bin.
- **Waste identification**
  The waste can be identified by its capacitive values and reflective properties.
- **Re-usability**
  The waste that can be used again can be identified and reused.
- **Recycling**
  The waste that can be recycled will be identified by the segregator through its capacitive value and thus sending that value to the app which will tell the user if that waste can be recycled or not based on some pre-given data.
- **Waste Prediction and Optimization**
  Through the network of the smart bin data sent to the cloud, we can establish a pattern of the kind and type of waste thrown in a particular locality and thus send the garbage disposal vehicle in the most optimized path, saving a lot of fuel and resources.

SYSTEM DESIGN

IR Sensors:

The IR sensors emit Infrared Light Which is either absorbed by the material (Waste) or reflected. The Sensor also consists of an IR receiver which measures the reflected Infrared Light. The 20 receiver is connected to the ADC module of the Microcontroller which converts the analog signal to digital signal which is analyzed and used to determine the type of waste. The IR sensor is also used as a proximity sensor for detecting whether the segregation chamber is filled or no.



Capacitive Plates:

The plates are copper clads of specific dimensions which are connected directly to the ADC module of the microcontroller.

Bluetooth Module:

The Bluetooth module used is HC-05 which is connected to the serial port of the microcontroller to transmit collected data to a mobile device for analysis and prediction.

Servo Motor:

Servo motor consists of a gearbox and a potentiometer due to which we can control the precise position of the shaft and hold it there. It only uses one control signal for controlling the movement of the shaft which is restricted to a rotation of 0 to 180.

Ultrasonic Sensor:

Using Ultrasound transceiver distance is calculated for determining whether somebody is approaching the dustbin. If a person is close enough to the dustbin a trigger is given to the microcontroller which triggers the dustbin lid to open.

Stepper Driver and Stepper Motor:

Stepper driver is used to drive the stepper motor using the microcontroller. The waste chamber is mounted on the step- per motor which aligns the respective sections (Dry, Wet and Plastic) under the capacitive plates.

Indication LEDs:

These LEDs are directly controlled by the microcontroller for displaying the status of the system. For indicating bin is full, Bluetooth Status indicator, for indicating the type of waste.

HARDWARE REQUIREMENTS

1. Atmega328P Microcontroller
2. Infrared Radiation Sensors:
3. Copper Clads
4. Bluetooth Module
5. Ultrasonic Sensor
6. Servo Motors
7. Stepper Motors
8. Motor Drivers

SOFTWARE REQUIREMENTS

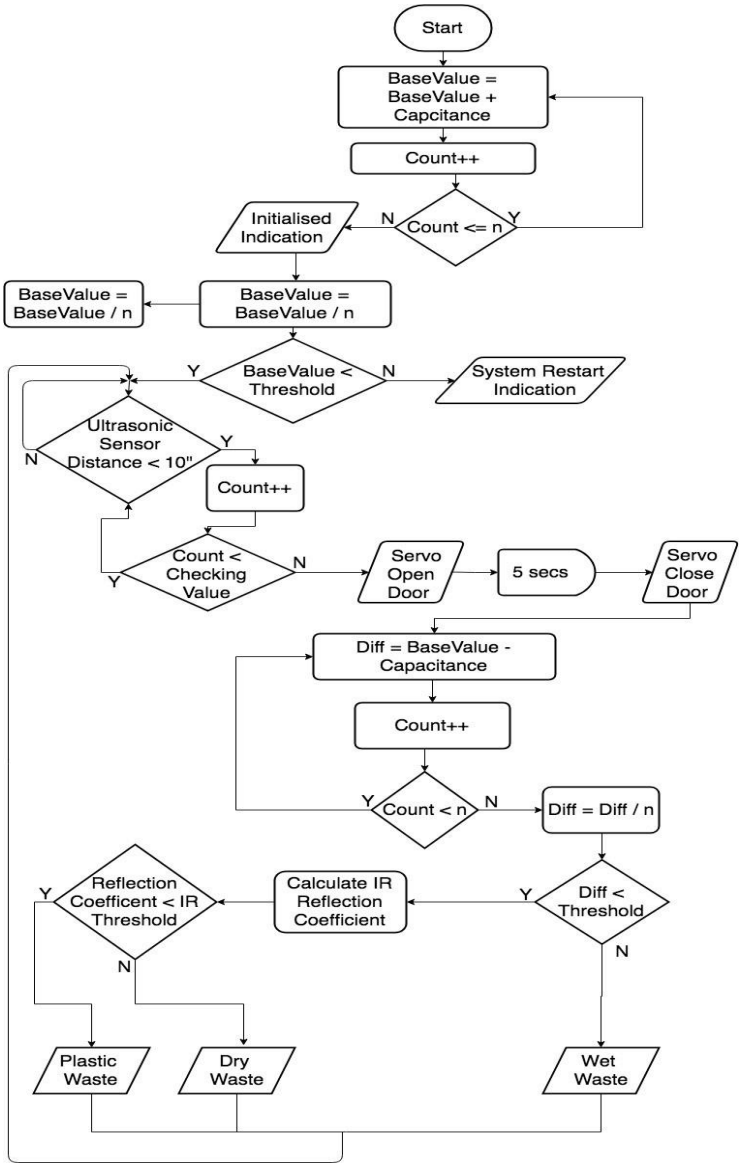
1. Arduino IDE
2. Android Studio
3. R Studio

METHODOLOGY

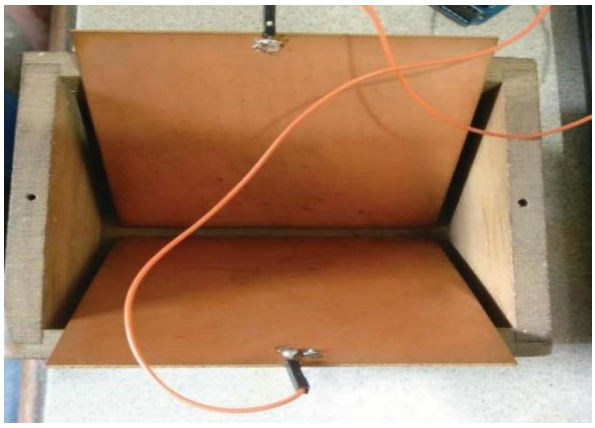
SEGREGATION:

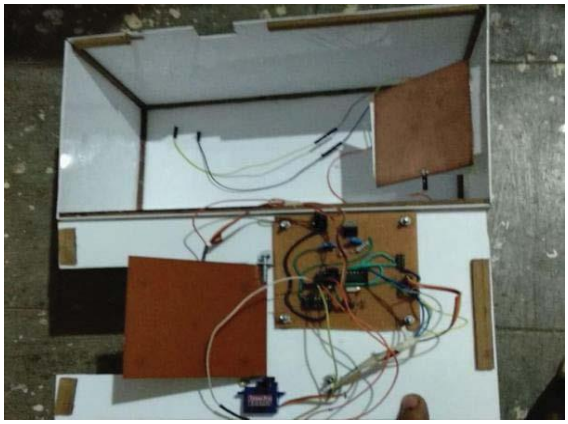
Wet and dry segregation:

Value of capacitance depends on the dielectric present between the plates. Garbage is collected in an arrangement consisting of two copper clad plates fixed at 45 ◦ to the horizontal as the plates are at 45 ◦, the projected vertical area is considered as “A". The value of capacitance without any dielectric is 6.532 pF. When Wet waste is thrown permittivity of wet waste is higher as compared to dry waste hence the capacitance increases considerably with respect to capacitance without any dielectric. In case of dry waste capacitance increases by a small amount. Once the waste is identified the respective chamber (Dry or Waste) Aligns itself under the plates. One of the plates moves and drops the garbage into the chamber.



Plastic segregation:
Plastic can be segregated by the method of spectroscopy. In spectroscopy, we can identify if the waste is a plastic or not by using an IR sensor [7]. We project an IR light towards the waste. Based on the absorptivity of the plastic, it can be identified and segregated. The absorptivity cannot be measured directly hence Reflectivity and Transmittivity is measured.





RESULTS

Object	Capacitive Reading (in pF)	Waste type
Threshold value	6.532	-
Dry Banana peel	25430	Dry
Paper	7.668	Wet
Wet Plastic wrapper	7.709	Dry
Cloth	7.301	Dry
PEN	7.260	Dry

Estimation for smart bin

Table 13.11 Estimate of Smart bin

Item	Amount
Atmega328P Microcontroller	490.00
Infrared Radiation Sensors	58.00
Copper Clads	499.00
Bluetooth Module	550.00
Ultrasonic Sensor	118.0
Servo Motors	194.00
Stepper Motors	850.00
Motor Drivers	272.00
IR Sensors:	58.00
Indication LEDs	29 per 5 pcs
Total	3100

Body of the dustbin and outer structure of the dustbin is independent the size of the dustbin which is additional cost.
Above estimation is only for the electrical parts.

13.1.8 Electrical Design 2: Automated Irrigation system

System Requirement

Functional requirements

Our system works through different stages and these stages can be found in,

1. If the moister sensor is dry in the line (its locations), the system will be checked by the rain sensor if there is rain the system will not work because no need to irrigate at the same time of rain, otherwise the system will check the temperature sensor with light sensor if the temperature is high and the percentage of light Is high as well then, the system will not work because it is not the right time for irrigation process because the water will easily evaporate.
2. If the temperature is low and the light is low and there is no rain but the moisture sensor is dry then signal will be sent to the controller to open the valve and pump.
3. If water level is low in the tank, then the system will shut down automatically and send SMS to the user, by using water level sensor.
4. When the system is ON by using flow meter sensor connected to LCD, we can know the amount of water goes from tank to each line so if there is a leak in the pipe we can know from LCD.

Non-functional requirements

Easy to implement

The materials required for this project must be easy to install to implement a successful project. In addition, materials should be easy to connect with each other to build this project and become more effective. Also, the materials of this project must be easy to replace it in case of any damage.

Open source

The controller used for this project is open-source, so the used hardware is reasonably priced and has a free development software. Strength The tools needed for this project must be strong to operate for a long period of time to achieve the desired success. In addition to achieving one of the important goals required to save money. Quality The tools required to build this project must be of excellent quality to operate for a long time. Selecting quality materials is very important to avoid wasting money and to avoid the technical problems of these devices and disturbance of the process. Excellent quality is required for this project to achieve the desired success of this project.

Modifiability

The material should be chosen based on its ease of modifiability, as its common to come across designs and connections. Also, to be easy to replace or modification required in the future.

Communication

Bluetooth connected to the system and real-time clock to take all data from prototype to mobile application.

Accuracy

The reading of all data should be in details because it will be saved in SD card for analysis and research

Performance

The system must work at the real-time

Operational

This system is work automatically and it is connected to the mobile application so the user must download the application on their mobile to control their system.

Cost

The cost of this system must be not too expensive because we aim to decrease the worker which mean decrease the amount of money in irrigation process and solve the main problem (reduce the water consumption) at the same time.

Design

To achieve the exact project objectives, we are shown that using Arduino as the operating system in this project is the best choice, it contains many open supply hardware and software.

Choice of materials

The first step of this process of building the prototype of the automated irrigation system was the choice of materials for this project are known, which are suitable and importance to agriculture, research was undertaken to select materials.

- **Field Control System**

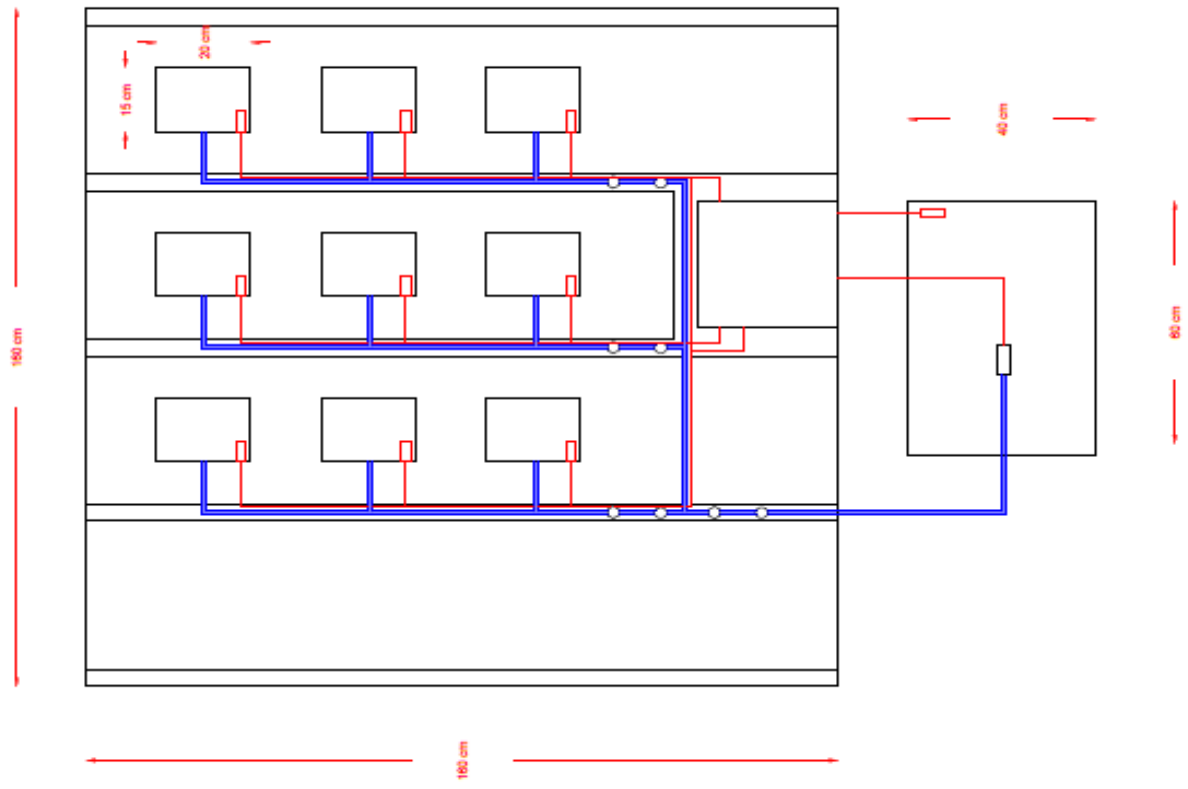
This step depends on the working of different sensors used in this project which are (moisture, temperature, light, rain).

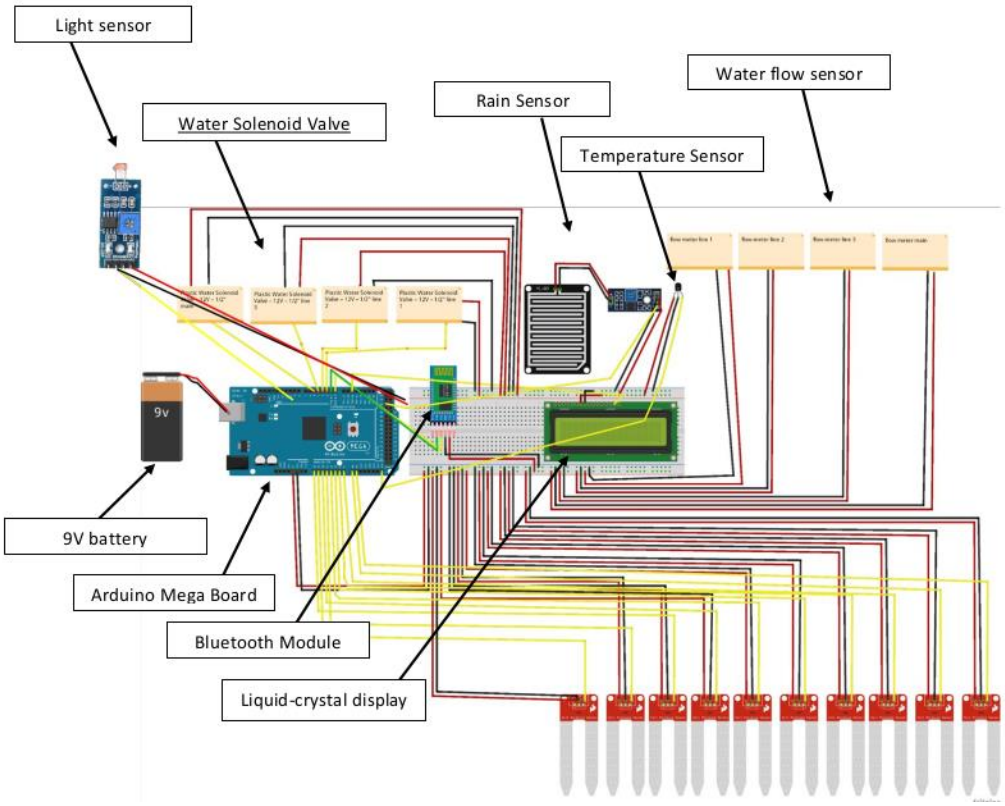
- **Mechanical Design**

In the beginning, sketch design for the project was made, then measurements, size needed for designing the project. Two wood table (1.6-meter x l.6 meter) has been chosen as a base and stand for this project.

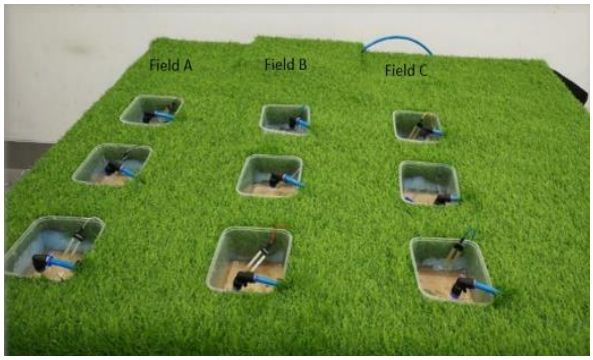
1- Moisture sensor
2- Pipes
3- Valve
4- Flowmeter
5- Controller box
6- Water level sensor
7- Pump

Note: Explanation of all these parts can be found in (Hardware platforms





Sequence of Scenario of the system



As it shows in figure, the project had divided into 3 fields (Field A, Field B, Field C). However, (Field A) has (valve 1 and flow meter 1), (Field B) has (valve 2 and flow meter 2) and (Field C) has (valve 3 and flow meter 3) and valve 4 with flow meter 4 is the main.

As it shows in the chart, it shows how the system works in one field if only one moisture sensor of Field B active the system will not work also temperature sensor and the light sensor works together. For example, when the temperature is more than 40 C and the light sensor is active then the system will switch OFF because the heat of the sun works to evaporate the water, this system had been configured to stop the process and schedule it. Moreover, the purpose of this system is to work in a smart way, so if there is rain the system will automatically be OFF.

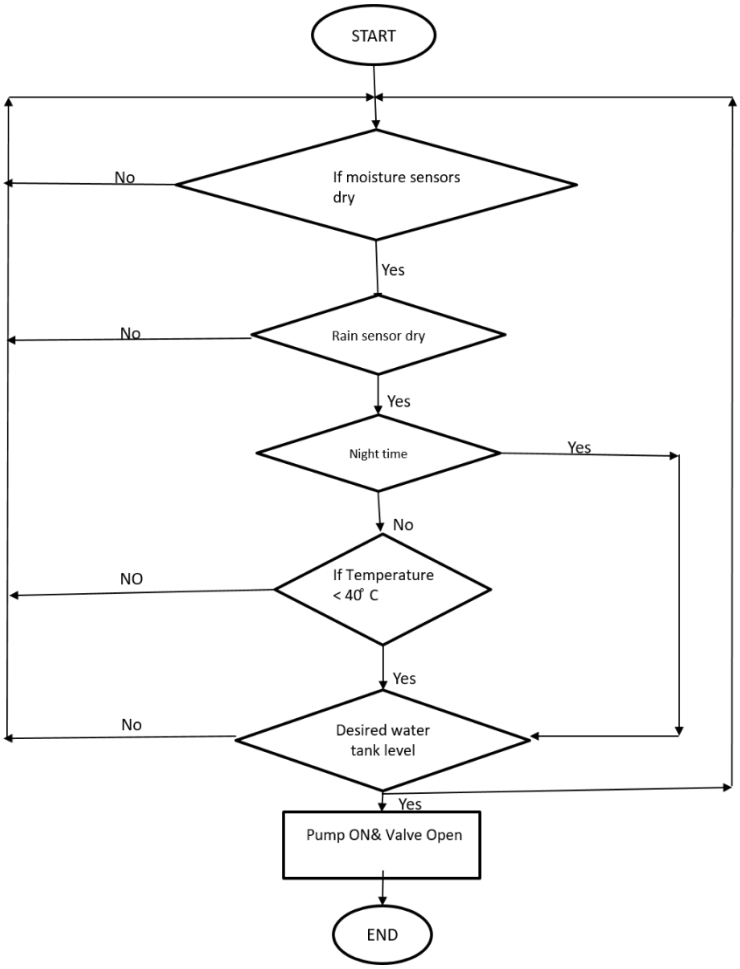
Please considered that main water tank will be monitored carefully so that it doesn't go below the level where the level where the pump cannot suck the water. The system will not work if the water level is low.

To start the process, two or three moisture sensors of Field B must be activated to move to next step. Next, the rain sensor must be dry to continue the process and the weather temperature

sensors should be less than 40 C to enable the process to move to next step. If the water tank level is not below, the pump will run, valve 2 and 4 will open and flow meter of 2 and 4 have the same reading.

If two or three moisture sensors of all fields (A, B, C) active at the same time and the rain sensor is dry, the temperature sensor should be less than 40 C and the light sensor is not active then the proceed to next step. If the water level sensor is not below then pump will be ON, valve (1,2,3) and 4 will open and flow meter (1,2,3,4) have the same readings.

Flow chart of implementation process

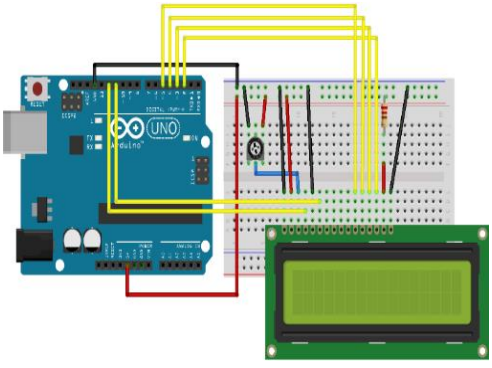


Hardware platforms

Arduino

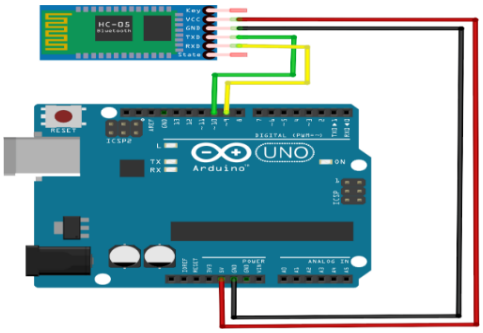
Arduino is "an open-source electronics platform based totally on clean-to-use hardware and software". The Arduino control panel programmed by Arduino c and is based on C and C ++

Arduino LCD



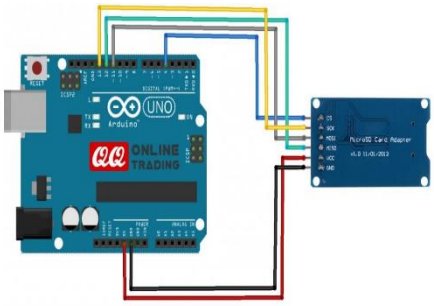
Liquid Crystal Library This library permits an Arduino board to control Liquid Crystal Display (LCD) that is on the Hitachi HD44780 chipset, which is on most text-based LCDs. [16].

Bluetooth device



HC 05/06 this tool works on serial connections and information is sent via Bluetooth when a particular button is pressed. Data is sent to the ARDWINO via TX, the signal is transmitted from the ARDWINO and the RX receives the signal from ARDWINO. The data is verified if gotten information is 1 the Driven turns on turns OFF when gotten information is 0 [17].

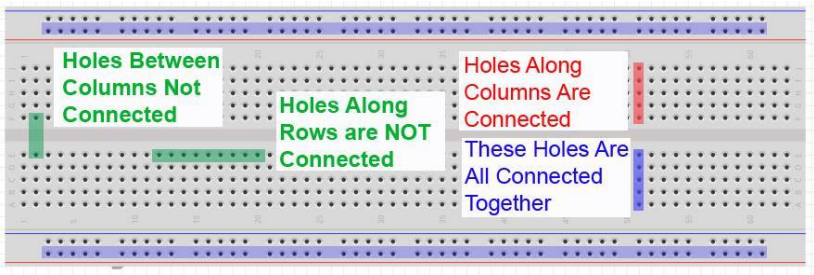
SD card



The Arduino circuit makes communication with popular Micro SD cards easy and is compatible with the SD memory card library in the Arduino IDE environment, which enables easy reading and writing of files and folders, and for communication with the memory card, the circuit operates four pins of The Arduino circuit attached to it, which is 13, 12, 11, and 11 digital poles, can be selected using a conductor.

Hardware tools

Arduino

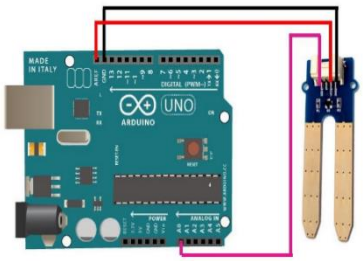


Arduino is an open-source operating system that relies on easy-to-use hardware. Arduino can read the ratio of light input to the sensor and convert it to output. For example, using Arduino we can control the room by turning on or off the light or air conditioner. This is done by sending a set of instructions to the control unit on the Arduino board.

Breadboard Definition

Breadboard is a plastic board for holding wires and electronic segments such as transistors and resistors

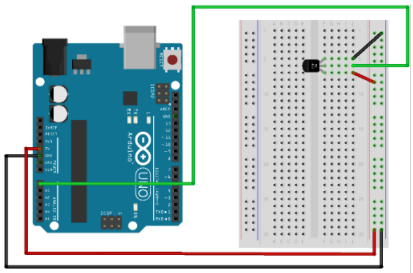
Moisture Sensor



The soil moisture sensor comprises of two tests that are utilized to the degree the volumetric substance of water. The two tests permit the current to pass through the soil, which gives the resistance esteem to the degree the dampness esteem. When there is water in the soil there will be less resistance and the soil will handle more power. But if the soil is dry, it conducts power weekly and needs less power and more resistance.

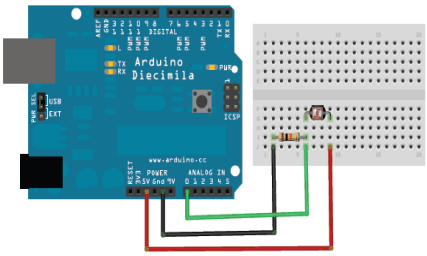
Temperature Sensor

A temperature sensor is sensor to measure the ambient temperature. This sensor has three pins – a positive, a ground, and a flag.



Light Sensor

A Light Sensor is a gadget that recognizes light. It creates a yield flag that is corresponding to the escalated of light. A light sensor measures the brilliant vitality display in the wide run of frequencies in the light range. A few of the common frequencies are infrared, obvious and bright

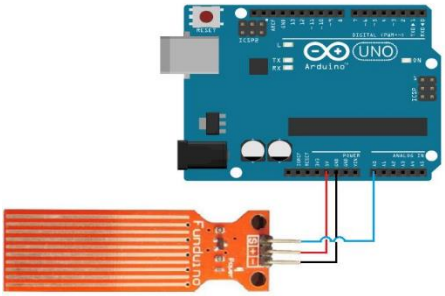


Plastic Water Solenoid Valve

Is to control the flow of fluid, a valve is ordinarily closed and has a 1/2″ non-taped outlets on each conclusion. On the off chance that 12V is connected through the two terminals of the valve the solenoid will open the valve.

Level Sensor

The water-level pointer is utilized to demonstrate the water level in the tank, by using this sensor we can control the flood of the water as well know the level of the water in the tank , and at any time we can know the water level in the tank, it has a basic circuit [24].

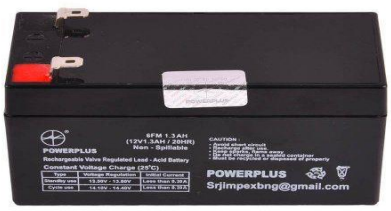


Water pump

It is used in this project to pump the water needed for irrigation from the main water tank through pipes. This pump can be used for different applications, in household include cleaning, bathing, space heating and flower of water. This pump is selected for this project because it has good advantages. Such as, it has a lightweight. Also, it has a small size, so it is easy to install and replace it. Furthermore, it has an enough efficiency to pump water for irrigation. Since it operates in 12 volts, so it consumes lower power. In addition, this pump has a very Low of noise. Finally, the cost of this pump is very cheap.

Rechargeable Battery

When selecting the appropriate battery for this project, some important points must be considered. Firstly, it should be environmentally friendly it should be sealed construction. Secondly, it should be stable quality and high reliability. Also, it must be rechargeable type, so it



will not contribute to pollution of the environment. This battery is a high-quality battery that is designed in order to give top performance, strength and long life.

Software platforms

App inventor is an open-source tool provided by google. This program allows beginners to create programs that can run on Android. It uses graphical interface such as Scratch.

1. Button. If it is clicked, it goes to the user to About Page, which have information about the app.
2. Button. If it is clicked, it goes to Help Page, which have information about the app.
3. List Picker. When it is clicked, it shows a list of all connected Bluetooth devices When a Bluetooth device is clicked.
4. Connection. If the device is connected, the text color change to green for feedback and speaks ‘Connected'.
5. ON /OFF buttons allow the user to switch on or off the system.
6. Detail's button. When clicked take the user to a details page which shows all the information and let user control system line by line.
7. List Picker. When it is clicked, it shows a list of all connected Bluetooth devices When a Bluetooth
8. device is clicked.
9. These two labels, shows the temperature and amount of water go from tank flow4 is the main one.
10. Plant button. When clicked it shows user list of details about plant such as (Name of the plant, humidity and amount of water).
11. These three labels, it is not visible unless the user clicks on plant button, when user click on plant1 all these labels become visible.
12. Responsive button, when it is clicked, it takes a user to the home page.
13. ON/OFF button in each line allow a user to switch on or off each line individually.

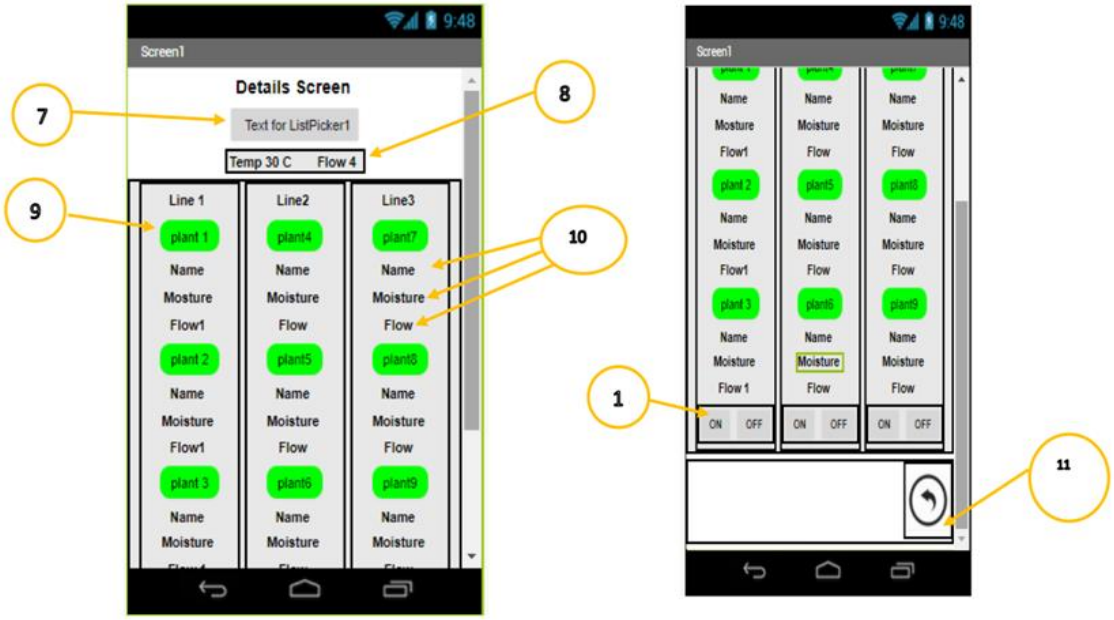


Table 13.12 Estimate of Automatic irrigation system

No	Description	Amount
1.	Moisture sensor	1285.00
2.	Pips	585.00
3.	Flowmeter	399.00
4.	Water level sensor	1285.00
5.	Arduino	585.00
6.	Arduino LCD	399.00
7.	Bluetooth device	198.00
8.	SD card	366.00
9.	Temperature sensor	185.00
10.	Light sensor per nos.	155.00
11.	Plastic water solenoid valve	299.00
12.	Level sensor	142.00
13.	Water pump	7500.00
14.	Rechargeable battery	649.00
15.	Rain sensor	181.00
16.	Approx. total	21674.00

This estimation is for only parts required in circuits.

13.1.9 Electrical Design 3: Motor protection against Single Phasing and Overheating

The rise in temperature level of a motor during its operation beyond a permissible limit is known as overheating. The causes of motor overheating are motor overloading, distortion in the supply voltage, impaired cooling capability, unbalanced supply voltages etc. Because of overheating, we can face the problems such as Electrical fire, Insulation failure, Decrease in life time of motor due to earlier wear and tear of the motor windings etc. Hence, for three phase induction motors, it is necessary that all the three phases of supply be present and the Motor Temperature be within the permissible limits. Hence, for the protection of the motors from mechanical damage and to increase its life time, it is very necessary to protect the phase motors from Single Phasing and Overheating.

We are going to design a hardware circuit to prevent the three phase loads from single phasing or overheating by disconnecting the load from the supply whenever any one of the two occurs, to monitor the current status of the motor by the help of LCD screen showing the current temperature and bulbs showing which phases are currently present, inform the user through alarm and by sending SMS to the user's mobile whenever any one of the abnormal condition occurs.

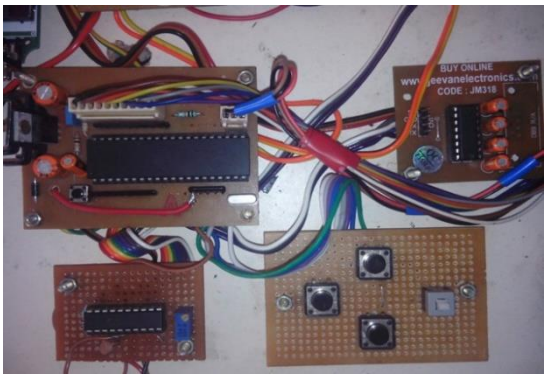
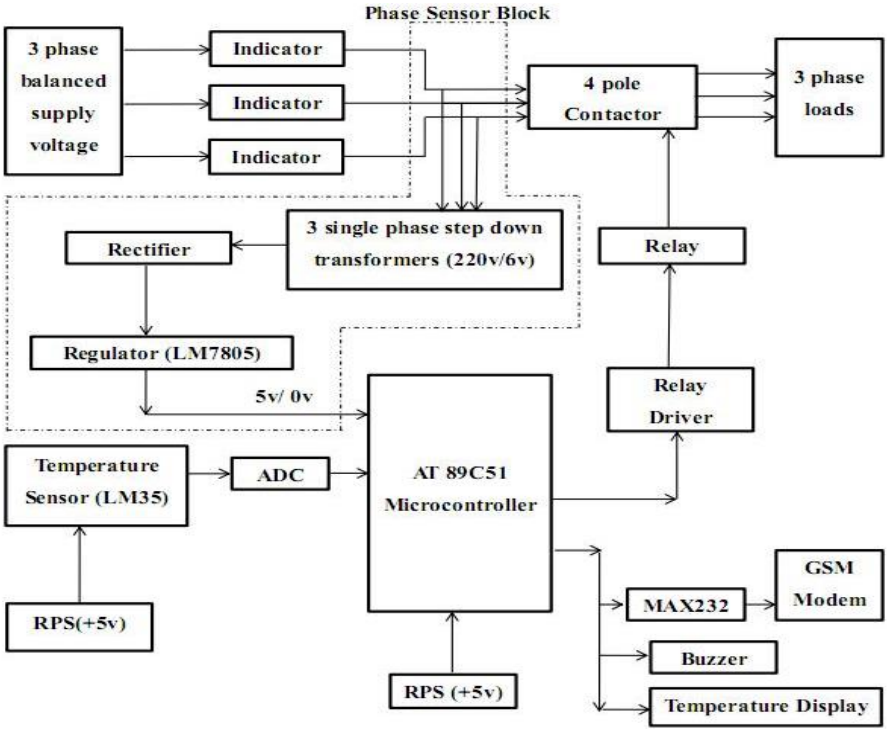


Figure 13.1 Hardware circuit

The hardware circuit makes the use of AT89C51 microcontroller to sense the abnormal condition i.e. single phasing or overheating and sound a buzzer and send SMS to the user's mobile by the use of a GSM Modem and de-energize the 4-pole contactor which disconnects the load from the supply. Three single phase transformers are used in star connection whose primary is connected to the 3-phase supply. The secondary ends of 6V are connected in parallel, which produces net output voltage of 0 V whenever all phases are present and nearly 6 V when any one of the phases fails. The LM35 temperature sensor senses the motor temperature. The output of the temperature sensor is analog signal. Hence, it is converted into Digital signal by using an Analog/Digital converter ADC 0804 and fed to the microcontroller. According to the motor class insulation, the hot spot temperature or the critical temperature of the motor can be set. The current motor temperature can be continuously monitored in the LCD screen. In case, if the motor temperature exceeds the hot spot or the critical temperature, the microcontroller buzzes an alarm, sends SMS and disconnects the supply from the load. Hence, as a real time application, this project finds it best place to be used in the Industries and various sectors to prevent the motor from the damages from Single Phasing and Overheating so as to improve the life expectancy of the motors and save the High-cost machines from frequent failure and permanent damages.

Block Diagram



WORKING

This project, consist of the above blocks. It mainly consists of two major blocks. Temperature sensor and phase sensor block. The Phase sensor block is generally used to sense the Single Phasing and temperature sensor block is generally used to sense the overheating in the motors. In Phase sensor block, 3 single phase potential transformers are connected in star connection in the primary side and delta connection in the secondary side. The output of the delta connected transformers is again fed to the rectifier and regulator circuit. If all the phases are present, the output of the rectifier and regulator circuit is 5V, if not, it is 0V. Hence this 5V or 0V is fed to the AT89C51 microcontroller to control the relay connected to it. On the other hand, the temperature sensor senses the temperature of the motor. In case, if the temperature of the motor exceeds the set temperature of the motor, the microcontroller trips the relay and hence disconnects the load from the supply. The AT89C51 microcontroller block is interfaced with GSM module, LCD Display and Buzzer. If anyone of the two cases occurs, the GSM modem will send a message to the user's mobile stating the present status of the motor and also sounds a buzzer. Hence, in this way, this circuit prevents the motor from the effects of overheating and single phasing.

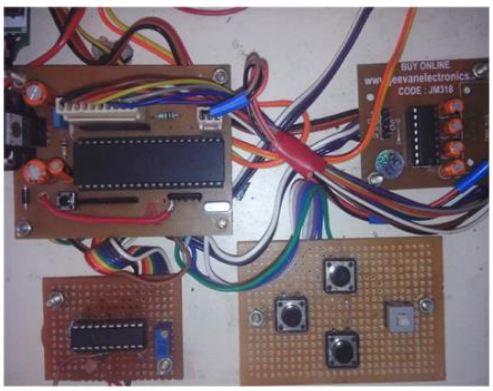


Figure 13.3 Microcontroller with Motor Start/ stop button

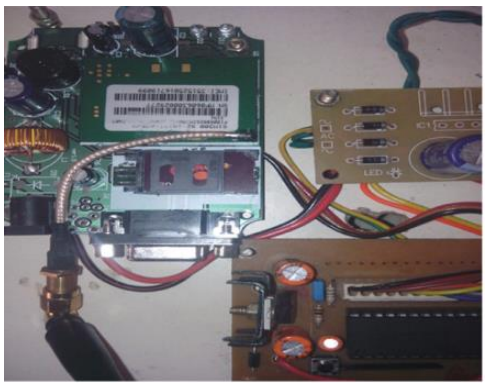


Figure 13.2 Regulated power supply

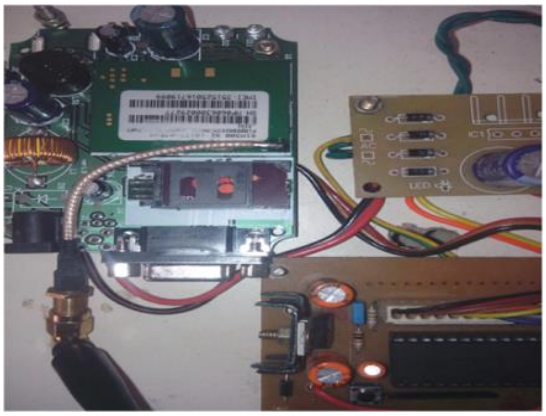


Figure 13.5 Microcontroller Interfaced with GSM Modul

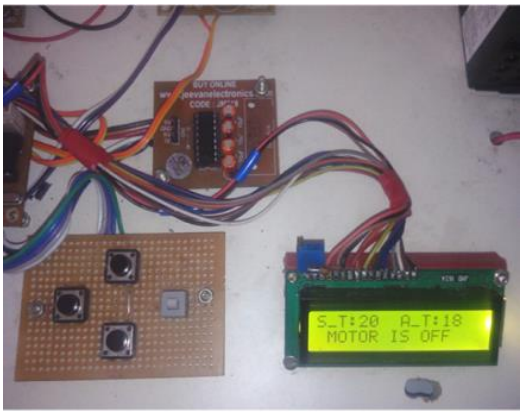
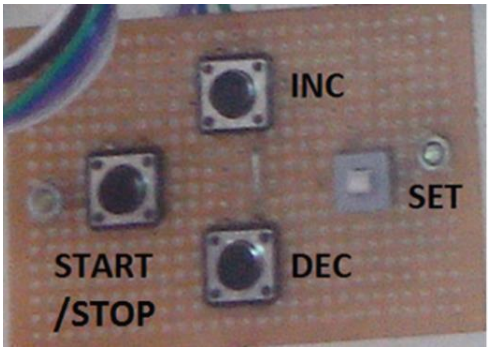


Figure 13.4 Screen display when motor goes into OFF state as single phasing occurs

WAY OF OPERATION



- Press SET button and go on pressing the INC button to increase the Critical Temperature value of motor. E.g. 50ºC
- We can use the DEC button to decrease the critical temperature value that we have set.
- Then press SET button again
- Press START/STOP button to start the motor.
- If we want to stop the motor, we can press START/STOP button again.
- In Display, we can view Actual Temperature and Set temperature.
- If Actual temperature reaches the Set temperature, the contactor trips the motor, buzzer is alarmed and Send SMS to the user's mobile.
- If anyone of the three phases R,Y,B fails, same process happens.
- Hence, we can save the motor from damage from Single phasing and Over heating

Estimation for Motor Protection against Single Phasing and Overheating

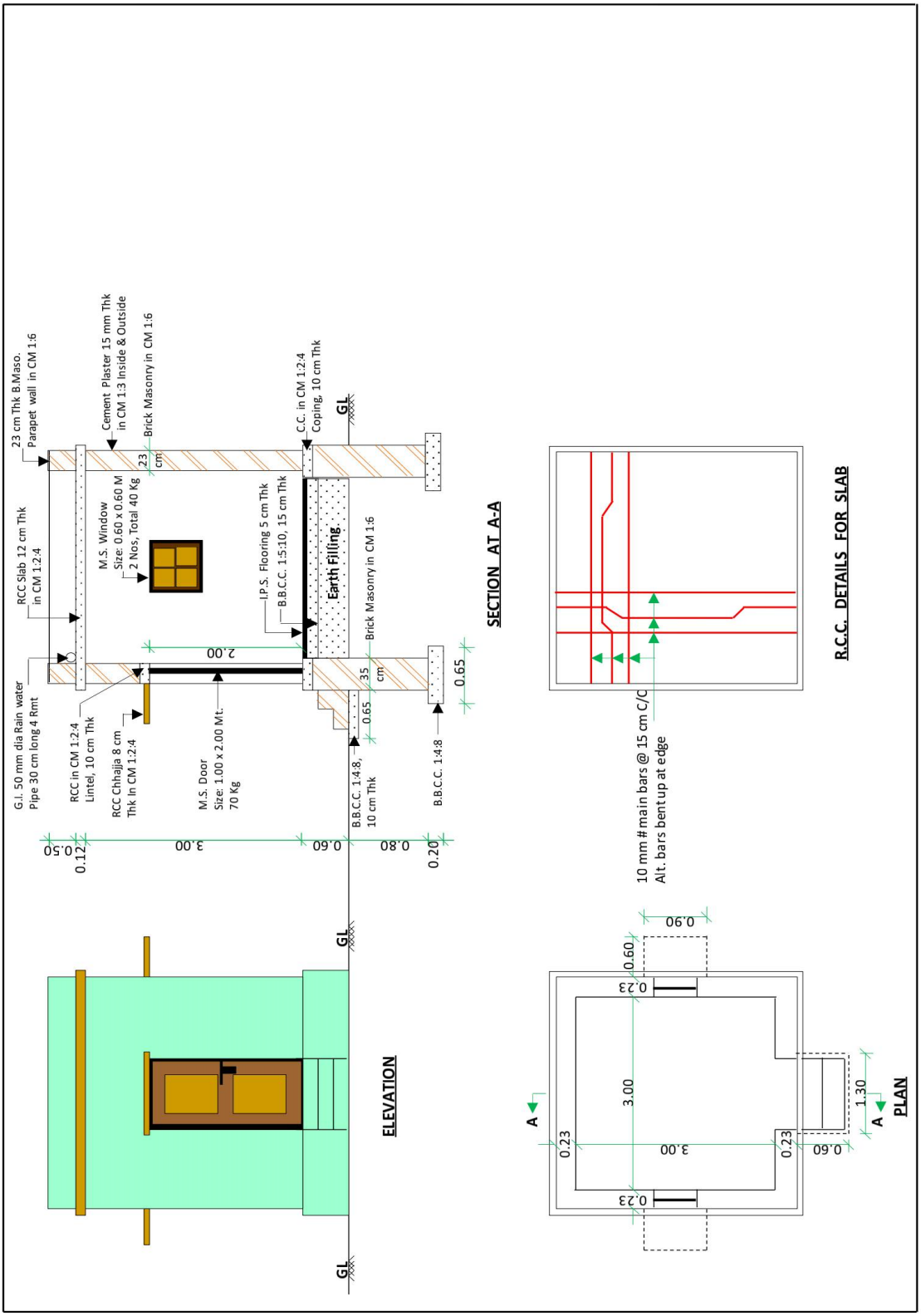
Table 13.13 estimate of Motor protection against single phasing and overheating

No.	Item	Rs.
1	AT89C51 microcontroller	65.00
2	Buzzer	149.00
3	GSM modem	1599.00
4	Lm35 temperature sensor	350.00
5	ADC 0804	135.00
6	X'mer 220v/6v	299.00
7	4 pole Contactor	4999.00
8	LM7805	9.00
9	Led screen	349.00
10	Total	7000~8000

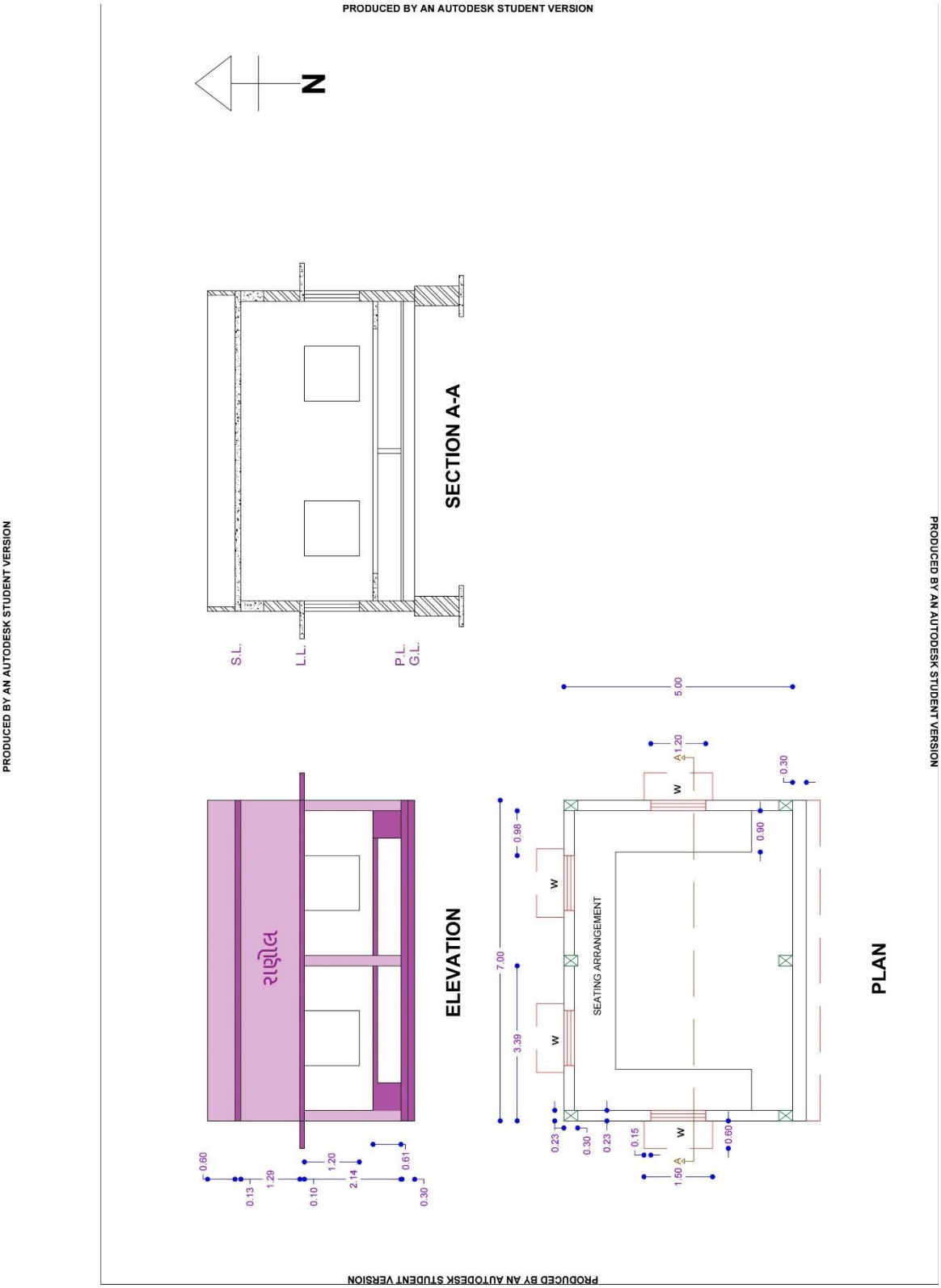
This estimation is for only parts required in circuits.

13.2 drawings

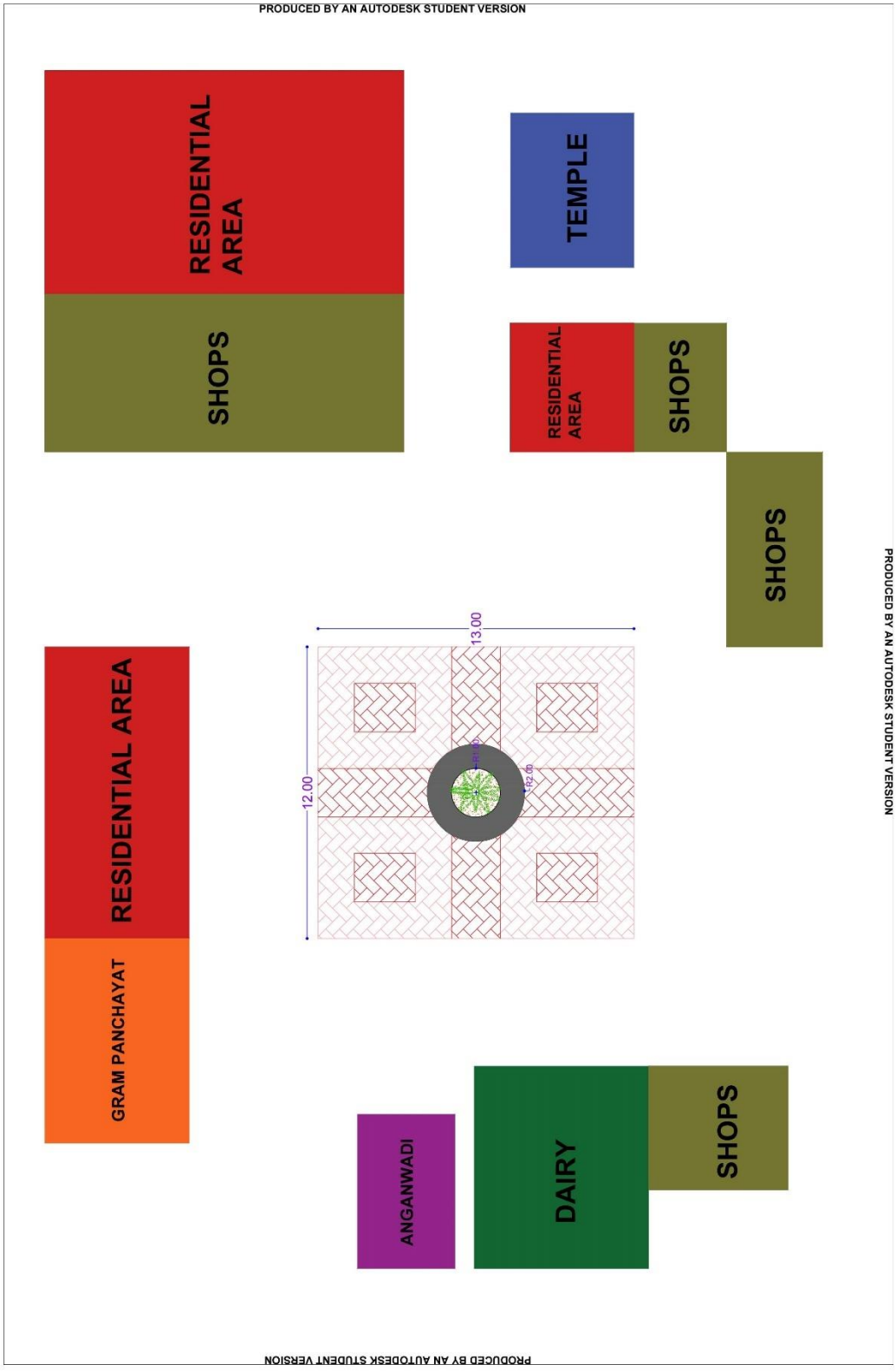
1. Pump House



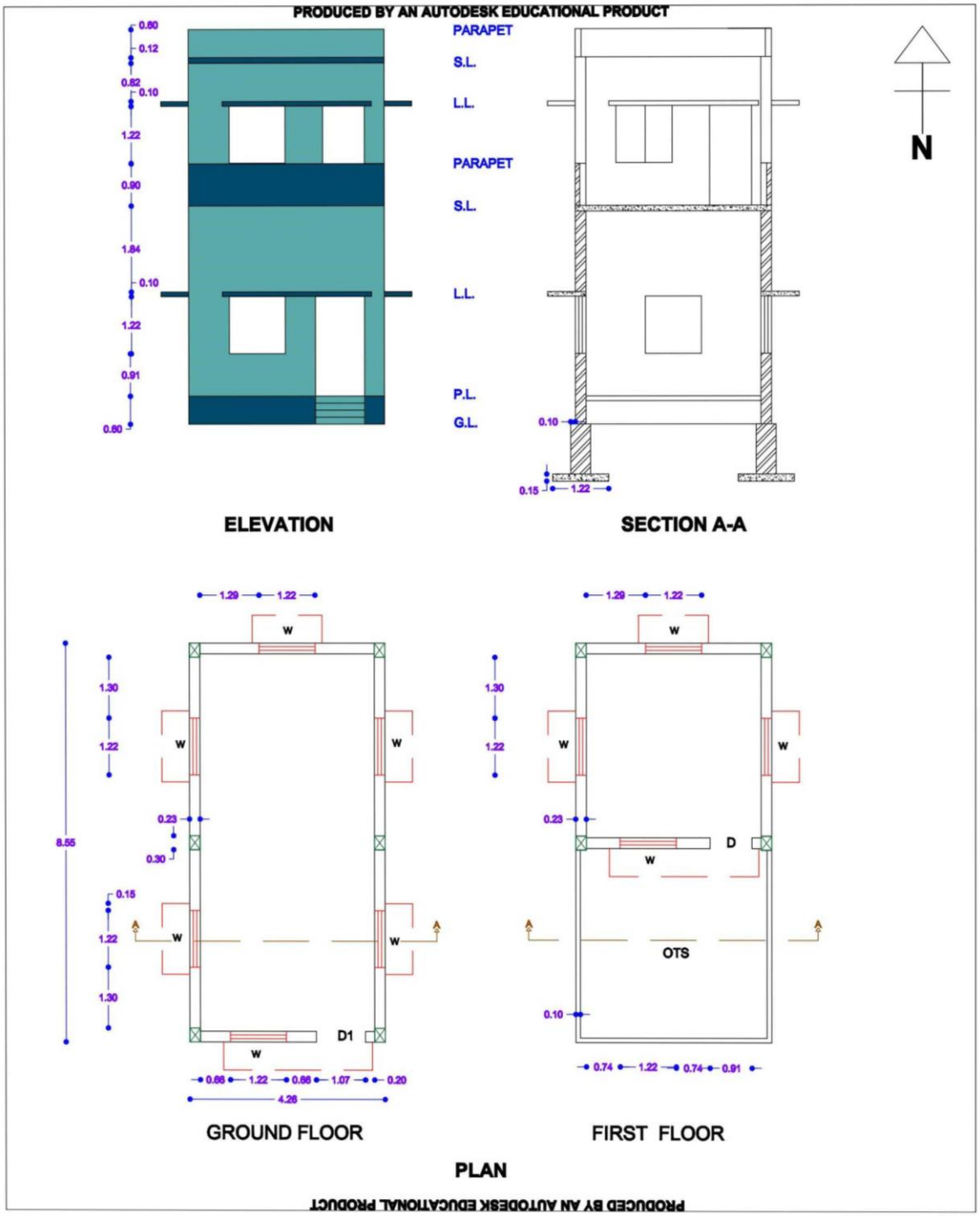
2. Pick up stand



3. Paver Block



4.Panchvati


PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT
PARAPET
S.L.
L.L.
PARAPET
S.L.
L.L.
P.L.
G.L.
N
ELEVATION
SECTION A-A
W
D1
D
OTS
GROUND FLOOR
FIRST FLOOR
PLAN

13.3 Reason for Students Recommending this Design

- Design to be proposed should be convenient enough, cost effective and valuable to the residents of the villagers. The design proposed is designed according to the use, value, costing recommended by the villagers.
- The cost of the design is the most important part which needs to be taken care of Costing should be value for money. Design should be designed according to number of people visiting, number of people going to use it, number of people wants the building or not.
- Our allocated village Ranol has most of the amenities and facilities needs by the resident and villagers for daily needs. Some amenities like public garden, public toilet, Primary school, RO plant and some requirements which are some amenities which can be beneficial to them in the long run and might also connect them to the fast-running world. Some of this might be not needed but might be as an entertainment and which can be used in the future.

13.4 About designs Suggestions / Benefit of the villagers

- For Reducing the migration of villagers to city area we provide some basic facilities to villagers then not required for them to live outside the villages.
- For providing better livelihood and facilities. We find out some lack of facilities in Ranol villages and design some amenities for villages. By providing these facilities to villagers they didn't required to live in cities, they got the facilities in the villages.
- Library, roads, underground drainage, primary health center, garden, animal husbandry, solar system, agricultural facilities, super market etc. help to villagers.

Chapter 14. Technical Options with Case Studies

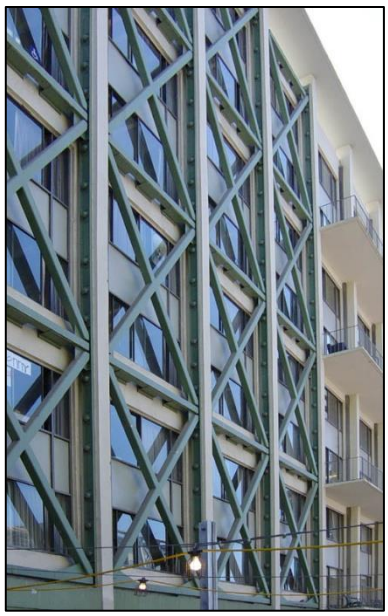
14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

Earthquake-resistant or aseismic structures are designed to protect buildings to some or greater extent from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during Seismic activity than their conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location. This means the loss of life should be minimized by preventing collapse of the buildings for rare earthquakes while the loss of the functionality should be limited for more frequent ones.[1]
To combat earthquake destruction, the only method available to ancient architects was to build their landmark structures to last, often by making them excessively stiff and strong.

Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest. These range from appropriately sizing the structure to be strong and ductile enough to survive the shaking with an acceptable damage, to equipping it with base isolation or using structural vibration control technologies to minimize any forces and deformations. While the former is the method typically applied in most earthquake-resistant structures, important facilities, landmarks and cultural heritage buildings use the more advanced (and expensive) techniques of isolation or control to survive strong shaking with minimal damage. Examples of such applications are the Cathedral of Our Lady of the Angels and the Acropolis Museum.

14.1.2 Seismic Retrofitting of Buildings



Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. With better understanding of seismic demand on structures and with our recent experiences with large earthquakes near urban centers, the need of seismic retrofitting is well acknowledged. Prior to the introduction of modern seismic codes in the late 1960s for developed countries (US, Japan etc.) and late 1970s for many other parts of the world (Turkey, China etc.),[1] many structures were designed without adequate detailing and reinforcement for seismic protection. In view of the imminent problem, various research work has been carried out. State-of-the-art technical guidelines for seismic assessment, retrofit and rehabilitation have been published around the world – such as the ASCE-SEI 41[2] and the New Zealand Society for Earthquake Engineering (NZSEE)'s guidelines.[3] These codes

must be regularly updated; the 1994 Northridge earthquake brought to light the brittleness of welded steel frames, for example.[4]
The retrofit techniques outlined here are also applicable for other natural hazards such as tropical cyclones, tornadoes, and severe winds from thunderstorms. Whilst current practice of seismic retrofitting is predominantly concerned with structural improvements to reduce the seismic hazard of using the structures, it is similarly essential to reduce the hazards and losses from non-structural elements. It is also important to keep in mind that there is no such thing as an earthquake-proof structure, although seismic performance can be greatly enhanced through proper initial design or subsequent modifications.

14.1.3 Advance Practices in Construction field in Modern Material, Techniques and Equipment's

What are Modern Methods of Construction?
Modern construction methods (MMC) are methods that are developed in construction industry with proper planning and design so that each project reduces the construction time, cost and maintain overall sustainability. There are many methods followed and constructed in the present scenario widespread.

Types of Modern Methods of Construction

1. Precast Flat Panel System
2. 3D Volumetric Modules
3. Flat Slab Construction
4. Precast Cladding Panels
5. Concrete Wall and Floors
6. Twin Wall Technology
7. Precast Concrete Foundation

3D Volumetric Modules

As the name implies, the 3D volumetric construction involves the manufacture of 3D units in the form of modules in off site. At the time of installation, they are brought to the site and assembled module by module. Each modular unit manufactured are 3D units, hence this construction is called as 3D volumetric construction or modular construction. The transportation of the modules can be carried out in various forms or methods. This can involve the transportation of the basic structure or a completed unit with all the internal and external finishes, services installed within it, that the only part remaining is the assembly. The factory construction brings different unit of same product maintaining their quality throughout. Hence this method is best suited for repetitive projects so that rapid assembly of the products is possible.

14.1.4 Engineering Aspects of Soil mechanics - 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.
There is historical precedent for the now mandatory Environmental Impact Assessments (EIA). Past efforts by governments have resulted in bans on activities that caused noxious odors, garbage dumps were positioned at places far away from habitation, and commercial activities were restricted to town centers.

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.

For example, The alignment of the road may require that certain lands have to be leveled or new embankments created. Cutting of the land and the new embankments would affect the geography of the area and probably upset its drainage pattern. This would require re-planning existing methods of treating the run-off and could cause existing watercourses to be modified. The new road may require the removal of existing green cover and this could affect the living conditions in that area. The traffic going through that area can cause pollution problems from vehicles which also includes an increase in sound pollution. The emissions from the vehicles can affect already existing atmospheric pollutants which in turn could affect human health, animal health and affect greenery in the area. The road may affect existing structures in the area which may have to be removed and can cause changes in the economic wellbeing of the persons who are using those structures.
A positive impact of the new road may mean a reduction in traffic congestion, its positive effect on pollution, and the economic advantage of these two aspects.
For any environmental impact assessment, complete data on all these aspects as they are at present has to be made so that any changes can be reasonably judged to existing standards required for good living. The deterioration or increase in these living standards has then to be highlighted by the EIA before any final decision on the project can be undertaken.

14.1.5 Water Supply-Sewerage System-Waste Water- Sustainable development techniques

Wastewater treatment is a process used to remove contaminants from wastewater or sewage and convert it into an effluent that can be returned to the water cycle. Once returned to the water cycle, the effluent creates an acceptable impact on the environment or is reused for various purposes (called water reclamation).[1] The treatment process takes place in a wastewater treatment plant (WWTP).There are two kinds of wastewater: domestic and industrial; both types of wastewater are treated at the appropriate wastewater treatment plant. For domestic wastewater (also called municipal wastewater), the treatment plant may be called a Water Resource Recovery Facility (WRRF) or a Sewage Treatment Plant (STP). For industrial wastewater, treatment either takes place in a separate industrial wastewater treatment plant, or in a sewage treatment plant (usually after some form of pre-treatment).

Processes commonly used are designed to achieve phase separation, oxidation or polishing. Types of wastewater treatment plants include sewage treatment plants, industrial wastewater treatment plants, agricultural wastewater treatment plants and leachate treatment plants.

The treatment of wastewater is part of the overarching field of sanitation. Sanitation also includes the management of human waste and solid waste as well as stormwater (drainage) management.[2] The main by-product from wastewater treatment plants is sewage sludge which is usually treated in the same or another wastewater treatment plant.[3]:Ch.14 Biogas can be another by-product if anaerobic treatment processes are used.

Process

The processes involved in waste-water treatment include physical processes such as settlement or flotation and biological processes such as aerated lagoons, activated sludge, or bio-films in trickling filters. Other physical methods such as filtration through sieves may be used in specialized circumstances such as de-watering waste-water sludge.

To be effective, sewage must be conveyed to a treatment plant by appropriate pipes and infrastructure, and the process itself must be subject to regulation and controls. Some wastewaters require specialized treatment methods. At the simplest level, treatment of sewage and most wastewaters is carried out through separation of solids from liquids, usually by sedimentation. By progressively converting dissolved material into solids, usually a biological floc, which is then settled out, an effluent stream of increasing purity is produced.

14.2Electrical Engineering

14.2.1 Design of Power Electronics converter

The power semiconductor devices or power electronic converter fall generally into six categories:

- AC to DC Converter (Controlled Rectifier)
- DC to DC Converter (DC Chopper)
- AC to AC Converter (AC voltage regulator)
- DC to AC Converter (Inverter)
- Static Switches

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.

AC to DC Converters.

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 Converters.

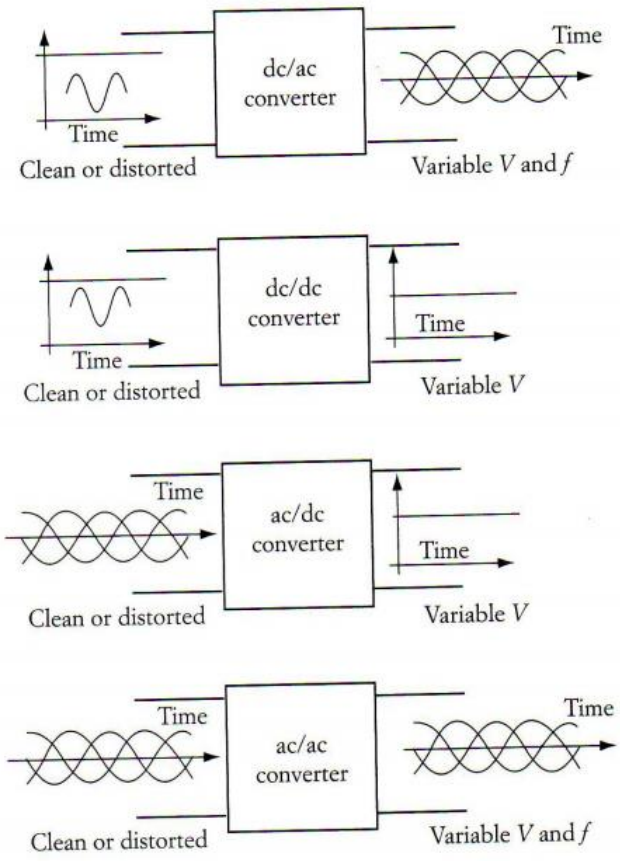
This converter can convert from a fixed ac input voltage into variable AC output voltage. The output voltage is controlled by varying firing angle of TRIAC. These type converters are known as AC voltage regulator.

DC to DC Converters.

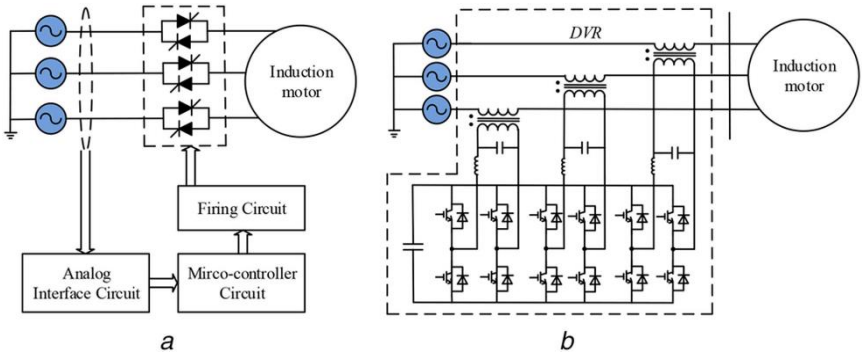
These converters can converter a fixed DC input voltage into variable DC voltage or vice versa. The DC output voltage is controlled by varying of duty cycle.

Static Switch.

Because 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.



14.2.2 Electronic Soft Starter for 1/3 Phase Induction Motor for Agriculture



An induction motor draws current more than the rated capacity during starting phase which might damage stator windings of three phase induction motor. To avoid the problem of high starting current, voltage is increased gradually from lower to higher level using smooth and soft starters. A smooth and soft starter is employed in a three-phase induction motor to eliminate the surge in current and electromagnetic torque during starting. The surge in current and torque are eliminated temporarily using soft started at the time of starting. This in turn reduces the stress applied on an electric motor and shaft attached with rotor. The soft starter also eliminates the unwanted effects in electric cables and power distribution network.

A soft starter provides reduced voltage to stator windings of three phase induction motor by controlling the acceleration of an electric motor. A three-phase induction motor is a self-starting motor and electromagnetic torque is produced due to an interaction between revolving magnetic field around rotor and rotor current. Initially during starting, a rated voltage is applied which causes high current to flow through stator windings. Now this high current is greater than the rated current which can cause heating of the stator windings and eventually damaging the insulation applied on stator windings. To avoid the problem of high starting current, there is a need of motor starters in an electric motor. The motor can be started in three ways. Firstly, by applying full load voltage i.e., direct on line starting. Secondly, by applying voltage gradually using star-delta starter and soft starter. Thirdly, by applying part winding starting i.e., autotransformer starter. A soft starter provides reduced voltage and hence reduced torque on electric motor. A soft starter comprises of solid-state devices like thyristors. The supply voltage to the motor is controlled by power semiconductor devices like thyristors. In a three-phase induction motor, the torque is proportional to the square of the starting current which in turn, is proportional to the applied voltage.

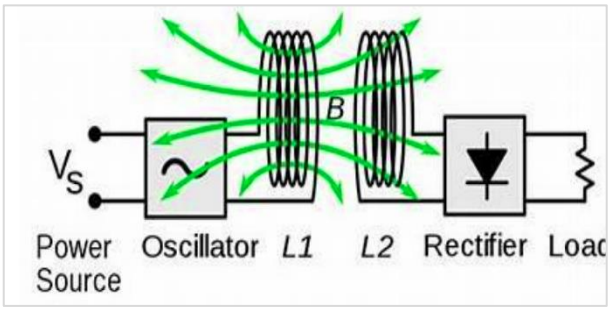
The starter works on the principle described above. Therefore, the torque and the current can be controlled by applying the reduced voltage at the time of starting of an electric motor. The two types of control are possible using soft starter. The first one is open loop control and second is closed loop control. In an open loop control, a start voltage is applied with time. This start voltage is applied irrespective of the current drawn or the speed of the motor. For each phase, two SCRs are connected in antiparallel direction and SCR are initially started at a delay angle of 1800 during respective half wave cycles. Each SCR conducts in each half cycle. This delay is reduced gradually with time when applied voltage reaches to the full supply voltage. The reduced voltage ramps up to the full voltage and simultaneously, the firing angle is reduced from 1800 to 00. This type of system is known as time voltage ramp system. This method has a drawback that it cannot control the acceleration of motor. In a closed loop control, any characteristic of the motor is monitored for the desired response. The starting voltage is

modified depending on required motor current or motor speed. The current in each phase is monitored properly and time voltage ramp is stopped when current in each phase exceeds a certain set point. The supply voltage applied to stator windings of three phase induction motor is controlled by controlling the conduction angle of SCRs.

14.2.3 Advanced Wireless Power Transfer System

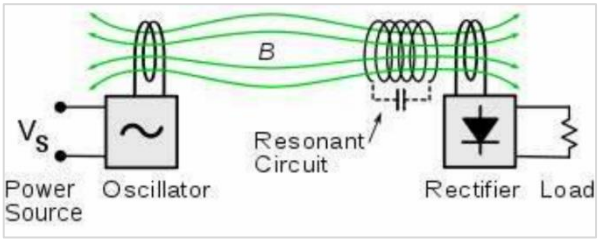
WIRELESS POWER TRANSFER METHOD

INDUCTIVE COUPLING



This type of WPT is simply based on inductive coupling between two coils. This is a type of near field technique measuring with appliance near the source. It is generally based on the principle of mutual induction, where two coils are placed vicinity to each other and there is no physical connection between these two coils. The simplest example is transformer where the transfer of energy takes place due to electromagnetic coupling. Each of these coils connected without wires and it has been an important and popular technology to transfer power without wires because of its simplicity and reliability. Based on this technology there are various application device has been already made including electric brush and charging pad for cell phones or laptop. But this kind of method also have some limitation i.e., the range can be very less up to few cm and separation distance is very less than the coil diameter.

MAGNETIC RESONANCE COUPLING WPT



This is also one of the important methods for transferring power based on near field technique. It generally overcome the disadvantage of up to some extent which arise in Non resonant inductive coupling. This type of coupling used the concept of resonance. At resonance we know that natural frequency and excitation frequency are same. This leads to the maximum amplitude, that means a maximum amount of energy is transferred between two coils. Here the receiver and transmitter coils are tuned to be at same resonant frequency. This allows us to transfer significant amount of power by increasing distance between coils [7]. These types of system are used for building mid-range power transfer. Mid-range can be specified by distance up to 10 times the diameter of the transmitting coil. Magnetic resonance coupling has several advantages such as efficiency increases with decrease in the radiation and power loss and range can be increase upto some meter and it is directional. The mainly disadvantage is that selection of resonance frequency which tunes with the natural frequency and it cannot be used for long range application.

MICROWAVE WPT

This is one of the types of far-field technique of WPT which have range upto KM, with power transfer up to MW. This method uses microwave frequency ranging from 1GHZ to 1000GHZ generated from the microwave generator. First the microwave is generated by microwave generator which pass through the coax-waveguide adapter to the waveguide circulator. Then a

tuner and directional coupler are used to separate wave according to their propagation direction. Then they are transmitted through antenna. At the receiver terminal, a receiver antenna receives which pass through a low pass filter to finally produce DC power. Based on microwave WPT system the present application is solar power satellite [8]. Advantages of microwave WPT are that it is used for several KM range with transferring high amount of power. Disadvantage are generally that the radiation effect to human beings from the microwave electromagnetic radiation

LASER WPT

This is also one of the types of far- field technique, where the power is transmitted through LASER beams. For power transmission firstly the electrical energy is converted to high LASER beams and at receiving side, these LASER beams are converted to electricity by using photo voltaic cells. This type of WPT has several disadvantages i.e., why it is not used for electrical power transmission because LASER beams can easily harm human being if they cut LASER beam path. Therefore, these are generally used for military weapon development and space research

COMPARISON BETWEEN WPT METHODS

WPT METHODS	SEPERATION DISTANCE	POWERE	EFFICIENCY
Inductive coupling	Few mm	Few watts	Low
Magnetic resonance coupling	Few mm	Few Kilo Watts	High
Microwave WPT	Up to 100KM	Up to 100 MW	High
LASER	Few meters but with high intensity	Up to 100 MW	Low

14.2.4 Industrial Temperature Controller

Temperature controllers are used in most of the manufacturing industries. The industries like textile mill, pharmaceutical industry, oil refinery etc. all requires temperature controller. The temperature controllers are used to maintain constant temperature of process or plant or any material. In such temperature controller system, there is one reference temperature called set point or set temperature that is the desired temperature that must be maintained. This reference temperature is set by external means. Also, it can be always adjustable according to requirements. Once this temperature is set the system tries to maintain it by sensing the current temperature and controlling it using heater, cooler or compressor etc.

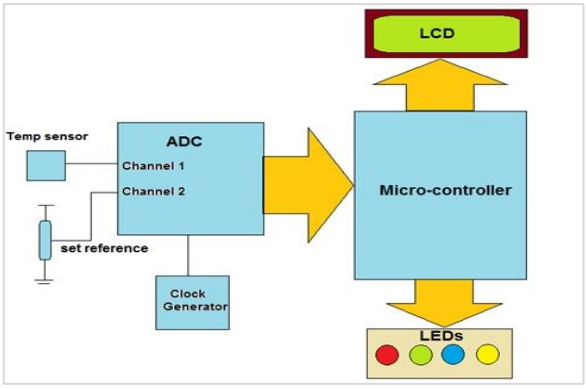
It senses current temperature, compares it with reference temperature and generates error signal. Then based on this error signal it controls heating element (or cooling element). If set temperature is more than error signal is negative and vice versa.

So here I have given one such **temperature control system** that senses current temperature using temperature sensor. It compares it with the set temperature that is set by external reference. And it gives indication of error signal as positive or negative.

If error is positive that means current temperature is more than set temperature that has to be reduced

If error is negative that means current temperature is less than set temperature and it is required to increase it

System Block Diagram:



As shown in above figure, major building blocks of system are temperature sensor, Analog to Digital Converter (ADC), micro-controller, LCD, clock generator and LED indicators.

Temperature sensor: It's a transducer. It gives corresponding voltage (or current) output as change in temperature. It can be calibrated to degree Celsius. Otherwise, it has to be calibrated first.

Reference potentiometer: It sets reference temperature between min to max value. The system operation depends upon this set temperature value.

ADC: Its analog to digital converter with built in multiplexer. It takes two analog inputs one from temperature sensor and another from reference potentiometer. It gives 8-bit digital output corresponding selected analog input. To get the digital output of any one channel, micro controller will select the required channel and takes digital output.

Clock generator: ADC requires clock signal for its operation. This clock signal is generated by IC555 based clock generator.

Micro controller: it controls operation of ADC and LCD. It takes digital output of both channels and displays them on LCD. It takes suitable decision by comparing two temperatures. Also, it gives different indications on LEDs

LED indicators: shows different indications like

Reading channel 1 temperature	Red LED
Reading channel 2 temperature	Green LED
Sensor temperature is more than set temperature (+Ve error)	Blue LED
Sensor temperature is less than set temperature (+Ve error)	Yellow LED

Working and operation:

Microcontroller first latches address of channel 1 in to ADC. Then it asserts start signal to start conversion. It waits for end of conversion (EOC) signal from ADC. When it gets it, it takes digital input from P1 and after processing it displays it on LCD as set temperature

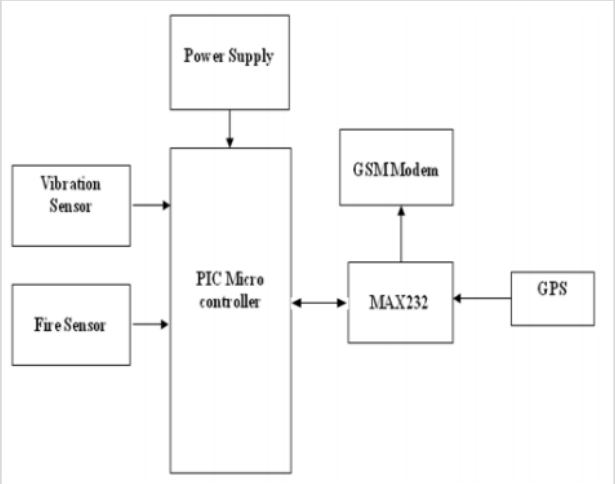
Next microcontroller latches address of channel 2. Again, it asserts start signal and waits for EOC. When it gets EOC, takes digital input – process it – displays it on LCD as current temperature

Then microcontroller take difference of these two temperature values that is the error. If error is positive then it indicates this on BLUE LED. If error is negative then it gives indication on YELLOW LED

This process is continuously repeated after every two second

14.2.5 Accident Alerts in Modern Traffic Signal Control System -Camera Surveillance System

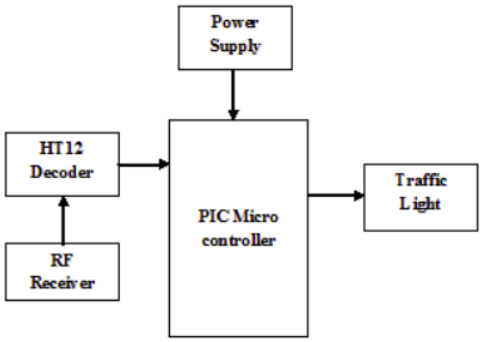
In proposed system if a vehicle has met accidents, immediately an alert message with the location coordinates is sent to the Control center. From the control center, a message is sent to the nearby ambulance. Also, signal is transmitted to all the signals in between ambulance and vehicle location to provide RF communication between ambulance and traffic section. The vehicle accident observed using vibration sensor and in the control section it is received by the microcontroller and then the nearby ambulance is received from the PC and controller sends the message to the ambulance. The signal to Traffic signal section is transmitted through RF communication. Also, if any fire occurs, it is detected using fire sensor and an alarm message is directly sent to the fire station.



Block Diagram of Vehicle Unit

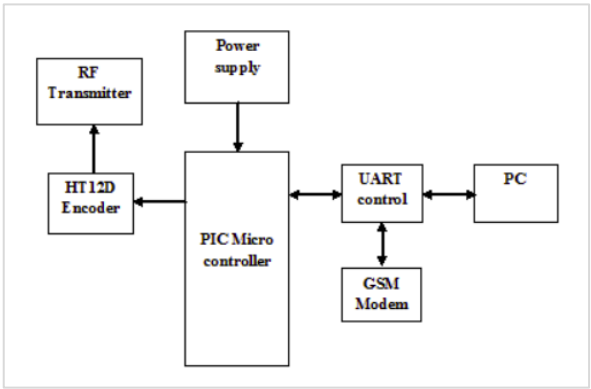
If a vehicle has met accident, vibration sensor or fire sensor gives the electric signal to microcontroller through signal conditioner. Then GPS provides latitude and longitude information about vehicle location to control section through GSM.

Block Diagram of Ambulance/Control Unit



In control section GSM modem receives message about accident and send it to PC. PC identifies the nearest ambulance and ambulance is instructed to pick up the patient. Control section transmits the control signal to all the signals in between ambulance and vehicle by RF transmission.

Block Diagram of Traffic Unit



Whenever the ambulance reaches near to the traffic signal (approximately 100m), the traffic signal will be made to green through RF communication. Thereby the ambulance is recommended to reach the hospital in time.

SYSTEM IMPLEMENTATION

system consists of three main units, which coordinates with each other and makes sure that ambulance reaches the hospital without any time lag. Thus our system is divided into following three units,

- The Vehicle Unit

- The Ambulance/control Unit
- Traffic unit

A. Vehicle unit

The vehicle unit installed in the vehicle senses the accident and sends the location of the accident to the controller. According to our system, every vehicle should have a vehicle unit. The vehicle unit consists of a vibration sensor, controller, siren, a user interface, GPS system and a GSM module. The vibration sensor used in the vehicle will continuously sense for any large-scale vibration in the vehicle. The sensed data is given to the controller GPS SYSTEM inside the vehicle. The GPS SYSTEM finds out the current position of the vehicle (latitude and the longitude) which is the location of the accident spot and gives that data to the GSM MODULE. The GSM MODULE sends this data to the control unit whose GSM number is already there in the module as an emergency number

B. Ambulance unit

The controller finds the nearest ambulance to the accident spot and also the shortest path between the ambulance, accident spot and the nearest hospital. The controller then sends this path to the ambulance. Also using this information, the controller controls all the traffic signals in the path of ambulance and makes it ready to provide free path to ambulance, which ensures that the ambulance reaches the hospital without delay. At the same time, the ambulance unit turns ON the RF transmitter. This will lead to communicate with the traffic section**.**

C. Traffic unit

Whenever traffic signal section receives the information about accident, the RF receiver in this section is turned ON to search for ambulance nearing the traffic signal. Whenever the ambulance reaches near to the traffic signal(approximately 100m), the traffic signal will be made to green through RF communication. Thereby the ambulance is recommended to reach the hospital in time

Chapter 15. Smart and Sustainable features of Chapter 8 & 13 designs, Impact on society.

No.	Design proposal	Benefits for villagers
	Part-1	
1	Library	Provides books and peaceful environment for readers
2	Health center	Villagers will get quick medical facilities in the village
3	Anganwadi	A good structure provides better environment for children and other vaccination program
4	Public Garden	Provide better environment to all age people and a safe playing area for children
5	Entry Gate	Look for smart village
6	Animal Husbandry	Its important for bio-gas plant and a vast area for animals for their tack care
7	Solar System for Panchayat House	Useful for saving energy & also working when electricity not available in village
8	Programmable Automatic Bell System	Schools and colleges follow a timetable for their classes, providing different time slots for different subjects and activities.
9	Auto Intensity control of street light using a PIC Microcontroller	Decrease the damage of street light when power increase or decrease
	Part-2	
1	Pump House	It's useful for operating the water supply in village
2	Bio-gas plant	For production of cooking gas and organic fertilizer in village, increase the income of village
3	Pick-up stand	Provide clean and comfortable sitting arrangement
4	Paver block	Increase the village's aesthetic view and centralized area for fairs and other occasions in village
5	Rain water Harvesting	Save the water and increase the ground water level, so increase irrigation facilities
6	Panchvati	A place to stay in group or visitors and villagers in summer and monsoon season
7	Smart Bin	These bin segregate the dry and wet waste
8	Automated Irrigation System	Farmer are relax about to irrigation because this system automatic start irrigation on provided scheduled
9	Motor protecting against Single Phasing and Overheating	Protect the motor in agriculture and centralized system in village

Chapter 16. Survey by Interviewing with Talati 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	Agriculture, Animal Husbandry
2	What are the chances of employment in village?		Agriculture
3	What are the special technical facilities in village?	Yes	Solar System
4	Is any debt on village dwellers?		don't get information
5	Are village people getting agricultural help?	Yes	
6	Is women health awareness Program organized in village?	Yes	
7	Are women having opportunity to work and income?	Yes	
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	
11	Women help line number information is provided to village people?	Yes	
12	Is water scarcity in village? How many days per year?	Yes	2 months per year
13	Is village under any debt?	-	
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.	Yes	male :- 6 Female :- 5
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?	Yes	mobile Network issue flood in 2017
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	but progress is slow

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

તલાટી કમ મંત્રી
રાણીલ ગ્રામ પંચાયત
તા.દાંતીવાડા, જી.બનાસકાંઠા.

NKP
સરપંચ
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તા.દાંતીવાડા, જી.બનાસકાંઠા.

1

Application for Approval of Design

To,
Sarpanch,
Village: Ranol,
Tehsil: Dantiwada, B.K.

Subject: Approval of Proposed Design for your village.

Respected Mam,

We have provided nine designs for your village as a part of our Vishwakarma yojana Phase- VIII. These designs will be helpful for growth of your village towards the path of smart village. Please Approve the designs, if you find helpful for the village growth.

Design proposal as off part: II

1. Pump House
2. Bio-gas Plant
3. Pick up stand
4. Paver Block
5. Rain water Harvesting
6. Panchvati
7. Smart Bin
8. Automatic Irrigation system
9. Moter Protection against Single Phasing and Overheating

Yours faithfully

Prajapati Nilesh R. (170610106048)
Patel Arth C. (180613106009)
Prajapati Hardik D. (170610109039)

સરપંચ
રાણોલ ગ્રામ પંચાયત
તા.દાંતીવાડા, જી.બનાસકાંઠા.

Chapter 17. Irrigation / Agriculture Activates and Agro Industry, Alternate Technics and Solution

Water is an essential element for survival. About seventy per cent of the human body consists of water while plants contain almost 90 per cent of water. Still, we have to depend on some outside sources to fulfil the water requirements of our body.
Similarly, crops require water for their growth and development. The process of supplying water to the crops is known as irrigation.

What is Irrigation?
Irrigation is the process of applying water to the crops artificially to fulfil their water requirements. Nutrients may also be provided to the crops through irrigation. The various sources of water for irrigation are wells, ponds, lakes, canals, tube-wells and even dams. Irrigation offers moisture required for growth and development, germination and other related functions.
The frequency, rate, amount and time of irrigation are different for different crops and also vary according to the types of soil and seasons. For example, summer crops require a higher amount of water as compared to winter crops.

Types of Irrigation:
There are different types of irrigation practiced for improving crop yield. These types of irrigation systems are practiced based on the different types of soils, climates, crops and resources. The main types of irrigation followed by farmers include:

1. **Surface Irrigation**
   In this system, no irrigation pump is involved. Here, water is distributed across the land by gravity.
2. **Localized Irrigation**
   In this system, water is applied to each plant through a network of pipes under low pressure.
3. **Sprinkler Irrigation**
   Water is distributed from a central location by overhead high-pressure sprinklers or from sprinklers from the moving platform.
4. **Drip Irrigation**
   In this type, drops of water are delivered near the roots of the plants. This type of irrigation is rarely used as it requires more maintenance.
5. **Centre Pivot Irrigation**
   In this, the water is distributed by a sprinkler system moving in a circular pattern.
6. **Sub Irrigation**
   Water is distributed through a system of pumping stations gates, ditches and canals by raising the water table.
7. **Manual Irrigation**
   This a labour intensive and time-consuming system of irrigation. Here, the water is distributed through watering cans by manual labour.

Methods of Irrigation:
Irrigation can be carried out by two different methods:

Traditional Methods
Modern Methods

Traditional Methods of Irrigation

In this method, irrigation is done manually. Here, a farmer pulls out water from wells or canals by himself or using cattle and carries to farming fields. This method can vary in different regions.

The main advantage of this method is that it is cheap. But its efficiency is poor because of the uneven distribution of water. Also, the chances of water loss are very high.

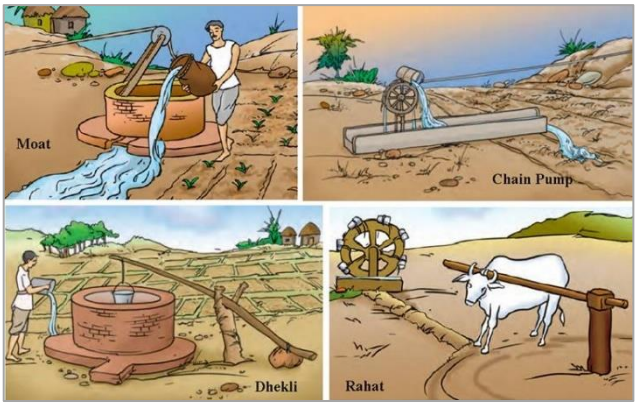


Figure 17.1 Traditional method of Irrigation

Some examples of the traditional system are pulley system, lever system, chain pump. Among these, the pump system is the most common and used widely.

Modern Methods of Irrigation

The modern method compensates the disadvantages of traditional methods and thus helps in the proper way of water usage.

The modern method involves two systems:

Sprinkler system

Drip system

Sprinkler System

A sprinkler system, as its name suggests, sprinkles water over the crop and helps in an even distribution of water. This method is much advisable in areas facing water scarcity.

Here a pump is connected to pipes which generate pressure and water is sprinkled through nozzles of pipes.

Drip System

In the drip system, water supply is done drop by drop exactly at roots using a hose or pipe. This method can also be used in regions where water availability is less.

Figure 17.3 Drip Irrigation

Figure 17.2 Sprinkler Irrigation

Chapter 18. Social Activities – Any Activities Planned by Students

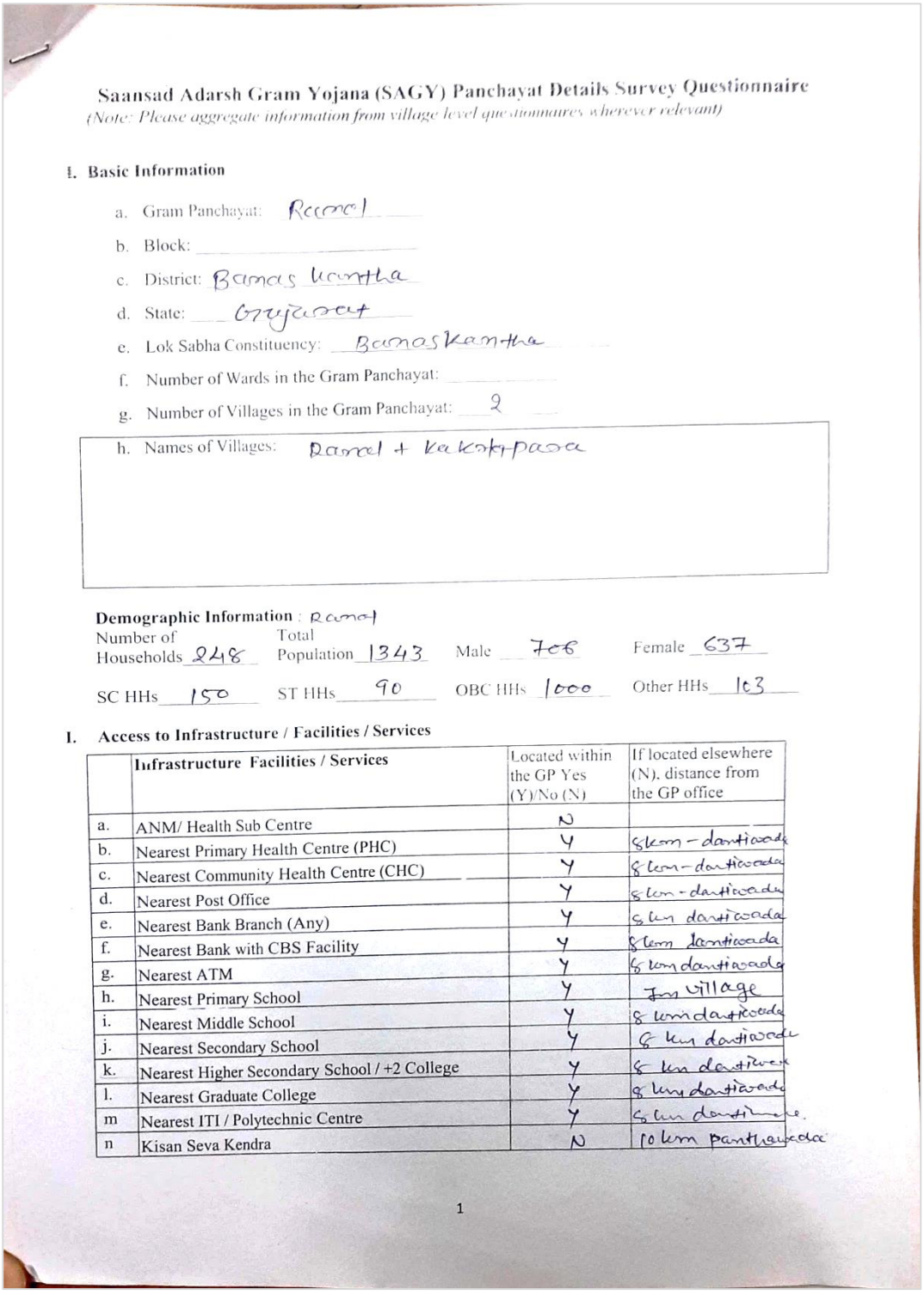
Our project time is passed during the COVID-19 pandemic, so we can't able to do some extra social activities by following COVID-19 guidelines in village. But Swachh bharat awareness program and COVID-19 awareness program suggested by the GTU in this project, so we did these two activities in Ranol village.

Figure 18.1 interaction with public related to swachhta and COVID-19 awareness

Figure 18.3 sanitizing in village

Figure 18.2 COVID-19 related check up by PHC staff

Chapter 19. Ranol SAGY Questionnaire Survey form with the Sarpanch Signature



Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

I. Basic Information

a. Gram Panchayat: Ranol

b. Block: _____

c. District: Banas kantha

d. State: Gujarat

e. Lok Sabha Constituency: Banaskantha

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: 2

h. Names of Villages: Ranol + Kakarkapara

Demographic Information : Ranol

Number of Households 248 Total Population 1343 Male 706 Female 637

SC HHs 150 ST HHs 90 OBC HHs 1000 Other HHs 103

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	N	
b.	Nearest Primary Health Centre (PHC)	Y	5km - dantiwada
c.	Nearest Community Health Centre (CHC)	Y	5 km - dantiwada
d.	Nearest Post Office	Y	5 km - dantiwada
e.	Nearest Bank Branch (Any)	Y	5 km dantiwada
f.	Nearest Bank with CBS Facility	Y	5 km dantiwada
g.	Nearest ATM	Y	5 km dantiwada
h.	Nearest Primary School	Y	In village
i.	Nearest Middle School	Y	5 km dantiwada
j.	Nearest Secondary School	Y	5 km dantiwada
k.	Nearest Higher Secondary School / +2 College	Y	5 km dantiwada
l.	Nearest Graduate College	Y	5 km dantiwada
m	Nearest ITI / Polytechnic Centre	Y	5 km dantiwada
n	Kisan Seva Kendra	N	10 km panthawada

1

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	N	
p	Nearest Agro Service Centre	N	
p	MSP based Government Procurement Centre	N	
q	Milk Cooperative /Collection Centre	Y	In village
r	Veterinary Care Centre	N	5 km dantiwada
s	Ayurveda Centre		
t	E – Seva Kendra		
u	Bus Stop	Y	In village
v	Railway Station	N	40 km palanpur
w	Library	N	5 km dantiwada
x	Common Service Centre	Y	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 0 Public – Private –

b. Mini Stadium : NO Yes(Y) No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

a. Number of Angan Wadi Centres: 2

b. Number of villages without Angan Wadi Centres –

Names of such villages: –

c. Schools (Number)

Primary Private: – Primary Govt.: Yes

Middle Private: – Middle Govt.: –

Secondary Private: – Secondary Govt.: –

Higher Secondary Private: – Higher Secondary Govt: –

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)					From gov.	In village	
b.	Kerosene					From gov.	In village	
c.	Other (mention) Oil					From gov.	In village	

2

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	Ranol, kakarlapara	
b.	Hand Pump Coverage in Villages:	Covered / Not Covered ✓		Ranol, kakarlapara.
c.	Coverage under Covered Drains:	Covered ✓ / Not Covered	Ranol	kakarlapara
d.	Coverage under Open Drains:	Covered / Not Covered ✓		
e.	Villages with Household Electricity Connection (Numbers)	Connected ✓ / Not Connected	Ranol, kakarlapara.	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	150 hec.	d.	Pasture / Grazing Land	—	g.	Check Dam	4 to 5
b.	Irrigated Land	150 hec.	e.	Forests/ Plantations	10 hec.	h.	Wells/Bore Wells	9
c.	Un-irrigated Land	—	f.	Other Common Land	2 hec.	i	Tanks /Ponds	4 to 5

[1] Mention the number of Villages Covered and Not Covered

3

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)	5
b)	Number of Households receiving pension (old age, widow, disability)	30
c)	Number of eligible Households who are not receiving pension	200
d)	Number of Households eligible for Ration Card	248
e)	Number of eligible HHs having ration cards	248
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	–
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	–
h)	Number of active Job Card holders under MGNREGA	50
i)	Number of Job Card holders who completed 100 days of work during 2013-14	20
j)	Number of shops selling alcohol	–
k)	Number of BPL families	40
l)	Number of landless households	35
m)	Number of IAY beneficiaries	10
n)	Number of FRA[2] beneficiaries	9
o)	Number of Community Sanitary Complexes	–
p)	Number of Households headed by single women	20
q)	Number of Households headed by physically handicapped persons	2
r)	Total number of Persons with Disability in the village	12
s)	Number of SHGs	5
t)	Number of active SHGs	5
u)	Number of SHG Federations	NO
v)	Number of Youth Clubs	–
w)	Number of Bharat Nirman Volunteers	–

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
		તલાટી કમ મંત્રી રાણોલ ગ્રામ પંચાયત તા.દાંતીવાડા, જી.બનાસકાંઠા.	

સરપંચ
રાણોલ ગ્રામ પંચાયત
તા.દાંતીવાડા, જી.બનાસકાંઠા.

રાણોલ ગ્રામ પંચાયત તા.દાંતીવાડા, જી.બ.કા.

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: Ranol

b. Ward Number: 211

c. Gram Panchayat: Ranol

d. Block:

e. District: Banas kantha

f. State: Gujarat

g. Lok Sabha Constituency: Banas kantha

h. Number of Habitations / Hamlets in the Gram Panchayat: In Ranol: 248

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 248 Total Population 1343 Male 706 Female 637

SC HHs 150 ST HHs 90 OBC HHs 1000 Other HHs 103

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	Y	
b.	Nearest Middle School	N	5km – dantiwada
c.	Nearest Secondary School	N	11
d.	Kisan Seva Kendra	N	11
e.	Milk Cooperative /Collection Centre	Y	
g.	Health Sub Centre	N	11
h.	Bank	N	11
i.	ATM	N	11
j.	Bus Stop	Y	
k.	Railway Station	N	40 km-Palanpur

[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) 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	N	
m	Common Service Centre	Y	
n	Veterinary Care Centre	N	8 km-dativada

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: _____

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: _____ *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

b.Hand Pump Coverage in Habitations: _____ *(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: _____ *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

b. Coverage under Open Drains: _____ *(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: _____

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: _____

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: _____

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): _____

b.Mini Stadium :_____ ___Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 2

c. Schools (Number)

Primary Private: — Primary Govt.: 2

Middle Private: — Middle Govt.: —

Secondary Private: —Secondary Govt.: —

Higher Secondary Private: — Higher Secondary Govt: —

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	150 hec.	d.	Pasture / Grazing Land	–	g.	Check Dam	4 to 5
b.	Irrigated Land	150 hec.	e.	Forests/ Plnatations	10 hec.	h.	Wells/Bore Wells	2
c.	Un-irrigated Land	–	f.	Other Common Land	2 hec.	I	Tanks /Ponds	4

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	45
2	Number of active Job Card holders who have completed 100 days of work	20
3	Number of shops selling alcohol	–
4	Number of BPL families	40
5	Number of landless households	35
6	Number of IAY beneficiaries	10
7	Number of FRA beneficiaries	9
8	Number of common sanitation complexes	1
9	Number of SHGs	5
10	Number of active SHGs	5
11	Existence of SHG Federation in the Village (Yes / No)	NO
12	Number of Youth Clubs	–
13	Number of Bharat Nirman Volunteers	–

Name and Signature of Surveyor and Respondent'

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
		તલાટી કમ મંત્રી રાણોલ ગ્રામ પંચાયત તા.દાંતીવાડા, જી.બનાસકાંઠા.	

રાણોલ ગ્રામ પંચાયત * તા.દાંતીવાડા, જી.બ.કાં. *

NKP
સરપંચ
રાણોલ ગ્રામ પંચાયત
તા.દાંતીવાડા, જી.બનાસકાંઠા.

3

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Ranol Gram Panchayat: Ranol Ward No. 211

Block: District: Banaskantha

State: Gujarat L S Constituency: Banaskantha

1. Family Identity and Size

Name of Head of Household	Becharbhai Bhemjibhai patrod.							Male/ Female	M
SECC Survey ID:		Family Size	5	Over 18	2	6 to 18	2	Under 6	1

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	GEN	Life Insurance	1. All Adults ✓ 2. Some Adults 3. None	AABY	1. Yes 2. No ✓	Kisan Credit Card Yes / No	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	YES
PDS (If NFSA is not implemented)		Annapurna	Antyodaya	BPL	APL ✓	Is any woman in the family member of an SHG? Yes / No	Yes
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]
Becharbhai Bhemjibhai patrod	50	M	N	Y	5	Y	Y	N
Ramilaben Becharbhai patrod.	45	F	N	Y	NO	Y	Y	N

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
Pimaben Becharbhai	14	F	N	N	8th	Y	9th	Y
kavitaben Becharbhai	12	F	N	N	6th	Y	6th	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
Jagdishbhai Becharbhai	6	M	NO	-	Y	Y	Y	38

[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
	Soap	Other	Soap	Other	
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	–	1
Children	–	–

9. House & Homestead Data

Own House: Yes / No	No. of Rooms:
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
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	500 Ft
Community Water Tap	Yes / No	
Hand Pump (Public / Private)	Yes / No	No
Open Well(Public / Private)	Yes / No	No
Other (mention): Bore well		

11. Source of Lighting and Power

Electricity Connection to Household: Yes / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: ______
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: ______
If cooking in Chullah: Normal/ Smokeless

12. Landholding (Acres)

1. Total	10 vigga	2. Cultivable Area	10 vigga
3. Irrigated Area	10 vigga	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 yes
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
Rajgaro		2000 kg
Magfali		2500 kg
Wheat		1500 kg

17. Livestock Numbers

Cows: 5	Bullocks:	Calves:
Female Buffalo:	Male Buffalo:	Buffalo Calves: 2
Goats/ Sheep: –	Poultry/ Ducks: –	Pigs: –
Any other: Type B		No.
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 30 Ltr		

18. What games do Children Play

kabbadi, cricket

19. Do children play musical instrument (mention)

NO

Schedule Filled By: N. R. Prajapati

Principal Respondent: [illegible]

Date of Survey:

Chapter 20. TDO-DDO-Collector email sending soft copy attachment in the report

About Vishwakarma yojana Project prepared by Students of Government Engineering college, Palanpur.

1 message

Nilesh Prajapati <nileshprajapati06106@gmail.com> Sun, 27 Jun 2021 at 12:07
To: ddo-ban@gujarat.gov.in <ddo-ban@gujarat.gov.in>, tdo-dantiwada@gujarat.com <tdo-dantiwada@gujarat.com>, judaldev@gmail.com <judaldev@gmail.com>

Respected sir/ Madam,

We are the students of Government Engineering College, Palanpur affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojana-VY in which students survey village and design various amenities to deliver it to them making ideal for living better life as per requirements & village problem statements.

As a part of Vishwakarma yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Ranol village profile of issues for development and our design work for them which is as below.


About Vishwakarma yojana Project prepared by Students of Government Engineering college, Palanpur.

NP Nilesh Prajapati <nileshprajapati06106@gmail.com>
12:07 PM

To: ddo-ban@gujarat.gov.in; tdo-dantiwada@gujarat.com; judaldev@gmail.com

Save all attachments

Letter to DDO, TDO, Talati.pdf 119.53 KB

VKY phase-III GECPL.pdf 26.73 MB

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As a part of Vishwakarma yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Ranol village profile of issues for development and our design work for them which is as below.

Village: Ranol		Population: 1343 (As per Senses 2011) At Present: 2000+
Key Issue	**Remark**	**Designs Given**
Health care	PHC Center is not available in the village, for primary medical facilities they need to go Dantiwada which is 8 km away from village.	-Health Center
Reading Library	There is not a single public place for reading, public library provides a better environment, newspaper, books etc. for young age and old age readers.	-Library
Recreational Area	Required garden so public and children can enjoy during their free time. Garden can also useful in many social activities. And some structure useful as a recreational structure.	-Public Garden -Paver block -Panchvati
Water scarcity	There are almost 3 months per year when water scarcity for irrigation. So, required better water supply and advanced irrigation facilities so saved water during monsoon will be useful in dried season. The people will get work during dried season and agriculture product will increase.	-Pump house
Solar system	There is not any solar system in village, if we provide solar system for panchayat building then electricity used in panchayat house decrease and unused electricity will increase village income.	-Solar system for panchayat house
Bio-gas plant	There is no any bio-gas plant in and near by villages, so if bio-gas plant is provided in village then it generates cooking gas for villagers and it also save cooking cost to villagers. Raw material available in village and near by villages from animal husbandry is main source for bio-gas plant.	-Bio gas Plant
Agriculture and irrigation advance techniques	The main work in village is agriculture so different advanced techniques useful for farmers for increasing the production and decrease the requirement of water for irrigation and some techniques make works easy for farmers.	-Programable Automatic Bell system -Automatic Irrigation System Motor protection against Single Phasing and Overheating
Rain water Harvesting	Rainwater harvesting increase the underground water level of village and useful for irrigation.	-Rain water Harvesting
Maintenance or new structure and designs of new technology	Anganwadi, underground sewage pipe line etc. required a maintenance and some new structure required for safety purpose.	-Anganwadi -Entry gate -Pick-up stand -Smart Bin -Auto intensity control of street light using a PIC Microcontroller

No.	Design proposal	Periods (Month)	Expenditure in (Rs)	Benefits for villagers
1	Library	3	804974.00	Provides books and peaceful environment for readers
2	Health center	3	518435.00	Villagers will get quick medical facilities in the village
3	Anganwadi	1	461043.00	New structure for Anganwadi work
4	Public Garden	4-5	202350.00	Provide better environment for people and a safe playing area for children
5	Entry Gate	1	145069.00	Smart village Shaw
6	Animal Husbandry	3	324625.00	It's important for producing Raw material for bio-gas plant and a vast area for animals for their tack care
7	Solar System for Panchayat House	1	81000.00	Useful for saving energy & also working when electricity not available in village
8	Programmable Automatic Bell System	1	5000.00	Automatic instruction to farmer when land required moisture so they can irrigate the land when moisture decrease, so this technique save water
9	Auto Intensity control of street light using a PIC Microcontroller	1	6000.00	Decrease the damage of street light when power changes
10	Pump House	1	467200.00	It's useful for operating the water supply in village
11	Bio-gas plant	1	253108.00	For production of cooking gas and organic fertilizer in village, increase the income of village
12	Pick-up stand	1	200500.00	Provide clean and comfortable sitting arrangement
13	Paver block	1	220000.00	Increase the village's aesthetic view and centralized area for fairs and other occasions in village
14	Rain water Harvesting	3	200370.00	Save the water and increase the ground water level
15	Panchvati	1	559677.00	Relaxing placefor visitors and villagers
16	Smart Bin	1	3100.00	These bin segregate the dry and wet waste
17	Automated Irrigation System	2	21674.00	Farmer are relaxing about to irrigation because this system automatic start irrigation on provided scheduled
18	Motor protecting against Single Phasing and Overheating	1	8000.00	Protect the motor in agriculture and centralized system of village

We Sent these two tables to DDO, TDO and Talati in mail as PDF format and our completed Report of project work for understanding the actual project purpose.

Chapter 21. Comprehensive report for the entire village

Concept

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 Rurbanization that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU.

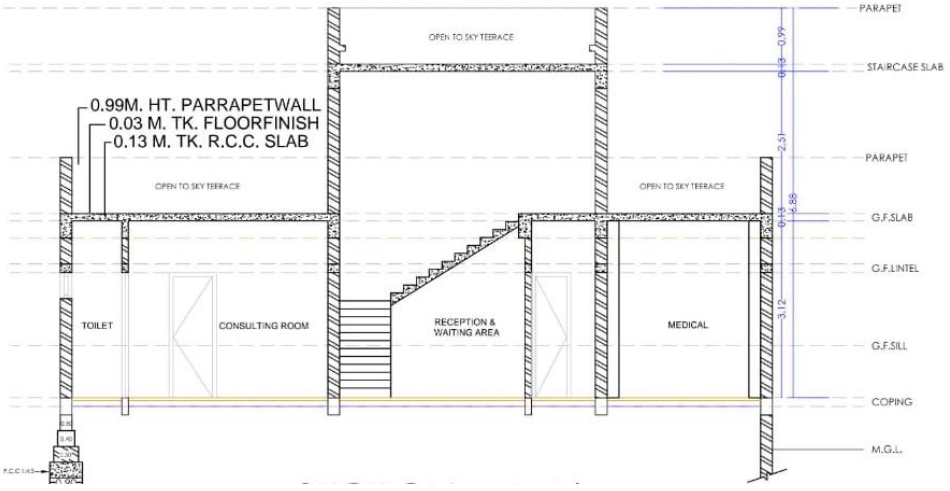
It is one of the strategies to reduce urban city pressure and lower the migration rate by developing village with a “rural soul” but with all urban amenities that a city may have. In this project the students meet the relevant citizens of village and survey the existing facilities. Then design of the 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.

Table 21.1Comprehensive Report for the entire village

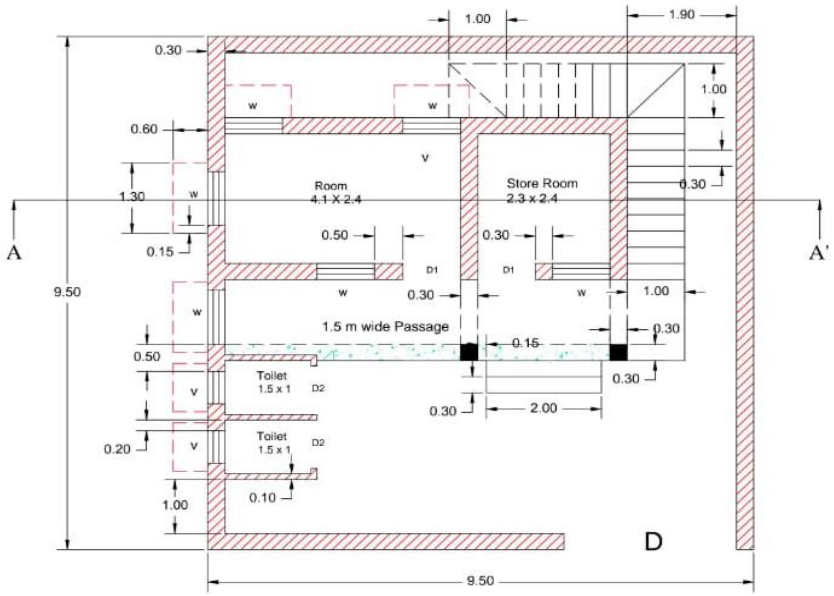
<table>
<tr><td colspan="7">Village: Ranol
Tehsil: Dantiwada
District: Banas Kantha</td></tr>
<tr><td colspan="7"></td></tr>
<tr><td>No.</td><td>Description</td><td colspan="5">Data collection</td></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Population
(As per Census 2011)</td><td>Male</td><td colspan="2">Female</td><td colspan="2">Total</td></tr>
<tr><td>706</td><td colspan="2">637</td><td colspan="2">1343</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Census data 2011</td><td>Population</td><td>Area(ha.)</td><td>Density (P/H)</td><td>Sex ratio</td><td>Literacy</td></tr>
<tr><td>1343</td><td>520.15</td><td>3</td><td>902</td><td>82.89%</td></tr>
<tr><td>3</td><td>Data collection</td><td colspan="5">✓ Average size of house- geo tagging of house
✓ Number of human beings in one house d
✓ Material available in village
✓ Material costing
✓ Geographical detail
✓ Occupation detail
✓ Agricultural detail
✓ Physical Infrastructure details
✓ Tourism development in village</td></tr>
<tr><td>4</td><td>Infrastructure details</td><td colspan="5">✓ Drinking water/ water management facilities
✓ Drainage network/ Sanitation Facilities
✓ Transportation and Road /network
✓ Housing Network
✓ Social Infrastructure Facilities
✓ Exiting Condition of Public building
✓ Technology
✓ Sports activity
✓ Socio-culture Facilities etc.
✓ Renewable energy source planning particularly for villages
✓ Irrigation Facilities
✓ Electricity Facilities
✓ Exiting Institution</td></tr>
<tr><td>5</td><td colspan="6">Design proposal for part-I</td></tr>
<tr><td rowspan="2"></td><td>Civil</td><td colspan="5">1. Library
2. Health center
3. Anganwadi
4. Public Garden
5. Entry Gate
6. Animal Husbandry</td></tr>
<tr><td>Electrical</td><td colspan="5">7. Solar System for Panchayat House
8. Programmable Automatic Bell System
9. Auto Intensity control of street light using a PIC Microcontroller</td></tr>
</table>

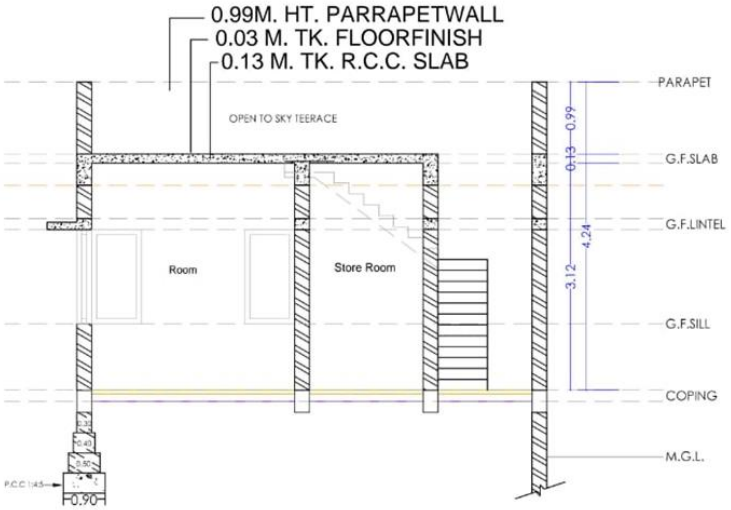
6	Design Proposal for Part-II	
	Civil	1. Pump House 2. Bio-gas plant 3. Pick-up stand 4. Paver block 5. Rain water Harvesting 6. Panchvati
	Electrical	7. Smart Bin 8. Automated Irrigation System 9. Motor protecting against Single Phasing and Overheating
7	Survey Forms & Approval Application	✓ Techno-economic survey ✓ Gap Analysis ✓ Approval for Public Interaction from Sarpanch ✓ Part-1 Design Approval application ✓ SAGY questionnaires survey form with the sarpanch & Talati ✓ SAGY questionnaires survey form with villagers ✓ Part-2 Design Approval Application

Infrastructure Design: Health Center

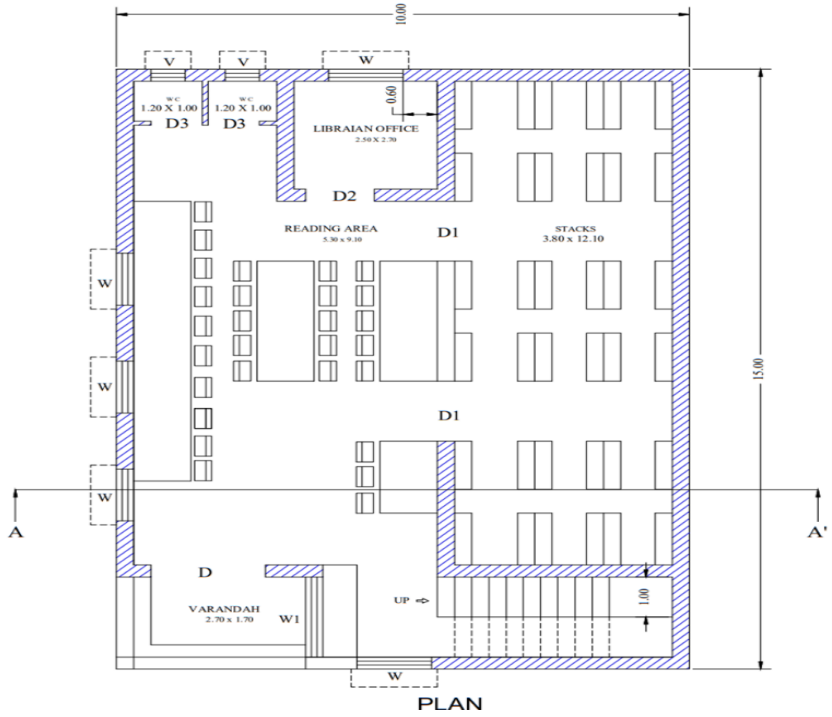


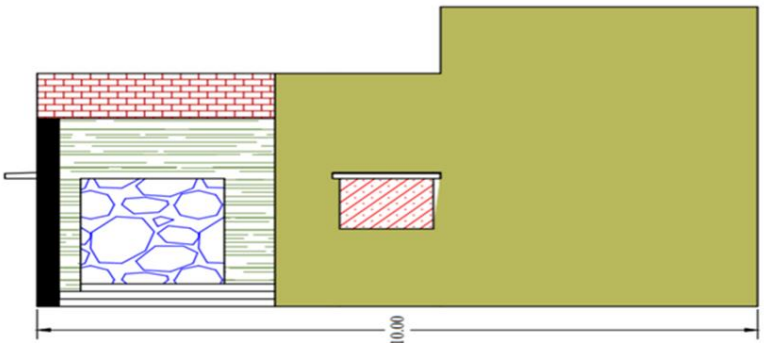
Infrastructure Design: Anganwadi

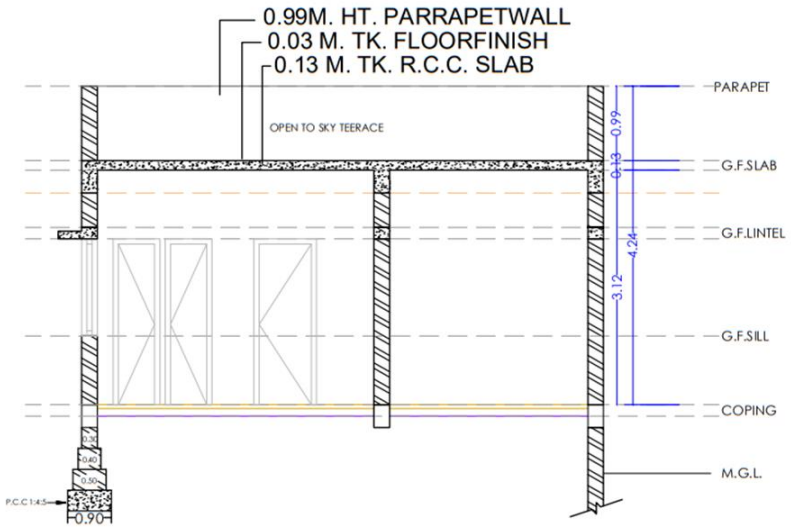




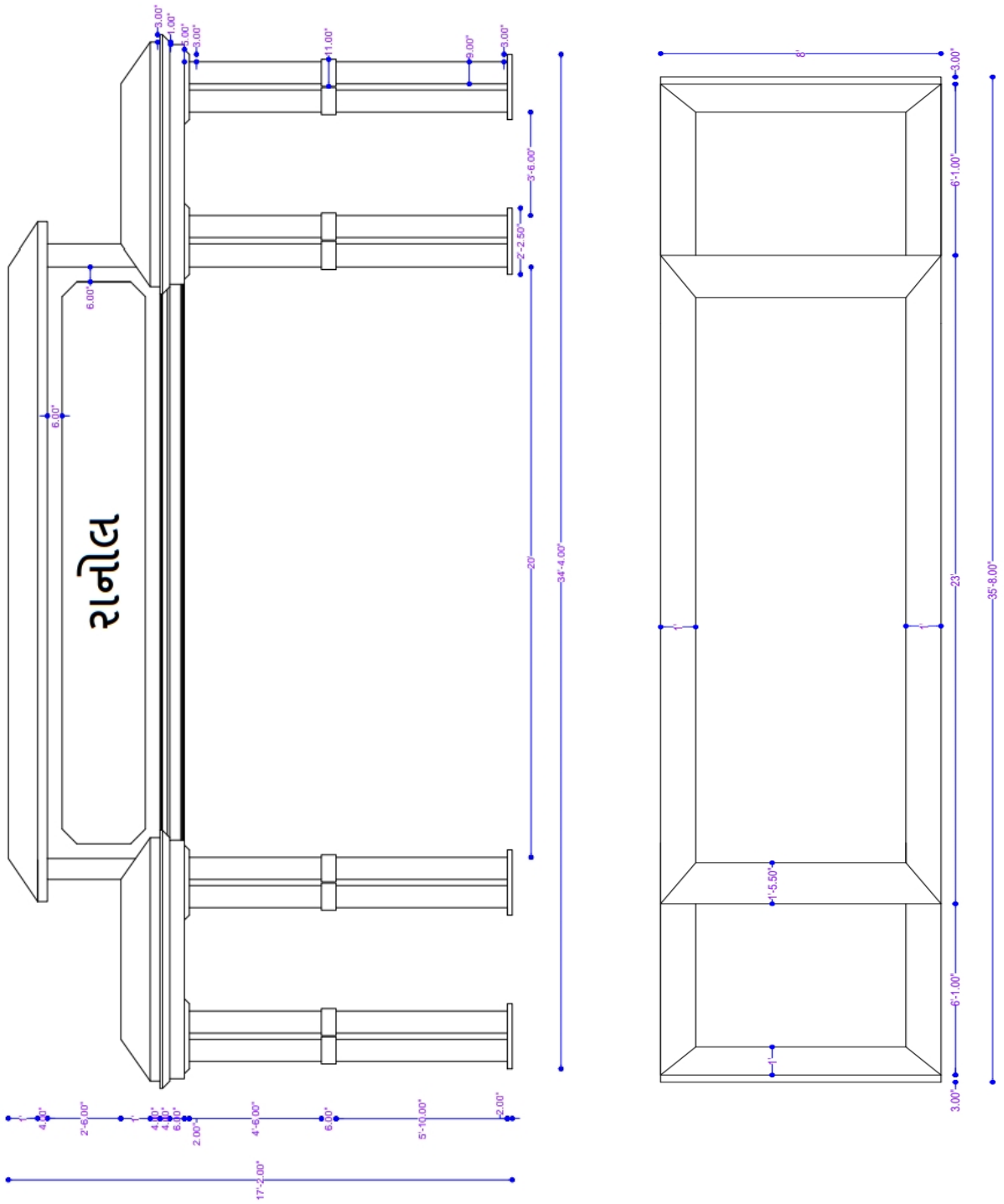
Infrastructure Design: Library



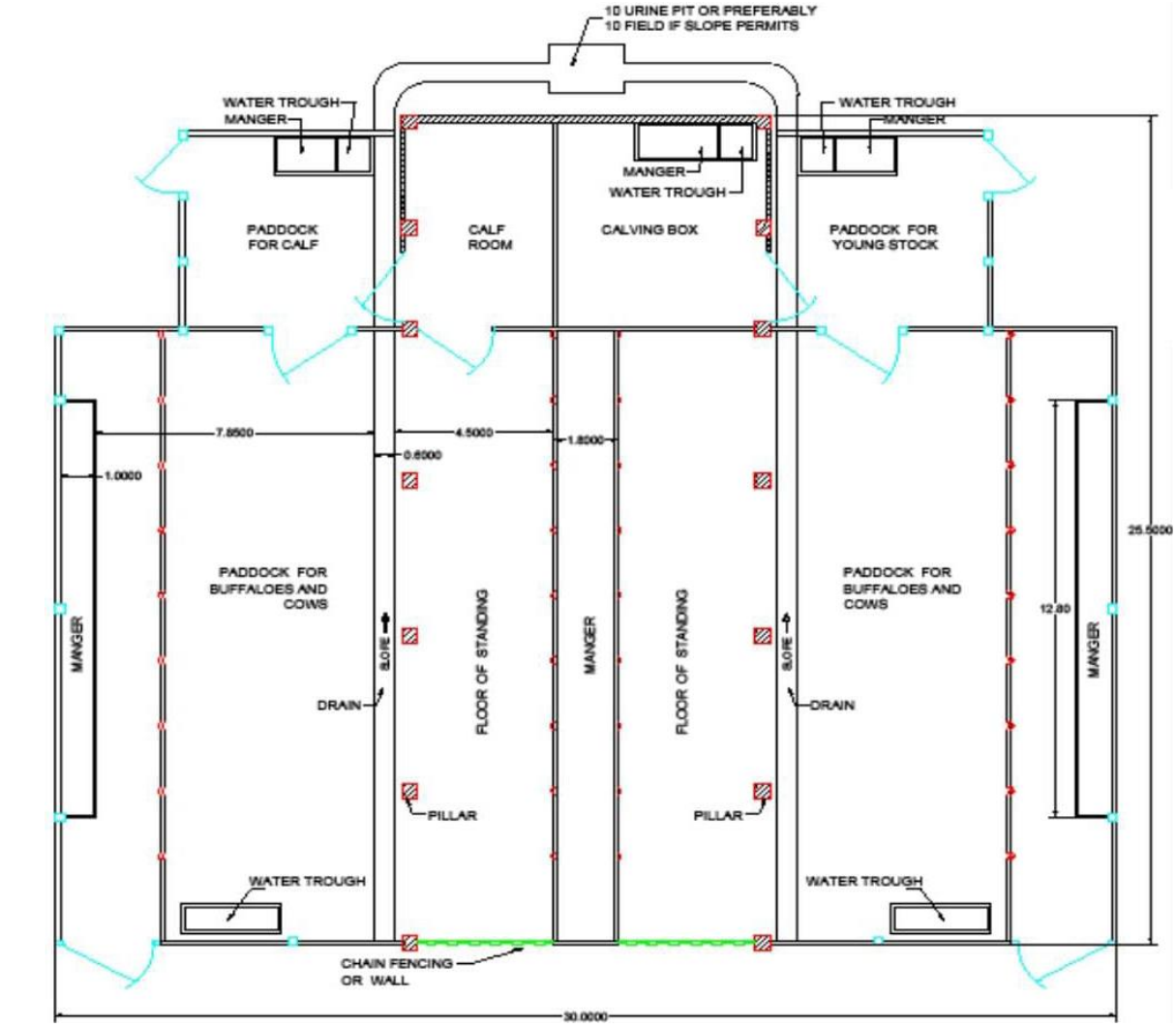


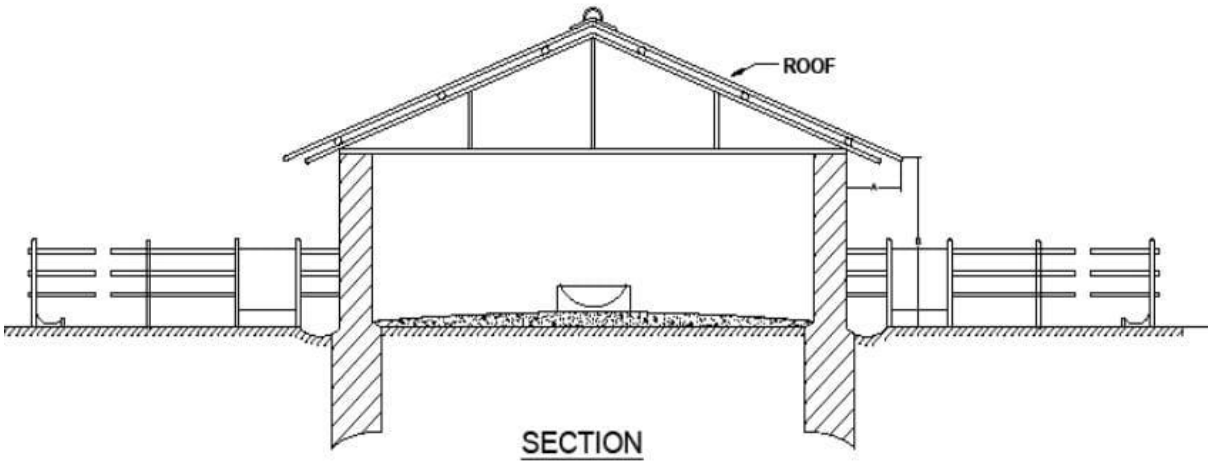


Infrastructure Design: Entry Gate

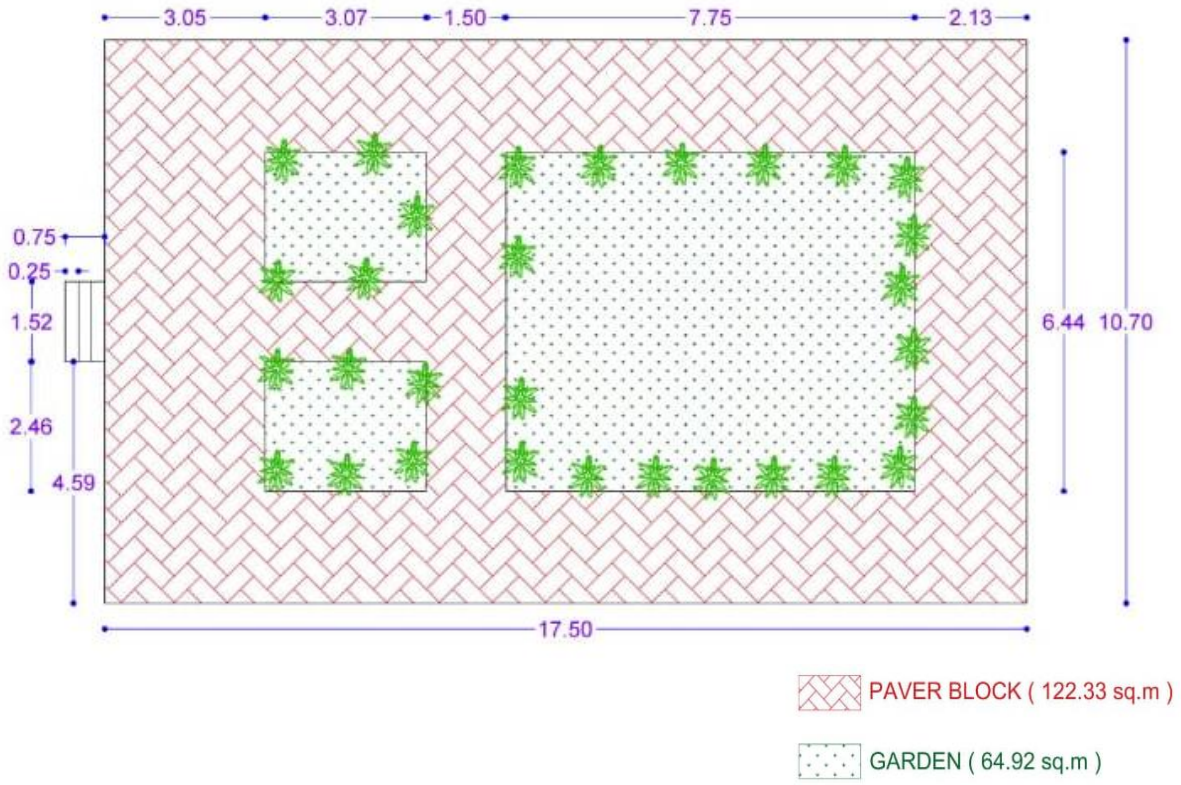


Infrastructure Design: Animal Husbandry

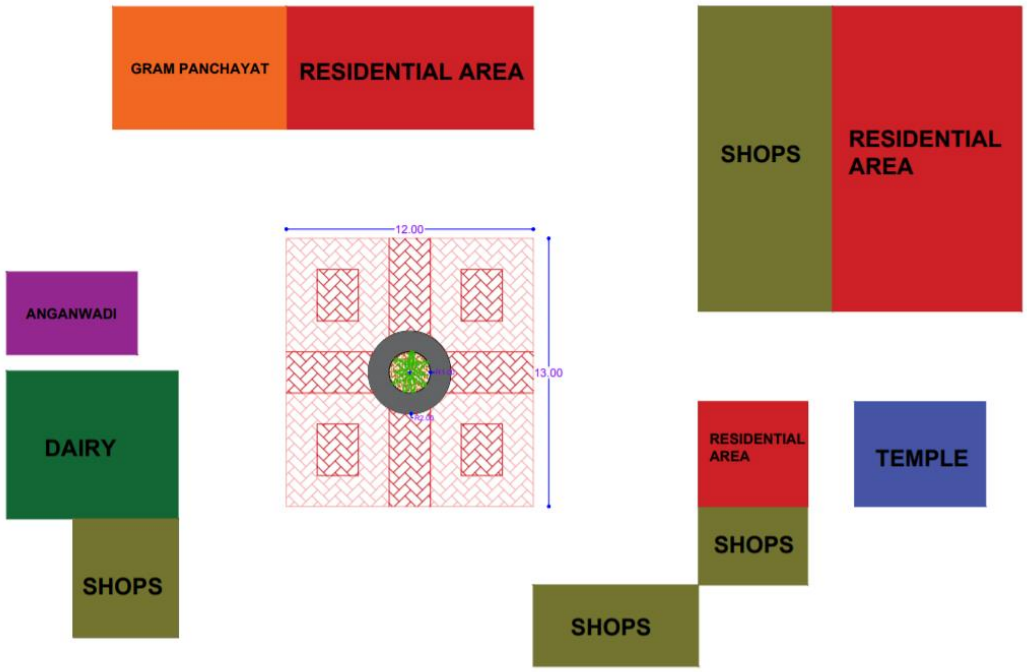




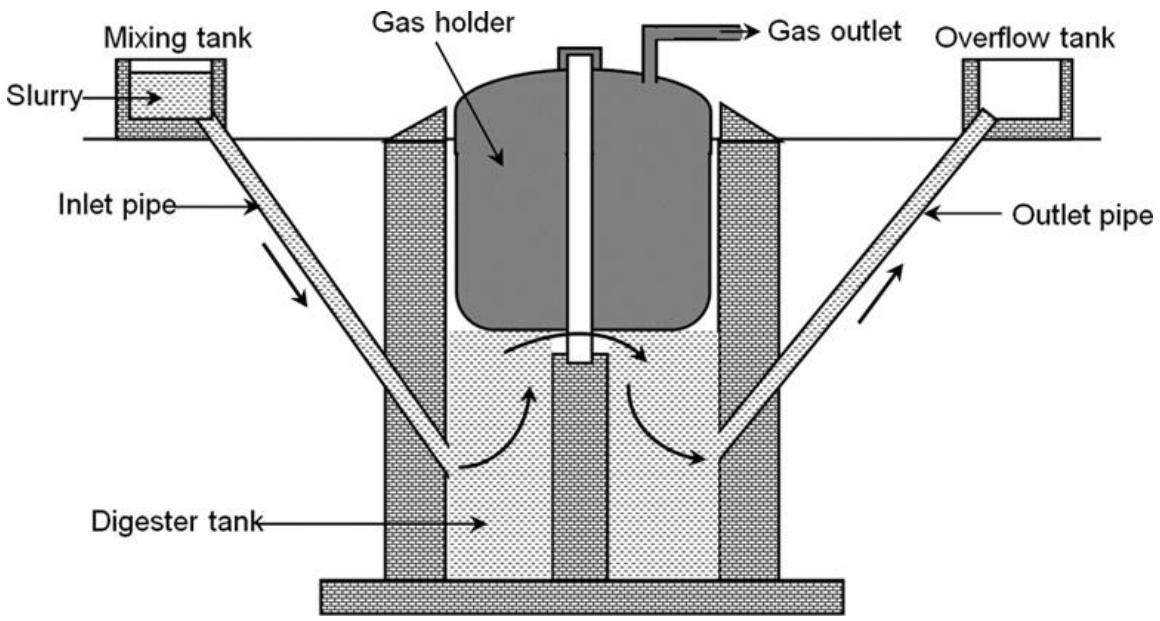
Infrastructure Design: Public Garden



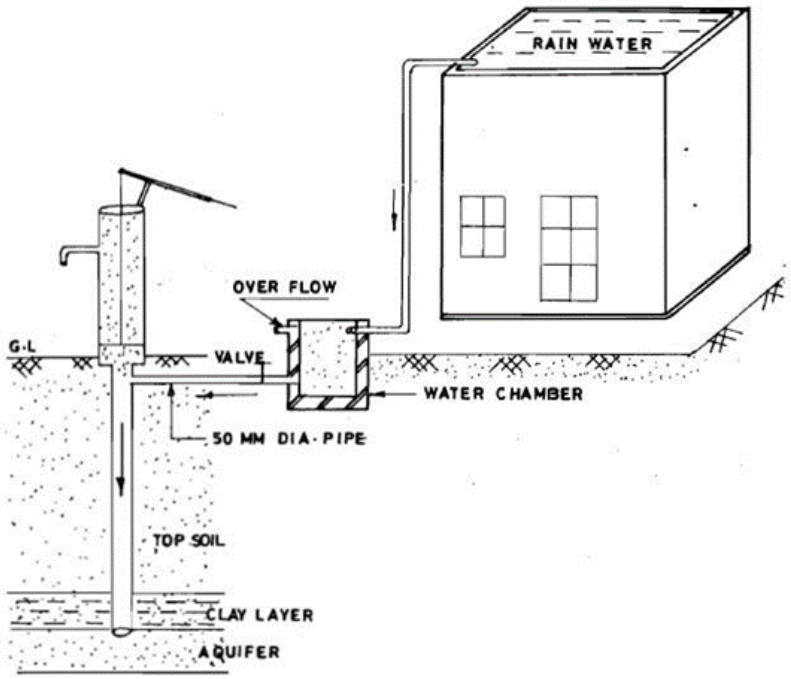
Infrastructure Design: Paver Block



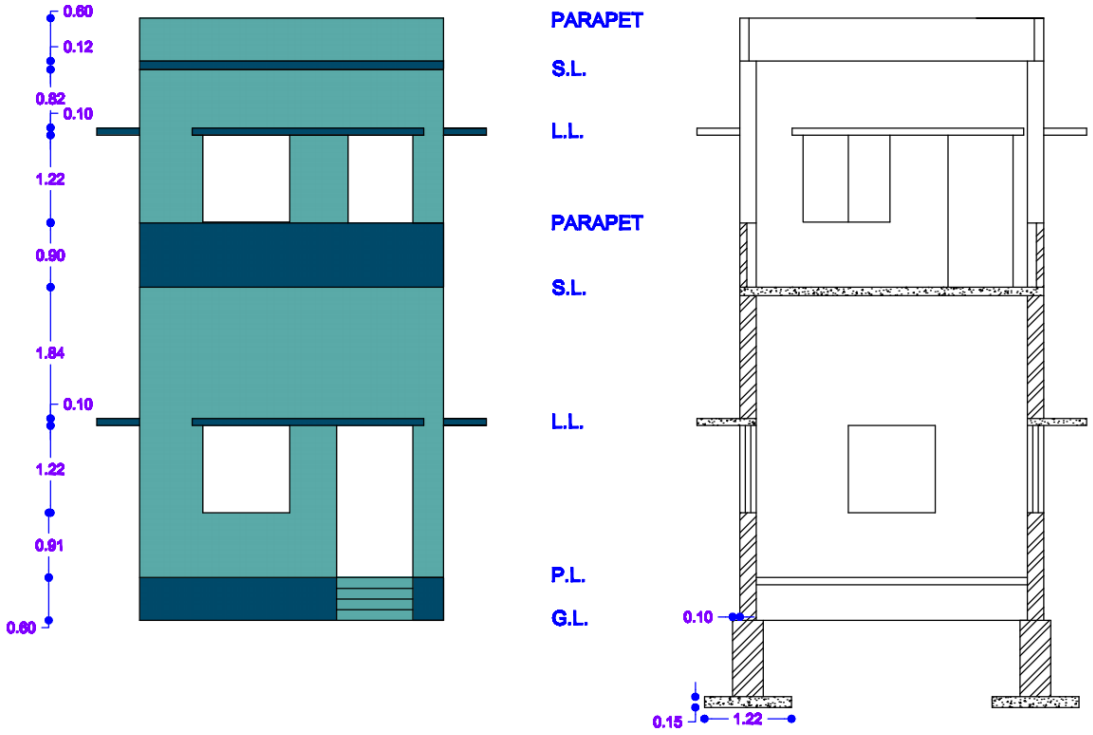
Infrastructure Design: Bio-gas Plant

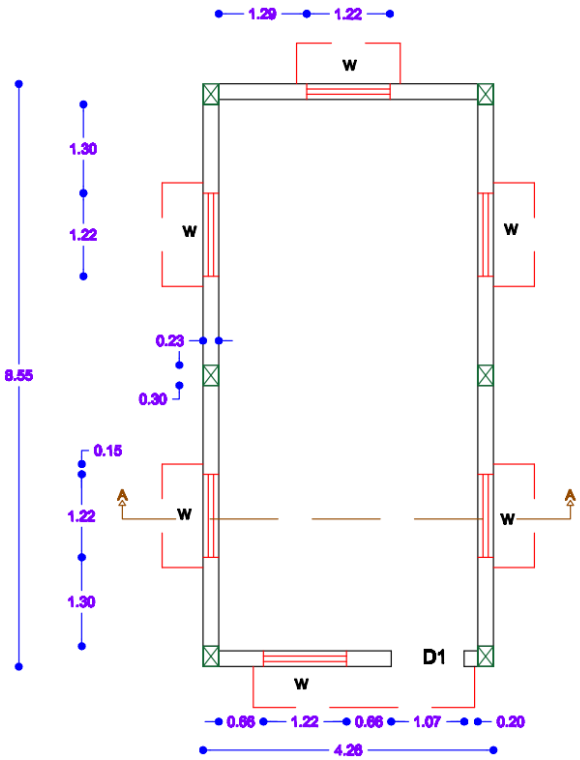


Infrastructure Design: Rain Water Harvesting

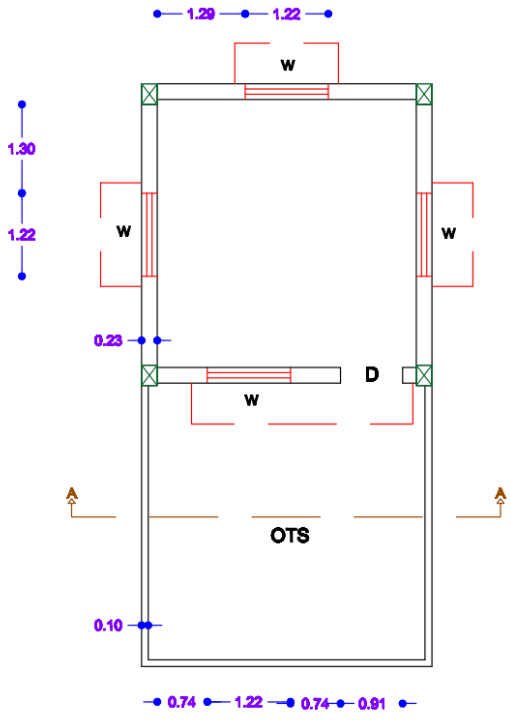


Infrastructure Design: Panchvati



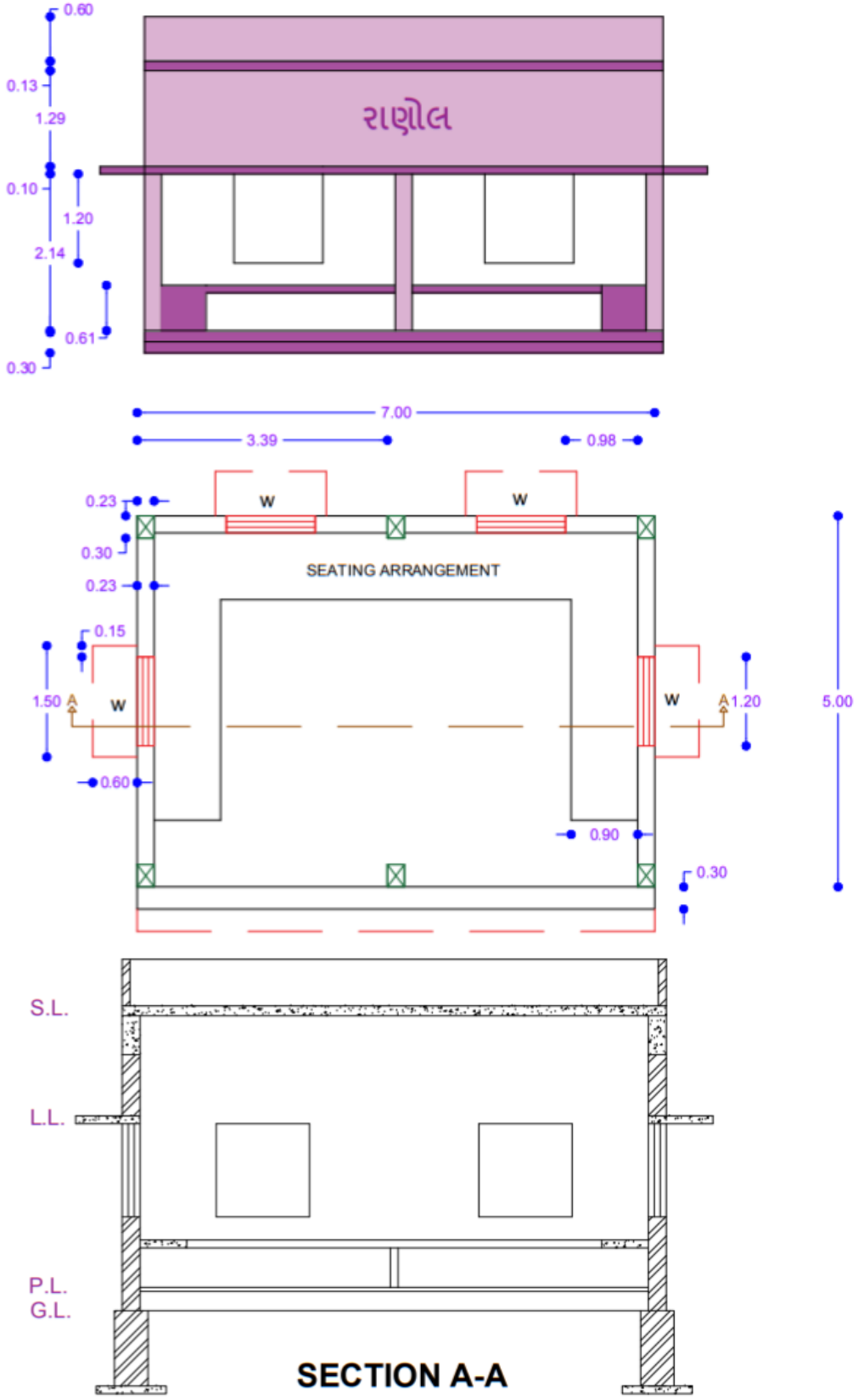


GROUND FLOOR

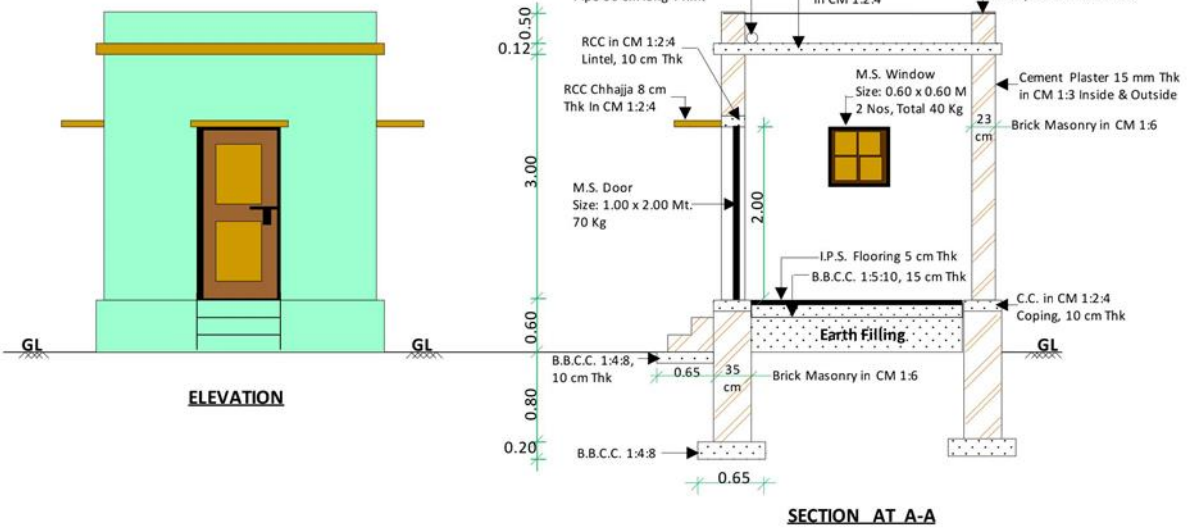


FIRST FLOOR

Infrastructure Design: Pick-up Stand

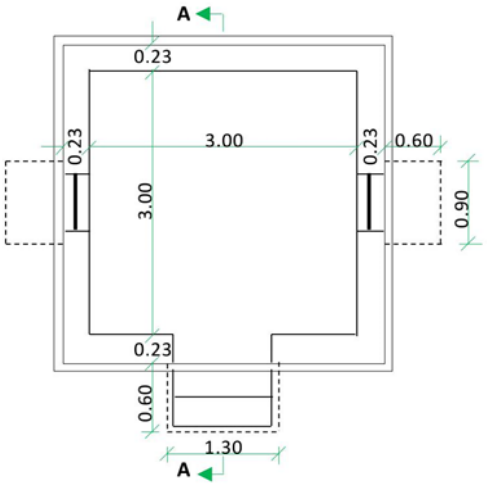


Infrastructure Design: Pump House

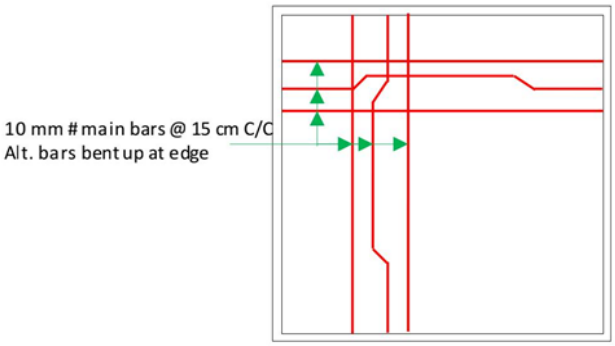


ELEVATION

SECTION AT A-A



PLAN



R.C.C. DETAILS FOR SLAB