DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII

AN APPROACH TOWARDS RURBANISATION

VAMAIYA Village

PATAN District

PREPARED BY

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COLLEGE LOGO:

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GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad– 382424 Gujarat

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CERTIFICATE

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

Detail Project Report for,

VILLAGE: VAMAIYA

DISTRICT: PATAN

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:	
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College Stamp:	

ABSTRACT

The Gujarat Government has launched "Vishwakarma Yojana: An Approach towards Rurbanisation" for development of villages which is implemented by "Gujarat technological University". Vishwakarma Yojana would provide "Design to Delivery" solution for development of villages in 'City' areas. In this Project, we describe the ecosystem for a village and then map out an integrated design procedure for building an Ideal Village. We define an Ideal Village as a bundle of services which are delivered to its residents and businesses in an effective and efficient manner. Computing, communication and information technologies play a major role in design, delivery and monitoring of the services. The selected village is surveyed, data has been analyzed for the village and an Infrastructure facility has been found out by this Yojna with the help of UDPFI guidelines.

We will give planning proposal of Physical Infrastructure, Social Infrastructure & Socio-Cultural Infrastructure facilities with method of giving Redesigning, Reimaging, Repair & maintenance, and Sustainable planning for basic need of village like government buildings, schools, health facilities, water supply and sanitation, waste disposal management system, electricity, road networks, irrigation facilities, community hall, Bio gas plant, drainage System , rainwater harvesting system, Solar energy utilization and other non conversation energy sources utilization etc..

Vamaiya is a large village located in Patan Taluka of Patan district, Gujarat with total 905 families residing. The Vamaiya village has population of 5228 of which 2732 are males while 2496 are females as per Population Census 2011. In Vamaiya village population of children with age 0-6 is 875 which make up 16.74 % of total population of village. Average Sex Ratio of Vamaiya village is 914 which is lower than Gujarat state average of 919. Vamaiya village has lower literacy rate compared to Gujarat. In 2011, literacy rate of Vamaiya village was 58.19 % compared to 78.03 % of Gujarat. In Vamaiya Male literacy stands at 73.56 % while female literacy rate was 41.79 %. As per constitution of India and Panchayati Raaj Act, Vamaiya village is administrated by Surpanch (Head of Village) who is elected representative of village. The total geographical area of village is 1324.15 hectares. Vamaiya has a total population of 5,228 peoples. There are about 905 houses in Vamaiya village. As per 2019 stats, Vamaiya villages come under Siddhpur assembly &Patan parliamentary constituency. Patan is nearest town to Vamaiya which is approximately 12 km away.

Key Words : Ideal Village Surveys, Techno-Economic Survey of Village, Data Collection, List out existing Facilities, Gap analysis, Making Rurbanisation by Redesigning, Reimagination, Repair & Maintaining, Sustainable Planning, Give Economical Design planning proposal.

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ABBREVIATIONS

SHORT FORM	FULL NAME
VY	Vishwakarma Yojna
PUE	Power Usage Effectiveness
O&M	Operations and Management
SCs	Scheduled Castes
PMEGM	Prime Minister's Employment Generation Programme
PMAY	Pradhan Mantri Awas Yojana
PMMY	Pradhan Mantri Mudra Yojana
MANREGA	Mahatma Gandhi National Rural Employment Guarantee Act

Chapter 1: Ideal village visit from District of Gujarat State (Civil Concept)

1.1 Background & Study Area Location

- Moviya is a Village in Gondal Taluka in Rajkot District of Gujarat State, India. It is located 42-KM towards South from District headquarters Rajkot. 275 KM from State capital Gandhinagar.
- Moviya Pin code is 360330 and postal head office is Moviya.
- Moviya is surrounded by Kotda Sangani Taluka towards North, Lodhika Taluka towards North, Jetpur Taluka towards South, and JamkandornaTaluka towards west.
- Rajkot, Kalavad, Amreli, Upleta are the nearby Cities to Moviya.
- Gondal Rail Way Station is the very nearby railway stations to Moviya. However Rajkot Jn Rail Way Station is major railway station 42 KM near to Moviya.
- Moviya is a large village located in Gondal of Rajkot district, Gujarat with total 2260 families residing. The Moviya village has population of 11008 of which 5708 are males while 5300 are females as per Population Census 2011.
- As per constitution of India and Panchayat Raaj Act, Moviya village is administrated by Surpanch (Head of Village) who is elected representative of village.
- The villages have received several awards from Government of Gujarat and India like best Gram Panchayat award and Nirmal Gram Puraskar. Village showcases development of rural area with vision and mission of gram Panchayat. Total population of village is 11008(As per census 2011) with farming and agriculture product business as main occupations.

Fig 1:-Map of Moviya

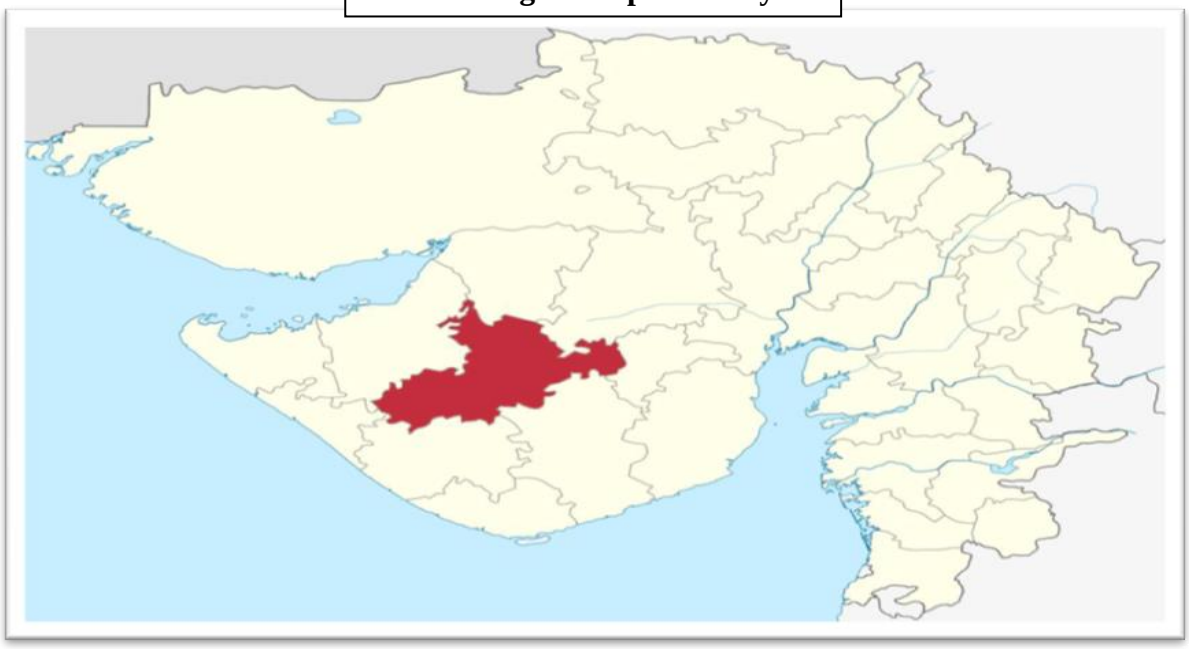

FIG 2: Map of Rajkot District in Gujarat

- Moviya is a village located in Rajkot district in the state of Gujarat, India. The village is located at about 42 km from the District, Rajkot. The village follows the Panchayat raj system.
- Coordinates of Moviya 21°54′55″N longitude and 70°50′47″E latitudes 162.80 meters above sea level.

1.2 Concept: Ideal Village, Normal Village

- An ideal Indian village will be so constructed as to lend itself to perfect sanitation. It will have cottages with sufficient light and ventilation built of a material obtainable within a radius of five miles of it.
- The cottages will have courtyards enabling householders to plant vegetables for domestic use and to house their cattle.
- The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all.
- It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayat for settling disputes.

1.2.1 Objectives

Following are the various objectives of study…….

(1) The objective of the project is to fulfill all basic amenities. The primary stage is for survey and shorting for these basic amenities and collect data of requirements of people and future growth and data of available resources.

(2) To provide insufficient Social infrastructure facilities like health and education facilities and to ensure proper delivery of facilities to village dwellers

(3) To promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.

(4) To provide internal roads within village settlement & efficient mass transportation systems between clusters of villages to improve connectivity

(5) To Identification sanitation facilities that are needed to be improve like sewerage and drainage line, dumping facilities, Electricity connections.

(6) Improvement of Solid and Water waste management, Provide best Irrigation facility, Batter educational system, Improve living standard of people, Improve drainage system, Provide solar Street light, Healthy Sanitation facility, Develop the Road system of village.

(7) To evolve strategic planning, proposal in the form of physical, social and renewable infrastructure facilities for the development of villages, channelizing urban growth and to sustain future.

1.2.2 Live Case studies of ideal village of India/Gujarat

- The Punsari village, located in Gujarat, a Indian village, which is providing its villagers much more than what even some urbanites can hope for.
- This village provides 24-hour Wi-Fi connectivity, CCTV cameras in the primary school, solar powered lamps, an independent bus service, clean drinking water at a nominal cost of Rs 4 for a 20-litre drinking water can and much more.
- The villagers even have accidental cover of Rs 1 lakh and a medi-claim cover of Rs 25,000. Well, their success story is simple – optimal utilization of government schemes.

Fig 3:- Pansuri village

1.2.3 The Idea of a model/Smart Village

- The idea of a model village has been explored earlier as well, most notably through the **Pradhan mantra Adarsh Gram Yojana**, launched by the Central Government in 2009-10.
- The scheme was implemented in pilot mode in 1000 villages of Assam, Bihar, Himachal Pradesh, Rajasthan and Tamil Nadu, with an allocation of Rs 10 lakh per village.
- This limit was later raised to Rs 20 lakh per village. The target villages under the scheme were those with more than 50% of the population belonging to Scheduled Castes (SCs).
- State governments have also taken steps in this direction. Himachal Pradesh launched a **Mukhya Mantri Adarsh Gram Yojna** along similar lines in 2011, with the allocation of Rs 10 lakh per village.

1.2.4 Ancient History Civil/ other Countries Perspective about village and its new Development

Mahatma Gandhi is often quoted as having said: "Real India lives in its villages." The fact that in the early decades of the 20th century, India's urban segment constituted only 11 per cent of the total population gave strength to his argument. It was the villages in which 89 per cent of the population lived. That made India an agricultural country.

The development of Village India, for Gandhi, was the development of India. Illiteracy, ignorance, and poverty characterized the vast population of rural India. Gandhi organized mass movements to draw attention to the problems of the rural people, and also to involve the peasants in the freedom struggle. Social scientists also became interested in studying rural problems, particularly the deteriorating rural economy.

Ancient village of India

There is sufficient evidence to suggest that the village was one of the important settlements in ancient India. The Rig Veda talks about the gram to which various families owed their allegiance. Valmiki's Ramayana talks of two types of villages – the ghosh and the gram. The ghosh was smaller than the gram and was also known as vraja, or brij (signifying a cattle farm). Both types of villages had their officials, called the mahattar. There is also a reference to a senior official called gramani or gramik. The Mahabharata talks of different types of settlements, for

example, ghosh or brij (cattle farm), palli (small hutments), gram (villages around the forts or durgs), kharvata or pattan (towns), and pur, puri, nagar (cities of different types). The villages were linked with one another, culturally, socially and administratively.

The administrator of ten villages was called dashi; of 20 villages, vinshati; of 100 villages, shati, and of over 1,000 villages, sahasragramadhipati. This is a clear indication of the interlink-ages between the villages. Kautilya's Arthashastra suggests that river, hill, forests, ditches, tanks, bunds or trees demarcated village boundaries. He prescribed that villages should be situated at distances of one or two krosha (in Rajasthan, it is spelt as koss, which is the equivalent of two miles or 3.219 km) from each other so that in times of need, one village could go to the help of the other.

Villages Today:

There were 580,781 villages in India, according to the 1991 Census. Of these; the largest number (390,093) consisted of small-sized villages with a population of less than 1,000. In the category of 1,000-2,000 population are another 114,395 villages. Taken together, they represent 86 per cent of the villages of India.

Villages with 2,000-5,000 population total 62,915, and those having a population of between 5,000-10,000 numbers 10,597. The highest concentration of very large villages, with more than 10,000 people, is to be found in the state of Kerala, which has 1,007 (of the 2,779) large villages.

At the time of the 2001 Census, the number of villages had gone up to 638,691. Like the 1991 Census, Uttar Pradesh (UP) continues to have the largest number of villages, although the state has become somewhat smaller with the state of Uttaranchal carved out of it. UP has 107,452 villages and Uttaranchal, 16,823, making a combined total of 124,275. While data exist for the average size of the village in each state in 2001, the, distribution of villages in different sizes is not yet available. On that basis, however, it can be said that the average size of villages in different states of India range between 17,281 (in Kerala) and 214 (in Arunachal Pradesh). In Uttar Pradesh, the average size of the village is 1,224 people, while in Uttaranchal, it is 375.

1.3 Socio economic, physical, demographic and infrastructure details of Ideal village – Moviya village

❖ **Physical Growth:-**

- There are various facility such as two public gardens, three mobile tower ,one public toilet , three bank , one community hall in village one Post office are available.
- For health purpose three Govt. hospital and three private hospital, three medical store and one vetarnity hospital are available.
- In village use 100 % of people LPG in home.
- In education five private school and four Govt. school with library.
- There is a 65 KV sub-station that supplies power to the village. Wi-Fi connected to the entire village so that the villagers can use unlimited internet once they purchase the modem from the Panchayat office
- The educational purpose in this village has made efforts to provide the best possible facilities to students. E-Class and CCTV cameras are installed in the primary schools as well as in the village.
- In village 25 CCTVs are installed at prime junctions of the village so that the litterbugs can be spotted and punished.
- Auto Rickshaw and bus are used for transport purpose within the village.
- For communication purpose, 120 waterproof speakers are installed ,
- There are five primary and secondary schools and three high-secondary schools in Moviya. There are three schools that have a hostel facility and own transport bus for village students and neighboring villages' students.
- For Water System the Panchayat had installed a reverse osmosis plant in 2010 to ensure the supply of clean drinking water to the villagers. During weddings and other ceremonies, water tankers are arranged.
- Drinking water taps are available for all. The village also has a proper sanitation and drainage system, which is completely underground.

Demographical growth:-

Table 1:- Demographical Growth

Total No. of Houses	**2,260**	-	-
Population	**11,008**	5,708	5,300
Child (0-6)	**961**	558	403
Schedule Caste	**726**	351	375
Schedule Tribe	**5**	2	3
Literacy	**80.80 %**	86.35 %	74.96 %
Total Workers	**4,115**	3,514	601
Main Worker	**3,883**	0	0
Marginal Worker	**232**	119	113

Economic profile:-

- In Moviya economic profiles are following:
- In Moviya 60% of peoples are concerned with farm. And 40% of peoples are concern with other business.
- The Gramm Panchayat is assisting Women of the village. There are 109 self-help groups (SHGs) (10-15 women per group). At present there are 1300 women‘s engaged in SHGs.
- In village does not show any un-employed workers.

Social scenario:-

Table 2: Social scenario

Year	Population	Male	Female
1991	7564	3706	3858
2001	11032	5611	5421
2011	**11008**	**5708**	**5300**
2021	19057	9338	9719
2031	23070	11304	11766

Infrastructures facilities:-

- **Physical Infrastructures facilities:**

- **Water:**

- The main source of water is "Bhadar Dam" at just 16 km away from the village.
- Elevated service reservoir is located at 75 ft. height at the ground level with 15 lakhs liter water storage capacity.
- 24 hour water supply system is activated with primary treatment at proper time period.
- The average rainfall in the village is 40 inch.
- The 80 to 90 number of tube well of 250ft. to 500ft.below the ground level is available in village.
- In agricultural area the open well is 75% are at 60ft. below the ground level and 25% are at 120ft. to 150ft. below the ground level.
- The drip irrigation systems are 70% occur in agricultural.

- **WI-FI:**

- A Wi-Fi facility is available in this village.
- With the use of Wi-Fi, a people of village are using an internet banking, online shopping, e-governance. Etc.

- **Drainage:**

- In a village the main drainage is underground but at some places a primary drainage is open.

- **Sanitation:**

- There is proper sanitization in all houses having a toilet i.e. Safety Tank toilets are installed in every home.

- **Public announcement:**

- Public Announcement system is installed at many places wherein announcements, news been announced when necessary.

- **Road and Transportation:**

- The 50% road of total road network is C.C. Road and other are under construction.
- The main transportation way is the road transportation.

- **Security:**

➢ 13 point CC TV cameras and monitors been installed at key locations in order to keep a close watch on the daily activities.

➢ Also CCTV cameras are installed in schools and health Centers.

Social Infrastructures facilities:

- **Educational:**

➢ There are 12 no. of Anganwadi is available.

➢ There are 5 private and 4 government primary school is available.

➢ There are 5 private and 4 government secondary school is available.

➢ There are 5 private and 4 government higher secondary school is available.

- **Bank and ATM:**

➢ There are 3 banks is available.

➢ There are 2 ATM.

- **Fire station:**

➢ In the village the fire station is not available.

- **Police station:**

➢ In the village not availability of any police station.

- **PHC:**

➢ In village 1 no. of Primary health Centre (PHC) is available With 5 no .of beds capacity.

➢ In PHC 1 no. of M.B.B.S. doctor 1 no. of Ayurveda doctor and 1 no. of homeopathic doctor, and one pharmacist.

➢ In PHC laboratory generally all primary test are occur.

➢ The total staff of PHC is near about 25 members.

➢ The total room available in PHC is 10.

- **General hospital:**

➢ There are 3 no. of General hospital is available with 3 beds.

❖ **Socio-culture Infrastructures facilities:**

- **Community hall:**

➢ There are two community halls within sittings of 450-500 people at a time with facilities of projectors and a sound system.

- **Play ground:**

➢ There are no special play ground is available but in each school and collage the playground is available.

- **Gardens:**

➢ There are 2 no. of public garden are available in village.

- **Public library:**

➢ There is 1 no. of public library is available.

- **Post office :**

➢ There is 1 no. of post office is available.

➢ The 4 member are in the staff of post office.

- **Gram Panchayat:**

➢ Gram Panchayat office of the village was fully computerized with personal for operation for each section. All forms and certificates were given immediately on payment of fee through computer. Panchayat office had conference hall for meetings of Panchayat members and gram shabha. People at gram Panchayat were very cooperative with positive attitude.

- **Women empowerment:**

➢ The Gram Panchayat is assisting Women of the village. There are 109 self-help groups (SHGs) (10-15 women per group). At present there are 1300 women's engaged in SHGs.

1.4 SWOT analysis of Ideal village / Smart Village:

➢ **SWOT Analysis** is a simple but useful framework for analyzing any field's Strengths and weaknesses, and the opportunities and threats that you face. It helps you focus on your strengths, minimize threats, and take the greatest possible advantage of **Table 3** SWOT Analysis.

Table 3:- SWOT Analysis

Strengths	➢ 100% literacy ➢ 100% tax returns ➢ Awareness about cleanliness, health and many more…

	➢ Better connectivity ➢ Effective security
Weakness	➢ Damaged road network ➢ 30 years obsolete water supply network ➢ (pipe lines required) ➢ No recruitment of teachers in government school(privatization in government school)
Opportunities	➢ Better Health. ➢ Better primary and secondary education ➢ Cleanliness ➢ Awareness among public ➢ Women empowerment
Threats	➢ Obsolete pipe line can cause water to be contaminated which may result deadly diseases ➢ Privatization may cause children of other backward class public to remain illiterate as there is no required number of teachers at government school

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

Some generalized guidelines for the development of Smart Villages Based on various programs undertaken taken by Central and state governments along with advanced technological initiatives, the Smart Village can achieve SMART infrastructure, SMART service delivery, SMART technology and innovation, SMART institutions along with optimal mobilization and

utilization of available resources, leading a head to faster and more inclusive growth. Economic, Environmental, social components will encircle a sustainable and inclusive development of all sections of the village community, so as they enjoy a high standard of living.

Approaches

The 'Smart Village-Smart Ward' programme will adopt the following approach in achieving its consequences with Swachh Village/Ward and sustainable development of resources as overall guiding principle:

1. Community Mobilizing for participatory local level development
2. Converging government schemes and private and voluntary initiatives to achieve comprehensive development
3. Building partnerships with voluntary organizations, co-operatives, academic and research institutions
4. Attention to a life-cycle approach and gender sensitization
5. Focusing on outcomes and sustainability
6. Protecting local traditions and heritage of the village

Technologies Used In Smart Villages:

1. Wireless sensor network (WSN)
2. 3S
3. Cloud Computing
4. Big Data
5. Radio Frequency Identification (RFID)

1.6 Benefits of the visits of Ideal village / Smart Village

- Villagers or Inhabitants

A village is formed, governed and maintained by its villagers. The People of an ideal village should be honest and hard-working. They should possess qualities like tolerance to every faith and religion, brotherhood and unity. They should live like a large family and help one another in the hour of need. They should have a sense of discipline and a spirit of service before self. They should keep themselves abreast of not only the happenings of the village but also of the country and the world as a whole. They should always be active and cheerful. Simple living and high thinking should be their motto in life.

- **Basic Infra-structures**

Besides the people, an ideal village should have the following basic infra-structures.

- **Good Connectivity**

Good connectivity is one of the most essential requirements of an ideal village. The village should be well-connected to other parts of the country by roads and also by rails, if possible. The streets and lanes of the village should also be well maintained so that people can easily commute from one part to another.

- **Houses**

The houses should be neat and clean. They should be well-ventilated to allow free flow of light and air. There should be good arrangement for proper sanitation and drainage system.

- **Sufficient sources of potable water**

An ideal village should have good supply of clean drinking water. There should be enough wells, tube-wells and even submersibles to meet the needs of the villagers. It would help everyone get good drinking water. There should also be separate ponds for villagers to take bath and to get water for their cattle.

- **Proper sanitation and drainage facilities**

An ideal village should have good system of sanitation and drainage so that dirty water and waste can be easily drained out. It would help the village keep clean and free from many diseases caused by filthy water. It would also save the villagers from water-logging during the rainy season.

- **Pasture land for cattle**

Almost every villager living in a village keeps cattle. There should be enough paster land for grazing of their cattle. Generally, it should be within the village, at a distance from the houses or just outside the village.

- **Food and fodder**

The villagers grow food and vegetables not only for themselves but also for the urban people. They also grow fodder for their cattle. They also produce dairy, poultry and other products for their own consumption as well as for supply to urban areas. There should be proper arrangements in the village itself to provide them with good seeds and all assistance related to their produces.

- **Wholesale market within the village**

Most of the people living in villages are farmers by profession. They grow food crops, cash crops and fodders in their fields. While they consume the food crops for themselves and the fodder for their cattle, the cash crops the other surplus products are sold in the market to meet their other requirements. There should be provision for wholesale market in the village itself so that the villagers can sell their surplus products there at reasonable rates and get good return. This would save them from the hands of the middle men and bring prosperity.

- **Cottage Industries**

An ideal village should have well-established small cottage industries so that the artisans and small farmers can utilize their skills and extra time to produce articles necessary for day to day use and earn a handsome profit by selling them in the market.

- **Healthcare Centers and hospitals**

Besides food, the other most important aspect of human life is health. An ideal village should have proper facilities taking care of the health of the villagers as well as of their cattle and poultry. There should be one-two healthcare centers depending upon the population of the village. A small hospital also adds to the quality of such a village. Besides health centers for the villagers, veterinary dispensaries should also be there to take care of their live-stock.

- **Educational facilities**

An ideal village should have proper arrangements of education for the children. There should be Primary schools and High schools so that the little children need not go out of the village for education. Primary education should be free and compulsory for every child up to a certain age. There should also be soft skills training centers and preferably an adult education centre for the elders who want to get education.

In addition to the above, some other facilities like a post-office, college, playground for children and a meeting place for elders should also be part of an ideal village.

- It help us gain firsthand information regarding functioning of the village.
- Provides an opportunity to plan, organize and engage in active learning experiences.
- It help to enhance are inter personal skills and communications.
- Helps to understand the do‘s and don‘ts of the village activity.

Chapter 2. Literature Review

2.1 Introduction: Urban & Rural village concept

- **Rural Area:**

A rural area is open long, wide strip of a land that has few homes or other buildings, and not very many people. The population density of rural area is low. In India rural area is also define as Village. In rural area the mail occupation is agriculture and cattle farming. Rural areas are also known as the 'countryside' or a 'village' in India. It has a very low population density. Typical rural areas have a low population density and small settlements. Agricultural areas are commonly rural, as are other types of areas such as forests. It is generally said that the rural areas house up to 70% of India's population. Rural India contributes a large chunk to India's GDP by way of agriculture, self-employment, services, construction etc. As per a strict measure used by the National Sample Survey in its 63rd round, called monthly per capita expenditure, rural expenditure accounts for 55% of total national monthly expenditure. The rural population currently accounts for one-third of the total Indian FMCG sales.

Fig. 4 Rural Area

- **Urban Area:**

Generally urban area is defined as area which is very developed and having high population density. In other way city and town are urban area. Most inhabitants of urban area have nonagricultural occupations. In urban planning and design, an urban village is an urban development typically characterized by medium-density housing, mixed use zoning, good public transit and an emphasis on pedestrianization and public space. Contemporary urban village ideas are closely related to New Urbanism and smart growth ideas initiated in the United States. Urban areas are created and further developed by the process of urbanization. Urban areas are measured for various purposes, including analyzing population density and urban sprawl.

Fig. 5 Urban development

2.2 Importance of the rural development

Sustainable rural development is vital to the economic, social and environmental viability of nations. It is essential for poverty eradication since global poverty is overwhelmingly rural. The manifestation of poverty goes beyond the urban-rural divide; it has sub regional and regional contexts. A dynamic and healthy agricultural sector is an important foundation of rural development,

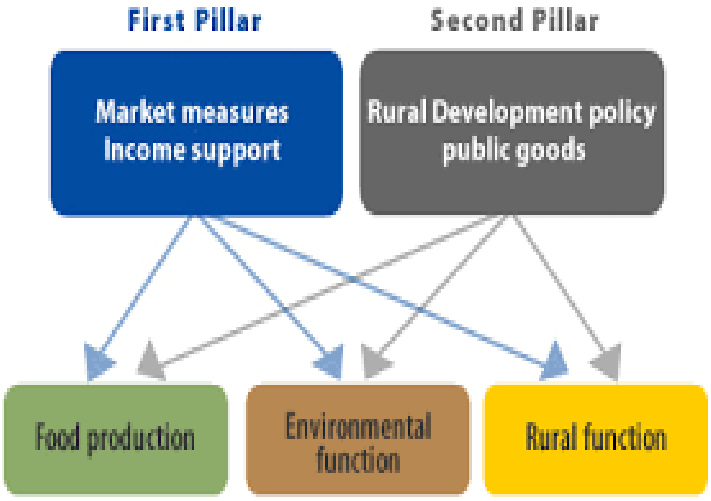

Fig. 6 Rural development

generating strong linkages to other economic sectors. Rural livelihoods are enhanced through effective participation of rural people and rural communities in the management of their own social, economic and environmental objectives by empowering people in rural areas, particularly women and youth, including through organizations such as local cooperatives and by applying the bottom-up approach. The success of sustainable rural development depends on, inter alia, developing and implementing comprehensive strategies for dealing with climate change, drought, desertification and natural disaster. Related actions include:

- Promoting poverty eradication in rural areas
- Promoting pro-poor planning and budgeting at the national and local levels
- Addressing basic needs and enhancing provision of and access to services as a precursor to improve livelihoods and as an enabling factor of peoples engagement in productive activities
- Providing social protection programmes to benefit, inter alia, the vulnerable households, in particular the aged, persons with disabilities and unemployed many of whom are in rural areas
- Ensure environmental sustainability in rural areas.
- Promote women empowerment and gender equality.

2.3 Different Definition of: Rural Urban Villages

RURAL:

In general, a rural area is a geographic area that is located outside the cities and towns. Typical rural areas have low population density and small settlements. Agricultural areas are commonly rural, though so are others such as forest.

URBAN:

For the Census of India 2011, the definition of urban area is as follow:

1. All place with a municipality, corporation, cantonment board or notified town area committee, etc.

2. All other places which satisfied the following criteria:

- minimum population of 5,000;
- At least 75% of the male main working population engaged in non-agricultural pursuits
- Density of population of at least 400 persons per sq. km.

An urban areas characterizes by higher population density and vast human feature in comparison to areas surrounding it, but the term is not commonly extended to rural settlements such villages and hamlets.

2.4 Scenario: Rural / Urban village of India population Growth

The report speculates that by 2050, the urban population will have increased to 87.7 million and the rural population will account for 78.3 million people. The urban population of India has seen a rise from 17.1 per cent to 29.2 per cent between 1950 and 2015.

Table 4: Population (In Crore)

	2001	2011	difference
India	102.9	121.0	18.1
Rural	74.3	83.3	9.0
Urban	2816	37.7	9.1

- For the first time since Independence, the absolute increase in population is more in urban areas that in rural areas
- Rural – Urban distribution: 68.84% & 31.16%

- Level of urbanization increased from 27.81% in 2001 Census to 31.16% in 2011 Census
- The proportion of rural population declined from 72.19% to 68.84%

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

Out of total population of Gujarat, 42.60% people live in urban regions. The urban population in the last 10 years has increased by 42.60 percent. Sex Ratio in urban regions of Gujarat was 880 females per 1000 males.

Table 5: Population

Description	**2011**	**2001**
Approximate Population	6.04 Crores	5.07 Crore
Actual Population	60,439,692	50,671,017
Male	31,491,260	26,385,577
Female	28,948,432	24,285,440
Population Growth	19.28%	22.48%
Percentage of total Population	4.99%	4.93%
Sex Ratio	919	920
Child Sex Ratio	890	883
Density / km2	308	258
Density / km2	798	669
Area in km2	196244	196024
Area in m2	75770	75685
Total child population (0-6 age)	7777262	7532404
Male population	4115384	4000148
Female population	3661878	3532256
Literacy	78.03%	69.14%
Male literacy	85.75%	79.66%
Female literacy	69.68%	57.80%
Total literate	411093358	298277750
Male literate	23474873	17833273

Female literate	17618485	11994477

2.6 Rural Development Issues - Concerns - Measures

Some of the problems faced for rural development in India are as follows:

- The financial, manpower and managerial resources devoted to the implementation of rural development programs are utterly inadequate.
- Better implementation of rural development programs can be ensured only if those responsible for actual implementation are paid reasonable well, appropriately trained, and sufficiently motivated. But this has not been done as yet.
- It is being increasing observed that the objectives of one program conflict with those of others, and there is no institutional mechanism for recording them. Consequently, many programs utterly fail in fulfilling their objectives. In addition, they also affect other programs.
- In many cases, instruments of rural development are not properly selected, and their levels are not consistent with the objectives they seek to achieve. This results in the wastage of valuable public resources, and unnecessary delay in achieving the objectives.
- Honesty, hard work, helping others, thrift and such other virtues indirectly help in economic development. In the Indian context, not much attention has been paid to this aspect of development.
- Observance of rituals, lack of rational decisions in economic matters, spending huge amounts of money on marriage, birth or death ceremonies, prevalence of the caste system and the joint family system in the rural areas and illiteracy are some of the factors which arrest the rural development in India.
- The political parties have a vital role to play in rural development. But unfortunately this role has not been effectively realized by any democratic political party so far. The political parties today are guide more by party interests rather than by national interests.

2.7 Projects / Schemes of Gujarat / Indian Government

Table 6: Projects / Schemes of Gujarat / Indian Government

Scheme	Sector	Provision
JAWAHARGRAM SAMRIDDHI YOJANA	Government	Creation of demand-driven village infrastructure including durable assets.
SCHEMES FOR SPRINKLER AND DRIP IRRIGATION SYSTEM	Government	Providing subsidy and motivation programmed for saving water
Indira AwashYojana	Government	Providing housing facilities for the poor villagers.
Provisions of urban amenities	Government	Developing parks and playgrounds in the rural area
PHC	Government	Providing primary health care facilities in the rural area
Schools	Government	Providing schools up to 12th in the rural area.
Blood banks	Government	Providing blood facilities in emergency in the rural areas.
Agriculture related schemes	Government	Implementing agriculture related programmers for motivation of agricultural products.
Water harvesting scheme	Government	Provisions developed for rain water harvesting and recharging of wells
Solar system scheme	Government	Provisions taken for development of solar energy conversation for street lights.

Road development scheme	Government	Provisions adopted for the road developing in the rural areas (cement concrete road)
Drought prone area scheme	Government	Providing relief and insurance against drought in the drought prone area. This year 95% is granted.
Transportation facility	Government	Providing transport facilities for the migration of people (GSRTC) and other private agencies.
Water facilities	Government	Measures taken to provide water for 24 hrs and possibility of providing pure drinking water.
Swarnim jayanti Gram swarojgar Yojana	Government	Providing daily wages for the people who are unemployed and intended to do some work.
Solid waste management	Government	Measures taken for clean India and dumping the solid waste at the dumping system.
Fuels	Government	Providing the biogas plant in the rural areas, various measures and subsides are provided for the development t of biogas plant.

- **Projects / Schemes by Private sector:-**

Table 7: Projects / Schemes by Private sector

Schools	Private	Providing schools up to 12th in the rural area.
Blood banks	Private	Providing blood facilities in emergency in the rural areas.
Transportation facility	Private	Providing private transport facilities in the rural areas for transportation of goods.

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

3.1 Introduction: Concepts and Definitions

Human society is progressing with fast urge and accumulated various successes for making its sustenance. The civilization gone through for various changes affiliated to its development through different accelerators like green revaluation, science and technology, industrial development etc. The present era is intensified on Information and Communication Technology. The increasing population of the world makes it necessary to alleviate the cities and villages to serve in a smart way. Hence, the idea of Smart cities came into being. Smart Villages are the need of the hour as development is needed for both rural and urban areas for improved livelihood. The impulsive motive behind the concept on “Smart Village " is that the technology .Now it's need of the hour is - integrated planning ,strategy, and above all monitoring and execution of the activities using proper governance models to work properly for the real future of emerging India.

Smart City

Smart city was an adaptive city, possessing high capacity to react; the key was on the adaptation and learning capacity, in which the citizens as the main roles in reacting, listening and receiving learning itself, and this learning must be done within groups. Smart city concept was operated in complex urban area, combined several complex infrastructures, human behavior, technology, social structure and politic as well as economy. Smart city was more than digital city as it was able to connect the capital city physically with its social and develop the services and infrastructures of a better city by combining IT and politic vision to clear program for the city improvement and its services.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

VISION OF SMART VILLAGE

To accomplish the ‘Smart Village/Ward’ status, the community, individually and collectively, will be empowered to take smart decisions using smart technologies and with the support of smart manpower and by managing to be self-sufficient.

Performance Measurement Indicators

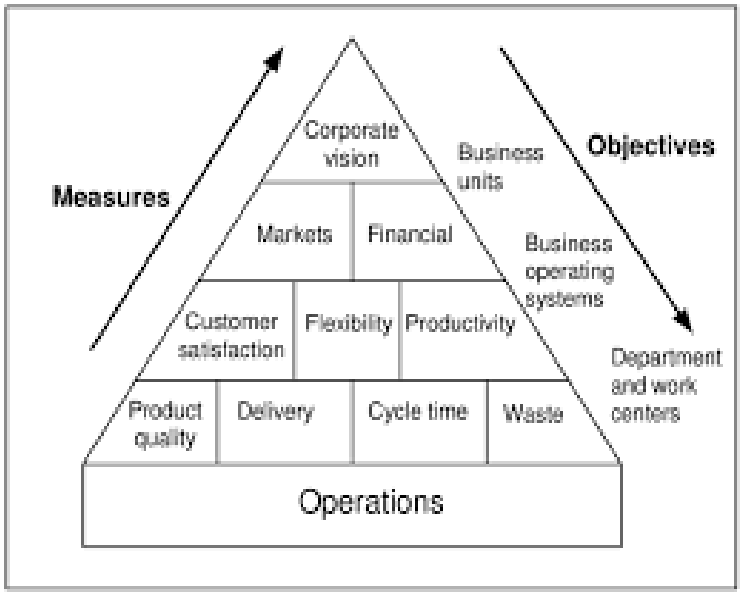

Fig 7 Performance Measurement Frame work

While there is a huge amount of indicator systems available to measure urban sustainability or performance on specific sectors, holistic indicator systems for smart city (project) performance measurement are still lacking. One reason for this might be that the concept of smart cities is not yet well established and it also covers issues that are rather difficult to measure. In CITY keys philosophy a smart city must be sustainable and therefore typical sustainability impact categories and KPIs can be found in the framework. The difference between smart and sustainable cities is that smart cities use innovative and integrated methods either technological or collaborative – to achieve the sustainability impacts. As a conclusion it is key to have in a smart city performance measurement framework both concrete output indicators that measure the implementation of certain measures (e.g. number of smart meters installed) and impact indicators that measure the progress towards the overall targets (e.g. GHG emission reduction). Also both quantitative and qualitative indicators are needed to capture the concept of smart city in its full extent. CITY keys framework has been co-developed in close collaboration with its main target group, i.e. cities, which is expected to ensure its usability in practice. The development of the framework remains, however, at theoretical level, and still needs to be tested and validated in real case studies that will take place in CITY keys project. One purpose of the CITY keys framework is to allow the assessment of lighthouse projects' performance which also still remains to be tested. However, the reception of the framework both at practical city level as well as political level has been already extremely positive. Several policy actors have already adopted CITY keys framework or KPIs in their work.

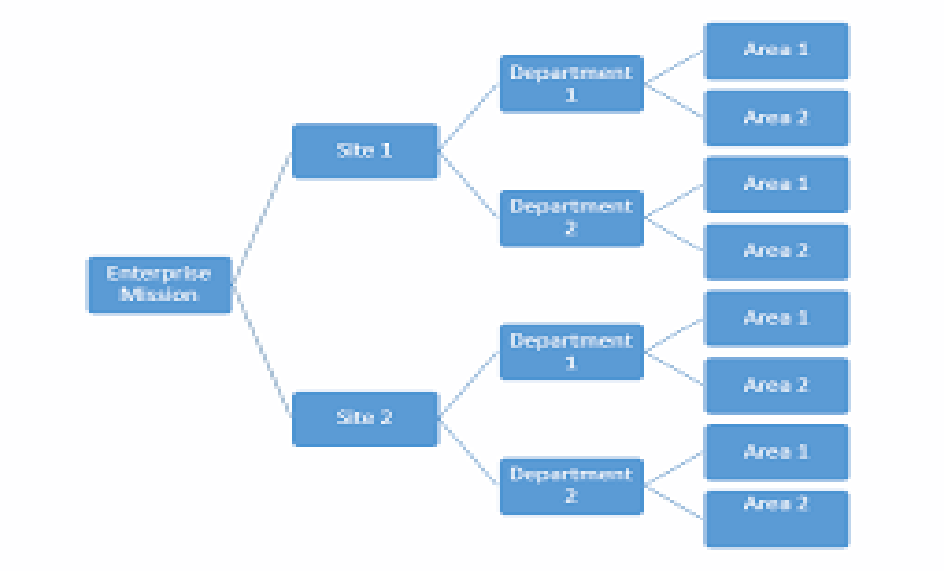

Fig 8 Comparative analysis of standardized indicators for Smart sustainable cities

3.3 Technological Options

Smart cities are cites where everything is connected to each other and this is highly depended on technologies. So let's have a look at six technologies crucial for smart cities.

Fig. 9 smart city

1. **Information and Communication Technology**

Creating a two-way communication channel is very important for a city to be smart. And here comes the role of Information and communication technology. ICT builds a bridge between the citizens and the government where the citizens can interact with the government and in return, the government can build a city which the choice of its citizens. ICT helps the government to analyze the demand pattern of the state and thus create a pool of resources to address the same online. The electronic medium of communication in a community helps in creating a collective intelligence which can be deployed for resource optimization with the help of analytics and deep learning.

Fig. 10 Information and Communication Technology

2. **Internet of Things**

Internet of things is like veins of the city spread all across and connecting each dot. Every device that is part of a smart city needs to be connected to each other so that they can talk amongst and can take decisions for themselves which in return allows managing resources of a megacity population. This is where the IoT comes in, providing the perfect template of a body of communicating devices that provides smart solutions to everyday problems. All smart solutions in smart cities are based on Internet of things where they are connected and smart enough to decide their action.

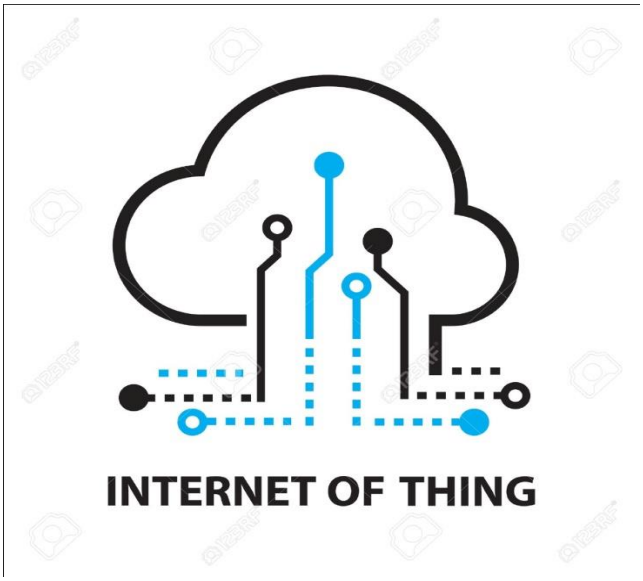

Fig.11 Internet of things

3. **Sensors**

Sensors are hidden but ubiquitous components of the urban landscape. Sensors are a crucial component of any intelligent control system. A process is improved based on its environment and for a control system to be aware of its environment, it is typically fitted with an array of sensors, from which it collects the required data. It then uses the appropriate variables to characterize its environment and adjusts its operations accordingly. The availability of a multitude of different sensors and continuously evolving technology enables applications that were infeasible in the past due to high costs and limited availability. Sensors are like converters which convert parameters of a physical nature to an electronic signal, which can be interpreted by humans or can be fed into an autonomous system. These signals for conventional sensors, amongst others, include light, pressure, temperature, humidity, moisture and a variety of other parameters.

4. **Geospatial Technology**

Whatever is built in a smart city has to be right and so to build right a right plan is the need which is sustainable and this requires accurate, concise and detail data and here comes the role of Geospatial technologies which provide the underlying foundation and ultimately the fabric upon which solution can be built. It provides location which allows pinpointing exactly on the need so that better solution can be applied to it. Geospatial technology provides a

Fig.13 Geospatial Technology

necessary framework for collecting data and transforming observation in these collections to facilitate software-based solution around smart infrastructure.

5. **Artificial Intelligence**

Smart city is a digital revolution generating a huge amount of data. Those data are of no use until and unless they are processed, which generates information in return. This massive amount of data generation brings the role of Artificial intelligence that can make sense out of those data.

Fig.14 Artificial Intelligence

AI allows machine to machine interaction by processing the data and making senses out of that. To understand the interesting aspect of Artificial intelligence in the context of smart cities, let us take an example. In a system where energy spikes tend to happen, AI can learn where they usually occur and under which circumstances and this information can be used for better management of the power grid. Likewise, Artificial Intelligence also plays a role in intelligent traffic management and healthcare facilities.

6. **Block chain**

Block chain application is new to smart city concept. Block chain technology secures data flow. Its integration into smart cities could better connect all city services while boosting security and transparency. In some ways, block chain is expected to influence cities through smart contracts, which help with billing, processing transactions and handling facilities management. Smart contracts are self-executing contracts with the terms of the agreement between buyer and seller directly written into lines of code. They permit trusted transactions and agreements to be carried out among disparate parties without the need for a mediating third party, making the process safer, cheaper and faster. Block chain can also be used in smart grids to facilitate energy sharing, a concept which is trending these days.

Fig.15 Blockchain

3.4 Road Map and Safe Guards

The main goal of this roadmap is to promote the development of sustainable, productive and resilient cities and communities.

The roadmap is to serve as a:

Guidebook: Describing the possible positive societal effects of smart city initiatives and identifying key opportunities, challenges and issues.

Bridge Builder: Defining smart cities in a Norwegian context and using this definition to establish a common set of values that promote collaboration and co-creation across all sectors, professions at all levels and, in particular, together with the public.

Value Creator: Aiming to contribute to renewal and innovation in the public sector. It describes the link between smart cities and urban and community development. It also shows how local and regional authorities can be the driving force behind this transformation.

Platform: Positioning Norway within the smart city context. It serves as a communication platform both internally and externally and stimulates the development of innovative, multidisciplinary solutions that can be scaled, thereby promoting value creation.

This first version of the roadmap provides a framework for smart city initiatives in Norwegian local and regional authorities, describing overriding principles and visions. In the next phase, the roadmap will be expanded with recommended measures, tools and best practices.

3.5 Issues & Challenges

Smart cities face challenges and opportunities

- Technology challenges with coverage and capacity.
- Digital security.
- Legislation and policies.
- Lack of confidence or reluctance shown by citizens (lack of clarity around

Fig 16 Smart City

benefits).

- Funding and business models.
- Interoperability.
- Existing infrastructure for energy, water and transportation systems.

3.6 Smart Infrastructure - Intelligent Traffic Management

In present-day times, the number of vehicles has increased drastically, but in contrast, the capabilities of our roads and transportation systems still remain underdeveloped and as a result, fail to cope with this upsurge in the number of vehicles. As a consequence, traffic jamming, road accidents, increase in pollution levels are some of the common traits that can be observed in our new age cities. With the emergence of the Internet of Things and its applicability in Smart Cities, creates a perfect platform for addressing traffic-related issues, thus leading to the establishment of Intelligent Traffic Management Systems (ITMS).

One of the key components in smart cities of the future is the use of Advanced Traffic Management Systems (ATMS) and Advanced Traveler Information Systems (ATIS) for efficient management and control of traffic flows. The purpose of the ATMS/ATIS is to improve the overall traffic system performance, e.g. reducing emissions, noise and travel times.

In order to manage and control traffic flows, the conditions of the road traffic have to be captured. The road traffic state can be described using speed, flow and density on a specific segment of the road. The length of the segment might vary depending on the geometry of the road. When estimating the traffic state, different types of traffic models are commonly used. However, the models can not include all aspects of the real system, and in order to have a good representation of reality the models have to be combined with measured data of the traffic state, e.g. traffic counts and speed/travel time measurements.

Today, most existing ATMS/ATIS rely on fixed point (eulerian) measurements from loop and radar detectors. Eulerian sensors can collect observations in terms of flow, speed and occupancy, but are unable to provide any trajectory based measurements (lagrangian measurements), such as direct trip observations or travel times on routes, which can contribute even further to the understanding of the behavior of the traffic flow. Already, cities generate large amounts of space-time location data from different systems, such as cellular networks, social networks and participatory sensing. When eulerian sensors are combined with lagrangian sensors available in

connected vehicles and user devices, the possibility of observing large scale mobility patterns will dramatically change. Massive amounts of lagrangian sensors enable a new era of road traffic sensing, making it possible to directly observe trips for a much larger penetration than before. These observations enable a new dynamic understanding of experienced travel times, as well as departure time, mode and route choices, which relate to the travel demand. If detailed data is available, activity patterns on individual level can also be captured.

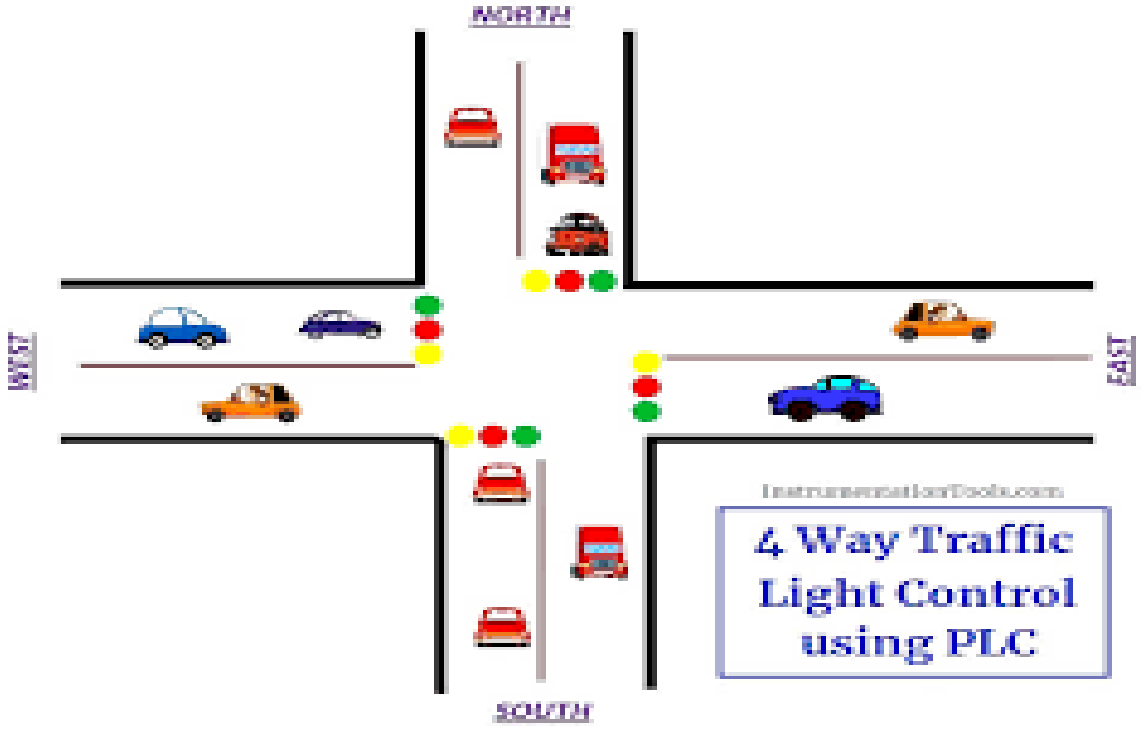

Fig 17 Intelligent Traffic Management System

3.7 Cyber Security and Green Building

Cyber Security

Encryption of data: Encryption is the conversion of electronic data into cipher-text which cannot be easily understood by anyone except authorized parties. Sensitive data need to be protected with (preferably strong) encryption at-rest and in-transit. Encryption guarantees data confidentiality as it protects against unauthorized access (*e.g.* wiretapping).

Deploy network intrusion detection systems: (Network) intrusion detection systems inspect all inbound and outbound network activity and identifies suspicious patterns that may indicate a

network or system attack. To perform efficiently, network intrusion detection systems shall be configured appropriately (e.g. monitor key data exchange, know authorized connections…)

Deployment of physical protection: Physical protection aims at limiting tampering and unauthorized access to the physical infrastructure. Physical protection measures include locks, alarms, surveillance equipment, sensors, access control systems, etc. It is particularly important to protect equipment not located in a secure location (*e.g.* Field equipment).

Access control: Access controls refer to the methods by which a systems grants/denies access approval to a subject based on the successful authentication. Access control is usually a combination of physical measures (*e.g.* key, lock…) and logical measures (*e.g.* authentication, access-control list…). Access control limits unauthorized access and provides evidences in case of tampering.

Alarms and surveillance: Surveillance refers to the monitoring of behaviour or other changing information. Alarms give a signal when a problem or a specific conditions occurs. Alarms need to be defined according to the security requirements. They monitor key performance indicators and can alert of a threat. For enhanced security, alarms are associated to organizational procedures.

Implementation of an information security policy: Information Security Policy/Framework is implemented to effectively manage information security throughout an organization. Such policy defines for example the elements to protect, the procedures to follow, the organization of security… A common example is ISO 270001.26

Creation of activity logs: Activity logs, audit trails, and error logging record actions onto a log file. These log offer evidence and analysis capacity in case of an incident. They provide a good indicator of what happened and how a threat materialized effectively.

Maintenance of backups: Maintain backups of data, ideally in secure off-site servers that allow for data recovery in the case of corruption/loss. Proper maintenance of backups ensures that data recovery retains integrity (*i.e.* no loss of data).

Regular auditing: Regular auditing is an inspection or examination of infrastructure (digital or physical) to evaluate or improve its appropriateness, safety, efficiency, or the like. Audits usually provide a report that points out weaknesses/vulnerabilities and proposes remedial actions.

Green Building

A 'green' building is a building that, in its design, operation or construction, 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 routine life. The Green Building practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

Fig. 18 Green House

The common objective of green buildings is to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant health and improving employee productivity
- Reducing waste, pollution and environmental degradation

Advantages of green buildings

1- Cost:

The construction costs are the same as a standard building and sometimes they cost a little bit more as they require special materials to be built. However, regular building costs won't stop after its construction since money will always be spent on maintenance, renovation, operation, or even demolition.

This doesn't mean that green buildings won't need maintenance, renovation, operation, or even demolition as well, but is built of natural resources all that re-doing stuff will take ages till done as they are not damaged that fast hence, investing in green building is 10 times more profitable than standard ones.

2- Efficiency:

This here is divided into the following:-

A- Water efficiency:

Green buildings don't know the meaning of "wasted", they recycle rainwater and greywater and use them for toilet flushing for instance.

B- Energy Efficiency:

These buildings save energy more than those built out of bricks. They only depend on all renewable energy resources such as solar power, hydro-power, and wind power which are used for heat and electricity and help improve the indoor air quality.

C- Material Efficiency:

Green buildings are built from natural, non-toxic and recycled materials that don't cost much and Eco-friendly such as bamboo, straw, recycled metal or concrete..etc.

3- Preserving infrastructure:

Being efficient in both energy and water supply, these buildings stretch the capacity of local infrastructure greatly.

4- High ROI rates:

Considering that these buildings are all-natural, they have a huge return on investment rates and properties in these buildings sell at high prices.

But as we all know nothing all sweet and perfect. Green buildings have their flaws too and to sum them up, they are as follows:-

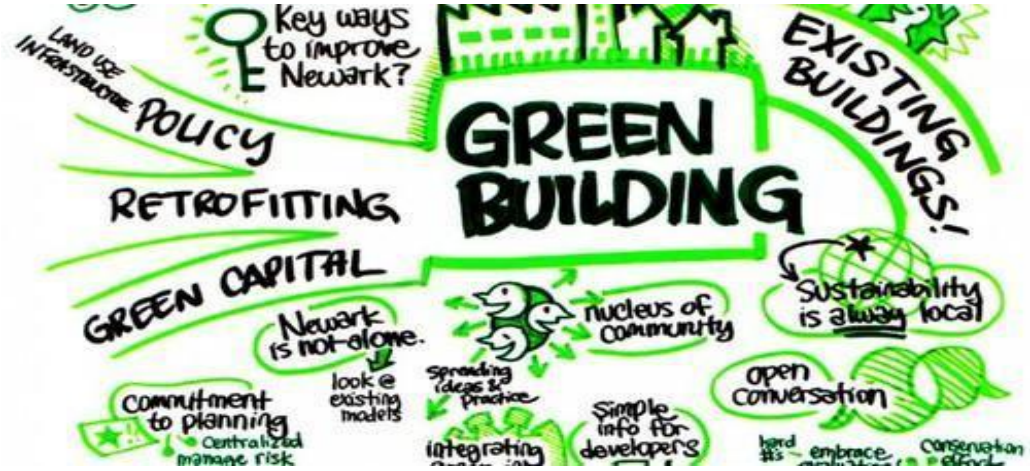

Fig. 19 Green House Concept

Disadvantages of green buildings

1- Location:

Since these buildings depend on the sun for energy, they need to be located in a position that will have the best sun exposure which may demand placing them opposite to other neighborhood homes.

2- Availability:

The materials to build such buildings can be hard to find especially in urban areas where preserving the environment is not the people's first option.

So shipping these materials can then cost a lot than a standard building.

3- No air cooling features

These buildings run on heat to generate power, so they are not designed for hot areas as they do not have any ventilation systems, so air conditioners will be required which will make these buildings anything but Eco-friendly.

4- A long time to construct:

Buildings require a longer time to be built and designed: Green building designs adopt a special method that takes into account the surrounding environmental conditions.

5- The cost of construction:

This is because at the present time the construction of green buildings requires a greater cost than regular buildings because they depend on a lot of natural materials, which may not be available at all times and places.

Process:

- The green building is not a bolt on conventional building but is instead an integrated discipline of design that requires a different way of thinking.
- Building a green Building is more than a matter of assembling a collection of latest green technologies or material. It is a process in which the elements of design are first optimized and then integrated as part of whole building solution.
- By blending the right mix of green technologies that cost less with green materials it is possible to have a project not much expensive than the conventional ones.

- More emphasis on adopting the right building science and less dependence on high-cost building technologies A better scientific understanding of the way buildings work and avoiding high technological sophistication.

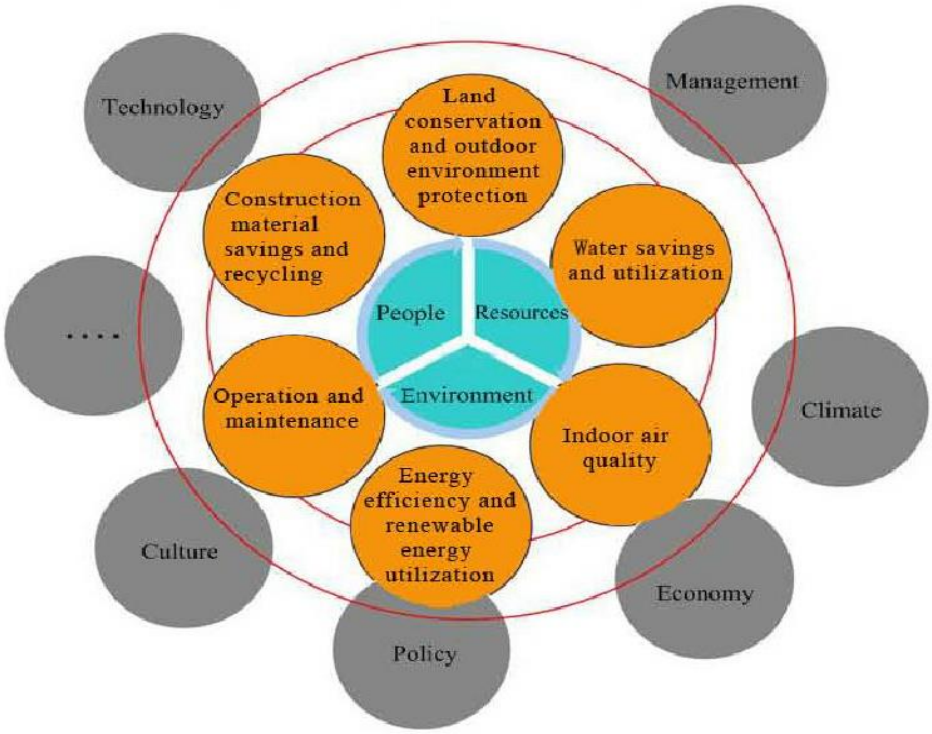

Fig. 20 Green Building Design & Construction - A Developer's Perspective

We can work and finding out suitable mode of solution of the needs identify and can be suggest suitable remedies

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

The strategic components of area-based development in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (green field development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city.

- Retrofitting will introduce planning in an existing built-up area to achieve smart city objectives, along with other objectives, to make the existing area more efficient and liveable. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens. Depending on the existing level of infrastructure services in the

identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. This strategy may also be completed in a shorter time frame, leading to its replication in another part of the city.

- Redevelopment will effect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens. For instance, a new layout plan of the identified area will be prepared with mixed land-use, higher FSI and high ground coverage. Two examples of the redevelopment model are the Saifee Burhani Upliftment Project in Mumbai (also called the Bhendi Bazaar Project) and the redevelopment of East Kidwai Nagar in New Delhi being undertaken by the National Building Construction Corporation.
- Greenfield development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population. One well known example is the GIFT City in Gujarat. Unlike retrofitting and redevelopment,
- Green field developments could be located either within the limits of the ULB or within the limits of the local Urban Development Authority (UDA).
- Pan-city development envisages application of selected Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions will involve the use of technology, information and data to make infrastructure and services better. For example, applying Smart Solutions in the transport sector (intelligent traffic management system) and reducing average commute time or cost of citizens will have positive effects on productivity and quality of life of citizens. Another example can be waste water recycling and smart metering which can make a huge contribution to better water management in the city.

3.9 Strategic Options for Fast Development

There still isn't much of a consensus on how to define the term "smart city." Most explanations of the term, however, describe using information technology, most notably the Internet of Things, to improve how cities are run and the quality of life for residents. The Smart Cities Council, a for-profit industry-led organization, states that a smart city harnesses information and communications technology to improve livability, workability and sustainability. In essence, a smart city uses connected sensors and information technology to improve the quality of life of residents.

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The underlying idea of using technology to improve the quality of life may be simple, but it's also an abstract and partly subjective concept. A vast range of cities across the world are attempting to deploy IoT technology to reimaging urban living and are adopting an array of strategies to do so. As a result, it isn't clear when a city deserves the "smart" moniker. At present, "smart city" seems to be more of an inspirational term than a reality, although many cities are making quick progress in deploying cutting-edge information systems that are beginning to up the IQ of their municipalities.

1. **It starts with having a realistic plan**

Lack of a solid definition for the term "smart city" should serve as a reminder of the importance of having a solid and realistic plan for transformation. If there is one lesson we can draw from so-called digital transformation efforts — whether they be in the city realm or another sector — it is that they are easier to talk about than they are to realize. Above all, real digital transformation and smart cities, however they are defined, require solid leadership and talent and an acceptance that intelligence is boundless rather than fixed.

2. Smart cities require extensive experimentation

One of the best models for studying smart cities is Singapore, which at once embodies the potential of techno centric governance while raising questions about the degree that a smart city should survey its citizens.

The island nation typically ranks at or near the top of most international rankings of smart cities. And unlike Song do and Masdar City, Singapore already had an extensive technological infrastructure before Prime Minister Lee Hsien Loong launched its smart city initiative in earnest in 2014 by deploying roughly 1,000 sensors across the island with an unspecified number to follow. Singapore is also one of the first cities to explore the idea of having a virtual twin of itself, a $73 million project it simply calls "Virtual Singapore." It also has one of the best transportation systems in the world and was the first nation to debut driverless taxis. In addition, Singapore has some of the fastest internet speeds in the world and is a pioneer in e-government initiatives.

3. Smart city vision should energize the private sector

In many respects, Columbus, Ohio, is the antithesis of Singapore: It is an "every city" that is more famous for being the home of Ohio State University and an excellent zoo than for being a global tech hub. While the city has a quickly growing tech scene, the reason is an emerging smart city pioneer is more rooted in its mission to use technology to help its citizens and the firm support of local organizations in its vision.

4. Smart cities demand smart data

A city isn't smart because it uses technology. A city is smart because it uses technology to make its citizens' lives better. Building a smart city is a different type of endeavor than many technological projects because the demographic market is so broad — it includes, to some extent, everyone who lives there as well as visitors. "I think a lot of people in smart cities forget that you are building a smart city for the people — for the consumer — and not necessarily for the technologists," said Michael Lee Sherwood, director of information technology for the city of Las Vegas.

5. Get creative when rethinking transportation

While city planners across the world work to rethink the age-old question of how to best get people from point A to B, there seems to be little agreement on what the best path forward might

be in the long run. On one hand, there are the techno-optimists who aggressively push a future where autonomous vehicles rule the road, electric vehicles outnumber those fueled by gasoline, and the concepts of parking and traffic fatalities — and perhaps even traffic jams — begin to become irrelevant thanks to cutting-edge technology.

6. **Don't downplay digital security**

It would be unfair to single out a single city for its less-than-stellar cybersecurity. But the city of Dallas, Texas, became an early poster child of what can go wrong when a prankster set off all of the municipality's 156 tornado sirens, causing some 4,000 people to dial 911. The sirens were, however, not linked to the internet. The hack targeted a weakness in the siren's radio communications to make them sound.

7. **Smart city initiatives should complement low-tech initiatives**

Cities aspiring to become "smart" run the risk of becoming so focused on technology that they lose sight of promising initiatives that don't require connected sensors, kiosks or any other type of widget.

Barcelona, one of the leading smart cities in Europe, provides an example of a city using a mix of high- and low-tech initiatives. Look at how the city is working to improve its air quality. Struggling to consistently meet EU air quality standards, Barcelona came up with a comprehensive plan for 2013 to 2018. It keeps tabs on pollution levels by using a system known as XVPCA, which monitors and forecasts air pollution levels. Barcelona is working on improving its air quality monitoring. It is deploying air quality sensors throughout the city. Researchers are also working to improve the precision of an air quality prediction system known as Calliope developed at Barcelona's Supercomputing Center.

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

The seriousness of the challenges associated with urban water supply and sanitation in India have been recognized in recent times. After decades of neglect, the first national effort to invest in the urban water and sanitation sector commenced in the 1970s, but was accorded considerable priority in the subsequent two decades as a part of different national- and state level schemes, culminating most recently in the 'Swacch Bharat Mission'. As most of the recent reports and

commentaries, (M. Shah (2013) have highlighted, the problems of the urban water and sanitation sector in India are complex and shall need concerted efforts to sustain the policy momentum. While the concerns of urban water and sanitation are faced in many countries in the global South, the scale of gaps in access and services in India poses a dilemma. According to the 2011 census, India has a total population of 1.21 billion, which is an addition of 181 million people during the decade of 2001–2011 (Census of India, 2011b). Although only 31.16 per cent of India is urban according to the Census of India, at 377 million, India's current urban population is larger than the entire population of United States which is the third most populous country in the world. As recent commentators have highlighted, if India fails to meet its MDG or the emerging SDG targets, the global targets would not be met.

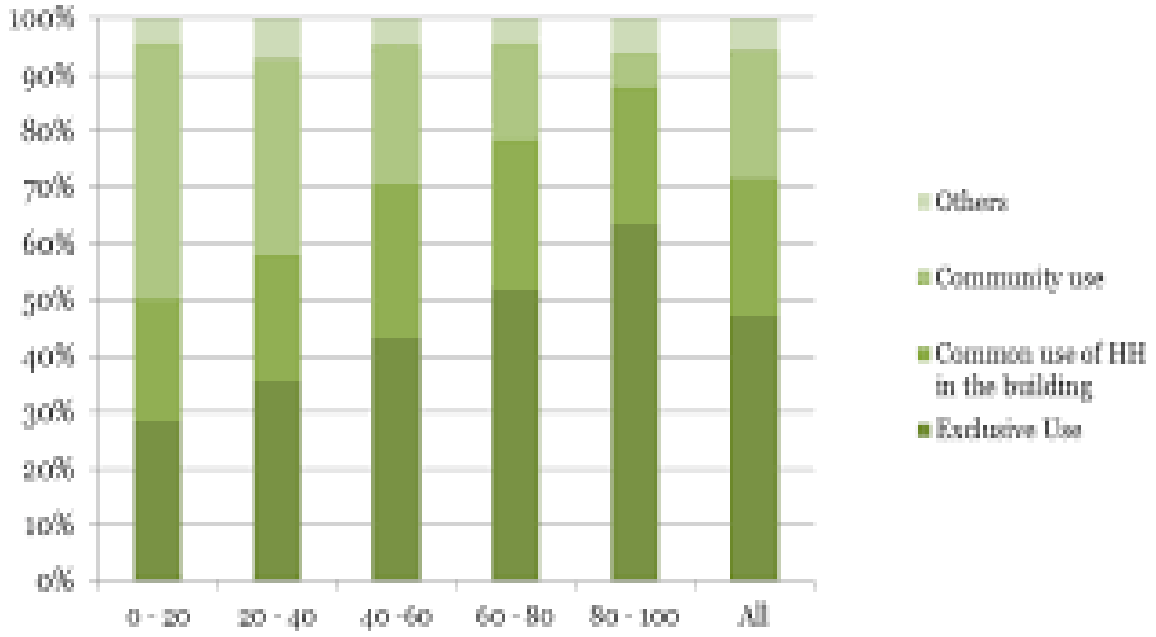


Fig 21 Urban Water supply And Sanitation in India

3.11 Smart Initiatives by District Municipal Corporation

Fig 22 Urban Smart City

Smart city is an urban renewal and retrofitting program by the Ministry of Housing and Urban Affairs. It was launched by the government of India on 25th June, 2015. The mission targets over 100 cities and promotes mixed land use in area based developments, housing and inclusiveness, creating walk able localities, preserving and developing open spaces, promoting a variety of transport options, making governance citizen friendly and cost-effective, applying Smart solutions to infrastructure and services in area-based development in order to make them better and overall giving identity to the city. The objective is to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions.

Smart city Mission was launched by Prime Minister Shri Narendra Modi on 25 June, 2015. Surat city was selected among 100 cities to be developed as smart city in India due to various achievements, initiatives and all inclusive approach. Accordingly Surat city had submitted "Smart City Proposal" (SCP) for Surat City in the given format on 15 December, 2015 to Ministry of Urban Development, Government of India with required consent of Government of Gujarat and statutory authority of Surat Municipal Corporation. Till deadline for submission total 97 cities had submitted their smart city proposal to Government of India. As per the already given plan, 20 cities were to be selected in round-1 (current year) on merit of their submitted proposal. Government of India had constituted 3 teams with expert members of World Bank, ADB and other independent members for evaluation and marking of all the submitted smart city proposals from 97 smart cities and to select final list of top 20 cities based on marking.

3.12 How to implement other Countries smart villages projects in Indian village context (Regarding Environment, Employment)

ICT is a composite word having combination of many tools and technologies. Detailed discussion on each and every tool and technology is out of scope in this paper. But, one of promising technology like Geo-informatics may be useful for villages, while transforming rural villages towards smart village. Geoinformatics technologies can play a very prominent role in the deployment and implementation of ICT in the "Smart Village" in terms of decision support systems. Available different spatial and non-spatial layers can be combined and integrated to facilitate analysis and make the best decision. Recent developments in GIS, GPS, remote sensing, web-services and location-based services and technologies can support innovative solutions for management, governance and citizen participation practices compliant with Smart Village objectives. Geo-spatial data and Geographic Information System (GIS) are essential components for building smart villages in a basic way that maps the physical world into virtual environment. GIS-based planning and support systems allow planners and village community to efficiently create and visualize alternative scenarios and determine their possible impacts on future land use patterns and associated population with employment trends. The future of India lies in converting each and every village into smart villages. The concept of smart village will provide the similar kind of facilities to the villages, so that the agrarian community will remain in villages and not migrate to urban areas. Future generations will contribute immensely in development process and enjoy the traditional agriculture activity with the use of modern technology. Following are some potential areas, where Smart Village may create measurable and significant impact:

- Organized settlement: The village population is distributed in staggered manner and they are not well Organized Settlements: The village population is distributed in a staggered manner and they are not well connected to the village roads. These may be re-distributed preserving proper zones for habitation, play ground, agriculture land and areas to develop various infrastructures like bio- fuel generation centre, overhead water tank, etc.

- Smart Agriculture: In order to increase quality and quantity of agricultural production is using technology to make farms more "intelligent" and more connected through the so-called "Precision agriculture" also known as 'smart farming'.
- Road Infrastructure: GIS analysis ensures all the houses in rural areas are well connected through rural road.
- Smart water supply: There should be provision for water supply for agricultural, household use and drinking. This may facilitate effective and judicial utilization of the surface and ground water resources.
- Smart sanitization: Smart equipments may be adopted in rural areas to facilitate disease free villages.
- Education: GIS analysis may be carried out to find suitable locations to establish state-of-the art education hubs for the villages. Virtual classroom facility may be provided to use the benefit of available experts at other locations.
- Disaster management (DM): Villagers are easily affected by disasters due to lack of preparedness. DM cells may be set up at the panchayat level to address all the disaster related issues. DM cell will connect to the National Disaster Management Authority (NDMA) through the central server for monitoring the future scenarios.

Chapter 4. About Vamaiya Village:

4.1 Introduction

4.1.1 Introduction About vamaiya Village details

"Vishwakarma Yojna" have suggested us the ideal village and poor developed village. Our project is work for Rurbanisation of Vamaiya village, which is located in Patan district, Gujarat. We studied Moviya village as ideal village depends on its development growth consort by gram Panchayat. Nowadays government is work of all-over growth of smallest area of our country. For that purpose we decided to work on poor developed villages.

As part of our subject PMMS we are given the project under the scheme of "**VISHWAKARMA YOJNA PHASE VIII".** In this project we allotted the village VAMAIYA of district PATAN. Under the project we visit the village and collect the data regarding the existing infrastructure and collect some pictures to propose new facilities.

Regarding this project first we contact the surpanch of the village Mr. Thakor and meet him. Here we inquired about the existing facilities available in the village like Public health centre, Sanitary system, drainage problems, water supply, road as well as some other amenities. They also tell us about the requirements of peoples and the problems that the villagers are facing and the future needs of the peoples of village.

Fig 23 Meeting with the Surpanch of village

After collecting the data and information we visit the various area of the village and collect the information about the existing facilities and the need of future development and expansion of the New facilities. We also take out some pictures of the existing facilities and infrastructures.

4.1.2 Need of the study

- Our Indian villages have required developing the infrastructure facility, Socio physical facility, Cultural infrastructure, battering Road Transportation facility, Water supply problem, Irrigation facility, Electricity, No better life for rural area.
- The need of the study is to provide the basic requirements and primary amenities of people in the village and for Rurbanisation of the village. For this purpose the information data of the village is collected based on different categories such as: Education, Water Facilities, Drainage Facilities, Transportation Facilities, Primary Health Care, Bank Facilities, Public Toilets, Community hall and other amenities. Based on these studies the requirements of the village for their development can be known and the future plan based on this requirement can be visualize for completed development of the village.
- As per village development guidelines smart village has all primary and advance technology available to solve general problems like good food, water, healthy climate, space for live (housing), sustainable energy sources, clothing and other basic amenities.

4.1.3 Study Area (Broadly define)

The study area mainly includes the village Vamaiya. Vamaiya is a large village located in Patan Taluka of Patan district, Gujarat with total 905 families residing. The Vamaiya village has population of 5228 of which 2732 are males while 2496 are females as per Population Census 2011.

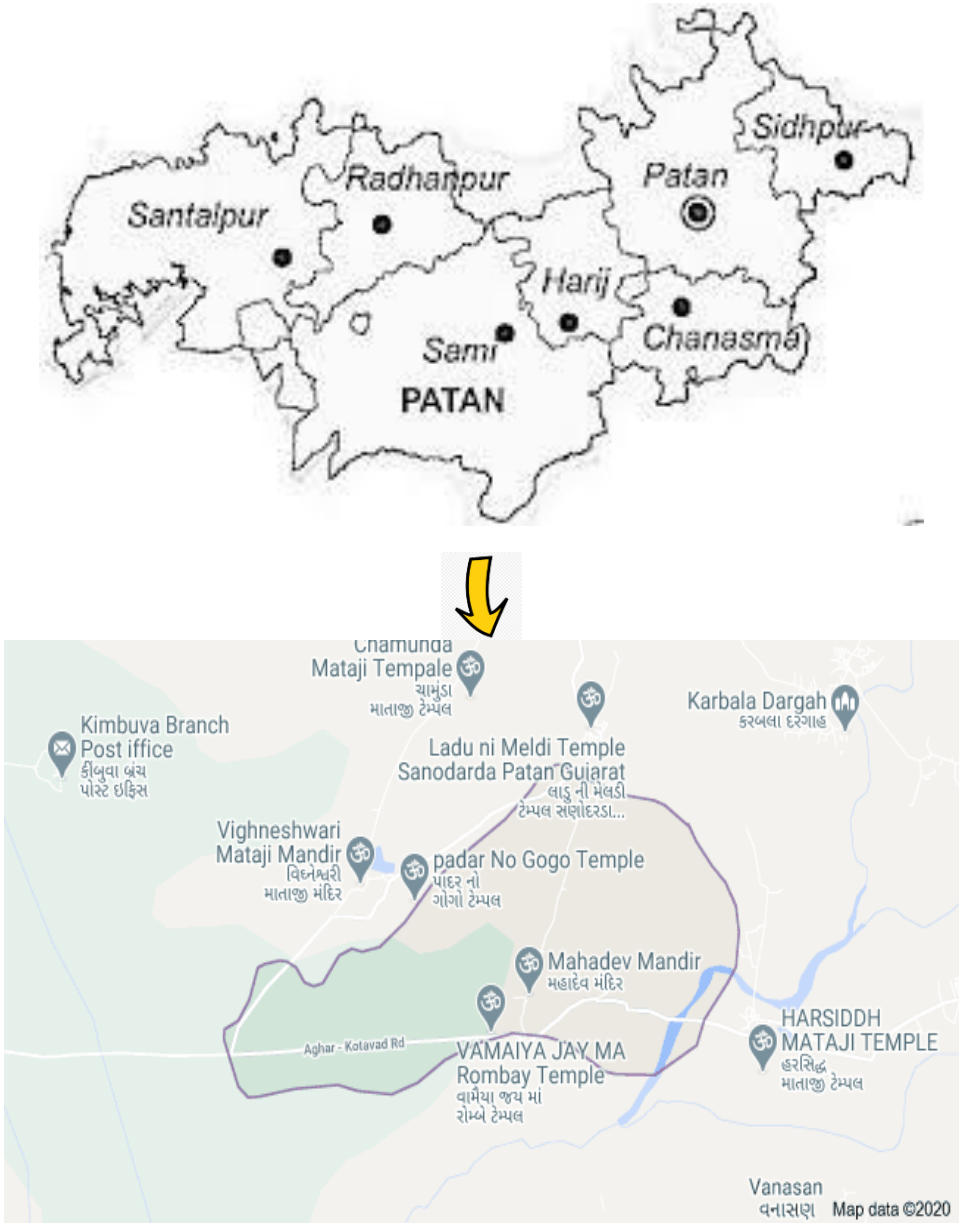


Fig 24 Map of Vamaiya Village

Vamaiya village has lower literacy rate compared to Gujarat. In 2011, literacy rate of Vamaiya village was 58.19 % compared to 78.03 % of Gujarat. In Vamaiya Male literacy stands at 73.56 % while female literacy rate was 41.79 %. As per constitution of India and Panchayati Raaj Act, Vamaiya village is administrated by Surpanch (Head of Village) who is elected representative of village.

4.1.4 Objectives of the study

Following are the various objectives of study…….

The objective of the project is to fulfill all basic amenities. The primary stage is for survey and shorting for these basic amenities and collect data of requirements of people and future growth and data of available resources.

(2) To provide insufficient Social infrastructure facilities like health and education facilities and to ensure proper delivery of facilities to village dwellers

(3) To promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.

(4) To provide Internal roads within village settlement & efficient mass transportation systems between clusters of villages to improve connectivity

(5) To Identification sanitation facilities that are needed to be improve like sewerage and drainage line, dumping facilities, Electricity connections.

(6) Improvement of Solid and Water waste management, Provide best Irrigation facility, Batter educational system, Improve living standard of people, Improve drainage system, Provide solar Street light, Healthy Sanitation facility, Develop the Road system of village.

(7) To evolve strategic planning, proposal in the form of physical, social and renewable infrastructure facilities for the development of villages, channelizing urban growth and to sustain future.

4.1.5 Methodology Frame Work for development of Vamaiya village

The general data is collect by the observation of village.

- By visiting village
- By techno economical survey
- By questioning to villagers
- By taking photograph of existing situation
- First we have study the main objectives and goals of Vishwakarma Yojna scheme and then we planned regarding to develop and provide the basic facilities and basic requirements.

- Then after we had contact to the surpanch of the vamaiya village and meet them.
- During the meeting we discussed about the existing conditions of the village and peoples and also discuss about the problems they are facing in daily life.
- We know the problems by them and note down tem and segregate the problems according to their categories.
- We also refer the Indian act and rules regarding the development of village and increase the existing facilities.
- After collection of the data we analyzed it and find the maximum possible solutions to solve the problems

4.2 Vamaiya Village: Study Area Profile

4.2.1 Study Area Location with brief History land use details

The study area mainly includes the village Vamaiya. Vamaiya is a large village located in Patan Taluka of Patan district, Gujarat with total 905 families residing. The Vamaiya village has population of 5228 of which 2732 are males while 2496 are females as per Population Census 2011.

In Vamaiya village population of children with age 0-6 is 875 which make up 16.74 % of total population of village. Average Sex Ratio of Vamaiya village is 914 which is lower than Gujarat state average of 919. Child Sex Ratio for the Vamaiya as per census is 804, lower than Gujarat Average of 890.

Fig 25 Vamaiya Village

4.2.2 Base Location map, Land Map

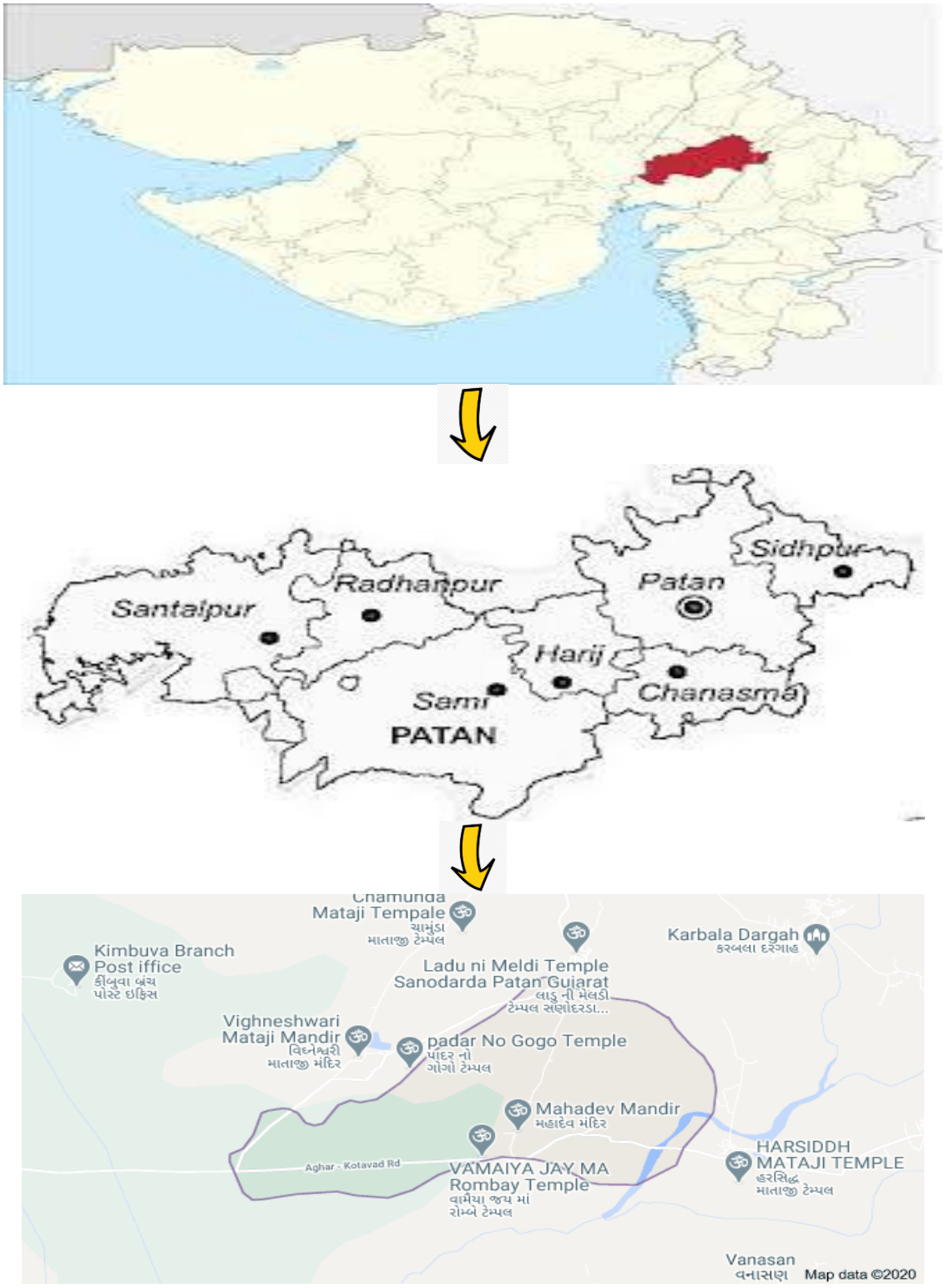


Fig 26 Map of Vamaiya Village

4.2.3 Physical & Demographical Growth

Table 8: Physical & Demographical Growth

Census Parameter	**Census Data**
Total Population	5228
Total No of Houses	905
Female Population %	47.7 % (2496)
Total Literacy rate %	48.5 % (2533)
Female Literacy rate	16.8 % (880)
Scheduled Tribes Population %	0.0 % (0)
Scheduled Caste Population %	4.6 % (240)
Working Population %	50.8 %
Child(0 -6) Population by 2011	875
Girl Child(0 -6) Population % by 2011	44.6 % (390)

4.2.4 Economic generation profile

Table 9: Economic generation profile

Name of major occupation groups in village	1.Farming
	2.Cattle farming

Major Crops:

Major Crops	Wheat, Cattle seed, cotton seed, black mustard seed.

4.2.5 Actual Problem faced by Villagers and smart solution

There is big problem of pakka road in this village. Due to Heavy dart some roads are fails. Due to improper roads there is many chances to cause accidents. There is also the problem of waste disposal so that the garbage and all other waste are disposed off improperly that causes many health problems to the peoples.

Fig. 27 Improper Disposal of waste

The deficiencies of facilities are like residential homes, water drainage system , pakka road, ATM and bank, Irrigation problems, Internal Roads, employment facilities, Health Related Facilities , etc.

Solid waste management is the term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage to trash. As long as people have been living in settlements and residential areas, garbage or solid waste has been an issue. Waste management is all about how solid waste can be change and used as valuable resources. In Vamaiya village there is need of solid waste manage. For this they need door to door waste collection system. After that they need to bifurcate it into different types of waste. And then recycle or destroy the waste in proper manner.

The Panchayat building of Vamaiya village need the solar panels on the roof. The benefit of this solar panel system is to use of renewable energy source. It reduces the cost of electricity. Solar panels green source of energy and eco-friendly.

Some of the problems faced for rural development in India are as follows:

- The financial, manpower and managerial resources devoted to the implementation of rural development programs are utterly inadequate.
- Better implementation of rural development programs can be ensured only if those responsible for actual implementation are paid reasonable well, appropriately trained, and sufficiently motivated. But this has not been done as yet.

- It is being increasing observed that the objectives of one program conflict with those of others, and there is no institutional mechanism for recording them. Consequently, many programs utterly fail in fulfilling their objectives. In addition, they also affect other programs.
- In many cases, instruments of rural development are not properly selected, and their levels are not consistent with the objectives they seek to achieve. This results in the wastage of valuable public resources, and unnecessary delay in achieving the objectives.

4.2.6 Migration Reasons

Migration is a practice livelihood strategy adopted in India and not simply a response to shocks. People certainly do migrate because there is not enough work locally in rural areas, but such migration should not be understood as forced or distress migration. Many poor and unskilled people perceive migration as an opportunity.

Migration from rural to urban in intra state is been increasing slowly with industrialization and modernization in India. The main reason for migration is Employment or business related migration. As we can see the migration of labor and employment are growing in all the three sectors like agriculture, industries and service employ very large number of Migrant workers. Many migrant labors are from textile, construction, stone quarries and mines, brick-Kilns, small scale industries, crop transplanting and harvesting, rickshaw pulling, food processing including fish and prawn processing, salt planning, domestic work, security service etc. The main reason for the migrants are work and business, it is found that employment oriented migrants are quite small, mostly the female migrants compared to male migrants giving employment or business as the reason for their migration.

4.3. Data Collection of vamaiya village (Photograph/Graphs/Charts/Table)

4.3.1 Describe Methods for data collection

- First of all we studied all the objectives and aspect of Vishwakarma Yojana and also studied about basic concept of rural development and urbanization.
- After it we collect the details from internet about the village vamaiya which is allotted to us.
- Than after we contacted the surpanch of vamaiya and also Talati.

- After this we visited the vamaiya village for the purpose of collecting data regarding to various facilities and amenities and survey of different aspects related to infrastructural and social facilities.
- Analysis is done based on data collected through the survey of village which we have done. And various suggestions are made for development of village by us.

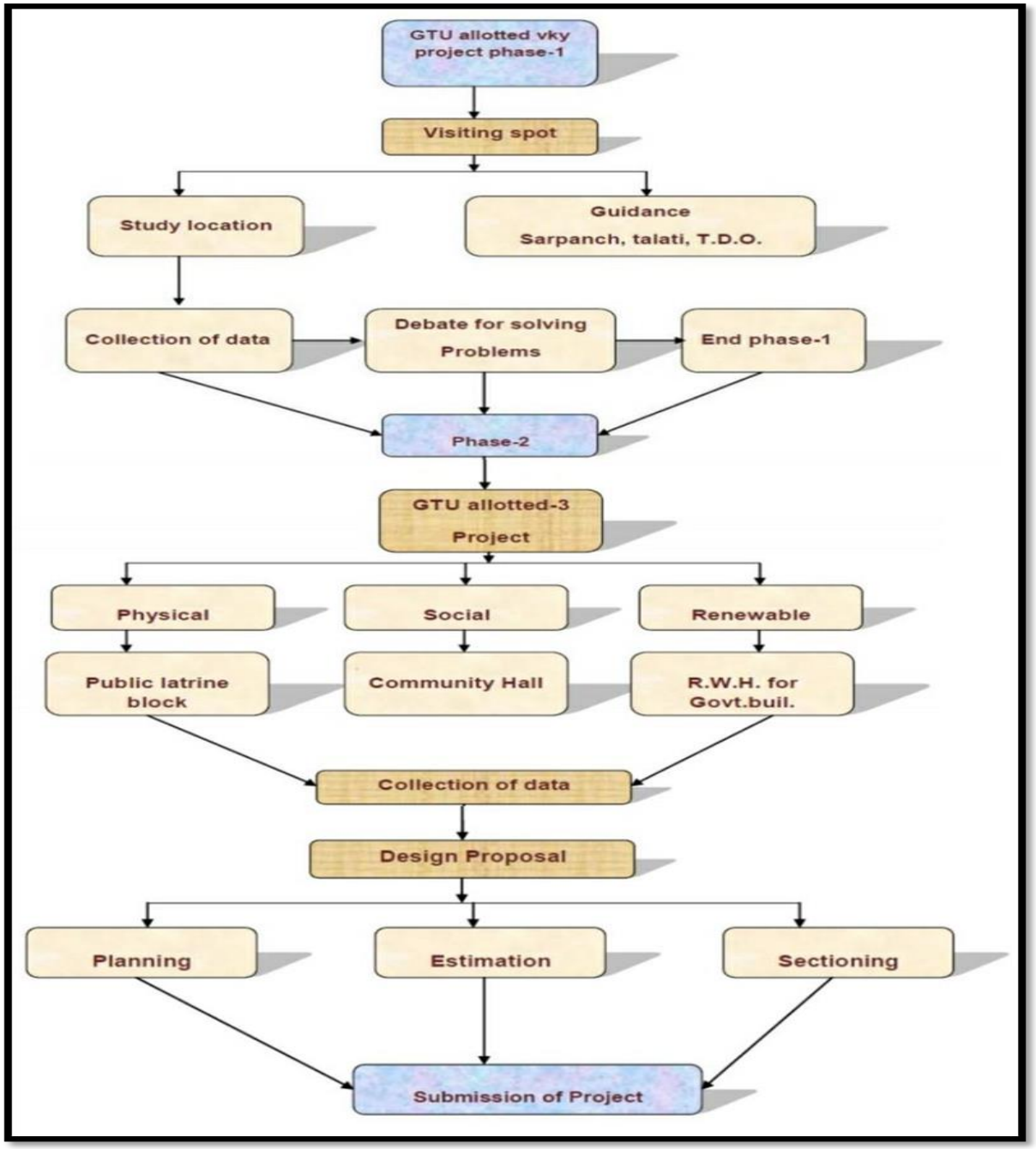


Fig 28 Methodology

4.3.2 Primary details of survey details

Educational:

Table 10: Educational details

Primary school	Yes
High school	No
other colleges	No
IIT colleges	No

Transportation :

Table 11: Transportation details

Bus station	No
Bus service	Yes
Railway Station	No
Nearest National Highway in less than 10 km.	No
Pukka road	Not proper
Footpath	No

Bank and ATM:

Table 12: Bank and ATM

ATM	No
commercial Bank	Yes
co-operative bank	No

Communication

Table 13: Communication

Sub Post Office	Yes
Landline	Yes
Mobile Coverage	Yes
Private Courier Facility	No

Drinking-Water and Sanitation

Table 14: Drinking water details

Treated Tap Water Supply	No
Tube Wells/Boreholes	Yes
Closed Drainage System	No
system to Collect garbage on street	No
rain water drain pipes	No

AGRICULTURAL DETAILS

Table 15: Agricultural Details

agriculture commodities	Pearl millet/bajra, Mustard and Cotton
agricultural power supply in summer	8 HOURS
agricultural power supply in winter	8 HOURS
Total irrigated area	777.66 hectares from Boreholes/Tube wells 777.66 hectares is the Source of irrigation.

PHC:

Table 16 : PHC

Primary Health Sub-Centre	Yes
Maternity And Child Welfare centre	Yes
Veterinary Hospital	Yes

Physical Infrastructures

Table 17: Physical Infrastructures

Panchayat Office	Yes
Bus station	No
Public Toilets	No
Rain water Drainage system	No
Library	No
Police Station	Yes
Temple	Yes

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

Vamaiya village is located in Patan Tehsil of Patan district in Gujarat state. It is situated 12 km away from Patan, which is both district & sub-district headquarter of vamaiya village. As per Census 2011 information the location code or village code of vamaiya village is 508898. The total geographical area of vamaiya village is 1972.82 Hectors.

As per census 2011 male population of vamaiya village is 3282. And female population of vamaiya village is 2979. Total population of vamaiya village as per census 2011 is 6261. Among this population child population in vamaiya is 744. Total number of house hold in vamaiya village is 1342.

4.3.4 No of Human being in One House

As per census 2011 total population of vamaiya village is 5228. And total number of household in vamaiya village is 905. As per this data average human being in one house is 4 to 5 people in each house.

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

People of vamaiya village has major occupation is agriculture and cattle farming. The major available material locally in village is almost related to agricultural material and cattle farming material. Also the village vamaiya have not any major factory or industry. Therefore village does not need any material related to any industry or any small factory or else.

4.3.6 Geographical Detail

Vamaiya is 12 km distance from Sub District Head Quarter Patan and it is 12 km distance from District Head Quarter Patan. Nearest Statutory Town is **Patan** in 12 km Distance .Vamaiya Total area is 961.87 hectares and Total irrigated area is 777.66 hectares.

The total geographical area of village is 1324.15 hectares. Vamaiya has a total population of 5,228 peoples. There are about 905 houses in Vamaiya village. As per 2019 stats, Vamaiya villages come under Siddhpur assembly & Patan parliamentary constituency. Patan is nearest town to Vamaiya which is approximately 12 km away.

Vamaiya Pin code is 384265 and postal head office is Patan. Hisor (2 KM) , Lodhpur (3 KM) , Kotavad (3 KM) , Vanasan (3 KM) , Chandansar (4 KM) are the nearby Villages to Vamaiya. Vamaiya is surrounded by Patan Taluka towards west, Unjha Taluka towards East , Chanasma Taluka towards South , Vadgam Taluka towards East. Patan , Sidhpur , Unjha , Palanpur are the nearby Cities to Vamaiya.

4.3.7 Occupational Detail - Occupation wise Details / Majority business

India is an agricultural nation. Almost 75% of people in India has occupation of agriculture. The Village vamaiya also has major occupation is agriculture and cattle farming. Vamaiya village has two major occupation agriculture and cattle farming.

Major crops grown during the year in village are:

1. Bajra
2. Mustord
3. Cotton

4.3.8 Physical Infrastructure Facilities

There are 2 primary school in Vamaiya Village. Anganvadi is also provided in Vamaiya. Most of facilities are available in this village like post office, bank, etc,

Fig 29 Primary School of Vamaiya

The nearest railway station to Vamaiya is Patan railways station which is 12 km away from village. Vamaiya has no any Bus stops. There are auto rickshaws and other private vehicles for internal transportation

Fig 30 Police Station of Vamaiya

4.3.9 Tourism development available in the village for attracting the tourist

Temple is situated in this village. People from the surrounding area visit this temple on various luscious occasions. Once it is fully developed it has a potential to be a tourist place.

Fig 31 Temple

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking Water / Water Management Facilities

Table 18 : Drinking Water / Water Management Facilities

Treated Tap Water Supply	No
Tube Wells/Boreholes	Yes
Closed Drainage System	No
system to Collect garbage on street	No
rain water drain pipes	No

4.4.2 Drainage Network / Sanitation Facilities

Closed Drainage System is not available in this Village. There is no system to collect garbage on street. Drain water is discharged directly into water bodies. There is lack of main drainage system in village. There is no facility for further like main drainage line or else.

4.4.3 Transportation & Road Network

For transportation there is no any bus stand in village. Vamaiya does not have Railway station. Railway station is 15 km away from the village.

For transportation there are autos and jeeps used by people of Vamaiya village. The state highway of Patan passes nearby Vamaiya village. Vamaiya village has poor road network. There is no approach road to state highway from village.

Fig 32 Road system in Vamaiya

Table 19 : Transportation & Road Network

Bus station	No
Bus service	Yes
Railway Station	No
Nearest National Highway in less than 10 km.	No
pukka road	Not proper
Footpath	No

4.4.4 Housing condition

As basic need of better life style pakka dwelling house is require. There is less number of pakka dwelling houses in village. Housing condition of Vamaiya village is poor.

Fig .33 House of Vamaiya

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

Education

Fig 34 Primary School of Vamaiya

Table 20: Education

Primary school	Yes
High school	No
other colleges	No
ITI colleges	No

Health

Table 21: Health

Primary Health Sub-Centre	Yes
Maternity And Child Welfare centre	Yes
Veterinary Hospital	Yes

Fig 35 Maternity and Child Welfare centre

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

Existing condition of public buildings like primary health centre, Police station, Bus station is well. The existing condition of dairy, Panchayat building, need repair and maintenance.

Panchayat Building of Vamaiya village need the solar plate for electricity in building. Also school building needs enough electricity.

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

There is no any Social importance is available in the Vamaiya village. There is one Temple is available in the village. As There is No community Hall , the gathering of peoples are not possible .

There is no any Recreational facilities is available in this village. Dudh mandli is available in this village. There are no any public parks or gardens or any other children play areas for the small childs of Village.

4.5 Existing Institution like - Village Administration – Detail Profile

4.5.1 Bachat Mandali

Bachat mandali of vamaiya village is situated in panchayat office of village. It is working in well manner and also helpful to people of vamaiya village.

4.5.2 Dudh Mandali

Vamaiya village has two dudh mandali. Both dudhmandali are co-operative dairy. It fulfill the need of villager. Villager of vamaiya village also gets cattle food from these dudhmandali. Free Pashu camp is also organize in dudhmandali.

Fig 36 Dudh Mandali

Chapter 5. Technical Options with Case Studies

5.1 Concept (Civil)

5.1.1 Renewable energy concept

Bio-gas plant :

Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen (an aerobically), primarily consisting of methane and carbon dioxide. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. Biogas is a renewable energy source.

Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials. This closed system is called an anaerobic digester, biodigester or a bioreactor.

Biogas is primarily methane (CH_4) and carbon dioxide (CO2) and may have small amounts of hydrogen sulfide (H_2S), moisture and siloxanes. The gases methane, hydrogen, and carbon monoxide (CO) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a fuel; it can be used for any heating purpose, such as cooking. It can also be used in a gas engine to convert the energy in the gas into electricity and heat.

Biogas can be compressed after removal of Carbon dioxide, the same way as natural gas is compressed to CNG, and used to power motor vehicles. In the United Kingdom, for example, biogas is estimated to have the potential to replace around 17% of vehicle fuel. It qualifies for renewable energy subsidies in some parts of the world. Biogas can be cleaned and upgraded to natural gas standards, when it becomes bio-methane. Biogas is considered to be a renewable resource because its production-and-use cycle is continuous, and it generates no net carbon dioxide. As the organic material grows, it is converted and used. It then re-grows in a continually repeating cycle. From a carbon perspective, as much carbon dioxide is absorbed from the atmosphere in the growth of the primary bio-resource as is released, when the material is ultimately converted to energy.

Advantages :

1. Biogas is Eco-Friendly

Biogas is a renewable, as well as a clean, source of energy. Gas generated through bio-digestion is non-polluting; it actually reduces greenhouse emissions (i.e. reduces the greenhouse effect).

No combustion takes place in the process, meaning there is zero emission of greenhouse gasses to the atmosphere; therefore, using gas from waste as a form of energy is actually a great way to combat global warming.

Unsurprisingly, concern for the environment is a major reason why the use of biogas has become more widespread. Biogas plants significantly curb the greenhouse effect: the plants lower methane emissions by capturing this harmful gas and using it as fuel. Biogas generation helps cut reliance on the use of fossil fuels, such as oil and coal.

Another biogas advantage is that, unlike other types of renewable energies, the process is natural, not requiring energy for the generation process. In addition, the raw materials used in the production of biogas are renewable, as trees and crops will continue to grow. Manure, food scraps, and crop residue are raw materials that will always be available, which makes it a highly sustainable option.

2. Biogas Generation Reduces Soil and Water Pollution

Overflowing landfills don't only spread foul smells- they also allow toxic liquids to drain into underground water sources. Consequently, yet another advantage of biogas is that biogas generation may improve water quality. Moreover, anaerobic digestion deactivates pathogens and parasites; thus, it's also quite effective in reducing the incidence of waterborne diseases. Similarly, waste collection, and management, significantly improve in areas with biogas plants. This, in turn, leads to improvements in the environment, sanitation, and hygiene.

Fig 37 Overflowing landfills

3. Biogas Generation Produces Organic Fertilizer

The by-product of the biogas generation process is enriched organic (digestate), which is a perfect supplement to, or substitute for, chemical fertilizers. The fertilizer discharge from the digester can accelerate plant growth and resilience to diseases, whereas commercial fertilizers contain chemicals that have toxic effects and can cause food poisoning, among other things.

Fig 38 : Organic Fertilizer

4. It's A Simple and Low-Cost Technology That Encourages A Circular Economy

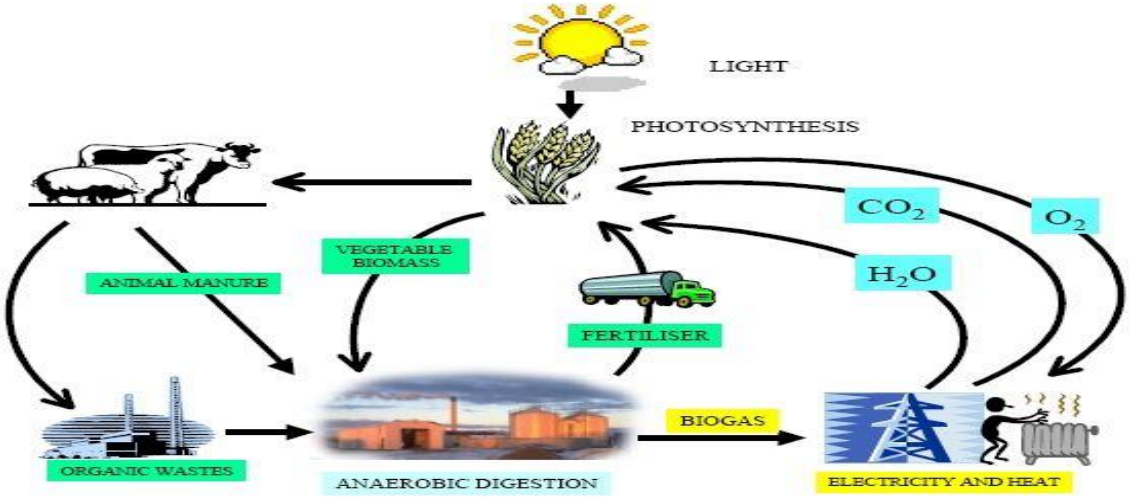


Fig 39 : Circular Economy

The technology used to produce biogas is quite cheap. It is easy to set up and needs little investment when on a small scale. Small bio-digesters can be used right at home, utilizing kitchen waste and animal manure. A household system pays for itself after a while, and the materials used for generation are absolutely free. The gas manifested can be used directly for cooking and generation of electricity. This is what allows the cost of biogas production to be relatively low. Farms can make use of biogas plants and waste products produced by their

livestock every day. The waste products of one cow can provide enough energy to power a light bulb for an entire day.

In large plants, biogas can also be compressed to achieve the quality of natural gas, and utilized to power automobiles. Building such plants requires relatively low capital investment, and creates green jobs. For instance, in India, 10 million jobs were created, mostly in rural areas, in plants and in organic waste collection.

5. Healthy Cooking Alternative For Developing Areas

Biogas generators save women and children from the daunting task of firewood collection. As a result, more time is left over for cooking and clean. More importantly, cooking on a gas stove, instead of over an open fire, prevents the family from being exposed to smoke in the kitchen. This helps prevent deadly respiratory diseases. Sadly, 4.3 million people a year die prematurely from illness attributable to the household air pollution caused by the inefficient use of solid fuels for cooking.

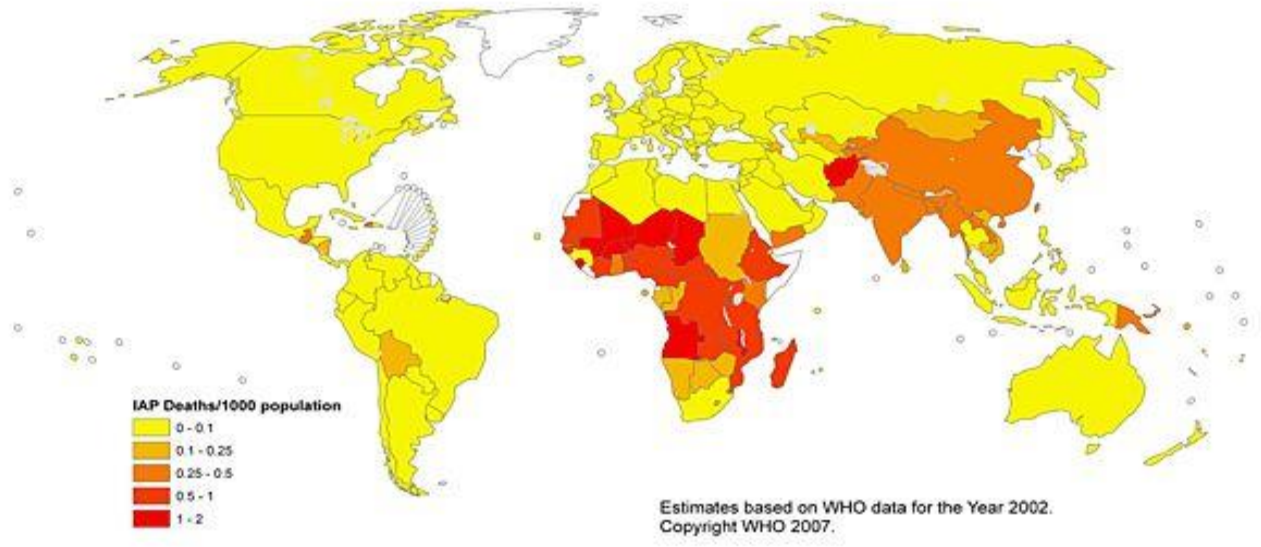


Fig 40 : Estimate Based on WHO data

Disadvantages of Biogas :

1. Few Technological Advancements

An unfortunate disadvantage of biogas today is that the systems used in the production of biogas are not efficient. There are no new technologies yet to simplify the process and make it abundant and low cost. This means large scale production to supply for a large population is still not

possible. Although the biogas plants available today are able to meet some energy needs, many governments are not willing to invest in the sector.

2. Contains Impurities

After refinement and compression, biogas still contains impurities. If the generated bio-fuel was utilized to power automobiles, it can corrode the metal parts of the engine. This corrosion would lead to increased maintenance costs. The gaseous mix is much more suitable for kitchen stoves, water boilers, and lamps.

3. Effect of Temperature on Biogas Production

Like other renewable energy sources (e.g. solar, wind) biogas generation is also affected by the weather. The optimal temperature bacteria need to digest waste is around 37°C. In cold climates, digesters require heat energy to maintain a constant biogas supply.

4. Less Suitable For Dense Metropolitan Areas

Another biogas disadvantage is that industrial biogas plants only makes sense where raw materials are in plentiful supply (food waste, manure). For this reason, biogas generation is much more suitable for rural and suburban areas.

5.1.2 Sustainable Sanitation (Public Toilets)

Prime Minister Narendra Modi's Swach Bharat scheme aims to eliminate open defecation by constructing toilets in every household by 2019. No one doubts the need for the programme. Close to 48% of India's urban population has no access to toilets. In rural areas, the number stands at 60%.

Fig 41: sanitation in village

"It is an ambitious plan and definitely the need of the hour," said Bindeshwar Pathak, founder of the sanitation organization Sulabh International. "However, the government will have to do it right, which will require comprehensive planning."

A draft proposal prepared by the ministry revealed that the project envisages building 20 million toilets by 2015. Already, officials at the Ministry for Drinking Water and Sanitation have warned that Modi's plan will be near-impossible to complete. They claim that the government has neither the resources nor manpower to finish the project by 2019.

Other experts say that building a toilet is not enough: without supporting infrastructure, the structures will be useless. "Just as a toilet is a necessity for every household, it is equally important to ensure that the supporting infrastructure like water supply, sewerage and waste management and cleaning is managed in a planned manner," said Wilson Bezwada, national convener of the Safai Karmachari Aandolan. "Otherwise, it will become the same as Modi's Jan Dhan Yojana, where poor people will have bank accounts but no financial mechanism or support for their unsteady monthly income."

Despite the challenges, here are four benefits the scheme is likely to bring.

1) It will save lives

Every year, 200,000 infants die in India alone because of open defecation, according to a study by Brian Arbogast, director of the Water Sanitation and Hygiene Programme at the Bill and Melinda Gates Foundation. Open defecation leads to contamination of food and water and transmits diarrhea-related diseases. In addition, it can also cause mental and cognitive stunting to young children, Arbogast's study said.

Doctors have identified a number of other diseases that follow from open defecation: skin diseases, respiratory diseases, eye problems, scabies, intestinal parasites resulting in kidney damage, anthrax and tuberculosis.

2) It will improve women's safety and literacy

Modi has emphasised that functioning toilets need to be available for girls in government schools. According to Ministry of Human Resource Development data, close to 10% of the 11 lakh schools in India do not have toilet facilities for female students – 101,443 schools, to be precise. As a consequence, girls leave school on average at an earlier age than their male contemporaries.

The safety of women is another major area of concern. Non-governmental organisations say there have been several cases of women being raped and killed on their way to relieve themselves.

"Unhygienic practices like defecating in the open lead to diseases and deaths of over 600,000

lives per year In India," said Rakesh Johri, a senior fellow at The Energy Resource Institute. "It also exposes a third of the nation's women to the risk of rape and sexual assault."

3) It will boost the economy

There are around 11.3 crore households in India that do not have access to toilets, according to the Census 2011 data. Constructing a basic toilet will cost between Rs 15,000 and Rs 20,000 per toilet, including the price of bricks, cement, sand, roof, door, sanitary ware, plumbing, septic tank and labour. The cost of building toilets across 11.3 crore households will be between Rs 1.65 lakh crore and Rs 2.2 lakh crore. The construction activity is also expected to boost job creation.

The Swach Bharat scheme could boost ceramic tile makers and sanitary-ware manufactures by 15%, according to news reports. Companies like Hindware, Somany Ceramics and Roca Parry ware are setting up new manufacturing units to prepare for the expansion in demand. Several companies have stepped in with their own initiatives. Tata Consultancy Services has invested Rs 100 crore to build toilets for girls across 10,000 schools across the country. Bharti Enterprises has announced a budget of Rs 100 crore for Satya Bharti Abhiyaan, an initiative to construct toilets in Ludhiana and the neighboring areas within the next three years. Hindustan Lever will build 24,000 toilets across Maharashtra, The Aditya Birla Group has announced that it will construct 10,000 sanitation facilities in states like Madhya Pradesh, Tamil Nadu, Uttar Pradesh and Gujarat by 2015. Hindustan Zinc plans to construct 30,000 toilets across rural areas in Rajasthan (and has already built 9,000 of these). ITC, meanwhile, has announced an initiative called Mission Sunehra Kal, part of which involves improving sanitation facilities in rural areas.

4) It will help eradicate manual scavenging

Though India banned the degrading practice of manual scavenging in 1993, humans continue to clear excreta from toilets around the country. However, a senior official at the Ministry for Drinking Water and Sanitation said that as new toilets were being constructed across the country, existing dry toilets would be demolished.

Since toilets in India's trains empty out on to the tracks, the railways employ manual scavengers to clean them, according to a study by the Rashtriya Garima Abhiyan. However, the Ministry of Railway and the Ministry of Environment and Forests are developing alternative sanitation strategies.

5.1.3 Green Walls concept

A vegetative cover placed over a interior or exterior wall, which creates many benefits for the environment and humans. The types of green walls can be used for multiple purposes such as providing stability to a sloped area and shade to an area. Green walls can be constructed by individual planters or placed in soiled beds by sections. Layers of root barriers, waterproof membranes, and drainage must be installed to prevent damage to the building. Before installing, please check to ensure that structure is stable enough for a green wall structure.

- **Benefits of Green wall**

Indoor Air Quality-

- Installing green walls can help reduce indoor air pollution and toxins such as benzene, formaldehyde, VOCs (Volatile Organic Compounds), and carbon dioxide.

Storm Water Management-

- rein walls allow filtration of storm water, reducing the amount of toxins and pollutants that enter our watersheds.

Biodiversity (Native Plant Species)-

- One way to help preserve biodiversity is to incorporate native plants into green wall settings.

Energy Savings-

- Exterior green walls increase the thermal performance of buildings lowering energy consumption and cost. Shading from the plants decreases the temperature inside the building in the summer months reducing the need for air conditioning. During winter months, green walls act as a wind barrier. Green walls also reduce the heat island effect in cities since plants absorb the sun's energy that reflects and radiates heat from bu ildings.

Gardens

- Exterior or interior green walls can be used for vertical gardens to grow vegetables or herbs.

Building Structure Protection

- Exterior green walls provide an extra layer of insulation protecting exterior finishes and masonry from UV radiation and rain.

Noise reduction-

- Exterior green walls absorb sound waves, reducing noise.

5.1.4 Modular House Concept

Fig 42: Modular House

Modular or prefabricated houses are among the latest architectural trends to hit the modern world and the **real estate** industry. These homes are often called factory-built, system-built or pre-fab homes. Most of us have heard about modular kitchens, but what are modular houses? The concept is a transition from the traditional and trusted build-on-site houses; modular houses are made in a factory or manufacturing unit and shipped to the housing site to be assembled and permanent placement. Sounds no less than a fairy tale or an online gaming concept? Let us elaborate the modern day housing concept for you.

How are modular houses built?

Fig 43: Construction of Modular House

Modular homes are built in parts in a factory setting. They are built indoors where they are never subjected to adverse weather conditions. They are made from hardier and easier-to-work-with materials. The sections move through the factory with the quality control department checking them step after step. The finished modules are covered for

protection and then transported to the home site. They are placed on a pre-made foundation, assembled and completed by a specializing builder.

How do the modular houses compare with built-on-site houses?

Fig 44: Modular House

Prefab houses are somewhat cheaper in comparison to the conventionally constructed homes. As with the traditional homes, the cost of the modular home increases with complicated architecture and design elements. Similarly, the plumbing and electricity costs are over and above the basic structure's cost. Despite the over and above costs, the prefab houses cost less than the built-on-site houses. Why? The biggest factor being that modular houses are manufactured in high numbers and most of the work is done by machines; they do not rely on extensive on-site labor work. When a house is built on site, one of the major expenditures is that of labour charges and the obstacles in man force due to reasons such as weather conditions, delay in delivery of raw materials etc. Therefore, modular houses take less time to complete as compared to built-in-houses.

What is the difference in modular houses and mobile homes?

People are generally confused between the concept of mobile homes and modular houses; however, there is a lot of difference between the two. Modular houses are built away from the house site; however, once they are ready, they are permanently assembled and installed at the location. They have a permanent foundation and cannot be moved every now and then. The mobile homes, on the other hand, are called so because of their feature of transportability.

5.1.5 Advance Sustainable construction techniques / Practices and Quantity Surveying

For contractors, a strategy for saving time and materials can lead to higher profitability and the good feeling of not creating unnecessary waste. Here's a look at five techniques that are having the greatest impact on sustainable building construction.

A. Prefabricating Materials in Controlled Environments

Constructing as much of a structure in a controlled environment as possible has improved the quality of buildings and resulted in less trash, says Spencer Finest, principal of Minneapolis-based Greiner Construction.

B. Construction Waste Management

Reducing waste is becoming more achievable for contractors as haulers have grown more sophisticated in recent years. Where jobsites once had trash bins for different types of waste, they now need just one, in many cases, because haulers use pickers to separate materials.

C. Managing the Site for Improved Environment

D. Lean Manufacturing to Reduce Energy

E. Material Selection

5.1.6 Advance Construction Material

India is witnessing construction of very interesting projects in all sectors of Infrastructure. High rise structures, under construction, include residential/commercial blocks up to a height of 320 m and RC chimneys for thermal power stations extending upwards up to 275m. Majority of the structures are in structural concrete. The functional demands of such high rise structures include the use of durable materials. High Strength Concrete, Self–compacting Concrete are gaining widespread acceptance. Apart from the basic structural materials, modern projects require a variety of secondary materials for a variety of purposes such as construction chemicals, waterproofing materials, durability aids etc.

A. Durable Concrete

Concrete Design and Construction Practices today are strength driven. Concrete grades up to M80 are now being used for high-rise buildings in India. However, due to escalation in the repair and replacement costs, more attention is now being paid to durability issues. There are

compelling reasons why the concrete construction practice during the next decades should be driven by durability in addition to strength.

A large number of flyovers and some elevated roads extending up to 20km in length are being realized in different parts of the country and involve huge outlay of public money. However, the concrete durability is suspect. Many of the structures built during the period from 1970 have suffered premature deterioration. Concrete bridge decks built during the period now require extensive repairs and renovations, costing more than the original cost of the project. Multi storied buildings in urban areas require major repairs every 20 years, involving guniting, shotcreting etc.

A holistic view needs to be taken about concrete durability. In this context, there are a large number of materials in the market which facilitate durable construction. Apart from the materials, the construction processes have also undergone changes with a view to improving the durability of the finished structure.

High Performance Concrete

In the United States, in response to widespread cracking of concrete bridge decks, the construction process moved towards the use of High Performance Concrete (HPC) mixes. Four types of HPC were developed:

- Very High Early Strength Concrete – 17.5 mPa in 6 hours
- High Early Strength Concrete – 42.5 mPa in 24 hours
- A Very High Strength – 86 mPa in 28 days
- High Early Strength with Fiber Reinforcement
- High Performance Concrete was introduced in India initially for the reconstruction of the pre-stressed concrete dome of the Kaiga Atomic Power Project, followed for parts of the Reactors at Tarapur and Rajasthan. Subsequently, a number of bridges and flyovers have introduced HPC up to M75 grade in different parts of India.

B. Self–compacting Concrete (SCC)

SCC was developed by the Japanese initially as a Quality Assurance measure, but now is being widely used for concrete structures worldwide. In India, one of the earliest uses of SCC was for some components of structures at Kaiga Atomic Power Project. Many components of the structures were very heavily reinforced and the field engineers found it difficult to place and compact normal concrete without honeycombs and weaker concrete. SCC was successfully used.

SCC leaving the batching plant is in a semi-fluid state and is placed into the formwork without the use of vibrators. Due to its fluidity, SCC is able to find its way into the formwork and in between the reinforcement and gets self-compacted in the process. SCC is particularly useful for components of structures which are heavily reinforced. The fluidity is realized by modifying the normal mix components. In addition to cement, coarse and fine aggregates, water, special new generation polymer based admixtures are used to increase the fluidity of the concrete without increasing the water content.

Due to its high fluidity, the traditional method of measuring workability by slump does not work. The fluidity is such that any concrete fed to the slump cone falls flat on raising the slump cone; the diameter of the spread of concrete is measured as an indication of workability of SCC. This is called Slump Flow and is in the range of 600 – 800 mm.

Apart from the use of superior grade chemical admixtures, the physical composition of the concrete for SCC has undergone changes. The concrete is required to have more of fine aggregates and compulsorily any of the mineral admixtures – fly ash, ground granulated blast furnace slag (GGBFS), silica fume, meta-kaolin, rice husk ash etc. Fly ash is abundantly available as a waste product at all the thermal power stations and the Government has encouraged use of fly ash by offering them practically free at the thermal power stations. GGBFS is again a by-product of the steel mills. During the production of steel, a molten steel is poured from blast furnaces and travels in special channels, leaving the impurities on top of the stream. The waste material, being lighter moves on top and easily diverted away from the usable steel. The diverted slag is quenched and forms small nodules. These nodules are crushed and granulated into very fine product, with particle size smaller than that of cement. The product is marketed in 50 kg bags and available economically in the regions around steel mills with blast furnaces. In other regions, additional transport cost of this bulk material is involved but its use is justified because of contribution to durability of concrete. For the concrete components of the structure for Bandra and Worli sewage outfalls in Mumbai, the German prime contractor insisted on compulsory use of GGBFS for the M40 concrete in order to improve the durability of concrete. GGBFS had to be transported from Vizag in the eastern part of India, in spite of heavy transportation cost. Since then GGBFS is finding widespread use in different parts of India for ensuring durable concrete.

C. The Use of Mineral Admixtures

After realization of the need for durable concrete structures, the composition of concrete has undergone changes. From being a product made of three or four materials (cement, aggregates, water), today a typical durable concrete consists of six or more materials. The use of low water cement ratio enables a reduction in the volume and size of capillary voids in concrete; this alone is not sufficient to reduce the cement based content of concrete which is the source of micro-cracking from thermal shrinkage and drying shrinkage.

To reduce the cement based content, both the water content and cement content must be reduced as much as possible. Concrete mixes with fewer micro cracks can be produced by blending the cement with mineral admixtures either in the batching plant or in the cement plant. This enhances the service life of concrete structures in a cost-effective manner.

D. Fly Ash

Thermal power stations are left with an undesirable by-product, fly ash, in large quantities which is not able to effectively utilize or dispose of. Currently, (2009) more than 120 million tonne of fly ash are generated annually and the storage and disposal has been costing the power stations substantial unproductive expenditure. Unfortunately, all the fly ash available at the power stations is not fit for use as mineral admixture directly. Fly ash as a mineral admixture should conform to IS: 3812. Such a material is available in the finer streams of Electro Static Precipitators fitted to the power generation system.

The coarser materials are required to be processed (generally with the help of Cyclones) before being considered for use as mineral admixture for concrete. There are only a few processing units in India, including the one as Nashik Thermal Power Station. As per the Euro Code for Concrete, only processed fly ash can be permitted as mineral admixture in concrete. The code limits the use of fly ash. About 35% of cement may be replaced by fly ash; the actual percentage replacement depending on the outcome of trial mixes.

E. High Volume Fly Ash Concrete (HVFA)

The high volume fly ash concrete (HVFA) represents an emerging technology for highly durable and resource efficient concrete structures. Laboratory and field experience have shown that fly ash from modern coal-fired thermal power plants, when used in large volume (typically 50 - 60% by mass of the total cementations materials content, is able to impart excellent workability in fresh concrete at a water content that is 15 – 20% less than without fly ash. To obtain adequate

strength at early age, further reductions in the mixing water content can be achieved with better aggregate grading and use of super-plasticizers.

HVFA concrete has now been successfully used in a few sporadic projects in India. All SCC in India use HVFA, to the extent of 50% cement replacement. Some concrete roads being built by NHAI have also used HVFA concrete, including the Four-Laning of Satara – Kolhapur National Highway.

F. Ground Granulated Blast Furnace Slag (GGBFS)

The problems associated with the quality of fly ash do not exist in the case of Ground Granulated Blast Furnace Slag GGBFS, as the produce is necessarily the outcome of grinding to the required particle size. Thus the use of GGBFS as a mineral admixture should be preferred, despite long leads for end users in certain parts of India far from the steel plants. GGBFS sold in India is of uniform quality and particle size gradation. For many landmark structures such as the Burj Dubai (the tallest building in the world in 2009) GGBFS has been extensively used as a mineral admixture, even though the material is imported from other countries, resulting in the landed cost being more than that of cement. This was a conscious decision with a view to obtaining a more durable concrete structure.

In India the use of GGBFS has been fairly limited, in spite of all the technical advantages. The Indian Concrete Code permits up to 70% of cement replacement where GGBFS is used. Technically, the use of GGBFS is more effective only at replacement levels of 50% or more. For a number of structures in a port in Andhra Pradesh, typically the M40 concrete mix contained 100 kg of cement and 300 kg of GGBFS.

Portland Slag Cement (PSC) is also available and useful for ensuring durability of concrete structures. Due to the proximity to steel mills, PSC is generally produced in locations close to steel plants. Here again due to the bulky nature of the product, the transportation cost predominate. Another issue concerning quality of the PSC is the actual percentage replacement while making PSC; this information is not normally displayed on the bags, leaving the user at a disadvantage. In developed countries, information regarding the percentage of slag utilized in making PSC is generally printed on each bag of cement.

G. Condensed Silica Fume (CSF)

CSF is a by-product of Ferro-Silicon industry and at present an imported product, easily available in the Indian market. The particle size is very small, about 100 times smaller than that of cement. It can occupy the voids in between cement particles in a concrete mix, reduce the water demand and thus contribute to a very dense concrete of high durability. Normally, 5 - 10% of cement can be replaced by CSF in order to produce durable concrete. The product is expensive and is used in developed countries only for very high strength concrete (above 75 mPa). Indiscriminate use of CSF for lower grades, barring exceptions, only increases the project cost without corresponding technical benefits. Even when used, the percentage replacement should be based on trial mixes in each case, which may vary from one to 10%. CSF may also be used for High Performance Concrete of lower grades.

Fig. 45: Condensed Silica fume

H. Cement Silos

The use of batching plants for producing concrete is gaining increasing acceptance. As large volumes of cement are used in a batching plant, the cement is generally stored in vertical steel silos. When cement is received in bulkers from the factory, the same is directly pneumatically pumped into the silos which have capacities ranging from 50 to 500 tonne depending upon the project requirements. If only bagged cement is available, they are emptied into the silos, usually with the help of screw conveyors. For modern applications, more than one silo will be required depending on the types of cement and mineral admixture used in the concrete mix. In a recently commissioned batching plant complex in the Middle East, each of the two plants feature nine cement silos for Portland cement, slag cement, micro silica, fly ash and SRC cement.

I. Durability Enhancing Products

A full line of products are available to prevent or repair corrosion damage. A typical corrosion inhibiting admixture prevents deleterious expansion and cracking caused by the formation of rust during over-induced corrosion. There are also penetrating sealants to protect new and repaired concrete from the corrosive effects of chloride. The saline and siloxane based reacting sealers soak into the surface, creating a barrier against water or chlorides.

Fig. 46: Durability Enhancing Product

A number of concrete waterproofing admixtures eliminate the need for conventional external waterproofing membranes and saves time, money and hassle at the construction site. It transforms concrete into a water-resistant barrier by becoming an integral part of the concrete matrix.

5.1.7 Green Building Concept

What is green building?

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:

A. Efficient use of energy, water and other resources
B. Use of renewable energy, such as solar energy
C. Pollution and waste reduction measures, and the enabling of re-use and recycling
D. Good indoor environmental air quality
E. Use of materials that are non-toxic, ethical and sustainable
F. Consideration of the environment in design, construction and operation

G. Consideration of the quality of life of occupants in design, construction and operation
H. 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 centre, or any other type of structure, provided it includes features listed above.

However, it is worth noting that not all green buildings are – and need to be - the same. Different countries and regions have a variety of characteristics such as distinctive climatic conditions, unique cultures and traditions, diverse building types and ages, or wide-ranging environmental, economic and social priorities – all of which shape their approach to green building.

This is why World GBC supports its member Green Building Councils and their member companies in individual countries and across regions, to pursue green buildings that are best suited to their own markets.

To get involved in your own country's transformation to green building, please contact or join your local Green Building Council.

5.1.8 Rainwater Harvesting

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation. Dew and fog can also be collected with nets or other tools. Rainwater harvesting differs from storm water harvesting as the runoff is collected from roofs, rather than creeks, drains, roads, or any other land surfaces. Its uses include watering gardens, livestock, irrigation, domestic use with proper treatment, and domestic heating. The harvested water can also be committed to longer-term storage or groundwater recharge.

Rainwater harvesting is one of the simplest and oldest methods of self-supply of water for households, and residential and household-scale projects, usually financed by the user. However, larger systems for schools, hospitals, and other facilities can run up costs only able to be financed by owners, organizations, and governmental units.

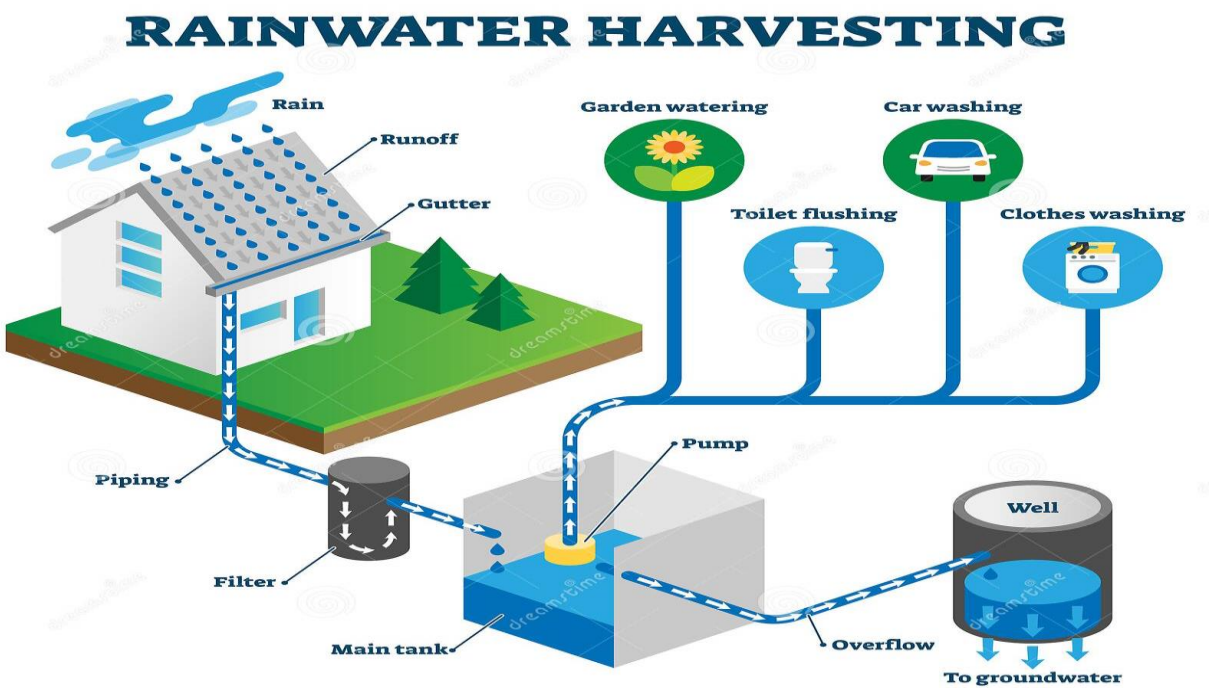


Fig. 47 : Rain Water Harvesting

Advantages

Rainwater harvesting provides the independent water supply during regional water restrictions, and in developed countries, it is often used to supplement the main supply. It provides water when a drought occurs, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable groundwater levels to be sustained. It also helps in the availability of potable water, as rainwater is substantially free of salinity and other salts. Applications of rainwater harvesting in urban water system provides a substantial benefit for both water supply and wastewater subsystems by reducing the need for clean water in water distribution systems, less generated storm water in sewer systems, and a reduction in storm water runoff polluting freshwater bodies.

A large body of work has focused on the development of life cycle assessment and its costing methodologies to assess the level of environmental impacts and money that can be saved by implementing rainwater harvesting systems.

I. Independent water supply

Rainwater harvesting provides an independent water supply during water restrictions. In areas where clean water is costly, or difficult to come by, rainwater harvesting is a critical source of

clean water. In developed countries, rainwater is often harvested to be used as a supplemental source of water rather than the main source, but the harvesting of rainwater can also decrease a household's water costs or overall usage levels. Rainwater is safe to drink if the consumers do additional treatments before drinking. Boiling water helps to kill germs. Adding another supplement to the system such as a first flush diverter is also a common procedure to avoid contaminants of the water.

Supplemental in drought

When drought occurs, rainwater harvested in past months can be used. If rain is scarce but also unpredictable, the use of a rainwater harvesting system can be critical to capturing the rain when it does fall. Many countries with arid environments, use rainwater harvesting as a cheap and reliable source of clean water. To enhance irrigation in arid environments, ridges of soil are constructed to trap and prevent rainwater from running down hills. Even in periods of low rainfall, enough water is collected for crops to grow. Water can be collected from roofs and tanks can be constructed to hold large quantities of rainwater.

In addition, rainwater harvesting decreases the demand for water from wells, enabling groundwater levels to be further sustained rather than depleted.

J. Life-cycle assessment

Life-cycle assessment is a methodology used to evaluate the environmental impacts of a system from cradle-to-grave of its lifetime. Devkota et al, developed such a methodology for rainwater harvesting, and found that the building design (e.g., dimensions) and function (e.g., educational, residential, etc.) play critical roles in the environmental performance of the system. The Economic and Environmental Analysis of Sanitations Technologies, EEAST model evaluates the greenhouse gas emissions and cost of such systems over the lifetime of a variety of building types.

To address the functional parameters of rainwater harvesting systems, a new metric was developed - the demand to supply ratio (D/S) - identifying the ideal building design (supply) and function (demand) in regard to the environmental performance of rainwater harvesting for toilet flushing. With the idea that supply of rainwater not only saves the potable water but also saves the storm water entering the combined sewer network (thereby requiring treatment), the savings

in environmental emissions were higher if the buildings are connected to a combined sewer network compared to separate one.

K. Cost-effectiveness

Although standard RWH systems can provide a water source to developing regions facing poverty, the average cost for an RWH setup can be costly depending on the type of technology used. Governmental aid and NGOs can assist communities facing poverty by providing the materials and education necessary to develop and maintain RWH setups.

Some studies show that rainwater harvesting is a widely applicable solution for water scarcity and other multiple usages, owing to its cost-effectiveness and eco-friendliness. Constructing new substantial, centralized water supply systems, such as dams, is prone to damage local ecosystems, generates external social costs, and has limited usages, especially in developing countries or impoverished communities. On the other hand, installing rainwater harvesting systems is verified by a number of studies to provide local communities a sustainable water source, accompanied by other various benefits, including protection from flood and control of water runoff, even in poor regions. Rainwater harvesting systems that do not require major construction or periodic maintenance by a professional from outside the community are friendlier to the environment and more likely to benefit the local people for a longer period of time. Thus, rainwater harvesting systems that could be installed and maintained by local people have bigger chances to be accepted and used by more people.

The usage of in-situ technologies can reduce investment costs in rainwater harvesting. In-situ technologies for rainwater harvesting could be a feasible option for rural areas since less material is required to construct them. They can provide a reliable water source that can be utilized to expand agricultural outputs. Above-ground tanks can collect water for domestic use; however, such units can be unaffordable to people in poverty.

5.1.9 Transport Infrastructure / system

Fig 48 : Transportation

India is overwhelmingly an agricultural country with about six lakh villages, many of which have little or no connection with the outside world. The preoccupation of Indian planners with inter-city and intra-city transport during past plan periods has left the rural transport system in a state of utter neglect. Although rural population accounts for three-fourth of the total population and generates more than half of the national income, commensurate attention to rural transportation has not been paid in the past.

In the planned development of rural areas the development of rural roads merits the highest priority. For multifarious aspects like provision of food and labour to the cities; for balanced regional development; for curbing rural to urban migration; for improvement of agricultural productivity; for removal of socio-economic inequalities and above all if all the people have to be brought into the main stream of development, rural roads have to be provided to link all the villages in an integrated road network.

During the last three decades of planned development, road length has gone up from 3.97 lakh kilometers in 1950-51 to 15.34 lakh kilometers in 1979-80, and well over Rs. 7500 crores have been spent in road construction and maintenance. Rural road length has increased from 1.65 lakh kilometers in 1950-51 to 4.50 lakh kilometers in 1982-83. However, overall availability and quality of roads are far below the desired level. A large part of network is unsurfaced with improper alignments, weak bridges, narrow widths, lack of shoulders, and poor maintenance. Quality of rural roads and connectivity of villages are much below the target values.

Rural road development for the first time received impetus during the Fifth Five Year Plan under the Minimum Needs Programme (MNP). The MNP stressed the urgency to provide social services as per the national norms. The programme stipulated that all villages with 1500 and more population and half of the villages with population of 1000-1500 should be linked with all-weather roads by 1990. In hilly, tribal costal and desert areas the cluster of villages approach was suggested. Under the Fifty Plan the target of linking 29000 villages was fixed and an outlay of Rs. 500 crore was provided for this purpose. However, only Rs. 200 crores could be spent and about 12,000 villages were linked.

For the period 1980-85 an outlay of Rs. 1148 crores was provided under MNP for rural roads, out of which only Rs. 1086 crores was spent. Table 1 provides year wise targets and achievements in connecting villages. It is disappointing to note that in most of the cases targets were not achieved. During the year 1983-84 the achievements were 61.52, 94.07 and 100.78 per cent of the targets for the villages with population 1500 and above, 1000-1500 and less than 1000 respectively.

5.1.10 Soil Liquefaction

Soil liquefaction occurs when a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress such as shaking during an earthquake or other sudden change in stress condition, in which material that is ordinarily a solid behaves like a liquid.

The effects of soil liquefaction on the built environment can be extremely damaging. Buildings whose foundations bear directly on sand which liquefies will experience a sudden loss of support, which will result in drastic and irregular settlement of the building causing structural damage, including cracking of foundations and damage to the building structure, or leaving the structure unserviceable, even without structural damage. Where a thin crust of non-liquefied soil exists between building foundation and liquefied soil, a 'punching shear' type foundation failure may occur. Irregular settlement may break underground utility lines. The upward pressure applied by the movement of liquefied soil through the crust layer can crack weak foundation slabs and enter buildings through service ducts, and may allow water to damage building contents and electrical services.

5.1.11 Vertical Farming

Fig 49 . Vertical Farming

Agriculture in India is continuously molting. Newer technologies are coming up to face the challenges arising due to overgrowing population, water scarcity, climate change, labour scarcity and urbanization leading to reduction in arable land. Various technologies like See &Spray Technology, field sensors for irrigation control, electrical conductivity sensing, machine learning and robotics in agriculture are on its way to come. These advanced technologies will no doubt boost the agriculture. Still then, in spite of all these latest and modern technologies, food security amidst the overpopulation pressure with decreasing arable lands is a major concern all over the world. Vertical farming is perhaps intensive way of increased food production with lesser lands. Vertical farming is cultivating and producing crops/ plants in vertically stacked layers and vertically inclined surfaces. The entire world is on the verge of population explosion and there is a gravest challenge of feeding the population. The population explosion has led to the decreased per capita land. Earlier with the aim of supplying the food to ever increasing population agricultural scientist stretched their innovative approaches to the tune of developing hybrid/ improved high yielding varieties, improved techniques, improved tools and implements, integrated practices in water, nutrient management and insect, pest management, greenhouse technology and even the genetically modified crops In India, vertical farming has been introduced. ICAR experts are working on the concept of 'vertical farming' in soil-less conditions, in which food crops can be grown even on multi-storied buildings in metros like New Delhi, Mumbai, Kolkata and Chennai without using soil or pesticides.

5.1.12 Water Treatment Plant

Water treatment plants are based on coagulation, flocculation and disinfection processes and found to be most cost-effective in treating large quantities of water. However, they entail large infrastructure costs which are difficult to raise in rural regions of developing countries and are generally installed using government funding. Hence, centralized treatment is available only in the metros of developing countries and mainly benefit the urban population. The transportation cost of water to the centralized treatment plant and from the treatment plant to the individual households is another major expense which limits its benefits to regions which are situated away from the treatment plant. Hence centralized treatment plants are generally installed near the freshwater resources (rivers or lakes) and benefit the people living closer to these water bodies.

Description of system:

The water treatment plant is made up of three integrated treatment systems designed to meet boiler feed water/steam purity and a ZLD requirement

J. Raw water pretreatment
K. Boiler feed water (make up water) treatment
L. Wastewater treatment

The plant takes water from both the wastewater and potable water facilities at Hanover county and discharges only solids in the form of filter cakes from both the pretreatment and wastewater treatment plants.

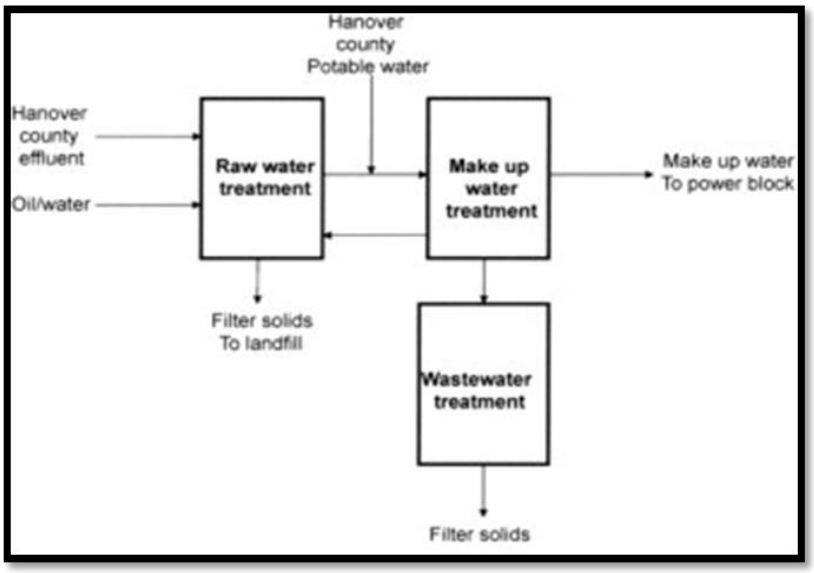


Fig. 50: Descriptive system

5.1.13 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

In the case of **Reinforced concrete structure** the ingress of moisture or air may lead to **corrosion** of steel, cracking and spelling of concrete cover thereby reducing durability of concrete **structure**. **Repair** has been suggested as the protective solution for damaged **structure** due to **corrosion**.

Fig 51: Repair and protect deteriorated RCC

5.1.14 Sewage treatment plant

Sewage treatment is the process of removing contaminants from municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safe enough for release into the environment. A by-product of sewage treatment is a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land.

Fig 52: Sewage treatment plant

Sewage treatment may also be referred to as wastewater treatment. However, the latter is a broader term that can also refer to industrial wastewater. For most cities, the sewer system will also carry a proportion of industrial effluent to the sewage treatment plant that has usually received pre-treatment at the factories to reduce the pollutant load. If the sewer system is a combined sewer, then it will also carry urban runoff (storm water) to the sewage treatment plant. Sewage water can travel towards treatment plants via piping and in a flow aided by gravity and pumps. The first part of the filtration of sewage typically includes a bar screen to filter solids and large objects that are then collected in dumpsters and disposed of in landfills. Fat and grease are also removed before the primary treatment of sewage.

5.1.15 Low Cost Housing Concept

Low Cost Housing is a new concept which deals with effective budgeting and following of techniques which help in reducing the cost construction through the use of locally available materials along with improved skills and technology without sacrificing the strength, performance and life of the structure. There is huge misconception that low cost housing is suitable for only sub standard works and they are constructed by utilizing cheap building materials of low quality. The fact is that Low cost housing is done by proper management of resources. Economy is also achieved by postponing finishing works or implementing them in phases.

Building Cost

The building construction cost can be divided into two parts namely:

Building material cost : 65 to 70 %

Labour cost : 65 to 70 %

Now in low cost housing, building material cost is less because we make use of the locally available materials and also the labour cost can be reduced by properly making the time schedule of our work. Cost of reduction is achieved by selection of more efficient material or by an improved design.

Areas from where cost can be reduced are:-

1) Reduce plinth area by using thinner wall concept .Ex.15 cms thick solid concrete block wall.

2) Use locally available material in an innovative form like soil cement blocks in place of burnt brick.

3) Use energy efficiency materials which consume less energy like concrete block in place of burnt brick.

4) It is suggested to use burnt bricks which are immersed in water for 24 hours and then shall be used for the walls

Rat – trap bond wall

Use environmentally friendly materials which are substitute for conventional building components like use R.C.C. Door and window frames in place of wooden frames.

5) Preplan every component of a house and rationalize the design procedure for reducing the size of the component in the building.

6) By planning each and every component of a house the wastage of materials due to demolition of the unplanned component of the house can be avoided.

7) Each component of the house shall be checked whether if it's necessary, if it is not necessary, then that component should not be used.

Cost reduction through adhoc methods Foundation

normally the foundation cost comes to about 10 to 15% of the total building and usually foundation depth of 3 to 4 ft. is adopted for single or double store building and also the concrete bed of 6″ (15 Cms.) is used for the foundation which could be avoided.

It is recommended to adopt a foundation depth of 2 ft.(0.6m) for normal soil like gravely soil, red soils etc., and use the uncaused rubble masonry with the bond stones and good packing. Similarly the foundation width is rationalized to 2 ft.(0.6m).To avoid cracks formation in foundation the masonry shall be thoroughly packed with cement mortar of 1:8 boulders and bond stones at regular intervals.

It is further suggested adopt arch foundation in ordinary soil for effecting reduction in construction cost up to 40%.This kind of foundation will help in bridging the loose pockets of soil which occurs along the foundation.

In the case black cotton and other soft soils it is recommend to use under ream pile foundation which saves about 20 to 25% in cost over the conventional method of construction.

Plinth

It is suggested to adopt 1 ft. height above ground level for the plinth and may be constructed with a cement mortar of 1:6. The plinth slab of 4 to 6″ which is normally adopted can be avoided and in its place brick on edge can be used for reducing the cost. By adopting this procedure the cost

of plinth foundation can be reduced by about 35 to 50%.It is necessary to take precaution of providing impervious blanket like concrete slabs or stone slabs all round the building for enabling to reduce erosion of soil and thereby avoiding exposure of foundation surface and crack formation.

Walling

Wall thickness of 6 to 9″ is recommended for adoption in the construction of walls all-round the building and 41/2" for inside walls. It is a cavity wall construction with added advantage of thermal comfort and reduction in the quantity of bricks required for masonry work. By adopting this method of bonding of brick masonry compared to traditional English or Flemish bond masonry, it is possible to reduce in the material cost of bricks by 25% and about 10to 15% in the masonry cost. By adopting rat-trap bond method one can create aesthetically pleasing wall surface and plastering can be avoided.

Concrete block walling

In view of high energy consumption by burnt brick it is suggested to use concrete block (block hollow and solid) which consumes about only 1/3 of the energy of the burnt bricks in its production. By using concrete block masonry the wall thickness can be reduced from 20 cms to 15 Cms. Concrete block masonry saves mortar consumption, speedy construction of wall resulting in higher output of labour, plastering can be avoided thereby an overall saving of 10 to 25% can be achieved.

Soil cement block technology

It is an alternative method of construction of walls using soil cement blocks in place of burnt bricks masonry. It is an energy efficient method of construction where soil mixed with 5% and above cement and pressed in hand operated machine and cured well and then used in the masonry. This masonry doesn't require plastering on both sides of the wall. The overall economy that could be achieved with the soil cement technology is about 15 to 20% compared to conventional method of construction.

Doors and windows

It is suggested not to use wood for doors and windows and in its place concrete or steel section frames shall be used for achieving saving in cost up to 30 to 40%.Similiarly for shutters commercially available block boards, fibre or wooden practical boards etc., shall be used for reducing the cost by about 25%.By adopting brick jelly work and precast components effective

ventilation could be provided to the building and also the construction cost could be saved up to 50% over the window components.

Lintels and Chajjas

The traditional R.C.C. lintels which are costly can be replaced by brick arches for small spans and save construction cost up to 30 to 40% over the traditional method of construction. By adopting arches of different shapes a good architectural pleasing appearance can be given to the external wall surfaces of the brick masonry.

Roofing

Normally 5″(12.5 cms) thick R.C.C. slabs is used for roofing of residential buildings. By adopting rationally designed in situ construction practices like filler slab and precast elements the construction cost of roofing can be reduced by about 20 to 25%.

Filler slabs

They are normal RCC slabs where bottom half (tension) concrete portions are replaced by filler materials such as bricks, tiles, cellular concrete blocks, etc. These filler materials are so placed as not to compromise structural strength, result in replacing unwanted and nonfunctional tension concrete, thus resulting in economy. These are safe, sound and provide aesthetically pleasing pattern ceilings and also need no plaster.

For more on filler materials check Filler Materials Used in Concrete.

Jack arch roof/floor

They are easy to construct, save on cement and steel, are more appropriate in hot climates. These can be constructed using compressed earth blocks also as alternative to bricks for further economy.

Ferro cement channel/shell unit

Provide an economic solution to RCC slab by providing 30 to 40% cost reduction on floor/roof unit over RCC slabs without compromising the strength. These being precast, construction is speedy, economical due to avoidance of shuttering and facilitates quality control.

Finishing Work

The cost of finishing items like sanitary, electricity, painting etc., varies depending upon the type and quality of products used in the building and its cost reduction is left to the individual choice and liking.

Conclusion

The above list of suggestion for reducing construction cost is of general nature and it varies depending upon the nature of the building to be constructed, budget of the owner, geographical location where the house is to be constructed, availability of the building material, good construction management practices etc. However it is necessary that good planning and design methods shall be adopted by utilizing the services of an experienced engineer or an architect for supervising the work, thereby achieving overall cost effectiveness to the extent of 25% in actual practice.

Chapter 6. Swatch Bharat Abhiyan (Clean India)

6.1 Swatchhta needed in allocated village

In vamaiya village there are no facilities for garbage collection. There is lack of collection of door to door waste collection. Vamaiya village has not provided dustbins for collection of waste and garbage. People of vamaiya village collect the waste on road side and flame it time by time. It is harm full to villagers of vamaiya village.

Fig 53: waste collection on road

6.2 Guidelines for Swachht Abhiyan

Swachh Bharat Mission (SBM), Swachh Bharat Abhiyan (SBA), or Clean India Mission is a country-wide campaign initiated by the Government of India in 2014 to eliminate open defecation and improve solid waste management (SWM). Phase 1 of the mission lasted till October 2019. Phase 2 will be implemented between 2020–21 and 2024-25.

Initiated by the Government of India, the mission aimed to achieve an "open-defecation free" (ODF) India by 2 October 2019, the 150th anniversary of the birth of Mahatma Gandhi. The objectives of the first phase of the mission also included eradication of manual scavenging, generating awareness and bringing about a behavior change regarding sanitation practices, and augmentation of capacity at the local level. The second phase of the mission aims to sustain the open defecation free status and improve the management of solid and liquid waste. The mission is aimed at progressing towards target 6.2 of the Sustainable Development Goals Number 6 established by the United Nations in 2015.

The campaign's official name is in Hindi. In English, it translates to "Clean India Mission". The campaign was officially launched on 2 October 2014 at Rajghat, New Delhi by Prime

Minister Narendra Modi. It is India's largest cleanliness drive to date with three million government employees and students from all parts of India participating in 4,043 cities, towns, and rural communities. At a rally in Champaran, the Prime minister called the campaign Satyagrah se Swachhagrah in reference to Gandhi's Champaran Satyagraha launched on 10 April 1916.

The mission was split into two: rural and urban. In rural areas "SBM - Gramin" was financed and monitored through the Ministry of Drinking Water and Sanitation; whereas "SBM - urban" was overseen by the Ministry of Housing and Urban Affairs.

As part of the campaign, volunteers, known as Swachhagrahis, or "Ambassadors of cleanliness", promoted indoor plumbing and community approaches to sanitation (CAS) at the village level. Other activities included national real-time monitoring and updates from non-governmental organizations (NGOs) such as The Ugly Indian, Waste Warriors, and SWaCH Pune (Solid Waste Collection and Handling).

The core objectives of the first phase of the mission were to reduce open defecation and improve management of municipal solid waste in both urban and rural areas. Elimination of open defecation was to be achieved through construction of individual household level toilets (often twin pit pour flush pit latrines), toilets and public toilets. For improving solid waste management, cities were encouraged to prepare detailed project reports that are bankable and have a financial model.

The second phase on the other hand focuses on sustaining gains of the first phase and improving management of the solid and liquid wastes.

The government provided subsidy for construction of nearly 110 million toilets between 2014 and 2019, although some Indians especially in rural areas choose to not use them. The campaign was criticized for using coercive approaches to force people to use toilets. Some people were stopped from defecating in open and threatened with withdrawal from government benefits.

Fig 54: Swachha Bharat Abhiyan

Chapter 7. Village condition due to Covid-19

7.1 Taken steps in Vamaiya Village

There are 17 patients detected positive in covid-19 of Vamaiya village. 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.

Health measures

- The COVID-19 regulations were immediately supplemented with the n-COVID-19 Guidelines. These guidelines cover: (i) case definitions, (ii) basic infection prevention control measures, and (iii) standard precautions to be followed during the care and treatment of suspected patients.
- On March 15, the government instructed all higher education institutions and other educational institutions including schools, polytechnics, anganwadis, to shut down till March 29. However, examinations of class X, XII, and universities were permitted to continue. Further, spitting in public was made a punishable offence.
- On March 19, the government ordered the closure of gyms, amusement parks, wedding halls, till March 31. Additionally, all private doctors, practicing modern as well as traditional systems of medicine, were instructed to report suspect cases to the government.
- A Fever Helpline 104 was launched on March 20 for reporting of suspect cases of COVID-19. Further, guidelines were also issued on the reporting of cases of Severe Acute Respiratory Illnesses (SARI) to the government. These include: (i) preparation of travel history and contact lists of reported suspect cases, (ii) nodal officer to decide on steps and treatment protocol for such cases, (iii) relevant authorities to initiate follow up and contact tracing for the patient for last 14 days, and (iv) initiating cluster management guidelines when new cases emerge.

Essential goods and services

- On March 20, a committee was formed by the government for daily monitoring of the availability, supplies, and manufacturing of medicines, masks, and sanitizers. On March

21, a Khas Kharid Committee was set up to ensure procurement of necessary medicines, equipments, and human resources during emergencies, bypassing existing purchase guidelines, if necessary.

- Between March 21 and March 22, the government announced a partial lockdown and released a list of essential services and businesses that were allowed to operate till March 25 in the cities of Ahmedabad, Surat, Vadodara, Rajkot, Kutch and Gandhinagar. These include: (i) government and municipal departments, (ii) shops selling essential goods, (iii) various medical facilities such as hospitals, clinics, and pharmacies, (iv) public utilities, (v) railways and transportation facilities, (vi) media, telecom, IT services, and (vii) banks and insurance firms.
- The government also invited NGOs to collaborate in the fight against COVID-19, by arranging for the supply of masks, sanitizers, and infrared thermometers, and running awareness campaigns.

Administrative measures

- On March 18, the government issued guidelines specifying preventive measures to be taken in all government offices and employees. Recommendations inlcude: (i) avoiding face-to-face meetings and non-essential travel, (ii) closure of gyms and yoga centres in the Secretariat, (iii) home quarantine for officials exhibiting any symptoms, and (iv) mandatory leave to be given to such persons going on quarantine.
- On March 21, the government released the terms of reference of Regional Nodal Officers appointed to work towards preventing the spread of COVID-19.
- On March 23, the Gujarat Legislative Assembly decided to indefinitely postpone the Rajya Sabha elections that were originally to be held on March 26.

Other measures

- An advisory was issued requesting private firms to not lay off workers (even if they fall sick to COVID-19) or reduce their salaries.

During the lockdown

On March 23, the state government extended and expanded the partial lockdown announced in select cities to the entire state. The lockdown was to be in place from March 23 to March 31. In addition to the exemptions announced in the partial lockdown orders, services such as (i) cattle feeding and veterinary services, (ii) stock broking, (iii) postal and courier services, and (iv)

operation of industries where workers are available on site, were permitted. The state-wide lockdown has been followed by a nation-wide lockdown since March 25. This has been further Extended until May 17. Some of the key measures undertaken during the lockdown period are:

Health measures

- On March 27, all private clinics and hospitals in the state were directed to utilize the Dr. TeCHO mobile app developed by the government. The app can be used for uploading information related to: (i) sample collection and (ii) reporting and surveillance of all SARI cases. Another app was launched to keep track of home quarantined people.
- On March 30, COVID-19 was included as a notified disaster under the State Disaster Response Fund (SDRF). Thus, all expenditure related to relief measures for displaced / homeless people, migrant labour or other stranded persons due to the lockdown, will be made out of the SDRF.
- On March 31, the government released new guidelines for the clinical management of COVID-19. These cover: (i) triage activities, (ii) case definitions and classification, (iii) infection and prevention control measures, (iii) specimen collection and handling, (iv) management and prevention of medical complications, (v) clinical management for COVID-19, (vi) discharge policy for patients, and (vii) dead body management.
- To exclusively cater to COVID-19 cases, four government hospitals and three private hospitals were declared as designated COVID-19 treatment facilities. Further, the government instructed all COVID-19 hospitals to provide treatment to the people free of cost. On May 1, 26 hospitals were additionally designated as COVID-19 facilities.

Resource Management:

- Between March 31 and April 7, the government initiated multiple measures to address the shortage of medical practitioners in government hospitals. These include: (i) extending tenures of retiring medical personnel, (ii) ad-hoc recruitment of teachers in medical colleges, (iii) contract-based appointments of class-1 specialist and class-2 medical officers from private sector, (iv) additional responsibilities to select class-1 doctors from the epidemiologist department, and (v) temporary shifting of Ayurvedic medical officers to various locations.
- On March 28, the state released guidelines for Human Resource management (HRM) in COVID-19 facilities. These include: (i) creation of district level task forces, (ii) patient

flow algorithm, (iii) deployment and rotation of HR, including residents and nursing staff, and (iv) pooling of HR from various institutes and cadres.

- The state has also allowed the use of AYUSH remedies and medicines, particularly for persons quarantined through contact tracing and to frontline personnel. Teams of corona warriors have been formed to assist people with preventive care. In addition, local officials have been asked to utilize the services of important stakeholders such as teachers, priests, and others, who can influence the social behavior of people to deal with COVID-19.
- A new State Health System Resource Centre has been established as the nodal agency in the state for all COVID-19 related research. Further, a COVID-19 research activity committee has been set up to lead this endeavour.

Welfare measures

- On March 25, the state government decided to provide ration to 60 lakh poor families who live on daily wages. Further, on March 28, to minimize the adverse effects of lockdown on casual labor, auto rickshaw drivers, and street vendors, the government announced free wheat, rice, pulses, sugar, and iodized salt for the month of April 2020.
- A Vadil Vandana scheme was launched to provide free of cost meals to the elderly and the aged living alone in various cities of the state.
- The government announced compensatory packages worth Rs 25 lakh for each frontline worker who may lose life on COVID-19 duty. Such workers include: (i) police personnel and (ii) other government employees under the state government, panchayats, and nagarpalikas.

7.2 Activities Done by Students for Vamaiya Village

- Give awareness about covid-19.
- Insist villagers to wear mask.
- Teach steps of hand wash to villagers.
- Give awareness about social distance.
- Inform villagers to use packing things after sanitation is done.
- Insist villagers to drink pure and hot water

Chapter 8. Sustainable Design Planning Proposal Part- I

8.1 Design Proposals

8.1.1 Sustainable Design

In the Part-I of Vishwakarma Yojana Phase-VIII we have selected two sustainable designs in this project report. One is of physical design of Public Toilet and the other one is of Bio Gas Plant for smart village design.

8.1.2 Public Toilet:

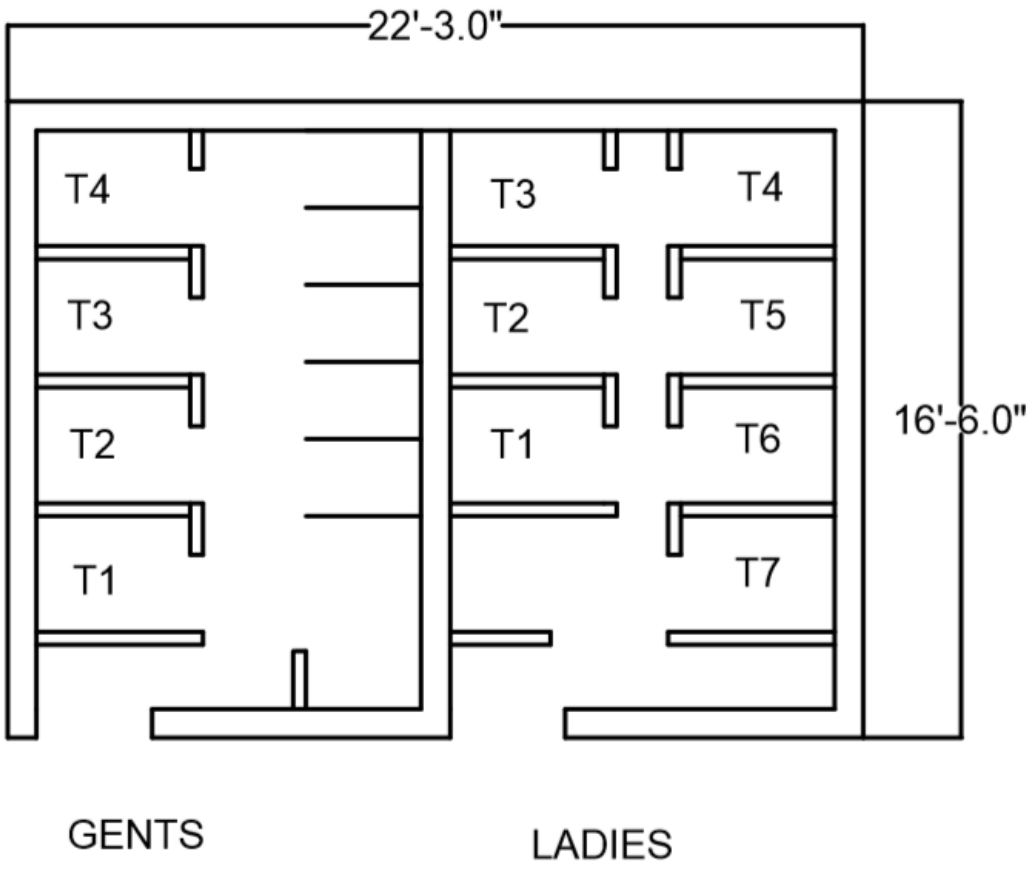


Fig 55: Plan View for Public Toilet

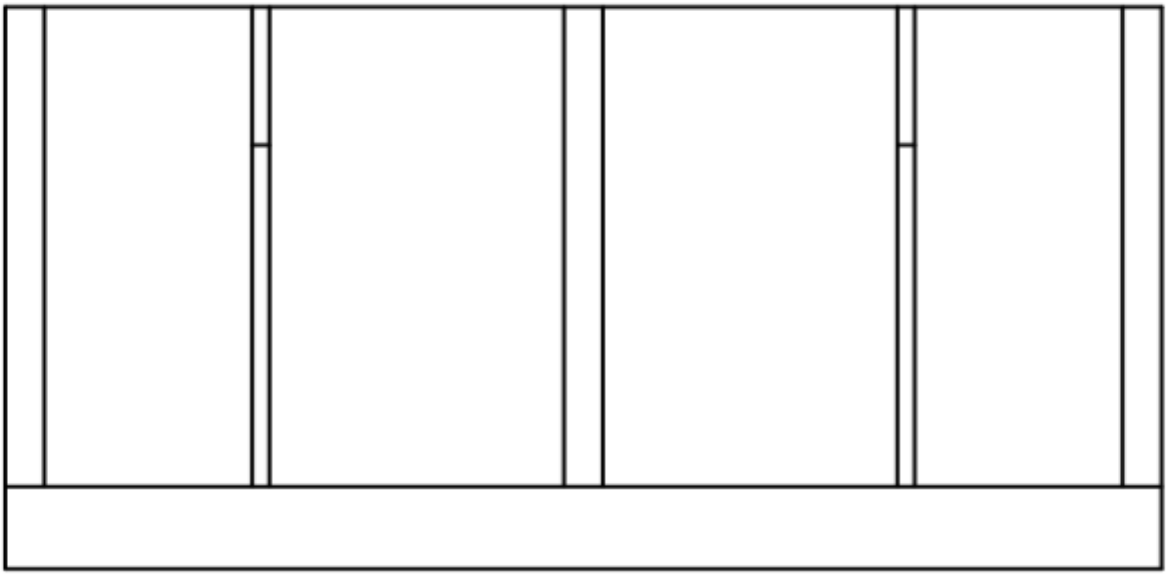


Fig 56 : Section View for Public Toilet

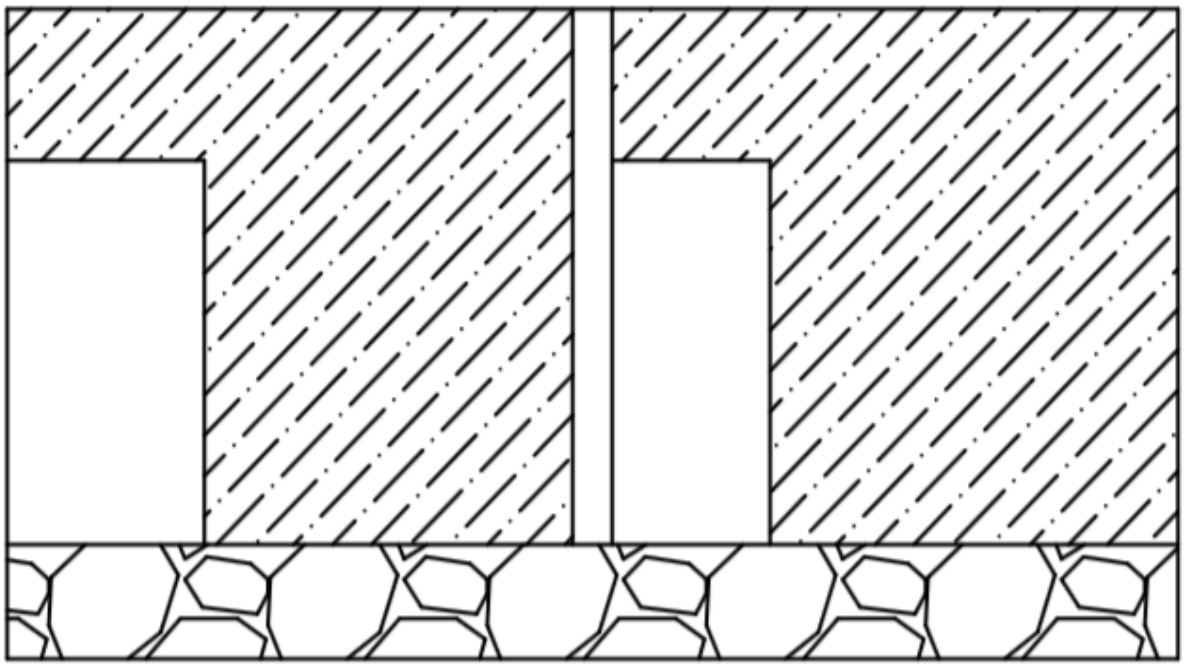


Fig 57: Elevation View for Public Toilet

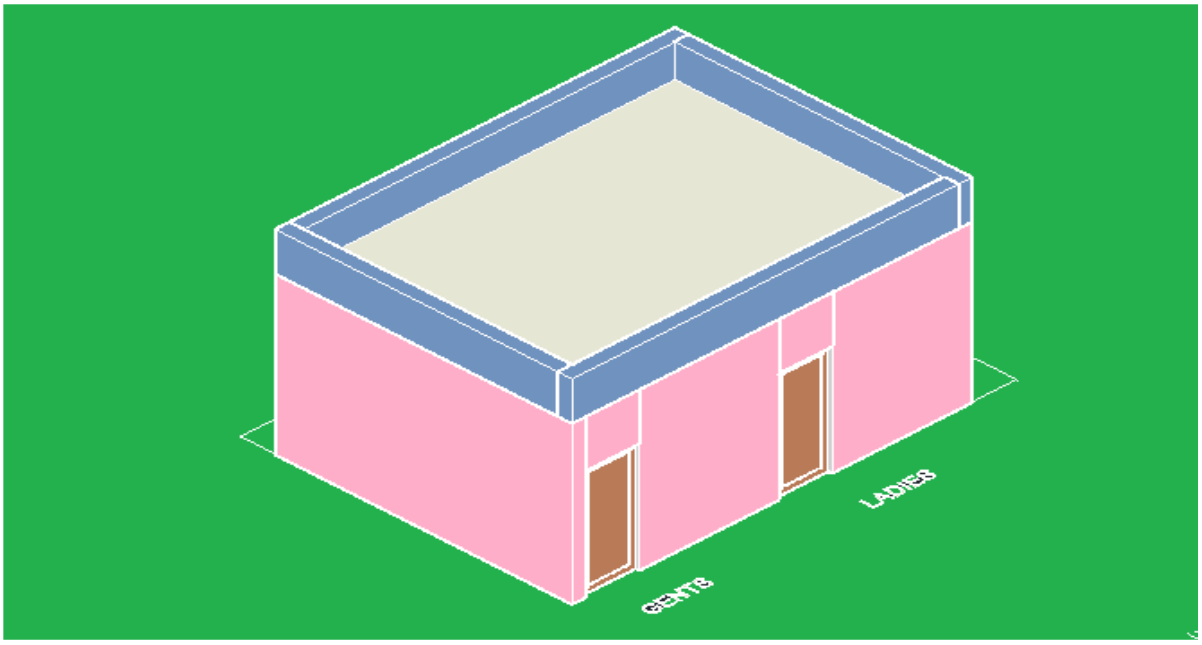


Fig 58 : 3D View for Public Toilet

Measurement Sheet for Public Toilet

Table 22: Measurement Sheet for Public Toilet

Sr. No	Item Description	No.	Length (m)	Breadth (m)	Height (m)	Quantity
1	Earth work in Excavation					
	Long Wall=7.09+0.9	2	7.99	0.9	0.3	**4.32 m^3**
	Short Wall=5.03-0.9	3	4.13	0.9	0.3	**3.35m^3**
						7.67m^3
2	PCC (1:3:6) in Foundation					
	Long Wall	2	7.99	0.9	0.3	**4.32 m^3**
	Short Wall	3	4.13	0.9	0.3	**3.25m^3**
						7.67m^3
3	First class brickwork up to plinth (1:6)					
	Long Wall = 7.99-0.67	2	7.32	0.23	0.61	**2.05 m^3**
	Short Wall = 4.13+0.67	3	4.8	0.23	0.61	**2.02m^3**
						4.07m^3
4	First class brickwork above the plinth up to first floor					
	Long Wall	2	7.32	0.23	3.05	**10.27 m^3**
	Short Wall	3	4.8	0.23	3.05	**10.10m^3**
	Short Wall:1	11	1.08	0.102	3.05	**3.7m^3**
	Short Wall:2	11	1.08	0.102	3.05	**4.34m^3**
						28.41m^3

Door & Window deduction D D1 Net Quantity = **23.18 m^3**	 2 11	 1.22 0.91	 0.2 0.2	 2.1 2.1	 1.0248 4.2042 **= 5.23m^3**

Abstract Sheet For Public Toilet

Table 23: Abstract Sheet for Public Toilet

Particulars	**Quality** **m^3**	**Per** **10 m^3**	**Total Amount** **Rs.**
Excavation for foundation	7.67	860	660
Cement concrete 1:4:8 in foundation	4.07	37674.9	15334
Brick bat cement in foundation (1:4:8)	28.41	31677	16824
First class brickwork in C.M. 1:6 in Superstructure (up to First Floor)	23.18	78888	182862
Net Amount of Cost up to First Floor Level		**288850**	

8.1.3 Biogas Plant:-

Design:

Total no. of animals in village = 580.

As per standard data assume per day dung of animals = 10.5 kg

So, total dung per day = 580 x 10.5

= 6090 kg/day

Design of Digester:

Assume retention period (R) = 70 days

Now total amount of slurry per day (S) = Total dung per day + water amount

= 6090 + 2(6090)

= 18270 kg/day

= 18.27 m3/day

Digester Volume = S x R = 18.27 x 30 = 1278.9 = 1280 m3

Assume cylinder shape biogas plant.

Provide total 2 no. of unit in different area.

So, digester volume becomes = 1280/2 = 640 m3

Provide = 640 m3

Total digester volume (Vd) = πr2h

640 = πr2 (10) , assume h = 10 m

r = 4.51 m

So, dimensions are h = 10 m, r = 4.5 m

Design of Gas Holder:

Assume digester temperature = 26-28 ^{O}C

Now,

Specific Gas Production (Gd) = 37 liter/day

Daily Gas Production G = Gd x Feed Volume

= 37 x 12870 = 675990 lit = 676 m3

Assume Gas Holder capacity = 60%

Gas Holder Volume = Daily Gas Production x Capacity of Holder

= 676 x 0.60

= 406 m3

So, take gas holder volume = 300 m3

Now, for 6 units provide volume of holder each unit = 300 m3 / 2 = 150 m3

Provide cylinder shaped,

Therefore, Volume = πr2h

150 = πr2 (1) assume h = 1

r = 6.91 m

So, dimension of the gas holder: h = 1 m, r = 7 m

Design of Inlet and Outlet:

Total Volume of slurry mix deposit = 18.27 / 2 = 9.135 m3 / day

Assume two-time filling operation in plant.

So, take total volume of slurry = 9.135 / 2 = 4.567 m3 / day = 4 m3 / day

Provide Rectangular tank.

So, Total volume for one time mixing of slurry = L x B x H

5 = L x B x 1

Dimensions of inlet: L = 3 m

B = 2 m

H = 1 m

Here, 5 m3 / day required < 6 m3 / day provided.

….. Hence OK.

Provide same size of outlet also.

CONSTRUCTION OF GAS PIPELINE:

The gas pipe conveying the gas from the plant to users point is vulnerable for damages by people, domestic animals and rodents. Therefore only heavy quality galvanized iron pipe should be used which must be, where possible buried 30m below ground level. Fittings in the pipeline must be sealed with zinc putty and Teflon tape. any other sealing agent , like grease , paint only , soap etc must be avoided.

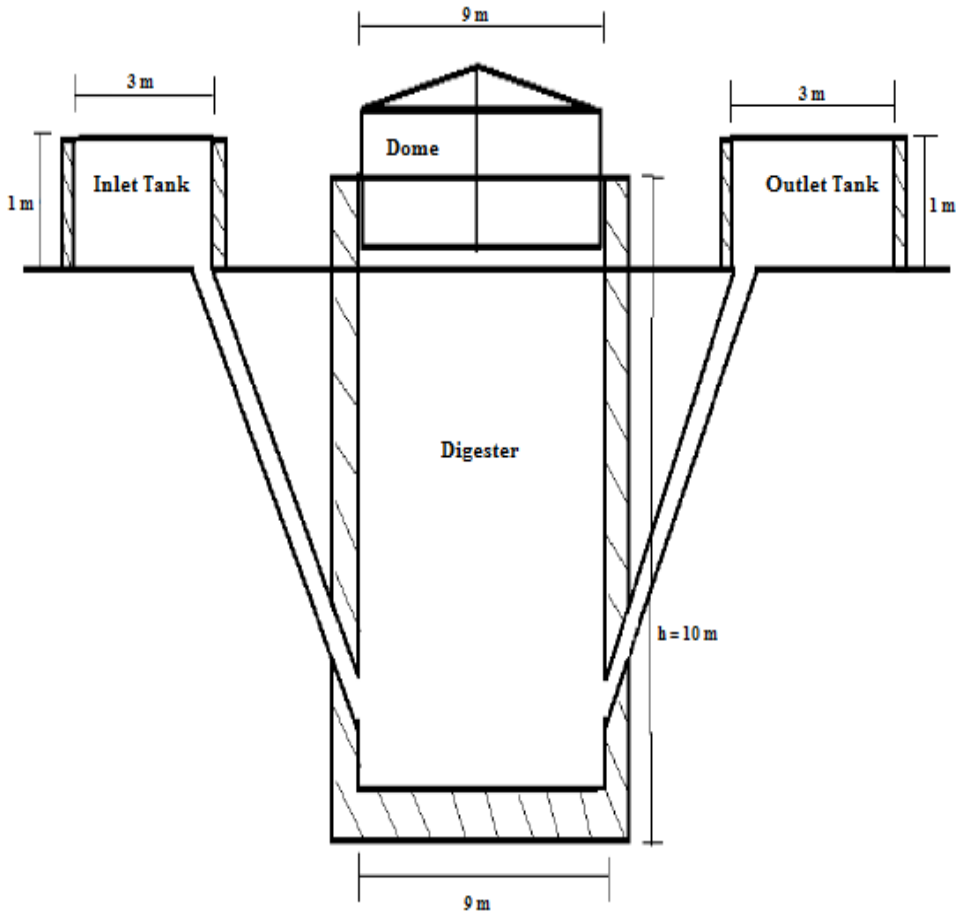


Fig 59:- Biogas Plant

8.1.4 Assembly polling booth cum conference hall using green wall concept (Smart village Design) :

Design of Assembly polling booth cum conference hall using green wall concept

- There is no Assembly polling booth and any conference hall available in the village, Primary school were used for election purpose so we will try to give design of Assembly Polling booth cum conference hall using green wall.

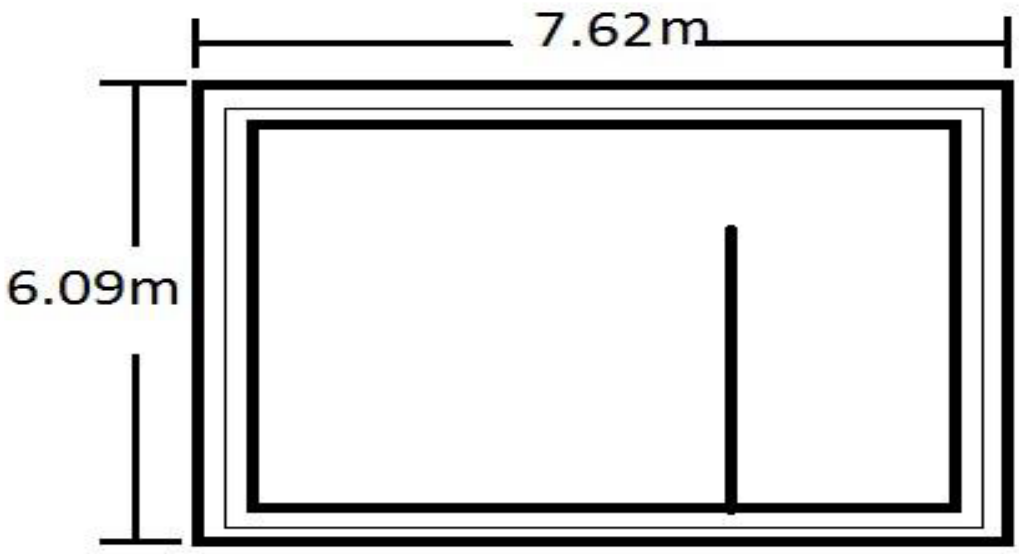


Fig 60 :- plan of assembly polling booth cum conference hall

Table 24 :- Measurement sheet Assembly Polishing Booth

Measurement Sheet						
Sr No	**Item Description**	**Nos**	**Length**	**Breadth**	**Height**	**Quantity(M^3)**
1	Excavation for ordinary soil	1	26.512	0.9	0.9	**21.47**
2	P.C.C.(1:4:8)	1	26.512	0.9	0.2	**4.77**
3	Masonry work					
	(i) First footing	1	26.512	0.6	0.15	2.38
	(ii) Second footing	1	26.512	0.5	0.15	1.98

	(iii) Third footing	1	26.512	0.4	0.15	1.59
	(iv) Fourth footing	1	26.512	0.23	0.25	1.52
						7.47
4	Masonry up to slab level	1	26.512	0.23	4	**24.39**
5	Parapet	1	26.512	0.23	1	**6.09**
6	Deduction					
	Window	5	0.914	0.23	0.914	0.96
	Door	1	0.914	0.23	1.83	0.38
						1.34
7	Concrete in slab	1	7.62	6.092	0.185	**8.59**

Table 25 :- Abstract sheet Assembly Polishing Booth

Abstract Sheet					
Sr no	**Particulars**	**Quantity/Nos.**	**Cost**	**per**	**Amount in INR**
1	Brickwork	18305	4000	1000	73,220
2	Excavation	21.47	100	M^3	2,147
3	PCC	4.77	4000	M^3	19,080
4	Slab	8.59	4000	M^3	34,360
5	Steel	1148.65 Kg	46	kg	52,837
6	Green Wall	500 M^2	100	M^2	50,000
				Total	2,31,644/-

Costing

Total 2,31,644/-

Add 10% contractor profit = 23,164/-

Add 2% water charges = 4633/-

Add lump-sum = 1000/-

Total Cost= 231644+23164+4633+1000 = 2,60,441/-

8.1.5 Physical design :- (U/G SUMP)

- **Sump Design Calculation:-**
  - Capacity of Water Tank = 1 lakh +25000 liter
  - Total capacity of overhead Water tank = 1.25 lakh liter
  - As per norms the capacity of sump is twice of overhead water tank.
  - So, sump capacity is 250 = 2 x Overhead water tank capacity

    = 1.25 lakh liter x 2 = 2.5lakh liter

    = Sump capacity is 250 m^3
  - Now, assume height of sump is 4 m and other dimension as below.
- **Calculation of sump:-**
  - Sump capacity (m^3) = $\prod$/4 x D^2 x h

    = 250 m^3 = $\prod$/4 x D^2 x 4
  - D = 8.89 m say provide 9 m
  - Thickness wall Provide = 300 mm = 0.30 m
  - Provide thickness of base slab of sump is 300 mm = 0.30m
  - Provide thickness of top slab of sump 160mm = 0.16m
  - Draw plan, elevation, section

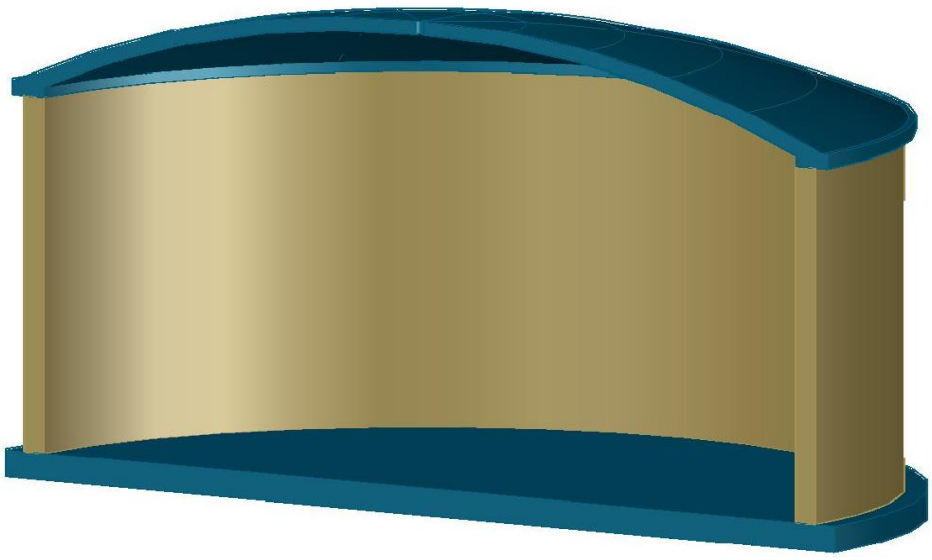
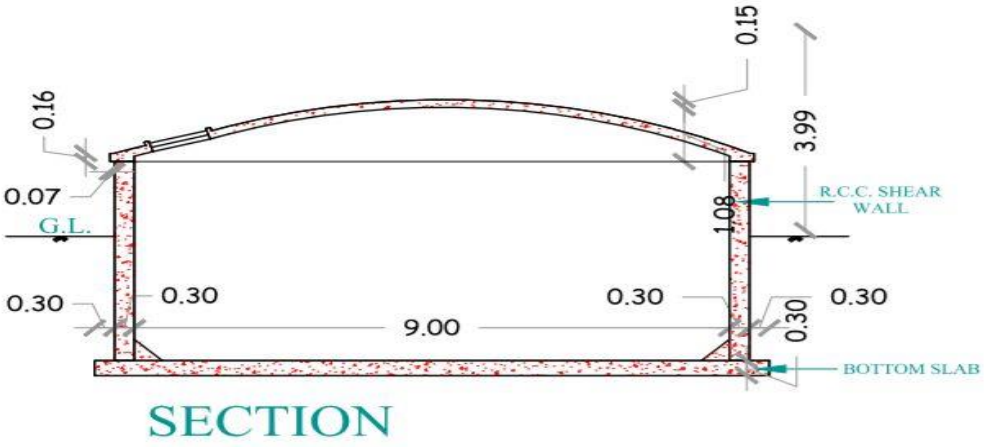
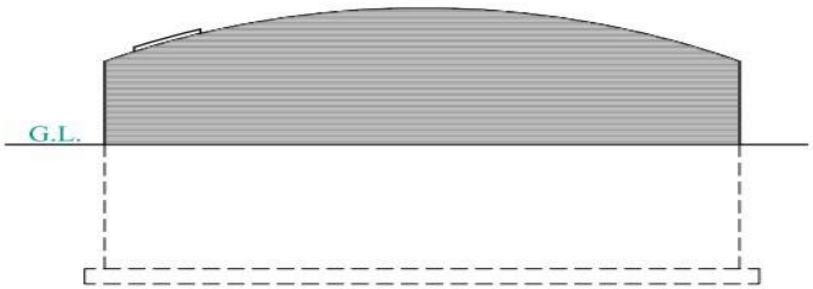


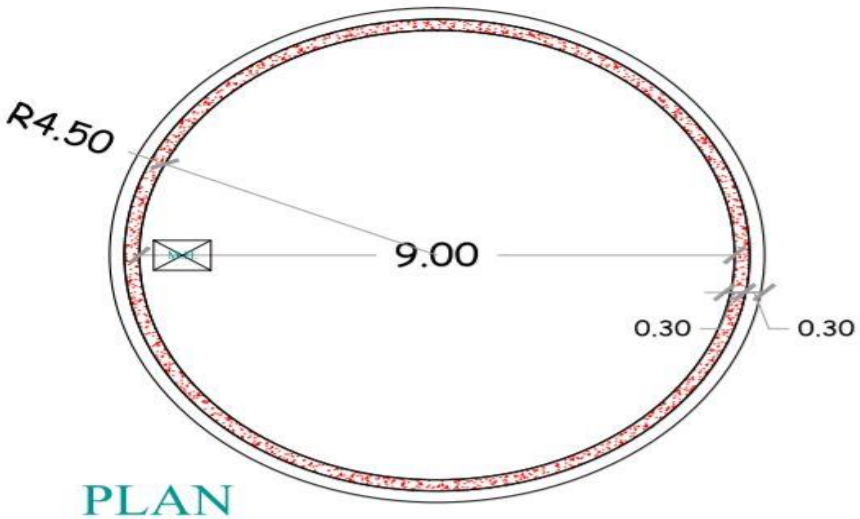
Fig No. 61 : U/G sump (3D)



SECTION



ELEVATION



PLAN

Fig no. 62 :-Underground sump

Measurement Sheet U/G Sump

Table no. 26:-Measurement sheet (U/G sump)

Sr No.	Item Description	Unit	nos.	Area	Length	Width	Height	Quantity	Total Quantity(m^3)
1.00	**Excavation**								
	Excavation below the ground level								
	As Per circular sump Total area is Π/4*d^2=81.71 m^2. Total depth of sump below ground level is 2.8 m.	m^3	1	81.71			2.8	228.788	228.788
2.00	**RCC Work In Base Slab**								
	RCC work At Base Slab As Per circular area is 81.71 m^2. Total depth of Base Slab is 0.3 m.	m^3	1	81.71			0.3	24.513	
3.00	**RCC Work Cylindrical wall**								
	Total center Line Length of wall is Π*D =29.22 m. width of wall is 0.3 m.	m^3	1		29.22	0.3	4	35.064	
4.00	**RCC Work Top Dom of water sump**								
	Top spherical area of Dom is ΠD*(D-Hc) =67.77 m^2. (here, spherical dia. (D)=18.76 &Hc = 1.15)	m^3	1	67.77		0.15		10.1655	
	Entrance Cap Deduction in top dom.	m^3	1	0.64	0.8	0.8	0.15	0.096	

								Total	69.6465
5.00	**Plaster Work**								
	Cylindrical Wall Outer Side above ground.	m^2	1		29.22	0.02	1.5	0.8766	
	For Top Dom	m^2	1	68.36			0.02	1.3672	
	deduction for Entrance Cap in Top Dom	m^2	1		0.8	0.8	0.02	0.0128	
								Total	2.231

Abstract Sheet U/G Sump

Table no. 27:-Abstract sheet (U/G sump)

Sr No.	Item Description	Unite	SOR	Total Quantity	Total Rate
1	**Excavation**				
	Excavation for foundation up to 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff up to 50 Meter lead.(B) Dense or Hard soil	cu.m	152	122.57	18630.64
	Excavation for foundation for depth from 1.5 m to 3.0 m including sorting out and stacking of useful materials and disposing off the excavated stuff up to 50 Meter lead.(B) Dense or Hard soil	cu.m	165	106.22	17526.3
2	**RCC Work**				
	RCC Work In Base Slab	cu.m	5620	24.52	137802.4
	RCC Work Cylindrical wall	cu.m	6210	35.06	217722.6

	RCC Work Top Dom	cu.m	5960	10.1	60196
3	**Plaster Work**				
	Out-Side Plaster				
	20mm thick sand faced cement plaster on walls up to height 10 meters above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete.	Sq.m	189	111.55	21082.95
	In-side Plaster				
	Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering up to floor two level and finished even and smooth in (I) Cement mortar 1:3 (1-cement:3-sand)	Sq.m	108	248.2	26805.6
	Total Estimated Cost of Main Items				204321.59
	Add 20% cost of Miscellaneous Building Items				40864.318
	Add 10% contractor profit				24518.5908
	Final Estimated Cost Building				269704.4988

8.1.6 Heritage Design:-

Chabutara

A heritage structure is make good appearance on the people and its preserve our culture.

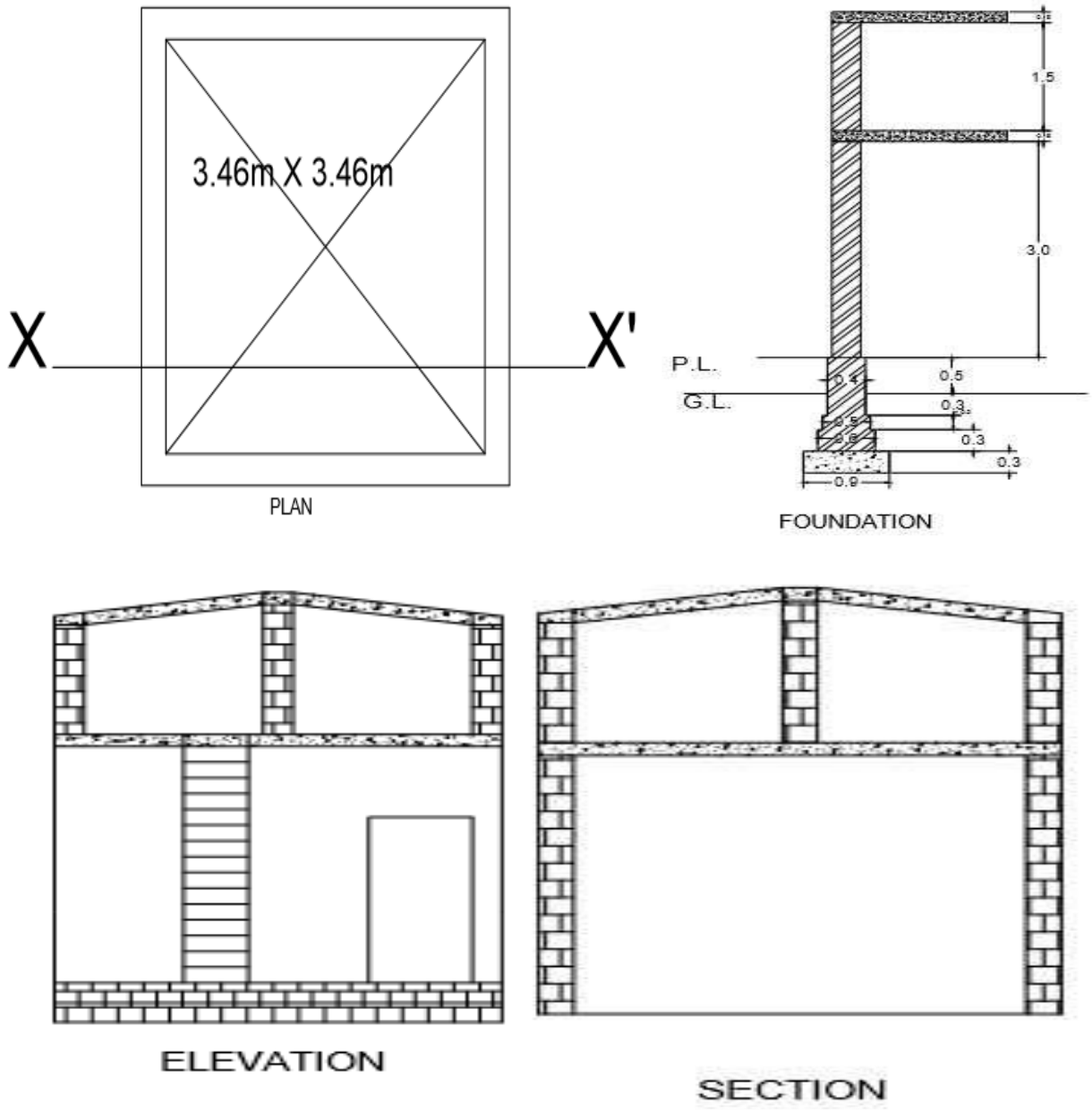


Fig no. 63:- Plan, Elevation, Section of Chabutara

Total center line = 13.2 m

Net center line = 13.2 m

Table no. 28:- Measurement sheet Chabutara

Measurement sheet							
Sr no.	**Item Description**	**Nos**	**Length(m)**	**Width(m)**	**Height(m)**	**Quantity(cu.m)**	**Total Quantity**
1	Excavation for foundation in Soft ordinary soil. Total length = 13.2 m	-	13.2	0.9	1.1	-	13.068
2	Providing and laying Foundation concrete (P.C.C.) (1:4:8) at Foundation.	-	13.2	0.9	0.3	-	3.564
3	Providing and laying Brick masonry at foundation up to G.L.	-				-	
3.1	1st footing Total length= 13.2 m	-	13.2	0.6	0.3	2.367	7.911cu.m.
3.2	2nd footing Total length= 1.2 m	-	13.2	0.5	0.2	1.32	
3.3	3rd footing (up to G.L.) Total length= 13.2 m	-	13.2	0.4	0.3	1.584	
3.4	Brick masonry up to P.L.	-	13.2	0.4	0.5	2.64	
4	Providing refilling of the ordinary soil	Refilling = Total Excavation – (P.C.C. + Brick masonry of 1st – 3rd footing + Brick masonry up to G.L.) = 4.237 cu. m.					

	in foundation trenches.						
5	Providing and refilling of the Yellow soil up to the Plinth level.	Refilling = 4.5 cu. m.					
6	Providing and laying Brick masonry up to bottom of the Slab. Total length = 13.2 m	1	13.2	0.3	3	11.88	11.88
	Deduction D	1	0.8	0.3	2.1	0.504	0.504
	Brick masonry 1st slab to 2nd slab	5	0.3	0.3	1.5	0.675	0.675
							Total brickwork = 12.042 cu. m.
7	Providing and Laying R.C.C. (1:2:4) work for 1st slab	1	3	3	0.15	1.35	1.35
	Providing and Laying R.C.C. (1:2:4) work for 2nd slab	1	3.48	3.482	0.15	1.81	1.81
	R.C.C. Chajja(1:2:4) D	1	0.95	0.6	0.15	0.086	0.086
							Total R.C.C. (1:2:4) Work = 3.246 cu. m.
9	Plaster						
9.1	inside plaster Total length =	5	3	3		45	45 sq.m
	Deduction D	1	0.8		2.1	0.252	0.252 sq.m
							Total outside plaster = 45.252 sq. m.
9.2	outside plaster up to 1st slab	4	3.65		3	43.5	43.8 sq.m
	Plaster for brick masonry column	5	0.3		1.5	2.25	2.25 Sq.m

	up to 1st to 2d slab						
	Deduction D	1	0.8		2.1	0.252	0.252 Sq.m
							Total inside plaster = 45.79 sq. m.
10	Flooring		3	3		9	9 Sq.m

Table no. 29:- Abstract Sheet Chabutara

Abstract Sheet					
Sr no.	**Particulars**	**Total Qty.**	**Rate**	**Per**	**Amount**
1	Excavation for foundation in soft ordinary soil.	13.068	86	M^3	1123.84
2	Providing and laying Foundation concrete (P.C.C.) (1:4:8) at foundation.	3.564	3000	M^3	10692
3	Providing and laying Brick masonry at foundation and plinth.	7.911	900	M^3	7119.9
4	Providing refilling of the ordinary soil in foundation trenches.	4.23	106.93	M^3	452.31
5	Providing and refilling of the Yellow soil at Plinth level	4.5	211.78	M^3	953.01
6	Providing and laying Brick masonry upto bottom of the slab	12.051	3530	M^3	42540
7	Providing and Laying R.C.C. (1:2:4) work	3.24	8800	M^3	28512
8	Providing 12 mm thick cement plaster in C.M. (1:4)	91.042	130	M^2	11835
9	Providing and fixing tile flooring	9	600	M^2	5400
		Total cost in Rupees =108628.06			

Additional costs.

Work out charges and contractor profit 10 % + Contingency charges (2% of the total cost) =

13035+108628= 121663 rs

1. Workout for materials required for R.C.C. slab, Lintels and Chajja 1: 2: 4 with 1% steel.

Volume of cement concrete in RCC slab + lintels + Chajja = 9.95 cu. m.

Taking 1.52 times more for dry volume of concrete = 1.52 X

9.95= 15.124 m3 Proportion = 1: 2: 4 => 1+2+4 = 7

- Cement =21 bags

- Aggregate =2 cu. m.
- Weight of Steel = 280 kg

2. Workout for materials required for P.C.C. work 1 : 4 : 8.

Volume of concrete required = 3.56 m3

- Cement = 12 bags
- Sand = 1.66 m3
- Aggregate = 3.32 m3

3. Workout for materials required for Plasterwork 1 : 4

Volume of concrete required = 91X 0.012 = 1.092 m3

Volume of wet mortar = 1.20 X 1.092 = 1.3104 m3

Volume of dry mortar = 1.35x1.3104 m3 = 1.769 m3

- Proportion = 1:4
- Cement = 11 bags
- Sand = 1.41 m3

4. **materials for brickwork (1 : 6)**

Volume of total brickwork = 20 m3

- Cement = 27 bags
- Sand (F.A.) = 5.65 m3
- Bricks = 10000 nos.

Table no. 30:- Material abstract Sheet

Material abstract Sheet					
Sr no.	**Particulars**	**Qty.**	**Rate**	**Per**	**Amounts**
1	Cement	71	280	bag	19880
2	Aggregate	10.97	800	cu.m	8776
3	Bricks	10000	4000	1000 nos	4000
4	Steel	280	45	Kg	12600
				Total Cost = 81256 Rs.	

8.1.7 School sanitary complex:-

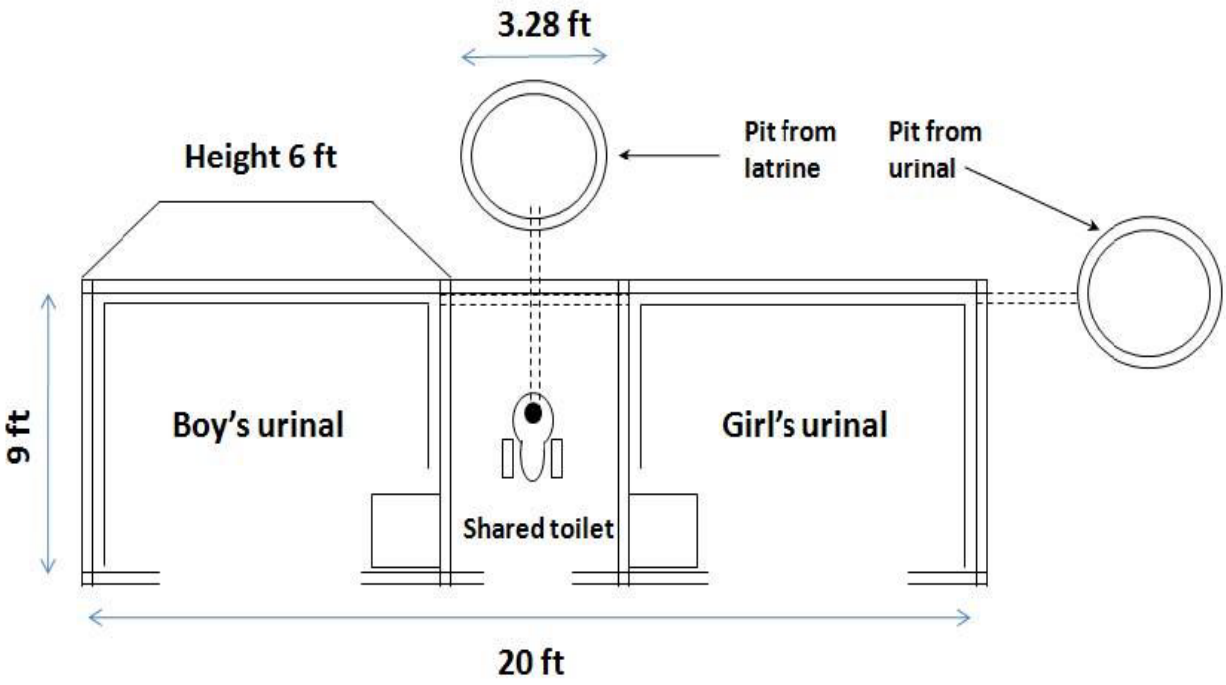


Fig no. 64:- School sanitary complex

Salient features:-

- School Sanitation is a tool for promoting better sanitation and water Management for children
- To improve the school environment
- Privacy for school children
- Following hygiene behaviors from the childhood
- Operation and maintenance by school children
- Separate facilities for children for urination and defecation
- School toilets should construct within the school campus
- Incinerator should be installed in girls toilet for menstrual hygiene management
- One toilet is enough for primary school children
- Water facilities and hand washing facilities should be inside of the toilet

Cost Estimate:-

Table no. 31:- Cost estimate of school sanitary complex

Sr No.	Particulars	Quantity/Nos.	Units cost	Amount Rs. Ps.
1	Cement	30 bags	280.00	8400.00
2	Sand	2 Units	2400.00	4800.00
3	Ceramic pan Water Closet 18‖ size with P trap and footrest	2 No.	270.00	540.00
4	Stoneware pipes – 4 ― or PVC pipes	8 Nos.	60.00	480.00
5	Earth work excavation charges	L.S.	….	1500.00
6	R.R. foundation work with soling stone	1Cart load	750.00	750.00
7	Basement work with R.R.	L.S.	….	1500.00
8	White washing and painting	L.S.	….	3000.00
9	Ceramic tiles and fitting charges	Tiles 8‖ x 8‖ size 12 boxes	500.00	6000.00
10	Water Tap connection to toilets and urinals	L.S.	….	1500.00
11	Pre-cast cement slab – 4‘x 2‘ size , 2‖ thickness – reinforced slab for toilet roof	8 Nos.	300	2400.00
12	Door with iron frame and tin sheet 5‘ x 2‘ size	4 Nos.	1000.00	4000.00
13	Country Bricks – 9‖ size	3000 Nos.	4.00	12000.00
14	Masonry charges	12 days	400.00	4800.00
15	Unskilled labour charges	24 days	Rs.150.00	3600.00
16	Transport Charges	….	….	1500.00
	Total cost			56770.00

8.1.8 Social design

Social design has become a popular topic in recent years. It is designated to solve social or local issues. Any products or services "design for the society" can be the purpose of design. Vamaiya Village faces the social issue to transform due to its outflow of labor force, loss of culture, and difficulty in sustaining traditional agriculture.

8.2 Reason for Students Recommending this Design

- Village has less number of proper Public Toilets.
- There are no facilities of Sanitation.
- There is no proper method for Pubic Urinals.
- There is lack of approach road to state high way.
- To provide better living facilities.
- To facilitate basic needs of day to day life.

8.3 About designs Suggestions / Benefit of the villagers

After providing these facilities in vamaiya village which are design above, everyday life style of villager of vamaiya village will be improved. Proper management of bath & WC in dwelling house gives good sanitation and healthy environment.

Due to providing proper Sanitation environmental problems can be reduce in village. Thus give better and healthy environment to villagers to vamaiya village.

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

- After completion of visit & data collection the project carried out in the current semester by the group members which includes the design of a sustainable facilities.
- The village still lacks in maintenance of the building and various structures. Taking this into consideration the estimation of its rehabilitation with other necessary amenities will be designed in the next semester.

In Next Semester We will Designs some Facilities like :

- Bus stand
- Physical Infrastructural design of pavement in graveyard with paver block
- Post Office
- Public Garden
- Solid Waste Management System
- Gazebo
- Modular Pre-Fab House
- Dwelling Houses
- Open Window Composite Structure
- Approach Road

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

The aim of Vishwakarma Yojana phase-VIII is to uplift the life style of the rural areas to its certain extent up to the level of an ideal village situated at the nearby location of that particular jurisdiction. We have tried to develop sustainable and economic technical design as per our knowledge and hard work from visiting the villages and providing standard design. In this phase we have mainly focused on the collection of data regarding the village and carried out surveys like socioeconomic survey, household interview survey etc.

Main idea behind development of villages or Rurbanisation is to decrease rate of migration from rural to urban area, equalizing facilities available to both urban and rural people and in short over all development of nation. The project carried by us indicates a clear indication of some of the most basic necessities that are fulfilled by the villages lack a lot behind the modern times and thus infrastructure facilities and some economic development is necessary.

As per problem observed in rural area preventive and renewable measures are suggested. Implementation of improvement will reduce problem in area and improve standard of living of village people. This can be resulted in improving social and economic effect of rural area on economy of the country and it may result in more efficient use of infrastructure. By caring out the Vishwakarma Yojna project work, Vishwakarma Yojna: Vamaiya Village came to know that if proper planning and guidance is provided youth can change the current situation of village. Thus, use of renewable energy, energy efficient equipment and proper use of energy can push village towards “Rurbanisation”.

In the Part of VY Project we have visited the Vamaiya village for the data collection i.e. information regarding existing facilities and proposed requirement of amenities. We carried out surveys like Tacho-economic surveys and home interview surveys. We met the Surpanch and the peoples of village and discussed about their problems and needs and noted down them. From the discussion we found the required proposed design facilities such as public toilet, biogas plant, dwelling houses, approach road for connection to main street, solid waste management etc.

By providing such facilities it will be quite easy for all the people of village to connect to peoples of outer world and it will be helpful to create more opportunities for village peoples.

Chapter 11. References refereed for this project

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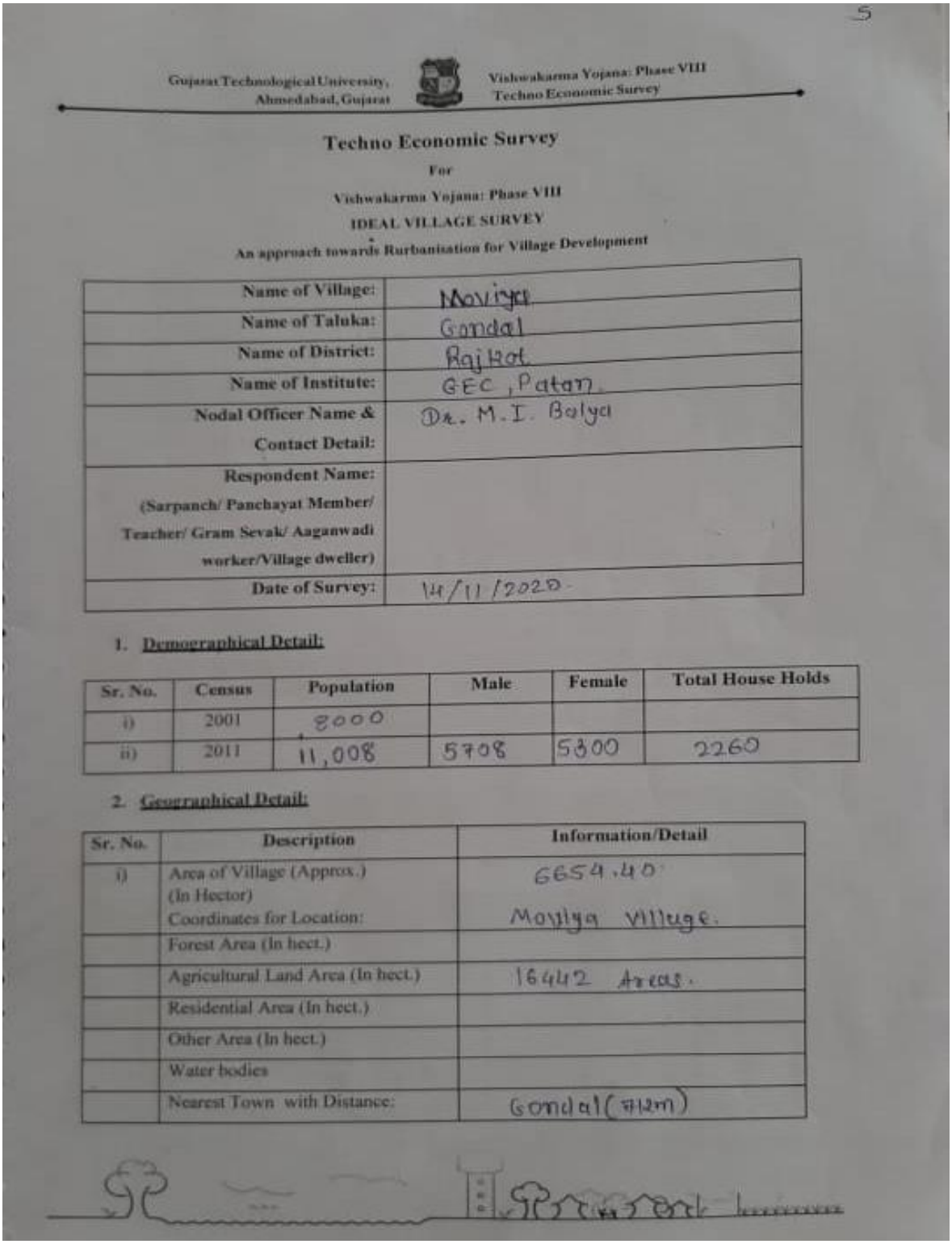
- https://www.nationalgeographic.org/encyclopedia/rural-area
- https://www.nationalgeographic.org/encyclopedia/urban-area

Chapter 12. Annexure attachment

12.1 Survey form of Ideal Village the report



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

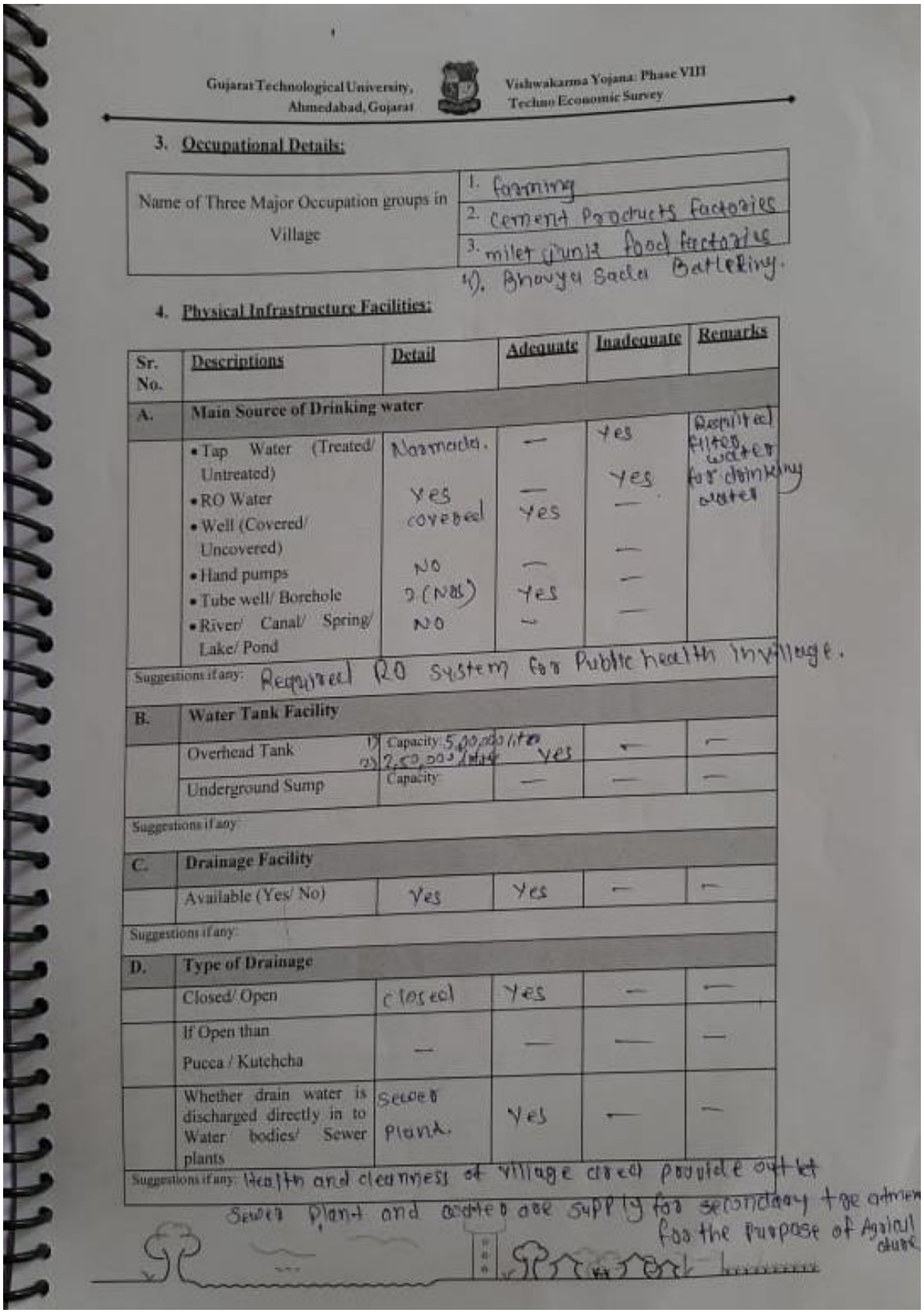
Name of Village:	Mavlya
Name of Taluka:	Gondal
Name of District:	Rajkot
Name of Institute:	GEC, Patan.
Nodal Officer Name & Contact Detail:	Dr. M.I. Balya
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	
Date of Survey:	14/11/2020

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	8000			
ii)	2011	11,008	5708	5300	2260

2. Geographical Detail:

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	6654.40 Mavlya Village.
	Forest Area (In hect.)	
	Agricultural Land Area (In hect.)	16442 Areas.
	Residential Area (In hect.)	
	Other Area (In hect.)	
	Water bodies	
	Nearest Town with Distance:	Gondal (41km)



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3. Occupational Details:

Name of Three Major Occupation groups in Village	1. farming 2. Cement Products factories 3. milet (Juvar) food factories 4). Bhavya Sacha Battering.

4. Physical Infrastructure Facilities:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	Narmada.	—	Yes	Required filter water for drinking water
	• RO Water	Yes	—	Yes	
	• Well (Covered/ Uncovered)	covered	Yes	—	
	• Hand pumps	NO	—	—	
	• Tube well/ Borehole	2 (Nos)	Yes	—	
	• River/ Canal/ Spring/ Lake/ Pond	NO	—	—	
Suggestions if any:	Required RO system for Public health in village.				
B.	**Water Tank Facility**				
	Overhead Tank	1) Capacity 5,00,000 lito 2) 2,50,000 lito	Yes	—	—
	Underground Sump	Capacity	—	—	—
Suggestions if any					
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes	Yes	—	—
Suggestions if any					
D.	**Type of Drainage**				
	Closed/ Open	closed	Yes	—	—
	If Open than Pucca / Kutchcha	—	—	—	—
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	Sewer Plant.	Yes	—	—
Suggestions if any:	Health and cleanness of village closed provide outlet Sewer plant and closed use supply for secondary use others for the purpose of Agrical close				

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E.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Asphalt	yes	–	–
	Main road	Asphalt and PCC	Yes	–	–
	Internal streets	Kacha		Yes	Required RCC Road.
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 7 12ms.			
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO gondal 7 12ms	–	Yes	–
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes good	Yes	–	–
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	STBus Auto Jeep Chhakda Private	Yes	–	–
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes (govt) month wise 6hrs.	Yes	–	–
	Power supply for Domestic Use	P.G.V.C.L	Yes	–	–
	Power supply for Agricultural Use	G.E.T.C.O	Yes	–	–
	Power supply for Commercial Use	P.G.V.C.L	Yes	–	–
	Road/ Street Lights	P.G.V.C.L	Yes	–	–

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	Electrification in Government Buildings/ Schools/ Hospitals	PGVCL	Yes	-	-
	Renewable Energy Source Facilities (Y/ N) Yes	Sonrej Vidali Solarpond	Yes	-	-
	LED Facilities	Yes	-	Yes	Requires maintenance soon.
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	(2) Nos	Yes	-	-
	Location Condition		Yes	-	-
	Community Toilet (With bath/ without bath facilities) - good.		Yes	-	-
	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)	Bore (well & bore old)	Yes	-	-
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	70 % Pucca 30 % Kachha	Yes	- Yes	-

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:	PHC - 1no good	Yes		
	Private Clinic/Private Hospital/ Nursing Home	Private Hospital	Yes	–	–
	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	9 Anganwadi	Yes	–	–
	Primary School (Yes)	7 no.			
	Secondary school (Yes)	7 nos			
	Higher sec. School (Yes)	7 nos.			
	ITI college/ vocational Training Center	No	–	–	–
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	Art, Commerce & Science college	–	Yes	Required to nearest
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

M.	Socio- Culture Facilities				
	Community Hall (With or without TV) Location:	Yes 1 no Kantaliya Vadi	Yes	–	–

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	Condition:	good	Yes	–	–
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	No		Yes	–
	Public Garden Location: Condition:	4 nos Near ~~bs~~ stand better	Yes	–	–
	Village Pond Location: Condition:	Yes Village good	Yes	–	–
	Recreation Center Location: Condition:	No	–	Yes	–
	Cinema/ Video Hall Location: Condition:	No	–	Yes	–
	Assembly Polling Station Location: Condition:	4 Nos. Village good	Yes	–	–
	Birth & Death Registration Office Location: Condition:	morning Grampanchayat Village good	Yes	–	–
If any of the above Facility is not available in village than approx. distance from village: ....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	1 nos	Yes	–	–
	Telecommunication Network/ STD booth	2 nos.	Yes	.	–

	General Market	NO	–	Yes	–
	Shops (Public Distribution System)	600 shops	Yes	–	–
	Panchayat Building	Yes	Yes	–	–
	Pharmacy/Medical Shop	medical shop-3	Yes	–	–
	Bank & ATM Facility	bank-3 ATM-3	Yes	–	–
	Agriculture Co-operative Society	Seva Sahakari Sahakari Mandali	Yes	–	–
	Milk Co-operative Soc.	Gov.-2 Private-4	Yes	–	–
	Small Scale Industries	Yes	Yes	–	–
	Internet Cafes/ Common Service Center/Wi Fi	Personal wifi	Yes	–	
	Other Facility	C.C.T.V Solar Panel	Yes	–	–

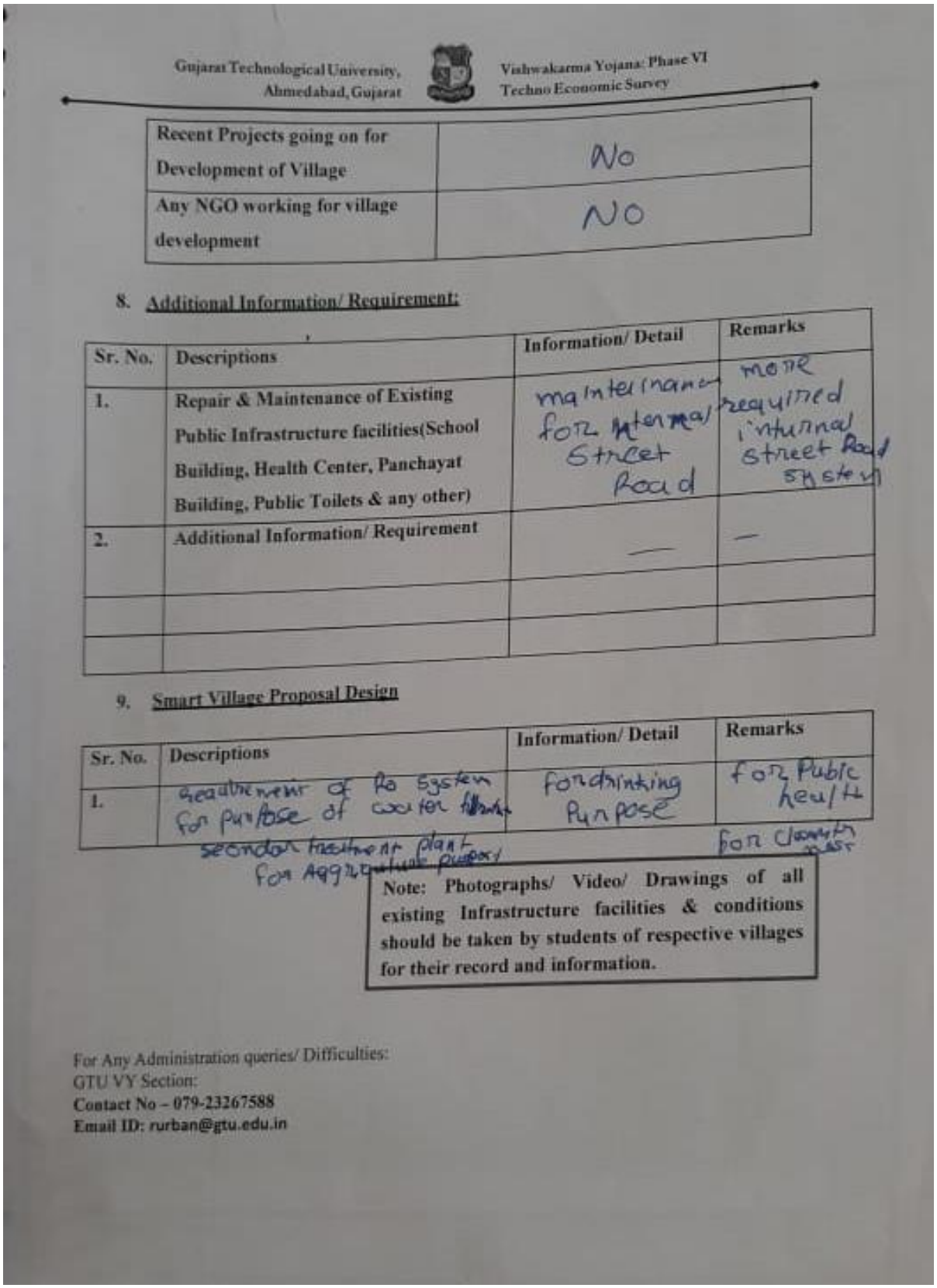
Suggestions if any:

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

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Sooraj vijali solar panel	Yes	–	more for Solar
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No Yes No	–	–	–
Q.	Any Other	NO	–	–	–

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	–



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Vishwakarma Yojana: Phase VI
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Recent Projects going on for Development of Village	No
Any NGO working for village development	NO

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)	maintenance for internal Street Road	more required internal street Road system
2.	Additional Information/ Requirement	—	—

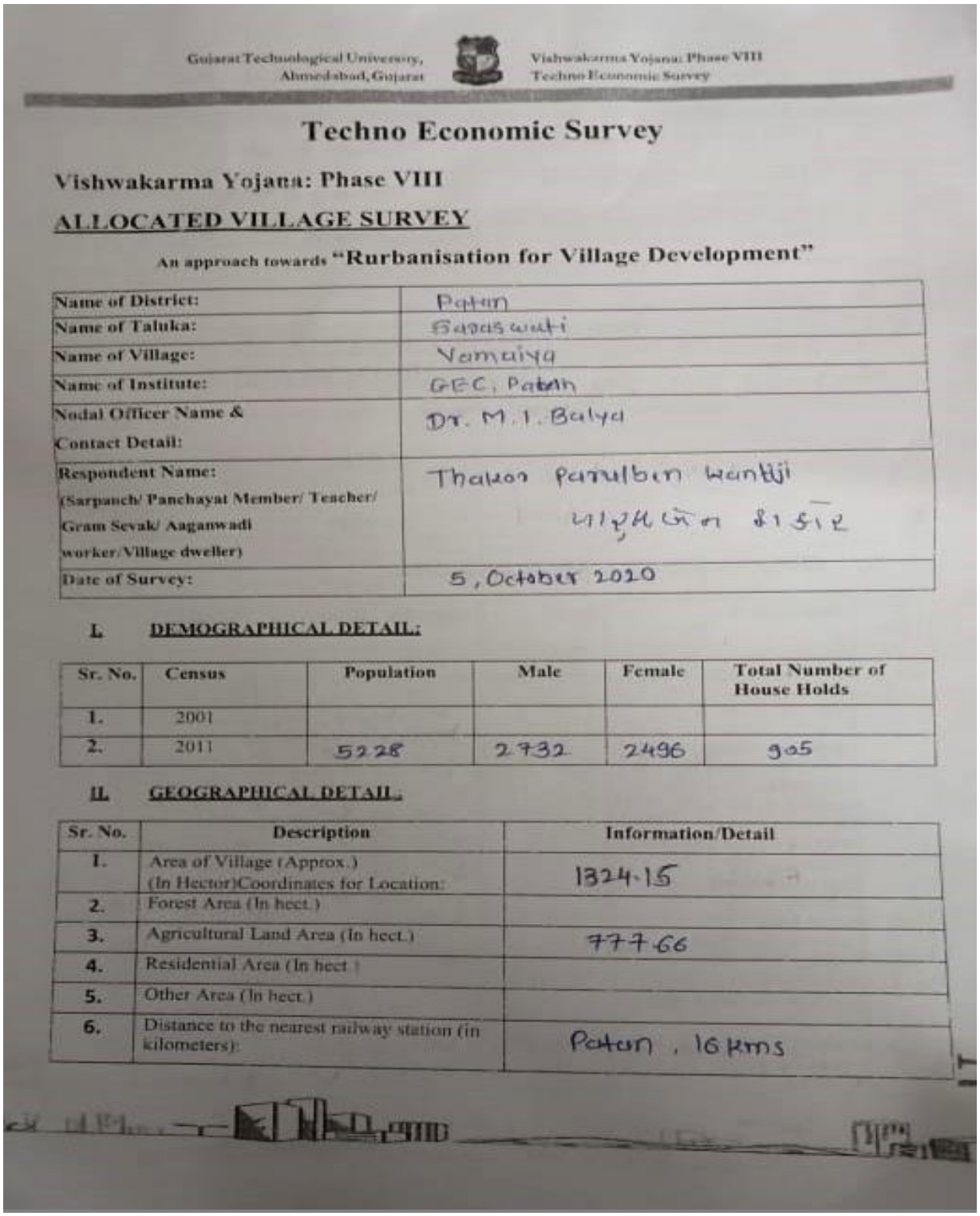
9. Smart Village Proposal Design

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	treatment of Ro System for purpose of water secondar treatment plant for Aggr	for drinking Purpose	for Public health for cleaning

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

12.2 Survey form of Vamaiya Village



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Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

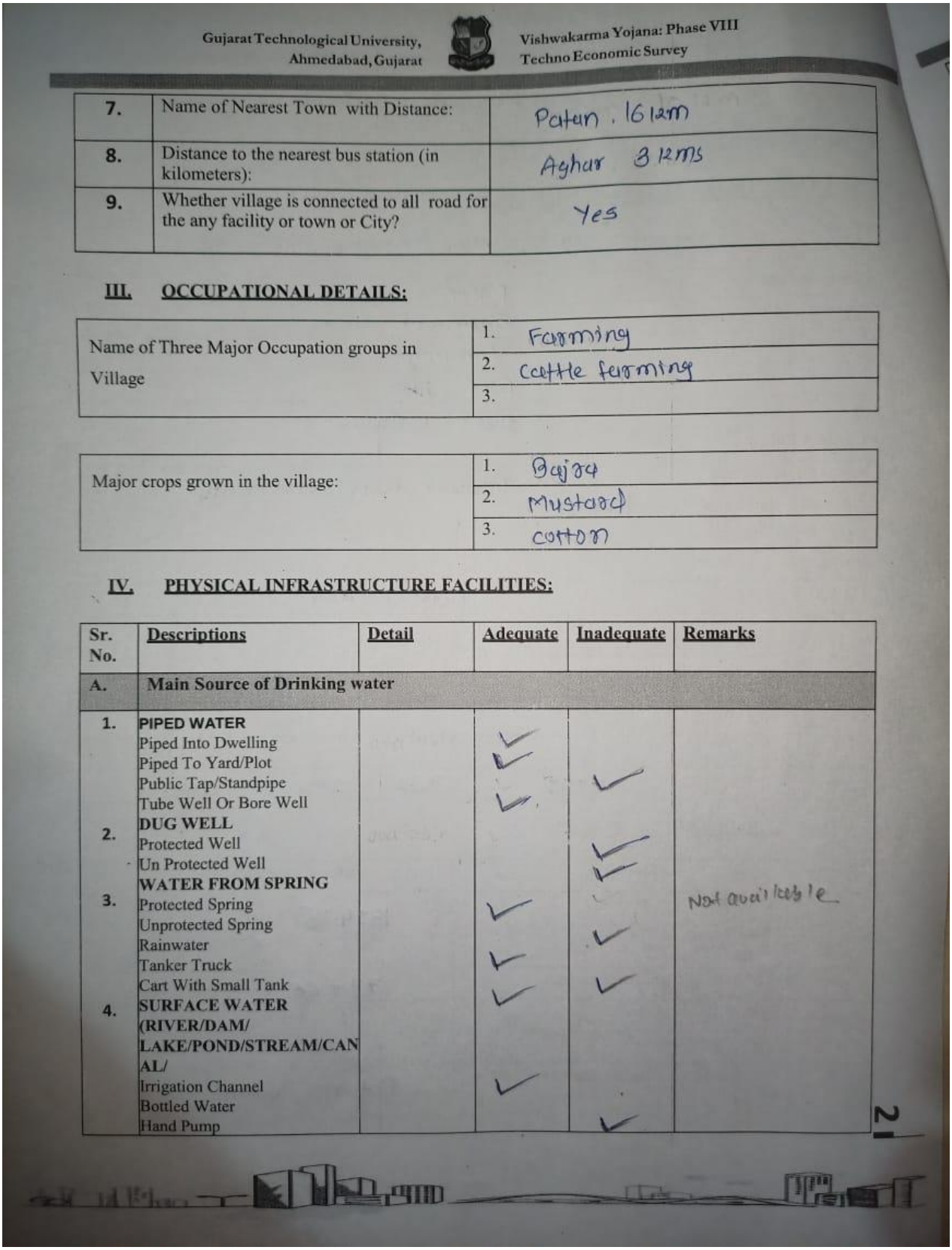
Name of District:	Patan
Name of Taluka:	Sarasvati
Name of Village:	Vamaiya
Name of Institute:	GEC, Patan
Nodal Officer Name & Contact Detail:	Dr. M. I. Baluch
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Thakor Parulben Vantiji
Date of Survey:	5, October 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	5228	2732	2496	905

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1324.15
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	777.66
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	Patan, 16 kms



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7.	Name of Nearest Town with Distance:	Patan . 16 12m
8.	Distance to the nearest bus station (in kilometers):	Aghar 3 12ms
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.	Farming
	2.	cattle farming
	3.	

Major crops grown in the village:	1.	Bajra
	2.	Mustard
	3.	cotton

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**				
	Piped Into Dwelling		✓		
	Piped To Yard/Plot		✓		
	Public Tap/Standpipe			✓	
	Tube Well Or Bore Well		✓		
2.	**DUG WELL**				
	Protected Well			✓	
	Un Protected Well			✓	
3.	**WATER FROM SPRING**				
	Protected Spring		✓		Not available
	Unprotected Spring			✓	
	Rainwater				
	Tanker Truck		✓		
	Cart With Small Tank		✓	✓	
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**				
	Irrigation Channel		✓		
	Bottled Water				
	Hand Pump			✓	

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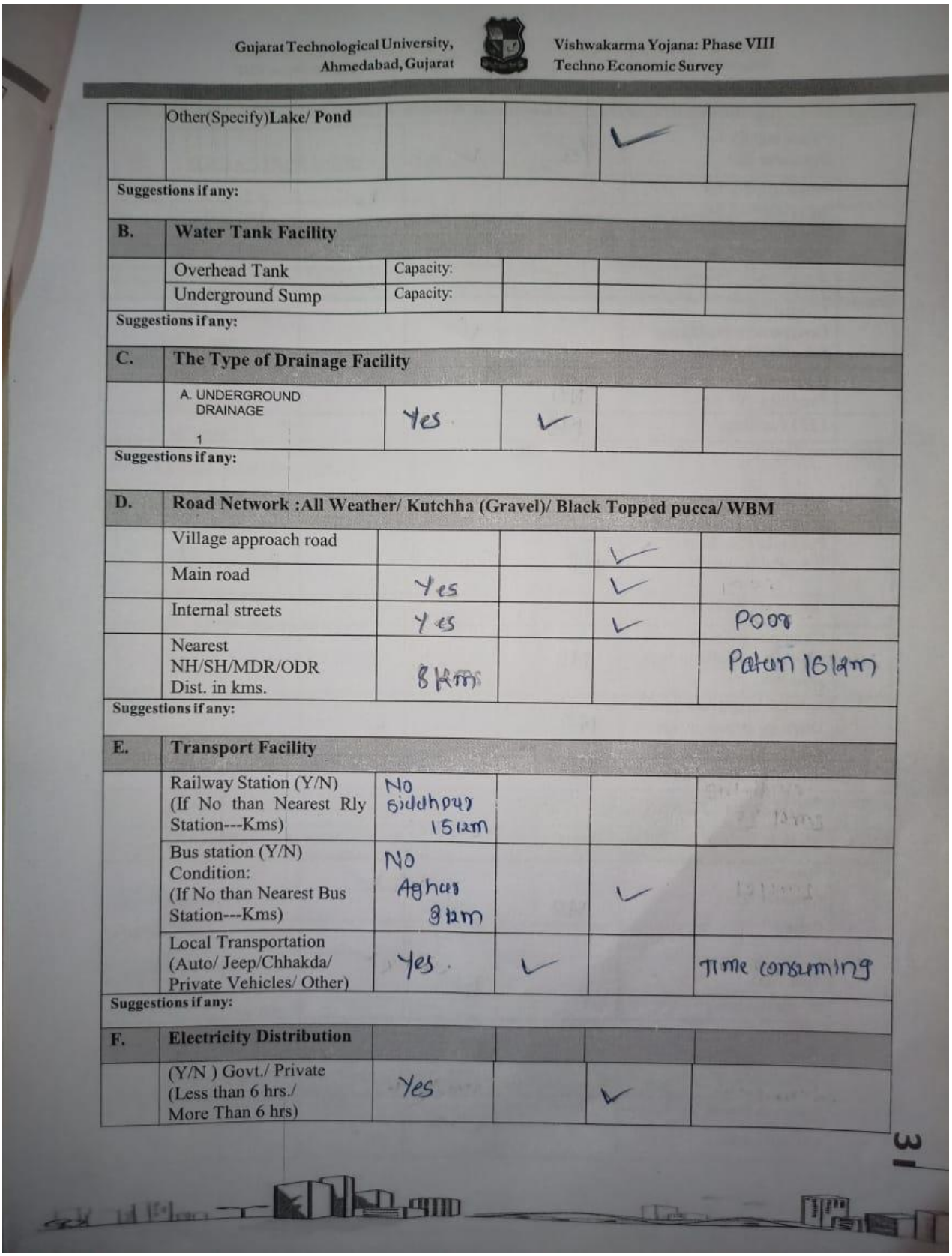

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	Other(Specify)**Lake/ Pond**			✓	

Suggestions if any:

B.	**Water Tank Facility**				
	Overhead Tank	Capacity:			
	Underground Sump	Capacity:			

Suggestions if any:

C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	Yes	✓		

Suggestions if any:

D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road			✓	
	Main road	Yes		✓	
	Internal streets	Yes		✓	Poor
	Nearest NH/SH/MDR/ODR Dist. in kms.	8 kms			Patan 16 km

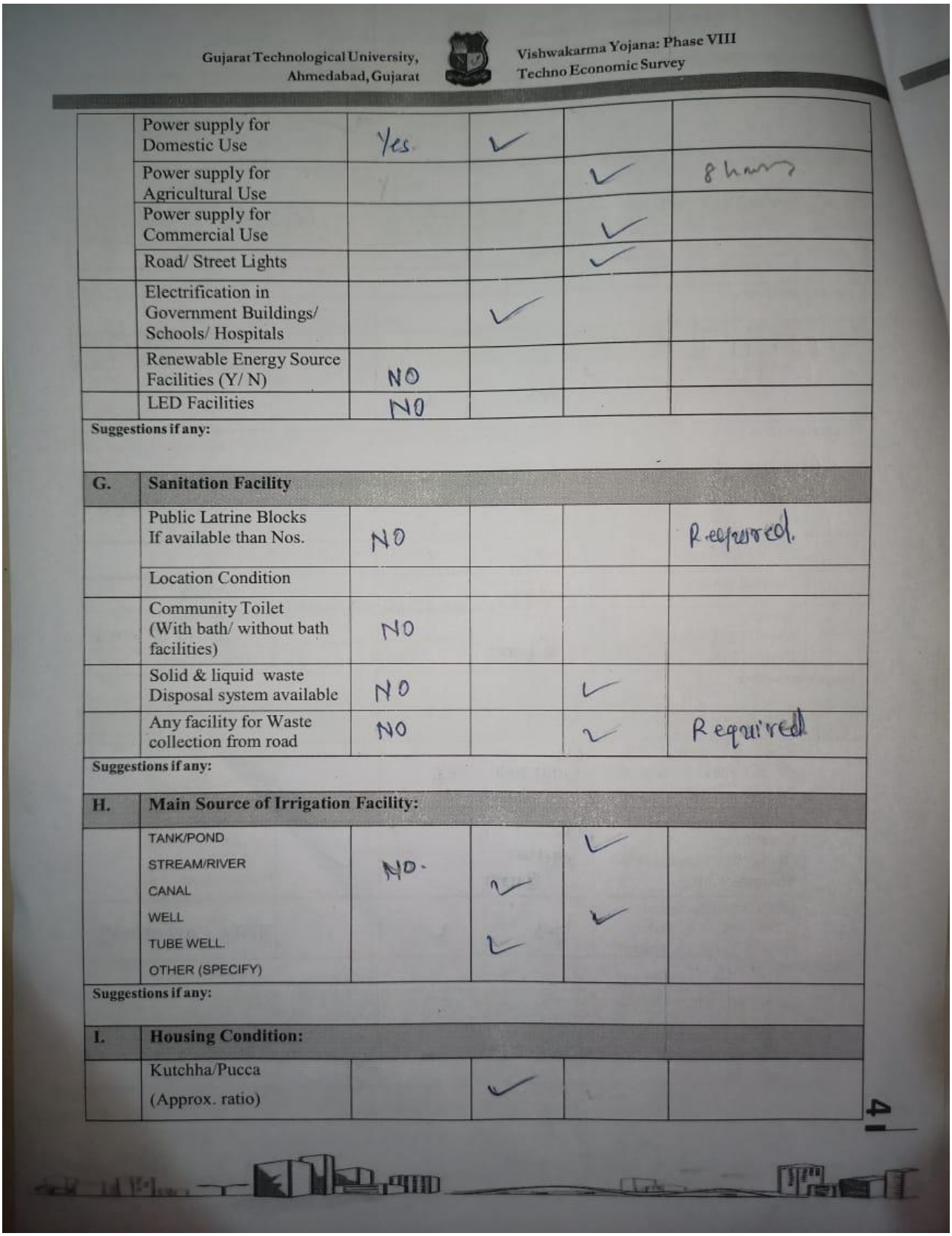
Suggestions if any:

E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No Siddhpur 15 km			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	No Aghar 8 km		✓	
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	✓		Time consuming

Suggestions if any:

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

3



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

Suggestions if any:

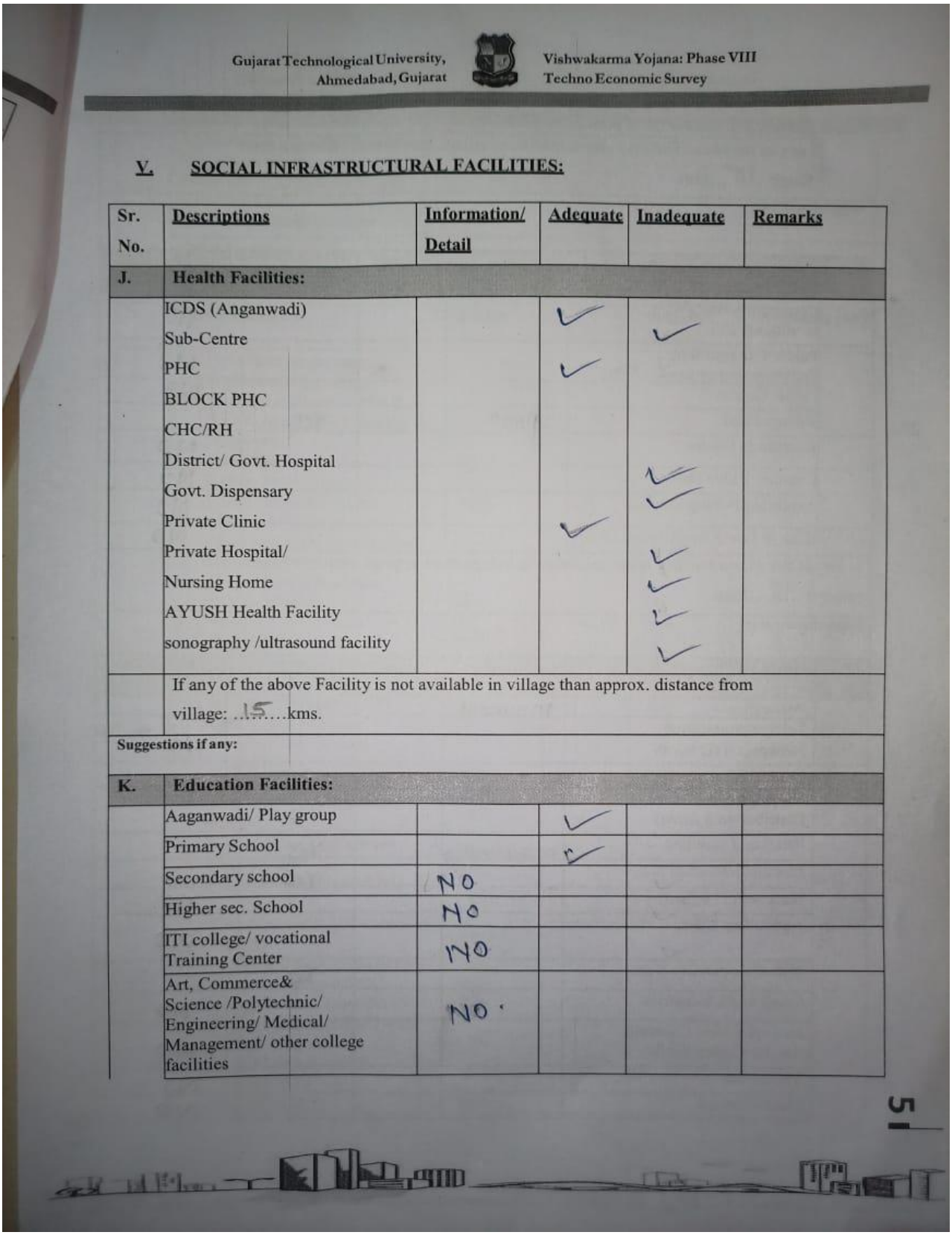
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO			Required.
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	NO			
	Solid & liquid waste Disposal system available	NO		✓	
	Any facility for Waste collection from road	NO		✓	Required

Suggestions if any:

H.	**Main Source of Irrigation Facility:**				
	TANK/POND	NO.		✓	
	STREAM/RIVER		✓		
	CANAL			✓	
	WELL		✓		
	TUBE WELL				
	OTHER (SPECIFY)				

Suggestions if any:

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



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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)		✓		
	Sub-Centre			✓	
	PHC		✓		
	BLOCK PHC				
	CHC/RH				
	District/ Govt. Hospital				
	Govt. Dispensary			✓	
	Private Clinic		✓	✓	
	Private Hospital/				
	Nursing Home			✓	
	AYUSH Health Facility			✓	
	sonography /ultrasound facility			✓	
				✓	
	If any of the above Facility is not available in village than approx. distance from village: ..15....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group		✓		
	Primary School		✓		
	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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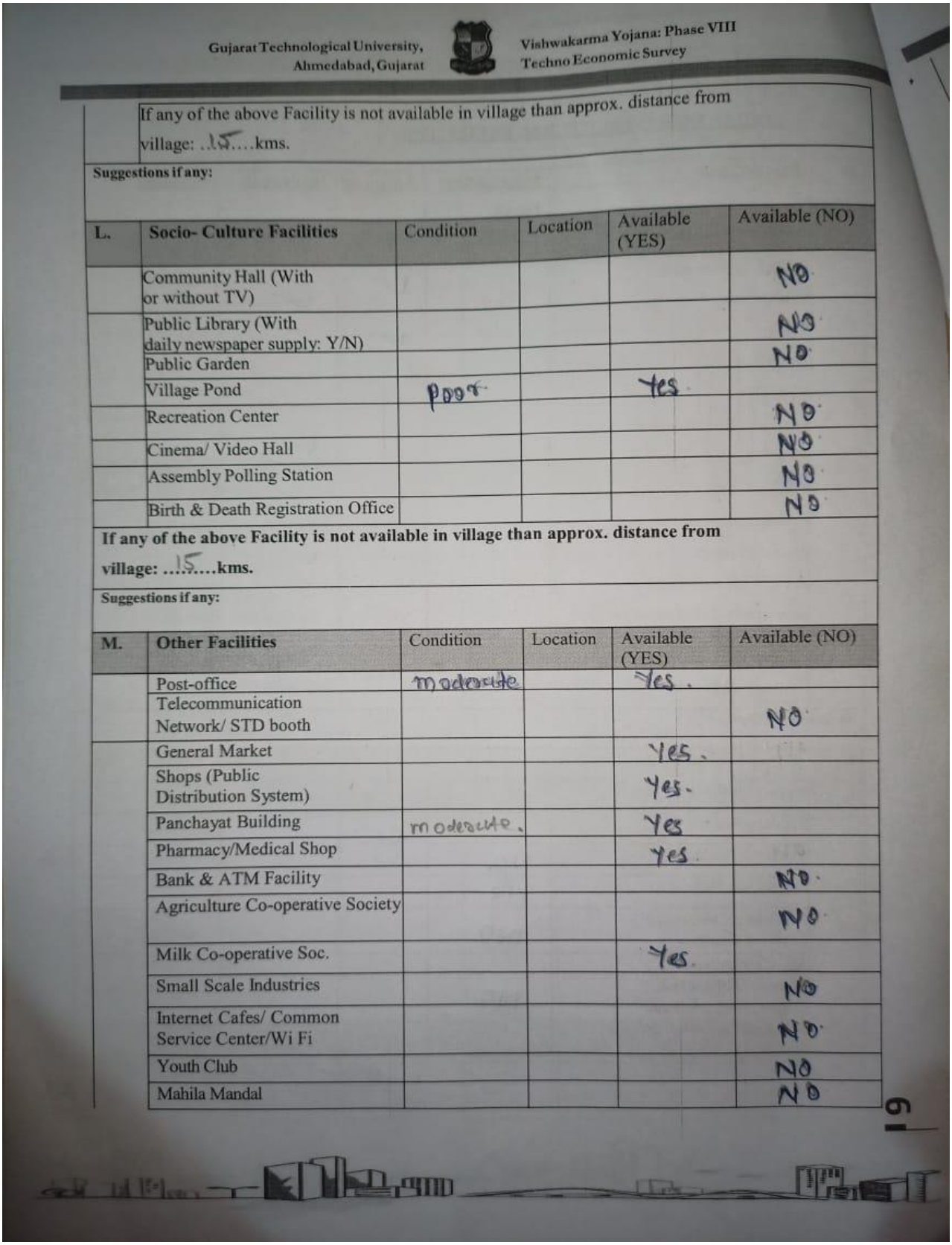

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If any of the above Facility is not available in village than approx. distance from village: ..15....kms.

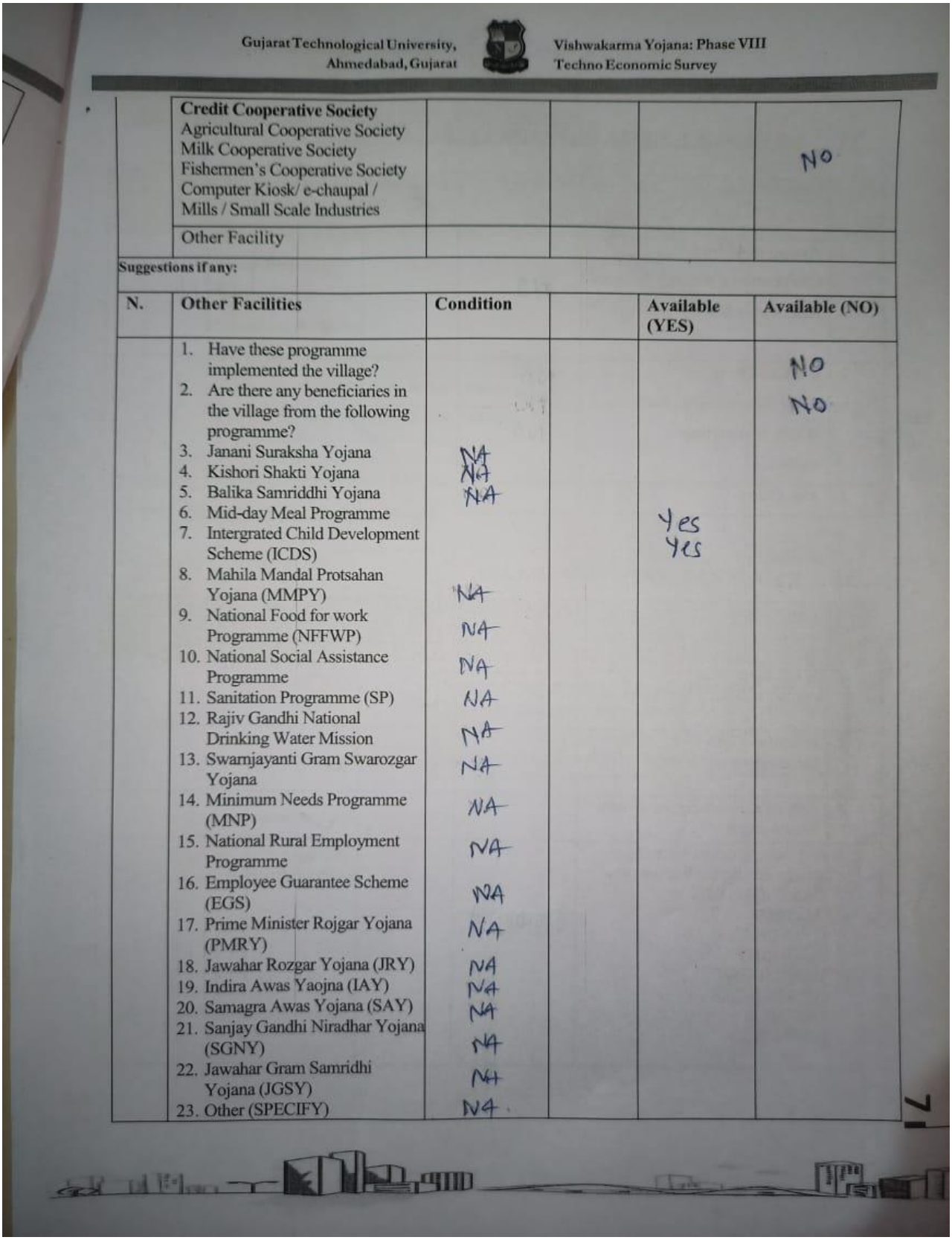
Suggestions if any:

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

If any of the above Facility is not available in village than approx. distance from village: ....15....kms.

Suggestions if any:

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



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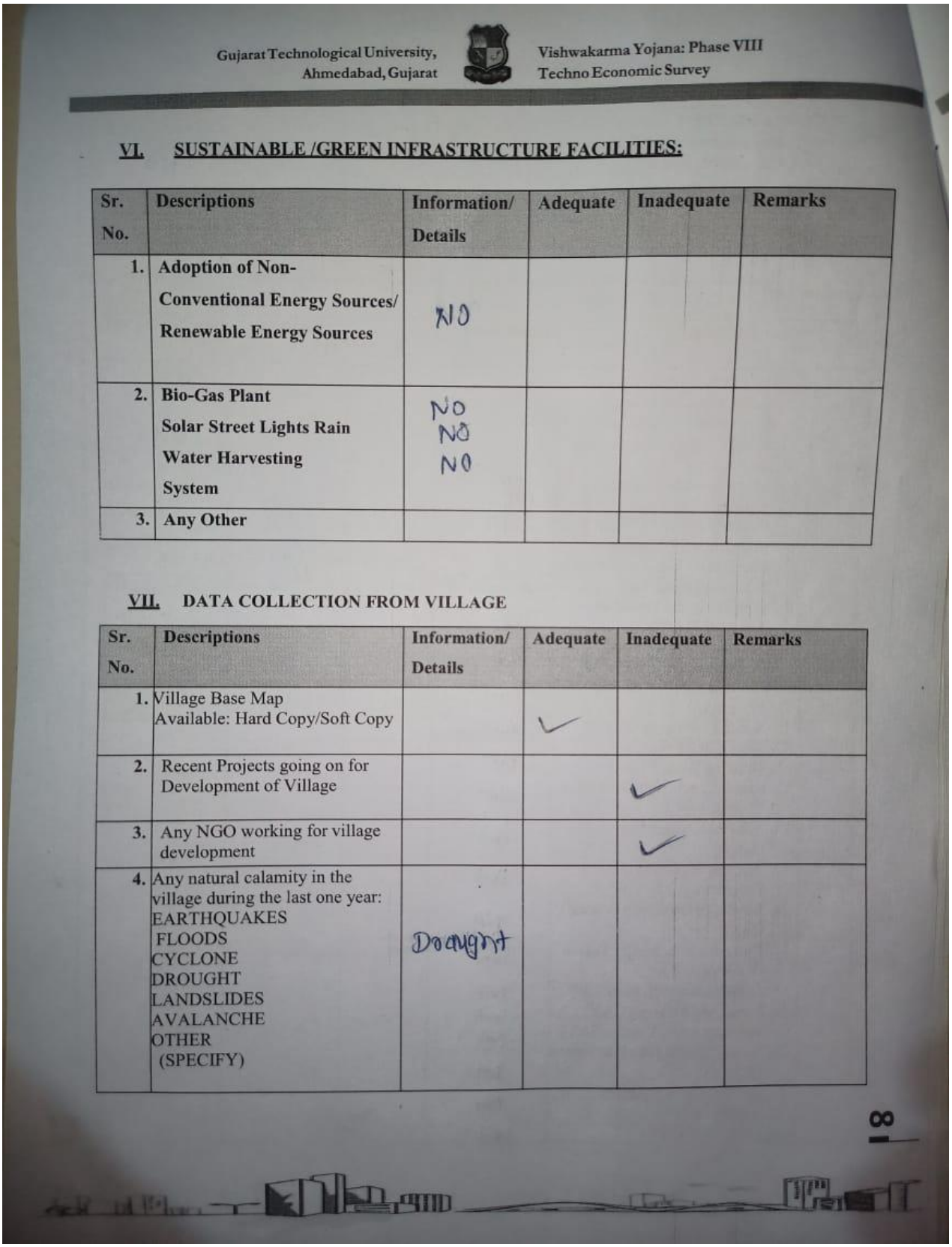
Techno Economic Survey

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries				NO
	Other Facility				

Suggestions if any:

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



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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	NO			
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	NO NO NO			
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		✓		
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)	Drought			

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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	Repair of Panchayat Building construction of Public Toilets	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	NO	

IX. Smart Village / Heritage Details

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

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

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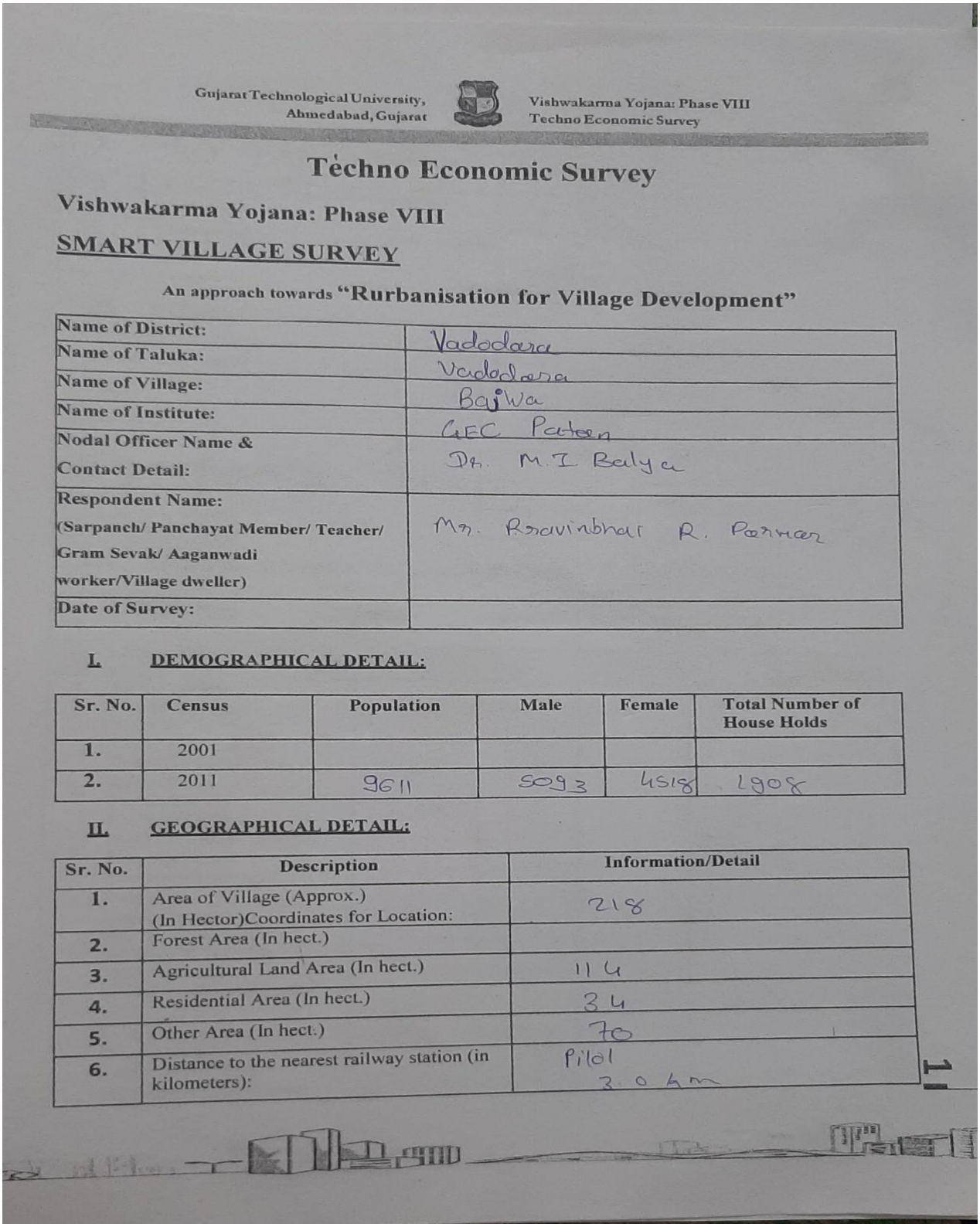
12.3 Smart village Survey Form



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	Vadodara
Name of Taluka:	Vadodara
Name of Village:	Bajwa
Name of Institute:	GEC Patan
Nodal Officer Name & Contact Detail:	Dr. M.I. Baluch
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mr. Ravinbhai R. Parmar
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	9611	5093	4518	1908

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	218
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	114
4.	Residential Area (In hect.)	34
5.	Other Area (In hect.)	70
6.	Distance to the nearest railway station (in kilometers):	Pilol 3.04m

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7.	Name of Nearest Town with Distance:	Vadodara!
8.	Distance to the nearest bus station (in kilometers):	savasi 2.0 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.	Private Job
	2.	Labours
	3.	farmers
Major crops grown in the village:	1.	
	2.	
	3.	

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**				
	Piped Into Dwelling				
	Piped To Yard/Plot				
	Public Tap/Standpipe		✓		
	Tube Well Or Bore Well				
2.	**DUG WELL**				
	Protected Well	2 Nos	✓		
	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	Yes	✓		
	Bottled Water				
	Hand Pump	3	✓		
	Other(Specify)**Lake/ Pond**	Yes	✓		

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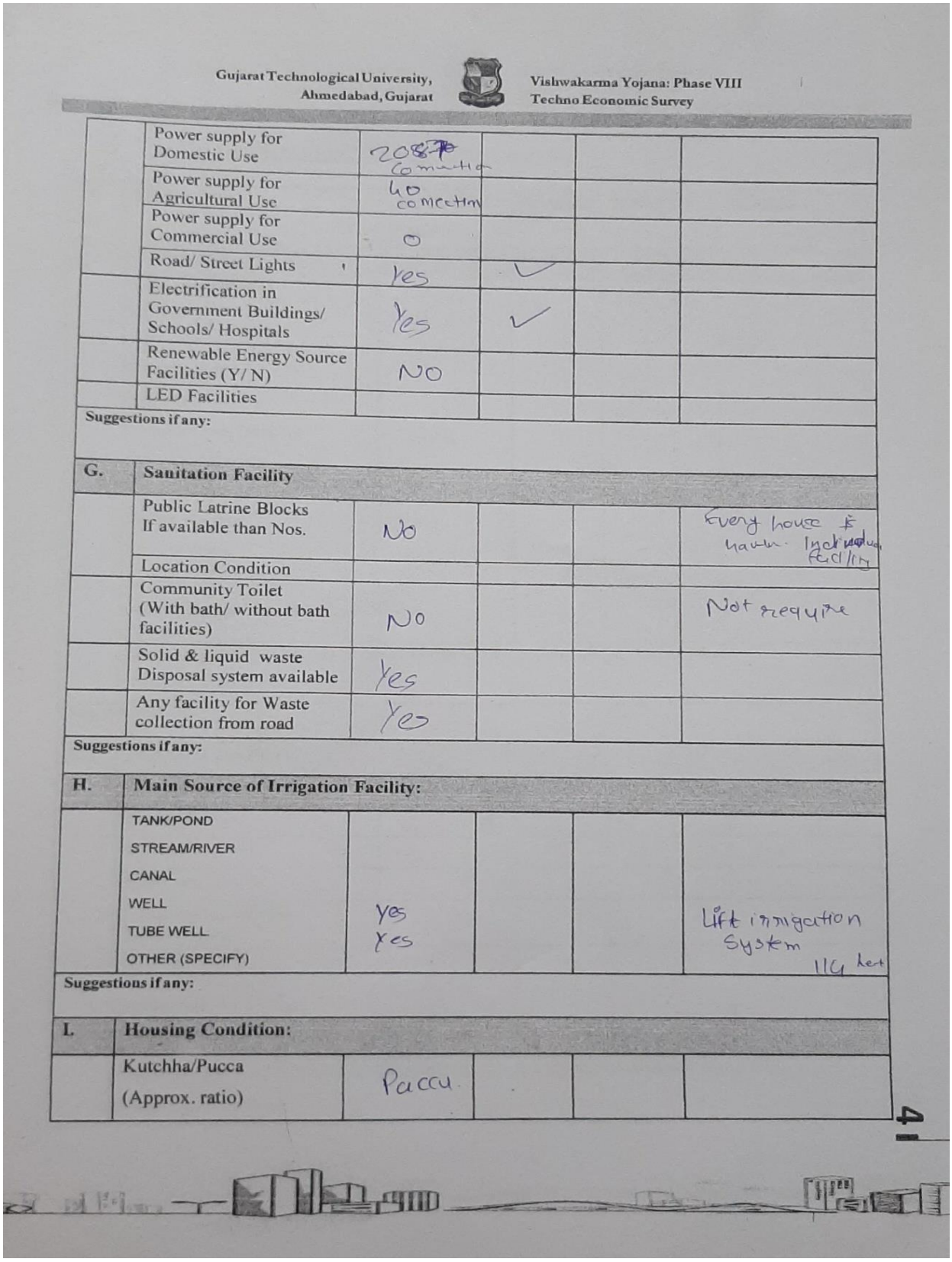
Suggestions if any:						
B.	**Water Tank Facility**					
	Overhead Tank	Capacity:	3 No.	2lakh,	1lakh,	50k lit
	Underground Sump	Capacity:	3No.			
Suggestions if any:						
C.	**The Type of Drainage Facility**					
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	Not Adequate				
Suggestions if any:						
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**					
	Village approach road	Black Top	✓			
	Main road	Yes	✓		R.C.C Road.	
	Internal streets	Yes	✓			
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH → 2km NH - 2km			SH - dumral NH → pasvath	
Suggestions if any:						
E.	**Transport Facility**					
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No			Nearest Railway - Pilol 3.1km	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NO			Nearest Bus station Savasi - 20km	
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)		✓			
Suggestions if any:						
F.	**Electricity Distribution**					
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes 24hrs			Three phase Connection	

3



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	Power supply for Domestic Use	208 Connection			
	Power supply for Agricultural Use	40 connection			
	Power supply for Commercial Use	0			
	Road/ Street Lights	Yes	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		
	Renewable Energy Source Facilities (Y/ N)	NO			
	LED Facilities				

Suggestions if any:

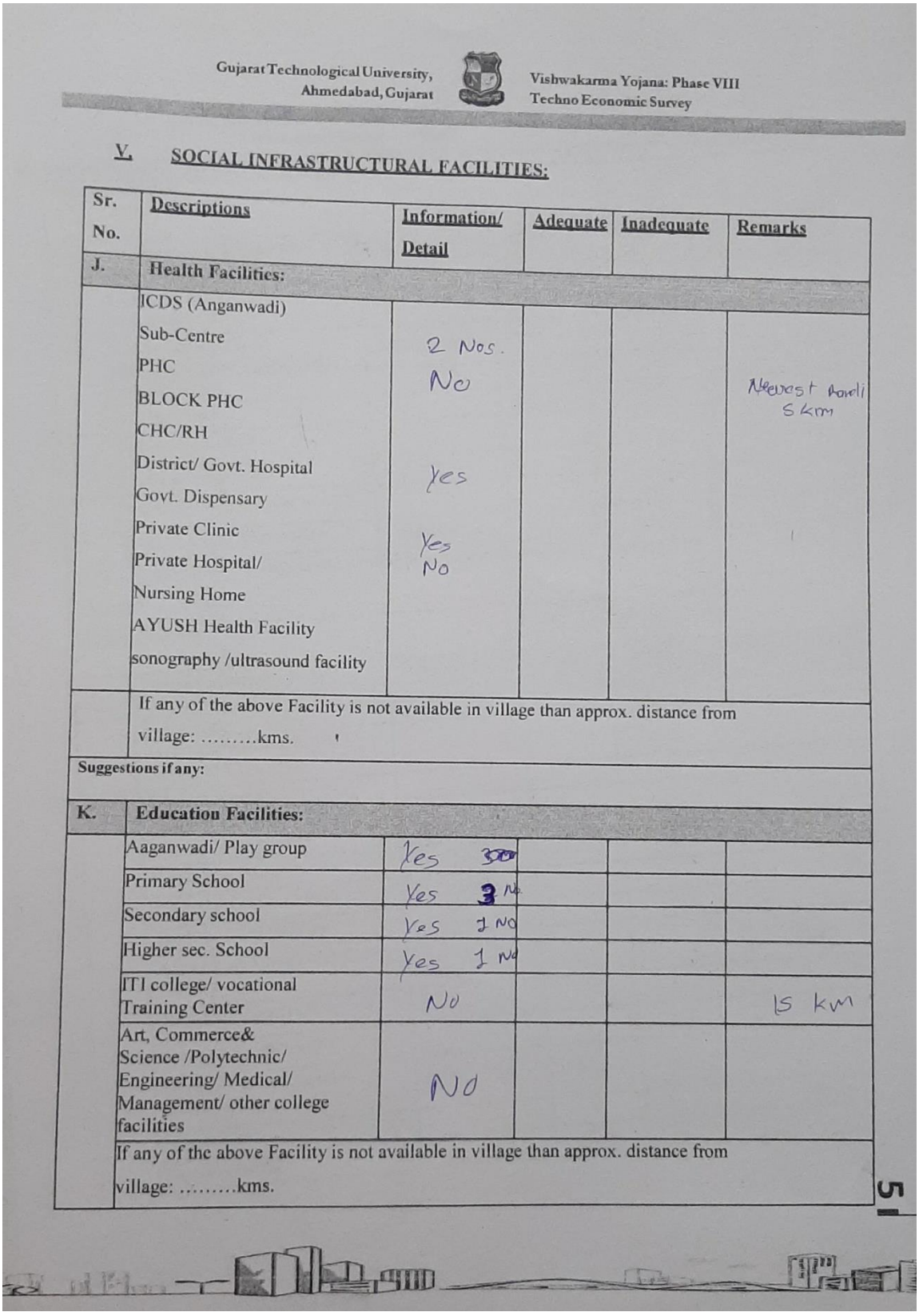
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	No			Every house is having Individual facility
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	No			Not require
	Solid & liquid waste Disposal system available	Yes			
	Any facility for Waste collection from road	Yes			

Suggestions if any:

H.	**Main Source of Irrigation Facility:**				
	TANK/POND				
	STREAM/RIVER				
	CANAL				
	WELL	Yes			Lift irrigation System 114 Nos
	TUBE WELL	Yes			
	OTHER (SPECIFY)				

Suggestions if any:

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)				
	Sub-Centre	2 Nos.			
	PHC	No			
	BLOCK PHC				Nearest Pandi 5 km
	CHC/RH				
	District/ Govt. Hospital	Yes			
	Govt. Dispensary				
	Private Clinic	Yes			
	Private Hospital/	No			
	Nursing Home				
	AYUSH Health Facility				
	sonography /ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes 300			
	Primary School	Yes 3 No			
	Secondary school	Yes 1 No			
	Higher sec. School	Yes 1 No			
	ITI college/ vocational Training Center	No			15 km
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	No			
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				

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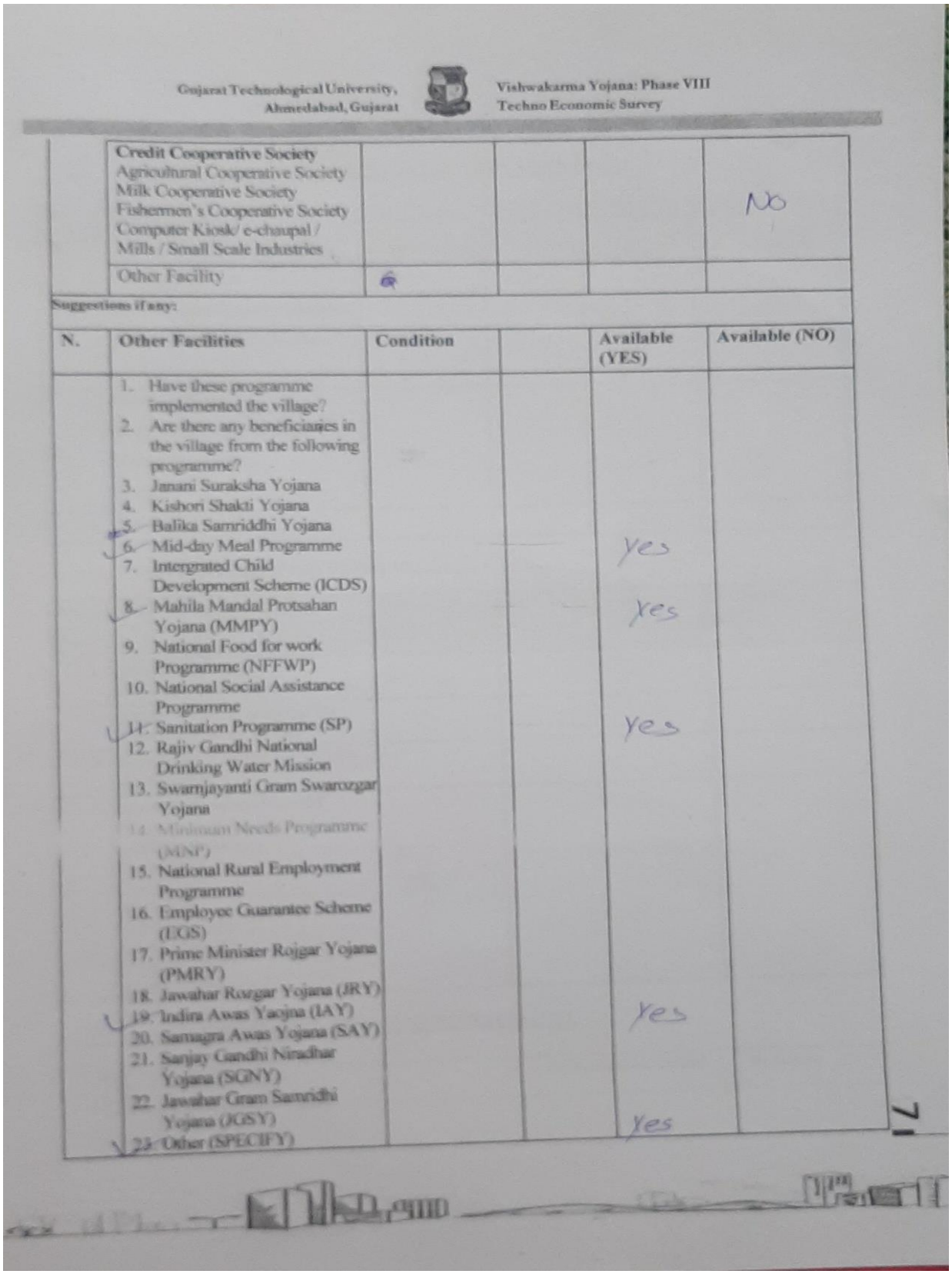
Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Adequate	Undera 3 KM	Yes	
	Public Library (With daily newspaper supply: Y/N)	Adequate	Kayali 3km	Yes	
	Public Garden				
	Village Pond		Bajwa	Yes	
	Recreation Center				No
	Cinema/ Video Hall				NO
	Assembly Polling Station			Yes	
	Birth & Death Registration	Adequate	Bajwa	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	Adquate	Bajwa	Yes	
	Telecommunication Network/ STD booth			Yes	
	General Market			Yes	
	Shops (Public Distribution System)			Yes	
	Panchayat Building			Yes	
	Pharmacy/Medical Shop			Yes	
	Bank & ATM Facility			Yes	
	Agriculture Co-operative Society				No
	Milk Co-operative Soc.			Yes	
	Small Scale Industries			Yes	
	Internet Cafes/ Common Service Center/Wi Fi		Bajwa	Yes	
	Youth Club				No
	Mahila Mandal	2 Nos	Bajwa	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				No
	Other Facility	6			

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			Yes	
	7. Intergrated Child Development Scheme (ICDS)				
	8. Mahila Mandal Protsahan Yojana (MMPY)			Yes	
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP)			Yes	
	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)			Yes	
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)			Yes	

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	—			
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	—			
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	~~Soft~~			
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 ~~calamity~~ calamity			

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

8

1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other		
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

Surpanch of Bajawada

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12.4 Gap Analysis of the Vamaiya Village

Gap analysis involves the comparison of actual performance with desired or potential performance. Gap analysis involves determining and improving the difference between requirements and current capabilities. It identifies gaps between current situation and optimize situation.

Table 32 : Gap Analysis

Facilities	**Existing**	**Required**	**GAPE**
Education			
Primary school	**01**	**01**	**00**
High school	00	01	**01**
other colleges	**00**	**00**	**00**
IITcolleges	**00**	**00**	**00**
Health			
Primary Health Sub-Centre	**01**	**01**	**00**
Maternity And Child Welfare centre	**01**	**01**	**00**
Veterinary Hospital	**01**	**01**	**00**
Drinking-Water and Sanitation			
Treated Tap Water Supply	**YES**	**YES**	**00**
Tube Wells/Boreholes	**YES**		
Closed Drainage System	**YES**		
system to Collect garbage on street	**00**	**YES**	**YES**
rain water drain pipes	**00**	**YES**	**YES**
Physical Infrastructures			
Panchayat Office	**00**	**01**	**01**
Bus station	**00**	**01**	**01**
Public Toilets	**00**	**01**	**01**
Rain water Drainage system	**00**	**01**	**01**
Library	**00**	**01**	**01**

Transportation			
Bus station	**00**	**01**	**01**
Bus service	**01**	**01**	**00**
Railway Station	**00**	**01**	**01**
Nearest National Highway in less than 10 km.	**00**	**01**	**01**
pakka road	**00**	**01**	**01**
Footpath	**00**	**01**	**01**
Communication			
Sub Post Office	**01**	**01**	**00**
Landline	**01**	**01**	**00**
Mobile Coverage	**01**	**01**	**00**
Private Courier Facility	**00**	**01**	**01**
Commerce			
ATM	**00**	**01**	**01**
commercial Bank	**00**	**00**	**00**
co-operative bank	**00**	**01**	**01**

12.5 Summary Details of All the Villages Designs

Table 33: Summary Details of All the Villages Designs

No.	Village	Design	
		Part I	Part II
1	Kungher	1.Dwelling House 2.Open Window Composite Structure 3. Bio-Gas plant 4. Pipe Culvert 5. ATM centre	1. Water tank 2.Approach Road 3.Irrigation Method 4. Solar Roof top plant 5. Pipe Drainage in

		6. Stone Pitching on Lake Boundary	Main Street 6. Septic Tank
2	Vamiya	1.Bio Gas Plant 2.Public Toilet 3.Community Hall Cum Booth 4. U/G Sump 5. Heritage : Chabutro 6. School Sanitary Complex	1. Solid Waste Management 2.Bus Station 3.Post Office 4. Dwelling Houses 5. Pavement in Graveyard with paver block 6. Public Garden
3	Aghar	1.Road 2.Bio Gas Plant 3.Public Toilet 4. Dairy 5. Agro-Centre 6. Medical shop	1. Lake Development 2. Post Office 3. Solid Waste Management 4. Public Garden 5. House Design 6. Drainage House
4	Bhilavan	1.Primary School 2. Post office 3. Bus Stop 4. Anganwadi 5. Auditorium 6. Entrance Gate	1. Public Toilet 2. Community Hall 3. Bio Gas Plant 4. Library 5. Bank 6. Gym

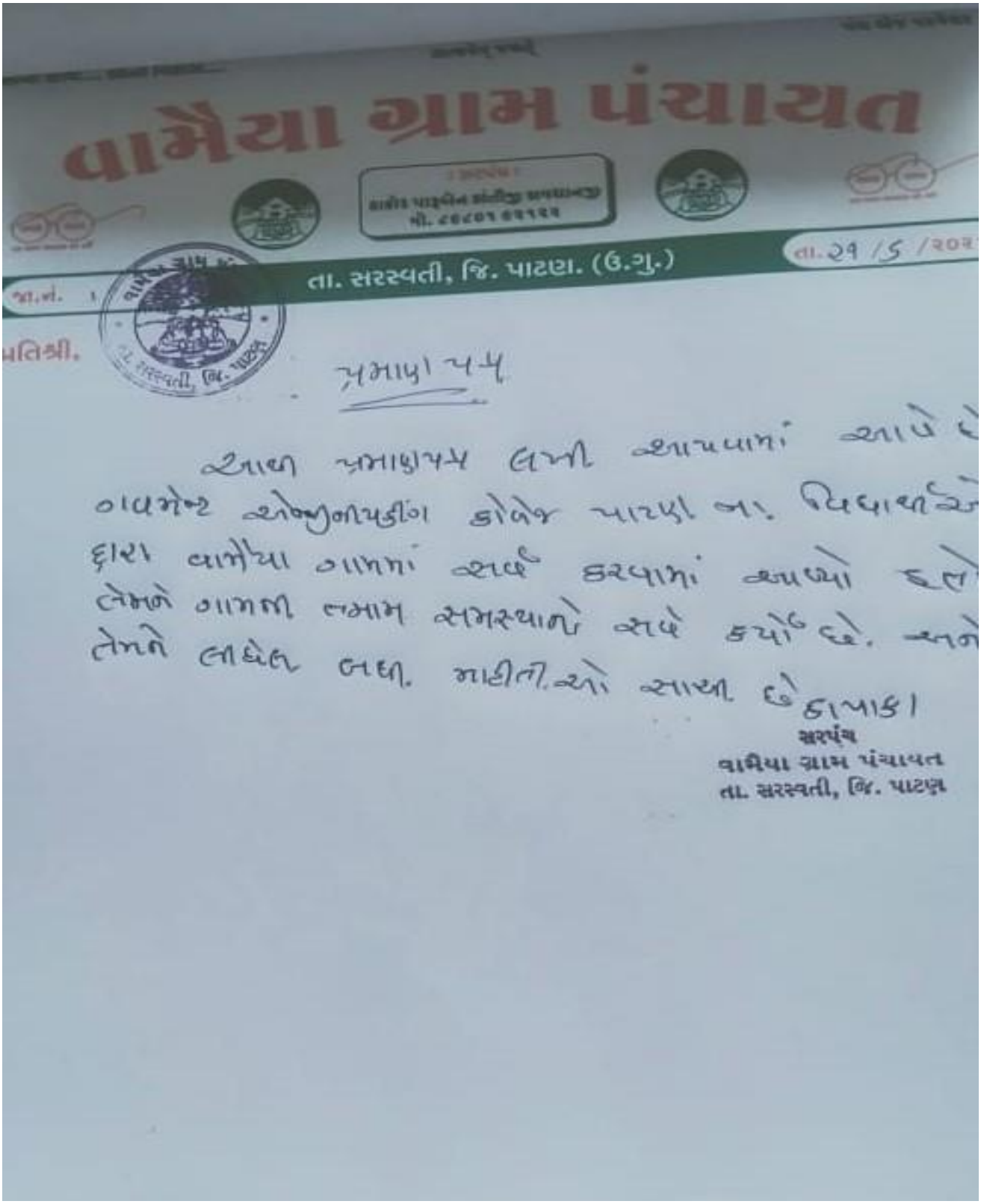
12.6 Village Interaction with Sarpanch

As a part of PMMS subject we have given the project under scheme of Vishwakarma Yojana phase VIII. Under this project we are allotted Vamaiya village of Patan district. Under this project we are suppose to visit the village to study existing infrastructure and to propose new amenity.

Here we inquired about the existing facilities available and the lake of some facilities like Bus stand, Public Toilets, Sanitary system, drainage problems, water supply, road as well as some other amenities. They also tell us about the requirements of peoples and the problems that the villagers are facing and the future needs of the peoples of village. we also collected information about the existing infrastructure and the condition of infrastructures like school building, dairy, police station, Panchayat building etc. They were very helpful and they give us detail information. We also inquire about the need of the village and they discuss about the future development need of the village and also gave us information regarding various projects going under the various scheme of the government of Gujarat.

Fig 65 : Village Interaction with Sarpanch

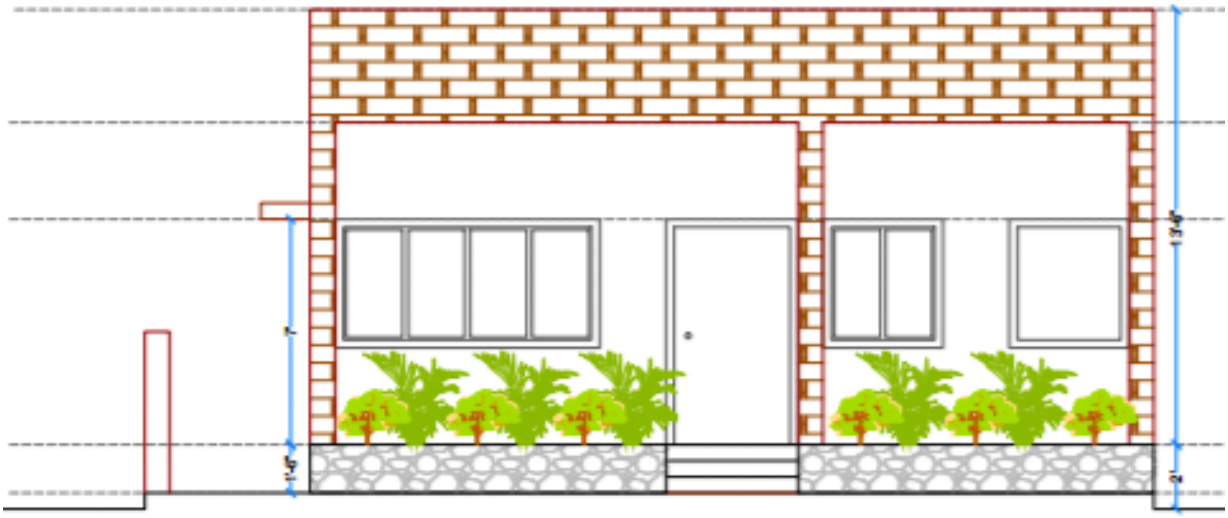
12.7 Sarpanch Latter :



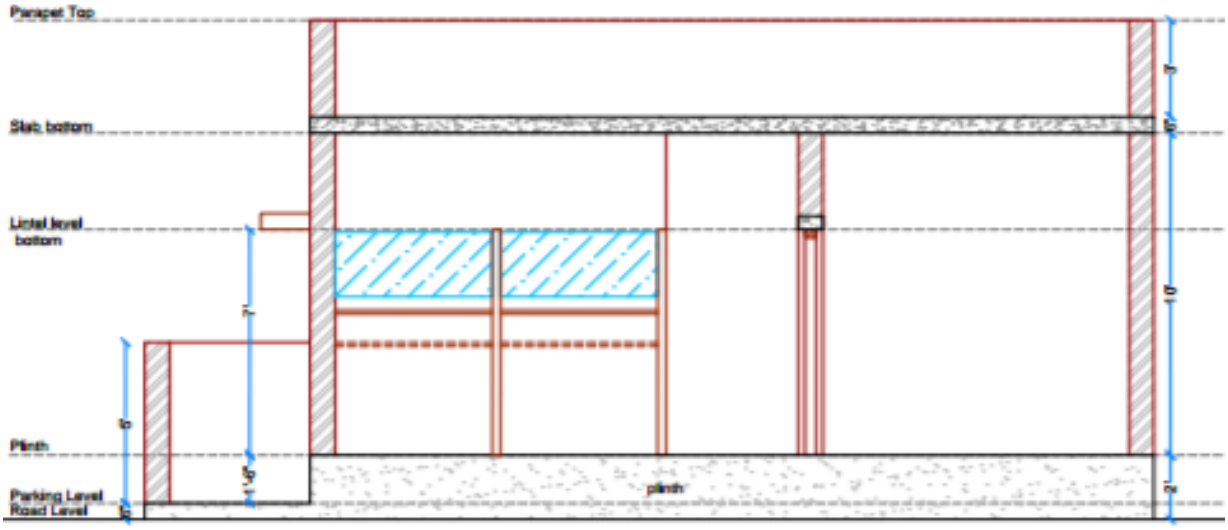
Chapter 13. From the Chapter- 9 future designs of the aspects

13.1 Design Proposals

13.1.1 Social design (Civil) Post Office :-



Front Elevation



Section - A To A'

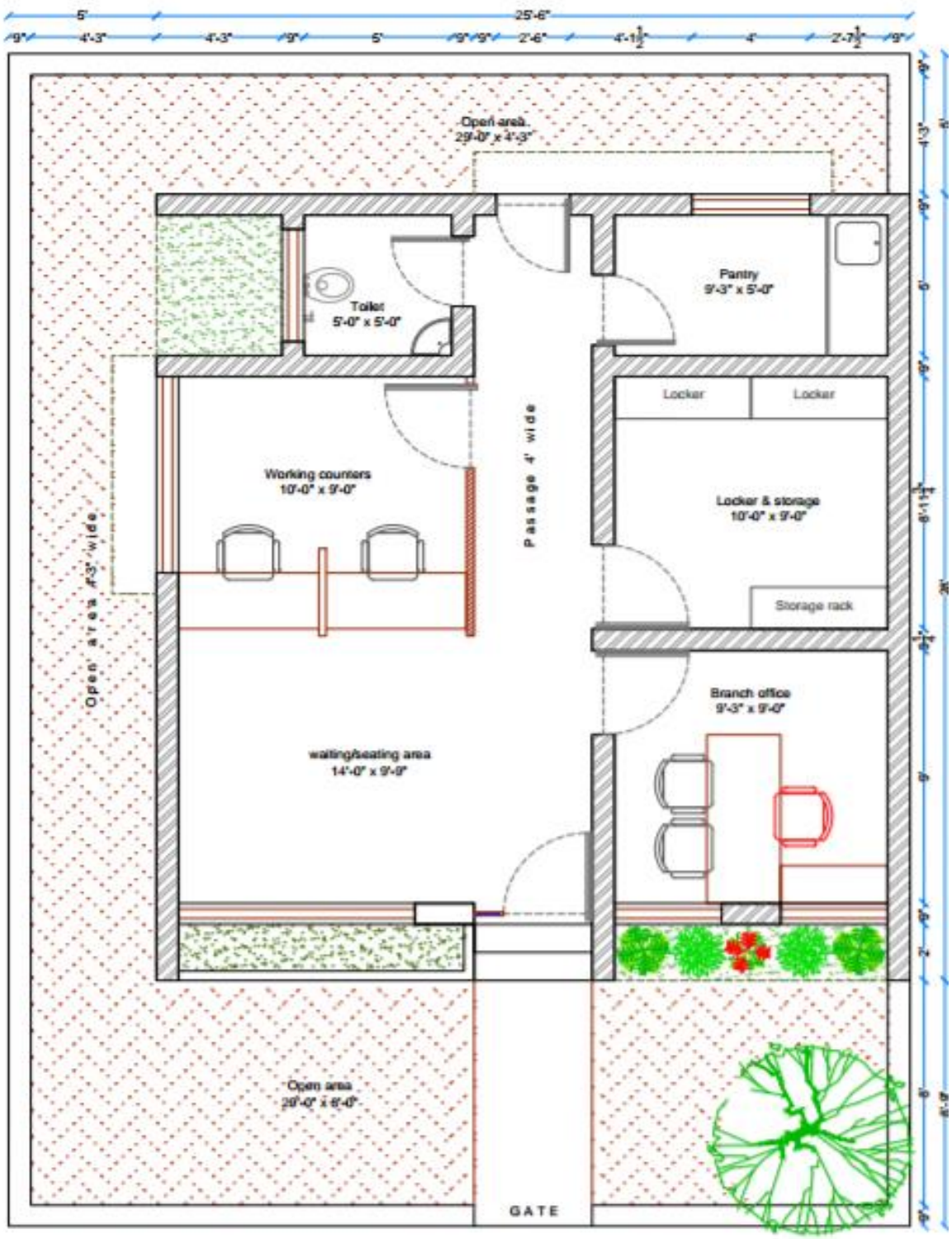


Fig no. 66 :-Post Office Plan, Elevation, and Section

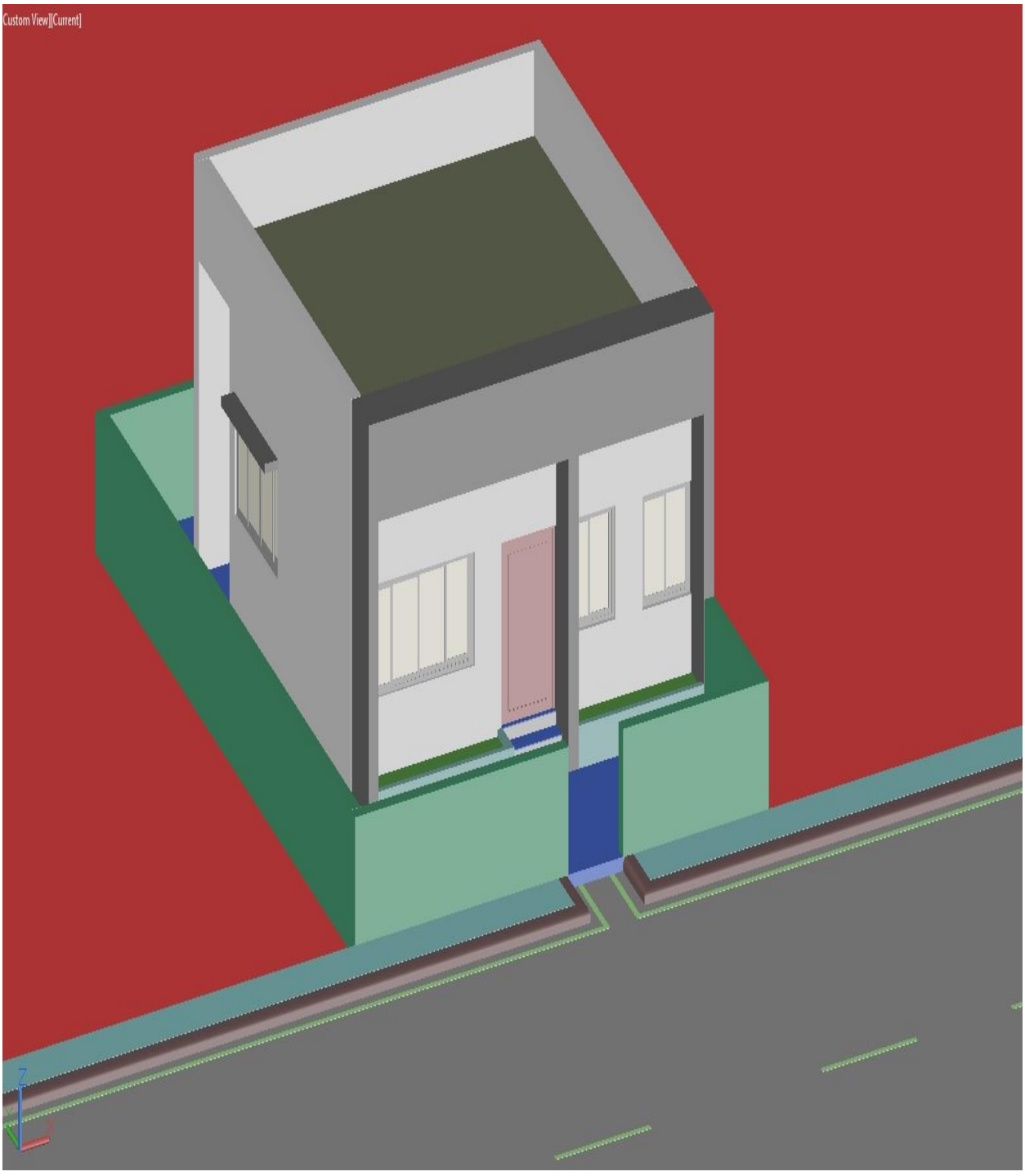


Fig no. 67 :- Three-D view of Post Office

Table no. 34 :- Quantity sheet of post office

Measurement sheet of post office								
Sr. No.	**Item Description**	**Unit**	**nos.**	**Length**	**Width**	**Height**	**Quantity**	**Total Quantity**
1.00	**Excavation**							
	Excavation below the ground level							
	As Per plinth area is 8.535*7.775 sq.m required depth is 0.30 m So As Per Calculation…	m^3	1	8.535	7.775	0.3	19.9078875	19.9078875
2.00	**Earth Filling in Plinth**	m^3	1	8.535	7.775	0.75	49.76971875	49.76971875
3.00	**PCC Work**							
	PCC work At top of plinth filling As Per plinth area is 8.535*7.775 sq.m of depth 0.05 m.	m^3	1	8.535	7.775	0.05	3.31798125	3.31798125
4.00	**RCC with M-20 concrete**							
	Slab	m^3	1	8.535	7.775	0.15	9.95394375	9.95394375
	Lintel & Chhajja	m^3						
	Lintel		1	60.04		0.12	7.2048	7.5492
	Chhajja for W1		1	1.18		0.12	0.1416	
	Chhajja for W2		1	1.69		0.12	0.2028	
7.00	**Super Structure**							167.21157

	Brick Work Plinth To Slab bottom	m^3	1	60.04		3	180.12	
	Deduction							
	Deduction of Door & Window							
	W	m^3	-1	2.4	0.23	1.2	-0.6624	
	W1	m^3	-3	1.2	0.23	1.2	-0.9936	
	W2	m^3	-1	2.1	0.23	1.2	-0.5796	
	V	m^3	-1	1.2	0.23	0.45	-0.1242	
	D1	m^3	-3	0.91	0.23	2.1	-1.31859	
	D2	m^3	-3	0.76	0.23	2.1	-1.10124	
	GATE	m^3	-1	1.2	0.23	2.1	-0.5796	
	Deduction of RCC Works							
	Lintel	m^3	-1	60.04		0.12	-7.2048	
	Chhajja for W1	m^3	-1	1.18		0.12	-0.1416	
	Chhajja for W2	m^3	-1	1.69		0.12	-0.2028	
						Total	-12.90843	
9.00	**Parapet Wall**	m^3	1	7.69		0.9	6.921	6.921
10.00	**Plaster Work**							
	Outer Side Plaster for full Height wall	m^2	1	37.7		4.6	173.42	
	Outer side plaster for parapet Top face.	m^2	1	33.65	0.23		7.7395	
	Outer side plaster for parapet inner face.	m^2	1	29.6		0.9	26.64	199.3515
						Total	207.7995	
	Deduction							
	W	m^2	-0.5	2.4		1.2	-1.44	
	W1	m^2	-1.5	1.2		1.2	-2.16	
	W2	m^2	-0.5	2.1		1.2	-1.26	

V	m^2	-0.5	1.2		0.45	-0.27	
D2	m^2	-0.5	0.76		2.1	-0.798	
GATE	m^2	-1	1.2		2.1	-2.52	
					Total	-8.448	
Over All Inside Plaster Before Deduction							
Working Area	m^2	1	23.50		3.00	70.5	
Branch office	m^2	1	11.10		3.00	33.3	
Locker & Store	m^2	1	11.10		3.00	33.3	
Pantry	m^2	1	8.69		3.00	26.07	
Washroom Area	m^2	1	6.10		3.00	18.3	
CEILING PLASTERING							
Working Area	m^2	1	26.50			26.5	
Branch office	m^2	1	7.73			7.73	
Locker & Store	m^2	1	7.73			7.73	
Pantry	m^2	1	4.30			4.3	
Washroom Area	m^2	1	2.32			2.32	212.677
					Total	230.05	
Inner Deduction Ventilation And Window							
Deduction							
W	m^2	-0.5	2.4		1.2	-1.44	
W1	m^2	-1.5	1.2		1.2	-2.16	
W2	m^2	-0.5	2.1		1.2	-1.26	
V	m^2	-0.5	1.2		0.45	-0.27	
D1	m^2	-3	0.91		2.1	-5.733	
D2	m^2	-2.5	0.76		2.1	-3.99	
GATE	m^2	-1	1.2		2.1	-2.52	
					Total	-17.373	

Table no. 35 :- Abstract sheet of post office

Abstract sheet of post office					
Sr. No.	**Item Descriptions**	**Unit**	**SOR**	**Total Quantity**	**Total Rate**
1	**Excavation**				
	Excavation for foundation up to 3 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff up to 50 Meter lead.(B) Dense or Hard soil	cu.m	152	19.9	3024.8
2	**PCC Work**				
	Providing and laying cement concrete 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) for reinforced concrete Chhajjas not exceeding 10 cm. thickness up to floor two level including finishing the exposed surfaces with cement mortar 1:3 (1- cement, 3 Fine sand) to give a smooth and even surface centering and formwork and curing complete excluding cost of reinforcement. (more than 10 ton)	cu.m	4655	3.32	15454.6
3	**RCC Work In Foundation**				
	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)(B) Conventional (up to 10 ton)	cu.m	4670	9.95	46466.5
4	**Earth Filling in Plinth & foundation tranches**				
	Filling available excavated earth in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each deposited layer by ramming and watering.	cu.m	85	19.9	1691.5
	Filling in foundation and plinth with Murom or selected soil in layers of 20 cm. thickness including watering ramming and consolidating etc. completed.	cu.m	250	29.87	7467.5

5	**Super Structure**				
	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in Ground floor wall in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(B) Conventional (up to 10 ton)	cu.m	2955	167.21	494105.55
6	**Parapet Wall**				
	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in parapet wall in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(B) Conventional (up to 10 ton)	cu.m	2990	6.92	20690.8
7	**Plaster Work**				
	Out-Side Plaster				
	20 mm thick sand faced cement plaster on walls up to height 10 meters above ground level consisting of 12 mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8 mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete.	Sq.m	189	199.35	37677.15
	In-side Plaster				
	Providing 15 mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering up to floor two level and finished even and smooth in (i) Cement mortar 1:3 (1- cement :3-sand)	Sq.m	108	212.68	22969.44
	Total Estimated Cost of Main Items				649547.84
	Add 20% cost of Miscellaneous Building Items				129909.568
	Add 10% contractor profit				77945.7408
	Final Estimated Cost Building				857403.1488

13.1.2 BUS STAND (Civil):-

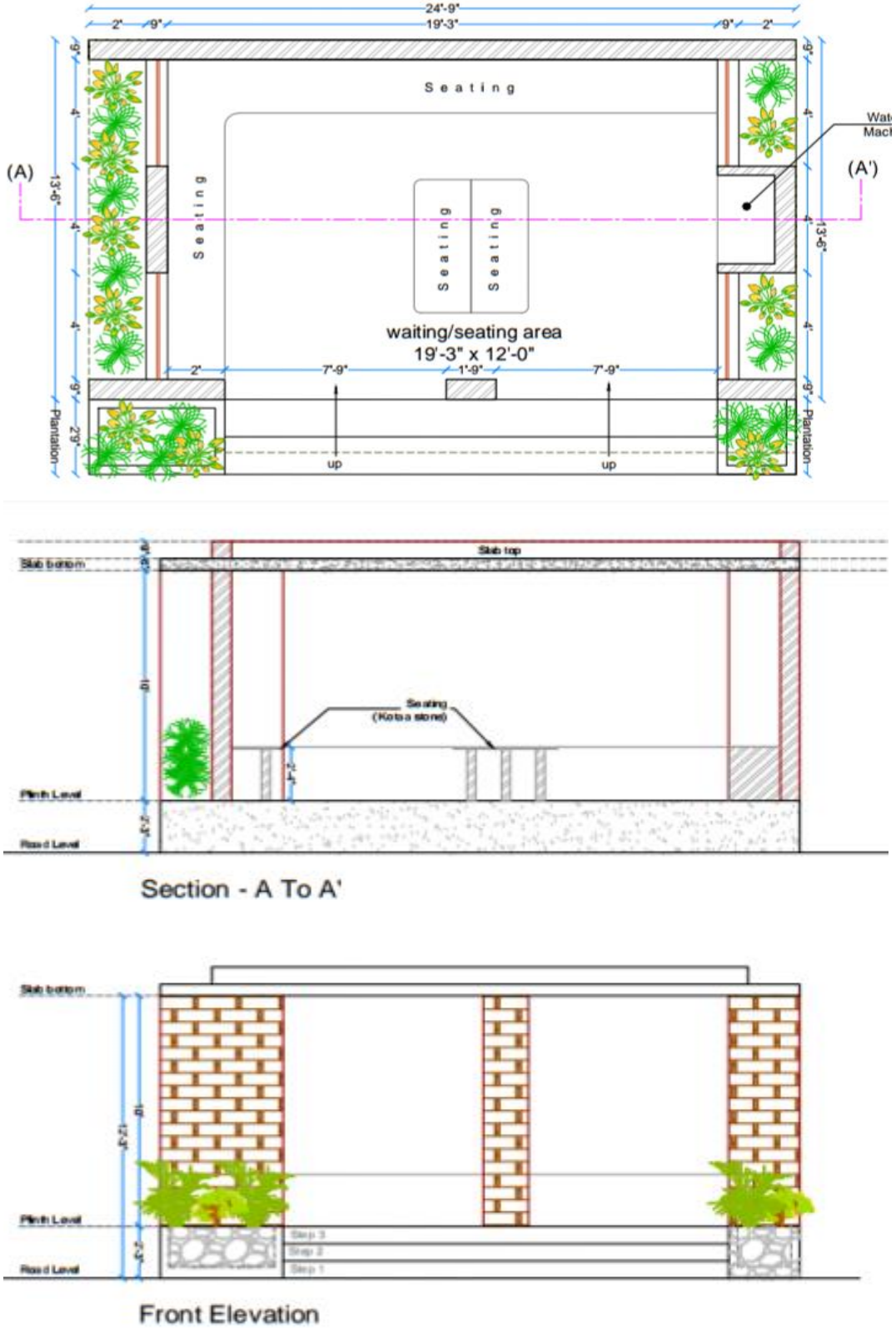


Fig no. 68 :- Bus Stand Plan, Elevation and Section

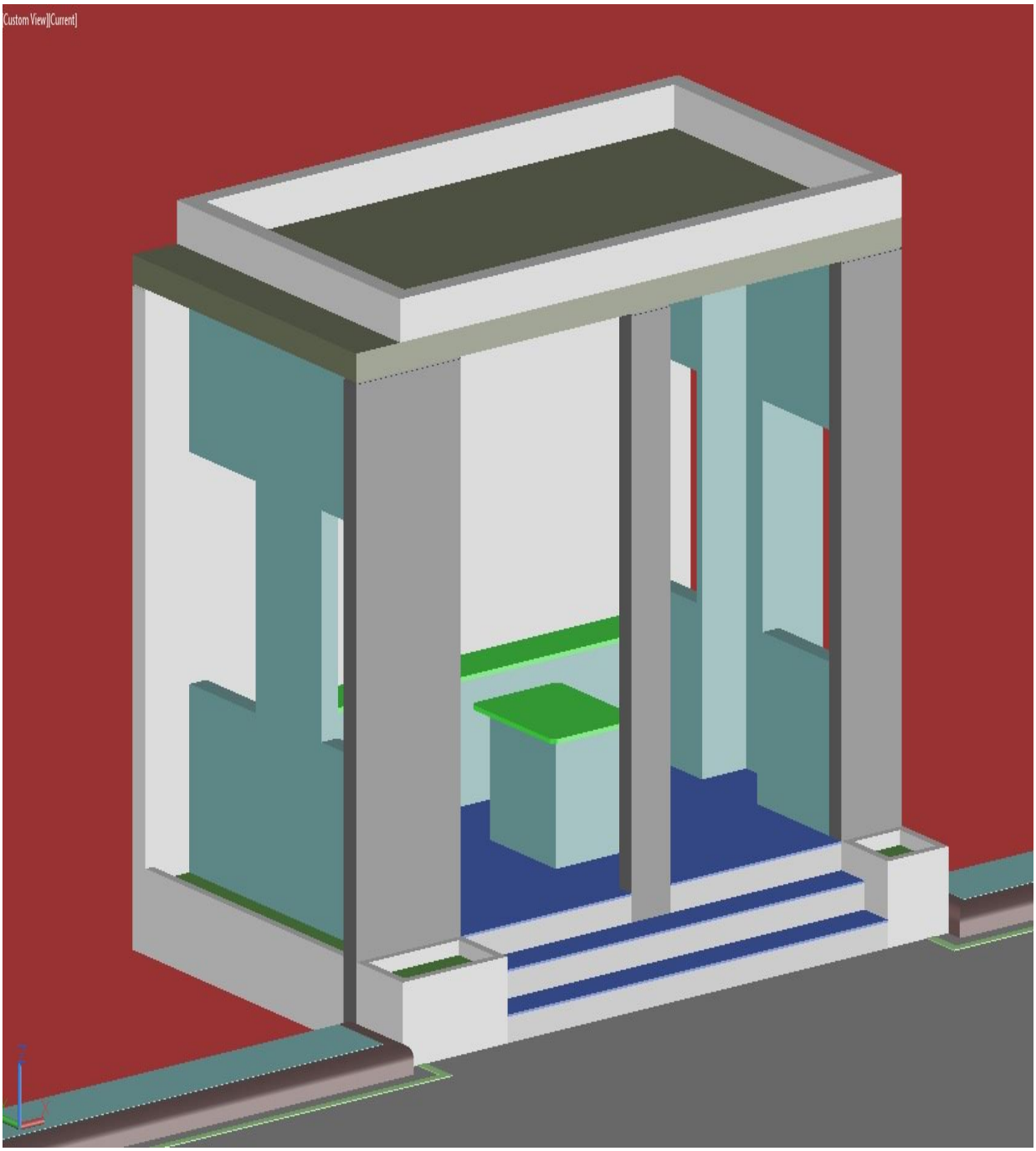


Fig no. 69 :- Three-D view of Bus stand

Table no. 36 :- Measurement sheet of Bus stand

Measurement sheet of Bus stand								
Sr.No.	**Item Description**	**Unit**	**nos.**	**Length**	**Width**	**Height**	**Quantity**	**Total Quantity**
1.00	**Excavation**							8.88
	Excavation below the ground level							
	As Per plinth area is 29.6 Sq.m required depth is 0.30 m So As Per Calculation…	m^3	1	29.6		0.3	8.88	
2.00	**Earth Filling in Plinth**	m^3	1	29.6		0.9	26.64	26.64
3.00	**PCC Work**							1.48
	PCC work At top of plinth filling As Per plinth area is 29.6 Sq.m of depth 0.05 m.	m^3	1	29.6		0.05	1.48	
4.00	**RCC with M-20 concrete**							
	Slab	m^3	1	33.7		0.15	5.055	5.055
7.00	**Super Structure**							9.288
	Brick Work Plinth To Slab bottom	m^3	1	4.2		3	12.6	

	Deduction							
	Deduction of Door & Window							
	SIDE OPENINGS	m^3	-4	1.2	0.23	3	-3.312	
9.00	**Parapet Wall**	m^3	1	5.5		0.23	1.265	1.265
10.00	**Plaster Work**							
	Outer Side Plaster for full Height wall	m^2	1	21.65		4.12	89.198	
	Outer side plaster for parapet Top face.	m^2	1	20.96	0.23		4.8208	
	Outer side plaster for parapet inner face.	m^2	1	20.27		0.23	4.6621	50.6809
						Total	98.6809	
	Deduction							
	Side Openings	m^2	-4	4		3	-48	
						Total	-48	
	Over All Inside Plaster Before Deduction							
	Wall plaster	m^2	1	21.95		3.00	65.85	
	Ceiling Plastering	m^2	1	21.95			21.95	39.8
						Total	87.8	

	Inner Deduction Ventilation And Window						
	Deduction						
	Side Openings	m^2	-4	4		3	-48
						Total	-48

Table no. 37 :- Abstract sheet of Bus stand

Abstract sheet of Bus stand					
Sr. No.	**Item Descriptions**	**Unit**	**SOR**	**Total Quantity**	**Total Rate**
1	**Excavation**				
	Excavation for foundation up to 3 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff up to 50 Meter lead.(B) Dense or Hard soil	cu.m	152	8.88	1349.76
2	**PCC Work**				
	Providing and laying cement concrete 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) for reinforced concrete Chhajjas not exceeding 10 cm. thickness up to floor two level including finishing the exposed surfaces with cement mortar 1:3 (1-cement, 3 Fine sand) to give a smooth and even surface centering and formwork and curing complete excluding cost of	cu.m	4655	1.48	6889.4

	reinforcement. (more than 10 ton)				
3	**RCC Work In Foundation**				
	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)(B) Conventional (up to 10 ton)	cu.m	4670	5.055	23606.85
4	**Earth Filling in Plinth & foundation tranches**				
	Filling available excavated earth in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each deposited layer by ramming and watering.	cu.m	85	8.88	754.8
	Filling in foundation and plinth with Murrum or selected soil in layers of 20 cm. thickness including watering ramming and consolidating etc. completed.	cu.m	250	17.64	4410
5	**Super Structure**				
	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in Ground floor wall in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(B) Conventional (up to 10 ton)	cu.m	2955	9.29	27451.95
6	**Parapet Wall**				

	Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in parapet wall in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(B) Conventional (up to 10 ton)	cu.m	2990	1.27	3797.3
7	**Plaster Work**				
	Out-Side Plaster				
	20 mm thick sand faced cement plaster on walls up to height 10 meters above ground level consisting of 12 mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8 mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete.	Sq.m	189	50.68	9578.52
	In-side Plaster				
	Providing 15 mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering up to floor two level and finished even and smooth in (i) Cement mortar 1:3 (1- cement :3-sand)	Sq.m	108	39.8	4298.4
	Total Estimated Cost of Main Items				82136.98
	Add 20% cost of Miscellaneous Building Items				16427.396
	Add 10% contractor profit				9856.4376
	Final Estimated Cost Building				108420.8136

13.1.3 Physical design of pavement in graveyard with paver block (Civil):-

- There are many advantages of Concrete Pavers as compared to Other Paving Solutions.
- Versatility& safety
- Low cost
- Unlimited paver styles and colors
- Custom designs
- Easy installation
- Maintenance Free
- Superior physical characteristics
- Durability 50 years + life expediency
- No cracking
- 4-time stronger then poured concrete
- Withstands freeze-thaw conditions
- Pavers are a flexible system and allow for movement

VERSATILITY

- Concrete Pavers are an ideal choice for both residential and commercial applications, including surface coverings for driveways, parking lots, promenades, sidewalks, pool decks, patios, streets, golf cart paths and even roof gardens. Interlocking concrete pavers are a sensible and aesthetically attractive choice for all outdoor surfaces. On both vehicular and pedestrian applications pavers have a non-skid surface even when the pavers are wet they are safe to walk or drive a vehicle over them.

LOW MATERIAL & INSTALLATION COST

- The cost of Concrete pavers is much less than other type of paving products since they are manufactured with machines as compared to other naturally occurring products. Concrete pavers are usually less expensive than clay pavers, granite pavers or sandstone pavers. When considering maintenance and replacement costs, concrete pavers offer an economical long-term alternative to other types of paving options. For small and simple projects cost can be also reduced by a home owner installing the pavement themselves using installation guides provided by the manufacturer of the paver products.

HIGH STRENGTH

- Concrete pavers are manufactured in a steel mold under exacting factory conditions & tight dimensional tolerances, thus resulting in a product that is many times stronger than regular poured concrete and more durable than black asphalt. They can withstand years of abuse and last for generations. In addition these interlocking paving units allow for expansion and contraction without producing surface cracks unlike monolithic concrete surfaces and stamped concrete. Each unit has joints that allow for a small amount of movement without cracking.

MAINTENANCE

- Pavers are low-maintenance and offer low life-cycle costs than any other paving products such as Asphalt, poured concrete, and stamped concrete. Pavers are easily maintained by regular sweeping and occasional rinsing. In the case tough stains, pressure washing with appropriate cleaning solutions or a simple spot treatment with a brush, cleaning solvent & water. Pavers can be repaired by lifting the affected area, re-grading and re-compacting the base and bedding sand and reinstalling the same pavers. It is an inexpensive procedure that leaves no unsightly repair patches. Concrete pavers also provide a functional and easy way for conducting maintenance to the under base or underground utilities. Simply remove and reinstate the same pavers with no ugly patches after the repairs to the underground utilities are completed. Pavers can be easily removed and replaced for utility repairs.
- **"Smartness of this design is to reuse of paver block when it's necessary and prone to water logging and get worn out quickly."**

- **Cost Estimate of Pavement with paver block**
- Rubberized PVC moulds for paver block 100 sq. Ft. = 262 piece
- For unpaved paver block 450 Rs. Per square meter
- For Milano Paver block 450 Rs. Per square meter
- We have 300 Sq.m. Area 300 m^2= 3230 Sq. ft. in grave yard of Vamaiya village
- 100 Sq. ft. = 262 piece
- So, 3230*262 = 8463 piece required.
- Cost of Paver block per square meter is Rs. 450/-300*450 **= 1,35,000/- Rs**
- So, for 300 m^2
- area We required 8463 paver blocks and its cost is around 1,35,000 Rs.

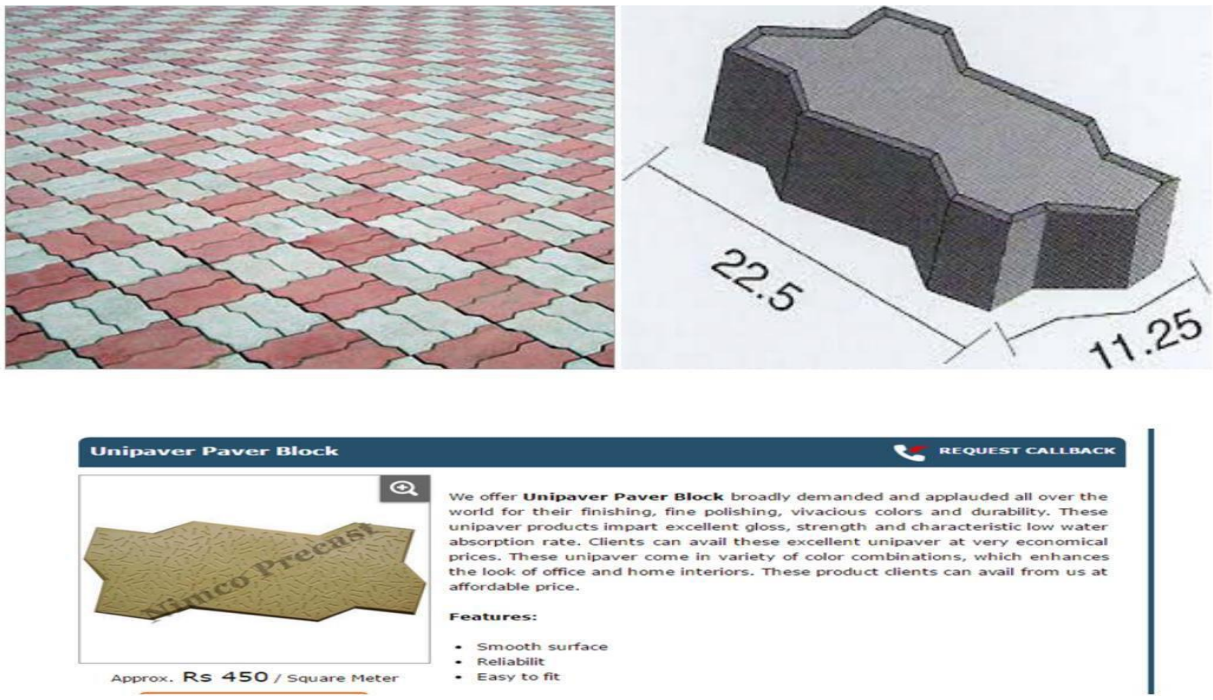


Fig. no. 70 :-Paver block Rode

- **Workout for materials for brickwork (1 : 6)**
- Volume of total brickwork = 31.312 m^3
- Cement = 1.5656 m^3 = 1.5656/0.035 = 44.73 ~ 45 bags
- Sand (F.A.) = 9.39 m^3
- Bricks = 13226.24 ~ 13227 nos

Table no. 38 :- QUANTITY and rate analysis

Sr no.	Particulars	Qty	Rate	Per	Amount
1	Cement	98	225	Bag	22,050
2	Sand (Fine aggregate)	15.353	616	M^3	9,457.45
3	Coarse aggregate	7.246	750	M^3	5,437.5
4	Bricks	13230	4	Piece	52,920
5	Steel	413	37	Kg	15,281
				Total cost	105146 /-

TOTAL ESTIMATED COST (in rupees) = 1,10,944 +1,05,146 = 2,16,090/-

13.1.4 Smart Village Design of Public Garden (Civil):-

Fig no. 71 :- Public Garden

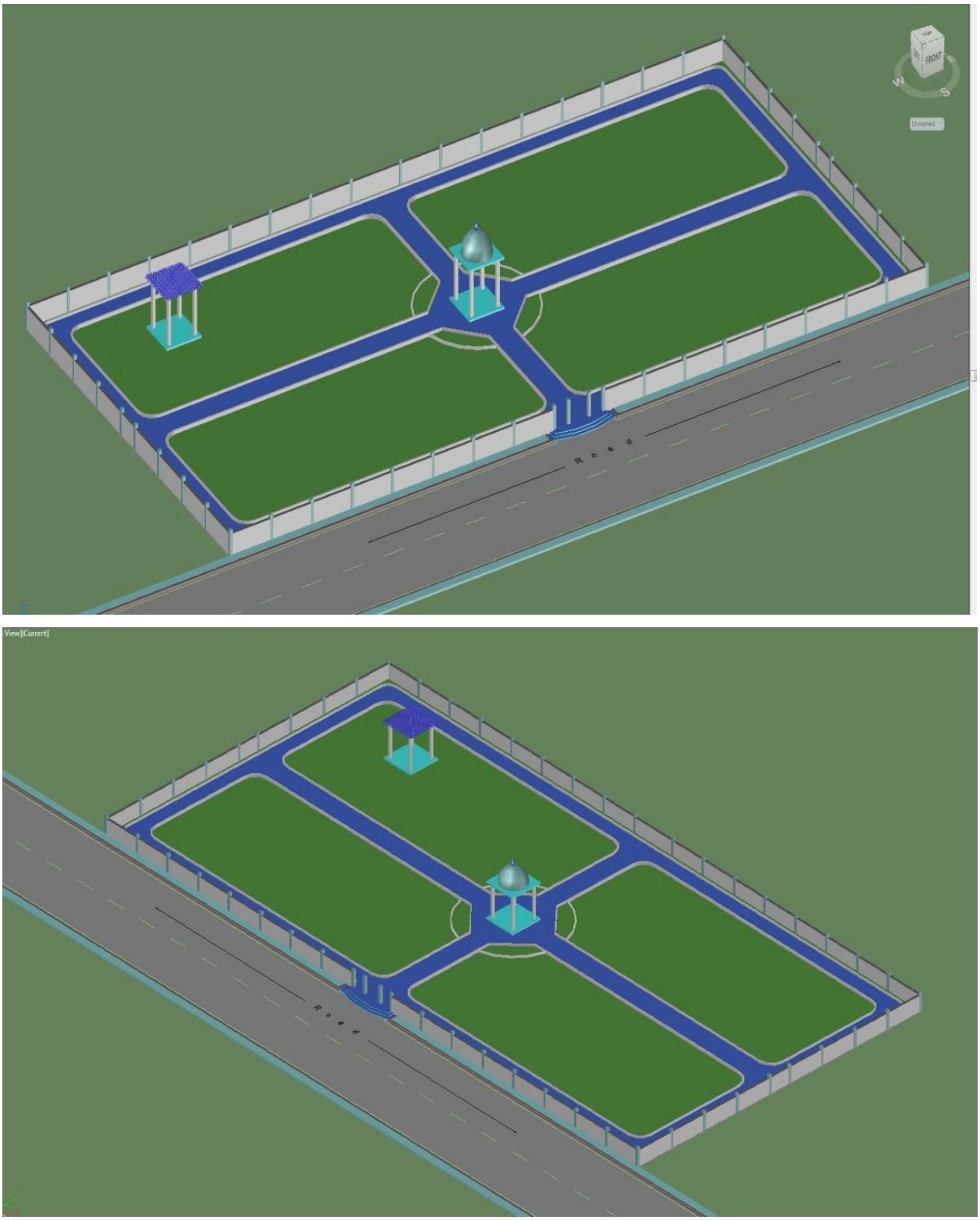


Fig no. 72 :- 3D view of Public Garden

Table no. 39 :- Measurement Sheet of Public Garden

Measurement Sheet of Public Garden								
Sr. No.	**Item Description**	**Unit**	**nos.**	**Length**	**Width**	**Height**	**Quantity**	**Total Quantity**
1.00	**Excavation**							93.618
	Excavation below the ground level							
	as per wall foundation of width of 0.23 along length of brick wall of depth 0.45	m^3	1	203	0.9	0.45	91.35	
	As Per precast concrete column area is 0.06 Sq.m required depth is 0.45 m So As Per Calculation…	m^3	56	0.09		0.45	2.268	
2.00	**Green lawn in Garden**	m^2	4	456			1824	1824
3.00	**RCC with M-20 concrete**							7.56
	Column	m^3	56	0.09		1.5	7.56	
4.00	**Sheeting Benches**	no.	20.00					20.00

5.00	**Paver Block in Garden** (44 blocks in 1 m2)	m^3	44	608		26752	26752

Table no. 40 :- Abstract Sheet of Public Garden

Abstract Sheet of Public Garden					
Sr. No.	**Item Description**	**Unit**	**SOR**	**Total Quantity**	**Total Rate**
1	**Excavation**				
	Excavation for foundation up to 3 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff up to 50 Meter lead.(B) Dense or Hard soil	cu.m	152	93.62	14230.24
2	**Green lawn in Garden**	Sq.m	85	1824	155040
3	**RCC Work In Column**	cu.m	4670	7.56	35305.2
4	**Sheeting Benches**	no.	3200	20	64000
5	**Paver Block in Garden**				
	Concrete Brick **B**lock of size (44 blocks in 1 m2)	cu.m	8	26752	214016

Total Estimated Cost of Main Items	482591.44
Add 20% cost of Miscellaneous Building Items	96518.288
Add 10% contractor profit	57910.9728
Final Estimated Cost Building	637020.7008

13.1.5 Dwelling House

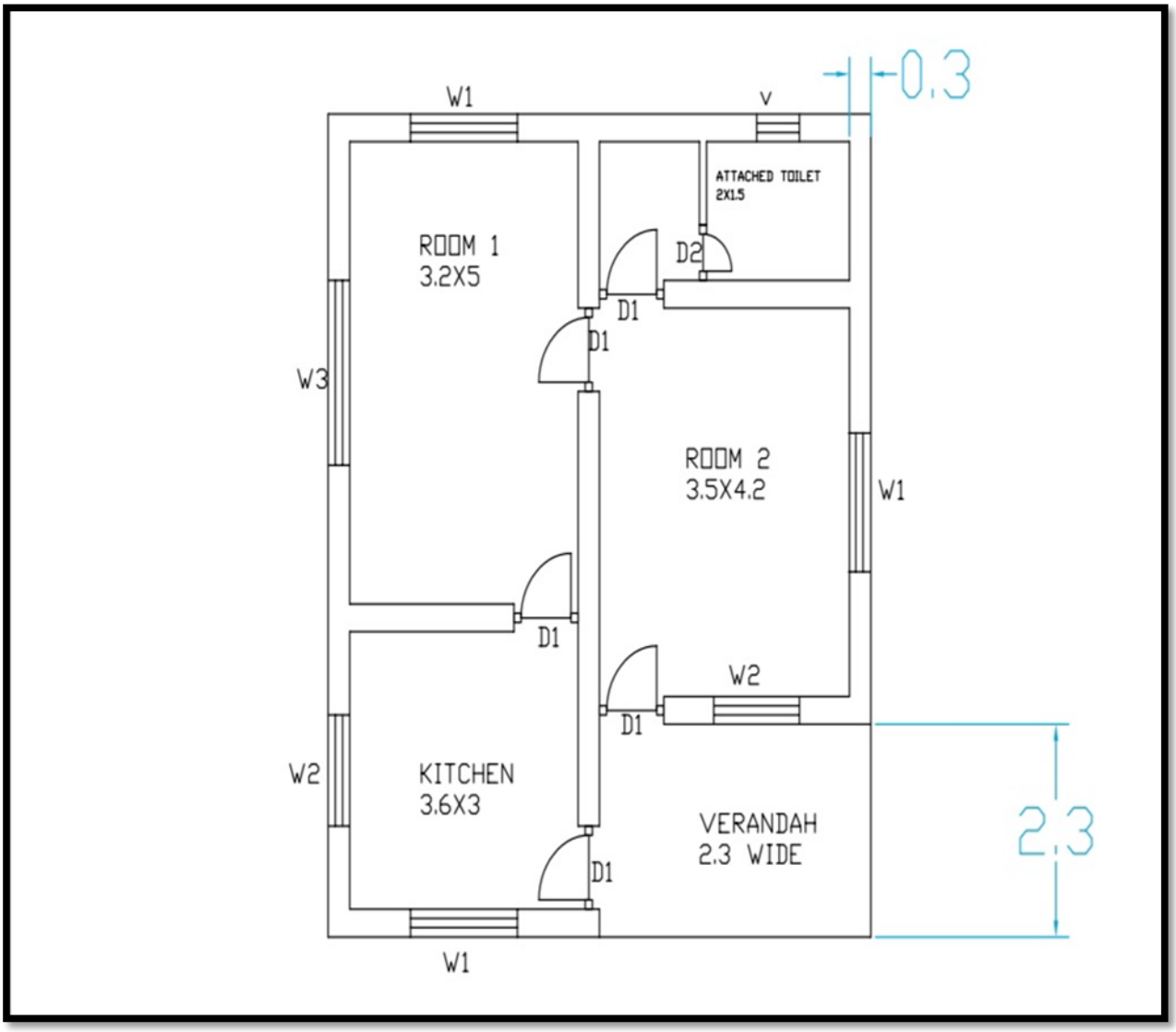


Fig. 73 : Plan of dwelling house

Fig. 74 Front view of dwelling house

Fig. 75 Dwelling house

Table 41. Measurement Sheet

Item No.	Item Description	No	Length(m)	Breadth(m)	Height(m)	Quantity
1	Excavation in foundation Long walls(vertical) L= 5 + 3+ 0.3 +2 x 0.15 + 2 x 0.45 = 9.5 m Short walls-type 1: L= 3.8 + 2 x 0.15-2 x 0.45 = 3.2 m Short walls-type 2: L= 3.5 + 2 x 0.15-2 x 0.45 = 2.9m	3 3 4	9.5 3.2 2.9	0.9 0.9 0.9	1.5 1.5 1.5	38.48 m^3 12.96 m^3 15.66 m^3 Total quantity=67.10 m^3
2	Plain cement concrete (P.C.C.) in foundation in 1 : 3 :6. Long walls Short walls,type-1 Short walls,type-2	 3 3 4	 9.5 3.2 2.9	 0.9 0.9 0.9 Total quantity= 13.43 m^3	 0.30 0.30 0.30	 7.70 2.60 3.13
3	Brickwork in foundation(up to plinth) long walls First step : L= 9.5– 2 x 0.15 = 9.2 m	3	9.2	0.6	0.2	3.31

	Second step:L=9.2– 2x .05 = 9.1 m	3	9.1	0.5	0.2	2.73
	Third step : L= 9.1– 2 x .05 = 9.0 m	3	9.0	0.4	0.2	2.16
	Fourth step:L= 9.0–2x 0.05 = 8.9 m H=(1.5-0.3-3x0.2)+6 =1.2 m(No D.P.C given)	3	8.9	0.3	1.2	9.61
	Short walls type-1					
	First step : L= 3.2+ 2 x0.15 = 3.5 m	3	3.5	0.6	0.2	1.26
	Second step:L=3.5+2x .05 = 3.6 m	3	3.6	0.5	0.2	1.08
	Third step : L= 3.6+ 2 x .05 = 3.7 m	3	3.7	0.4	0.2	0.89
	Fourth step:L= 3.7+2x 0.05 = 3.8 m	3	3.8	0.3	1.2	4.10
	Short walls type-2					
	First step : L= 2.9+ 2 x 0.15 = 3.2 m	4	3.2	0.6	0.2	1.54
	Second step:L=3.2+ 2x .05 = 3.3 m	4	3.3	0.5	0.2	1.32
	Third step : L= 3.3+ 2 x .05 = 3.4 m	4	3.4	0.4	0.2	1.09
	Fourth step:L= 3.4+2x 0.05 = 3.5 m	4	3.5	0.3 Total quantity=	1.2	5.04

				34.13 m^3		
4	Brick work in super structure in cement mortar 1:4 (up to slab)					
	Long walls : L =8.9 m	2	8.9	0.3	3.0	16.02
	Long walls :L=8.9-2.3 = 6.6 m	1	6.6	0.3	3.0	5.94
	Short walls -1: L=3.8m	3	3.8	0.3	3.0	10.26
	Long walls-2 :L=3.5m	3	3.5	0.3	3.0	9.45
	For Parapet wall:					
	Long walls:	2	8.9	0.3	0.9	4.81
	Short walls:	2	7.6	0.3	0.9	4.10
						50.58m^3
	Deductions for doors/Windows:					
	D1	5	0.9	0.3	2.1	2.84
	W1	3	1.5	0.3	1.2	1.62
	W2	2	1.2	0.3	1.2	0.86
	W3	1	2.0	0.3	1.2	0.72
	V	1	0.6	0.3	0.45	0.08
						6.12m^3
	Deductions for Lintels: 15 cm bearing at each end					
	D1	5	1.2	0.3	0.12	0.22
	W1	3	1.8	0.3	0.12	0.19
	W2	2	1.5	0.3	0.12	0.11
	W3	1	2.3	0.3	0.12	0.08
	V	1	0.9	0.3	0.12	0.03

						0.63m^3
	Net quantity = 50.58 -6.12 -0.63 = 43.83m^2					
5	RCC work in slab ,chajja and lintel R.C.C slab : L= 5 + 3 x 0.3 = 8.9 m B = 3.8 + 3.5 + 3 x 0.3 = 8.2 m R.C.C Chajja : W1 W2 W3 RCC lintels(From Item-4)	1 3 1 1	8.9 1.8 1.5 2.3	8.2 0.6 0.6 0.6	0.12 0.10 0.10 0.10	8.76 m^2 0.324 0.09 0.14 0.554 m3 0.63 m^3 =9.94 m^3
6	2 cm thick marble flooring Room 1 Room 2 Kitchen Verandah Door Sills D1	 1 1 1 1 5	 3.8 3.5 3.8 3.8 0.9	 5.0 4.2 3.0 2.3 0.3	 - - - - -	 19.0 14.70 11.40 8.74 1.35 =55.19 m^2
7	Earth Filling in plinth H= 0.6 - 0.075 – 0.025 0.02					

	=0.48 m					
	Room 1	1	3.8	5.0	0.48	9.12
	Room 2	1	3.5	4.2	0.48	7.06
	Kitchen	1	3.8	3.0	0.48	5.47
	Verandah	1	3.5	2.0	0.48	3.36
	Toilet	1	3.5	1.5	0.48	2.52
						=27.53 m^3

Table 42. Abstract Of Quantities:

Item No	Particulars of Item	Quantity	Per	Rate	Amount Rs.
1.	Excavation in foundation	67.10 m^3	m^3	85	5,704
2.	Plain cement concrete (P.C.C) In foundation in 1 : 3 : 6	13.43 m^3	m^3	3200	42,976
3.	Brickwork in foundation	34.13 m^3	m^3	3200	1,09,216
4.	Brickwork in super structure in cement mortar 1 : 4	43.83 m^3	m^3	3500	1,53,405
5.	RCC work in slab, chajja and lintel	9.94 m^3	m^3	800	87,472
6.	2 cm thick marble flooring	55.19 m^3	m^3	500	27,596
7.	Earth filling in plinth	27.53 m^3	m^3	50	1,376

Total Rs. 4,27,744

Add 3% contingencies Rs. 12,832

Add 2% work charge establishment Rs. 8,555

Grand Total Rs. 4,49,131

13.1.6 Open Window Composite Structure

Profile of the Study of Vamaiya Village

Vamaiya is a large village located in Patan Taluka of Patan district, Gujarat with total 905 families residing. The Vamaiya village has population of 5228 of which 2732 are males while 2496 are females as per Population Census 2011. The amount of daily waste generated is not less than 500 kgs per day.

Follow three steps :

A) Install dustbins

B) Collection & transportation

C) Disposal by using open window composting method

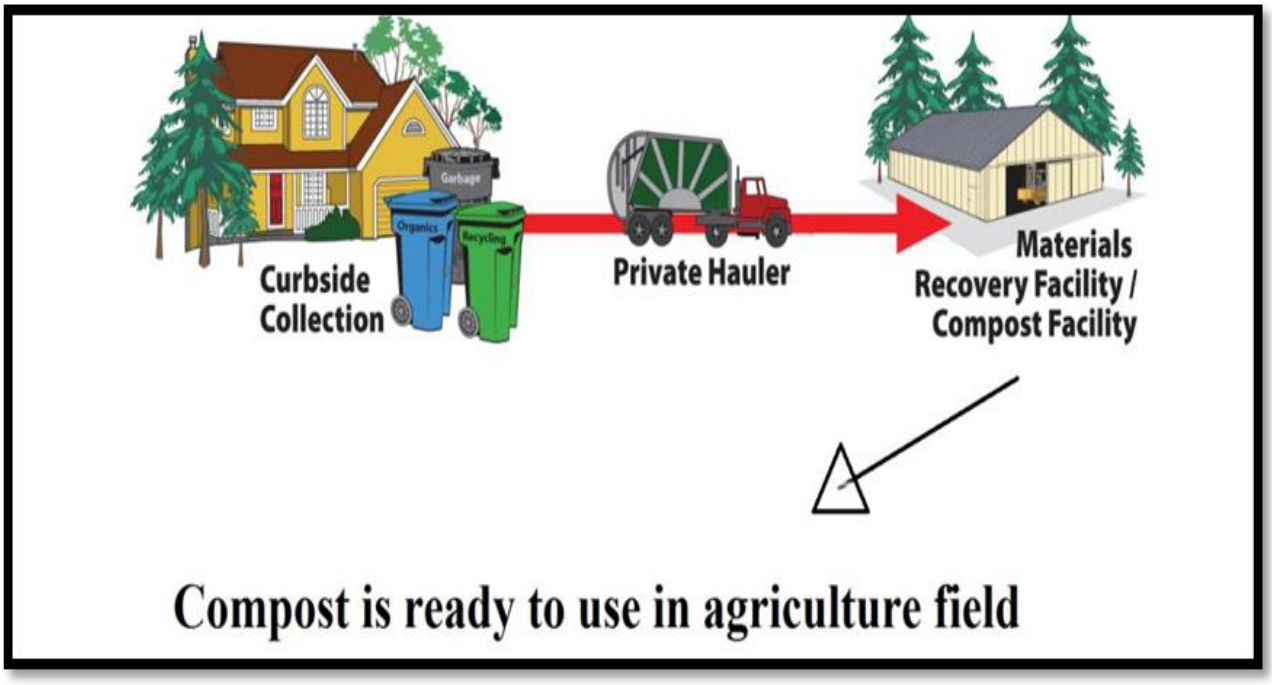


Fig. 76 Solid Waste Management

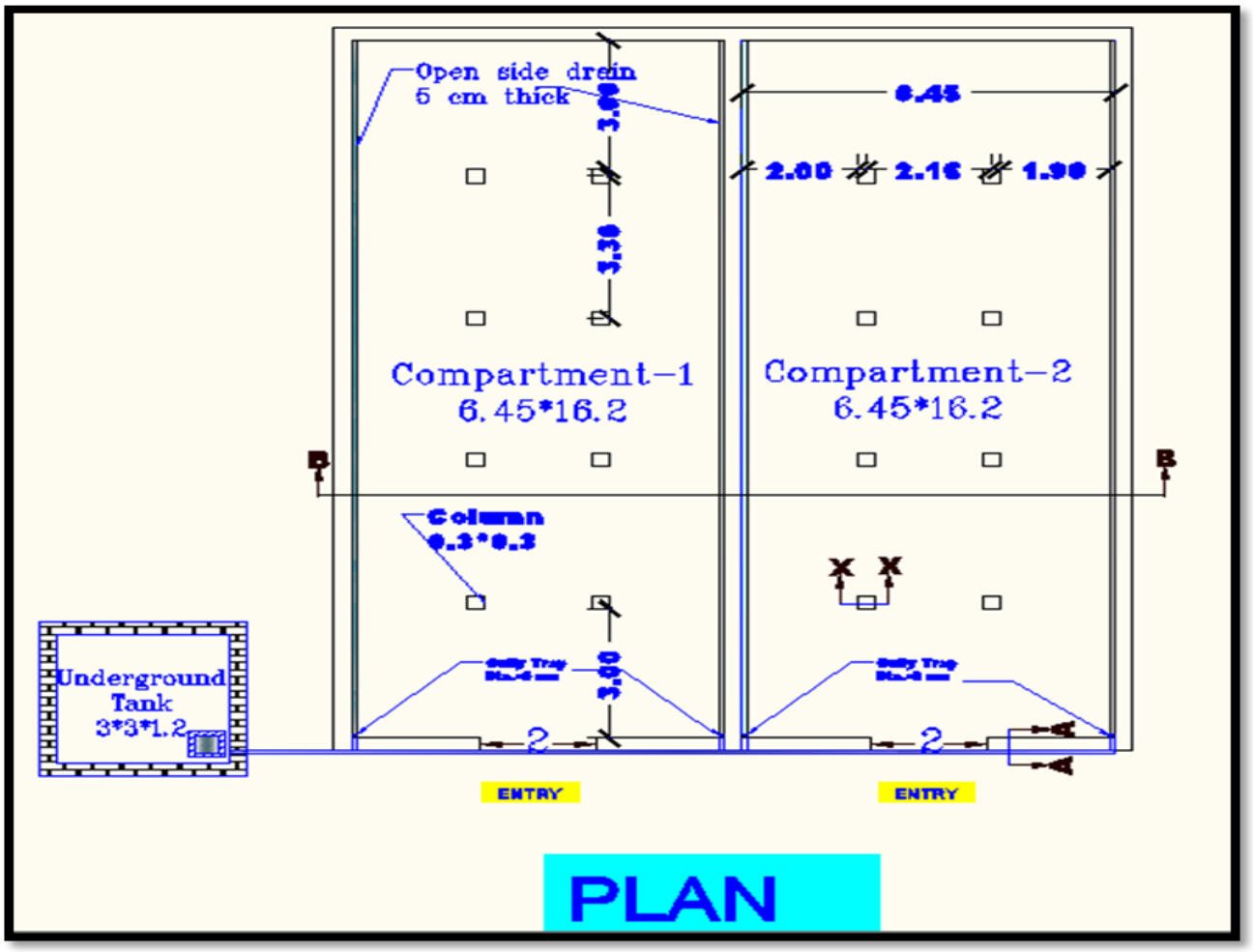


Fig. 77 Plan of open window composting structure

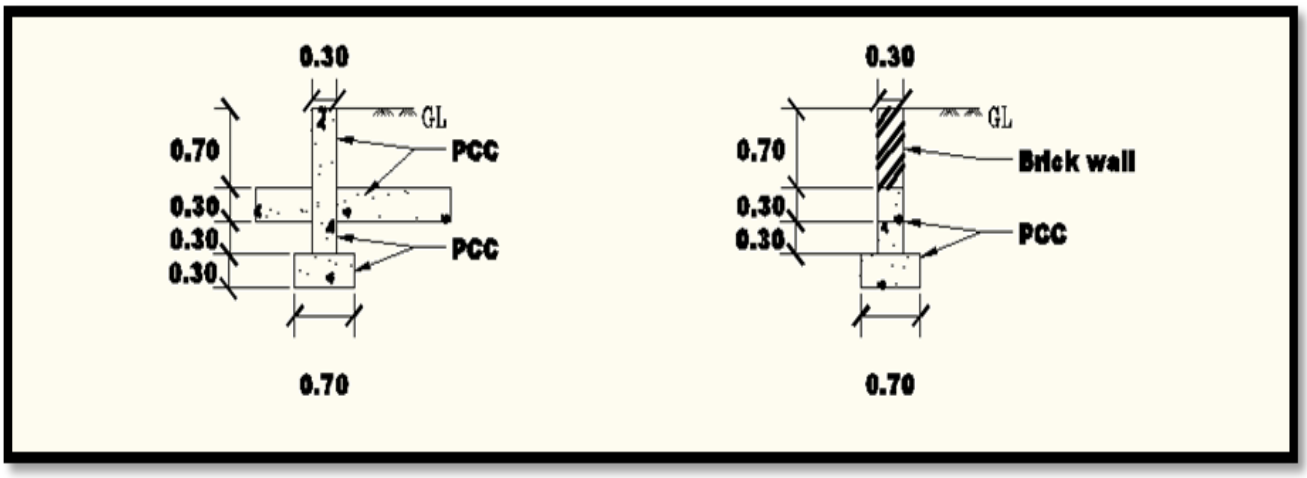


Fig. 78 Section X-X & A-A plan for wall and footing of composting structure

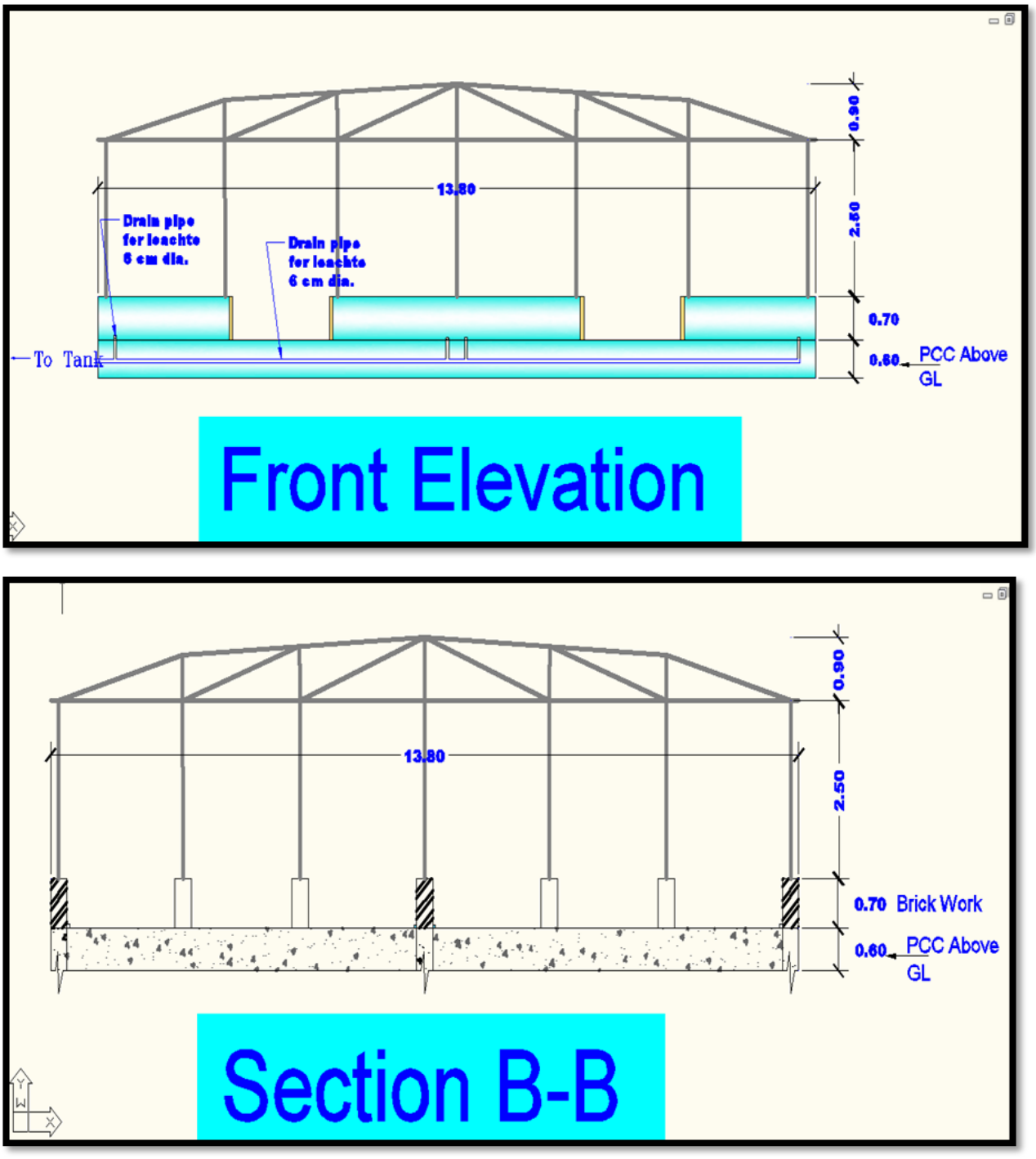


Fig. 79 Front elevation and section B-B for composting

(A & B) No. of dustbins Install & Collection & transportation :

Table 43 cost estimation

Sr. no	Particulars	Quantities	Unite Price	Total Cost
No. of dustbins install				
	Common dustbins of 100 kg capacity (including school, anganwadi and panchayat Building, other place and road)	75	500	37500
	Dustbins for households green color (10 liters)	275	135	37125
	Dustbins for households red color (15 liters)	275	175	37125
System for collection, segregation and disposal of household garbage				
	Workers Uniforms, safety equipment; hand gloves, canvas shoes, first aid kits etc.		3000	3000
	Tools required (Shovels, Brooms etc.)	1 set	15000	15000
	Waste Collection Vehicles (Battery operated vehicles)	2	200000	400000
	SWM Activities, Landscaping and Beautification			30000
			Total 5,59,750	

C) Disposal by using open windrow/window composting method :

Table 44. Measurement sheet for open window composting structure

Item no.	Item Description	No.	L(m)	B(m)	H(m)	Quantity
1	Excavation Foundation Total Center Line Length = 76.5 m Net Center line Length = 76.5– ½ x 0.7 x 2 =					

	75.8 m					
2	P.C.C. in Foundation	1	75.8	0.7	0.3	15.91 m3
3	P.C.C. up to Ground Level	1	76.2	0.3	0.6	13.71 m3
4	Brick masonry above G.L. Deductions: Entry doors Columns	1 2 26	76.2 2 0.3	0.3 0.3 0.3	0.7 0.7 0.7	16.02 m3 0.84m^3 1.638m^3 Total= 13.524m^3
5	P.C.C for columns	26	0.3	0.3	0.7	1.638 m^3
6	P.C.C. for floor	2	16.2	6.4	0.3	62.69 m^3
7	Inside Plaster Deduction	4 4 1	6.45 16.2 2	0.7 0.7 0.7		18.06 m^2 45.36m^2 1.4m^2 Total= 62.02 m2
8	Outside Plaster Deduction	2 2 1	13.8 16.8 2	0.7 0.7 0.7		13.32m^2 23.52m^2 1.4m^2 Total= 41.44m^2

Table 45. Abstract sheet open windrow/window composting structure

No.	Item	Qty.	Rate.	Per	Amount Rs.
1.	Excavation in Foundation	31.83 m3	85	m3	2705.55
2.	P.C.C. in Foundation	15.91 m3	2604	m3	41429
3.	P.C.C. up to Ground level	13.71 m3	2604	m3	35700
4.	Brick Masonry above G.L.	13.52 m3	3321	m3	44899.92
5.	P.C.C. for Columns	1.63 m3	2604	m3	4244.52
6.	P.C.C. for floor	62.69 m3	2604	m3	163244.76
7.	Smooth Plaster inside (C.M.-1:3)	62.02 m2	130	m2	8062
8.	Outside Plaster (C.M.-1:4)	41.44 m2	150	m2	6216

Total all items amount = Rs. 3,06,501

Add Water Charges (1.5%) = Rs.4,597

Contractor Profit (10%) = Rs. 30,650

Contingencies charges (5%) = Rs. 15,325.05

Total grant amount = Rs. 3,57,073.05

13.2 About designs Benefit of the villagers

The allocated village Vamaiya has lake of the some facilities like Bus Stand, Public Toilet, Under ground sump, school sanitary complex, paver block in ground, Public Garden as well as Solid waste management system and Dwelling Houses, etc.

After providing the basic facilities to the village, the peoples of the village live their daily life properly and the indirectly the village also gets pollution free and this can considerably reduce the migration of peoples from the village to the cities.

13.3 About designs Suggestions / Benefit of the villagers

- Community hall is used for conducting various functions like marriage.
- Public Toilet as soon as provided for the Swatch Bharat Abhiyan or Clean India Propose for making surrounding environment pollution free.
- Post office should be need in the communication purpose in the village.
- Garden is used for children and old person for enjoy and Recreation.
- Bus stand it's also provide in the village for waiting purpose and for the purpose of transportation from one place to another
- Chabutara it's also provide for the eating and resident for the birds.
- Polling booth its provide for the voting purpose.
- Biogases plant also provide should be provide for the natural gas and its utilization and keeping environment clean.

Public Toilet:-

- The public toilets make the village pollution free.
- Public Toilet is not proper in this village, so the peoples of the village pollute the surrounding by open urination and sanitation.

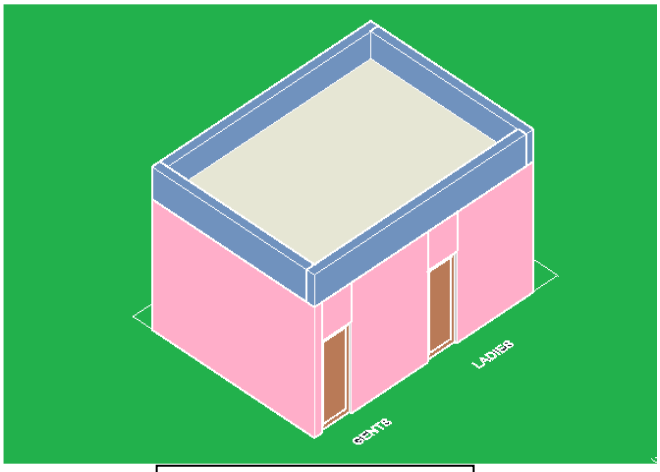


Fig 80: Public Toilet

Fig 81: Solid waste Management

Solid Waste Management:-

- The main aim of this is to Make the village pollution free and also contribute the swatch Bharat Abhiyan.
- This facility not available in this village.
- **Solid-waste management**, the collecting, treating, and disposing of solid material that

is discarded because it has served its purpose or is no longer useful. Improper disposal of municipal solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease—that is, diseases spread by rodents and insects. The tasks of solid-waste management present complex technical challenges. They also pose a wide variety of administrative, economic, and social problems that must be managed and solved.

- This process to make the village is clean and Pollution free.
- Dustbin is provided in the specific area.

Post Office:-

- This facility is a smart village and SAGY facility.
- Post Office is in too bad and poor condition. it provides means of communication to the villagers.
- It is involved in delivering **mail** (**post**), remitting money by money orders, accepting deposits under Small Savings Schemes, providing life insurance bcoverage under **Postal** Life Insurance (PLI) and Rural **Postal** Life Insurance (RPLI) and providing retail services like bill collection, sale of forms, etc. This facility implement to the short time this village is a announce adarsh Village.

14. Technical Options

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

Earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to **reduce the earthquake-generated forces acting upon it.**

Earthquake Resistant Design Techniques for Buildings and Structures

Among the most important advanced techniques of earthquake resistant design and construction are:

- Base Isolation
- Energy Dissipation Devices

Base Isolation Method

A base isolated structure is supported by a series of bearing pads which are placed between the building and the building's foundation. (See Figure 1.) A variety of different types of base isolation bearing pads have now been developed. The bearing is very stiff and strong in the vertical direction, but flexible in the horizontal direction.

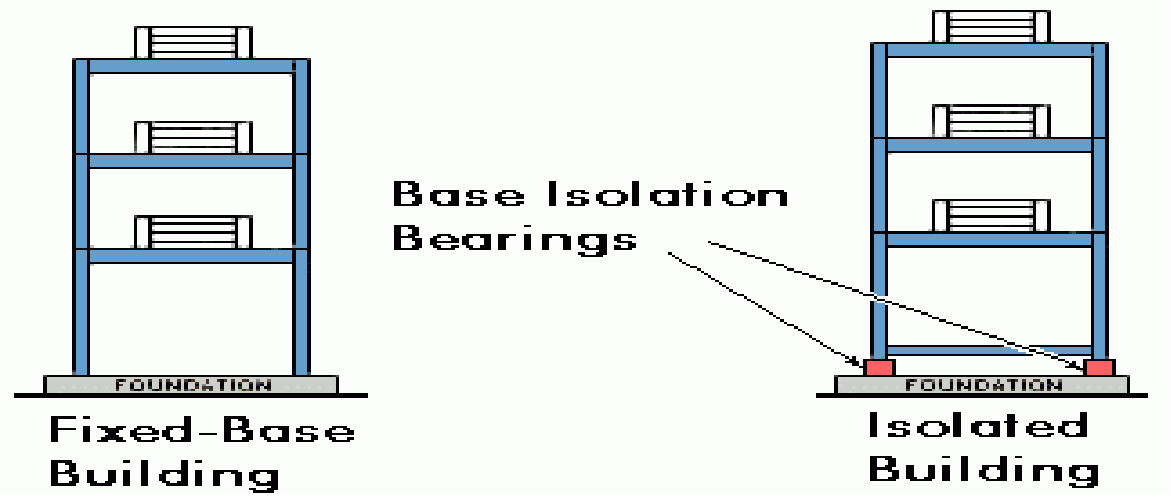


Figure 82: Base-Isolated and Fixed-Base Buildings

Earthquake Generated Forces

To get a basic idea of how base isolation works, examine Figure 2. This shows an earthquake acting on both a base-isolated building and a conventional, **fixed-base,** building. As a result of an earthquake, the ground beneath each building begins to move. In Figure 2, it is shown moving to the left. Each building responds with movement which tends toward the right. The building undergoes **displacement** towards the right. The building's displacement in the direction opposite the ground motion is actually due to **inertia.** The inertial forces acting on a building are the most important of all those generated during an earthquake. It is important to know that the inertial forces which the building undergoes are proportional to the building's **acceleration** during ground motion. It is also important to realize that buildings don't actually shift in only one direction. Because of the complex nature of earthquake ground motion, the building actually tends to **vibrate** back and forth in varying directions.

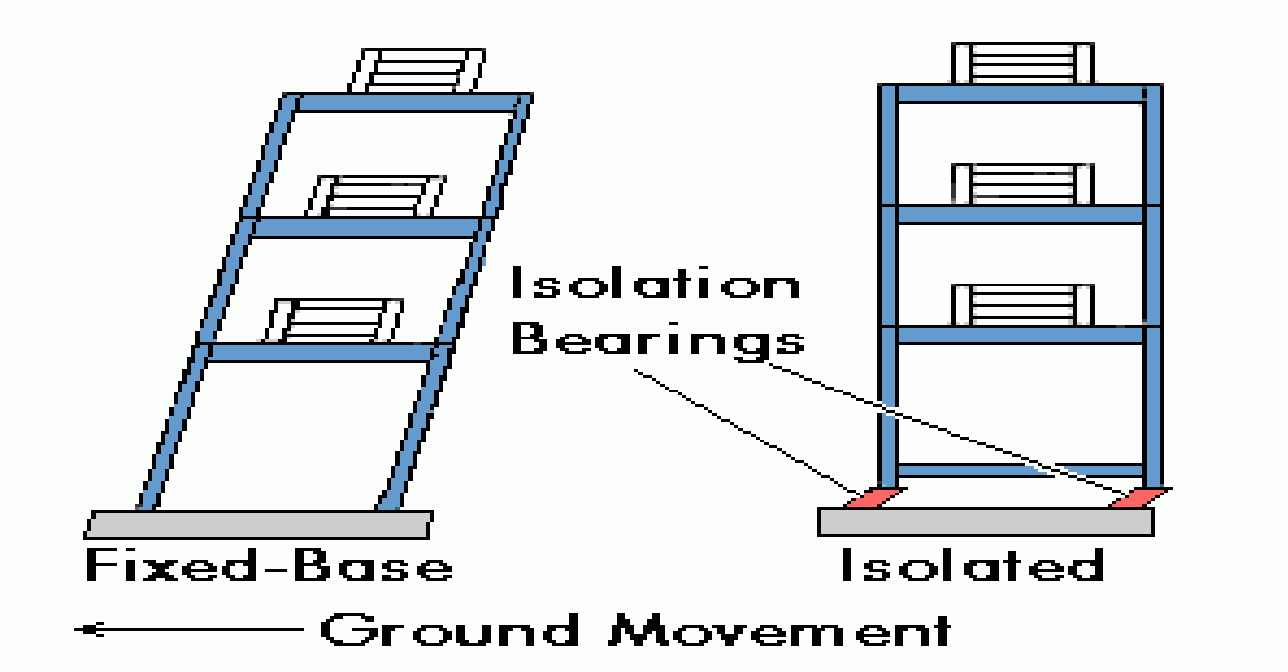


Figure 83: Base-Isolated, Fixed-Base Buildings

Deformation and Damages to Structures

In addition to displacing toward the right, the un-isolated building is also shown to be changing its shape-from a rectangle to a parallelogram. It is **deforming.** The primary cause of earthquake

damage to buildings is the **deformation which the building undergoes as a result of the inertial forces acting upon it.**

Response of Base Isolated Building

By contrast, even though it too is displacing, the base-isolated building retains its original, rectangular shape. It is the lead-rubber bearings supporting the building that are deformed. The base-isolated building itself escapes the deformation and damage, which implies that the inertial forces acting on the base-isolated building have been reduced. Experiments and observations of base-isolated buildings in earthquakes have been shown to reduce building accelerations to as little as 1/4 of the acceleration of comparable fixed-base buildings, which each building undergoes as a percentage of gravity. As we noted above, inertial forces increase, and decrease, proportionally as acceleration increases or decreases. Acceleration is decreased because the base isolation system lengthens a building's **period of vibration,** the time it takes for the building to rock back and forth and then back again. And in general, structures with longer periods of vibration tend to reduce acceleration, while those with shorter periods tend to increase or **amplify** acceleration. Finally, since they are highly elastic, the rubber isolation bearings don't suffer any damage. But the lead plug in the middle of our example bearing experiences the same deformation as the rubber. However, it generates heat. In other words, the lead plug reduces, or **dissipates,** the energy of motion, i.e., **kinetic energy**--by converting that energy into heat. And by reducing the energy entering the building, it helps to slow and eventually stop the building's vibrations sooner than would otherwise be the case, in other words, it **damps** the building's vibrations.

Energy Dissipation Devices

The second of the major new techniques for improving the earthquake resistance of buildings also relies upon damping and energy dissipation, but it greatly extends the damping and energy dissipation provided by lead-rubber bearings. As we've said, a certain amount of vibration energy is transferred to the building by earthquake ground motion. Buildings themselves do possess an inherent ability to dissipate, or damp, this energy. However, the capacity of buildings to dissipate energy before they begin to suffer deformation and damage is quite limited. The building will dissipate energy either by undergoing large scale movement or sustaining increased internal strains in elements such as the building's columns and beams. Both of these eventually result in varying degrees of damage. So, by equipping a building with

additional devices which have high damping capacity, we can greatly decrease the seismic energy entering the building, and thus decrease building damage. Accordingly, a wide range of **energy dissipation devices** have been developed and are now being installed in real buildings. Energy dissipation devices are also often called **damping devices.** The large number of damping devices that have been developed can be grouped into three broad categories:

- **Friction Dampers**: these utilize frictional forces to dissipate energy
- **Metallic Dampers** : utilize the deformation of metal elements within the damper
- **Viscoelastic Dampers** : utilize the controlled shearing of solids
- **Viscous Dampers**: utilized the forced movement (orificing) of fluids within the damper

Fluid Viscous Dampers

General principles of damping devices are illustrated through Fluid Viscous damper. Following section, describes the basic characteristics of fluid viscous dampers, the process of developing and testing them, and the installation of fluid viscous dampers in an actual building to make it more earthquake resistant.

Damping Devices and Bracing Systems

Damping devices are usually installed as part of **bracing systems.** Figure 3 shows one type of damper-brace arrangement, with one end attached to a column and one end attached to a floor beam. Primarily, this arrangement provides the **column** with additional support. Most earthquake ground motion is in a horizontal direction; so, it is a building's columns which normally undergo the most **displacement** relative to the motion of the ground. Figure 3 also shows the damping device installed as part of the bracing system and gives some idea of its action.

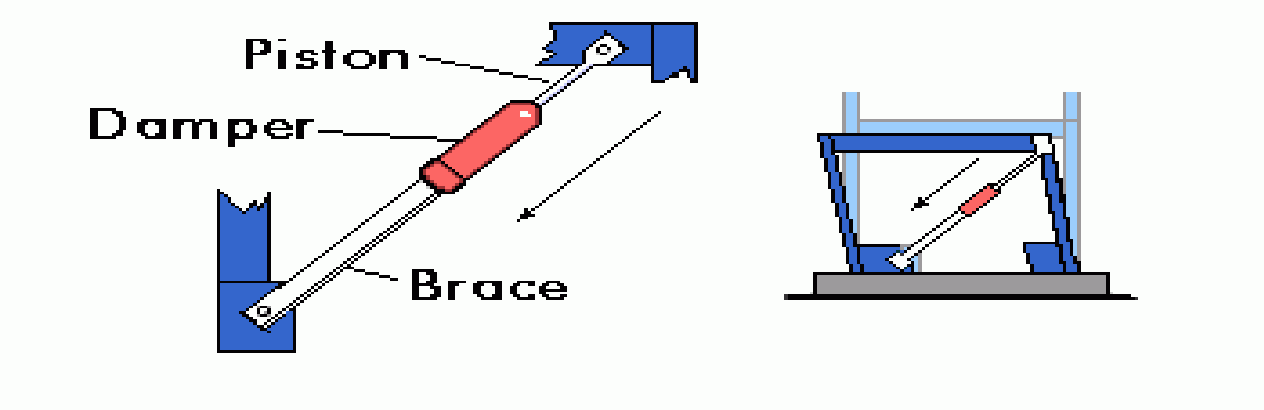


Figure 84: Damping Device Installed with Brace

14.1.2 Seismic Retrofitting of Buildings

Seismic Retrofitting Techniques for Concrete Structures:

Seismic Retrofitting Techniques are required for concrete constructions which are vulnerable to damage and failures by seismic forces. In the past thirty years, moderate to severe earthquakes occurs around the world every year. Such events lead to damage to the concrete structures as well as failures. Thus the aim is to Focus on a few specific procedures which may improve the practice for the evaluation of seismic vulnerability of existing reinforced concrete buildings of more importance and for their seismic retrofitting by means of various innovative techniques such as base isolation and mass reduction. So Seismic Retrofitting is a collection of mitigation technique for Earthquake engineering. It is of utmost importance for historic monuments, areas prone to severe earthquakes and tall or expensive structures. **Keywords:** Retrofitting, Base Isolation, Retrofitting Techniques, Jacketing, Earthquake Resistance

1. Introduction to Seismic Retrofitting Techniques:

- Earthquake creates great devastation in terms of life, money and failures of structures.
- Upgrading of certain building systems (existing structures) to make them more resistant to seismic activity (earthquake resistance) is really of more importance.
- Structures can be (a) Earthquake damaged, (b) Earthquake vulnerable
- Retrofitting proves to be a better economic consideration and immediate shelter to problems rather than replacement of building.

1.1 Seismic Retrofitting of Concrete Structures:

Definition: It is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. The retrofit techniques are also applicable for other natural hazards such as tropical cyclones, tornadoes, and severe winds from thunderstorms.

1.2 Need for Seismic Retrofitting:

- To ensure the safety and security of a building, employees, structure functionality, machinery and inventory
- Essential to reduce hazard and losses from non-structural elements.
- predominantly concerned with structural improvement to reduce seismic hazard.

- Important buildings must be strengthened whose services are assumed to be essential just after an earthquake like hospitals.

1.3 Problems faced by Structural Engineers are:

Lack of standards for retrofitting methods – Effectiveness of each methods varies a lot depending upon parameters like type of structures, material condition, amount of damage etc.,

1.4 Basic Concept of Retrofitting:

The aim is at:

- Upgradation of lateral strength of the structure
- Increase in the ductility of the structure
- Increase in strength and ductility

2. Classification of Retrofitting Techniques:

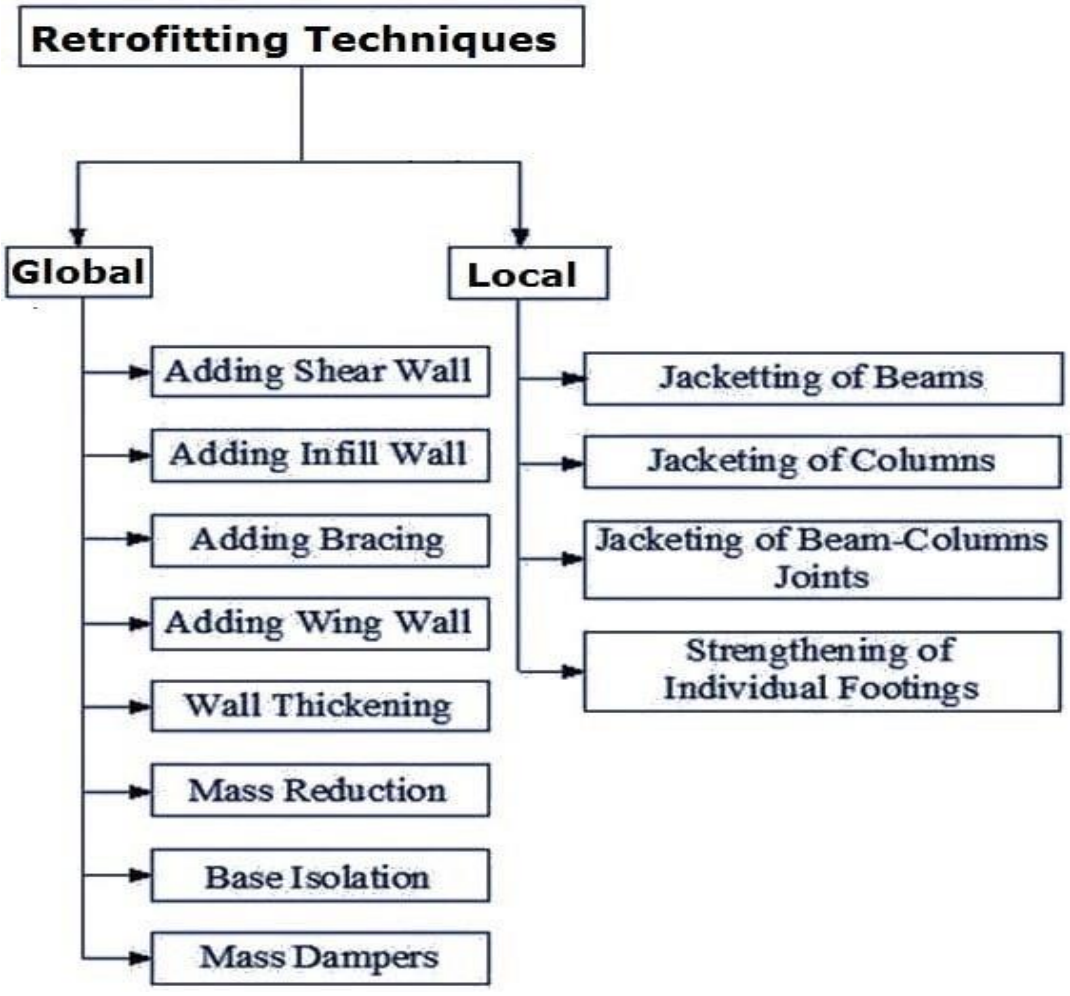


Fig 85 : Retrofitting Techniques for Reinforced Concrete Structures

2.1 Adding New Shear Walls:

- Frequently used for retrofitting of non ductile reinforced concrete frame buildings.
- The added elements can be either cast?in?place or precast concrete elements.
- New elements preferably be placed at the exterior of the building.
- Not preferred in the interior of the structure to avoid interior mouldings.

Fig 86: Additional Shear Wall

2.2 Adding Steel Bracings

- An effective solution when large openings are required.
- Potential advantages due to higher strength and stiffness, opening for natural light can be provided, amount of work is less since foundation cost may be minimized and adds much less weight to the existing structure.

Adding STEEL

Bracings:

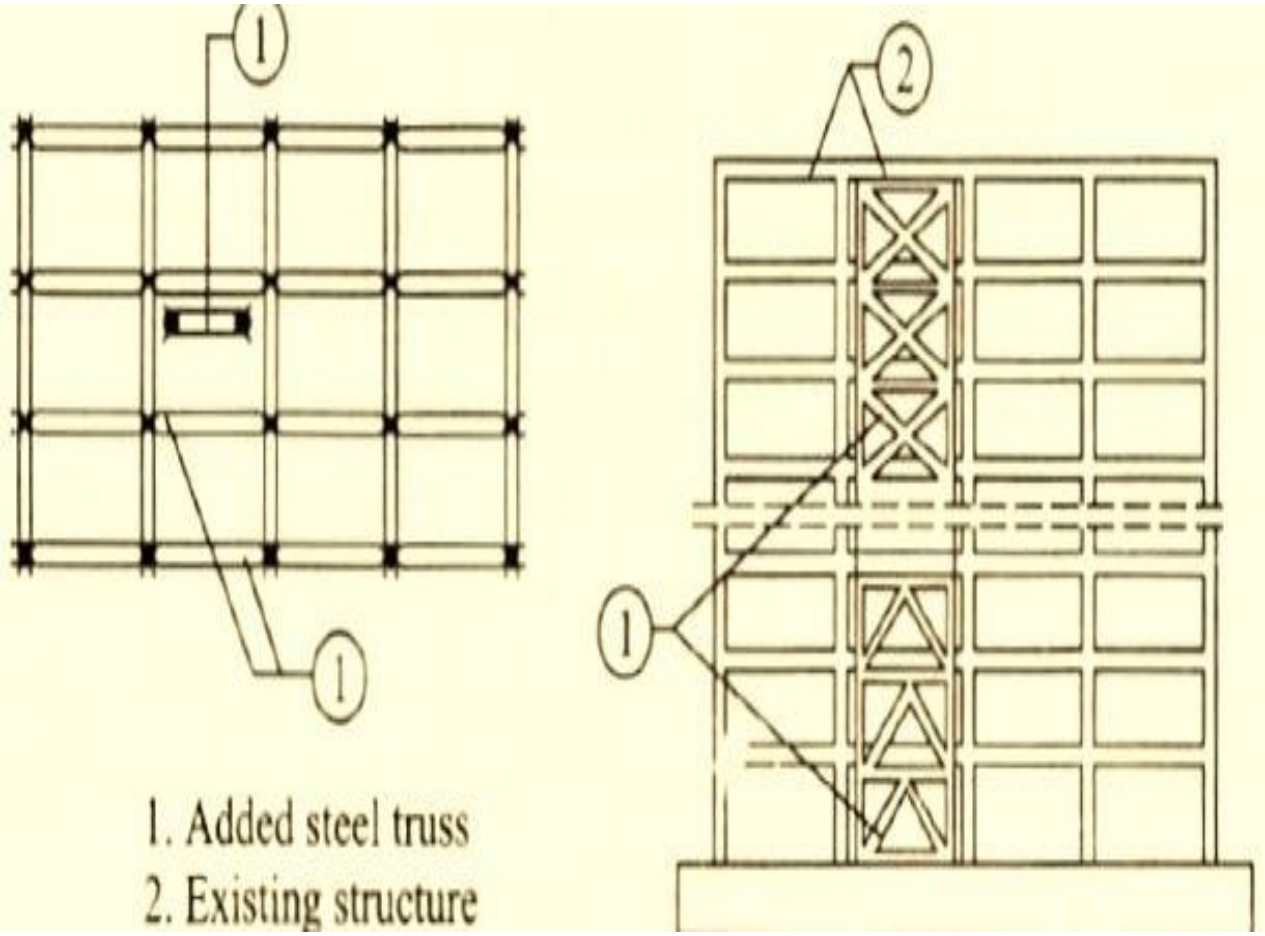


Fig 87 : RC Building retrofitted by steel bracing

2.3 Jacketing (Local Retrofitting Technique):

This is the most popular method for strengthening of building columns.

Types of Jacketing:

1. 1. Steel jacket,
2. Reinforced Concrete jacket,
3. Fiber Reinforced Polymer Composite (FRPC) jacket

Purpose for jacketing:

- To increase concrete confinement
- To increase shear strength
- To increase flexural strength

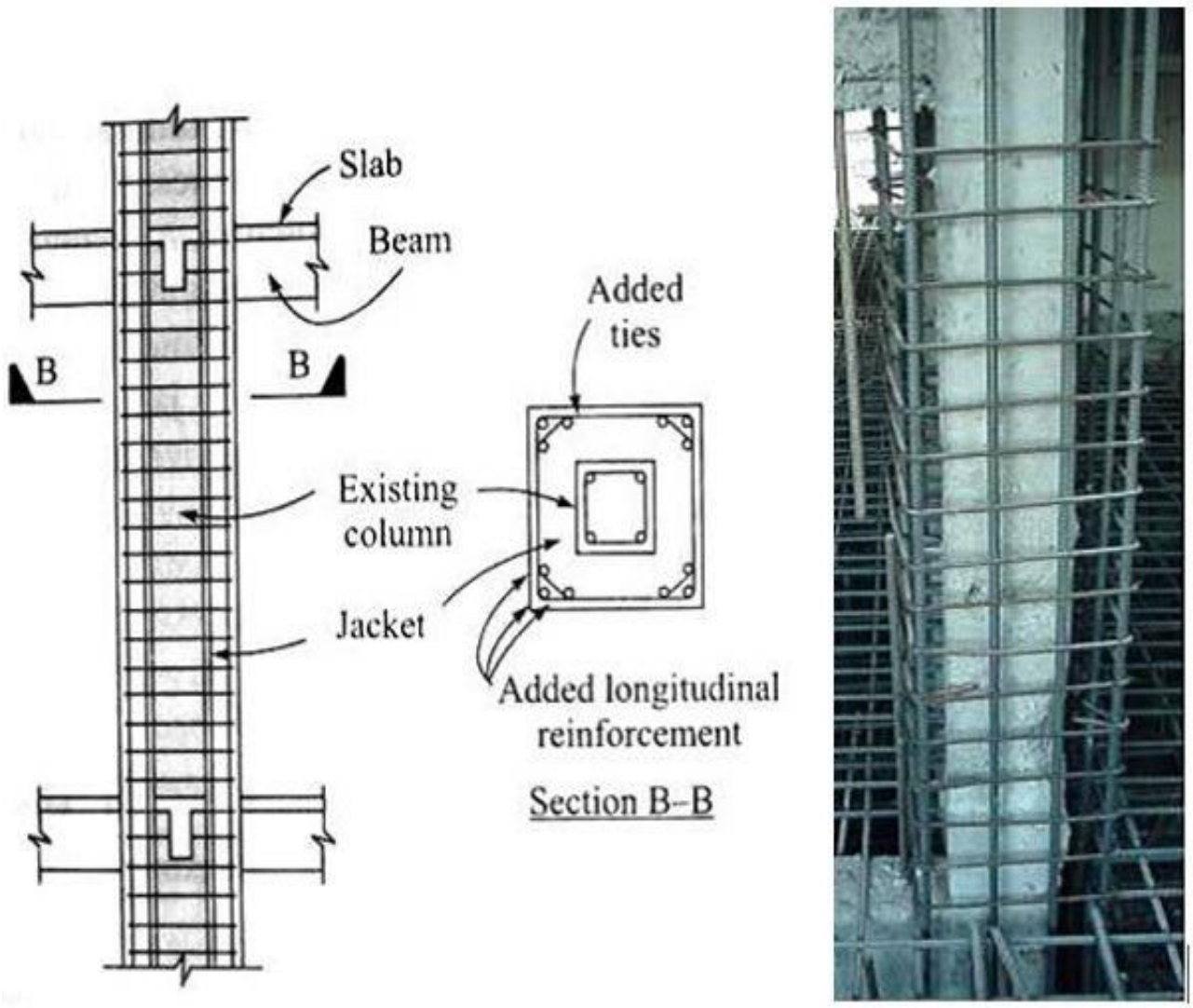


Fig 88 : Column Jacketing

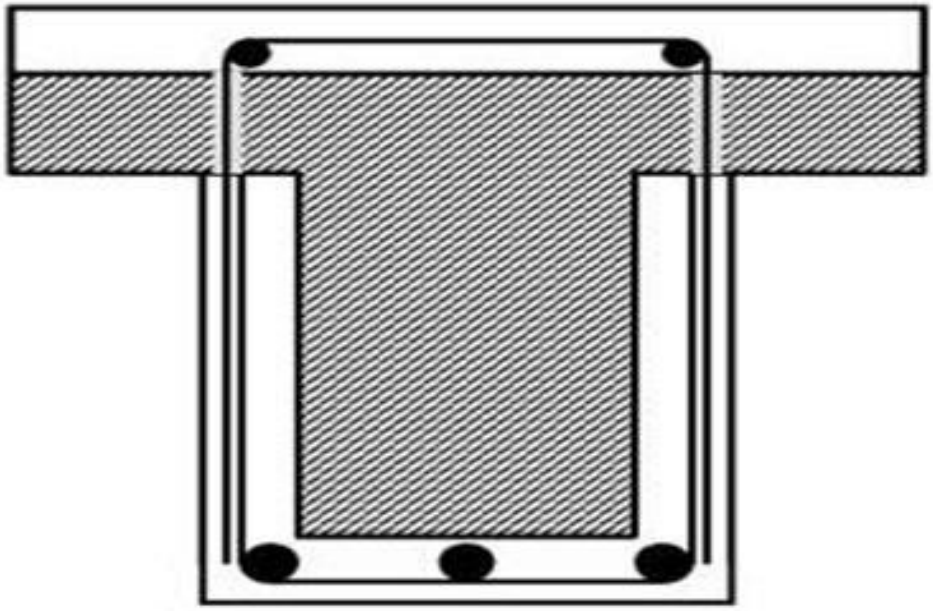


Fig 89 : Beam Jacketing

2.4 Base Isolation (or Seismic Isolation):

Isolation of superstructure from the foundation is known as base isolation. It is the most powerful tool for passive structural vibration control technique.

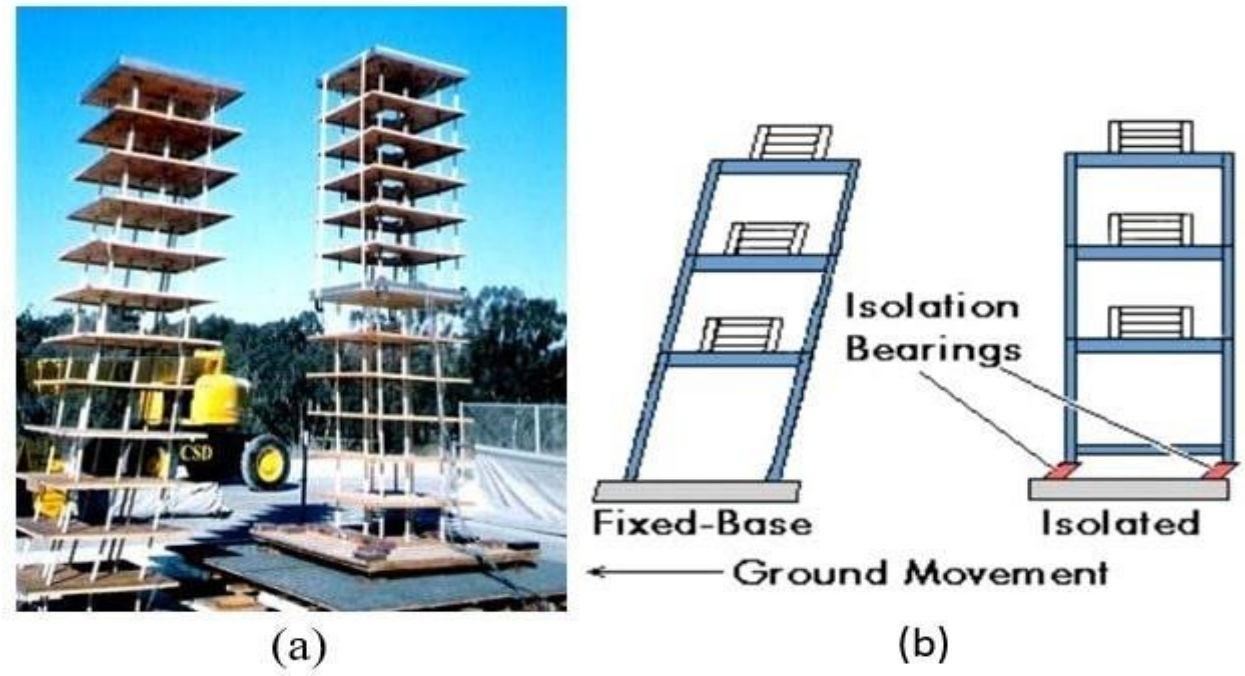


Fig 90 : Base Isolated Structures (a)Model Under Test, (b) Diagrammatical Representation

2.4.1 Advantages of Base Isolation

- Isolates Building from ground motion – Lesser seismic loads, hence lesser damage to the structure, -Minimal repair of superstructure.
- Building can remain serviceable throughout construction.
- Does not involve major intrusion upon existing superstructure

2.4.2 Disadvantages of Base Isolation

- Expensive
- Cannot be applied partially to structures unlike other retrofitting
- Challenging to implement in an efficient manner

2.5 Mass Reduction Technique of Retrofitting:

This may be achieved, for instance, by removal of one or more storey's as shown in Figure. In this case it is evident that the removal of the mass will lead to a decrease in the period, which will lead to an increase in the required strength.

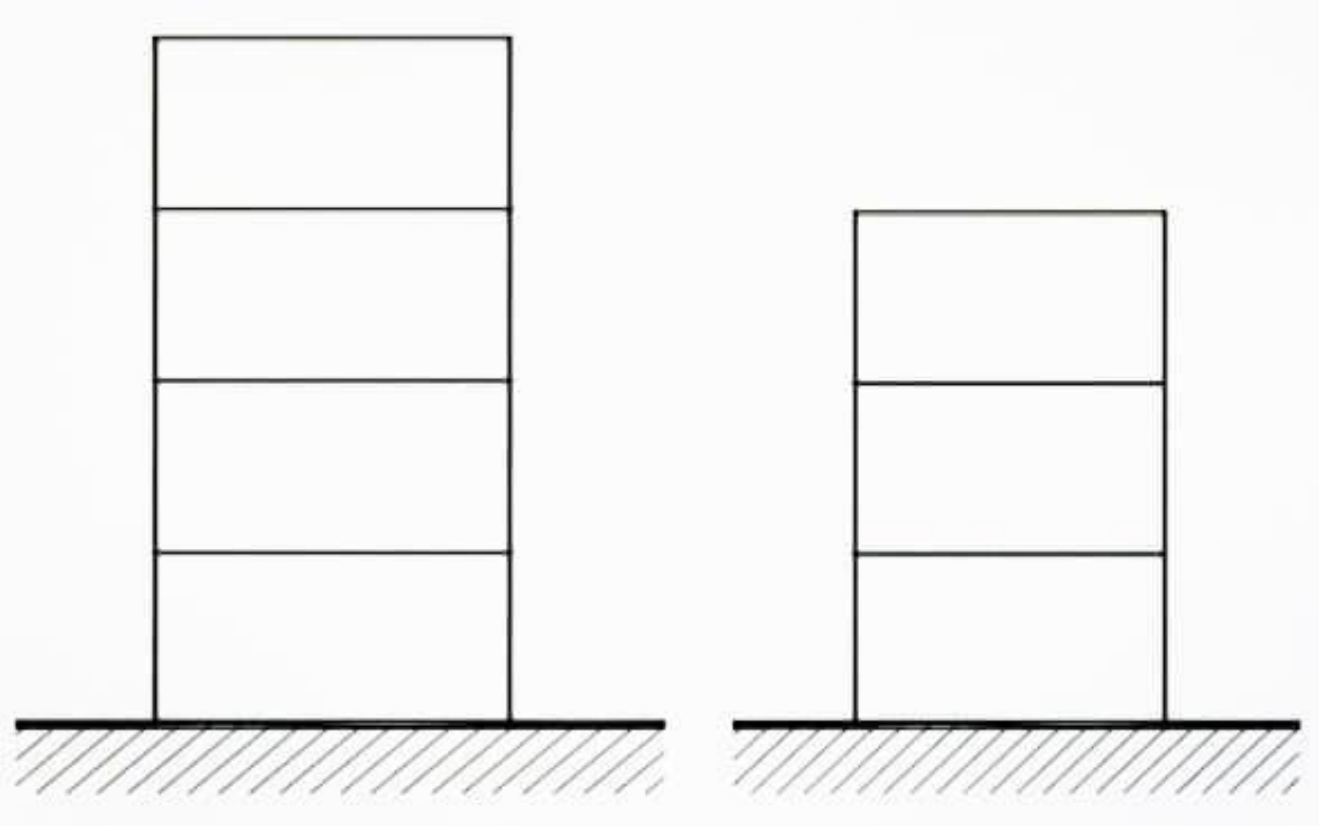


Fig 91: Seismic Retrofitting by Mass reduction (removal of Storey)

2.6 Wall Thickening Technique of Retrofitting:

The existing walls of a building are added certain thickness by adding bricks, concrete and steel aligned at certain places as reinforcement, such that the weight of wall increases and it can bear more vertical and horizontal loads, and also its designed under special conditions that the transverse loads does not cause sudden failure of the wall.

Indian Standard Codes for Earthquake Design of Structures:

- IS: 1893-2002 (part-1) Criteria for Earthquake Resistant Design of Structures (Part 1 : General Provision and Buildings) – Code of Practice
- IS: 4326-1993 Earthquake Resistant Design and Construction of Buildings – Code of Practice
- IS: 13920-1993 Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces – Code of Practice
- IS: 13935-1993 Repair and Seismic Strengthening of Buildings – Guidelines
- IS: 13828-1993 Improving Earthquake Resistance of Low Strength Masonry Buildings – Guidelines
- IS: 13827-1993 Improving Earthquake Resistance of Earthen Buildings – Guidelines

Conclusion – Seismic Retrofitting Techniques for concrete structures:

- Seismic Retrofitting is a suitable technology for protection of a variety of structures.
- It has matured in the recent years to a highly reliable technology.
- But, the expertise needed is not available in the basic level.
- The main challenge is to achieve a desired performance level at a minimum cost, which can be achieved through a detailed nonlinear analysis.
- Optimization techniques are needed to know the most efficient retrofit for a particular structure.
- Proper Design Codes are needed to be published as code of practice for professionals related to this field.

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

The Indian **advanced construction techniques** industry is experiencing a period of fast growth. Aiming to overcome the housing problem, it also has to face the dual challenge of fulfilling the needs of the client and maintain the quality standards.

At the same time, the up-gradation of technology through the adoption of new techniques has become necessary to survive in a tough competitive environment.

The traditional methods of construction are inadequate in executing the work speedily with economy and quality. The construction industry in India must switch over to advanced construction techniques to achieve its goal in "minimum time with maximum efficiency".

Fig 92 : ADVANCED CONSTRUCTION TECHNIQUES

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ADVANCED CONSTRUCTION TECHNIQUES – NECESSITY

The building construction activity, especially the residential and commercial complex is highly labour intensive with very little mechanization. Approximately 35% of the total construction cost is spent on labour.

- The labourers have their limitations and may fail to meet the time limits. The quality of workmanship, too, differs from person to person. Hence, quality standards cannot be maintained. Wastage of material is considerably high as it is handled and utilized manually.
- The objective of the construction organizations should be 'speed and economy'. This cannot be achieved with labour oriented advanced construction techniques.
- Only studying and adopting modern industrial techniques and equipment is the solution. By this, one can save material, reduce labour expenses, and increase the speed of work, leading to the economy in construction.
- Though the scope of the subject is vast, in this chapter we shall discuss only the advanced techniques to be used in advanced construction techniques activities.

EQUIPMENT USED FOR SMALL AND MEDIUM CONSTRUCTION WORK

i. The equipment with proven utility in building construction may be as listed below
ii. Chain and pulley block.
iii. Grouting pumps.
iv. Sprayers for painting work.
v. Tile cutters.
vi. Portable hand drilling machines.
vii. Horizontal trolleys, wheelbarrows.
viii. Pumps.
ix. Vibrators for compaction of concrete, surface vibrators.
x. Auto ramming concrete block machine.
xi. Sand washing machine.
xii. Vertical lifts, hoists, winches.
xiii. M.S. tubular scaffolding, and formwork.
xiv. Concrete mixers.

xv. Cranes.

xvi. Earth excavators.

xvii. Earthmovers.

The engineer in-charge should study, develop, and implement the advanced techniques, to improve the quality of work, with speed and economy. Some of the techniques are listed below :

a. The different work stages through which basic material is converted into the finished product, maybe studied.
b. The relation between different work stages are established as a flowchart.
c. Works are planned and executed according to the work and time study.
d. Planning and execution of the activities ís done according to bar charts, C.P.M., and P.E.R.T.
e. Suggestions are put forth, discussed, and implemented to improve quality.
f. Prefabricated and precast units are utilized, wherever possible.
g. Admixtures and plasticizers are used for concreting and water-proofing.
h. 'Design mix and weigh batching' are used for mass concreting.
i. Easily detachable lightweight tubular structures are used.
j. Modern methods of curing are adopted.
k. Advanced adhesives and chemicals are used.
l. Simultaneous execution of the activities are arranged.
m. Work is executed in shifts.
n. Activities are crashed.
o. Task work is delegated to the laborers along with incentives.

45.4 VARIOUS TECHNIQUES, EQUIPMENTS AND THEIR ADVANTAGES IN BUILDING CONSTRUCTION

SR. NO.	USE OF TECHNIQUE/ EQUIPMENT	WORK ACTIVITY	ADVANTAGES
01	Precast lintel and chajja	Masonry work above lintel level	Saving of time
02	Providing cavities in masonry during execution	Concreting of hold fast for doors and windows	Breaking of concrete block/brick is avoided, which saves labour time
03	Wheel barrows, trolleys cranes, chain pulley block	Shifting/lifting of any type of material	Shifting by manual head load is avoided. Maximum output with minimum efforts
04	Prefabricated units	Doors, windows, grills, walls, slabs, etc.	Fast erection, saving of time in casting and curing
05	Steel shuttering material	All centering work	Works out to be cheaper as more repetition is possible
06	Auto ramming block machine (For mechanical compaction)	Casting of concrete blocks for masonry	Increases the production and quality remarkably
07	Sand washing machines	Concreting, masonry, plastering	Decrease in silt content, results into better plastering and uniform higher strength concrete
08	Small capacity concrete mixers	Concreting at upper floors	Portable, speed and quality is maintained without extra consumption of cement
09	Sand screening machines	Masonry, plastering etc.	Time saving for screening and less wastage of sand

SR. NO.	USE OF TECHNIQUE/ EQUIPMENT	WORK ACTIVITY	ADVANTAGES
10	Form vibrator	Casting of slab	Better compaction, less honeycombing of the concrete
11	Tower hoist bucket	Transporting material e.g. bricks, sand, cement	Shifting of material vertically with speed and extra quantity
12	Travelling belt conveyor/trolley	Slab concreting	Labour required to transport wet concrete is reduced, speed and quality increases
13	Dumpers	Transporting building material	Unloading operation is easy, and can be done as and when required. Speed increases
14	Admixtures and plasticizers	Concreting and water-proofing	Increases the workability strength, reduces the curing period and improves the quality
15	Loaders	Shifting of material and refilling	Reduces the labour for loading of trucks. Speed increases
16	Road rollers	Compacting the filling material	Compaction is achieved as specified which is not possible manually
17	Plate/earth vibratory compactors	Compacting the filling material in building plinth	Rapid and better compaction than manual process of *dhummas*. Larger area can be covered
18	Pneumatic tools (Jack hammer)	Excavation in rock	Excavates the hard rock with ease where normal chisels do not work. Increases the output remarkably
19	Excavators	Excavation and levelling	Excavates, dumps and levels the soft strata as desired. Completes the work of three manual shifts in one shift
20	Bull-dozer	Dismantling and excavating	Dismantles and disposes off the excavated stuff as and when required
21	Vacuum de-watering system for concreting	Factory flooring for achieving better compressive strength	Saves cement, curing period is reduced

USE OF COMPUTER IN BUILDING CONSTRUCTION TECHNOLOGY

With the evolution of computer technology, the dimensions of the computer have shrunk while increasing its power and speed. The advanced technology of computers has valuable applications in building construction. They are :

- Construction management.
- Structural design.
- Estimation and costing
- Architects and interior designers in pune.
- Financial management.

1. COMPUTER FOR CONSTRUCTION MANAGEMENT

- By simplifying his job, a person can implement the technique of management. The manual methods of preparing bar charts; C.P.M., P.E.R.T., etc. have limitations. As the complexity of the project increases, computers prove advantageous.
- Computers can depict the entire network graphically and simultaneously provide a labor report of the progress of each task. Modifications and alterations can be incorporated and the effect on the remaining activities is automatically computed. This income a very useful option in time crashing. Computers provide a quick and easy reference to study the change in time estimate of one or more activities.
- P.E.R.T. involves statistical calculation for estimated times. Computers are useful in providing a guideline framework. It is useful in accurate computations, quick response, and the ability to react to modifications. This helps in saving time and money.

2. COMPUTER FOR STRUCTURAL DESIGN

Structural design is an engineering science and is most suited for computing. The designs of beams and slabs can be computerized. On keying in the various loads, sizes of steel and other parameters are ready for implementation. The designs are accurate and quick. Appropriate drawings can also be plotted through computer programs.

3. COMPUTER FOR ESTIMATION AND COSTING

It involves simple calculations like multiplication and addition. But whereas manual calculations might be faulty, the computer calculates with great speed and accuracy.

4. COMPUTER FOR ARCHITECTURAL AND INTERIOR DESIGNS

The working drawings, electrical layouts, furniture drawings, etc. can be prepared with a computer. It develops a dimensional perspective and helps in better visualization. Any minor error is easily detected and can be modified before the actual work begins. The color scheme of the project or interior decoration can also be finalized with the help of computers.

5. COMPUTER FOR FINANCIAL MANAGEMENT

Financial management can be controlled through computerized financial and material schedules. Updated programs specify the monthly financial requirements. Work is never held up for lack of funds if computer technology is properly implemented.

OTHER BUILDING CONSTRUCTION TECHNIQUES – TECHNOLOGY

Some new, cost-effective and time-saving techniques used in building advanced construction technology are

1. LIGHTWEIGHT BLOCKS & CONCRETE

The density of normal concrete varies from 2200 to 2600 kg/m3 while that of lightweight concrete varies from 300 to 1850 kg/m³.

Advantage

- Reduction of dead load.
- Increases the progress of work.
- Lowers the handling cost.
- This leads to a lighter structural design.
- Advantageous for structures resting on weak soils.

2. FERROCRETE TECHNIQUES

Ferrocrete consists of wire mesh and cement mortar. The wire mesh is spaced closely & impregnated with a rich cement mortar mix.

Advantages

- It has got a higher ratio of tensile strength to weight and superior cracking behavior compared to R.C.C.
- It can be used for septic tanks, water tanks, fishing boats, roofs and wall panels for low-cost housing, bio-gas digesters, silos, kitchen otta, door and window frames, cupboard, etc.
- It is cheaper than conventional concrete.

3. EARTH MOVING MACHINES

For mass excavation works & a huge amount of filling, earthmoving machines are useful. They save considerable time & manpower.

Advantages

- Save time.
- Cost-effective.
- Save manpower.
- Useful for mass excavation & filling basements, canals, etc.

4. SLIP TUNNEL FORMWORK TECHNIQUES

For mass concreting of high rise buildings, slip tunnel formwork can be used.

Advantages

- Save the de-shuttering & shuttering time.
- More number of repetitions for formwork
- More accuracy in work.
- Reduce labour.
- Overall quality increases, with a reduction in cost.
- Most suitable for identical vertical lifts.

5. PRECAST COMPONENTS

They are factory-made components of the building which are joined to form the structure.

Advantages

- Controlled quality of the final product.
- Better curing and higher strength due to mechanization.
- Saves space for raw material stackings.
- Reduces the requirement of skilled labour.
- Increase in construction speed due to symmetrical and simple joining methods.
- Saves, total project time.

Dependability of the activities can be nullified & most of the activities can be taken up simultaneously.

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.

You can gain a better understanding of EIA by understanding how any typical **project** can affect the environment of a particular area. Take for example the building of a new road in a city.

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

Access to basic water services

(a) Sustain and accelerate progress towards the water access goal, supported by increased resources from all sources, including official development assistance, in response to countries? needs, with a focus on the following actions;

(i) Prioritizing water in national development plans and facilitating access to water for all;

(ii) Strengthening capacities of national and local authorities in resource allocation and management, quality control, development and implementation of water supply projects, and monitoring of service provision;

(iii) Promoting support for water infrastructure planning and development;

(iv) Involving all stakeholders, particularly women and youth, in the planning and management of water services and, as appropriate, decision-making processes;

(v) Instituting economic incentives to encourage the participation of small-scale water service providers;

(vi) Employing the full range of policy instruments, including regulation, voluntary measures, market and information-based tools and cost recovery of water services, that contribute to the sustainability of services provision, without cost-recovery objectives, becoming a barrier to access to safe water by poor people;

(vii) Targeting subsidies for the poor, including connection costs;

(b) Develop and strengthen human and institutional capacities for effective water management and service delivery, through:

(i) Building capacities of local communities in operation and maintenance of water systems, and training educators, managers and technicians in different aspects of water management;

(ii) Tapping local and indigenous knowledge in project development and implementation;

(iii) Promoting and strengthening commercial capacities of local suppliers;

(iv) Improving monitoring and analytical capabilities of water information management agencies;

(c) Develop and transfer low-cost technologies for safe water supply and treatment, in accordance with countries? needs, with a focus on the following:

(i) Promoting access to appropriate low-cost and environmentally sustainable water use and supply technologies through North-South and South-South cooperation and partnerships;

(ii) Developing capacities in the area of water desalination, treatment of contaminants, rainwater harvesting and water efficiency through technology transfer and sharing of best practices;

(iii) Investing in research and development projects;

(iv) Addressing the special needs of countries with arid and semi-arid areas due to water scarcity;

Integrated water resources management

(d) Recognizing that the 2005 target on integrated water resources management may not be met by all countries, accelerate the provision of technical and financial assistance to countries in preparing nationally owned integrated water resources management and water-efficiency plans tailored to country-specific needs, paying particular attention to economic development, social and environmental needs, supporting implementation through learning-by-doing, directed, inter alia, towards the following:

(i) Improving water governance through strengthening of institutional and regulatory reforms, capacity development and innovation;

(ii) Providing technical and management support to local authorities and community-based organizations, taking into account research, traditional knowledge and best practices, to improve water resources management within national policy frameworks;

(iii) Providing additional resources, as appropriate, for regional and subregional initiatives, such as the African Water Facility;

(iv) Encouraging effective coordination among all stakeholders in water-related decision-making;

(v) Enhancing the sustainability of ecosystems that provide essential resources and services for human well-being and economic activity in water-related decision-making;

(vi) Facilitating information exchange and knowledge-sharing, including indigenous and local knowledge;

(vii) Strengthening the prevention of pollution resulting from wastewater, solid waste, and industrial and agricultural activities;

(viii) Developing preventive and preparedness measures, as well as risk mitigation and disaster reduction, including early warning systems;

(ix) Protecting and rehabilitating catchment areas for regulating water flows and improving water quality, taking into account the critical role of ecosystems;

(x) Raising awareness of the importance of water use efficiency and conservation;

(xi) Involving all stakeholders, including women, youth and local communities, in integrated planning and management of land and water resources;

(xii) Encouraging, where appropriate and within their mandates, the use of multilateral environmental agreements to leverage additional resources for integrated water resources management;

(xiii) Promoting higher priority and greater action on water quality;

(e) Support African initiatives in the area of water, within the framework of the African Ministerial Conference on Water, with particular reference to basin-wide initiatives in Africa;

(f) Enhance cooperation among riparian States through relevant arrangements and/or mechanisms with the consent of the States concerned, taking into account the interests of the riparian States;

(g) Develop and strengthen national monitoring systems on the quantity, quality and use of surface- and groundwater resources at national and local levels, and for measuring progress towards internationally agreed goals and targets, as appropriate, as well as for assessing the impact of climate variability and change on water resources, through the following actions:

(i) Establishing and managing water information systems;

(ii) Installing networks for monitoring water resources and quality;

(iii) Standardizing methodologies and developing monitoring indicators;

(iv) Transferring monitoring technologies adaptable to local conditions;

(v) Disseminating information to relevant stakeholders;

(h) Support more effective water demand and water resource management across all sectors, especially in the agricultural sector, by:

(i) Using efficient irrigation and rainwater harvesting technologies;

(ii) Implementing irrigation projects with a focus on the poor, particularly in Africa;

(iii) Training farmers and water user associations in efficient water use and sustainable agricultural land management;

(iv) Promoting the use of wastewater for certain irrigation purposes, subject to health and environmental standards;

(v) Increasing the efficiency and, where appropriate, the use of rain-fed agriculture;

B. Sanitation

(i) Provide adequate sanitation, recognizing the interlinkages among water, sanitation, hygiene and health, including water-borne disease vectors, as well as the positive impacts of access to sanitation on poverty reduction, privacy, dignity, security and education;

Access to basic sanitation

(j) Sustain and accelerate progress towards the sanitation target of the Johannesburg Plan of Implementation, supported by increased resources from all sources, including official development assistance, in response to countries? needs, with a focus on the following actions:

(i) Establishing an institutional home for sanitation, prioritizing sanitation in national development plans, and incorporating sanitation in integrated water resources management plans;

(ii) Allocating a specific and adequately resourced budget for sanitation;

(iii) Prioritizing investments directed towards areas of greatest need and greatest impact, notably in schools, workplaces and health centres;

(iv) Employing cost recovery, where appropriate, to contribute to the sustainability of services, with targeted subsidies for the poor;

(v) Instituting economic incentives to encourage the participation of small-scale sanitation and hygiene service providers;

(vi) Conducting assessment of the health impacts of the lack of sanitation at community level;
(vii) Supporting existing regional and interregional initiatives such as the Global Water, Sanitation and Hygiene for all (WASH) programme for water and sanitation;
(viii) Promoting and supporting on-site sanitation infrastructure, especially in rural areas;
(ix) Supporting the provision and maintenance of sanitation services to refugees and refugee host countries;

(k) Ensure effective capacity for building, operating and maintaining sanitation and sewerage systems, including by:

(i) Providing managerial and technical training to public utilities, community-based organizations and small-scale providers for development, operation and maintenance of sanitation systems;
(ii) Strengthening the role of women in planning, decision-making and management of sanitation systems;
(iii) Tapping local and indigenous knowledge in project development and implementation;
(iv) Promoting and strengthening commercial capacities of local suppliers in establishing sustainable sanitation delivery models;
(v) Improving monitoring and analytical capabilities of information management agencies;

(l) Ensure access to culturally appropriate, low-cost and environmentally sound sanitation technologies, including by:

(i) Promoting research, development and dissemination of information on low-cost sanitation options;
(ii) Investing in research and development projects including applications of indigenous technologies and ecological sanitation;
(iii) Providing technology transfer for sanitation, wastewater treatment, reuse and residuals management;
(iv) Strengthening North-South and South-South cooperation in developing and applying sanitation technology;

Sanitation and hygiene education

(m) Support countries in promoting sanitation and hygiene education and awareness-raising, focusing on the following measures:

(i) Promoting gender-sensitive sanitation and hygiene education and awareness, including through social marketing and public information campaigns such as Water, Sanitation and Hygiene for all (WASH), and improving understanding of the linkages among sanitation, hygiene and health;

(ii) With an emphasis on children and youth, incorporating gender-sensitive hygiene education in school curricula and ensuring the provision of separate sanitation facilities for boys and girls in all schools;

(iii) Promoting the involvement of women, youth and community groups in sanitation and hygiene education programmes;

Wastewater collection, treatment and reuse

(n) Expand and improve wastewater treatment and reuse, with a focus on the following:

(i) Financial and technical assistance to national and local authorities in deploying cost-effective and environmentally sound sewerage and wastewater treatment systems, including decentralized urban systems;

(ii) Meeting operation and maintenance costs through an appropriate mix of measures including user charges, wastewater reuse and budgetary allocations;

(iii) Establishing sustainable business models and financing mechanisms linked to capital markets such as revolving funds for sewerage services;

(iv) Education and training in building, operating and maintaining wastewater collection and treatment systems;

(v) Research, development and dissemination of information on low-cost and efficient wastewater treatment technologies, including on water quality and reuse;

(vi) Dissemination of information and guidelines on surface- and groundwater quality and the safe reuse of treated wastewater;

(vii) Establishing regional project development facilities to provide seed capital, training and technical assistance;

(o) Support regional and subregional arrangements, to protect water resources from pollution, addressing the specific needs of arid, semi-arid and coastal countries;

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

Sr. No	Design Name	Period	Amount Expenditure	Benefit
1	Public Toilet	immediately	288850.0	for public use and for making village pollution free
2	Bio Gas plant	within 1 year	-	For gas Production
3	Assembly polling booth cum conference hall using green wall concept	Long term (3-5 years)	2,60,441	Work of the politician and various function.
4	Under Ground Water Sump	Long term (3-5 years)	269704.4988	Heavy water storage.
5	Chabutara	Long term (3-5 years)	121663	For the birds in resident.
6	School sanitary complex	Immediately	56770.00	Separately used for girls and boys are toilets.
7	Post office	Within 1 year	857403.1488	In this village for speed post and other
8	Bus Stand	Within 1 year	108420.8136	Waiting for the bus and other
9	Pavement in graveyard with paver block	Within 1 year	2,16,090	Smart village proposal and speedily transportation if any.
10	Public Garden	Long term (3-5 years)	637020	Enjoy and mind fresh.
11	Dwelling House	1 year	4,49,131	Better live hood
12	Open Window Composite	1 year	3,57,073	Solid waste management

Chapter 16. Survey By Interviewing With Talati And / Or Sarpanch

As a part of PMMS subject we have given the project under scheme of Vishwakarma Yojana phase VIII. Under this project we are allotted Vamaiya village of Patan district. Under this project we are suppose to visit the village to study existing infrastructure and to propose new amenity by getting existing facilities by various types of survey like Techo Economic and by the help of our guide and the suggestion of the villager and surpanch.

We visited Vamaiya village and First we met village Sarpanch Shri Kantiji Thakor and Other two peoples of the village of their committee. Here we inquired about the existing facilities available and the lake of some facilities like Bus stand, Public Toilets, Sanitary system, drainage problems, water supply, road as well as some other amenities. They also tell us about the requirements of peoples and the problems that the villagers are facing and the future needs of the peoples of village. we also collected information about the existing infrastructure and the condition of infrastructures like school building, dairy, police station, Panchayat building etc. They were very helpful and they give us detail information. We also inquire about the need of the village and they discuss about the future development need of the village and also gave us information regarding various projects going under the various scheme of the government of Gujarat.

Fig 93 : Sarpanch Interaction

Chapter 17. Irrigation / Agriculture Activities and Alternate Techniques and Solution

The total geographical area of village is 1324.15 hectare. Distance .Vamaiya Total area is 961.87 hectares and Total irrigated area is 777.66 hectares. Wheat, cattle seed and cotton seed are agriculture commodities grow in this village. 8 hours agricultural power supply in summer and 8 hours agricultural power supply in winter is available in this village. Total irrigated area in this village 777.66 hectares from Boreholes/Tube wells 777.66 hectares is the Source of irrigation.

Alternate techniques and solutions:

- High yielding varieties of seeds can be used.
- Chemical fertilizers can apply.
- Irrigation has been improved by utilizing properly both ground water and surface water resources of the State.
- Cold storage, logistics and improved infrastructure can be developed

Different types of irrigation systems can be used for agriculture like

- Surface irrigation
- Drip irrigation
- Sprinkler irrigation
- Center pivot irrigation
- Lateral move irrigation
- Sub-irrigation
- Manual irrigation

Fig 94 : Irrigation

Chapter 18. Social Activities- COVID Awareness

Due to covid pandemic we cannot do more social activities in Vamaiya village. We insist to have precaution to covid. And also promote and motivate villagers of Vamaiya village about covid awareness.

- Give awareness about covid-19.
- Insist villagers to wear mask.
- Teach steps of hand wash to villagers.
- Give awareness about social distance.
- Inform villagers to use packing things after sanitation is done.
- Insist villagers to drink pure and hot water.
- Insist for Covid vaccination.

Fig 95 : COVID 19 Vaccination

Chapter 19. Vamaiya SAGY Questionnaire Survey form

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Vamaiya Gram Panchayat: Vamaiya Ward No.

Block: Patan District: Patan State: Gujarat L S Constituency:

1. Family Identity and Size

Name of Head of Household	Ratilal Kanjibhai Thakor							Male/ Female	M
SECC Survey ID:		Family Size	4	Over 18	4	6 to 18	-	Under 6	-

2. Category & Entitlement Details (Tick as appropriate)

Social Category	open	Life Insurance	1. All Adults 2. Some Adults 3. None •	AABY	1. Yes 2. No•	Kisan Credit Card	Yes
Poverty Status Year	1. BPL 2. APL •	Health Insurance	1. All Adults 2. Some Adults • 3. None	RSBY	1. Yes 2. No •	MGNREGS Job Card Number	No
PDS (If NFSA is not implemented)		Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? 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	Education Status	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension
Ratilal Thakor	53	M	N	2	6	Y	Y	0
kokilaben Thakor	45	F	N	2	6	Y	Y	0
Rohit Thakor	24	M	N	1	8	Y	Y	0
Arjunji Thakor	21	M	N	1	9	Y	Y	0

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
-----	-	-	-	-	-	-	-	-
-----	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-

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
-----	-	-	-	-	-	-	-	-
-----	-	-	-	-	-	-	-	-
-----	-	-	-	-	-	-	-	-

[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 Diploma07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)*

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	Soap •	Other	Soap	Other	
Before Eating	Soap	Other	Soap •	Other	

6. Use of Mosquito Net
Children: - -- Adults: Yes

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	No	No	No
Children	-	-	-

8. Consumption of Tobacco

	Smoking	Chewing
Adults	•	-
Children	-	-

9. House & Homestead Data

Own House: Yes	No. of Rooms: 2
Type: Semi Pucca	
Toilet: Private	
Drainage linked to House: Open	
Waste Collection System : NO	Door Step
Homestead Land: No	Kitchen Garden : Yes / No
Compost Pit: None	Biogas Plant: None

10. Source of Water (Distance from source in KMs)

Source of Water		**Distance**
Piped Water at Home	Yes	
Community Water Tap	Yes	
Hand Pump (Public / Private)	No	
Open Well(Public / Private)	No	
Other (mention):		

11. Source of Lighting and Power

Electricity Connection to Household: Yes
Lighting: Electricity
Mention if Any Other: _____
Cooking: LPG /Wood
Mention if Any Other: _____
If cooking in Chullah: Normal

12. Landholding (Acres)

1. Total		2. Cultivable Area	
3. Irrigated Area		4. Uncultivable Area	

13. Principal Occupations in the Household

Livelihood	**Tick if applicable**
Farming on own Land	•
Sharecropping /Farming Leased Land	•
Animal Husbandry	•
Pisciculture	•
Fishing	--
Skilled Wage Worker	•
Unskilled Wage Worker	--
Salaried Employment in Government	--
Salaried Employment -- Private Sector	•
Weaving	--
Other Artisan(mention)	---
Other Trade & Business (mention)	---

14. Migration Status
Does any member of the household migrate for Work: No. If Yes Entire Year / Seasonal
Does anyone below 18 years migrate for work: No

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes
Do you use Chemical Insecticides	Yes
Do you use Chemical Weedicide	Yes
Do you have Soil Health Card	Yes
Irrigation: Canal	
Drip or Sprinkler Irrigation: Drip /Sprinkler	

16. Agricultural Produce in a normal year (Top 3)

Name	**Unit**	**Quantity**
Wheat	kg	1200
Cattle seed	kg	900

17. Livestock Numbers

Cows: 1	Bullocks: 2	Calves:
Female Buffalo: -	Male Buffalo: -	Buffalo Calves: -
Goats/ Sheep:	Poultry/ Ducks:	Pigs:
Any other: Type _____ No._____		
Shelter for Livestock: Kutcha		
Average Daily Production of Milk(Litres): 5		

18. What games do Children Play

19. Do children play musical instrument (mention)

Schedule Filled By:
Principal Respondent:
Date of Survey:

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: Vamaiya

b. Block: Vamaiya

c. District: Patan

d. State: Gujarat

e. Lok Sabha Constituency: Patan

f. Number of Wards in the Gram Panchayat:

g. Number of Villages in the Gram Panchayat: --

h. Names of Villages:

Demographic Information

Number of Households : 905	Total Population: 5228	Male : 2732	Female : 2496
SC HHs	ST HHs	OBC HHs	Other HHs

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	Y	
b.	Nearest Primary Health Centre (PHC)	Y	
c.	Nearest Community Health Centre (CHC)	Y	
d.	Nearest Post Office	Y	
e.	Nearest Bank Branch (Any)	N	10 KM
f.	Nearest Bank with CBS Facility	N	10 KM
g.	Nearest ATM	N	10 KM
h.	Nearest Primary School	Y	
i.	Nearest Middle School	Y	
j.	Nearest Secondary School	Y	
k.	Nearest Higher Secondary School / +2 College	N	15 KM
l.	Nearest Graduate College	N	15 KM
m	Nearest ITI / Polytechnic Centre	N	15 KM
n	Kisan Seva Kendra	N	15 KM

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	15 km
p	Nearest Agro Service Centre	N	15 km
p	MSP based Government Procurement Centre	N	15 km
q	Milk Cooperative /Collection Centre	Y	
r	Veterinary Care Centre	N	15 km
s	Ayurveda Centre	N	15 km
t	E – Seva Kendra	N	15 km
u	Bus Stop	N	15 Km
v	Railway Station	N	15 km
w	Library	N	15 Km
x	Common Service Centre	N	15 km

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total : 1 Public : 1 Private : --

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres

Names of such villages:

c. Schools (Number)

Primary Private: 0 Primary Govt.: 1

Middle Private: 0 Middle Govt.: 0

Secondary Private: 0 Secondary Govt.: 1

Higher Secondary Private: 0 Higher Secondary Govt: 0

VI. <u>Public Distribution System</u>

	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)	--	--	yes	yes	--	--	--
b.	Kerosene	--	--	yes	yes	--	Panchayat	--
c.	Other (mention)	--	--	--	--	--	--	--

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

VIII. Land and Irrigation

	Private Land	Area in Hectare		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	961.87	d.	Pasture / Grazing Land	--	g.	Check Dam	--
b.	Irrigated Land	777.66	e.	Forests/ Plantations	--	h.	Wells/Bore Wells	--
c.	Un-irrigated Land	--	f.	Other Common Land	--	i	Tanks /Ponds	--

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)	
b)	Number of Households receiving pension (old age, widow, disability)	
c)	Number of eligible Households who are not receiving pension	
d)	Number of Households eligible for Ration Card	
e)	Number of eligible HHs having ration cards	
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	
i)	Number of Job Card holders who completed 100 days of work during 2013-14	
j)	Number of shops selling alcohol	
k)	Number of BPL families	
l)	Number of landless households	
m)	Number of IAY beneficiaries	
n)	Number of FRA[2] beneficiaries	
o)	Number of Community Sanitary Complexes	
p)	Number of Households headed by single women	
q)	Number of Households headed by physically handicapped persons	
r)	Total number of Persons with Disability in the village	
s)	Number of SHGs	
t)	Number of active SHGs	
u)	Number of SHG Federations	
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

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: Vamaiya

b. Ward Number:

c. Gram Panchayat: Vamaiya

d. Block: Vamaiya

e. District: Patan

f. State: Gujarat

g. Lok Sabha Constituency: Patan

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

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 905	Total Population 5228	Male 2732	Female 2496
SC HHs	ST HHs	OBC HHs	Other HHs

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	Y	
c.	Nearest Secondary School	Y	
d.	Kisan Seva Kendra	N	15 km
e.	Milk Cooperative /Collection Centre	Y	
g.	Health Sub Centre	N	15 km
h.	Bank	Y	
i.	ATM	N	15 km
j.	Bus Stop	N	
k.	Railway Station	N	15 km

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

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	15 Km
m	Common Service Centre	N	15 km
n	Veterinary Care Centre	N	15 km

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: None

iii. Drinking Water Facilities

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

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

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

If 3 mention the name of the habitations not covered:

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: Some *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:

b. Coverage under Open Drains: Some *(1-All 2-None 3-Some)*

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

c. Coverage under Doorstep Waste Collection: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections: Some *(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): 1

b.Mini Stadium : No Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private:0 Primary Govt.: 1

Middle Private: 0 Middle Govt.: 1

Secondary Private:0 Secondary Govt.: 1

Higher Secondary Private: 0 Higher Secondary Govt: 1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Hectare		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	961.87	d.	Pasture / Grazing Land		g.	Check Dam	
b.	Irrigated Land	777.66	e.	Forests/ Plantations		h.	Wells/Bore Wells	
c.	Un-irrigated Land		f.	Other Common Land		I	Tanks /Ponds	

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

Name and Signature of Surveyor and Respondent'

Surveyor	PRIRespondent(Preferablya ward member from a ward that is fully or partially covered underthe Village)	Official Respondent (Preferably senior most Government official in the Gram Panchayat)	Date of Survey

Chapter 20.TDO-DDO-Collector email sending Soft copy

Gmail Savan Dave <savandave13@gmail.com>

Vishwakarma Yojana phase 8 Vamaiya village

Savan Dave <savandave13@gmail.com> Wed, Jun 23, 2021 at 6:16 PM
To: ddo-pat@gujarat.gov.in, collector-pat@gujarat.gov.in
Cc: principalgecpatan@gmail.com, Manjuralimomin1@gmail.com, rurban@gtu.edu.in

Respected Sir,

As a part of PMMS subject we had given the project under scheme of Vishwakarma Yojana phase VIII. Under this project we had allotted Vamaiya village of Patan district. Under this project we had visited the village to study existing infrastructure and to propose new amenity.

In Vishwakarma Yojana Phase VIII, we had assigned the village Vamaiya for survey. We visited the village and met the Sarpanch and Talati of the village and discussed about the infrastructure facilities available in village and other details about village. We had collected the data from the villages and proposed twelve new designs such as Bio-Gas Plant, Dwelling house, Open Window composite structure, Public Toilet, School Sanitary complex, Paver Block, Post Office etc. to fulfill the requirement of existing population. The proposed designs are as under:

Sr. No	Design Name	Period	Amount Expenditure	Benefit
1	Public Toilet	immediately	288850.0	for public use and for making village pollution free
2	Bio Gas plant	within 1 year	-	For gas Production
3	Assembly polling booth cum conference hall using green wall concept	Long term (3-5 years)	2,60,441	Work of the politician and various function.
4	Under Ground Water Sump	Long term (3-5 years)	269704.4988	Heavy water storage.
5	Chabutara	Long term (3-5 years)	121663	For the birds in resident.
6	School sanitary complex	Immediately	56770.00	Separately used for girls and boys are toilets.
7	Post office	Within 1 year	857403.1488	In this village for speed post and other
8	Bus Stand	Within 1 year	108420.8136	Waiting for the bus and other
9	Pavement in graveyard with paver block	Within 1 year	2,16,090	Smart village proposal and speedily transportation if any.
10	Public Garden	Long term (3-5 years)	637020	Enjoy and mind fresh.
11	Dwelling House	1 year	4,49,131	Better live hood
12	Open Window Composite	1 year	3,57,073	Solid waste management

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6/23/2021 Gmail - Vishwakarma Yojana phase 8 Vamaiya village

So, this is for your kind information…

Please find the attached detailed Project Report of Vamaiya Village…

Thanks for sparing your valuable time to read this mail.

Vamaiya Village.doc

Chapter 21. Comprehensive Report for the entire Village

In Vishwakarma Yojana Phase-8 we will find rural current issues and problems, listing out existing amenities and give best economical solution. We will give planning proposal of Physical Infrastructure, Social Infrastructure & Socio-Cultural Infrastructure facilities with method of giving Redesigning, Reimaging, Repair & maintenance, and Sustainable planning for basic need of village like government buildings, schools, health facilities, water supply and sanitation, waste disposal management system, electricity, road networks, irrigation facilities, community hall, Bio gas plant, drainage System , rainwater harvesting system, Solar energy utilization and other non conversation energy sources utilization etc..

The study area mainly includes the village Vamaiya. Vamaiya is a large village located in Patan Taluka of Patan district, Gujarat with total 905 families residing. The Vamaiya village has population of 5228 of which 2732 are males while 2496 are females as per Population Census 2011.

In this phase of Vishwakarma Yojana, we had assigned the village Vamaiya for survey. We visited the village and met the Sarpanch and Peoples of the village and discussed about the infrastructure facilities available in village and other details about village. We gathered information about demography of the village. and discussed about the infrastructure facilities available in village. There we recorded the data in the given form. We have collected the data from the village . To collect the data we visited some part of the village. There we met some residents of the village. As it was high time of the on going pandemics, We met limited people with due care for covid protocols. And tried to collect maximum details regarding existing infrastructure and perceived need by the residents. We have collected the data from the villages with different surveys and proposed six new design such as Bio-Gas Plant, Community Hall Cum Booth, Public Toilet, Chabutara, school sanitary complex, U/G Sump, for part 1 and other new six design such as Bus station, Post office, Pavement in Graveyard with Paver block, public garden, Dwelling house, Open Window composite structure, for part 2 to fulfill the requirement of existing population.