DETAIL PROJECT REPORT

ON

VISHWAKARMA YOJNA: VIII

AN APPROACH TOWARDS RURBANISATION

SHAMPARA Village

BHAVNAGAR
District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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GOVERNMENT ENGINEERING COLLEGE, BHAVNAGAR

PROF V. S. DAVE
HEAD OF DEPT.
CIVIL ENGG. DEPT.

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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CERTIFICATE

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

Detail Project Report for,

VILLAGE: - SHAMPARA

DISTRICT: - BHAVNAGAR

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.

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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Date of Report Submission:	
Principal Name and Signature:	DR. G. P. VADODARIA
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Internal(Evaluator) Guide Name and Signature:	PROF. V.S. DAVE
College Name:	GOVERNMENT ENGINEERING COLLEGE, BHAVNAGAR.
College Stamp:	

ABSTRACT

Vishwakarma Yojana project and how you do your vision project: Vishwakarma Yojana is an approach towards rurbanisation and Vishwakarma Yojana would provide "Design to Delivery" solution for development of villages in 'Rurban' areas. The team has conducted Vishwakarma Yojana Project for Shampara Village with the vision of the developmental work in villages that could be undertaken as per the need of the village, in particular includes Physical, Social and Sustainable infrastructure facilities.

About your village description: Shampara village is located in Bhavnagar Tehsil of Bhavnagar District in Gujarat, India. It is situated 10 km away from Districts headquarter Bhavnagar.As per 2009 statistics; Shampara is the Gram Panchayat of Shampara Village. The total geographical area of village is 315.52 hectares. Total population of Shampara is 1828 people. As per 2019 stats, Shampara Village comes under Bhavnagar Rural assembly & Bhavnagar parliamentary constituency. Bhavnagar is nearest town to Shampara which is approximately 10 km away. The basic facilities available in the village are like new Panchayat building, drainage facilities, pucca road, school, etc.

About existing village condition: In Shampara village water supplied to the people is sufficient. There is Proper Street lighting facilities in village. Bank, Post office, Bus stops are not available in the village. All the village roads are Pucca roads. The village lack of basic facilities like public toilet, PHC, community hall, etc.

About your proposed designs your view for village development: For development of the village infrastructure facilities like community hall, PHC, recreational centre etc. are required after analyzing the gap analysis. For sustainable development of the village new way of storing water of rain water harvesting is needed. By providing these basic facilities to villager's migration rate will be decreased. And this is ultimate aim of the Vishwakarma Yojana.

About future scope of the village development: According to UDPFI norms, the team can enhance and design basic facilities which are unavailable at present in the village. These may include but not limited to (a) physical infrastructure including Solid waste Management, Water supply in village, (b) social infrastructure including some Community Hall, PHC(c) Recreational Facilities like Redevelopment of existing pond of Shampara village, etc. In a nutshell, the future scope would be study of urban replicating amenities that would be sustainable in rural areas of Bhavnagar.

Key Words: Rurban, Smart village, Gap analysis, Sustainable development, etc.

ACKNOWLEDGEMENT

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

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

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

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

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

An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer, **Prof V.S. Dave**, for their invaluable guidance, constant inspiration and active involvement in our project work.

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

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

CONTENT

LIST OF FIGURES

ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
CCTV	Closed-Circuit Television
LED	Light Emitting Diode
MDM	Mid-Day Meal
CDP	Community Development Program
NES	National Extension Services
IRDP	Integrated Rural Development Program
SGSY	Swarnjayanti Gram Swarozgar Yojana
PRI	Panchayati Raj Institutions
ICAR	Indian Council for Agricultural Research
IRRI	International Rice Research Institute
PPP	Public Private Partnership
ST	Statutory Town
CT	Census Town
MCD	Municipal Corporation of Delhi
UDPFI	Urban and Regional Development Plans Formulation and Implementation
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme

LIST OF TABLES

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

1.1 Background & Study Area Location

"The future of India lies in its villages."
— Mahatma Gandhi

Shampara is a medium size village located in Bhavnagar Taluka of Bhavnagar district, Gujarat with total 306 families residing. The Shampara village has population of 1828 of which 957 are males while 871 are females as per Population Census 2011.

We visited our allocated village Shampara on 6th November, 2020 and then again in successive month and also interviewed many people of village for different aspects. Shampara village is 10 km from District Headquarter Bhavnagar. Atmosphere of the village is very decent and air quality is also good as no polluting industries are near to the village and also gathered some information of economical aspect of our village. We came know that main occupation is Agriculture and so it is the major income source of the village. Also, some people are engaged in Diamond Industry.

Shampara is having surfaced land. Latitude and Longitude of the village are respectively 21.71 and 72.11. Most of the parts of village are having all weather roads and main road is also connected with approach road. As mentioned earlier, the agricultural activity is the main occupation and cotton and groundnut are major crops taken there. A Gram Panchayat building three schools, and some temples are situated in the village.

Figure 1.1: Location of our village in Gujarat State

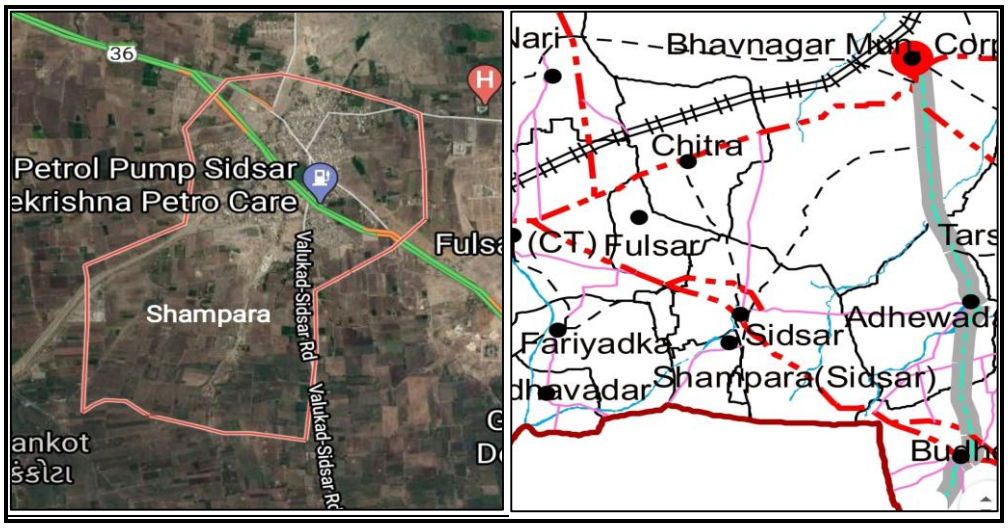

Figure 1.2: Satellite Image

1.2 Concept: Ideal Village, Normal Village

1.2.1 Objective:

Rural Development in India is one of the most important factors for the growth of the Indian economy. India is primarily an agriculture-based country. Agriculture contributes nearly one-fifth of the gross domestic product in India. In order to increase the growth of agriculture, the Government has planned several programs pertaining to Rural Development in India. Sectors like Agriculture, handicrafts, fisheries, poultry, and dairy are the primary contributors to the rural business and economy.

- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- It aims at improving rural people's livelihoods in an equitable and sustainable manner, both socially and environmentally.
- Create and sustain a culture of cooperative living for inclusive and rapid development.
- Alleviation of poverty and unemployment through creation of basic social and economic infrastructure.
- To discourage seasonal and permanent migration to urban areas.

1.2.2 Example / Live Case studies of ideal village of India/Gujarat

Hiware Bazar situated in Maharashtra which were among such village which have transformed a lot from water- scarcity, poor and deserted villages and schools to economically energetic, environmentally stable and socially cohesive communities. It has become the models for participatory village governance and development planning. This village shown that with united efforts and some key initiatives, all Panchayats across the country just by involving and working together with their communities canal so establish such transformations in their own villages in a few years.

1.2.3 The Idea of a model/Smart Village

India there are 6,00,000 villages out of them 1,25,000 villages are backward so there is a need for designing and building the village as a smart village. With modernization and urbanization people migrate from one place to another place for different facilities such as education, employment and affinity of people towards the locality or city. Village is main criteria for development of nation. So, develop the village in such a way that which is self-dependent in providing the services, employment and well connected to the rest of the world i.e. smart village. The smart village corrects the social oversight by providing accommodations for sustainable family relationships without disturbing the lifestyle of different generations. The vision of smart village is that modern energy access can act as catalyst for development in education, health, productive enterprise, clean water, sanitation, environmental sustainability and participatory democracy which helps to support further improvement in access to energy. Initially the concept of development of village is of Mahatma Gandhi i.e. Swaraj and Suraj village. But, now days it is newly termed as smart village. We know that, India is a developing nation, with the help of smart village we can make India as a SS nation. Now days, our government also gives strong focus on smart village. Government implements so many schemes on smart village.

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

Mohandas Karamchand Gandhi had the main aim to see the rural areas of the country as, self-contained and self-sufficient. The problem of the rural individuals, which he was aware of was to completely eradicate those problems without any kind of interference from the outside agencies. He wanted to make provision of solutions to those problems with the help of local individuals and local resources. Therefore, for the betterment of the individuals, he formulated 18 programs. These include, the promotion of village industries, basic and adult education in terms of rural sanitation, upliftment of backward tribes, women and underprivileged sections of the society, education in public health and hygiene, propagation of the natural language, organization of labour unions, students and so forth. In addition, special attention was paid upon crafts, traditional oil press, leather works and grain processing. Gandhian rural work activities were based upon the principles of truth and non-violence. His ideas and perspectives in terms of rural reconstruction were adopted officially and resulted in the adoption of khadi and village industries program, the principle of village self-sufficiency and faith in the panchayati raj and Sahakari Samaj Movement.

In India, the concept of rural development is turning out to be more complicated, despite of the advancements taking place in technology, the availability of resources and the continued efforts from the pre-independence period. Various programs were initiated to bring about development of rural areas in the pre independence period. These are, Sriniketan Experiment, The Martandam Experiment, The Gurgaon Experiment, Gandhian Constructive Program Sewagram, Rural Reconstruction Programs in Baroda and The Firka Development Scheme. The three important programs that were formulated with the main aim of rural construction in the post-independence period are, The Etawah Pilot Project, The Nilokheri Experiment, and The Bhoodan Movement. After the country achieved its independence, there were establishment of five year plans, which focused upon rural development. In all five year plans, there were formulation of measures and programs that put emphasis upon development of rural communities.

In the post-independence era, adequate consideration was given to the development of rural areas. This has taken place in an effective manner, through the initiation of programs and schemes. The country adopted the planned development. The first five year plan put emphasis upon the development of the

agricultural sector. It formulated number of measures to bring more land under irrigation. Major irrigation dams, such as the Bakhra Nangal Dam, Hirakud, Nagarjunasagar and Tungabhadra were constructed, which generated power for augmenting industrialization within the country and water for irrigation. As a result of the construction of these dams, the Indian farmers were not exclusively dependent upon the monsoon season. Intensive cultivation of the land is made possible through farm mechanization. There has been an increase in the production of tractors within the country and they are being made use of by the farmers, throughout the country. The other techniques that the farmers are making use of are, threshing machines, deep boring and irrigation pumps, which lead to improvements in high yielding improved seeds, fertilizers and other inputs. To enable the farmers to make purchases of the inputs, the rural credit system has been invigorated with the co-operatives. Furthermore, Regional Rural Banks and Rural Branches of Commercial Banks were established with the main objective of making provision of financial assistance to the rural individuals and augment their economic conditions. The initiation of the micro-finance system has been a recent mea-sure that has proved to be advantageous to rural individuals to a large extent .After the country attained its independence, there were introduction of the land reform legislation. The main areas that have been taken into consideration are, abolition of the zamindari system, abolition of the bonded labour system, land ceiling and so forth.. There was commitment on the part of the Government of India to bring about rapid and sustainable development of rural communities, through the initiation of pro-grams and schemes. The major aim of these programs is to bring about improvements in all facets of rural life.

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

The process of village development planning in Hiware Bazar involves identifying the current problems in the village and finding out some ways to solve them. It also involves identifying the future desired goals and systematic ways to achieve them. In general the process of village planning must be directed towards meeting the basic life needs of all the–safety and security of persons and their possessions, housing, water, sanitation, electricity, roads, transport and communication facilities, livelihoods, education and health facilities. The process of village development and planning is based on the successful processes of local self-governance, village planning and development by a number of Panchayats across the country. Postgraduate son of a village named Popatrao Pawar gave up his cricket career in Pune and came back in Hiware Bazar in 1989 to create positive transformation in the village. Present condition of the village in last 15 years the average income of the village has risen up to 20 times from Rs 832 to Rs24000. Each village residents earns almost double the average income of the top ten percent of the rural population of India. The villages has now the place of54millionaires. The number of wells has increased to 217 from 97 as well as the irrigation land which has increased from 120 ha to 300ha.Farmers grow at least three crops in a year sometimes four with a past experience of one unreliable crop a year following the rules of crop rotation and abandoned the use of water-intensive crops, and instead vegetables, pulses, flowers and fruit that use less water were grown. Grass production has increased drastically from 100 metric tonnes to 1000 metric tonnes in just 4 years (2000-2004) due to the ban on open grazing. The villagers started focusing on cattle farming, results in an increase in milk production which further produces large revenue. Back in the mid-90s, about 150 litres of milk were produced per day, and today milk production has increased to 4000 litres per day. In 1992 there were 180 families in the village standing below poverty line and surprisingly now there are no such families under B.P.L category according to the sarpanch of the village Popatrao Pawar.The village has potential to tackle any kind of challenge launched in their way by Nature or man-made. Slowly and steadily the village documented growth and prosperity which results in reverse migration.
The works which were undertaken in the programme are as follows:

- Construction of deep Continuous Contour Trenches (CCT),
- Construction of percolation tanks
- Widening and deepening of drain beds
- Construction of cement storage tanks
- Plantation for soil and water conservation,
- Adoption of Chloride Mass Balance method

Figure 1.3 ideal village Hiware Bazar

1.4 SWOT analysis of Ideal village / Smart Village

In 1972, the village experience severe drought. Water shortage was a serious problem in that village prior to 1989. After 1989, the villagers started to do rainwater harvesting and drip-irrigation for water conservation. These things helped to fight against water scarcity. Now this village is known for its irrigation system and water conservation program. By the 1990s, reverse migration started as families started returning home. In 2012, the village with its 235 families and an overall population of 1,250, had a monthly per capita income Rs 30,000, up from Rs. 830 in 1995, plus it had 60 families with an annual income of over 10 Lakh rupees. The villagers implemented a drip-irrigation system to conserve water and soil, and to increase the food production. They avoided crops like sugarcane and bananas, which require a high use of water. The program included rainwater harvesting, digging trenches around the hill contours to trap water, afforestation and building of percolation tanks.

The initiatives greatly improved the socio-economic conditions in the village, and the village was declared an "Ideal Village" by the Government of Maharashtra. At the "National Ground Water Congress" in New Delhi on 11 September 2007, the village received the "National Water Award" by the Government of India. In 1995, only a tenth of the village's land was arable and 168 of its 182 families were below the poverty line. By 2010, the average income of the village had increased twenty-fold: 50 of the villagers had become millionaires (in Indian rupees), and only three families were below the poverty line. The grass harvest increased from 100 tonnes in 2000 to 6,000 tonnes in 2004, and the milk production rose from 150 litres a day in the mid-1990s to 4,000 in 2010

The key challenges in the future will be to improve productivity, with use of techniques to minimize water use and changing cropping patterns.

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- Construction of cement storage tanks
- Plantation for soil and water conservation,
- Adoption of Chloride Mass Balance method.

All these works were implemented through Employment Guarantee Scheme (EGS). It was the laborers from the village itself who built the structures thereby improving livelihood.

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

Village authority is planning to launch a mobile app for the village to receive daily weather updates, market prices of crops, organic and carbon status of the villages around, and soil health and water audit reports.The Hiware Bazar Gram Sabha have already decided to have a community drip irrigation project at a cost of Rs. 26 crore, which would interconnect 364 existing wells in the village to three main wells for equal distribution of water.

1.6 Benefits of the visits of Ideal village / Smart Village

In context of Vishwakarma Yojana Project, the study of ideal / smart village strengthens the thinking process about how the allocated should be developed. One may think for the allocated villages in respect of ideal village:

- To generate models of local level development and effective local government which can motivate and inspire neighboring Gram Panchayats to learn and adapt
- To nurture the identified Adarsh Grams as schools of local development to train other gram panchayat
- To substantially improve the standard of living and quality of life of all section of the population through -
    - Improved basic amenities
    - Higher productivity
    - Enhanced human development
    - Better livelihood opportunity
    - Reduced disparities

1.7 Electrical / Civil aspects required in Ideal village / Smart Village

Our village is situated in Bhavnagar Taluka in which we can take ‘Budhel’ as smart village and ‘Koliyak’ as ideal village, Koliyak has many facilities and amenities by which it is ideal. The history of Koliyak is very rich and on geographical basis, it is having great sea shore. A much known Mythological story about Koliyak is that Pandavas came here after Kurukshetra War for sanctification ritual. This village is having all weather road and block paved streets. Koliyak also has its own Bus Station .In terms of sanitation they have Public Toilet in the village. A 25 bed Hospital is situated near

village. A post office in good condition working in the village, educationally village is in good shape, so overall we can put this village in ideal village category because it is fulfilling criteria of planning commission report. Now coming to smart village category, Budhel is taken here.

Budhel is village situated near National Highway so people living enjoying many commercial benefits there. This village has piped water connection and citizens are having tap water at their houses and they are having adequate water supply for all the activities, village has pucca road and street light system and sanitation is also good there. Viewing economical aspect it has facilities of banks, ATMs, Post office, market etc and overall education structure is also in good quality. So that is why we can consider this village as smart village.

After gap analysis and viewing these villages, our village Shampara does not have some basic amenities like Primary health centre, in some areas still drainage system is not available, on Economical aspect a single Bank or ATM not available there. Education structure is at its peak condition because it has number of schools and Anganwadis. Our village is not having street light system also. As many more things are to be planned there we can surely say, and an effort we made here under Vishwakarma Yojana to introduce some designs and concepts for village development.

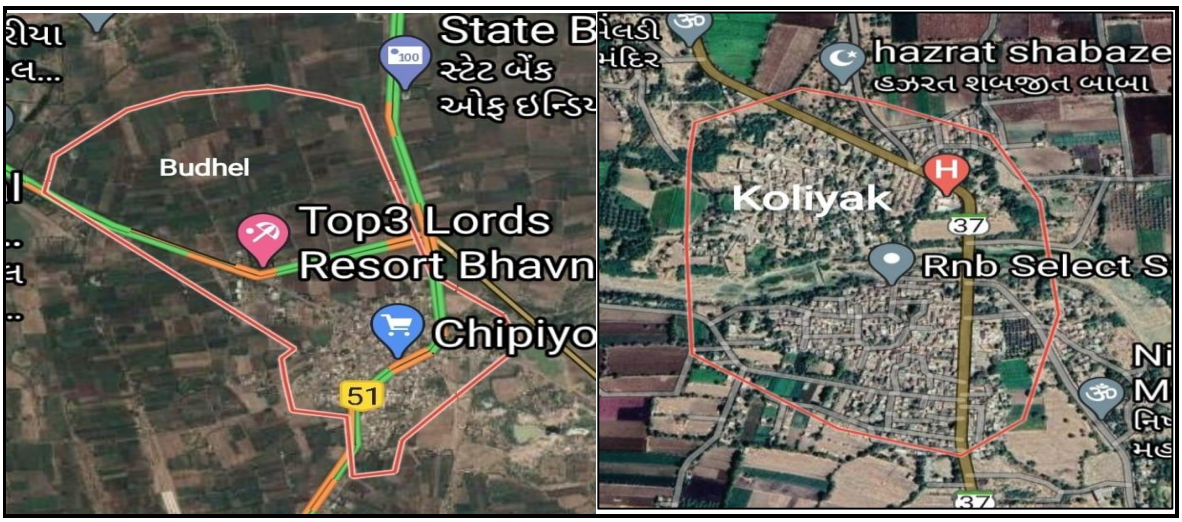

Figure 1.4: Smart/Ideal village location

Budhel is village situated near National Highway so people living enjoying many commercial benefits there. This village has piped water connection and citizens are having tap water at their houses and they are having adequate water supply for all the activities, village has pucca road and street light system and sanitation is also good there. Viewing economical aspect it has facilities of banks, ATMs, Post office, market etc and overall education structure is also in good quality. So that is why we can consider this village as smart village.

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Chapter 2
Literature Review – (Civil & Electrical Concept)

2.1 Introduction: Urban & Rural village concept

The latest population figures are based on data from the 2011 census of India. India has 641,000 inhabited villages and 72.2 percent of the total population reside in these rural areas and 27.8 percent urban population lives in more than 5,100 towns and over 380 urban agglomerations. But the share of urban population which lives in towns and cities, actually classified as urban, and governed by urban local bodies is even lower at 26%. The urban village as an entity exists only as a concept. Administratively, it merges with the urban ward as soon it gets notified, but has starkly different characteristics from the rest of the ward. The rural-urban conflicts are strongly manifested here. At Bhavnagar, Bhavnagar Area Development Authority proposed to include Adhewada Village in Bhavnagar Municipal Corporation after merging it was divided into 2 separate wards. Before few years, Sidsar Village – another village of Bhavnagar Taluka – was merged under the administrative boundary of Bhavnagar Municipal Corporation. In context of town planning and regional planning, any particular patch of land – ranging from a small area to a town/city – should be planned and grown in controlled fashion.

2.2 Importance of the rural development

Rural development is a topic that is pretty easy to understand but hard to implement. It focuses upon the upliftment and development of the sections of rural economies, that experience grave poverty issues and effectively aims at developing their productivity. It also emphasizes the need to address various pressing issues of village economies that hinder growth and improve these areas. Some areas that need urgent attention for Rural Development in India are:

- Public health and sanitation
- Literacy
- Female empowerment
- Enforcement of law and order
- Land reforms
- Infrastructure development like irrigation, electricity, etc.
- Availability of credit
- Eradication of poverty

The rural economy is an example of an agrarian economy. Although farming and agriculture are one of the most important primary activities, the problem lies in the fact that they share in the GDP of the agriculture sector is on a constant decline. At the same time, about two-thirds of India's population depends on agriculture. As a result, the productivity is not up to the mark, with conditions only getting worse.Moreover, public investment declined since 1991 coupled with a lack of adequate infrastructure, credit, transport, employment, etc. Henceforth the agricultural output has grown at only 3.2% during 2007-2011. All these factors have been denting the process of development. Therefore there is a need to focus on rural development and not just urban development.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

Even after the destruction of Indus Valley civilization village-civilizations in different parts of India continued to flourish. Most of them belonged to the later Chalcolithic age because they used stone as well as copper for making their tools and arms. Besides, iron also became known to some of them at a later stage. Several village-civilizations flourished in the territory where once the Harappa civilization existed. Remnants of these civilizations have been discovered from several places in Punjab, Haryana, Rajasthan, Gujarat and western Uttar Pradesh. The primary source of recognizing these civilizations is clay-pottery found at various places. However, it has not been made clear whether these civilizations had any relation with the Harappa-civilization or not and. if there was any, what sort of relation these had with each other. Besides these village-settlements or civilizations in the north-west, many civilizations flourished at different places in south-east Rajasthan, Madhya Bharat, south India, east India, Ganges Valley and the Ganga-Yamuna Doab. Remnants of these civilizations discovered at different places are proofs of their existence. In Rajasthan remnants of Chalcolithic age have been discovered at different places particularly at Ahara and Gulunda near Udaipur. The civilization of these places dates back to 2000 B.C. Copper was profusely used there. Rings, bangles, knives and axes made of copper have been excavated from there. The people there produced rice and, probably, millet. Domestication of animals was also one of their primary professions. Bones of fish, she-goat, cock, cow, she-buffalo, stag and pig have been recovered from there. At Ahara, stone was used in laying down foundations of houses while bamboos and Gara was used for raising the walls. Floors were made of black mud and yellow Gad. At Gulunda, baked bricks w ere used for construction of houses. There the people constructed Tandoors (ovens for baking breads).Several instruments were made of stone there and clay-pottery was prepared of different variety. Most of the clay-pottery was of black and red colour which was decorated by white dots. This civilization of Ahara and Gulunda has been named as Ahara-civilization. In the following content, various definitions of ‘urban village’ have been presented to know how the term has various horizon ranging from local level to international level.Generally, a village community may be defined as a group of people living in a definite geographical area, characterised by consciousness of kind, common life styles and various intensive social interaction. The term ‘village’ refers to a small area with small population which follows agriculture not only as an occupation but also as a way of life. 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.”

2.4 Scenario: Rural / Urban village of India population Growth

Rural population refers to people living in rural areas as defined by national statistical offices. It is calculated as the difference between total population and urban population. Aggregation of urban and rural population may not add up to total population because of different country coverage.

- India rural population for 2019 was **895,386,226**, a **0.34% increase** from 2018.
- India rural population for 2018 was **892,321,651**, a **0.39% increase** from 2017.

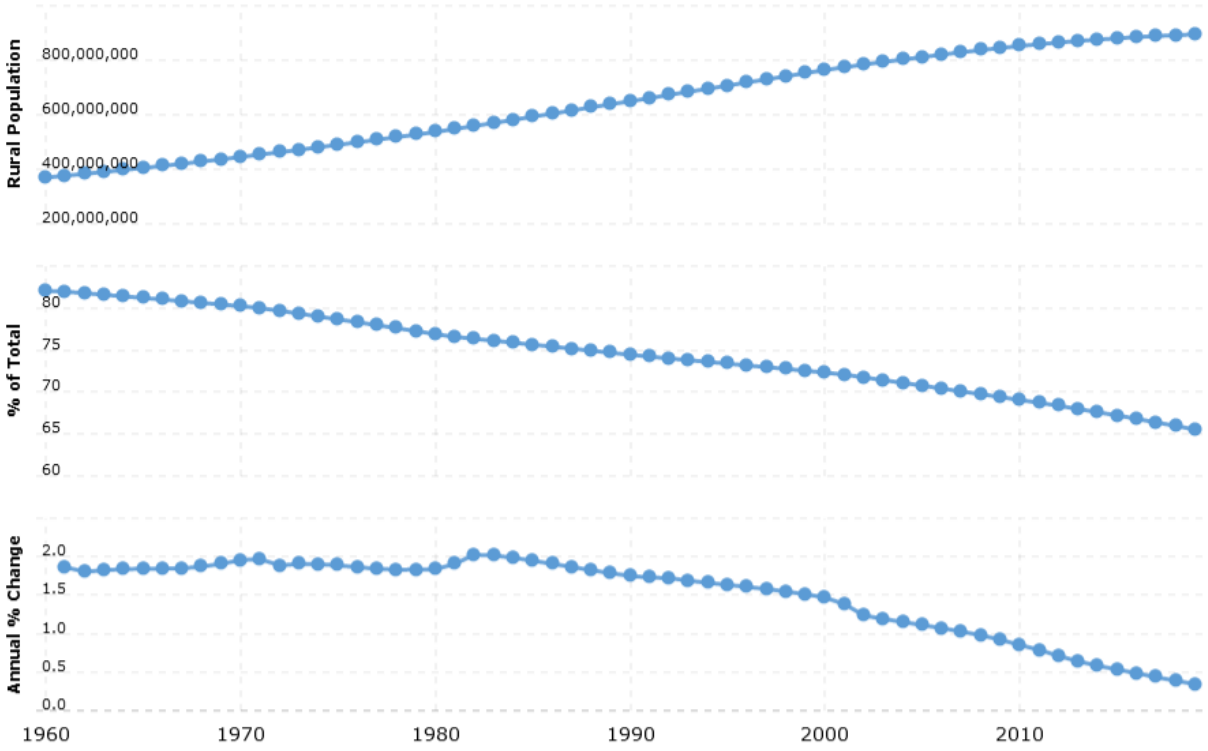

Figure 2.1 Population Growth

Seven of every 10 Indians live in settlements designated as ‘rural.’ However, a growing number of these settlements are exhibiting characteristics that are no longer considered ‘rural,’ but are emerging as ‘urban.’ For instance, urban areas in various large cities are being extended by town planning departments and development authorities to accommodate the influx of additional populations. The spatial expansion and penetration of urban development in rural hinterlands is leading to reduced farm lands and changing occupational patterns of villagers, seen in a shift to non-agricultural work. Furthermore, with increasing population densities and changing employment patterns, many rural settlements situated near cities are meeting the ‘urban area’ criteria adopted by India’s census office, and are therefore being classified as ‘urban.’ Another phenomenon adding to India’s urbanization process is the saturation of large cities, and accumulation of population and economic activities in Tier II cities, which are becoming the new growth centers.

Population census data revealed a notable demographic tilt in favor of urban, for the first time, in 2011. During the decade 2001-11, the growth of India’s urban population was slightly higher than that of the rural. The National Commission on Population (NCP) in India predicts that in the next 15 years (i.e., by 2036), about 38.6 percent of Indians (600 million) will live in urban areas.

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

Gujarat Population Census Data shows that it has Total Population of 6.03 Crore which is approximately 4.99% of total Indian Population. Literacy rate in Gujarat has seen upward trend and is

79.31% as per 2011 population census. Of that, male literacy stands at 87.23% while female literacy is at 70.73%.Urban Population of the State is 42.6%, which used to be at 37.4% in 2001. Rural population in the state in 2011 fell to 57.4% from 62.6% in 2001. The data recently released by the Sample Registration Survey (SRS) of population by the central government for the year 2018 reveals that 45% of Gujarat's population lies in age groups below 25 years. The last government data on population released by the Census 2011 report showed the population of below 25-year groups forming 29.3% of the state's population. So, the below 25-year age groups have increased their share in the state's population by 15% between 2011 and 2018. The SRS stated that the age groups below 25 years constituted 47.4% of the population in rural areas of the state and 43.2% in urban areas.

2.6 Rural Development Issues - Concerns - Measures

Rural development is the backbone for any country's economic development and its helps the economy to grow and sustain .Rural development is the axis of the economy involving the labor ethics impacting the potential of business in big way. It is a popular belief that economic development takes place because of rapid industrialization. But the industrial development itself cannot take place without agriculture .Specifically, agriculture contributes to economic development by product contribution and market contribution. Agricultural sector is the long-term strategy for the economic development. The agriculture is volatile and fluctuating industry because it depends on the monsoon and the weather conditions. This sector of development of the economy is important to feed the nation and country though people have become modernized in the urban sector depending more on non-vegetarian food for their survival needs. The people in the rural sector are facing the problems of poverty and exploitation which is impacting the total productivity of the Indian agriculture. The agriculture is the economic face of any country. It is important for the prosperity and growth of the country. The aim is to build the country with the development potential so to give the value of growth to the Indian economy. The demand for the industrial products will be generated if the industrial production is high Fluctuations in agricultural output play a key role in the state of the national economy. Rural consumption of industrial goods is nearly three times that of urban consumption. As a matter of fact, the current spurt in the rural consumption of durable goods has led to redefinition consumer demographics itself. Obviously, there is a direct relationship between agriculture production, income and the demand for industrial goods. Similarly, performance in agriculture also influences total demand via government savings and public investments. Agriculture is the main contributor to national income and it is the primary source of savings and capital formation which influences the economic growth of any economy. The Indian rural faces the tough conditions of drought and famine which impact the life of people because are uneducated and they depend on agriculture. The rural people are facing the problems of undulation and poverty. The people are unemployed because they lack the skills to take up opportunities in life. If the rural sector is educated and advanced, it is easier to do business and the development is high. The economic development and the rural society have a kind of relationship which is generally interlocked because the issues of the external environment impact the values of economic development. It is necessary for the government to move in the direction and rhythm with the society because their sustainability is dependent on the long term benefits derived from the economic, social and environmental issues connected to rural basics.

Rural development focuses upon the upliftment and development of the sections of rural economies, that experience grave poverty issues and effectively aims at developing their productivity. It also emphasizes the need to address various pressing issues of village economies that hinder growth and improve these areas. Some areas that need urgent attention for Rural Development in India are:

- Public health and sanitation
- Literacy
- Female empowerment
- Enforcement of law and order
- Land reforms
- Infrastructure development like irrigation, electricity, etc.
- Availability of credit
- Eradication of poverty

The role of government in upgrading the rural environment: The rural economic development involves the integration of cross functional areas and this delivers critical policies for the change to give sustainable development to the rural sector. The practice of using better and upgraded policies helps in better performance so to enhance the overall productivity integrating the various variable of the rural economic environment. The total economic system is impacted by the forces of operation in the markets because they connect the people and business. The government has to understand the needs of the people and provide them the employment opportunities through project based growth. The government needs to invest in education so as enhance the empowerment and ability of people. ROLE OF NGOs AND SHGs: Voluntary social services have been an integral part of the socio-cultural and religious ethos of our society from ancient times. The objective has been to increase human capacities by promoting non-economic factors such as education, health and nutrition, which in turn would speed up the process of economic development. The role of NGOs is both co-operative and complementary to the state. The existence of NGOs assumes importance in the context of rural settings, as living conditions have deteriorated. State-NGO partnership alone cannot resolve all the socio-economic problems; hence it has to be in co-ordination with all agents of social change, i.e., the state, local self-governments, the corporate sector, academics and civil society groups. NGOs can play a significant role in strengthening local self-government by facilitating interaction and co-operation with state departments and also acting as catalysts to effectively implement various departmental schemes. The role of voluntary agencies in the development of rural areas can be to supplement efforts of government for the upliftment of the poor and needy disseminate information about development schemes and programmes of the government to rural people; make people aware of the consequences of female feticides and imbalance in sex ratio; mobilize financial resources from the community; help in up gradation of skills of rural youths for self-employment opportunities; facilitate the formation of self-help groups and micro-finance; ensure protection of women and children's rights and abolish ills of child labour; and, make available technologies in a simpler form to the rural poor.

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

Rural Area Development Plan Formulation and Implementation (RADPFI) Guidelines, 2016,
The absence of planned spatial development in rural areas has major impact on regional development, especially in case of villages in the planning area boundary of the metropolitan areas and cities. The Rural Area Development Plan Formulation and Implementation Guidelines (RADPFI) guidelines emphasizes the need for the preparation of rural spatial plans, integrated with the overall development. The RADPFI guidelines aims to provide direction for the preparation of spatial plans for Gram Panchayat and also mentions the required alterations and additions in the existing statutory provisions of planning. Norms and Standards for Infrastructure provision and construction activities are essential to promote development of amenities as well as sustainable built up environment for human habitation. The standards for building construction and infrastructural allocations have been prescribed by National Building Code of Bureau of Indian Standards, Indian Road Congress etc., in various sectors of infrastructure construction and development. There have been standards and norms in existence and enforced to a certain extent by the relevant statutory authorities in urban areas but compliance to the same in rural areas is virtually non-existent. Hence the construction activities in rural areas are by and large unregulated resulting in organic growth which is characterized by haphazard development and access to basic facilities remains a big challenge in rural areas. The idea of Planning in rural areas often receives cynical perspectives because of the socio economic constraints that exist in villages, lack of technical knowledge, lower levels of educational attainment. However, with the new Digital Literacy vision of the government and the anticipated socioeconomic development, the rural planning may be contemplated as the next possibility. Moreover, the provision of basic infrastructural facilities requires norms and standards to make available the required services. Such norms and standards are prescribed by the RADPFI guidelines to facilitate the development in rural areas.

Use	Standard/Population	Area (in hectares)	Distance from Habitation
a) Primary School	1 for 5000	0.4 to .6 ha	Within 500 metres
b)High School with Primary School	1 for 15000	1 ha	Within 1km
c)Dispensary/Health Centre	1 for 5000	.05 ha	Within 500 metres
d) Community Hall	1 for 5000	.05 ha	Within 1 km
e) Aanganwadi	1 for 5000	.05 ha	Within 500 metres

Table 2.1 Norms for Educational/health/public utility Facilities

Built up Area	Use category	Activities Permitted
	Residential	Residences*
	Commercial/Economic	Retail shopping
		Informal Shop
		Daily market, weekly, informal , regulated and specialised markets
		Godowns, Storage grounds
	Industry	Service and Light industry(MSMEs, Household industries, agrobased industries, khadi industries, cottage industry, industries depended on indigenous raw materials and art and craft.) Location of SEZ and Big Industries.
	Educational	School
		Anganwadis
		Training Centres
		Vocational Institute
		College
		Skill development institute/Organisation
	Health Services	Subcentre/PHC/CHC
		Dispensary
		Pvt. Clinic
		Vetrinary Hospital/Clinic
		Hospitals

Table 2.2 land use for rural area

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

2.9 Other Projects / Schemes of Gujarat / Indian Government

Different ministries of the government of India formulate various development schemes not to raise the profit but to maximize the welfare of the people. Some schemes like National Rural Livelihood Mission, MGNREGA, Bharat Nirman etc. are made by the government for rural development of India. These are some other schemes,

- Deen Dayal Upadhyay Grameen Kaushal Yojna
- Roshni: Skill Development Scheme for Tribals
- Sansad Adarsh Gram Yojna
- Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)
- National Rural Livelihood Mission
- Pradhan Mantri Gram Sadak Yojna
- Training to Rural Youth for Self Employment (TRYSEM)
- National Rural Health Mission

In context of Gujarat, many schemes and projects are going on for the rural development. Gujarat has effectively utilized the funding from Mahatma Gandhi National Rural Employment Guarantee Scheme

(MGNREGS), a momentous initiative towards pro-poor growth, to create sustainable and productive assets and in turn helped boosting the rural economy, protecting the environment, empowering rural women, reducing rural urban migration and fostering social equity among others. ‘Mission Mangalam' is an award-winning venture aimed at poverty elimination and women empowerment. It aims at uplifting women belonging to the poor families by giving them enough support to enable them to utilize their skills and improve their conditions. The programme is implemented by Gujarat Livelihood Promotion Company. Much of the area of this state remains arid with saline water which is unusable for the agricultural purpose. This area depends mainly on seasonal rain-water. Thus, to effectively manage and conserve rain-water, Watershed Management Programme was incorporated. It aims at promoting agriculture by eliminating the scarcity of water resource and in turn create employment opportunities for the rural families. Much of the state of Gujarat remains arid with brackish water which is unusable for agricultural purposes. The area is mainly dependent on seasonal rain water for agriculture. Thus, "Watershed Management Program (WSMP)" is implemented for effective management and conservation of rainwater. Which helps in creating employment opportunities for rural households by alleviating the scarcity of water resources and promoting agriculture

The State Government recognizes the practical and social importance of the household so that the State of Gujarat is active in the implementation of the "Indira Awas Yojana", which provides lined housing to the rural poor. With all this, the Government of Gujarat has been active in the improvement of rural life and has continued its efforts with greater zeal.

Vatan Prem Yojana by Gujarat Government

• Under the scheme, Gujaratis living anywhere in India and abroad will be able to pick up the projects, villages, and agencies of their choice by making a monetary contribution of 60%, while the state government will be contributing the remaining 40%.

• Under Vatan Prem Yojana, donors will be able to contribute for the construction of smart classes, classrooms, primary health centres, community halls, mid-day meal rooms, anganwadi, libraries, storerooms, gymnasiums, water recycling systems, CCTV Camera surveillance system, lake beautification, sewage treatment plants, water tanks, solar street lights, bus stands, tubewell as part of the scheme.

• Under the scheme, the priority will be given towards the construction of the classrooms in rural government schools.

Objectives of the Yojna

- To help achieve all-round development in addition to excellent public facilities in rural areas of Gujarat
- To help the rural areas become self-reliant
- To form a trinity of govt., donors and welfare of fellow countrymen
- To make the village life vibrant

CHAPTER – 3
Smart (Cities/ Village) Concept Idea and its Visit (Civil & Electrical Concept)

3.1 Introduction: Concepts, Definitions and Practices

A smart city uses information and communication technology (ICT) to improve operational efficiency, share information with the public and provide a better quality of government service and citizen welfare. The main goal of a smart city is to optimize city functions and promote economic growth while also improving the quality of life for citizens by using smart technologies and data analysis. The value lies in how this technology is used rather than simply how much technology is available. Smart Village is a concept adopted by national, state and local governments of India, as an initiative focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gramand Swaraj (Self Reliance). Prime Minister Narendra Modi launched Sansad Adarsh Gram Yojana (SAGY) or SAANJHI) on 2 October 2014, Gandhi's birthday, in addition to Smart Cities and Digital India, as a development programme for India. SPMRM is also a scheme launched by the Ministry of Rural Development (MoRD) in 2016 to deliver integrated project based infrastructure in the rural areas, which will also include development of economic activities and skill development.

Mission's Vision

Large parts of rural areas in the country are not stand-alone settlements but part of a cluster of settlements, which are relatively proximate to each other. These clusters typically illustrate potential for growth, have economic drivers and derive locational and competitive advantages. Hence, making a case for concerted policy directives for such clusters. These clusters once developed can then be classified as 'Rurban'. Hence taking cognizance of this, the Government of India, has proposed the Shyama Prasad Mukherji Rurban Mission (SPMRM), aimed at developing such rural areas by provisioning of economic, social and physical infrastructure facilities. The National Rurban Mission (NRuM) follows the vision of "Development of a cluster of villages that preserve and nurture the essence of rural community life with focus on equity and inclusiveness without compromising with the facilities perceived to be essentially urban in nature, thus creating a cluster of "Rurban Villages".

Mission's Objective

Bridging the rural-urban divide-viz: economic, technological and those related to facilities and services. The objective of the National Rurban Mission (NRuM) is to stimulate local economic development, enhance basic services, and create well planned Rurban clusters.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

Cities accommodate nearly 31% of India's current population and contribute 63% of GDP (Census 2011). Urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructure. All are important in improving the quality of life and attracting people and investment, setting in motion a virtuous cycle of growth and development. Development of Smart Cities is a step in that direction. The Mission will cover 100 cities and its duration will be five years (FY2015-16 to FY2019-20) The State/UT begins with short listing the potential smart cities on the basis of conditions precedent and scoring criteria and in accordance with the total number allocated to it. The first stage of the competition will be intra-state, in which cities in the State will compete on the conditions precedent and the scoring criteria laid out. These conditions precedent have to be met by the potential cities to

succeed in the first round of competition and the highest scoring potential smart cities will be shortlisted and recommended to participate in Stage 2 of the Challenge. In the second stage of the competition, each of the potential 100 smart cities prepare their proposals for participation in the 'City Challenge'. This is a crucial stage as each city's Smart City Proposal (SCP) is expected to contain the model chosen, whether retrofitting or redevelopment or Greenfield development or a mix thereof, and additionally include a Pan-City dimension with Smart Solutions. The SCP will also outline the consultations held with the city residents and other stakeholders, how the aspirations are matched with the vision contained in the SCP and importantly, what is the proposal for financing of the smart city plan including the revenue model to attract private participation. An evaluation criterion for the SCPs has been worked out by MoUD based on professional advice and this should act as guidance to the cities for preparing their proposal. The criteria and the documents to be sent with the application are also framed under Smart City Mission. The Mission may be continued thereafter in the light of an evaluation to be done by the Ministry of Urban Development (MoUD) and incorporating the learnings into the Mission. An Apex Committee (AC), headed by the Secretary, MoUD and comprising representatives of related Ministries and organisations will approve the Proposals for Smart Cities Mission, monitor their progress and release funds. This Committee will meet periodically, as considered necessary

3.3 Technological Options

A smart city relies heavily on the deployment of technology. Different combinations of technological infrastructure interact to form the array of smart city technologies with varying levels of interaction between human and technological systems.

Smart energy

Both residential and commercial buildings in smart cities are more efficient, using less energy, and the energy used is analyzed and data collected. Smart grids are part of the development of a smart city, and smart streetlights are an easy entry point for many cities, since LED lights save money and pay for themselves within a few years

Smart transportation

By making parking smarter, people spend less time looking for parking spots and circling city blocks. Smart traffic lights have cameras that monitor traffic flow so that it's reflected in the traffic signals, In Australia, traffic lights are prioritized based on the bus schedules so that traffic flows more freely during rush hours

Smart infrastructure

Having a smart infrastructure means that a city can move forward with other technologies and use the data collected to make meaningful changes in future city plans.

3.4 Road Map and Safe Guards

For rurbanization process, ideal roadmap is to make vibrant policy, planning, analysis and implementation. Policy needs to define the roles and strategies for whole process. By using modern technology, goal of rurban mission can be achieved swiftly.

Smart cities demand carefully planning at early ages, it is important the city will fulfill the requirements of government and citizen. A clear strategy must address two key factors: "functions" and "purposes," the function refers to aesthetical appearance and operations of a city, and "purposes" refers to the benefits promised by a smart city model.The Future Internet domain landscape comprises a great

diversity of research streams and related topics for designing alternatives for the Internet of tomorrow. For example, the Internet of Things (IoT) is considered as a major research and innovation stream leading to plenty opportunities for new services by interconnecting physical and virtual worlds with a huge amount of electronic devices distributed in houses, vehicles, streets, buildings and many other public environments. Hence, a massive amount of data will be flowing over the Internet that should not decrease the overall service performance and satisfaction.

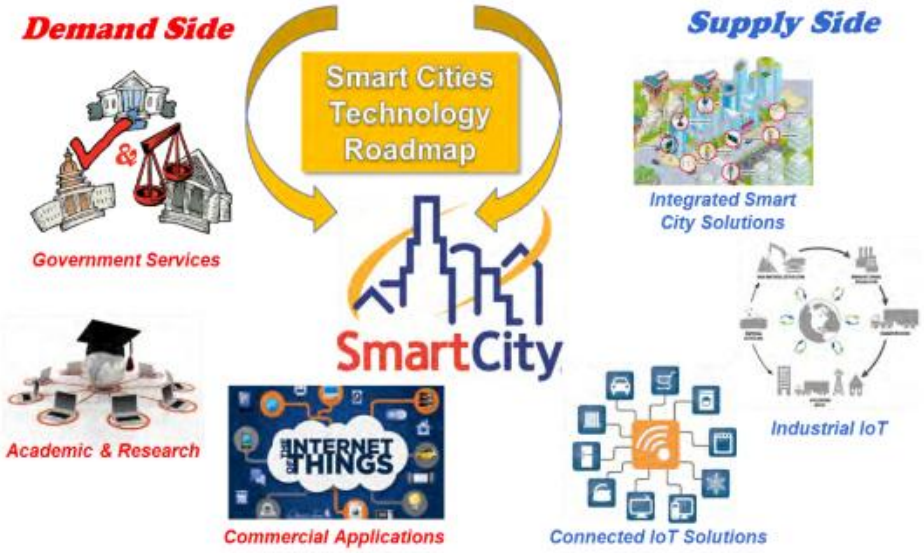

Figure 3.1 Smart city roadmap

3.5 Issues & Challenges

Understanding the concepts of retrofitting, redevelopment and Greenfield development by the policy makers, implementers and other stakeholders at different levels will require capacity assistance. Major investments in time and resources will have to be made during the planning phase prior to participation in the Challenge. This is different from the conventional DPR-driven approach. The Smart Cities Mission requires smart people who actively participate in governance and reforms. Citizen involvement is much more than a ceremonial participation in governance. Smart people involve themselves in the definition of the Smart City, decisions on deploying Smart Solutions, implementing reforms, doing more with less and oversight during implementing and designing post-project structures in order to make the Smart City developments sustainable.

3.6 Smart Infrastructure - Intelligent Traffic Management

An intelligent traffic management system (ITMS) is defined as an advanced application that without embodying intelligence as such—aims to provide innovative services related to different modes of transport and traffic management. It enables users to be better informed and to make safer, more coordinated, efficient and smarter use of transport networks. It is an advanced application which aims to provide innovative services relating to different modes of transport and traffic management and enable users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks. Some of these technologies include calling for emergency services when an accident occurs, using cameras to enforce traffic laws or signs that mark speed limit changes depending on conditions.

In ITMS, communication and information technologies are applied in the field of road transport, road

infrastructure, vehicles, users and traffic management. ITMS provides a useful interface with other modes of transport to improve the efficiency of road transport and traffic management. In developing countries such as ours, migration from rural to urbanized habitats due to rapid urbanization and industrialization is causing high population density without significant infrastructural development of the suburbs. Mega cities, such as New Delhi and Mumbai, are affected the most. Use of multimodal transportation systems, including bicycles, motorcycles, auto rickshaws, cars, buses, metro, trains and pedestrians, are leading to rapid increase in road traffic.
This ever-increasing traffic flow leads to traffic congestions and jams, giving rise to increase in the cost of transportation as well as affecting the routine lives of people. It is causing several problems such as wastage of fuel and time, increasing environmental pollution, accidents and cases of road rage. There are several other reasons causing this sudden surge in road traffic, including rise in population (leading to an increase in the number of vehicles on road), insufficient road capacity, traffic control lights (that are not as per traffic density), non-availability of complete and timely information regarding traffic density on different routes, inefficient transport management and unrestrained demand for vehicles. Given this situation, the very nature of traffic makes it difficult to estimate the road traffic density on real-time basis, so as to make better traffic-related decisions and manage the traffic efficiently. The solution lies in leveraging advanced technologies and intelligent solutions by deploying ITMS. This system would be able to track the flow and pace of traffic to provide real-time traffic management, which is more dynamic and accommodative of the varying nature of traffic density. A number of technologies, described below, are integrated to build ITMS. The technologies need to be chosen depending on use, location and finances available.

- Communication technologies
- Technologies for automotive electronic systems
- Video vehicle-detection system
- Audio vehicle-detection system
- Sensing systems
- Systems based on cellphones
- GPS-based method

3.7 Cyber Security or any other concept

Cyber security is concerned with making cyberspace safe from threats, namely cyber-threats. The notion of “cyber-threats” is rather vague and implies the malicious use of information and communication technologies (ICT) either as a target or as a tool by a wide range of malevolent actors. As commonly used, the term “cyber security” refers to three things:

- A set of activities and other measures, technical and non-technical, intended to protect computers, computer networks, related hardware and devices software, and the information they contain and communicate, including software and data, as well as other elements of cyberspace, from all threats, including threats to the national security;
- The degree of protection resulting from the application of these activities and measures;
- The associated field of professional endeavor, including research and analysis, aimed at implementing and those activities and improving their quality.

Cyber security is thus more than just information security or data security, but is nevertheless closely related to those two fields, because information security lies at the heart of the matter. Cyber security has become an integral aspect of national security. Moreover, its area of influence extends far beyond military domains to cover all aspects of a nation's governance, economy and welfare. In the Information Technology Amendment Act, 2008, cyber security is exercised under sections 43(data protection), 66(hacking), 66A (measures against sending offensive messages), 66B punishment for illegally possessing stolen computer resources or communication devices), 67(protection against unauthorized access to data), 69 (cyber terrorism), 70 (securing access or attempting to secure access to a protected system) and 72 (privacy and confidentiality) among others. Although India was one of the few countries to launch a cyber-security policy in 2013, not much has transpired in terms of a coordinated cyber approach. Thus, there is a need for a comprehensive cyber security policy in India. Recognizing cyber security as a key priority, the Ministry of Housing and Urban Affairs (MoHUA) published the 'Cyber Security Framework for Smart Cities' on 20 May 2016 and issued an advisory to all smart cities to drive conformance to this framework.

3.8 Retrofitting – Redevelopment – Greenfield Development District Cooling

The most effective path to the smart city for existing urban environments is a retrofit, where innovative digital technologies are applied to the existing infrastructure. There are new technologies coming into the market that enable this type of approach. The result is the ability to implement smart cities faster and more efficiently, with less disruption to city operations. 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 livable.

Area-based development (ABD)	Description
Retrofitting	Identify an area of more than 500 acres and prepare a plan to make it more efficient and livable with citizens' participation (Connaught Place in Delhi, Bhendi Bazar in Mumbai).
Greenfield	Introduce smart solutions in an area of 250 acres by using innovative planning (land pooling/land reconstitution in Outer Delhi, GIFT city in Gujarat)
Redevelopment	Replace existing built-up area (50 acres) and prepare a new layout plan with enhanced infrastructure by way of mixed land use (Kidwai Nagar in Delhi).

Table 3.1 Area-based development

3.9 Strategic Options for Fast Development

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 to 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 substantial contribution to better water management in the city.

- strengthening of public sector roles with regard to the investment into and application of smart technologies
- greater focus on cooperative and more inclusive governance as well as greater influence of urban activism in sustainability issues

Special Purpose Vehicle (SPV) is created for the purpose. Special purpose vehicle will develop a site and, after earning the requisite dividend, will exit the project The SPV will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects. Each smart city will have a SPV which will be headed by a full time CEO and have nominees of Central Government, State Government and ULB on its Board.

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

Universal access to both water and sanitation still remains an issue in urban India. As illustrated, the mere presence of infrastructure is no indicator of service levels. While 40 percent do not have access to public piped water supply, the remaining households may not get a sufficient quantity of water, or regular water supply. In absence of public service, households depend on multiple sources of water procuring water from private players or some form of provisioning. In addition, nearly one-third of urban households do not have any water source within their premises, and nearly a third depend on shared facilities. Water quality is likely to be a concern. At the city level, the biggest concern remains the high distribution losses, and high non-revenue water.

Nearly 10 million urban households do not have access to any form of latrine, and defecate in the open, while another 2 million have access to unimproved sanitation. Any equally pertinent concern is the abysmal record on wastewater conveyance and treatment side. Only one-third of the waste is carried through sewered networks, and only 15 per cent of wastewater is treated. There are minimal facilities for safe sullage/seepage removal, transportation and treatment

Many challenges to achieving urban water security are common across cities:

- Knowledge gaps
- Outdated infrastructure
- Socio-economic stress
- Undervaluing water
- Lack of alternative sources of water
- Excessive emphasis on the supply side
- Ad hoc solutions

- Lack of coordination amongst policy intervention

Ongoing COVID-19 pandemic has brought to the fore the discussion around urban transformation and how our cities can be more liveable. Research and analysis are centred around reducing pollution, safer, cleaner streets, better transportation options, better healthcare and related facilities and perhaps most importantly the need for more open green spaces.

Role of Indigenous Technologies -
The Integrated Urban Water Management (IUWM) approach by GWP India and WAPCOS Limited is a paradigm shift for urban water management. It is not a prescriptive model but a process that invites existing cities and emerging ones to adjust their current planning and management practices, given their own priorities, in a hydrological, environmental and socio-economic context. It is based on the following key concepts. Participation of key stakeholders coming from the public, private and social sectors representing different socio-economic activities that have an interest in water in urban areas. Wastewater is a resource that can be used productively. Grey water can be reused for irrigation, urban agriculture and industrial processes, treated or untreated depending on the purpose of its use and its legislation; nutrients in wastewater (grey and black) can be used for energy production and fertilizer production. Effective water governance with an IUWM perspective encompasses many aspects with the main following key elements: adopting a new mind set, a holistic and cross sectorial approach linking urban water management with overall urban planning; adjusting some of the policy and legislation concerning the use of water and reuse of waste water; analyzing aspects of centralized and decentralized management; assessing the economic and financial impact of adopting an IUWM approach; building the capacity of technical and managerial staff; and sharing information with the public and users.

3.11 Initiatives in village development by local self-government

The goal of rural development is the enrichment of the quality of human life in rural areas accompanied by bridging the rural-urban gap through provision of all amenities. The national policy and programs for a successful rural development task should aim at diversification of economic activities, minimizing the dependence of rural households on agriculture and bringing about a significant increase in the share in both output and employment of allied activities, rural industries, business and service components of the rural economy. Different ministries of the government of India formulate various development schemes not to raise the profit but to maximize the welfare of the people. Some schemes like National Rural Livelihood Mission, MGNREGA, and Bharat Nirman etc. are made by the government for rural development of India

- Mahatma Gandhi National. Rural Employment Guarantee Act 2005
- Pradhan Mantri Awaas Yojana – Gramin
- Mission Antyodaya
- Pradhan Mantri Gram Sadak Yojana
- Shyama Prasad Mukherji Rurban Mission

3.12 Smart Initiatives by District Municipal Corporation

Surat Municipal Corporation (SMC) is selected on the list of 98 smart cities declared by the Government of India for the expansion of Smart Cities Mission. Surat is selected in the first round of selected 20 Smart Cities and has implemented as well as completed the largest number of projects under Smart City Mission. It received an award by Ministry of Housing and Urban Affairs, Government of India for its work in the areas of urban environment, mobility, transport and sustainable integrated development.

Microsoft Citynext Initiative has tied up with Tata Consultancy Services and Wipro so that it can grasp the sustainable growth of the cities in India. The first IT Smart City in India Under this initiative is Surat. Surat Municipal Corporation and Microsoft will together transform Surat into a smart city. Surat Municipal Corporation has also tied up with IBM in order to provide better citizen service with aid of IBM Smarter City program to help them address challenges like waste management, disaster management and citizen services. Surat Municipal Corporation has set a special purpose vehicle (SPV), Surat Smart City Development Limited (SSCDL) for implementing the developing projects. It has completed 53 works worth Rs. 1204 crores within two years out of total 76 projects worth Rs. 2988 crores. Few amongst the various projects launched by SSCDL are as below.

- Integrated Traffic and Mobility Administration Centre

This centre caters various departments which are involved in management of the city traffic such as BRTS, city bus, traffic police, RTO, fire, emergency services, etc. IT applications present with these agencies helps them coordinate with each other and manage traffic operations. SMC also as a transit system for BRTS and city bus that shows real time vehicle location and other required information. Adoptive Traffic Control System (ATCS) in BRTS, and CCTV cameras will extend in all the major locations along with IT-MAC. The centre is assumed to be a single stop source in resolving all the issues.

- Incubation Centre

It proposes to help semi-skilled and skilled job seekers in various trades. The authorities assume that creation of similar infrastructure shall help in promoting the Startup Ecosystem in the City and shall contribute in the Digital India Initiative.

Figure 3.2 Surat smart city center

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

There is no any project either at present or under pipeline contributed working by Government / NGO / Other as part of Digital Country Concept either in Bhavnagar City or District.

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

Inakadate village in Minamitsugaru district (Japan), achieved self-sufficiency through community participation instead of trying to create big-ticket PPP projects. Inakadate village has succeeded in revitalizing its local economy by creating a paddy art mural that is a unique form of landscaping using live crop anywhere in the world, Inakadate's revival for this small village – spread over 22.31 sq. km and the smallest in Aomori prefecture – it was a matter of revitalizing the local economy through their traditional expertise in paddy cultivation. And the impact has seen the village economy booming; the village earned 39 million Yen in 2013 only from entry fee. Village elders recall that like many other villages in Japan, Inakadate too was facing the problem of shrinking agricultural revenues due to the aging population. The only alternate income the village had was from the Neolithic-themed amusement park to showcase its historic roots with paddy cultivation. Today, the villagers use the pointillist painting technique and a computer to map out where to plant stalks so the pictures would have proper proportions when viewed from top. Next, small reed sticks with color markings are planted in the field as an outline sketch. The painting is later completed by planting different varieties of paddy in between. To realize such a complex design only by rice, planting and reaping are always done manually. The villagers use local rice varieties to create the colors. However, the village soon had some cash flowing in through donations by tourists to cover the cost and build the present observation deck on top of the village office. Smart villages should be priority for progress of India- to strengthen rural economies, to knit in local human resources with varied skills and potentials, through appropriate training, into a self-sustaining system in harmony with local ecological conditions. The concept of smart villages should attract people back into the villages, especially from big cities. We can implement the Japanese model of PPP and make our villages self-reliant.

Despite an aging population, particularly the farmers (more than half of them are over 65 years), Japan has not seen large-scale migration to cities, except for big-ticket jobs and higher education. Interestingly, unlike India, where the share of agriculture and allied sectors to the GDP was 13.7 percent in 2012-13, Japan's agriculture sector contributed just 1.4 percent to its GDP. The Japan Agricultural Co-operative (JA) too has been playing an important role providing farm guidance, helping in marketing of farm products, supplies of production inputs, credit and mutual insurance businesses at the prefecture and municipality level.

What India can learn from Japan

- Drive local level development and self-sufficiency through community participation instead of trying to create big-ticket PPP projects.
- Show equal respect to the rights of all individuals, including the disabled and elder citizens. Accessibility for all should be primary criteria for all projects.
- The devil is in the detail and it is important that policy makers, planners and those executing a project consider all aspects – short term, mid-term and long term – in view.
- Create environment, policy and economic framework to incentivize innovation by individuals, society and industry.
- Strategic marketing can help transform rural economy and open new revenue opportunities from allied activities and value-added (e.g., food processing) sector.
- Strengthen Panchayati Raj Institutions and focus on agro tourism to revive rural economy.

- Promote entrepreneurship through industry-academic-government financial partnership, simplified legal framework and funding mechanism to help locals venture into value-added business.
- Replicate the milk federation cooperative model to drive rural and agricultural sector growth.
- Smart villages are as important as smart cities and economic criteria should not be used to decide where to provide basic amenities, which is a right of every citizen.
- Security and technology interventions should be non-intrusive and felt, not seen. Such processes should respect human dignity and an individual's right.
- Language is not a barrier for development and it is important to work in local languages.

3.15 Visit of Selected Smart Village for the Vishwakarma Yojana Project

Figure 3.3: Smart village map

Budhel is a large village located in Bhavnagar Taluka of Bhavnagar district, Gujarat with total 1355 families residing. The Budhel village has population of 7760 of which 3974 are males while 3786 are females as per Population Census 2011.Budhel village has lower literacy rate compared to Gujarat. In 2011, literacy rate of Budhel village was 75.89 % compared to 78.03 % of Gujarat. In Budhel Male literacy stands at 83.98 % while female literacy rate was 67.63 %. Budhel is village situated near National Highway so people here enjoying many commercial benefits there. This village has piped water connection and citizens are having tap water at their houses and they are having adequate water supply for all the activities, village has pucca road and street light system and sanitation is also good there. Viewing economical aspect, it has facilities of banks, ATMs, Post office, market etc and overall education structure is also in good quality. So that is why we can consider this village Budhel as smart village.

Chapter 4
Introduction about Shampara Village

4.1 Introduction

This chapter describes a brief introduction to the study justification, the purpose of this project, approach and study framework indicating the data collection process and the work done. As part of the village segment course field work module, conducting survey of Shampara village located in Gujarat state district of Bhavnagar. Known facilities existing and lacking in the village from the study and data collection and made an attempt to properly develop the village.

4.1.1. About Shampara Village

Shampara village is located in Bhavnagar taluka of Bhavnagar district in Gujarat with total 306 families residing. The Shampara village has population of 1828 of which 957 are males while 871 are females as per population Census 2011.

Particulars	Total	Male	Female
Total No. of houses	306	-	-
Population	1,828	957	871
Child (0-6)	244	142	102
Schedule Caste	13	7	6
Schedule Tribe	0	0	0
Literacy (in %)	77.78	87.73	67.23
Total Workers	942	514	428
Main Worker	805	-	-
Marginal Worker	137	23	114

Table 4.1: Demographic details of Shampara Village

4.1.2. Study justification/ need of the study

The necessity of the study of the village is to identify the facility which are existing and which are lacking in the village and then it can be concluded that which in more useful and needed for the village dweller. Urbanization is a strategy design to approach the infrastructure facility towards the village and provide the basic facility to village dwellers.

Needs of the study:

- To reduce migration rate to the village.
- To increase economic ratio of village to village.
- Implementation of village infrastructure projects
- Redefine the role of government, NGOs and local organizations.

4.1.3 Study Area

Shampara village is located in Bhavnagar Taluka of Bhavnagar district in Gujarat. It is located 10 Km towards from district headquarters Bhavnagar The total geographical area of Shampara village is 315.52 hectares with population of 1828 peoples

4.1.4. Objectives of the study

- Basic Physical Infrastructure should be the priority focus and be provided.
- Basic Social Infrastructure should be provided and ensure proper delivery of facilities to village dwellers.
- Promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.
- Identification of sanitation facilities that need improvement.
- Electricity connections like street lighting that is energy efficient and eco-friendly.
- Refurbishing of village lakes, water tanks and wells, construction of rain water harvesting structures for sustainable Development.
- Development of socio culture facilities like community hall, public library, recreational activities and repairing of existing amenities.
- Repair & maintenance of Existing Infrastructure.
- To reduce migration rate to the village activities and repairing of existing amenities.
- Repair & maintenance of Existing Infrastructure.
- To reduce migration rate to the village.

4.1.5. Scope of the Study

- In Shampara village many people commute from village to other city for job, business, employment etc. From guideline of Vishwakarma Yojana Phase VIII we will study about village and carry out various surveys from village.
- In the village we will conduct techno- economic survey and collect all information from village such as Socio-cultural infrastructure, sustainable infrastructure etc.
- According to survey we will know about their problems, existing condition, requirement of facilities etc. From this we can carry out gap analysis as per census 2011 and also the future action plan to village. From all the information we will try to provide best work for village development as per guideline of smart village development.

4.1.6 Methodology for development of your village

Firstly, we studied what are various objectives and the need of the Vishwakarma Yojana. Then, we completed our Literature Review that includes the basic definitions of rural area, urban area,

Rurbanisation, Sustainable development etc. Gap analysis is done using the collected data and various suggestions made by us on the development of the village and based on this suggestion we will design proposed facilities in the village according to the need and population of the village.

4.1.7 Available Methodology for development of related to Civil/Electrical

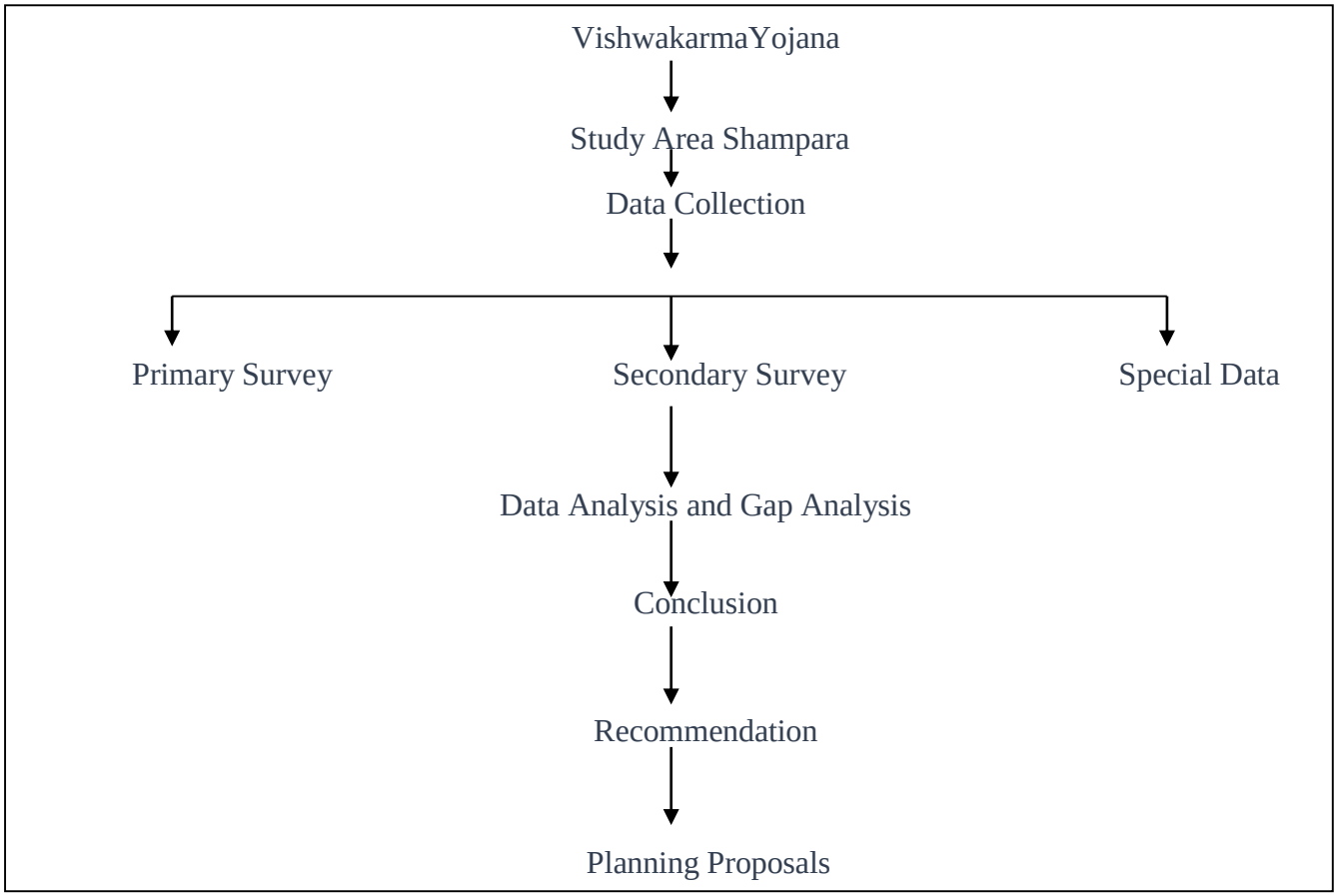

Table 4.2: Methodology of Shampara

4.2. Study Area Profile of Shampara

4.2.1 Study area location

Shampara village is located in Bhavnagar taluka of Bhavnagar district in Gujarat. It is located 10 Km towards from district headquarters Bhavnagar, the total geographical area of Shampara village is 315.52 hectares.

4.2.2 Base Location map, Land Map, Gram Tal Map

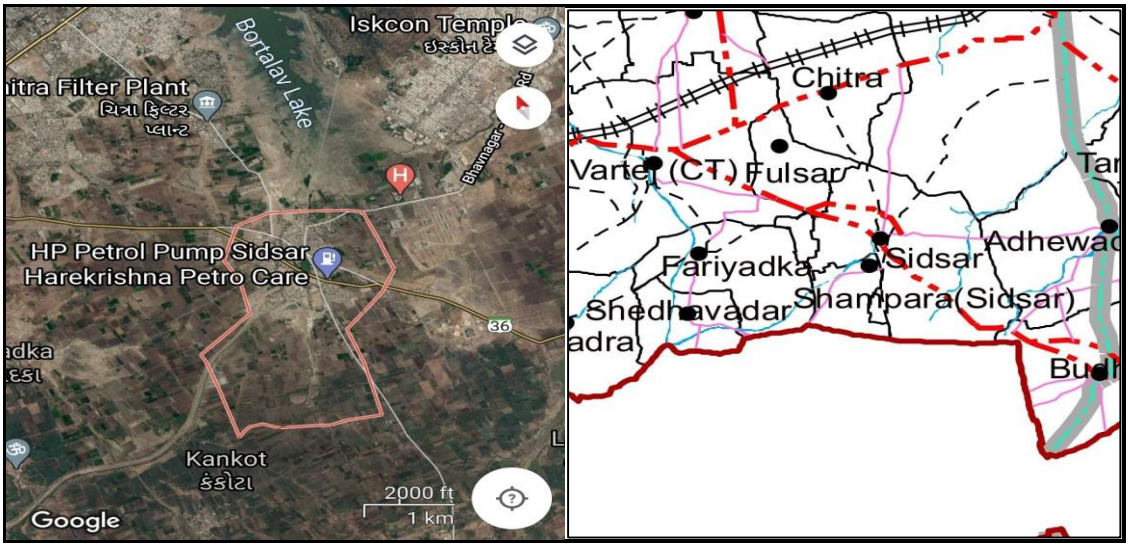

Figure 4.1: Base Location map, Land Map, Gram Tal Map (Shampara)

4.2.3. Physical & Demographical Growth

Shampara is a Village in Bhavnagar Tehsil, Bhavnagar district and Gujarat State. Shampara village's Pin code is 364060. Shampara Village Total population is 1828 and number of houses are 306, Female Population is 48%. Total 1232 people in the village are literate, among them 715 are male and 517 are female. Literacy rate (children under 6 are excluded) of Shampara is 78%. 88% of male and 67% of female population is literate here. Overall literacy rate in the village has increased by 14%. Male literacy has gone up by 9% and female literacy rate has gone up by 17%.Area village is 315.52 hectares.

4.2.4 Economic Profile / Banks

Majority of the population is engaged in agriculture followed by service. Shampara has 52% (942) population engaged in either main or marginal works. 54% male and 49% female population are working population. 51% of total male population is main (full time) workers and 2% are marginal (part time) workers. For women 36% of total female population is working and 13% are marginal workers, there is no bank available at this village right now.

4.2.5 Actual Problem faced by Villagers and smart solution

Villagers are facing problems in many areas like transportation, social development, heath-care, education etc., i.e. there is no community hall present in village as Primary Health Centre is also not available. Street light system is not provided yet in the village, so here in this part 1 we are providing some planning proposals and solutions for village development by using various resources.

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

The village is home to 1828 people, among them 957 (52%) are male and 871 (48%) are female. 99% of the whole population are from general caste, 1% are from schedule caste. Child (aged under 6 years)

population of Shampara(Sidsar) Village is 13%, among them 58% are boys and 42% are girls. Here people of Hindu religion live, so all the major festivals are celebrated. As many people migrated to Surat for jobs they come here every year to enjoy Diwali at their home. Local Kathiawar cuisine is famous here.

4.2.7 Migration Reasons / Trends

There are some reasons behind migration from this village.

- Enough jobs are not available in village in either particular or diversified sectors.
- Due to Diamond industry rise, trend became of migration to Surat for workmanship.
- Agricultural revenue is not sufficient.
- Amenities are not available like healthcare, Higher education and proper job, etc.

These are the major reasons and trends for migration.

4.3. Data Collection Shampara Photograph/Graphs/Charts/Table)

4.3.1. Describe Methods for data collection

In Vishwakarma Yojana we are collecting the data and analyzing it using appropriate method.
The methodology of the total work process as shown below: -

- The whole work is done after detailed study & appropriate guidance in Shampara village.
- All data & analysis are made as per formats & appropriate study methods.
- The whole project is made as per the requirement of Shampara Village.
- In this project, it has been conducted Problem identification, Problem involution, Infrastructure feasibility Study & Design preparation ‘for solving them.

4.3.2. Primary survey details

Shampara village is located in Bhavnagar taluka of Bhavnagar district in Gujarat. It is located 10 Km towards South west from district headquarters Bhavnagar

4.3.3 Average size of the House

In Shampara, approximate ratio of the houses is 70% house Pukka and 30% kutcha and the average bungalow type houses are more preferable to build by the dwellers.

Figure 4.2: Houses of study village

4.3.4 No of human being in one house

There are 306 households in the village and an average 6 persons live in every family.

4.3.5 Material available locally in the village and Material Outsourced by the villagers

Materials like Cement, Marble, Steel Reinforcement, Sand, Aggregate have to be Purchased from outside as there is no material shop in the Village.

Most of the houses have been constructed of RCC frames. There are very few Kuccha Homes madeof Bricks and Stones in the Village. The ratio of kuccha to Pukka House is 30:70.

4.3.6 Geographical Details:

Shampara is at an elevation of 37m above sea level and is located at a distance of 10 km from District Headquarter.

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

The Shampara village has population of 1828 of which 957 are males while 871 are females as per Population Census 2011.Schedule Caste (SC) constitutes 0.71% of total population in Shampara village. The village Shampara currently doesn't have any Schedule Tribe (ST) population.

Most of the people are using AADHAR card for identification processes. Other proofs such as Driving License, Voter ID etc are used.

4.3.8 Occupational Detail – Occupation wise Details / Majority business

Shampara (Sidsar) has 52% (942) population engaged in either main or marginal works. 54% male and 49% female population are working population. 51% of total male population are main (full time) workers and 2% are marginal (part time) workers. For women 36% of total female population is main and 13% are marginal workers

4.3.9 Agricultural Details / Organic Farming / Fishery

Cotton and Groundnut are the main Crops grown in the Village. Hardly one percent of farmers are doing organic farming over conventional and fishery activity is not observed as village is lack of any big water body there.

4.3.10 Physical Infrastructure Facilities – Manufacturing HUB / Ware Houses

There are no large-Scale Manufacturing Industries in the Village. Small scale industries such as diamond polishing exist in the village

4.3.11 Tourism development available in the village for attracting the tourist

There is no major tourist attraction in the village

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking Water

Main source of drinking water Mahi Pariyojna, and also tanks available for storage, tap water facility inducted at most houses.

Figure 4.4: Drinking Water

4.4.2 Drainage Network / Sanitation Facilities

Drainage is available with the closed drainage system.

4.4.3 Transportation & Road Network

Local transport facilities like 3-wheelers, Auto-rickshaw, are available to reach the village. There is no bus stop in the village. The approach road of village is RCC while the internal roads are pucca. There are approximate6 pucca road in village. This village is connected through State highway no.36.

Figure 4.5: Road condition

4.4.4 Housing condition

Both kutchha and pucca houses are there in Shampara village. Approx. ratios of kutcha and pucca houses are 50:50. Housing conditions are needed to be improved. Most of houses have sanitation facilities in the form of bath and toilet. Houses are havingmetered electricity connection.

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

- Primary School
- Panchayat Bhavan
- Anganwadi

Health Facilities

- Primary health centre is not available here.

Education Facilities

- Two primary schools and one secondary school are available in the Shampara village which is sufficient for whole village population. One anganwadi is available in Shampara village. ITI College is not available in village because there is less number of people doing higher studies

Community Hall: In Shampara, community hall is not available.

Library: There is no library available at village.

Figure 4.6: School Building

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

Existing condition of the buildings at village are good and well maintained as most of them are newly constructed like Grampanchayat building and Model School.

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

Most of the adults use mobile phones. There are no WiFi towers in the village. Clear information

regarding internet usage is not available. There are no Cyber Café in the Village. Gram Panchayat building is having WiFi connection.

4.4.8 Sports Activity as Gram Panchayat

No such activities are done in the village

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

The assembly polling is done at School and Panchayat Office. Birth and Death Records are kept in Gram Panchayat itself. There is no Community Hall in the Village.

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

No such facilities are available

4.4.11 any other details

There is a small water body available in the centre of village, which is mostly used for cattle / animal usage. This village is known for communal harmony.

4.5 Electrical Concept

4.5.1 Renewable energy source planning particularly for villages

Currently there is no planning.

4.5.2 Irrigation Facilities

Adequate irrigation to farmers.

4.5.3 Electricity Facilities with Area

Supply more than 6 hours

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 Bachat Mandali

Bachat Mandali is a kind of organization in which villagers invest their money.Bachat Mandali provides facilities almost similar to bank.Villagers can invest their money in Bachat Mandali and withdraw whenever they want.

4.6.2 Dudh Mandali

Dudh Mandali in a kind of organization in village's people all milk is collect in the village andafter its distributed various milk refinery Dudh mandali is available in this village.

4.6.3 Mahila forum

Mahila Mandalas are voluntary service organizations which work for the betterment of the women in the villages of India.

4.6.4 Plantation for the Air Pollution

This village has normal compositions of external air by volume and approximately as follows: Nitrogen 78.1%, Oxygen 20.94% and Carbon dioxide 0.06%. Forestation was made near school by forest department.

4.6.5 Rain Water Harvesting - Waste Water Recycling

No Rainwater harvesting system available of Shampara village.

4.6.6 Agricultural Development

Understanding agricultural and rural development can create jobs and livelihoods for small farmers and the landless, whiles producing food and raw materials for the urban economy by Shampara village is also good option.

Chapter 5
Sustainable Technical Options with case studies of the Existing Village

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

1. Greener Asphalt
2. Construction-Site Robots
3. Virtual Reality (VR) in Preconstruction
4. Augmented Reality (AR)
5. Self-Healing Concrete
6. Solar Roadways and Smart Highway

1. Greener Asphalt

Green asphalt, or recycled asphalt, is taken from destroyed or unrepairable asphalt and repurposed as a form of useable asphalt. Some asphalt companies have developed methods for breaking down and refining used asphalt and reusing it to pave roads, driveways and more. Construction robots are automated machines that assist in construction. Although the fear of the robots taking over jobs is understandable, it's more like they are upgrading jobs rather than stealing them. Increasing automation in the construction industry is expected to displace or replace as much as 49 percent of the America's blue-collar construction workforce (2.7 million workers) and eliminate nearly 500,000 non-construction jobs by 2057, according to the MEPI study.

2. Construction-Site Robots

Until recently, construction was one of the least digitized and automated industries in the world. Many projects could be completed more efficiently with the help of the right construction robotics, mainly because the related tasks are incredibly repetitive.

While manual labor will likely always be a huge component of modern construction, technology has been steadily improving since the first pulleys and power tools. Robots, drones, autonomous vehicles, 3D printing, and exoskeletons are beginning to help get the work done. Robots excel at repetitive tasks in a controlled environment. Construction sites could not be more opposite. Robots need to be able to adapt to real-time variability in their environment with little to no reprogramming in order to be profitable and productive. This is difficult for robots to do, but a few different construction robots are taking on these historically challenging tasks.

Types of Construction Robots

There are a few different types of construction robots that are poised to break into the construction market at a mass scale. First is a 3D-printing robot that can build large buildings on demand. A mobile robotic arm controls a 3D-printer, and with a set of preprogrammed instructions, this system 3D prints an entire structurally-safe building. This technology is also beginning to be used for building bridges, with the first ever 3D printed bridge recently being built in the Netherlands. This combination of 3D printing and industrial robots is some of the most promising automation technology in the construction

industry. There are also construction robots for brick-laying and masonry, and even robots that lay an entire street at one time. These types of robots dramatically improve the speed and quality of construction work.

Demolition robots are another type of construction robot that's about to break into mainstream applications. While they're slower than demolition crews, they're far safer and cheaper when it comes to demolishing concrete and structural components of a building at the end of its lifecycle.
There are several other types of construction robots, such as remote controlled or autonomous vehicles, but the few mentioned above are the most prepared to function in a current construction site and may be the most impactful.

As a highly unautomated industry, construction robots will have a major impact on the construction industry. As construction companies look to automate more and more tasks for the sake of efficiency and productivity, demand for construction robots will grow steadily.

Site robots

3. Virtual Reality (VR) in Preconstruction

Now VR allows you to actually enter the space, walk through and inspect every detail, before construction has even begun. Given good data and the proper modelling system, construction companies can offer fully immersive virtual models of a project at any stage.
While VR was developed predominantly for the gaming and entertainment industries, it has started to be used in the construction sector. Primarily this takes the form of simulating a building, structure or space in which users can immerse themselves prior to it being constructed in reality. This enables designers and other construction professionals to test ideas, components and features before committing them for construction. It can also help identify potential conflicts or problems before construction work has started and alterations become more costly.
In addition, VR can be used to simulate workspaces for the purposes of providing training and health and safety guidance. By exploring, gaining familiarity with, and practising in, a simulated environment, knowledge and skills can be gained without any of the real-world consequences.
VR can also greatly benefit the client by being able to experience the project in a virtual realm, enabling them to review the design and decide whether it meets their requirements. Small details can be picked up on that might be overlooked in a traditional computer-aided design (CAD) model or with building information modelling (BIM).

4. Augmented Reality (AR)

AR for Design Analysis
Augmented reality has a wealth of design and construction uses beyond visualization, too. It can be used for design analysis to pick out clashes by virtually walking through your completed model. It fits the bill for constructability review by letting the architect and contractor collaborate on changes that have to happen between design and construction due to constructability issues. It can even assist with prefabrication of building components.

5. Self-Healing Concrete

Self-healing concrete is mostly defined as the ability of concrete to repair its cracks autogenously or autonomously. It is also called self-repairing concrete. Cracks in concrete are a common phenomenon due to its relatively low tensile strength. Durability of concrete is impaired by these cracks since they provide an easy path for the transportation of liquids and gases that potentially contain harmful substances. If microcracks grow and reach the reinforcement, not only the concrete itself may be attacked, but also the reinforcement steel bars will be corroded. Therefore, it is important to control the crack width and to heal the cracks as soon as possible. Self-healing of cracks in concrete would contribute to a longer service life of concrete structures and would make the material not only more durable but also more sustainable

6. Solar Roadways and Smart Highway

Solar roadways are modular systems of carefully-engineered solar panels where people can walk over and automobiles can run through. The panels used for solar roadways are designed with LED lights that produce light used as signage.
One of the best things about solar roadway is its ability to prevent snow and ice accumulation on roads. Solar roadways are made of tempered glass that can support even the weight of a semi-truck. While many are surprised to learn that these solar roadways are made of glass, it has a tractioned surface that is equivalent to asphalt.
The goal of solar roadways is to modernize one infrastructure at a time with modular, intelligent and specially engineered solar panels. In consonance to this, solar panels can help produce clean and renewable energy for homes, businesses, and other entities.
With this innovation, roads can be safer and more convenient to use especially during winter. These solar roadways are designed with microprocessors that allow them to provide the safety and convenience of motorists. If solar energy can fuel up automobiles, why not provide suitable solar energy for roads.

5.1.2 Soil Liquefaction

The phenomenon is most often observed in saturated, loose (low density or uncompacted), sandy soils. This is because loose sand has a tendency to compress, when a load is applied. Dense sands, by contrast, tend to expand in volume or dilate. If the soil is saturated by water, a condition that often exists when the soil is below the water table or sea level, then water fills the gaps between soil grains (pore spaces). In response to soil compressing, the pore water pressure increases and the water attempts to flow out from the soil to zones of low pressure (usually upward towards the ground earthquake shaking, storm wave loading) such that the water does not flow out before the next cycle of load is applied, the water pressures may build to the extent that it exceeds the force (contact stresses) between the grains of soil that keep them in contact.

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

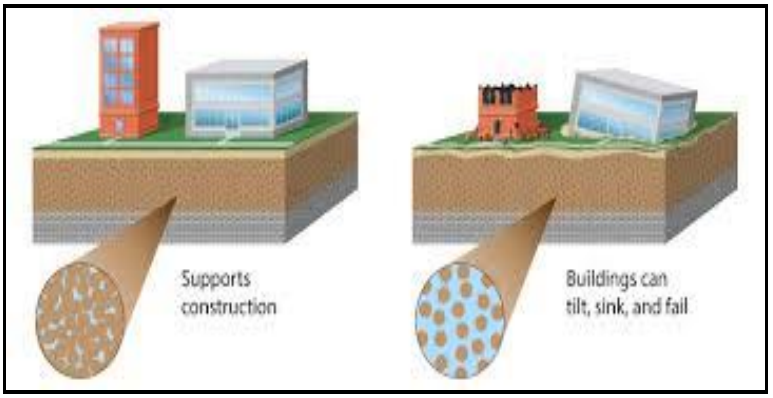

Figure 5.1 Soil Liquefaction

These contacts between grains are the means by which the weight from buildings and overlying soil layers is transferred from the ground surface to layers of soil or rock at greater depths. This loss of soil structure causes it to lose its strength (the ability to transfer shear stress), and it may be observed to flow like a liquid (hence liquefaction).

Soil liquefaction occurs when the effective stress (shear strength) of soil is reduced to essentially zero. This may be initiated by either monotonic loading (i.e. a single, sudden occurrence of a change in stress – examples include an increase in load on an embankment or sudden loss of toe support) or cyclic loading (i.e. repeated changes in stress condition – examples include wave loading or earthquake shaking). In both cases a soil in a saturated loose state, and one which may generate significant pore water pressure on a change in load are the most likely to liquefy. This is because loose soil has the tendency to compress when sheared, generating large excess pore water pressure as load is transferred from the soil skeleton to adjacent pore water during undrained loading. As pore water pressure rises, a progressive loss of strength of the soil occurs as effective stress is reduced. Liquefaction is more likely to occur in sandy or non-plastic silty soils, but may in rare cases occur in gravels and clays

Although the effects of soil liquefaction have been long understood, engineers took more notice after the 1964 Niigata earthquake and 1964 Alaska earthquake. It was a major factor in the destruction in San Francisco's Marina District during the 1989 Loma Prieta earthquake, and in Port of Kobe during the 1995 Great Hanshin earthquake. More recently soil liquefaction was largely responsible for extensive damage to residential properties in the eastern suburbs and satellite townships of Christchurch, New Zealand during the 2010 Canterbury earthquake and more extensively again following the Christchurch earthquakes that followed in early and mid-2011. On 28 September 2018, an earthquake of 7.5 magnitude hit the Central Sulawesi province of Indonesia. Resulting soil liquefaction buried the suburb of Balaroa and Petobo village in 3 meters deep mud. The government of

Indonesia is considering designating the two neighborhoods of Balaroa and Petobo that have been totally buried under mud, as mass graves.
The building codes in many countries require engineers to consider the effects of soil liquefaction in the design of new buildings and infrastructure such as bridges, embankment dams and retaining structures

Figure 5.2 Soil liquefaction example

5.1.3 Sustainable Sanitation

Sustainable sanitation is a simple approach: the most basic principle is that it considers wastewater and excreta not as a waste, but as a resource, that sanitation has to be socially acceptable and should be as economically viable as possible. There is no "one-fits-all" approach, much rather, the most adequate solution has to be found from case to case, considering climatic conditions, water availability, agricultural practices, socio-cultural preferences, affordability, safety, and technical prerequisites. Most sanitation systems have been designed with these aspects in mind, but they fail far too often because some of the criteria are not met. In fact, there is probably no system which is absolutely sustainable. The concept of sustainability is more of a direction than a state to reach. Nevertheless, it is crucial that sanitation systems are evaluated carefully with regard to all dimensions of sustainability. Since appropriateness to the context is such a core criterion for sustainable sanitation, there is no one-size-fits-all sanitation solution. However, taking into consideration the entire range of sustainability dimensions, it is important to observe some basic principles when planning and implementing a sanitation system.

Case study of the Existing Village: Jambudiyapura Village,Vadodara Gujarat

"Sustainable sanitation"

Community: Rural tribal village
Population: Approx. 250 people
Challenges: Low water usage and low cost sustainability
Solution: Public outreach and Clearford One sanitation solution with household toilets and bathrooms, and a low maintenance treatment facility
Cost- The project includes large scale behavior change and treatment of all black as well as gray water. The Clearford One system will improve public health and the quality of life for residents. Project is valued at **13,950,000 INR (approximately $270,000 CAD).**

A small agricultural community is the first open-defecation free (ODF) tribal village in Gujarat State thanks to corporate social responsibility (CSR) funding for an affordable wastewater technology and public sanitation outreach. A new communal wastewater system with private toilets and bathrooms were successfully delivered along with public outreach programming to enable residents to achieve public health objectives and environmental stewardship in their community. The public sanitation project was carefully planned and implemented within a strict budget through the CSR department of Infrastructure Leasing & Financial Services Limited (IL&FS), one of India's leading infrastructure development and finance companies. An output-based aid (OBA) model was selected that transfers the performance risk to the solution providers, thereby offering a new tool in the effort to sustainably end open defecation in India.

Background:

Gujarat Road & Infrastructure Co. Ltd (GRICL), a special purpose vehicle of IL&FS, has adopted a number of tribal villages along their toll road between Vadodara and Halol in Gujarat State as part of their CSR program. Under this initiative and with support from the Gujarat Government, the village of Jambudiyapura was designated as a model site for the creation of the first ODF village in Gujarat. Jambudiyapura is an agricultural tribal village having a population of 250-300 people with 56 homes, a school and an Anganwadi (child healthcare centre). The main sources of income in the village are agriculture and manual labour. While there is water supply to the homes from a communal water tower and distribution network, only ten family homes had toilets while the majority of residents practised open defecation in the fields around the village. Most homes had outdoor bathing areas with cloth screens for privacy. The practice of open defecation poses a clear public health concern and, especially for women, a threat to personal safety and dignity. The ponding of greywater from bathing areas and household washing activities also presented a health risk to residents of waterborne disease and illness, a problem exacerbated by flooding during the monsoon season. Hence, there was a need for a low-cost sanitation solution with private toilets and bathrooms, as well as sustainable wastewater collection and treatment.

The goal of the CSR initiative was to use the principles of OBA to transform sanitation practices in the village away from open defecation towards a locally sustainable model that improves the long-term health of residents. A study by Research Institute for Compassionate Economics found that "widespread open defecation in rural India is [attributable] to beliefs, values, and norms about purity, pollution, caste, and untouchability…." (Coffey et al. 2017) For this project, an interesting observation that came out of interviews with the villagers was that two groups of people were most opposed to stopping open defecation—older men habituated to using the outdoors and, more unexpectedly, young girls aged 12-16 who valued going in groups as an opportunity to socialize and get out of the house. These viewpoints were addressed by talking directly to individuals and explaining the benefits of moving away from open defecation practices in terms of social status, health and hygiene.

Challenges:
The challenges of providing improved sanitation and sustainable wastewater servicing in rural India are complex and well documented. There is a critical need for solutions that provide a low life cycle cost of building and maintaining sanitary infrastructure, while also providing reliable performance under different operating conditions than are typically encountered in developed communities

Low water usage:
The community has limited water supply resulting in low water usage of only 70 litres/person/day (compared to 200-450 in North America). This poses a significant concern because conventional sewers rely on the flow of water to carry sewage solids through gravity pipes. When less water is being used, more solids accumulate in the pipe network leading to blockages that can cause sewer backups. Other technical challenges for the project included: • Black cotton soils and saturated ground, • Sewer alignment constraints from existing development, • Limited power supply for pumping and mechanical treatment operations

Solution:
A clearford one system was designed with four components to meet the project objectives while overcoming the technical and social challenges related to implementation of the new system. Private bathrooms bathroom facilities were constructed in the backyard of each home to provide safe, private access to a toilet, shower and washing area. Each bathroom was constructed of durable materials and equipped with lighting and plumbing, including a rooftop water tank to store clean water for daily use. The challenges associated with bathroom design and their acceptance by residents are described in the sidebar below

INTERCEPTOR TANKS
ClearDigest tanks were built next to each bathroom to capture sewage solids before releasing the liquid effluent to the sewer network. The tanks were constructed in place from bricks and cement with a working volume of 2000 litres each. Wastewater is pretreated by digesting the organic pollutants and trapping the inorganic solids.

SMALL BORE SEWERS
Clear Convey small diameter gravity sewers were installed to collect effluent wastewater from the interceptor tanks. Flexible high density polyethylene (HDPE) pipe was installed in shallow cut-and-cover trenches to accommodate the irregular sewer alignment through the backyards. Small cleanouts were provided throughout the sewer network instead of large manhole structures. Thermal fusion of pipe and fitting joints ensures zero infiltration of groundwater and no contamination of soils through leaky joints in the sewer network.

TREATMENT FACILITY
Clear Recover treatment is provided at a treatment facility supplied by Vision Earthcare Pvt. Ltd using the CAMUS-SBT soil biotechnology that was developed by the Indian Institute of Technology Mumbai. A small pumping station is required to lift wastewater from the buried sewer network to an aboveground vertical structure. The facility was built in place and filled with selected soil media and plantings that achieve the treated effluent standards set by the Ministry of Environment and Forest and Central Public Health and Environmental Engineering Organisation (CPHEEO). Recovered water is safely returned to the environment for reuse for agricultural irrigation, particularly in the dry summer months.

The new sanitary infrastructure is designed for minimal maintenance. The interceptor tanks do not require electricity or additives. The removal of solids, oils and grease in the tanks protects the small bore sewers from blockages, so that practically no maintenance is required. Meanwhile, anaerobic digestion in the tanks minimizes sludge production, thereby requiring only infrequent pump-out compared to alternative systems such as septic tanks.

TOWARDS SUSTAINABLE SANITATION
Although long-term success of the project remains to be confirmed, the positive response and involvement of the community are clear steps towards achieving sustainable sanitation and public health in the village. The experience in Jambudiyapura offers an appealing model for output-based CSR funding of projects in rural India through community engagement, careful selection of technologies, and thoughtful project planning and implementation.

5.1.4 Transport Infrastructure / system

Five Major Modes of Transportation

1. Road transport
2. Railway transport
3. Water transport
4. Air transport
5. Pipeline transport

Different modes of transport (types of transportation)

Road transport -
Road transport exists in all parts of the world, this involves the use of motor vehicles (cars, lorries, buses, bicycles, and trucks). There are various types of roads according to size and functions, some roads are tarred while others are not. The best of these roads are the modern roads which link major towns. Road transport, when compared with other modes of transportation, is more flexible. It is relatively cheaper and faster. Road transport has a high capacity for carrying goods over short distances. Maintenance is one of the major disadvantages of this mode of transport.

Railway transport -
Railways were developed during the period of the industrial revolution in the 19th century, these were partly for political reasons and for economic reasons. In many countries, they were built especially to penetrate isolated regions and help promote political unity. The major advantage of railway transport includes the provision of reliable services. It has the ability to convey heavy and bulky goods; it is also very cheap, safe, and also comfortable for passengers over a long distance.

Water transport-
Water transport is very important because it is the cheapest way of transporting bulky goods over a long distance. In the world, there are two major types of water transport namely: Inland water transport and ocean water transport.

Inland water transport-

This is the system of transport through all navigable rivers, lakes, and man-made canals. Many large rivers in different parts of the world are used by ships and barges for transportation; the main rivers where inland water transport is important are the Rhine and Dambe in Europe, Zaire in Africa, the Nile in Africa, the Mississippi in the USA, etc.

Ocean Waterways –

However, Ocean waterways carry a lot of the world's trade, the majority of the bulky goods, materials, and passengers pass through ocean waterways from one country to another at the cheapest cost.

Air transport-
Air transport is the newest means of transport; it was introduced in 1903 but developed into full means of transporting people and goods in the 1930s. The greatest air transportation started after the Second World War (WWII). This mode of transportation can be used for both domestic and international flights.

Pipeline transport-
This system of transportation involves the use of hollow pipes in the transportation of water, crude oil, (petroleum) and gas. This mode of transportation is safer than using tankers or trailers in the transportation of these liquids.

Other modes of transportation

- Animal-powered transport: which is mostly referred to as a beast of burden. It is the oldest means of transportation; this usually involves the use of animals for the transportation of people and goods. Humans may ride some of the higher animals directly, or harness them. Examples of such animals used for transporting humans and goods include camel, horse, donkey, elephant, and giraffe.

- Human-powered transport: this is another form of transport, which includes people, goods or both transported from one place to another using human muscle-power, in the form of walking, running and swimming. Modern technology has allowed machines to take over human power. Human-powered transport remains popular for reasons of cost-saving, physical exercise, leisure, and environmentalism; it is sometimes the only type available, especially in underdeveloped or inaccessible regions.

- Spaceflight: is a means of transport that moves out of Earth's atmosphere into outer space by means of a spacecraft. While large amounts of research have gone into technology, it is not commonly used except to put satellites into orbit and conduct scientific experiments.
- Cable transport: cable transport is a broad class of transport modes that have cables as the foundation for transporting goods or people, often in vehicles called cable cars. The cable may be driven or passive; items may be moved by pulling, sailing, sliding, or by drives within the object being moved on cableways, this is another means of transport used in the mountain. The use of pulleys and balancing of loads going up and down are common elements of cable transport.

5.1.5 Vertical Farming

Vertical farming is the practice of growing crops in vertically stacked layers. It often incorporates controlled-environment agriculture, which aims to optimize plant growth, and soilless farming techniques such as hydroponics, aquaponics, and aeroponics. Some common choices of structures to house vertical farming systems include buildings, shipping containers, tunnels, and abandoned mine shafts.

Figure 5.3 Vertical Farming

Background & Concept of Vertical Farming

In 1915, Gilbert Ellis Bailey coined the term "vertical farming" and wrote a book titled "Vertical Farming". In the early 1930s, William Frederick Gerick pioneered hydroponics at the University of California at Berkley. In the 1980s, Ake Olsson, a Swedish ecological farmer, invented a spiral-shaped rail system for growing plants and suggested vertical farming as a means for producing vegetables in cities. Crops are grown indoors, under artificial conditions of light and temperature. It aims at higher productivity in smaller spaces. It uses soil-less methods such as hydroponics, aquaponics and aeroponics. Vertical farming uses significantly less water and pesticides than traditional agricultural methods. Being indoors, the crops aren't subject to seasons and hence give high productivity year-round. Lettuces, tomatoes and green crops can be produced through this practice.

The modern concept of vertical farming was proposed in 1999 by Professor Dickson Despommier. His concept was to grow the food in urban areas itself utilizing less distance and saving the time in bringing the food produced in rural areas to the cities.He intended in growing food within urban environments and thus have fresher foods available faster and at lower costs. Consequently, Vertical farming is conceptualised as cultivating and producing crops/ plants in vertically stacked layers and vertically inclined surfaces. In the physical layout, the plants are vertically stacked in a tower-like structure. This way, the area required to grow plants in minimised. Next, a combination of natural lights and artificial lights is used to maintain a perfect environment for an efficient growth of the plants. The third parameter is the growing medium for the plants. Instead of soil, aeroponic, hydroponic or aquaponic growing mediums are used as the growing medium.

As the technique becomes scientific, efficiency of the process increases and as a result, vertical farming becomes sustainable requiring 95% less water as compared to other farming methods.

Techniques of Vertical Farming

1. Hydroponics

It is a method of growing food in water using mineral nutrient solutions without soil. The basic advantages of this method is that it reduces soil-related cultivation problems like soil borne insects, pest and diseases.

2. Aeroponics

The invention of aeroponics was motivated by the initiative of NASA (the National Aeronautical and Space Administration, USA) to find an efficient way to grow plants in space in the 1990s.

In aeroponics, there is no growing medium and hence, no containers for growing crops. In aeroponics,

mist or nutrient solutions are used instead of water. As the plants are tied to a support and roots are sprayed with nutrient solution, it requires very less space, very less water and no soil.

3. Aquaponics
The term aquaponics is coined by combining two words: aquaculture, which refers to fish farming, and hydroponics—the technique of growing plants without soil, to create symbiotic relationships between the plants and the fish.
The symbiosis is achieved as nutrient-rich waste from fish tanks serves as "fertigate" to hydroponic production beds. In turn, the hydroponic beds also function as bio-filters that remove gases, acids, and chemicals, such as ammonia, nitrates, and phosphates, from the water. Additionally, the gravel beds provide habitats for nitrifying bacteria, which augment the nutrient cycling and filter water. Consequently, the freshly cleansed water can be recirculated into the fish tanks.

Advantages of Vertical Farming

Vertical Farming has several advantages, which makes it promising for the future of agriculture. The land requirement is quite low, water consumption is 80 percent less, the water is recycled and saved, it is pesticide-free and in cases of high-tech farms there is no real dependency on the weather.
A vertical farm makes farming within the confines of a city, a reality. And when the farms are nearby, the produce is quickly delivered and always fresh; when compared to the refrigerated produce usually available at supermarkets. Reduction in transportation reduces the fossil fuel cost & resulting emissions and thus also reduce the spoilage in transportation.
However, like everything else vertical farming has its own drawbacks. Initial capital costs for establishing the vertical farming system is the major problem. In addition there are costs of erecting the structures along with its automation like computerized and monitoring systems, remote control systems and software's, automated racking and stacking systems, programmable LED lighting systems, climate control system, etc.

5.1.6 Corrosion Mechanism, Prevention and Repair measures of RCC Structure

Corrosion Mechanism, Prevention & Repair Measures of RCC Structure Though concrete is quite strong mechanic allies, its highly susceptible too chemical attack and structure gets damage and even fail unless some preventive measures are adopted to counteract this and thereby increasing the durability of structure. In the case of Reinforced concrete structure the ingress of moisture and air may lead to corrosion of steels, cracking and spelling of concrete covers there are reducing durability of concrete structure. Repair suggested as the protective solution for damaged structure due to corrosion.

Corrosion mechanism Ways to Prevent Corrosion of Metal Parts 1. Protective Coating Coatings can provide a layer of protection against corrosion by acting as a physical barrier between the metal parts and oxidizing elements in the environment. One common method is galvanization, in which manufacturers coat the part with a thin layer of zinc. Powder coatings are another effective way to prevent corrosion in metal parts. With proper application, a powder coating can seal the surface of the part away from the environment to guard against corrosion. 2. Environmental Control Many environmental factors impact the likelihood of corrosion. It helps to keep metal parts in a clean, dry place when not in use. If you intend to store them for a long time, consider using methods to control the level of sulfur, chloride, or oxygen in the surrounding environment. Galvanic corrosion occurs when

metal parts with two different electrode potentials are in contact along with an electrolyte like saltwater. This causes the metal with higher electrode activity to corrode at the point of contact. One can prevent galvanic corrosion by storing these parts separately. This effect can also work as an anti-corrosion measure, as explained below. 3. Cayhodic Protection It is possible to prevent corrosion by applying an opposing electrical current to the metal's surface. One method of cathodic protection is an impressed current, using an outside course of electrical current to overpower a corrosive current in the part

A less-complex method of cathodic corrosion protection is the use of a sacrificial anode. This involves attaching a small, reactive metal to the part you wish to protect. Metal ions will flow from the reactive metal to the less active part, reducing corrosion at the expense of the smaller piece. 4. Miantenance Protective coatings, environmental control, and cathodic protection are effective ways of preventing corrosion in metal parts. However, these measures are nothing without ongoing maintenance and monitoring. Coatings can wear over time; even small nicks and scratches can lead to corrosion. Be sure to keep parts clean and apply additional protection as necessary. Repair Measures of RCC Structure the Repair and Rehabilitation of structures include the following

- Inspection methods, assessment, monitoring, maintenance of structures.
- Concrete durability, fatigue issues in bridges, laboratory studies, dynamic testing & analysis
- Seismic strengthening
- General repairs repair and rehabilitation of r.c.c. structures Structure repair and rehabilitating is a process whereby an existing structure is enhanced to increase the probability that the structure will survive for a long period of time and also against earthquake forces.

This can be accomplished through the addition of new structural elements, the strengthening of existing structural elements, and/or the addition of base isolators. Deterioration of concrete and corrosion of embedded reinforcement structure might make the R.C.0 structure structurally deficient. Corrosion can be controlled to some extent by fixing of chloride or protective coating (Powder coatings based on thermosetting epoxy, polyester or acrylic technology, are electro statically sprayed.) or cathodic protection. Once this has happened, two alternatives of fixing the problem are to replace the structure or to strengthen it. Economically, repair and strengthening are often the only viable solution.

Surface preparation and interfacial bond for application of patch repairs, sealers and coatings in concrete repair

The main purpose of surface preparation is to provide maximum coating adhesion and to increase the surface area by increasing the roughness of the surface. Achieving an adequate lasting bond between repair materials and existing concrete is a critical requirement for durable concrete repair. Good surface preparation using proper concrete removal methods and workmanship is the key element in a long-lasting concrete repair technique.

Conventional strengthening methods

Grouting Process : - Grouting is the process of placing a material into cavities in concrete or masonry structures for the purpose increasing the load bearing capacity of a structure, restoring the monolithic nature of a structural member, filling voids around pre cast connections and steel base plates, providing fire stops, stopping leakages, placing adhesive and soil stabilization. Primary grouting materials and their common uses are: Methods of application normally used include: hand pumps, piston pumps, single and plural component pumps, gravity and dry packing placement, micro capsules and single component pressurized cartons. 4.2 Guniting Process: - Guniting is an effective technique, which has been extensively used in the rehabilitation of structurally distressed RC members. There have been

cases of heavy rusting of the mesh in the form of powder or in the form of a sheet coming out. De-stressing before restoration is possible only in the case of overhead tanks which can be restored when the tanks are empty.

Application of epoxy resins to strengthen the structural member with external reinforcement

In these methods of strengthening, an epoxy adhesive normally consisting of two components - a resin and a hardener is used to bond steel plates to overstressed regions of RC members.
Normally, the steel plates are located in the tension zone of concrete to enhance the flexural capacity. The plates can also be placed in the compression and shear regions for enhancing the axial and shear-capacities of the RC structural elements. As the adhesive provides a continuous shear connection between the RC member and the external plates, a concrete adhesive-steel composite structural member is developed to cater for the additional live load effects on the structures.

- Section Enlargement/jacketing: - n this method the entire height of the column section is increased and a cage of additional main reinforcement bars with shear stirrups is provided right from the foundation as per the requirement of additional load, etc. However, there are many instances where the column section is increased with additional reinforcement bars only on one face, and that too starting from the floor slab level of a particular floor and only up to the height of deterioration of the column. The enlargement should be bonded to the existing concrete to produce a monolithic member a composite system, Cement mortar is used for these enlargements.

- Post tensioning: - External prestressing is now widely developed for concrete strengthening in the United States, Japan, and Switzerland. External prestressing techniques have been employed with great success to correct excessive and undesirable deflections in existing structures. They have also been used to strengthen existing concrete structures to carry additional loads. Prestressing may be used on tile inside of box girders or the outside of I girders to increase the capacity of existing bridges and to provide improved resistance to fatigue and cracking. The following are the advantages of external prestressing.

- Simple Construction Methods: - Simple strand or tendon profile resulting in simple construction on tile site. Few or no problems with tendon grouting. Possibility of inspection during the lifetime of the structure with x-ray or other nondestructive detection techniques. Irreplaceability of strands and tendons. The disadvantages of external prestressing are those which arise from it location outside the structure.

MATERIALS USED IN REPAIRS

- Polymer modified concrete/cement mortar.
- Fiber-Reinforced Plastics
- Epoxy resins
- Polymer-based materials.
- High performance cement.
- Fiber reinforced polymer tubes for pile/column.
- Epoxide resin latex and polymer-based latex.
- Fiber-reinforced polymer

5.1.7 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. Sewage treatment may also be referred to as wastewater treatment.

Essentially, a sewage treatment plant operates by circulating air to encourage the growth of bacteria to break down sewage. The goal being to deliver much cleaner, more environmentally friendly effluent. It involves a similar process to a typical septic tank but has some key differences. Sewage treatment plants, depending on their size, can treat the waste of commercial properties or a number of domestic dwellings.

The general construction of a sewage treatment plant doesn't differ too drastically from that of a septic tank. Just as with a septic tank, sewage flows from the property being serviced into the first chamber of the sewage treatment plant. Here, the water sits until grease, oil and scum have floated to the top and solids have settled on the bottom of the tank. Once the process of separation has taken place, the liquid travels into a second chamber which is where sewage treatment plants differ from septic tanks. This chamber is fitted with an air pump that circulates air around the chamber to encourage the growth of aerobic bacteria. This bacteria helps to break down the contaminants in the water, effectively cleaning it. The final stage of a sewage treatment plant is one last settlement tank. This final tank allows the very last solids that may remain to sink to the bottom of the tank before the effluent is discharged into a soakaway or watercourse. Once the treatment process has been completed and the wastewater has been treated as thoroughly as possible, it can be discharged into the environment. This is another key area where sewage treatment plants differ from sewage treatment plants. Whereas you must discharge effluent from a septic tank into a soakaway for further treatment in the ground, subject to an Environment Agency Consent to Discharge, you can discharge your effluent into local water sources straight from your treatment plant. This is because of the vastly improved effluent quality that the treatment process produces.

Sewage treatment plant processes fall into two basic types:

Anaerobic Sewage Treatment
Sewage is partly decomposed by anerobic bacteria in a tank without the introduction of air, containing oxygen. This leads to a reduction of Organic Matter into Methane, Hydrogen Sulphide, and Carbon Dioxide etc. It is widely used to treat wastewater sludge and organic waste because it provides volume and mass reduction of the input material to a large extent. The methane produced by large-scale municipal anerobic sludge treatment is currently being examined for use in homes and industry, for heating purposes. Septic tanks are an example of an anerobic process, but the amount of methane produced by a septic tank (it is only the SLUDGE at the bottom that produces methane) serving less than 100 people is miniscule. In addition to this, septic tank effluent still contains about 70% of the original pollutants and the process smells very badly, due to the Hydrogen Sulphide, if not vented correctly. The effluent produced by this process is highly polluting and cannot be discharged to any watercourse. It must be discharged into the Aerobic layer of the soil (within the top metre of the ground) for the aerobic soil bacteria to continue the sewage treatment via the aerobic process below.

Aerobic Sewage Treatment

In this process, aerobic bacteria digest the pollutants. To establish an aerobic bacterial colony you must provide air for the bacteria to breathe. In a sewage treatment plant, air is continuously supplied to the Biozone either by direct Surface Aeration using Impellers propelled by pumps which whisk the surface of the liquid with air, or by Submerged Diffused Aeration using blowers for air supply through bubble diffusers at the bottom of the tank. Aerobic conditions lead to an aerobic bacterial colony being established. These achieve almost complete oxidation and digestion of organic matter and organic pollutants to Carbon Dioxide, Water and Nitrogen, thus eliminating the odour and pollution problem above. The effluent produced by this process is non-polluting and can be discharged to a watercourse

Conventional sewage water treatment involves either two or three stages, called primary, secondary and tertiary treatment. Before these treatments, preliminary removal of rags, cloths, sanitary items, etc. is also carried out at municipal sewage works.

Requirement

The first thought for anyone planning a new development should be getting connected to mains sewers. They are typically the most cost-effective and reliable method of dealing with your wastewater. However, getting a mains sewer connection isn't always possible. In some scenarios, the distance from the nearest sewer or the layout of the land can make it impossible to have your property serviced by a mains sewer. That's where sewage treatment plants and other alternatives come in. The operation of a sewage treatment plant means that you can have one installed almost anywhere, as long as you have an electrical connection.

Advantages of a sewage treatment plant

- Reliable and unlikely to encounter problems with only regular maintenance
- Can be installed even on challenging or compact sites
- Cost-effective over time, with only installation, power and maintenance to pay for

Disadvantages of a sewage treatment plant

- The plant needs a constant supply of electricity to run
- Will require professional maintenance annually, and in the unlikely event of problems
- Design and installation of the system needs to be undertaken professionally

Figure 5.4 STP

Chapter 6
Swachh Bharat Abhiyan

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

"Cleanliness is Godliness" is the mantra of Mahatma Gandhiji, Father of Nation. He demonstrated, propagated and insisted for individual and community cleanliness throughout his life. Following his footprints, Swachh bharat Mission campaign achieved encouraging results. This vision will be translated into action by bringing in community participation for clean toilets and integrated waste management to make Gujarat open defecation free, zero waste, dust free, plastic free and green. The objectives of the Swachh Bharat Mission are:

- To bring improvement in general quality of life in Urban and Rural areas.
- Encouraging sustainable sanitation facilities through creating awareness and health education, giving inspiration to communities and Panchayati Raj Institutions.

Figure 6.1 Change in village

- Encouraging affordable and proper technology for ecological life and sustainable sanitation.
- The schools which are not covered under Sarva Siksha Abiyan be covered, to provide Anganwadi centers of rural area with proper sanitation and health facilities and provide active engagement about health education and sanitation facilities to students.

Figure 6.2 School Sanitation

- Focusing on solid and liquid waste in Urban and Rural areas for entire cleanliness, develop environmental sanitation system being arranged by community.

When we visited the village first time, we observed the cleanliness and sanitation across the village, the level was quite satisfactory. The streets were clean and looked like swept on daily basis. All the public buildings were clean, but some parts like a waterbody available in village were full of waste. The common plots of the village were not cleaned by anyone and they were used by villagers to dispose their house waste. The main locations like Gram Panchayat Building, Model School, and Temples across village are totally clean. Headman of the Village is positive for village cleanliness and making efforts.

We also met teachers of the school and came to know that they are taking lot of initiative for cleanliness of village. All the villagers are taking care of their houses by themselves. No people are assigned by administration for sweeping and cleaning activity. On the basis of our observation, we suggest that door to door waste collection and some more activities regarding cleanliness.

6.2 Guidelines - Implementation in allocated village with Photograph

The general features of Swachh Bharat Mission are given below:

- Implementation and monitoring at State level by Swachh Bharat Mission.
- Phase-wise implementation of block wise programme from 2014-15 to 2018-19.
- Determination of "Zero waste" policy in the State.
- Formation and implementing of "Public Health Bye-Laws for all cities.
- Sanitation for all
- Formation of task force for supervision of programme for all cities at City Level.
- Free health check-up of sanitation and drainage employees twice in a year.
- Cover schools/ Anganwadis in urban areas with sanitation facilities and promote hygiene education and sanitary habits among students.

- Encourage cost effective and appropriate technologies in sanitation.
- Eliminate open defection to minimize risk of contamination of drinking water sources and food.
- Convert dry latrines to pour flush latrines, and eliminate manual scavenging practice, wherever in existence in urban areas. In context of above features and under Swachh Bharat Mission, following guidelines have been framed by Government of India.

Our village Shampara is doing well in terms of cleanliness. When we asked villagers about cleanliness, after Swachh Bharat mission they feel that cleanliness is increased in village. As we know that there was no individual toilet available before this scheme implementation on individual toilet. Villagers are now seasoned with these practices and they got all the support from administration. Due to individual toilet block, they have seen decrease in disease related to defecation. One Public toilet block is developed by Gram Panchayat for those who do not have their own toilet. Due to this construction all the villagers are accessing the basic right of sanitation. To accelerate the efforts to achieve universal sanitation coverage and to put the focus on sanitation, all villages, Gram Panchayats, Districts, States and Union Territories in India declared themselves "open-defecation free" (ODF) by 2 October 2019, the 150th birth anniversary of Mahatma Gandhi, by constructing over 100 million toilets in rural India.

To ensure that the open defecation free behaviors are sustained, no one is left behind, and that solid and liquid waste management facilities are accessible, the Mission is moving towards the next Phase II of SBMG i.e ODF-Plus

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6.3 Activities Done by Students for allocated village with Photograph

Because of prevailing pandemic situations of COVID-19, the team members were unable to practice any activities in the allocated village, but the team has observed various points and can recommend following practices either to be initiated or continued to be carried forward by the villagers:

Figure 6.3 Animation of cleanliness

- ✓ Elimination of open defecation
- ✓ Eradication of Manual Scavenging
- ✓ Adoption of Modern and Scientific methods for Solid Waste Management
- ✓ Make people aware about behavioral change regarding healthy sanitation practices including for the cases of household toilets, public toilets and communal toilet facilities
- ✓ Spreading generate awareness about sanitation and its linkage with public health
- ✓ Capacity Augmentation for local bodies to create an enabling environment for private sectors

Chapter 7
Village condition due to Covid-19

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

The nation-wide lockdown imposed in India from March 25 to May 31, 2020 following the breakout of the COVID-19 pandemic affected rural India in diverse ways. This was only to be expected given the great variation in production systems and socio-economic conditions in villages across agro-ecological zones. However, the impact is differential across socio-economic classes and regions of the country, which are observed and narrated by the researchers T.S. Modak, S. Baksi and D. Johnson, which are presented below:

1. The impact on harvesting operations in the irrigated villages was limited, mainly because of the easy availability, and widespread use of combine harvesters in most of the surveyed villages. While it is too early to conclude, one can argue that the use of machines for various agricultural operations has received a thrust under the current crisis. In rain fed villages, being the lean agricultural season, the opportunities for farm employment were already restricted.

2. The major impact on agriculture, however, was in terms of access to marketing channels, and price received for the produce. In villages of Punjab and Kerala, there was active intervention by respective State governments to ensure procurement at fair prices. Such institutional mechanisms were absent in other States. The local market channel of sale through small traders and merchants had collapsed, and gravely impacted poor peasants for whom these traders were the main channel. Restricted mobility hindered access to regulated markets even for richer capitalist farmers. The disruption of the supply chain has led to a slump in the local farm harvest prices for most agricultural produce. Producers of perishable goods, particularly vegetables, were severely affected. Among them, the worst hit were poor peasants, without any access to storage facilities or procurement centers.

3. While agricultural operations were not affected much in the irrigated villages, a tendency seemingly encouraged by the lockdown is an expanded use of family labour among smaller landowners. The tendency to use family and exchange labour among poor peasants implies that the scope of agricultural wage work was lower for manual workers during the lockdown.

4. Non-agricultural work, which was crucial in the lean agricultural season, had completely collapsed. In the complete absence of non-farm employment, workers, and even artisans, were being forced to seek employment in agriculture. The reduced mobility due to the lockdown also implied that workers who otherwise regularly migrated for work were now competing for agricultural employment. As a consequence, a downward pressure on rural wage-rates was already beginning to be felt. The Covid-19 lockdown has broken down the complementary relationship between agricultural and non-agricultural work, where the surplus labour from the former was usually absorbed by the latter.

5. Despite income flows drying up for all socio-economic classes to varying degrees, the immediate impact was most severely felt by manual workers and poor peasants who did not have any savings. With meagre cash in hand, no home produce for consumption, and lack of employment, the class of manual workers were certainly the worst affected. In addition, a major blow to the class of manual workers, and poor peasants has been the complete breakdown in receipt of remittances. The combination of low levels of income, ineffective public distribution systems, and negligible income-

support had serious implications for subsistence of these households, leading to increased indebtedness especially from informal sources. The class of landlord and capitalist farmer was the least impacted by the lockdown. Better access to storage facilities and regulated markets implied that their farm incomes were relatively protected. Also, they had sufficient cash in hand and food stocks for daily household consumption.

Figure 7.1 Covid in Villages

To sum up, the Covid-19 lockdown has worsened the already prevalent distress in the Indian countryside especially for manual worker and poor peasant households. There is also a fear that if the lockdown restrictions are prolonged, crop production in the kharif season will be severely affected. Government intervention is critical to maintain a basic level of household consumption and to resume normal agricultural production.

Figure 7.2 Janta Curfew appeal

The allocated village for the team has not been proven as a difference maker than the other and in context of above mentioned situations. Below are the steps taken in the allocated village

As we know that nationwide lockdown was imposed on 25th March 2020 due to Covid-19 Virus. Everything was stopped due to lockdown, when we asked people about this condition; they told that all the citizens were positive to overcome this situation. Headman was in regular communication with all the authorities. The borders were sealed as lot of people trying to come in their villages. After Unlock, Lot of people came in village from Surat and nearby big cities to their homeland and due to great amount of transportation; two positive cases were recorded in village. These patients were taken to nearest district hospital Sir Takhtsinghji at Bhavnagar; because of proper treatment they are safe now. Testing facility was developed near village so that they can reduce the spread.

After lockdown MNREGA yojna helped for rural economy, as lot of people lost their jobs. Many people changed their occupation also. All the people are still positive and doing their job taking all the care. During this pandemic Swami Vivekanand Homeopathy College donated immunity booster dose to village. So overall condition is good at the Shampara village.

7.2 Activities Done by Students for allocated village with Photograph

Because of prevailing pandemic situations of COVID-19, the team members were unable to practice any activities in the allocated village, but the team has observed various points and can recommend following practices either to be initiated or continued to be carried forward by the villagers to fight against COVID-19:

- ✓ Making the villagers aware about initial preparedness through following common and specific guidelines levied by Central and State Governments time by time.
- ✓ Identifying the possibilities of development of screening facilities either at village entrance or common entrance point of either Taluka or nearby region.
- ✓ Tracing the contacts or migrants in the village.
- ✓ Testing to treatment facilities and centers in the village.
- ✓ Identifying manpower augmentation and training
- ✓ Suggesting various locations for temporary shelter homes either for isolation or for quarantine.

7.3 Any other steps taken by the students / villagers

As mentioned earlier, the team members found themselves unable to carry out any activities or steps because of COVID-19 Pandemic situation, but based on the village visit, following points can be suggested either as simultaneous or parallel to points suggested in above topic no. 7.2:

- ✓ Continuous contact between Gram Panchayat and District Level Control Room or Task Force for getting latest guidelines, practices and steps taken for fighting against COVID-19 Pandemic situations.
- ✓ Continuing the practice of social distancing, wearing masks and consulting health care units without shying.
- ✓ Distribution of food, fruit, dairy products, grain, vegetables, oils, petroleum products, etc. should be observed so that neither scarcity nor rush can be observed.
- ✓ Inter-village and intra-village active cases movements as well as rural to urban to and fro migration should be observed and recorded so that contact tracing can be practiced effectively.
- ✓ Awareness to governance through social media and digital platform should be practiced, which may lead less movement for various purposes.
- ✓ Making villagers aware and educated have become must, even if they are vaccinated in nearby future.

Chapter 8
Sustainable Design Planning Proposal (Prototype Design) – Part – I

(Scenario / Existing Situation / Proposed Design in Auto cad / Recapitulation Sheet / Measurement Sheet / Abstract Sheet / Sustainability of Proposal / Any other software)

Sr No.	Proposed Designs
1	Rain Water Harvesting System
2	Septic Tank
3	Primary Health Centre
4	Community Hall
5	Vegetable Market
6	Recreational Centre

Table 8.1: List of Designs

8.1 Design Proposals

8.1.1 Sustainable Design (Civil)

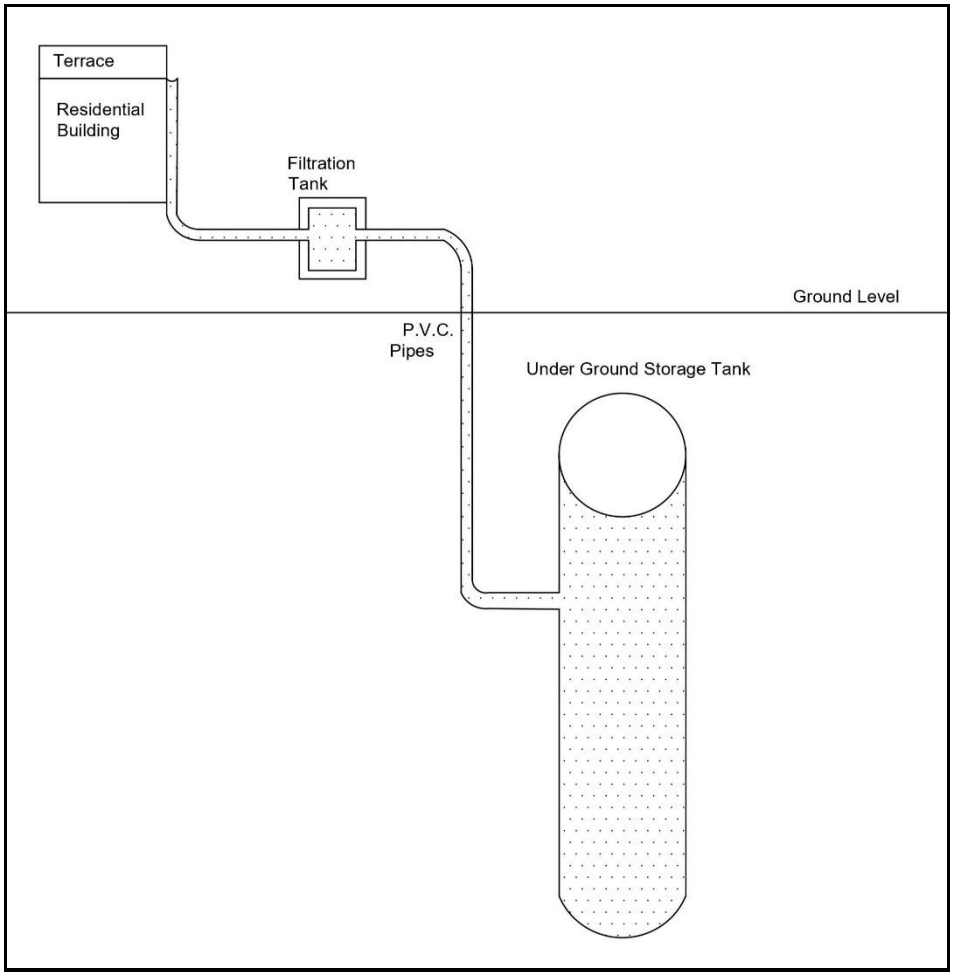

Figure 8.1 RWH Model

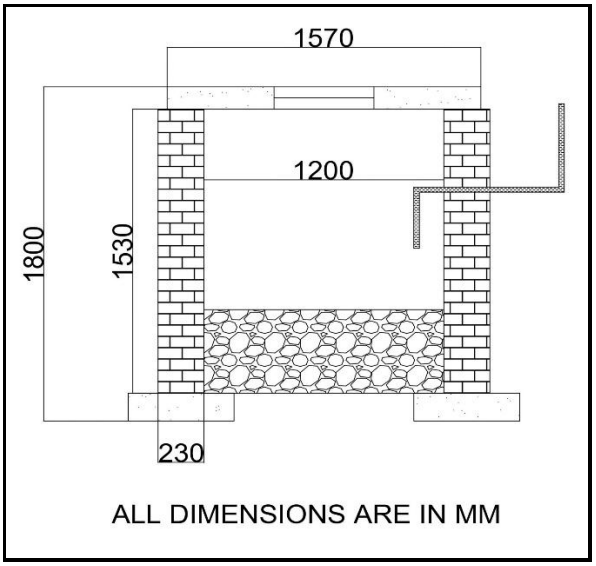

Figure 8.2 RWH water tank

NAME OF WORK : CONSTRUCTION OF RAIN WATER HARVESTING SYSTEM (7000 LIT)								
ITEM NO.	**DESCRIPTION OF ITEM**	**NO.**	**NO.**	**LENGTH**	**WIDTH**	**DEPTH / HEIGHT**	**QUANTITY**	**REMARK**
1	EXCAVATION FOR FOUNDATION IN DENSE OR HARD SOIL UP TO 1.5M DEPTH INCLUDING SORTING OUT, STACKING OF USEFUL MATERIALS AND DISPOSING OF THE EXCAVATED STUFF UP TO ANY LEAD.							
	TANK	1		3.02		1.8	5.44	D=1.96
						TOTAL	5.44	
2	PROVIDING AND LAYING CEMENT CONCRETE 1: 4: 8 (1 CEMENT: 4 COARSE SAND: 8 GRADED STONE AGGREGATE 20 MM NOMINAL SIZE) AND CURING COMPLETE EXCLUDING COST OF FORMWORK IN FOUNDATION & PLINTH							
	BELOW FOUNDATION WALL	1		4.5	0.53	0.15	0.36	D=1.43
						TOTAL	0.36	
3	BRICK WORK USING COMMON BURNT CLAY BUILDING BRICK HAVING CRUSHING STRENGTH NOT LESS THAN 35 KG/SQ. CM. IN FOUNDATION AND PLINTH IN CEMENT MORTAR 1:6 (1 CEMENT: 6 FINE SAND) BRICK MASONRY UP TO PLINTH (B) CONVENTIONAL							
		1		4.5	0.23	1.53	1.58	D=1.43
						TOTAL	1.58	
4	FILLING OF BROKEN BRICKS FILTER MEDIA WITH SAND	1		1.13		0.45	0.51	D=1.2
						TOTAL	0.51	

5	PROVIDING & LAYING ORDINARY CEMENT CONCRETE 1:2:4 (1 CEMENT :2 COARSE SAND:4 GRADED STONE AGGREGATES) AND FINISHING SMOOTH WITH CURING ETC. COMPLETE INCLUDING SMOOTH WITH CURING ETC. COMPLETE INCLUDING THE COST OF FORMWORK BUT EXCLUDING THE COST OF REINFORCE-MENT FOR REINFORCED CONCRETE WORK IN RCC SLABS HAVING THICKNESS MORE THAN 10 CM AND UPTO 13CM THICKNESS. R.A.							
		1		1.93		0.12	0.23	D=1.57
	DEDUCTION MANHOLE	1		0.6	0.5	0.12	-0.036	
						TOTAL	0.2	
6	C.I. MAN HOLE COVER SIZE 0.6X0.6 M	1					1	
						TOTAL	1	
							NOS.	1
7	PROVIDING & FIXING HAND PUMP.	1						
							1	
						TOTAL	1	
							NOS	1
8	VALVE OF 75MM DIA. P.V.C. PIPE	5					5	
						TOTAL	5	
							NOS	5
9	FILTRATION CHAMBER	1						
							1	
						TOTAL	1	
							NOS	1
10	UNDERGROUND PERCOLATION WELL TO RECHARGE WATER AS PER APPROVED DRAWING					1	1	
						TOTAL	1	
							NOS	1

Table 8.2 Measurement sheet of RWH

ITEM NO.	DESCRIPTION OF ITEM	QNT	UNIT	R & B SOR (IN RS.)	ESTIMATD AMOUNT (IN RS.)
1	EXCAVATION FOR FOUNDATION IN DENSE OR HARD SOIL UP TO 1.5M DEPTH INCLUDING SORTING OUT,STACKING OF USEFUL MATERIALS ANDDISPOSING OF THE EXCAVATED STUFF UP TO ANY LEAD.	5.44	CMT	86.72	471.75

2	PROVIDING AND LAYING CEMENT CONCRETE 1: 4 : 8 (1 CEMENT : 4 COURSE SAND : 8 GRADED STONE AGGREGATE 20 MM NOMINAL SIZE)AND CURING COMPLETE EXCLUDING COST OF FORMWORK IN FOUNDATION & PLINTH	0.36	CMT	3,197.26	1151.01
3	BRICK WORK USING COMMON BURNT CLAY BUILDING BRICK HAVING CRUSHING STRENGTH NOT LESS THAN 35 KG/SQ. CM. IN FOUNDATION AND PLINTH IN CEMENTMORTAR 1:6 (1 CEMENT: 6 FINE SAND) BRICK MASONRY UP TO PLINTH (B) CONVENTIONAL	1.58	CMT	2,954.25	4667.71
4	FILLING OF BROKEN BRICKS FILTER MEDIA WITH SAND	0.51		900	459
5	PROVIDING & LAYING ORDINARY CEMENT CONCRETE 1:2:4 (1 CEMENT :2 COARSE SAND:4 GRADED STONE AGGREGATES) AND FINISHING SMOOTH WITH CURING ETC. COMPLETE INCLUDING SMOOTHWITH CURING ETC. COMPLETE INCLUDING THE COST OF FORMWORKBUT EXCLUDING THE COST OF REINFORCEMENT FOR REINFORCED CONCRETE WORK IN RCC SLABSHAVING THICKNESS MORE THAN 10 CM AND UP TO 13CM THICKNESS. R.A.	1.57	CMT	5590.08	8776
6	C.I. MAN HOLE COVER SIZE0.6X0.6 M	1.00	NO.	500.00	500.00
7	PROVIDING & FIXING HAND PUMP.	1.00	NO.	600.00	600.00
8	VALVE OF 75MM DIA.P.V.C. PIPE	5.00	NO.	250.00	1250.00
9	FILTRATION CHAMBER OF SIZE 0.6X0.75 MX .45M	1.00	NO.	4000.00	4000.00
10	UNDERGROUND PERCOLATION WELL TO RECHARGE WATER AS PER APPROVED DRAWING	1.00	NO.	7000.00	7000.00
				TOTAL IN RS.	28,875

Table 8.3 abstract sheet of RWH

8.1.2 Physical design (Civil)

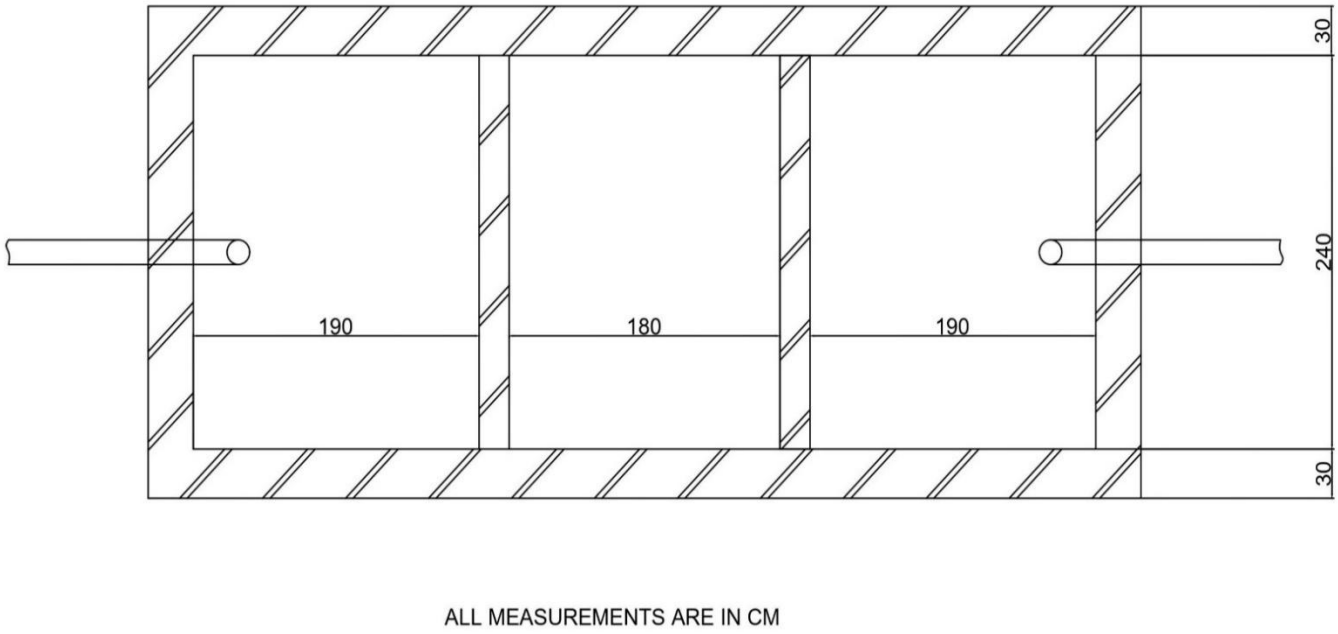

Figure 8.3 Septic tank plan

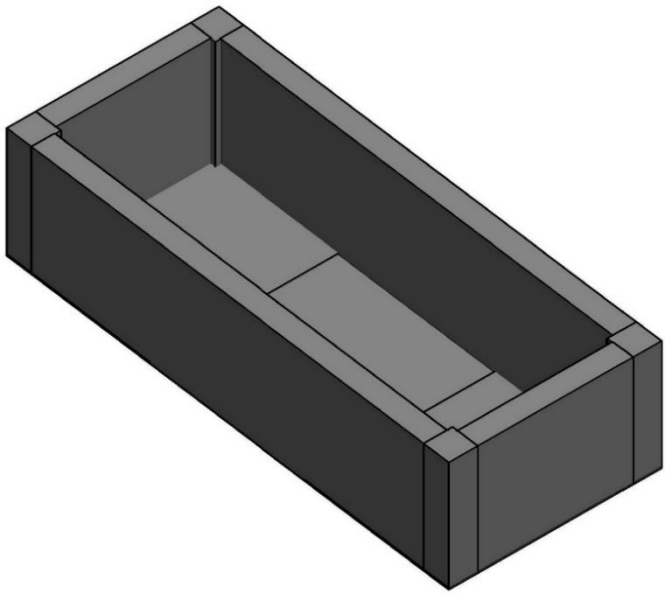

Figure 8.4 3D layout of Septic tank

A septic tank is an underground chamber made of concrete, fiberglass, or plastic through which domestic wastewater (sewage) flows for basic treatment. Settling and anaerobic processes reduce solids and organics, but the treatment efficiency is only moderate (referred to as "primary treatment"). Septic tank systems are a type of simple onsite sewage facility (OSSF). They can be used in areas that are not connected to a sewerage system, such as rural areas. The treated liquid effluent is commonly disposed in a septic drain field, which provides further treatment. Nonetheless, groundwater pollution may occur and can be a problem.

The term "septic" refers to the anaerobic bacterial environment that develops in the tank that decomposes or mineralizes the waste discharged into the tank. Septic tanks can be coupled with other onsite wastewater treatment units such as biofilters or aerobic systems involving artificially forced aeration.

MEASUREMENT SHEET OF SEPTIC TANK						
ITEM	ITEM	NO	L	B	H	QUANTITY
NO.	DESCRIPTION					
1	TOTAL EXCAVATION	2	8.6	1.3	2.25	50.31
	LONG WALLS					
	L = 8.6 M					
	B = 1.3 M					
	H = 2.25					
	SHORT WALLS					
	L = 1.6 M	2	1.6	1.3	2.25	9.36
	B = 1.3 M					
	H = 2.25 M					
	MIDDLE PART					
	L = 6 M					
	B = 1.6 M	1	6	1.6	1.65	15.84
	H = 1.65 M					
						TOTAL = 75.51 M3
OR	CEMENT CONRETE 1:2:8					
1	BELOW LONG WALLS :					
	BELOW SHORT WALLS :					
	AT THE BOTTOM OF TANK	2	8.6	1.3	0.3	6.71
	L = 6.8 M					
	B = 2.4 M	2	1.6	1.3	0.3	1.25
	H = 0.15 M					
		1	6.8	2.4	0.15	2.45
						TOTAL = 10.41 M3

2	TOTAL CEMENT CONCRETE 1:2:4 FOR SLAB	1	7.4	3	0.15	3.33
	L = 7.4 M					
	B = 3.0 M					
	LINTEL :					
	L = 2.7 M					
	B = 0.2 M					
	ASSUME 15 CM BEARING AT EACH END OF LINTEL					
	FLOOR	1	2.7	0.2	0.15	0.08
	L = 6.8 M					
	B = 2.4 M					
	DEDUCTION MAN HOLE					
		1	6.8	2.4	0.1	1.63
		3	0.6	0.5	0.15	-0.14
						NET QUAN=
						4.90 M3
3	BRICK MASONARY					
	LONG WALL:					
	FIRST STEP : L = 8.2 M					
	SECOND STEP: L = 7.8M	2	8.2	0.9	0.3	4.43
	THIRD STEP : L = 7.4 M					
	SHORT WALLS	2	7.8	0.5	0.6	4.68
	FIRST STEP : L = 2.0 M					
	SECOND STEP: L = 2.4M	2	7.4	0.3	1.2	5.33
	THIRD STEP : L = 2.4 M					
	BAFFLE WALL LEFT					
	L = 2.4 M					
	H = 1.2 M	2	2	0.9	0.3	1.08
	BAFFLE WALL RIGHT					
	H =1.10M					
		2	2.4	0.5	0.6	1.44
		2	2.4	0.3	1.2	1.73
		1	2.4	0.2	1.2	0.58
		1	2.4	0.2	1.1	0.53
						TOTAL =
						19.80 M3
4	CI STEPS	3				3
5	MAN HOLE COVER					
6	100 33 DIA SW PIPE					
	OUTLET PIPE					

	L = 5.6 M					
	INLET PIPE	1	5.6			5.6
	L = 2.4 M					
			2.4			2.4
7	75 MM DIA CI VENT PIPE L = 12 M	1	12			12

Table 8.4 Measurement sheet of Septic tank

TABLE ABSTRACT SHEET FOR SEPTIC TANK					
NO.	ITEM	QUANTITY	RATE	PER Rs.	AMOUNT Rs.
1	EXCAVATION FOR				
	FOUNDATION:				
	· UPTO 1.5 M DEPTH		85	M3	4276.35
	· FROM 1.5 M TO 3 M	58.11 M3			
	· MORE > 3 M				
		9.36	100		936
		15.84	150		2376
2	TOTAL CEMENT CONCRETE	4.9	2000	M3	9800
	(1:2:4)				
3	FIRST CLASS BRICK MASONARY IN				
	C.M. (1:6) FOR THE WALLS OF SEPTIC				
	TANK			M3	
		19.8	3200		63360
4	CI STEPS	3	300		900
				NO	
5	MAN HOLE COVER	1	450	NO	450
	50 * 60CM				
6	100 MM DIA SW PIPE	8	130	M	1040
7	75 MM DIA CI VENT PIPE	12	300	CM	3600
					TOTAL =
					RS. 86738.35
					ADD CONT.
					RS. 4336.92
					GRAND TOTAL
					RS. 91,075.28

Table 8.5 Abstract sheet of Septic tank

8.1.3 Social design (Civil)

Primary Health Centre

Figure 8.5: Design of PHC

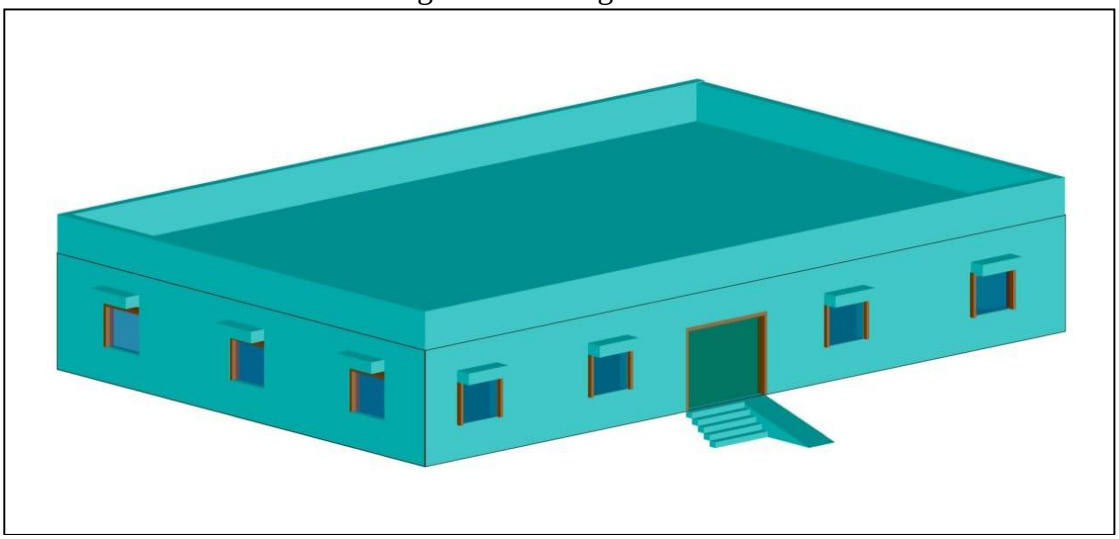

Figure 8.6: 3D view of PHC

SR NO.	DESCRIPTION	NO	LENGTH(M)	WIDTH(M)	HEIGHT(M)	QUANTITY
						M3
1	EARTHWORK IN ESCAVATION FOR FOUNDATION					
	TOTAL CENTRE LENGTH					
	NO OF JUNCTIONS=20					
	NET CENTER LENGTH	1	166	0.9	1.1	165
2	P.C.C. (1:4:8) FOR FUNDATION		166	0.9	0.2	30
		1				
3	BRICK MASONARY UPTO PLINTH LEVEL					
	1ST STEP:	1	170	0.5	0.3	25.5
	2ND STEP:	1	171	0.4	0.3	21
	3RD STEP:	1	172	0.3	0.85	44
	FOR STEPS					0
	1ST STEP L=1.1	1	1.1	0.9	0.15	0.15
	2ND STEP	1	1.1	0.6	0.15	0.1
	3RD STEP	1	1.1	0.3	0.15	0.05
						90.8
4	BRICK MASONARY WORK ABOVE PLINTH LEVEL UPTO SLAB LEVEL					
	L= 173	1	173	0.2	3	103.8
	DEDUCTION					
	FOR DOORS & WINDOWS					
	D1	11	1.1	0.2	2.1	5.08
	D2	1	1.2	0.2	2.1	0.504
	W1	21	1.8	0.2	1.4	10.38
	V	2	0.6	0.2	0.6	0.144
					DEDUCTION	19.254
					TOTAL	84.54
5	RCC, SLAB, LINTEL, CHHAJJA					
	SLAB	1	16	23	0.12	44.16
	LINTELS OVER WINDOWS	27	15	0.6	0.1	2.43
	LINTELS OVER DOORS	12	2	0.6	0.1	1.41
						48.03
6	EARTH FILLING	1	16	23	0.55	202.4
7	PLASTERING					
	INSIDE & OUTSIDE	2	175		5	1750

	DEDUCTION OF OPENING					
	DOOR	11	1.1		2.1	25.41
	D1	1	1.2		2.1	2.52
	D2	2	0.9		2.1	3.78
	WINDOW1	21	1.8		1.4	52.92
	WINDOW2		1.2		1.4	6.72
	WINDOW3	12	1.5		1.4	25.2
	TOTAL PLASTERING					1654.45

Table 8.6: Measurement sheet of PHC

ITEM NAME	QUANTITY	RATE	PER	AMMOUNTRs
EXCAVATION FOR PHC	165	85	CUB. M	14025
PCC(1:4:8)	52.88	2700	CUB. M	81000
BRICK MASONARY UPTO PLINT	525.239	3200	CUB. M	290560
BRICK MASONARYABOVE PLINTH	179.4	3500	CUB. M	295890
R.C.C SLAB,LINTEL,CHHAJJA	134.3868	8800	SQ.M	422664
EARTH FEELING	609.89	50	CUB. M	10120
INNER AND OUTER PLASTER	2949.6	150	SQ. M	248167
TOTAL				1362426

Table 8.7: Abstract sheet of PHC

8.1.4 Socio-Cultural design (Civil)

Community Hall

Shampara village has good educational amenities but social infrastructure is not available so for any gathering, function or community work villagers have to organize separately in their yards which is not feasible in most of the time. After survey we came to know about this problem.

So this design of community hall will help them for any gathering, even authority can use this hall for relief purpose in the time of any calamity. This design fulfills all the requirement of modern community hall.

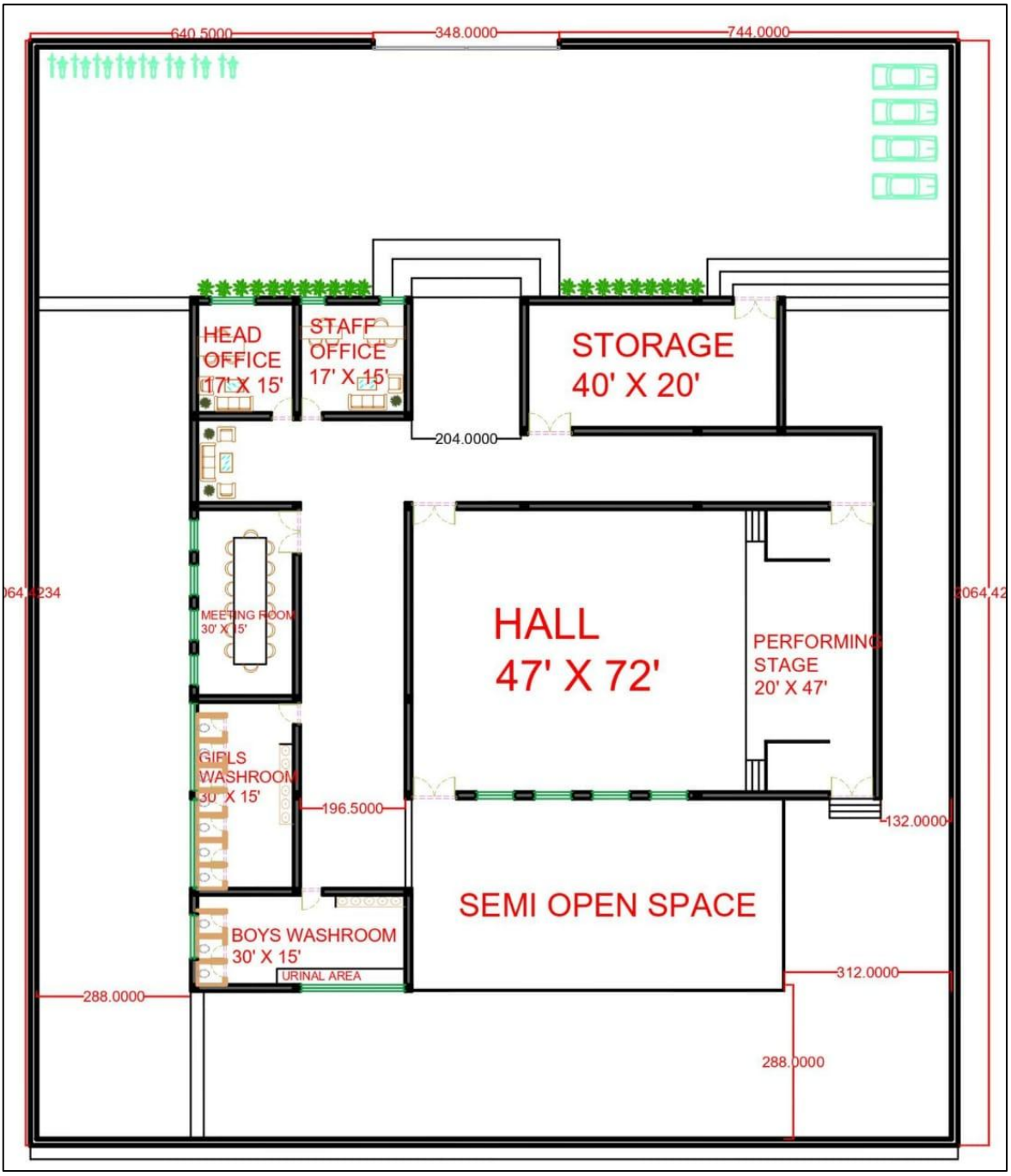

Figure 8.6: Design of Community hall

Figure 8.7: 3D design of Community Hall

SR	DESCRIPTION	NO	L (M)	W (M)	H (M)	QUAN
1	EARTHWORK IN ESCAVATION FOR FOUNDATION	1				
	TOTAL CENTER LINE LENGTH=300M					
	NO OF JUNCTIONS=16					
	NET CENTER LENGTH=293.8	1	293.8	0.9	1.1	290.862
2	P.C.C. (1:4:8) FOR FUNDATION		293.8	0.9	0.2	52.88
		1				
3	BRICK MASONARY UPTO PLINTH LEVEL					
	1ST STEP: L=296	1	296	0.5	0.3	44.4
	2ND STEP: L=296.8	1	296.8	0.4	0.3	35.616
	3RD STEP:	1	297.6	0.4	0.85	101.184
	L= 297.6					
	FOR STEPS					0
	1ST STEP L=1.1	1	1.1	0.9	0.15	0.1485
	2ND STEP	1	1.1	0.6	0.15	0.099
	3RD STEP	1	1.1	0.3	0.15	0.0495
						525.239
4						
	L= 298.4	1	298.4	0.2	3	179.4
	DEDUCTION					
	FOR DOORS & WINDOWS					
	D1	8	1	0.2	2.1	3.36
	D2	2	2	0.2	2.1	1.68

	W1	12	1.5	0.2	1.4	5.04
	V	2	0.6	0.2	0.6	0.144
						10.224
5	RCC, SLAB, LINTEL, CHHAJJA					
	SLAB	1	33.3	33.3	0.12	133.0668
	LINTELS OVER WINDOWS	12	1.5	0.6	0.1	1.08
	LINTELS OVER DOORS	2	2	0.6	0.1	0.24
						134.3868
6	EARTH FILLING	1	33.3	33.3	0.55	609.8895
7,8	PLASTERING					
	INSIDE & OUTSIDE	2	300		5	3000
	DEDUCTION OF OPENING					`
	DOOR					
	D1	8	1		2.1	16.8
	D2	2	2		2.1	8.4
	WINDOW					
	WINDOW	12	1.5		1.4	25.2
	TOTAL PLASTERING					2949.6

Table 8.8: Measurement Sheet of Community Hall

ITEM NAME	QUANTITY	RATE	PER	AMMOUNT
EXCAVATION FOR COMMUNITY HALL	290.862	85	CUB. M	24723.27
PCC (1:4:8)	52.88	2700	CUB. M	142776
BRICK MASONARY UPTO PLINT	525.239	3200	CUB. M	1680765
BRICK MASONARYABOVE PLINTH	179.4	3500	CUB. M	627900
R.C.C SLAB, LINTEL, CHHAJJA	134.3868	8800	SQ.M	1182604
EARTH FEELING	609.89	50	CUB. M	30494.5
INNER AND OUTER PLASTER	2949.6	150	SQ. M	442440
TOTAL				4131702

Table 8.9: Abstract sheet of Community hall

8.1.5 Smart Village Design (Civil)

Vegetable Market

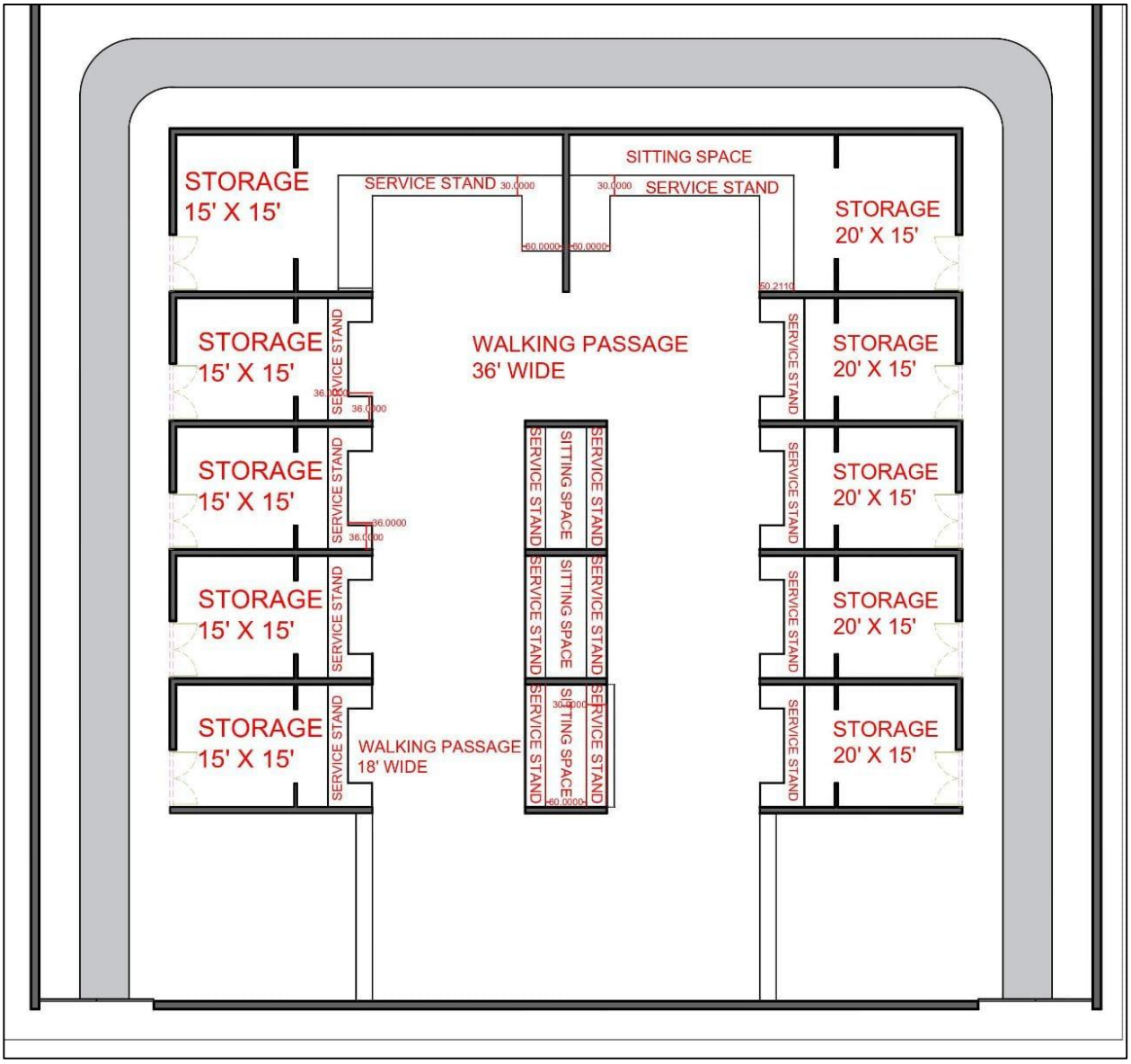

Figure 8.8: Design of Vegetable market

Figure 8.9: 3D design of Vegetable Market

SR NO.	DESCRIPTION	NO	LENGTH	WIDTH	HEIGHT	QUANTITY
1	EARTHWORK IN ESCAVATION FOR FOUNDATION					
	TOTAL CENTER LINE LENGTH					
	NO OF JUNCTIONS=9					
	NET CENTER LENGTH	1	181	0.9	1.1	180
2	P.C.C. (1:4:8) FOR FUNDATION		181	0.9	0.2	32.5
		1				
3	BRICK MASONARY UPTO PLINTH LEVEL					
	1ST STEP:	1	182.75	0.5	0.3	27.41
	2ND STEP:	1	183.2	0.4	0.3	22
	3RD STEP:	1	183.65	0.3	0.85	46.83
	FOR STEPS					0
	1ST STEP L=1.1	1	1.1	0.9	0.15	0.15
	2ND STEP	1	1.1	0.6	0.15	0.1
	3RD STEP	1	1.1	0.3	0.15	0.05
						96.54
4	BRICK MASONARY WORK ABOVE PLINTH LEVEL UPTO SLAB LEVEL					
	L= 184.1	1	184.1	0.2	3	110.5
	DEDUCTION					
	FOR DOORS & WINDOWS					

	D1	10	1.5	0.2	2.1	6.5
						104
5	RCC, SLAB, LINTEL, CHHAJJA					
	SLAB	1	22.86	26.21	0.12	72
	LINTELS OVER DOORS	10	1.5	0.6	0.1	0.9
						72.9
6	EARTH FILLING	1	22.86	26.21	0.55	329.5
7	PLASTERING					
	INSIDE & OUTSIDE	2	185		3	1110
	DEDUCTION OF OPENING					`
	DOOR					
	D1	10	1.5		2.1	31.5
	TOTAL PLASTERING					1078.5

Table 8.10: Measurement sheet of Vegetable market

ITEM NAME	QUANTITY	RATE IN RS	PER	AMOUNT
				IN RS.
EXCAVATION FOR COMMUNITY HALL	180	85	CUB. M	15300
PCC(1:4:8)	32.5	2700	CUB. M	87750
BRICK MASONARY UPTO PLINT	96.54	3200	CUB. M	308928
BRICK MASONARYABOVE PLINTH	104	3500	CUB. M	364000
R.C.C SLAB,LINTEL,CHHAJJA	72.9	8800	SQ.M	641520
EARTH FEELING	329.5	50	CUB. M	16475
INNER AND OUTER PLASTER	1078.5	150	SQ. M	161775
TOTAL				1595748

Table 8.11: Abstract sheet of Vegetable market

8.1.6 Heritage Village Design (Civil)

Recreational center

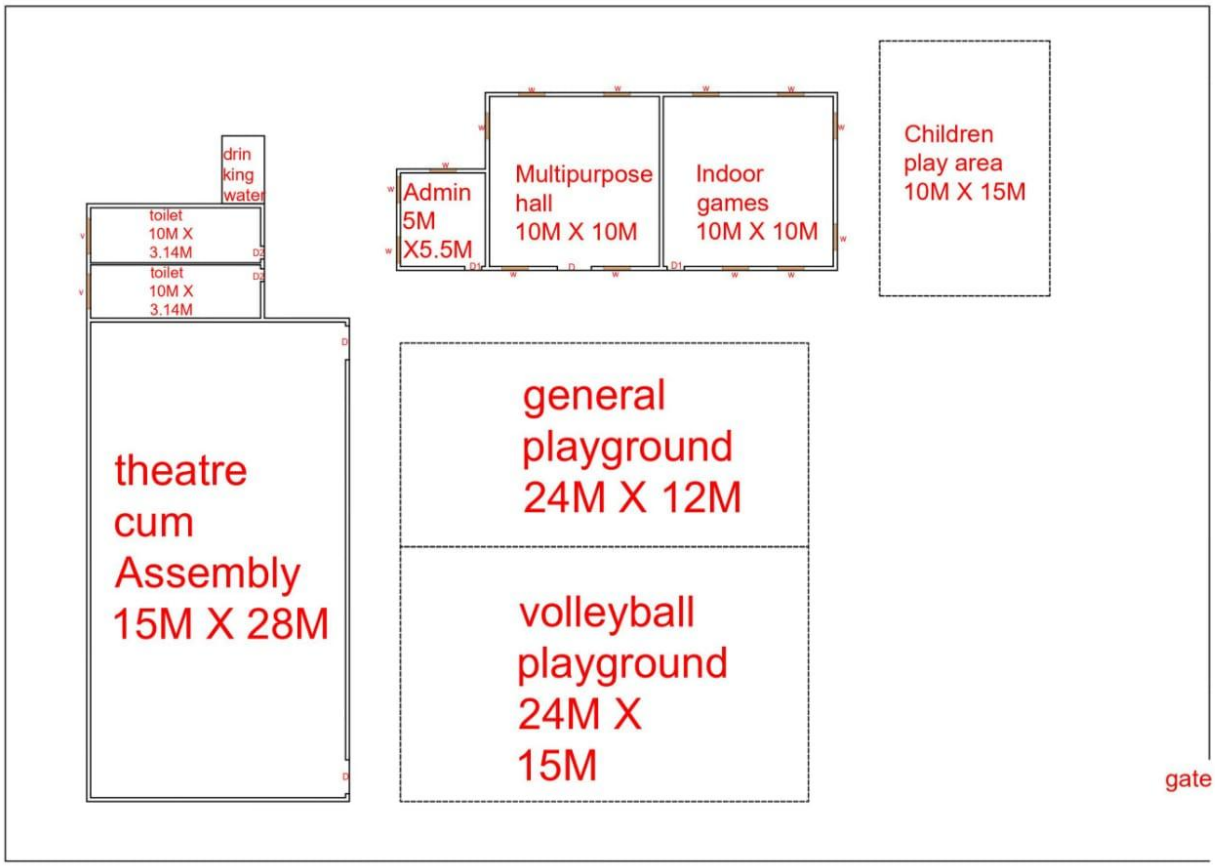

Figure 8.10: Design of recreational center

Figure 8.11: 3D view recreational center

SR	DESCRIPTION	NO	L	W	H	QUANTITY
1	EARTHWORK IN ESCAVATION FOR FOUNDATION					
	TOTAL CENTER LINE LENGTH=208 METER					
	NO OF JUNCTIONS=8					
	NET CENTER LENGTH	1	206.4	0.9	1.1	204.33
2	P.C.C. (1:4:8) FOR FUNDATION		206.4	0.9	0.2	37.15
		1				
3	BRICK MASONARY UPTO PLINTH LEVEL					
	CL LENGTH=208 METER					
	NET CL LENGTH = CL – (1/5)*W*NO OF JUNCTIONS					
	NET CL LENGTH = 208-(1/5)*0.23*8 = 206.4					
	WIDTH OF WALL=0.23 METER					
	HEIGHT = 0.6 METER					
	DEDUCTION					
	1ST STEP: L=	1	208	0.5	0.3	31.2
	2ND STEP: L=	1	208.4	0.4	0.3	25
	3RD STEP: L=	1	208.4	0.3	0.85	53.2
	FOR STEPS					
	1ST STEP L=1.1	1	1.1	0.9	0.15	0.15

	2ND STEP	1	1.1	0.6	0.15	0.1
	3RD STEP	1	1.1	0.3	0.15	0.05
						110
4						
	L= 209.2	1	209.2	0.2	5	209.2
	DEDUCTION					
	FOR DOORS & WINDOWS					
	D	3	1.2	0.2	2.1	1.5
	D1	2	1.1	0.2	2.1	1
	D2	2	0.9	0.2	2.1	0.75
	W	14	1.5	0.2	1.4	6
	V	2	0.6	0.2	0.6	0.15
						199.8
5	RCC, SLAB, LINTEL, CHHAJJA					
	SLAB 1	1	35.2	15.3	0.12	64.6
	SLAB 2	1	25.9	10.3	0.12	32
	LINTELS OVER WINDOWS	14	25.9	10.3	0.12	1.26
	LINTELS OVER DOORS	6	2	0.6	0.1	0.72
						90.58
6	MURUM FILLING IN PLINTH					
	INDOOR GAMES ROOM	1	12	12	0.6	86.4
			TOTAL FILLING			86.4
7	PCC AT PLINTH LEVEL					
	INDOOR GAMES ROOMS	1	12.6	12.6	0.1	15.58
			TOTAL			15.58
8	DPC ON PLINTH BEAM					
	CL LENGTH=208 METER	1	208	0.23	1	47.84
	WIDTH OF WALL = 0.23 METER					
	HEIGHT=0.07					
	METER					
			TOTAL			47.84
9	EARTH FILLING	1	35.2	15.5	0.55	296.2
		1	25.9	10.3	0.55	146.7
						443
10	PLASTERING					
	INTERNAL PLASTER	1	210		5	1050

	EXTERNAL PLASTER	1	210		5	1050
	DEDUCTION OF OPENING					`
	D	3	1.2		2.1	7.56
	D1	2	1.1		2.1	4.62
	D2	2	0.9		2.1	3.78
	W	14	1.5		1.4	25.2
	V	2	0.6		0.6	0.72
	TOTAL PLASTERING					205.8

Table 8.12: Measurement sheet of recreational center

ITEM NAME	QUANTITY CUM	RATE IN RS.	PER	AMMOUNT IN RS.
EXCAVATION FOR FOUNDATION UP TO 1.5 M DEPTH INCLUDING EXCAVATION FOR FOUNDATION UP TO 1.5 M DEPTH.	204.3	85	CUB. M	17365.5
PCC: PROVIDING AND LAYING CEMENT CONCRETE 1:3:6 (1-CEMENT: 3-COARSE SAND: 6- HAND BROKEN STONE AGGREGATES 40MM NOMINAL SIZE) AND CURING COMPLETE EXCLUDING COST OF FORMWORK IN FOUNDATION AND PLINTH (UPTO 10 TON)	37.15	2700	CUB. M	100305
BRICK MASONARY UPTO PLINTH PROVIDING AND LAYING ORDINARY CEMENT CONCRETE 1:2:4 (1-CEMENT 2- COARSE SAND : 4- GRADED STONE AGGREGATES 20 MM NOMINAL SIZE) EXPOSED WORK WITH CURING ETC. COMPLETE INCLUDING THE COST OF FORMWORK BUT EXCLUDING THE COST OF REINFORSEMENT FOR R.C.C WORK.	110	3200	CUB. M	352000
BRICK MASONARYABOVE PLINTH	119.8	3500	CUB. M	419300
R.C.C SLAB, LINTEL, CHHAJJA	96.58	8800	SQ.M	867504
EARTH FILLING	443	50	CUB. M	22150
INNER PLASTER PROVIDING 15MM THICK CEMENT PLASTER IN SINGLE COAT ON ROUGH (SIMILAR) SIDE.	1034	150	SQ. M	158100

OUTER PLASTER 20 MM THICK SAND FACED CEMENT PLASTER ON WALLS. AT ALL HEIGHTS 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.	1034	150	SQ M	158100
TOTAL				20,87,324 RS

Table 8.13: Abstract sheet of recreational center

8.2 Reason for Students Recommending this Design

- Rain water harvesting - this is a new technique to save rain water to use it whenever needed, right now this structure is not available in village.
- Septic Tank - Existing drainage facility is enough for villagers but in outskirt of village this design is needed for migrated workers.
- Primary Health Center - As per gap analysis and norms, PHC is necessary for village.
- Community Hall - As per the village population community hall should be available as social and religious gatherings go on in open spaces
- Vegetable Market - Large vegetable production needs place for selling for their customer so it is required
- Recreational Centre- As per the survey youth and students need one center for their overall development and betterment of society.

8.3 About designs Suggestions / Benefit of the villagers

- Rain water harvesting – it would improve water condition of the village
- Septic Tank – It will create good environment in village and can be taken as a step towards Swachha Bharat.
- Primary Health Center – PHC will help to make village healthy and efficient. Transportation for emergency will be reduced
- Community Hall – currently social and religious gatherings go on in open spaces so in arid condition this amenity will help villagers.
- Vegetable Market – Economy of village will grow more after this design implementation.
- Recreational Centre- Mental and Physical development can be seen in students of village

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

In this part of project, we have proposed some basic facilities through our sustainable, physical and smart village designs in our allocated village after completing all surveys and site visits, we have proposed our best designs in this part.

In Part-II of this project we are going to improve some of basic ammonites in village that is at percent is not good or not enough efficient or not useful to current scenario of village. By this Part-I designs now we have our wider perspective to developed the village in according to make it smart village by providing missing infrastructures.

According to UDPFI norms we are going to provide some facilities that is at percent is not available in Shampara village like, Physical infrastructure including Solid waste Management, Water supply in village etc.

In future scope we would be study other different urban amenities that would be sustainable in rural areas of Bhavnagar.

The village is now on the path of becoming smart village by our given designs but the villagers have to maintain the given facilities by them self. To make this possible we are going to give them smart design and smatter technology to maintain infrastructures, by this we are closer to give them good living standards.
Designs for future development of the village for the Part-II design

- Lake front for tourism
- Agriculture product market building
- Washing ghat with circulatory tank
- Library
- Bank
- Skill Training Institute

Chapter 10
Conclusion of the Entire Village Activities of the Project

The project work started with the basic data collection, survey work and it progressed through meeting with headman, Talati-cum-Mantri shri and Principal of the existing school. The gap analysis was later framed and 6 various design problems were identified. The proposed solutions are framed in such a way that the village can enhance the overall physical, social and educational conditions of villagers and can promise the sustainable growth of the village in context to the Bhavnagar City, in which the village falls.

The concluding remarks of the project in the form of team details, problem definition and designed solutions are as follows:

Village and Team Details					
Village name:	Team details:	Enrollment No.:	170210106037	(1) Name	Pandya Bhavya
Shampara		Enrollment No.:	170210106050	(2) Name	Sanghavi Mihir
Problem Definition and Design Details					
Sr. No.	Problem Definition			Capacity (mention unit)	Estimated cost (in Rs.)
Design –1	Rain Water Harvesting System			750 cum water	3,36,564
Design –2	Septic tank			50 persons	26,939
Design –3	Primary Health Centre			375 cum Carpet area	13,62,426
Design –4	Community hall			150 persons	41,31,702
Design –5	Vegetable Market			10 Shops	15,95,748
Design –6	Recreational Centre			750 cum Carpet area	20,87,324

Table 10.1 conclusion sheet

Chapter 11
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Chapter 12 Annexure attachment

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	KoliyaK
Name of Taluka:	Bhavnagar
Name of District:	Bhavnagar
Name of Institute:	Goverynent Engineering College, Bhavnagar
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch Shri. Gram panchayat.
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	2422			600
ii)	2011	4724			750

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	21.98 Hact.
	Forest Area (In hect.)	65.60 Hect.
	Agricultural Land Area (In hect.)	13.39 Hact.
	Residential Area (In hect.)	16.28 Hact.
	Other Area (In hect.)	1.54 Hect.
	Water bodies	0.77. Hact.
	Nearest Town with Distance:	Bhavnagar 26 Kms

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1.	Farmers
	2.	Labours
	3.	Fisher

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	Treated	✓	✓	
	• RO Water	–			
	• Well (Covered/ Uncovered)	Both	✓		
	• Hand pumps	–		✓	
	• Tube well/ Borehole	4- Nos.	✓		
	• River/ Canal/ Spring/ Lake/ Pond	–	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	✓		
	Underground Sump	Capacity:	✓		
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	yes			
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	Closed	✓		
	If Open than Pucca / Kutchcha	–			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	Direct Discharged in Water bodies			
Suggestions if any:					

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Vishwakarma Yojana: Phase VIII
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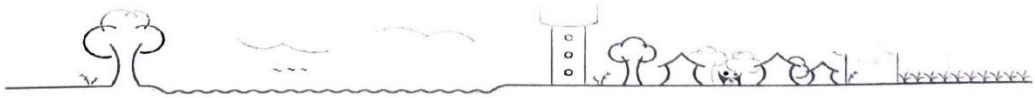
E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road		✓		All weather
	Main road	Bituminous	✓		
	Internal streets	Block paved	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH-37	✓		Passes through Koliyak
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No - 33 kms		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes Not in good Cond.			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto - Jeep	✓		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	More than 6 Hrs.	✓		
	Power supply for Domestic Use	More than 6 Hrs.	✓		
	Power supply for Agricultural Use	8 Hrs.		✓	
	Power supply for Commercial Use	-	✓		
	Road/ Street Lights	Available		✓	Not working



3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1.	Farmers
	2.	Labours
	3.	Fisher

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	Treated	✓		
	• RO Water	–		✓	
	• Well (Covered/ Uncovered)	Both	✓		
	• Hand pumps	–		✓	
	• Tube well/ Borehole	4- Nos.	✓		
	• River/ Canal/ Spring/ Lake/ Pond	–	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	✓		
	Underground Sump	Capacity:	✓		
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	yes			
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	Closed	✓		
	If Open than Pucca / Kutchcha	–			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	Direct Discharged in Water bodies			
Suggestions if any:					

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road		✓		All weather
	Main road	Bituminous	✓		
	Internal streets	Block paved	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH-37	✓		Passes through Koliyak
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No - 33 kms		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes Not in good Cond.			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto - Jeep	✓		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	More than 6 Hrs.	✓		
	Power supply for Domestic Use	More than 6 Hrs.	✓		
	Power supply for Agricultural Use	8 Hrs.		✓	
	Power supply for Commercial Use	-	✓		
	Road/ Street Lights	Available		✓	Not working

	Electrification in Government Buildings/ Schools/ Hospitals	Available	✓		
	Renewable Energy Source Facilities (Y/ N)	No		✓	
	LED Facilities	No		✓	
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	✓		1 No.
	Location Condition	Near Gram Panchayat			good
	Community Toilet (With bath/ without bath facilities)	No		✓	
	Solid & liquid waste Disposal system available	No		✓	
	Any facility for Waste collection from road	No		✓	
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	River Canal Tube well	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	90 % 10 %			

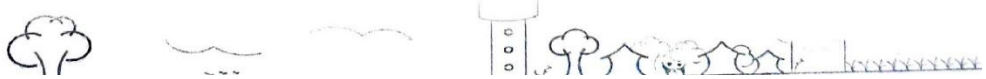
5. Social Infrastructural Facilities:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	Government Hospital	✓		25 Bed good condition
	Private Clinic/Private Hospital/ Nursing Home	Yes			5 Nos
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

L.	Education Facilities:				
	Aaganwadi/ Play group	Yes	✓		4 Nos
	Primary School	Yes	✓		5 Nos.
	Secondary school	Yes	✓		1 Nos.
	Higher sec. School	Yes	✓		1 Nos.
	ITI college/ vocational Training Center	No		✓	
	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: 24....kms.				
Suggestions if any:					

M.	Socio- Culture Facilities				
	Community Hall (With or without TV) Location:	No		✓	



	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	No		✓	
	Public Garden Location: Condition:	No		✓	
	Village Pond Location: Condition:	No		✓	
	Recreation Center Location: Condition:	Mishkulank Temple 3 kms.	✓		
	Cinema/ Video Hall Location: Condition:	No		✓	
	Assembly Polling Station Location: Condition:	No		✓	
	Birth & Death Registration Office Location: Condition:	Yes Gram Panchayat good	✓		
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	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	No		✓	
	Internet Cafes/ Common Service Center/Wi Fi	Yes	✓		
	Other Facility	-			
Suggestions if any:					

6. Sustainable /Green Infrastructure Facilities:

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

7. Data Collection From Village

Village Base Map Available: Hard Copy/Soft Copy	

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)	Yes	Bus stand Repair
2.	Additional Information/ Requirement		

9. Smart Village Proposal Design

Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

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

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

તલાટી/મંત્રી
ડોળીયાડ
તા.જી. ભાવનગર.

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	Bhavnagar
Name of Taluka:	Bhavnagar
Name of Village:	Budhel
Name of Institute:	Government Engineering College, Bhavnagar.
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Grampanchayat Member Kuldeepsinh Mori
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	7760	3974	3786	1355

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1162.81
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	841.30
4.	Residential Area (In hect.)	260.25
5.	Other Area (In hect.)	—
6.	Distance to the nearest railway station (in kilometers):	18 Kms. Bhavnagar

7.	Name of Nearest Town with Distance:	10 kms. Bhavnagar
8.	Distance to the nearest bus station (in kilometers):	2 kms Budhel Bus Stop
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.	Farmers
	2.	Labours
	3.	Workers
Major crops grown in the village:	1.	Cotton
	2.	Bajara
	3.	Sesame

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 Unprotected Spring			✓	
4.	Rainwater Tanker Truck Cart With Small Tank **SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump Other(Specify)**Lake/ Pond**			✓	

Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:		Yes	
	Underground Sump	Capacity:		Yes	
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	closed	Yes		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM/RCC	✓		
	Main road	RCC	✓		
	Internal streets	Block paved	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	3 kms	✓		
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	18 kms		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)		✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto	✓		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	> 6 Hrs	✓		

	Power supply for Domestic Use	> 6Hrs	✓		
	Power supply for Agricultural Use		✓		
	Power supply for Commercial Use	> 6Hrs	✓		
	Road/ Street Lights	✓	✓		
	Electrification in Government Buildings/ Schools/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)		✓		
	LED Facilities		✓		

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	3	✓		
	Location Condition	good			
	Community Toilet (With bath/ without bath facilities)			✓	
	Solid & liquid waste Disposal system available			✓	
	Any facility for Waste collection from road		✓		

Suggestions if any:

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

Suggestions if any:

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

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: ..10....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group		✓		
	Primary School		✓		
	Secondary school		✓		
	Higher sec. School		✓		
	ITI college/ vocational Training Center			✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities			✓	
	If any of the above Facility is not available in village than approx. distance from village: 10.....kms.				

51

Suggestions if any:

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

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	good		✓	
	Telecommunication Network/ STD booth	good		✓	
	General Market	good		✓	
	Shops (Public Distribution System)	good		✓	
	Panchayat Building	good		✓	
	Pharmacy/Medical Shop	good		✓	
	Bank & ATM Facility	good		✓	
	Agriculture Co-operative Society	good		✓	
	Milk Co-operative Soc.	good		✓	
	Small Scale Industries	good		✓	
	Internet Cafes/ Common Service Center/Wi Fi				✓
	Youth Club	good		✓	
	Mahila Mandal	good		✓	

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

Suggestions if any:

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

71

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			✓	
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)			✓	

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other		No Need
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?		Nill

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

સરપંચશ્રી
બુધેલ ગ્રામ પંચાયત
તા.જી. ભાવનગર

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	Bhavnagar
Name of Taluka:	Bhavnagar
Name of Village:	Shampara (Sidsar)
Name of Institute:	Government Engineering College, Bhavnagar.
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sanjay Bhai, Talati shri. Gram Panchayat.
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	1826 2	957	871	306

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	315.22 hect
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	Not Available
4.	Residential Area (In hect.)	—
5.	Other Area (In hect.)	—
6.	Distance to the nearest railway station (in kilometers):	Vartej 6 kms.

7.	Name of Nearest Town with Distance:	10kms Bhavnagar
8.	Distance to the nearest bus station (in kilometers):	3 Kms. Sidsar
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.	Farmers
	2.	Workers
	3.	Labours

Major crops grown in the village:	1.	Cotton
	2.	ground Nut
	3.	Sorghum

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 Unprotected Spring Rainwater Tanker Truck Cart With Small Tank			✓	
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump		✓		

	Other(Specify)Lake/ Pond		✓		
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	closed	Yes		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road		✓		
	Main road		✓		
	Internal streets		✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.		✓		
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	6 kms. Vartej		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)		✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto	✓		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	>6 HRS	✓		

3

	Power supply for Domestic Use		✓		
	Power supply for Agricultural Use		✓		
	Power supply for Commercial Use		✓		
	Road/ Street Lights		✓		
	Electrification in Government Buildings/ Schools/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)		✓		
	LED Facilities				
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.			✓	
	Location Condition				
	Community Toilet (With bath/ without bath facilities)			✓	
	Solid & liquid waste Disposal system available			✓	
	Any facility for Waste collection from road			✓	
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. OTHER (SPECIFY)		✓ ✓ ✓		
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	70% 30%			

41

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)		✓		2 Nos
	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: ..10....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group		✓		2 Nos.
	Primary School		✓		1 No.s.
	Secondary school		✓		1 No.s.
	Higher sec. School		✓	✓	
	ITI college/ vocational Training Center			✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities			✓	

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

Suggestions if any:

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

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

Suggestions if any:

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

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

Suggestions if any:

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

71

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			✓	
2.	Recent Projects going on for Development of Village		✓		Model school
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)			✓	

18

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		Not Needed
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?		Nil

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

12.4 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis

Village Facilities	Planning Commission/UDPFI Norms	Village Name: Shampara Population: 1898 Existing	Required as per Norms	Smart Vilage / Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	1	1.54		-0.46
Primary School	Each Per 2500 population	1	1.54		-0.54
Secondary School	Per 7,500 population	1	1		0
Higher Secondary School	Per 15,000 Population	0	1		-1
College	Per 125,000 Population	0	1		-1
Tech. Training Institute	Per 100000 Population	0	1		-1
Agriculture Research Centre	Per 100000 Population	0	1		-1
Skill Development Center	Per 100000 Population	0	1		-1
Health Facility		0	1		-1
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	0	1		-1
Primary Health & Child Health Center	Per 20,000 population	0	1		-1
Child Welfare and Maternity Home	Per 10,000 population	0	1		-1
Multispeciality Hospital	Per 100000 Population	0	1		-1
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	19.78		19.78
Physical Infrastructure Facilities					
Transportation		Adequate / Inadequate			
Pucca Village Approach Road	Each village	✓			
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)		✓		
Drinking Water (Minimum 70 lpcd)		Adequate / Inadequate ✓			
Over Head Tank	1/3 of Total Demand	✓			
U/G Sump	2/3 of Total Demand	✓			
Drainage Network - Open		Adequate / Inadequate ✓			
Drainage Network - Cover		✓			
Waste Management System		Adequate / Inadequate	✓		
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	1		-1
community hall and Public Library	Per 15000 Population	0	1		-1
Cremation Ground	Per 20,000 population	1	1		-1
Post Office	Per 10,000 population	0	0		-1
Gram Panchayat Building	Each individual/group panchayat	1	1		1
APMC	Per 100000 Population	0	0		0
Fire Station	Per 100000 Population	0	0		0
Public Garden	Per village	0	1		-1
Police post	Per 40,000Population	0	0		0
Shopping Mall					
Electrical Design					
Electricity Network		Adequate / Inadequate			
		✓			
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

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

Sr. no.	Village Name	Discipline	Phase - I	Phase - II
1.	**Shampara**	Civil	Rain Water Harvesting System	Village Bank
			Septic tank	Washing Ghat with Circulatory tank
			Primary Health Centre	Agricultural Product Market Building
			Community hall	Library
			Vegetable Market	Skill Training Institute
			Recreational Centre	Lake front for tourism development point
2.	**Songadh**	Civil	College Building	Secondary School Building
			Design of Septic Tank	Recreation center
			Design of Sports Complex	Rainwater harvesting system
			Bus Stand	Public Toilets & Baths
			Design of Shelter Home	Defense training center
			Agriculture Market Building	Science center/Museum/Similar building
3.	**Valukad**	Civil	Public Library	Vegetable Market building
			Public Bath & Toilet	RCC road
			Public Bus-Stand	Street Light network expansion
			Public Storage Building	Sports complex
			Public Hostel	Community hall
			Public Shelter Home	Lake front for tourism development point
4.	**Kalatalav**	Civil	Public Toilets & Baths	Rain water harvesting system
			Anganwadi	Under ground water sump
			Primary & Secondary School	Elevated storage reservoir

			Vegetable Market	Water supply distribution system
			Bank	Skill training institute
			Street Light	Zinga production and storage building
5.	**Dharuka**	Civil	Sustainable Design RCC Road	Post office
			Storage Building	Retaining & flood protection wall
			Rainwater Harvesting	Bituminous road
			Water Supply Storage and Distribution	Washing Ghat with Circulatory tank
			Sewerage System in Mafatnagar of Dharuka	Primary health center
			Recreation Centre	Defense training center
6.	**Bambhaniya**	Civil	Public Health Center	Bus stop
			Community Hall	Village Bank
			Street Light	Secondary School Building
			Drainage system	Vegetable Market building
			Elevated Service Reservoir	Recreation center
			RCC Road	Post office
7.	**Morchand**	Civil	Anganwadi Building	Bus stop
			Agricultural Product Market Building	RCC road
			Secondary School Building	Street Light network expansion
			Hostel Building	Sports complex
			Bank Building	Public Toilets & Baths
			Library Building	Community hall

Table 12.1 Summary Details of All the Villages

12.6 Drawings (If required, A1, A2, A3 design is not visible then only)

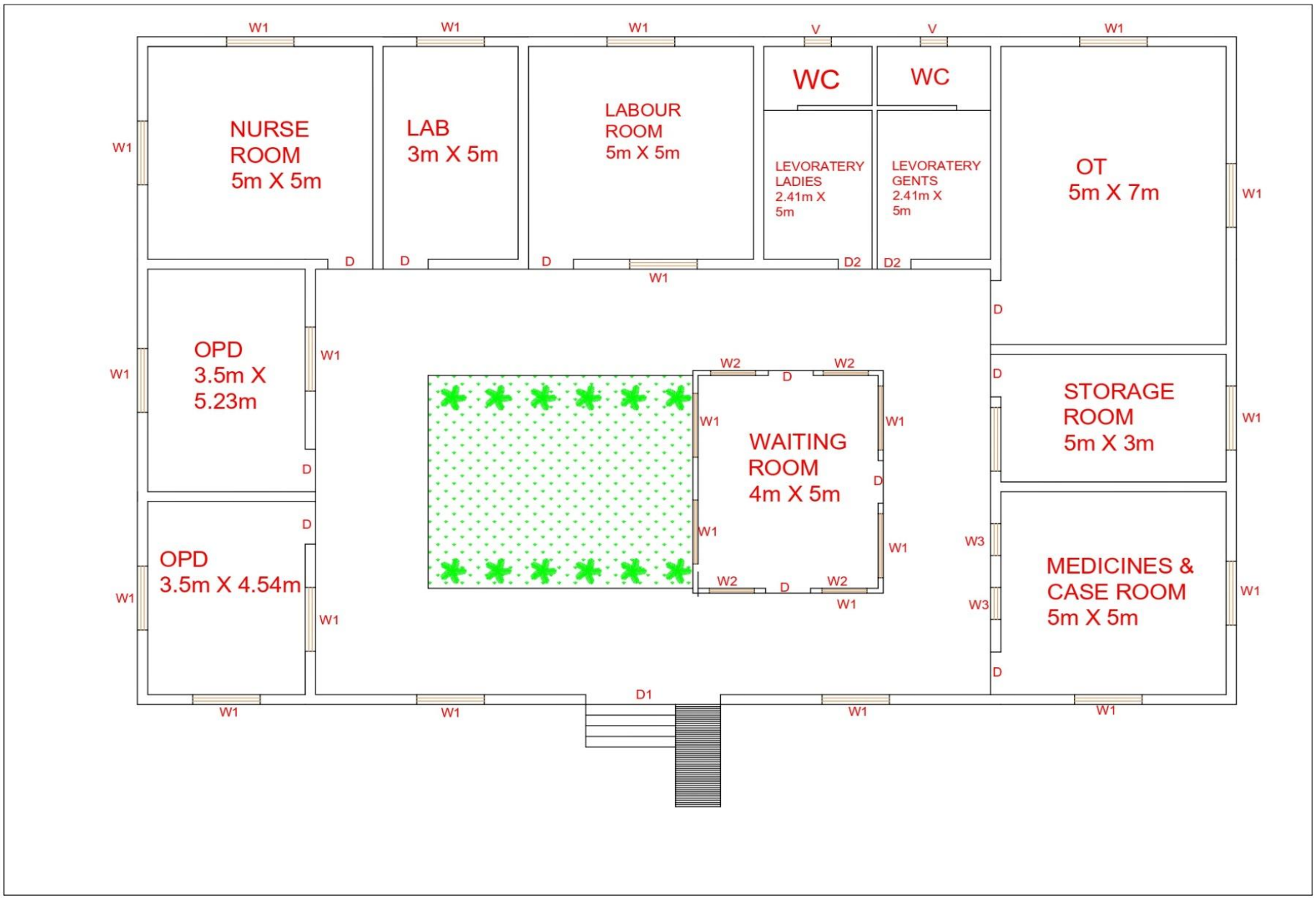


Figure 12.1 A3 design of PHC

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

Allocated Village: Shampara

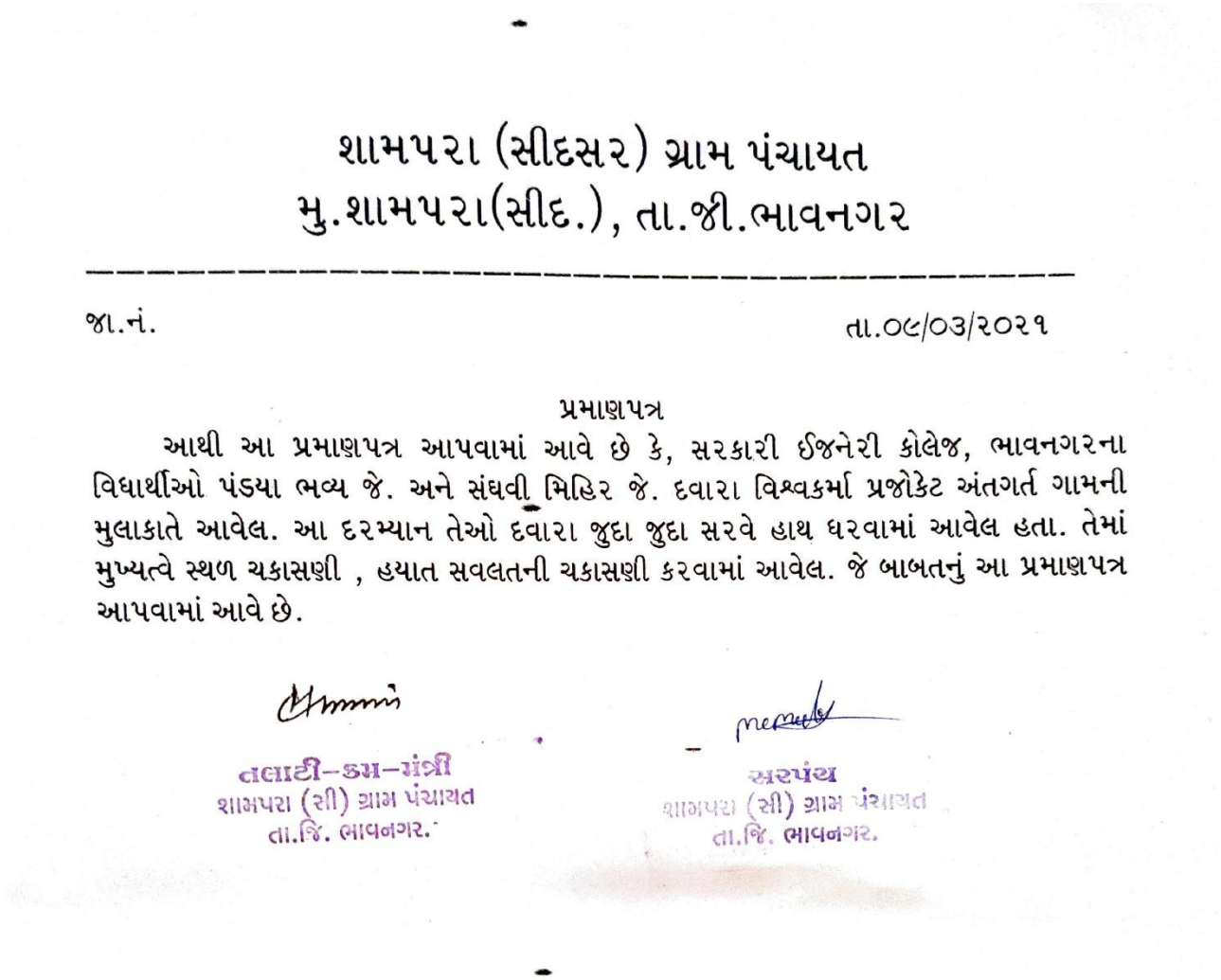
12.8 Village Interaction with Sarpanch Report with the photograph

By following Covid-19 measures, on the date of 14th December 2020 we visited Shampara village, we met Sarpanch Shri Mamtaben, Talati Mantri Shri Sanjaybhai and interacted them about village problems and current development scenario.

We talked about needs of villages, current trends and conditions. They helped us in data and survey process. After meeting them we came to know lot of new things about village. Sarpanch Shri and all the villagers were very enthusiastic about the Vishwakarma Project and its process. So overall interaction with all the villagers was fruitful.

Figure 12.2 Meeting with Sarpanch

12.9 Sarpanch Letter giving information about the village development



શામપરા (સીદસર) ગ્રામ પંચાયત
મુ.શામપરા(સીદ.), તા.જી.ભાવનગર

જા.નં. તા.૦૯/૦૩/૨૦૨૧

પ્રમાણપત્ર

આથી આ પ્રમાણપત્ર આપવામાં આવે છે કે, સરકારી ઈજનેરી કોલેજ, ભાવનગરના વિધાર્થીઓ પંડયા ભવ્ય જે. અને સંઘવી મિહિર જે. દવારા વિશ્વકર્મા પ્રજોકેટ અંતગર્ત ગામની મુલાકાતે આવેલ. આ દરમ્યાન તેઓ દવારા જુદા જુદા સરવે હાથ ધરવામાં આવેલ હતા. તેમાં મુખ્યત્વે સ્થળ ચકાસણી , હયાત સવલતની ચકાસણી કરવામાં આવેલ. જે બાબતનું આ પ્રમાણપત્ર આપવામાં આવે છે.

તલાટી-કમ-મંત્રી
શામપરા (સી) ગ્રામ પંચાયત
તા.જિ. ભાવનગર.

સરપંચ
શામપરા (સી) ગ્રામ પંચાયત
તા.જિ. ભાવનગર.

Figure 12.3 Sarpanch Letter

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

13.1 Design Proposals

13.1.1 Civil Design 1

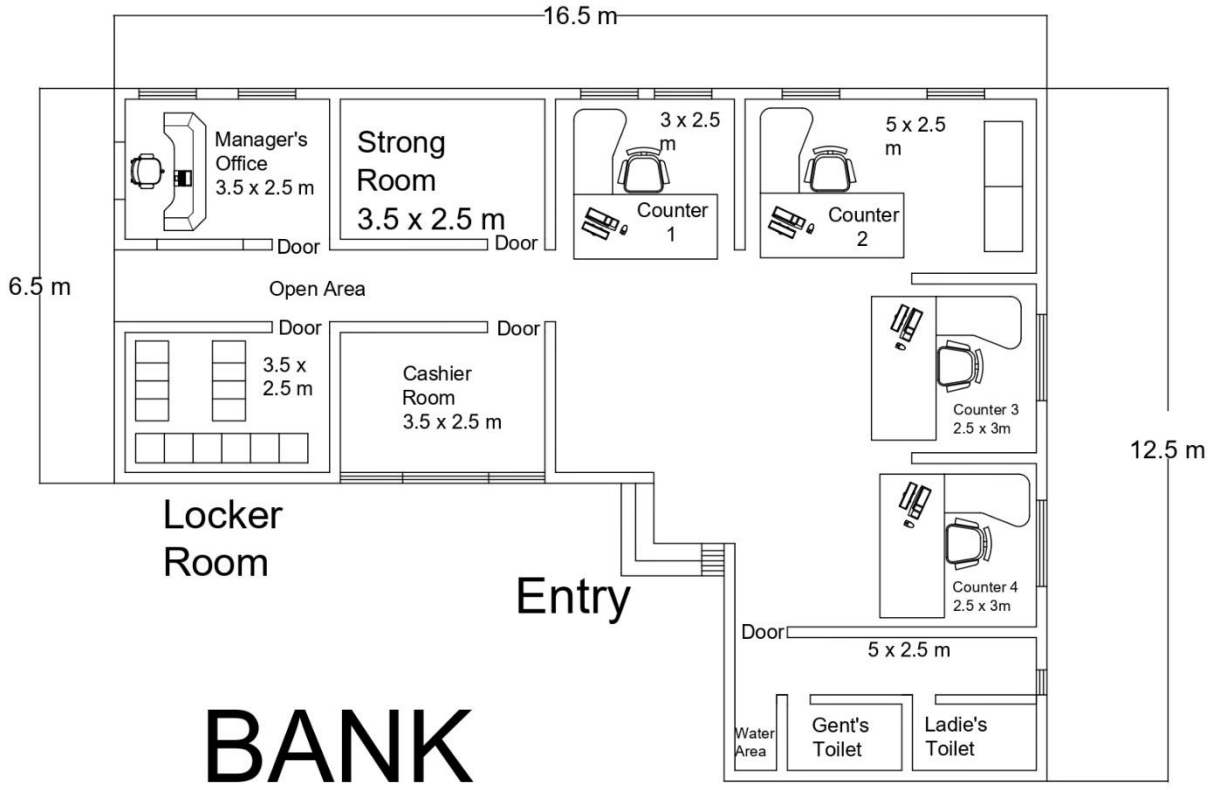


Figure 13.1 Bank

Sr. No.	Item Name	Nos.	L (M)	B (M)	H (M)	Quantity
						(m3)
1	Excavation for Building in soft Soil					
	(1) Long wall	3	16.5	1	1.5	74.25
		1	7	1	1.5	10.5
		2	5	1	1.5	15
	(2) Short wall	1	12.5	1	1.5	18.75
		4	6.5	1	1.5	39
		1	6	1	1.5	9
		3	2.5	1	1.5	4.25
						Total
						137.25
2	PCC Foundation					
	1) Long wall	3	16.5	1	0.15	7.425
		1	7	1	0.15	1.05
		2	5	1	0.15	1.5
	2) Short wall	1	12.5	1	0.15	1.875
		4	6.5	1	0.15	3.9
		1	6	1	0.15	0.9
		3	2.5	1	0.15	1.125
						Total 13.725
3	Brick masonry in foundation					
	Long wall Short wall footing 1					
	Long wall	3	16.5	0.7	0.45	15.5
		1	7	0.7	0.45	2.2

		2	5	0.7	0.45	3.25
	Short wall	1	12.5	0.7	0.45	3.9
		4	6.5	0.7	0.45	8.19
		1	6	0.7	0.45	1.89
		3	2.5	0.7	0.45	2.36
	Footing 2					
	Long wall	3	16.5	0.25	0.3	3.41
		1	7	0.25	0.3	0.48
		2	5	0.25	0.3	0.69
	Short wall	1	12.5	0.25	0.3	0.8265
		4	6.5	0.25	0.3	1.79
		1	6	0.25	0.3	0.414
		3	2.5	0.25	0.3	0.51
						Net brick masonry =
						44.5
4	RCC work plinth, beam, concrete					29.55
5	Murum filling in plinth at aprox					60
6	DPC on plinth beam					
	Long wall	1	16.5	0.23		3.79
		1	7	0.23		1.61
		1	5	0.23		1.15
	Short wall	1	12.5	0.23		2.175
		1	6.5	0.23		1.45
		1	6	0.23		1.38
		1	2.5	0.23		0.575
						Total = 12.8

7	Plaster inside and outside	2	98.38		3.56	700
8	Flooring	1	120	2		240
9	Inside and external paint					
		2	98.38		3.96	700
10	Quantity of steel					4800 kg
11	Safety grill and pipe lumpsump					2000 kg

Table 13.1 Measurement sheet Bank

Item Name	Quantity	Rate	Per	Amount
Excavation for foundation upto 1.5 m depth	137.25	119	m3	16332
PCC 1:3:4	13.725	2255	m3	30949
Brick work using common burnt clay building bricks	44.5	3114	m3	138573
RCC work	29.55	3800	m3	113544
Plastering internal and external	700	130	m3	91000
Flooring	240	760	m2	182400
Painting	350	72	m2	25200
Safety grill	2000	80	kg	160000
Total cost of building = 757998				
Add 3% contingencies = 22739 Add 5% work charge = 37899 Add 10% plumbing and sanitary = 151599 Add 20% Electrification = 278585 Total = 11,21,834 Rupees				

Table 13.2 Abstract sheet Bank

13.1.2 Civil Design 2

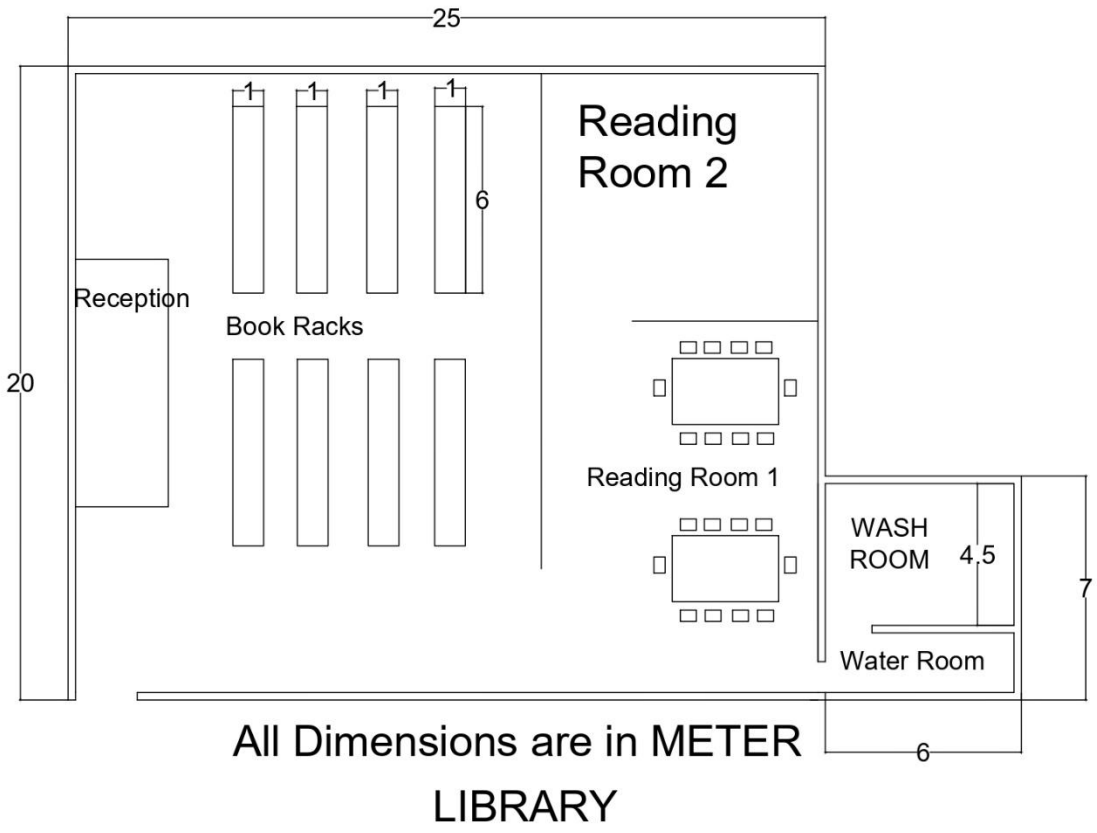


Figure 13.2 Library

Sr. No.	Item Name	Nos.	L (M)	B (M)	H (M)	Quantity
						(m3)
1	Excavation for Building in soft Soil					
	Long wall	2	25	1	1.5	75
		3	6		1.5	27
	Short wall	3	20	1	1.5	90
		1	7	1	1.5	10.5
						Total
						202.5
2	PCC Foundation					
	Long wall	2	2.5	1	0.15	7.5
		3	6	1	0.15	2.7
	Short wall	3	20	1	0.15	9
		1	7	1	0.15	1.05
						Total 20.25
3	Brick masonry in foundation					
	Long wall Short wall footing 1					
	Long wall	2	25	0.7	0.45	15.75
		3	6	0.7	0.45	5.67
	Short wall	3	20	0.7	0.45	18.9
		1	7	0.7	0.45	2.205
	Footing 2					
	Long wall	2	25	0.23	0.3	3.45
		3	6	0.23	0.3	2.07
	Short wall	3	20	0.23	0.3	4.14

		1	7	0.23	0.3	0.43
						Net brick masonry =
						52.668
4	RCC work plinth beam concrete					
	Long wall	1	25	0.23	0.3	1.725
		1	6	0.23	0.3	0.474
	Short wall	1	20	0.23	0.3	1.35
		1	7	0.23	0.3	0.483
	Main slab beam					
	Long wall	2	25	0.23	0.3	3.45
		1	6	0.23	0.3	0.828
	Short wall	3	20	0.23	0.3	4.13
		1	7	0.23	0.3	0.413
						Total 12.90
5	Murum filling in plinth at aprox					86
6	DPC on plinth beam					
	Long wall	1	25	0.23		5.75
		1	6	0.23		1.38
	Short wall	1	20	0.23		4.6
		1	7	0.23		1.61
						Total = 13.34
7	Plaster inside and outside	2	120		4	960
8	Flooring	1	150	2		300
9	Inside and external paint					
		2	120		4	960

10	Quantity of steel				5000 kg
11	Safety grill and pipe lumpsump				2100 kg

Table 13.3 Measurement sheet Library

Item Name	Quantity	Rate	Per	Amount
Excavation for foundation upto 1.5 m depth	202.5	119	m3	24097.5
PCC 1:3:4	20.25	2255	m3	45663.75
Brick work using common burnt clay building bricks	52.668	3114	m3	164008
RCC work	12.90	3800	m3	49020
Plastering internal and external	960	150	m3	144000
Flooring	270	800	m2	216000
Painting	960	80	m2	76800
Safety grill	2100	90	kg	189000
				Total cost of building = 908500
				Add 3% contingencies = 27255 Add 5% work charge = 45425 Add 10% plumbing and sanitary = 181700 Add 20% Electrification = 181700 Total = 1344580 Rupees

Table 13.4 Abstract sheet Library

13.1.3 Civil Design 3

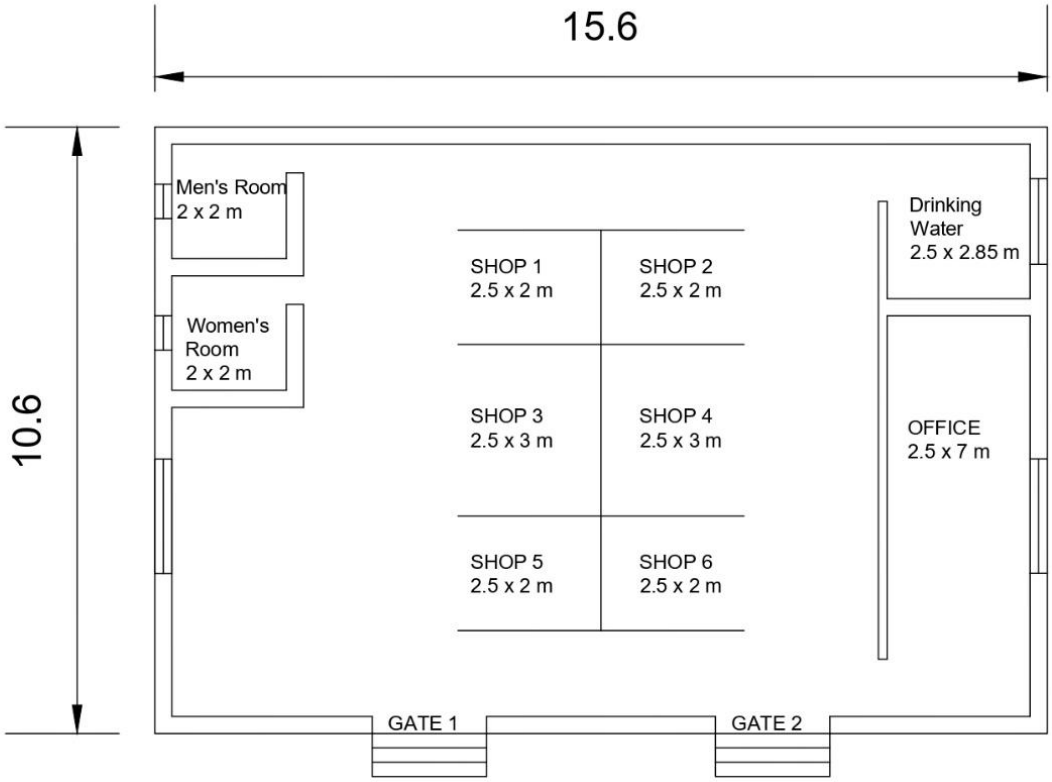


Figure 13.3 Agricultural product market building

Sr. No.	Item Name	Nos.	L (M)	B (M)	H (M)	Quantity
						(m3)
1	Excavation for Building in soft Soil					
	(1) Long wall	2	16.35	0.9	1.1	32.37
	(2) Short wall	2	9.4	0.9	1.1	18.61
						50.98 m3
2	BBCC (1:4:8)	2	16.35	0.9	0.2	5.88
	1) Long wall	2	9.4	0.9	0.2	3.38
	2) Short wall					––– 9.26m3
3	Brick masonry up to plinth					
	1) Long wall					
	· Step 1					
	· Step 2	2	15.95	0.5	0.3	4.785
	· Step 3	2	15.85	0.4	0.3	3.8
	2) Long wall	2	15.75	0.3	0.85	8.03
	· Step 1	2	9.8	0.5	0.3	2.94
	· Step 2	2	9.9	0.4	0.3	2.376
	· Step 3	2	10	0.3	0.85	5.1
						27.031m3
4	Brick masonry above plinth	2	0.3	3	15.75	28.35
	1) Long wall	2	0.3	3	10	18
	2) Short wall Deduction=6.556 m3					––– 46.35m3
					46.35-	
					6.556 = 39.80 m3	
5	R.C.C Slab, lintel, chajja	1	15.75	10.6	0.12	20
	1. Slab	W1=6 W2=1	1.8	0.6	0.1	0.648

	2. Chajja		1.5	0.6	0.1	0.09
		_	_	_	_	0.82 m3
						21.56 m3
6	Earth filling	1	15.15	10	0.55	83.32m2
7	Internal smooth plaster					
	1. long wall	2	15.15	-	3	90.9
	2. short wall	2	10	-10	3	60
	3. ceiling Deduction	1	15.15	-	_	151.5
		-	-		-	9.55
					302.4-	
					9.55=	292.85m2
8	Outer plaster					
	1. long wall	2	15.75	-	3.1	97.65
	2. short wall	2	10.6	-	3.1	65.72
	3. Deduction	-	-	-	-	9.55 m2
					163.37-	153.82 m2
					9.55=	

Table 13.5 Measurement sheet Agricultural product market building

Item Name	Quantity	Rate	Per	Amount
Excavation for Bus stand	50.98	85	m3	4333.3
BBCC (1:4:8)	9.26	2700	m3	25002
Brick masonry up to plinth	27.031	3200	m3	86499.2
Brick masonry above plinth	39.80	3500	m3	139300
R.C.C Slab, lintel ,chajja	21.56	8800	m3	189728
Earth filling	83.32	50	m3	4166
Internal smooth plaster	292.85	150	m2	43927.5
Outer plaster	153.82	150	m2	23073
Total cost of building = 516029 Rs				

Table 13.6 Abstract sheet Agricultural product market building

13.1.4 Civil Design 4

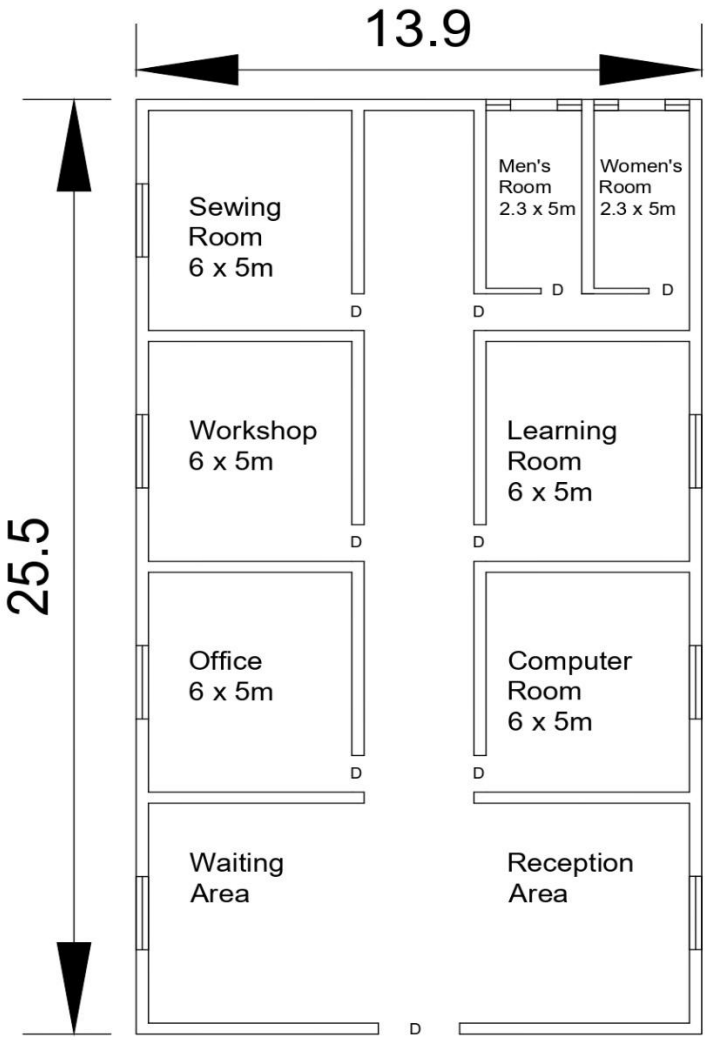


Figure 13.4 Skill Training institute

No.	Item Description	No.	Length	Breadth	Height	Quantity
1	Excavation in foundation					
	Long wall 1	2	26.1	0.9	1.4	65.772
	Long wall 2	2	19.8	0.9	1.4	49.896
	Long wall 3	1	7.2	0.9	1.4	9.072
	Short wall 1	3	12.7	0.9	1.4	48.006
	Short wall 2	4	4.4	0.9	1.4	22.176
	Below steps (Assume depth .2 m.)	1	1.2	0.6	0.2	0.144
						195.06 m^3
	Long wall 1	2	26.1	0.9	0.4	18.792
	Long wall 2	2	19.8	0.9	0.4	14.256
	Long wall 3	1	7.2	0.9	0.4	2.592
	Short wall 1	3	12.7	0.9	0.4	13.716
	Short wall 2	4	4.4	0.9	0.4	6.336
3	Brick work upto plinth in c.m. (1:6)					
	(1) Long wall 1					
	Step 1	2	25.8	0.6	0.4	12.384
	Step 2	2	25.7	0.5	0.4	10.28
	Step 3	2	25.6	0.4	0.75	15.36
	(2)Long wall 2					
	Step 1	2	19.5	0.6	0.4	9.36
	Step 2	2	19.4	0.5	0.4	7.76
	Step 3	2	19.3	0.4	0.75	11.58
	(3)Long wall 3					
	Step 1	1	6.9	0.6	0.4	1.656
	Step 2	1	6.8	0.5	0.4	1.36
	Step 3	1	6.7	0.4	0.75	2.01
	(4) Short wall 1					
	Step 1	3	13	0.6	0.4	9.36
	Step 2	3	13.1	0.5	0.4	7.86
	Step 3	3	13.2	0.4	0.75	11.88
	(5) Short wall 2					0
	Step 1	4	4.7	0.6	0.4	4.512

	Step 2	4	4.8	0.5	0.4	3.84
	Step 3	4	4.9	0.4	0.75	5.88
						115.08 m^3
4	DPC (1:2:4) above plinth walls					
	Long wall 1	2	25.3		0.4	20.48
	Long wall 2	2	19.6		0.4	15.44
	Long wall 3	1	6.7		0.4	2.68
	Short wall 1	3	13.2		0.4	15.84
	Short wall 1	4	4.9		0.4	7.84
						62.28 m2
5	Earth filing in plinth					
	ROOM	6	5	6	0.45	81
	OFFICE	1	6.5	6	0.45	17.55
	WC	1	6.5	6	0.45	17.55
	PASSAGE	1	18.6	2.7	0.45	22.599
						138.7 m3
6	Brickwork in super structure in cement					
	Long wall 1	2	25.5	0.3	3	45.9
	Long wall 2	2	19.2	0.3	3	34.56
	Long wall 3	1	6.6	0.3	3	5.94
	Short wall 1	3	13.3	0.3	3	35.91
	Short wall 2	4	5	0.3	3	18
	Partition wall					
						179.44 m^3
	Deduction for door/windows:					14.6 m3
	Deduction for lintels: 15cm bearing					1.38 m3
						Net quantity = 163.46 m^3
7	Brick work for step	1				0.216 m^3
8	2cm thick marble flooring	1				312.9 m^2
9	Wood work for door-window (sq.m)	1				52.2 m2
10	RCC work in slab, chajja and lintel					

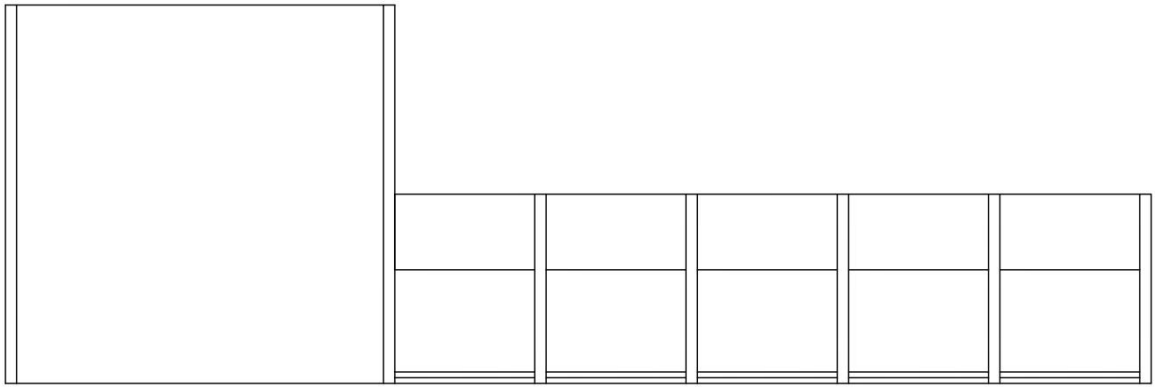
	RCC Slab	1	25.5	19.2	0.12	58.752
	RCC Chajja	10	1.2	0.6	0.1	2.1
						60.85
11	Smooth plaster on inside walls and ceiling	1				982.02 m2
	Deduction for doors/windows:					53.7 m2
						Net = 928.32 m2
	Outer side plaster up to parapet wall					316.8
	Deduction					53.7
						Net = 259.1 m2

Table 13.7 Measurement sheet Skill training institute

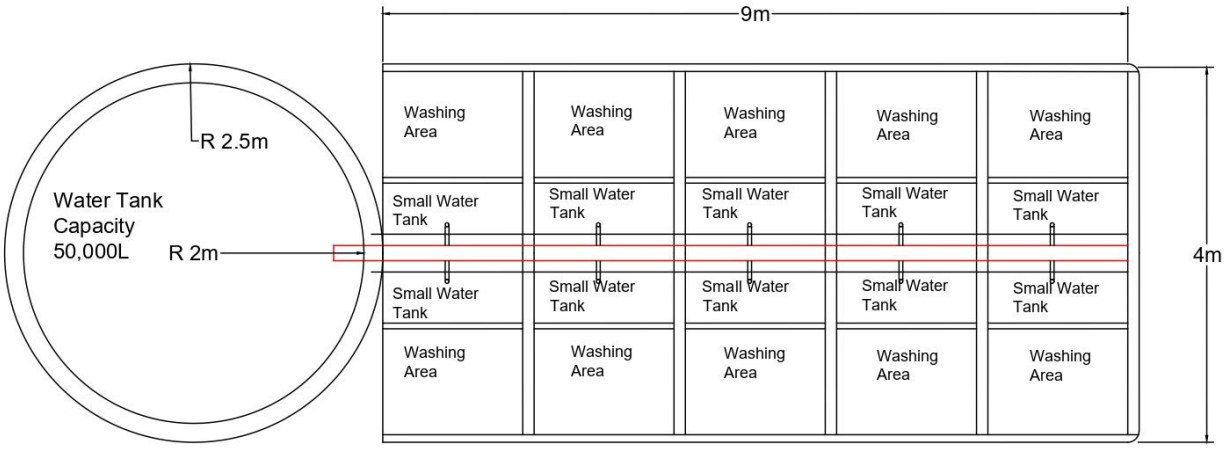
No.	Item Description	Qty.	Rate	Per	AMOUNT
1	Excavation in foundation	195.06	85	m3	16580.1
2	BBCC (1:3:6)	55.69	2700	m3	
					150363
3	Brick work up to plinth in cm (1:6)	115.08	3200	m3	
					368256
4	DPC (1:2:4) above plinth walls	62.28	150	m2	
					9342
5	Earth filing in plinth	138.7	50	m3	
					6935
6	RCC work for slab , Chajja and	60.85	8800	m3	
					535480
7	Brickwork for steps	0.216	3200	m3	
					691.2
8	2cm thick marble flooring	312.9	500	m2	
					156450
9	Wood work for door-window	52.2	7800	m2	
					407160
10	Smooth plaster inside, outer side and				
	Ceiling in cm (1:3)	1187.1	150	m2	
					178065
11	Brick work for in Super structure	163.46	3500	m3	
					572110
				Rs.	2401432
				Add 5%	120071
				Rs.	2521503

Table 13.8 Abstract sheet Skill Training Institute

13.1.5 Civil Design 5



ELEVATION



PLAN

Figure 13.5 washing ghat

SR	DESCRIPTION	NO	LENGTH(M)	WIDTH(M)	HEIGHT(M)	QUANTITY
1	EARTHWORK	1	44	0.6	1	26.4
	TOTAL CENTER LINE LENGTH					
	FOR WASHING	1	25		0.57	14.25
2	P.C.C. (1:4:8)					

	FOR 230 MM	1	44	0.6	0.57	15
	FOR CIRCULAR	1	25		0.57	14.25
3	BRICK					
	400 THICK	1	44	0.4	0.2	3.52
	300 THICK	1	44	0.3	0.2	22
	230 THICK	1	44	0.23	0.9	9
4	WASHING	1	44	0.23	0.3	3
5	SMOOTH	1	44		0.3	13.2 M2
6	CONCRETE	1	9		3.4	30.6
	SLAB AREA =	1	25		0.115	2.875
	BASE SLAB	1	2	7.5		15
7	STEEL					1166.5 KG

Table 13.9: Measurement sheet of washing ghat

ITEM NAME	QUANTITY	RATE IN RS	PER	AMOUNT IN RS.
EXCAVATION	40.65	85	CUB. M	3455
PCC(1:4:8)	29.5	2700	CUB. M	79650
BRICK MASONARY UPTO PLINT	15.16	3200	CUB. M	48512
BRICK MASONARYABOVE PLINTH	3	3500	CUB. M	105 00
PLASTERING	13.2	150	SQ. M	1980
CONCRETE WORK	48.225	2000	CUB. M	96450
STEEL WORK	1166.5	56	KG	65324
				305871 Rs
WATER SUPPLY EQUIPMENT COST 50 PERCENT				152935
TOTAL				458806 Rs

Table 13.10: Abstract sheet of washing ghat

13.1.6 Civil Design 6

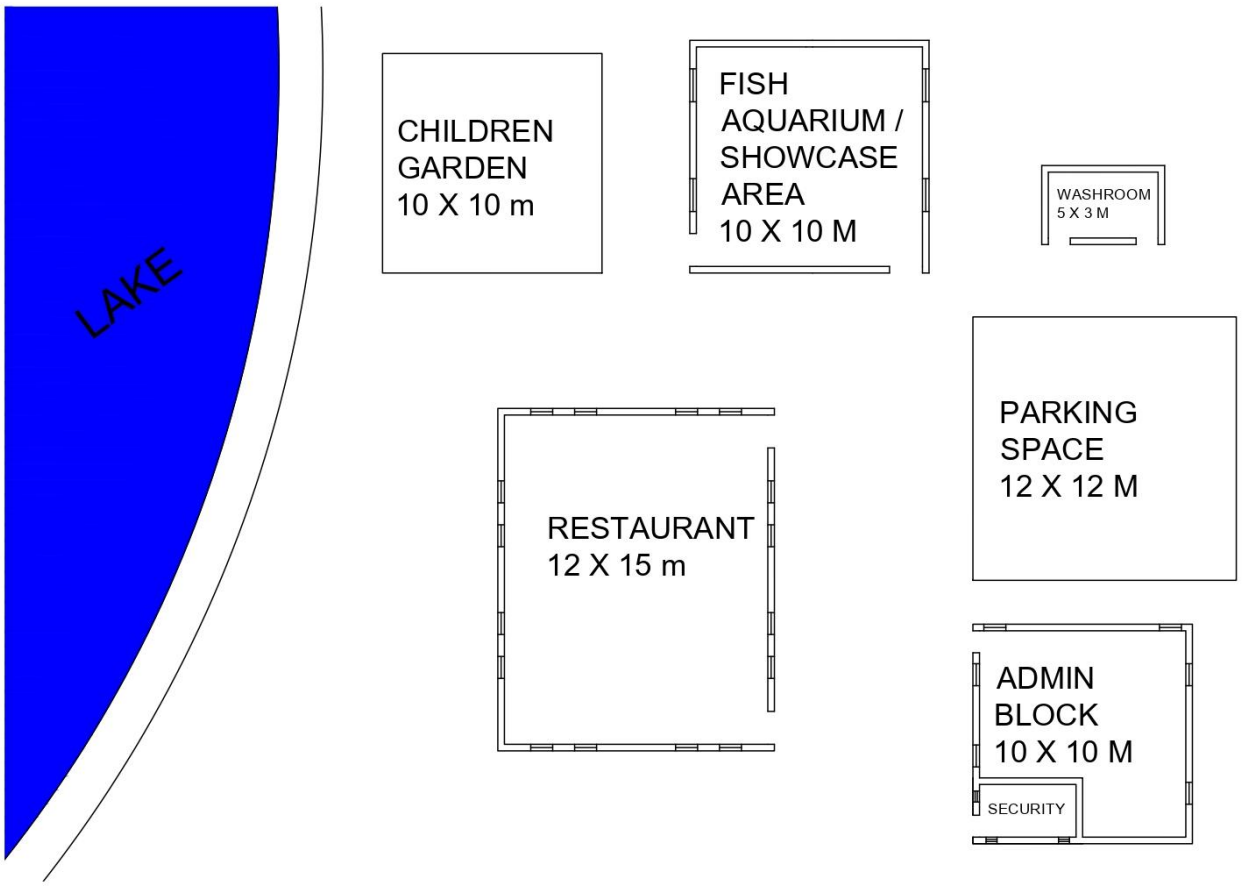


Figure 13.6 lake front

SR NO.	DESCRIPTION	NO	LENGTH(M)	WIDTH(M)	HEIGHT(M)	QUANTITY M3
1	EARTHWORK IN ESCAVATION FOR FOUNDATION					
	TOTAL CENTER LINE LENGTH = 266 m	1	266	0.9	1.1	263.34
2	P.C.C. (1:4:8) FOR FUNDATION	1	266	0.9	0.2	47.88
3	BRICK MASONARY UPTO PLINTH LEVEL					
	1^{ST} STEP:	1	267.7	0.5	0.3	40.16
	2^{ND} STEP:	1	268.2	0.4	0.3	32.184
	3^{RD} STEP:	1	269	0.3	0.85	68.59
	FOR STEPS					
	1^{ST} STEP L=1.1	1	1.1	0.9	0.15	0.15
	2^{ND} STEP	1	1.1	0.6	0.15	0.10
	3^{RD} STEP	1	1.1	0.3	0.15	0.05
4	BRICK MASONARY WORK ABOVE PLINTH LEVEL UPTO SLAB LEVEL	1	268	0.2	3	160.8
5	RCC, SLAB, LINTEL, CHHAJJA					
	SLAB	1	54	56	0.12	362.88
	LINTELS OVER DOORS	10	15	0.6	0.1	0.9
6	EARTH FILLING	1	54	56	0.55	1663.2
7	PLASTERING					
	INSIDE & OUTSIDE	2	266		3	1596
	DEDUCTION OF OPENING					
	DOOR	8	1.5		2.1	25.2

	WINDOW	18	1.5		0.9	24.3
	TOTAL PLASTERING					1546.5

13.11 Measurement sheet lake front

ITEM NAME	QUANTITY	RATE IN RS	PER	AMOUNT IN RS.
EXCAVATION	263.34	85	CUB. M	22384
PCC(1:4:8)	47.88	2700	CUB. M	129276
BRICK MASONARY UPTO PLINT	200	3200	CUB. M	640000
BRICK MASONARYABOVE PLINTH	160.8	3500	CUB. M	562800
R.C.C SLAB,LINTEL,CHHAJJA	363.78	8800	SQ.M	3201264
EARTH FEELING	1663.2	50	CUB. M	83160
INNER AND OUTER PLASTER	1546.5	150	SQ. M	231975
TOTAL				4870859
STEEL	7000	56	KG	392000
CONTACTOR PROFIT 10 PERCENT				526285
EQUIPMENT COST 20 PERCENT				1052571.78
ELECTRIFICATION 10 PERCENT				526285
TOTAL COST				736802.46

13.12 Abstract sheet lake front

13.2 Reason for Students Recommending this Design

- Bank - There is no bank available, so for financial transactions it is needed
- Skill Training Institute - Villagers want to become self-dependent, that is why needed
- Library- There are many students in the village, for their development Library is required
- Agriculture Product Market Building- Villagers have to go nearest city to by Agro products.
- Washing Ghat with Circulatory tank - There is no infrastructure available for washing.
- Lake Front for tourism development point - For tourism boost this is required.

13.3 About designs Suggestions / Benefit of the villagers

- Bank – Village economy will be boosted.
- Skill Training Institute – Self dependency of village would be gained by this institute.
- Library- Literacy rate will be improved.
- Agriculture Product Market Building- Villagers can buy Agro products so it will save fuel and time.
- Washing Ghat with Circulatory tank – poor villagers can wash their cloths easily
- Lake Front for tourism development point – More tourist will come to village.

CHAPTER 14. Technical Options with Case Studies

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant Building

Earthquake-resistant structures are structures designed to protect buildings from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during seismic activity than their conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location. Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest. These range from appropriately sizing the structure to be strong and ductile enough to survive the shaking with an acceptable damage. The conventional approach to earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to reduce the earthquake-generated forces acting upon it.

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

1. Base Isolation

2. Energy Dissipation Devices

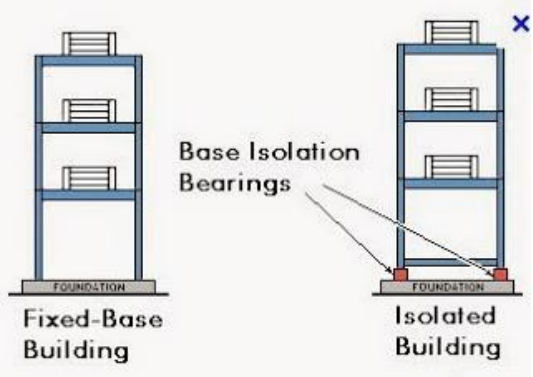


Figure 14.1 Base Isolation

A base isolated structure is supported by a series of bearing pads which are placed between the building and the building's foundation. 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. To get a basic idea of how base isolation works, examine Figure. This

shows an earthquake acting on both a base isolated building and a conventional, fixed-base, and building. As a result of an earthquake, the ground beneath each building begins to move. In Figure, 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. By contrast, even though it too 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.

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 (prefacing) of fluids within the damped

Earthquake-Resistant Materials

While shock absorbers, pendulums, and "invisibility cloaks" may help dispel the energy to an extent, the materials used in a building are equally responsible for its stability. Steel and Wood

For a building material to resist stress and vibration, it must have high ductility — the ability to undergo large deformations and tension. Modern buildings are often constructed with structural steel - a component of steel that comes in a variety of shapes that allow buildings to bend without breaking. Wood is also a surprising ductile material due to its high strength relative to its lightweight structure.

Innovative Materials

Scientists and engineers are developing new building materials with even greater shape retention. Innovations like shape memory alloys have the ability to both endure heavy strain and revert to their original shape, while fiber-reinforced plastic wrap — made by a variety of polymers — can be wrapped around columns and provide up to 38% greater strength and ductility.

Engineers are also turning to natural elements. The sticky yet rigid fibers of mussels and the strength-to-size ratio of spider silk have promising capabilities in creating structures. Bamboo and 3D printed materials can also function as lightweight, interlocking structures with limitless forms that can potentially provide even greater resistance for buildings.

Over the years, engineers and scientists have devised techniques to create some effective earthquake-proof buildings. As advanced the technology and materials are today, it is not yet possible for building to completely withstand a powerful earthquake unscathed. Still, if a building is able to allow its occupants to escape without collapsing and saves lives and communities, we can consider that a great success.

14.1.2 Seismic Retrofitting of Buildings

Retrofitting means providing something with a component or feature not fitted during manufacture or adding something that it did not have when first constructed. It is often used in relation to the installation of new building systems, such as heating systems, but it might also refer to the fabric of a building, for example, retrofitting insulation or double glazing.

The process of retrofitting involves the careful balancing of different elements and their effects on the overall performance of a building. A change in one part of a building can affect another, and sometimes this is only apparent after irreversible defects have occurred. For example:

- Sealing buildings to improve their air-tightness can cause condensation problems.
- Insulating a roof without also ventilating it can cause decay of timber structure.
- Internal wall insulation will remove the benefits of thermal mass which may have a detrimental effect on fuel usage.

- External wall insulation will prevent the thermal store of heat from solar gain to be utilised within the building.
- Poorly installed cavity wall insulation can create cold spots that then have damp problems that are extremely difficult to rectify.
- Pre-existing problems can be covered up, and so more difficult to diagnose and rectify.

Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. With better understanding of seismic demand on structures and with our recent experiences with large earthquakes near urban centers, the need of seismic retrofitting is well acknowledged. Prior to the introduction of modern seismic codes in the late 1960s for developed countries (US, Japan etc.) and late 1970s for many other parts of the world (Turkey, China etc.),many structures were designed without adequate detailing and reinforcement for seismic protection. In view of the imminent problem, various research work has been carried out. State-of-the-art technical guidelines for seismic assessment, retrofit and rehabilitation have been published around the world – such as the ASCE-SEI 41 and the New Zealand Society for Earthquake Engineering (NZSEE)'s guidelines. These codes must be regularly updated; the 1994 Northridge earthquake brought to light the brittleness of welded steel frames, for example.

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

Figure 14.2 Seismic Retrofitting

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

The construction industry is repeatedly criticized for being inefficient and slow to innovate. The basic methods of construction, techniques and technologies have changed little since Roman times. But the application of innovation in the construction industry is not straight forward. Every construction project is different, every site is a singular prototype, construction works are located in different places, and involve the constant movement of personnel and machinery. In addition, the weather and other factors can prevent the application of previous experience effectively. The term advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies. Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money. However, there is often a conflict between traditional industry methods and innovative new practices, and this is often blamed for the relatively slow rate of technology transfer within the industry. The adoption of advanced construction technology requires an appropriate design, commitment from the whole project team, suitable procurement strategies, good quality control, appropriate training and careful commissioning. Advanced construction technologies are commonly described as including (amongst many others) advanced forms of:

3D Volumetric Construction

Using this modular construction technology, 3D units are produced in controlled factory settings using needful construction and building materials. Finished units are transported to site in various modules, basic structural blocks or final touched up units with all amenities installed, for assembly. Blocks can be erected rapidly at site and properties of concrete like fire retardant, sound resistivity, thermal mass etc. are retained.

Precast Flat Panel Modules

These are primarily wall and floor modules which are manufactured away from the actual site and then transported to site for erection. Load bearing components like decorative cladding and insulation panels can also be produced. Also called cross-wall construction, the technology has gained momentum due to seamless adherence to specifications and ease as well as swiftness of construction.

Figure 14.3 3D Printing

Tunnel Formwork System

With this tunnel technique, construction is paced up for cellular structures of repetitive patterns through the building of monolithic walls or units in a single operation per day. Expeditious work is achieved by deploying formwork and readily mixed concrete with the convenience and agility of factory conditions. Formworks in tunnel form are stacked and used at the site with cranes.

Flat Slabbing Technology

This technique utilizes the simplicity of contemporary formwork for quickly building flat slabs to facilitate easy and swift placing of horizontal amenities and for partitioning. Maximization of pre-fabricated services occurs as services can be carried out in an uninterrupted manner in zones underneath the floor slabs. Every top-notch building Construction Company is using the same as internal layouts can be conveniently modified for accommodating alterations at a later date. Further, reinforcement needed is lesser which cuts down labor costs significantly.

Pre-cast Foundation Technique

Foundations can be built swiftly with precast concrete units which are produced in a factory and are high on quality quotient. Strength is imparted to foundation related building construction materials through interconnected concrete piles. This technique allows construction work to progress even in inclement weather and minimizes excavation activity**.**

Hybrid Concrete Building Technique

This technique expedites construction turnaround time by blending the advantages of concrete pre-casting with the in-situ building. Quality improves, whereas the cost of construction plummets. Hybrid concrete structures are easy to build, competitive in nature and perform consistently.

Thin Joint Masonry Technique

Utilization of this technique leads to the reduction of the quantum of mortar applied by slashing it depth from 10mm to lesser than 3mm. Consequently, mortar can be laid swiftly with enhanced productivity on the longer wall panels. With large sized concrete blocks, higher construction efficiency along with significant cost reduction can be achieved. Within a single day, the number of mortar courses laid is higher as curing of mortar takes place quickly without compromising on bonding strength resulting in the elimination of floating problem.

Advanced equipment

1. Telematics

Telematics is one of the key technologies changing the way the construction industry does business. A telematics system can provide machine diagnostics alerts that help prevent downtime, theft, and misuse. Savage of Vermeer explains that many manufacturers are using telematics that allow the machine to communicate vital information to fleet managers and equipment owners.

Additionally, telematics provides a number of benefits to the construction industry including increased productivity, greater efficiency, and heighted security of the operations.

2. Integrated grade control systems

The second big technology impacting construction equipment today is grade control systems. Technology providers are often partnering with manufacturers to deliver advanced 3d grade control with no external masts or cables. This can reduce costs and risk of theft or damage to the equipment.

3. Payload weighing

Another way that construction equipment continues to advance is through payload weighing, which gives construction companies the ability to monitor material moved on a worksite.

4. Drones

The final technology that is playing a big role at the construction jobsite today is drones, also known as unmanned aerial vehicles. Drones, which were once viewed as primarily recreational, have now taken on the task of industrial work

Figure 14.4 Drones

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment

The Need for an Environmental Impact Assessment

An Environmental Impact Assessment is a formal method of judging the impact that any new developmental project would have on the environment and its constituents. This can include changes that the project would create in the physical aspects of existing geography, chemical changes to the atmosphere including air and water, biological changes that affect plant, animal and human life, cultural impact of a project on the society in the area, and other socio-economic effects that the project can have.

Such an assessment allows problems to be foreseen, so that the design and planning of the projects is modified to reduce any negative effects. It is now fashionable to build green buildings which have a

positive effect on the environment. 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.

Stages of Environmental Impact Assessment

Stage 1. Identification:

The first step is to define a project and study all the likely activities involved in its process so as to understand the range and reach of the project. This helps in deciding the possible zones of environmental impacts.

Stage 2. Screening:

Screening is done to see whether a project requires environmental clearance as per the statutory notifications. Screening criteria are based upon:

(i) Scales of investment

(ii) Types of development

(iii) Location of development

A project will have several ramifications biophysical or environmental, economic and social. Hence, it requires some degree of public participation. The law for EIA varies from country to country. If screening shows that a project necessitates EIA, it moves to the next stage. Some projects may not require EIA. It is generally determined by the size of the project and is sometimes based on the site-specific information. The output of the screening process is a document known as "Initial Environmental Examination or Evaluation (IEE)", based on which the decision is taken whether an EIA is needed and if so, to what extent.

Stage 3. Scoping and Consideration of Alternatives:

Scoping is the procedure of identifying the key environmental issues and is possibly the most important step in an EIA. Scoping means the scope or range of the EIA report. It undertakes the project's effect on the air, water, soil, noise level, air quality and physical impact. It identifies issues and concerns, decides the assessment methods, identifies affected parties and invites public participation for agreement on debatable issues. In which public participation involves interactions of all stakeholders including project beneficiaries, local people, private sectors, NGOs, scientists and other.

Stage 4. Impact Prediction:

Impact Prediction is a way of 'mapping' the environmental consequences of the significant aspects of the project and its alternatives. There are two steps in impact analysis:

(i) Identification:

Identification of the impacts would have been initiated in the scoping stage itself. These initial identifications may be confirmed and new ones are added as and when the investigations reveal.

(ii) Prediction of Impacts:

Predication of impacts is both qualitative and quantitative. The scale and severity of an impact is determined by whether it is reversible or irreversible. If the impact is reversible, then it may be taken as low impact. If the adverse impact cannot be reversed then the impact is said to be high.

Stage 5. Mitigation:

This stage includes recommended actions that can offset the adverse impacts of the project. This is done with the idea of lessening the negative effects and improving the scope for project benefits.

Mitigating measures may be:

(i) Preventive: public awareness programs

(ii) Compensatory: to reduce potential reactions

(iii) Corrective: putting into place devices and installations

Stage 6. Reporting To Decision-Making Body:

The project authorities have to furnish the following documents for environmental appraisal of a development project.

(i) Detailed project report (DPR)

(ii) Filled in questionnaire

(iii) Environmental impact statement (EIS): EIS should provide the possible impact (positive and negative) of the project.

Stage 7. Public Hearing:

After the completion of EIA report the law requires that the public must be informed and consulted on a proposed development after the completion of EIA report. Any one likely to be affected by the proposed project is entitled to have access to the executive summary of the EIA.

Stage 8. Review (EIA Report):

Once the final report is prepared, it may be reviewed based on the comments and inputs of stakeholders.

Stage 9. Decision-Making:

The final decision is based on the EIA to approve or reject the project. This is open to administrative or judicial review based on procedural aspects.

Stage 10. Post Project Monitoring & Environment Clearance Condition:

Once a project is approved, then it should function as per the conditions stipulated based on environmental clearance. These conditions have to be strictly monitored and implemented. Monitoring should be done during both construction and operation phases of a project. This is not only to ensure that the commitments made are complied with, but also to observe whether the predictions made in the EIA reports were correct or not.

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

Technique - SCADA project of Water supply

"SCADA" stands for "supervisory control and data acquisition." The SCADA system is essentially a distributed computer system that is used by operations and management for process monitoring and automation. As shown in Figure the SCADA communication network is spread throughout the water distribution system. Workstations, which are typically PC-based and located in a control room at a treatment plant, allow operators to view the entire process and perform control actions. Within the plant, process controllers or programmable logic controllers (PLC's) supervise unit processes, such as chemical treatment and filters. A local area network (LAN), such as Ethernet, links the controllers to the workstations as well as to one another. Remote terminal units (RTU's) are used at remote sites and usually exist in vulnerable areas, such as pump stations, storage tanks, valve vaults and treatment facilities. Today's RTU's are rugged versions of process controllers and operate in outdoor environments. The RTU's communicate on a wide area network that is typified by the radio system shown in the figure below. Traditionally a dial-up or leased telephone line system, the wide area network is now more often being implemented with wireless communication. Realistically, most SCADA systems do not fit the ideal scenario. Not all pump stations are equipped with RTU's. Not all vulnerable areas are covered by the network.

Utilizing the SCADA system to its fullest is the best way for water companies to leverage existing infrastructure and available resources. With such capabilities and coverage at your service, the SCADA system should not merely be one aspect of your operation to consider in a security assessment. Many companies have decided to make it central to their entire security effort.
A major advantage of SCADA systems is that security measures are coordinated with operations. Many security systems and other recommended measures are not necessarily coordinated and require significant effort to do so.

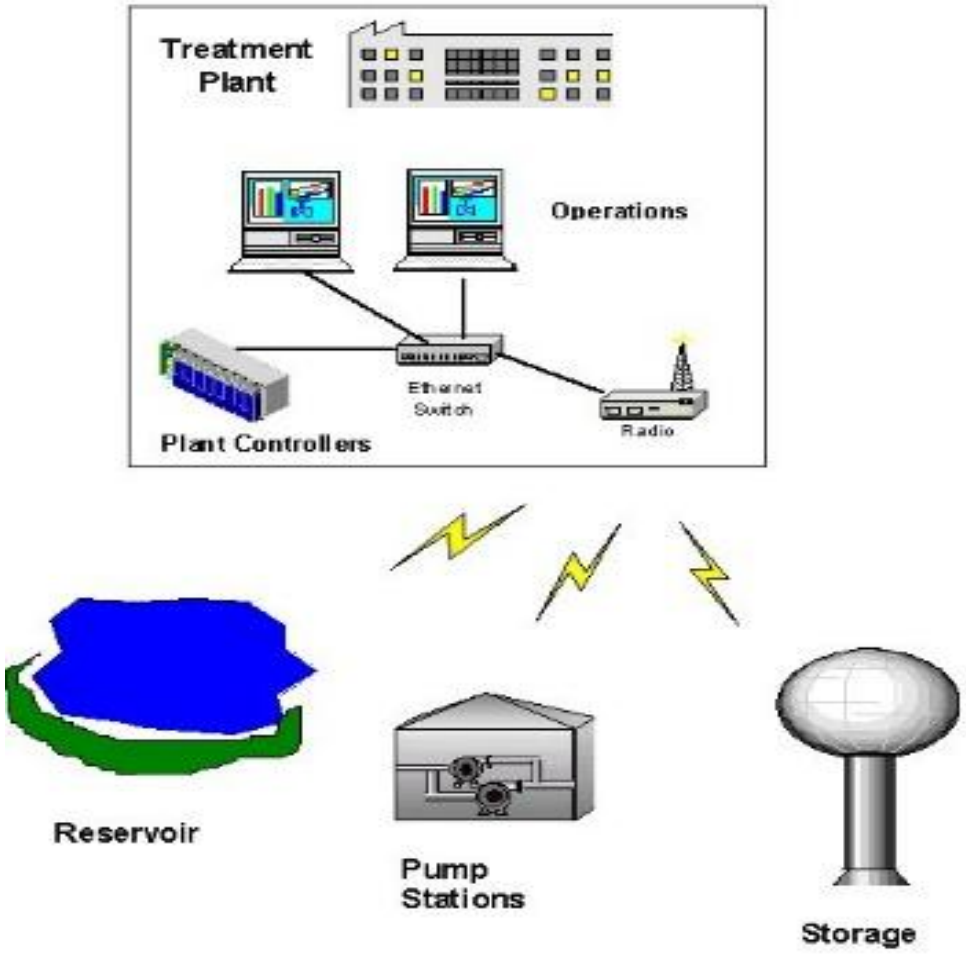


Figure 14.5 SCADA

Since SCADA systems exist in most water operations, they allow water companies to leverage existing infrastructure and available resources. The SCADA system is typically distributed throughout the entire operation. It should be central to a water company's security and, at the same time, can provide the added benefit of more efficient operation. The SCADA System can:

- Coordinate security measures with process operations
- Reduce or eliminate manned patrols; provide constant monitoring, system-wide
- Record alarms and events
- Automatically react to alarms and events by performing emergency shutdowns or other control actions
- Typically expand rather easily via additional I/O points, RTU devices and network links

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

Sr.	DESIGN NAME	PERIOD	COST	FEATURES
1	Rain Water Harvesting System	Within 1 year	3,36,564	It would improve water condition of the village
2	Septic tank	Immediately	26,939	It will create good environment in village
3	Primary Health Centre	Immediately	13,62,426	PHC will help to make village healthy and efficient. Transportation for emergency will be reduced
4	Community hall	Immediately	41,31,702	Currently social and religious gatherings go on in open spaces
5	Vegetable Market	Within 1 year	15,95,748	Economy of village will grow more after this design implementation.
6	Recreational Centre	Long term	20,87,324	Mental and Physical development can be seen in students of village
7	Bank	Within 1 year	11, 21,834	Village economy will be boosted.
8	Skill Training Institute	Long term	25,21,503	Self-dependency of village would be gained by this institute.
9	Library	Long term	13,44,580	Literacy rate will be improved.
10	Agriculture Product Market Building	Within 1 year	5,16,029	Villagers can buy Agro products so it will save fuel and time.
11	Washing Ghat with Circulatory tank	Long term	4,58,806	Village will become more clean and hygienic.
12	Lake Front for tourism development point	Long term	73,68,02	More tourist will come to village

Table 15.1 Impact on society

CHAPTER 16 Survey by Interviewing With Talati And/or Sarpanch

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	✓	ખેતી
2	What are the chances of employment in village?	✓	
3	What are the special technical facilities in village?	✗	
4	Is any debt on village dwellers?	✓	
5	Are village people getting agricultural help?	✓	
6	Is women health awareness Program organized in village?	✓	
7	Are women having opportunity to work and income?	✓	ખેતી
8	Child girl education is appreciated in village?	✓	
9	Facility of vaccination to child is available in village?	✓	
10	Are village people aware about child vaccination and done to each and every child as per norms?	✓	
11	Women help line number information is provided to village people?	✓	
12	Is water scarcity in village? How many days per year?	✓	
13	Is village under any debt?	✗	
14	Is any serious issue due to debt from bank or any person happened in village?	✓	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	✓	
16	Is any death of patient occurred due to unavailability of medical facility in village?	✓	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	✓	
18	Is village improvement is observed in comparative scenario from past to present?	✓	
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	✗	
20	Life Living standard of girls and women is appreciated and uplifted in village?	✓	

Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.

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

સરપંચ
શાગપરા (સી) ગ્રામ પંચાયત
તા.જિ. ભાવનગર.

CHAPTER - 17. Irrigation / Agriculture Activities and Agro Industry, Alternate Technics and Solution

To irrigate is to water crops by bringing in water from pipes, canals, sprinklers, or other man-made means, rather than relying on rainfall alone. Places that have sparse or seasonal rainfall could not sustain agriculture without irrigation. In areas that have irregular precipitation, irrigation improves crop growth and quality. By allowing farmers to grow crops on a consistent schedule, irrigation also creates more reliable food supplies. Ancient civilizations in many parts of the world practiced irrigation. In fact, civilization would probably not be possible without some form of irrigation. The earliest form of irrigation probably involved people carrying buckets of water from wells or rivers to pour on their crops. As better techniques developed, societies in Egypt and China built irrigation canals, dams, dikes, and water storage facilities. Ancient Rome built structures called aqueducts to carry water from snowmelt in the Alps to cities and towns in the valleys below. This water was used for drinking, washing, and irrigation. Modern irrigation systems use reservoirs, tanks, and wells to supply water for crops. Reservoirs include aquifers, basins that collect snowmelt, lakes, and basins created by dams. Canals or pipelines carry the water from reservoirs to fields. Canals and pipelines, just like the ancient Roman aqueducts, often rely on the force of gravity. Pumps may also move water from reservoirs to fields. Crops are irrigated by several methods: flooding an entire field, channeling water between rows of plants, spraying water through large sprinklers, or letting water drop onto plants through holes in pipes. There are some alternate techniques also.

Drip System: Water flows through narrow pipes laid on the fields and drips through small holes (emitters) directly at the place of plant roots. Roots absorb the water and nourish the plant. There is no water waste with this method, as less water is lost to evaporation, runoff and wind.

- Optimizes soil moisture, saving water
- Direct hydration of plant roots for plant health
- Inhibits weed growth since water is applied directly to plants, not spread around the field
- Bacterial growth is limited since area near plants is dry

Subsurface Drip System: When the water table is deep below the ground surface, plastic drip tubes or trickle emission devices are buried below the soil surface within plant root zones. This low-pressure method of irrigation can reduce water use by 25% compared to above ground sprinkler irrigation, and works well in irregular shaped fields and on slopes.

- Saves water and improves plant health by eliminating surface water run-off and evaporation
- Reduces weed growth and disease
- Useful in hot, dry, windy climates with limited water supply

There are several modern and sustainable ways of doing productive farming; ways that will be beneficial to both farmers and consumers. Many biotechnologists and agricutural researchers come

up with effective ideas to improve agricultural practices. However, their solutions and findings remain restricted to journals and other publications that are far from the reach of uneducated or local farmers.

Figure 17.1 Drip irrigation

Some of the modern techniques are:

- Genetic manipulation
- Intensive tillage
- Monoculture
- Use of synthetic fertilizers
- irrigation technologies

Modern agricultural crops techniques have many benefits but may also have adverse impacts if used aggressively. Too much of tillage and excessive use of fertilizers can degrade the quality of land and crops. Chemical farming can affect intra-species diversity and produce only fewer variety of crops.

Drones- the breakthrough in agriculture/ farming:

The government of India has announced its support for use of agricultural drones that are already popular in the West. Drones are unmanned aerial vehicles equipped with sensors and thermal cameras that can fly over fields and monitor the condition of the crops. These aerial vehicles can give farmers accurate information about the condition of the soil, crops, excessive dampness or erosion, pest related problems etc. in real time. This way, the need for manual inspection of crops, spread across several acres of land, is eliminated. Drones can help spot flaws in the fields at the earliest, giving farmers the chance to correct the problem before it is too late, thanks to its integrated GIS mapping and crop health imaging systems. It can help farmers determine where more irrigation is needed and where water supply has to be restricted.

Figure 17.2 Drones in Agriculture

CHAPTER 18. Social Activities – Any Activates Planned By Students

Due to current pandemic situation, we could not plan much activities. We partnered with local NGO for this activity. By respecting Covid-19 guidelines we have done some other activities like,

- We distributed masks and other preventive materials in the village to reduce the spread of virus.
- Information flyers about vaccination from health department were distributed in the village.
- By these activity villagers became aware of many things about spread.
- We went to the village and started screening of villagers by checking their oxygen level and temperature.
- We also distributed immunity booster doses.

We planned other activities also, but due to pandemic this is the only activity we could perform.

CHAPTER 19. SHAPARA SAGY Questionnaire Survey form with the Sarpanch Signature

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Shampara Gram Panchayat: Shampara Ward No.

Block: District: Bhavnagar

State: Gujarat L S Constituency: Bhavnagar

1. Family Identity and Size

Name of Head of Household	Ravjibhai Saiwtani							Male/ Female	~~Male~~
SECC Survey ID:		Family Size	3	Over 18	3	6 to 18	-	Under 6	-

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	GEN APL	Life Insurance	1. All Adults 2. Some Adults 3. None	AABY	1. Yes 2. No	Kisan Credit Card Yes / No	No
Poverty Status Year[2]:	1. ~~BPL~~ 2. APL	Health Insurance	1. All Adults 2. Some Adults 3. None	RSBY	1. Yes 2. No	MGNREGS Job Card Number	-
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? Yes / No		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F / O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension[5]
Ravji Bhai	62	M	N	Y	Good	Y	Y	-
Hiraben	58	F	N	Y	"	Y	Y	-
JaydipBhai	21	M	N	N	"	Y	Y	-

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
-			-		-		-	
-			-		-		-	
-			-		-		-	

4. Children below 6 years

Name	Age	Sex M/F/ O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth
-			-			-		
-			-			-		
-			-			-		

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)

[3] Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4

[4] Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)

[5] 0- Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

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

6. Use of Mosquito Net
Children: Yes / No Adults: Yes / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / No	Yes / No	Yes / No
Children	Yes / No	Yes / No	Yes / No

8. Consumption of Tobacco

	Smoking	Chewing
Adults	–	✓
Children	–	–

9. House & Homestead Data

Own House: Yes / No	No. of Rooms: 2
Type: Kutcha / Semi Pucca / Pucca	Pucca
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System	Door Step / Common Point / No Collection System
Homestead Land: Yes / No	Kitchen Garden : Yes / No
Compost Pit: Individual/ Group/ None	Biogas Plant: Individual/ Group/ None

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

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

11. Source of Lighting and Power

Electricity Connection to Household: Yes / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: –
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: Gas –
If cooking in Chullah: Normal/ Smokeless

12. Landholding (Acres)

1. Total	5	2. Cultivable Area	5
3. Irrigated Area		4. Uncultivable Area	

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	Yes
Sharecropping /Farming Leased Land	No
Animal Husbandry	No
Pisciculture	No
Fishing	No
Skilled Wage Worker	Yes
Unskilled Wage Worker	No
Salaried Employment in Government	–
Salaried Employment - Private Sector	–
Weaving	–
Other Artisan(mention)	–
Other Trade & Business (mention)	–

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

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes/No
Do you use Chemical Insecticides	Yes/No
Do you use Chemical Weedicide	Yes/No
Do you have Soil Health Card	Yes/No
Irrigation: None/ Canal/ Tank/ Borewell/Other	Canal
Drip or Sprinkler Irrigation: Drip /Sprinkler / None	

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

Name	Unit	Quantity
Cotton seeds		
Groundnut		

17. Livestock Numbers

Cows: –	Bullocks: –	Calves: –
Female Buffalo: –	Male Buffalo: –	Buffalo Calves: –
Goats/ Sheep: –	Poultry/ Ducks: –	Pigs: –
Any other: Type –		No. –
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres):		

18. What games do Children Play
–

19. Do children play musical instrument (mention)
–

Schedule Filled By: Bhavya Pandya
Principal Respondent: Ravjibhai
Date of Survey: 05/07/21

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: Shampara

b. Block: 8

c. District: Bhavnagar

d. State: Gujarat

e. Lok Sabha Constituency: 6 Bhavnagar

f. Number of Wards in the Gram Panchayat: 8

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages:

Shampara (Sidsar)

Demographic Information

Number of Households 420 Total Population ~~1828~~ 1828 Male 957 Female 871

SC HHs 160 ST HHs — OBC HHs 465 Other HHs 1203

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	N	2 km
b.	Nearest Primary Health Centre (PHC)	N	"
c.	Nearest Community Health Centre (CHC)	N	"
d.	Nearest Post Office	N	"
e.	Nearest Bank Branch (Any)	N	"
f.	Nearest Bank with CBS Facility	N	"
g.	Nearest ATM	N	"
h.	Nearest Primary School	Y	—
i.	Nearest Middle School	Y	—
j.	Nearest Secondary School	Y	—
k.	Nearest Higher Secondary School / +2 College	N	—
l.	Nearest Graduate College	N	12km
m	Nearest ITI / Polytechnic Centre	N	12km
n	Kisan Seva Kendra	N	2km

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	N	2km
p	Nearest Agro Service Centre	N	2km
p	MSP based Government Procurement Centre	N	2km
q	Milk Cooperative /Collection Centre	Y	—
r	Veterinary Care Centre	N	2km
s	Ayurveda Centre	N	2km
t	E – Seva Kendra	Y	—
u	Bus Stop	Y	—
v	Railway Station	N	5 km
w	Library	N	2 km
x	Common Service Centre	Y	—

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total NO Public — Private —

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 2

b. Number of villages without Angan Wadi Centres —

Names of such villages: —

c. Schools (Number)

Primary Private: — Primary Govt.: 1

Middle Private: — Middle Govt.: 1

Secondary Private: — Secondary Govt.: 2

Higher Secondary Private: — Higher Secondary Govt: 2

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)	—	—	—	—	Yes	In village	—
b.	Kerosene	—	—	Yes	—	—	4	—
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	Shampara	—
b.	Hand Pump Coverage in Villages:	Covered ✓ 4 Nos. Not Covered	Shampara	✓
c.	Coverage under Covered Drains:	Covered ✓ Not Covered	Shampara	—
d.	Coverage under Open Drains:	Covered ✓ Not Covered	Shampara	—
e.	Villages with Household Electricity Connection (Numbers)	Connected ✓ Not Connected	Shampara	—

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	779.647	d.	Pasture / Grazing Land	NA	g.	Check Dam	9
b.	Irrigated Land	600+	e.	Forests/ Plantations	NA	h.	Wells/Bore Wells	100+
c.	Un-irrigated Land	—	f.	Other Common Land	NA	i	Tanks /Ponds	1

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

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	40
b)	Number of Households receiving pension (old age, widow, disability)	40
c)	Number of eligible Households who are not receiving pension	—
d)	Number of Households eligible for Ration Card	280
e)	Number of eligible HHs having ration cards	280
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	100
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	60
l)	Number of landless households	50
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	20
q)	Number of Households headed by physically handicapped persons	20
r)	Total number of Persons with Disability in the village	40
s)	Number of SHGs	3
t)	Number of active SHGs	3
u)	Number of SHG Federations	—
v)	Number of Youth Clubs	—
w)	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

Bhavya Pandya Surveyor	સરપંચ શામપરા (સી) ગ્રામ પંચાયત PRI Respondent (Preferably Gram Panchayat Chairperson)	તલાટી-કમ-મંત્રી શામપરા (સી) ગ્રામ પંચાયત Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	05/07/21 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: Shampara

b. Ward Number: 8

c. Gram Panchayat: Shampara

d. Block: 8

e. District: Bhavnagar

f. State: Gujarat

g. Lok Sabha Constituency: Bhavnagar

h. Number of Habitations / Hamlets in the Gram Panchayat: 1

i. Names of Habitations / Hamlets:

Shampara

Demographic Information

Number of Households 306 Total Population 1828 Male 957 Female 871

SC HHs 160 ST HHs — OBC HHs 465 Other HHs 1203

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	2km
e.	Milk Cooperative /Collection Centre	Y	
g.	Health Sub Centre	N	2km
h.	Bank	N	2 km
i.	ATM	N	2km
j.	Bus Stop	N	
k.	Railway Station	N	5 km

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

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	2km
m	Common Service Centre	Y	
n	Veterinary Care Centre	N	2km

ii. Road Connectivity

a. Habitations connected by All-weather Roads All (*1-All 2-None 3-Some*)

If 3 mention the name of the habitations where not available:_____

iii. Drinking Water Facilities

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

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

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

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

b. Coverage under Open Drains: None (*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: None

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections: (*1-All 2-None 3-Some*) All

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

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

b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 2

c. Schools (Number)

Primary Private: — Primary Govt.: 1

Middle Private: — Middle Govt.: 1

Secondary Private: — Secondary Govt.: 2

Higher Secondary Private: — Higher Secondary Govt: 2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	999.69	d.	Pasture / Grazing Land	NA	g.	Check Dam	9
b.	Irrigated Land	–	e.	Forests/ Plnatations	NA	h.	Wells/Bore Wells	100+
c.	Un-irrigated Land	–	f.	Other Common Land	NA	I	Tanks /Ponds	1

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	100
2	Number of active Job Card holders who have completed 100 days of work	100
3	Number of shops selling alcohol	–
4	Number of BPL families	60
5	Number of landless households	50
6	Number of IAY beneficiaries	–
7	Number of FRA beneficiaries	–
8	Number of common sanitation complexes	–
9	Number of SHGs	3
10	Number of active SHGs	3
11	Existence of SHG Federation in the Village (Yes / No)	–
12	Number of Youth Clubs	–
13	Number of Bharat Nirman Volunteers	5

Name and Signature of Surveyor and Respondent'

Bhavya Pandya	મનસુખભાઈ સરપંચ શામપરા (સી) ગ્રામ પંચાયત તા.જી. ભાવનગર.	શામપરા (સી) ગ્રામ પંચાયત તા.જી. ભાવનગર.	૦૬/૦૪/૨૧
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

CHAPTER 20. TDO-DDO-Collector email sending Soft copy attachment in the report

Gmail

Bhavya Pandya <bhavyapandya0601@gmail.com>

Detailed Project Report of VY phase VII - Shampara(Sidsar Village)

1 message

Bhavya Pandya <bhavyapandya0601@gmail.com> Wed, Oct 6, 2021 at 7:50 PM
Cc: ddo-bav@gujarat.gov.in, collector-bav@gujarat.gov.in, tdobhavnagar@gmail.com

Respected Sir/Madam
We are students of Government Engineering College Bhavnagar affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojanaa-VY in which students survey various villages and Design various amenities to deliver them to make their life better as per requirements & village problem statements.

As a part of Vishwakarma Yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Shampara Village profile of issues for development and our design work for them which is as below.

Sr.	DESIGN NAME	PERIOD	COST	FEATURES
1	Rain Water Harvesting System	Within 1 year	3,36,564	It would improve water condition of the village
2	Septic tank	Immediately	26,939	It will create good environment in village
3	Primary Health Centre	Immediately	13,62,426	PHC will help to make village healthy and efficient. Transportation for emergency will be reduced
4	Community hall	Immediately	41,31,702	Currently social and religious gatherings go on in open spaces
5	Vegetable Market	Within 1 year	15,95,748	Economy of village will grow more after this design implementation.
6	Recreational Centre	Long term	20,87,324	Mental and Physical development can be seen in students of village
7	Bank	Within 1 year	11, 21,834	Village economy will be boosted.
8	Skill Training Institute	Long term	25,21,503	Self-dependency of village would be gained by this institute.
9	Library	Long term	13,44,580	Literacy rate will be improved.
10	Agriculture Product Market Building	Within 1 year	5,16,029	Villagers can buy Agro products so it will save fuel and time.
11	Washing Ghat with Circulatory tank	Long term	4,58,806	Village will become more clean and hygienic.
12	LakeFront for tourism development point	Long term	73,68,02	More tourist will come to village

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7194K

CHAPTER 21. Comprehensive report for the entire village

The project work started with the basic data collection, survey work and it progressed through meeting with headman, Talati-cum-Mantri shri and Principal of the existing school. The gap analysis was later framed and 12 various design problems were identified. The proposed solutions are framed in such a way that the village can enhance the overall physical, social and educational conditions of villagers and can promise the sustainable growth of the village in context to the Bhavnagar City, in which the village falls. Vishwakarma Yojana is an approach towards rurbanisation and Vishwakarma Yojana would provide "Design to Delivery" solution for development of villages in 'Rurban' areas. The team has conducted Vishwakarma Yojana Project for Shampara Village with the vision of the developmental work in villages that could be undertaken as per the need of the village, in particular includes Physical, Social and Sustainable infrastructure facilities.

So we tried to give ideas of development for our allocated village Shampara, in this process we are thankful to all the people who helped us.

Sr. No.	DESIGN NAME	AMOUNT IN Rs	FEATURES
1	Rain Water Harvesting System	3,36,564	It would improve water condition of the village
2	Septic tank	26,939	It will create good environment in village and can be taken as a step towards Swachha Bharat
3	Primary Health Centre	13,62,426	PHC will help to make village healthy and efficient. Transportation for emergency will be reduced
4	Community hall	41,31,702	Currently social and religious gatherings go on in open spaces so in arid condition
5	Vegetable Market	15,95,748	Economy of village will grow more after this design implementation.
6	Recreational Centre	20,87,324	Mental and Physical development can be seen in students of village
7	Bank	11, 21,834	Village economy will be boosted.
8	Skill Training Institute	25,21,503	Self-dependency of village would be gained by this institute.
9	Library	13,44,580	Literacy rate will be improved.
10	Agriculture Product Market Building	5,16,029	Villagers can buy Agro products so it will save fuel and time.
11	Washing Ghat with Circulatory tank	4,58,806	Village will become more clean and hygienic.
12	Lake Front	73,68,02	More tourist will come to village

Images from allocated village - Shampara