DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
Moti sarsan Village

Panchmahal District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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COLLEGE NAME

ENGINEERING COLLEGE TUWA

NODAL OFFICERS NAME

PROFF.RUTU DOSHI

COLLEGE LOGO

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_Moti Sarsan

DISTRICT Panchmahal

Under

Vishwakarma Yojana: Phase-VIII

in partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

during the academic year 2020-21.

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

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Internal(Evaluator) Guide Name and Signature:	
College Name:	**Engineering college tuwa**
College Stamp:	

ABSTRACT

Vishwakarma Yojana project and how you do your vision project: Vishwakarma Yojana is one of the approaches to reduce urban city Pressure and lower the migration rate by developing village with a 'rural soul' but with all urban amenities that a city may have. The developmental work in villages that could undertake as per the need of the village in particular includes Physical, Social and Renewable infrastructure Facilities

About your village description:

Moti sarsan is the center of attraction for migrants. Here also a trunk of hot water is located. Here is the religious significance of bathing with hot water. According to legend, Pandav and Lord Rama had visited this place. It is also said that Lord Ram had separated this land from his arrow for hot water to treat Sant Surdas, from which the hot spring of water came out.

About existing village condition:

Moti sarsan village general facilities like drainage facilities, children play ground, public latrine block, PHC, transportation and communication facilities are not available and they are not using the any sustainable energy. So, we will give proposal regarding sustainable energy sources and solutions related to infrastructural problems.

About your proposed designs your view for village development:

by providing different facilities in unlike categories such as Physical infrastructure (Water tank, Road etc.), Social infrastructure (Health, Community Hall, And other) and Sustainable Infrastructure (Biogas, Solar Street Light and Other). The help the rural people to Progress with Urban People.

About future scope of the village development:

By providing these type of basic facilities to villager at migration rate will be decreased. This is end goal of the Vishwakarma yojana project

Key Words:Design water tank,toilet,bio gas plant 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.

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
PHC	Public health Centre
TDO	Taluka Developer Officer
DDO	District Developer Officer
PPP	Public Private Partnership
NGO	Non-government organization
PURA	Provision of Urban Amenities in Rural
DRDA	District Rural Development Agency
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
PMGSY	PradhanMantri Gram Sadak Yojana
NRUM	National Rurban Mission
WBM	Water bound macadam
CDHO	Chief District Health Officer
MoRTH	Ministry of Road Transport and Highways
RTO	Road Transport Offices

Chapter: 1

Ideal Village Visit of Bhayli

(Vadodara, Gujarat)

1.1 Background & Study Area Location:

Vishwakarma Yojana is one of the approaches towards Rurbanization to solve issues of rural area. Vishwakarma Yojana is government project for developing various villages. In this project various details of villages like demographical details, geographical details, occupational details, physical infrastructure facilities, social infrastructure facilities etc. various data are collected. And efforts are made to develop facilities as possible as best in village area. The main purpose is to make village as model or ideal village with maximum facilities.

The basic need of rural development program have been alleviation of poverty and unemployment through creation of basic social and economic infrastructure, provision of training to rural unemployed youth and providing employment to marginal Farmers/Laborers to discourage seasonal and permanent migration to urban areas.

Study Area Location.

- Bhayli village is located in tehsil of Vadodara district.
- This village is developed during recent years very efficiently and now this village have all basic amenities like c.c. road, underground drainage, water supply, solid waste management, gram panchayat, all houses are pucca, transportation services, higher education etc.. This village has post office and hospital.
- Some important details about location of village is as follow:
  - **Name of Village : Bhayli**
  - **Name of Taluka : Vadodara**
  - **Name of District : Vadodara**
  - **Latitude : 22.2896’N**
  - **Longitude : 73.1298’E**
  - **Population Range : 8750**

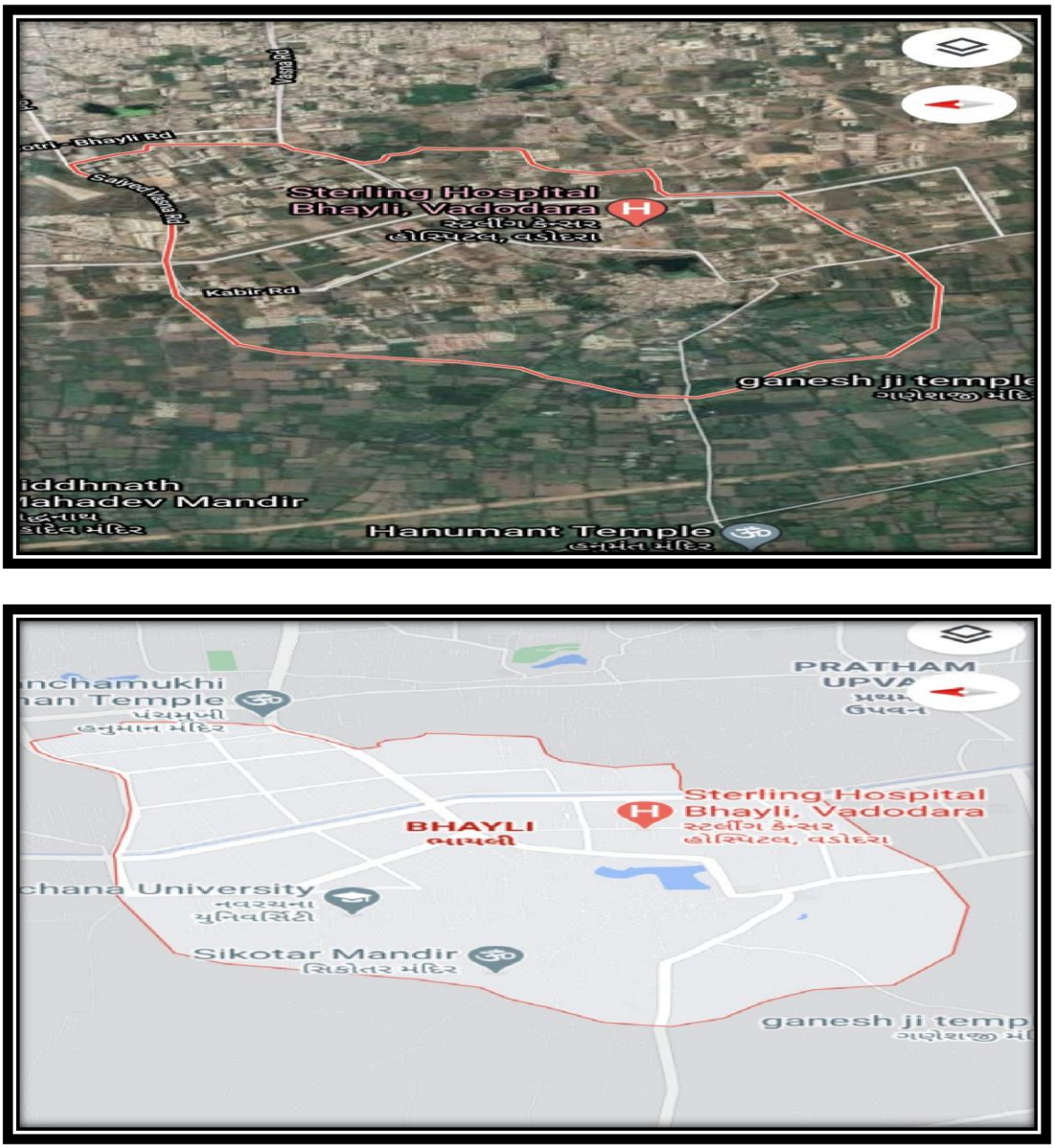

Fig 1.0: Map Location of Bhayli

1.2 Concept: Ideal Village.

An ideal Indian village will be so constructed as to lend itself to perfect sanitation. It will have cottages with sufficient light and ventilation built of a material obtainable within a radius of five miles of it. The cottages will have courtyards enabling householders to plant vegetables for domestic use and to house their cattle.

The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit, and its own Khadi.

The very first problem the village worker will solve is its sanitation. It is the most neglected of all theproblems that baffle workers and that undermine physical well-being and breed disease.

1.2.1 Objectives.

An ideal village project has the following important objectives:

- Provide awareness about government schemes & policies to farmers.
- Provide urban amenities to improve the quality of life in rural areas.
- Provide advanced agricultural equipment & educate farmers about climate smart agriculture practices.
- Provide a help in setting up good roads infrastructure & transportation.
- Empowerment of rural areas with latest digital technology.
- Prevent distress migration from rural to urban areas
- Create and sustain a culture of cooperative living.

1.2.2 Example/Live Case study of any other state ideal village:

Punsari, Sabarkantha, Gujarat

- In a case study of other state village we have selected Punsari village of Sabarkantha district of Gujarat state.
- The Sarpanch Mr. Himanshu Patel is a major part of the development of the village.
- Mr. Himanshu Patel the Sarpanch of the Punsari village is utilized various Government Schemes for the purpose of village welfare. He serves as a good coordinator for various development activities in his village.
- He is able to communicate with other villagers effectively Because of his efforts, his village is having all required basic amenities. He has done significant work in health care aspects. His work in solid waste management is also important. He could create awareness among villagers regarding solid waste management and healthcare.

Fig 1.2.2 Village Gate of Gram panchayat

Backdrop

Punsari village is birth place of Mr. Himanshu Patel. This village is located in Sabarkanthadistrict, Gujarat, India. He was raised there. Once, elementary education was completed, he had to pursue higher education. For this purpose, his family started living in a town near to his village. During vacations, Himanshu used to visit his village. Hence, he could distinguish between facilities available at village and town. This made him feel the need to contribute towards the betterment of the village and the people living there.

Fig1.2.2.1 Health care facilities

Fig1.2.2.2 Gram panchayat&Nandghar

Objectives:

Providing basic amenities to Punsari village through various Govt. Schemes.

1. Improving healthcare system of Punsari village
2. Improving collection and management of solid waste
3. Creating awareness about various Government Schemes

Implementation process:

1. The IMR (Infant Mortality Rate) and MMR (Mother Mortality Rate) came down to zero after the village introduced its own transport facility. Health has considerably improved and crimes have gone down to zero.
2. In rural areas, there is perennial shortage of physicians. Due to financial constrains hospitals in rural areas are less as compare to urban areas. Care companies do not have interest in rural market. Over the years, there is more integration of health care Institutions and health care professionals with

system. This is related to health care finance also. Rural health care system changed a bit due to all this development. Government has implemented various rural health care programs. In context of rural health care, primary care medical professionals may play significant role.

3. Mr. Himanshu Patel encouraged villagers to learn about waste collection and management. For solid waste management, technology may be selected based on certain criteria i.e. within village area, there should be a common space, water supplysources/pattern for public as well as individual, manpower availability, housing pattern, financial status of villagers etc.
4. There are various Wastewater treatment technologies concerning liquid waste management i.e. Soil Bio technology, Waste stabilization pond system, sequencing batch reactor system, Duckweed pond system, Extended aeration system, constructed wetland, package aeration system, up flow anaerobic sludge blanket etc

Fig1.2.2.3 a mini bus used for milk transportation to Milkbank by villagers

Fig1.2.2.4 School of Punsari village

Impact:

o Wi-Fi is available to the villagers. CCTV cameras are installed in the village. Punsari is developed as a clean and green village to prevent diseases. There is a renewable power station in the village. Vaccination in village is hundred percent. Approximately 6000 villagers have been benefitted by efforts of Mr. Himanshu Patel. Sixty persons are actively involved in various initiatives by Mr.Himanshu Patel.

1.2.3 The Idea of a model / Smart village.

- India is a country of villages, where more the 68% of the total population reside in over 5.97 lakhs of villages.
- As said, India lives in its villages Mahatma or India's soul is in villages, which is the backbone of Indian culture.
- The references of the villages as "Sabha" is found in the time of Rig-Veda, which was the grass root level governing system.
- Agriculture is practice in the country from antiquity (from Harappa Civilization) where, communication settled and civilized structure of villages evolved.

- The social, economic and scientific development in these communities helped in the growth of such villages and also has become the building block of civilization.
- However, even after the collapse of such progressed civilization, villages continued to exist and flourish through rich heritage and traditional practices.

- Now a day's urbanization has taken place on a big scale. Only due to lack of facilities and sources in villages.

1.2.4 Ancient History Civil concept about Indian Village/Foreign Countries Perspective and itsDevelopment

The village in India holds a unique place, both in the social and economic spheres. There were 212.6million people living in rural areas in 1901,in 2001 rural population has increased to 721.1 million naturally the density of population has increased, land under agriculture has diminished, affected the forests and exodus to urban areas accelerated agricultural labor continued to be exploited. The phenomenon of Rural Development is becoming more and more complex despite technological advancement and availability of resources as well as continued efforts from the pre independence period. Rural Development has a long history in India.

Chhotkei village in Angul district of Odisha has emerged as the first smart micro grid implementing village in India. The village gets a supply of 30kWp (kilowatt, peak) Solar- power. The village has installed a Smart Nanogrid to meet the energy demands of 140 households, 20 street lights, temple, and three community centres. After usage the village saves around 10 kWp which they set aside for day-time use in irrigation pumps and microenterprises to improve agricultural output, to enable value-addition to agriculture, and generate employment.

1.3. Detail of Ideal village / Smart Village withphotograph study

1.3.1 Ideal village:Bhayli

❖ Physical & Demographical Growth:

Today Bhayli is a well-developed village of Vadodara District of Gujarat.We can see all basic facilities like Hospital, School, Good Roads, Approach from all direction of the village, Banks, Lake, Proper water Facility, Electric Power Grid Substation, Public Transportation facility, clean atmosphere etc. Dwellers over here are of middle class and mature enough to understand the running scenario. As per the government records, the town has 2011 families and Bhayli population is 8750. Out of this, 4553 are males and 4197 are females. This town area has 869 children in the age group of 0-6 years. Among males the literacy rate is 86% while female literacy rate is 67%.

❖ Economic profile

Total number of workers in the village are 798 who are engaged in Agriculture work.Major 3 occupation in village are farmers, agriculture, labour and small private business.

❖ Infrastructure Facilities (all type):

Infrastructure of Bhayli is having all primary and secondary needs for giving a better lifestyle to village people.

Primary Infrastructural need:
All primary infrastructure needs are fulfilled here. They have pukka houses, and necessary government buildings. All this are well developed and well maintained. Amongst this all buildings newly constructed houses are having proper wiring scheme and earthing. Even roads over here are of good condition.

Secondary Infrastructural need:

Bhayli have School and Anganvadi for better development of Children also with midday meal facility. It also have a Hospital, so that people of Bhayli can get the treatment either very own village only.

Fig 1.3:Panchayat Office

Fig 1.3.1: Overhead water tank

Fig 1.3.2:Primary,Secondary and Higher Secondary School

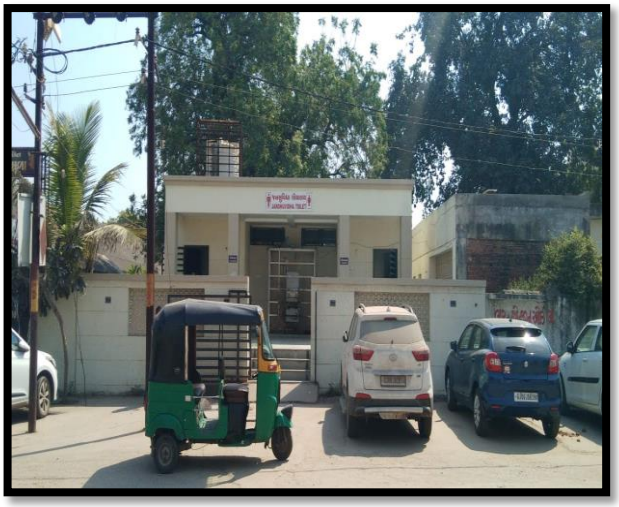

Fig 1.3.4: Public Toilet

Fig 1.3.5: Bus Stop Near Overhead Tank

Fig 1.3.6: Govt Primary School

Fig 1.3.7: Rickshaw Stand

Fig 1.3.8: Govt Health Care centre

Fig 1.3.9: Bhayli Pond

Fig 1.3.10: Front Gate of Bhayli

Fig 1.3.11: Temple

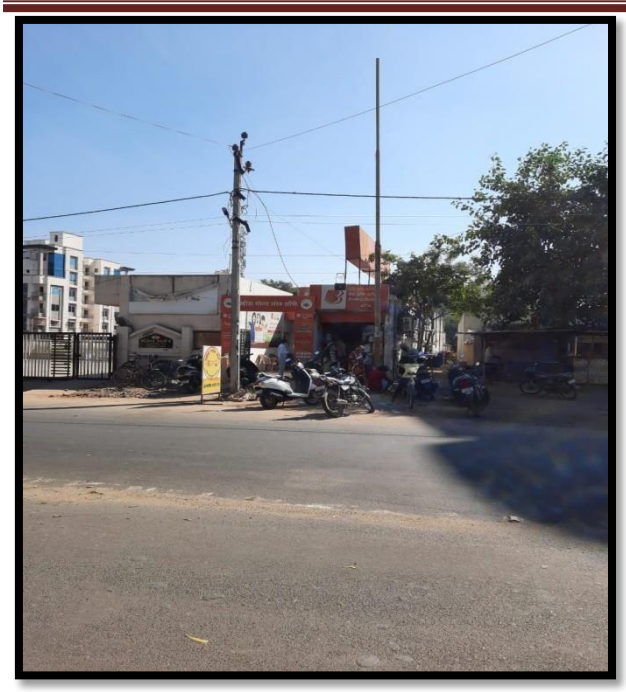

Fig 1.3.12: Bank & ATM

Fig 1.3.13: Health care centre

Geographical Details of Bhayli:

Sr. No	Description	Information/Details
1	Area of Villages (Approx) (In Hector)	1396.70
2	Forest Area	-
3	Agricultural Land (In Hector)	
4	Residental Area	-
5	Other Area (In Hector)	
6	Nearest Railway Station (In Km)	
7	Nearest Town With Distance	
8	Nearest Bus Station	
9	Road Connectivity	Yes Village Connected to all Road

Table 1.3.Geographical Details

Deographical Details of Bhayli:

Sr No	Census	Population	Male (In Nos)	Female(In Nos)	Total No of house Holds
1	2011	8750	4553	4197	6400

Table 1.3.1Demographical Details

Occupational Details of Bhayli:

Name of the Major Occupation Groups in Villages	❖ **Service Work, Private Business**
	❖ **Farming**
	❖ **Laborers**

Table 1.3.2Occupational Details

Infrastructure Facilities Details:

Village Details of Bhayli	Facilities Available In Bhayli
Education	
Anganwadi	3
Primary School	2
Secondary School	1
Higher Secondary school	1
College	0
Tech. Training institute	0
Agriculture Research centre	0
Medical Facility	
Gov./Panchayat Dispensary or Sub PHC or Health Centre	1
PHC & CHC	1
Child Welfare and Maternity Home	1
Hospital	Private yes
Transportation	
Pucca village Approach road	Yes
Bus/auto stand Provision	Yes
Drinking Water	
Water Facilities	Yes
Over Head Tank	3
U/G Sump	3
Public Latrines	1
Cremation Ground	2
Post Office	1

Gram Panchayat Building	1
APMC	0
Fire Station	0
Police Station	0
Community Hall	1
Super Market	Yes
Bank	1

Table 1.3.3Infrastructure Details

Smart village:Bajwa

Background & Study Area Location

- Bajwa village is located in tehsil of Vadodaradistrict.
- This village is having population of 9611. There is 1906 house in the city.

Study area location

- **Name: bajwa**
- **District: Vadodara**
- **Taluka: Vadodara**
- **Pin code: 391310**
- **Language: Gujarati, Hindi, Gujarati,English**
- **Time zone: IST (UTC+5:30)**

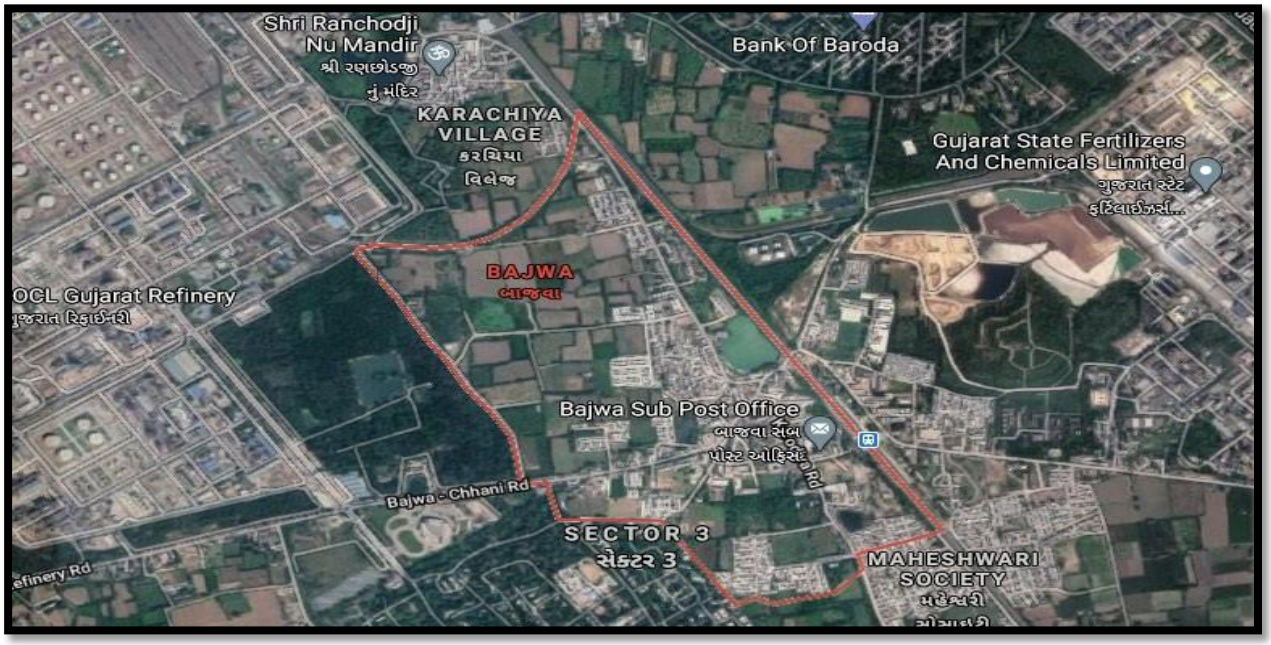

Fig 1.3.14Map Location of Bajwa Village

Geographical Details of Bajwa:

Sr. No	Description	Information/Details
1	Area of Villages (Approx.) (In Hector)	218
2	Forest Area	-
3	Agricultural Land (In Hector)	114
4	Residential Area	-
5	Other Area (In Hector)	34
6	Nearest Railway Station (In Km)	Pilol (Savli-Vadodara 3Km)
7	Nearest Town With Distance	-
8	Nearest Bus Station	Savasi (Vadodara- 2Km)
9	Road Connectivity	Yes Village Connected to all Road

Table 1.3.4Geographical Details

Demographical Details of Bajwa:

Sr No	Census	Population	Male (In No's)	Female(In No's)	Total No of house Holds
1	2011	9611	5093	4518	4500

Table 1.3.5Demographical Details

Occupational Details of Bajwa:

Name of the Major Occupation Groups in Villages	❖ Service Work, Private Business
	❖ Farming
	❖ Laborers

Table 1.3.6Occupational Details

Infrastructure Facilities (all type):

Village Details of Bajwa	Facilities Avaliable in village
Education	
Anganwadi	7

Primary School	3
Secondary School	2

Higher Secondary school	2
College	0
Tech. Training institute	0
Agriculture Research centre	1
Medical Facility	
Gov./Panchayat Dispensary or Sub PHC or Health Centre	1
PHC & CHC	1
Child Welfare and Maternity Home	2
Hospital	Private yes
Transportation	
Pucca village Approach road	Yes
Bus/auto stand Provision	Yes
Drinking Water	
Water Facilities	Yes
Over Head Tank	3
U/G Sump	3
Public Latrines	Each house Has Toilet
Cremation Ground	1
Post Office	1
Gram Panchayat Building	1
APMC	0
Fire Station	0
Police Station	1
Community Hall	1
Super Market	Yes
Bank	1

Table 1.3.7 Infrastructure Details

Fig 1.3.15: Panchayat Office

Fig 1.3.16: Overhead water tank

Fig 1.3.17: Primary,Secondary and Higher Secondary School

Fig 1.3.18: Anganwadi

Fig 1.3.19: Bank & ATM

Fig 1.3.20: Post Office

Fig 1.3.21: Overhead water tank

Fig 1.3.22: Temple

Fig 1.3.23: RCC Road and CCTV Camera

Fig 1.3.24 Supermarket

Fig 1.3.25 Public Toilet

1.4. SWOT Analysis of ideal village and Smart village:

Strength	Weakness	Opportunity	Threat
1.Education	**No Cinema Hall**	**By use of renewable energy sources like Biogas Plant, Solar Street Lights, Roof Solar Panels etc. electricity can be producedlocally**	` **No threat were found in the village**
2.Hospital	**No Recreational Centre**	**To make the village digital and wifi connected**	
3.Electricity	**No renewable energy resource**	**To improve the living standard of the Village resident**	
4.Water facility		**To Create more employment by establishing industries in Village Vicinity area**	
5.Post office			

1.5. Future prospects of Bhayli and Bajwa Village

Bajwa village is developing very fast and more residential projects are going on in vicinity of Bajwa village. Bajwa village is surrounded by Industries and Gujarat Refinery hence Development of Bajwa village in Future is going to prominent. Bajwa Village is having all facilities required to satisfy minimum needs. The living standard of people living in Bajwa is also good. On the other handbhayli village is taken under taluka and bhayli village progress is also tremendous same as bajwa village.

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

- To know the strength and weakness ofvillage.
- To know existing facilities in ideal and smart village for comparison and survey.
- To get reference for allotted village
- To know about growth and living standards of people residing in village

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Chapter:2

Literature review (Civil concept)

2.1 Introduction: Urban Area & Rural Area.

Urban Area:

- Urban area can refer to towns, cities and suburbs. An urban area includes the city itself, as well as the surrounding areas. An urban area is the region surrounding a city. In urbanism, the term contrasts to rural such as villages and hamlets and in urban sociology or urban anthropology in contrasts with natural environment.
- The creation of early predecessors of urban area during the urban revolution led to the creation of human civilization with modern urban planning, which along with other human activities such as exploitation of natural resources leads to human impact on the environment.
- As per the Census 2011 there are 7,935 towns, 4041 statutory towns, 3894 census towns, 475 urban agglomerations in the country. The number of towns has increased by 2,774 since last Census.

Trends supporting urbanisation in India

Here are some key points regarding urbanization and planning in India:

- Private cities are now expanding due to the support of private companies. Private developers are building private housing projects that will exponentially grow in the years to come.
- The Delhi-Mumbai Corridor is an infrastructure program set to develop 'Smart Cities' and combine next-generation technology with infrastructural development.
- The transport and logistics sector of India underlines the importance of interconnecting the different modes of transportation: road, rail, sea and air. An efficient multi-modal system is relevant in the development and successful growth of the infrastructural systems.
- Special Economic Zones dot the landscape of India. Each of these zones is focused on a particular sector such as IT, apparel and fashion, or petroleum and petrochemical industries.
- Industrial townships are built to house employees close to the factories and manufacturing plants at which they work. After the success of the pioneering industrial township – Tata's Steel Town – the government is planning on developing more like it.
- India's expected economic growth opens up expansion prospects for Indian airports. Domestic and international passengers are inevitably predicted to double in number in the years to come

India's 13 benchmarks for smart cities

The Indian Government's Union Ministry of Urban Development identified 13 benchmarks for smart cities. These benchmarks include the following:

1. **Transport**: maximum travel time of 30-45 minutes depending on city size.
2. **Spatial Planning**: 175 people per hectare along transit corridors.
3. **Water Supply**: includes covering all households and providing water 24/7.
4. **Sewage Sanitation**: covers all households.
5. **Solid Waste Management**: 100% collection and recycling of solid waste.
6. **Storm Water Drainage**: 100% rainwater harvesting.

7. **Electricity**: includes covering all households and providing electricity 24/7 with 100% metering, and many more.
8. **Telephone Connections**: covers all households.
9. **Wi-fi Connectivity**: covers all cities.
10. **Healthcare Facilities**: establishment of intermediate and multispecialty hospitals.
11. **Education**: the set-up of educational institutions.
12. **Firefighting**: 1 fire station per lakh population/5-7 km radius.
13. **Others**: renewable energy, green buildings.

Fig 2.1: Urban Area Image

Fig 2.2: Rural Area in India

Fig 2.3: Rural Area in India

Rural Area:

- A rural area is an open swath of land that has few homes or other buildings, and not very many people. A rural areas population density is very low. Many people live in a city, or in urban area. Their homes and businesses are located very close to one another.
- Rural people account for about 3/4th (75%) of the total population.
- In 2016, 68.84% of people accounted for the rural population.
- However, they have always lagged much behind the overall progress of the economy.
- There are five persons in the Panchayat leading the maintenance, management and working of the village. The National Sample Survey Organization (NSSO) defines "rural" as follows:
- An area with a population density of up to 400 per square kilometre.
- Villages with clear surveyed boundaries bus no municipal board.
- A minimum of 75% of male working population involved in agriculture and allied activities.
- Rural population in India was reported at 66.46% in 2017.

2.2 Importance of Rural Development.

The aim objectives composed by the government in the sixth five-year plan for rural development are.

- To improve productivity and the wages of rural people.
- To guarantee increased and quick employment possibilities.
- To demolish unemployment and a notable decline in underemployment.
- To guarantee to increase the standard of living of the underprivileged population.
- To provide the basic needs – e.g. elementary education, health care, clean drinking water, and, rural roads, etc.

2.3 Ancient village/different definitions of rural area village.

In ancient time villages were a usual form of community for societies that practice subsistence agriculture, and also for some non-agricultural societies. A village is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand. Although many patterns of village life have existed, the typical village is often small, consisting of perhaps 5 to 30 families. rural area settlements are based more on natural resources and events.

2.4 Scenario: Rural/Urban India: Gujarat as per Census 2011 and latest population.

- As per details from Census 2011, Gujarat has population of 6.04 Crores, an increase from figure of 5.07 Crore in 2001 census. Total population of Gujarat as per 2011 census is 60,439,692 of which male and female are 31,491,260 and 28,948,432 respectively.
- In 2001, total population was 50,671,017 in which males were 26,385,577 while females were 24,285,440. The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent.
- The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the figure was 4.93 percent.Recently as per Gujarat census data, 83.92% houses are owned while 13.54% were rented. In all, 65.95% couples in Gujarat lived in single family. In 2011, 57.87% of Uttar Pradesh population had access to Banking and Non-Banking Finance Corporation.
- Only 3.13% of Uttar Pradesh population had internet facility which is likely to improve in 2021 due to Jio. 6.10% of family in Uttar Pradesh owned car while 34.14% owned two wheller. In few months we will also get details of election data for Gujarat

❖ Gujarat population as per census

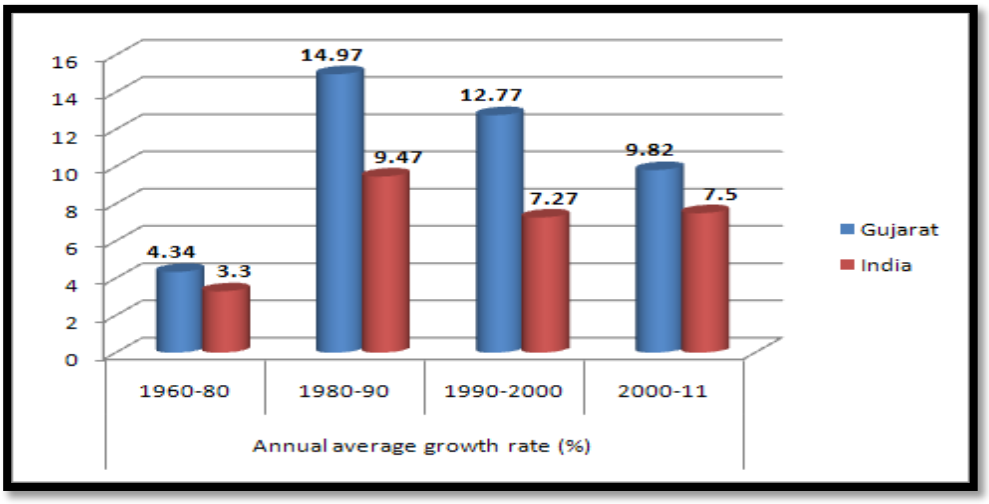

Fig 2.4Rural and Urban Population Growth in Gujarat

Fig 2.5: Gujarat population as per census

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

Table 2.1: Percentage increase in literacy rate

Year		Rural			Urban	
	Female	Male	Total	Female	Male	Total
1951	4.87	19.02	12.1	22.33	45.6	34.59
1961	10.1	34.3	22.5	22.5	66	54.4
1971	15.5	48.6	27.9	48.8	69.8	60.2
1981	21.7	48.6	36	56.3	76.7	67.2
1991	30.17	56.96	36	64.05	81.09	67.2
2001	46.7	71.4	59.4	73.2	86.7	80.3
2011	59.73	77.15	66.77	79.11	88.76	84.11
% increase in	**24%**	**8%**	**12%**	**8%**	**2%**	**5%**

- **Literacy** rate in **Gujarat** has seen upward trend and is 78.03 percent as per **2011 population census**. Of that, male **literacy** stands at 85.75 percent while female **literacy** is at 69.68 percent

2.5 Rural Issues & Concerns.

1. Illiteracy percentage:

In India the percentage of illiteracy is alarming. Every five persons among ten in India are illiterate.

2. Basic Hygiene:

Sanitation is yet another problem, but one of the biggest, in India village (rural area).

o Healthcare system:

The healthcare facility is very poor in India village due to some corrupted gov. and overburden of work on healthcare supply employ.

3. Poverty:

Due to bad policy by gov. and some corrupted people due to this reason Indian village people are get poor and now India has 3rd. largest country which population of 31 % people live in international poverty line.

4. Infrastructure:

India needs to works wiftlyon its infrastructure towards better roads and services like water, sanitation etc.

5. Production Price:

The price the farmers get for their produces less than in relation to the work they put in.

2.6 Various infrastructure & amp: Guidelines / Norms for villages for the provision of different infrastructure facilities.

Facilities	Planning Commission Norms	Required as per Norms
Education		
Anganwadi	**Each village**	0
Primary School	**Each Village**	0
Secondary School	**Per 7,500 Population**	0
Higher Secondary school	**Per 15,000 Population**	0
College	**Per 125,000 Population**	0

Tech. Training institute	**Per 100,000**	0

Public Latrines	Each Village	0
Cremation Ground	Per 20,000 Population	0
Post Office	Per 10,000 Population	0
Gram Panchayat Building	Each individual/group	0
APMC	Per 100,000 Population	0
Fire Station	Per 100,000 Population	0
Police Station	Per 15,000 Population	0
Community Hall	Per 10,000 Population	0

Table 2.2: Various guidelines and norms for infrastructure

2.7 Other Projects and Schemes.

Following are the schemes that are running or on board for the rural development by Indian Government:

- Deen Dayal Upadhyay Grameen Kaushal Yojana
- PradhanMantri Gram Sadak Yojana (PMGSY)
- Indira AwasYojana
- PradhanMantriAdarsh Gram Yojana
- Mahatma Gandhi National Employment Guarantee Act. (MGNREGA)

- National Rural Livelihood Mission
- Training to Rural Youth for Self Employment (TRYSEM)
- National Rural Health Mission

Deen Dayal Upadhyay Grameen Kaushal Yojana:

- This is a placement linked skill development scheme for rural poor youth.
  It was launched by on 25 September 2014 by Union Ministers NitinGadkari and Venkaiah Naidu on the occasion of 98th birth anniversary of Pandit Deendayal Upadhyaya.
- It aims to target youth, under the age group of 15–35 years.
  A total of 52000 candidates have been skilled under this programme till 2014-15

PradhanMantri Gram Sadak Yojana (PMGSY):

- Initially it was 100% centrally funded scheme, launched on the December 25, 2000.
- After the recommendation of 14th finance commission report now expenditure will be shared by the centre and state at ratio of 60:40.
- The main aim of this scheme is to provide all weather road connectivity to the rural areas whose population is more than 500 persons and in terms of hilly areas it is 250 persons.
- This scheme is launched by the Ministry of Rural Development

Indira AwasYojana:

- The government in 1985 under the leadership on Rajiv Gandhi introduced a public housing scheme that is popularly known as the Indira AwasYojana.
- This programme happened to fall under a larger scheme called RLEGP which was the official acronym Rural Landless Employment Guarantee Programme.
- This scheme was run under the Ministry of Rural Development where the primary objective was to provide housing for the roofless. This programme particularly targeted the free bonded labourers under the below poverty line
  (BPL) and the population falling in the Scheduled Castes and Scheduled tribes categories where it intended to address the housing issues and eventually construct residences.
- The year 1996 saw the Indira AwasYojana, become and independent scheme that fell under the Ministry of Rural Development.
- Through the central idea of the scheme was to provide housing for all, it also aimed at eradication of rural poverty along with the alleviation of the general living standards of the rural population by providing them with various development programs.

The benefits of the Indira AwasYojana are as follows:

- The Indira AwasYojana aims to provide assistance and support in the construction of the houses in rural locations.
- It seeks to support the construction of the houses with the required supplies including workplaces within the house.
- The houses under the scheme are to be designed based on the requirement of the residence.

PradhanMantri Adarsh Gram Yojana:

- PradhanMantri Adarsh Gram Yojana (PMAGY) is a rural development programme launched by the central government in India in the financial year 2009-10 for the development of villages having a higher ratio (over 50%) of people belonging to the scheduled castes through convergence of central and state scheme and allocating financial on a per village basis.
- The plan aims to build an "Adarsh Gram" (model village) which has adequate physical and institutional infrastructure, in which minimum needs of all sections of the society are fully met. The village which is progressive and dynamic and its residents live in harmony.
- All the facilities necessary for dignified living should be available and the residents are enabled to utilise their potential to the fullest.
- The plan is considered ambitious as it aimed to bring a number of development programs to the village. Some of these programs are Bharat Nirman, PradhanMantri Gram Sadak Yojana (PMGSY) for rural, water supply, housing, electrification and other big-ticket schemes like Sarva Shiksha Abhiyan, Mahatma Gandhi National Rural Employment Guarantee Act, Integrated Child development Services, Sanitation.
- This program would be applicable to around 44,000 villages which had a scheduled castes population above 50% and so qualified for PMAGY.

Mahatma Gandhi National Rural Employment Guarantee Act. (MGNREGA)

- National Rural Employment Guarantee Act 2005, was launched on the 2nd Feb.2006. Now the new name of this scheme is "Mahatma Gandhi National Rural Employment Guarantee Act" (or, MGNREGA).
- This scheme is an Indian labour law and social security measure that aims to provide 'right to work' to the people falling Below Poverty Line.
- It guarantees 100 days employment in a year to the village people. Fifty percent workers should be women.
- Its 90% funding is borne by the central government and 10% by the state government.

National Rural Livelihood Mission:

- This scheme was restructured from the SwarnJayanti Gram SwarojgarYojna in 2011.
- National Rural Livelihoods Mission (Aajeevika) is aimed to empower the women's self-help group model across the country.
- Under this scheme govt. provides loan up to 3 lakh rupee at the rate of 7% which could be lowered to 4% on the timely repayment.

Fig 2.6 National Rural Livelihoods Mission

Training to Rural Youth for Self Employment (TRYSEM):

- This centrally sponsored programme was started on august 15, 1979.
- The main target of this scheme was to provide technical and business expertise to rural BPL people who are in the age group of 18-35.
- This programme has been merged with SwarnJayanti Gram SwarojgarYojna on April1, 1999.

National Rural Health Mission:

- The National Rural Health Mission (NRHM), now under National Health Mission is initiated on 12 April, 2005.
- Main aim of this plan is to provide accessible, affordable and accountable quality health services even to the poorest households in the remotest rural regions.
- Accredited social health activists (ASHA) scheme is also operational under this scheme.
- It is run by the ministry of health and family welfare.

Fig 2.7 National Rural Health Mission

Objectives:

The objective of providing and organizing this yojanas and schemes for people of villages and small towns is to enhance their vision towards the future and rurbanization. Education, housing, daily needs are the most important aspects of life which shows our standard of living. So, these schemes are just a start to the way of good standards of living which enhances the future of the rural people.

2.6 Other Projects / Schemes of Gujarat / Indian Government

Projects / Schemes by Government sector:

- ✓ IRDP(Integrated Rural Development Program)
- ✓ SGSY(Swaranjayanti Gram Swarozgar Yojana)
- ✓ NRUM(National Rurban Mission)
- ✓ Pradhan Mantri Gram Sadak Yojana
- ✓ Indira Aawas Yojana
- ✓ Mahatma Gandhi National Rural Employment Guarantee Act-2005 DRDA(District Rural Development Agency)
- ✓ PURA(Provision of Urban Amenities in Rural Areas)
- ✓ PMGSY(Pradhan Mantri Gram Sadak Yojana)
- ✓ NRDWP(National Rural Drinking Water Programme)
- ✓ JNNURM(Jawaharlal Nehru National Urban Renewal Mission)
- ✓ IWDP (Integrated Wasteland Development Programme

Projects / Schemes by Private sectors:

- ✓ Intensive Agricultural Area Programme
- ✓ Intensive Agricultural District Programme
- ✓ High Yielding Varieties Programme

Rural Industries Project

Chapter:3
Smart Village & Cities concept

3.1 Inroduction:

➢ Concept:

- Over 68 percent of India's population lives in rural areas. There has been a gradual increase in migration from villages to cities primarily for livelihood opportunities, better education, and healthcare facilities, among others. The rising burden on urban cities due to migration emphasises the need to transform villages so that they can meet the critical as well as aspirational needs of the villagers. This can be done using innovative technologies and transforming the service delivery models for villages. Transformed villages are called Smart Villages.
- While the phrase 'Smart Village' has become a buzzword in policy and rural development discussion, there is no universal definition of such villages. Two things that are common to all Smart Villages are the extensive use of technology and integration of several key interventions in infrastructure and service delivery.
- It's an integrated approach of delivering access to skills and quality basic services including education, e-health, 24x7 power, safe food, among others.

S	Social, Skilled and Simple	Zero Tolerance for Caste and Creed or better no caste & creed and no discrimination on Gender and Religion Everyone is Literate and skilled Simple living and high thinking
M	Moral, Methodical and Modern	Moral values of Gandhiji, Swami Vivekananda etc Methodical using Total Literacy and latest techniques Modern like cities
A	Aware, Adaptive and Adjusting	Highest level of awareness on global social & economic issues Adaptive and adjusting to fast changing environments
R	Responsive and Ready	Responsive to collective wisdom, cooperative movement & larger social issues Ready to generate own resources for self-sufficiency and self-reliance
T	Techno-Savvy and Transparent	Techno-savvy for IT and Mobile usage Transparent in harmonic relations and delivery of services

➢ Definitions (Civil):

- Civil engineering plays vital role in development of smart city. Construction of new infrastructure and maintenance of existing structure, construction of bridges, road network, drainage network,

water distribution, high rise building, traffic management and everywhere it requires.

- A deeper review, of approximately 100 definitions, combining all three sources17 shows that the majority of them posit ICT as the prime aspect, explicitly or implicitly (refer to Figure 2). However,

the importance of the integration of systems and compatibility of frameworks on which a city functionally operates, are largely missing. This shows a lack of clarity in balancing sustainability constraints with a city's aspirational goals. Also, equity as an outcome of a sustainable city fails to get mentioned and is often represented through the idea of 'people' in general. This partially indicates a lack of conscious effort to leverage the capabilities of smart attributes to include the marginalized and disadvantaged within a city's development plans18. Overall, there is a sense of confusion, between the end and the means.

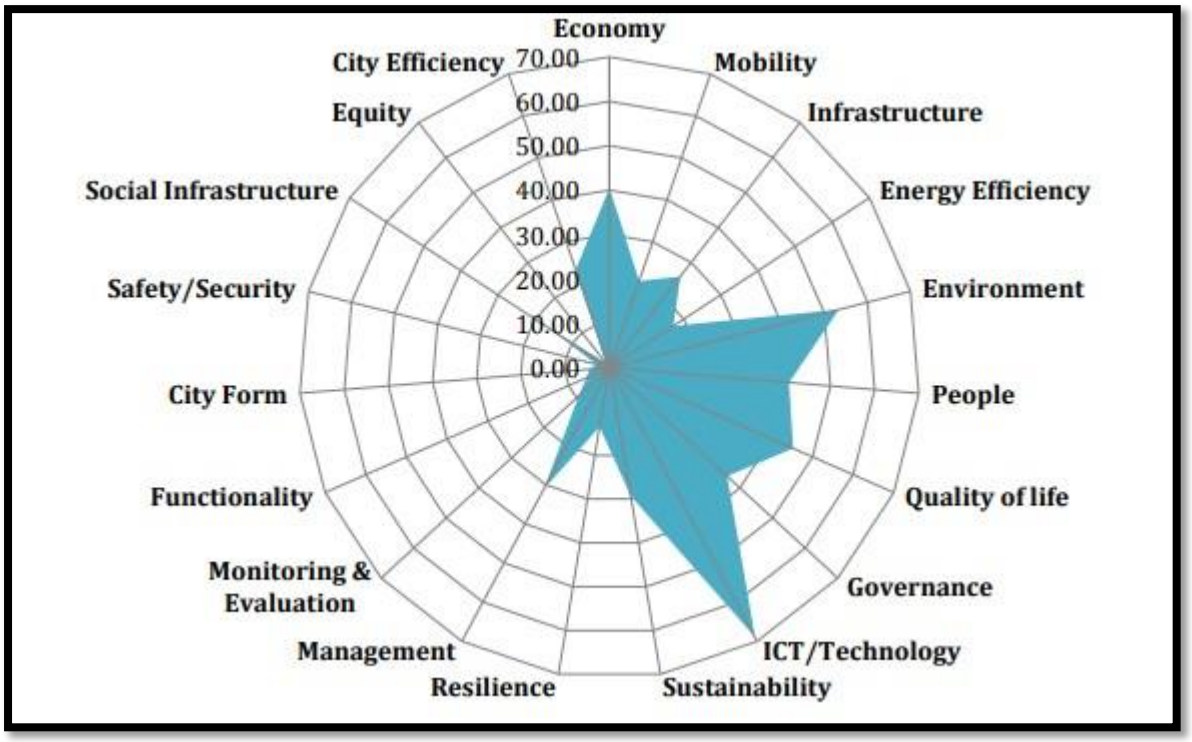

Fig :- 3.0 Definitions of Smart City in Literature as a Combination of Various Aspects

- **Practices(Civil):**

It has already been noted that the implementation of smart concepts into regional,both rural and urban contexts has to be adapted to socio-cultural and environmental circumstances. Thus, in the cities, different issues need to be tackled than in rural areas, where the main challenge is to bridge the distances among relatively small number of people. In the context of digital transformation that is at the forefront of our interest, this means that also digitalization requires adapted concepts, business models and solutions that have to strive to generally improve the well-being of the ruralpopulation. Need a following practices:

3.2 Vision-Goals, Standards and Performance Measurement Indicators

Some of the bench marks which shows the detailed needs of smart city as below:

- Smart traffic management
- Smart meters
- Building automation and control solutions (security, fire safety, alarms, lighting, gas and smoke detection).

- Smart energy management (Smart grid, smart water meters, smart solar energy solutions, smart electricity meters).
- Free public Wi-Fi network.

- GHG emissions tracking
- Applying smart solutions to infrastructure and service in area-based development.

➢ Smart Cities Standards:

Standardized indicators within standards benefit smart cities in the following ways:

- Effective governance and efficient delivery of services.
- International and Local targets, benchmarking and planning.
- Informed decision making and policy formulation.
- Leverage for funding and recognition International entities.
- Transparency and open data for investment attractiveness.
- A reliable foundation for use of big data and the information explosion to assist cities in building core knowledge for city decision-making and enable comparative insight.

Fig 3.1 Animated image of Smart technology implementation in village

3.3 Technological Options

- Smart energy
- Smart mobility
- Smart infrastructure
- Smart public services
- Smart care

3.4 Road Map and Safe Guard

Smart Maps capture abroad range of detailed data, such as roads (with details including lanes, speed limits, and turn restrictions),shops,(types, user ratings),and other information(bike and transit routes, building shapes, etc.)Smart Maps are designed so that users can quickly and intuitively interact with

them despite having virtually no training, ensuring that information reaches the widest possible audience. Smart Maps are built to update quickly and correctly as cities change and evolve.

For example, Lusail City in Qatar,Masdar City in the UAE,and Songdo in SouthKorea are all making digital technology,networks, and appsa central part of how they operate and interact with citizens. By contrast, existing or brownfield metropolitan areas face clear challenges in moving up the ICT

Maturity ladder, as they need to modernize their existing infrastructure with embedded sensors and control systems and retrofit old buildings a complicated and expensive process.

3.5 Issues and challenges:

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

2. Financing smart cities: The High Power Expert Committee (HPEC) on Investment Estimates in Urban Infrastructure has assessed a per-capita investment cost (PCIC) of Rs 43,386 for a 20-year period. Using an average figure of 1 million people in each of the 100 smart cities, the total estimate of investment requirements for the smart city comes to Rs 7 lakh crore over 20 years (with an annual escalation of 10 per cent from 2009-20 to 2014-15). This translates into an annual requirement of Rs 35,000 crore. One needs to see how these projects will be financed as the majority of project need would move through complete private investment or through PPPs (public-private partnership).

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

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

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

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

7. Providing clearances in a timely manner: For timely completion of the project, all clearances

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

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

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

10. Reliability of utility services: For any smart city in the world, the focus is on reliability of utility services, whether it is electricity, water, telephone or broadband services. Smart cities should have universal access to electricity 24×7; this is not possible with the existing supply and distribution system. Cities need to shift towards renewable sources and focus on green buildings and green transport to reduce the need for electricity.

3.6 Smart Infrastructure:

Responds intelligently to changes in its environment, with the ability to influence and direct its own delivery, use, maintenance and support. Smart Information and Communications Technology (smart ICT) has the potential to transform the way we plan and manage infrastructure. New developments in computer hardware, new applications and software are changing the face of the infrastructure sector, and society more generally; driving greater efficiency, increasing productivity, and greatly simplifying construction processes and life-of-asset maintenance.

The core infrastructure elements in a smart city would include:

- Adequate Water Supply
- Assured Electricity Supply
- Sanitation, including Solid Waste Management
- Efficient Urban Mobility and Public Transport
- Affordable housing, especially for the poor
- Robust IT connectivity and digitalization
- Good governance, especially e-Governance and citizen participation
- Sustainable environment
- Safety and security of citizens, particularly women, children and the elderly, and
- Health and Education

3.7 Cyber Security:

Smart cities and communities aim to increase economic competitiveness, strengthen sustainability efforts, and improve the quality of life of its people. The components of a smart city or community are designed to

increase convenience and open the door to new services and communications in an ever-increasing mobile society.

As urban hubs become increasingly connected, many economic, environmental, and quality-of-life benefits are realized. However, with cyber everywhere, this connectivity comes with unique privacy and cybersecurity risks.

In a converging physical and digital world, relying on perimeter cyber defense is not enough. City and community leaders should, therefore, embrace a broader future-minded approach to grow anywhere, safely

3.8: Retrofitting- Redevelopment- Greenfield Development District Cooling:

- **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. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens.
- **Redevelopment** will effect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens.
- **Greenfield** development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population.
- As far as Smart Solutions are concerned, an illustrative list is given below. This is not, however, an exhaustive list, and cities are free to add more applications.

3.9: Strategic Options for Fast Development

Following strategic option for fast development of smart city:

- It starts with having a realistic plan.
- Smart cities require extensive experimentation.
- A smart city vision should energize the private sector.
- Smart cities demand smart data.
- Get creative when rethinking transportation.
- Don’t downplay digital security.
- Smart city initiatives should complement low-techinitiatives.

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

Urban water supply: status and challenges

- As per Census 2011, over 71.2% of India’s urban house hold shad access to drinking water within their premises; up from 65.4% during Census 2001. Another 20.7% households had a water source within 100 m of their premises. Over 8% of India’s urban households need to move beyond 100 m from their premises to access drinking water; this has come down only marginally from the levels of 9.4% of households during Census 2001 and is a cause for concern.

- Even as basic access eludes about 8% of urban population,a bigger challenge has been in making access to urban water supply consistent, equitable and sustainable. The HPEC report points out that inadequate coverage, intermittent supplies, low pressure, and poor quality are

prominent features of water supply in the cities of India. A vicious circle is at play; high commercial and physical losses in the distribution network com- pounded by unwillingness to charge and collect user fees, often results in water utilities unable to improve service levels.

Water utilities in India typically recover only a third of their operations and maintenance (O&M) cost, which is lower than peer Asian city counterparts.

- It is in this context that some of the cases showcased in this Compendium hold promise. They reinforce the view that with sharp institutional focus and commitment, urban water supply systems can indeed be transformed in a relatively shorter period of time. Nagpur is attempting to scale up positive results from delivering 24x7 supply in a demonstration zone, to the entire city. The efforts of Bangalore, Pimpri-Chinchwad and Surat towards improvements in efficiency and information management are a welcome shift from asset creation towards a greater focus on service delivery improved efficiencies.

Urban sanitation: status and challenges

- A City Sanitation Ranking study (2010) conducted by MoUD found that none of 423 cities covered were found to be 'healthy' and 'clean'. While Chandigarh, Mysore, Surat and New Delhi were the only four ULBs that fared relatively better, nearly 190 cities were rated to be in a state of emergency with respect to public health and the environment.
- Urban India has still not been able to eliminate the scourge of open defecation;at Census 2011,over 12.6% of urban households resorted to open defecation. While this is a sharp reduction from the 18% at Census 2001, concerted efforts on a war-footing are required to eliminate open defecation all-together. Asarticulated in the National Urban Sanitation Policy (NUSP), achieving totally sanitised cities requires going beyond building toilets towards adopting holistic city-wide and community-led approaches. The relative successes of Trichy and Nanded in combating open def- ecation through city-wide community-led efforts reaffirm this philosophy and hold insights for rest of urbanIndia.
- Less than a third of the domestic waste-water undergoes any form of treatment. Pollution impacts and loss of freshwater owing to pollution is an area of serious concern. The NUSP reit- erates the need for a combination of city-level sewerage systems complemented with onsite systems and effective septageman- agement in smaller cities and in unserved areas to effectively address this situation.
- In recent years, capital funding from Government of India's Jawaharlal Nehru National Urban Renewal Mission (JnNURM), State-level initiatives and funding from multi-lateral / bi-lat- eral programs have helped a number of cities to expand their sewerage systems. However, the inability to deal with financing O&M has raised serious questions over long-term sustainability of some of these projects. The use of connection deposits, loans, taxear marking anduser charges in Tirunelveli's sewerage system (an approach adopted initially in Alandur in the mid-1990s and replicated in over 25 ULBs in Tamil Nadu) suggests that with policy commitment, effective project appraisals and citizen in-volvement, long-term sustainability of sewerage systems can be achieved.

Recent Initiatives In Urban Water and Sanitation

Jawaharlal Nehru National Urban Renewal Mission (JnNURM): In 2005, the Government of India launched the Jawaharlal Nehru National Urban Renewal Mission (JnNURM) and its allied Programme, the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) to provide

reform-linked grants for urban infrastructure with an outlay of Rs. 54,000 crore. As of March 2014, over 319 water and sewerage projects were sanctioned under JnNURM with anoutlay of Rs.39078crore

and another 753 water and sewerage projects were sanctioned under UIDSSMT with anoutlay of Rs.22662crore.Achieving 100% O&M cost recovery in water and sewerage services and transfer of water management function to local bodies are mandatory reforms to be implemented by participating cities under the mission program.

- **Service Level Benchmarking:** The Ministry of Urban Development (MoUD), Government of India has launched the Service Level Benchmarking (SLB) initiative covering water, sanitation, solid waste management and storm water drainage. A Handbook on Service Level Benchmarking has been released by MoUD to identify aminimum set of standard performance parameters, to define a common minimum framework for monitoring and reporting and to set out guide- lines on how to operationalize this framework in a phased manner. To encourage and facilitate adoption of the SLB framework outlined in the Handbook, the MoUD launched an SLB Pilot Initiative in February2009 in 28 pilot cities. As a follow up to the Workshop, cities developed Plans, which identified specific actions to be taken along with targets for expected service levels consequent to their implementation. Since then a number of states and cities have adopted these SLB framework to facilitate a planned approach to undertake improvements in performance and service delivery.
- **National Urban Sanitation Policy:** In 2008, Ministry of Urban Development, Government of India (MoUD) launched the National Urban Sanitation Policy (NUSP) with anaspirational vision for Indian cities – 'All Indian cities and towns become totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and afford- able sanitation facilities for the urban poor and women'. To support implementation of this vision, the NUSP envisaged formulation of City Sanitation Plan (CSP) at a city level as a comprehensive document that would detail short, medium and long term plans for governance, technical, financial, capacity building, awareness and pro-poor actions to ensure 100% access to safe sanitation. As a follow up to the NUSP, the Government of India initiated a periodic rating of cities by independent agencies on a range of sanitation indicators. A National Annual Award has also been instituted on the basis of this rating.

3.11. Initiatives in village development by local self-government:

In the past "government as provider" approach, the priorities were to secure budget allocations and develop projects. The Housing Policy and the NCU statement implicitly give higher priority to two other requirements: first, the reform of policies and regulations that now inhibit development initiatives by the people; and second, more efficient resource management and the building of institutional capacity. Resource Management and Institutional Development. As discussed in Section 5, India's urban institutions do not have the capacity to provide adequate services at present, let alone address the requirements of accelerated urban growth in the future. Proposals relate to three types of institutions.

He primes public sector actors in the urban development process; call for clearer allocations of responsibility and authority to them; and recognize the need for new organizational relationships between local governments and development authorities and State governments that would avoid overlaps and facilitate coordinated programming. Improved personnelincentives will be needed to permit the recruitment and retention of qualified staff as will skills training programs. Resource constraints, however, preclude simply expanding local government under current practices in proportion to urban growth. In many areas, the very nature of the way work is conducted will have to be redesigned to permit much higher levels of productivity.

The NCU recognizes reforms of internal management as vital. This is likely to entail implementing more systematic and efficient approaches in many areas: for example, budgeting and financial management;

project management and control; billing and collections; infrastructure systems maintenance; and personnel management.

Financial Systems. Constraints on government budgets and the rigidities of the present system of intergovernmental transfers prevent an adequate response of traditional arrangements to the challenge of urbanization. A new and more decentralized system of public and private financial intermediaries will be required. The establishment of the NHB represents an important step: an apex institution that will stimulate the creation of a network of mortgage financing. The NCU also calls for the creation of Urban Infrastructure Development banks to permit local governments to borrow for infrastructure.

Non-Governmental Organizations. Given the size of the job and the difficulty governmental agencies have in dealing directly in some aspects of the development of urban areas (e.g. stimulating informal sector enterprise and provision of shelter) there is a recognition of the need for new and expanded NGOs to assist in facilitating the urbanization process.

3.12. Smart Initiatives by District Municipal Corporation:

City bus service users will now be able to get information on the movement of their buses with the implementation of **Integrated Transport Management System** (ITMS). The system will also lead to a series of other improvements in the city bus service. ITMS was launched in 75 city buses by the **Vadodara Municipal Corporation** (VMC) as a Smart City initiative. In the second phase of the programmed, it will be launched in the remaining 75 buses.

As a part of the ITMS, the city buses are also being equipped with CCTVs, **Passenger Information System** (PIS) displays, panic buttons, driver display units and GPS tracking

The CCTVs and panic buttons will ensure better passenger safety. Apart from live tracking of buses on VMC's official mobile application and website, the estimated time of arrival of buses will also be seen on displays at bus stands soon. Officials said that if the bus diverts from its route or skips the bus stop, those monitoring the service will get an alert. The system will also ensure that the bus drivers do not overspeed and drive safely.

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

1. **Digi Locker**

   The service was launched as an important facility to store crucial documents like Voter ID Card, Pan Card, BPL Card, Driving License, education certificates, etc. in the cloud.

2. **My Gov. in**

Fig 3.2.Digi Locker

The portal works as an online platform to engage citizens in governance through a “Discuss”, “Do” and “Disseminate” approach.

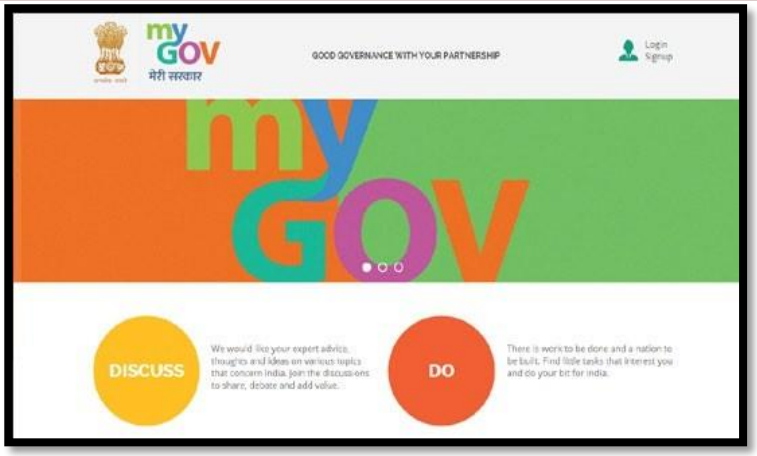

Fig 3.3 My Gov

3. E-Sign Frame work

This initiative would enable users to digitally sign a document online using Aadhaar authentication

Fig 3.4 E-Sign Frame work

Fig 3.5 Swatch Bharat Mission Mobile App

4. Swatch Bharat Mission Mobile App

The app will enable organizations and citizens to access information regarding the cleanliness drive and achieve the goals of the mission.

5. E-Hospital

Online Registration System under this initiative enables people to avail services like online registration, payment of fees and appointment, online diagnostic reports, checking on the availability of blood online, etc.

Fig 3.6 E-Hospital

6. Digitize India Platform

This initiative will involve digitization of data and records on a large scale in the country to make easy and quick access to them possible.

Fig 3.7 Digital India

7. Centre of Excellence on Internet Of Things (IOT)

In partnership with NASSCOM, Deity and ERNET in Bangalore, Centre of Excellence will enable rapid adoption of IOT technology and encourage a new growth strategy. IOT will help the citizens in services like transport system, parking, electricity, waste management, water management and women's safety to create smart cities, smart health services, smart

manufacturing and smart agriculture, etc

Fig 3.8 IOT

8. Electronic Development Fund

The fund will be set up to support the manufacturing of electronics products that would help create new jobs and reduce import. The funds will promote innovation, research and product development to create a resource pool within the country.

3.14 How to Implement Other Countries Smart Villages Projects in Indian VillageContext

1. Promoting mixed land use in area-based developments

Planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The states will enable some flexibility in land use and building bye-laws to adapt to change.

2. Housing and inclusiveness

Expand housing opportunities for all.

3. Creating walkable localities

Reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance.

4. Preserving and developing open spaces

Parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in areas and generally promote eco-balance.

5. Promoting a variety of transport options

Transit oriented development (TOD), public transport and last mile para-transport connectivity.

6. Making governance citizen

Friendly and cost effective-increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without having to go to municipal offices. For minge-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites.

Chapter:4

4.1 Introduction about MotiSarsan village

4.1.1 INTRODUCTION:

About 70% of India's population, or 750 million, live in its 600,000 villages. The average village has 200-250 households, and occupies an area of 5 sq. km. Most of this is farmland, and it is typical to find all the houses in one or two clusters. Villages are thus spaced 2-3 km apart, and spread out in all directions from the market towns. The market centers are typically spaced 30-40 km apart. Each such Centre serves a catchment of around 250-300 villages in a radius of about 20 km. As the population and the economy grow, several large villages are continually morphing into towns and market centers. Around 65% of the State's population is living in rural areas. People in rural areas should have the same quality of life as is enjoyed by people living in sub urban and urban areas. Further there are cascading effects of poverty, unemployment, poor and inadequate infrastructure in rural areas on urban centers causing slums and consequential social and economic tensions manifesting in economic deprivation and urban poverty. Hence Rural Development which is concerned with economic growth and social justice, improvement in the living standard of the rural people by providing adequate and quality social services and minimum basic needs becomes essential. The present study deals with the same.

Vishwakarma Yojana would provide "Design to Delivery" solution for development of villages in 'Rurban' areas. The developmental work in villages that could undertake as per the need of the village in particular includes Physical infrastructure facilities (Water, Drainage, Road, Electricity, Solid waste Management, Storm Water Network, and Telecommunication & Other), Social infrastructure facilities (Education, Health, Community Hall, Library, Recreation Facilities & other) and renewable energy (Rain water harvesting, Biogas plant, Solar Street lights & Other) for Sustainable development.

4.1.2 NEED OF THE STUDY:

The need of the study is to provide the basic requirements of people in the village and for Rurban Development of the village. For this purpose the information of the village is collected based on different categories such as Education, Water Facilities, Drainage Facilities, Transportation Facilities, Primary Health Care, Bank Facilities, Public Toilets, Community hall and other amenities.

65% of the population of the country lives on agriculture which contributes only 15 % to the country's GDP. If we compare this with China which has a similar sector contribution to the GDP, only 30% of people depend on agriculture whereas in country like USA just 2% of the people are dependent on agriculture. Rurbanisation addresses this concern and imbalance by providing alternate jobs to rural masses dependent upon agriculture.

4.1.3 Study area

Study area mainly includes study of Pali Village which is situated at Santrampur Taluka in Panchmahal District of Gujarat State, India. It also includes some sub Village like Pali,Gohimda(3 KM) , Anjanwa (3 KM) , Chhayan (4 KM) , Ranijini Padedi (4 KM) , Gamdi (4 KM)The Vishwakarma Yojana is aimed to Rurban development of the village. For that purpose study area is decided for taking detail information of the village. The study area includes

education,

social life, basic needs of the person, economic growth of village, transport facilities etc
The Vishwakarma Yojana is aimed to Rurban development of the village. For that purpose study area is decided for taking detail information of the village. The study area includes education, social life, basic needs of the person, economic growth of village, transport facilities etc.

Education includes various facilities like Anganwadi, Primary School, Secondary School,
Higher Secondary School, College etc. Medical Facility includes study of Gov. / Panchyat Dispensary, Health Centre, PHC & CHC, Child Welfare and Maternity Home, Hospital etc.

4.1.4 OBJECTIVES OF THE STUDY :

Following are the various objectives of study…….

- To provide insufficient basic physical infrastructure facilities like Water Supply, Transportation, Sewerage and Solid Waste Management etc.
- To provide insufficient Social infrastructure facilities like health and education facilities and to ensure proper delivery of facilities to village dwellers
- To promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.
- To provide Internal roads within village settlement & efficient mass transportation systems between clusters of villages to improve connectivity
- To Identification sanitation facilities that are needed to be improve like sewerage and drainage line, dumping facilities, Electricity connections.

4.1.5 SCOPE OF THE STUDY:

By studying the present status and techno-economic survey of Pali village in santrmpur districts of the Gujarat state in terms of basic services, public amenities, other infrastructural facilities for the need of the people and to prepare a report on the expected socio-economic growth of the area with the consultation of TDO, DDO and Sarpanch; will help full in providing better facilities and services in village.
From the gap analysis, development strategies for village development will be proposed and planning proposals for Physical infrastructure, Social Infrastructure and Renewable energy Source will be suggested for the village.

4.1.6 METHODOLOGY :

- First of all we studied what are the various goals and different objectives and aspect of Vishwakarma Yojana and also studied various basic definitions related to the project like rural area, urban area, urbanization etc.
- After this we contacted our village (Pali) surpanch, talati mantri and different gram-panchyat members.
- Than after we frequently visited the Pali village for the purpose of collecting various data related to various facilities and amenities and survey of different aspects related to physical, infrastructural, social facilities.
- Gap analysis is done based on data collected through survey of village. And various suggestions are made by us on development of village. And based on this suggestions we will design proposed facilities in the village according to the need and population of that village

4.1.7 Available methodology for development of related to civil

- Chapter 1: Includes introduction and aim, objectives, justification, scope of the study etc.
- Chapter 2: Includes literature review of government norms, case study of ideal village and government schemes in the village.
- Chapter 3: Includes study area profile like village location, its history, physical and demographical growth, social and economic profile and land use detail.
- Chapter 4: Includes data collection and primary and secondary survey details and data presentation.
- Chapter 5: Includes design proposals based on observation, recommendation and suggestions.
- Chapter 6: Includes conclusion, survey form, and abstract of data, base map of village, photographs and Drawing/sketches

4.2 STUDY AREA PROFILE :

4.2.1 Study Area Location with brief history land use details

Moti Sarsan is a Village in Santrampur Taluka in Panch Mahals District of Gujarat State, India. It is located 55 KM towards North from District head quarters Godhra. 9 KM from . 138 KM from State capital Gandhinagar

Locality Name : Moti Sarsan (મોટી સરસ ાં)
Taluka Name : Santrampur
District : Panch Mahals
State : Gujarat
Language : Gujarati and Hindi
Current Time 09:51 AM
Date: Saturday , Nov 28,2020 (IST)
Time zone: IST (UTC+5:30)
Elevation / Altitude: 205 meters. Above Seal level

4.2.2 Base location map

4.2.2.1 Base Location Map

4.2.3 PHYSICAL & DEMOGRAPHICAL GROWTH :

Moti Sarsan Local Language is Gujarati. Moti Sarsan Village Total population is 1145 and number of houses are 243. Female Population is 46.9%. Village literacy rate is 67.2% and the Female Literacy rate is 26.4%.

Future population calculation as per geometric increase method for 2021 will be 20081, and for 2031 will be 23551

Particulars	Total	Male	Female
Total No. of Houses	**243**	-	-
Population	**1,145**	608	537
Child (0-6)	**120**	63	57
Schedule Caste	**332**	177	155
Schedule Tribe	**320**	164	156
Literacy	**75.02 %**	85.69 %	62.92 %
Total Workers	**645**	330	315
Main Worker	**269**	-	-
Marginal Worker	**376**	99	277

TABLE 2 (DEMOGRAPHICAL DETAIL)

BRIEF HISTORY:

Pali is a Village in Santrampur Taluka in Panchmahal District of Gujarat State, India. It is located 12KM towards East from District headquarters santrampur . 12 KM from. 60 KM from godhra

.

Urban areas around Pali village are thasra, balasinor and dakor.
Nearest town from Pali village is Thasra and it is 14 km away from Pali. The village is known for its communal harmony.

4.2.4 ECONOMIC PROFILE :

Name of three major occupation groups in village are…..

1 Agriculture(70% of total population)
2 Labour work(20% of total population)
3 Business(10% of total population)

Majority Crops taken in village are Tobacco, Bajra, Wheat, and Rice & Cotton. In Pali village the labours concern with agricultural work are 25% of total population and concern with stone crushing industries are 15% of total population. Agriculture is the main occupation of Pali village. Accept it some people are running stores (local shops)

4.2.6 SOCIAL SCENARIO :

Following table is showing the sex ratio of female and male and literacy rate of village population as per census data for year 2001 and 2011.

TABLE 3 (SEX-RATIO & LITERACY RATE)

Sex-Ratio (Female/Male)	**Literacy rate**
0.8959% IN 2001	70.59% IN 2001
0.8999% IN 2011	80.03% IN 2011

4.2.7 To Know the reasons of migration/ trends of migration / problem and potentials of migrants

1.Employment
2.Marriage
3.Education
4.Hospitals other public facilities

4.3.1 Describe Methods for data collection :

Base line survey is a benchmark for any intervention during and post implementation of any development programme. A detailed baseline survey was undertaken which involved household census survey, Bio-physical survey and Village level data collection from Sarpanch. This gave in the details of the demographic profile of the village, the literacy percentage, SC/ST population, number of BPL household, cattle population and net consumption rate in the village, average milk production of the cattle and various schemes running and their benefits Bio-physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, well in the area, crop taken in the field, Cropping pattern, fertilizer used and various sources of irrigation in the field.

4.3.2 PRIMARY SURVEY DETAILS :

Primary survey is done in order to collect the basic information about various facilities available in the village.

In this survey data is collected by various means like house to house means door to door survey, by interviewing people, school teachers, shop keepers, and other public.

Accuracy of this data is not sufficient means that data based on primary survey is not reliable or very accurate. Variances in the data happened due to different views of people.

We checked the infrastructure condition of different buildings like school, gram- panchyat, police station, banks, etc. And also check the condition of various basic amenities like water supply, drainage, electricity, solid waste management, railway station, bus station, hospitals, PHC, etc

SECONDARY SURVEY DETAILS :

Secondary survey includes data collection from various government offices like gram panchyat, police station, phc, etc.

We collect the data related total population of the Pali village , male female ratio , literacy rate of village , growth rate , number of schools, various government schemes running for village development , area of village , agricultural area of village , major occupations , major crops taken, water supply source for drinking as well as irrigation water, etc.

We had done this secondary survey with the help of sarpanch, talati mantri, gram- panchyat members.

4.3.4 No of Human Being in one House

On an Average Survey of Village No of Human being in One House is Approximately 5 to 8 people.

4.3.5 Material Available locally in the village and Materials Out Sourced by Villagers

The construction of the houses is made of Bricks, Sand, cement, Concrete. In this village there were more pucca house then katchcha house. In village concrete house and renovation of old house are done on wider scales. There were also Widening of approach Road going on in kumetha village. All Material are out sourced and supplied by contractor.

4.3.6 Geographical Detail

Village	**MotiSarsan**
District	**Panchmahal**

Tehsil	**Santrampur**
Area (hectare)	**715**
Government	**Panchayat**
Population	**1145**
Pin code	**389230**

Table 4.3Geographical Details Chart

4.3.7 Demographical Details

Sr No	Census	Population	Male (In Nos)	Female(In Nos)	Total No of house Holds
1	2011	1145	608	537	243

Table 4.3.1Demographical Details Chart

4.3.8 Occupational Details /4.3.9 Agricultural Details

Name of the Major Occupation Groups in Villages	❖ **Agriculture**
	❖ **Service Work, Private Business**
	❖ **Laborers**
Name of the Major Crop Grown in the Village	❖ **Wheat**
	❖ **Cotton Seed**
	❖ **Pulses**

Table 4.3.2 Occupational Details Chart

4.3.10 Manufacturing HUB/ Ware houses

The Village is connected to highway and Area of nearby village is surrounded by various small as well as big manufacturing industries like (Rehau Polymer Pvt ltd, Alembic pharmaceuticals limited, Schneider Electric Infrastructure Limited etc.)

4.3.11 Tourism development

No tourism in this village.

4.4 INFRASTRUCTURE DETAILS:

4.4.1 DRINKING WATER

Pure drinking water is supplied through underground pipes in easy way from Mahisagar River to the elevated storage tanks (fig 2) and from tank it is supplied to the village.

As per standard data of NBC code, 100 liters of water is required for per person per day in village area. Total 1712200 liters of water is needed for whole village per day. This is sufficient for the whole village

FIGURE 4.4.1 ELEVATED STORAGE TANKS (1 LAKH LITERS)

4.4.2 DRAINAGE WORKS

Almost in all areas of village an open ditch drainage network is available. But it is not sufficient for the monsoon season, so it is required to increase the depth of open ditch. Open drainage system is not preferable for good health conditions, so it is required to cover it make it underground.

Size of open ditch is 20*15 cm which is not sufficient for the peak hour discharge.

FIGURE 4.4.5: OPEN DITCH DRAINAGE SYSTEMS

4.4.3 TRANSPORTATION & ROAD NETWORK

A good approach road (state highway 59) to reach Pali village is available in good condition. Streets are in acceptable condition in village .Internal streets are in fair weather condition and not suitable in all weathers like monsoon. Quality of internal streets is needed to be improving.

FIGURE 4.4.7: INTERNAL STREETS

FIGURE 4.4.5: APPROACH ROAD

BUS STAND

A Bus-station is available in Pali village near bazar area. Infrastructural condition of bus-stand is very poor accordingly to the village population and it need to be improve. A railway-station is also available in Pali village near bus-station in good condition. Anand-godhara approach line is passing through Pali village

FIGURE BUS STATION

ELECTRICITY

Government electricity is available in village and it is supplied almost for 24 hours. Road/street lights are available on main road and streets of village. In all the government buildings like gram-panchyat, police station, anganwadies, schools, post- office; good electrification is available which is adequate

SANITATION FACILITIES

Public toilet blocks are not available in the Pali village. In government buildings like gram panchyat, police station sanitation facilities are need to be improved & maintenance. Accept it most of houses have their own toilet-bath facilities.

IRRIGATION FACILITIES

Irrigation water is available in adequate amount for agricultural activities from mahisagar river through underground pipes and accept it farmers have their own deep wells in their farms. Farmers use conventional irrigation system like border strip system which results in waste full use of water. It is advisable to use drip-irrigation system to conserve water.

4.4.4 HOUSING CONDITION

Both kutchha and pucca houses are there in Pali village. Approx. ratios of kutchha and pucca houses are 60:40. Housing conditions are needed to be improved. Most of houses have bath-toilet facility.

FIGURE 10: HOUSING CONDITIONS

4.4.5 SOCIAL INFRASTRUCTURE FACILITIES

HEALTH FACILITIES

Primary health center is available in village in bazar area which is almost in center of village. Which have 6 bad capacities and it is not adequate as per the population of village. Accept it five private clinics & one private hospital (phc hospital) of 20 bed capacity with all primary health services are available in village.

4.4.1.4 EDUCATION FACILITIES

Seven primary schools, three secondary schools and two higher secondary schools are available in the Pali village which is sufficient for whole village population. Seven aaganwadis (play group) are available in Pali village in different areas. ITI College is not available in village because there is less number of people doing higher studies and ITI is available nearby in dakor village.

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

In village existing public building like panchayat building, school, PHC are in good condition and they don't required maintenance. Anganwadi required maintenance as well as Post Office branch required maintenance

Fig 4.4.15: Anganwadi **Fig 4.4.16 Post Office**

4.4.7. Technology Mobile / Wi-Fi / Internet Usage Details in %:

In village 60 to 65 % use smart phone, among which 20 to 25% use a normal phone and rest of people are still having less knowledge of phone. Youth of Village have knowledge of internet and its usages.

4.4.8. Sport Activity as Gram Panchayat

No activity of sports is conducted by gram panchayat but School Conduct Sport Activities.

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

socio-cultural facilities like Community Hall, Public Library, Public Garden /Park, Village Pond are not available in the village. One cricket play ground is available in the village which needs to be improved. Accept it no other recreational facilities are available in the village.

4.4.11. Other Facilities /4.4.12 Any other Details

- One post office is available in main bazar area.
- A police station is located in main bazar area which is out police station.
- All the shops of general market are held in main bazar area.
- A gram panchyat building and computer room is available in Pali village which need to be repair or reconstruct.
- There are many medical shops are available in the village. Different banks like SBI, DENA BENK, BOB, URBAN CO. BANK are available in the village. There are some small stone crushing industries are located around village

1. Technical Options with Case Studies

Case Study on Central Bus-station, Vadodara, Gujarat

5.1 About The City:

Vadodara features a tropical wet and dry climate. There are three mainly seasons: Summer, Monsoon and Winter. Aside from the Monsoon season,the climate is dry. the weather is hot through the months of march to july. the average temperature of summer max is 40'C(104'F),and the average minimum is 23'C(73'F).From November to febuary, the average max temperature is 30'C(86'F).the average minimum is 15'C(59'F) and the climate is extremely dry. the southwest Monsoon brings a humid climate from mid-june to mid-september. the average rainfall is 93 CM(37IN),but infrequent heavy rains cause the river flood.

5.1.1 Site & Surroundings:

The site area of bus terminal at Vadodara is 22,325 SQMT and built up area is 1.8 times the site area (40,150SQMT) as it also incorporates shopping mall. It is inaugurated in 14th February,2014 by our prime minister Shree Narendra Modi. Right now, the terminas already handles over 800 buses and as many as 28,000 to 35,000 passengers daily.it is built under a public-private partnership between the Gujarat state road transport corporation (GSRTC) and realty firm cube construction.

The terminal has 4 accesses: 1st is bus entry, 2nd is bus exit, 3rd is public entry, 4th is through the shopping area. The site is west facing and the road width is 18m people as well as busses accesses through. Railway station is located just opposite the access road (0.2km) and airport is 5.2km away from the bus terminus and also SSG hospital is 1.4km away from the bus terminus.

Fig 5.1 Site view of central bus station

Surroundings are as follows:

North : commercial shops

East : maharaja sayajirao university

South : commercial shops/fuel filling station
West : road (18m wide)

5.1.2 Site plans & floor plans:

The Bus Terminus have :

- 20 plateforms
- Parking area for 10 buses & ticket counters
- Inquiry counter
- Cafeteria(24*7)
- 12 shops and also include medical shop
- Tourist information cabin
- Parcel office
- Water body in semi open area
- Guest room
- Doormatries for 120 male & 80 female
- Waiting hall for 200 peoples
- Administrative department
- Potable water area
- Toilets for male & female
- GSRTC office
- Parking for 275 four-wheelers & 400 two-wheelers and Auto-stand

The commercial area have 40 retail shops of an average 25 to 35 square-meter each, a fleamarket, a food court with 22 outlets, a seven screen multiplex run by cinepolis India.

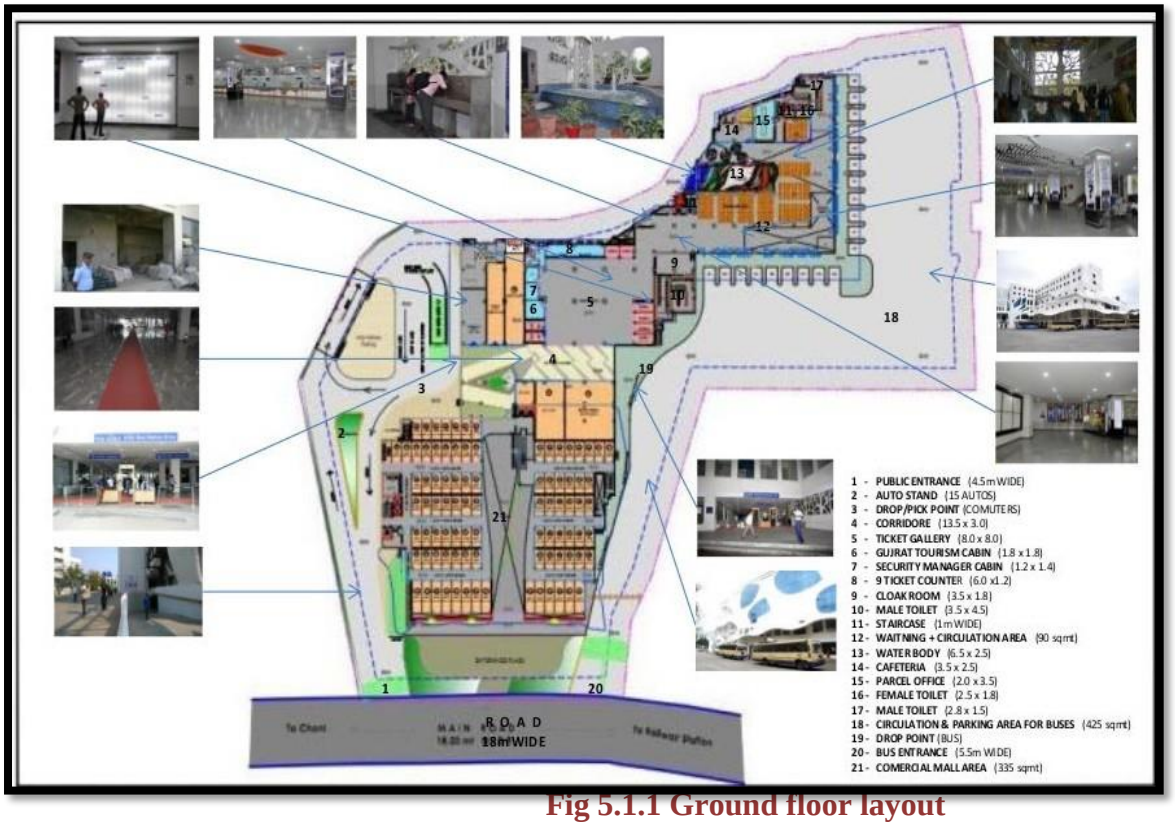

Fig 5.1.1 Ground floor layout

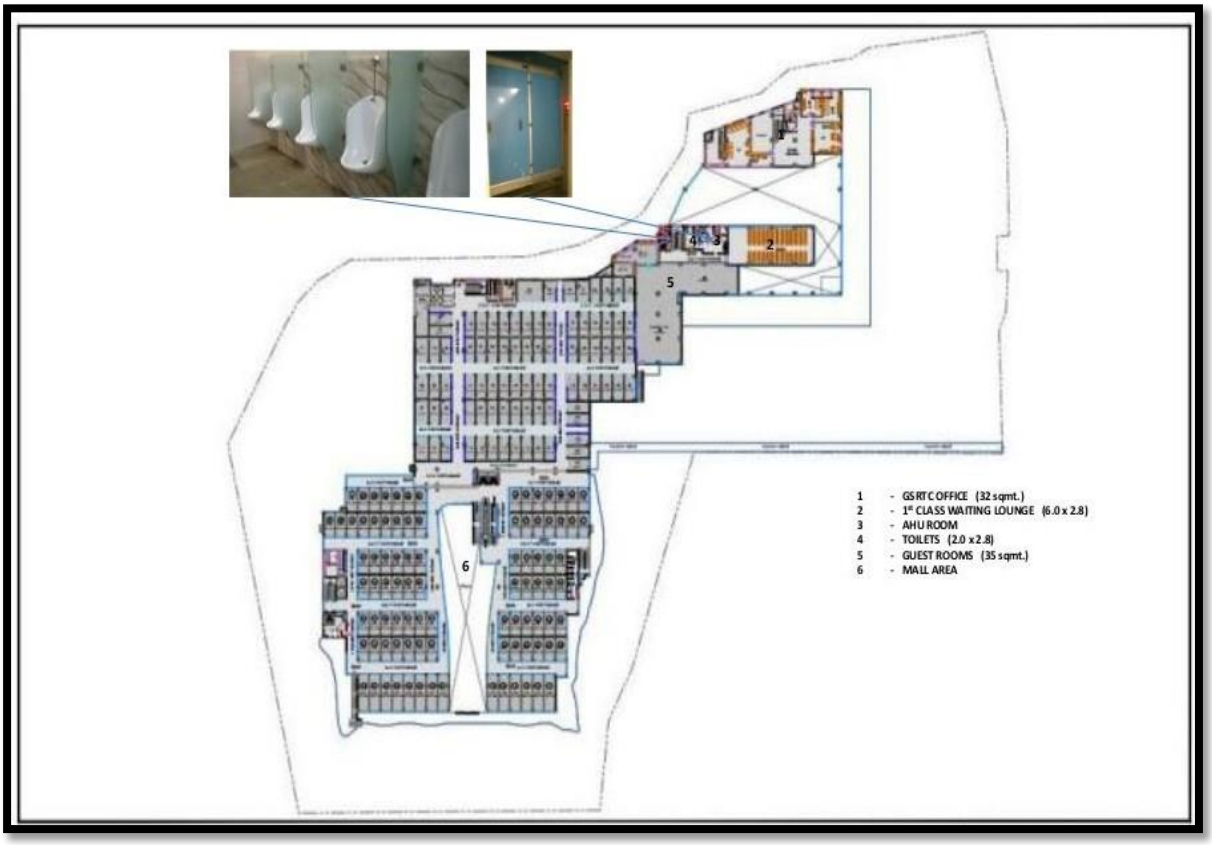

Fig 5.1.2 First floor layout

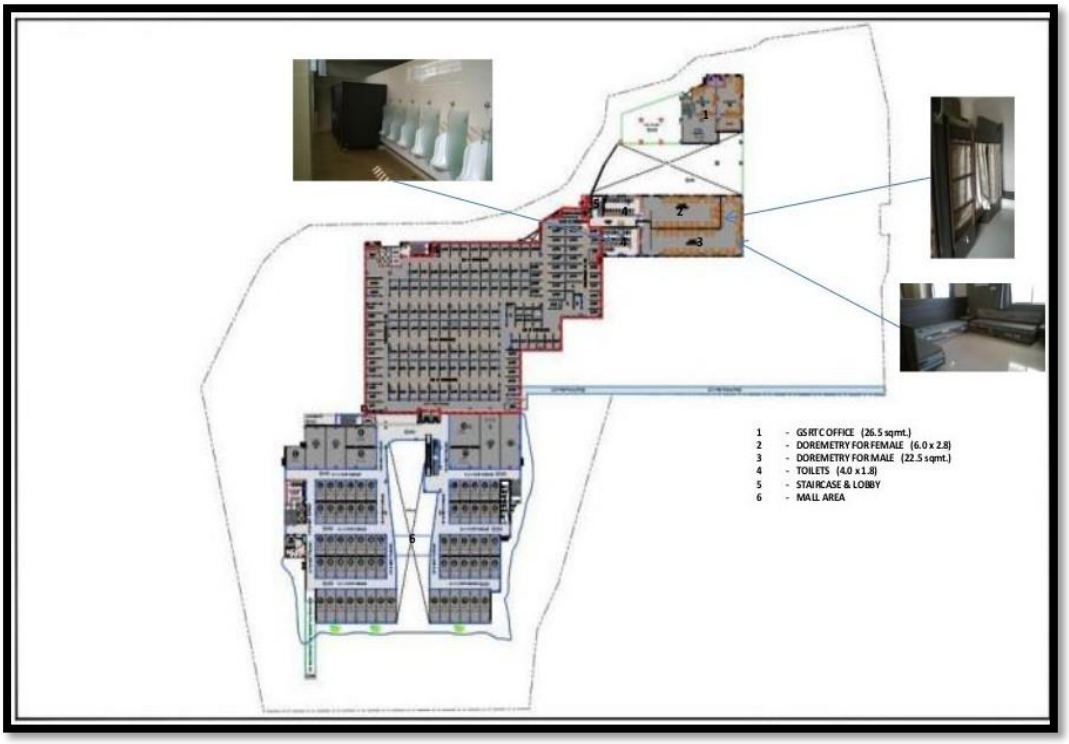

Fig 5.1.3 Second floor layout

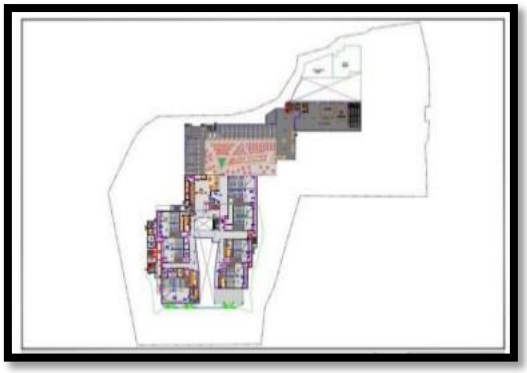

Fig 5.1.4 Third floor layout

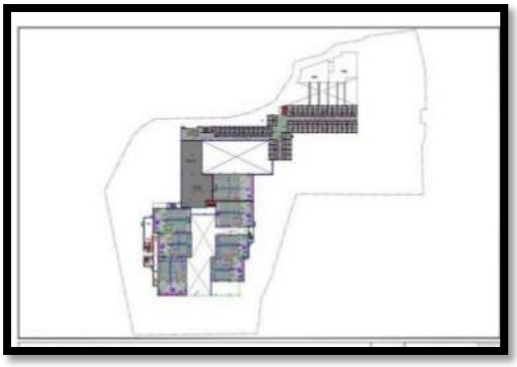

Fig 5.1.5 Fourth floor layout

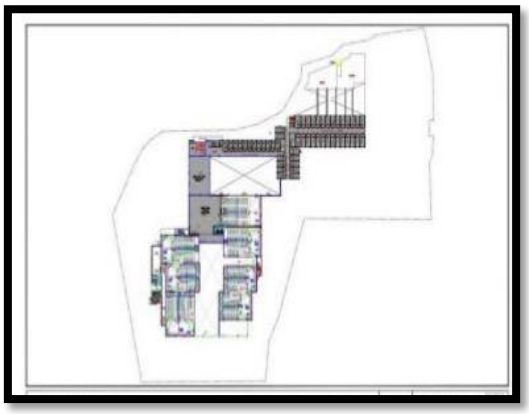

Fig 5.1.6 Fifth floor layout

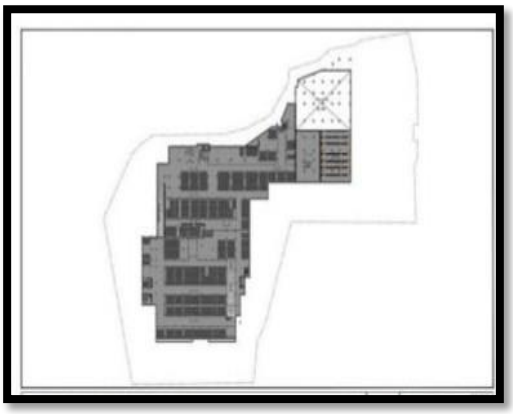

Fig 5.1.7 Lower basement floor layout

5.2 Service analysis:

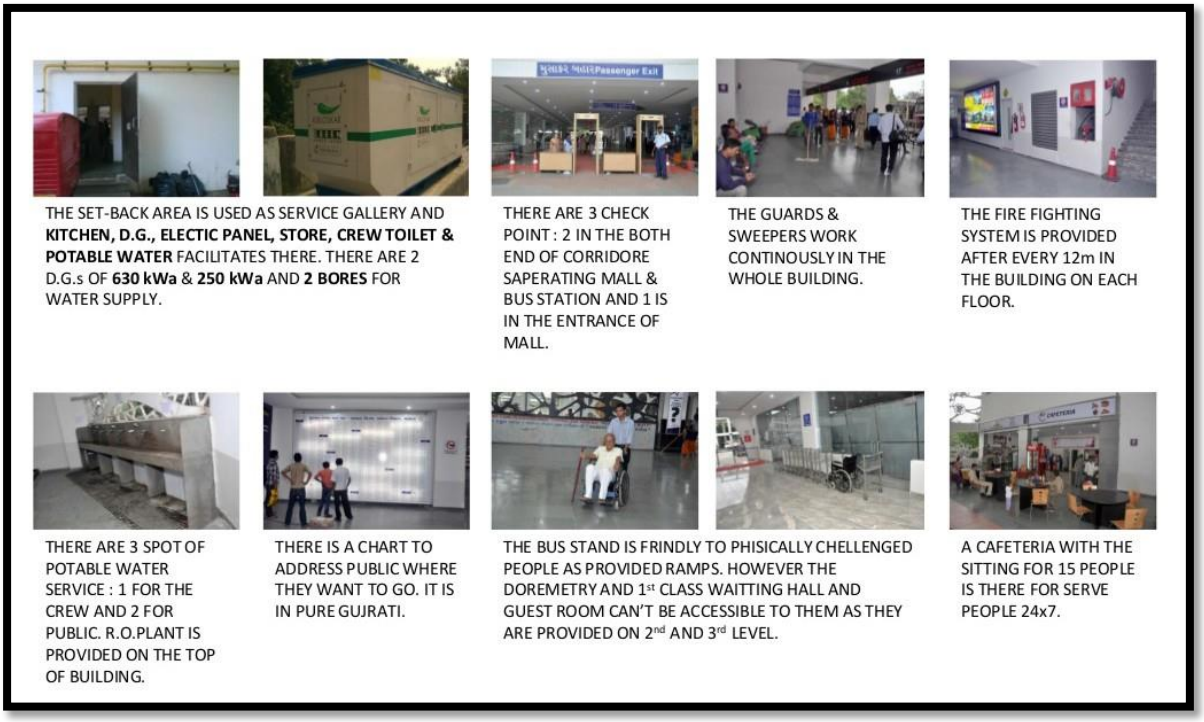

Fig 5.2 Service analysis of Bus terminus

5.3 Material & structural analysis:

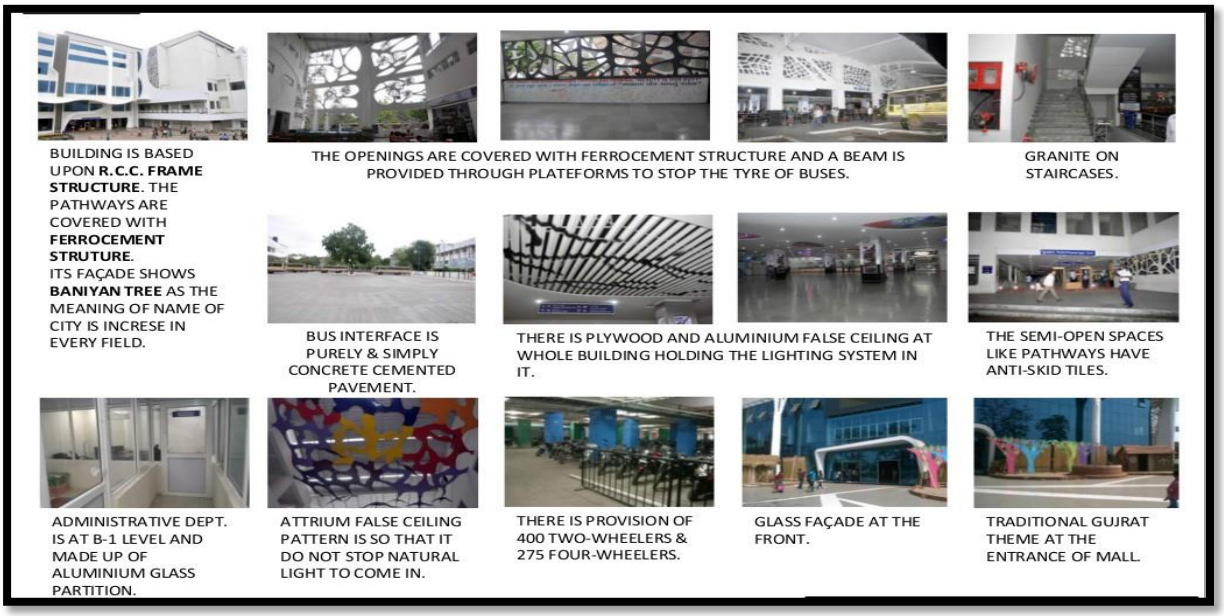

Fig 5.3 Material & Structural analysis

5.1.1 Sustainable Sanitation

Sustainable Sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. In order to be sustainable a sanitation system has to do this, and additionally be economically viable, socially acceptable, and technically and institutionally appropriate, and it should also protect the environment and the natural resources. This implies the following criteria:

- **Health and hygiene:** The sanitation system must put an effective barrier between its user and the environment, and must prevent exposure that could affect public health at all points of the sanitation system: from the toilet, via the collection and treatment system, to the point of reuse or disposal and downstream populations — hence it also includes hygiene behavior.
- **Environment and natural resources:** In order to be sustainable, the sanitation system must protect and respect the natural environment and resources. Wherever possible, the resources contained in excreta and wastewater (energy, nutrients, water) are recycled, thereby protecting other resources (e.g. by replacing fossil fuels through biogas). Should use little energy, water or other resources (e.g. for construction, operation and maintenance), and should produce as little harmful emissions to the environment as possible (both liquid, solid and gaseous).
- **Technology and operation:** A sustainable sanitation system utilizes a technology and a mode of operation that are well adapted to local circumstances. This includes the system's functionality and the ease with which the entire system including the collection, transport, treatment and reuse and/or final disposal can be constructed, operated and monitored by the local community and/or the technical teams of the local

utilities. Furthermore, the robustness of the system, its vulnerability towards power cuts, water shortages, floods, etc. And the flexibility and adaptability of its technical elements to the existing infrastructure and to demographic and socio-economic developments are important aspects to be evaluated.

- **Financial and economic issues:** The cost of a sanitation system must relate to the financial capacity of households, communities or institutions and includes not only the costs for construction, but also a rising costs for operation, maintenance and necessary reinvestments of the system. Besides the evaluation of these direct costs also direct benefits e.g. from recycled products (soil conditioner, fertilizer, energy and reclaimed water) and external costs and benefits have to be taken into account. Such external costs are e.g. environmental pollution and health hazards, while benefits include increased agricultural productivity and subsistence economy, employment creation, improved health and reduced environmental risks.
- **Socio-cultural and institutional aspects:** A sanitation system only lasts and can be sustainable if it is appropriate and accepted by the community. Again, this includes the whole sanitation system — i.e. Not only toilets, but also maintenance and operation and the recharge and reuse system adopted. A sustainable sanitation system must hence be socially acceptable, convenient, respect gender issues and impacts on human dignity, consider impacts on food security. In regards to institution aspects, it must be in compliance with the legal framework and must make for stable and efficient institutional settings.

Most sanitation systems have been designed with these aspects in mind, but in practice they are failing far too often because some of the criteria are not met. In fact, there is probably no system that is absolutely sustainable. The concept of sustainability is more of a direction rather than a stage to reach. Nevertheless, it is crucial, that sanitation systems are evaluated carefully with regard to all dimensions of sustainability. Since there is no one-for-all sanitation solution, which fulfils the sustainability criteria in different circumstances to the same extent, this system evaluation will depend on the local framework and has to take into consideration existing environmental, technical, socio-cultural and economic conditions.

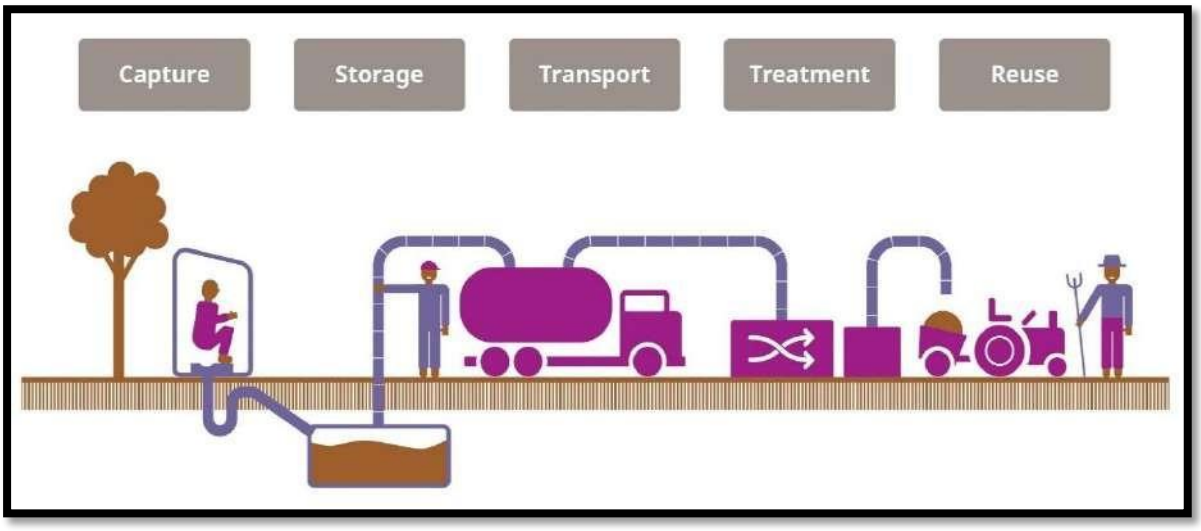

Fig. 5.3 SANITATION CHAIN

5.1.2 Transport Infrastructure / system:

Transport infrastructure consists of the fixed installations necessary for transport and includes roads, railways, airways, waterways, and terminals. Transport is vital to the well-functioning of economic activities and a key to ensuring social well-being and cohesion of populations. Transport ensures everyday mobility of people and is crucial to the production and distribution of goods. Adequate infrastructure is a fundamental precondition for transport systems. In their endeavor to facilitate transport, however, decision-makers in governments and international organizations face difficult challenges. These include the existence of physical barriers or hindrances, such as insufficient or inadequate transport infrastructures, bottlenecks and missing links, as well as lack of funds to remove them. Solving these problems is not an easy task. It requires action on the part of the governments concerned, actions that are coordinated with other governments at international level.

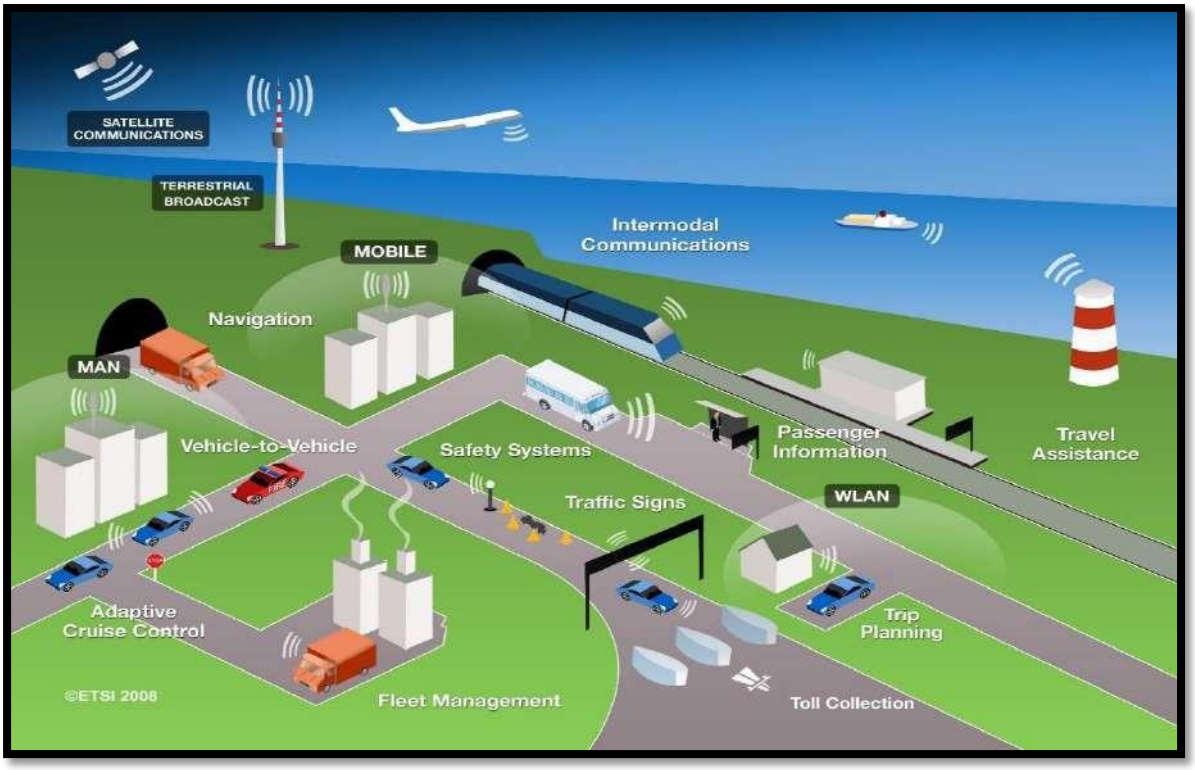

Fig. 5.4 FUTURE TRANSPORT SYSTEM CONCEPT

5.1.3 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. As of 2020, there is the equivalent of about 30 ha (74 acres) of operational vertical farmland in the world. The modern concept of vertical farming was proposed in 1999 by Dickson Despommier, professor of Public and Environmental Health at Columbia University. Despommier and his students came up with a design of a skyscraper farm that could feed 50,000 people. Although the design has not yet been built, it successfully popularized the idea of vertical farming. Current applications of vertical farming coupled with other state-of-the-art technologies, such as specialized LED lights, have resulted in over 10

times the crop yield than would receive through traditional farming methods. The main advantage of utilizing vertical farming technologies is the increased crop yield that comes with

a smaller unit area of land requirement. The increased ability to cultivate a larger variety of crops at once because crops do not share the same plots of land while growing is another sought-after advantage. Additionally, crops are resistant to weather disruptions because of their placement indoors, meaning less crops lost to extreme or unexpected weather occurrences. Because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna. Vertical farming technologies face economic challenges with large start-up costs compared to traditional farms. In Victoria, Australia, a "hypothetical 10 level vertical farm" would cost over 850 times more per cubic meter of arable land than a traditional farm in rural Victoria. Vertical farms also face large energy demands due to the use of supplementary light like LEDs.

Fig. 5.5 VERTICAL FARMING

5.1.4 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

Corrosion Mechanism, Prevention & Repair Measures of RCC Structure Though concrete is quite strong mechanically, it is highly susceptible to chemical attack and thus structure gets damaged 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 or air may lead to corrosion of steel, cracking and spilling of concrete cover thereby reducing durability of concrete structure. Repair has been suggested as the protective solution for damaged structure due to corrosion.

Overall, there is very little published empirical evidence that provides insight into the durability of saline treatments and their long-term residual protection (i.e. following at least 10 years of

service). Such a gap in knowledge is undesirable given the scale of infrastructure treated with hydrophobic treatments such as silences.

5.1.5 Sewage treatment plant:

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

The term "sewage treatment plant" (or "sewage treatment works" in some countries) is nowadays often replaced with the term wastewater treatment plant or wastewater treatment station. Sewage can be treated close to where the sewage is created, which may be called a "decentralized" system or even an "on-site" system (in septic tanks, bio filters or aerobic treatment systems). Alternatively, sewage can be collected and transported by a network of pipes and pump stations to a municipal treatment plant. This is called a "centralized" system (see also sewerage and pipes and infrastructure)

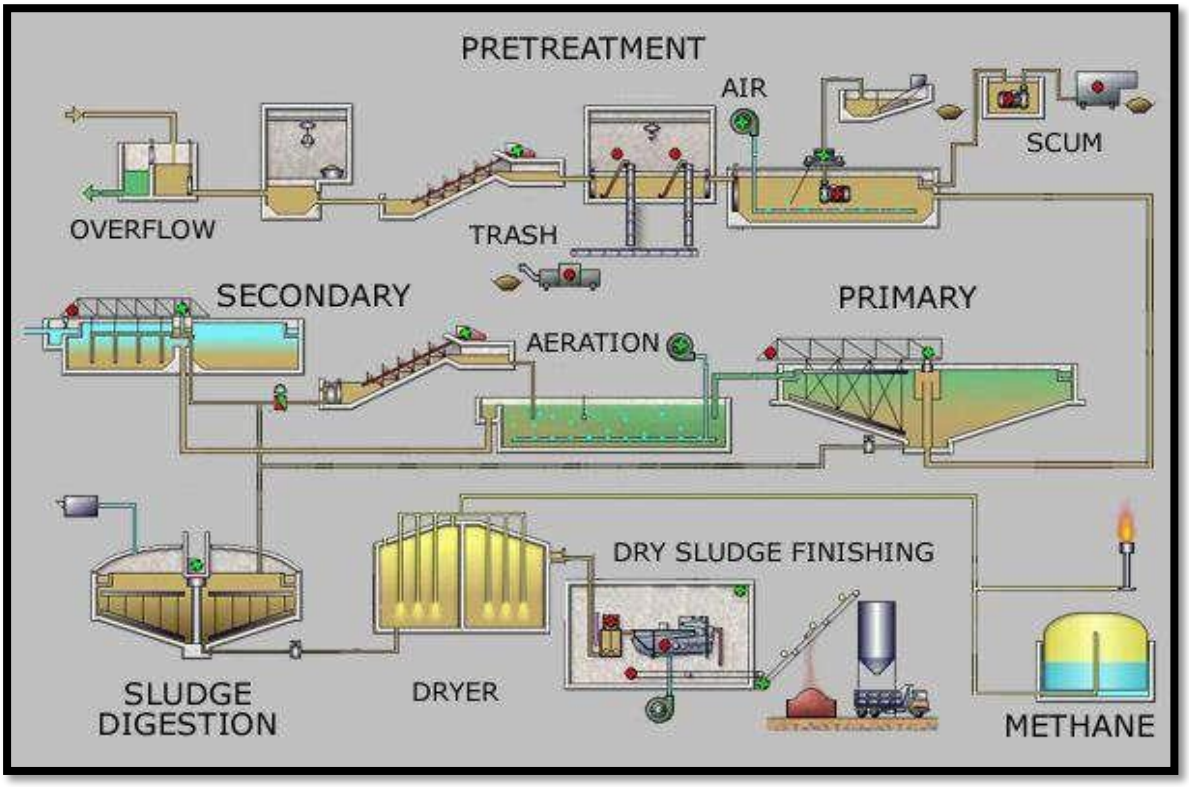

Fig. 5.6 SEWAGE TREATMENT PLANT

5.4 Conclusion:

- Central Bus station of Vadodara is newly innograted about an year ago well managed by GSRTC & Cube construction Engineering LTD at public private partnership for 31 year bond.
- The project layout and design with blend of bus terminal and commercial facilities is completely innovative and accommodates highest level of comfort and convenience for public.
- The bus station project will shortly introduce at ahemedabad with the same company at ppt model.
- The company is aimed to provide the highest/latest standard of passanger comfort at bus terminal and also to provide innovative structure with international quality standard at affordable prices for commercial outlets.

5.4.1 Positive aspects:

- The building is friendly for physical challenged people.
- There are fire extenguishers and sprinklres at sevral points for fire fighting.
- There is a mall area connected with the bus station so the people who have to wait can utilize their time in the mall.
- The building have security check point at 3 places for safety.
- The whole terminus is neat & clean because it is in the private control.
- Bus entry, exit and public entry are separate to control traffic as well as crowd.
- The total new concept and design of the project will make this place a “City Icon” and would surely become pride for the city.

5.4.2 Negative aspects:

- The doremetry, guest rooms and waiting hall are not accessible to physically challenged people as they are on different levels.
- The administrative area which is on B-1 floor is poorly constructed with aluminium glass work and is not ventilated at all.
- The terminus don’t have fuel filling station in it.

Fig 5.4 Central Bus station of Vadodara

2. Swatchh Bharat Abhiyan (Clean India)

6.1 Swatchhta needed in allocated village Existing Situation with photograph

In a village a need of swatchhta is more because unavailability of solid waste management like collection of waste collection dustbin and management of that waste. Due to this village people throw all waste around the village border**.** This is real issue of villagers the disposal of waste.

Fig 6.0 Existing Sanitation Condition In Kumetha

6.2 Guidelines - Implementation in allocated village with Photograph

Fig 6.1 Swatchh Bharat Abhiyan

"A clean India would be the best tribute India could pay to Mahatma Gandhi on his 150 birth anniversary in 2019," said Shri Narendra Modi as he launched the Swachh Bharat Mission at Rajpath in New Delhi. On 2nd October 2014, Swachh Bharat Mission was launched throughout length and breadth of the country as a national movement. While leading the mass movement for cleanliness, the Prime Minister exhorted people to fulfill Mahatma Gandhi's dream of a clean and hygienic India. Shri Narendra Modi himself initiated the cleanliness drive at Mandir Marg Police Station. Picking up the broom to clean the dirt, making Swachh Bharat Abhiyan a mass movement across the nation, the Prime Minister said people should neither litter, nor let others litter. He gave the mantra of 'Na gandagi karenge, Na karne denge.' Shri Narendra Modi also invited nine people to join the cleanliness drive and requested each of them to draw nine more into the initiative. By inviting people to participate in the drive, the Swachhta Abhiyan has turned into a National Movement. A sense of responsibility has been evoked among the people through the Clean India Movement. With citizens now becoming active participants in cleanliness activities across the nation, the dream of a 'Clean India' once seen by Mahatma Gandhi has begun to get a shape.

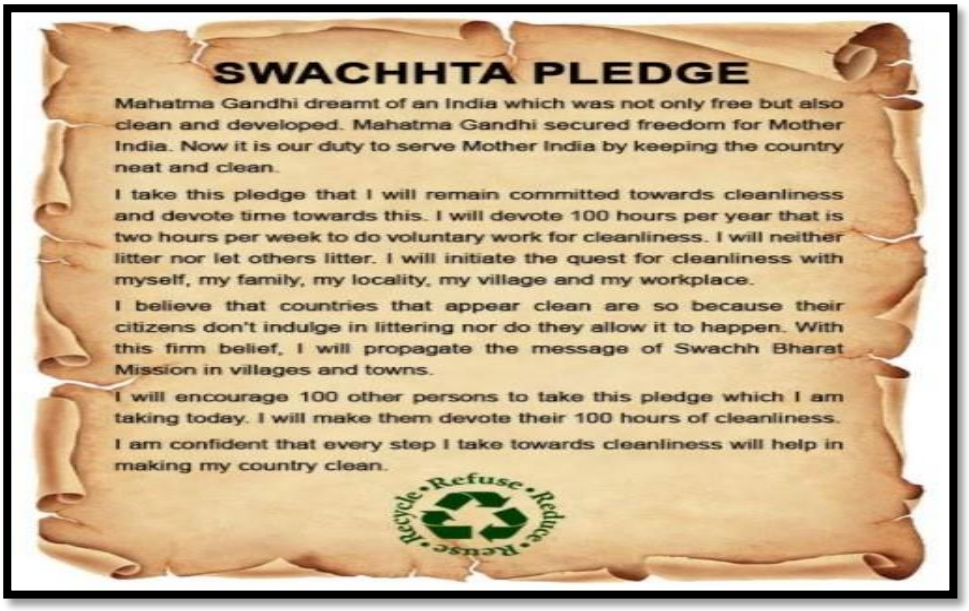

Fig 6.2 Swatchh Bharat Abhiyan

Guidelines for swatch village by government:

Table 6.0 Guidelines For Swatch Bharat Abhiyan

ENSURE	❖ **Identification of households without toilets for corrective action** ❖ **Toilet use andmaintenance.** ❖ **Facilities for solid and liquid wastemanagement.** ❖ **Water-use efficiency by rationalizing wateruse.** ❖ **Inclusion of water and sanitation issues in Gram Panchayat Development Plan(GPDP).** ❖ **Compliance with environmental safeguards for all GPDP activities.**
PROMOTE	❖ **Hygiene education.** ❖ **Toilets for all households and institutions.** ❖ **Modern agriculture and water-use technologies to conserve water.** ❖ **Water-use rationalization by selecting appropriate cropping patterns.**
ESTABLISH	❖ **Local environmental safeguard measures.** ❖ **Surveillance of water bodies.** ❖ **Safeguards for water bodies.**
PLAN AND IMPLEMENT	❖ **Environmental management framework.** ❖ **Water supply schemes.**

FACILITATE	❖ **Appropriate irrigation methods** ❖ **Regulation of water extraction based on demand yield match.** ❖ **Participation of local communities in improving water and sanitation management.**

Village have following thing implemented:-

- Use of toilets and Maintenance of it
- Inclusion of water and sanitation issues in Gram Panchayat Development Plan (GPDP).
- Hygiene education.
- Toilets for all households and institutions.

Village have Certain Draw Backs:

- Solid waste management
- Public toilet
- Surveillance of water bodies
- Water supply scheme
- Environment management framework

6.3 Activities Done by Students for allocated village with Photograph

- We avoided throwing waste in open and always used dustbin.
- We interacted with village people and tried to spread awareness regarding Swatch bharat abhiyan
- We proposed Solid waste management design for the allocated village.
- We also planned to carry out awareness campaign but due to Covid-19 we didn't get permission still we will conduct campaign in future

3. Village condition due to Covid-19

Coronavirus disease 2019 (**COVID-19**) is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first case was identified in Wuhan, China in December 2019.

Common symptoms of COVID-19 include fever, cough, fatigue, breathing difficulties, and loss of smell and taste. Symptoms begin one to fourteen days after exposure to the virus. While most people have mild symptoms, some people develop acute respiratory distress syndrome (ARDS). ARDS can be precipitated by cytokine storms,[9] multi-organ failure, septic shock, and blood clots. Longer-term damage to organs (in particular, the lungs and heart) has been observed. There is concern about a significant number of patients who have recovered from the acute phase of the disease but continue to experience a range of effects—known as long COVID—for months afterwards. These effects include severe fatigue, memory loss and other cognitive issues, low-grade fever, muscle weakness, and breathlessness.

COVID-19 spreads via a number of means, primarily involving saliva and other bodily fluids and excretions. These fluids can form small droplets and aerosols, which can spread as an infected person breathes, coughs, sneezes, sings, or speaks. The virus may also spread by direct contact and it is unknown how often it spreads via fomites (contaminated surfaces).[14][15] The exact route of transmission is rarely proven conclusively,[16] but infection mainly happens when people are near each other for long enough, which is known as "close contact".[a] It can spread as early as two days before infected persons show symptoms (presymptomatic), and from asymptomatic individuals. People remain infectious for up to ten days in moderate cases, and two weeks in severe cases. The standard diagnosis method is by real-time reverse transcription polymerase chain reaction (rRT-PCR) from a nasopharyngeal swab.

Preventive measures include social distancing, quarantining, ventilation of indoor spaces, covering coughs and sneezes, hand washing, and keeping unwashed hands away from the face. The use of face masks or coverings has been recommended in public settings to minimise the risk of transmissions.

Fig 7.0 Covid-19 WHO Guideline

Fig 7.1 Covid-19 WHO Guideline

Fig 7.2 Covid-19 WHO Guideline

Fig 7.3 Covid-19 WHO Guideline

7.1 Taken steps in allocated village related to existing situation withphotograph

- They Maintain social distance with people
- Use of nose mask and sanitizer
- Maintaining hygienic condition
- Avoided travelling
- Drinking immunity booster

7.2 Activities Done by Students for allocated village with Photograph

- We organized Covid-19 awareness camp in kumetha village. We interacted with villagers and told them regarding the danger of corona virus. We also interacted withSarpanch and distributed nose mask and sanitizer. Corona virus is one of the pandemic which has broken the economic leg of world's leading nation and lots of people have lost lives till date. In such situation it is very necessary to not underestimate the severity of this disease.
- Guidelines which WHO have given we tried to explain to villagers.

Interaction with villagers and we explain them the severity of covid-19 & how dangerous itis. Villagers were not using mask and sanitizers so we distributed them sanitizers,mask and instructed them how to take precaution. Villagers still need to be made aware regarding pandemic situation and we get to know that in rural area people are still not taking this problem seriously. We told them though government has unlock the states and all activities are carried out in usual manners that doesn't mean the pandemic is over and we are virus free.

1. Sustainable Design Planning Proposal (Prototype Design)- Part- I

DESIGN SELECTION :

Form the above observation we selected following facilities are develop first for better life of village people….

1. Drainage system
2. Dry compost toilet
3. Community hall
4. bio-gas plant

6.2 DRAINAGE SYSTEM:

In Pali bazar area there is no drainage system is provided. So it caused many problem related to sanitation and health and aesthetic appearance. So good drainage system is needed to be develop in the village of good sanitation.

Main 3 advantages of drainage system are……

Prevents Water Accumulation:

Drainage systems can prevent water accumulation that can lead to flooding by directing the water away from your home. Water that over-accumulates in your yard may kill plants. Drainage systems also prevent the accumulation of stagnant water, which can encourage mosquitoes to breed.

Reduces Soil Erosion:

Over time, stagnant water accumulated can make soil muddy, which in turn can cause soil to erode. Drainage systems maintain balanced moisture in your garden to reduce soil erosion.

Removes Toxic Materials and Disease Organisms:

Continuous, heavy rains may cause the water to rise, which can lead to flash floods, especially when you live near a big body of water. Often these flash floods bring contaminated water into your soil. Drainage systems can remove these toxic materials by draining them away from your yard.

Drainage system with reference to Pali village:

First of all to develop a drainage system we taken the RL of different points in Main bazar area with the help of dumpy level and staff and measure relative distances between them with the help of measurement tap.

We take railway station as bench mark and from it we taken the all RL readings of various points. We take the RL of railway station as 50.

Following figure shows the RL of various points with reference to Bus station.

DISTANCE M	
AB	71
BC	296
BB1	210
CD	112
DE	57
CF	55
FG	48
GH	30
FI	49
IJ	91
JK	92
KL	110
LN	57
JJ1	93
J1J2	71

DISTANCE m	
NN1	149
LM	112
JO	41
OP	71
OQ	93
QR	94
QS	81
ST	108
SU	120
UV	148
UX	44
XW	83
B1Y	132
YZ	129
II1	79

FIGURE 18: PROFILE LEVELLING

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FIGURE 20: HOUSEHOLD AND DIRECTION OF FLOW

FIGURE 20: HOUSEHOLD AND DIRECTION OF FLOW

So, now following are the calculation for total discharge of the bazar area. Total number of house hold at y point are 399.

So, total population of it= 399*5=1995

Now we predict the future population by geometric increase method….
Growth rate=17.28

P2021= 1995(1+17.28/100)

= 2340

Now take extra 5 % for commercial shops and other common facilities like schools, hospitals etc.

Total population=2340+117=2457
Now take 100 lpcd supply in the village as per NBC code. And total 70 % of it is generated as waste water

Amount of water=2457*70=171990 lpcd

$= 0.0239\ M^3/S$

Assume velocity=0.7 M/S

Q=VA

$A=0.0239/0.7=0.034125\ M^2$

D=20.84 cm for circular pipe

So provide main pipe of 20 cm diameter from point j to y and provide 15 cm pipe from x to point all other pipes are of 10 cm diameter.

DESIGN OF SEDIMENTATION TANK

Assume detention time=3 hr.

Volume of tank = flow* detention time

$= (171990*10^{-3}*3)/24$

$=21.498\ M^3$

So provide 25 M^3

Assume depth of tank=1.5 m

Surface area=25/1.5=16.66 m^2

Provide 18 m^2

Assume L/B = 3.

SO L = 3B

A = 3*B*

B 18 = 3*B*B

B = 2.449 M

L = 3*B=7.347

So, provide L=7.5 m B= 2.5 and D=1.5+0.2=1.7 m

Provide extra 0.2 m depth for sludge accumulation

6.3 DRY COMPOSE TOILET:

There are no toilets in some house in village in some area. So we develop the public cum private dry compose toilet.

6.3.1 Conventional Sanitation Systems: Drawback & Limitations

The sanitation practices promoted today are either based on hiding human excreta in deep pits (‘drop-and-store’) or on flushing them away and diluting them in rivers, lakes and the sea (‘flush-and discharge’).

Drop-and-store systems can be simple and relatively low-cost but have many drawbacks. Often they cannot be used at all in crowded areas, on rocky ground, where the groundwater level is high or in areas periodically flooded. They require access to open ground and the digging of new pits every few years.

Flush-and-discharge systems require large amounts of water for flushing, and for many municipalities couldn’t afford investments in pipe networks and treatment plants. Over a year for each person some 400-500 liters of urine and 50 liters of faeces are flushed away with 15,000 liters of pure water. Water from bath, kitchen and laundry may add up to another 15,000-30,000 liters for each person.

The problems people normally face from the conventional sanitation system are:

- They are not working properly at all and do not ensure safe and healthy sanitation but increase health risks from severe water pollution due to On- Site Sanitation systems.
- No recycling of water and nutrients leading to Loss of valuable nutrients for agriculture are largely linear end-of-pipe technology systems where drinking water is misused to transport waste into the water cycle, causing environmental damage and hygienic hazards, and contributing to the water crisis.
- Unsatisfactory purification or uncontrolled discharge of more than 90 % of wastewater worldwide.

- Use of freshwater to transport human excreta in sewers results in high drinking water demand. In water-scarce regions, additional pressure is put on limited freshwater resources.

Ecological (dry compose) Sanitation Systems: Advantages

Ecological sanitation systems render human excreta safe, preventing pollution rather than attempting to control it after pollution takes place and proposes to use the safe products of human excreta for agricultural Therefore it can be characterized as a"closed loop" sanitation system which treats human excreta as a resource. Human excreta are processed until they are completely free of disease organisms. Nutrients obtained in the form of compost and urine is recycled by using them in agriculture. As ecological sanitation systems adopt treatment processes that closely mimic the cycles of nature, it is sustainable and has no negative impact on the environment

Some of the advantages in the use of ecological sanitation systems are:

- Ecological sanitation systems lead to enormous quantities of fresh water since urine diverting dry toilets and waterless urinals do not require water for flushing.
- Faeces and urine which require different treatment processes can be handled easily when separated at source. Studies show that the segregated treatment approach is both energy efficient and cost effective.
- Separation of faeces, which has high pathogen levels, from urine and absence water used for flushing, significantly reduces the volume of waste fraction to be treated.
- By using ecological sanitation approach pollution of water sources and the risks posed by diarrhoeal diseases due to unsafe disposal of human excreta can be mitigated.
- Ecological systems facilitate decentralized and sustainable treatment options for disposal of human excreta.
- Compost obtained from ecological sanitation toilets is a good soil conditioner and increases soil fertility.
- Urine, which is usually sterile, is rich in nitrogen, phosphorous and potassium can be directly applied to crops or further processed as crystal fertilizer.
- Recovery of nutrients from human excreta using ecological sanitation systems can effectively substitute mineral fertilizers which are non-renewable whose prices have treatment processes can be handled easily increased multifold due to depletion of oil that and phosphate rock reserves.
- Linking sanitation and agriculture using ecological sanitation approaches can play a major role in ensuring health security as well as food security of economically weaker sections of society.

6.3.2 Components of a Dry compose Toilet:

Chamber:

Single, double, multiple chambers or removable bins are used for collection and processing of faeces.

Toilet Seat:

Specially designed toilet seats are utilized for separation of faeces, urine and wash and

water. Toilet seats with two-hole or three-hole separation arrangements are utilized for this purpose

TABLE 6 - DESIGN PARAMETERS AND THEIR AVERAGE VALUES FOR ECOSAN TOILET DESIGN

Design Parameters	Average Values
Ultimate desiccated volume of faeces and additives added	0.25 to 0.4 liters / per person per use
Volume of urine	0.25 to 0.3 liters / per person per use
Wash water	1 to 2 liters / per person per use
Storage period of faeces for inactivation of pathogens	9–12 months (after a vault fills-up and is sealed

Vent pipe:
Vent pipes provided to the chambers facilitate aeration, moisture removal and increase in temperature.

Toilet Structure:

Covered super structure provided to the toilets offer privacy to the users and also protects the chambers from rain, cold weather and from insects and animals.

Urine Storage:

Collection of urine in a storage tank provided within or outside the toilet facilitates its application as liquid fertilizer for crops.

Wash Water Disposal:

Planted beds or soak pits provided outside the toilets facilitate safe disposal of wash water containing faecal matter

Additives:

Wood ash, soil, saw dust and powdered leaves can be added as additives to the faeces to remove moisture, increase pH and achieve desired C: N ratio of the mixture.

6.3.1 Design Considerations:

Capacity:

A household ecosan toilet is normally designed for use by 5 - 7 members. In special cases it is designed for use up to a maximum of 20 members in a residential scenario. In such situations, the faeces collection chamber(s) should be designed to accommodate higher number of users.

Volume of Chambers:

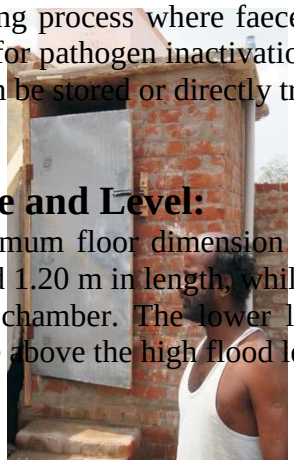
For designing the storage volume of faeces collection chamber, an ultimate volume of desiccated faeces and additive mixture of 0.25 to 0.40 liters per person per day can be considered depending upon the local condition and usage pattern.

Type of Chambers:

A twin chamber ecosan toilet is most ideal which requires very minimal maintenance compared to others. However, if there is no space for a double chamber ecosan toilet and the members of the household are confident of managing the regular maintenance requirements, a single chamber ecosan toilet with removable bins can be chosen.

Retention Period:

A minimum retention period of 10 months for pathogen inactivation of faeces and additive mixture in the faeces collection chamber must be considered in the design. If bins or any other removal method of collection is proposed for use, the bins or the secondary composting process where faeces is processed must take the appropriate retention period required for pathogen inactivation. Urine can be collected in jerry cans of 10-15 liters size. These can be stored or directly transported for agricultural applications.



Floor Space and Level:

The minimum floor dimension of ecosan toilets with single chamber must be 1.00 m in width and 1.20 m in length, while it should be at least 1.50 m in width and 1.20 m in length for twin chamber. The lower level of the faeces collection chambers of ecosan toilets should be above the high flood level expected in low lying and flood prone areas.

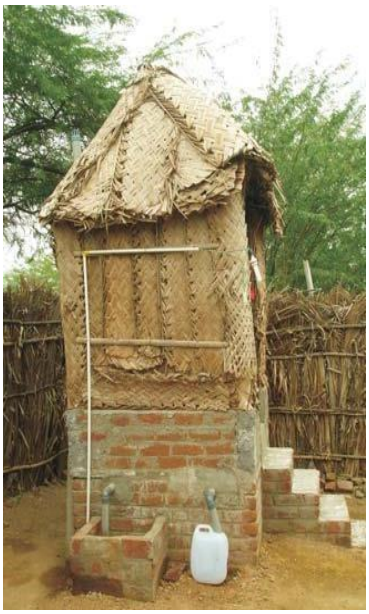
Construction materials:

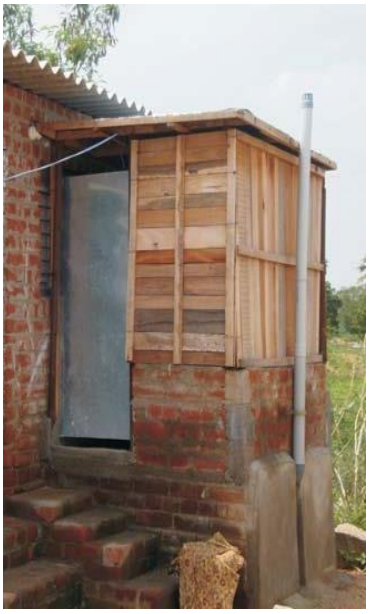
An ecosan toilet is designed with a leak proof faeces and urine collection chambers / tanks and super structure with pans / arrangements that help in source separation of faeces, urine and wash water. Ecosan toilets can be constructed using locally available materials like bricks, cement blocks, concrete, bamboo or other suitable materials can be used for construction of ecosan toilets. Cost of household ecosan toilets can be drastically reduced by using low cost materials like bamboo, thatch, gunny bags, etc., for the construction of superstructure. However, care should be taken to prevent entry of rainwater into the dry compose toilet.

Brick Walls Mud Blocks Hollow Blocks

FIGURE 21: NORMAL OPTIONS OF SUPERSTRUCTURE

Coconut Thatch Palm Thatch Waste Wood





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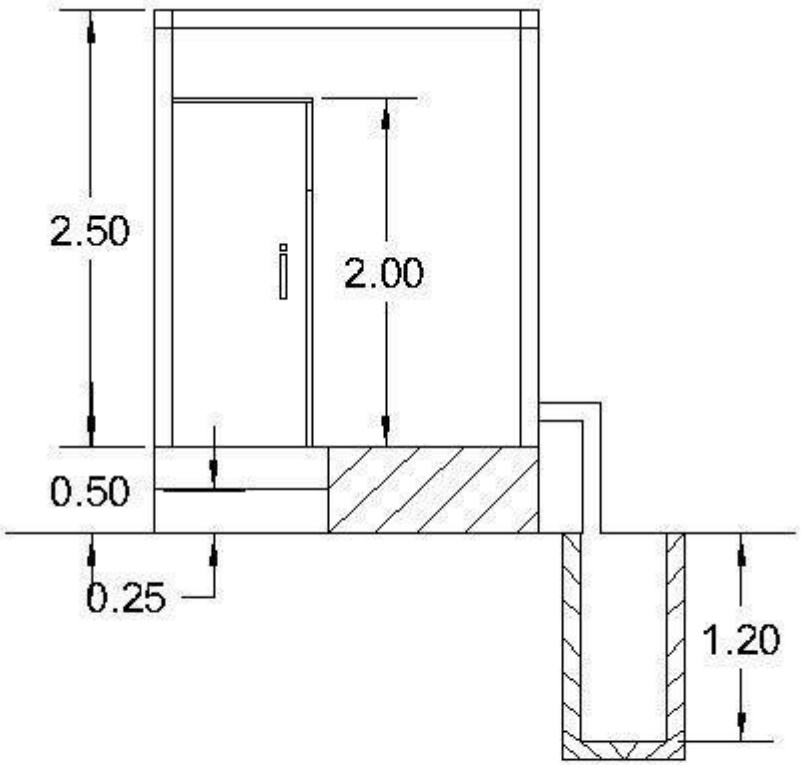
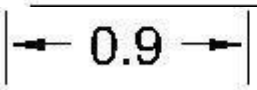


FRONT ELEVATION



PLAN

FIGURE 23: PLAN AND ELEVATION OF TOILET

6.3.6 WORKING:

These dry compose toilet contains two special pans in which human excreta is separated from urine and wash water and it is stored in chamber provided below toilet. There are two pans and two chambers provided in toilet so when one chamber completely fills than toilet can be used with the help of other toilet chamber. After complete filling the one chamber ash and soil and saw dust. And after 5 to 6 months it will turn in to organic fertilizer.

6.3.7 Estimation of cost for dry compose toilet:

TABLE 7 - DRAWING DETAIL OF TOILET

Design details	Specificatio n
No. of users	5 members
Average volume of desiccated material	0.25 liters / person / day
Retention period	300 days
No. of chambers	2 nos.
Size of faeces collection tanks Volume of tanks needed Size of one tank provided	 = 5 nos. x 300 days x 0.25 l/p/d = 375 liters = 0.9 m x 1.4 m x 0.50 m x 1000 liters = 630 liters
Size of chamber access hole	750 mm wide x 400 mm high
Vent pipe	100 mm dia connecting both tanks 500 mm above roof level Cowl on top
Toilet size (floor area)	1.4m width x 1.8 m length
Plant bed or Soak pit	0.50 m x 0.50 m size or 0.50 m x 0.50 m x 1.20 m size
Door	0.8 m x 2 m
Roof	1–2” thick Ferro-cement slab or AC/GI sheets
Super structure	Brick wall 200 mm thick

ITEM	L	B	H/D	Q	RATE	MONEY
EXCAVATION	8.7	0.4	0.25	0.87	201	174.8
DOOR	2	0.2	0.8	0.32		
VENTILATOR	0.5	0.2	0.5	0.05		
BBLC	8.7	0.4	0.10	0.348	4000	1392
				3.23	2900	9367
MASONARY UP TO PLINTH	8.7	0.3	0.65	1.696		
SLAB AT PLINTH	2.2	1.8	0.1	0.396	3392	1343
DEDUCTION OF DOORS(2)	0.75	1.8	0.4	0.54	1000	2500
ASBESTOS SHEET				1.516	2817	4270
BOTH SIDE PLASTER(2)	7.2	-	2.5	36		
DEDUCTION						
DOOR	2	-	0.8	1.6		
VENTILATOR	0.5	-	0.5	0.25		
				34.15	100	3415
COST OF PANS AND DOOR					2600	2600
						25061

BIO-GAS PLANT:

Bio gas plant is one of the plant for renewable energy sources. It transforms rural village in to clean village and also provide gas as energy source and gives fertilizer at end.

6.5.1 BASIC THINGS:

Total numbers of animals in village = 3000

As per standard data assume per day dung of animal=10.5 Kg.

So total per day dung = 3000 * 10.5 =31500 Kg. /day

6.5.2 DESIGN OF DIGESTER:

Assume retention period (RT) = 70 days.

Assume mixing proportion of solid and water is 1:2.

Now total amount of slurry per day (S_d) = Total per day dung + Water amount

= 31500 + (2*31500)

= 94500 Kg. /day

= 94500 Lit. /day

= 94.5 m^3 / day

Digester volume (V_d) = Sd * RT

= 94.500 * 70

= 6615 m^3

Assume cylinder shaped bio gas plant.

Provide total 6 numbers of units in different areas, so digester volume becomes for one unit= 6615 ÷ 6 =1102 m^3

So provide= 1100 m^3

Total digester volume (Vd) = $\pi r^2 h$

1100 = πr^2 (h = 10 m)

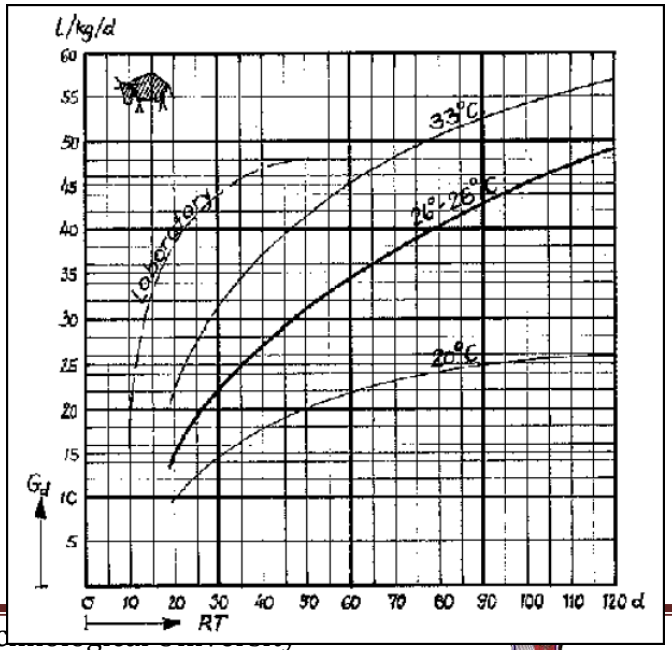
So dimensions of digester are h=10 m

R=6m

6.5.1 DESIGN OF GAS HOLDER:

Assume digester temperature= 26-28 ˚

Now from following fig find Gd by taking RT=70 days



Daily gas production G = Gd × Feed volume

= 37 × 31500

=1165500 Lit.

=1165.5 m^3

Now assume gas holder capacity = 60 %

Gas holder volume = Daily gas production × Capacity of holder

= 1165.5 × 0.60

=699.3 m^3

So take Gas holder volume = 700 m^3

Now for 6 units provide volume of holder of each unit = 700 ÷ 6

= 116.66

Take it =120 m^3

Provide cylinder shaped holder; so…

Volume = $\pi r^2 h$

120 = πr^2 (h = 1 m)

So dimensions of Gas holder are H = 1 m

R = 6 m

6.5.1 DESIGN OF INLET & OUTLET:

Total volume of slurry mix per unit = 94.50 ÷ 6 = 15.75 m^3 / day

Assume two time filling operation in plant; so take total volume of slurry = 15.75 ÷ 2

= 7.87 m^3 / day Take it = 8 m^3 / day

Provide rectangular tank…

So... Total volume for one time mixing of slurry = L × B × H

8 = L × B × (H=1m)

Dimension of inlet are L = 3 m

B = 3m

H = 1 m

Here 8 m^3 / day required < 9 m^3 / day provided.
Hence ok Provide same size for outlet tank also.

[References taken from biogas book by LUDWIG SASSE, & WWW.BIOTEC-ASIA.COM & WWW.TANAU.AC.IN]

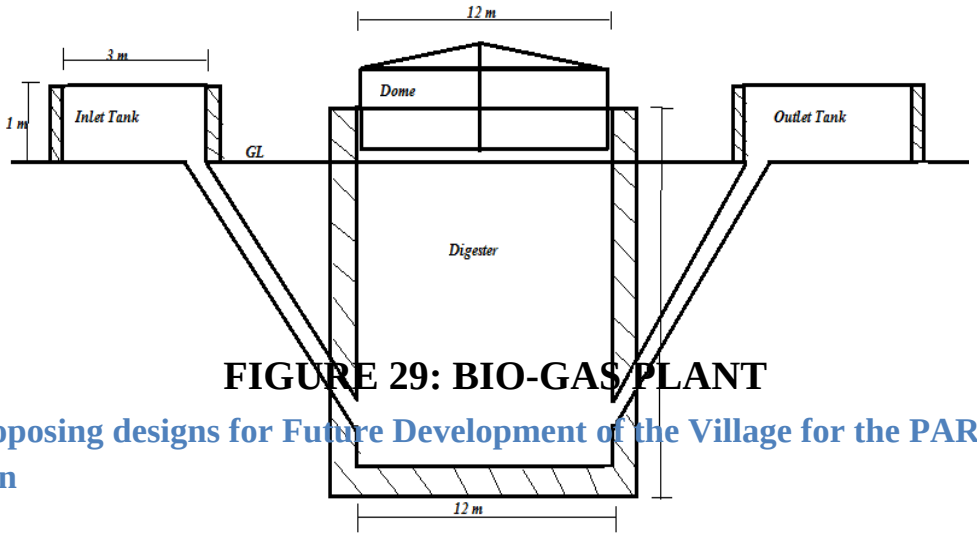


FIGURE 29: BIO-GAS PLANT

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

Following points should be considered for Kumetha village in future prospects:

- Kumetha Village required a post office as they don't have a proper one in there village
- To facilitate good health amenities through building Maternity Home and dispensary. Currently there are no maternity facilities present in the village. Hence provision of a Maternity home and dispensary in the village will prove to be useful in the time of emergency and also day to day basic treatment.
- Chabutro can be provided to make the village aesthetically good.
- There is no Pick up stand or bus stand in Kumetha village so provision of

bus stand or pick up stand provides ease to villagers.

- The existing Capacity of sump is not sufficient to meet and store water which can meet requirement of villager hence Provision of sump is prime requirement.
- There is no Public garden and Recreational Centre in Kumetha village, hence provision of public garden and Recreational will provide gathering and refreshing place to villagers.
- Most of villagers in Kumetha are engaged in agricultural activities like farming, Hence provision of Krishi Kendra will prove too beneficial to villagers. Farmers problems can be resolve in that Centre.

5. Conclusion of the Entire Village Activities of the Project

The motive of Vishwakarma Yojana phase-VIII is to uplift the life style of the rural areas to its certain extent up to the level of an ideal village situated at the nearby location of that particular jurisdiction. We have tried to develop sustainable and economic design as per our knowledge and hard work from visiting the villages and provide proper design. In this phase we have focused mainly on Data collection and done the survey of village.

It is an effective government scheme to develop the rural areas under economical cost with good workability and efficiency during its usage. The project tends to improve the physical, social as well as socio-cultural aspects of the village by implementing and improvising various infrastructures with regards to lesser or least hindrance to its rural authenticity.

These amenities designed under this project will be helpful for better development of village as physically as well as socially, which improves the overall lifestyle of people along with nation with preserving nature bit by bit.

"Where there is a will, there is a vision". With this motto students who want to work towards preservation of rural soul of country can do many things for our own good and environment. By implanting given design proposals, we can say that all the missing amenities are provided will stop the migration of rural people towards the urban area. This can cause reduce the load on urban areas as well as pollution in both sector can be minimized gradually. These amenities designed under this project will be helpful for better development of village as physically as well as socially, which improves the overall lifestyle of people along with nation with preserving nature bit by bit.

We are proposing a design base on our survey, knowledge and Gap analysis to village for its development.

Following are all design we propose for villages are:

1. Public Toilet
2. Bank
3. Water Tank
4. KrishiSeva Kendra
5. Bus Stop
6. Bio-Gas plant
7. Maternity Home
8. Underground Sump
9. Solid Waste Management
10. Smart-Centre
11. Chabutro
12. Recreational Centre
13. Rain Water Harvesting
14. Post Office

11. References

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- https://en.wikipedia.org/wiki/Mode_of_transport
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- https://en.wikipedia.org/wiki/Sansad_Adarsh_Gram_Yojana
- https://earth.google.com/
- http://www.vyojana.gtu.ac.in/ (Vishwakarma literatures)

12. Annexure attachment

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

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	Yes	No
Children	No	No

9. House & Homestead Data

Own House: Yes / ~~No~~	No. of Rooms: 3
Type: ~~Kutcha~~ / Semi Pucca / ~~Pucca~~	
Toilet: ~~Private~~ / Community / ~~Open Defecation~~	
Drainage linked to House: ~~Covered~~ / ~~Open~~ / None	
Waste Collection System	~~Door Step~~ / Common Point / ~~No Collection System~~
Homestead Land: ~~Yes~~ / No	Kitchen Garden : ~~Yes~~ / No
Compost Pit: Individual/ ~~Group~~/ ~~None~~	Biogas Plant: ~~Individual~~/ ~~Group~~/ None

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

Source of Water		Distance
Piped Water at Home	Yes / No	100 m
Community Water Tap	Yes / ~~No~~	20 m
Hand Pump (~~Public~~ / Private)	Yes / ~~No~~	~~12~~ 20 m
Open Well(Public / ~~Private~~)	Yes / ~~No~~	100 m
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: _____
If cooking in Chullah: Normal/ ~~Smokeless~~

12. Landholding (Acres)

1. Total	2	2. Cultivable Area	1.6
3. Irrigated Area	1.1	4. Uncultivable Area	0.4

13. Principal Occupations in the Household

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

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

15. Agriculture Inputs

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

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

Name	Unit	Quantity
Rice	Tone	1
Wheat	TON	0.5
Makai	TON	1

17. Livestock Numbers

Cows: 2	Bullocks: 2	Calves: 1
Female Buffalo: 3	Male Buffalo: 1	Buffalo Calves: 2
Goats/ Sheep: 2	Poultry/ Ducks: 4	Pigs: -
Any other: Type _____		No. -
Shelter for Livestock: ~~Pucca~~ / Kutcha / ~~None~~		
Average Daily Production of Milk(Litres): 10		

18. What games do Children Play
→ cricket
→ Running

19. Do children play musical instrument (mention)

Schedule Filled By:
Principal Respondent:
Date of Survey:

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SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Moti Sarsan Gram Panchayat: Moti Sarsan Ward No. 7

Block: Santrumpur District: Panchmahal

State: Gujarat L S Constituency: Dahod Parliamentary

1. Family Identity and Size

Name of Head of Household	Khant Arjunbhai dhulabhai							Male/ Female	M
SECC Survey ID:		Family Size	5	Over 18	4	6 to 18	1	Under 6	-

2. Category & Entitlement Details (Tick as appropriate)

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

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension[5]
Khant Arjunbhai D	40	M	N	2	8	Yes	Yes	0
Khant Krishiben A.	38	F	N	2	5	Yes	Yes	0
Khant Mahendrabhai A	23	M	N	1	7	Yes	Yes	0
Khant Suruben A	20	F	N	1	6	Yes	Yes	0

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
Khant Manishbhai A	17	M	N	1	5	NO		NO

4. Children below 6 years

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

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

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

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

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

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

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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	NO	-
p	Nearest Agro Service Centre	yes	1 km
p	MSP based Government Procurement Centre	NO	-
q	Milk Cooperative. /Collection Centre	yes	1 Km
r	Veterinary Care Centre	NO	-
s	Ayurveda Centre	NO	-
t	E – Seva Kendra	yes	0.6 km
u	Bus Stop	yes	0.8 km
v	Railway Station	NO	-
w	Library	NO	-
x	Common Service Centre	NO	-

IV. Sports Facilities in the Gram Panchayat

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

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres 1

Names of such villages: Moti Sarsan , Rameni Sarsan

c. Schools (Number)

Primary Private: - Primary Govt.: 2

Middle Private: - Middle Govt.: 2

Secondary Private: - Secondary Govt.: -

Higher Secondary Private: - Higher Secondary Govt: -

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)					godown		
b.	Kerosene					godown		
c.	Other (mention)		✓					

2

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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: Moti sarsan
b. Block: Santrampur
c. District: Panchmahal
d. State: Gujarat
e. Lok Sabha Constituency: Dahod parliamentary
f. Number of Wards in the Gram Panchayat: 7
g. Number of Villages in the Gram Panchayat: 5
h. Names of Villages:
1. Moti sarsan
2. Rana ni sarsan
3. chela pagina muvada
4. gadar talavadi
5. Limdu muvadi

Demographic Information

Number of Households 243 Total Population 1145 Male 608 Female 537

SC HHs 332 ST HHs 320 OBC HHs 245 Other HHs 245

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	~~No~~ Yes	0.4km
b.	Nearest Primary Health Centre (PHC)	yes	3 km
c.	Nearest Community Health Centre (CHC)	yes	8 km
d.	Nearest Post Office	yes	0.5 km
e.	Nearest Bank Branch (Any)	yes	0.9 km
f.	Nearest Bank with CBS Facility	no	-
g.	Nearest ATM	no	-
h.	Nearest Primary School	yes	1 km
i.	Nearest Middle School	yes	1 km
j.	Nearest Secondary School	yes	3 km
k.	Nearest Higher Secondary School / +2 College	yes	3 km
l.	Nearest Graduate College	no	-
m	Nearest ITI / Polytechnic Centre	no	-
n	Kisan Seva Kendra	no	-

1

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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 Covered Not Covered	→ Moti sarsan → gala talavadi → Ranu ni sarsan → limada muvadi → chelu pagina muvado	
b.	Hand Pump Coverage in Villages:	Covered Covered Not Covered	→ Moti sarsan → gala talavadi → Ranu ni sarsan → limada muvadi → chelu pagina muvado.	
c.	Coverage under Covered Drains:	Covered Not Covered not covered		→ moti sarsan → gala talavadi → Ranu ni sarsan → limada muvadi → chelupagina muvado
d.	Coverage under Open Drains:	Covered Covered Not Covered	→ Moti sarsan	
e.	Villages with Household Electricity Connection (Numbers)	Connected connected Not Connected	→ moti sarsan → gala talavadi → Ranu ni sarsan → limada muvadi → chelu pagina muvado	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	600	d.	Pasture / Grazing Land	-	g.	Check Dam	6
b.	Irrigated Land	550	e.	Forests/ Plantations	-	h.	Wells/Bore Wells	25
c.	Un-irrigated Land	250	f.	Other Common Land	-	i	Tanks /Ponds	2

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

3

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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: Moti Sarsan
b. Ward Number: 7
c. Gram Panchayat: Moti sarsan
d. Block: Santrampur
e. District: Panchmahal.
f. State: gujarat
g. Lok Sabha Constituency: Dahod Parliamentary
h. Number of Habitations / Hamlets in the Gram Panchayat: 5

i. Names of Habitations / Hamlets:
→ Moti sarsan → limadamuvadi
→ galo talavadi → chelu pagina muvadu
→ Nanu ni sarsan

Demographic Information

Number of Households 243 Total Population 1145 Male 608 Female 537

SC HHs 332 ST HHs 320 OBC HHs 245 Other HHs 248

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	yes	1 km
b.	Nearest Middle School	yes	1 km
c.	Nearest Secondary School	yes	3 km
d.	Kisan Seva Kendra	No	–
e.	Milk Cooperative /Collection Centre	yes	1 km
g.	Health Sub Centre	No	–
h.	Bank	yes	0.9 km
i.	ATM	No	–
j.	Bus Stop	yes	0.8 km
k.	Railway Station	No	–

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

1

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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~~)	130
b)	Number of Households receiving pension (old age, widow, disability)	125
c)	Number of eligible Households who are not receiving pension	10
d)	Number of Households eligible for Ration Card	230
e)	Number of eligible HHs having ration cards	200
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	80
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	50
h)	Number of active Job Card holders under MGNREGA	150
i)	Number of Job Card holders who completed 100 days of work during 2013-14	100
j)	Number of shops selling alcohol	-
k)	Number of BPL families	44
l)	Number of landless households	15
m)	Number of IAY beneficiaries	-
n)	Number of FRA[2] beneficiaries	-
o)	Number of Community Sanitary Complexes	15
p)	Number of Households headed by single women	10
q)	Number of Households headed by physically handicapped persons	11
r)	Total number of Persons with Disability in the village	18
s)	Number of SHGs	-
t)	Number of active SHGs	-
u)	Number of SHG Federations	-
v)	Number of Youth Clubs	15
w)	Number of Bharat Nirman Volunteers	13

Name and Signature of Surveyor and Respondent[1]

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

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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	600	d.	Pasture / Grazing Land	–	g.	Check Dam	6
b.	Irrigated Land	550	e.	Forests/ Plnatations	–	h.	Wells/Bore Wells	25
c.	Un-irrigated Land	250	f.	Other Common Land	–	I	Tanks /Ponds	2

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	150
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	44
5	Number of landless households	15
6	Number of IAY beneficiaries	–
7	Number of FRA beneficiaries	–
8	Number of common sanitation complexes	15
9	Number of SHGs	1
10	Number of active SHGs	–
11	Existence of SHG Federation in the Village (Yes / No)	–
12	Number of Youth Clubs	15
13	Number of Bharat Nirman Volunteers	13

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

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SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

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

ii. Road Connectivity

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

If 3 mention the name of the habitations where not available: some,

iii. Drinking Water Facilities

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

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered:

b. Coverage under Open Drains: 3 *(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: 3

v. Coverage of Habitations under Electrification

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

If 3 mention the name of the habitations not covered: 1

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

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

vi. Sports Facilities in the Village

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

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

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private: ____ Primary Govt.: 2

Middle Private: ____ Middle Govt.: 2

Secondary Private: ____ Secondary Govt.: ____

Higher Secondary Private: ____ Higher Secondary Govt: ____

2

Scanned by CamScanner

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

and Part-II

ITM UNIVERSE,
VADODARA

No.	Village Name	Part 1	Part2
1	Kumetha	Water tank	Pick up Stand
		Public Toilet	Krishi Kendra
		Bank	Maternity Home
		Bio-Gas Plant	Chabutro/Post Office
		Solid Waste Management	Recreational Centre
		Smart-Centre	Under Ground Sump/Public Garden
2	Kamrol	Community Hall	Bio Gas Plant
		Dispensary	Solid Waste Management /RainWater Harvesting
		Cyber Cafe	Public Garden
		ATM	Child Welfare/MaternityHome
		Front Gate	Public toilet/Bank
		Super Market	Solar Street Light/ Dust Bin
3	Bhaniyara	Pick up Stand	Community Hall
		Skill development	Public Toilet
		Public Garden	Anganwadi
		Rain water harvesting	Cyber Security
		Cremation Ground	Pharmacy Store
		Post office	Front Gate

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

All the images and drawings are attached in the chapter along with design.

CHAPTER-13 Future Designs of the Aspect

13.1 Civil Design – Community Hall

Scenario:

Community hall is a public location where members of a community gather for group activities, events, festivals and social purpose. They may sometimes be open for whole community or for a specialized group example Mahila mandal hall. A community hall of village generally consists of a hall, storage or kitchen area and washroom.

Existing situation of Motisarsan village:

In the Krushapur village there is no any community hall so that according to the village population there should be requires one community hall in village.

Sustainability of design proposal:

All the people living in the village of even outsiders from nearby villages and relatives of the villagers can use or utilize a community hall for their different uses with the permission of Sarpanch, Talati and some authorized people of the village.

Design summary:

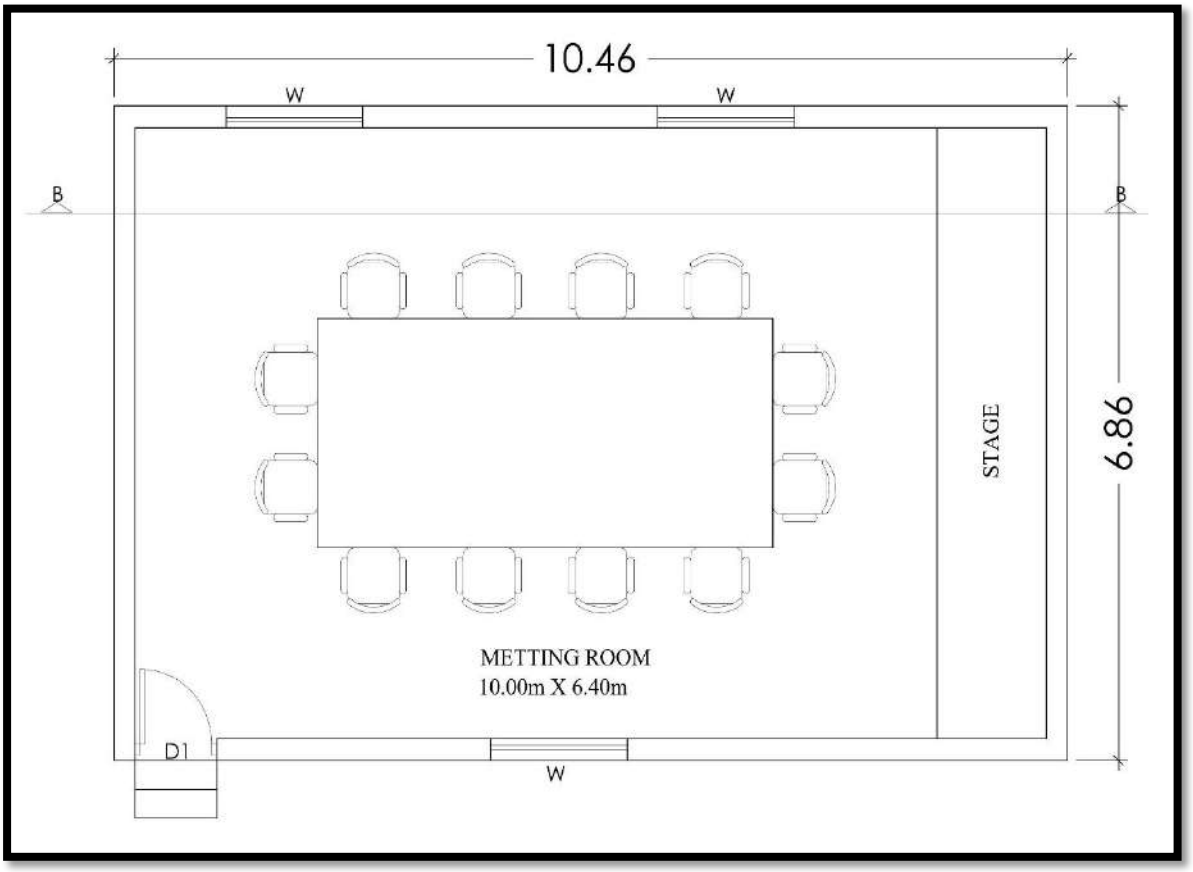


Fig. 13.7 PLAN OF COMMUNITY HALL

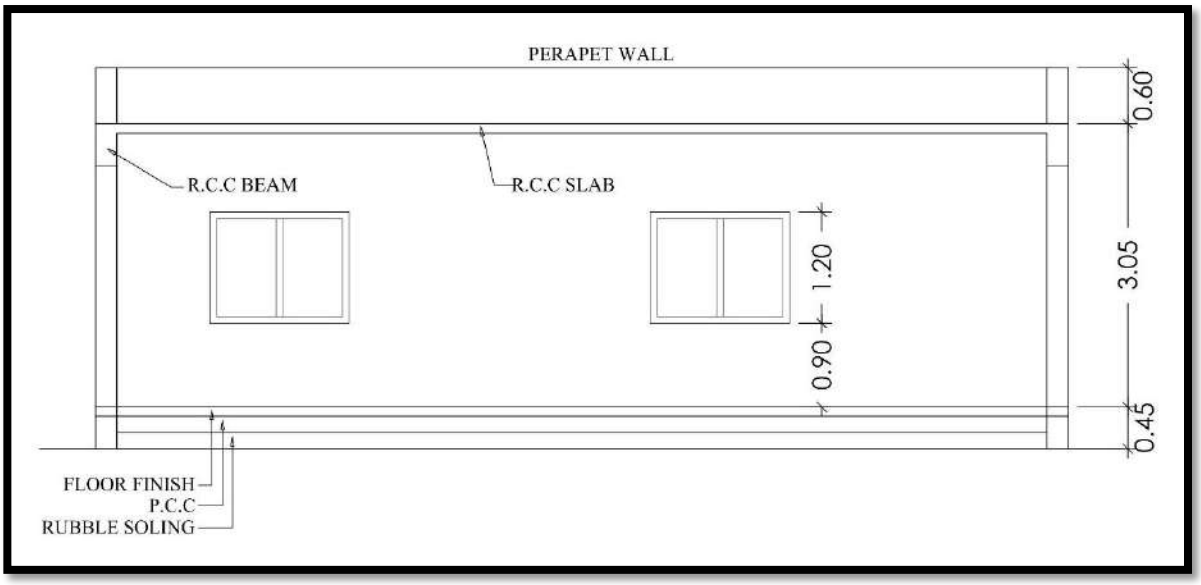
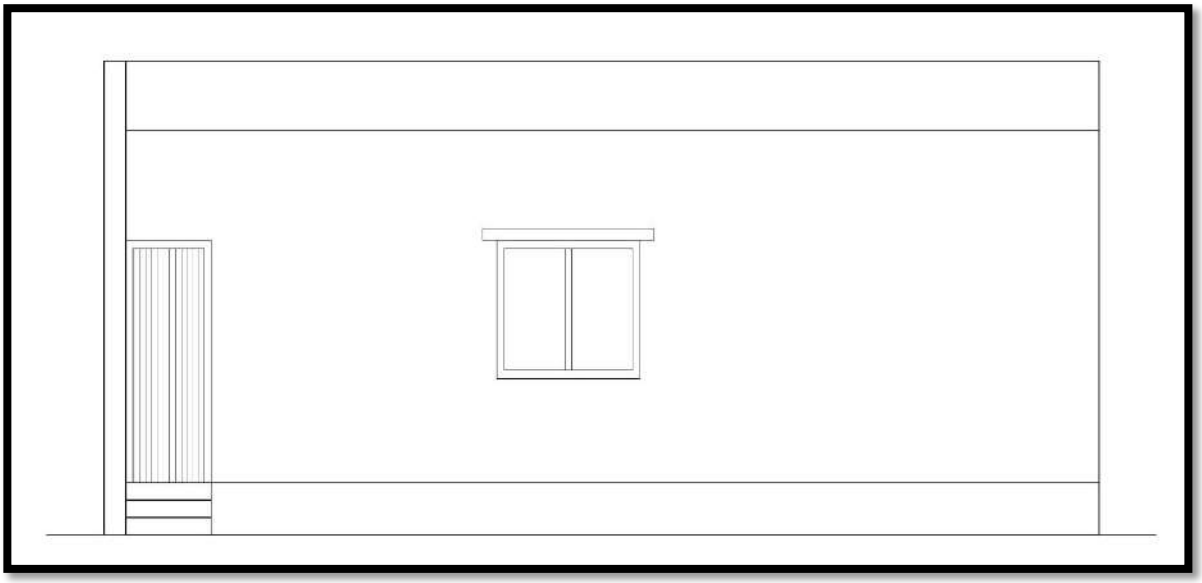


Fig. 13.8 SECTION B – B



t sheet –

M e a s u r e m e n

Fig: 13.9 ELEVATION

Table-25 Measurement Sheet of Community Hall

Sr. no	Description	No	Length L (m)	Width B (m)	Height H (m)	Quantity	Total Quantity
1	**Excavation for foundation**						
	Long wall	2	11.73	1.73	1.5	60.87	
	Short wall	2	4.67	1.73	1.5	24.23	**85.11 m^3**
2	**Plain cement concrete (1:4:8) for foundation**	4	1.73	1.73	0.15	1.79	**1.79 m^3**
3	**Brick masonry up to plinth in C.M. 1:6**						
	First step	4	1.43	1.43	0.30	2.45	

	Second step	4	0.83	0.83	0.30	0.82	**3.28 m^3**
A	Footing pedestal	4	0.23	0.30	0.60	0.16	**0.16 m^3**
B	Footing wall	1	32.52	0.230	0.60	4.48	**4.48 m^3**
C	Ground beam	1	33.72	0.230	0.300	2.32	**2.32 m^3**
D	Murram filling	1	10.00	6.40	0.20	12.8	**12.8 m^3**
E	Rubble soling	1	3.54	2.04	0.20	1.44	**1.44 m^3**
F	Plain cement concrete slab	1	10.46	6.86	0.15	10.76	**10.76 m^3**
G	Floor finish	1	10.00	6.40	0.10	6.4	**6.4 m^3**
H	Column	4	0.23	0.30	2.9	0.80	**0.80 m^3**
4	**Brick masonry above plinth up to slab level in CM (1:6)**	1	33.72	0.230	2.9	22.49	
	Deduction						
	Door	1	1	2.10	0.23	0.48	
	Window	3	1.5	1.5	0.23	1.55	
	Lintel	1	33.72	0.23	0.10	0.77	**19.68 m^3**
5	**Slab beam**	1	33.72	0.230	0.45	3.49	**3.49 m^3**
6	**R.C.C. work for slab**	1	10.46	6.86	0.15	10.76	**10.76 m^3**
7	**Parapet wall**	1	33.72	0.230	0.60	4.65	**4.65 m^3**
8	**Smooth plaster 12 cm thick inside and celling in CM1:3**						
	Cabin	2	9.86			19.72	
		2	6.26	9.86	0.23	12.52	
	Celling	1	9.86			97.22	
	Deduction for door	1	1.0				**129.23 m^2**
9	**Rough plaster outside 15 cm thick**	2	10.46		3.65	76.35	
	Cabin	2	6.86		3.65	50.07	
	Deduction for door	1	1.0		0.23	0.23	**126.20 m^2**

Abstract sheet –

Table-26 Abstract Sheet of Community Hall

Sr. no	Description	Total Quantity	Rate	Per Unit	Total Amount
1	Excavation For Foundation	86.77	85.90	m^3	7,454.05

2	P.C.C (1:4:8)	1.79	2324.00	m^3	4,173.20

3	Brick work In foundation and plinth in cement mortar 1:6	3.28	3000	m^3	9,841.20
A	Footing pedestal	0.16	2500	m^3	414.00
B	Footing wall	4.48	2350	m^3	10,544.45
C	Ground beam	2.32	4436.71	m^3	10,322.44
D	Earth filling	12.8	50	m^3	640.00
E	P.C.C. slab	10.76	4250	m^3	45,742.75
F	Floor finish	6.4	636	m^2	4,070.40
G	Column	0.80	4910.87	m^3	3,930.66
4	Brickwork up to slab	19.68	3500	m^3	68,880.00
5	Slab beam	3.49	4875.75	m^3	17,016.36
6	R.C.C. work for slab	10.76	7800	m^3	83,951.40
7	Parapet Wall	4.65	3000	m^3	13,959.00
8	Smooth Plaster 12 cm Thick	129.23	230	m^2	29,722.90
9	Rough Plaster 15cm Thick	126.20	300	m^2	37,861.80
10	Painting	255.43	250	m^2	63,859.00
				Total :	**4,12,383.62 ₹**
				Add 5 % Contingency Charge :	20,619.18 ₹
				Add 2 % Work Charge Establishment :	8,247.67 ₹
				Add 1.5 % Electric Charge :	6,185.75 ₹
				Grand Total :	**44,74,36.23 ₹**

Total Cost of project = ₹ 44,74,36.23 /-

CHAPTER-14 Technical Options with Case Studies

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant :

An Earthquake is Earth's Shaking or in other words release of energy due to the movement of tectonic plates. This can be destructive enough to kill thousands of people and bring huge economic loss. This natural disaster has many adverse effects on earth like ground shaking, landslides, rock falls from cliffs, liquefaction, fire, tsunami etc. Buildings are highly affected by an earthquake, and in some cases they are shattered down to the ground level. When the ground shaking occurs beneath the building's foundations they vibrate in an analogous manner with that of the surrounding ground. The inertia force of a structure can develop shearing effect on it which in turn causes stress concentration on the connections in structure and on the fragile walls. This results in partial or full failure of structure. The excitement and prevalence of shaking depends on the orientation of the building. High rise structures have the tendency to magnify the magnitude of long time periodic motions when comparing to the smaller one. Every construction has a resonant prevalence which are the characteristics of structure. Taller buildings have a tendency for long time periods than shorter one which make them relatively more susceptible to damage. Hence, one has to be careful while performing the analysis of a tall structure. In order to analyze a tall structure many analysis procedures are valid like a) Equivalent static analysis, b) Response spectrum analysis, c) Linear dynamic analysis, d) Nonlinear static analysis or nonlinear pushover analysis and e) Nonlinear dynamic analysis. Soil structure interaction analysis is also essential to be considered. After identifying the soil type, analyzing procedure is selected to do the detailed analysis of the interaction between soil and structure. To reduce the seismic effects on tall buildings several equipment is used like dampers or base isolation process. In dampers viscous damper, friction damper, yielding damper, magneto rheological fluid dampers tuned mass damper or harmonic absorber can be used. In base isolator magneto rheological elastomer, elastomeric bearing system, sliding system can be used.

14.1.2 Seismic Retrofitting of Buildings:

In recent times, reinforced concrete buildings have become common in India, particularly in towns and cities. Reinforced concrete (or simply *RC*) consists of two primary materials, namely concrete with reinforcing steel bars. Concrete is made of sand, crushed stone (called aggregates) and cement, all mixed with pre-determined amount of water. Concrete can be moulded into any desired shape, and steel bars can be bent into many shapes. Thus, structures of complex shapes are possible with RC.A typical RC building is made of horizontal members (beams and slabs) and vertical members (columns and walls), and supported by foundations that rest on ground. The system comprising of RC columns and connecting beams is called a RC Frame. The RC frame participates in resisting the earthquake forces. Earthquake shaking generates inertia forces in the building, which are proportional to the building mass. Since most of the building mass is present at floor levels, earthquake-induced inertia forces primarily develop at the floor levels. These forces travel downwards – through slab and beams to columns and walls, and then to the foundations from where they are dispersed to the ground. As inertia forces accumulate downwards from the top of the building, the columns and walls at lower storeys experience higher earthquake-induced forces and are therefore designed to be stronger than those in storeys above.

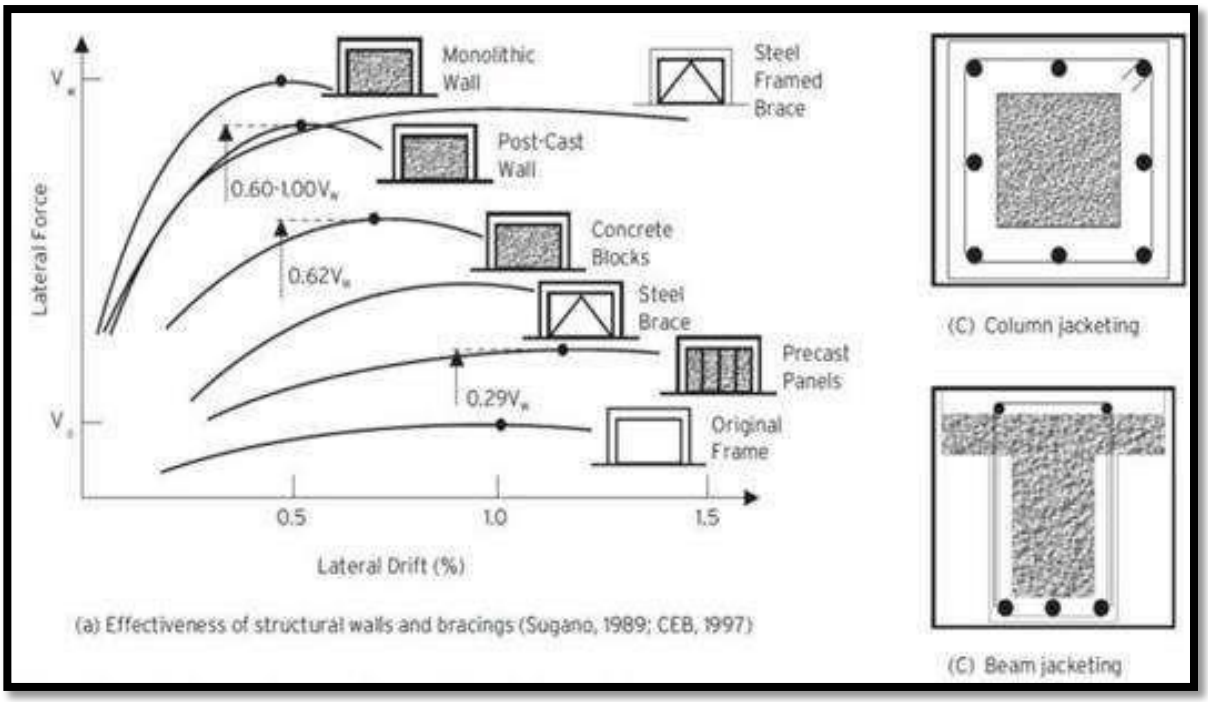


Fig. 14.1 CONVENTIONALSTRENGTHENING METHODS USEDFOR SEISMIC RETROFITTING

Addition of shear walls and bracings shown in Fig. 14.1 (a) is the most popular strengthening method due to its effectiveness, relative ease, and lower overall project cost compared to column and beam jacketing shown in Fig. 14.1(b) and (c), respectively. Relative effectiveness of various wall and bracing configurations are compared in Fig. 14.1(a). From this figure, it is seen that post-cast shear walls and steel braced frames are the most effective strengthening techniques.

14.1.3 Advance Practices in Construction field in Modern Material, Techniques

To understand all how and about of super performing construction materials we must study materials according to their use from very root to tip. By that way we can easily conclude and infer about the application, implementation and feasibility of that particular construction material. Elements of construction where these smart materials and techniques shall be implemented are: Foundation, Plinth, Beam, Column, Wall, Sill, Window, Door, Roof, Parapet, Skylights and Finishing Works. Construction materials are said to be super performing when they –

- ✓ Save overall building energy
- ✓ Make building esthetically pleasing
- ✓ Cut cost of construction
- ✓ Easily available
- ✓ Increase life span of building
- ✓ Upgrade building quality
- ✓ Make the building safe for living

Some Super Performing Safe materials

a) Collapse preventing Structure
b) Bombproof fiber material
c) High pressure metal laminates
d) Stratified wood panels
e) Metafloor

Super Performing Materials

Advancements in Concrete

a) High Performance Concrete

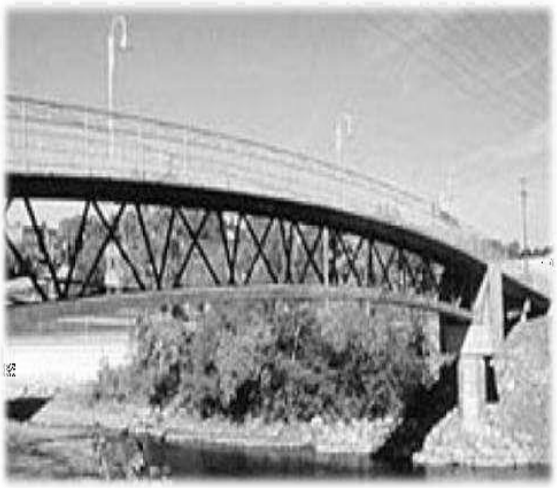


Fig. 14.2 BRIDGE MADE OF HIGH PERFORMANCE CONCRETE

b) Light Transmitting Concrete

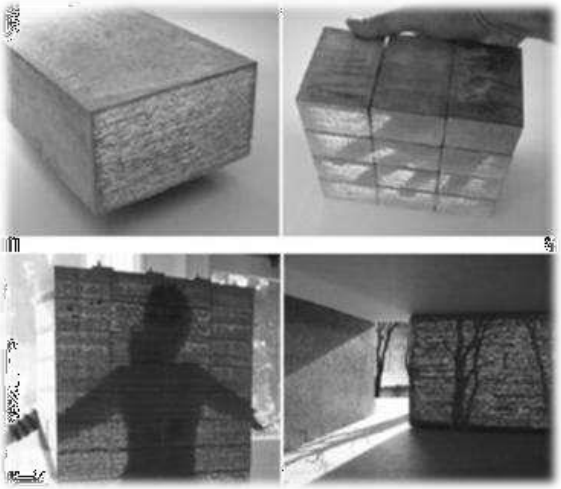


Fig. 14.3 TRANSLUCENT CONCRETE IN USE

c) Pervious Concrete

Fig. 14.4 USE OF WATER PERMEABLE CONCRETE

d) Aerated Concrete

Fig. 14.5 LIGHT WEIGHT CONCRETE

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment:

Our daily life environment in Nigeria relates to air, noise, sunlight, geological features, fauna, flora, landscape and etcetera. All these affect the economy of the country: if the environment is abused, daily life style (living and working conditions, etc.) will be affected; and this will in turn affect the economy. As there is need to protect the environment in every possible way, it must also be noted that the need for the existence of infrastructure as an indispensable part of any economy cannot be over emphasized. As those infrastructures come into existence, there are resulting positive effects as well as adverse effects, which in many cases tend to out-number the positive effects; and yet not usually noticed. The impact of

these projects on the environment range from cumulative to long term and short term impacts; and include impacts on human beings and man-made features, agriculture, effects on flora,

fauna and geology, effects on land, effects on water, air and climate and, of course, the indirect and secondary impacts associated with the project. Environmental impact assessment may be said to be one of the vital steps required for careful planning and management of natural resources resulting from pressures placed on virtually all areas of the earth from the need to provide food, water, minerals, fuel, and other necessities for such increasing number of people. In other to properly assess environmental impact of civil engineering infrastructural development projects, it is necessary to perceive the environment from the point of the view of the entire physical setting, experiencing a complex array of interrelationships compassing life and development. Since the environment itself is multi-dimensional in nature, it means that the circumstances that create (adverse) impacts on it are multi-dimensional; and therefore require some sort of multidimensional or multidisciplinary handling. It is therefore very necessary to involve as many disciplines as should be interested or connected to the environment as possible. These professionals will carry out comprehensive investigations prior to the actual project execution. These investigations are usually geared towards the matching of ecological and technological requirements of land use with the qualities of land and the effect of the proposed use of such land on the environment.

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

a) Water Supply Development Techniques :

The water supply in India has increased greatly from 1980 to present. Still, many people lack access to clean water, toilets, and sewage infrastructure. Various government programs at national, state, and community level have brought rapid improvements in sanitation and the drinking water supply. Some of these programs are ongoing.

Challenges – As of 2010, only two cities in India — Thiruvananthapuram and Kota — get continuous water supply. In 2005 none of the 35 Indian cities with a population of more than one million distributed water for more than a few hours per day, despite generally sufficient infrastructure. Owing to inadequate pressure people struggle to collect water even when it is available. According to the World Bank, none have performance indicators that compare with average international standards] A 2007 study by the Asian Development Bank showed that in 20 cities the average duration of supply was only 4.3 hours per day.

Achievements –Navi Mumbai, a planned city with more than 1m inhabitants, has achieved continuous supply for about half its population as of January 2009. Badlapur, another city in the Mumbai Conurbation with a population of 140,000, has achieved continuous supply in 3 out of 10 operating zones, covering 30% of its population. Trivandrum, the capital of Kerala state with a population of 1,645,000 in 2011, is the largest Indian city and the only Million agglomeration that enjoys uninterrupted hygienic water supply. Malkapur, a town in Satara District of Maharashtra, is the first Indian town to provide 24*7 water supply with 100 percent coverage. The program started in 2008 as a pilot project and soon covered the entire city. The connection is 100 percent metered with telescopic tariff.

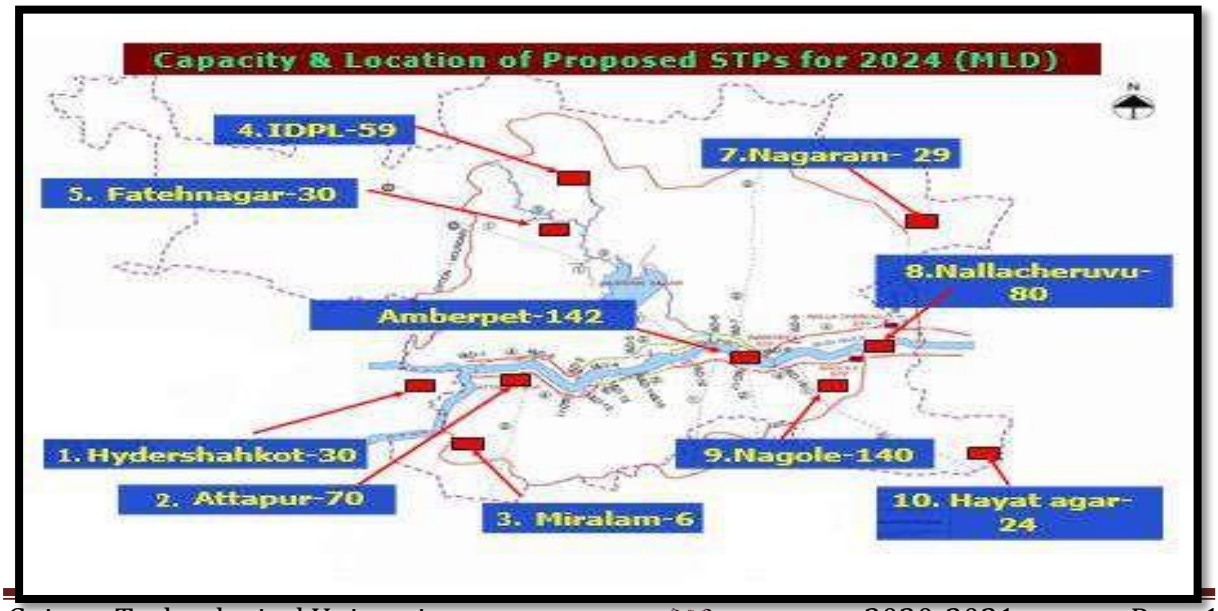
Innovative approaches – A number of innovative approaches to improve water supply and sanitation have been tested in India, in particular in the early 2000s. These include community-led total sanitation, demand-driven approaches in rural water supply and a public-private partnerships to improve the continuity of urban water supply in Karnataka, and the use of microcredits in water supply and sanitation to women in order to improve access to water.

b) Sewerage System Development Techniques :

The United Nations has recognized 19 of the world's biggest megacities with a population of 10 million and above. From India, five of Delhi, Mumbai, Kolkata, Bangalore and Chennai are in the list. The historic city of Hyderabad is on the way to step into megacity family with a population of 9.5 million. The city is known for its rivers and lakes from the early 19th century. The prominent among them is the river Musi, a tributary to river Krishna, originating from Ananthagiri Hills. The river travels 70 km upstream before entering Hyderabad near Rajendranagar, flowing west to east, bifurcate the old and new city on south and north of river Musi. The river traverses about 28km within the city limits and flows downstream, about 158km before joining the river Krishna, near Wazeerabad, Nalgonda District.

Status of Sewerage System – The first sewerage system with Sewage Treatment Plant (STP) facility for Hyderabad city dates back to 1931, covering an area of 54 sq. km with a population of 4, 68, 000, under the technical guidance of Sir Mokshagundam Visvesvaraiah. The system was meant to serve an area of 54 Sq.kms with 53 MLD capacity STP having a primary treatment facility. At that time Secunderabad had a sewerage system which was originally a combined system. Both the systems of Hyderabad and Secunderabad were amalgamated in the year 1964. Later in a phased manner, the sewerage system was upgraded during 1984, 1994 and 2004 with major interventions, particularly by laying certain trunk sewer mains network and construction of Sewage Treatment Plants (STPs).After transfer to HMWSSB, subsequently many improvements to the sewerage network were carried out, keeping in pace with the population growth and expansion of the city. The existing sewerage system covers approximately 90% of the erstwhile core MCH area of 169.3 sq.km.

Proposed NRCD Project Phase-II – Under phase-II the NRCD covers an area 574.59 Sqkm; it is divided into 10 catchments for locating the STPs and it is proposed for 610 MLD capacity STP. The GoAP has forwarded the DPR proposals with the consent of 30% state share and requested the NRCD, MoEF, GoI to accord sanction to the project with 70% grant of GOI. The technical appraisal was completed. The final sanction was deferred stating that the adequate



budget allocation was not available with NRCD, MoEF, GoI.

Fig. 14.6 PROPOSED SEWAGE TREATMENT PLANT (STP) UNDER NRCP PHASE-II

c) Waste Water Development Techniques :

Water is an essential resource that is required to sustain life. Its availability has to be adequate, safe and easily accessible. Current trends in climate change and rise in human population has compromised water adequacy, availability and safety. Wastewater managers around the world have the responsibility to ensure that the effluent that is eventually released into the environment does not degrade the quality of the recipient water bodies. Attaining sustainability in wastewater management is top in the of Sustainable Development Goals' Agenda. All in all, the realization of a more sustainable wastewater management will require a highly holistic and balanced approach in evaluating a particular management strategy's overall sustainability.

Wastewater Treatment Techniques – Treatment of wastewater can be undertaken in three stages: primary, secondary, and tertiary (or advanced). Primary or mechanical stage is designed to remove gross, suspended and floating solids from raw sewage that is direct from the source. It includes screening to trap solid objects and sedimentation by gravity to remove suspended solids that come from the catchment (Mannie and Bower 2014). Secondary stage is designed to remove the dissolved organic matter that escapes primary treatment. This stage comprises of microbes consuming the organic matter as food, and converting it to carbon dioxide, water, and energy for their own growth and reproduction (Tilley, 2014; Benammar et al., 2015; Dharmender et al., 2016). Generally, high-rate biological processes are normally characterized by relatively small reactor volumes and high concentrations of microorganisms compared with low rate processes (Mang and Li, 2010; Jeon et al., 2014; Sanjeev et al., 2014).

Advancement in Wastewater Treatment for Environmental Sustainability – To increase the efficiency of wastewater treatment, an additional stage has always been incorporated. The tertiary wastewater treatment stage can remove more than 99 percent of all the impurities from sewage, producing an effluent of almost drinking-water quality status (Vymazal, 2009; Francisca et al., 2016). An application of a typical tertiary treatment process is the modification of a conventional secondary treatment plant to remove additional nutrients such as phosphorus and nitrogen.

d) Sustainable Development Techniques :

Sustainable development is the organizing principle for meeting human development goals while simultaneously sustaining the ability of natural systems to provide the natural resources and ecosystem services on which the economy and society depend. The desired result is a state of society where living conditions and resources are used to continue to meet human needs without undermining the integrity and stability of the natural system. Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability goals, such as the current UN-level Sustainable Development Goals, address the global challenges, including poverty, inequality, climate change, environmental degradation, peace, and justice.

Development of the concept – Under the principles of the United Nations Charter the Millennium Declaration identified principles and treaties on sustainable development, including economic development, social development and environmental protection. Broadly defined, sustainable development is a systems approach to growth and development and to manage natural, produced, and social capital for the welfare of their own and future

generations. The term sustainable development as used by the United Nations incorporates both issues associated with land development and broader issues of human development such as education, public health, and standard of living.

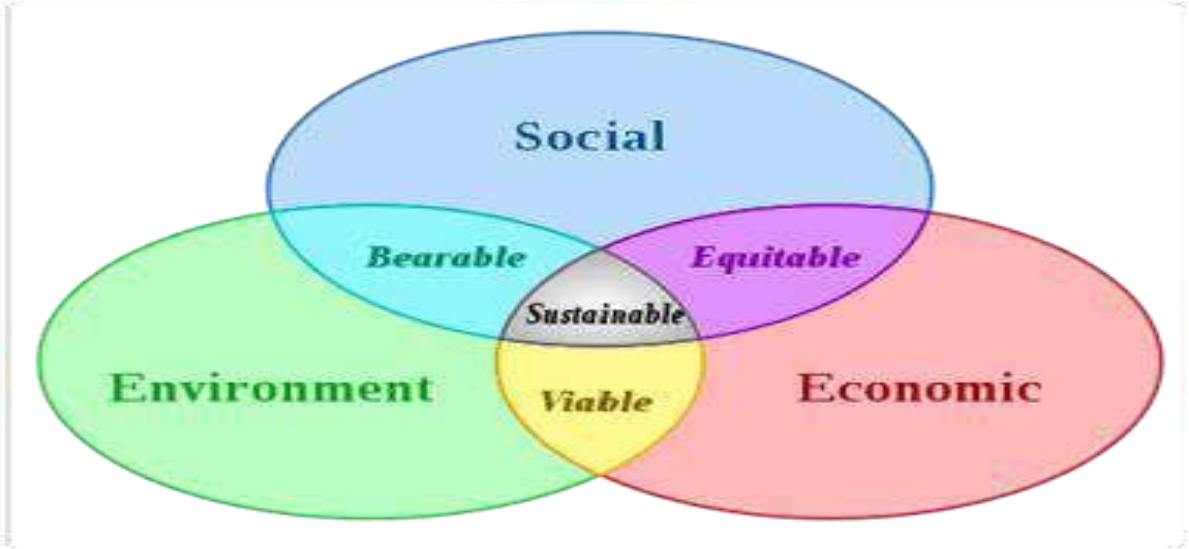


Fig. 14.7 SCHEME OF SUSTAINABLE DEVELOPMENT OF THREE CONSTITUENT PARTS

Environmental – Environmental sustainability concerns the natural environment and how it endures and remains diverse and productive. Since natural resources are derived from the environment, the state of air, water, and the climate is of particular concern. The IPCC Fifth Assessment Report outlines current knowledge about scientific, technical and socio-economic information concerning climate change, and lists options for adaptation and mitigation. Environmental sustainability requires society to design activities to meet human needs while preserving the life support systems of the planet. This, for example, entails using water sustainably, using renewable energy, and sustainable material supplies (e.g. harvesting wood from forests at a rate that maintains the biomass and biodiversity).

Economics – It has been suggested that because of rural poverty and overexploitation, environmental resources should be treated as important economic assets, called natural capital. Economic development has traditionally required a growth in the gross domestic product. This model of unlimited personal and GDP growth may be over. Sustainable development may involve improvements in the quality of life for many but may necessitate a decrease in resource consumption. According to ecological economist Malt Faber, ecological economics is defined by its focus on nature, justice, and time. Issues of intergenerational equity, irreversibility of environmental change, uncertainty of long-term outcomes, and sustainable development guide ecological economic analysis and valuation.

14.1.6 Case Study On "SEISMIC RETROFITTING ON A 4-STOREY EXISTING RC BUILDING" :

The current structure, which were plan and developed by early coral arrangements, don't fulfil necessities of current seismic code and configuration rehearses. It is perceived that the best strategy for diminishing the danger of harming structure is seismic retrofitting. Lately, there is a critical improvement of retrofitting methods. This examination features the standards of surveying and retrofitting of construction against seismic occasions. A three dimensional R.C.

outline planned with direct versatile unique examination utilizing reaction range technique. The PC programming bundle STAAD Pro is utilized for elements examination strategy is utilized to evaluate the presentation of a built up solid structure.

Reason Behind This Case Study :-

According to the Seismic Zoning Map of IS 1893:2002, India is divided into five seismic zones, in ascending order of a certain zone factor which is assigned to them on the basis of their seismic intensity. The 4-storey RC Structure being analyzed in this particular project is the main institute building of NIT Rourkela, which is located in the least susceptible zone i.e. zone

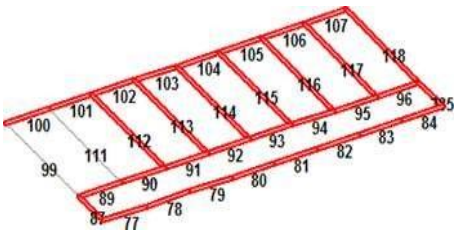
II. However, considering that the primary structural system of the building is at least 50 years old, it was not designed according to the design provisions given in IS 1893:2002. Hence, it may fail in the event of any moderately strong tectonic activity in its vicinity. Studying the performance of the structure and suggesting suitable retrofit measures for the building would therefore be a necessity. Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. This goal maybe achieved by adopting one of the following strategies-

a) By reducing the seismic demands on members and the structures as a whole
b) By increasing the member capacities

Problem Formulation –

For performing the seismic analysis, an existing four- storey building is been considered. The existing structures consist of eight bays (rooms) spanning 3.5 meters . A projected slab cantilevered for 1.2 meters is provided in the structure. Floor height of existing structure is considered as 3.3 meters (clear span). The structure is situated in Seismic Zone II, as specified in IS 1893:2002 Seismic zones classifications, which has the seismic intensity of 0.10. The structure is considered as Ordinary Moment Resisting Frame (OMRF). Also, the structure is built on medium soil. The structure is then analyzed under seismic loading and the failing members are then retrofit using FRP Jacketing.

FIRST STOREY **SECOND STOREY**



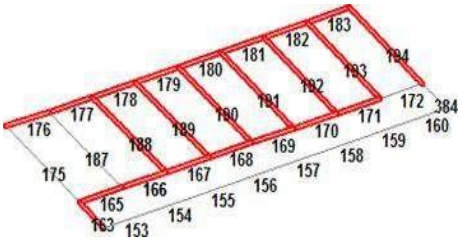


Fig. 14.8 FIRST STOREY BEAMS **Fig. 14.9 SECOND STOREY BEAMS**

THIRD STOREY **FIRST STOREY**

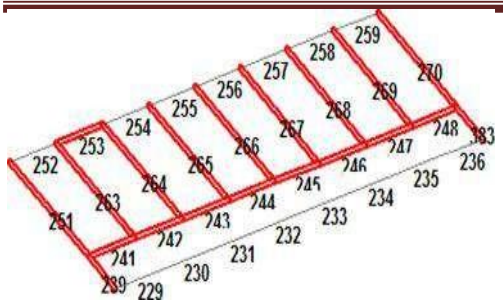


Fig. 14.10 THIRD STOREY BEAMS

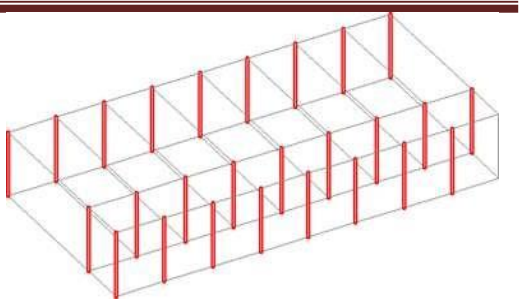


Fig. 14.11 FIRST STOREY COLUMNS

Second, Third and Fourth Storey Columns –

The objective of this study is the evaluation (seismic) of a four-storey RC framed structure, built about fifty years ago, on medium soil, in seismic zone-II, with seismic intensity 0.10 , using commercially used software STAADPRO V8i and retrofit the failing members using FRP jacketing. The existing structure is located in zone II and is not designed to resist earthquakes. The construction of the structure is not based according to the specifications mentioned in IS 1893:2002.

What They Did In This Project –

The existing structure is modeled in commercial software STAADPRO V8i and is subjected to seismic loading. The seismic performance of the structure is then analysed. Also, the Demand to capacity ration DCR is obtained for all the storey. The piles used for jacketing of failing members with FRP are then calculated. The failing members' efficiency is recalculated based on Demand-to-capacity ratio for maximum shear force generated under seismic loading. DCR= Demand/Capacity. The member is said to be passing if the demand to capacity ratio does not exceeds unity (one). Conversely, the member is said to be failed if the demand to capacity ratio exceeds unity (one). The demand to capacity ratio is proved to be an important and key feature in determining whether the structural element is passed or failed under given loading exposure. In this project, flexure and shear checks are performed for all the structural members for which demand to capacity ratio is exceeding unity (ONE).

Results and Conclusion –

The analysis of beams by Equivalent Static Method revealed that most of the beams failed in flexural capacity. The number of failing beams decreased with increasing storeys. However, the number of beams failing in shear capacity were very less i.e. beams 23, 36, 40 in 1st storey; 112, 116, 118 in 2nd storey; 188, 192 in 3rd storey. For columns too, the analysis revealed that most of them failed in flexural capacity but were safe in shear. Based on the above observations, the immediate need to counter deficiency in flexural capacity was identified and the FRP jacketing scheme was suggested only for beams, failing in flexure. Due to the high tensile strength and stiffness, stability under high temperatures and resistance to acidic/alkali/organic environments, carbon fiber was chosen as the FRP material to be used.

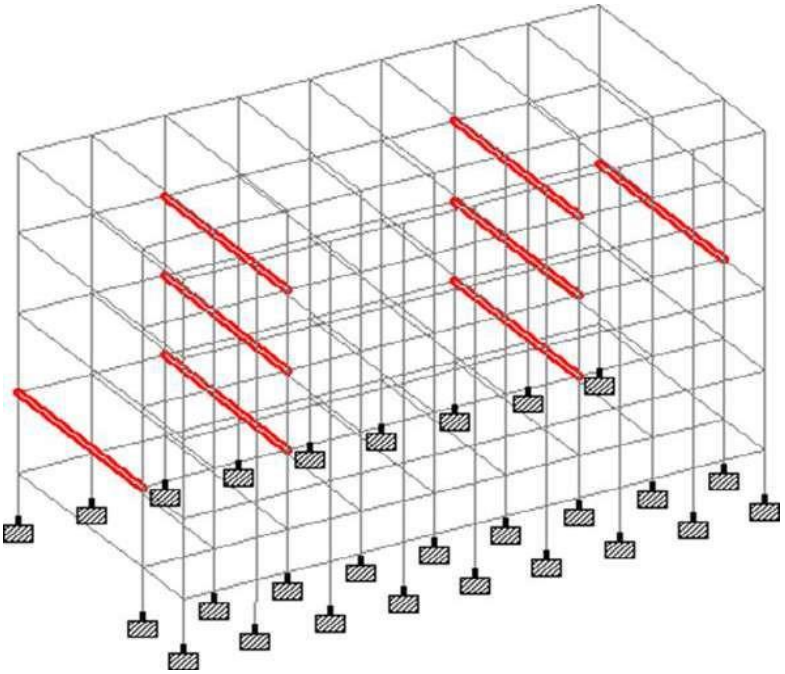


Fig. 14.12 BEAMS FAILING IN SHEAR CAPACITY

CHAPTER-15 Sustainable features of Chapter 8 & 13 designs, Impact on society.

Sr. No	Design Name	Estimated Cost	Duration (months)	Requirement	Benefits
1	Roof Top Rain Water Harvesting	2,53,614 ₹	1-2	Within 1 year	- Utility storage water
2	Bus Stand	31,334.28 ₹	1-2	Within 1 year	- For easier transportation
3	Aganwadi	9,27,358.00 ₹	3	Within 1 year	- Education and supplementation, as well as pre-school activities
4	Public Garden	17,72,414.92 ₹	3-4	Long term (3-5 years)	- Recreational facility
5	ATM	1,15,909.70 ₹	1	Immediately	- Emergencies that require monetary exchange
6	Entrance Gate	10,33,496.70 ₹	1-2	Long term (3-5 years)	- Aesthetic and heritage
7	Fish Market	5,83,510.90 ₹	2	Within 1 year	- To easier selling, storage & etc.
8	Post office	2,76,380.00 ₹	2-3	Within 1 year	- For parcel service
9	Community Hall	44,74,36.23 ₹	6-7	Long term (3-5 years)	- To organise events
10	Library	3,27,562.00 ₹	2-3	Within 1 year	- Education
11	Over Head Reservoir	20,92,274.45 ₹	12-14	Immediately	- Water storage utility
12	Primary School Toilet	2,50,342.70 ₹	2-3	Immediately	- Sanitation

CHAPTER-18 Social Activities – Any Activates Planned By Students

Subject: Apology for not visiting the village due to this Covid – 19 pandemic.

Dear ma'am

I'm Taher Challawala leader of the group writing on behalf of our team in order to apologize for not visiting the village for social activities. We could not able to visit village for social activities and awareness regarding the project work because of this pandemic. We also asked sarpanch of village to allow us for visiting the village but he refused and said that currently they would not let anyone come from the outside of village. We try many times to visit the village for Current Project work DPR Part – II. For awareness camp, social activities, Survey and For Techno Economic Survey form. But we can't able to visit the village. We done our work by Telephonic conversation

Hope you understand our situation. Thank you for your invaluable support.